SPOKANE RIVER HYDROELECTRIC PROJECT

FERC No. 2545

Final Application for New License
Major Project—Existing Dam

VOLUME I
Exhibits A, B, C, D, F, G, and H

Avista Corporation
Spokane, Washington

July 2005

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

AVISTA CORPORATION SPOKANE RIVER HYDROELECTRIC PROJECT
FERC Project No. 2545

APPLICATION FOR NEW LICENSE FOR MAJOR PROJECT—
EXISTING DAM

18 CFR, PART 4, SUBPART F, SECTION 4.51

INITIAL STATEMENT

(1) Avista Corporation (Avista or Applicant), a corporation under the laws of the State of Washington and having its executive offices and principal place of business in Spokane Washington, applies to the Federal Energy Regulatory Commission (FERC or Commission) for a new license for the Spokane River Hydroelectric Project (Project) as described in the attached exhibits. The Project is currently designated as Project No. 2545 and consists of five hydroelectric developments (HED): Post Falls HED in Idaho and Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs, all four of which are located in Washington. Avista is seeking to obtain a new license for all five developments; however, the four developments located in Washington State would remain under one license and continue to be known as the Spokane River Hydroelectric Project. Post Falls HED, located in Idaho, would continue to operate, but under a separate license and would be known as the Post Falls Project. In this document we refer to it as Post Falls HED. The Applicant's existing license for the Spokane River Hydroelectric Project expires on August 1, 2007. Given the levels of expenditure proposed for each of these applications, Avista believes a license term of at least 40 years is appropriate.

Avista believes there are compelling reasons for the issuance of separate licenses for Post Falls HED and the four downstream developments that would remain as the Spokane River Project. The licensing issues that have been raised with respect to Post Falls HED and the Spokane River developments are very distinct, and there may be a greater likelihood that those issues can be resolved more quickly for the latter developments than they can for Post Falls HED. Although several of the commentors indicated a preference for a single license, the actual comments on the open licensing issues tended to reinforce Avista's views that there are considerable differences between the issues relating to Post Falls HED and those relating to the downstream developments. If necessary, license conditions can be imposed, as they have been in other FERC licensing cases, to ensure coordination of separately licensed project on the same river system.

The following license application has been prepared in accordance with Chapter 18 of the Code of Federal Regulations (CFR) Sections 4.32, 4.34, 4.51, 16.8, and 16.10

(2) The proposed location of the Spokane River Project under a new license is:

State:	Washington
Counties:	Spokane, Stevens, and Lincoln
Nearby Town:	Spokane, Washington
Stream:	Spokane River

(3) The exact name and business address of the Applicant are:

Avista Corporation
P.O. Box 3727
1411 E. Mission Avenue
Spokane, WA 99220-3727
(509) 489-0500

The exact name and business address of each person authorized to act as agent for the Applicant in this application are:

Agent: Bruce Howard
Avista Corporation
P.O. Box 3727
1411 E. Mission Avenue
Spokane, WA 99220-3727
(509) 489-0500

(4) The Applicant is a domestic corporation organized under the laws of the State of Washington and is not claiming preference under Section 7(a) of the Federal Power Act.

(5)(i) The statutory or regulatory requirements of the State of Washington, in which the Project is located, that affect the Project with respect to beds and banks and to the appropriation, diversion, and use of water for power purposes, and with respect to the right to engage in the business of developing, transmitting, and distributing power and in any other business necessary to accomplish the purposes of the license under the Federal Power Act, are:

- Chapter 90.03, Revised Codes of Washington, governs the appropriation, diversion, and use of water for hydropower generation.

- Sections 90.16.050, 90.16.060, and 90.16.090 of the Revised Codes of Washington empower the Washington Department of Ecology (WDOE) to assess a power production license fee.

- Public Law 92-500, Public Law 95-217, Revised Code of Washington 90.48, and Washington Administrative Codes 173.201 and 173.225 define the requirements of Water Quality Certification.

- Chapter 80.01.040, Revised Codes of Washington, empowers the Washington Utilities and Transportation Commission to regulate in the public interest the rates, services, facilities, and practices of all persons engaging in the supply of any utility service or commodity to the public for compensation, including electrical companies.

(ii) Avista is an electric utility organized under the laws of the State of Washington, in good standing with the Washington Secretary of State's Office, authorized to develop, transmit, and distribute power within its service territory in the states of Washington and Idaho. Avista has taken or plans to take the steps described below to comply with each of the cited laws.

Avista has been authorized by the Washington State Utilities Commission to provide electric service in the state of Washington.

Avista operates the Project in a manner consistent with the water rights issued by the State of Washington. Avista holds non-consumptive water rights for power generation of 2,600 cubic feet per second (cfs) at Upper Falls HED; 2,900 cfs at Monroe Street HED; 6,500 cfs at Nine Mile HED; and 6,300 cfs at Long Lake HED.

An entity claiming the right to use water for power development is required to pay an annual power license fee to the State of Washington. Avista currently pays this annual fee and will continue to do so while appropriating water for power generation.

Avista will request Water Quality Certifications, as required by the Clean Water Act of 1977, from Washington Department of Ecology to cover the term of a new license for the Project.

(6) The owner of all existing Project facilities is:

Avista Corporation
P.O. Box 3727
1411 E. Mission Avenue
Spokane, WA 99220-3727
(509) 489-0500

The following information is submitted as part of this Application for New License for Major Project—Existing Dam for the Project pursuant to the requirements of 18 CFR § 4.32:

(7) To the best of Avista's knowledge, no person, citizen, association of citizens, domestic corporation, municipality, or state other than the Applicant has or intends to maintain any proprietary rights necessary to operate and maintain the existing Project.

(8)(i) The names and mailing addresses for every county in which any part of the Project is located are:

Spokane County 1116 West Broadway Avenue Spokane, WA 99201-2004	Stevens County 215 S. Oak Street, Room 214 Colville, WA 99114-2862

Lincoln County
450 Logan Street
P.O. Box 32
Davenport, WA 99122-0000

The Project does not involve the use of any federal facility.

(ii) In Washington State, the Spokane River flows through the metropolitan area of the city of Spokane, which has a population of approximately 200,000 (2000 U.S. Census data). Both Monroe Street and Nine Mile HEDs are located within the Spokane city limits. The address for the City of Spokane is:

City of Spokane
808 W. Spokane Falls Boulevard
Spokane, WA 99201

a. No part of the Project is located within any irrigation district, drainage district, or similar special purpose political subdivision. No irrigation district, drainage district, or similar special-purpose political subdivision owns, operates, maintains, or uses any Project facilities.

b. The names and addresses of other towns in the general area of the Project that there is reason to believe are interested in or affected by this application are included below. Although not formally defined as political subdivisions, communities such as Nine Mile and Tum Tum have shown an interest in the relicensing of the Spokane River Project; federal, state, and local agencies that have a regulatory responsibility for resources found in the Project area and have been active stakeholders throughout the process have also shown interest.

City of Spokane Valley
11707 E. Sprague, Suite 106
Spokane Valley, WA 99206

City of Liberty Lake
22710 E. Country Vista Boulevard
Liberty Lake, WA 99019

(v) The names and mailing addresses of Indian Tribes that may be affected by the Project and that are actively involved in the relicensing process through participation in the Cultural Resources Work Group, the Plenary Work Group, other resource-specific work groups or that expressed a continued interest in the relicensing activities, are:

Coeur d'Alene Tribe of Indians
P.O. Box 408
Plummer, ID 83851

Spokane Tribe of Indians
P.O. Box 100
Wellpinit, WA 99040

Colville Confederated Tribes
P.O. Box 150
Nespelem, WA 99155

Kalispel Tribe of Indians
P.O. Box 39
Usk, WA 99180

(9) The following exhibits will be filed as part of the Spokane River Hydroelectric Project Application for New License for Major Project—Existing Dam:

Exhibit A—Description of the Project

Exhibit B—Project Operation and Resource Utilization

Exhibit C—Construction History and Proposed Construction Schedule

Exhibit D—Original Project Costs and Financing

Exhibit E—Environmental Report[1]

Exhibit F—General Design Drawings[2]

Exhibit G—Maps of the Project

Exhibit H—General Information

[1] The environmental report is titled the *Spokane River Hydroelectric Project, FERC No. 2545, Applicant-Prepared Preliminary Draft Environmental Assessment* and was prepared in compliance with the Commission's regulations for an alternative licensing process under 18 CFR § 4.34(i). The Applicant-prepared Preliminary Draft Environmental Assessment (PDEA) is submitted under separate cover.

[2] The content of this exhibit is considered non-public under Commission Order No. 630, Critical Energy Infrastructure Information.

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The foregoing INITIAL STATEMENT and attached exhibits and the PDEA are hereby made a part of this Application for New License for Major Project—Existing Dam.

IN WITNESS WHEREOF Applicant has caused its name to be hereunto signed by Bruce F. Howard, its License Manager, and attested to by Susan Miner, its Assistant Corporate Secretary, all thereunto duly authorized this 26th day of July 2005.

By ______________________

ATTEST:

By Susan Y. Miner

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Verification

This Application for New License for Major Project—Existing Dam is executed in the

State of Washington
City of Spokane
County of Spokane

Bruce F. Howard, being first duly sworn, deposes and says that he is License Manager of Avista Corporation, the applicant in the proceeding entitled above, that he has read the foregoing application and knows the contents thereof, that the same are true of his own knowledge.

AVISTA CORPORATION

By ________________________

Avista Corporation

SUBSCRIBED AND SWORN to before me, this 26th day of July, 2005.

(NOTARIAL SEAL)

Sue Miner

Print Name: Sue Miner

Notary Public in and for the State of Washington,
residing at Spokane, Washington

My commission expires: 8-20-2007

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ACRONYMS AND ABBREVIATIONS

AC	alternating current
AFUE	annual fuel utilization efficiency
aMW	average megawatt
Applicant	Avista Corporation
Btu	British thermal unit
CAA	Community Action Agency
CD	compact disc
CEII	Critical Energy Infrastructure Information
CCCT	combined-cycle combustion turbine
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO_2	carbon dioxide
Commission	Federal Energy Regulatory Commission
DC	direct current
DSM	Demand-Side Management
EAP	Emergency Action Plan
EF	efficient fuel
FERC	Federal Energy Regulatory Commission
GCC	Generation Control Center
gpm	gallon per minute
GWh	gigawatt-hour
HED	hydroelectric development
HSPF	heating seasonal performance factor
HVAC	heating, ventilation and air conditioning
IDFG	Idaho Department of Fish and Game
kV	kilovolt
kVA	kilovolt ampere
kW	kilowatt
kWh	kilowatt-hour
MW	megawatt
MWh	megawatt-hour
NEAA	Northwest Energy Efficiency Alliance
NIP	Non-Internet Public
NRDC	Natural Resources Defense Council
NWPPC	Northwest Power Planning Council
O&M	operation and maintenance
PDEA	Preliminary Draft Environmental Assessment
PME	protection, mitigation, and enhancement
PNCA	Pacific Northwest Coordination Agreement
Project	Spokane River Hydroelectric Project
rpm	revolutions per minute
SCCT	simple-cycle combustion turbine
SEER	seasonal energy efficiency ratio
Therm	100,000 Btus
USGS	U.S. Geological Survey

WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology

EXHIBIT A—DESCRIPTION OF THE PROJECT

A.1 General Description and Location of the Spokane River Project

The Spokane River Hydroelectric Project (Project) is owned and operated by Avista Corporation (Avista) and operates under a license issued by the Federal Energy Regulatory Commission (Commission or FERC) as Project No. 2545. The Project as currently licensed consists of five hydroelectric developments (HED) located on the Spokane River in northern Idaho (Kootenai and Benewah counties) and eastern Washington (Spokane, Stevens, and Lincoln counties). Through the relicensing process, Avista is seeking to obtain a separate license for the eastern-most HED, Post Falls, which is the only Project HED located in Idaho. This license application describes the four HEDs located in Washington State and the operations of all four HEDs. The information about Post Falls HED is contained in a separate license application filed concurrently with this license application and the accompanying preliminary draft environmental assessment (PDEA).

The Spokane River originates at the outlet of Coeur d'Alene Lake in Idaho and flows westerly approximately 111 miles to the confluence with the Columbia River in eastern Washington (which is now within Lake Roosevelt, the impoundment created by Grand Coulee Dam). The four developments (upstream to downstream) proposed as the new Spokane River Project are Upper Falls (river mile 74.2), Monroe Street (river mile 74), Nine Mile (river mile 58), and Long Lake (river mile 34). The Project has a combined installed capacity of 122.92 megawatts (MW). Post Falls HED, which is located at river mile 102, has an installed capacity of 14.75 MW and brings the entire system capacity up to 137.67 MW.

Upper Falls HED is a run-of-river[3] facility consisting of a 366-foot-long, 35.5-foot-high dam across the north channel of the Spokane River; a 70-foot-long, 30-foot-high intake structure across the south channel; an 800-acre-foot reservoir; a 350-foot-long, 18-foot-diameter penstock; and a single-unit powerhouse with a generator nameplate capacity of 10 MW.

Monroe Street HED is a run-of-river facility consisting of a 240-foot-long, 24-foot-high dam; a 30-acre-foot reservoir; a 332-foot-long, 14-foot-diameter penstock; and an underground single-unit powerhouse with a generator nameplate capacity of 14.82 MW.

Nine Mile HED is a run-of-river facility consisting of a 466-foot-long, 58-foot-high dam; a 4,600 acre-foot reservoir; a 120-foot-long, 5-foot-diameter diversion tunnel; and a 4-unit powerhouse with a nameplate capacity of 26.4 MW.

Long Lake HED is a storage-type facility consisting of a 593-foot-long, 213-foot-high main dam; a 247-foot-long, 108-foot-high cutoff dam; a 148,500-acre-foot reservoir (gross storage); four 236-foot-long, 16-foot-diameter penstocks; and a 4-unit powerhouse with a nameplate capacity of 71.7 MW.

The four hydroelectric developments are further described in the sections that follow.

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[3] Run-of-river, as used here, means that water flow into the hydroelectric development reservoir is essentially equal to downstream outflow, and the reservoir water levels change little unless under flood conditions, operations and maintenance activities, or other unusual circumstance.

A.2 Upper Falls HED

A.2.1 Physical Composition, Dimension, and Configuration of Existing Structures

Upper Falls HED, located 28 river miles downstream of Avista's Post Falls HED, includes two dams located on either side of a natural island (Havermale Island) in the Spokane River. One of the dams includes a headgate structure and is located on the south channel (river mile 74.2). The second dam and control works structure (for water level and spill control) are located on the north channel (river mile 74.7). The remnant downstream channel on the south side of the island was filled in at an early date, most likely when a lumber mill was constructed next to the river, to facilitate access to Havermale Island.

A.2.1.1 Dams and Spillways

North channel dam is a 366-foot-long, 35.5-foot-high concrete gravity dam. The top of the dam is at elevation 1,878.9 feet. The dam includes a 290-foot-long spillway with a capacity of 38,000 cfs at water surface elevation 1,870.5 feet. The spillway has two 60-foot-wide, 16-foot-high rolling sector spillgates (where the spillway crest elevation is 1,854.9 feet) and four 42-foot-wide, 13-foot-high vertical lift gates (where the spillway crest elevation is 1,858.9 feet).

South channel dam is a 70-foot-long, 30-foot-high concrete gravity dam with an integral headgate structure. The top of the dam is at elevation 1,876.9 feet.

A.2.1.2 Power Intake and Water Conduit

South channel dam and headgate incorporates a 350-foot-long, 18-foot-diameter reinforced concrete penstock. The intake is controlled by three 11.8-foot-wide, 15-foot-high curtain headgates.

A.2.1.3 Powerhouse

The Upper Falls powerhouse is a 69-foot-long, 39-foot-wide reinforced concrete structure located on the south bank of the river. It houses a single turbine-generator unit with a generator nameplate capacity of 10 MW and a hydraulic capacity of 2,500 cfs.

A.2.2 Reservoir

The reservoir extends approximately 4 miles upstream of the south channel dam. The reservoir has a surface area of 150 acres at a normal full pool elevation of 1,870.5 feet. It has storage of 800 acre-feet with a maximum drawdown of 6 feet, although it is operated at a nearly constant level except during maintenance or emergencies.

A.2.3 Turbine Generator

Upper Falls HED has a single turbine-generator unit. The turbine is a Francis-type, vertical-shaft unit, initially installed in 1922. It has a hydraulic capacity of 2,500 cfs, a rated output of 14,250 horsepower, and a design head of 64 feet. It operates at 105.8 revolutions per minute (rpm). The generator has a nameplate rating of 10 MW.

A.2.4 Primary Transmission

There is no primary transmission line associated with Upper Falls HED. Power flows underground to Avista's downtown Post Street substation and into the underground electrical network serving the city of Spokane.

A.2.5 Appurtenant Mechanical, Electrical, and Transmission Equipment

Upper Falls HED has two 4.0/13.2-kilovolt (kV) transformers, both located at Post Street substation. Transformer Bank 1 is rated at 4,500 kilovolt amperes (kVA). Bank 2 is rated at 7,500 kVA.

A.2.6 Proposed New Structures and Facilities

No facility upgrades or structural changes are proposed at this time. Periodic maintenance of the entire facility will continue through the term of a new license.

A.3 Monroe Street HED

A.3.1 Physical Composition, Dimension, and Configuration of Existing Structures

Monroe Street HED is located about 1,000 feet downstream of Upper Falls HED. Monroe Street HED includes a single concrete gravity dam spanning the river, with an intake structure located adjacent to the south abutment of the dam. The powerhouse is located predominantly underground on the south shore of the Spokane River a short distance downstream of the dam.

A.3.1.1 Dam

The Monroe Street Dam is a 240-foot-long, 24-foot-high concrete gravity dam. The top of the dam is at elevation 1,806 feet. The dam incorporates a 217-foot-long ungated concrete overflow spillway with an estimated capacity of 70,000 cfs.

A.3.1.2 Power Intake and Water Conduit

The power intake adjacent to the dam's south abutment connects to a single 332-foot-long, 14-foot-diameter steel penstock.

A.3.1.3 Powerhouse

The Monroe Street powerhouse is a 92-foot-long, 49-foot-wide underground facility with a roof at ground level. It houses a single turbine-generator unit with an installed generating capacity of 14.82 MW and a hydraulic capacity of 2,850 cfs.

A.3.2 Reservoir

The reservoir extends approximately 0.2 mile upstream of the dam. The reservoir has a surface area of 5 acres at a normal full pool elevation of 1,806.32 feet. During prime public viewing hours, the reservoir elevation is held at 0.3 foot above normal full pool to provide a required 200-cfs minimum flow over the spillway, which enhances the aesthetic characteristics of lower Spokane Falls. The impoundment has storage (not usable) of 30 acre-feet.

A.3.3 Turbine Generator

Monroe Street HED has a single turbine-generator unit. The turbine is a Kaplan-type, vertical shaft unit, installed in 1992. It has a hydraulic capacity of 2,850 cfs, a rated output of 20,340 horsepower, and a design head of 74 feet. It operates at 200 rpm. The generator has a nameplate rating of 14.82 MW.

A.3.4 Primary Transmission

There is no primary transmission line associated with Monroe Street HED. The power flows underground directly into Avista's downtown Post Street substation and into the underground electrical network serving the city of Spokane.

A.3.5 Appurtenant Mechanical, Electrical, and Transmission Equipment

Monroe Street HED has a single-isolation 13.8-kV transformer, located at Post Street Substation. It is rated at 20,000 kVA.

A.3.6 Proposed New Structures and Facilities

No facility upgrades or structural changes are proposed at this time. Periodic maintenance of the entire facility will continue through the term of a new license.

A.4 Nine Mile HED

A.4.1 Physical Composition, Dimension, and Configuration of Existing Structures

Nine Mile HED lies 16 river miles downstream of Monroe Street HED and consists of a single dam and integral powerhouse and a sediment bypass tunnel installed in 1996.

A.4.1.1 Dam

The Nine Mile Dam is a 364-foot-long, 58-foot-high concrete gravity dam with an adjacent 102-foot-long reinforced concrete cutoff wall. The top of the dam is at elevation 1,596.6 feet. The dam accommodates two tiers of 5-foot-high flashboards. The dam incorporates a 225-foot-long ungated concrete overflow spillway with a capacity of 28,500 cfs at water surface elevation 1,606.6 feet.

A.4.1.2 Power Intake and Water Conduit

Nine Mile HED has four intakes integral to the face of the dam where water is fed to the turbines via steel and concrete bulkhead chambers.

Additionally, there is a 120-foot-long, 5-foot-diameter low-level bypass tunnel through the dam at the left side of the powerhouse. The tunnel is capable of passing a flow of 400 cfs at a water surface elevation of 1,606.6 feet.

A.4.1.3 Powerhouse

The Nine Mile powerhouse is a 139-foot-long, 80-foot-wide reinforced concrete facility integral to the dam. It houses four turbine-generator units with a combined installed generating capacity of 26.4 MW and a hydraulic capacity of 6,500 cfs.

A.4.2 Reservoir

The 4,600-acre-foot (gross storage) reservoir is approximately 6 miles long and has a surface area of 440 acres at a normal full pool elevation of 1,606.6 feet (with flashboards). It has storage of 3,130 acre-feet and a 16.6-foot maximum drawdown.

A.4.3 Turbine Generators

The Nine Mile powerhouse contains four turbine-generator units (Units 1–4).

Units 1 and 2 have Francis-quad-type horizontal-shaft hydraulic turbines that were initially installed in 1910 (Unit 1) and 1908 (Unit 2). Each turbine has a hydraulic capacity of 1,300 cfs, a rated output of 5,000 horsepower, and a design net head of 50 feet. The turbines operate at 240 rpm. The Unit 1 generator has a nameplate rating of 3.36 MW. The Unit 2 generator has a nameplate rating of 3 MW.

Units 3 and 4 have Francis-quad-type horizontal-shaft hydraulic turbines that were installed in 1994. Each turbine has a hydraulic capacity of 1,950 cfs, a rated output of 14,000 horsepower, and a design net head of 65 feet. The turbines operate at 327 rpm. Each generator has a nameplate rating of 10 MW.

A.4.4 Primary Transmission

There is no primary transmission line associated with Nine Mile HED. Power flows into the interconnected 115-kV transmission lines in the area and helps serve the load of the city of Spokane and the surrounding suburban development of Spokane County. The transmission interconnections are the 115-kV Devil's Gap-Nine Mile transmission line and the 115-kV Nine Mile-Westside transmission line.

A.4.5 Appurtenant Mechanical, Electrical, and Transmission Equipment

Nine Mile HED includes two step-up transformers. Transformer Bank 1 (serving Units 1 and 2) is a 2.3-to-60/115-kV transformer with a rating of 16,000 kVA. Bank 2 (for Units 3 and 4) is a 13.8/115-kV transformer with a 24,000-kVA rating.

A.4.6 Proposed New Structures and Facilities

Periodic maintenance of the entire facility and assessment of upgrade potential will continue through the term of a new license. Avista will evaluate replacing the flashboards with a more permanent feature such as a rubber dam. Assuming the flashboards are eventually replaced by a rubber dam, the pool level would not change, nor would operations change at Nine Mile HED other than that the flashboards would no longer be released downstream, and Avista would have the ability to restore the pool elevation somewhat more quickly after spill events.

A.5 Long Lake HED

A.5.1 Physical Composition, Dimension, and Configuration of Existing Structures

Long Lake HED is located 24 river miles downstream of Nine Mile HED. Long Lake HED includes an L-shaped, concrete gravity dam ("main dam") and adjacent intake structure; a concrete arch cutoff dam ("crescent dam") located along the western shoreline approximately 700 to 800 feet upstream of the main dam; a gated spillway along the top of the main dam; and a four-unit powerhouse.

A.5.1.1 Dam

The main dam is a 593-foot-long, 213-foot-high concrete gravity dam. The top of the dam is at elevation 1,537 feet. The main dam includes a 353-foot-long, gated ogee spillway with a crest elevation of 1,508 feet. The spillway has eight 25-foot-wide, 29-foot-high vertical lift gates and a capacity of 115,000 cfs at a water surface elevation of 1,536 feet.

The cutoff, or crescent, dam is a 247-foot-long, 108-foot-high concrete arch dam with a crest elevation of 1,537 feet.

A.5.1.2 Power Intakes and Water Conduits

There are four intake structures integral to the main dam connecting to four 236-foot-long, 16-foot-diameter riveted steel penstocks that traverse the downstream face of the dam.

A.5.1.3 Powerhouse

Located at the base of the dam, the T-shaped powerhouse consists of a 161-foot-long, 75-foot-wide generator section and a 207-foot-long, 56-foot-wide switchroom section. The powerhouse contains four turbine-generator units with a total generating capacity of 71.7 MW and a combined hydraulic capacity of 6,300 cfs.

A.5.2 Reservoir

The reservoir (commonly known as Lake Spokane) extends approximately 23.5 miles upstream of the main dam. It has a maximum depth of 180 feet and a 5,060-acre surface area at normal full pool elevation of 1,536 feet. The usable storage, at a maximum drawdown of 24 feet, is 105,080 acre-feet.

A.5.3 Turbine Generator

The powerhouse contains four turbine-generator units (Units 1–4). All four are double Francis-type, horizontal-shaft turbines with a hydraulic capacity of 1,575 cfs and a design net head of 168 feet. They operate at 200 rpm. Each unit has a rated output of 27,800 horsepower.

Unit 1, 2, and 3 generators are rated at 17.46 MW. The Unit 4 generator has a 19.21 MW rating.

A.5.4 Primary Transmission

An 0.81-mile-long, 115-kV transmission line and a 1.03-mile-long, 115-kV transmission line connect the power plant to the Devil's Gap substation.

A.5.5 Appurtenant Mechanical, Electrical, and Transmission Equipment

Long Lake HED includes five transformers: one each for Units 1 through 4 plus one spare transformer. Bank 1, Bank 2, and the spare transformer are 4.2/115-kV step-up transformers with 20,000-kVA ratings. Bank 3 and Bank 4 are 4.2/115-kV step-up transformers, also with 20,000-kVA ratings.

A.5.6 Proposed New Structures and Facilities

No facility upgrades or structural changes are proposed at this time. Periodic maintenance of the entire facility will continue through the term of a new license.

A.6 Federal Lands Within the Project Boundary

No federal lands lie within the boundary of the Spokane River Project.

A.7 Literature Cited

Avista (Avista Corporation). 2002. Initial Information Package for the FERC relicensing of the Spokane River Hydroelectric Project. FERC Project No. 2545. Avista Corporation, Spokane, WA. July 2002.

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EXHIBIT B—PROJECT OPERATIONS AND RESOURCE UTILIZATION

B.1 Project Operations

B.1.1 Plant Supervision

All four of the Spokane River hydroelectric developments are monitored or controlled by Avista personnel 24 hours a day, 365 days a year, either remotely by computer and/or by operations personnel when they are present at the hydroelectric development. For remote monitoring operation, the four hydroelectric developments and the Generation Control Center (GCC) communicate using a range of primary and backup communication means. The GCC monitors a number of conditions as well as security at each hydroelectric development; the ability to implement remote control over hydroelectric development operations varies by plant. In general, remote control is available for responding to emergency situations via intake and/or spill-gate control. In addition, Avista staff is always available to rove between the Spokane River hydroelectric developments and Post Falls HED, and additional staff members are on call for quick response.

B.1.2 Estimated Annual Plant Factor

Operations at Post Falls HED influence the four Spokane River Project HEDs because Post Falls HED is the most upstream facility and provides primary storage. Operations from 1993 through the present are representative of current Project operations at Long Lake HED. For a consistent comparison, we adopted the 11-year period from 1993 through 2003 to make the plant factor computation. Based on gross energy generation records (see Section B.2.2) and plant nameplate capability, the estimated average annual plant factors for calendar years 1993 through 2003 at each of the four Spokane River hydroelectric developments are summarized in Table B-1.

Table B-1. Spokane River Project average plant factor estimates.[a]

Development	Average Gross Generation (MWh)	Nameplate Capacity (MW)	Plant Factor (%)
Upper Falls	73,179	10.00	83.5
Monroe Street	96,120	14.82	74.0
Nine Mile	116,722	26.40	50.4
Long Lake	481,570	71.70	76.6
Total	767,591	122.92	71.2

[a] Based on calendar years 1993 through 2003. Values in 1993 and 1994 are estimated based on net generation records from FERC Form 1.

B.1.3 Operation during Low, Normal, and High Water Years

Long Lake HED has a reservoir that provides some operating flexibility under differing hydrologic conditions. Upper Falls, Monroe Street, and Nine Mile HEDs are run-of-river projects and operate in response to Spokane River flows. These flows are influenced by hydrologic conditions and the operations of Post Falls HED. The operations at Post Falls HED are described in a separate license application. Long Lake reservoir stage is either fixed at normal maximum pool or primarily a function of flow during spill events. Exceptions may occur during the summer when the pool may fluctuate up to 1 foot on some days to meet load, or during special maintenance operations.

Long Lake HED's reservoir operations were analyzed for years (August 1 through July 31) 1993 through 2002. Although most of our analysis of historical data are based on the years 1979 through 2002, this is the one exception because the drawdown for Lake Spokane was modified from a maximum of 24 feet to a target maximum of 14 feet on a voluntary basis by Avista in the early 1990s. At Long Lake HED, during normal or wet years, the reservoir is typically maintained at or nearly full throughout the year. Under drier hydrologic conditions (such as those shown for the 90 percent exceedance elevation), the reservoir may be drawn down to generate additional energy during winter months. Figure B-1 illustrates how the lake varied under dry (90 percent exceedance), normal (50 percent exceedance), and wet (10 percent exceedance) conditions from August 1992 through July 2002.

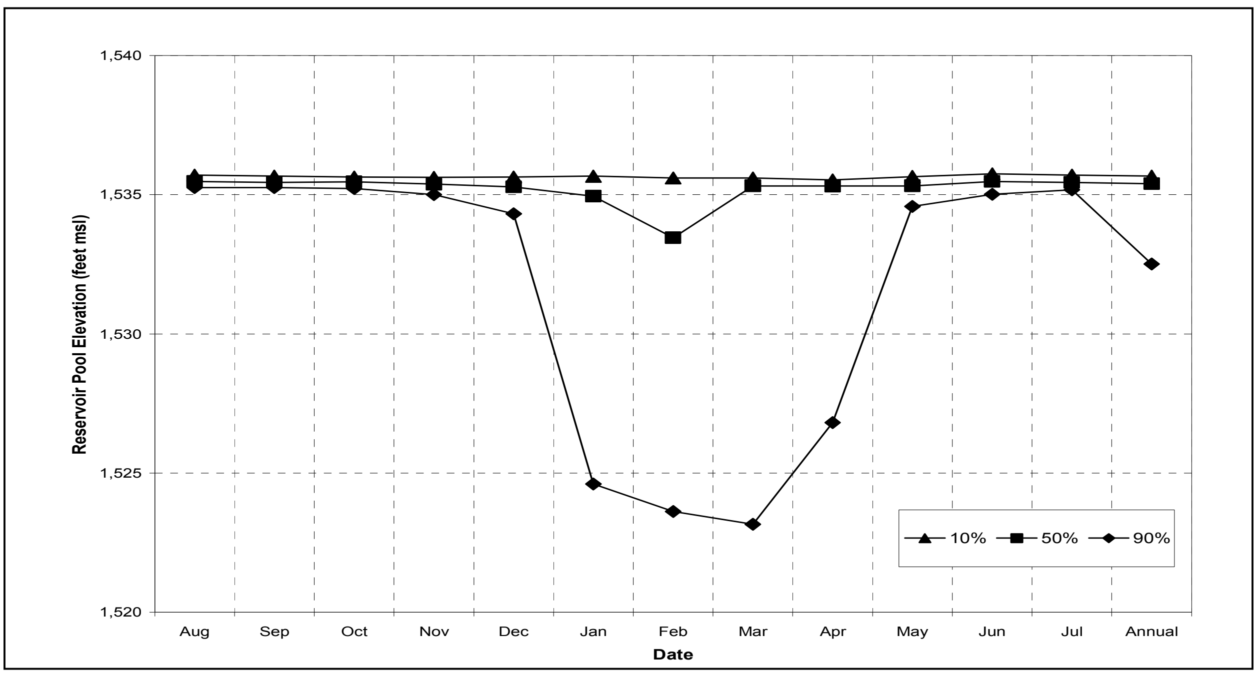

Figure B-1. Reservoir (Lake Spokane) operations at Long Lake HED under various water conditions. (Source: Adapted from Karpack, 2004)

B.2 Project Capacity and Production

B.2.1 Dependable Capacity

The dependable capacity is the average output that the Project can sustain to meet load requirements during a critical streamflow period. Winter daily peaks are typically from 6:00 a.m. to 10:00 a.m. and 5:00 p.m. to 9:00 p.m. Avista coordinates operation of the Spokane River Project with Post Falls HED and other generating plants operated by the parties to the Pacific Northwest Coordination Agreement (PNCA). Avista was one of the original signatories to the PNCA in 1964. The dependable capacity of the Spokane River Project under current Project operations is estimated to be 69.5 MW. The dependable capacity for each hydroelectric development is summarized in Table B-2. The estimate is based on simulating year 2001 (August 2000 through July 2001) hydrologic conditions and computing the average generation over that period. Year 2001 is the driest recent year on record.

Table B-2. Spokane River Project dependable capacity estimates.

Development	Dependable Capacity (MW)
Upper Falls	8.3
Monroe Street	9.9
Nine Mile	11.9
Long Lake	39.5
Total	69.6[a]

[a] Any variation in numbers is due to rounding.

B.2.2 Annual Generation

As discussed in Section B.1.2, the period of record best reflecting current Project operations is from 1993 through 2003. A full range of flow conditions was encountered during this period, and long-term generation during this period is reasonably representative of current Project operations.

At the Spokane River Project, annual historical gross generation during the 11-year period from water years 1993 through 2003 averaged 767,591 megawatt-hours (MWh), and station service (i.e., generation used at the power plant) averaged 3,534 MWh or about 0.50 percent of gross generation. The values for each of the four hydroelectric developments are summarized in Table B-3.

As described in Exhibit C, Avista has maintained and upgraded various developments over time. Avista used a computer simulation model, the “Spokane River Daily Model,” to account for these improvements and to better estimate average annual energy generation, flow, and reservoir elevations under current Project operations over a longer term. Avista also uses the model to evaluate potential measures affecting generation and to simulate the results of plant improvements. Avista has used modeled results in the PDEA to assess the effects of proposed measures on generation rather than the historical values presented in this section.

Table B-3. Spokane River Project historical average annual energy generation.[a]

Development	Average Gross Generation (MWh)	Average Net Generation (MWh)	Station Service Generation (MWh)
Upper Falls	73,179	73,019	159
Monroe Street	96,120	95,390	730
Nine Mile	116,722	116,363	359
Long Lake	481,570	479,284	2,286
Total	767,591	764,056	3,534

[a] Based on calendar years 1993 through 2003. Gross generation for 1993 and 1994 is estimated based on the net generation submitted on FERC Form 1. All net generation data are from FERC Form 1, and gross generation for 1995 through 2003 is from Avista's database.

B.2.3 Flow Data and Flow Duration Curves

Reasonable estimates of flow at three of the four Spokane River hydroelectric developments are readily available from a series of U.S. Geological Survey (USGS) gages along the Spokane River. Flow data are available at USGS Gage No. 12422500 (Spokane River at Spokane, WA) located at river mile 72.9 and 0.5 mile upstream of Hangman Creek and a short distance downstream from the Monroe Street powerhouse; and USGS Gage No. 12433000 (Spokane River at Long Lake, WA) located at river mile 33.88 and just downstream of the Long Lake HED powerhouse. Although the flow downstream of Nine Mile HED is not gaged, Avista has estimated the inflow to be approximately one-half the accretion between USGS Gage No. 12422500 and Lake Spokane. Additionally, Avista maintains records of reservoir elevations and content for Lake Spokane. Combining this information with knowledge of drainage areas and local hydrology enabled reasonable estimates of Project inflows. Reservoir data at Nine Mile HED do not exist in electronic format and are not as critical because it is operated as a run-of-river facility. Major changes in reservoir elevation occur only for periodic or special maintenance, or in conjunction with the release and replacement of flashboards, which varies each year.

Flow statistics for years 1979 through 2002 are summarized in Table B-4. The average inflow for the hydroelectric developments is consistent with longer-term flow records.

Table B-4. Spokane River Project average, minimum and maximum flow (1979–2002).

Development	Daily Average Flow (cfs)	Minimum Daily Flow (cfs)	Maximum Daily Flow (cfs)	Maximum Daily Flow (USGS Period of Record) (cfs)
Upper Falls and Monroe Street	6,215.4	473	42,200	49,000
Nine Mile	6,783	662	43,300	No USGS gage
Long Lake	7,351	90	44,700	49,700

The annual flow duration curves for each of the Spokane River Project hydroelectric developments for the period of record for years 1979 through 2002 are shown in Figures B-2 through B-4. The curves are truncated at 25,000 cfs for readability. As shown above, the actual maximum is 49,700 cfs at Long Lake HED, but 25,000 cfs is just over the 2 percent exceedance flow. Monthly flow duration curves for the same period (years 1979 through 2002) are provided in Appendix B-1 of this exhibit for both Upper Falls and Monroe Street HEDs, Appendix B-2 for Nine Mile HED, and Appendix B-3 for Long Lake HED. A single set of curves is provided for both Upper Falls and Monroe Street HEDs because the drainage area difference is inconsequential.

B.2.4 Reservoir Storage Curves

Long Lake HED has significant storage and provides some operational flexibility. Upper Falls and Monroe Street HEDs are run-of-river facilities, and reservoir operation curves are not applicable. At Nine Mile HED, there is some seasonal variation in storage due to the presence of flashboards. However, the development is operated as run-of-river, and, therefore, storage capacity is not utilized. Refer to Section B.2.4.1 below.

B.2.4.1 Nine Mile HED

Nine Mile HED has a normal full-pool elevation of 1,606.6 feet, which corresponds to an available storage volume of 3,130 acre-feet when both tiers of flashboards are in place. The minimum normal pool is 1,596.6 feet (spillway crest elevation) (Figure B-5).

B.2.4.2 Long Lake HED (Lake Spokane)

Lake Spokane has a normal full pool elevation of 1,536 feet, which corresponds to a storage volume of 105,080 acre-feet (Figure B-6). Currently, Avista may operate Long Lake HED at as low an elevation as 1,522 feet, which corresponds to a current active storage volume of 66,270 acre-feet. The hydroelectric development is licensed to operate down to a minimum pool elevation of 1,512 feet, which corresponds to a minimum active storage content of 0 acre-feet.

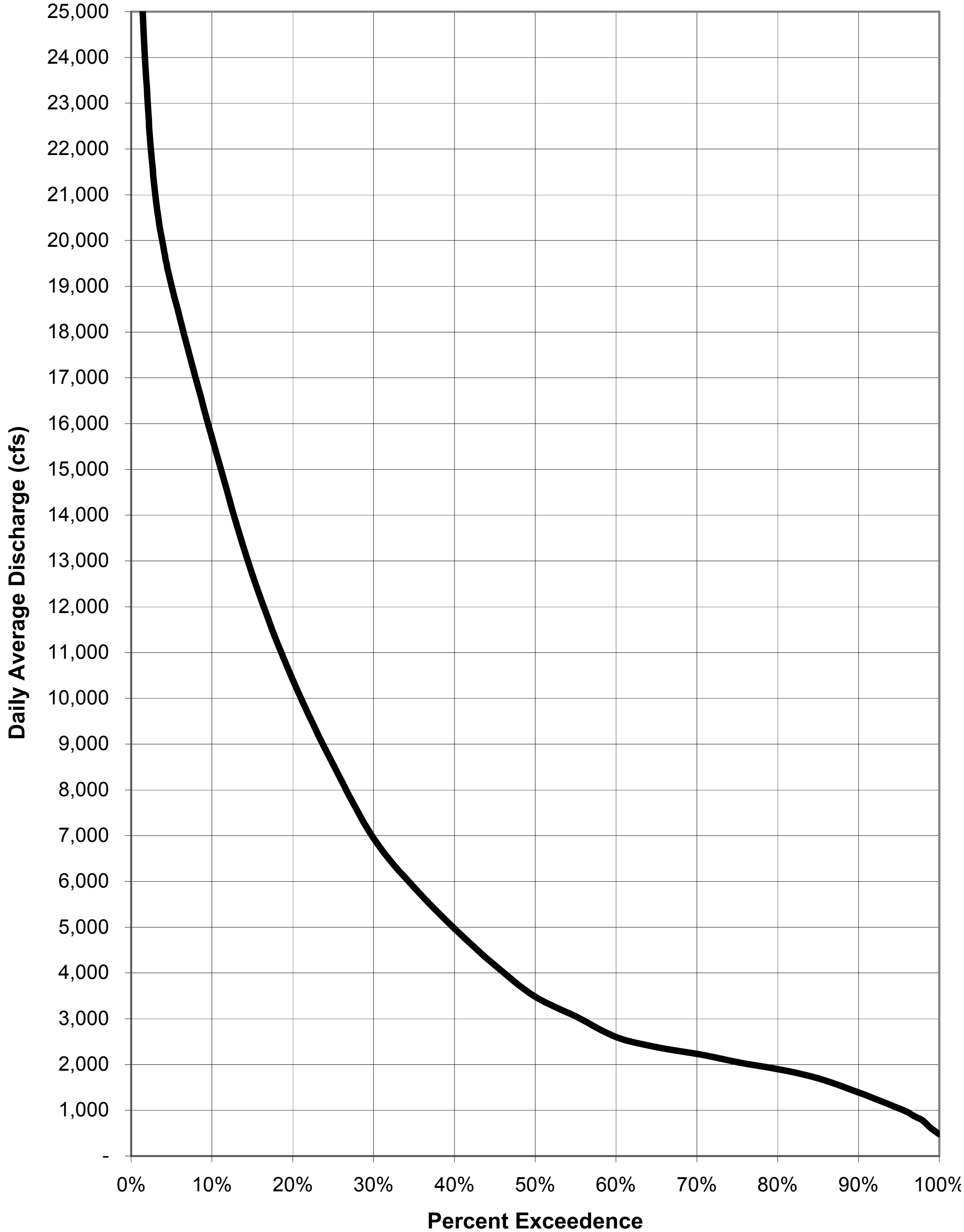

Figure B-2. Flow duration curve for daily average flows for Upper Falls and Monroe Street HEDs (years 1992 through 2002). (Source: USGS, 2005)

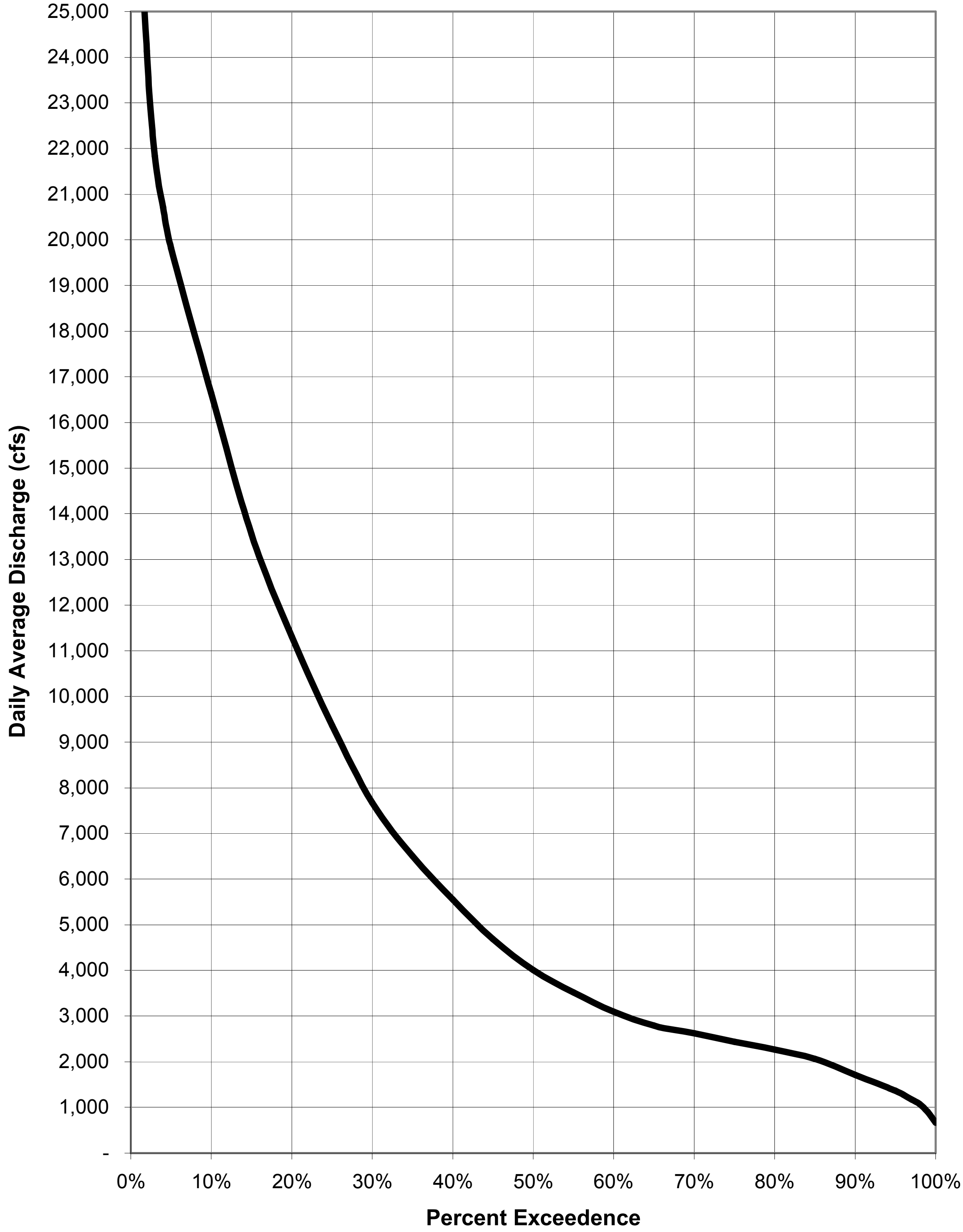

Figure B-3. Flow duration curve for daily average flows for Nine Mile HED (years 1979 through 2002). (Source: USGS, 2005; Karpack, 2004)

Figure B-4. Flow duration curve for daily average flows for Long Lake HED (years 1979 through 2002). (Source: USGS, 2005)

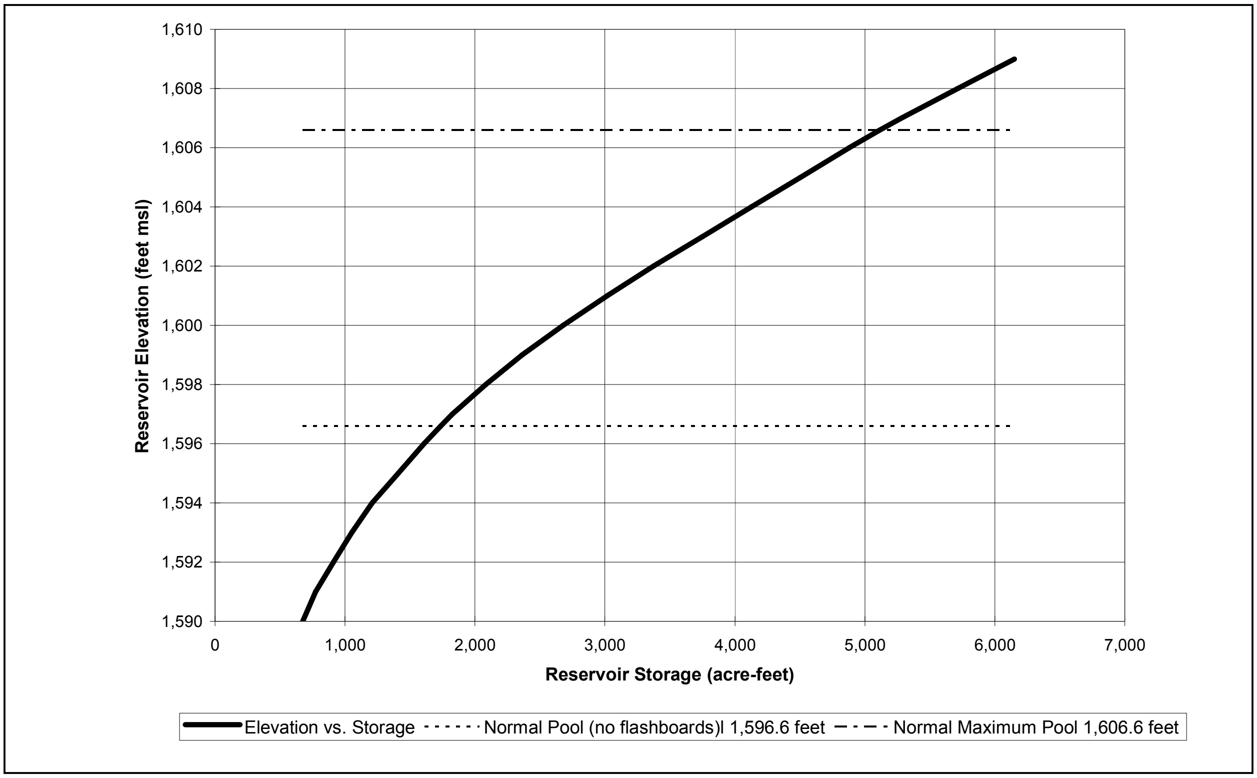

Figure B-5. Elevation vs. storage curve for Nine Mile Reservoir.

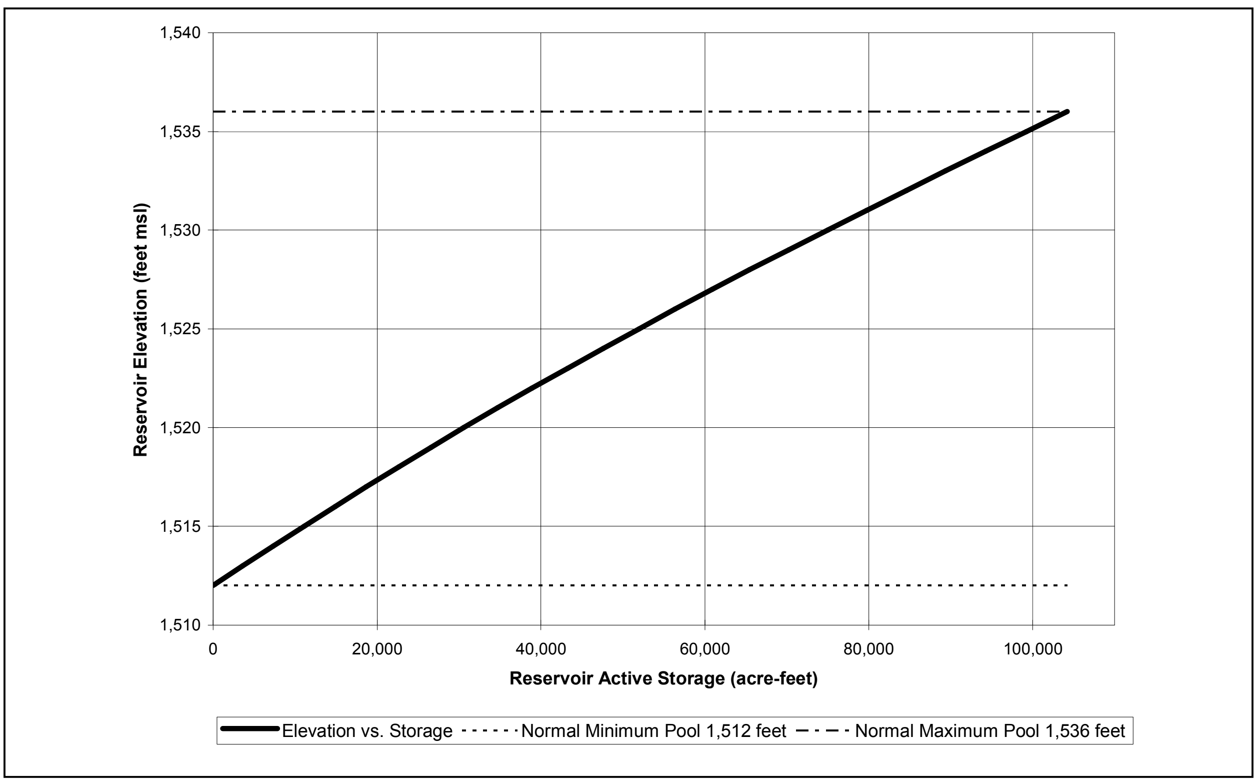

Figure B-6. Elevation vs. storage curve for Long Lake Reservoir.

B.2.5 Hydraulic Capacity

Each of the hydroelectric developments in the Spokane River Project has a minimum and maximum plant hydraulic capacity. The maximum capacity generally corresponds to the maximum gross head, while the minimum capacity generally corresponds to the minimum gross head. Table B-5 summarizes the maximum normal pool, minimum normal pool, and corresponding maximum and minimum hydraulic capacities at each hydroelectric development.

Table B-5. Spokane River Project maximum and minimum hydraulic capacity and corresponding pool levels.

Development	Maximum Normal Pool Elevation (feet)	Maximum Hydraulic Capacity (cfs)	Minimum Normal Pool Elevation (feet)	Minimum Hydraulic Capacity (cfs)
Upper Falls	1,870.5	2,500	Not typically drawn down	500
Monroe Street	1,806.3	2,850	Not typically drawn down	500
Nine Mile	1,606.6	6,500	1,596.6	500
Long Lake[a]	1,536	6,300	1,512	500

[a] Currently, Long Lake HED is normally not operated below elevation 1,522 feet; however, it is licensed to operate as low as elevation 1,512 feet.

B.2.6 Tailwater Rating Curve

Figures B-7 through B-10 illustrate the tailwater rating curve for each of the four Spokane River Project hydroelectric developments. The Upper Falls tailwater level is influenced by releases from the Upper Falls powerhouse, flow through the north channel control works, and the elevation of the forebay at Monroe Street HED.

The reach downstream of the Monroe Street powerhouse is free-flowing, and the tailwater at this location is affected by the discharge from the Monroe Street powerhouse, aesthetic spills, and any bypassed flows. The reach downstream of the Nine Mile powerhouse is free-flowing and is affected by both powerhouse releases and spills over the dam. The reach downstream of the Long Lake powerhouse is influenced by the release from the powerhouse, any spill at Long Lake Dam, and the backwater from the Little Falls Reservoir.

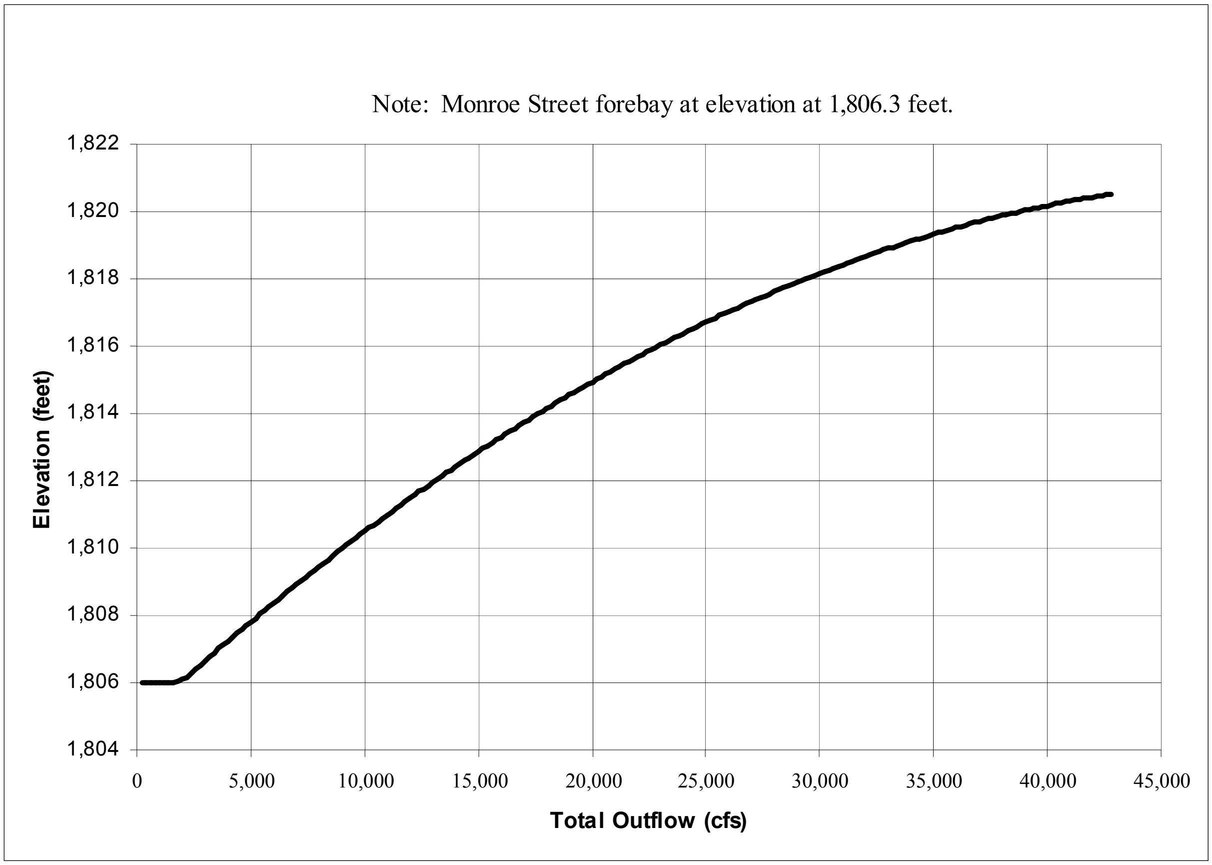

Figure B-7. Tailwater rating curve for Upper Falls HED.

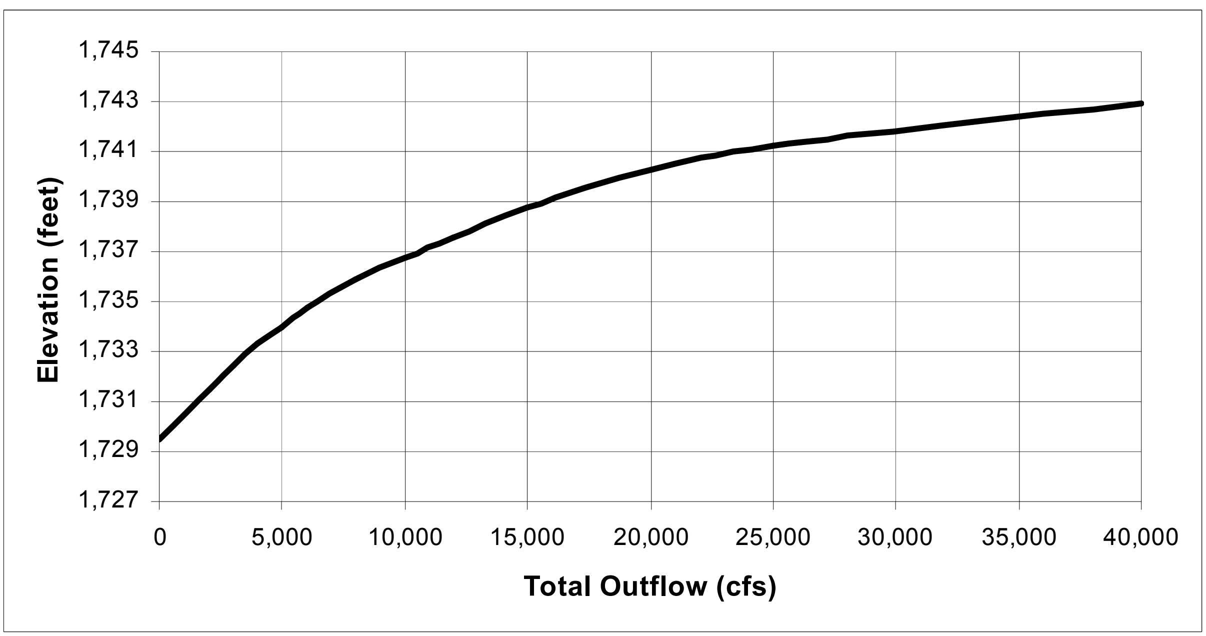

Figure B-8. Tailwater rating curve for Monroe Street HED.

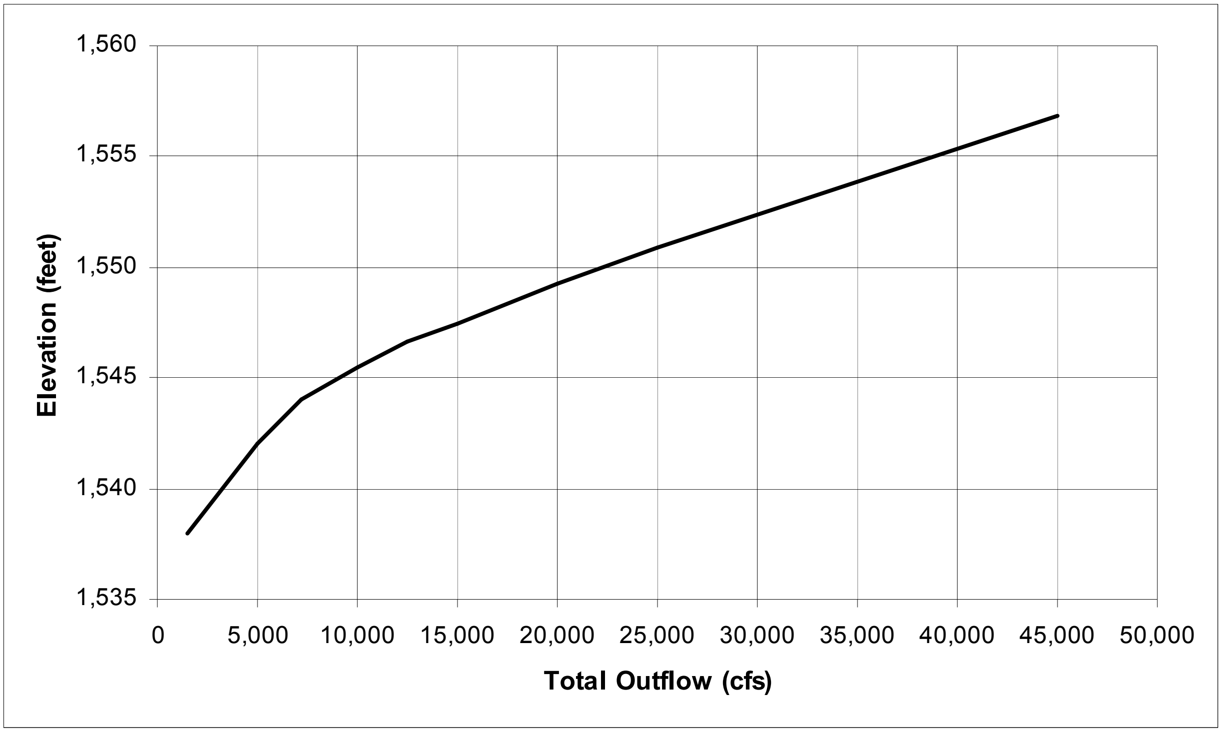

Figure B-9. Tailwater rating curve for Nine Mile HED.

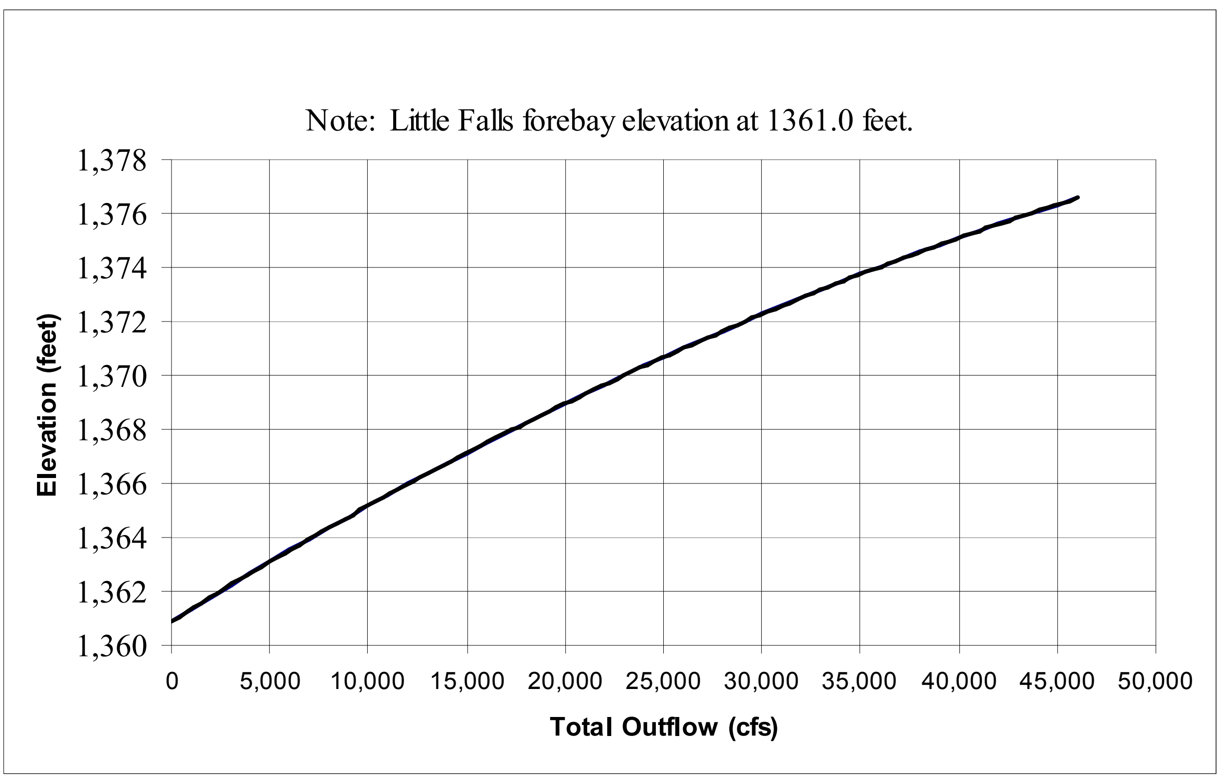

Figure B-10. Tailwater rating curve for Long Lake HED.

B.2.7 Power Plant Capacity versus Head Curve

Figures B-11 through B-14 illustrate the relationship between the output capacity of each of the Spokane River Project hydroelectric developments and the net head over the range of minimum to maximum head.

The maximum capacity of 10.2 MW at Upper Falls HED occurs when the net head is 65 feet. Monroe Street HED reaches its maximum capacity of 15 MW when the net head is 76 feet. During non-daylight hours, the Monroe Street pool level drops to elevation 1,806 feet, and the corresponding heads change 0.3 foot (Monroe Street loses head, but head is gained by Upper Falls). At Nine Mile HED, a maximum capacity of 26 MW corresponds to a net head of 67 feet. The maximum capacity of 88 MW occurs when net head at Long Lake HED is 175 feet.

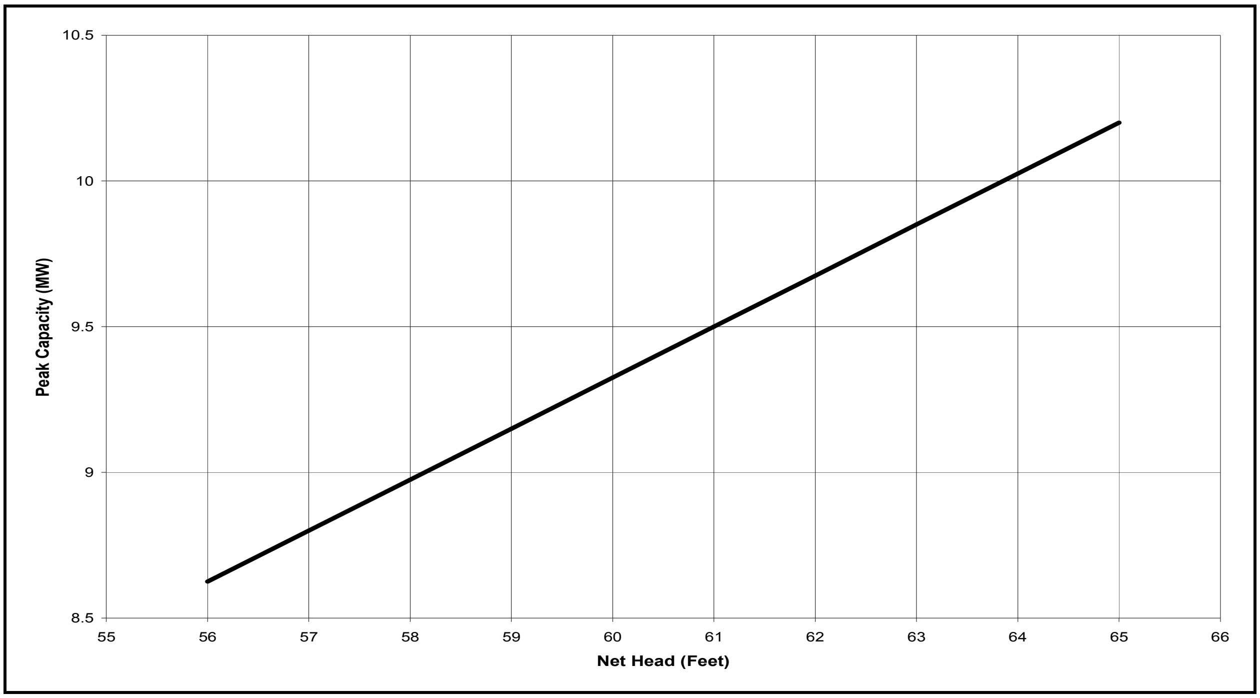

Figure B-11. Plant output versus net head for Upper Falls HED.

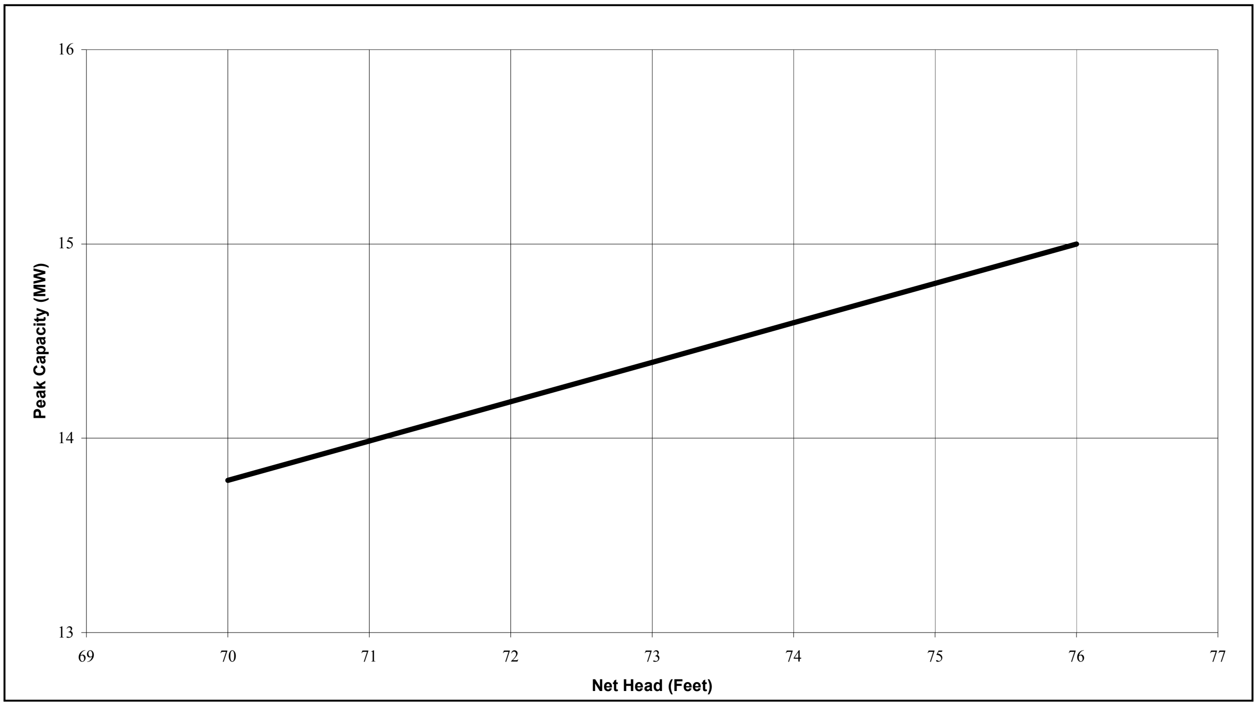

Figure B-12. Plant output versus net head for Monroe Street HED.

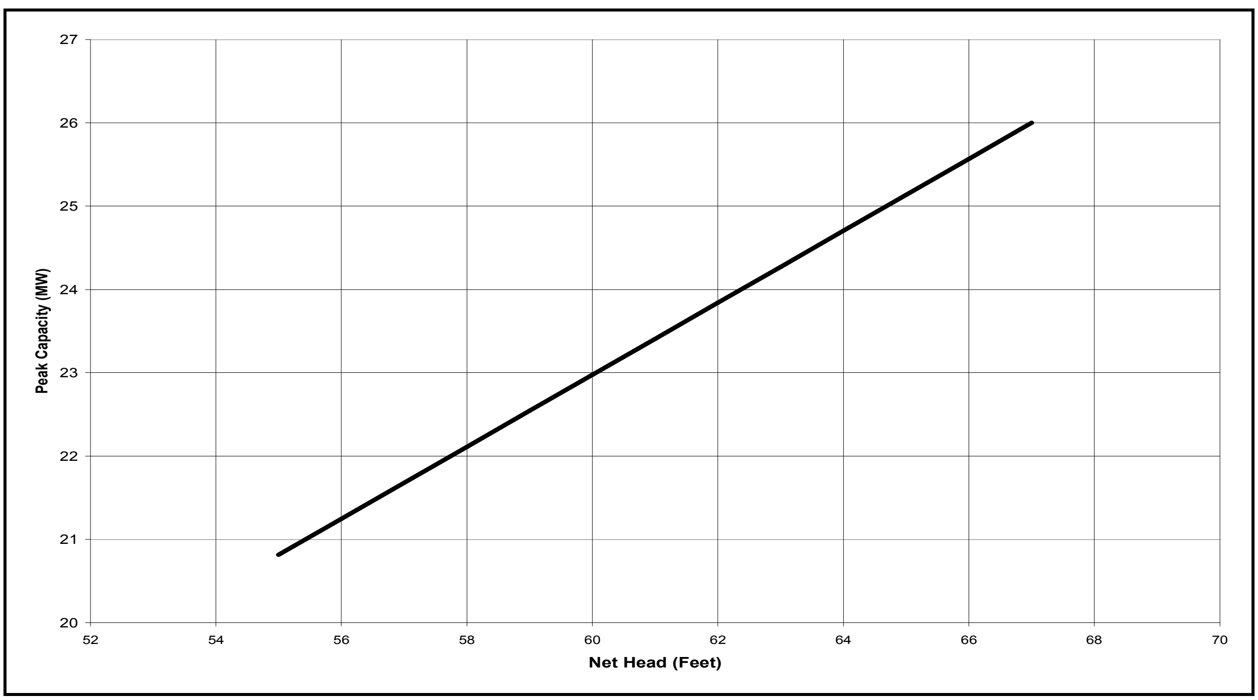

Figure B-13. Plant output versus net head for Nine Mile HED.

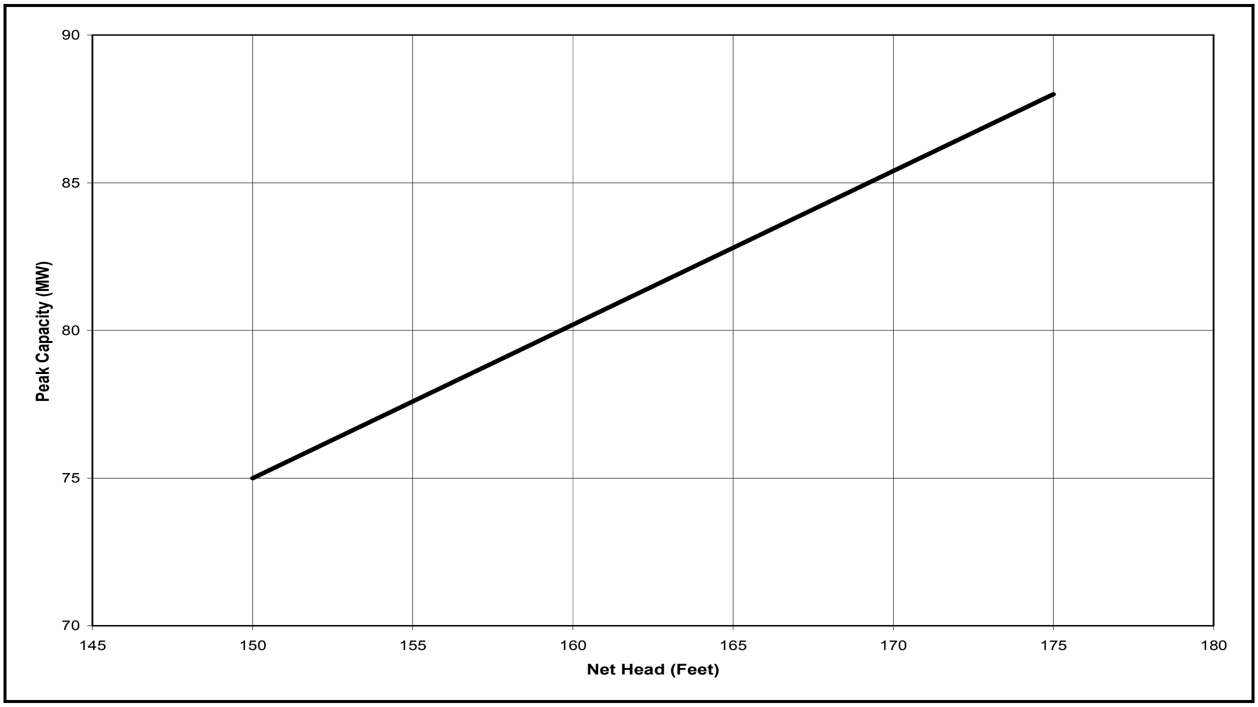

Figure B-14. Plant output versus net head for Long Lake HED.

B.3 Power Usage

Avista generally uses output from the Spokane River Project to meet system load. A portion of the Project output is used to meet station service requirements as described in Section B.2.2.

B.4 Future Development

Avista does not propose to develop any additional generating capacity within the Spokane River Project at the present time.

B.5 Literature Cited

Karpack, L. 2004. E-mail from L. Karpack, Principal, Northwest Hydraulic Associates, Kent, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 3, 2004.

USGS (U.S. Geological Survey). 2005. USGS NWISWeb data for the Nation web site. http://waterdata.usgs.gov/nwis, updated May 12, 2005, accessed January 26, 2005. U.S. Geological Survey.

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APPENDIX B-1

MONTHLY FLOW DURATION CURVES FOR UPPER FALLS AND MONROE STREET

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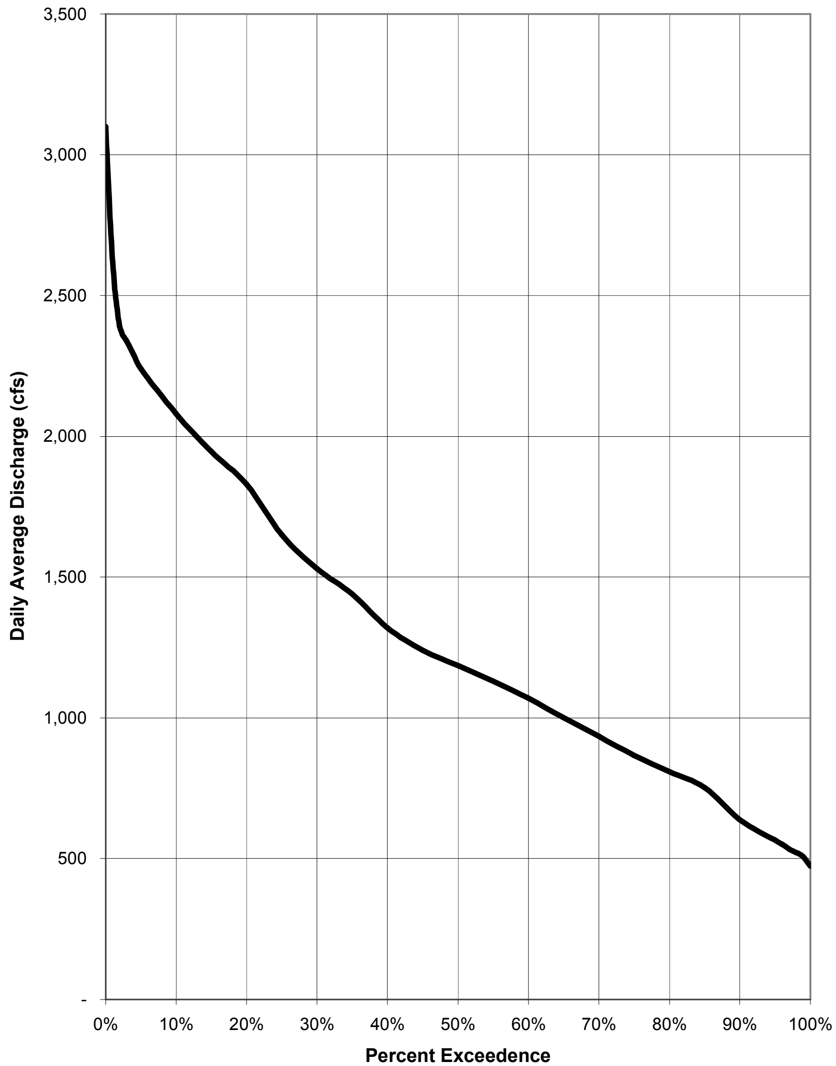

Figure B-1-1. August flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

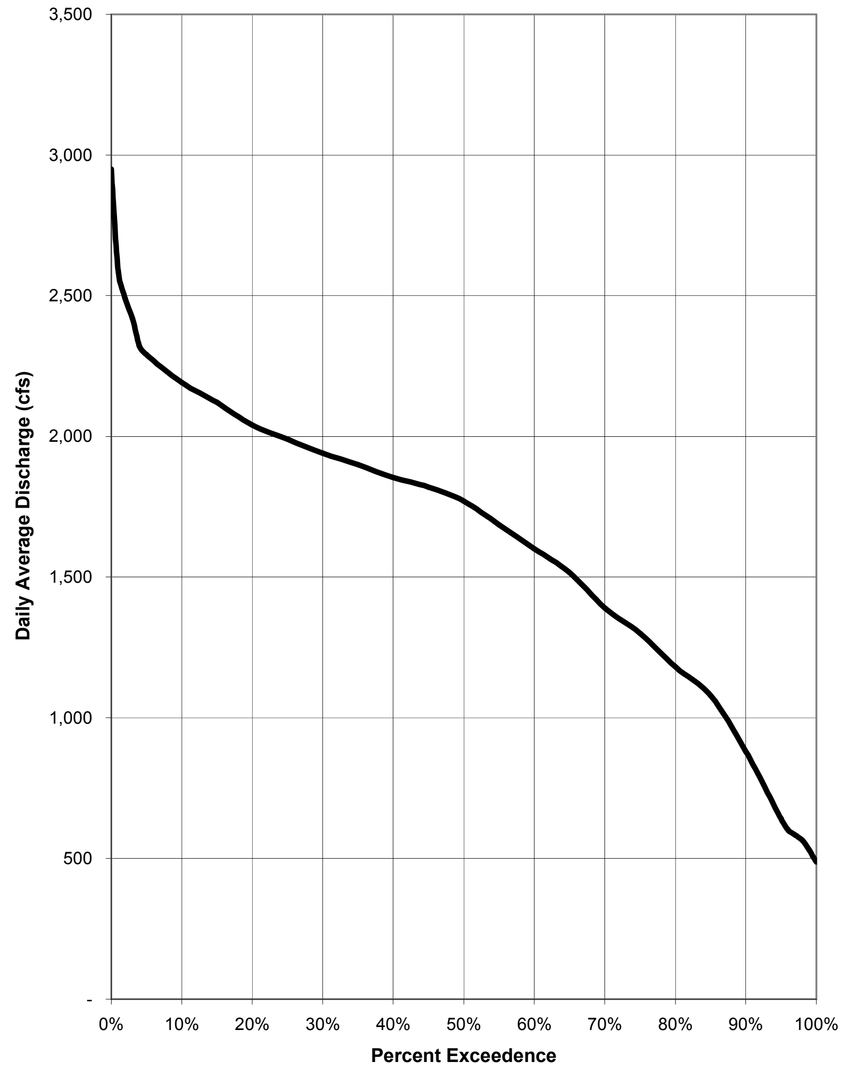

Figure B-1-2. September flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

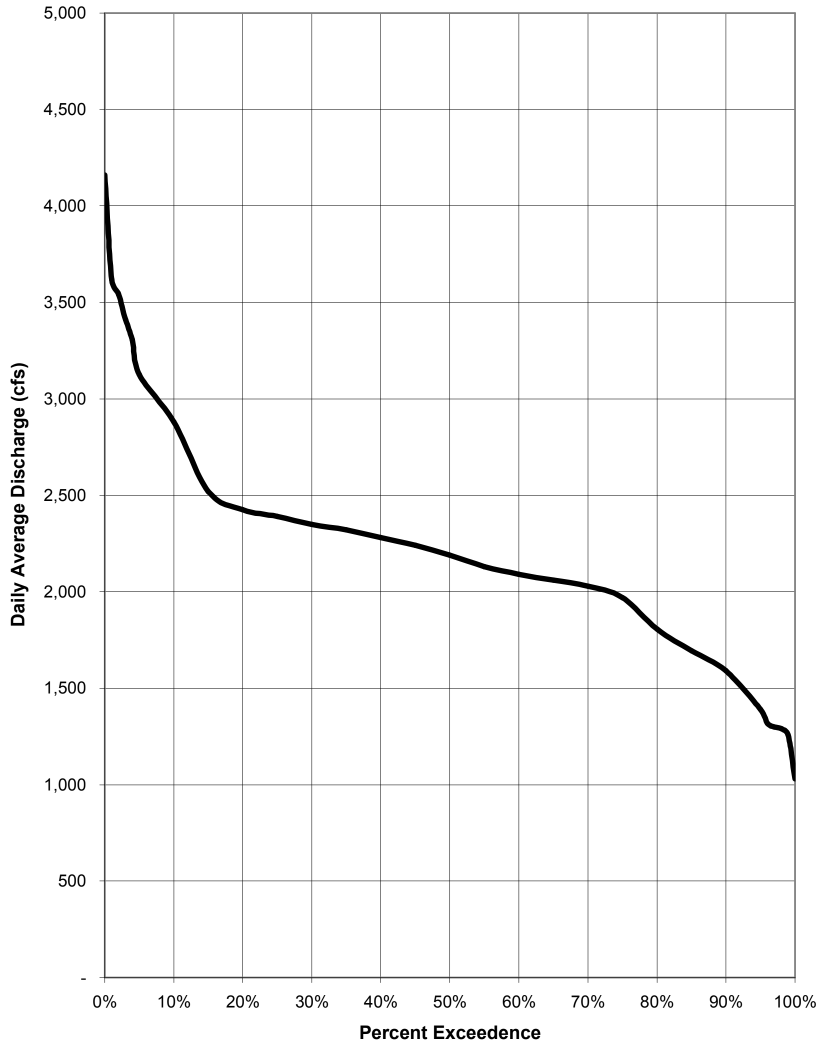

Figure B-1-3. October flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

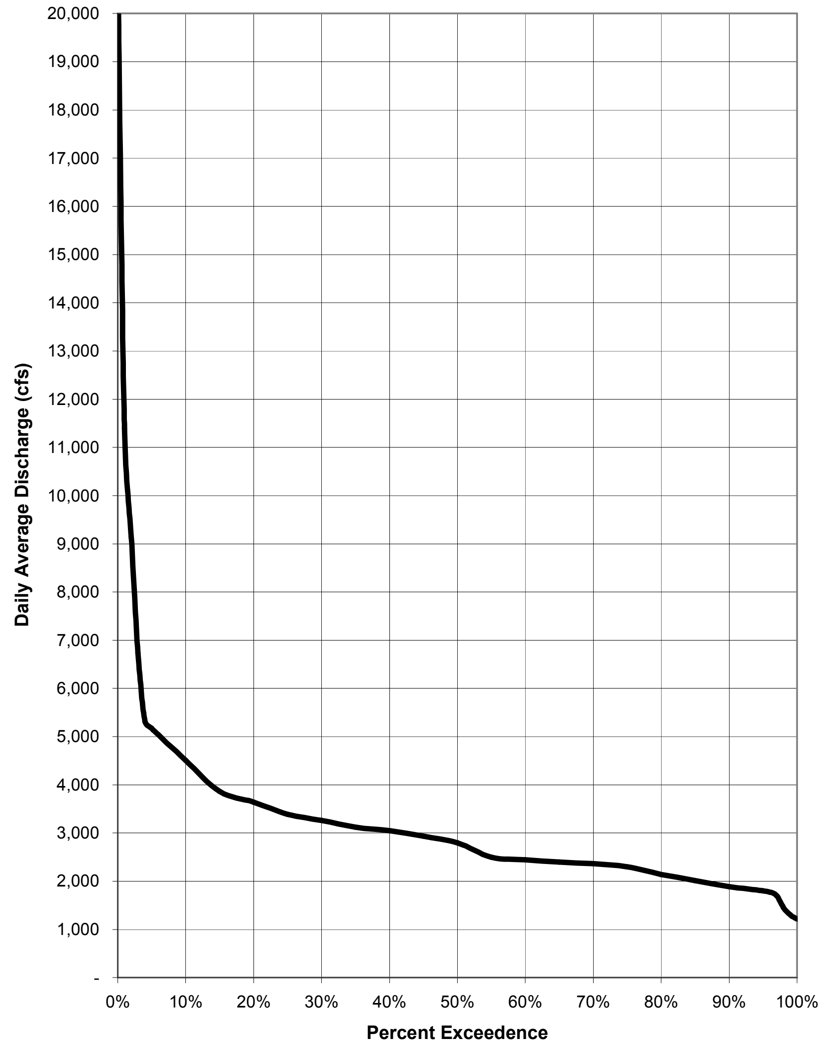

Figure B-1-4. November flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

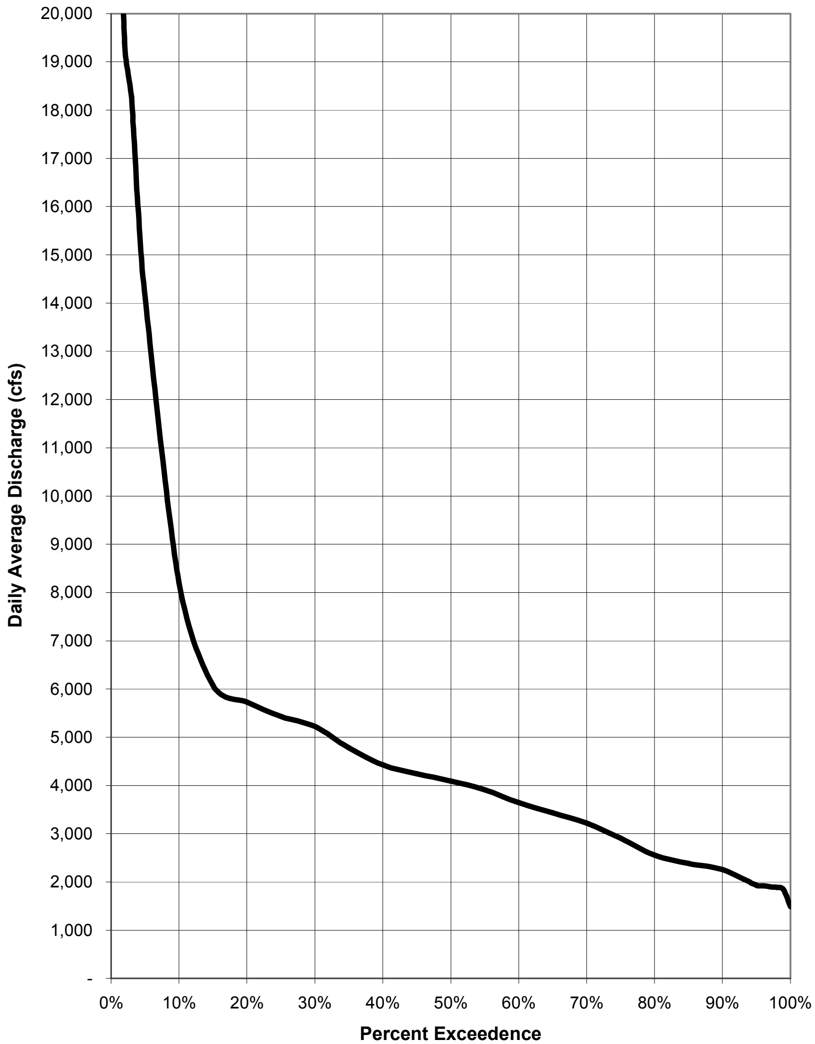

Figure B-1-5. December flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

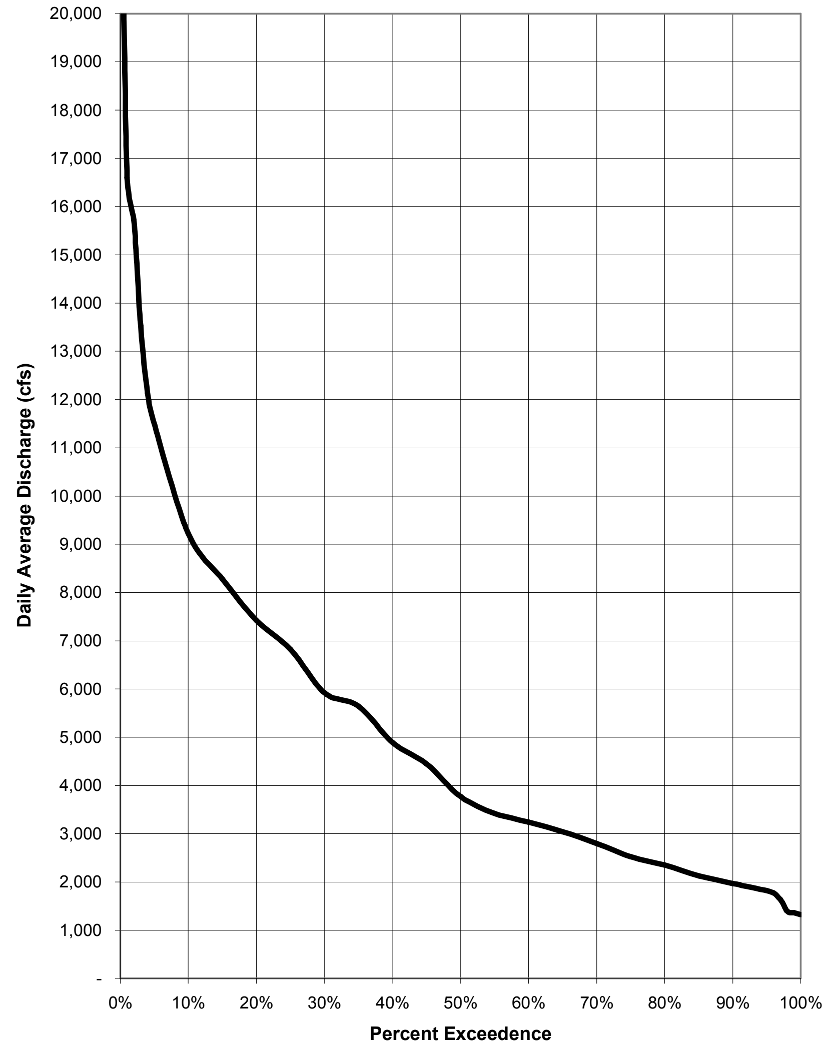

Figure B-1-6. January flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

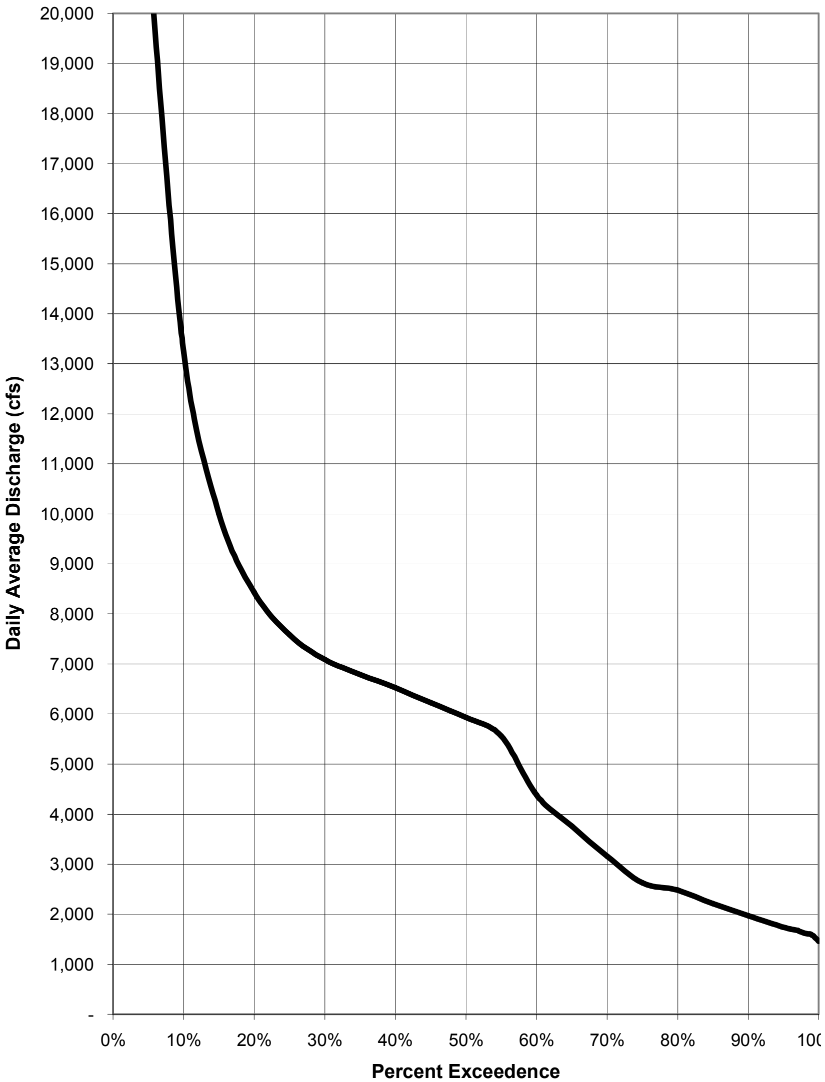

Figure B-1-7. February flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

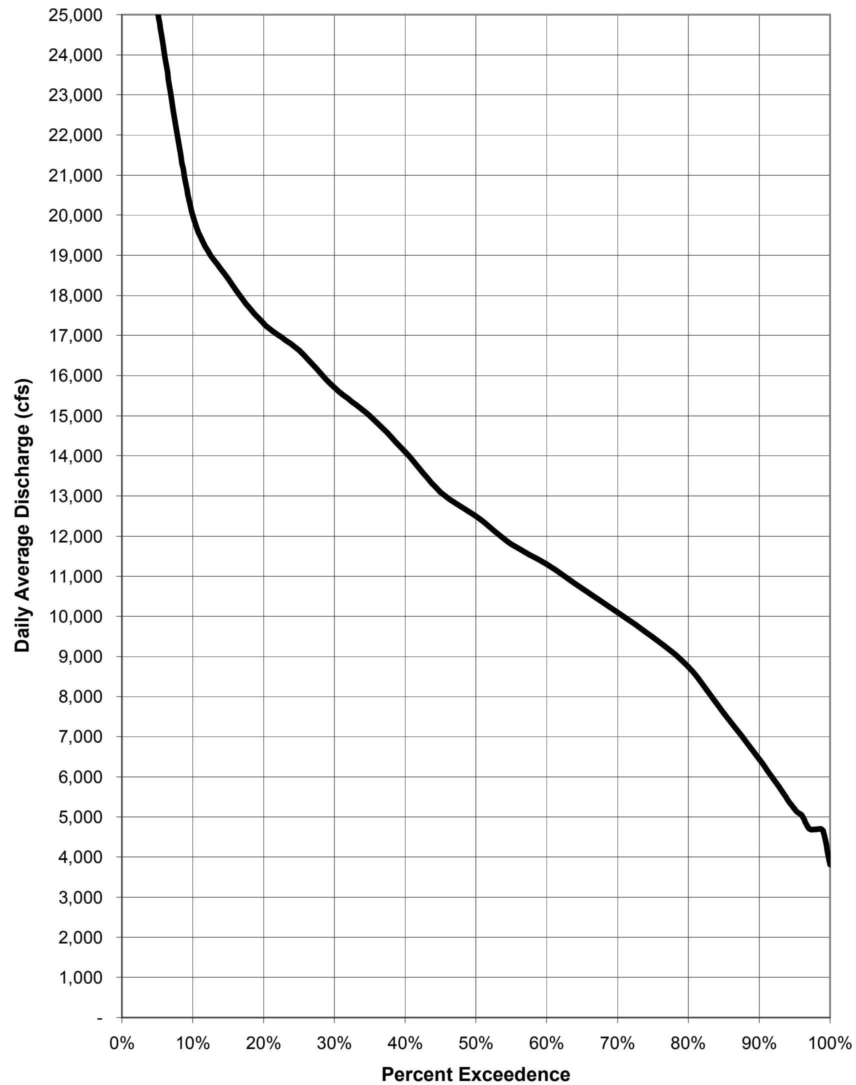

Figure B-1-8. March flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

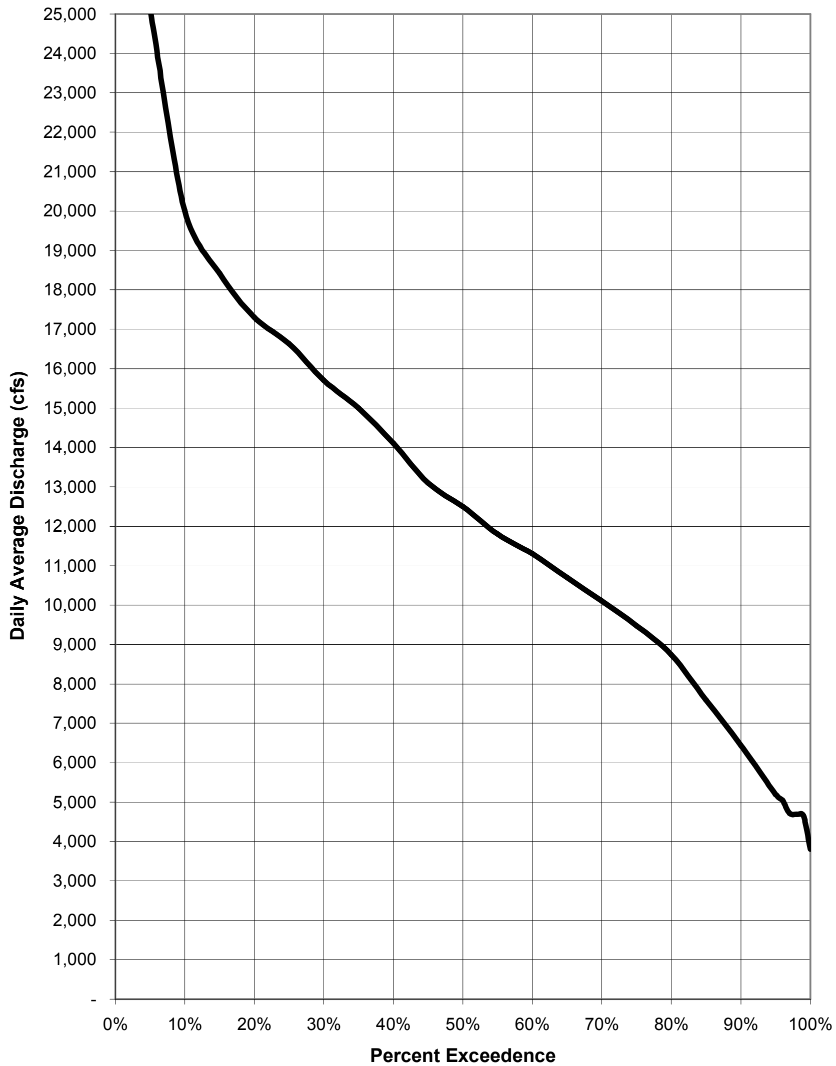

Figure B-1-9. April flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

Figure B-1-10. May flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

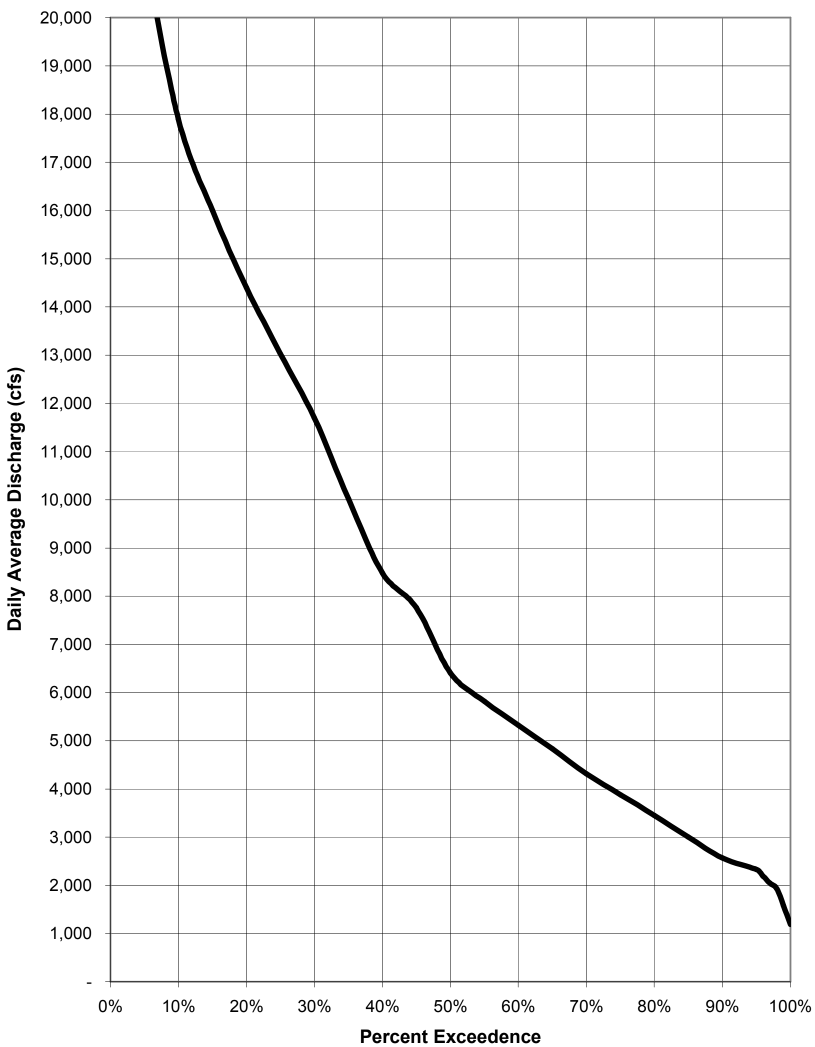

Figure B-1-11. June flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

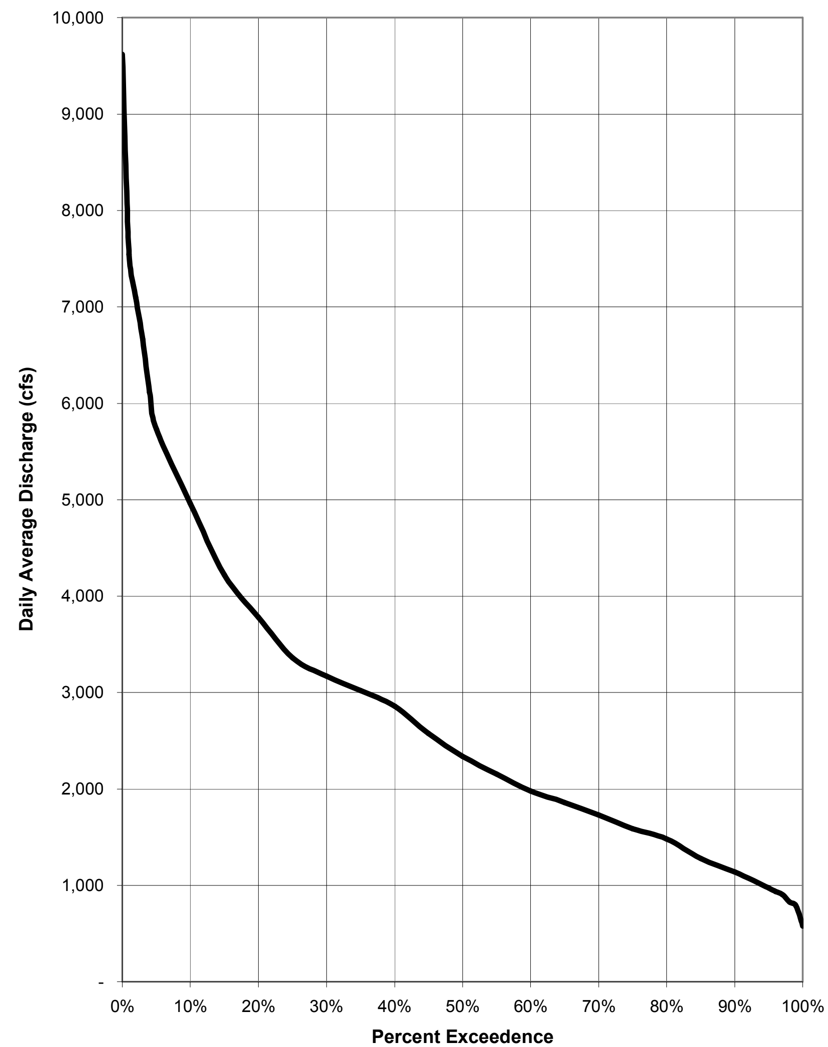

Figure B-1-12. July flow duration curve for unregulated daily average flows for Upper Falls and Monroe Street HEDs (years 1979–2002). (Source: USGS, 2005)

APPENDIX B-2

MONTHLY FLOW DURATION CURVES FOR NINE MILE HED

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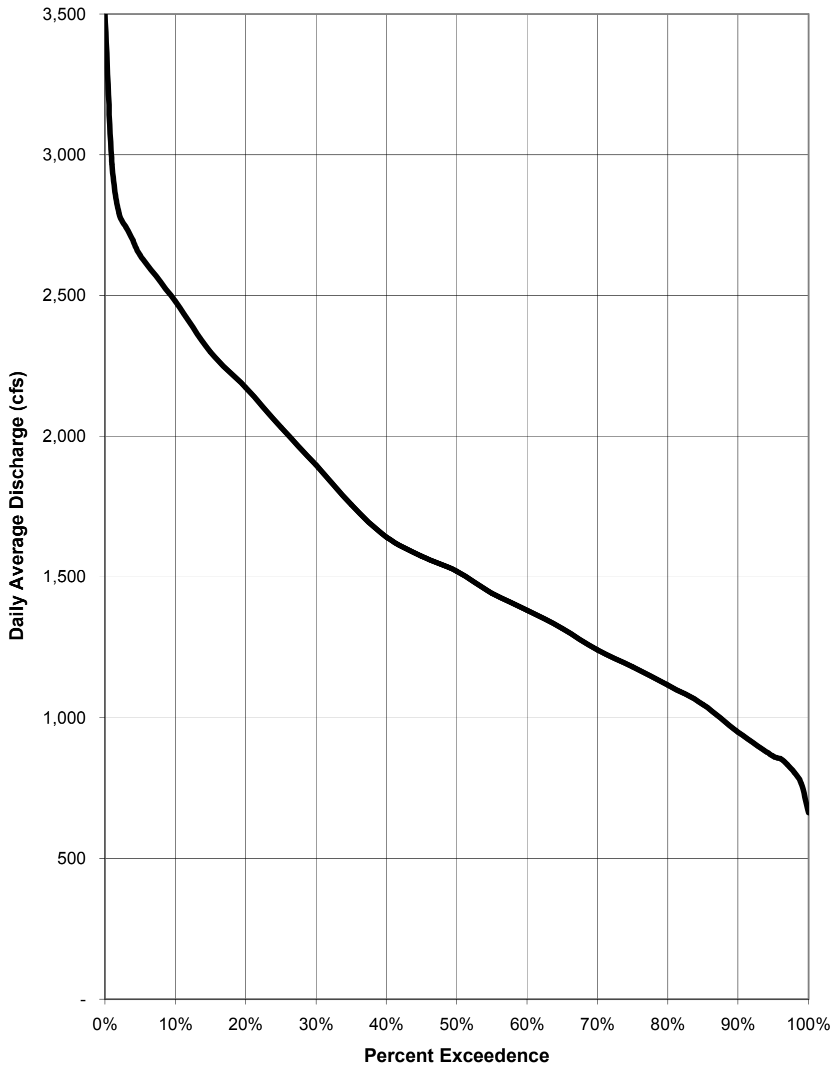

Figure B-2-1. August flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

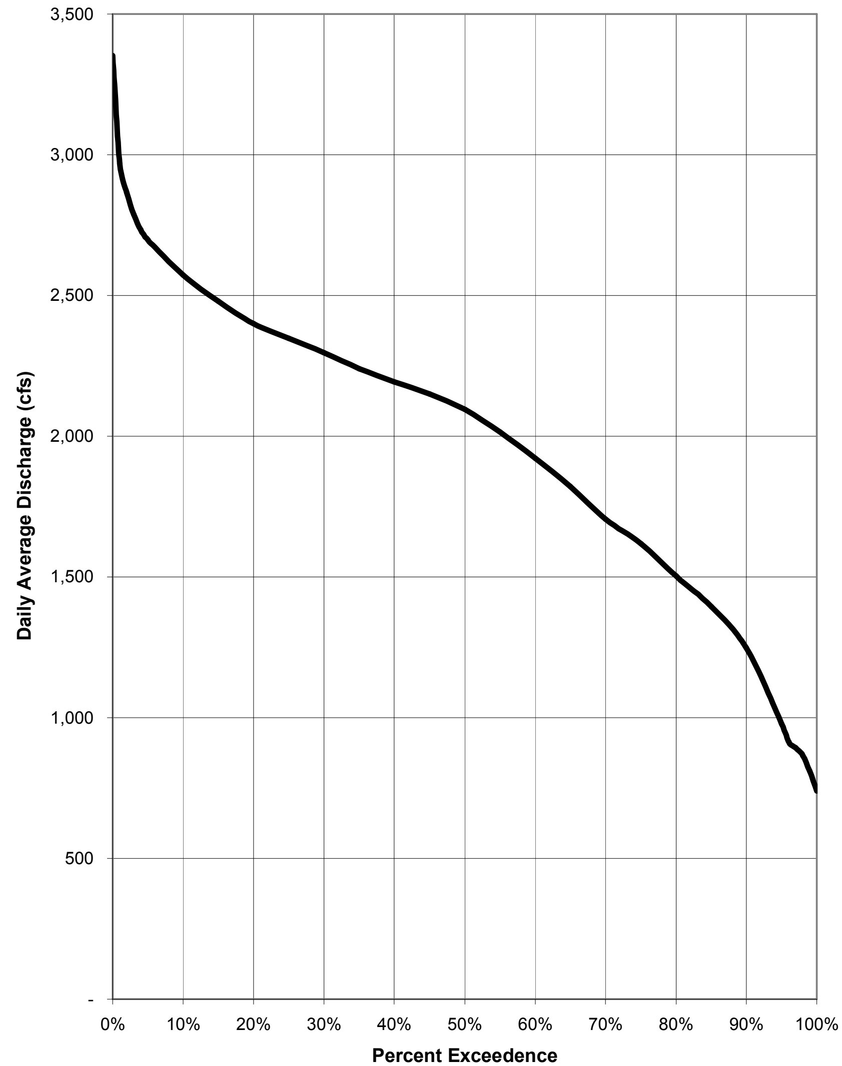

Figure B-2-2. September flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

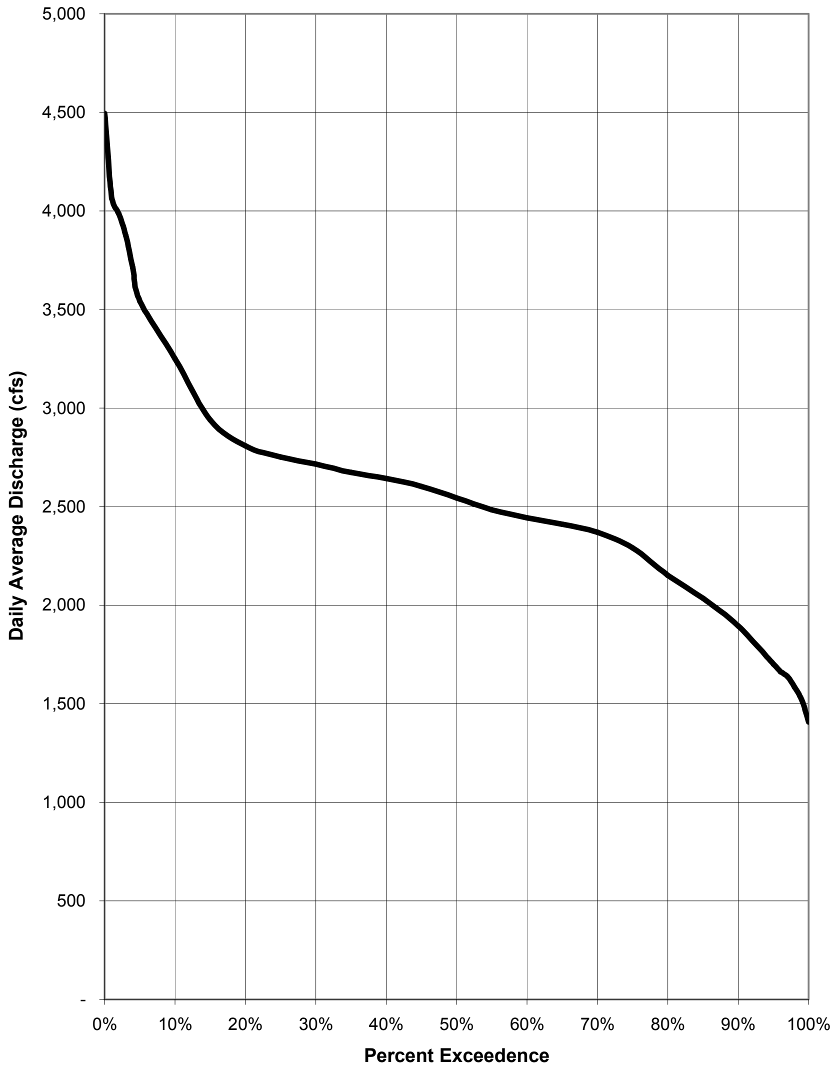

Figure B-2-3. October flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

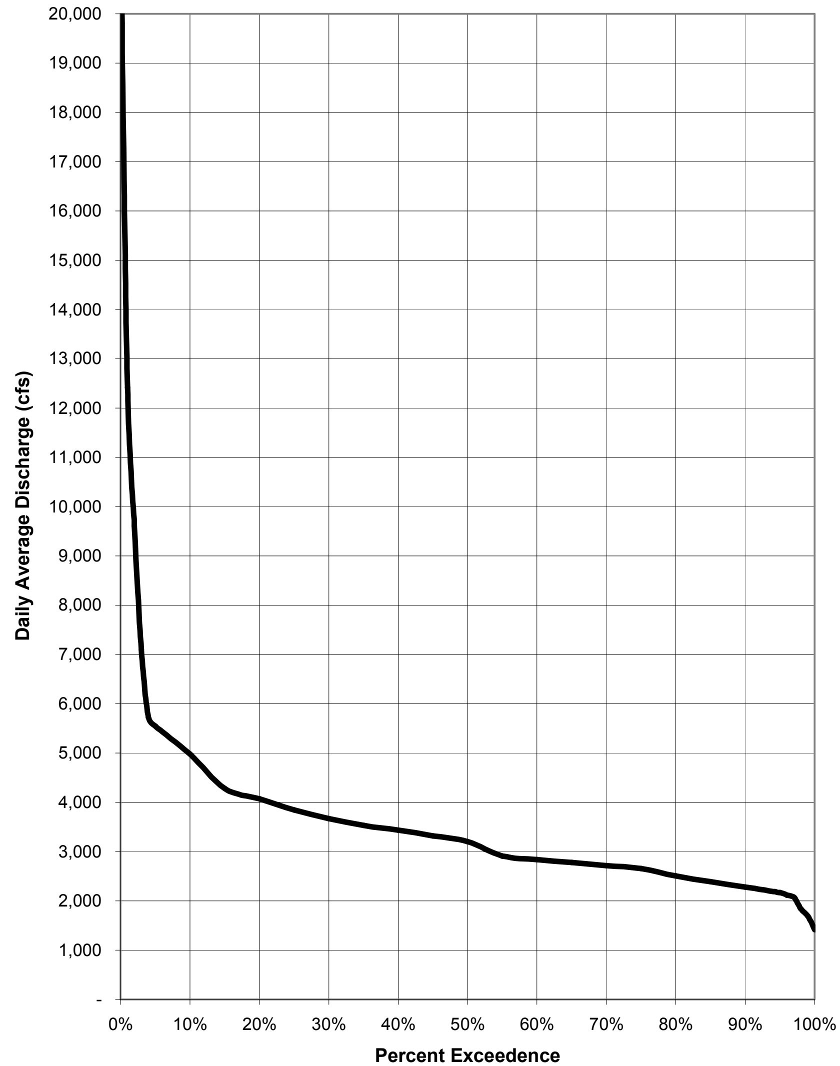

Figure B-2-4. November flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

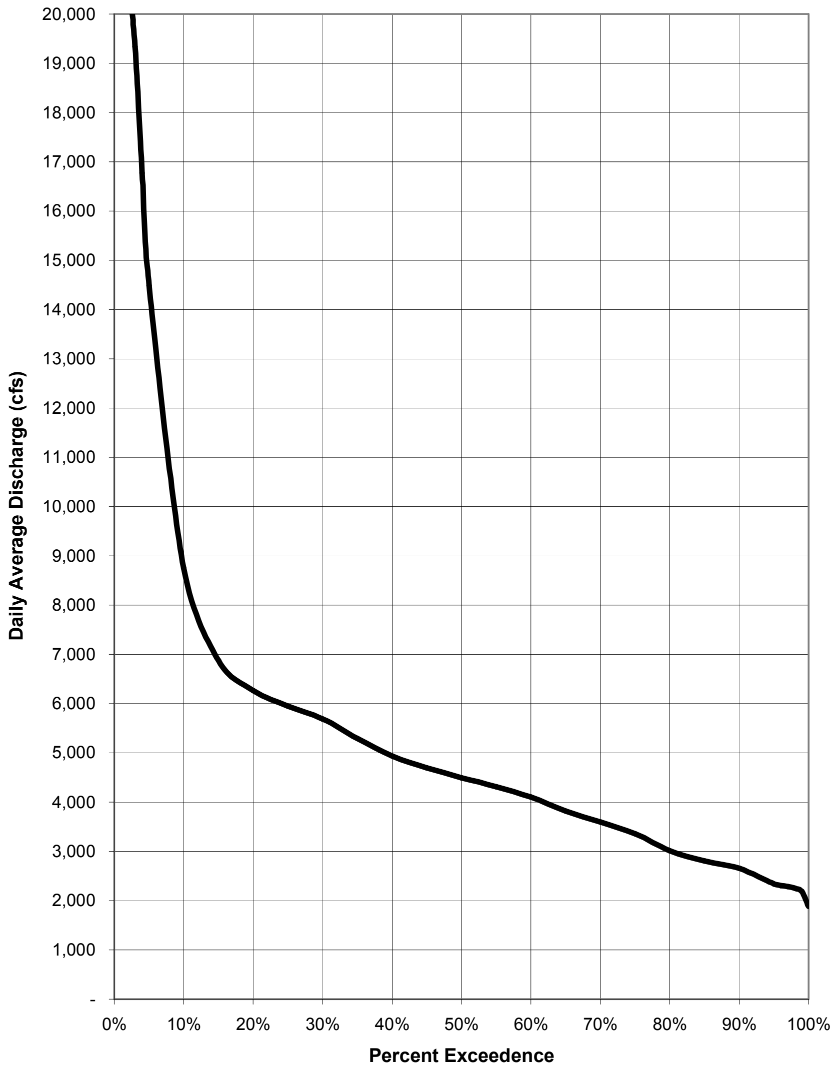

Figure B-2-5. December flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

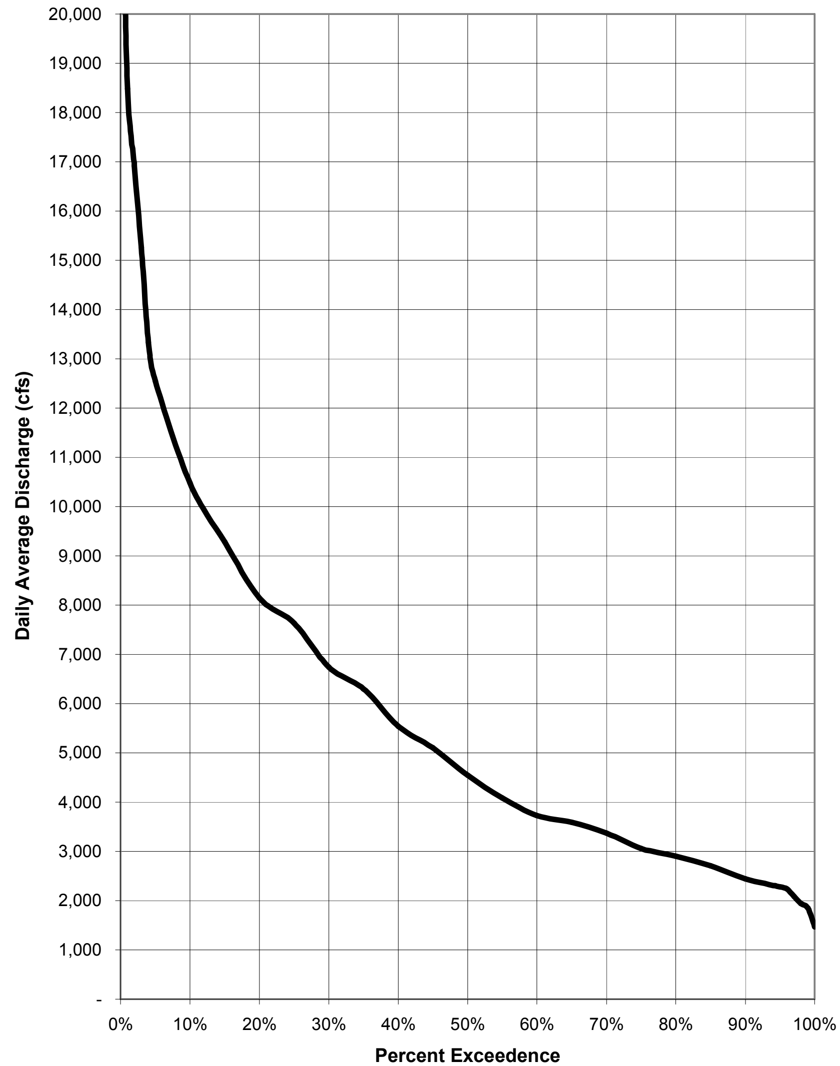

Figure B-2-6. January flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

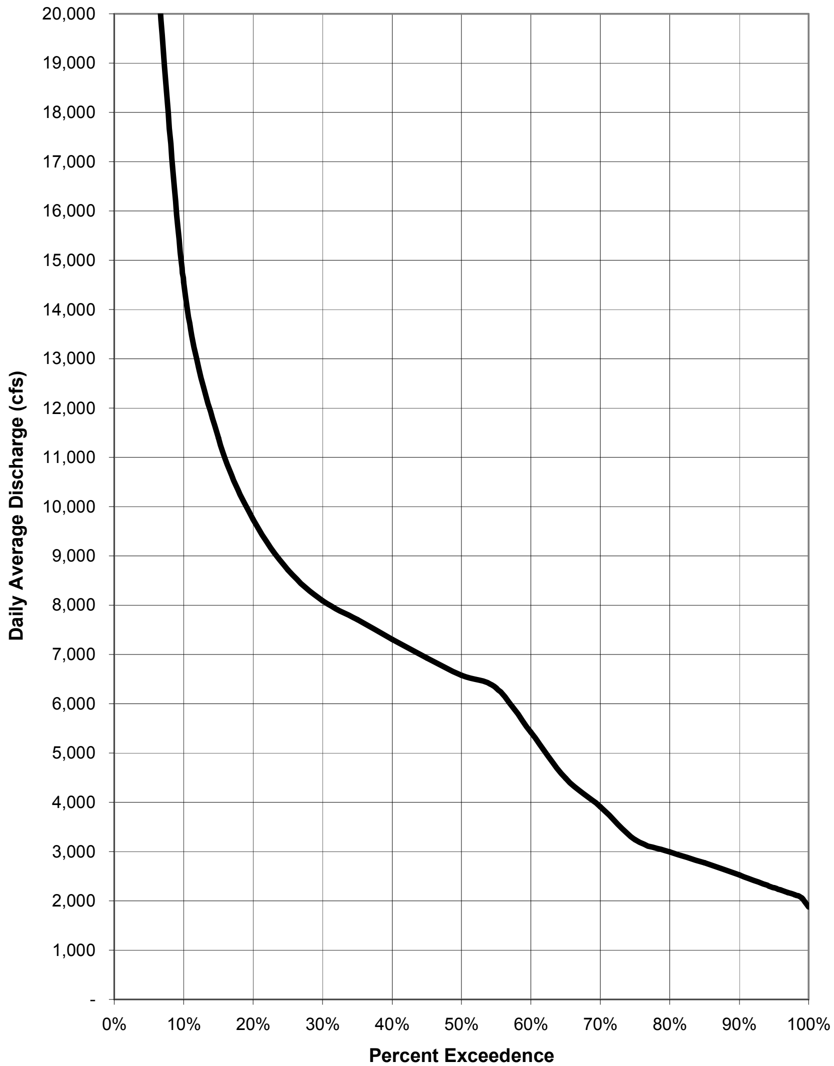

Figure B-2-7. February flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

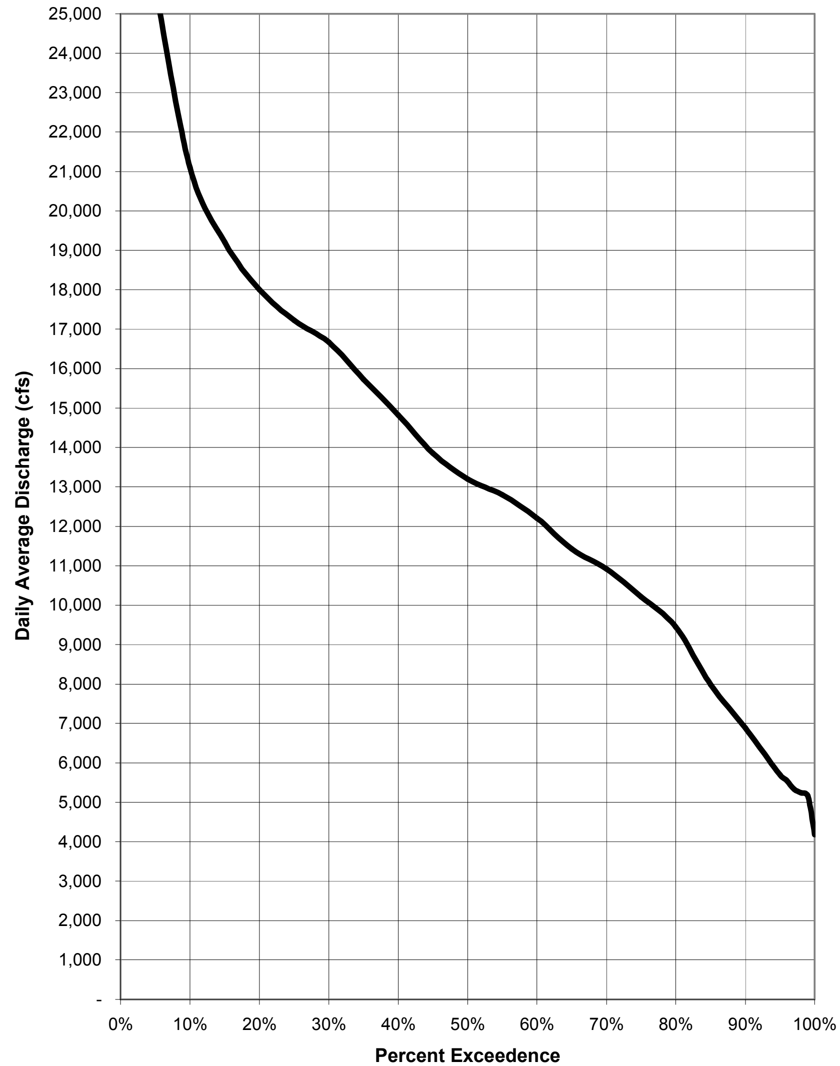

Figure B-2-8. March flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

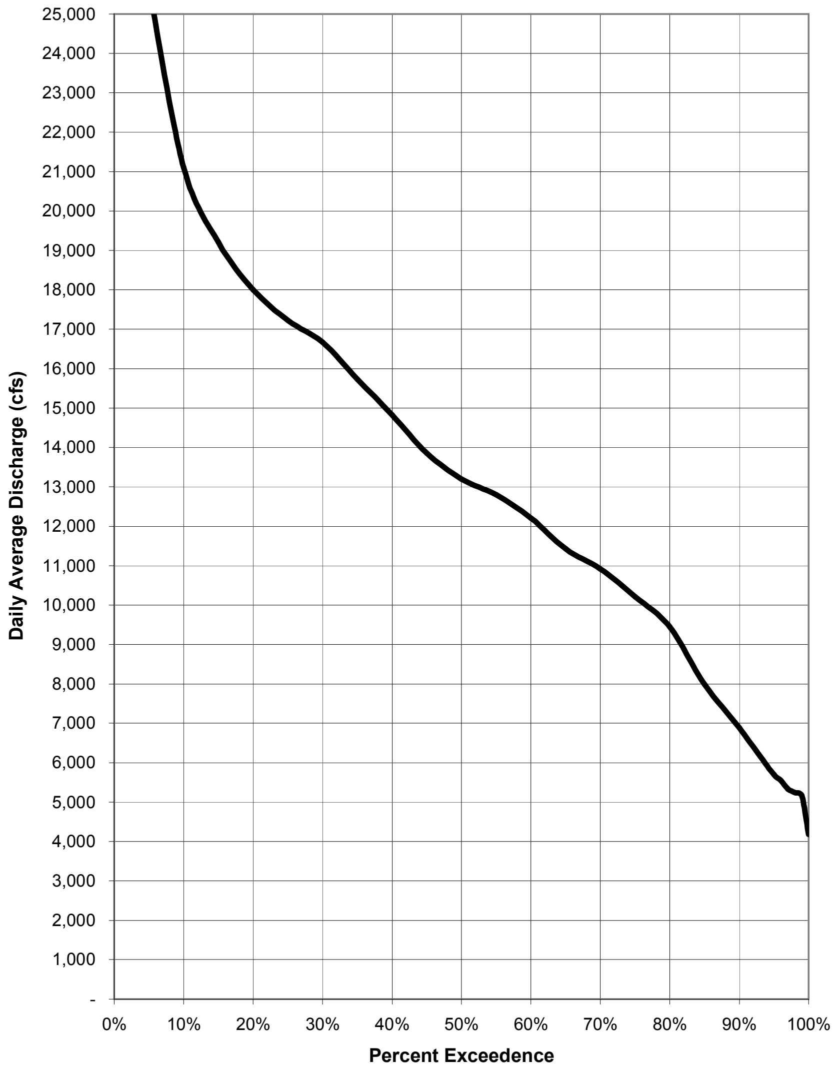

Figure B-2-9. April flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

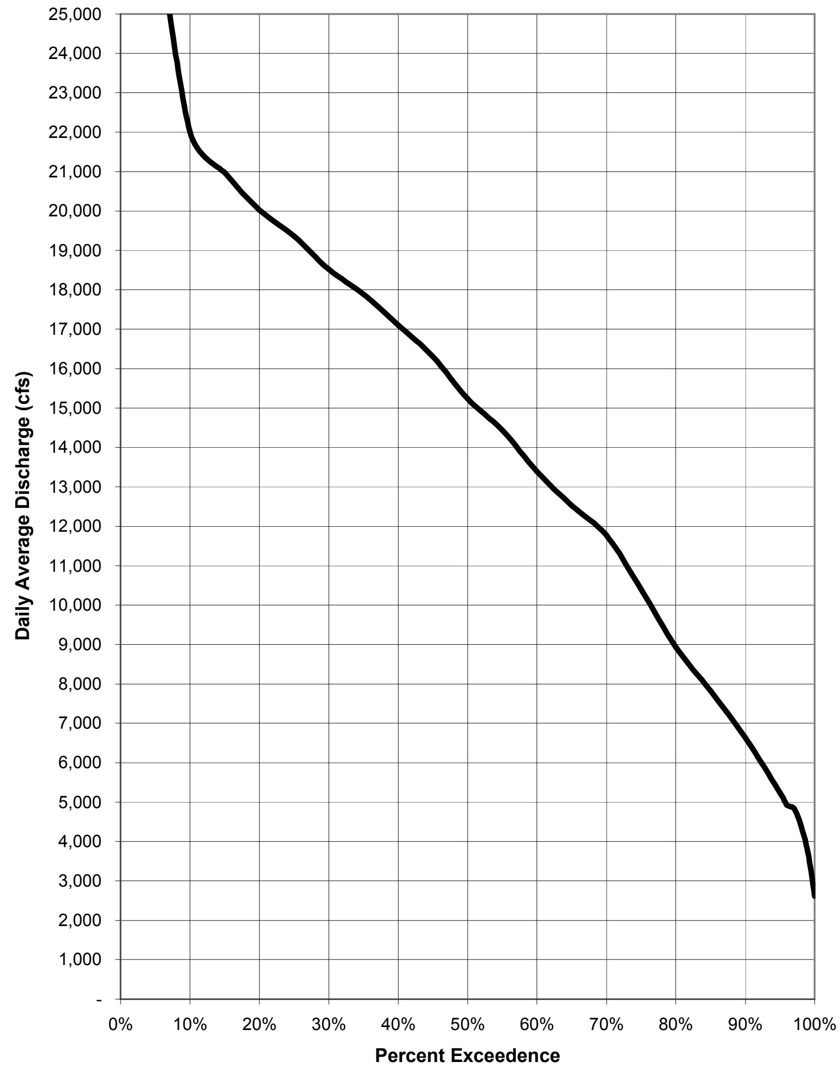

Figure B-2-10. May flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

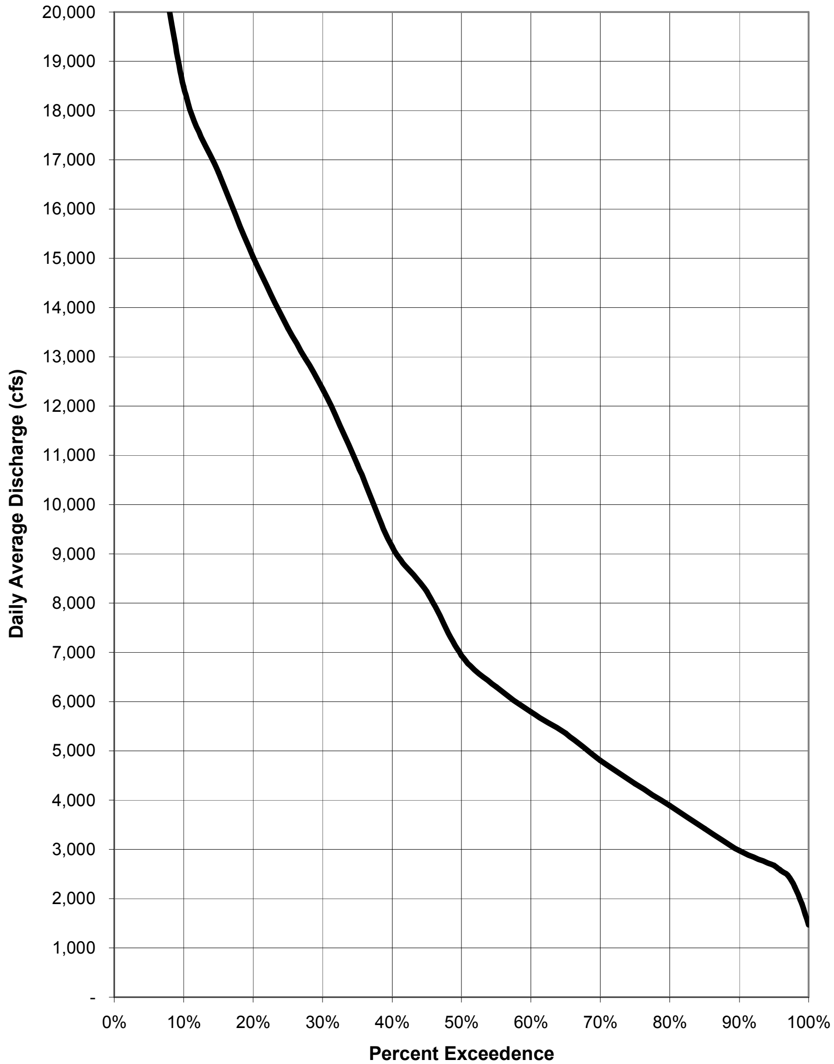

Figure B-2-11. June flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

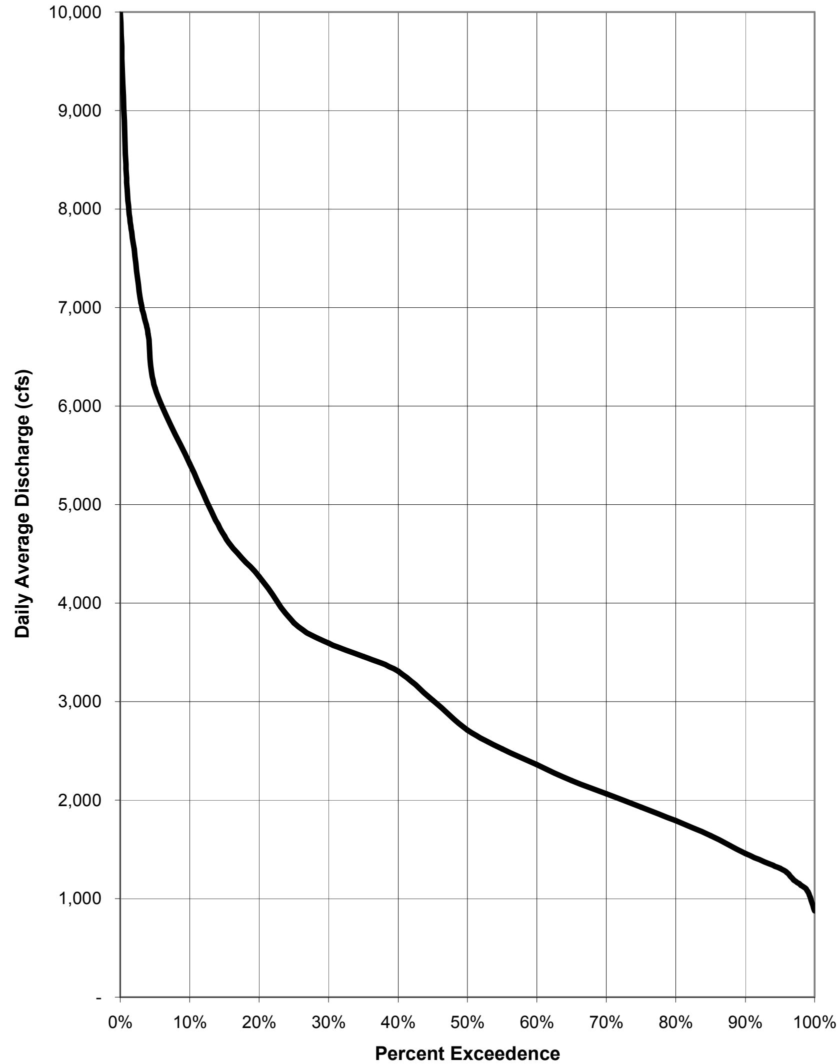

Figure B-2-12. July flow duration curve for unregulated daily average flows for Nine Mile HED (years 1979–2002). (Source: NHC, 2004)

APPENDIX B-3

MONTHLY FLOW DURATION CURVES FOR LONG LAKE HED

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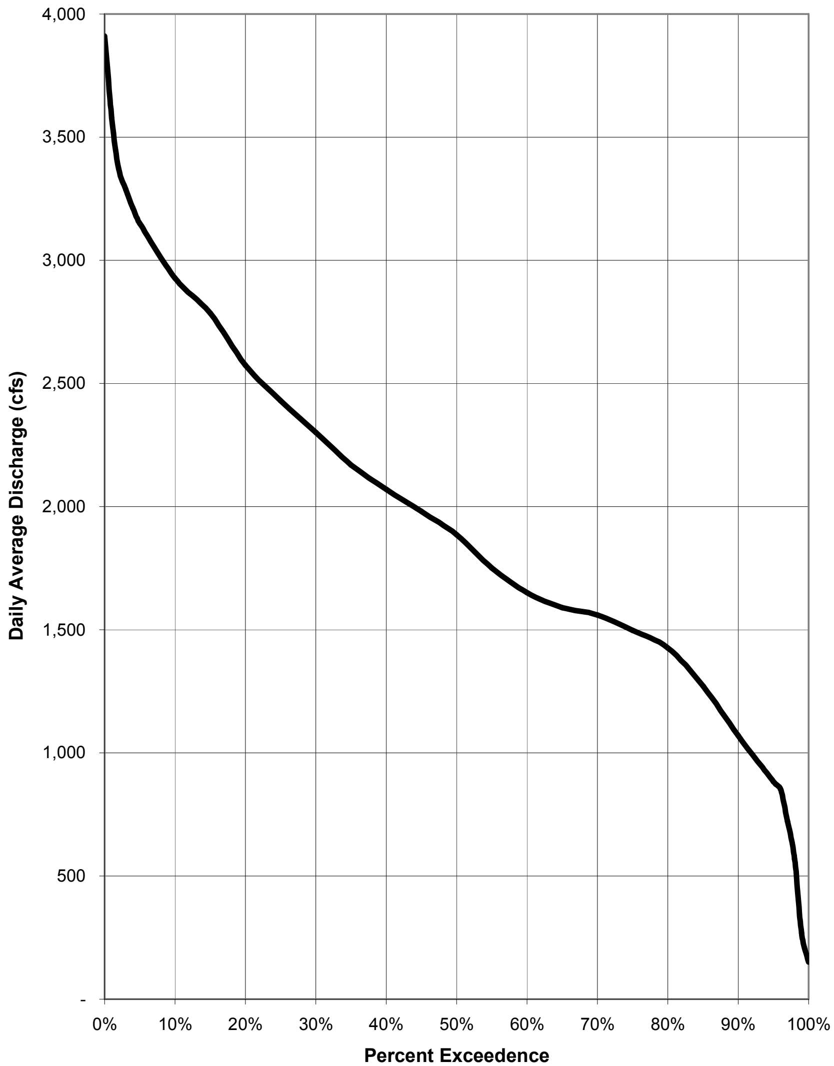

Figure B-3-1. August flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

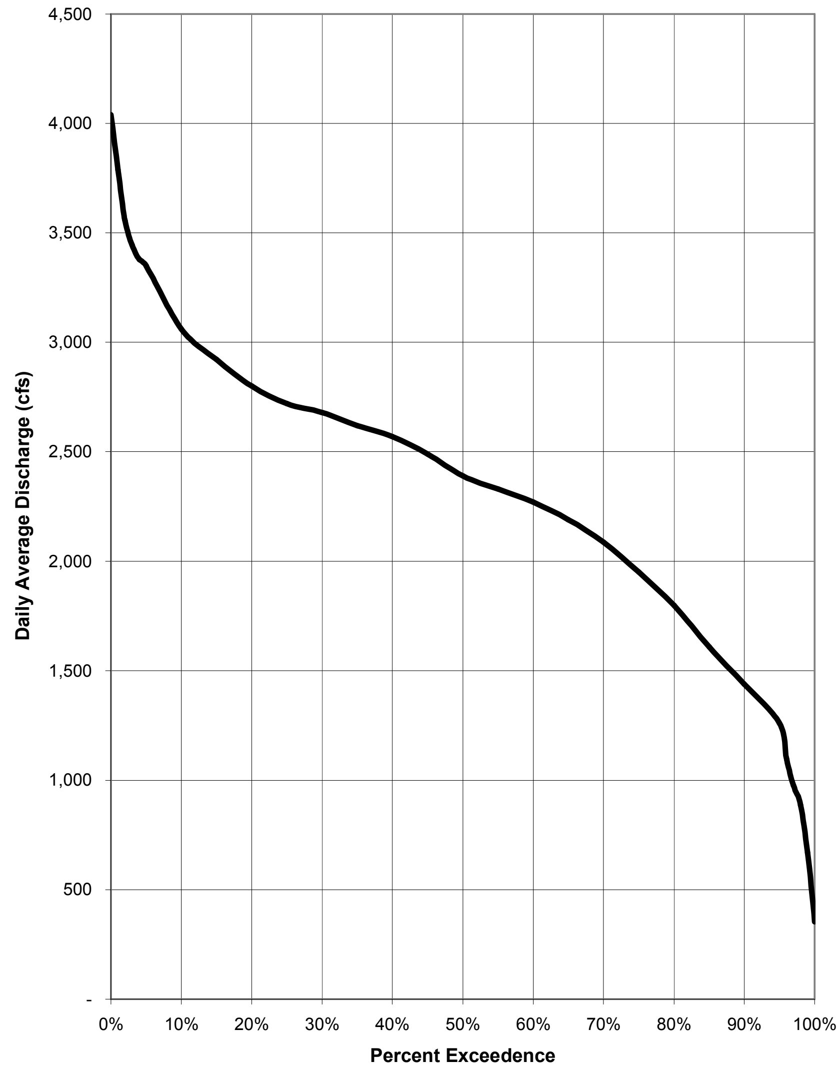

Figure B-3-2. September flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

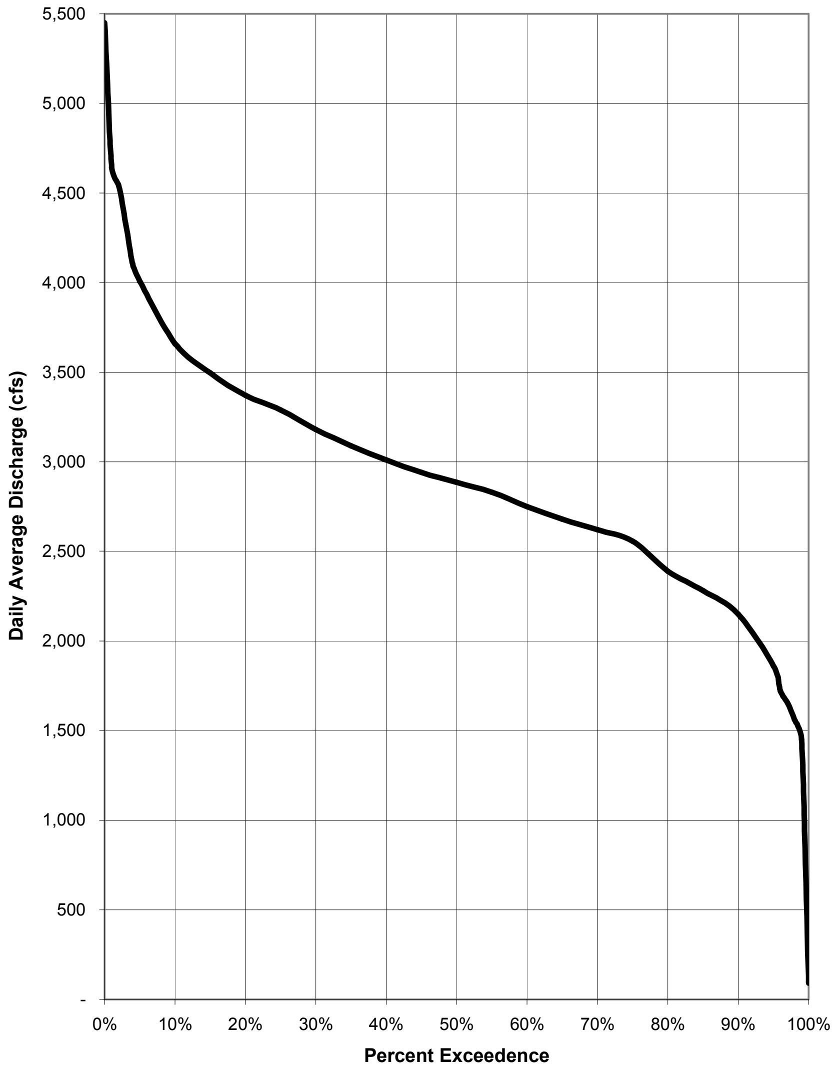

Figure B-3-3. October flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

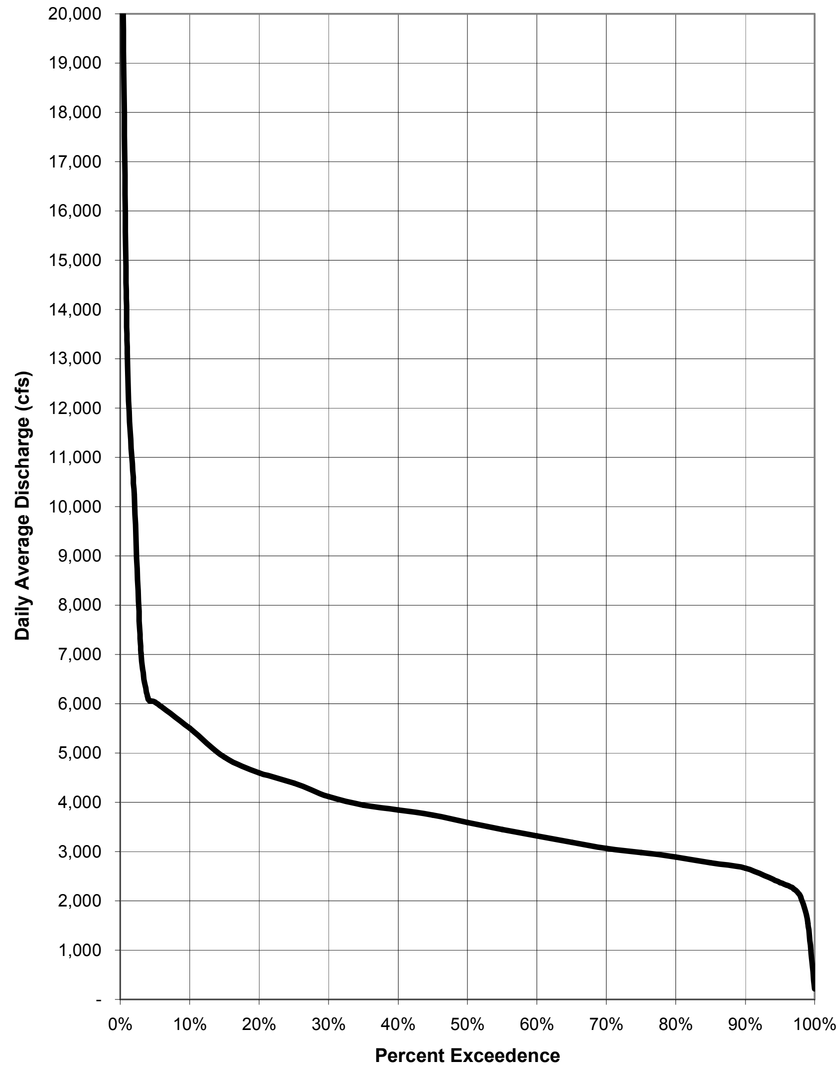

Figure B-3-4. November flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

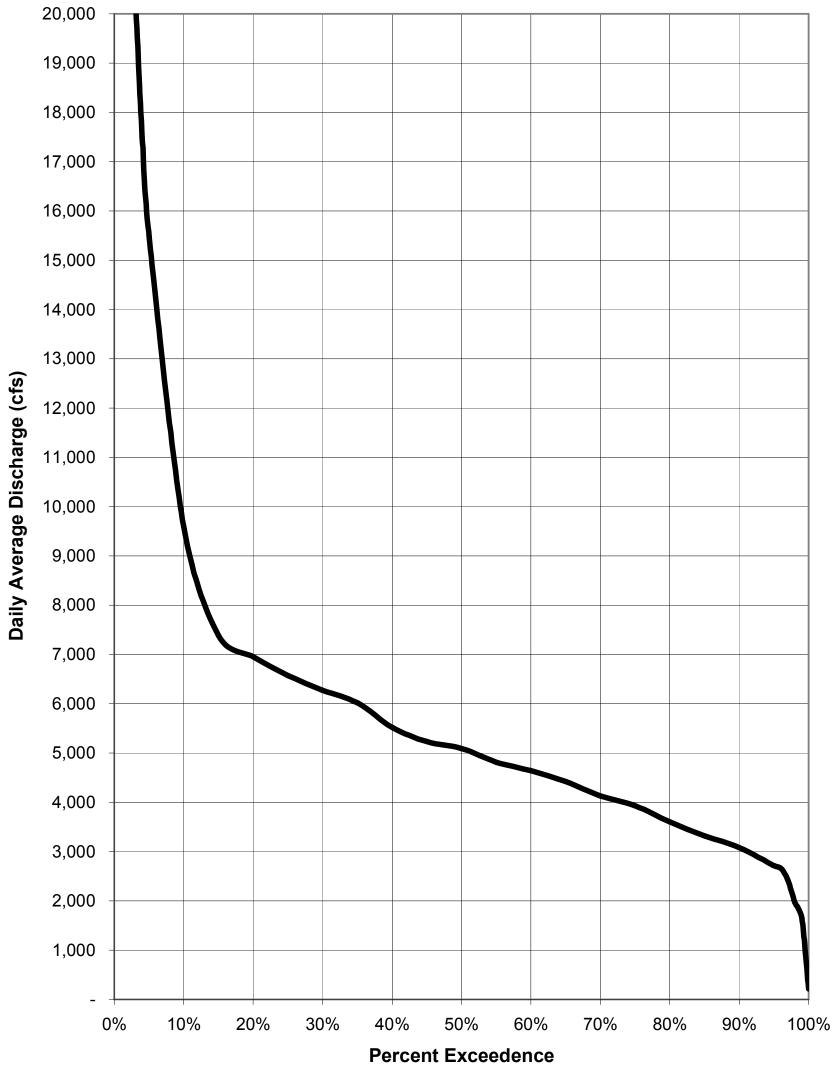

Figure B-3-5. December flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

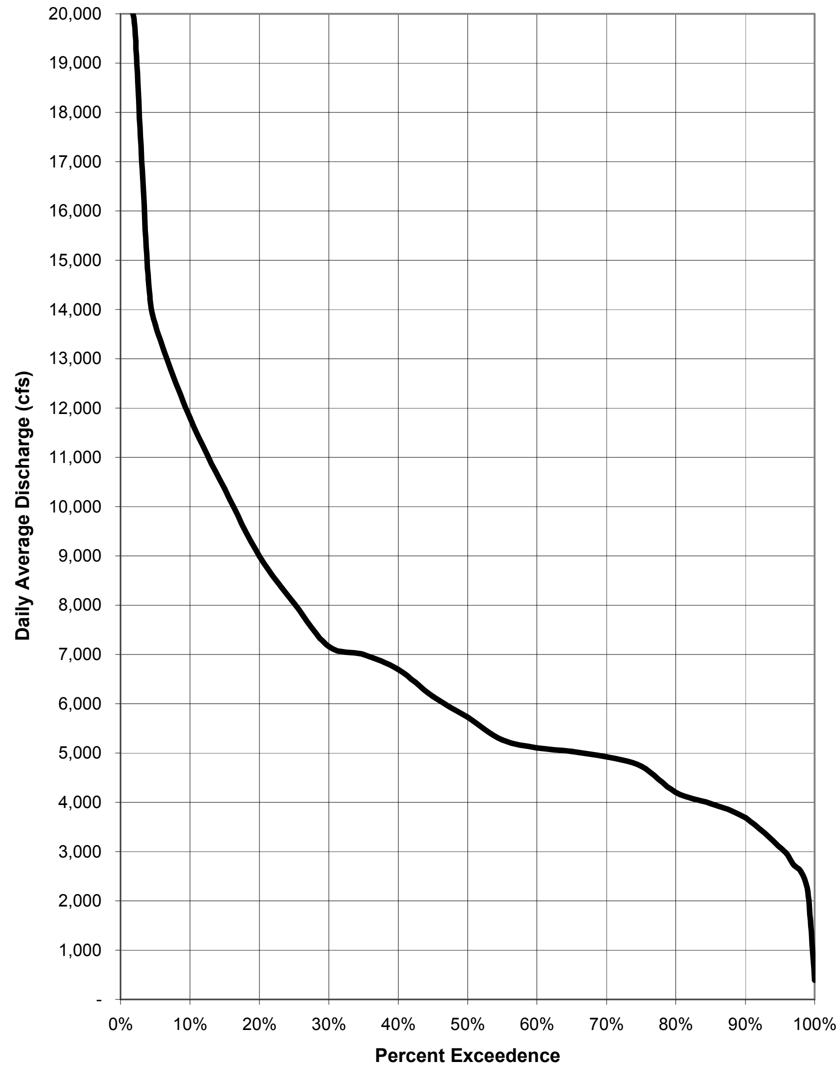

Figure B-3-6. January flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

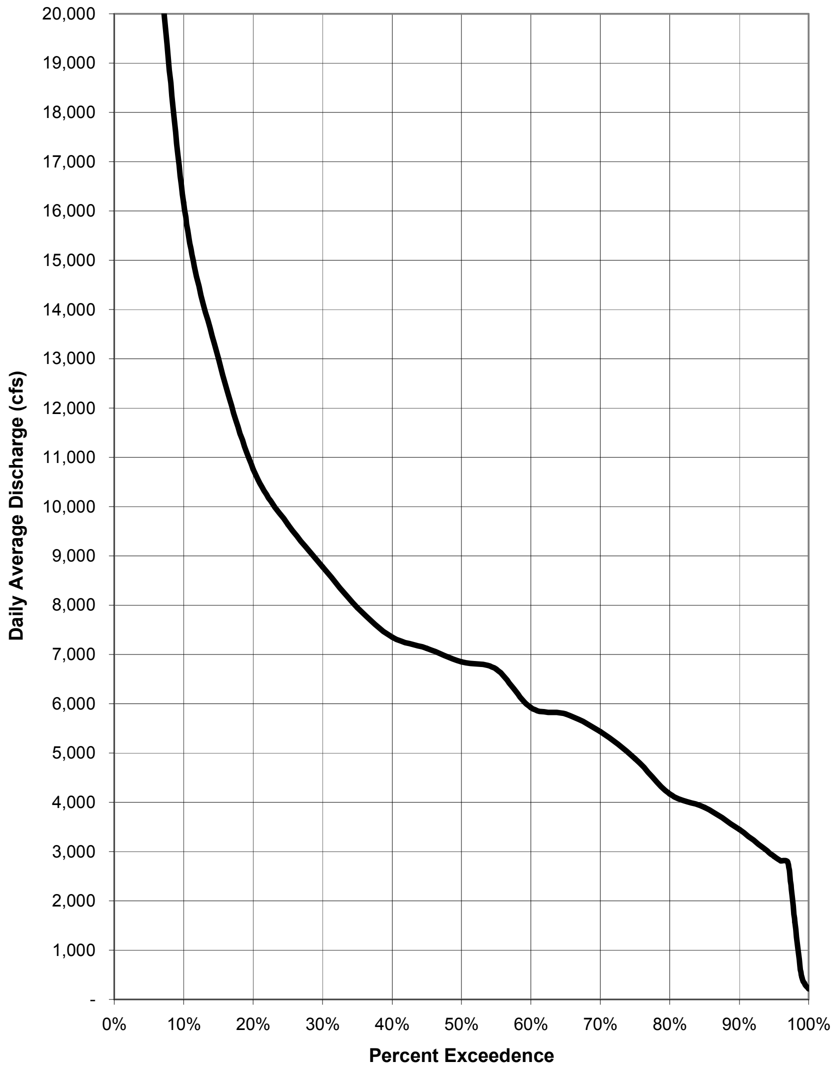

Figure B-3-7. February flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

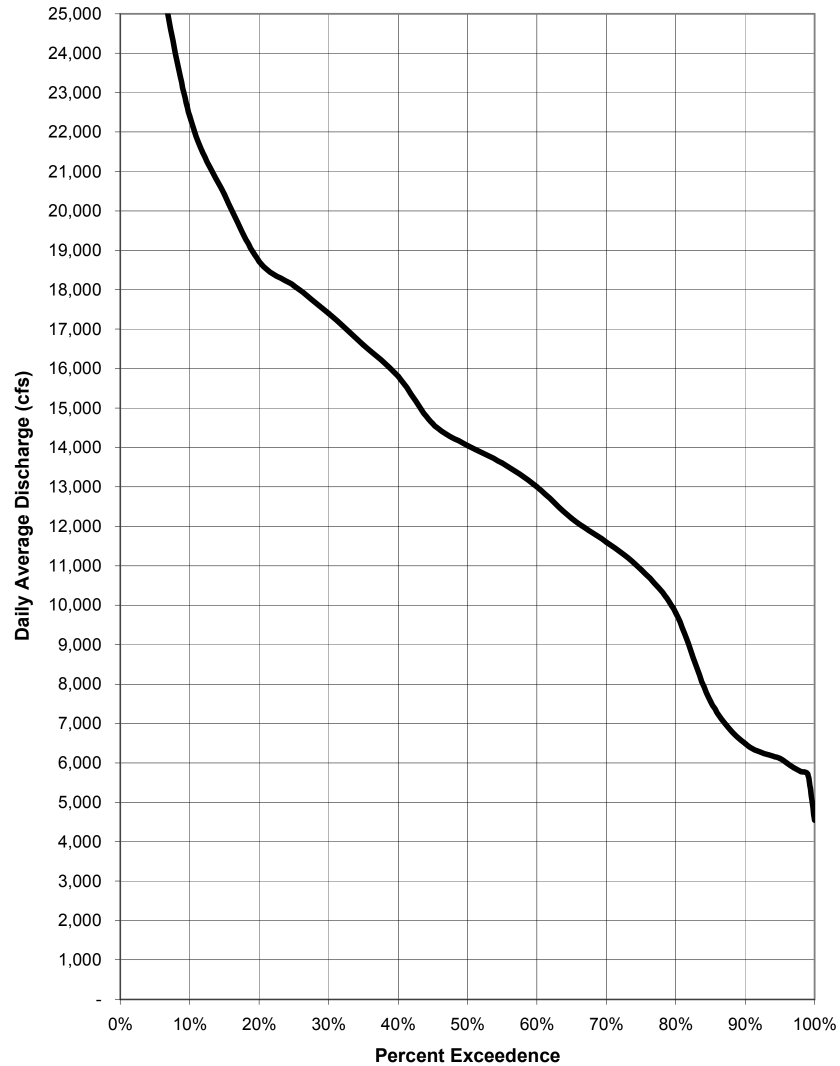

Figure B-3-8. March flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

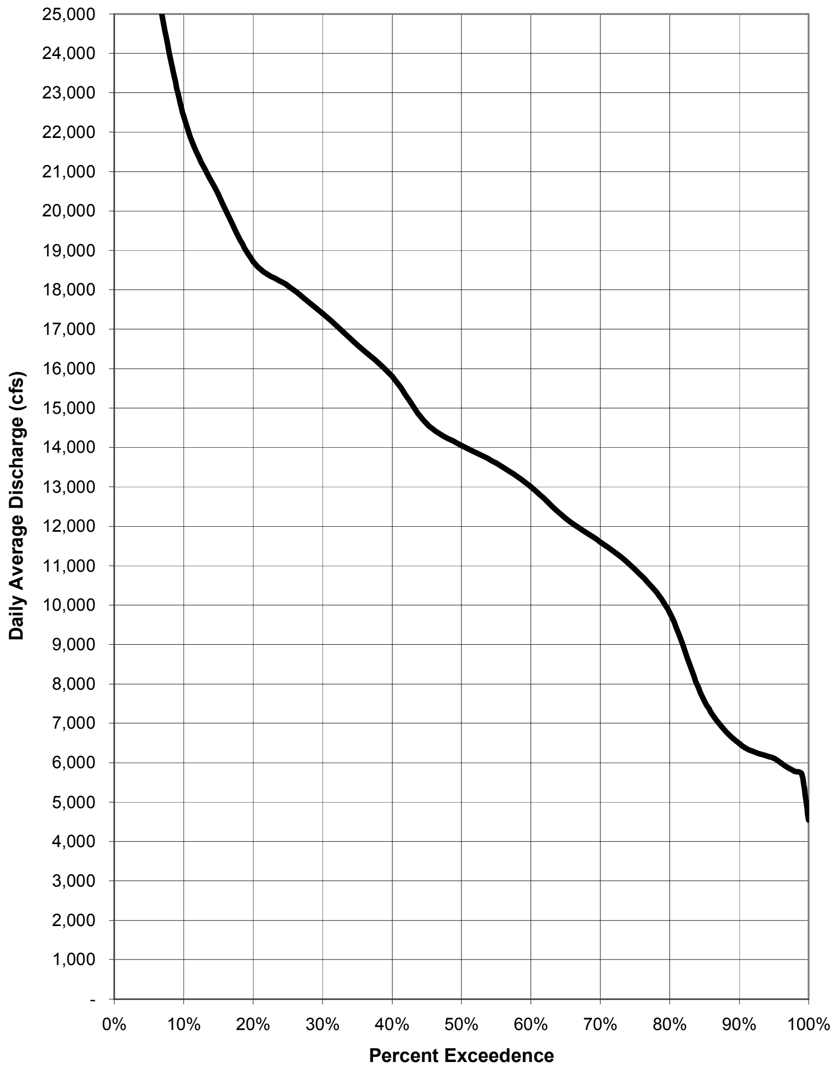

Figure B-3-9. April flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

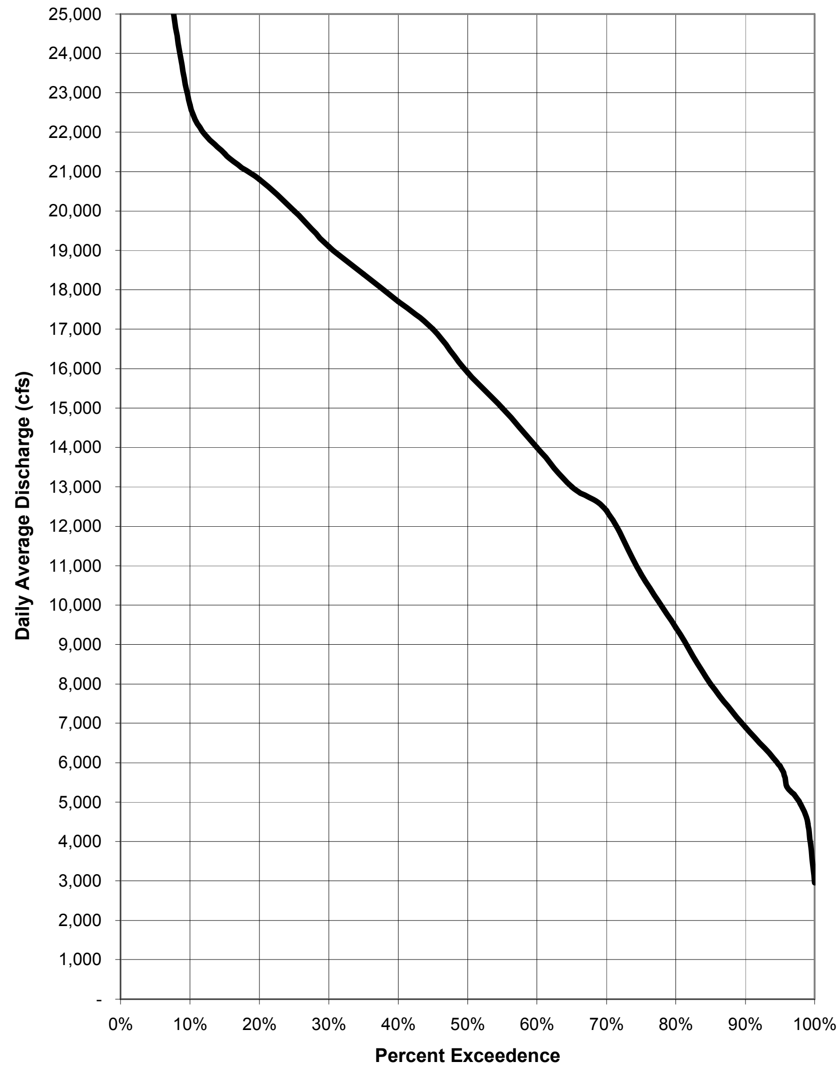

Figure B-3-10. May flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

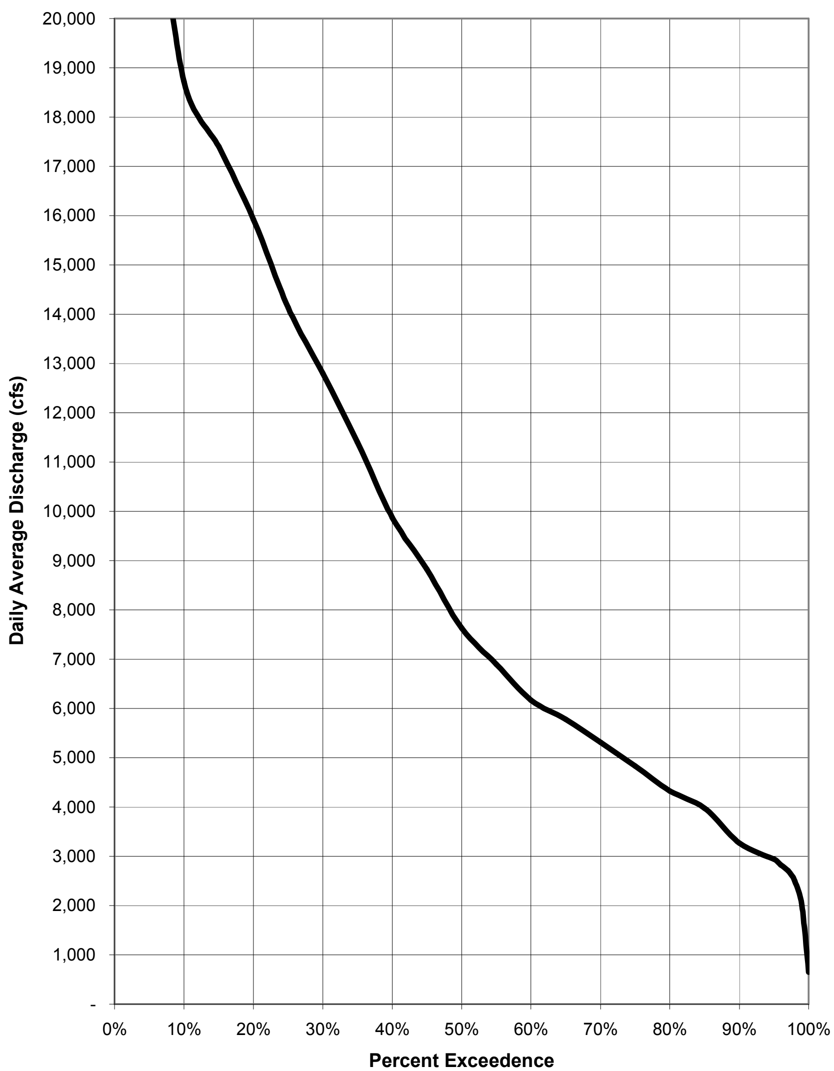

Figure B-3-11. June flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

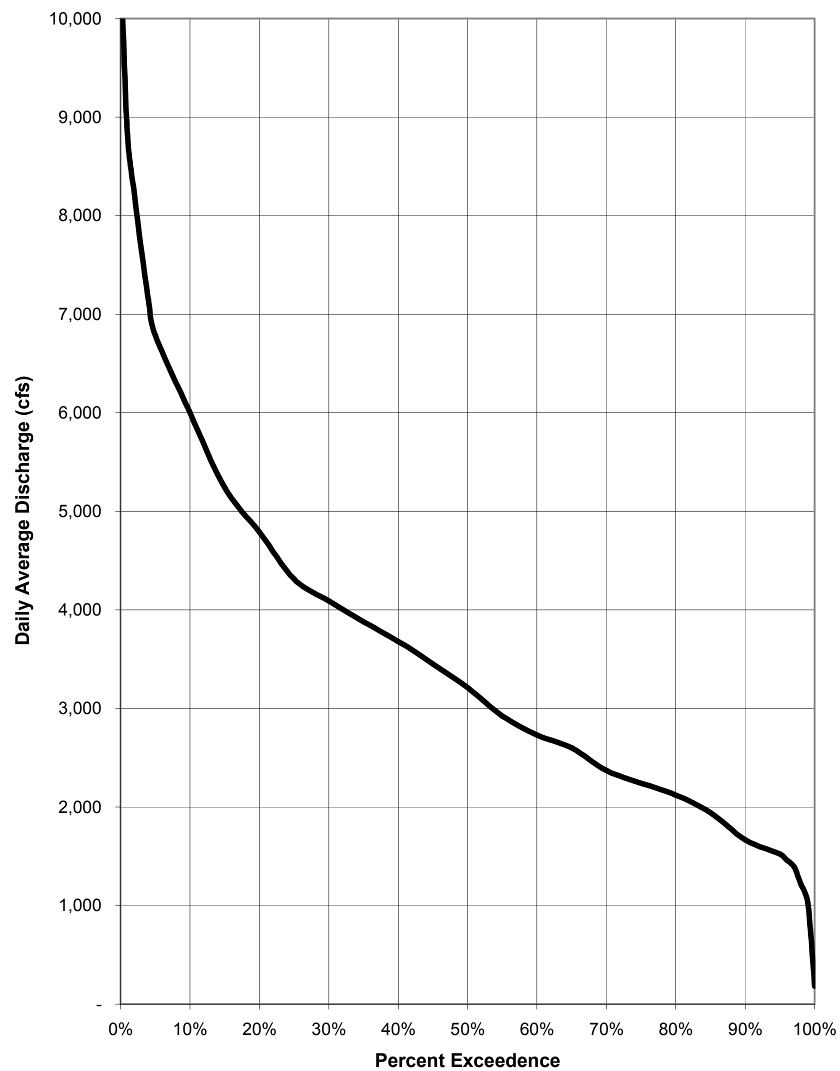

Figure B-3-12. July flow duration curve for unregulated daily average flows for Long Lake HED. (Source: USGS, 2005)

EXHIBIT C—PROJECT HISTORY AND PROPOSED CONSTRUCTION SCHEDULE

C.1 Project History

Before Washington Water Power Company was formed in the late 1800s and began constructing hydroelectric developments on the Spokane River, water power facilities for the purposes of electrical generation already existed. Most of these early facilities were located within the downtown portions of the city of Spokane, then known as "Spokan Falls." These facilities were mostly limited to small installations fed by flumes or built where a water wheel could be dropped directly into the river current. Most of these were Edison electric lighting plants, with the Edison Electric Light Company (headquartered in the eastern United States) typically retaining 30 percent of the profits from the plants.

In 1889, a group of local Spokane businessmen formed Washington Water Power Company and began negotiating for the power rights to the lower falls of the Spokane River, an area later referred to as "Monroe Street." While the local founders of the Washington Water Power Company strongly believed in the value of the river's water power, there were eastern investors in the company that held equally strong beliefs that steam was a superior power source. These investors saw little value in the use of water power for the purpose of electrical power production. Nonetheless, the local company founders persisted and eventually pressed forward with the acquisition and development of the lower falls of the Spokane River.

Monroe Street HED became Spokane's first "modern" hydroelectric plant upon completion in 1890. Monroe Street HED was considered modern because it used penstocks to deliver water to the generating equipment rather than open ditches and flumes. The initial installed capacity of 350 kilowatts (kW) of direct current (DC) electricity on November 12, 1890, more than doubled the generating capacity of all power plants then operating on the Spokane River. Given the size and efficiency of the new power plant and the electricity demands of the time, the Edison systems soon became obsolete. Washington Water Power Company began acquiring those properties and had acquired all of the Edison plants by the end of 1891, paving the way for the company to further develop the Spokane River's water power potential.

Washington Water Power Company then began a systematic approach for development of a broader electrical generation and transmission system in 1903 with the addition of two alternating current (AC) turbine-generator units at Monroe Street HED. This was followed by a period of substantial expansion in Washington Water Power Company's generating capacity along the Spokane River, extending up through 1930. Substantial transmission line facilities were also being constructed or acquired by Washington Water Power Company during this period, and it provided electricity to a wide area around Spokane and extending well into Idaho. It was during these years that Post Falls (1906), Little Falls (1910),[4] Long Lake (1915), and Upper Falls (1922) HEDs were completed by Washington Water Power Company. It was also during this time that The Spokane and Inland Empire Railway Company completed Nine Mile

[4] The Little Falls Project is owned and operated by Avista but is not part of the Spokane River Project or Post Falls HED.

HED (1908). In 1925, Washington Water Power Company purchased Nine Mile HED from The Spokane and Eastern Inland Railway & Power Company (formerly the Inland Empire Railway Company) (Avista, 2002).

The construction history for the four hydroelectric developments that comprise the 122.92 MW Spokane River Project is summarized below, presented in chronological order of the original hydroelectric development construction.

C.1.1 Monroe Street HED

Washington Water Power Company began construction of Monroe Street HED in 1889 and completed the development in 1890. When completed, it housed DC turbine generator units with an installed capacity of 350 kW. At the time, it represented the first and largest reliable electric power source for commercial and domestic customers in Spokane, Washington.

The Monroe Street powerhouse was expanded in 1903, when two AC turbine generator units were added, bringing the installed capacity to 7.9 MW. Between 1904 and 1912, the DC units were phased out as the area's electric service was converted to AC, and the installed capacity dropped to around 5 MW at this time.

In 1972, the Monroe Street Dam was rebuilt, and 20 years later, in 1992, Washington Water Power Company completely replaced the old Monroe Street power plant with a new, low-profile, underground powerhouse. The new powerhouse contains a single, vertical Kaplan turbine generator unit that expanded the generator nameplate capacity to 14.82 MW.

C.1.2 Nine Mile HED

The Spokane and Inland Empire Railway Company constructed Nine Mile HED between 1906 and 1908. The site was originally acquired and the hydroelectric development constructed by the entrepreneur J.P. Graves specifically for the purpose of powering an electric railway system that ran into the Palouse agricultural area south of Spokane. The electric railway system was short lived, however, and by 1922 the railway company was in receivership. Nine Mile HED was sold to Washington Water Power Company in 1925.

When purchased by Washington Water Power Company, the Nine Mile powerhouse contained four generator turbine units with a total capacity of 12 MW. Between 1947 and 1950, an additional 5 feet was added to the existing 5-foot-high flashboards at the top of the dam, increasing the generating capacity to 18 MW. In 1994, Units 3 and 4 were replaced with new, more efficient units, increasing the generating capacity by almost 50 percent to the current 26.4 MW.

The turbines at Nine Mile HED have been subject to excessive wear from the heavy sediment loads originating in Hangman Creek. To protect the turbines, a sediment bypass tunnel was constructed in 1998 to divert sediment away from the turbine intakes and discharge it directly downstream of the dam.

C.1.3 Long Lake HED

Constructed over a 4-year period from 1911 to 1915, Long Lake HED is the largest hydroelectric development on the Spokane River. The original capacity, when completed in 1915, was 25 MW, produced by two Francis-style turbines. Additional units were installed in 1919 (Unit 3) and 1924 (Unit 4). The forebay water surface elevation was increased by 3 feet in 1930, and then again by 5 feet in 1949. In the 1990s, Avista upgraded the turbines and amended the license in 1996 to reflect the current installed capacity of 71.7 MW.

C.1.4 Upper Falls HED

Constructed between 1921 and 1922, Upper Falls HED was the last hydroelectric development constructed by Washington Water Power Company on the Spokane River, using the power potential of the falls located immediately upstream of Monroe Street HED. The Upper Falls powerhouse contains a single generator and vertical-shaft Francis turbine rated at 10 MW. No significant construction or capacity changes have occurred at the development, and the original unit is still in place.

C.1.5 Project Chronology

Table C-1 presents the chronology of construction, major maintenance, and upgrades of the Spokane River Project.

Table C-1. Spokane River Project chronology.

Activity	Date
Monroe Street HED construction	1889–1890
Monroe Street HED powerhouse expanded: two additional AC turbine generator units added	1903
Monroe Street HED DC units phased out	1904–1912
Nine Mile HED construction (The Spokane and Inland Empire Railway Company)	1906–1908
Long Lake HED construction	1911–1915
Long Lake HED Unit 3 added	1919
Upper Falls HED construction	1921–1922
Long Lake HED Unit 4 added	1924
Nine Mile HED purchased from The Spokane and Eastern Inland Railway & Power Company by Washington Water Power Company	1925
Long Lake HED forebay water surface elevation increased by 3 feet	1930
Added 2-foot flashboards to top of existing flashboards at Nine Mile HED	1947
Long Lake HED forebay water surface elevation increased by additional 5 feet	1949
Added 3-foot flashboards to top of existing flashboards at Nine Mile HED	1950
Long Lake HED Unit 1 rewound	1956
Long Lake HED Unit 3 rewound	1957

Activity	Date
Nine Mile HED Unit 2 rewound	1958
Long Lake HED Unit 2 rewound	1958
Long Lake HED Unit 4 rewound	1959
Upper Falls HED generator rewound	1967
Monroe Street Dam reconstructed as a concrete gravity dam	1972
Nine Mile HED Unit 1 rewound	1977
Monroe Street power plant replaced with underground powerhouse and single Kaplan-type turbine generator unit	1992
Nine Mile HED Units 3 and 4 installed	1994
Long Lake HED Unit 4 turbine runner replaced	1994
Long Lake HED Unit 1 turbine runner replaced	1995
Long Lake HED Unit 2 turbine runner replaced	1996
Sediment bypass tunnel constructed at Nine Mile HED	1996
Long Lake HED Unit 3 turbine runner replaced	1999

C.2 Proposed Project Developments

C.2.1 Proposed New Development

Avista will evaluate replacing the flashboards at Nine Mile HED with a more permanent feature such as a rubber dam (see Section A.4.6 for more detail). Ongoing maintenance at all HEDs would include minor upgrades as necessary to maintain the facilities.

C.2.2 Proposed Construction Schedule

At this time no new facility construction is proposed. Should evaluation of the flashboards at Nine Mile HED result in a decision to replace them with a more permanent feature, a construction schedule will be developed at that time.

C.3 Literature Cited

Avista (Avista Corporation). 2002. Initial Information Package for the FERC relicensing of the Spokane River Hydroelectric Project. Avista, Corporation, Spokane, WA.

EXHIBIT D—PROJECT COSTS

D.1 Original Cost of the Project

The Spokane River Project (Project) was first licensed in 1972 and currently comprises five hydroelectric developments: Post Falls, Upper Falls, Monroe Street, Nine Mile, and Long Lake. In seeking a new license for the continued operation of these five hydroelectric developments, Avista proposes to maintain the Upper Falls, Monroe Street, Nine Mile and Long Lake developments under the Spokane River Project name and project number, while acquiring a separate license and project number for Post Falls HED. As such and because neither action constitutes an application for an original license, a statement of original costs is neither relevant nor necessary.

D.2 Amount Payable if the Project is Taken Over by Another Party

Avista estimates that the current net investment (original cost less depreciation) in the four hydroelectric developments that make up the Spokane River Project under the existing license is approximately $68,732,000. Without knowing the details of any takeover proposal and in the absence of any FERC definition on the issue of severance damages, Avista is not able at this time to provide a firm estimate of severance damages. For the purposes of this exhibit, Avista has assumed the severance damages associated with any takeover of the Spokane River Project would equal the cost of acquiring equivalent replacement power from combined-cycle combustion turbines.

The net investment and an estimate of severance damages for the Spokane River Project is shown in Table D-1.

Table D-1. Spokane River Project takeover costs.

Current net investment	$68,732,000
Severance Damages[a]	
Cost of replacement power	$476,322,600
Spokane River Project HED costs	$68,732,000
Total	$545,054,600

[a] Severance damages reflect a 30-year present value analysis of the cost of acquiring an equivalent amount of power from combustion turbines after deducting the costs for hydro production and maintenance.

D.3 Estimated Costs for New Development

No new development is proposed at the Spokane River Project at this time.

D.4 Estimated Average Annual Cost of the Project

Avista estimated the average annual cost of the Project over a 30-year period (2007−2036), using a base year of 2007 for current Project operations and the Proposed Action.

Annual costs include both annualized[5] capital costs and recurring annual costs. Avista's weighted average cost of capital is 9.72 percent (Table D-1), and the appropriate discount rate is 8.22 percent. Capital costs include the costs of future replacements; costs of the relicensing process; and the capital costs of proposed protection, mitigation, and enhancement (PME) measures (Proposed Action only). Refer to Table 6-1 in the PDEA for a listing of these measures. The rates for taxes and insurance as well as other economic assumptions are also shown in Table D-2.

Annual expenses comprise the Project's operation and maintenance (O&M) costs, FERC fees, and the O&M associated with proposed PME measures (Proposed Action only). The estimated average annual costs for both current Project operations and the Proposed Action are summarized in Table D-3. Additionally, Avista anticipates an energy revenue reduction of $33,900 associated with the implementation of new PME operational measures as described in the PDEA.

Table D-2. Assumptions for economic analysis of the Spokane River Project. (Source: Avista 2005)

Assumption	**Value**
Base Year for costs and benefits	2007
Period of analysis	30 years
Term of financing	20 years
Federal and state tax rate	35.00%
Local tax rate	1.25%
Long term inflation	0.00%
Insurance	0.25%
Discount rate	8.22%
Short-term Debt	9.72%
Long-term Debt	8.75%
Weighted Cost of Capital	9.72%
Return on equity	10.64%
Debt ratio	49%
Factor to annualize measures with tax and insurance with capital costs up front and O&M cost identical over 30 years[a]	13.71%
Factor to annualize measures with no tax or insurance with capital costs up front and O&M cost identical over 30 years[a]	12.13%

[a] Many items have irregular cash flows (for example, a measure that is constructed in year 5 and has O&M costs from years 6 through 30). Annualizing factors for such measures are developed on a case-by-case basis.

[5] Avista annualizes costs by computing the effects of interest, principal, depreciation, income taxes, local taxes, and insurance (if appropriate) and computing the present worth. That present worth is then converted to a stream of equal payments over a 30-year period of analysis.

Table D-3. Estimated average annual Project costs ($2007). (Source: Avista, 2005)

Item	Current Project Operations	Proposed Action
Annualized Capital Costs		
Net Investment[a]	9,424,800	9,424,800
Future replacements[b]	4,836,000	4,836,000
Relicensing costs[c]	954,900	954,900
Proposed PMEs	--	640,700[d]
Annual Expenses		
O&M	3,375,500	3,375,500
FERC fees	436,600	436,600
PME O&M	--	856,400[e]
Total	19,027,800	20,524,900

[a] Levelized carrying cost based on total net investment of $68,732,000.

[b] Levelized carrying cost based on future plant capital expenditures of $46,336,000.

[c] Levelized carrying cost based on relicensing expenditures of $7,874,100

[d] For a detailed listing of PME costs, refer to table 6-5, Summary of Capital and One-time Costs, Annual Costs, Annual Energy Costs, and Total Annualized Costs of Environmental Measures Proposed by Avista for Spokane River Project, in Section 6.0 of the PDEA (Volume II, Part 1 of 2, of this application). Levelized carrying cost based on total capital expenditures for PMEs of $5,345,000.

[e] Levelized cost of regular O&M and irregular O&M.

D.5 Estimated Annual Value of Project Power Based on Lowest Cost Alternative

The most likely least-cost alternative for Avista would be a combination of short- and long-term power purchases and construction at some future date of new generating units, most likely a gas-fired, combined-cycle combustion turbine (CCCT). For illustrative purposes Avista summarizes pricing a 140-MW CCCT unit in Table D-4.

Table D-4. Present value and levelized value of CCCT Project costs (in 2007 dollars). (Source: Avista, 2003)

Combined Cycle Combustion Turbine	Cost
Capacity (MW)	128.30
Energy (GWh)	796.64
Present value capital cost	101,103,000
Levelized capital cost over 30 years	13,863,600
Levelized fuel cost over 30 years	23,761,700
Levelized variable operations and maintenance cost over 30 years	2,230,600
Levelized fixed operations and maintenance cost over 30 years	3,335,900
Total levelized cost	43,191,800
Unit levelized cost per MW	336,600
Unit cost of energy ($/MWh)	54.22

D.6 Source and Extent of Financing and Annual Revenues Available

Operating revenues are available to Avista from electric energy and natural gas, and other sales (refer to Table D-5). The actual financing of utility construction and operational needs depends on the cost and availability of external funds through capital markets and financial institutions. Avista expects to finance any Project additions as part of its construction financing program, using funds from operations plus the sale of some securities. No specific Project-related financing is anticipated.

Table D-5. Avista Utilities financial information (dollars in thousands). (Source: Adapted from Avista, 2004)

Item	2003	2002	2001
Operating Revenues	$928,211	$893,964	$1,230,847
Resource Costs	$474,927	$453,525	$849,996
Gross Margins (operating revenues less resource income)	$453,284	$440,439	$380,851
Operations and Maintenance Expenses	$107,697	$97,668	$97,831
Administrative and General Expenses	$65,951	$63,751	$53,416
Depreciation and Amortization Expenses	$72,068	$66,243	$61,383
Income from Operations	$146,777	$149,180	$114,927
Income from Continuing Operations	$36,241	$36,382	$24,164
Assets	$2,563,572	$2,369,418	$2,569,798
Capital Expenditures	$102,271	$64,207	$119,905

D.7 Literature Cited

Avista (Avista Corporation). 2005. Spokane River Hydroelectric Project (FERC No. 2545) Application for New License Major Project—Existing Dam: Volume II Applicant-prepared Preliminary Draft Environmental Assessment. Avista Corporation, Spokane, WA. February 2005.

Avista. 2004. Form 10-K, Avista Corp—ava, filed on March 08, 2004 (period: December 31, 2003)

Avista. 2003. 2003 Integrated Resource Plan. http://www.avistautilities.com/resources/plans/electric.asp, accessed on June 1, 2004. Avista Utilities, Spokane, WA.

EXHIBIT E—ENVIRONMENTAL REPORT

Avista, in consultation with stakeholders in the Spokane River Hydroelectric Project relicensing, petitioned the Commission to use the alternative licensing process in April 2002. The Commission approved this request in June 2002. The alternative licensing process has allowed Avista to prepare and substitute an applicant-prepared PDEA in place of the traditional Exhibit E of a license application, pursuant to 18 CFR § 4.34(i)(6)(iv). During the course of the relicensing activities, Avista decided to apply for a separate license for Post Falls HED, which is the only development of the current Spokane River Project to be situated in the state of Idaho. To that end, two license applications are being filed concurrently: one for the Spokane River Project that encompasses Upper Falls, Monroe Street, Nine Mile and Long Lake developments; and one for Post Falls HED. The PDEA prepared in support of the relicensing activities has been filed under separate cover as part of this Spokane River Project license application (Volume II) and as part of the Post Falls HED license application (Volume II). The draft license application was distributed for public review and comment on February 28, 2005. Appendix A presents a summary of the comments received on the draft license application and Avista's response to those comments.

In preparation for the alternative licensing process, Avista and the stakeholders participating in the process developed a Communications Protocol and Guiding Principles to help manage the relicensing process. To facilitate the distribution of such information to all stakeholders and to establish a record of consultation, Avista developed and maintains the Spokane River Project relicensing web site. This web site, available at www.avistautilities.com/resources/relicensing/Spokane, provides an overview of the Project and a record of the relicensing process, including study plans and results, meeting schedules and summaries, and work products and reports applicable to both the Spokane River Project and Post Falls HED.

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EXHIBIT F—GENERAL DESIGN DRAWINGS

F.1 General Design Drawings

The Federal Energy Regulatory Commission Rule RM02-40-000, Order No. 630, as amended by RM02-4-001 and PL02-1-001, Order No. 630-A, requires applicants to separate certain information into the following categories:

- *Public*
- *Non-Internet Public*
- *Critical Energy Infrastructure Information*
- *Privileged (other non-public)*

Drawings of the general design and principal Project works for the Spokane River Project are classified as Critical Energy Infrastructure Information (CEII) under Order No. 630. These Exhibit F drawings are included in Volume III of the Application for New License and are identified as “CEII.” The drawings will not be available in the Commission’s Public Reference Room or as a public access image on the Commission’s eLibrary web locations, except as an indexed item.

The procedures for obtaining access to CEII may be found at 18 CFR § 388.113. Requests for access to CEII should be made in writing to the Commission’s CEII Coordinator and include the requester’s name, title, address, telephone number, and social security number; the name, address, and telephone number of the person or entity on whose behalf the information is requested; a detailed statement explaining the particular need for and intended use of the information; and a statement as to the requester’s willingness to adhere to limitations on the use and disclosure of the information requested.

Avista may also make copies of the Spokane River Project Exhibit F drawings available to interested parties if a demonstrated need can be shown. Such a request may require the execution of a confidentiality agreement or other form of record keeping necessary to maintain a record of the distribution of the drawings for security purposes.

The drawings that are contained in Exhibit F are listed in Table F-1 below.

Table F-1. Spokane River Project general design drawings.

HED	FERC Drawing Number	Avista Drawing Number	Drawing Title
Upper Falls			
	F-1	M-36292/1	Plan and Section of Control Works
	F-2	M-36292/2	Control Works and Sections of Spillway

HED	FERC Drawing Number	Avista Drawing Number	Drawing Title
	F-3	M-36292/3	Control Works, Rolling Sector Gate Section
	F-4	M-36292/4	Control Works, Vertical Lift Gates
	F-5	M-36292/5	Penstock
	F-6	M-36292/6	Penstock Intake
	F-7	M-36292/7	Headgates and Oper Mech
	F-8	M-36292/8	Section through Powerhouse
	F-9	M-36292/9	Generator Floor
	F-10	M-36292/10	Upper Falls HED One-line Wiring Diagram
Monroe Street			
	F-11	M-36292/11	General Plan
	F-12	M-36292/12	Penstock Plan and Profile
	F-13	M-36292/13	Intake Structure as Built for 1995 Modifications
	F-14	M-36292/14	Thrustblock Sections and Details
	F-15	M-36292/15	Powerhouse Plan
	F-16	M-36292/16	Powerhouse Transverse Section
	F-17	M-36292/17	Powerhouse Plans at Elevation 1,742 and 1,724
	F-18	M-36292/18	Powerhouse
	F-19	M-36292/19	Monroe Street HED One-line Wiring Diagram
Nine Mile			
	F-20	M-36292/20	General Plan
	F-21	M-36292/21	Spillway Cross Section
	F-22	M-36292/22	Section through Powerhouse
	F-23	M-36292/23	Transverse Section through Powerhouse Units 3 and 4
	F-24	M-36292/24	Diversion Tunnel General Arrangement - Elevation
	F-25	M-36292/25	Nine Mile HED One-line Wiring Diagram
Long Lake			
	F-26	M-36292/26	General Plan
	F-27	M-36292/27	Elevation and Section at Main Dam
	F-28	M-36292/28	Section through Intake Dam
	F-29	M-36292/29	Cut-off Dam

HED	FERC Drawing Number	Avista Drawing Number	Drawing Title
	F-30	M-36292/30	Section through Powerhouse
	F-31	M-36292/31	Long Lake HED One-Line Wiring Diagram

F.2 Supporting Design Report

For Avista's Supporting Design Report, we reference the current FERC Part 12D Dam Safety Reports. The Part 12D Report for Long Lake and Nine Mile HEDs was submitted to the Commission on December 29, 2004, and was entered on the docket on January 5, 2005. Upper Falls and Monroe Street HEDs are not considered high-hazard dams, and Part 12D inspections are not required for these facilities. Part 12D Reports are considered non-public under CEII. A third-party may request access to these reports under 18 CFR § 388.113 using the same procedures described under Section F.1.

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EXHIBIT G—MAPS OF THE PROJECT

The Federal Energy Regulatory Commission Rule RM02-40-000, Order No. 630, as amended by RM02-4-001 and PL02-1-001, Order No. 630-A, requires applicants to separate certain information into the following categories:

- *Public*
- *Non-Internet Public*
- *Critical Energy Infrastructure Information*
- *Privileged (other non-public)*

The Project boundary maps included in Exhibit G are classified as Non-Internet Public (NIP) information and are included in Volume IV of the Spokane River Project License Application. They have been produced in a geo-referenced electronic format, with a minimum of three triangulated reference points. NIP information is maintained and available for viewing in the Commission's Public Reading Room. Avista will, however, place these maps on its relicensing web site and provide the maps to interested parties on compact disc (CD) by request. A smaller scale representation of the Project boundary can be found in Figures 3-2 through 3-4 of the PDEA (Volume II) that accompanies this license application.

The 22 Exhibit G maps of the Spokane River Project, located within the counties of Spokane, Stevens, and Lincoln in the state of Washington, identify the current boundaries of the Upper Falls HED, Monroe Street HED, Nine Mile HED, and Long Lake HED, as well as the proposed boundary adjustments.

Currently, the Spokane River Project HEDs encompass 6,164.9 acres; 138.2 acres within the Monroe Street and Upper Falls HED boundary, 413.9 acres within the Nine Mile HED boundary, and 5,612.8 within the Long Lake HED boundary.

At Monroe Street and Upper Falls HEDs, Avista proposes to remove approximately 2.8 acres of land that was originally included in the Project boundary based on a metes and bounds survey. Much of the shoreline area originally included in the Project boundary has been modified over the years, especially during the preparation for Expo 74, when this heavily industrialized area was completely redeveloped. The proposed Project boundary would follow pool elevations pertinent to the two HEDs.

At Nine Mile HED, Avista proposes to remove 66 acres from the Project boundary, which includes removing 19.1 acres on the east side of the HED that is separated from the Project by State Highway 291, an area that includes a non-Project transmission line right-of-way. Avista also proposes to remove 5.4 acres on the west side of the river that includes the old overlook and cottage compound used by Washington State Parks for employee housing and 3.3 acres from the Project boundary that is located downstream of the HED facility and is separated from the HED by Charles Road, because these lands serve no Project purpose. Finally, Avista proposes to remove 38.2 acres of private and state-owned land in small scattered parcels located adjacent to the Project boundary. These private lands serve no Project purpose, and the small state-owned parcels are managed as part of the 10,000-acre Riverside State Park.

At Long Lake HED, Avista proposes to expand the Project boundary by adding 350.1 acres of Avista-owned lands. This addition would include 319.9 acres in a 200-foot-wide shoreline buffer, 15.4 acres for the Nine Mile Resort property, and 3.0 acres at a dredged boat area. Avista also proposes to add 11.8 acres for the 1.8-mile-long section of transmission line associated with Long Lake HED, which as a result of transmission system changes, serves to deliver Project-generated power to the regional system.

EXHIBIT H—GENERAL INFORMATION

H.1 Efficiency and Reliability

Avista provides energy to more than 325,000 electric and 300,000 natural gas customers in a 30,000-square-mile service area that covers parts of four western states (Washington, Idaho, Oregon, and Montana) with a variety of energy resources (Table H-1). To meet the needs of its electric customers, Avista owns and operates both hydro and thermal power plants (Table H-1). These include six hydroelectric projects on the Spokane River (192 MW) and two on the Clark Fork River (773 MW). Avista owns a 15 percent share of Colstrip 3 and 4, a coal-fired thermal plant in eastern Montana (222 MW). Avista owns and operates three natural gas-fired projects within its service territory (274 MW) and Coyote Springs 2 (287 MW), a new gas-fired project in Oregon. Avista also owns and operates a large wood-waste-fired generating plant near Kettle Falls, Washington (50 MW). In combination with several medium- to long-term power supply purchase and sale arrangements (including wind power), Avista manages its resources to provide efficient and reliable service to its electric customers.

Avista intends to apply its demonstrated expertise in operating and managing power-generating resources to the efficient and reliable operation of the Spokane River Project over the term of the new license.

H.1.1 Plans for Increased Capacity or Generation

Avista has conducted a regular program of Project upgrades and of generator rewinds and turbine refurbishments at the Spokane River Project (reference Exhibit C, Table C-1) and will continue to do so over the new license term.

No increases in capacity or generation are planned as part of this application for new license.

H.1.2 Project Coordination with Other Electric Systems

Avista operates the Spokane River Project in coordination with its other power supply resources to meet the power needs of its customers, and, as a signatory to the Pacific Northwest Coordination Agreement, as an element of the coordinated regional system in accordance with the provisions of that agreement.

Generally, the five hydroelectric developments that comprise the current Spokane River Project are operated to maximize power generation to meet local and regional electricity demands, with consideration also given to flood management, resource protection, recreation, and other water-associated needs. During extreme weather events or regional power shortages, normal operating conditions on the Spokane River Project may be modified, but still remain consistent with constraints imposed by the existing license. Operational changes may also occur in emergency situations, such as accidents or other conditions that pose a threat to life or property, or in the event of equipment failures.

The current Spokane River Project hydroelectric developments are operated in a coordinated manner, with Post Falls HED regulating flows in the Spokane River at certain times of the year in accordance with minimum flow requirements and other lake-level or downstream-flow considerations. Downstream of Post Falls, Upper Falls and Monroe Street HEDs, which have very little storage capacities, are operated as run-of-river facilities. Farther downstream, Nine Mile HED is also operated as a run-of-river facility.

At Long Lake HED, the most downstream of the Project hydroelectric developments, storage is used primarily for responding to the energy demands of Avista's customers during the winter months, with the pool level dropping over a period of several weeks to several months, depending on energy needs and water inflow. During the summer and fall, Avista maintains Lake Spokane at a level near full pool, generally using no more than the top foot of storage for responding to daily changes in energy demand.

Even though Avista is seeking to obtain a separate license for Post Falls HED for the new license term, the four developments that would remain in the Spokane River Project and Post Falls HED would continue to be operated in this coordinated manner.

H.1.3 Flood Control Coordination with Upstream or Downstream Projects

The Spokane River Project (downstream of Post Falls HED) plays no role in flood management. Avista draws Coeur d'Alene Lake down during the fall and winter (to as low as elevation 2,120.5 feet), which increases the storage capacity in Coeur d'Alene Lake to accommodate fall through spring precipitation and spring snowmelt. Nonetheless, spring rain and snowmelt can result in high flows into Coeur d'Alene Lake such that the lake level rises above elevation 2,128 feet even though all spill gates are open at Post Falls HED and all water reaching the development is immediately passed downstream. Because of the natural Coeur d'Alene Lake outlet characteristics, there is nothing Post Falls HED can do to alter a flood event once flows reach flood stage.

H.2 Applicant's Need for the Project

Avista is an investor-owned utility that provides electric service to approximately 325,000 residential, commercial, and industrial customers in portions of Washington and Idaho. Avista meets its load requirements through a combination of owned and contracted resources (refer to Section H.3.2). Its power supply resource mix consists of 55 percent hydroelectric, 29 percent natural gas, 13 percent coal, and 3 percent biomass. As of 2004, Avista's electric power resources, both owned and under long-term contract, provided approximately 2,000 MW in peaking capacity and 1,350 aMW in energy generation capability.

Avista's *2003 Integrated Resource Plan* describes the Applicant's current and projected future generating capacity and production, as well as current and future loads (Avista, 2003). The Integrated Resource Plan is a comprehensive, long-range planning process, in which forecasted energy requirements are fully integrated with potential energy resources. The process helps determine the most cost-effective means for Avista to meet those projected requirements (Avista, 2003). The information presented in the remainder of this section is derived from the Integrated Resource Plan. See Section H.3.2 for additional detail.

Avista forecasts its annual growth rate of electricity sales to average 3.4 percent over the 20-year planning period. Total energy load obligations would rise from 1,176 aMW in 2004 to 1,556 aMW in 2013, and to 2,069 in 2013. Avista forecasts that its winter peak load will grow by 512 MW over the next 10 years, from 1,470 MW in 2004 to 1,982 MW in 2013. By 2023, Avista anticipates a winter peak of 2,780 MW.

The availability levels of Avista's existing resources are anticipated to decrease approximately 14 percent over the 20-year planning period. This estimate primarily reflects the expiration of mid-Columbia contract hydroelectric resources (92-aMW loss over the planning period) and the expiration of other power supply contracts (144-aMW loss).

Avista has adequate resources to meet its future annual energy load obligations through 2007, including reserve margins and accounting for load and hydroelectric variability. On an average annual basis, the first significant deficit occurs in 2008. With regard to capacity, the first deficit is forecast to occur in 2010.

As discussed in Exhibit B.1.2, the period of record best reflecting current Project operations is from 1993 through 2003. The generation provided by the Spokane River Project (87.6 aMW of energy and 137-MW maximum capacity) and Post Falls HED (9.6 aMW of energy and 18-MW maximum capacity) is assumed available throughout the planning period. Any loss of this generation would advance the onset of energy deficits and increase their magnitude, thereby necessitating an accelerated program of new resource acquisition.

H.2.1 Costs and Availability of Alternative Sources of Power if License Not Granted

The loss of the Spokane River Project generating resource would advance the onset of forecasted energy and capacity deficits and increase the need for new resources. Avista routinely evaluates the feasibility of adding system generation and capacity from a full range of reasonable alternative resources. As described in its Integrated Resource Plan, Avista has a variety of available electric resource opportunities to balance its load-resource outlook. These alternatives include demand-side management measures, combined-cycle combustion turbines, simple-cycle combustion turbines, coal-fired steam, wind generation, solar generation, and cogeneration.

According to Avista's *2003 Integrated Resource Plan*, the least-cost expansion strategy is the "All CCCT" strategy, consisting entirely of natural gas-fired combined–cycle combustion turbines. This finding is consistent with region-wide least-cost planning, and CCCTs account for most of the new generation proposed and under development in the Northwest. A plant design could incorporate one to three gas turbine generators (about 160 MW each) in combination with a steam turbine of about 80 to 90 MW per turbine. A heat recovery system captures heat from the gas turbine(s) to create the steam for the secondary steam turbine system. Avista selected a one-on-one configuration (one gas turbine exhausting heat into a single heat recovery steam generator) to match the anticipated magnitude of its incremental load requirements. A new CCCT could be located in or near Avista's service territory. Avista is in the process of updating its Integrated Resource Plan and preferred options to add generation will continue to evolve.

H.2.2 Replacement Costs and Increased Costs if License Not Granted

The current estimate of the 30-year annual levelized cost of owning and operating the Spokane River Project, starting in 2007, is shown in Section D.4, Table D-3. The estimated minimum annual cost to replace the generation and capacity of the Spokane River Project with new gas-fired combustion turbine generation, also starting in 2007, is $43,191,800 (see Section H.3.3.2).

If Avista is not granted a new license for the Spokane River Project, the 30-year annual levelized cost would increase over current costs. The extent of the increase cannot be determined at this time.

H.2.3 Effects of Alternative Sources of Power

H.2.3.1 Effects on Customers

Avista's electric service area covers parts of Washington and Idaho. Avista is subject to the regulatory authority of the state utility commissions as to retail utility rates.

Because Avista is a regulated electric utility company, the costs of power production, procurement, and distribution are passed directly on to residential, commercial, and industrial customers. Any viable new generating resource equal in output and comparable in operating characteristics to the Spokane River Project would likely be more expensive than continued operation of the existing Project. Therefore, under current laws and regulations, replacing the Project with a different generating resource would likely increase retail power costs across the entire service area.

H.2.3.2 Effects on Operating and Load Characteristics

The Spokane River Project is a stable component of Avista's generating resources and, like most hydroelectric projects, can be brought on-line quickly. Avista's hydroelectric resources also have a lower reserve requirement (5 percent) than thermal generation (7 percent). If a new license were not granted for the Project, its power production would likely be replaced eventually with new thermal-generating resources. Loss of the Spokane River Project could affect Avista's regional operating and load characteristics.

H.2.3.3 Effects on Communities Served

The Spokane River Project is part of Avista's integrated power supply system. Therefore, the communities served by the Project are the residential and business customers throughout Avista's service area (see Section H.2.3.1). The loss of this generating resource would result in higher power production costs associated with replacement power and additional transmission lines, and these higher costs would, under current law, be passed on to all consumers in Avista's service area.

If the license were transferred to a different licensee, the Project's operating costs and power benefits would be transferred to the new licensee. This would result in a reallocation of the Project's net benefits from Avista's customers to the customers of the new licensee.

H.3 Data on Cost, Need, and Availability of Alternatives

H.3.1 Cost of Project Power

The power production costs of the Spokane River Project consist of carrying charges and O&M expenses. Under current Project operations (the five hydroelectric developments that include Post Falls HED) and with existing license terms, annual levelized carrying charges, including capital expense recovery, future capital plant costs, return on equity, and taxes are $15,215,700. Current annual O&M expenses, including FERC fees, are $3,812,100.

The estimated cost of power is based on incorporating the environmental measures as described in the PDEA (refer to PDEA Table 6-3). With these measures included, the annual levelized carrying charges are $15,856,400, and the annual O&M expenses are $4,668,500. In addition, costs related to Section 10(e) for storage of water on federal reservations has yet to be determined. The actual cost of power from the Project will depend on the final terms of a new license and cannot be forecast at this time. Furthermore, energy losses associated with the new environmental measures are anticipated to be about $33,900.

H.3.2 Resource Requirements

H.3.2.1 Capacity and Energy Requirements over the Short and Long Term

Avista developed a 20-year forecast of customers, energy sales, and peak demands for its electric service territory as part of the *2003 Integrated Resource Plan*. The methodology, assumptions and findings are summarized in this section.

Avista relies upon employment and population forecasts for the three counties that comprise over 80 percent of its service territory: Spokane County, Washington, and Kootenai and Bonner counties, Idaho. The county-level estimates were completed in May 2002, and these form the basis for Avista's electric customer forecast. Over the past 20 years, there has been a strong regional trend away from an economy largely based on natural-resource-based manufacturing to one based on light manufacturing and services. Looking ahead, Spokane County is expected to exhibit moderate, steady growth for the next 20 years. Kootenai County, which has been the third-fastest growing county in the country, is expected to continue growing rapidly. Bonner County is expected to experience modest growth.

Population growth and housing trends are the key components of forecasting residential and commercial customer growth. Over the 20-year planning horizon, customer growth is forecast to average 1.8 percent per year, slightly higher than the 1.5 percent annual growth rate experienced over the 5 years preceding the forecast.

The 20-year forecast of electric retail sales assumes no additional plant closures beyond those several large industrial facility closures during the 2001/2002 economic recession, relatively stable retail electric prices that increase slightly below the prevailing rate of inflation, and a modestly healthy overall economy. Energy conservation acquisitions are assumed to continue throughout the forecast period, and energy-efficient equipment is assumed to be installed in new construction and to replace retired equipment in existing residences and businesses.

The result of the forecast is that Avista's retail electric sales are forecast to increase from just under 8,000 GWh in 2003 to almost 15,000 GWh in 2013. The retail sales forecast is then converted into energy and peak load forecasts, the results of which are presented in Section H.3.2.4, below.

H.3.2.2 Existing Energy and Capacity Resources

The *2003 Integrated Resource Plan* examines Avista's existing generating resources for meeting customer demand. Avista meets its load requirements through a combination of company-owned and contracted resources. Table H-1 lists these resources, their output, and the dates when any contract or license will expire.

Table H-1. Resource and major contract summaries. (Source: Avista, 2003)

Name	River System	Fuel	Location	Start Date[a]	Maximum Capacity (MW)[b]	Energy (aMW)[b]	End Date[c]
Monroe Street	Spokane	Water	Spokane, WA	1890	15.0	13.2	July 31, 2007
Post Falls	Spokane	Water	Post Falls, ID	1906	18.0	9.9	July 31, 2007
Nine Mile	Spokane	Water	Nine Mile Falls, WA	1925	24.5	16.4	July 31, 2007
Little Falls	Spokane	Water	Ford, WA	1910	36.0	22.8	NA
Long Lake	Spokane	Water	Ford, WA	1915	88.0	52.4	July 31, 2007
Upper Falls	Spokane	Water	Spokane, WA	1922	10.2	8.8	July 31, 2007
Cabinet Gorge	Clark Fork	Water	Clark Fork, ID	1952	246.0	122.2	March 1, 2046
Noxon Rapids	Clark Fork	Water	Noxon, MT	1959	527.0	202.9	March 1, 2046
Colstrip 3	NA	Coal	Colstrip, MT	1984	111.0	95.6	NA
Colstrip 4	NA	Coal	Colstrip, MT	1986	111.0	95.6	NA
Rathdrum	NA	Gas	Rathdrum, ID	1995	176.0	167.2	NA
Northeast	NA	Gas/oil	Spokane, WA	1978	66.8	63.5	NA
Boulder Park	NA	Gas	Spokane Valley, WA	2002	24.6	23.4	NA

Name	River System	Fuel	Location	Start Date[a]	Maximum Capacity (MW)[b]	Energy (aMW)[b]	End Date[c]
Coyote Springs 2	NA	Gas	Boardman, OR	2003	287.0	272.6	NA
Kettle Falls	NA	Wood	Kettle Falls, WA	1983	50.0	48.9	NA
Kettle Falls CT	NA	Gas	Kettle Falls, WA	2002	6.9	6.5	NA
Rocky Reach	Mid-Columbia	Contract	NA	1961	37.7	20.5	October 31, 2011
Wells	Mid-Columbia	Contract	NA	1967	28.6	9.9	August 31, 2018
Priest Rapids	Mid-Columbia	Contract	NA	1965	129.3	71.0	TBD
PacifiCorp Exchange	NA	Contract	NA	1954	50.0	0.0	March 31, 2004
PGE Capacity Sale	NA	Contract	NA	1992	150.0	0.0	December 31, 2016
Upriver Dam	Spokane	Contract	Spokane, WA	1966	14.4	10.0	June 30, 2004
WNP-3	NA	Contract	NA	1987	82.0	48.0	June 30, 2019
Medium-term Purchases	NA	Contract	NA	2004	100.0	100.0	December 31, 2010

Notes: CT – combustion turbine

NA – not applicable

[a] Date is when ownership/contract began.

[b] Company's share of Project in 2004; hydro generation assumes "average" water from NWPP 2000/2001.

[c] Date is when contract/license will expire.

H.3.2.3 Demand-Side Management Measures

Avista acquires Demand-Side Management (DSM) resources from various energy-efficiency technologies delivered through commercial/industrial and residential sectors. These technologies include lighting, motors, resource management, renewables, appliances, controls, heating, ventilation and air conditioning (HVAC), and industrial processes. Avista's DSM program activities are under the continuous review of an oversight board known as the External Energy-Efficiency Board. In its current business plan, Avista is targeting low-cost and no-cost DSM measures, traditional efficiency measures that are commercially available, reliable and produce predictable and cost-effective energy savings, and lost opportunity measures.

Programmatic DSM resource acquisition, that is, efficiency measures with which Avista is directly involved, is separately accounted for in the load growth forecast. More generalized DSM absorption cannot be disaggregated and is implicitly incorporated in the forecast.

H.3.2.4 Load-Resource Outlook

Avista's load-resource outlook is presented in the *2003 Integrated Resource Plan* and summarized here. Avista anticipates its system-wide electric energy load to grow by 341 aMW over the next 10 years, from 985 aMW in 2004 to 1,326 aMW in 2013. By 2023, Avista anticipates an electric energy load of 1,860 aMW. Avista forecasts its winter peak to grow by 512 MW over the next 10 years, from 1,470 MW in 2004 to 1,982 MW in 2013. By 2023, Avista anticipates a winter peak of 2,780 MW (refer to Section H.3.2.1 for the basis of these forecasts).

The availability levels of Avista's existing resources are anticipated to decrease approximately 14 percent over the 20-year planning period. This estimate reflects primarily the expiration of mid-Columbia contract hydroelectric resources (92 aMW loss over the planning period) and the expiration of other power supply contracts (144 aMW loss). Refer to H.3.2.2, above.

Avista simulated the dispatch of its existing resources to serve the forecasted load over a 20-year planning period to quantify its load-resource outlook. The results of this load-resource analysis for energy are summarized in Table H-2.

Table H-2. Loads and resources energy forecast (aMW). (Source: Avista, 2003)

	Year							
	2004	**2005**	**2006**	**2007**	**2008**	**2013**	**2018**	**2023**
Loads								
System retail load	985	1,014	1,051	1,083	1,120	1,326	1,569	1,860
Demand-side management load[a]	2	5	10	14	19	41	64	56
Contingency[b]	189	189	189	189	189	189	189	153
Total obligations	1,176	1,208	1,250	1,286	1,328	1,556	1,822	2,069
Resources								
Hydroelectric	550	545	530	530	529	477	471	458
Demand-side management[a]	2	5	10	14	19	41	64	56
Net contracts	156	157	175	177	177	58	59	12
Base thermal	223	230	223	223	230	230	230	230
Gas dispatch	158	156	158	158	156	158	158	156
Gas peaking units	181	181	181	181	181	181	181	181
Total resources	1,270	1,274	1,277	1,283	1,292	1,145	1,163	1,093
Net position	94	66	27	–3	–36	–411	–659	–976

	Year							
	2004	2005	2006	2007	2008	2013	2018	2023

Notes: % – percent
aMW – average megawatt
DSM – demand-side management

[a] DSM acquisitions are prescriptive. In other words, without prescribed DSM acquisitions, both loads and supply-side resource acquisitions would be higher. This is represented in the table by including DSM as both an obligation and a resource, the net of which is zero.

[b] The contingency includes an allowance to reflect the 12-month average of reserve energy necessary to ensure no more than a 10 percent probability of loads exceeding forecast due to extreme weather and/or the hydroelectric resources underperforming due to low water conditions.

The forecast indicates that Avista's energy position, on an annual basis, is surplus through 2006. On a monthly basis, however, Avista expects to encounter energy deficits during some months in all years of the forecast. In other months, particularly during spring runoff, Avista would be in a surplus situation. Avista may balance its monthly positions through short-term market purchases or sales, exchanges, or other resource arrangements. The first significant annual energy deficit is forecast in 2008 (–36 aMW). This deficit is forecast to grow to 411 aMW by 2013 and to 976 aMW by 2023.

As in the case of energy generation, Avista also forecasts peak capacity loads and resources (Table H-3). Peak load is defined as the maximum one-hour load obligation on the expected average coldest day in January, plus operating reserves. Peak resource capability is defined as the maximum 1-hour generation capability of Avista resources, plus the net contract contribution. The forecast indicates that Avista is in a surplus capacity position through 2009. Annual capacity deficits begin in 2010, with winter peak loads exceeding peak resource capability by more than 100 MW. By 2013, a capacity shortfall of as much as 432 aMW is forecast.

Table H-3. Peak loads and resources capacity forecast (MW). (Source: Avista, 2003)

	Year							
	2004	2005	2006	2007	2008	2013	2018	2023
Loads								
Retail load	1,470	1,515	1,570	1,617	1,672	1,982	2,349	2,780
Operating reserves	110	110	108	108	108	104	103	101
Total obligations	1,580	1,625	1,678	1,725	1,780	2,086	2,452	2,881
Resources								
Hydroelectric	1,177	1,177	1,135	1,134	1,133	1,043	1,035	998
Net contracts	70	19	43	45	45	–73	78	–2
Base thermal	272	272	272	272	272	272	272	272

	Year							
	2004	**2005**	**2006**	**2007**	**2008**	**2013**	**2018**	**2023**
Gas dispatch	176	176	176	176	176	176	176	176
Gas peaking units	236	236	236	236	236	236	236	236
Total resources	1,931	1,880	1,862	1,863	1,862	1,654	1,797	1,680
Net position	351	255	184	138	82	–432	–655	–1,201

Notes: % – percent
MW – megawatt

H.3.3 Alternative New Sources of Power

Avista has a variety of available electric resource opportunities to balance its load-resource outlook. These alternatives include DSM measures, combined-cycle combustion turbines, simple-cycle combustion turbines, coal-fired steam plants, wind generation, solar generation, and cogeneration. These are described in detail in the *2003 Integrated Resource Plan* and are summarized here.

Avista recognizes the significant value of DSM in a long-term electric resource strategy. As shown in Table H-2, Avista forecasts the introduction of 56 aMW of new programmatic DSM over the planning period, indicative of Avista's commitment to future acquisitions of cost-effective DSM. Refer to Section H.11 for more information on Avista's energy conservation programs.

In addition to conservation resources, Avista considers a range of generic resource technologies in its integrated resource planning process. In its *2003 Integrated Resource Plan*, Avista adopted the resources and their associated characteristics from the Northwest Power Planning Council (NWPPC) Fifth Power Plan. NWPPC developed this database of resources by relying on a committee of regional experts drawn from utilities, power developers, regulators, and other interested parties. Five new resource alternatives were incorporated into Avista's integrated resource planning: CCCT, simple-cycle combustion turbine (SCCT), coal-fired steam, wind, solar, and cogeneration. Table H-4 displays key cost and operational characteristics of each resource used for comparative screening purposes. In addition to the foregoing resource options, Avista also evaluated a generic fixed-price, 100-MW power supply contract as a potential resource.

Table H-4. New resource alternatives (in $2000).

Resource	Installed Capacity (MW)	Unit Capacity (MW)	Heat Rate (Btu/kWh)	Unit Availability (%)	Fixed O&M ($/kW-year)	Variable O&M ($/MWh)	Levelized Cost ($/MWh)
CCCT	686	280	6,946	92	26	2.80	56.21
SCCT	730	92	9,486	941	8	3.70	93.53
Coal	1,230	400	9,550	84	55	1.75	58.05
Wind	679	100	NA	30	35	0.50	52.64

Resource	Installed Capacity (MW)	Unit Capacity (MW)	Heat Rate (Btu/kWh)	Unit Availability (%)	Fixed O&M ($/kW-year)	Variable O&M ($/MWh)	Levelized Cost ($/MWh)
Solar	6,000	20	NA	22	30	0.00	NA
Cogen	1,000	25	5,500	85	26	2.00	74.71

Notes: CCCT – combined-cycle combustion turbine
NA – not applicable
SCCT – simple-cycle combustion turbine

In prior years, Avista had identified some 32 resource options, but basic cost-effectiveness screens quickly reduce the range of viable alternatives. Resources not currently under consideration include geothermal, nuclear, advanced coal, bio-gasification, new hydroelectric facilities, and various high-cost solar technologies.

Avista combined the foregoing new resource options into six alternative capacity expansion strategies to meet the forecasted energy and capacity deficits. The strategies were No Additions, Lowest Cost, Lowest Risk, All CCCT, All Coal, and Wind. These strategies were evaluated using Monte Carlo simulation techniques under a range of market condition scenarios. The *2003 Integrated Resource Plan* includes further detail on the modeling process.

The least-cost expansion plan was shown to be the "All CCCT" strategy. When considerations of risk, capital expenditures, rate impacts, and reliance on the wholesale marketplace were weighed, in addition to cost, Avista identified a Preferred Resource Strategy consisting of a combination of CCCT (149 aMW), wind (25 aMW), coal (197 aMW), and SCCT (40 aMW). This expansion strategy would be sufficient to address Avista's forecasted load-resource deficit through 2013.

H.3.3.1 Least-Cost Alternative to the Spokane River Project

Avista's integrated resource planning approach is to consider an integrated portfolio analysis for the value and timing of new resources. If an alternative to the Spokane River Project's power and capacity was required, no single replacement resource would be assumed. Instead, integrated portfolio planning implies that all of Avista's existing resources and loads would be evaluated together to find the best mix of resources based on a combination of cost, risk, rate impacts, and other evaluation factors.

For this analysis, however, the alternative to the Project's generation and capacity is assumed to be a percentage of a generic new, efficiently sized gas-fired CCCT generating plant. This selection is consistent with Avista's finding in the *2003 Integrated Resource Plan* (discussed above) that the least cost expansion strategy is the "All CCCT" strategy, consisting of natural gas-fired CCCT.

H.3.3.2 Power Production Costs of the Least-Cost Alternative

These estimated costs for a CCCT are shown in Table H-5. The assumptions used in this analysis are consistent with the generic resource assumptions used in the portfolio analysis as reported in the *2003 Integrated Resource Plan*, including capital costs, financing, depreciation rates, and tax rates.

Table H-5. Spokane River Project replacement cost.

Item	Value
Discount rate	8.22%
Hydro reserve	5.00%
Thermal reserve	7.00%
Levelizing factor for capital costs	13.71%
Target-load factor CCCT	70.83%
Transmission line loss	1.90%
Cost of CCCT per kW ($2007)	788.0
Levelized capital cost CCCT per kW ($2007)	108.05
Fuel cost ($/MMBtu) (First Year 2007 average)	4.99
Levelized fuel cost ($/MMBtu) (First Year 2007 average)	4.29
Heat rate (Btu/kWh)	6,946
Fixed annual O&M cost CCCT ($2007/kW)	26.00
Levelized annual O&M cost CCCT ($2007/kW)	26.00
Variable annual O&M cost CCCT ($2007/MWh)	2.80
Levelized variable annual O&M cost CCCT ($2007/MWh)	2.80
Total existing Spokane River replacement capacity (MW)	126.22
Existing Spokane River replacement capacity less 5% reserve (MW)	119.91
Thermal capacity equivalent including 7% reserve (MW)	128.30
Total long-term Spokane River Project Energy (GWh)	796.64
Capacity from CCCT (MW)	128.30
Capital cost of CCCT ($2007)	$101,103,000
Levelized capital cost of CCCT ($2007)	$13,863,600
Levelized fuel cost CCCT ($2007)	$23,761,700
Levelized annual escalated fixed CCCT O&M over 30 years ($2007)	$3,335,900
Levelized variable annual O&M cost of CCCT ($2007)	$2,230,600
Total annual cost of CCCT excluding capital ($2007)	$29,328,200
Total levelized capital costs ($2007)	$13,863,600
Total levelized cost ($2007)	$43,191,800

H.3.3.3 Emissions from Replacement Resources

As discussed above (Section H.3.3), thermal resources will be required to meet Avista's forecasted load-resource deficits. Further, any loss of existing hydro resources, such as replacing the Project, would necessitate the development or acquisition of more thermal resources.

As a result, the loss of the Project would very likely result in increased air emissions from thermal generating resources. For example, an efficient CCCT with a heat rate of 6,900 British thermal unit (Btu)/kilowatt-hour (kWh) would produce about 400 tons of carbon dioxide (CO_2) per GWh. Replacing the Project's generation with a like amount of gas-fired CCCT generation could result in an increase of approximately 321,000 tons of CO_2 emissions per year.

H.3.4 Effect of Alternative Sources on Direct Providers

Under existing contracts, the direct providers who purchase power from Avista would not be affected by a change in Avista's production costs. If Avista enters into future power supply contracts with direct providers, replacing the Spokane River Project with a more expensive alternative would increase the cost of power to any direct providers and their customers.

H.4 Effect on Applicant's Industrial Facilities and Related Operations

Avista does not operate any industrial facilities that depend on the power production of the Spokane River Project.

H.5 Indian Tribe Need for Electricity

The Applicant is not an Indian Tribe.

H.6 Transmission System Impacts

H.6.1 Redistribution of Power Flows

The Spokane area transmission system primarily distributes power to within-region loads, moving power east and west between Grand Coulee and the Spokane area and eastward toward the Coeur d'Alene area. System constraints are dependent on direction of power flow, temperature, local area generation, and system configuration.

In the past, constraints for moving power both locally and between Spokane and other load centers have been an issue, but recent upgrades have overcome some of these limitations as described in Section H.6.2.

The Spokane River Project includes developments both within the city of Spokane as well as within relatively short distances (Long Lake HED is approximately 24 miles northwest of the Spokane city center as the crow flies). Consequently, reducing or eliminating generation from the Spokane River Project could have a potentially negative effect on transmission losses if the replacement generation were located some distance from the city center. Avista's recently acquired share of the Coyote Spring CCCT, for example, is 167 air miles from Spokane.

H.6.2 Advantages of the Applicant's Transmission System in Distribution of Project Power

Avista's existing transmission system has been recently upgraded to improve regional transfer capacity and local reliability in the Spokane area with the installation of a new 230 kV, double-circuit line replacing the existing 230-kV, single-circuit line. The new line between Beacon and Rathdrum can now accommodate 800 to 1000 MW of energy (Transmission & Distribution World, 2004). This system will improve the distribution of Project power with reduced line losses. Additionally, the regional transmission system has been enhanced with the Bonneville Power Administration's upgrade of the existing 115-kV, 84-mile-long transmission line between Grand Coulee Dam and the Bell Substation located near Mead just north of Spokane, to 500 kV. That linkage ensures better power-flow transmission on a region-wide level, including power from the Spokane River Project (Spokane Journal of Business, 2004). Avista is an active participant in the Northwest Operation Planning Study Group, which conducts operations studies of transmission flow, and Avista's transmission engineers are well qualified to optimize power flows in the Spokane area.

H.6.3 One-Line Diagram

One-line wiring diagrams for the Spokane River Project developments are included in Exhibit F as Figures F-10 (Upper Falls), F-19 (Monroe Street), F-25 (Nine Mile), and F-31 (Long Lake).

H.7 Plans to Modify Project Facilities or Operations

Avista proposes to modify Project operations to reflect a desire for balancing among resource objectives. A summary of the current Project operations is included below, followed by a description of the proposed operational changes at Upper Falls, Monroe Street, Nine Mile and Long Lake, the four developments that would make up the Spokane River Project under a new license. A full description of these modifications and their effects, as well as the associated costs, is included in the accompanying PDEA (Volume II).

The current FERC license for the Spokane River Project includes several specific operational terms and conditions providing for the protection and enhancement of environmental resources at Upper Falls, Monroe Street, Nine Mile and Long Lake HEDs. These include:

- Maintaining an aesthetic scenic flow of at least 200 cfs over the Monroe Street Dam during normal viewing hours from 10 a.m. to one-half hour after sunset each day; and

- Limiting the maximum drawdown of Long Lake HED operating reservoir (Lake Spokane) to no more than 24 feet (elevation 1,512 feet, compared to a normal full pool elevation of 1536 feet).

In addition to the foregoing, Avista has entered into a number of voluntary cooperative agreements with agencies, organizations, and individuals that affect operations:

- Maintenance of the Lake Spokane elevation within approximately 1 foot of full pool (1,536 feet) throughout the summer recreation season. (Voluntary)

- When possible, limiting the winter drawdown of Long Lake HED operating reservoir (Lake Spokane) to no more that 14 feet in consideration of local domestic water supplies. (Voluntary)

Under the Proposed Action, Avista would operate the Spokane River Project with the following restrictions:

- Avista would continue to provide the current 200-cfs minimum flow from 10:00 am to one-half hour after sunset daily, year-round, at Monroe Street HED and would initiate the same aesthetic flow and schedule through Upper Falls HED bypass reach (north and middle channel) from Memorial Day weekend through September 30.

- Avista would limit the drawdown of Lake Spokane to 14 feet, except under certain emergency conditions, which is a change from the current license condition that allows for a 24-foot maximum drawdown.

- Avista would attempt to periodically draw down Lake Spokane during the winter to expose the lakebed to freezing temperatures to reduce the occurrence of aquatic weeds such as Eurasion watermilfoil.

Of the many comprehensive plans for improving, developing or conserving waterways submitted to FERC by federal and state governmental agencies, 12 were found applicable to the four HEDs located in Washington State that would form the Spokane River Project[6] during a new license term. Each of these plans is discussed in Section 8.0 of the PDEA. All of the voluntary cooperative actions and the actions proposed by Avista under the terms of a new license, as described above, are consistent with these plans.

H.8 Justification for the Lack of Plans to Modify Existing Project Facilities or Operations

As described above in Section H.7, Avista proposes to modify Project operations.

Avista does not propose to modify existing Project facilities because internal upgrade feasibility analysis, while showing that some potential exists to capture more energy, demonstrates that it is not cost effective to do so. The upgrades pursued at Nine Mile, Long

[6] Northwest Conservation and Electric Power Plan, Columbia River Basin Fish and Wildlife Program; North American Waterfowl Management Plan; Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service; Spokane Resource Area Management Plan and Final Environmental Impact Statement; Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy; An Assessment of Outdoor Recreation in Washington State: A State Comprehensive Outdoor Recreation Planning (SCORP) Document 2002-2007; Statute Establishing the State Scenic River System, Chapter 79.72 RCW; Water Resources Management Program-Little Spokane River Basin; Washington State Wetlands Integration Strategy; Application of Shoreline Management to Hydroelectric Developments; Hydroelectric Project Assessment Guidelines; and, State of Washington Natural Heritage Plan.

Lake, and Monroe Street HEDs during the past 15 years appear to have exhausted the cost-effective upgrade potential of the Spokane River Project given current and anticipated power prices. Avista will continue to evaluate potential upgrades.

H.9 Applicant's Financial and Personnel Resources

Avista has adequate financial resources to meet its obligations under a new license for the Spokane River Project with a total capitalization of more than $2.6 billion. Avista serves more than 300,000 electric customers in the states of Washington and Idaho, producing in excess of $650,000,000 in operating revenues. Avista employs more than 280 people (as of September 2004) to operate and maintain its generating facilities for Avista's system and surrounding control-area neighbors, implement FERC-mandated PME requirements, and monitor and regulate power flows. Since year 2000, Avista's gross investment in its hydroelectric plants has increased by $30 million, and its current O&M costs for its hydroelectric plants are roughly $13 million per year. Avista's financial information is available online in its annual report that can be accessed at www.avistacorp.com.

H.10 Expansion Notification

Avista proposes to create a 200-foot buffer zone on its lands abutting Lake Spokane and add this buffer zone to the Long Lake HED lands. The proposed buffer zone would lie entirely on Avista-owned lands, and no notification to other landowners would be required. Avista also proposes to add its lands encompassing the Nine Mile Resort and two segments of Project transmission line to the Project.

H.11 Electricity Consumption Efficiency Improvement Program

Avista's tariff riders under Schedules 91 and 191 were North America's first non-bypassable distribution charge to fund energy efficiency. The electric tariff rider was established as a 1.54 percent surcharge to all rate classes, with the exception of pre-existing special contracts. The natural gas tariff rider was initially established as a 0.52 percent surcharge.

The tariff riders and the corresponding energy efficiency programs have been very successful. In the first 10 years of tariff rider operation, more than 47 aMW of energy-efficiency resources have been implemented, including nearly 16 aMW acquired during the 2001 Western energy price spike period. Avista's programs have contributed to 7.2-million therms of savings since reinitiating its natural gas DSM programs in 2001. Most states have since adopted similar electric distribution charges by state law or public utility commission order.

H.11.1 History of Avista's Demand-Side Management

Avista's DSM Tariff Rider is celebrating its tenth anniversary. John Etchart, former Chairman of the NWPPC, stated in 1996 that "Washington Water Power's *[now Avista]* DSM Tariff Rider—along with its menu of market-moving customer programs and services—is the utility DSM strategy that I hear most frequently mentioned as our region addresses restructuring issues and opportunities."

The Tariff Rider, under development in late 1994 and implemented in 1995, was a product of its time. In 1994, the electric industry was anticipating retail competition and customer choice of electric suppliers. Many thought consumers would purchase power as they did long-distance telephone service. The local "wires" company would provide service to homes and businesses, but customers would select their power marketer of choice. The electric utility industry as a whole either down-sized or "zeroed out" energy efficiency programs because of concerns of adding costs to its power supply portfolio—costs that would not be included in power supply competitors' product. The Tariff Rider, developed with input from stakeholders, was able to continue conservation programs without this potential consequence. Avista was, and remains, committed to providing its customers with cost-effective energy options.

The Results Center, an Independent Research and Benchmarking Company, stated "Washington Water Power's Distribution Charge, formally known by its regulators as 'the DSM Tariff Rider,' is the most sophisticated model of its kind and a powerful harbinger of what may well become the future predominant energy efficiency services funding mechanism . . . Washington Water Power Company has not only implemented the first 'non-bypassable systems benefit charge' but is also the first utility to provide results on the success of the model's implementation."

The Results Center prediction was accurate. Soon thereafter, most states adopted similar models either by legislative statute or Commission regulation. Ralph Cavanagh, Energy Program Director of the Natural Resources Defense Council (NRDC), as he helped develop legislation in California and Montana, said this about the tariff rider "The so-called 'tariff rider' for DSM is actually the nation's first use of non-bypassable distribution charges to sustain cost-effective energy efficiency investments. This concept, which is now sweeping the nation, was invented first in Spokane. I wish NRDC could claim some credit, but we learned all about it from Washington Water Power Company, and they were kind enough to waive the copyright."

Avista has regularly convened a stakeholders' forum, now the External Energy Efficiency Board and previously known as the DSM Opportunities Group. These forums have included customer representatives, Commission staff members, Public Counsel, the environmental community, and other interested parties. Each program, as well as the underlying cost-effectiveness tests and results, has been reviewed at these stakeholder forums.

H.11.2 Energy Conservation and Efficiency Programs and Record

Avista's programs serve residential, commercial, and industrial customers by providing technical assistance, incentives, and education about the wise use of energy. As electric and natural gas prices have increased in recent years, more and more customers are turning to Avista's conservation programs.

Generally, the programs have been divided into three local portfolios: commercial/industrial, limited income, and residential along with Avista's participation in the Northwest Energy Efficiency Alliance (a regional energy-efficiency, market-transformation organization).

During the last 26 years, Avista has acquired 111 aMW of energy through the implementation of its conservation programs. Avista continues to work diligently in providing cost-effective conservation programs to customers. Below are brief program summaries that provide an overview of the services available to Avista's customers along with a breakdown of energy savings over the last 4 years.

H.11.2.1 Commercial/Industrial Program Description and History

The Commercial/Industrial Program allows for the flexible response to any energy-efficiency measure within tariff guidelines. Any commercial or industrial customer is eligible to participate. The programs are not categorized by rate schedule or size of building. If the efficiency technology is a proven measure and will show savings for the customer, they would be eligible for participation in the program. Avista periodically modifies the implementation of the program with "prescriptive paths." A prescriptive path allows for streamlined implementation of measures that are numerous and reasonably uniform. The prescriptive treatment reduces administrative cost and increases the marketability of the program in circumstances where it is applicable.

Table H-6 represents the energy savings associated with the implementation of the Commercial/Industrial programs during the last 4 years.

Table H-6. Avista's Commercial/Industrial Program energy savings.

Electric Program Savings in First-Year kWhs			
2001	2002	2003	2004
90,809,708	19,836,578	29,981,039	29,927,962
Gas Program Savings in First-Year Therms			
2001	2002	2003	2004
2,636,820	449,798	570,404	891,213

H.11.2.2 Residential Program Portfolio

Immediately prior to the 1995 approval of the current DSM Tariff Rider mechanism, Avista offered a series of residential electric-to-gas conversion programs that were popular throughout the service territory. As a consequence of the success of this program, there was relatively little Residential Program activity during the early years of the Tariff Rider. Much of the activity that did exist is actually contained within the costs associated with regional program participation through the Northwest Energy Efficiency Alliance.

Local residential programs during this time period include:

- Weatherization—This program has been offered in several forms over the years. The program has included ceiling, wall, floor, duct and pipe insulation. This program has been applied to both electric and natural gas-heated homes.

- High-Efficiency Furnaces—For the installation of high-efficiency (90 percent annual fuel utilization efficiency [AFUE]) gas furnaces or high-efficiency natural gas boilers (85 percent AFUE) into new or existing homes.

- High-Efficiency Water Heating—Replacement of existing electric or gas water heaters with an appliance of like-fuel meeting Avista's "high-efficiency" standards (0.62 EF for gas, 0.91 EF for electric). This program may be used in conjunction with the electric-to-natural gas conversion of the appliance.

- Heat Pumps—Incentives are available for customers whose primary heat source is electric and who install air-source heat pumps of 8.0 heating seasonal performance factor (HSPF) with a 13.0 seasonal energy efficiency ratio (SEER) cooling efficiency. Standards for manufactured homes are 7.5 HSPF and 12.0 SEER.

- Programmable Thermostat—This program provided rebates for the installation of programmable thermostats in electric- or gas-heated homes.

- Electric-to-Gas Conversion—This program provides direct incentives to customers for the conversion of existing Avista electric space or water heat appliances to natural gas. This program may be used in conjunction with the high-efficiency space and water heat program if the customer installs qualifying high-efficiency gas appliances.

- Energy Star Clothes Washer Program—This program leveraged regional activity by offering customer incentives and augmenting the marketing of resource-efficiency Energy Star clothes washers.

Table H-7 represents the energy savings associated with the implementation of Avista's residential programs during the last 4 years.

Table H-7. Avista's Residential Program energy savings.

Electric Program Savings in First-year kWhs			
2001	2002	2003	2004
2,498,155	2,941,906	3,614,175	4,561,232
Gas Program Savings in First-year Therms			
2001	2002	2003	2004
258,373	200,685	149,579	125,265

H.11.2.3 Limited Income Portfolio

Avista uses local Community Action Agencies (CAAs) to implement gas and electric DSM programs. By working with the CAAs, the Company is able to leverage the outreach, income qualification and delivery mechanism that these agencies have in place. Avista enters into annual agreements with the CAAs for program implementation. Measures permitted under the Limited Income Program contracts are extremely broad and include electric-to-gas end-use conversion, weatherization, infiltration, high-efficiency furnaces, high-efficiency water heaters, refrigerators, window replacement, compact fluorescent lighting, and other measures. Both electric and gas measures have been funded. There are allowable components within the contract that address health and human safety, other dwelling improvements necessary to maintain the measure life of the efficiency measure and the habitability of the home, and administrative costs borne by the CAAs.

Because the incentive covers the entire installed cost of the measure for qualified limited-income customers, there is no additional customer cost.

Table H-8 outlines the energy savings and costs associated with the Limited Income Program over this period.

Table H-8. Avista's Limited Income Program energy savings.

	Energy Savings in First-Year kWhs or Therms			
	2001	**2002**	**2003**	**2004**
Electric (kWhs)	5,131,332	2,364,528	1,800,060	2,832,219
Gas (therms)	7,169	36,817	24,278	24,129

H.11.2.4 Northwest Energy Efficiency Alliance

Northwest Energy Efficiency Alliance's (NEEA's) mission is to acquire electric-efficiency resources by transforming markets to enhance or accelerate the acceptance of efficient products and services. This is achieved through a series of market transformation ventures and a supporting portfolio of infrastructure projects. Avista's funding is proportionate to the share of regional end-use load within each funding participant. This has amounted to 4.0 percent of total NEEA funding for the initial contractual period and for the subsequent renewal of that original funding agreement.

During this time, Avista has had a representative on NEEA's Board of Directors and, at various times, has also been represented within the Executive Committee, Board Development Committee, and as a member and chair of the Cost-Effectiveness Committee. The energy savings, utility costs, and customer costs of the NEEA program are shown in Table H-9.

Table H-9. NEEA Program energy savings, utility costs, and customer costs.

	Energy Savings (in aMW)				
	1997–1999[a]	**2000**	**2001**	**2002**	**2003**
NEEA	0.24	0.27	0.35	0.34	0.30

Note: NEEA – Northwest Energy Efficiency Alliance

[a] Energy savings data are aggregated for the 3 years of 1997 to 1999 in accordance with available NEEA data, consistent with prior reports released by NEEA.

The costs represented above are for the Avista Washington and Idaho system. Thirty percent of these costs are allocated to Avista's Idaho electric tariff rider and seventy percent to Washington. The costs are almost exclusively the dues associated with Avista's membership in NEEA, but also include the additional labor costs associated with maintaining an active role in NEEA governance.

H.11.3 Compliance with Regulatory Requirements

Avista's energy efficiency and conservation programs comply with all known federal and Washington State laws and regulatory requirements.

H.12 Tribe Mailing List

The Spokane Indian Reservation is located several miles downstream of Long Lake HED, and the Spokane Tribe of Indians, along with three other tribes, have been involved in the Spokane River Project relicensing process through the Cultural Resources Work Group and other technical work groups. These Tribes are listed below. None of the lands within the four Washington State HEDs that would comprise the Spokane River Project during the term of a new license lie adjacent to or within any tribal boundaries.

Spokane Tribe of Indians
P.O. Box 100
Wellpinit, WA 99040

Colville Confederated Tribes
P.O. Box 150
Nespelem, WA 99155

Kalispel Tribe of Indians
P.O. Box 39
Usk, WA 99180

Coeur d'Alene Tribe of Indians
P.O. Box 408
Plummer, ID 83851

H.13 Measures to Ensure Safe Project Management, Operation, and Maintenance

Avista maintains a proactive and comprehensive hydro public safety program. Since 1890, when Avista operated its first generating plant in downtown Spokane, harnessing hydroelectricity safely and responsibly has been the major focus of the company's business.

All of the dams in the Spokane River Project have been constructed, inspected, maintained, and upgraded to ensure their structural integrity. Long Lake and Nine Mile are inspected at least once a year by both Avista engineering personnel and representatives of FERC. Monroe Street and Upper Falls are inspected at least biannually by Avista engineering personnel and FERC staff.

In addition, independent consultants thoroughly examine each of the larger facilities once every 5 years, and complete an extensive report on each safety inspection. These reports, along with the consultants' recommendations, are submitted to FERC for review. The latest independent inspection reports for Nine Mile and Long Lake were completed in December 2004 by Findlay Engineering. The inspections observed no deficiencies in the condition of Project structures, maintenance, or methods of operation that might endanger public safety.

In addition to ongoing dam maintenance work, Avista annually submits an instrumentation and monitoring report on its hydroelectric facilities to FERC. Via charts and graphs, these annual reports describe programs that record safety-related measurements such as changes in uplift pressure and deflection.

Even though the possibility of a major structural emergency is extremely remote, Avista has developed Emergency Action Plans (EAPs) to help ensure public safety. Individual plans have been developed for Nine Mile and Long Lake. (EAPs are not required for Monroe Street and Upper Falls because they are considered "low hazard" dams with minimal water storage.) The EAPs are designed to minimize potential dangers to people and property downstream of the dams; they provide guidelines for notification and early warning in the event of an actual or potential failure. Based on computer simulations of catastrophic failures at each site, the plans provide the framework for a coordinated response by Avista employees, local law enforcement teams, and emergency management personnel. Developed in accordance with FERC standards and requirements, each EAP is tested and updated annually. Plant personnel are also required to complete annual EAP training.

All four Spokane River plants are monitored by Avista personnel, 24 hours a day, 365 days a year, either remotely by computer alarms and/or by station operators physically present on site. All facilities normally have an operator physically on site at least 40 hours a week. Plants not staffed 24 hours a day, 7 days a week by an on site operator are normally inspected by a roving operator at least once every 12 hours. If a remote alarm indicates a potential structural problem at a facility, a roving operator and/or other Avista personnel are called to investigate.

Avista has installed numerous public safety devices at its Spokane River developments and at Post Falls. More than 200 warning signs with pictographs and reflective lettering have been installed since 1992. Boater restraining cables, featuring highly visible buoys, were installed at Post Falls, Nine Mile, and Long Lake HEDs. Additional chain-link fencing was also installed at the developments to limit public access to dangerous areas of plant operations. More extensive information regarding public safety devices at each facility (including surveillance cameras and downstream warning speakers) is contained in separate Post Falls, Nine Mile, Long Lake, and Downtown Spokane (Upper Falls/Monroe Street) *Hydroelectric Public Safety Plans*, which are updated as needed.

An illustrated hydro safety insert panel is annually included in bills mailed to over 300,000 customers, and is also available on Avista's web site. The insert reminds recreators to obey warning signs and boater restraints. It also emphasizes the dangers of swift currents around dams and the sometimes sudden discharges of water due to normal hydroelectric plant operations.

Since 1995, Avista personnel have annually presented a one-hour program titled *It's Hydrological* to approximately 60 elementary and middle-school classrooms throughout Avista's service territory. Several segments of the program discuss public safety when recreating near dams: students are informed of the potential dangers from strong undertows, changing water levels, and submerged objects; they are also encouraged to pay attention to warning signs and other public safety devices such as fencing, buoys, and boater cables.

Avista participates in at least six different national and state hydro and water safety associations. The company has also been an active member of the Inland Northwest Drowning Prevention Coalition since its founding in 1993. Comprising representatives from more than two dozen local businesses and government organizations, the Coalition interactively promotes water safety and the wearing of life jackets among residents in eastern Washington and northern Idaho and participates in events such as Junior Bloomsday.

In 1993 and 1999, Avista personnel received regional "Awards of Merit" from the National Water Safety Congress for "outstanding efforts, accomplishments, and contributions to water safety." Avista received one of only eight awards given each year to organizations in a northwestern U.S. region that includes the entire states of Washington, Idaho, Montana, Oregon, Wyoming, and Alaska.

Avista has addressed public safety issues not only by complying with license conditions, but by proactively developing additional programs. Public safety has been one of Avista's primary concerns for over a century and continues to be one of the most important aspects of the Company's business operation.

H.13.1 Operation During Flood Conditions

Operations at Upper Falls, Monroe Street, Nine Mile and Long Lake HEDs are responsive to operations occurring in the watersheds feeding the Spokane River. This includes the Coeur d'Alene/St. Joe Basin and the Hangman Creek Basin.

The St. Joe, Coeur d'Alene, and St. Maries rivers carry most of the runoff from the 3,784 square-mile drainage basin upstream of Post Falls HED. Avista develops streamflow forecasts based upon real-time data from the Soil Conservation Service snowpack telemetry system sites, USGS stations, and reservoir and river stage observations. Primary sites monitored are the Mosquito Ridge near Clark Fork, Sunset Peak near Wallace, the Coeur d'Alene River at Enaville and Cataldo, the St. Joe River at Calder, and Coeur d'Alene Lake at Coeur d'Alene. Flow data are received daily (more frequently, when conditions warrant). Forecasts, developed by Avista Hydro Operations, are communicated to the Generation Control Center (GCC), the Post Falls Plant Operator, and other downstream plants.

Because there are no reservoirs upstream of Coeur d'Alene Lake, inflows to the lake cannot be reduced or controlled. If there is a significant increase in Spokane River flows as a result of inflows to Coeur d'Alene Lake, downstream developments are notified and flows are coordinated with Upriver Dam (owned and operated by the City of Spokane) and Avista's other downstream developments (Upper Falls, Monroe Street, Nine Mile, and Long Lake.)

Hangman Creek, which drains extensive low elevation areas, can experience flood flows at different times than the Spokane River at Spokane. These events lead to spill events at Nine Mile and Long Lake HEDs.

Per FERC's "Regulations Governing Safety of Water Power Projects and Project Works" (18 CFR, Part 12), EAPs have been developed for the two "high hazard" developments of the Spokane River Project (Nine Mile and Long Lake) and for Post Falls HED. The primary purposes of the plans are to provide procedures to identify and mitigate any unusual and unlikely conditions that may endanger the dams and to list notification responsibilities that give maximum early warning to persons potentially affected by a failure of the dams. During severe flooding (although the dams may not be in any danger of failure), the EAP can be used to provide early flood warning to downstream areas. The plans were used for this latter purpose during the severe Spokane River floods in May/June 1997.

H.13.2 Public Safety Warning Devices

In addition to boater safety devices located upstream of all Project spillways and intakes, extensive fencing surrounding each facility, and more than 200 public safety warning signs with pictographs and reflective lettering strategically placed throughout the Project, the following audible warning devices have been installed.

H.13.2.1 Nine Mile: Flashboard Failure Alarm

Because of the installation of seasonal flashboards on the top of the Nine Mile overflow spillway, extensive "Stay Out/Stay Alive" warning signs and fencing have been installed. The signs are placed to deter anglers from entering the immediate downstream channel between the Charles Road Bridge and the dam. When spotted by the plant operator, recreators in this area are asked to leave. If the recreators refuse to vacate the area, the Spokane County Sheriff is notified.

During a flashboard failure, the air whistle/siren (mounted on top of the powerhouse near the spillway) is automatically activated. This alarm serves as an additional safeguard for any recreators who have ignored the warning signs and fencing.

H.13.2.2 Long Lake: Emergency Action Plan Warning Siren

During a sudden breach of Long Lake Dam (the largest of Avista's Spokane River structures), immediate downstream houses, including those at Avista's operator village (approximately 1/2 mile below the dam) could be inundated by up to 15 feet of water. For this reason, a 127-decible (at 100 feet) emergency warning siren was installed on the upper level of the powerhouse in 1994. Pointed directly downstream, the siren has an effective range of up to 2 miles. It is circuit-tested monthly, and publicly tested each March, usually on a Saturday (when downstream residents are more likely to be home). The siren is activated by the Control Room Operator; the "alternating wail" tone sounds for 60 minutes, or until canceled.

Additional public safety and warning device information is contained in separate Nine Mile, Long Lake, and Downtown Spokane (Upper Falls/Monroe Street) *Hydroelectric Public Safety Plans*, which are updated as needed.

H.13.3 Proposed Changes Affecting the Emergency Action Plan

EAPs for Avista's two "high-hazard" facilities at the Spokane River Project (Nine Mile and Long Lake) are on file with FERC and appropriate state and local emergency management/law enforcement organizations. The plans are updated and tested annually, and were revised in January 2005. Avista is not proposing any changes that would affect either of these existing emergency action plans.

H.13.4 Structural Safety Monitoring Devices

H.13.4.1 Devices and Programs Common to All Developments

High/Low Forebay and Equipment Failure Alarms

Spokane River Project generating equipment includes a wide assortment of remote alarms that sound in the control rooms and/or remotely at the GCC located in Spokane when any abnormality occurs. Some of the more important monitored items include high/low forebay, intake trashrack differential, cooling water flow, bearing temperature, stator temperature, and shaft vibration and run-out.

Penstock Inspection Program

A penstock maintenance and inspection program was initiated in 1990 for all plants. The penstocks are now thoroughly inspected (inside and outside) at least once every 4 years by hydro engineering personnel. Recent inspections have found the penstocks at all plants to be in relatively good condition. The penstocks are also visually inspected by plant operations personnel as part of their normal rounds.

H.13.4.2 Monitoring for Stress, Structural Movement, Seepage, and Uplift

Specific monitoring programs for measuring changes in stress, structural movement, seepage, and uplift have been developed for each plant. Each monitoring program requires its own data collection procedure and frequency.

Upper Falls HED

Two Avongard-calibrated crack monitors were installed in November 1990 to measure the separation of cracks in the generator pit. The Avongards were read on a monthly basis by an Avista station operator or engineering technician. Since no movement had been recorded in 13+ years, the crack monitoring program was discontinued as of January 2004.

Monroe Street HED

No structural instrumentation monitoring programs are currently implemented at Monroe Street HED.

Nine Mile HED

Nine Mile HED has monitoring programs for measuring seepage flow, horizontal and vertical deflection, and crack propagation. Each monitoring program requires its own data collection procedure and frequency.

Measurement of Seepage through Left Abutment—The program monitoring seepage flow from the left abutment was implemented in September 1987. The quantity of flow is determined by timing how long it takes to fill a 5-gallon bucket. Measurements are taken on a monthly basis by a Nine Mile station operator. Seepage readings fall within the normal range.

Horizontal and Vertical Deflection along the Left Wing Wall Deck—Following replacement of the cap of the left wing wall deck, a program to measure horizontal and vertical deflection was implemented in April 1995. Nine pins were installed along the top of the deck, and two control points were established on either side.

Horizontal deflection is measured by using a theodolite and a steel tape to measure the distances between the base line and the pins located on the deck, and then comparing these distances to previous measurements. Using a geodetic level and invar rod, vertical deflection is determined by taking measurements from a benchmark located off the dam to the locations of each of the nine pins. The difference between current and previous elevation measurements determines the amount of deflection.

Vertical and horizontal deflection measurements are recorded on a quarterly basis. Although horizontal deflection seems to indicate a slight downstream trend, overall horizontal and vertical deflection measurements still fall within an acceptable range.

Left Wing Wall Crack Separation—A program to monitor the separation of cracks in the left wing wall was initially implemented in August 1991. The program used Avongard-calibrated crack monitors, which were read on a weekly basis. However, six of the eight Avongards were destroyed during late autumn 1993 construction work at the dam. The damaged monitors were replaced with PK™ nails to measure distances between the crack separation points. In January 1995, the cap of the left wing wall (containing the cracked concrete) was replaced. The cap is now visually inspected on a regular basis and will continue to be inspected regularly by station operators. As of January 2005, no cracks have appeared in the new cap.

Spillway Toe Monitoring—Four underwater inspections of the spillway toe and stilling basin were performed during the last 16 years. Hibbard Marine performed a 1989 inspection for Avista; United Marine Services conducted a sonar inspection in 1993. Norwesco Marine conducted a detailed underwater diving inspection in August 1999. Associated Underwater Services conducted the latest diving inspection in July 2004. No significant erosion was recorded during any of the four examinations.

Long Lake

Long Lake has monitoring programs for measuring seepage flow, horizontal and vertical deflection, and crack propagation. The data obtained from these programs are collected by an Avista station operator, engineering technician, or surveyor. It is then reviewed by a hydro safety engineer. The monitoring procedure and frequency depend upon the type of data being collected.

Inspection Gallery Flow—This program was implemented in 1980. Until 1990, two weirs were used to measure flow in the inspection galleries. A V-notch weir monitored flow in the east gallery (intake dam) and a rectangular weir monitored flow in the north gallery (spillway dam). The weirs were replaced with a collection system which pipes seepage flows outside the inspection galleries. In January 1991, flumes were installed in the drainage pipes to provide a more reliable measurement technique. Flow data are currently collected monthly by a Long

Lake station operator or an Avista engineering technician. Readings follow a normal seasonal pattern and fall within an expected historical range.

Seepage at Crescent Dam—The measurement of seepage on the right abutment at the Long Lake crescent dam was implemented in September 1985. Initially, a current meter measured the crescent dam seepage. The current meter was replaced by a rectangular weir in July 1988. In March 1990, a new system was installed to collect seepage from both sides of the crescent dam. Following the construction of an outlet pipe, a stopwatch method was used to measure flows into receptacles.

In May 1990, a drainage system was installed to route the seepage down the hill. Flumes were placed in the drainage pipes in February 1991 (right side) and December 1991 (left side) to provide a more reliable measurement technique. Currently, data are collected monthly by either an Avista station operator or engineering technician. Following grouting work in August 1995, seepage flows through the left abutment significantly decreased to less than 1 gallon per minute (gpm). Until August 2002, seepage flows through the right abutment remained relatively flat, falling within an acceptable and narrow historical range (approximately 50 gpm at normal forebay of 1,536 feet). From October 2002 through December 2004, right abutment seepage readings increased slightly, averaging 57 gpm over this 26-month time span. The right abutment seepage increases will continue to be closely monitored in future measurements.

Vertical and Horizontal/Radial Deflection along Crescent Dam Crest—The program measuring crescent dam vertical and horizontal (radial) deflection was implemented in January 1990 and revised in May 1991. Two permanent concrete collimation piers and five target points were installed. Using a theodolite, horizontal (radial) deflection is now determined by shooting distances to each point from the collimation piers. Coordinates are then assigned to the points by trilateration method. Deflection can be determined by comparing the coordinates to those of previous measurements. Using a geodetic level, vertical deflection is determined by taking measurements from a benchmark located off the dam to pins located at each of the five points. The difference between current and previous elevation measurements determines the amount of deflection.

Vertical and horizontal deflection measurements are recorded quarterly by an Avista surveyor. Measured crescent dam deflection varies seasonally, with upstream movement occurring during the summer; and downstream movement occurring during the winter. Overall vertical and horizontal deflection measurements for the Long Lake crescent dam fall within an expected range.

Vertical and Horizontal Deflection along the Spillway Dam—In March 2000, Avista began a program to measure horizontal and vertical deflection along the piers of the spillway dam. Four deflection measuring points (one on the south/forebay side of each pier) were established. Control points were established on the west pier near spillgates 7 and 8 (left side of the dam) and on the vertical rock cliff east of spillgate no.1 (right side of dam).

Horizontal deflection is measured by using a theodolite, which is placed on point 1 on the west pier. The theodolite is sighted into the control point located on the east cliff. This process establishes a baseline. Any deflection is determined by using a steel tape to measure the distances between the baseline and the other three points located on the piers, and then comparing these distances to previous measurements. Using a geodetic level and invar rod, vertical deflection is determined by taking measurements from a benchmark (located near the forebay staff gage) to the locations of each of the points on the four piers. The difference between current and previous elevation measurements determines the amount of deflection.

Vertical and horizontal deflection measurements are recorded quarterly by an Avista surveyor. All deflection readings remain relatively flat and fall within expected ranges.

Vertical and Horizontal Deflection along the Intake Section—In July 2003, Avista began a program to measure horizontal and vertical deflection at the intakes. Three deflection measuring points (one between each of the four penstock vent pipes) were established on the deck inside the headgate house. Control points were established just inside each of the two headgate house access doors.

Horizontal deflection is measured by using a theodolite and a steel tape to measure the distances between the baseline and the other three points located on the deck, and then comparing these distances to previous measurements. Using a geodetic level and invar rod, vertical deflection is determined by taking measurements from a benchmark inside the south access door to the locations of each of the other four points on the deck. The difference between current and previous elevation measurements determines the amount of deflection. Vertical and horizontal deflection measurements are recorded quarterly by an Avista surveyor.

Crack Monitoring at the Crescent Dam—This monitoring program was implemented in January 1990. Three Avongard calibrated crack monitors were installed to measure the separation of cracks on the crest of the crescent dam. The Avongards are read on a quarterly basis by an Avista surveyor. No movement has been recorded as of January 2005.

Spillway Toe Monitoring (Part 12)—During the summer of 1991, the spillway toe area was dewatered, and a base map of the area was prepared utilizing terrestrial photogrammetry. Underwater surveys of the spillway toe and stilling basin were conducted in 1988, 1989, 1991, 1993, 1994, 1995, 1999, and 2004. According to the October 1994 Part 12 Report, the depth measurements of the stilling basin were “fairly close to one another” in the 1988 through 1993 underwater surveys. The 1994 sonar survey results showed no unusual changes.

The July 14, 1999, underwater diving inspection, conducted by Norwesco, used improved control techniques over previous diver surveys to obtain better data and repeatable results. It measured undercutting below the spillway dam at each of the 1994 sonar survey cross sections. According to the September 1999 Part 12 Report, the 1999 inspection indicated that “essentially no new undercutting appears to have occurred since the 1994 sonar survey.”

The latest underwater inspection was conducted by Associated Underwater Services in October 2004. The inspection indicated no significant increase in toe undercutting since the 1999 inspection and also noted that erosion was less than the threshold limits that would trigger the need for a repair.

H.13.5 Safety Record

H.13.5.1 Employee Safety

Per the Avista "Safe Practices Manual," all Avista personnel are given safety training as part of new-employee orientation. In addition, they are given a position-specific safety orientation prior to beginning work in any new position. All safety training is tracked in a company database, by both individual and department. All union/craft personnel are required to attend monthly safety training sessions and participate in other safety training as necessary. This process ensures that required training is given both initially and recurrently, as mandated by both state and federal regulations.

From 1992 to 2004, there have been 11 lost-time accidents involving personnel stationed at the four Spokane River Project HEDs located in Washington and at Post Falls HED located in Idaho. These accidents are shown by year in the following table:

Year	Number	Year	Number	Year	Number	Year	Number	Year	Number
1992	1	1995	1	1998	0	2001	0	2004	0
1993	1	1996	0	1999	2	2002	1		
1994	0	1997	1	2000	0	2003	4		
Total: 11 lost-time accidents in the past 13 years.									

H.13.5.2 Public Safety

Avista annually includes an illustrated hydro safety insert panel each spring in bills mailed to over 300,000 customers. Printable copies of the insert are also available on the company's web site. Emphasizing the dangers of swift currents around dams and the sometimes-sudden discharges of water due to normal hydroelectric plant operations, the hydro safety messages ask recreators to be Avista's "Partner in Safety" by obeying warning signs and heeding boater restraints and other safety devices.

In cooperation with Riverside State Park, the Spokane County Sheriff's Office, and a local scouting troop, Avista has published a "Navigational Aid" brochure for the Riverside State Park Boat Launch area downstream of Nine Mile HED. The brochure is distributed by Riverside State Park at the launch in an effort to promote river safety.

Since 1999, Avista has annually distributed "Safe Sailboating: Watch Your Mast" brochures to approximately one dozen Coeur d'Alene area marinas, several sailing organizations, the local U.S. Coast Guard Auxiliary (boating classes), and the Kootenai County Sheriff's Marine Enforcement Division for distribution to local sailboat enthusiasts. The brochures educate/remind sailboat and catamaran users of the potential dangers of overhead obstacles, such as power and phone lines, and of seasonal differences in water levels due to runoff and/or operation of hydroelectric power facilities.

Since 1995, company personnel annually present a one-hour program titled *It's Hydrological* to approximately 60 elementary and middle-school classrooms throughout Avista's service territory. Several segments of the program discuss public safety when recreating near dams: students are informed of the potential dangers from strong undertows, changing water levels, and submerged objects; they are also encouraged to heed warning signs and other public safety devices such as fencing, buoys, and boater cables.

During the term of the current Spokane River license (i.e., since 1972), only one Project-related accident occurred. However, this single incident resulted in three fatalities. On April 24, 1989, a small boat was pulled through the open spillgates of the Post Falls south channel dam, resulting in the death of three of the four occupants of the vessel. As a result of this incident, and at the urging of Avista safety personnel, two separate local ordinances were passed by Kootenai County and the City of Post Falls, making it illegal to boat, float, or swim in the area between the Spokane Street Bridge and the Post Falls dams whenever spillgates are open. Also, as a direct result of the incident, Avista and the City of Post Falls keep the public boat launch (at Q'emiln Park) located just upstream of the south channel dam closed whenever spillgates are open at either the north or south channel dam.

H.14 Current Operations

H.14.1 Supervisory Control

The Project developments are centrally monitored and/or controlled from Avista's GCC. The GCC is staffed by at least one operator every day, 24 hours per day. The GCC communicates with the power plants via utility-owned or leased communication lines. The communications system is managed so that the generation control is independent of other communication activities.

H.14.2 Power Generation Operations

H.14.2.1 Upper Falls HED

Upper Falls HED operates near elevation 1,870.5 feet with a full-pool elevation of 1,871 feet and does not include any discharge requirements or other limitations under the current FERC license. Upper Falls HED has very little storage (800 acre-feet) and is operated as a run-of river facility. Because the City of Spokane's Upriver Project is also typically operated as a run-of-river facility, the operation and subsequent electric generation at Upper Falls HED is driven primarily by the flows in the Spokane River.

When river flow is less than the 2,500-cfs turbine capacity of Upper Falls HED, all flows are typically routed into the south channel through the intake structures and the powerhouse. During these times, the north channel around Havermale Island receives only leakage flows of up to 32 cfs through the control works and a small amount of groundwater inflow. When river flow exceeds the turbine capacity, excess water is then passed through the north channel control works while maintaining a relatively stable water level in the reservoir.

H.14.2.2 Monroe Street HED

Monroe Street HED is operated as a run-of-river facility with a pool elevation of 1,806 feet, with almost no storage (30 acre-feet). Therefore, as at Upper Falls, Spokane River flows drive the operation of Monroe Street HED. The FERC license for the Spokane River Project requires Avista to maintain an aesthetic flow of at least 200 cfs over the Monroe Street Dam and downstream ledges during viewing hours (10 a.m. to one-half hour after sunset) each day, year-round.

H.14.2.3 Nine Mile HED

The Nine Mile forebay has an operating full-pool elevation of 1,606.6 feet. The FERC license for the Project does not include any minimum flow, water level, or other limitations specific to Nine Mile HED. However, flow below the dam generally mirrors inflow into the reservoir. There is no bypassed reach at Nine Mile HED because the powerhouse is integral to the dam. Powerhouse discharge and/or spill over the dam flow directly into the downstream river channel.

Nine Mile HED has 3,130 acre-feet of storage but is capable of only limited storage and release operation. However, Nine Mile HED is operated as a run-of-river facility. Therefore, operation of Nine Mile HED is driven primarily by Spokane River flows. Two rows of 5-foot-high boards are installed on the spillway to maintain the full-pool level. During high-flow periods, sections of the flashboards are removed to allow the water to pass, resulting in a temporary drop and subsequent restoration of the reservoir surface elevation of up to 10 feet in those years when full flashboard removal is required. The flashboards are replaced once river flow allows for safe access to the crest of the dam. Flashboard removal varies greatly from year to year, depending on hydrologic conditions.

H.14.2.4 Long Lake HED

The normal full-pool elevation at Long Lake HED is 1,536 feet. The current FERC license for the Project allows for a 24-foot drawdown of Lake Spokane to elevation 1,512 feet. There are no other water-level or discharge requirements or limitations in the FERC license that pertain to Long Lake HED. With more than 100,000 acre-feet of storage, Long Lake HED is operated as a storage-and-release facility for power generation purposes. Historically, Lake Spokane was lowered to the 24-foot limit during certain winter periods. In recent years, depending on river flows and several other considerations, Lake Spokane has typically been lowered no more than 14 feet during the winter and is typically held within 3 feet of full pool during most of the year. During the summer recreation season, the reservoir is normally within 1 foot of the full-pool elevation.

H.14.3 Recreation Operations

When consistent with operational objectives, Avista seeks to maintain the Lake Spokane reservoir elevation within 1 foot of full pool (1,536 feet) to provide favorable conditions for recreational activities during the recreation season. This is a voluntary action by Avista and there are no related requirements in the current FERC license.

H.14.4 Fishery Management Operations

In cooperation with the Washington Department of Fish and Wildlife (WDFW) and Idaho Department of Fish and Game (IDFG), Avista monitors flows and rainbow trout spawning and emergence in the free-flowing reach of the Spokane River downstream of Post Falls HED and upstream of the Spokane River Project's Upper Falls HED each year (Avista, 2000b). Based on the annual variability in river flow and the monitoring results, Avista operates Post Falls HED in a manner that attempts to maintain downstream river flows that are sufficient to keep the majority of the rainbow trout spawning redds wetted through the fry-emergence period.

H.15 Project History

A chronology of the construction history of the Spokane River Project, including the upgrade programs to improve efficiency or capacity of the Project, are presented below in Table H-10. A more thorough description of the Project's history is presented in Exhibit C.

Table H-10. Spokane River Project chronology.

Activity	Date
Monroe Street HED construction	1889–1890
Monroe Street HED powerhouse expanded: two additional AC turbine-generator units added	1903
Monroe Street HED DC units phased out	1904–1912
Nine Mile HED construction (The Spokane and Inland Empire Railway Company)	1906–1908
Long Lake HED construction	1911–1915
Long Lake HED Unit #3 added	1919
Upper Falls HED construction	1921–1922
Long Lake HED Unit #4 added	1924
Nine Mile HED purchased from The Spokane and Eastern Inland Railway & Power Company by Washington Water Power Company	1925
Long Lake HED forebay water surface elevation increased by three feet	1930
Added 2-foot flashboards to top of existing flashboards at Nine Mile HED	1947
Long Lake HED forebay water surface elevation increased by additional 5 feet	1949
Added 3-foot flashboards to top of existing flashboards at Nine Mile HED	1950
Long Lake HED Unit 1 rewound	1956
Long Lake HED Unit 3 rewound	1957
Nine Mile HED Unit 2 rewound	1958
Long Lake HED Unit 2 rewound	1958
Long Lake HED Unit 4 rewound	1959
Upper Falls HED generator rewound	1967
Monroe Street Dam reconstructed as a concrete gravity dam	1972
Nine Mile HED Unit 1 rewound	1977
Monroe Street power plant replaced with underground powerhouse and single Kaplan-type turbine-generator unit	1992

Activity	Date
Nine Mile HED Units 3 and 4 installed	1994
Long Lake HED Unit 4 turbine runner replaced	1994
Long Lake HED Unit 1 turbine runner replaced	1995
Long Lake HED Unit 2 turbine runner replaced	1996
Sediment bypass tunnel constructed at Nine Mile HED	1996
Long Lake HED Unit 3 turbine runner replaced	1999

H.16 Generation Lost Due to Outages

Table H-11 lists unscheduled (forced) outages at the Spokane River Project for the period 2001 through April 1, 2005. For each outage the starting and ending dates, the location of the outage, the units involved, the duration of the outage in hours and the potential energy loss in MWh, reason for the outage, and the resolution of the outage problem are summarized. The potential energy loss is an estimate based on the potential generation that could have occurred had the unit been in service and is based on the nameplate capacity in MW times the duration of the outage in hours. It is important to note that, in some cases, energy may have been generated using other units if the development were not operating at capacity or water could have been temporarily stored and hence the actual loss may have been lower than the potential energy loss.

Table H-11. Forced outages for the Spokane River Project, 2001 through April 1, 2005.

Start Date Outage	End Date Outage	Develop-ment	Unit Number(s) Involved[a]	Forced Outage Hours	Potential Energy Loss (MWh)	Reason for Outage	Outage Resolution
3/24/2001	3/30/2001	Nine Mile	3	146.90	969.54	Gate motor linkage broke	Repairs completed.
4/26/2001	4/26/2001	Monroe Street		0.80	12.00	Lightning strike at Post Street	Repairs completed.
5/2/2001	5/2/2001	Long Lake	4	1.04	18.46	Replaced lvdt in governor system	Repairs completed.
5/9/2001	5/9/2001	Long Lake	4	18.17	322.52	Troubleshoot governor erratic gate tracking	Repairs completed.
5/17/2001	5/17/2001	Monroe Street		0.10	1.50	Unit tripped - CO2 discharged	Repairs completed.
6/1/2001	6/1/2001	Upper Falls		1.57	15.70	Unknown trip	Unit reset.
6/12/2001	6/17/2001	Long Lake	3	123.22	2187.16	Repair open pole piece	Repairs completed.
6/16/2001	6/16/2001	Long Lake	2	0.12	2.06	Accidental trip by electricians	Unit reset.
6/22/2001	6/22/2001	Nine Mile	4	17.60	116.16	Generator control - tripped on gate error	Repairs completed.
6/23/2001	6/23/2001	Long Lake	4	2.83	50.23	Woodward 505 governor malfunctioning	Repairs completed.
6/29/2001	6/30/2001	Long Lake	3	35.56	631.19	505 governor speed sensor bad	Repairs completed.
6/29/2001	6/29/2001	Monroe Street		0.10	1.50	Forebay drop due to upper falls plant trip	Unit reset.
6/29/2001	6/29/2001	Upper Falls		1.07	10.70	High bearing temperature	Repairs completed.
7/1/2001	7/2/2001	Long Lake	3	36.42	646.46	505h governor speed sensor problem	Repairs completed.
7/24/2001	7/24/2001	Nine Mile	4	6.00	39.60	Divers reattaching stilling well water level sensor	Repairs completed.
8/9/2001	8/14/2001	Long Lake	1	118.35	2100.71	Water in upstream bearing	Repairs completed.
8/20/2001	8/23/2001	Long Lake	1	76.28	1353.97	Upstream generator bearing wiped	Repairs completed.
8/31/2001	8/31/2001	Long Lake	1	1.58	28.05	Bus trip at Devils Gap	Unit reset.
8/31/2001	8/31/2001	Long Lake	2	1.58	28.05	Bus trip at Devils Gap	Unit reset.

Start Date Outage	End Date Outage	Develop-ment	Unit Number(s) Involved[a]	Forced Outage Hours	Potential Energy Loss (MWh)	Reason for Outage	Outage Resolution
10/5/2001	10/8/2001	Nine Mile	2	71.00	468.60	Air pressure regulating valve problem	Repairs completed.
11/27/2001	11/28/2001	Nine Mile	3	21.80	143.88	Generator control-electronic governor problem	Repairs completed.
12/18/2001	12/18/2001	Nine Mile	2	1.00	6.60	Lube oil system problem	Repairs completed.
12/31/2001	12/31/2001	Long Lake	4	0.55	9.76	505 governor overspeed trip	Repairs completed.
1/1/2002	1/2/2002	Long Lake	4	16.29	289.15	505h governor speed sensor malfunction	Repairs completed.
1/31/2002	1/31/2002	Monroe Street		2.70	40.50	Relay testing	Unit reset.
2/1/2002	2/1/2002	Monroe Street		0.60	9.00	Relay testing	Unit reset.
2/2/2002	2/2/2002	Nine Mile	3	1.60	10.56	Adjust brake band	Repairs completed.
2/13/2002	2/27/2002	Nine Mile	2	332.70	2195.82	Governor- wicket gate controller b. o.	Repairs completed.
2/14/2002	2/15/2002	Long Lake	3	12.02	213.36	Upstream packing leaking	Repairs completed.
2/15/2002	2/16/2002	Nine Mile	4	16.10	106.26	Exciter-diodes shorted	Repairs completed.
3/21/2002	3/22/2002	Nine Mile	4	19.20	126.72	Loose wire in bailey cabinet-field contactor drop	Repairs completed.
4/22/2002	4/22/2002	Long Lake	3	4.81	85.38	Governor unstable	Repairs completed.
5/1/2002	5/1/2002	Long Lake	3	7.06	125.32	Governor emergency stop-overspeed trip	Repairs completed.
6/3/2002	6/3/2002	Nine Mile	1	0.72	4.75	Exciter—reps on site to take communicator read	Task completed.
6/3/2002	6/3/2002	Nine Mile	2	0.72	4.75	Exciter—reps on site to take communicator read	Task completed.
6/6/2002	6/6/2002	Nine Mile	3	0.20	1.32	Cut out to flush debris from wicket gates	Debris flushed.
6/16/2002	6/16/2002	Nine Mile	3	11.00	72.60	Generator control gate error troubleshoot	Repairs completed.
6/16/2002	6/16/2002	Nine Mile	4	5.04	33.26	Generator controls—MVAR limit	Repairs completed.

Start Date Outage	End Date Outage	Develop-ment	Unit Number(s) Involved[a]	Forced Outage Hours	Potential Energy Loss (MWh)	Reason for Outage	Outage Resolution
6/29/2002	6/29/2002	Nine Mile	3	0.20	1.32	Water lubricated/flushed bearings	Repairs completed.
7/2/2002	7/3/2002	Monroe Street		32.60	489.00	Broken shear pin and headgate cable break	Repairs completed.
7/8/2002	7/8/2002	Monroe Street		2.60	39.00	Broken shear pin	Repairs completed.
7/11/2002	7/16/2002	Nine Mile	2	113.00	745.80	Generator control problems	Repairs completed.
7/27/2002	7/27/2002	Long Lake	2	5.36	95.14	Packing water leak into upstream bearing oil	Repairs completed.
8/15/2002	8/15/2002	Long Lake	3	0.97	17.22	Field ground relay tripped	Repairs completed.
9/23/2002	9/23/2002	Long Lake	1	3.25	57.69	Headgate problem	Repairs completed.
11/7/2002	11/8/2002	Nine Mile	3	25.30	166.98	Generator control—unable to control gates	Control problem solved.
12/10/2002	12/12/2002	Nine Mile	4	48.15	317.79	Replace shaft seal	Repairs completed.
12/12/2002	12/12/2002	Monroe Street		3.00	45.00	Post street north 13-kV bus trip	Repairs completed.
12/30/2002	12/30/2002	Long Lake	2	1.56	27.69	Bad pt module causing random unloading	Repairs completed.
12/30/2002	12/30/2002	Monroe Street		0.30	4.50	Blade angle Bailey module replacement	Repairs completed.
12/31/2002	1/22/2003	Nine Mile	2	517.10	3,412.86	Generator control problems—troubleshooting	Control problem solved.
1/4/2003	1/4/2003	Long Lake	3	0.82	14.56	Governor overspeed shutdown	Repairs completed.
1/29/2003	1/29/2003	Long Lake	3	0.67	11.89	Replace speed sensor cable	Repairs completed.
3/21/2003	3/21/2003	Long Lake	2	116.14	2061.49	Downstream generator bearing failure	Repairs completed.
5/17/2003	5/17/2003	Nine Mile	3	0.10	0.66	Vibration alarm	Repairs completed.
5/20/2003	5/20/2003	Long Lake	2	0.50	8.88	Bearing oil leaking onto slip rings	Repairs completed.
6/1/2003	6/1/2003	Monroe Street		1.60	24.00	Bad vibration probe	Repairs completed.
6/5/2003	6/5/2003	Monroe Street		0.50	7.50	Technician accidentally tripped unit	Reset unit.

Start Date Outage	End Date Outage	Develop-ment	Unit Number(s) Involved[a]	Forced Outage Hours	Potential Energy Loss (MWh)	Reason for Outage	Outage Resolution
6/16/2003	6/16/2003	Long Lake	4	27.35	485.46	Scroll case drain valve leak	Repairs completed.
6/16/2003	6/16/2003	Nine Mile		106.70	2816.88	Station battery failure	Repairs completed.
6/17/2003	6/17/2003	Nine Mile	3	169.30	1117.38	Upstream generator bearing failure	Repairs completed.
6/25/2003	6/25/2003	Nine Mile	3	117.90	778.14	Investigate unit vibration problem	Repairs completed.
8/19/2003	8/19/2003	Monroe St		1.10	19.53	Under voltage trip	Reset unit.
11/20/2003	11/23/2003	Nine Mile	1, 2, & 4	13.10	259.38	Back-up battery failure—loss of DC for 3 days	Repairs completed.
12/4/2003	12/4/2003	Long Lake	3	5.58	99.05	Replace faulty governor speed sensor	Repairs completed.
1/17/2004	1/17/2004	Upper Falls		14.30	143.00	Cable fault between upper falls and Post Street.	Repairs completed.
1/25/2004	1/26/2004	Long Lake	2	23.30	413.58	Speed device coupling shaft failure	Repairs completed.
1/28/2004	1/28/2004	Long Lake	1	0.18	3.20	Change bad bearing temperature RTD	Repairs completed.
1/30/2004	1/30/2004	Nine Mile	3	0.07	0.44	Generator tripped on bearing x-axis alarm	Repairs completed.
2/1/2004	2/4/2004	Nine Mile	2	69.27	457.18	Wicket gate controller problem	Repairs completed.
2/23/2004	2/23/2004	Nine Mile	3	2.85	18.81	Gen lock out tripped—X-Y vibration alarm	Repairs completed.
6/3/2004	6/3/2004	Long Lake	2	4.80	85.20	Field ground relay, arcing on slip ring	Repairs completed.
6/26/2004	6/26/2004	Long Lake	3	5.89	104.55	Down stream turbine bearing temp	Repairs completed.
6/28/2004	6/28/2004	Long Lake	4	0.62	11.01	Add ring of packing	Repairs completed.
7/9/2004	7/9/2004	Long Lake	2	2.58	45.80	Field flash switch broken	Repairs completed.
8/1/2004	8/1/2004	Long Lake	2	744.00	N/A	Downstream generator bearing failure	Repairs completed.
8/2/2004	8/2/2004	Nine Mile	All	7.60	200.64	Lightning strike tripped bus lockout relays	Reset relays.

Start Date Outage	End Date Outage	Develop-ment	Unit Number(s) Involved[a]	Forced Outage Hours	Potential Energy Loss (MWh)	Reason for Outage	Outage Resolution
8/29/2004	8/29/2004	Long Lake	1	24.50	N/A	Governor speed sensor bad	Repairs completed.
9/1/2004	9/17/2004	Long Lake	2	398.00	7064.50	Repair downstream generator bearing	Repairs completed.
9/16/2004	9/16/2004	Nine Mile	3	1.53	10.10	GCC unable to cut in unit-control screen program	Control problem solved.
9/27/2004	9/27/2004	Long Lake	1	5.07	89.99	Broken inter head cover bolt	Repairs completed.
10/5/2004	10/11/2004	Nine Mile	1	136.270	899.38	Thrust bearing over heating	Repairs completed.
10/6/2004	10/8/2004	Nine Mile	4	51.620	340.69	4 head gate stuck in closed position H	Repairs completed.
10/7/2004	10/7/2004	Nine Mile	3	3.080	20.33	3 head gate closed to allow divers on 4 head gate	Repairs completed.
10/8/2004	10/8/2004	Nine Mile	3	1.833	12.10	3 head gate closed to allow divers on 4 head gate	Repairs completed.
11/18/2004	11/18/2004	Nine Mile	1	5.000	33.00	Speed sensor failed--tripped generator lockout relay	Repairs completed.
11/18/2004	11/18/2004	Long Lake	4	0.970	17.22	Add packing to downstream bearing	Repairs completed.
12/2/2004	12/2/2004	Long Lake	2	0.400	7.10	Phantom master trip	Repairs completed.
12/3/2004	12/3/2004	Long Lake	2	2.050	36.39	Field ground – dirty brushes	Repairs completed.
12/29/2004	12/29/2004	Nine Mile	1	0.850	5.61	D.S. generator – bearing out, pump failed	Repairs completed.
1/17/2005	1/17/2005	Nine Mile	1	0.233	1.54	Generator tripped on high thrust bearing temp	Repairs completed.
1/20/2005	1/20/2005	Nine Mile	1	0.833	5.50	Generator tripped on high thrust bearing temp	Repairs completed.
1/20/2005	1/20/2005	Nine Mile	1	0.200	1.32	Generator tripped on high thrust bearing temp	Repairs completed.
1/28/2005	1/28/2005	Nine Mile	1	0.267	1.76	Generator tripped on high thrust bearing temp	Repairs completed.
1/24/2005	1/24/2005	Long Lake	4	0.680	12.07	Bearing high temp or oil loss of flow	Repairs completed.

Start Date Outage	End Date Outage	Develop-ment	Unit Number(s) Involved[a]	Forced Outage Hours	Potential Energy Loss (MWh)	Reason for Outage	Outage Resolution
1/28/2005	1/28/2005	Long Lake	3	0.220	3.91	Accidental trip by utility man	Repairs completed.
2/8/2005	2/8/2005	Nine Mile	1	0.217	1.43	Generator tripped on high thrust bearing temp	Repairs completed.
2/28/2005	2/28/2005	Nine Mile	1	0.733	4.84	Generator tripped on high thrust bearing temp	Repairs completed.
2/28/2005	2/28/2005	Nine Mile	1	3.133	20.68	Generator tripped due to Bailey module failure	Repairs completed.
2/3/2005	2/3/2005	Monroe Street	1	8.200	123.00	Loss of excitation--glazed slip-ring surface	Repairs completed.
3/9/2005	3/31/2005	Long Lake	3	543.220	9642.16	Generator neutral cable failure	Repairs completed.
3/15/2005	3/15/2005	Long Lake	1	0.180	3.20	Low flow brg temp alarm	Repairs completed.
3/25/2005	3/25/2005	Long Lake	1	0.220	3.91	Faulty US turbine bearing RTD	Repairs completed.
3/1/2005	3/1/2005	Nine Mile	1	12.420	81.97	Bailey control module failure	Repairs completed.
3/1/2005	3/2/2005	Nine Mile	1	9.460	62.44	High bearing temp alarm	Repairs completed.
3/3/2005	3/31/2005	Nine Mile	1	685.450	4523.97	Repair turbine bearing	Repairs completed.
4/1/2005	4/2/2005	Long Lake	3	24.170	429.02	Generator neutral cable failure	Repairs completed.
4/1/2005	4/1/2005	Nine Mile	3	0.217	1.43	Master trip–net 90 shut down	Repairs completed.

[a] No unit number indicates the development has just a single unit.

H.17 Record of Compliance

Avista has demonstrated a good-faith effort to comply with the terms and conditions of its existing license for the Spokane River Project. The Commission has the jurisdiction to assess license compliance and investigate any incident or action that could violate license conditions to determine whether a violation has occurred. Files documenting any complaints or notices of non-compliance with current license conditions are kept in the FERC regional offices for any project under a specific region's jurisdiction.

The FERC Portland Regional Office conducts annual operation inspections for the purpose of reviewing Project conditions and discussing with Avista staff any past or potential future conditions that could result in a non-compliance event. Avista maintains dialogue with the FERC Portland Regional Office throughout the course of each year to ensure that the Commission is familiar with the Project operations and aware of any circumstance that could result in a variation from normal operating regimes.

Several incidents have occurred at Monroe Street HED in the recent past that resulted in a variance from the terms of the current license. Each of these variances was quickly remedied and the Commission determined that they did not constitute a violation of the license.

On July 6, 2003, and on September 3, 2003, the 200-cfs minimum flow over Monroe Street HED Dam was not met. The purpose of this flow is to maintain and promote the scenic values of the Spokane River during normal viewing hours. The July 6 aesthetic flow was to begin at 10:00 a.m. and last until 9:20 p.m. The operator failed to initiate the flow and the error was not remedied until 6:00 p.m. Avista immediately installed a reminder to initiate the flow on the software of the daily load sheet computer. The September 3 incident was the result of a technician having shut off the power to the forebay control modules and audible alarm system while the operator dealt with a computer control problem. This resulted in a 35-minute reduction in minimum flow. Upon review of the records, the Commission determined that, in light of Avista's immediate corrective action to prevent future occurrences, neither of these incidents resulted in a violation of the license terms.

H.18 Project Actions Affecting the Public

Hydroelectric power generation is a renewable resource that reduces the pollutants that would be emitted if replaced by fossil fuels like coal, oil, or natural gas and helps avoid some of the environmental impacts related to burning fossil fuels such as acid rain, generation of greenhouse gases, and depletion of the ozone layer.

Avista is an investor-owned utility supplying electricity to residential, wholesale, commercial, and industrial users in the Northwest. Avista owns and operates the Spokane River Hydroelectric Project, which produces enough electricity per year to serve the needs of more than 53,000 average residences[7]. Avista operates the Spokane River Project in concert with four other hydroelectric developments (including Post Falls HED), coal-fired thermal plants, and gas-

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[7] Based on 1,200 kWh per month of typical household use.

fired combustion turbine plants to minimize the overall cost of power production and to provide low-cost, reliable electricity to its ratepayers.

The Spokane River Project is one of more than 250 hydroelectric developments in the Columbia River system. The management of this system is facilitated by the Pacific Northwest Coordination Agreement (PNCA), which dictates the amount and timing of water released from the Columbia River system to optimize power generation and provide additional benefits such as transportation, irrigation, and natural resource protection. Through the cooperation of Avista and other parties to the PNCA, the Columbia River system provides demand-following generation assets to the regional power system.

In addition to operating and managing the Spokane River Project to serve its customers with quality electric service at the lowest possible cost, Avista recognizes the Project should provide additional benefit to the natural resources and communities that the Project affects. More broadly, Avista recognizes its role in the community and the region.

H.18.1 Community-Based Programs

H.18.1.1 Avista Foundation

The Avista Foundation is the primary charitable giving vehicle for Avista Corporation. Supporting the communities served by Avista Utilities has been a core value throughout the company's 113-year history. The Avista Foundation continues Avista's legacy of community support in the geographic areas served by Avista Utilities. These areas are eastern Washington, northern Idaho, southern Oregon, as well as Sanders County, Montana.

The foundation awarded grants totaling more than $100,000 in 2004 to organizations that promote education, provide assistance to those on limited incomes, and help the communities in Avista's service area grow and prosper. Some of these non-profit organizations include the Ronald McDonald House Charities of Spokane, Boys & Girls Club of Spokane, Kids Unlimited of Oregon, Association for Sacred Encounters in Idaho, and multiple regional food banks (42 in 4th quarter 2004 alone).

H.18.1.2 Project Share Contributions

Project Share aids those who need emergency energy assistance. It is a "fuel blind" fund that helps pay for any type of heating fuel including electric, coal, wood, propane and natural gas. The program is administered through CAAs throughout the region and the recipients do not have to be Avista customers. Assistance is provided as a one-time grant when other avenues of assistance have been exhausted. Avista contributed $200,000 to Project Share during 2004 from shareholder earnings, and it also encourages customers and employees to contribute to the Project Share program.

H.18.1.3 Other Customer Assistance Programs

Avista provides additional support to its customers and the local communities through company-sponsored programs such as Low Income Rate Assistance Program, the Senior Energy

Outreach program in Washington, the Senior Conservation Workshops in Washington and Idaho, and Customer Assistance Referral and Education Service.

Natural and Social Resource Measures

Avista provides facilities and programs related to water supply, fisheries, wildlife, recreation and aesthetics as required by the current Spokane River Project FERC license, the Clark Fork Project FERC license, and other regulatory regulations, in addition to voluntarily providing program and measures that go beyond current requirements.

The current FERC license for the Spokane River Project includes several specific terms and conditions providing for the protection and enhancement of environmental resources. These terms and conditions are described in Section H.7 and Section 3.1.3 of the PDEA.

In addition to the specific environmental measures called for in the existing FERC license for the Spokane River Project, Avista has also implemented environmental and resource protection measures to ensure compliance with other applicable regulatory requirements. Avista has also entered into a number of voluntary cooperative agreements with agencies, organizations, and individuals, or otherwise supported a variety of measures to enhance and conserve environmental resources. Examples of these regulatory actions and voluntary measures that are specifically designed to protect and enhance Project-associated resources are described in Section H.7 and Section 3.1.3 of the PDEA.

Avista received a new FERC license for the Clark Fork River Project (No. 2058) in 2001 and has been implementing an extensive program for environmental, recreational and cultural resources since 1999. A total of 26 PME measures address fisheries, wildlife, recreation, cultural resources, water quality, operations, and aesthetics. Twenty-seven signatories reached a comprehensive agreement through this collaborative relicensing process. That effort has fully transitioned into a collaboratively managed implementation program that has received national recognition as a relicensing model.

H.19 Expense Impact from Transfer of License

Table H-12 shows the annual ownership and operating expenses that would be reduced if the Project license was transferred from Avista to another party. The expenses in Table H-12 are based on levelized annual costs.

Table H-12. Spokane River Project annual operating expenses.

Item	Annual Expenses ($2007)
O&M	3,375,500
FERC fees	436,600
Insurance	188,900
Property taxes	900,900
Total annual operating expenses	4,901,900

H.20 Annual Fees

FERC fees (including current land-use fees) for the five developments that currently comprise the Spokane River Project (2004) were approximately $467,500. It is expected that FERC fees will continue to increase. In addition, annual charges under Section 10(e) of the Federal Power Act have not been determined.

H.21 Literature Cited

Avista (Avista Corporation). 2003. 2003 Integrated Resource Plan. http://www.avistautilities.com/resources/plans/electric.asp, accessed on June 1, 2004. Avista Utilities, Spokane, WA.

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APPENDIX A

Comments on the Draft License Application
and
Avista's Responses

Comments on the draft license application and Avista's responses

Comment ID	Comment	Response
BIA-S-122	More detail is needed on integrated and coordinated Project operations to meet base and peak loads; consistent terminology should be used within the exhibit; the hydrologic analysis period and stream flow data should be consistent between draft license application and PDEA; provide design drawings of Project facilities.	Please see the revisions to Exhibit B. Because Project design drawings are considered critical information for FERC, they must be filed separately from the main body of the license application as Exhibit F. These drawings may be made available on request to Avista, or from FERC under the Freedom of Information Act guidelines.
BIA-S-123	Change "dry (10 percent exceedance) conditions" to "wet (10 percent exceedance) conditions" in the sentence that begins "Figure B-1 illustrates how the lake varied…."	Thank you for the comment; revision has been made.
BIA-S-124	Using the daily Spokane River Operations Model would not accurately estimate power generation benefits. Include a graph of generalized hourly load or release patterns.	The Spokane River Model is appropriate for estimating power generation benefits, as it reflects true Project operations. The Spokane River Project is not operated in response to hourly loads. The economics of current operations are not significantly different than an hourly model.
BIA-S-125	BIA recommends that hydrologic analyses should be consistent between the PDEA and draft license application with respect to analysis period and flow data.	Thank you for the comment; each of these analyses were based on the appropriate period and flow data for their purposes. Please see revised Exhibit B.2.3.
BLM-10	It is incorrect to say that there are no federal lands within the Project boundary. There are 316 acres of BLM-administered land within the boundary. They meet the criteria of a "federal reservation" and gives BLM mandatory conditioning authority as it relates to BLM lands.	The text in Exhibit A.7 of Post Falls HED license application has been amended to reflect BLM's assertion. The issue of 4(e) authority must be resolved by FERC, the State of Idaho, and the BLM and FS. Avista does not have the authority to decide who has 4(e) authority and who does not.
CDAT-1	The Coeur d'Alene Tribe requests that Avista hold a meeting to attempt to resolve substantive disagreements with the PDEA and draft license application; including the Coeur d'Alene Tribe's concerns about Avista's Spokane River Operations Model.	Although not required under the ALP, Avista did hold a meeting with Plenary Group members on June 10, 2005, to discuss substantive disagreements. Avista has subsequently met with, and is also interested in ongoing discussions with the Coeur d'Alene Tribe to resolve disputes.

Comment ID	Comment	Response
CDAT-2	The Coeur d'Alene Tribe believes that inclusion of parties other than "disagreeing resource agenc[ies] or Indian tribe[s] and other agencies with similar or related areas of interest, expertise, or responsibility" in the dispute resolution meeting exceeds the express regulatory regime specified in 18 CFR 16.8 (c)(6)(i)(2004).	Avista believes inviting other Plenary Group members to the June 10, 2005, dispute resolution meeting was consistent with the intent of the meeting and the ALP.
CDAT-3	The Coeur d'Alene Tribe has calculated the total surface area of Lake Coeur d'Alene as 44,800 acres and storage volume as 284,471 acre-feet and requests that these values be used in the final application.	Avista has calculated the total surface area and storage volume of Lake Coeur d'Alene on the best information available at this time.
CDAT-4	Description of Upper Falls, Monroe Street and Nine Mile HEDs as "run-of-river" is inaccurate given regulation at Post Falls HED, lake level manipulation, and downstream facility operations.	Avista believes this description is accurate for the operations of the specific plants. Run-of-river as used in the license application means that water flow into the hydroelectric development reservoir is essentially equal to downstream outflow, and the reservoir water levels change little unless under flood conditions, operation and maintenance activities, or other unusual circumstances.
CDAT-5	The Coeur d'Alene Tribe estimates that approximately 9,600 acres of tribal lands on-reservation lying within the bed and banks of Lake Coeur d'Alene are included within the Project boundary. This value should replace the estimate of 6,000 acres in the application. The Coeur d'Alene Tribe believes that there was prior knowledge that tribal lands were located within the Project boundary; accordingly, the last sentence in footnote 1 at page A-9 of the draft license application should be deleted.	Please see the response to CDAT-3. The acreage figures given are based on GIS data produced during the Project's bathymetry studies; which produced the only modeled data with verifiable input, assumptions, and output. We do not have a source to verify the Tribe's alternative estimates. Avista believes the referenced footnote in Exhibit A is accurate.
CDAT-6	The final license application should state that no compensation for occupancy and use of tribal submerged lands and no PME measures for impacts to tribal trust resources have been paid or provided since impoundment at Post Falls began in 1907. The application should also state that tribal claims for compensation and PME measures are under current negotiation with Avista and the Coeur d'Alene Tribe.	The regulations ask simply that federal lands within the Project boundary be identified in Exhibit A. Exhibits C and D of the Post Falls HED license application discuss in more detail the history of impoundment at Post Falls and the pending determination of fees for use of federal lands.
CDAT-7	The Coeur d'Alene Tribe joins the views expressed in BIA-S-122.	Please see response to BIA-S-122.
CDAT-8	See BIA-S-123; "dry (10 percent exceedance)" should be changed to "wet (10 percent exceedance)."	Thank you for the comment; revision made.
CDAT-9	See BIA-S-124 comment.	Please see response to BIA-S-124.

Comment ID	Comment	Response
CDAT-10	The Coeur d'Alene Tribe requests a complete description of the technical basis for the dependable capacity figures listed in Table B-2.	Please see revised Exhibit B.2.
CDAT-11	The Coeur d'Alene Tribe concurs with BIA-S-125 comment and asks for clarification of whether "years 1979 through 2002" refer to calendar, water or energy years.	Thank you for the comment; each of these analyses were based on the appropriate period and flow data for their purposes. The reference is to the period from August through July because, based on past operations, the same level for Coeur d'Alene Lake each August 1 would be assumed, making energy comparable between such annual periods. Please see revised Exhibit B.2.3.
CDAT-12	Greater detail needed on how Project facilities are operated in a coordinated and integrated manner in order for FERC to fulfill its statutory mandate under the Federal Power Act.	Thank you for the comment. Please see revised Exhibits B.2 and H.1.2.
CDAT-13	Neither the draft license application or PDEA contains an adequate explanation of how the Spokane River Operations Model is constructed or how results are derived. The license application must sufficiently describe how the model works. The predictive capabilities of the model appear limited due to a lack of historical data.	The Spokane River Model is described in the relevant report referenced in the PDEA (NHA, 2003). Please also see revised Exhibit B.2.
CDAT-14	The Coeur d'Alene Tribe requests that the descriptions of legal decisions and effects of the Project on tribal trust resources that were used in the *Tribes Briefing Document for April 17, 2005, Government-to-Government Consultation between FERC and the Coeur d'Alene Tribe* be included in Exhibit C.	The requirements of Exhibit C are to provide a chronology of Project construction and facility upgrades; however, additional historical background information has been added.
CDAT-15	The application should indicate that the amount of reasonable annual charges payable to the tribe under Section 10(e) is under negotiation and that FERC reserved the authority in 1981 to set such charges for the use of the tribal lands for water storage purposes.	Exhibits D.4 and H.20 reflect the unresolved annual charges under Section 10(e).
CDAT-16	Include the boundaries of the present Coeur d'Alene Reservation on all maps depicting the Project.	We include the shape file depicting Coeur d'Alene Tribal land on every Exhibit G map when it falls in the area shown on the map. There are 26 Exhibit G maps that depict the Coeur d'Alene Tribe boundary.

Comment ID	Comment	Response
CDAT-17	The Coeur d'Alene Tribe specifically reserves the right to challenge any cost figures set forth in Exhibit H (and in Exhibit D) in negotiations and/or litigation concerning the amount of 10(e) reasonable charges.	Comment noted.
SC-108	The initial statement must list and describe the statutory or regulatory requirements of the states in which the project is located that affect the project and steps taken or plans to take to comply with such laws.	Please see the final license application which includes an initial statement meeting all regulatory and statutory requirements.
SC-109	Exhibit B must include a statement of the manner in which the power generated is to be used, the amount of power to be sold, and the identity of any proposed purchaser.	The Spokane River Project is located geographically near the center of Avista's service territory in northeastern Washington and northern Idaho. The energy generated by the Project is delivered either directly to substations within Avista's service territory or to the regional transmission system. It is not possible to differentiate this power from other sources once it is in the regional transmission system. The Spokane River Project generates approximately 10 percent of Avista's required load; power is not generated for specific "sales," but as part of the overall energy generated for primarily local customers.
SC-110	On-peak and off-peak power valuations not included for Post Falls, Long Lake or Upper Falls as required by 18 CFR § 4.51(e)(8).	As discussed in Exhibit H.3, information on Avista's peak power valuations is included in the *2003 Integrated Resource Plan* available on Avista's web site.
SC-111	Need data on short and long term contracts, information showing that a new Cacti would be the next lowest cost alternative, and economic data on value of Project power prior to provide a meaningful opportunity for comparison of alternatives, and as required in 18 CFR § 4.51(e)(5).	Please see revised Exhibit D.5.
SC-112	Avista should disclose the financial data necessary to assess revenues available from these projects for mitigation and detailed information on other financing sources prior to filling. Avista should be wiling to pay mitigation costs up to the point where the Spokane River Project is no longer the least-cost generating resource.	Please see Exhibit D.6. Avista disagrees with the assertion that new costs should be added to make the Project as or more expensive than other generation resources. Our ratepayers are obligated to pay mitigation costs consistent with the environmental impacts of ongoing operations. Avista operates a range of generation resources, the combined costs of which creates the rate base.

Comment ID	Comment	Response
SC-113	Provide an estimate of average annual increase or decrease in Project generation, and the estimated average annual increase or decrease of the value of Project power due to changes in Project operation (18 CFR § 4.51(e)(9).	Please see Section 6.0, *Developmental Analysis*, of the PDEA.
SC-114	According to the Sierra Club's calculations the Project is not reliable, the power may not be needed or valuable, and it may not be critical to the region.	The Spokane River Project is operated as a necessary and reliable source of energy to its customers. Avista disagrees with the Sierra Club's representation of the need and value of the Project.
SC-115	Perform analyses, with and without Project, of when Avista must acquire additional capacity; provide daily generation profile, plant by plant, for last 10 years; state the projected rate implications for meeting the most likely needs scenarios; calculate the rate effects over next ten years of taking out energy supply services from Post Falls, Upper Falls, Monroe Street, and Nine Mile HEDs.	The Spokane River Project has met customer needs reliably and economically for nearly a century and is expected to do so after relicensing. Avista's future needs are described over a 20-year planning period in the *2003 Integrated Resource Pla*n which is available on the Avista web site, and summarized in Exhibit H.3.2.1 through H.3.3.2.
SC-116	Is the 111 aMW of energy through conservation for a year? Is the forecast for an additional 53 aMW? What is the planning period?	The 26-year cumulative electric impact of Avista's demand-side management program is 111 aMW. Avista's 2003 Integrated Resource Plan (IRP) indicates that there is 4.6 aMW of total resource cost-effective annual acquisition through Avista's local programs. Avista's IRP is based upon a twenty-year planning period. Avista completes an updated IRP process every 2 years.
SC-117	Would eliminating or reducing generation have negative effects on transmission losses if replacement were located some distance away? How would this affect rates?	In general, the closer generation is to the source of demand, the less transmission loss that occurs. It is impossible to calculate changes to transmission loss for replacement power located "some distance away." Additionally, ratepayers would bear the cost of decommissioning the existing facilities and the purchase of replacement facilities.

Comment ID	Comment	Response
SC-118	What resources constitute the 47-aMW energy efficiency figure? What impact does this have on rates and revenues?	The 47 aMW consists of a mix of residential, commercial and industrial efficiency technologies. The flexible nature of Avista's electric-efficiency programs allows any electric-efficiency measure to qualify for assistance. Efficiency measures reduce native loads that would otherwise be served by Avista and consequently reduce utility revenues. These programs simultaneously cause upward rate pressure and, to the extent that they are cost-effective, a reduction in the participating customer's energy bill and the total resource cost of serving end-use loads.
SC-119	Explain the impacts of the residential programs on rates, revenue, and supply.	Resources acquired through residential energy-efficiency programs act to reduce the generation and purchases required by Avista to meet native load requirements. Residential energy-efficiency programs act to reduce the load requirements of the residential segment, and consequently reduce the utility revenue derived from that segment. Cost effective programs create upward pressure on rates while simultaneously reducing the participating customer's total energy cost and reducing the aggregate total resource cost of operating end-use equipment.
SC-120	Fail to mention negative downstream effects on recreation and tourism; and the effects of altered flows and impounded sediment on water quality, fish habitat and migration patterns, riparian areas, and aesthetic features. Never state a cost per kwh or Project costs compared to rates, so impossible to determine if customers are receiving lowest possible rate.	The environmental analysis of current Project operations is described in the PDEA that is part of the license application submittal to FERC. The economic analysis required by FERC is provided in Exhibit D and in Section 6.0, *Developmental Analysis,* of the PDEA.
STI-1	The Spokane Tribe of Indians believes the license application should better identify potentially affected tribal trust resources including waters, land, fish, animals, plants, and other resources associated with the Spokane River and its riparian ecosystem.	During the past 3 years of consultation, issues and resources related to Project operations were identified through work groups. The Spokane Tribe of Indians participated in these work groups. All of the resource areas listed in this comment were investigated.
STI-2	The draft license application lacks important details on Project operations.	Please see the revisions to Exhibit B.

Comment ID	Comment	Response
STI-3	The Spokane Tribe of Indians supports BIA’s comments and requests that the Project design drawings be addressed in the final application.	Please see response to BIA-S-122.

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SPOKANE RIVER HYDROELECTRIC PROJECT

FERC No. 2545

Application for New License
Major Project—Existing Dam

VOLUME II

Applicant-Prepared
Preliminary Draft Environmental Assessment

18 CFR, Part 4, Subpart F, Section 4.51

Avista Corporation
Spokane, Washington

July 2005

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LIST OF TABLES

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LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

Advisory Council	Advisory Council on Historic Preservation
AGWA	Automated Geospatial Watershed Assessment
ALP	alternative licensing process
aMW	average megawatt
APE	area of potential effect
Avista	Avista Corporation
AWTP	advanced wastewater treatment plant
BLM	U.S. Bureau of Land Management
BPA	Bonneville Power Administration
ºC	degrees Celsius
CCC	Criterion Continuous Concentration
cfs	cubic feet per second
cm	centimeter
CMC	Criterion Maximum Concentration
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CRWG	Cultural Resources Work Group
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
DO	dissolved oxygen
ºF	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWG	Fisheries Work Group
FWS	U.S. Fish and Wildlife Service
HED	hydroelectric development
HPMP	Historic Properties Management Plan
IDAPA	Idaho Administrative Procedures Act
IDFG	Idaho Department of Fish and Game
IDPR	Idaho Department of Parks and Recreation
IDWR	Idaho Department of Water Resources
IPUC	Idaho Public Utilities Commission
IRP	Integrated Resource Plan
IWTP	industrial wastewater treatment plant
kg	kilogram
LUMP	Land Use Management Plan
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
mm	millimeter
MW	megawatt
MWh	megawatt hour
National Policy	National Recreational Fisheries Policy

NEPA	National Environmental Policy Act
NHC	Northwest Hydraulic Consultants
NHPA	National Historic Preservation Act of 1966
NPCC	Northwest Power and Conservation Council (known as the Northwest Power Planning Council prior to 2003)
NPPC	Northwest Power Planning Council (changed its name to Northwest Power and Conservation Council [NPCC] in 2003)
NRHP	National Register of Historic Places
NTU	Nephelometric turbidity unit
OU	Operable Unit
PA	programmatic agreement
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PDEA	preliminary draft environmental assessment
pH	potential hydrogen (a measure of acidity and alkalinity)
PME	protection, mitigation, and enhancement
PNCA	Pacific Northwest Coordination Agreement
POTW	publicly owned treatment works
Project	Spokane River Hydroelectric Project
RCW	Revised Code of Washington
RLUAWG	Recreation, Land Use, and Aesthetics Work Group
RU	recovery unit
SD1	Scoping Document 1
SHPO	State Historic Preservation Officer
Spokane River Project	Spokane River Hydroelectric Project
TCP	Traditional Cultural Properties
TDG	total dissolved gas
TMDL	total maximum daily load
TRWG	Terrestrial Resources Work Group
μS	micro-Siemens
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology
WDNR	Washington Department of Natural Resources
WRIA	water resources inventory area
WRWG	Water Resources Work Group
WUTC	Washington (State) Utilities and Transportation Commission
WWR	whole-water recoverable
WWTP	wastewater treatment plant

SUMMARY

BACKGROUND

The existing Spokane River Hydroelectric Project (Spokane River Project, or Project) (FERC No. 2545) consists of five developments, has a nameplate generating capacity of 137 megawatts, and has an average energy production of 100 average megawatts. The Project is located in Kootenai and Benewah counties, Idaho, and Spokane, Lincoln, and Stevens counties, Washington, in and near the city of Spokane, Washington. The Project currently operates under a license issued by the Federal Energy Regulatory Commission (Commission or FERC) on August 17, 1972, which expires on August 1, 2007. The Project's five developments (from upstream to downstream on the Spokane River) include Post Falls Hydroelectric Development (HED), Upper Falls HED, Monroe Street HED, Nine Mile HED, and Long Lake HED (see Figure 1-1).[1] Post Falls and Long Lake HEDs operate with regulated reservoirs (Coeur d'Alene Lake and Lake Spokane, respectively), while Upper Falls and Monroe Street HEDs operate in run-of-river mode. Nine Mile HED impounds Nine Mile Reservoir, but it also operates as a run-of-river facility. The Project's developments are operated in a coordinated manner to contribute to Avista Corporation's (Avista's) electric generating resources.

In April 2002, Avista requested the Commission to approve its use of the alternative licensing process (ALP) for relicensing the Project, and on June 14, 2002, the Commission issued its approval. The ALP is intended to facilitate participation and improve communication among interested parties, avoid unnecessary conflict, increase confidence that all reasonable alternatives have been adequately and fairly evaluated, and increase the likelihood of a comprehensive settlement.

As part of the ALP, a Plenary Group of stakeholder organizations was formed to participate in and generally oversee the ALP and the desired development of a settlement agreement. The Plenary Group held its first meeting on May 21, 2002, and at that time established five additional work groups to focus on issues within major resource areas: water resources; fisheries; terrestrial resources; recreation, land use and aesthetic resources; and cultural resources. The work groups met approximately monthly for almost 3 years to define issues, review and approve study plans and results, and recommend environmental measures for inclusion into the intended Settlement Agreement and for incorporation into Avista's Proposed Action. Some, but not all, of the work groups' recommendations are included in the Proposed Action presented here.

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1 Avista is filing two applications: one to relicense the four Washington developments as the Spokane River Project, keeping the original Project No. 2545, and the other to relicense Post Falls HED as a separate project.

PROPOSED ACTION

Separate Licenses

Avista is applying for separate licenses for Post Falls HED and the downstream developments. The original license for the Spokane River Project covered only the four Washington developments; in addition, another FERC-licensed project, owned by the City of Spokane, separates Post Falls from the rest of the developments. Avista believes that consideration of a separate license may either allow a quicker resolution of issues downstream and/or facilitate a resolution of the unique issues associated with Post Falls HED.

Operational Changes

Under the Proposed Action, Avista would operate the Post Falls HED and the four Spokane River Project's four HEDs in Washington in a manner generally similar to current Project operations, but with several operational changes intended to address stakeholder concerns. Proposed operational changes include the following:

- The minimum discharge from Post Falls HED would be set at 600 cubic feet per second (cfs) year-round under normal operations, as measured at the U.S. Geological Survey (USGS) gage 12419000 (Spokane River near Post Falls). Between July 1 and September 15 of each year, Avista would reduce the minimum discharge to 500 cfs if the level of Coeur d'Alene Lake dropped below 2,127.75 feet (3 inches below full pool).

- Operations at Post Falls HED would be managed to comply with the discharge approaches outlined in the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan* (Avista, 2004).

- The summer recreational elevation of Coeur d'Alene Lake, at or near 2,128 feet, would start as soon as practicable each summer (the same as current Project operations) and would be maintained until September 15. Exceptions would occur, if needed, to maintain the minimum discharge flow from Post Falls HED and to meet fisheries resource needs, as noted above.

- Operations at Post Falls HED would follow a downramping rate that corresponds to no more than a 4-inch drop per hour in downstream water levels at the USGS gage 12419000 (Spokane River near Post Falls).

- Aesthetic flows would continue to be provided year-round at Monroe Street HED and also would be initiated seasonally at Post Falls and Upper Falls HEDs.

- Flows from Post Falls HED would be adjusted when possible in late spring and in the fall to maintain preferred whitewater paddling flows for an extended time, and, when possible, increased flows for open-water boating would be scheduled for one or more weekends in August.

- Avista would limit the drawdown of Lake Spokane to 14 feet, except under certain emergency conditions. This would constitute a change from current license conditions, which allow for a 24-foot maximum drawdown, but would not be a change from the way the Project has been operated in recent years.

- Avista would attempt to periodically draw down Lake Spokane during the winter to expose the lake bed to freezing temperatures to reduce the occurrence of aquatic weeds such as Eurasian watermilfoil.

The Proposed Action includes a number of additional environmental protection and enhancement measures summarized below. Measures applicable to Post Falls HED are listed first, followed by measures proposed for the Project's four HEDs in Washington. Many of the measures at all five HEDs are designed to be implemented in cooperation with various state and local agencies, the tribes, and other interested parties.

Post Falls HED Measures

Water Resource Measures

Total Dissolved Gas Control and Mitigation Program (PF-WQ-1)

- Develop and implement a total dissolved gas (TDG) control and mitigation program, including spill gate operating protocols and ongoing TDG monitoring and evaluation.

Idaho Water Quality Protection, Mitigation, and Enhancement (PF-WQ-2)

- Develop and implement a water quality monitoring program.

Aquatic Resource Measures

Post Falls HED Fish Protection, Mitigation, and Enhancement Program (PF-AR-1)

- Maintain a 600-cfs minimum discharge flow at Post Falls HED under normal operating conditions, with a defined trigger for reducing the minimum flow to 500 cfs.

- Comply with the Post Falls HED discharge levels as outlined in the Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan.

- Maintain a maximum allowable per hour discharge downramping rate at Post Falls HED that corresponds to no more than a 4-inch drop per hour in downstream water levels.

- Provide for a population and habitat protection and enhancement program for westslope cutthroat trout and bull trout in the Coeur d'Alene Lake Basin and native rainbow trout in the free-flowing reach of the Spokane River downstream of Post

Falls HED. This component may also support wild salmonid protection by providing for alternative angling and harvest opportunities through recreational and fishery enhancement and supplementation.

- Support population and habitat assessments and monitoring for westslope cutthroat trout and bull trout in the Coeur d'Alene Lake Basin and/or native rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED.

- Provide assistance and support for a public information, education, and law enforcement program specific to bull trout and westslope cutthroat trout in the Coeur d'Alene Lake Basin and native rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED.

Coeur d'Alene Lake Aquatic Weed Management Program (PF-AR-2)

- Provide assistance and financial support for public education, monitoring, and weed management measures associated with exotic/noxious weeds in Coeur d'Alene Lake.

Terrestrial Resource Measures

Coeur d'Alene Lake and Tributary Erosion Control and Wetlands and Riparian Habitat Protection and Enhancement (PF-TR-1)

- Identify and prioritize specific areas of concern for protection and erosion control opportunities. Implement erosion control measures on Coeur d'Alene Lake and the affected tributaries once appropriate access has been obtained.

- Identify and evaluate agreed-upon wetland and riparian habitat sites associated with Coeur d'Alene Lake or its tributaries in order to protect, enhance or restore them. Appropriate access will need to be obtained prior to implementing this measure.

Aesthetic Resource Measures

Post Falls HED Aesthetic Flows (PF-AES-1)

- Provide aesthetic flows at Post Falls HED through the North Channel spill gates (approximately 46 cfs) on Saturdays and Sundays from 12:00 p.m. until 6:00 p.m., Memorial Day weekend through Labor Day.

Land Use Measures

Post Falls HED Land Use Management Plan Implementation Protection, Mitigation, and Enhancement (PF-LU-1)

- Implement the Project Land Use Management Plan's (LUMP's) land management practices on Avista-owned Project lands.

- On and adjacent to the Project, provide assistance and financial support for enforcement of land- and water-based laws and regulations administered by federal, state, local, and tribal governments.

Recreation Resource Measures

Post Falls HED Recreation Plan (PF-REC-1)

- Develop and implement a Project recreation plan that encompasses the various recreation protection, mitigation, and enhancement (PME) measures and consultation with the appropriate recreation management entities.

Coeur d'Alene Recreation Protection, Mitigation, and Enhancement (PF-REC-2)

- Cost-share improvements at City of Coeur d'Alene parks adjacent to the Project. Enter into a separate agreement with the City to supplement their related operation and maintenance costs.

- Cost-share improvements, operation, and maintenance at Falls Park with the City of Post Falls.

- Cost-share improvements, operation, and maintenance at Q'emiln Park with the City of Post Falls.

- Cost-share six Coeur d'Alene Lake and tributary boat ramp extensions with the appropriate recreation management entities.

- Provide private aids to navigation on Coeur d'Alene Lake and its tributaries and assist in the associated operation and maintenance costs.

- Cost-share facility improvements on U.S. Bureau of Land Management (BLM) recreation lands adjacent to or in the Project boundary. Enter into a separate agreement with BLM to supplement their related operation and maintenance costs.

- Cost-share facility improvements on Coeur d'Alene tribal lands adjacent to the Project. Enter into a separate agreement with the Coeur d'Alene Tribe to supplement its related operation and maintenance costs.

- Cost-share abandoned dock and debris removal from the Project with the appropriate recreation management entities.

- Cost-share the Higgens Point breakwater and shoreline stabilization projects. Enter into a separate agreement with the Idaho Department of Parks and Recreation (IDPR) to supplement their related operation and maintenance costs.

- Cost-share facility improvements on FS lands adjacent to or in the Project boundary. Enter into a separate agreement with the FS to supplement their related operation and maintenance costs.

- Cost-share mooring buoys and the related operation and maintenance at Mowry State Park.

- Cost-share four Trail of the Coeur d'Alenes trail spurs that will provide access for people with disabilities. Enter into a separate agreement with the Coeur d'Alene Tribe to cost-share the related operation and maintenance.

- Cost-share Hawley's Landing boat dock improvements with IDPR.

- Cost-share Plummer and Rocky Point beach improvements with IDPR.

- Cooperate with the other recreation management entities to ensure continued public access to the Project in the future by assisting in the planning and development of new and/or reconstructed recreation facilities after the facilities identified in this PME are completed.

Post Falls/Spokane River Recreation Protection, Mitigation, and Enhancement (PF-REC-3)

- Coordinate the late-spring and fall flow releases from Post Falls HED to extend whitewater play boating opportunities on the Spokane River and provide scheduled open-water boating flows during one or two weekends in August.

- Cost-share USGS Post Falls Gage modifications and a real-time flow information system with USGS.

- Cooperate in the acquisition, development, and related operation and maintenance for the Trailer Park Wave access site.

- Cost-share Corbin Park boat ramp improvements with the City of Post Falls.

Post Falls HED Public Outreach (PF-REC-4)

- Prepare and implement an Interpretation and Education Plan.

- Conduct visitor surveys adjacent to the Project every 6 years.

Cultural Resources Measures

Historic Properties Management Plan (PF-CR-1)

- Develop and implement the Historic Properties Management Plan (HPMP).

Other Items

- Purchase and maintain a boat to be used to support PME measure implementation at Post Falls HED and at Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs (one-half cost to be covered by the Post Falls development and one-half by the other four developments).

- Provide for internal administrative overhead costs for new PME measures.

Upper Falls, Monroe Street, Nine Mile, and Long Lake HED Measures

Water Resource Measures

Total Dissolved Gas Control and Mitigation Program (SRP-WQ-1)

- Develop and implement a TDG control and mitigation program, including spillgate operating protocols, ongoing TDG monitoring and evaluation, and a comprehensive Long Lake HED TDG abatement plan.

Washington Water Quality Protection, Mitigation, and Enhancement (SRP-WQ-2)

- Develop and implement a water quality monitoring program.

Aquatic Resource Measures

Spokane River Fish Protection, Mitigation, and Enhancement Program (SRP-AR-1)

- Provide for fish population and aquatic habitat protection and enhancement efforts on the Spokane River and Lake Spokane.

- Support the development and implementation of enhanced fish population and related aquatic habitat assessments and monitoring programs associated with the Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs.

Lake Spokane Aquatic Weed Management Program Protection, Mitigation, and Enhancement (SRP-AR-2)

- Implement site-specific and general weed control measures in Lake Spokane, including potential use of bottom barriers to maintain public access sites. Attempt periodic winter drawdowns of 10 to 14 feet to assist in managing weeds in Lake Spokane.

Terrestrial Resource Measures

Lake Spokane/Nine Mile Terrestrial, Riparian and Wetlands Habitat Protection and Enhancement Protection, Mitigation, and Enhancement (SRP-TR-1)

- Secure appropriate property protection for, and implement, new wetland enhancement or restoration efforts adjacent to or near the Nine Mile or Long Lake HEDs.

- Incorporate into the Project boundary Avista-owned lands within 200 feet of the Lake Spokane shoreline (representing approximately 320 acres) and manage as appropriate under the LUMP.

- Support regional efforts to reduce erosion (and downstream sedimentation) in the Hangman Creek Watershed.

Project Transmission Line Management Program Protection, Mitigation, and Enhancement (SRP-TR-2)

- Provide raptor protection and non-chemical vegetation management, as appropriate, on approximately 2.1 miles of existing Project transmission lines, as well as any new transmission lines that may become part of the Project in the future.

Aesthetic Resource Measures

Spokane River Project Aesthetic Flows Protection, Mitigation, and Enhancement (SRP-AES-1)

- Provide a 200-cfs minimum daily aesthetic flow through Upper Falls HED bypass reach (north and middle channels) from 10:00 a.m. to one-half hour after sunset, Memorial Day weekend through September 30 and implement channel restoration as feasible to enhance visual conditions.

- Continue to provide the current 200-cfs minimum daily aesthetic flow from 10:00 a.m. to one-half hour after sunset daily, year-round, at Monroe Street HED.

Land Use Measures

Project Land Use Management Plan Implementation Protection, Mitigation, and Enhancement (SRP-LU-1)

- Implement the Project LUMP's management practices on Avista-owned Project lands.

- On and adjacent to the Project, provide assistance and financial support for enforcement of land- and water-based laws and regulations administered by governments within their jurisdictions.

Recreation Resource Measures

Spokane River Project Recreation Plan (SRP-REC-1)

- Develop and implement a Project Recreation Plan that encompasses the various recreation PME measures and consultation with appropriate recreation management entities.

Spokane River Recreation Protection, Mitigation, and Enhancement (SRP-REC-2)

- Continue to manage Huntington Park as a natural area/buffer within the city of Spokane.

- Cost-share Water Avenue access site improvements at a low level of development. Enter into a separate agreement with the City of Spokane to supplement its related costs for operation and maintenance.

Spokane River Public Outreach Protection, Mitigation, and Enhancement (SRP-REC-3)

- Prepare and implement an Interpretation and Education Plan.

- Conduct visitor surveys adjacent to the Project every 6 years.

Lake Spokane/Nine Mile Reservoir Recreation Protection, Mitigation, and Enhancement (SRP-REC-4)

- Develop a separate agreement with Washington State Parks regarding future use and management of Nine Mile cottages.

- Cooperate with Washington State Parks to develop, operate, and maintain an interpretative center at Nine Mile HED and to improve the interpretation program at the Spokane House.

- Cooperate with Washington State Parks to develop, operate, and maintain the Nine Mile portage, parking, and signage improvements.

- Cost-share the Centennial Trail extension from Sontag Park to Nine Mile Resort.

- Redevelop and manage Nine Mile Resort day-use and boat access improvements in a manner consistent with Washington State Parks' Riverside State Park proposed new campground.

- Cooperate with Washington Department of Natural Resources (WDNR) to expand, operate, and maintain WDNR's Lake Spokane Campground.

- Cooperate in the development, operation, and maintenance of up to 10 semi-primitive boat-in-only campsites on Lake Spokane.

- Redevelop, operate, and maintain the Long Lake Dam Overlook.

- Develop and maintain the Long Lake Dam river access site for carry-in-only boat access.

- Operate and maintain the Devil's Gap Trailhead.

- Cooperate with other recreation management entities to ensure continued public access to the Project in the future by assisting in the planning and development of new and/or reconstructed recreation facilities after the facilities identified in this PME measure are completed.

Cultural Resources Measures

Historic Properties Management Plan (SRP-CR-1)

- Develop and implement the HPMP.

Other Items

- Purchase and maintain a boat to be used to support PME measure implementation at Post Falls HED and at Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs (one-half cost to be covered by the Post Falls development and one-half by the other four developments).

- Provide for internal administrative overhead costs for new PME measures.

Project Boundary Modifications

The current Project boundary for Post Falls HED is defined by the 2,128-foot elevation contour, as shown in a 1980 FERC license amendment. Recent fieldwork led Avista to make corrections to the 2,128-foot contour maps. Avista therefore is proposing to amend the Project boundary maps to correspond with the more recent data, consistent with retaining the current 2,128-foot boundary. Other proposed changes to the Project boundary include the following:

Post Falls HED

- At Post Falls HED, add 2,352 acres (now within the 2,128-foot contour) and remove 0.5 acre east of the abandoned Corbin Ditch.

Spokane River Project

- At Upper Falls and Monroe Street HEDs, remove 2.8 acres that serve no Project purpose.

- At Nine Mile HED, remove 66 acres that serve no Project purpose.

- At Long Lake HED, add 350.1 acres associated with a proposed shoreline buffer, the Nine Mile Resort, and two short sections of primary transmission line.

1.0 APPLICATION

On or about July 31, 2005, Avista Corporation (Avista) filed two applications with the Federal Energy Regulatory Commission (Commission or FERC) for new licenses for the developments of the existing Spokane River Hydroelectric Project (Spokane River Project or Project). The Project, consisting of five developments, has a nameplate generating capacity of 137 megawatts (MW) and an average energy production of 100 average megawatts (aMW). The Project is located in Kootenai and Benewah counties, Idaho, and Spokane, Lincoln, and Stevens counties, Washington, in and near the city of Spokane, Washington (Figure 1-1). The Project currently operates under a license issued by the Commission on August 17, 1972, which expires on August 1, 2007.

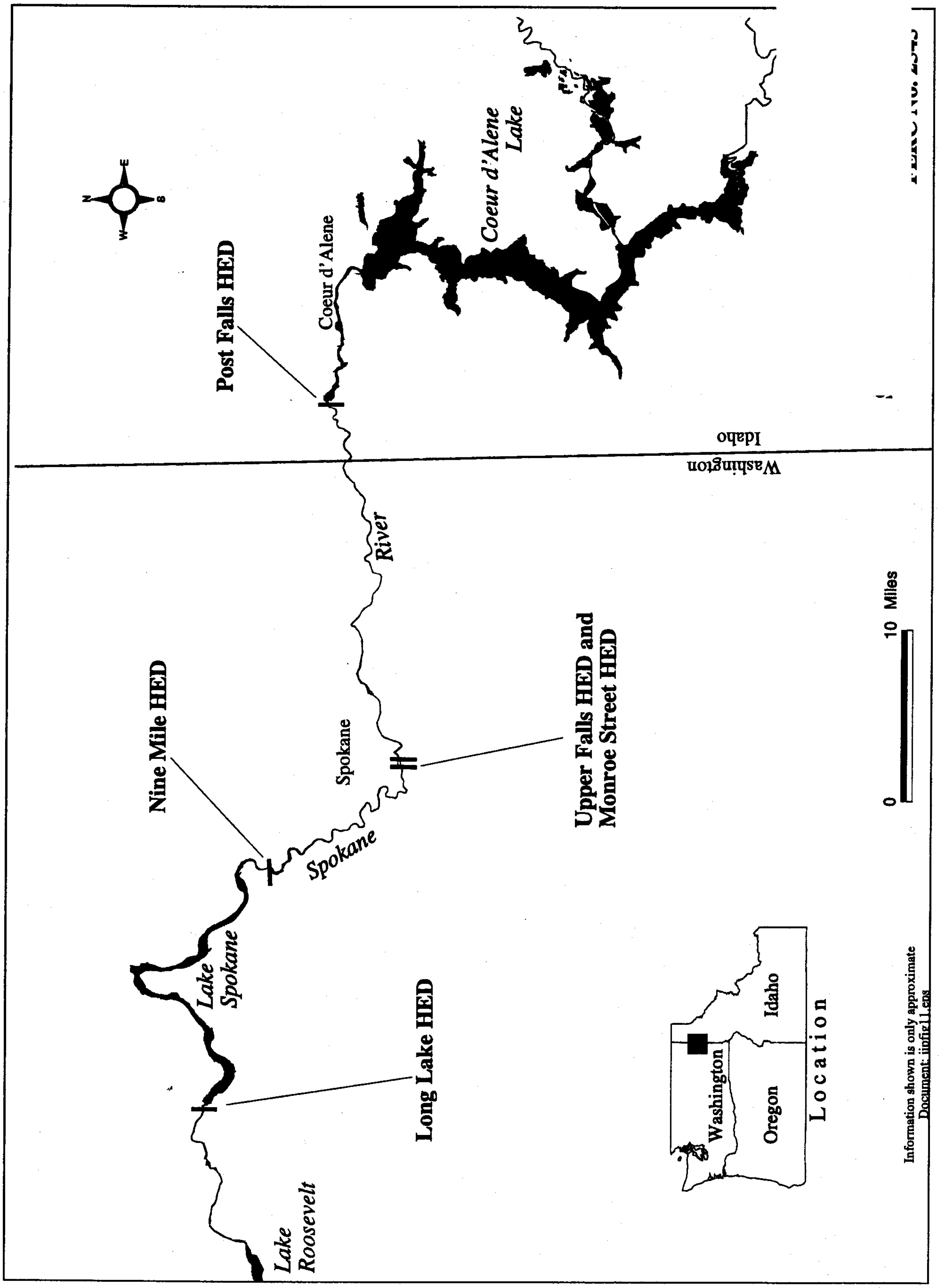

Figure 1-1. Spokane River Hydroelectric Project location map.

2.0 PURPOSE OF ACTION AND NEED FOR POWER

2.1 Purpose of Action

The Commission must decide whether to relicense the Project and what conditions should be placed on any license(s) issued. In deciding whether to authorize the continued operation of the Project and related facilities in compliance with the Federal Power Act (FPA) and other applicable laws, the Commission must determine that the Project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (e.g., flood control, irrigation, and water supply), the Commission must give equal consideration to the purposes of energy conservation; the protection of, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality.

In this Preliminary Draft Environmental Assessment (PDEA), Avista presents the environmental and economic effects of (1) continuing to operate the Project as it is currently operated (No-action Alternative) and (2) operating the Project in keeping with Avista's draft relicensing proposal (Proposed Action). The analysis also considers an option of operating part of the Project (i.e., the Post Falls Hydroelectric Development [HED]) under the natural hydrograph, as well as federal takeover, non-power license, and Project retirement options. Briefly, the principal issues addressed in the PDEA include: (1) reservoir operations related to power generation and other purposes; (2) Project releases for protection of native fish populations and other purposes; (3) water quality; (4) fishery management and protection needs; (5) protection and enhancement of wildlife habitat; (6) potential effects on threatened and endangered species; (7) recreational access and facility improvements; (8) protection of cultural and historic resources; (9) waterway bank erosion; and (10) aesthetic flows and aesthetic resources.

2.2 Need for Power

2.2.1 Overview

Avista, an investor-owned utility supplying electricity to residential, wholesale, commercial, and industrial users, owns and operates the Spokane River Project. The 137-MW Spokane River Project includes developments that operate in both run-of-river mode and with regulated reservoirs. The Project's five developments are operated in a coordinated manner to contribute to Avista's electric generating resources.

Regional energy groups forecast a continued increase in electrical demand. Meeting this demand while maintaining system reliability will require additional generation resources, energy conservation, and, to the greatest extent possible, preservation of existing generation assets. Generation assets that are able to respond to the seasonal and/or daily changes in electricity demand will be particularly important for maintaining future system reliability. Hydroelectric developments that are capable of quickly responding to load demand changes, such as the

Spokane River Project's Long Lake HED, are important for their demand-following generation capabilities.

Avista also operates the Clark Fork Hydroelectric Project facilities, including the 466-MW Noxon HED and the 257-MW Cabinet Gorge HED, totaling 723 MW of licensed nameplate capacity. On the Spokane River, Avista also operates the Little Falls Hydroelectric Project, which has a nameplate rating of 32 MW. These three Avista hydroelectric facilities, together with Avista's five Spokane River Project hydroelectric developments, provide about 892 MW of hydro capacity (Avista, 1999). Energy from the eight hydroelectric developments accounts for 451 aMW, or about 36 percent of Avista's 1,270 aMW resource portfolio in 2004.

The balance of Avista's firm generation resources are coal-fired thermal plants, gas-fired combustion turbine plants, purchases from independent power producers, and wholesale power purchases. Additionally, Avista participates in the Northwest Energy Efficiency Alliance and several public-purpose energy conservation, audit, and weatherization programs.

Avista operates the Spokane River Project in concert with its other facilities and programs to minimize the overall cost of power production. Without this Project, Avista would be faced with replacing the Project's energy and capacity at costs reflecting the value of new resource acquisition.

2.2.2 Regional Perspective

The Bonneville Power Administration's (BPA's) 2003 white book is a snapshot of overall Pacific Northwest regional conditions as of March 31, 2004 (including the revisions of December 1, 2004), and incorporates load, contract, and resource estimates provided by BPA, federal agencies, public utilities, cooperatives, and investor-owned utilities (BPA, 2004). Figure 2-1 illustrates how the monthly peak firm MW deficit could grow to as much as 5,104 MW by operating year 2014.[2] For the month of January (a peak-demand month for the region), the total regional firm load is projected to be 38,333 MW in 2014, and total net power resources are expected to be 31,897 MW. The colder winter months are most susceptible to deficits, while late April and May could also experience deficits.

The average annual regional firm load is expected to rise from 19,666 aMW in 2005 to 22,849 aMW in 2014, excluding the load associated with exports. The direct-service industrial loads component of this total is projected to grow from 292 aMW in 2005 to 674 aMW in 2014. Additionally, energy exports are expected to decrease from 1,468 aMW in 2005 to 848 aMW in 2014. In general, the regional firm load is projected to be 21,135 aMW in 2005 and 23,698 aMW in 2014. Total net power resources are expected to grow from 23,559 aMW in 2005 to 23,487 aMW in 2014, resulting in a surplus of firm power of 1,748 aMW in 2005 and a deficit of 885 aMW in 2014. These BPA projections indicate a continued need for power in the Pacific Northwest.

[2] An operating or energy year begins August 1 and ends July 31.

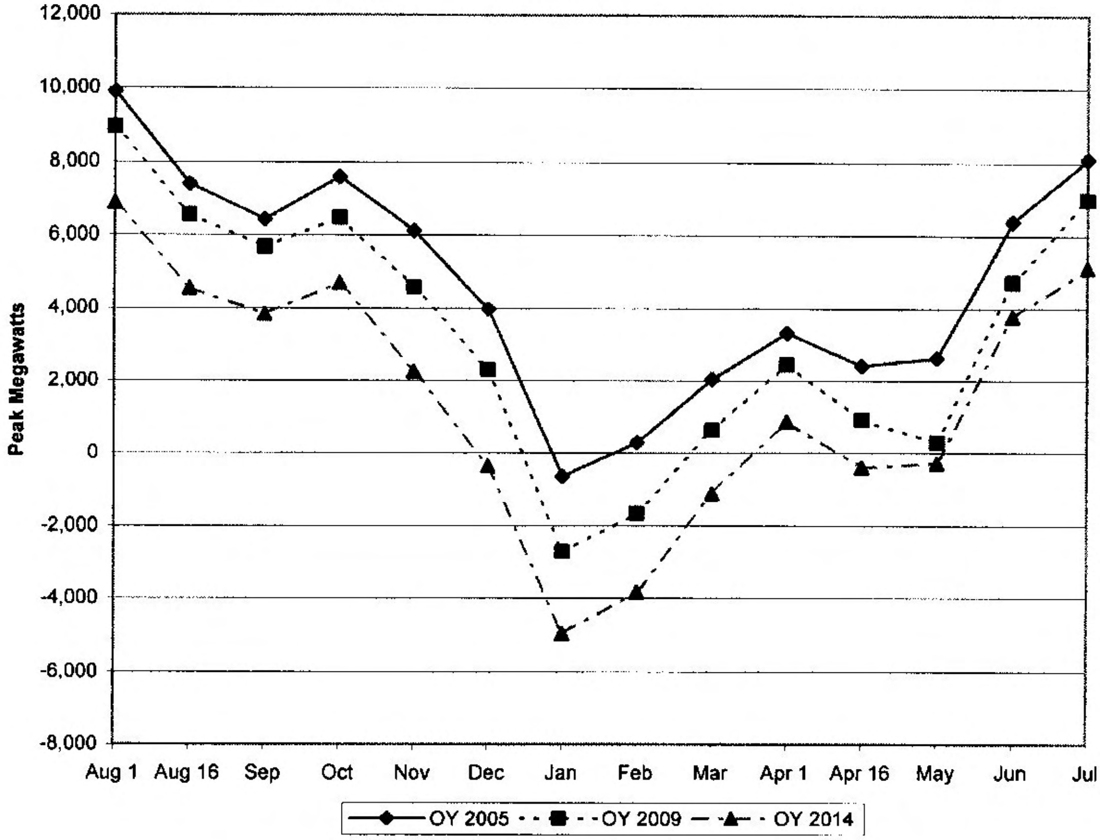

Figure 2-1. Regional firm monthly capacity surplus/deficit projections for several operating years (OY)(surplus/deficit projections assume normal weather conditions and 1936–1937 critical water year conditions for hydro). (Source: BPA, 2004)

The Spokane River Project is one of more than 250 hydroelectric developments in the Columbia River system. The amount and timing of water released from the Columbia River system projects substantially affect both hydroelectric generation and the other benefits provided by the system (e.g., transportation, irrigation, and natural resource protection). The efficient management of this complex hydroelectric and water resource system is facilitated by the Pacific Northwest Coordination Agreement (PNCA). Most public and private utilities and federal generators in the region, including Avista, are parties to the PNCA. The PNCA provides for the coordination of water releases from the participating hydroelectric projects to optimize energy production and other benefits.

The Spokane River Project falls under the purview of the PNCA and operates in coordination with other hydroelectric developments in the system. The amount of storage water provided by the Spokane River system, however, is very small compared to the many other, much larger storage reservoirs in the Columbia River system, including Flathead Lake on the Flathead River, Lake Pend Oreille on the Clark Fork-Pend Oreille River system, the Canadian storage reservoirs on the upper Columbia River, Lake Roosevelt (formed by Grand Coulee Dam) on the main stem of the Columbia River, and the Snake River storage reservoirs.

2.2.3 Utility Perspective

Avista filed its 2003 Electric Integrated Resource Plan (IRP) in the states of Washington and Idaho under the regulation of the Washington (State) Utilities and Transportation Commission (WUTC) and Idaho Public Utilities Commission (IPUC) on April 30, 2003. The IRP is a comprehensive, long-range planning process in which forecasted energy requirements are fully integrated with potential energy resources. The process helps determine the most cost-effective means for Avista to meet those projected requirements (Avista, 2003). As shown in Table 2-1, the IRP indicates that on an annual basis, the company has surplus energy through 2006. However, Avista anticipates that the overall growth in electricity sales will average 3.4 percent per year between now and 2023. By 2013, an energy shortfall of 411 aMW is projected for the year, and an energy shortfall of as much as 556 aMW could occur in January—the month with the largest energy shortfall.[3]

Table 2-1. Loads and resources energy forecast (aMW). (Source: Avista, 2003)

	Year							
	2004	**2005**	**2006**	**2007**	**2008**	**2013**	**2018**	**2023**
Loads								
System retail load	985	1,014	1,051	1,083	1,120	1,326	1,569	1,860
Demand-side management load	2	5	10	14	19	41	64	56
80% confidence interval	189	189	189	189	189	189	189	153
Total obligations	1,176	1,208	1,250	1,286	1,328	1,556	1,822	2,069
Resources								
Hydroelectric	550	545	530	530	529	477	471	458
Demand-side management	2	5	10	14	19	41	64	56
Net contracts	156	157	175	177	177	58	59	12
Base thermal	223	230	223	223	230	230	230	230
Gas dispatch	158	156	158	158	156	158	158	156
Gas peaking units	181	181	181	181	181	181	181	181
Total resources	1,270	1,274	1,277	1,283	1,292	1,145	1,163	1,093
Net position	94	66	27	–3	–36	–411	–659	–976

Notes: % – percent
aMW – average megawatt

Similarly, on an annual basis, Avista forecasts surplus capacity through 2009 as shown in Table 2-2. By 2013, a capacity shortfall of as much as 432 aMW is expected for the year, and a 547-MW shortfall could occur in December—the month with the largest capacity shortfall.

[3] Avista uses an 80 percent confidence level for energy planning to account for abnormal monthly weather patterns and below-average monthly hydroelectric capability. Avista also maintains operating reserves in accordance with industry standards.

Table 2-2. Loads and resources capacity forecast (MW). (Source: Avista, 2003)

	Year							
	2004	2005	2006	2007	2008	2013	2018	2023
Loads								
Retail load	1,470	1,515	1,570	1,617	1,672	1,982	2,349	2,780
Operating reserves	110	110	108	108	108	104	103	101
Total obligations	1,580	1,625	1,678	1,725	1,780	2,086	2,452	2,881
Resources								
Hydroelectric	1,177	1,177	1,135	1,134	1,133	1,043	1,035	998
Net contracts	70	19	43	45	45	–73	78	–2
Base thermal	272	272	272	272	272	272	272	272
Gas dispatch	176	176	176	176	176	176	176	176
Gas peaking units	236	236	236	236	236	236	236	236
Total resources	1,931	1,880	1,862	1,863	1,862	1,654	1,797	1,680
Net position	351	255	184	138	82	–432	–655	–1,201
Reserve margin[a] (%)	23.8	16.8	11.7	8.5	4.9	–21.8	–27.9	–43.2

Notes: % – percent
MW – megawatt

[a] Net position divided by retail load.

To address the need for power, Avista identified an action plan as part of the IRP. The action plan involves both demand-side management and supply-side resource options.

The elements of demand-side management are listed below:

1. Evaluate the cost-effectiveness and resource potential of conservation voltage reduction on Avista's system.

2. Acquire electric resources that are at least proportionate to the percentage of demand-side management revenues being expended.

3. Field a demand-side management portfolio that continues to be cost-effective on a societal and utility basis.

4. Prepare contingency plans for future emergency responses to unexpected fluctuations in wholesale electric markets.

5. Prepare for a re-evaluation of continued participation in the Northwest Energy Efficiency Alliance upon expiration of the current contract period (which expires at the end of 2004).[4]

6. Convene a Technical Advisory Committee meeting in the fall of 2003 to discuss the various alternatives for integrating demand-side management into the 2005 IRP process.[5]

The supply-side resource options are as follows:

1. Pursue a new license for the Spokane River Project by filing a new license application by July 31, 2005.

2. Continue to evaluate the effects and costs of integrating wind generation into Avista's electrical system.

3. Consider and evaluate the potential to add coal facilities to Avista's mix of existing generating resources.

4. Determine the feasibility of entering into a medium-term firm power sale during Avista's surplus years.

5. Initiate a study to determine the optimal reserve margin for Avista, including the benefits of additional peaking capacity.

6. Continue to assess the cost-effectiveness of new resource additions.[6]

7. Continue to work with WUTC and IPUC staff on methods whereby Avista can acquire resources with development timelines beyond 1 or 2 years and increase the probability for full rate recovery.

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[4] Avista recently committed to extend its participation in this partnership for another 5-year period.

[5] This meeting was held on October 23, 2003.

[6] Subsequent to the evaluation referenced here, Avista acquired an additional generation resource at a combined-cycle gas turbine facility, Coyote Springs 2. This purchase will add 140 MW of capacity to Avista's thermal generation resources.

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 No-action Alternative

Under the No-action Alternative, the Spokane River Project would continue to operate under the terms and conditions of the existing license. No new environmental enhancements or protection measures would be implemented, but those already included in the current license would continue. Ongoing environmental measures and operating regimens that Avista currently implements on a voluntary basis are assumed to continue. Potential energy production from the Project would be unchanged from current Project operations.

Under current National Environmental Policy Act (NEPA) guidelines and Commission policy, the No-action Alternative serves as the baseline against which the Applicant's Proposed Action and other alternatives are evaluated. A description follows of the existing Project facilities, current operations, and current environmental measures.

3.1.1 Existing Project Facilities

3.1.1.1 Project Location and General Setting

The Spokane River Project includes five hydroelectric developments and associated reservoirs located on the Spokane River in northern Idaho (Kootenai and Benewah counties) and eastern Washington (Spokane, Stevens, and Lincoln counties). The Spokane River originates at the outlet of Coeur d'Alene Lake in Idaho and flows westerly approximately 111 miles to its confluence with the Columbia River in eastern Washington (which is now within Lake Roosevelt, the impoundment created by Grand Coulee Dam). In downstream order, the Spokane River Project includes Post Falls HED, which is in Idaho (river mile 102), and Upper Falls HED (river mile 74.2), Monroe Street HED (river mile 74), Nine Mile HED (river mile 58), and Long Lake HED (river mile 34), all four of which are located in Washington (Figure 1-1). Two other hydroelectric developments located on the Spokane River are the Upriver Project, owned by the City of Spokane (river mile 80; FERC Project No. 3074), and the Little Falls Project (river mile 29), which is owned by Avista but is not part of the Commission-licensed Spokane River Project.

The Spokane River Project affects the Spokane River as well as Coeur d'Alene Lake and, at times, the lower portions of the lake's tributaries, including the Coeur d'Alene, St. Joe, and St. Maries[7] rivers and their associated lateral lakes (or "chain lakes"). Free-flowing stretches of the Spokane River occur downstream of Post Falls HED (approximately 15 miles), the Upriver Project (approximately 2 miles), Monroe Street HED (approximately 10 miles), and Nine Mile HED (approximately 0.5 mile).

Cities and towns associated with the Spokane River Project in Idaho include Post Falls and Coeur d'Alene. Smaller centers with populations of less than 2,000 are located along the shorelines of Coeur d'Alene Lake (e.g., Harrison and St. Maries, Idaho) and along the Spokane River (e.g., Nine Mile Falls and Tum Tum, Washington). Spokane, Washington (population

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7 The St. Maries River is a major tributary to the St. Joe River.

195,600 in the 2000 U.S. census), where Upper Falls and Monroe Street HEDs are located, is the largest city in the region.

The Coeur d'Alene Indian Reservation is located adjacent to and includes the southern portion of Coeur d'Alene Lake, and the current Project boundary includes more than 8,000 acres of lake and river areas that lie within the borders of the Reservation.[8] The Spokane Indian Reservation is located approximately 2 miles downstream of Long Lake HED (the most downstream of the Project hydroelectric developments). A wide variety of land uses and human development is associated with the Project waters and shorelines. While some shoreline areas exhibit little or no human development, the overall Project area is generally characterized by varying levels of residential, recreational, agricultural, commercial, and/or industrial development.

Coeur d'Alene Lake is a recreation destination. Northern portions of the lake shoreline nearest Coeur d'Alene, Idaho, are characterized by areas of residential and commercial development. Other portions of the shoreline exhibit a more rural and undeveloped nature, with both year-round and seasonal homes, as well as residential and commercial boat docks. Residential and commercial development is common along the nine miles of the Spokane River between Coeur d'Alene Lake and Post Falls HED, along with several public park areas and some undeveloped shoreline. Alongside and immediately upstream of Post Falls HED, the shorelines exhibit a variety of residential, commercial, and industrial development associated with the city of Post Falls, Idaho. Two public park areas, one on each side of the river, lie close to Post Falls HED.

Downstream of Post Falls HED, the shorelines are currently lightly developed and include a mix of agricultural, residential, and open lands, with small beach areas and public access sites near scattered residential areas. Open lands adjacent to the river between Post Falls HED and Upper Falls and Monroe Street HEDs are being developed at an increasing rate, primarily for residential use. The Idaho-Washington border is approximately 5 miles downstream of Post Falls HED. Interstate 90 crosses the Spokane River near the states' border. The Centennial Trail, a surfaced footpath and bicycle trail, generally follows the river from Coeur d'Alene to well downstream of Spokane. The trail, in conjunction with local parks, offers river access at several points.

Near Spokane, development along the shoreline intensifies as residential, commercial, and industrial uses increase. Both Upper Falls and Monroe Street HEDs are located within downtown Spokane. Riverfront Park, a city-owned public park, is located along the river in downtown Spokane, and another small public area, Huntington Park, is located immediately adjacent to Monroe Street HED. Downstream of the city of Spokane, the free-flowing river borders public parks and residential areas. Further downstream the Spokane River shoreline is primarily within Riverside State Park, which provides public access to much of the river between the city and Nine Mile HED. Other adjacent land uses include scattered residential development, with some agricultural or otherwise undeveloped open-space lands. Lake Spokane, the reservoir created by Long Lake HED, includes numerous year-round and seasonal residences, as well as public land access points and private facilities.

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[8] Refer to Section 5.11.2.4 for an estimate of Reservation acreage within the proposed Project boundary.

3.1.1.2 Drainage Area

The drainage area upstream of Post Falls HED, the most upstream of the five Spokane River Project hydroelectric developments, encompasses approximately 3,780 square miles. The majority of water in Coeur d'Alene Lake originates as precipitation in the Bitterroot Mountain Range and reaches the lake via the St. Joe and Coeur d'Alene rivers. At Long Lake HED, the most downstream development in the Project, the drainage area increases to approximately 5,840 square miles and includes the Hangman Creek[9] and Little Spokane River watersheds.

Outside of the peak runoff period, relatively little surface water flow enters the Spokane River between Post Falls and Long Lake HEDs. Hangman Creek is the only significant tributary between Post Falls and Nine Mile HEDs and enters the river a short distance downstream of Monroe Street HED. Hangman Creek is flashy in nature, contributing an annual average of 200 cubic feet per second (cfs) to the Spokane River, although it has peaked as high as nearly 20,000 cfs during extreme runoff conditions. The Little Spokane River flows into the uppermost portion of Lake Spokane. The Little Spokane River, fed by a portion of the Spokane-Rathdrum aquifer, contributes an annual mean discharge of more than 600 cfs to the Spokane River.

The Spokane Valley-Rathdrum Prairie Aquifer underlies the area adjacent to the Spokane River and influences river hydrology. In the uppermost reaches of the Spokane River, water is generally lost to the aquifer, while in the middle and more downstream reaches, aquifer flows tend to add to the river's flows.

3.1.1.3 Project Boundary

The Project boundary, as defined in the current FERC license, is depicted in Exhibit G of the License Applications.[10] As these exhibits show, the current Project boundary encompasses four distinct areas, one each for Post Falls HED, Nine Mile HED, and Long Lake HED, and one that encompasses both Upper Falls and Monroe Street HEDs. The Project boundary generally follows the normal high water line of the Project reservoirs, with some additional areas included around the Project dams, powerhouses, and tailraces. At Long Lake, Nine Mile and Post Falls HEDs, the Project boundary also encompasses some additional, relatively small, parcels of company-owned lands.

3.1.1.4 Project Hydroelectric Developments

Post Falls HED

Post Falls HED is located on the Spokane River at river mile 102, in Post Falls, Idaho, approximately 9 miles downstream of the river headwaters at Coeur d'Alene Lake. This development impounds the 9 miles of the Spokane River upstream of the Post Falls HED, and influences the water levels in Coeur d'Alene Lake and the lower reaches of lake tributaries, depending on volume of tributary inflow and time of year.

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[9] Hangman Creek is also known as Latah Creek. This document uses Hangman Creek, which is the USGS convention.

[10] The Exhibits G also show the proposed Project boundary so that the proposed changes are evident. The proposed Project boundary is also depicted in Appendix A of this document, Figures 3-1 through 3-4.

Post Falls HED includes three dams (north channel, middle channel, and south channel, with natural islands connecting the three structures), spillways along the top of the north and south channel dams, a powerhouse integral to the middle channel dam, and various appurtenant structures (Figure 3-5, Appendix A). The operating reservoir for Post Falls HED encompasses Coeur d'Alene Lake, the lower portions of the St. Joe, St. Maries, and Coeur d'Alene rivers, and the portion of the Spokane River between the lake outlet and the dam. Development dimensions and specifications associated with Post Falls HED include:

- a reservoir that covers the uppermost 9 miles of the Spokane River, Coeur d'Alene Lake, and lower portions of lake tributaries, having a normal full-pool elevation of 2,128 feet;

- Coeur d'Alene Lake (including lateral lakes and affected river reaches of the Coeur d'Alene, St. Joe, St. Maries, and Spokane rivers), having a surface area of approximately 40,600 acres, a maximum depth of more than 200 feet, and usable storage of approximately 223,100 acre-feet (equating to a 9-foot drawdown at the development and a 7.5-foot drawdown in the lake);

- a 431-foot-long, 31-foot-tall north channel dam, with a top-of-dam elevation of 2,133 feet and incorporating the north channel spillway (spillway crest elevation of 2,114 feet), which includes a 100-foot-wide, 14-foot-high rolling sector gate, seven 21-foot-wide, 12-foot-high radial gates, and one 12-foot-wide, 12-foot-high radial gate;

- a 215-foot-long, 64-foot-tall middle channel dam, with a top-of-dam elevation of 2,135 feet;

- a 127-foot-long, 25-foot-tall south channel dam, with a top-of-dam elevation of 2,135 feet and incorporating the 37-foot-long south channel spillway (spillway crest elevation of 2,128.5 feet), which is controlled by six 6-foot-wide, 13-foot-high vertical sluice gates;

- six 56-foot-long, 11.25-foot-diameter intakes and steel penstocks, integral to the middle channel dam, with top of intake openings at 2,113.75 feet; and

- a six-turbine powerhouse, integral to the middle channel dam, with a total nameplate capacity of 14.75 MW and a total hydraulic capacity of 5,400 cfs.

Upper Falls HED

Upper Falls HED is located on the Spokane River (river mile 74.2) in downtown Spokane, Washington, 28 miles downstream of Post Falls HED. Upper Falls HED creates a relatively small reservoir.

Upper Falls HED includes two dams located on either side of a natural island (Havermale Island) in the Spokane River (Figure 3-6, Appendix A). A dam and headgate structure (i.e., for the intakes to the penstocks) is located on the south channel (river mile 74.2), and a dam and control works structure (for water level and spill control) is located on the north channel (river mile 74.7).

Some of the features, structures, and specifications associated with Upper Falls HED include:

- a 4-mile-long reservoir upstream of the south channel dam, having an impounded surface area of 150 acres and a volume of 800 acre-feet at normal full-pool elevation of 1,870.5 feet;

- a 366-foot-long, 35.5-foot-tall north channel dam with a top-of-dam elevation of 1,876.9 feet and incorporating the north channel spillway (spillway crest elevation of 1,854.9 feet), which includes two 60-foot-wide, 16-foot-high rolling sector gates and four approximately 42-foot-wide, 13-foot-high vertical lift gates;

- a 70-foot-long, 30-foot-tall south channel dam with a top-of-dam elevation of 1,876.9 feet;

- three 15-foot-high, 12-foot-wide intakes with headgates, with the top of the intake opening at 1,861.4 feet;

- one 350-foot-long, 18-foot-diameter, reinforced concrete penstock; and

- one powerhouse, located along the south shore of the river, containing one vertical turbine with a total nameplate capacity of 10 MW and a total hydraulic capacity of 2,500 cfs.

Monroe Street HED

Monroe Street HED, which creates a very small reservoir, is also located in downtown Spokane, Washington, at river mile 74, about one thousand feet downstream of Upper Falls HED (Figure 3-6, Appendix A). Monroe Street HED includes a single concrete gravity dam spanning the river, with an intake structure located adjacent to the south abutment of the dam. The powerhouse is located underground on the south shore of the Spokane River a short distance downstream of the dam. A small public park area, Huntington Park, surrounds Monroe Street HED. Some of the features, structures, and specifications associated with Monroe Street HED include:

- a 0.2-mile-long reservoir with a normal full-pool elevation of 1,806 or 1,806.3 feet (the additional 0.3 foot of elevation is maintained during viewing hours to provide a required 200-cfs minimum flow over the spillway), 5 acres of impounded surface area, and 30 acre-feet of storage;

- a 24-foot-tall, 240-foot-long dam with a top-of-dam elevation of 1,806 feet;

- a 217-foot-wide concrete overflow spillway;

- a single intake with a 332-foot-long, 14-foot-diameter steel penstock; and

- a powerhouse (largely underground and completed during a 1992 redevelopment) containing one vertical, Kaplan-style turbine with a total nameplate capacity of 14.82 MW and a total hydraulic capacity of 2,850 cfs.

Nine Mile HED

Nine Mile HED is located on the Spokane River at river mile 58. Nine Mile HED lies 16 miles downstream of Monroe Street HED and 24 miles upstream of Long Lake HED. A single dam and associated powerhouse comprise this development. Some unique features associated with Nine Mile HED include a sediment bypass tunnel (or diversion tunnel) that was installed at the dam in 1996, and the Nine Mile cottages, originally built for facility operators at the dam and now leased to Washington State Parks (Figure 3-7, Appendix A). Some of the features, structures, and specifications associated with Nine Mile HED include:

- an approximately 6-mile-long reservoir (Nine Mile Reservoir) with normal full-pool elevation of 1,606.6 feet, an impounded surface area of 440 acres at full pool and storage of 3,130 acre-feet under a 16.6-foot maximum drawdown;
- a 364-foot-long, 58-foot-tall dam;
- a 225-foot-long concrete overflow spillway, with a spillway crest elevation of 1,596.6 feet, plus two rows of 5-foot-high flashboards;
- four intakes integral to the face of the dam where water is fed to the turbines via steel and concrete bulkhead chambers called a "wet pit"; and
- a powerhouse integral to the dam containing four horizontal Francis turbines (including an indoor substation) with a total nameplate capacity of 26.4 MW and a total hydraulic capacity of 6,500 cfs.

Long Lake HED

Long Lake HED is located on the Spokane River (river mile 34), approximately 25–30 miles northwest of Spokane, Washington, and 24 miles downstream of Nine Mile HED. Long Lake HED includes an L-shaped, concrete gravity main dam and adjacent intake structure, a concrete arch cutoff dam located along the western shoreline approximately 700 to 800 feet upstream of the main dam, a gated spillway along the top of the main dam, and a powerhouse (Figure 3-8, Appendix A). Some of the features, structures, and specifications associated with Long Lake HED include:

- a 23.5-mile-long reservoir (Lake Spokane) with a maximum width of about 0.7 mile, a maximum depth of 180 feet, and approximately 5,060 acres of impounded surface area and 105,080 acre-feet of storage at normal full-pool elevation of 1,536 feet;
- a 213-foot-tall, 593-foot-long main channel dam, with a top-of-dam elevation of 1,537 feet;

- a 108-foot-tall, 247-foot-long cutoff dam;
- a 213-foot-long, gated ogee spillway with a crest elevation of 1,508 feet; eight 29-foot-tall, 25-foot-wide lift gates; and a capacity of 115,000 cfs at a normal full-pool elevation of 1,536 feet;
- four intake structures integral to the main dam, with three 16-foot-diameter and one 14-foot-diameter, 236-foot-long steel penstocks that traverse the downstream face of the dam, and the top of each penstock at elevation 1,507 feet; and
- a powerhouse, including an indoor substation, located at the base of the dam containing four turbines with a total nameplate capacity of 71 MW and a total hydraulic capacity of 6,300 cfs.

3.1.2 Current Project Operation

3.1.2.1 Avista System Operations

The power generated by the Spokane River Project is used to help meet the energy needs of Avista's customers. The Spokane River Project may be used to help meet daily or seasonal increases in demand for energy, called "peaks." Avista determines how to best meet the customer energy demands at any given time either by using available generation sources or through power purchases from other providers. Although Avista depends most significantly on its larger generation sources like the 723 MW Clark Fork Project to meet daily and seasonal peaks in energy demand.

3.1.2.2 Current Spokane River Project Operation

Generally, the five hydroelectric developments that comprise the Spokane River Project are operated to maximize power generation to meet local and regional electricity demands, with consideration given to flood management, natural resource protection, recreation, and other river-water associated needs. During extreme weather events or regional power shortages, normal operating conditions on the Spokane River Project may be modified, but still remain consistent with constraints imposed by the existing license. Operational changes may also occur in emergency situations, such as accidents or other conditions that pose a threat to life or property, or in the event of equipment failures.

The five Spokane River Project hydroelectric developments are operated in a coordinated manner. Post Falls HED is used to "regulate" flows in the Spokane River at certain times and in accordance with minimum flow requirements and other lake level or downstream flow considerations. Downstream of Post Falls HED, Upper Falls and Monroe Street HEDs are operated as run-of-river facilities ("run-of-river" means that water flowing into the reservoir is essentially equal to the water being discharged from the hydroelectric development, and the reservoir water levels change little unless under flood conditions, operation and maintenance activities, or some other unusual circumstance). Farther downstream, Nine Mile HED is generally operated as a run-of-river facility, with relatively minor pool level fluctuations.

At Long Lake HED, the most downstream of the five Project hydroelectric developments, there is significant storage. The storage capacity at Long Lake HED is used primarily for responding to the energy demands of Avista's customers during the winter months, with the pool level lowering over a period of several weeks to several months, depending on energy needs and water inflow. During the summer, Avista attempts to maintain Lake Spokane at a level near full pool, generally using the top foot of storage for responding to daily changes in energy demand.

More detail on the operation of the individual Project hydroelectric developments, the associated water levels and Project discharges, and specific limitations and requirements of the current FERC license is provided below.

Post Falls HED

Post Falls HED is currently operated to meet several interests, including:

- minimum-flow requirements of the FERC license;
- customer energy demands;
- maximizing the amount of storage available in Coeur d'Alene Lake for absorbing spring run-off flows; and
- consideration of upstream recreational, residential, and commercial interests for a stable water level along with downstream resource needs.

The FERC license for the Spokane River Project requires a minimum instantaneous discharge at Post Falls HED of at least 300 cfs, or an amount equal to the inflow to Coeur d'Alene Lake, whichever is less. This minimum flow is normally provided through powerhouse discharge into the river immediately below the middle channel dam. Seepage flows also provide some water into the downstream channels. These seepage flows are estimated as high as 30 cfs or more into the north channel when the upstream pool is at 2,128 feet. Considerably less seepage flows into the south channel (10 cfs or less), but it is still enough to maintain several wetted pools in the incised bedrock below this dam.

Beyond meeting the minimum flow requirements of the license, operations of Post Falls HED vary from year to year due to weather conditions and energy demands. The operations of Post Falls HED have also evolved over time in response to a range of community interests. Post Falls HED typically controls water levels in the Spokane River and Coeur d'Alene Lake about 6 months a year. Many factors, including weather forecasts, snowpack conditions, runoff predictions, resource interests, and energy demand, are considered in determining when to begin controlling the lake's water level with Post Falls HED. More importantly, Avista cannot begin controlling the lake level until after spring runoff flows have peaked and largely subsided. This typically occurs in late June or early July, and allows Avista to then maintain Coeur d'Alene Lake at or near elevation 2,128 feet throughout the summer recreation season.

In the fall, Avista begins to release water at Post Falls HED, resulting in a gradual drawdown of the Coeur d'Alene Lake water level. The drawdown, typically 1 to 2 feet per month, generally begins the week following Labor Day. The timing of the drawdown varies because of the annual variations in flow conditions, weather forecasts, and energy demands. This release of water achieves several ends: optimizing energy production, adding storage capacity in Coeur d'Alene Lake for fall and winter precipitation to help minimize upstream flooding, and increasing flow in the Spokane River.

Upper Falls HED

Upper Falls HED operates near elevation 1,870.5 feet with a full-pool elevation of 1,871 feet, and does not include any discharge requirements or other limitations under the current FERC license. Upper Falls HED has very little storage (800 acre-feet) and is operated as a run-of river facility. Since the City of Spokane's Upriver Project, located upstream of Upper Falls HED, is also operated as a run-of-river facility, the operation and subsequent electric generation at Upper Falls HED is driven primarily by Spokane River flows.

When river flow is less than the 2,500-cfs turbine capacity of Upper Falls HED, all flows are typically routed into the south channel through the intake structures and to the powerhouse. During these times, the north channel around Havermale Island receives only minimal leakage flows of about 30 cfs through the control works and a small amount of groundwater inflow. When river flow exceeds the turbine capacity, excess water is passed through the north channel control works while maintaining a relatively stable water level in the reservoir.

Monroe Street HED

Monroe Street HED is operated as a run-of-river facility with a pool elevation of 1,806 feet, with almost no storage (30 acre-feet). Therefore, as at Upper Falls, Spokane River flows from Coeur d'Alene Lake drive the operation of Monroe Street HED. The FERC license for the Spokane River Project requires Avista to maintain an aesthetic flow of at least 200 cfs over the Monroe Street Dam and downstream ledges during viewing hours (10:00 a.m. to one-half hour after sunset) each day, year-round.

Nine Mile HED

The Nine Mile forebay has an operating full-pool elevation of 1,606.6 feet. The FERC license for the Project does not include any minimum flow, water level, or other limitations specific to Nine Mile HED. However, flow below the dam generally mirrors inflow into the reservoir. There is no bypass reach at Nine Mile HED, since the powerhouse is integral to the dam. Powerhouse discharge and/or spill over the dam flow directly into the downstream river channel.

Nine Mile HED has 3,130 acre-feet of storage and, while capable of limited storage and release operations, it is operated as a run-of-river facility. Therefore, operation of Nine Mile HED is driven primarily by Spokane River flows from Coeur d'Alene Lake. Two rows of 5-foot-high boards are installed on the spillway to maintain the full-pool level. During high flow periods, sections of the flashboards are removed to allow the water to pass, resulting in a temporary drop and subsequent restoration of the reservoir surface elevation of up to 10 feet in those years when flashboard removal is required. The flashboards are replaced once river flow allows for safe access to the crest of the dam.[11]

Long Lake HED

The normal full-pool elevation at Long Lake HED is 1,536 feet. The current FERC license for the Project allows for a 24-foot drawdown of Lake Spokane to elevation 1,512 feet. There are no other water level or discharge requirements or limitations in the FERC license that pertain to Long Lake HED. With more than 100,000 acre-feet of storage, Long Lake HED is operated as a storage and release facility for power generation purposes. Historically, Lake Spokane was lowered to the 24-foot limit during certain winter periods. In recent years, depending on river flows and several other considerations, Lake Spokane has rarely been lowered more than 14 feet during the winter, and is typically held within 3 feet of full pool during most of the year. During the summer recreation season, the reservoir is normally within 1 foot of the full-pool elevation.

3.1.2.3 Flood Control Operations

The Spokane River Project plays an annual role in managing upstream flood potential. This role is limited by the Project's storage capacity (confined to the 7.5-foot depth between the low pool elevation of 2,120.5 feet and the full pool elevation of 2,128 feet) and by the outflow capacity of the natural outlet restriction of Coeur d'Alene Lake relative to flood flows in the Spokane River basin. This same feature, the lake's natural outlet restriction, provides downstream flood protection. Based on USGS gage historical records, inflow to the lake can be more than twice as high as outflow, which has led to a recorded lake elevation as high as 2,139 feet (Kootenai County, 1998).

Avista draws Coeur d'Alene Lake down during the fall (to as low as elevation 2,120.5 feet), which increases the storage capacity in Coeur d'Alene Lake to accommodate fall through spring precipitation and spring snowmelt. Nonetheless, spring rain and snowmelt can result in high flows into Coeur d'Alene Lake such that the lake level rises above elevation 2,128 feet even though spill gates are open at Post Falls HED and all water reaching the development is immediately passed downstream. Because of the natural Coeur d'Alene Lake outlet characteristics, there is little Post Falls HED can do to alter a flood event once flows reach flood stage.

3.1.2.4 Recreation Operations

When consistent with operational objectives, Avista seeks to maintain certain reservoir levels favorable for recreational activities during the recreation season, although this is a voluntary action by Avista and there are no related requirements in the current FERC license. At Coeur d'Alene Lake, Avista typically maintains reservoir elevations at or near 2,128 feet from

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[11] Under both the No-action and Proposed Action alternatives, Avista would evaluate replacing the flashboards with a more permanent feature such as a rubber dam. Assuming the flashboards are eventually replaced by a rubber dam, the pool level would not change, nor would operations change at Nine Mile HED other than that the flashboards would no longer be released downstream, and Avista would have the ability to restore the pool elevation somewhat more quickly after spill events.

late June or early July through the week after Labor Day. At Lake Spokane, Avista tries to maintain reservoir elevations within 1 foot of full pool (1,536 feet) throughout the summer recreation season.

3.1.2.5 Fishery Management Operations

In cooperation with the Washington Department of Fish and Wildlife (WDFW) and Idaho Department of Fish and Game (IDFG), Avista monitors flows and rainbow trout spawning and emergence in the free-flowing reach of the Spokane River downstream of Post Falls HED each year (Avista, 2000a). Based on the annual variability in river flow and the monitoring results, Avista operates Post Falls HED in a manner that attempts to maintain downstream river flows that are sufficient to keep the majority of the rainbow trout spawning redds wetted through the fry emergence period. This operation, including the monitoring and agency consultation, often requires either no substantial change in operations or only a minor delay or lessening in spill and/or discharge at Post Falls HED, with an associated minor delay in reaching the desired Coeur d'Alene Lake summer water level near 2,128 feet (Avista, 2000a). These operations are voluntary, and there are no specific requirements for this in the current FERC license.

3.1.3 Current Environmental Measures

Avista currently provides facilities and programs related to river flows, fisheries, wildlife, recreation, and aesthetic resources, either as required by the current FERC license or other regulations or on a voluntary basis.

The current FERC license for the Spokane River Project includes several specific terms and conditions providing for the protection and enhancement of environmental resources. These terms and conditions include:

- maintaining a minimum discharge from Post Falls HED of 300 cfs or an amount equal to the inflow to Coeur d'Alene Lake, whichever is less;
- maintaining an aesthetic scenic flow of at least 200 cfs over the Monroe Street Dam during normal viewing hours from 10:00 a.m. to one-half hour after sunset each day;
- limiting the maximum drawdown of Long Lake HED operating reservoir (Lake Spokane) to no more than 24 feet (elevation 1,512 feet, compared to a normal full-pool elevation of 1,536 feet);
- maintaining Huntington Park, located in downtown Spokane and adjacent to Monroe Street HED, as a publicly accessible park and open space; and
- stocking catchable-size rainbow trout in the Spokane River each year both upstream of Monroe Street HED and in the Nine Mile reservoir.

In addition to the specific environmental measures called for in the existing FERC license for the Project, Avista has also implemented environmental and resource-protection measures to ensure compliance with other applicable regulatory requirements. Avista has also entered into a number of voluntary cooperative agreements with agencies, organizations, and individuals, or otherwise supported a variety of measures to enhance and conserve environmental resources. Examples of these regulatory actions and voluntary measures (as noted in parentheses below) that are specifically designed to protect and enhance Project-associated resources include the following:

- Maintenance of the Coeur d'Alene Lake level at or close to 2,128 feet from late June or early July past Labor Day. (Voluntary)

- Maintenance of the Lake Spokane elevation within 1 foot of full pool (1,536 feet) throughout the summer recreation season. (Voluntary)

- Maintenance of public access at the Nine Mile Resort on Lake Spokane. The facility, which is owned by Avista and operated by concessionaires, offers boating, camping, and swimming opportunities. (Voluntary)

- Appropriate preservation, protection, and maintenance of historic properties and features associated with the Project, pursuant to the National Historic Preservation Act of 1966 (NHPA) and as listed or eligible for listing in the National Register of Historic Places (NHRP). Past and ongoing activities include maintenance of the Nine Mile cottages and ongoing consideration of the historic significance of various features of Post Falls, Upper Falls, Nine Mile, and Long Lake HEDs whenever considering or proposing any significant facility modifications or alterations. Avista also donated a turbine unit removed from Monroe Street HED to the Henry Ford Museum. (Regulatory/Voluntary)

- Development and implementation of appropriate guidelines and requirements for addressing interactions between migratory birds and/or bird nests and Project-associated facilities (pursuant to the Migratory Bird Treaty Act and/or Endangered Species Act [ESA]). Activities have included relocating nests (primarily osprey nests), providing alternative nesting platforms, and modifying transmission line spacing (increasing the spacing between "hot" wires and grounding wires or surfaces). These activities are intended to protect birds from electrocution as well as to prevent power outages and damage to power poles. (Regulatory)

- Monitoring of rainbow trout spawning and fry emergence each year in the free-flowing reach of the Spokane River, located downstream of Post Falls HED, and coordination of the operation of the development with fisheries agencies to keep the majority of the redds wetted through the fry emergence period. (Voluntary)

- When possible, limitation of the winter drawdown of Long Lake HED operating reservoir (Lake Spokane) to no more that 14 feet in consideration of local domestic water supplies. (Voluntary)

- Implementation of a Bald Eagle Nest Territory Management Plan for a nest site associated with Long Lake HED. (Voluntary)

- Lease of approximately 20 acres of property at Falls Park and 78 additional acres of Avista land for Q'emiln Park to the City of Post Falls, at no cost. (Voluntary)

- Support for development and implementation of an aquatic weed management plan for Lake Spokane. (Voluntary)

- Provision of financial support to the Washington Department of Natural Resources (WDNR) for operation and maintenance of the Lake Spokane boat launch and campground and the Avista-owned boat-in overnight camping sites. (Voluntary)

- Support of numerous other public parks, water access, and recreational sites and features. Specific examples include land donations and other support for the Cougar Bay conservation area; financial support for Falls Park, Riverfront Park, Riverside State Park, Plese Flats, and the Centennial Trail; and development and/or maintenance of the Nine Mile Resort and the North Shore Campsites (Lake Spokane). (Voluntary)

- Permitting of limited private recreational uses of Project-associated property through annual permits. (Regulatory)

- Support of numerous resource agency, academic, and Avista studies and resource evaluations concerning Project-associated environmental resources. These have included water quality studies and evaluations, erosion inventories and studies, wetlands inventories, several wildlife and recreation studies, and a variety of fisheries-related studies and investigations undertaken in years prior to the relicensing process. (Voluntary)

- Support of local watershed restoration efforts in Hangman Creek Watershed. (Regulatory/Voluntary)

3.2 Proposed Action[12]

Avista proposes to implement the operations and resource enhancements discussed in the Proposed Action over the term of a new license of at least 40 years. Under the Proposed Action described in this section, Avista would continue to operate the Project in a manner similar to current Project operations, but with a slightly modified reservoir management approach and flow release regimes. Additionally, Avista would implement various protection, mitigation, and enhancement (PME) measures.[13]

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[12] Post Falls HED is distinct in several ways from the other four hydroelectric developments currently included in Project No. 2545. It is located in a different state than the other four HEDs, there is a separate FERC Project (Upriver Dam, owned by the City of Spokane) located between it and the next Project development (Upper Falls), and the issues raised during the pre-application filing process regarding Post Falls generally were distinct from those regarding the other four developments. Because of these distinctions, Avista has filed two separate license applications: one seeking a separate license for the Post Falls development and one seeking a license for the other four developments of Project No. 2545.

[13] As part of the ongoing ALP, Avista and the other stakeholders identified and evaluated a variety of potential changes in current Project operations, as well as appropriate environmental PME measures, but did not reach consensus as to a Settlement Agreement for the new licenses. Avista included in its license applications some,

3.2.1 Project Facilities

The Proposed Action includes no changes to Project facilities, other than may be identified and constructed pursuant to specific PME measures.[14]

3.2.2 Project Operation

Under the Proposed Action, Avista would operate the Post Falls HED and the four Spokane River Project's four HEDs in Washington in a manner generally similar to current Project operations, but with several operational changes intended to address stakeholder concerns. Proposed operational changes include the following:

- The minimum discharge from Post Falls HED would be set at 600 cfs year-round under normal operations, as measured at USGS gage 12419000 (Spokane River near Post Falls). Between July 1 and September 15 of each year, Avista would reduce the minimum discharge to 500 cfs if the level of Coeur d'Alene Lake dropped below 2,127.75 feet (3 inches below full pool).

- Operations at Post Falls HED would be managed to comply with the discharge approaches outlined in the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan* (Avista, 2004).

- The summer recreational elevation of Coeur d'Alene Lake, at or near 2,128 feet, would start as soon as practicable each summer (the same as current Project operations) and would be maintained until September 15. Exceptions would occur, if needed, to maintain the minimum discharge flow from Post Falls HED and to meet fisheries resource needs, as noted above.

- Operations at Post Falls HED would follow a downramping rate that corresponds to no more than a 4-inch drop per hour in downstream water levels at the USGS gage 12419000 (Spokane River near Post Falls).

- Aesthetic flows would continue to be provided year-round at Monroe Street HED and also would be initiated seasonally at Post Falls and Upper Falls HEDs.

- Flows from Post Falls HED would be adjusted when possible in late spring and in the fall to maintain preferred whitewater paddling flows for an extended time, and, when possible, increased flows for open-water boating would be scheduled for one or more weekends in August.

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but not all, of the PME measures that have been discussed, and in some cases agreed to, by participants in the ALP.

[14] Under both the No-action and Proposed Action alternatives, Avista would evaluate replacing the flashboards at Ninemile HED with a more permanent feature such as a rubber dam. Assuming the flashboards are eventually replaced by a rubber dam, the pool level would not change, nor would operations change at Nine Mile HED other than that the flashboards would no longer be released downstream, and Avista would have the ability to restore the pool elevation somewhat more quickly after spill events.

- Avista would limit the drawdown of Lake Spokane to 14 feet, except under certain emergency conditions. This would constitute a change from current license conditions, which allow for a 24-foot maximum drawdown, but would not be a change from the way the Project has been operated in recent years.

- Avista would attempt to periodically draw down Lake Spokane during the winter to expose the lake bed to freezing temperatures to reduce the occurrence of aquatic weeds such as Eurasian watermilfoil.

3.2.3 Environmental Measures

The Proposed Action includes a number of environmental measures summarized here (with their alpha-numeric designation) and fully described in Appendix B. Measures applicable to Post Falls HED are listed first, followed by measures proposed for the Project's four HEDs in Washington. Many of the measures at all five HEDs are designed to be implemented in cooperation with various state and local agencies, the tribes, and other interested parties.

3.2.3.1 Post Falls HED Measures

Water Resource Measures

Total Dissolved Gas Control and Mitigation Program (PF-WQ-1)

- Develop and implement a TDG control and mitigation program, including spill gate operating protocols and ongoing TDG monitoring and evaluation.

Idaho Water Quality Protection, Mitigation, and Enhancement (PF-WQ-2)

- Develop and implement a water quality monitoring program.

Aquatic Resource Measures

Post Falls HED Fish Protection, Mitigation, and Enhancement Program (PF-AR-1)

- Maintain a 600-cfs minimum discharge flow at Post Falls HED under normal operating conditions, with a defined trigger for reducing the minimum flow to 500 cfs.

- Comply with the Post Falls HED discharge levels as outlined in the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan*.

- Maintain a maximum allowable per hour discharge downramping rate at Post Falls HED that corresponds to no more than a 4-inch drop per hour in downstream water levels.

- Provide for a population and habitat protection and enhancement program for westslope cutthroat trout and bull trout in the Coeur d'Alene Lake Basin and native rainbow trout in the free-flowing reach of the Spokane River downstream of Post

Falls HED. This component may also support wild salmonid protection by providing for alternative angling and harvest opportunities through recreational and fishery enhancement and supplementation.

- Support population and habitat assessments and monitoring for westslope cutthroat trout and bull trout in the Coeur d'Alene Lake Basin and/or native rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED.

- Provide assistance and support for a public information, education, and law enforcement program specific to bull trout and westslope cutthroat trout in the Coeur d'Alene Lake Basin and native rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED.

Coeur d'Alene Lake Aquatic Weed Management Program (PF-AR-2)

- Provide assistance and financial support for public education, monitoring, and weed management measures associated with exotic/noxious weeds in Coeur d'Alene Lake.

Terrestrial Resource Measures

Coeur d'Alene Lake and Tributary Erosion Control and Wetlands and Riparian Habitat Protection and Enhancement (PF-TR-1)

- Identify and prioritize specific areas of concern for protection and erosion control opportunities. Implement erosion control measures on Coeur d'Alene Lake and the affected tributaries once appropriate access has been obtained.

- Identify and evaluate agreed-upon wetland and riparian habitat sites associated with Coeur d'Alene Lake or its tributaries in order to protect, enhance or restore them. Appropriate access will need to be obtained prior to implementing this measure.

Aesthetic Resource Measures

Post Falls HED Aesthetic Flows (PF-AES-1)

- Provide aesthetic flows at Post Falls HED through the North Channel spill gates (approximately 46 cfs) on Saturdays and Sundays from 12:00 p.m. until 6:00 p.m., Memorial Day weekend through Labor Day.

Land Use Measures

Post Falls HED Land Use Management Plan Implementation Protection, Mitigation, and Enhancement (PF-LU-1)

- Implement the Project Land Use Management Plan's (LUMP's) land management practices on Avista-owned Project lands.

- On and adjacent to the Project, provide assistance and financial support for enforcement of land- and water-based laws and regulations administered by federal, state, local, and tribal governments.

Recreation Resource Measures

Post Falls HED Recreation Plan (PF-REC-1)

- Develop and implement a Project recreation plan that encompasses the various recreation PME measures and consultation with the appropriate recreation management entities.

Coeur d'Alene Recreation Protection, Mitigation, and Enhancement (PF-REC-2)

- Cost-share improvements at City of Coeur d'Alene parks adjacent to the Project. Enter into a separate agreement with the City to supplement their related operation and maintenance costs.

- Cost-share improvements, operation, and maintenance at Falls Park with the City of Post Falls.

- Cost-share improvements, operation, and maintenance at Q'emiln Park with the City of Post Falls.

- Cost-share six Coeur d'Alene Lake and tributary boat ramp extensions with the appropriate recreation management entities.

- Provide private aids to navigation on Coeur d'Alene Lake and its tributaries and assist in the associated operation and maintenance costs.

- Cost-share facility improvements on U.S. Bureau of Land Management (BLM) recreation lands adjacent to or in the Project boundary. Enter into a separate agreement with BLM to supplement their related operation and maintenance costs.

- Cost-share facility improvements on Coeur d'Alene tribal lands adjacent to the Project. Enter into a separate agreement with the Coeur d'Alene Tribe to supplement its related operation and maintenance costs.

- Cost-share abandoned dock and debris removal from the Project with the appropriate recreation management entities.

- Cost-share the Higgens Point breakwater and shoreline stabilization projects. Enter into a separate agreement with the Idaho Department of Parks and Recreation (IDPR) to supplement their related operation and maintenance costs.

- Cost-share facility improvements on FS lands adjacent to or in the Project boundary. Enter into a separate agreement with the FS to supplement their related operation and maintenance costs.

- Cost-share mooring buoys and the related operation and maintenance at Mowry State Park.
- Cost-share four Trail of the Coeur d'Alenes trail spurs that will provide access for people with disabilities. Enter into a separate agreement with the Coeur d'Alene Tribe to cost-share the related operation and maintenance.
- Cost-share Hawley's Landing boat dock improvements with IDPR.
- Cost-share Plummer and Rocky Point beach improvements with IDPR.
- Cooperate with the other recreation management entities to ensure continued public access to the Project in the future by assisting in the planning and development of new and/or reconstructed recreation facilities after the facilities identified in this PME measure are completed.

Post Falls/Spokane River Recreation Protection, Mitigation, and Enhancement (PF-REC-3)

- Coordinate the late-spring and fall flow releases from Post Falls HED to extend whitewater play boating opportunities on the Spokane River and provide scheduled open-water boating flows during one or two weekends in August.
- Cost-share USGS Post Falls Gage modifications and a real-time flow information system with the USGS.
- Cooperate in the acquisition, development, and related operation and maintenance for the Trailer Park Wave access site.
- Cost-share Corbin Park boat ramp improvements with the City of Post Falls.

Post Falls HED Public Outreach (PF-REC-4)

- Prepare and implement an Interpretation and Education Plan.
- Conduct visitor surveys adjacent to the Project every 6 years.

Cultural Resources Measures

Historic Properties Management Plan (PF-CR-1)

- Develop and implement the Historic Properties Management Plan (HPMP).

Other Items

- Purchase and maintain a boat to be used to support PME measure implementation at Post Falls HED and at Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs (one-half cost to be covered by the Post Falls development and one-half by the other four developments).
- Provide for internal administrative overhead costs for new PME measures.

3.2.3.2 Upper Falls, Monroe Street, Nine Mile, and Long Lake HED Measures

Water Resource Measures

Total Dissolved Gas Control and Mitigation Program (SRP-WQ-1)

- Develop and implement a TDG control and mitigation program, including spillgate operating protocols, ongoing TDG monitoring and evaluation, and a comprehensive Long Lake HED TDG abatement plan.

Washington Water Quality Protection, Mitigation, and Enhancement (SRP-WQ-2)

- Develop and implement a water quality monitoring program.

Aquatic Resource Measures

Spokane River Fish Protection, Mitigation, and Enhancement Program (SRP-AR-1)

- Provide for fish population and aquatic habitat protection and enhancement efforts on the Spokane River and Lake Spokane.

- Support the development and implementation of enhanced fish population and related aquatic habitat assessments and monitoring programs associated with the Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs.

Lake Spokane Aquatic Weed Management Program Protection, Mitigation, and Enhancement (SRP-AR-2)

- Implement site-specific and general weed control measures in Lake Spokane, including potential use of bottom barriers to maintain public access sites. Attempt periodic winter drawdowns of 10 to 14 feet to assist in managing weeds in Lake Spokane.

Terrestrial Resource Measures

Lake Spokane/Nine Mile Terrestrial, Riparian and Wetlands Habitat Protection and Enhancement Protection, Mitigation, and Enhancement (SRP-TR-1)

- Secure appropriate property protection for, and implement, new wetland enhancement or restoration efforts adjacent to or near the Nine Mile or Long Lake HEDs.

- Incorporate into the Project boundary Avista-owned lands within 200 feet of the Lake Spokane shoreline (representing approximately 320 acres) and manage as appropriate under the LUMP.

- Support regional efforts to reduce erosion (and downstream sedimentation) in the Hangman Creek Watershed.

Project Transmission Line Management Program Protection, Mitigation, and Enhancement (SRP-TR-2)

- Provide raptor protection and non-chemical vegetation management, as appropriate, on approximately 2 miles of existing Project transmission lines, as well as any new transmission lines that may become part of the Project in the future.

Aesthetic Resource Measures

Spokane River Project Aesthetic Flows Protection, Mitigation, and Enhancement (SRP-AES-1)

- Provide a 200-cfs minimum daily aesthetic flow through Upper Falls HED bypass reach (north and middle channels) from 10:00 a.m. to one-half hour after sunset, Memorial Day weekend through September 30 and implement channel restoration as feasible to enhance visual conditions.

- Continue to provide the current 200-cfs minimum daily aesthetic flow from 10:00 a.m. to one-half hour after sunset daily, year-round, at Monroe Street HED.

Land Use Measures

Project Land Use Management Plan Implementation Protection, Mitigation, and Enhancement (SRP-LU-1)

- Implement the Project LUMP's management practices on Avista-owned Project lands.

- On and adjacent to the Project, provide assistance and financial support for enforcement of land- and water-based laws and regulations administered by governments within their jurisdictions.

Recreation Resource Measures

Spokane River Project Recreation Plan (SRP-REC-1)

- Develop and implement a Project recreation plan that encompasses the various recreation PME measures and consultation with appropriate recreation management entities.

Spokane River Recreation Protection, Mitigation, and Enhancement (SRP-REC-2)

- Continue to manage Huntington Park as a natural area/buffer within the city of Spokane.

- Cost-share Water Avenue access site improvements at a low level of development. Enter into a separate agreement with the City of Spokane to supplement its related costs for operation and maintenance.

Spokane River Public Outreach Protection, Mitigation, and Enhancement (SRP-REC-3)

- Prepare and implement an Interpretation and Education Plan.
- Conduct visitor surveys adjacent to the Project every 6 years.

Lake Spokane/Nine Mile Reservoir Recreation Protection, Mitigation, and Enhancement (SRP-REC-4)

- Develop a separate agreement with Washington State Parks regarding future use and management of Nine Mile cottages.
- Cooperate with Washington State Parks to develop, operate, and maintain an interpretative center at Nine Mile HED and to improve the interpretation program at the Spokane House.
- Cooperate with Washington State Parks to develop, operate, and maintain the Nine Mile portage, parking, and signage improvements.
- Cost-share the Centennial Trail extension from Sontag Park to Nine Mile Resort.
- Redevelop and manage Nine Mile Resort day-use and boat access improvements in a manner consistent with Washington State Parks' Riverside State Park proposed new campground.
- Cooperate with WDNR to expand its Lake Spokane Campground. Enter into a separate agreement with WDNR to supplement its related costs for operation and maintenance.
- Cooperate in the development, operation, and maintenance of up to 10 semi-primitive boat-in-only campsites on Lake Spokane.
- Redevelop, operate, and maintain the Long Lake Dam Overlook.
- Develop and maintain the Long Lake Dam river access site for carry-in-only boat access.
- Operate and maintain the Devil's Gap Trailhead.
- Cooperate with other recreation management entities to ensure continued public access to the Project in the future by assisting in the planning and development of new and/or reconstructed recreation facilities after the facilities identified in this PME measure are completed.

Cultural Resources Measures

Historic Properties Management Plan (SRP-CR-1)

- Develop and implement the HPMP.

Other Items

- Purchase and maintain a boat to be used to support PME measure implementation at Post Falls HED and at Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs (one-half cost to be covered by the Post Falls development and one-half by the other four developments).

- Provide for internal administrative overhead costs for new PME measures.

3.2.4 Project Boundary Modifications

The current Project boundary for Post Falls HED is defined by the 2,128-foot elevation contour, as shown in a 1980 FERC license amendment. Recent fieldwork led Avista to make corrections to the 2,128-foot contour maps. Avista therefore is proposing to amend the Project boundary maps to correspond with the more recent data, consistent with retaining the current 2,128-foot boundary. Other proposed changes to the Project boundary include the following:

Post Falls HED

- At Post Falls HED, add 2,352 acres (now within the 2,128-foot contour) and remove 0.5 acre east of the abandoned Corbin Ditch.

Spokane River Project

- At Upper Falls and Monroe Street HEDs, remove 2.8 acres that serve no Project purpose.

- At Nine Mile HED, remove 66 acres that serve no Project purpose.

- At Long Lake HED, add 350.1 acres associated with a proposed shoreline buffer, the Nine Mile Resort, and two short sections of primary transmission line.

3.3 Alternatives Considered but Eliminated

We also considered other alternatives in addition to the No-action and Proposed Action alternatives, but eliminated them from further study because they are not reasonable alternatives, as defined by NEPA, in the circumstances of this case.

3.3.1 Federal Takeover

Federal takeover and operation of the Project is not a reasonable alternative, because it would not achieve the Project's purpose and because it is considered unlikely. Federal takeover and operation of the Project would require Congressional approval, and there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested that a federal takeover would be appropriate, and no federal agency has expressed an interest in operating the Project.

3.3.2 Non-power License

The FPA permits governmental bodies to obtain a temporary non-power license. A non-power license is temporary in that the Commission would terminate the non-power license whenever it determines that another government agency would assume regulatory authority and supervision over the lands and facilities covered by the non-power license. Such a non-power license could preserve one or more of the Project reservoirs, but not allow power generation. In the case of the Spokane River Project, no agency has suggested its willingness or ability to accept a non-power license. No party has sought a non-power license, and there is no basis for concluding that the Project should no longer be used to produce power. A non-power license would not achieve the purposes of the Project, and issuance of a non-power license is considered unlikely. As such, a non-power license is not viewed as a reasonable alternative requiring further analysis.

3.3.3 Project Retirement

Project retirement could result from (1) Avista notifying the Commission that it sought to surrender its license; (2) Avista failing to file its license application; or (3) an order of termination issued by the Commission based on an implied surrender. Surrender of the license might or might not require dam removal; however, the Commission could require dam removal as a condition of license surrender. If dam removal were not required, the Commission could require certain modifications to Project works, such as backfilling power tunnels, disabling or removing equipment used to generate electricity, and vandal-proofing the facilities that remain. Because Avista has indicated its intent to seek a new license and because Project retirement would not achieve the Project's purpose, Project retirement is not considered a reasonable alternative.

3.3.4 Natural Hydrograph at Post Falls HED

Several stakeholders participating in the alternative licensing process (ALP) have expressed an interest in demonstrating how the river and environment would be different if Post Falls HED ceased operating in the manner it does and Coeur d'Alene Lake and the Spokane River were allowed to function under natural flow conditions. In response, Avista used the same modeling that was used to evaluate lake levels and river flows under current Project operations (No-action) and under the Proposed Action to make a preliminary evaluation of the effects of a scenario referred to as the Natural Hydrograph at Post Falls HED (Natural Hydrograph). This scenario is not considered a reasonable alternative given full consideration in this PDEA because the overwhelming majority of stakeholders participating in the ALP do not view it as a reasonable alternative. Additionally, as noted in the sections below, this scenario would have adverse socioeconomic effects that would more than offset any gains to some resources. However, Avista undertook an evaluation of the Natural Hydrograph and presents the results of that evaluation here to provide information sought by the interested stakeholders.

The following key assumptions define this scenario:

- Post Falls HED would continue to operate and produce power, but under a significantly revised operating regime. The development would be operated in a manner that allowed the Coeur d'Alene Lake level and Spokane River flows to be determined solely by inflows and the lake's natural outlet restriction. There would be no minimum flow provided by Post Falls HED.

- The other four hydroelectric developments would operate as they would under the No-action Alternative, albeit with a modified flow regime.

The following sections indicate how the Natural Hydrograph would affect the Project area, focusing on the Spokane River flows and Coeur d'Alene Lake water level. Effects on other environmental and other resources are briefly addressed in a primarily qualitative manner.

3.3.4.1 Water Quantity Effects

Spokane River Flow

Under the existing license, Avista operates Post Falls HED to provide a year-round minimum outflow equal to the lesser of 300 cfs or natural inflow into Coeur d'Alene Lake, although plant discharges have rarely fallen below 300 cfs. Section 5.4.2.1, *Lake Level Management and Flow Releases,* provides detailed information about current Project operations. We base the assessment of flows on the August 1978 through July 2002 daily flow period of record.

Under the Natural Hydrograph, Avista would release the amount of flow at Post Falls that would occur naturally given the natural channel hydraulics of the Spokane River channel below Coeur d'Alene Lake and the corresponding lake surface elevation. Following are results of the model runs made to evaluate this scenario. The breakpoints noted in the following paragraphs were determined by the flow levels where the two curves cross each other.

- Very low flow conditions would be similar to current Project operations (i.e., within 10 percent of the flows that occur under current Project operations with Post Falls HED operating; see Figure 3-9). However, the timing of these very low flows would likely occur approximately 4 to 6 weeks later in the year. Flows of 330 cfs or less would occur only approximately 0.03 percent of the time under the Natural Hydrograph, compared to 1.36 percent of the time under current Project operations. However, the absolute value of low flows would be lower for extreme dry conditions under the Natural Hydrograph.

- Flows of approximately 330 cfs to 740 cfs would occur more often under the Natural Hydrograph than they do under current Project operations. Such flows would occur approximately 6.3 percent of the time, compared to 5.0 percent of the time under current Project operations.

- Flows between 740 cfs and approximately 3,000 cfs would occur with equal frequency (about 42.1 percent of the time) under the Natural Hydrograph and under current Project operations. As Figure 3-9 indicates, however, flows within this range generally would be lower under the Natural Hydrograph than under current Project operations. Much of this change reflects the slightly higher-than-natural flows that currently occur in the fall when Avista drafts Coeur d'Alene Lake.

- Flows between 3,000 cfs and 11,500 cfs would occur approximately 33.2 percent of the time under the Natural Hydrograph and current Project operations. Flows in this range generally would be higher under the Natural Hydrograph (as shown in Figure 3-9), largely because of higher unregulated runoff during the spring months.

- Flows between 11,500 cfs and 17,000 cfs would occur approximately 10.8 percent of the time under the Natural Hydrograph and under current Project operations. Flows in this range generally would be similar or slightly higher under current Project operations.

- At flows greater than 17,000 cfs, the flow duration curves would be similar (within 2 percent of each other) under the Natural Hydrograph and under current Project operations. Such flows would occur about 7.6 percent of the time.

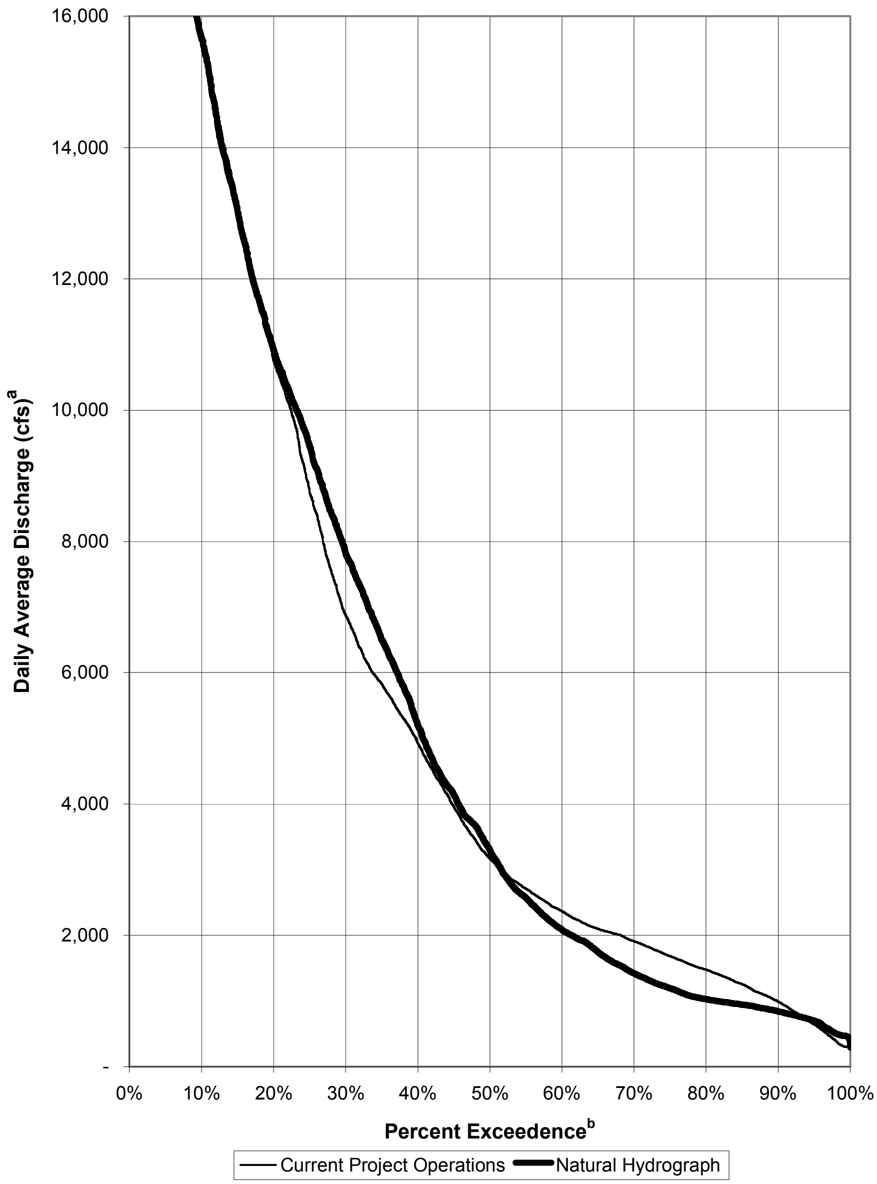
Mean annual flows would be very slightly (7 cfs) higher under the Natural Hydrograph compared to current Project operations because there would be less evaporation from Coeur d'Alene Lake.

Figure 3-10 indicates how modeled Natural Hydrograph flows in the Spokane River would differ from the observed flows in an example wet year (1997), dry year (1994), and normal hydrologic year (1986).

The wet year comparison indicates that, under the Natural Hydrograph, flows in the Spokane River downstream of Post Falls would be noticeably lower between September and December relative to current Project operations (Figure 3-10, top graph). From January through mid-June, flows under the Natural Hydrograph would be relatively similar to current Project operations. From late June through August, flows would be higher under the Natural Hydrograph.

In dry years, under the Natural Hydrograph, flows in the Spokane River downstream of Post Falls would be noticeably lower between September and January than they are currently in drier years (Figure 3-10, middle graph). From February through April, flows under the Natural Hydrograph would be similar to current Project operations. From May through August, flows would be higher under the Natural Hydrograph.

Under typical hydrologic conditions, the Natural Hydrograph flows in the Spokane River downstream of Post Falls would be noticeably lower between September and January relative to current Project operations (Figure 3-10, bottom graph). From February through May, flows under the Natural Hydrograph would be similar to current Project operations. From June through August, flows would be higher under the Natural Hydrograph.



[a] The flow duration curve is truncated at 16,000 cfs because there is very little difference between the Natural Hydrograph and current Project operations at flows greater than 16,000 cfs.

[b] The percent exceedance is the percentage of time a given flow is equaled or exceeded. For example, under the Natural Hydrograph, the 90 percent exceedance flow is 840 cfs. This means that the flow is greater than or equal to 840 cfs 90 percent of the time, while the flow is less than 840 cfs the remaining 10 percent of the time.

Figure 3-9. Flow duration curve for Spokane River near Post Falls, Idaho (energy years 1978 through 2002). (Source: E-mail from L. Karpack, Principal, Northwest Hydraulic Consultants [NHC], Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 3, 2004)

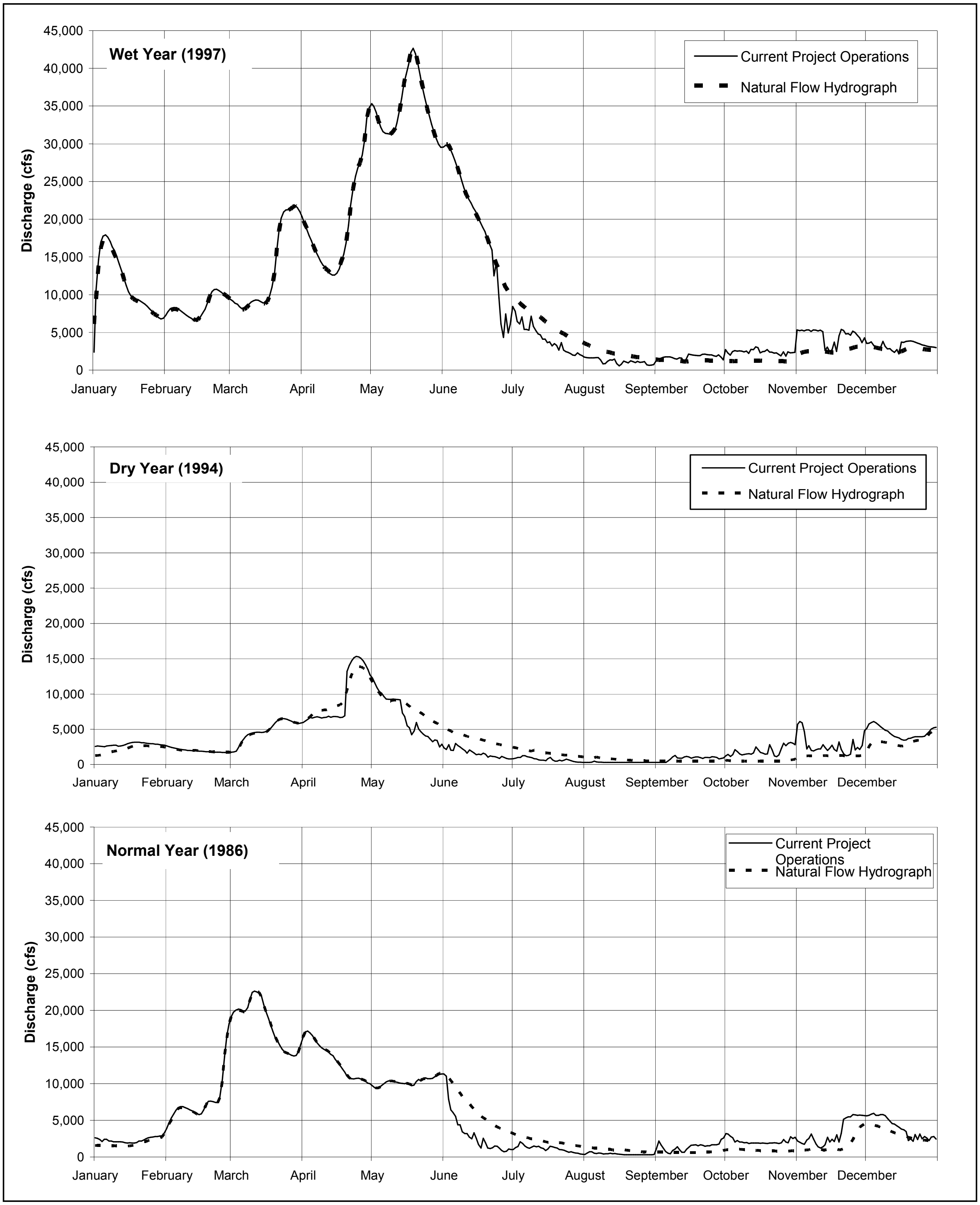


Figure 3-10. Wet, dry, and normal year flows for the Spokane River downstream of Post Falls under modeled current Project operations and modeled flows under the Natural Hydrograph.

Coeur d'Alene Lake Level

The Natural Hydrograph would produce significant changes in the Coeur d'Alene Lake level compared to current Project operations. The elevation duration curve in Figure 3-11 illustrates dramatic changes in the frequency with which lake elevations up to elevation 2,128 feet would occur. For example, the median elevation (that is, the elevation that would be exceeded 50 percent of the time) would decrease from about 2,126.8 feet under current Project operations to 2,122.5 feet (a drop of 4.3 feet) under the Natural Hydrograph. The percent of time that the lake is within 3 inches of full pool or higher (above elevation 2,127.75 feet) would drop from approximately 32.2 percent of the time under current Project operations to approximately 12.7 percent of the time under the Natural Hydrograph.

The wet year comparison (Figure 3-12, top graph) shows that, under the Natural Hydrograph, Coeur d'Alene Lake would be significantly (more than 1 foot) lower than under current wet-year conditions from July to December. From January through June, lake levels under the Natural Hydrograph would be much more similar to current wet-year conditions. The greatest difference would occur during September, when the lake level under current wet-year conditions would be approximately 7 feet higher than under the Natural Hydrograph.

The dry-year comparison (Figure 3-12, middle graph) indicates that, under the Natural Hydrograph, Coeur d'Alene Lake would be significantly lower (more than 1 foot) between May and January than it is currently in drier years. From February through April, lake levels under the Natural Hydrograph would be much more similar to current dry-year conditions. The greatest difference would occur during August, when the lake level under current dry-year conditions would be approximately 8 feet higher than under the Natural Hydrograph.

The analysis of a normal hydrologic year indicates that, under the Natural Hydrograph, Coeur d'Alene Lake would be significantly lower than under current Project operations (more than 1 foot) from June through January (Figure 3-12, bottom graph). From February through May, lake levels under the Natural Hydrograph would be much more similar to current Project operations. The greatest difference would occur during August and September, when the lake level under current typical hydrologic conditions would be approximately 8 feet higher than under the Natural Hydrograph.

Inundated Acreage

As noted above, following the Natural Hydrograph would alter the pattern of inundation around Coeur d'Alene Lake. This follows naturally from Figure 3-11, which shows the lake (and hence the backwatered areas of the tributaries and lateral lakes) at lower elevations more of the time. The greatest change from current Project operations would occur in August because the lake would no longer be held at approximately full pool (2,128 feet) through at least Labor Day. In August, an average 8,567 acres that are under water under current Project operations would not be inundated under the Natural Hydrograph.

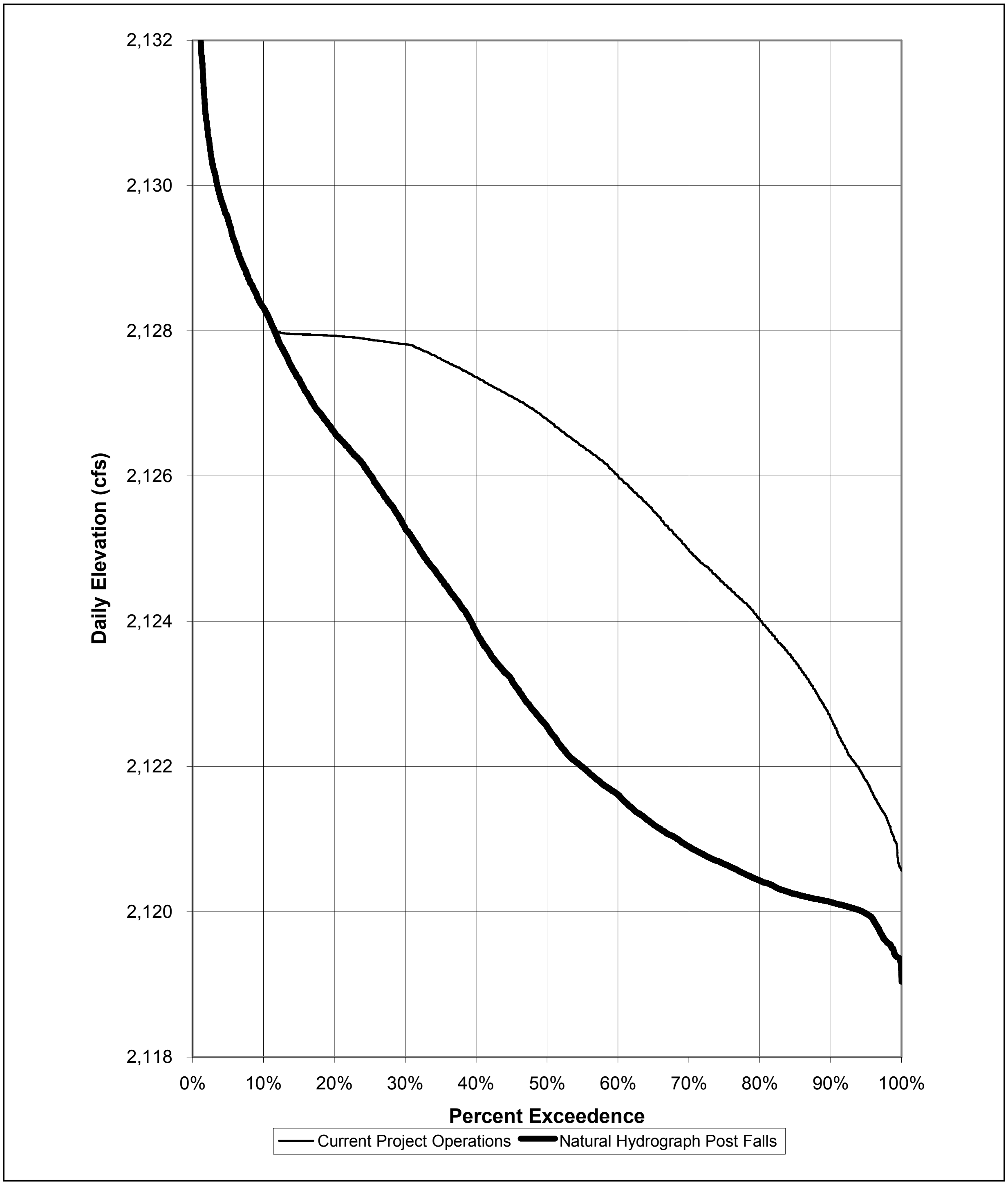


Figure 3-11. Elevation duration curve for Coeur d'Alene Lake, Idaho (energy years 1978 through 2002). (Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 3, 2004)

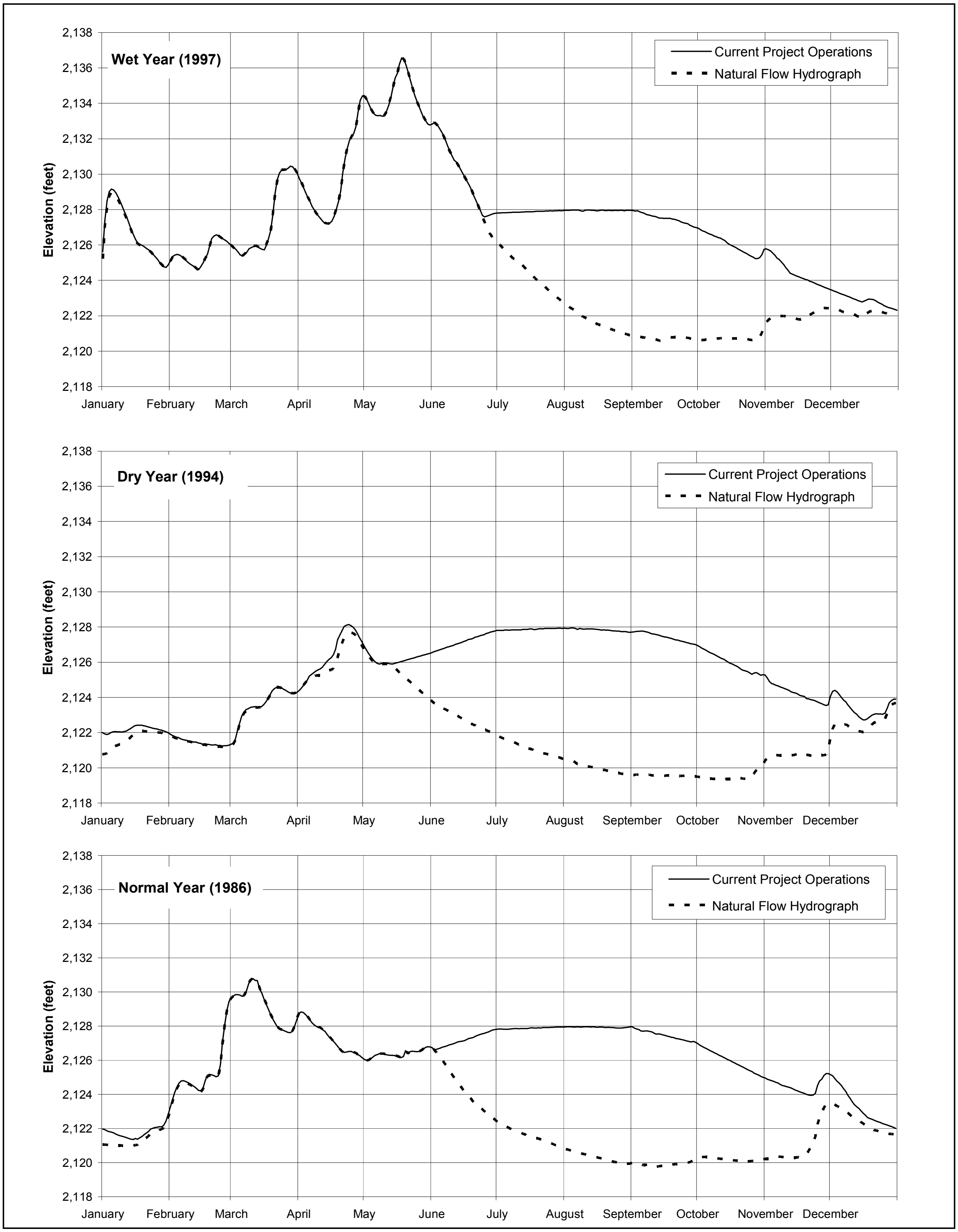


Figure 3-12. Wet, dry, and normal year Coeur d'Alene Lake elevations under current modeled Project operations and modeled lake levels under the Natural Hydrograph.

Groundwater

Operating under the Natural Hydrograph at Post Falls might influence seasonal localized groundwater levels adjacent to both Coeur d'Alene Lake and the Spokane River, although the degree of the effect is not known. Because mean annual flow below Post Falls would gain only 7 cfs (0.12 percent) under the Natural Hydrograph relative to current Project operations, no long-term effects on mean Spokane Valley-Rathdrum Prairie aquifer levels would be anticipated.

3.3.4.2 Energy and Regulatory Effects

Operating Post Falls HED to a Natural Hydrograph would affect other aspects of the Project. If Post Falls Dam were not used to store any water in Coeur d'Alene Lake, the Project boundary would be redefined to include just the area affected by the dam, which would include only the powerhouse, islands, and adjoining property, along with a very short reach of the Spokane River just upstream of the hydroelectric development. The development would be operated at a lower average gross head, based on the lower headwater elevations that would result from replicating natural flows in the Spokane River from the lake's natural outlet, as released through Post Falls HED.

The loss of storage and head would lead to a loss of generation. Under the Natural Hydrograph, average annual energy at the Post Falls HED would drop approximately 6,800 megawatt hours (MWh). This is equivalent to an average drop in energy of less than 1 MW. Average annual energy production at the four downstream HEDs would also drop, by approximately an additional 3 MW. Avista would need to make up these losses from other energy sources.

At the same time, because Post Falls HED would include no water storage, the Project's regulatory setting would change. Neither Sections 4(e) nor 10(e) of the FPA would be triggered for Post Falls HED, reducing the regulatory requirements that the Project must meet. If the Secretary of Interior (on behalf of BIA and the Coeur d'Alene Tribe) were to require Avista to operate Post Falls HED to the Natural Hydrograph through Section 4(e) conditions, we assume that would be its preferred approach for mitigation and enhancement. Avista assumes that applying the Natural Hydrograph to the system would address these stakeholders' environmental concerns regarding Post Falls HED operations, and we would reduce the number and extent of PME measures compared to the Proposed Action. We have made no effort here to evaluate any other legal effects, if any, of a reversion to the natural hydrograph.

3.3.4.3 Other Environmental Effects

Geology and Soils

Operating under the Natural Hydrograph would lead to a Coeur d'Alene Lake level that would be lower in the summer months than it is under current Project operations. The lake level would drop from approximately 2,128 feet in June to as low as 2,120 in August.

In the short term, the Natural Hydrograph would lead to increased erosion of the unvegetated shorelines that are inundated by the stable summer lake levels under current Project operations. This erosion would result from a variety of causes, including boat- and wind-caused waves, rain splash, rill erosion, and freeze/thaw erosion. Some of this short-term erosion would decrease as the shoreline slopes evolved and where vegetation became established. Erosion would be expected to decrease at the level of the current water-shoreline interface.

Over the long term, and as the lake level annually dropped from roughly 2,128 feet in June to approximately 2,120 feet in August or September, shoreline erosion and erosion along the inside banks of the natural levees along the Coeur d'Alene and St. Joe rivers would be spread out over a broader zone than under current Project operations. Because the lake and lower rivers are easily navigable between 2,128 and 2,120 feet and because boat traffic, one of the leading causes of erosion, would remain the same or continue to increase in the lake and tributary reaches most affected by erosion, boat-caused erosion would continue as it would under current Project operations, but would be spread over the broader zone from 2,120 feet to 2,128 feet. Long-term wind-caused erosion would be less under the Natural Hydrograph because the wetlands at the south end of the Lake and in the lateral lakes along the Coeur d'Alene and St. Joe rivers would transition from aquatic bed/inundated emergent to emergent wetlands. This development, along with the reduced amount of open water, would lead to less wind-caused erosion.

Over a long period, the rate of loss of the natural levees might be slowed, although the loss is unlikely to stop completely without major reductions and changes in the amount and type of boat traffic that passes up and down the Coeur d'Alene and St. Joe rivers. In addition, natural erosion would continue, its effects aggravated in the lower river reaches by the continued presence of upstream human-made levees, dikes, and road and railroad beds. However, over time, some sediment deposition could begin to rebuild portions of levees as the banks are revegetated, allowing for sediment to be trapped and held on the tops and back sides of the levees during high-flow periods.

Under the Natural Hydrograph, erosion rates along the Coeur d'Alene River would likely continue to be slower than those along the St. Joe River because of the mine wastes in the river alluvium on the Coeur d'Alene River. However, Coeur d'Alene River sediments would experience increased exposure to oxygen under the Natural Hydrograph. This would lead to an increase in metal loading from the oxidation of primary sulfides (Golder, 2005a). Increased metal loading might also lead to secondary effects by hindering revegetation and increasing human and wildlife exposure to metal contamination.

A long-term benefit of the Natural Hydrograph would include re-establishment of vegetation on the eroded ledges along the river levees. Some of these ledges, especially those on the back sides of the levees, would begin to revegetate because they would be subjected to less boat- and wind-caused wave erosion, and they would also be inundated for a shorter time during the growing season. However, it is questionable if vegetation along the inside banks of the levees would be able to re-establish itself and survive in a pre-Project state because of ongoing and increasing boat-caused wave action and natural erosion. The inside banks of the levees would continue to be susceptible to boat-caused wave erosion because the river channels are easily navigable at all lake levels.

Sediment transport and erosion on the Spokane River would likely remain much as they are under current Project operations. This is because bank erosion, channel migration, and sediment transport are dominated by larger magnitude flow events that are unrelated to operation of Post Falls HED. These large flow events would be essentially the same under the Natural Hydrograph as they are currently.

Water Quality

Operating the Project under the Natural Hydrograph (unregulated or unimpounded condition at Post Falls HED) would have both positive and negative long-term effects on the thermal regime of Coeur d'Alene Lake and the Spokane River that would vary by location (Golder, 2004a; HDR, 2004). Based on a multi-year simulation of water temperature (1991–2003) in Coeur d'Alene Lake, the upper 10 meters of the lake would experience a slight improvement (about 5 percent) in the volume of water that meets the various regulatory criteria for temperature in July and August. There would be negligible temperature improvements in deeper layers of the lake. Between Post Falls HED and the Idaho-Washington border, temperature improvements of up to 1 degree Celsius (°C) (1.8 degrees Fahrenheit [°F]) are predicted. This would slightly improve compliance with regulatory criteria.

Between Barker Road and Long Lake HED, the Natural Hydrograph would have negative long-term effects on water temperature. Summer temperatures would increase an average of 0°C to 1.4°C (0° to 2.5°F) during the summer because the higher warm summer flows from Coeur d'Alene Lake would be proportionally higher than the cooler groundwater inflow between Barker and Sullivan Roads (HDR, 2005). This dynamic would cause an increase in the frequency that Washington's 20°C (68°F) criterion is exceeded, although this temperature would be considered the "natural" background from a regulatory standpoint. Operating Post Falls HED under a Natural Hydrograph would have minimal influence on temperatures in Lake Spokane because of the overriding influences of groundwater, inflows from Hangman Creek and the Little Spokane River, and the effects of thermal stratification in Lake Spokane itself.

Operating under the Natural Hydrograph would cause minimal changes in the frequency of flows greater than 10,000 cfs (see Figure 3-9). Because total flows of less than 10,000 cfs do not result in TDG levels greater than the applicable 110-percent criterion at Post Falls HED (Golder Associates Ltd., 2003, 2004; Golder, 2004b), the Natural Hydrograph would cause only negligible changes in the frequency of exceedances of the applicable TDG criterion.

Aquatic Resources

Operating Post Falls HED under a Natural Hydrograph would result in Coeur d'Alene Lake mean water levels that would be about 5 to 8 feet lower during July, August, and September in normal years. The lower water level during the summer months would result in slightly increased water velocities in reaches of the St. Joe, St. Maries, and Coeur d'Alene rivers that are currently affected by Post Falls HED. Westslope cutthroat trout and bull trout would continue to migrate upstream during the season when Post Falls HED typically would not control water levels in Coeur d'Alene Lake even under current operations. Any increased rate of out-migration of any juvenile adfluvial westslope cutthroat trout and bull trout migrating from tributary rearing areas to the lake during this period would likely be minimal. The modest increase in water velocities and free-flowing stream sections could potentially improve conditions for bull trout; however, it is not possible to estimate the magnitude of the benefit to adfluvial populations.

Lower lake levels could reduce the habitat suitability for introduced predatory species such as northern pike and bass. Largemouth bass use areas with aquatic vegetation and typically spawn in relatively shallow water during the late spring and summer. Under a Natural Hydrograph, areas currently used by largemouth bass for spawning could become less common. Smallmouth bass typically spawn in slightly deeper water and would be less susceptible to such changes in water levels. Because pike typically spawn early enough in spring, they would not be affected by changes from a Natural Hydrograph at this life stage. Populations of non-native predator species do not appear to be controlled or substantially influenced by lake level regulation. However, if submerged vegetated areas decreased under a Natural Hydrograph, these species might experience a decline in habitat. It is not possible to estimate the net effects on their populations, or the secondary effects on adfluvial westslope cutthroat and bull trout.

Under the Natural Hydrograph, average flows in the Spokane River below Post Falls could be nearly 4,000 cfs higher in June; 2,000 to 4,000 cfs higher in July; and more than 600 cfs higher in August. During most of September, flows would be several hundred cfs lower under the Natural Hydrograph. A Natural Hydrograph would be expected to provide a slight benefit for incubating rainbow trout eggs and fry. The higher velocity flows in June and July could adversely influence trout fry, which prefer shallow water habitat with low velocity. The higher summer flows would likely increase the prevailing water temperature downstream of Sullivan Road in the coldwater refugia created by groundwater inflow in the Spokane River. Overall, we expect that the Natural Hydrograph could have a slight negative effect on the wild rainbow trout population in the Spokane River by reducing available thermal refugia.

Terrestrial Resources

The return to a Natural Hydrograph, in which Coeur d'Alene Lake would be lower in the summer than it is currently, would result in a gradual overall change in wetlands and riparian vegetation. The Natural Hydrograph would variously expose the substrate between 2,121 feet and 2,128 feet during the growing season, an area that is currently inundated through mid-September. Based on the changes that resulted from initial Project construction and ongoing operations, this would result in a change of wetland type and distribution and could increase the total wetland acreage, although the magnitude of the change is uncertain.

The wetlands vegetation would change over time from predominantly aquatic bed/inundated emergent to emergent wetlands; eventually shrub/scrub and forested wetlands could re-establish in some locations. As a result of this successional process, emergent meadows could become more predominant, possibly allowing for the re-establishment of native vegetation. Factors that may prevent the re-establishment of native plant species include the abundance and type of invasive plants, boat traffic, and the lack of natural predators for beavers in Coeur d'Alene Lake, the lateral lakes, and the Coeur d'Alene and St. Joe rivers.

These changes would be most profound in the open-water bays of Coeur d'Alene Lake, including Wolf Lodge Bay, Cougar Bay, Mica Bay, and Plummer Bay. Some of these areas would become new emergent wetlands. In other areas, such as Rockford Bay, Harrison Bay, Benewah Lake, and north of the St. Joe River, aquatic bed wetlands would change to emergent marsh.

Currently, wetlands above 2,128 feet are variously saturated for only portions of the growing season. Those wetlands at the upper end of the flood zone would dry out soon after spring floods under a Natural Hydrograph. Wetlands above 2,128 feet associated with the lateral lakes could decrease in extent, to the degree that their wetland hydrology is dependent upon the current 2,128-foot summer lake level.

Because Coeur d'Alene Lake is a natural lake, it would continue to function as such under the Natural Hydrograph. As a result, wildlife habitat types would continue to be similar to current conditions. However, there would be less acreage of inundated aquatic beds and more emergent marsh. As a result, waterfowl nesting habitat would increase but foraging areas might decrease. Cottonwood trees could also expand on newly exposed bars and benches (if not curtailed by beavers). Bald eagles would continue to have nesting, perching, and roosting trees.

Changes to the Spokane River below Post Falls would be reflected in the shift of flows. Without Post Falls HED creating summer storage in the lake, river flows would be higher in the early summer and sometimes lower in the late summer and fall than they are currently. The higher water levels in early summer might benefit cottonwood seedling establishment along the Spokane River.

Cultural Resources

Under the Natural Hydrograph, the short-term increase in erosion along shorelines of Coeur d'Alene Lake and the St. Joe, Coeur d'Alene, and St. Maries rivers would increase the potential for erosion of archaeological sites in these areas. The greater exposure of the fluctuation zone that would occur during the summer months could also increase the potential for vandalism of the material artifacts that remain along the shoreline. However, over the long term, this scenario also may reduce the boat-induced erosion of shorelines in the southern end of the lake and tributaries, and in combination with stabilization of shoreline vegetation, could reduce the rate of loss of sites along the shoreline. However, as stated above, the erosive forces at work in the Coeur d'Alene River system would continue, even if their impacts would be at different elevations. Sites that have been protected from active erosion and/or from vandalism by their inundation during the summer months would become exposed to active degradation for a longer period under a Natural Hydrograph.

A Natural Hydrograph scenario may provide the opportunity to restore some of the emergent wetland areas with native plants of cultural value to the Coeur d'Alene Tribe. In addition, to the degree habitat conditions improved for native salmonids, in particular cutthroat trout, these resources could increase.

Recreation

Under the Natural Hydrograph, the increase in waterfowl habitat could lead to improved waterfowl hunting opportunities at the southern end of Coeur d'Alene Lake. However, there would be fewer opportunities to use many existing recreational facilities managed by federal, state, and local agencies. In contrast to the current condition, Coeur d'Alene Lake would drop relatively quickly following the end of the spring freshet and would fall to its historical low levels during summer and fall. With the lower summer lake levels, fewer public access sites would provide access to Coeur d'Alene Lake and the Coeur d'Alene and St. Joe rivers because the boat ramps and docks currently located in shallow water would no longer reach the water. Access sites along the Spokane River between the Coeur d'Alene Lake outlet and Post Falls Dam would become largely unusable during most of the summer recreation season, although some would provide access during times of the year when natural lake levels were higher. This particular reach of the Spokane River would change significantly from a flat deep-water river to a shallow-water river during the summer. Many of the existing sites around the lake and on the rivers would require significant modification to remain useful, such as extending the boat ramps and developing new docks and mooring systems. Others would no longer provide access during the summer recreation season, particularly those in upstream areas that are currently shallow and provide only marginal public access when the lake is low. Further, private boat docks along the Spokane River above Post Falls Dam and in the lake's shallow bays would be dewatered during most of the recreational season, reducing boating and recreational opportunities for shoreline residents. Flat-water boating opportunities would continue to be available, although the average navigable surface area during the primary boating season would be reduced. The reduction in the usable flat-water boating area would proportionally increase demand for the remaining flat-water resources, potentially leading to crowding and user conflicts at those public access sites that would continue to provide reasonable but seasonal access to the lake. Because of the growing population in the area and the growing popularity of flat-water boating, the amount of boating would likely continue to grow over the years, despite the reduced access and the potential for crowding and user conflicts.

Changes would also occur in the river-related recreational activities in the areas downstream of the Post Falls Dam. Compared to conditions under current Project operations, flows from the Natural Hydrograph in the Spokane River downstream of Coeur d'Alene Lake would be higher in the spring and early summer months and lower in the fall and winter months. It is unlikely that the Natural Hydrograph would create new boating opportunities during the spring months because boaters are not as sensitive to changes in high-flow and flood conditions as they are to changes when flows are low (Louis Berger, 2004a). During summer and fall months, there would be fewer freestyle boating opportunities because many of the current sites in the upper Spokane River are associated with specific flows that would occur less frequently. Opportunities for enhancing whitewater boating opportunities as described in the Proposed Action would be lost. However, there would likely be an increase in open-water canoeing opportunities during July and August. Because of the predominance of power boating in Project-related recreation, implementation of the Natural Hydrograph would have an overall negative net effect on the recreation resources of the Project, considering the effects on Coeur d'Alene Lake, its tributaries, and the Spokane River.

Land Use and Aesthetics

In the short term, the Natural Hydrograph would create visual effects of barren land below the current high-water mark on portions of the Coeur d'Alene Lake shoreline, which would displease some residents and visitors. Eventually, riparian vegetation would re-establish to some degree at a point closer to the natural lake level, and Coeur d'Alene Lake would continue to provide a setting for flat-water boating, fishing, hiking, camping, and swimming. Some recreational facilities, primarily those related to boating, would require significant modification to accommodate the lower summer lake levels, while other facilities, particularly those in the southern portion of the Lake, would likely be abandoned or modified for river-related types of recreational use.

The lower average lake levels in the summer would change the characteristics of the land in front of private shoreline residences and lake-oriented businesses. The shoreline in the summer would be lowered by 2 to 8 vertical feet, in some cases moving the normal pool more than 100 horizontal feet away from the current summer shoreline. Over time, these dewatered lands in front of the homes and businesses would likely grow riparian vegetation, which would change views of the Lake and possibly restrict access to the shoreline. Because of the ongoing likelihood of seasonally high water under a Natural Hydrograph, the exposed areas would not be suitable for development. The Natural Hydrograph may increase spill and, therefore, aesthetic spill, particularly in July, if flows stayed above plant capacities at Post Falls and Upper Falls. There would be less water available for aesthetic spills in the early fall.

Socioeconomics

Regional socioeconomic conditions would be affected in a variety of ways under Natural Hydrograph operations. It is difficult to draw firm conclusions about these effects without speculation. However, it is possible to highlight the types of effects that may occur, based on a socioeconomic baseline study that was undertaken as a part of the ALP (Northwest Economics Associates, 2004). This study identified a number of economic sectors affected by the operations of the Spokane River Project, including recreation, tourism, hospitality, real estate, utilities, and others.

A Natural Hydrograph scenario could positively affect some issues, such as Tribal access to certain cultural resources, waterfowl hunting, and other outdoor activities associated with the increased emergent wetland areas at the southern end of Coeur d'Alene Lake.

At the same time, the lower summer lake level of Coeur d'Alene Lake would likely have a significant negative effect on tourism and related recreational economies in north Idaho. Directly affected industries would include businesses such as marinas, resorts, restaurants, logging, and other water-oriented property development because these industries would have to accommodate changing water levels on the lake, tributary rivers, and the Spokane River upstream of Post Falls HED, and the attendant changes in flat water recreation opportunities. The area around Coeur d'Alene Lake has experienced a significant shift in its economic base in recent years, with the decline of traditional natural resource-related employment and the increase in tourism, hospitality, and service economy employment. In addition to directly affected industries, secondary effects of the Natural Hydrograph would be significant in the broader community. A reduced number of, or change in type of, visitors to the region would negatively affect existing nearby tourist and recreation destinations such as golf courses, theme parks, etc. Businesses and properties could lose value, leading to short-term declines in property tax revenue and a possible increase in tax rates or reduction in services. This negative multiplier effect would likely affect broad areas of the local economy such as wholesale and retail trades and a range of services, through income and employment losses. From a socioeconomic standpoint, the net result of a Natural Hydrograph scenario would be negative for the Project area.

4.0 CONSULTATION AND COMPLIANCE

4.1 Consultation with Agencies, Tribes, and Other Parties

In July 1999, Avista initiated collaborative discussions about relicensing the Project by contacting potentially interested parties to make them familiar with the Project and with Avista's plans for continued Project operation through the pursuit of a new FERC license. Avista held stakeholder interviews, meeting with representatives of organizations that potentially could have an interest in the upcoming relicensing process. Through the interview process, 108 individuals representing 71 organizations were asked to share their opinions, ideas, and knowledge related to FERC relicensing, the type of decision-making process they favored, and their interests and issues related to the continued operation of the Project (Lukas and Ayer, Inc., 2000).

In April 2001, Avista convened a public stakeholder meeting to discuss the relicensing process; the meeting was attended by more than 80 people representing state and federal resource agencies, several Indian tribes, a number of local government agencies and special-purpose political subdivisions, and several non-governmental organizations, as well as individual members of the public. Avista met separately with more than 50 stakeholder organizations through the summer of 2001 and held a second public stakeholder meeting in October 2001 to further discuss and determine the desired approach for relicensing the Project. During this time, Avista also drafted, with the input of stakeholders, a set of Guiding Principles for the relicensing process and a formal Communications Protocol.

In April 2002, Avista requested that the Commission approve its use of the ALP and, on June 14, 2002, the Commission issued its approval. The ALP is intended to facilitate participation and improve communication among interested parties, avoid unnecessary conflict, increase confidence that all reasonable alternatives have been adequately and fairly evaluated, and increase the likelihood of a comprehensive settlement. The ALP also seeks to expedite Project licensing by combining the pre-filing consultation and environmental review steps into a single process.

Avista issued the Initial Information Package for the FERC relicensing of the Spokane River Hydroelectric Project in July 2002, held a public First-stage Consultation Joint Meeting on September 10, 2002, and conducted a public tour of the Project on September 11, 2002.

As a follow-up to the stakeholder meetings held in 2001, a Plenary Group of stakeholder organizations was formed to participate in and generally oversee the ALP and the desired development of a settlement agreement. The Plenary Group held its first meeting on May 21, 2002, and at that time established five additional work groups to focus on issues within major resource areas: water resources; fisheries; terrestrial resources; recreation, land use and aesthetics; and cultural resources. The work groups met approximately monthly to define issues, review and approve study plans, review and discuss study results, and develop recommended environmental measures for incorporation into Avista's Proposed Action. Plenary Group meetings were held with increasing frequency in 2004 and early 2005, as work groups forwarded PME measures to the Plenary Group. In addition, numerous subgroups met to try to resolve specific issues. A draft PDEA was issued February 22, 2005 for a 90-day public review. Appendix C of this final PDEA includes a summary of comments on the draft and Avista's responses, including an indication of points where the PDEA text was amended in response to the comment. Dialogue with stakeholders continues, although a comprehensive Settlement Agreement has not been developed at the time of this filing. The choice of environmental measures included in the Proposed Action was Avista's alone, although the included measures reflect areas of significant agreement reached during the consultation process. Many, though not all, of the environmental measures that were forwarded by the work groups to the Plenary Group are included in the Proposed Action. The consultation record has been maintained and is located at www.avistautilities.com/resources/relicensing/spokane/.

4.2 Scoping

Public scoping meetings and an open and extensive collaborative relicensing process were used to define the issues addressed in the PDEA, as well as to guide the selection and design of resource studies associated with those issues. The scoping of environmental issues was initiated through the collaborative process at the work group level, consistent with procedures defined in the *Consultation Process Communications Protocol* (Avista, 2002a).

On May 7, 2003, the Commission issued notice that it intended to perform scoping for the Project relicensing in accordance with NEPA and the Commission's regulations for using the ALP. Avista and the Commission staff jointly issued Scoping Document 1 (SD1) on May 6, 2003, and held two public scoping meetings in Spokane, Washington, on June 3, 2003. In addition to the opportunity to provide comments at the meetings noted above, all parties also had a 60-day period for submitting written comments on SD1. The 60-day written comment period concluded on July 7, 2003. On June 15, 2004, Avista, in consultation with FERC, issued Scoping Document 2, which addressed comments filed on SD1.

4.3 Applicable Laws and Regulations

As a part of FERC relicensing, Avista or FERC must comply with a range of applicable laws and regulations. In addition to the FPA, which relates directly to the relicensing of hydroelectric projects, a number of other authorities are triggered by the relicensing process. A number of these authorities are discussed in the following sections. Avista hopes that consultation through the prefiling stages of the ALP will result in a Proposed Action and associated environmental measures that are consistent with and adequately address the issues related to these authorities.

4.3.1 Water Quality Certification

Pursuant to Section 401(a)(1) of the Clean Water Act (CWA) and FERC regulations, within 60 days of acceptance of its FERC license application, an applicant is required to file a copy of the Water Quality Certification provided by the appropriate certifying authorities or proof that such certification has been applied for or that the certifying authority has waived the requirement. Certification under Section 401, or waiver of certification, is required before the Commission may issue a new license for the Project. In addition, the Commission must include the requirements attached to certification as conditions of a new license. In the case of the Spokane River Project, the authority to review and certify the Project for consistency with Section 401 lies with the Idaho Department of Environmental Quality (IDEQ) and Washington Department of Ecology (WDOE).

Avista will submit its applications for certification within the timeframe required.

4.3.2 Section 18 Fishway Prescription

Section 18 of the FPA states that the Commission is to require construction, maintenance, and operation by a licensee of such fishways as the secretaries of Commerce and Interior may "prescribe." The Commission must include any such prescriptions within the conditions of a new license.

In the case of the Spokane River Project, no anadromous or catadromous fish species (species that migrate between estuary and/or ocean habitats and freshwater habitats) are present in the Project area that could trigger a fishway prescription by the Secretary of Commerce through NOAA Fisheries. In the case of resident fish passage, the U.S. Department of the Interior, through the U.S. Fish and Wildlife Service (FWS), exercises Section 18 authority. Discussion within the ALP related to fish passage needs, as well as written comments submitted by the FWS and other resource agencies, has not identified the need for fish passage facilities at the Project hydroelectric developments at this time. As a result, Avista expects that no Section 18 fishway prescription will be required, other than the reservation by the FWS of its authority to issue such prescriptions at some future time if it determines fish passage needs have changed.

4.3.3 Section 4(e) Federal Land Management Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a Project within a federal reservation shall be subject to and contain such conditions as the secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. Federal lands within the Spokane River Project boundary are inundated lands (refer to Table 5-49 in Section 5.11, *Land Use and Aesthetic Resources*).

The Spokane River Project occupies more than 8,000 acres within the Coeur d'Alene Indian Reservation. The Secretary of the Interior, represented through the U.S. Bureau of Indian Affairs (BIA), is responsible for addressing Section 4(e) with respect to the Coeur d'Alene Indian Reservation. Both BIA and the Coeur d'Alene Tribe have been participating in the ALP process. The Secretary of Agriculture is responsible for addressing Section 4(e) with respect to FS. The Secretary of the Interior is responsible for addressing Section 4(e) with respect to BLM. FS and BLM have indicated that they have inundated lands within the Project. Representatives of the FS and BLM have also been participating in the ALP.

4.3.4 Section 10(j) Recommendations

Under Section 10(j) of the FPA, each hydroelectric project license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the Project. The Commission considers these conditions in the Project license and also determines if they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission attempts to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency.

4.3.5 Section 10(a) Recommendations

Under Section 10(a) of the FPA, in issuing a hydroelectric project license, the Commission must be satisfied that the project to be licensed is best adapted to a comprehensive plan for improving and developing the waterway. In making this judgment, the Commission considers comprehensive plans prepared by federal and state entities; the recommendations of federal and state agencies exercising administration over flood control, navigation, recreation, cultural and other relevant resources; and the recommendations (including fish and wildlife recommendations) of Native American tribes affected by the Project.

4.3.6 Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the designated critical habitat of such species. The federally listed bull trout, bald eagle, gray wolf, Spalding's catchfly, Ute ladies'-tresses, and water howellia may occur in the vicinity of the Project. Coeur d'Alene Lake and the Coeur d'Alene and St. Joe rivers are designated bull trout critical habitat. The status of federally listed species could change over the term of the new license. We present our summary analyses of the potential and likely Project effects on threatened and endangered species or their designated critical habitat in Section 5.8, *Threatened and Endangered Species*.

Avista has been designated as the Commission's non-federal representative for the purpose of conducting informal ESA consultation with FWS.[15] As the relicensing process continues, the Commission will initiate formal ESA consultation, typically beginning with issuance of the Commission staff's environmental assessment or environmental impact statement. The Commission will also prepare a biological assessment, using Avista's analysis as the basis for that document. FWS will review the Commission's biological assessment and issue its findings (i.e., concur or not concur with the conclusions of the biological assessment concerning effects on listed species and designated critical habitat). If necessary, FWS may develop and submit a biological opinion that includes appropriate license terms and conditions related to protection of ESA species. The Commission will include any such terms and conditions in any new license that is issued.

4.3.7 Pacific Northwest Power Planning and Conservation Act

Under Section 4(d) of the Pacific Northwest Power Planning and Conservation Act, the Northwest Power and Conservation Council (NPCC, formerly known as the Northwest Power Planning Council or NPPC) authorized the Columbia River Basin Fish and Wildlife Program to protect, mitigate, and enhance the fish and wildlife resources associated with development and operation of hydroelectric projects within the Columbia River Basin. Section 4(h) of the Act states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies should take the Program into account to the fullest extent possible.

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[15] Avista has developed a draft biological assessment following consultation with FWS during the relicensing process. This draft will be submitted to the Commission following filing of the license application.

4.3.8 National Historic Preservation Act: Section 106

FERC's relicensing of a hydroelectric project is considered an undertaking under Section 106 of the NHPA, as amended (P.L.89-665, 16 U.S.C.470). Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, Traditional Cultural Properties (TCPs), and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the NRHP. Avista has been designated by FERC as the non-federal lead for pre-filing Section 106 consultation. As the lead federal agency for issuing a license, the Commission is responsible for ensuring that the licensee evaluates alternatives or modifications that "would avoid, minimize, or mitigate any adverse effects on historic properties" for the term of any license issued for the Project. The lead agency must also consult with State Historic Preservation Officers (SHPO[s]), as well as with federal land management agencies where the undertaking may have an effect, and with Native American Tribes that may have cultural affiliations with affected properties. The Section 106 review process is overseen by the Advisory Council on Historic Preservation (Advisory Council), an independent federal agency.

To meet the requirements of Section 106, the Commission will execute a programmatic agreement (PA) for the protection of historic properties from the effects of the continued operation of the Spokane River Project. It is anticipated that parties to the PA would include the Commission, Washington SHPO, Idaho SHPO, the Coeur d'Alene Tribe, the Spokane Tribe of Indians, the Confederated Tribes of the Colville Reservation, Avista, BIA, and the Advisory Council. The PA, which would ultimately be incorporated into the license by FERC, forms an agreement that Avista would implement an HPMP regarding NHRP-eligible properties within the Project boundary. HPMPs generally entail ongoing consultation involving historic properties for the term of any license that is issued.

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5.0 ENVIRONMENTAL ANALYSIS

In this section, we describe the anticipated environmental effects associated with implementation of the Proposed Action. Consistent with CEQ guidelines and FERC policy, our baseline for analysis is the No-action Alternative. The section begins with a summary description of the Coeur d'Alene-Spokane River Watershed, followed by identification of resources that are cumulatively affected. The effects analysis is organized by resource topic, based on specific issues identified through the collaborative scoping process. For each resource topic, we begin by describing the affected environment. Next, we summarize the effects analysis for each issue related to the resource topic and the effects associated with continued Project operation under the Proposed Action. We also assess the environmental effects of any PME measures proposed to address the issue.

5.1 General Description of the Basin

The Coeur d'Alene Lake-Spokane River Watershed lies within two geologic provinces, the old North American Continent to the east and the Columbia Plateau to the west. The old North American Continent is represented by the Rocky Mountains east of Coeur d'Alene Lake. Ancient rocks of the continental crust are more than two billion years old and consist of granite, gneiss, and schist. To the west along the Spokane River, the old continent disappears beneath the basalt rock of the Columbia Plateau. Enormous lava flows during the Miocene Period deposited fine-grained basalt across much of central Washington. Primary headwater tributaries of the combined Coeur d'Alene Lake-Spokane River Watershed drain the Bitterroot Mountains lying east of Coeur d'Alene Lake. Downstream of Coeur d'Alene Lake, the Spokane River enters a wide, flat valley created during the last ice age when the large ice dams of glacial Lake Missoula collapsed, releasing a series of enormous floods and associated materials. Around this fluvial valley, the topography includes more rolling hills and subtle gradient changes. Between Post Falls, Idaho, and the City of Spokane's Upriver Dam, the Spokane River has a moderate gradient (a drop of about 140 feet over 18 miles) characterized by marginal channel entrenchment. Channel characteristics include unembedded cobble and boulder substrates, relatively stable banks, and direct hydrologic connections to the Spokane Valley-Rathdrum Prairie Aquifer. Spokane Falls, the location of the Upper Falls and Monroe Street HEDs, marks a noticeable shift in river channel characteristics and the underlying geology.

The river channel at Spokane Falls is highly entrenched, with a bedrock-dominant substrate. Below the falls, the river remains entrenched within a valley, with instream substrate dominated by unembedded cobble and boulder. Downstream of Spokane, the gently rolling terrain, punctuated by areas of steeper relief, continues to the Long Lake HED and beyond. Along the Spokane River itself, there are steep-sided gorges and rock formations, which are particularly visible in the unimpounded reach of river upstream of Nine Mile Reservoir (e.g., in the Bowl and Pitcher whitewater area) and in the areas immediately downstream of the Nine Mile and Long Lake HEDs.

The climate of the Spokane River Project area reflects the diversity of an intermountain region with both maritime and continental influences. The local climate is heavily influenced by maritime air masses from the Pacific Coast, which are in turn modified by continental air masses intruding southward from Canada (NPPC, 2000b,c). Summers are mild and relatively dry, while fall, winter, and spring have more precipitation in the form of both rain and snow. A seasonal snowpack can cover the landscape above 4,500 feet mean sea level from late November into May.

In the immediate Spokane vicinity, average annual precipitation is less than 20 inches, much of which consists of snowfall (FERC, 1997; NPPC, 2000b,c). Average annual temperature is 49 degrees Fahrenheit (ºF), with July being the warmest month and January the coldest. At Coeur d'Alene, Idaho, average precipitation is about 25 inches annually. Farther to the east, the Coeur d'Alene River and St. Joe River watersheds are much cooler and wetter. Much of the precipitation in the higher elevations occurs as snow, which is important to the subsequent runoff and seasonal streamflows.

5.2 Cumulatively Affected Resources

According to the Council on Environmental Quality's regulations for implementing NEPA (Section 1508.7), an action may cause cumulative effects on the environment if its effects overlap in time and/or space with the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on our review of the issues raised in the ALP consultation and NEPA scoping processes, the following resources have been identified as having potential to be cumulatively affected by the Project in combination with other past, present, and future activities: geology and soils, water quantity, water quality, aquatic resources, terrestrial resources, cultural resources, and recreational resources.

In the following subsections, we discuss the geographic and temporal scope of the analysis of these cumulatively affected resources. Past actions that have affected the above-listed resources are briefly described in the *Affected Environment* sections for each resource. The cumulative effects analysis at the end of each resource section summarizes the potential for the Proposed Action to contribute to cumulative effects of past, present, and future activities on these resources.

5.2.1 Geographic Scope

The geographic scope for each cumulative effect issue depends on the nature of the actions influencing the cumulatively affected resource.

5.2.1.1 Geology and Soils

Indications are that the current range of Coeur d'Alene Lake surface elevations is similar to its range over the last several thousand years or more (Earth Systems and Parametrix, 2004). Each creek and river entering the lake is depositing its sediment onto the inundated valley bottom and slowly building levees and deltas out into the lake (Bookstrom et al., 1999). Project operations at Post Falls HED maintain lake levels during the summer at an elevation higher than pre-Project conditions, and this, in conjunction with powerboat wakes and natural wind-driven wave energy, has a cumulative effect on shorelines and natural levees and deltas (Earth Systems and Parametrix, 2004).

Numerous human-caused factors have also influenced sediment supply to the Coeur d'Alene Lake-Spokane River Watershed. In particular, hard-rock mining upstream on the South Fork of the Coeur d'Alene River has added about 57 million tons of mine wastes to the system (Bookstrom et al., 1999), such that the existing sediments in and along the rivers and lakes in the Project area are a mixture of metal-enriched mine deposits and natural sediments. High river flows and wave action in near-shore areas continue to redistribute these sediments (Earth Systems and Parametrix, 2004).

In addition, the construction of artificial levees and dikes for roads, railroads, farm drainage, and flood control all have affected the shoreline topography as well as the energy effects of high flow events. These activities reduce the effectiveness of the natural floodplain to store water and retain sediment and, in diked reaches, increase the energy of flows in the main channel during higher flows. Smaller, but notable, effects have occurred from direct construction activities along shorelines, especially the construction of bulkheads or other shoreline protection efforts that can displace the effects of erosion to other areas.

Studies undertaken as part of this relicensing effort indicate that sediment transport in the Coeur d'Alene and St. Joe rivers occurs primarily, though not solely, during bankfull or greater flows and that Coeur d'Alene Lake acts as a sink for sediments under both pre-Project and current Project conditions (Golder, 2004c).

Downstream of Spokane, Hangman Creek, in particular, and the Little Spokane River contribute substantial amounts of fine sediments to the Spokane River, especially during high-flow periods. Channel alterations to Hangman Creek combined with intensive agricultural practices in the watershed have increased sediment discharge from this watershed into the Spokane River (NPPC, 2000c). Nine Mile HED passes, on average, approximately 75 percent of sediment entering the reservoir, but is still accumulating sediment each year (Golder, 2004c). Sediment transport past Long Lake HED is restricted to fine materials that remain suspended, and Lake Spokane is also accumulating sediment (Golder, 2004c).

Erosion of the Lake Spokane shoreline was greater when the Project was first built than it is today, and both wind-driven waves and powerboat wakes have had a continuing erosional effect on the shoreline since Long Lake HED inundated the river valley (Earth Systems and Parametrix, 2004).

Based on the distribution of natural and human-caused factors that cumulatively affect sediment supply and transport in the Project area, the geographic scope of the cumulative effects analysis for this issue includes the entire Project boundary.

5.2.1.2 Water Quantity

The storage and release of water for power generation and other purposes at the Spokane River Project affect lake levels and Spokane River flows both between hydroelectric developments and below the most downstream Project dam (Long Lake HED). In combination with other hydroelectric developments (including the Upriver Project, Little Falls Project, and Grand Coulee Dam), the Spokane River Project interrupts the free flow of water in the Spokane River. Of the 111 river miles of the Spokane River from the pre-Grand Coulee Dam confluence with the Columbia River upstream to the Coeur d'Alene Lake outlet, about 79 miles (71 percent) of the river is affected by backwater from dams under full-pool conditions. Accordingly, the geographic scope of the cumulative effects analysis of river flows and lake level extends from the tributaries of Coeur d'Alene Lake downstream to the pool of the Little Falls Project.

5.2.1.3 Water Quality

Water quality is influenced by a wide variety of human activities in the Coeur d'Alene Lake-Spokane River Watershed, including historical upstream mining operations, mining-related cleanup, nutrient-rich discharges from wastewater treatment systems, various land management activities, current Spokane River Project operations, and increasing human development in the vicinity of the Project. In particular, past upstream mining activities have contributed to metals contamination of some of the Project waters (NPPC, 2000b); Hangman Creek and the Little Spokane River have been identified as significant sources of fine sediment for the Spokane River (GEI, 2004); and nutrient loading from tributaries and wastewater treatment systems affect Project waters (Golder, 2004d). Water quality downstream of Project and non-Project dams along the Spokane River affects instream habitat for aquatic species.

Accordingly, the geographic scope of the cumulative effects analysis for water quality focuses on the Coeur d'Alene Lake-Spokane River Watershed from the Coeur d'Alene Lake tributaries downstream to the Little Falls Project Pool.

5.2.1.4 Aquatic Resources

Past actions from a variety of sources, including mining, agriculture, urban and suburban development, recreation, Project construction and operation, resource management efforts, and other human activities in the Coeur d'Alene Lake-Spokane River Watershed have cumulatively affected aquatic species and habitats in the basin. Anadromous fish are no longer present in the Project area, with upstream passage into the Spokane River (i.e., to downstream of Little Falls Dam) currently precluded by several dams on the Columbia River (NPCC, 2004). Tributaries in the Coeur d'Alene Lake subbasin provide important spawning habitat for native salmonid species that occupy Project waters at other life stages, such as westslope cutthroat trout and bull trout. These tributaries also affect fish species in the Project area by transporting metal-enriched sediments from upstream mining areas, nutrient-enriched sediments from agricultural areas, and other sediments produced by upstream activities such as timber harvesting, road building, and residential/commercial development. Current Project operations that regulate reservoir water levels and downstream flows affect fish populations in varying ways. Resource agency management programs throughout the Project area also affect fish species through the protection and management of native salmonids and the introduction and management of native and non-native game fish populations. The intensity of sport fishing occurring throughout the Project area also influences game fish populations.

Considering these potential sources of cumulative effects on fisheries resources, the geographic scope of our cumulative effects analysis for aquatic species and habitat focuses on the Coeur d'Alene Lake-Spokane River Watershed from the tributaries to Coeur d'Alene Lake downstream to the Little Falls Project Pool.

5.2.1.5 Terrestrial Resources

Past actions from a variety of sources, including mining, agriculture, urban and suburban development, recreation, Project construction and operation, and other human activities in the Coeur d'Alene Lake-Spokane River Watershed have cumulatively affected certain plant communities and wildlife habitats in the basin (Parametrix, 2004a, 2003b).

Riparian habitats and wetlands associated with Coeur d'Alene Lake and its tributaries have been particularly affected. Large camas meadows that were historically present in the Coeur d'Alene, St. Joe, and St. Maries River valleys have been drastically reduced by agriculture, grazing, diking, and drainage of wet meadows. Project operation has increased the period of inundation of lower river shallow water habitats, converting pre-Project wetland and riparian habitat types. Downstream of Post Falls HED, agriculture, residences, and other development on both sides of the Spokane River have modified or eliminated much of the wetland and riparian habitat. A variety of land uses and recreational boating have introduced non-native invasive aquatic species to both Coeur d'Alene Lake and Lake Spokane.

The loss of habitat due to development and exposure to metal-enriched sediments in wetlands and lakes, particularly in the lower Coeur d'Alene River area, have affected wildlife species (Parametrix, 2003b). Exposure to lead, zinc, cadmium, arsenic, and copper has proven toxic to various bird, mammal, amphibian, and plant species. Metal contaminant levels in the Spokane River generally decrease with increased distance from Coeur d'Alene Lake. Project effects on metal concentrations are discussed in Section 5.5.1.4, *Metals*. Polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) also occur in the river system, most likely introduced by industrial sources along the river.

Considering these sources of cumulative effects, the geographic scope of the cumulative effects analysis for terrestrial resources focuses on the Coeur d'Alene Lake-Spokane River Watershed (including tributaries to Coeur d'Alene Lake) downstream to Long Lake Dam, including a short length of transmission-line corridor associated with Long Lake HED.

5.2.1.6 Cultural Resources

Past actions from a variety of sources, including mining, farming, railroads, urban development, Project construction and operation, and other human activities in the Coeur d'Alene Lake-Spokane River Watershed have cumulatively affected prehistoric and historic archaeological resources, culturally sensitive areas, and historic structures and buildings in the basin (Entrix and Western Historical Services, 2004). Key cumulatively affected resources include the cultural materials associated with tribal culture (including plants, animals, and sites) and the historic components associated with the period of exploration and settlement and with railway and hydroelectric facility development. The geographic scope of the cumulative effects analysis for cultural resources is the Coeur d'Alene Lake-Spokane River Watershed.

5.2.1.7 Recreational Resources

In the last several decades, recreational activities have increased in the Project area as well as at other sites in the region. Coeur d'Alene Lake has been a popular recreation destination since the area was settled (Entrix and Western Historical Services, 2004). Project operations at Post Falls HED maintain Coeur d'Alene Lake at a stable summer lake level, contributing to the popularity of the lake for summer boating, year-round and seasonal home sites, and other recreation. Current Project operations also affect downstream flows and the associated recreational resources and opportunities. The geographic scope of the cumulative effects analysis for recreation focuses on the area within and adjacent to the Project boundary, extending from the affected reaches of Coeur d'Alene Lake tributaries downstream through Long Lake HED.

5.2.2 Temporal Scope

The assessment of cumulative effects includes the effects of other past, present, and reasonably foreseeable future actions. Thus, the cumulative effects analysis addresses past effects to resources, including pre-Project conditions, as well as current and future effects. Based on the potential term of any new license issued for the Spokane River Project, the future actions included in the cumulative effects analysis focus on the next 30 to 50 years.

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5.3 Geology and Soils

5.3.1 Affected Environment

5.3.1.1 Geology

The Coeur d'Alene Lake-Spokane River Watershed spans two distinct geologic provinces: the older North American Continent to the east and the younger Columbia Plateau to the west (NPPC, 2000c). To the west along the Spokane River, the older continental rocks disappear beneath the younger basalt of the Columbia Plateau. Atop this basalt, the wide pre-glacial Spokane River Valley is filled in with late-Pleistocene glacial deposits. Rivers and great floods flowing from the Cordilleran Ice Sheet filled the valley with glacial outwash, lake, and outburst flood deposits that are as thick as 200 meters (650 feet) and constitute the Spokane Valley-Rathdrum Prairie Aquifer (SAJB, 2004; Molenaar, 1988; as cited by Box and Wallis, 2002). These glacial-age valley fill deposits blocked all the tributary valleys to form lakes, including Coeur d'Alene Lake, the largest in the area. Drainage from the Coeur d'Alene River and St. Joe River valleys was forced up against the high bedrock uplands on the south side of the valley, locking the Spokane River into its current location. The Spokane River eroded into the unconsolidated valley fill forming the present valley, in places encountering bedrock and forming the falls and canyon sections, including Post Falls, Spokane Falls, Nine Mile Falls, and much of the river canyon along Long Lake HED (Earth Systems and Parametrix, 2004).

Coeur d'Alene Lake Area

An extensive, natural sill at the outlet of Coeur d'Alene Lake controls the flow rate of the river out of the lake. Dams in the Post Falls area, including those established by Frederick Post in the late 1800s, and since 1906, Post Falls HED, added additional structural controls to the river's flow rate out of the lake (Box and Wallis, 2002).

The rock notches and valley fill elevations along the lower Coeur d'Alene and St. Joe rivers indicate that current lake surface elevations have been roughly similar for at least several thousand years (Earth Systems and Parametrix, 2004). Each creek and river entering the lake has been slowly filling the inundated valley bottom at the mouth of each tributary to the lake. Through time, the tributary streams have built deltas out into Coeur d'Alene Lake or the lateral lakes along the rivers. Larger tributaries such as the Coeur d'Alene and St. Joe rivers have built deltas typically with a single main channel and natural levees that build out into Coeur d'Alene Lake, forming extensive back lakes and marshes (Bookstrom et al., 1999).

St. Joe and St. Maries River Deltas[16]**—**The valley walls of the ancient St. Joe River Valley confine the St. Joe River delta; therefore, it does not have a classic delta shape. The St. Joe River delta builds and gradually fills Coeur d'Alene Lake and the lateral lakes by construction of lobes at the delta front and at occasional breaks in the levee, and by overbank deposition on the levee tops and lateral lake/marsh floodplains. The end of the main river channel is currently at Beadle Point, but an older delta lobe and main channel are also visible in aerial photographs.

The delta plain starts at about river mile 22 on the St. Joe River and at about river mile 7.2 on the St. Maries River (Figure 5-1). The upper delta areas on the St. Joe and St. Maries rivers generally consist of a single main channel, the levees along the channel, and lateral marsh areas. The overbank areas of the upper delta are primarily shallow marshes on the back side of the natural levees. During most flows, the main channel is isolated from the floodplain by the natural levees that formed through deposition of suspended sediment during overbank floods.

During the past 125 years, human development has modified the natural levees and often further isolated the main channel from the flood plain. This has concentrated flood flows within the main channel, increased erosion and sediment transport through this reach, and reduced deposition in the overbank lakes and marshes. The lower St. Joe River delta begins around river mile 5, where the overbank areas on the back side of the levees are less confined and the river channel has more lake characteristics. Here, velocities in the channel are lower and the bed consists of sand, silt, and clay. This downstream portion of the levees has limited historical shore development and is the least-modified portion of the river. Downstream of river mile 2, where the natural levees are youngest and therefore lower and narrower, grazing, erosion, and soil saturation have eliminated much of the vegetation and increased the potential for erosion. The result is that the exposed portion of the levees has been narrowed or eliminated.

Coeur d'Alene River Delta[17]**—**The valley-bottom river and delta depositional processes and landforms for the Coeur d'Alene River are generally similar to those previously described for the St. Joe River. However, during the mining era,[18] about 57 million tons (dry weight) of mine wastes were put into Coeur d'Alene River tributaries and distributed downstream by the stream currents, especially the finer fractions that remained suspended (Bookstrom et al., 1999). The existing sediments in and along the river and associated lakes are a mixture of metal-enriched mine deposits and natural sediments, and each flood and boating season continues to redistribute this sediment. In addition, flood events upstream can continue to deliver fresh sediments to the system.

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[16] Information in this section has been excerpted and adapted from Earth Systems and Parametrix (2004).

[17] Information in this section has been excerpted and adapted from Earth Systems and Parametrix (2004).

[18] An extensive human history of hard rock mining for a variety of metals exists in this region, and the legacy of mine wastes and smelter fallout influencing the environment lives on through contamination of the Coeur d'Alene River, Coeur d'Alene Lake, and the surrounding environment. Bunker Hill Mining and Metallurgical Complex National Priorities List Site (located on the South Fork Coeur d'Alene River, upstream of the Spokane River Project boundary) was listed on the National Priorities (Superfund) List in 1983.

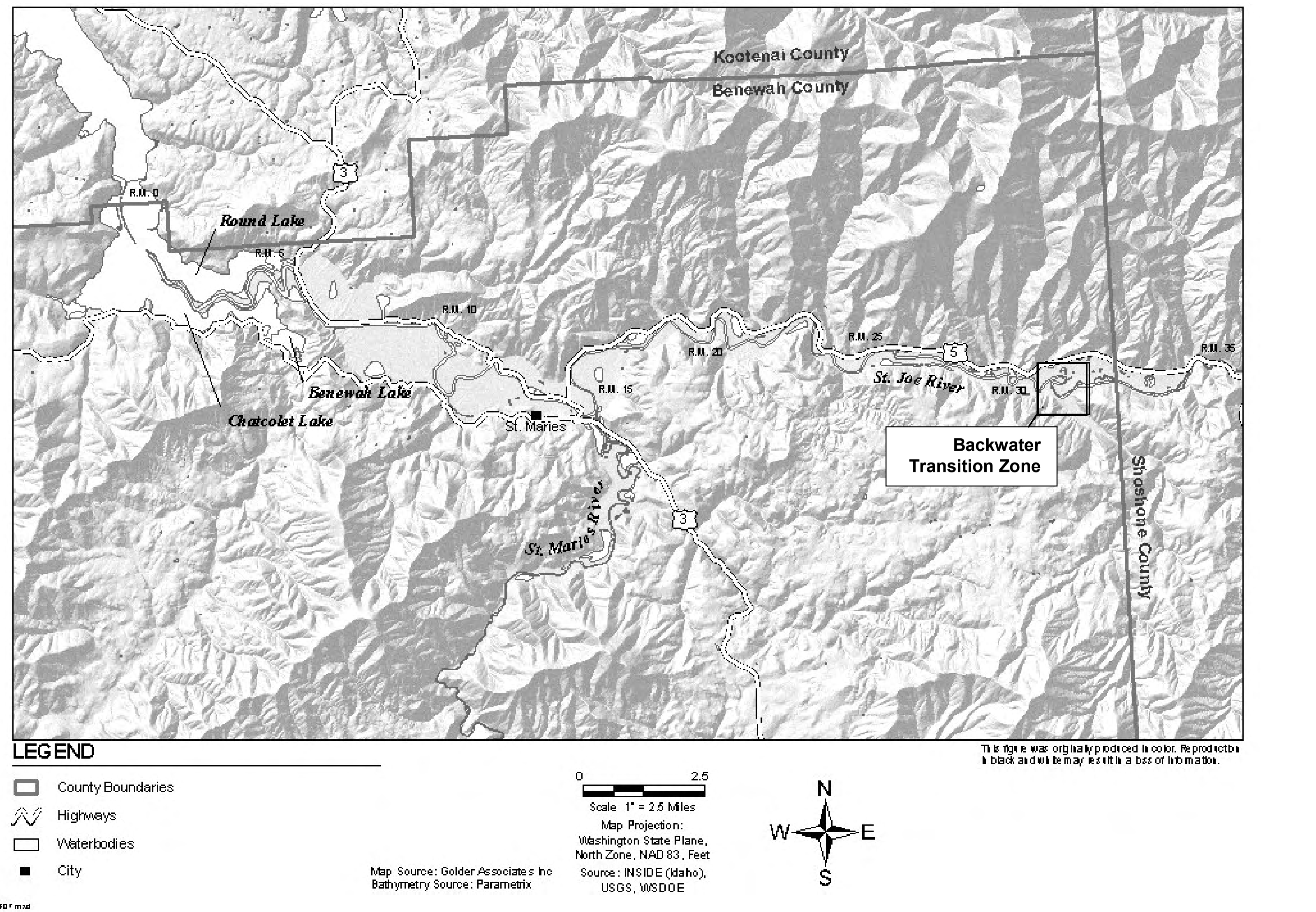

Figure 5-1. St. Joe River features.

The Coeur d'Alene River from the upper watershed to Cataldo Flats is a high-gradient, cobble- and gravel-bedded river. Downstream of Cataldo Flats, the backwater influence of the lake both pre- and post-Project development has formed a long compound delta that is relatively confined by the bedrock valley walls and, at the wider portions, by ancient lake and river deposits. The lower Coeur d'Alene River typically has low velocities and a sand, silt, and clay bottom, similar to the St. Joe River downstream of river mile 22 and the St. Maries River downstream of river mile 7 (Figure 5-2).

The Coeur d'Alene River delta front runs from Harrison to Harlow Point. Natural levees extend upstream forming lakes and marshes behind them, providing a high area that was often increased and used for building roads, dikes, and buildings. The natural levees have steep riverside banks of sand, silt, and clay, with mining-related metal-enriched silty mud mixed in (Bookstrom et al., 1999). The metal-enriched deposits are typically 1 to 6 feet thick along the banks and 1 to 5 feet thick on the levee tops. Metal-enriched deposits are present across the entire floodplain with lower concentrations and thinner deposits of metals farther down the back sides of the levees and in the lateral marshes and lakes (Bookstrom et al., 1999).

The upper air-exposed layers of the metal-rich sediment along much of the Coeur d'Alene River banks are harder and relatively resistant to impact or seepage erosion because of the oxidation products of the metals and greater percentage of fines. Metal-rich bank layers are typically hard, more blocky and brittle, and less erosive than the natural alluvium. Overall, bank slumps along the Coeur d'Alene River show more brittle edges and tend to be blockier than the St. Joe bank slumps, but basically form a relatively unstable and steep bank of similar proportion.

Spokane River Area—Downstream of Coeur d'Alene Lake, the Spokane River enters a wide, flat valley formed by the series of enormous glacial floods and associated sediment deposition (Box and Wallis, 2002). In this fluvial valley, the topography includes rolling hills and subtle gradient changes. Between Post Falls, Idaho, and the City of Spokane's Upriver Dam, the Spokane River has a moderate gradient (a drop of about 140 feet over 18 miles) and is characterized by a wide valley and marginal channel entrenchment (NPPC, 2000c; FERC, 1997). Other channel characteristics include unembedded cobble and boulder substrates, relatively stable banks, and direct hydrologic connections that are flowing into and out of the Spokane Valley-Rathdrum Prairie Aquifer, depending on the reach and time of year (Avista, 2002b).

Farther downstream, Spokane Falls, the location of Upper Falls and Monroe Street HEDs, marks a noticeable shift in river channel characteristics and underlying geology (NPPC, 2000c). Spokane Falls is a geologic nick point comprising Miocene basalt flows. Here, the channel is highly entrenched, and bedrock is the dominant substrate. Downstream of Spokane Falls, the channel remains deeply entrenched for a short distance, with a relatively narrow valley floor, and is dominated by unembedded cobble-to-boulder substrate in areas that are not affected by reservoir conditions (Box and Wallis, 2002). Outside the immediate river corridor, the gently rolling terrain generally continues to Long Lake HED and beyond.

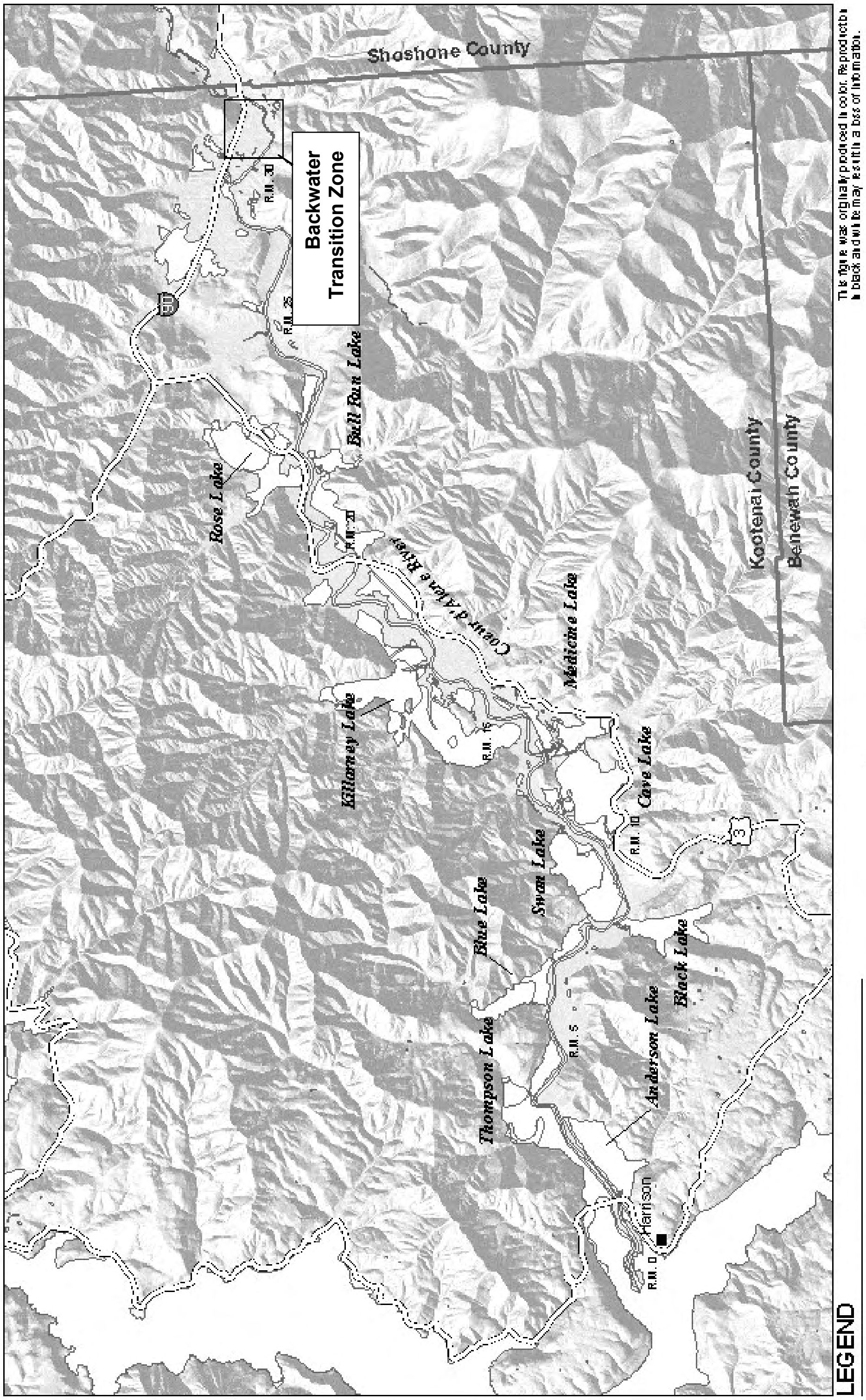

Figure 5-2. Coeur d'Alene River features.

Spokane River Tributaries—Within the Project area, there are only two perennial tributaries to the Spokane River downstream of Coeur d'Alene Lake: Hangman Creek and the Little Spokane River. Hangman Creek enters the Spokane River on the left bank from the south in the city of Spokane, downstream of Upper Falls and Monroe Street HEDs (NHC, 1999).

Hangman Creek Watershed includes the rolling, fine-grained, and erosive Palouse Hills and the uplands lying to the east. Large areas of agriculture, combined with the development of roads and other infrastructure, have increased the watershed's sediment supply. In addition, stream gradients are relatively low and channelization and road construction have eliminated the natural meander patterns along much of the stream. These factors have increased the downstream transport of sediment and led to increased delivery of sand and fine sediment into the Spokane River (NPPC, 2000c).

The Little Spokane River enters the Spokane River from the northeast on the right bank, downstream of Nine Mile HED, within the upper reaches of Lake Spokane. The Little Spokane River drains a diverse watershed that includes forested uplands and mountains as well as lowlands that have been historically farmed or ranched (NPPC, 2000c); in recent years the watershed has become increasingly developed with residential and commercial projects. The little Spokane River supplies sand and fines to the delta forming in the upper end of Lake Spokane (NPPC, 2000c).

5.3.1.2 Soils

Project area soils are dominated by valley bottom and wetland soils. Some edges of the Project area include portions of the typically steep Spokane River Valley walls. Around Coeur d'Alene Lake, the slopes consist primarily of fairly steep valley walls with relatively shallow colluvium over bedrock. Downstream of Coeur d'Alene Lake, the rest of the Project area is generally located in the glacial-age valley and glacial-fill deposits of the Spokane River Valley. Here, a narrow zone of recent alluvial valley bottom soils bounds the river, with older alluvial soils perched on terraces at various levels above the valley bottom. The steep valley walls comprise shallow, loose colluvium over the thick, older sequence of glacial fill units. The valley walls also include steep bedrock slopes and cliffs where sections of bedrock are exposed.

Soils along the St. Joe and St. Maries rivers are a mix of deposits laid down on the delta surface during each flood. The flood deposits form fine sand and silt levees near the main channel and deposit finer silt and clay across the lateral lakes and marshes. Four levee soil units were typically identifiable along the banks of the St. Joe and St. Maries rivers. Erosion ledges from boat waves are eroded into one or more of these four soil units along most of the river. These soil units vary from fine sand to fine sandy silt, generally are soft to very soft at the water level and up to 1.5 feet above the water, and are firm to stiff when 1.5 feet or more above the water level. The lowest soil unit along the banks is always wet, with a soft to firm texture (Earth Systems and Parametrix, 2004).

Surface soil conditions along the Coeur d'Alene River channel and floodplain would be similar to the St. Joe River, except they include metal-enriched sediments derived from upstream mining, milling, and smelting (Bookstrom et al., 1999; Earth Systems and Parametrix, 2004). Relative to uncontaminated sediments of the region, metal-enriched sediments are highly enriched in silver, lead, zinc, arsenic, antimony, and mercury; and enriched to a lesser degree in copper, cadmium, manganese, and iron (Fousek, 1996, as cited by Bookstrom et al., 1999). Widespread distribution of metal-enriched sediments has resulted from over a century of mining in the upstream Coeur d'Alene Mining District, direct mine-waste discharge into the river during the first 80 years of mining, and regular overbank floods that redistribute this sediment along the channel and floodplain (Bookstrom et al., 1999). Various weathering oxides in these deposits may turn the alluvial deposits various reddish and orange tones with a medium-dense to dense consistency near the waterline and above.

The shoreline of Coeur d'Alene Lake is dominated by bedrock and slope deposits derived from rocky upland soils and sandy beaches in and around tributary creeks, rivers, and unconsolidated shore areas (Earth Systems and Parametrix, 2004). The Coeur d'Alene Lake shoreline elevation has naturally varied between 2,118 and 2,140 feet during the past several thousand years, and the existing lake shoreline and beaches have been formed by the wind-caused wave erosion and associated influences and conditions within this relatively large elevation zone (Earth Systems and Parametrix, 2004). The summer lake level maintained by Post Falls HED during the past 50+ years shifted the vegetation line and upper extent of the summer beaches to the 2,128-foot elevation and has shifted the shallow aquatic and wetland zones.

Downstream of Post Falls, the Spokane River flows over a cobble-to-boulder bed for most of its course downstream to Hangman Creek, except for a 0.5-mile-long reach through downtown Spokane, where bedrock forms Spokane Falls (Box and Wallis, 2002). Upstream and downstream of the falls area, the floodplain consists of recent alluvium deposits filling the bottom of the valley, which is cut into the thick sequence of Pleistocene outburst flood deposits. The coarse gravel-cobble-boulder riverbed is a natural lag[19] derived from erosion by the river into these coarse-grained valley fill deposits. The glacial-age flood deposits and the modern alluvium derived from them consist predominately of well-rounded boulders, cobbles, gravel, and sand, with blocks that range to 10-foot-diameter. Silt and finer grain-sized material are scarce in the Pleistocene flood channel deposits and recent alluvium because much of the fine sediment remains suspended and moves farther down the valley or is deposited in thin layers in the limited overbank areas along the Spokane River.

Because of their geologic characteristics and land-use influences, Hangman Creek and the Little Spokane River tributaries contribute substantial amounts of sediment to the Spokane River downstream of Spokane, particularly during high-flow periods (NPPC, 2000c). In particular, the Hangman Creek Watershed has been subjected to intensive farming practices in the upper and middle reaches. Channelization of the creek, combined with steep slopes, fine silt and clay loess soils and large runoff events have made the watershed susceptible to streambed and upland agricultural erosion (Edelen and Allen, 1998, as cited by NPPC, 2000c).

Nine Mile Reservoir is relatively small compared to the upstream sediment supply, so it has been filled with sediment for a long time and in addition to the continuing sediment input,

[19] Coarse-grained material that is rolled or dragged along the bottom of a stream at a slower rate than the finer material or is left behind after currents have washed away the finer material. In this instance, the latter is more likely the case.

some of the stored sediment is reworked during floods. Flow through this reach is more riverine in nature than lake-like, and point bars and lateral bars, some of substantial length, form along the inside of the river bends. Historical photographs indicate that prior to construction of Nine Mile HED, the channel through this reach had a well-defined, bedrock-controlled channel with bed and banks dominated by large rocks, boulders and bedrock outcrops (Golder, 2005b). Upper valley walls and cliffs still reflect this morphology.

Around Lake Spokane, there are three main types of shoreline soil materials. The most common material is sandy, gravely, glacial-flood deposits that make up the shoreline's steep valley walls, forming about 66 percent of the shoreline (Earth Systems and Parametrix, 2004). The second most common shore material is river alluvium deposited by the ancient and recent Spokane River bedload movement, which accounts for about 25 percent of the shoreline (Earth Systems and Parametrix, 2004). The third most common shore material is bedrock or colluvium derived from bedrock, accounting for about 7 percent of the shoreline. Roughly 2 percent of the shoreline consists of glacial-age lake deposits and gravely sands at the alluvial fans and small deltas of tributary creeks (Earth Systems and Parametrix, 2004).

5.3.1.3 Existing Geologic Hazards

There are no seismic hazards related to the Project and there are no geologic hazards of significance. The Project is periodically assessed for seismic and other geologic hazards through the required Part 12 inspections under the Commission's authority.

Shallow translational landslides occur on the steep valley walls surrounding Lake Spokane. The active landslides are primarily located in the downstream end of the reservoir (particularly the downstream 5 miles), where the reservoir water levels intersect the steeper valley walls at an elevation above the previous natural river shoreline. At the upstream end of Lake Spokane, the valley is broader, with gentle slopes, and the shoreline is composed of rock and old river terraces, along with engineered road prisms (Earth Systems and Parametrix, 2004). The naturally steep valley wall slopes in the downstream end of the reservoir are made up of erosive materials (gravely sands) that generally do not completely stabilize even with dense vegetation. Along the Lake Spokane full-pool shoreline, there are 26 acres with slopes greater than 30 degrees. This is where most of the shallow slides occur. Many of these sandy, unconsolidated slopes are near or at their limits of stability and would experience some erosion regardless of any Project-related influence. This is evident by the areas of visible slope erosion that are located away from and upslope of the reservoir shoreline. Typically, these slides have bare areas of soil loss; include down, tilted, or exposed roots of trees or brush; and have sharp edges to scarps, headwalls, sidewalls, or toe deposits. Less-active slides or ancient non-active slides have stable vegetation and more rounded edges and slopes (Earth Systems and Parametrix, 2004).

The potential for drawdown-induced shoreline seepage leading to bank slumping does exist on portions of Lake Spokane because of the steep valley walls around the downstream shoreline and the presence of loose-to medium-compact unconsolidated sandy-layered slope materials. However, Earth Systems and Parametrix (2004) found no direct evidence of drawdown-induced slumping following a recent 12-foot drawdown of Lake Spokane. Earth Systems and Parametrix (2004) note that drawdown-induced slumping may have been a factor during the early history of the reservoir when more of the shore slopes were less adjusted to the new lakeshore, but the limited extent of large drawdowns and the fairly long history of the reservoir limit the current likelihood of drawdown-induced slumping.

5.3.1.4 Sediment Supply and Transport

Under natural conditions, sediment is first supplied to the Coeur d'Alene Lake-Spokane River system by hillslope erosion processes. Once mobilized by erosion on the land surface, sediment is generally transported to the stream system by colluvial and/or fluvial processes. Within the riverine environment, sediment may be actively transported downstream or stored indefinitely in the channel or on the floodplain. Variability in stream discharge, changes in upstream sediment supply, natural channel migration and evolution of its morphology, landslides, alluvial fans, and human-induced effects on the channel and entire river basin, such as land use practices and road density, all influence the supply and transport rate of sediment. In addition, larger-scale geologic processes—such as the deposition of glacial flood sediments on what has become the floodplain of the Spokane River—can function as a supplemental sediment source for a river or creek. In the Coeur d'Alene River Basin, fluvial erosion of mine tailings piles also contributes sediment to the system.

Sediment Supply and Transport in the Coeur d'Alene, St. Joe, and St. Maries Rivers

Coeur d'Alene River—Golder (2004c) has identified several sediment sources for the Coeur d'Alene River above Coeur d'Alene Lake. These sources include sediment supplied from the North and South forks (including substantial quantities of contaminated mine waste), local bank erosion, and channel bed remobilization. Mining and milling in the Coeur d'Alene mining area have produced approximately 109 million tons of tailings since approximately the late 1800s (Long, 1998, as cited by Bookstrom et al., 1999). Approximately 51 percent of the tailings generated in the Coeur d'Alene Mining District were discarded directly into creeks that are tributaries to the Coeur d'Alene River (Long, 1998, as cited by Box et al., 2001). Local bank erosion is caused by wind-generated waves, boat wakes, and flood events. We discuss sediment supplied by bank erosion in more detail in Section 5.3.2.2, *Sediment Transport* in *Environmental Effects*.

Sediment from the mainstem Coeur d'Alene River is generally transported to Coeur d'Alene Lake, with widespread deposition on the levees, back marshes, and lakes during overbank floods. The Coeur d'Alene River inundates large portions of its floodplain during high-flows, depositing sediment in the process. This physical process of sediment transport and deposition is described below in greater detail. More detailed discussion and analysis of sediment transport and deposition is provided by Golder (2004c).

Several agencies have monitored and analyzed sediment transport at the Rose Lake and Harrison gages on the river (Clarks and Woods, 2001; U.S. Environmental Protection Agency [EPA], 2001a, as cited in Golder, 2004c). EPA (2001a, as cited in Golder, 2004c) estimates that an average 27,207 tons of sediment is transported past the USGS Coeur d'Alene-River-at–Rose-Lake Gage by the river each year. In 1999, approximately 29,700 tons of suspended sediment were estimated to be transported past the gage. Of that, about 23,000 tons were fines and 6,700 tons were sand. In general, most of the sediment transport observed at the gage occurs between March and June during the peak stream discharges (EPA, 2001a, as cited in Golder, 2004c).

An average 81,338 tons of sediment is estimated to be transported by the river past the Coeur d'Alene-River-near-Harrison Gage (USGS Gage No. 12413860) each year (EPA, 2001a, as cited in Golder, 2004c). As with the segment of river upstream of it, most of the sediment transport observed at this gage generally occurs during the large stream discharges between March and June.

From Cataldo to Harrison, the floodplain of the Coeur d'Alene River generally slopes away from the tops of the natural levees that flank the river. Therefore, if floodwater overtops the levees or flows through low passes in the levees, it tends to cover most of the floodplain and sediment deposition occurs (Bookstrom et al., 1999). At this localized scale, sediment is being both transported and deposited. Figure 5-3 illustrates a conceptual diagram of the cycle of transport and deposition of fine-grained sediment in the lower Coeur d'Alene River (i.e., from the river mouth to approximately 30 miles upstream), with sediment moving through the system via a series of interconnected physical processes.

Sediment movement is not uniform or continuous. Although sediment may be moving at the full range of low flows to peak flows, the majority of sediment transport in the river is driven by higher flow velocities[20] (Golder, 2004c) and is therefore closely related to larger flow events, occurring typically between November and June. Since mining began in 1886, 13 major floods have inundated the floodplain of the Coeur d'Alene River Valley, and 26 lesser floods have flooded much of the valley floor (Box, 1994 [unpublished data], as cited by Bookstrom et al., 1999). For the purpose of discussing the frequency of movement of the sediment, two general types of floods must be distinguished—spring floods and winter floods.

The rise in the hydrograph for the annual spring runoff floods is typically relatively gradual, with consistent stage and flow velocities maintained over a prolonged period. Annual spring floods commonly inundate the lower end of the river valley, and major spring floods inundate most of the floodplain (Bookstrom et al., 1999). During these spring floods, fine-grained, metals-rich sediment is mobilized from the channel bottom and banks and deposited on the floodplain (as described above) and carried into and across Coeur d'Alene Lake (as observed in the spring runoff of 1999) (Box et al., 1998 [unpublished data]; Woods, 1999 [unpublished data]; both as cited by Bookstrom et al., 1999).

Winter rain-on-snow floods are less frequent but more aggressively erosive, typically with higher flow velocities but of shorter duration. Winter floods commonly begin when the lake level is down and the hydraulic differential between the upper basin and the lower reaches of the river is greatest. The relationship between peak flows on the Coeur d'Alene River as recorded at the Cataldo Gage and lake levels for the period from 1911 through 2003 is depicted in Figure 5-4. During these winter floods, sediment is often delivered from the upper watershed through surface runoff and is transported and deposited as described above.

[20] Additional information and greater detail on the velocities required to transport sediment are provided in Section 5.3.2, *Environmental Effects*.

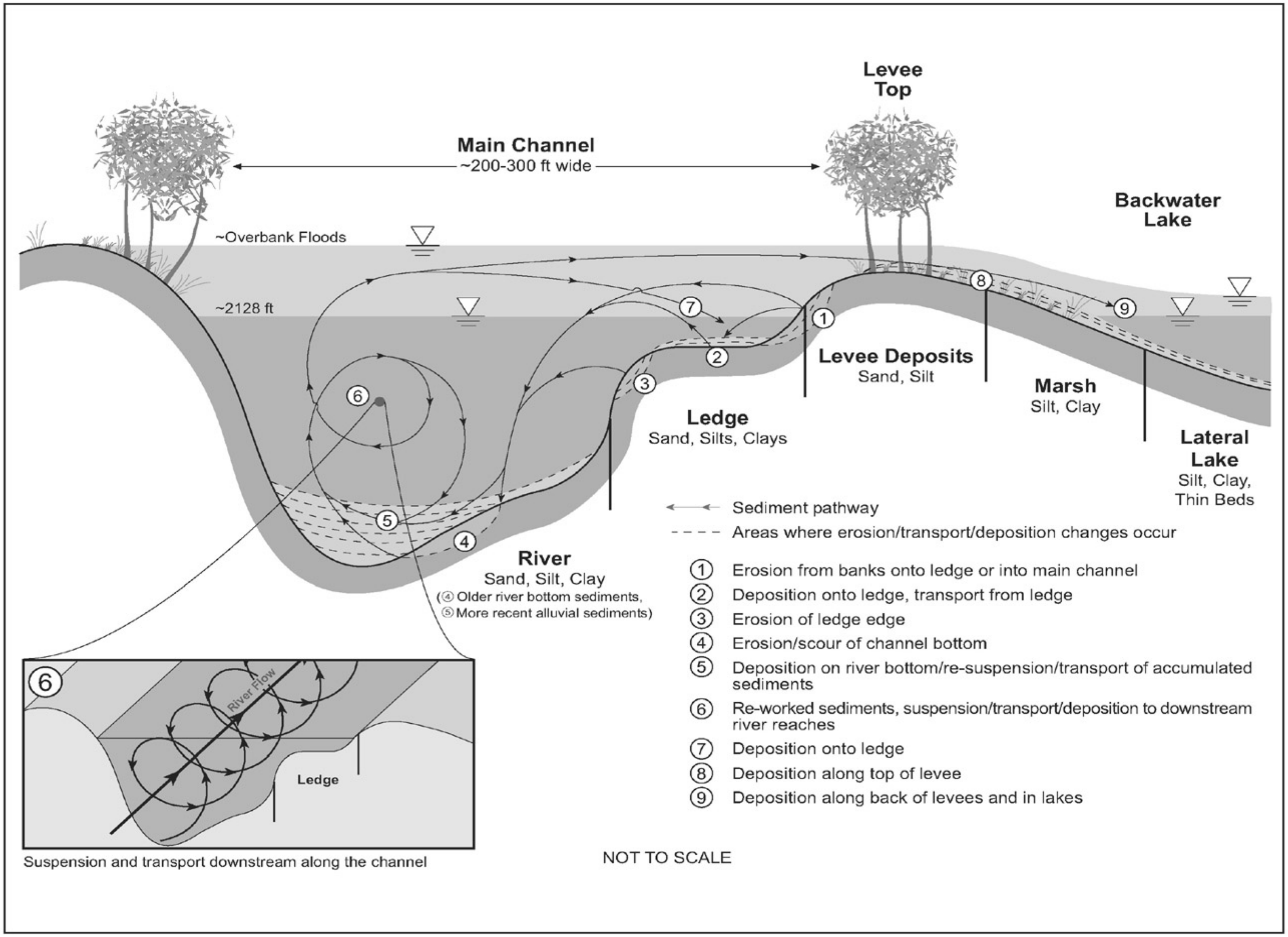

Figure 5-3. Conceptual model of sediment erosion, transport, and deposition. (Source: Adapted from Golder [2004c])

St. Joe River and St. Maries River—Because these rivers have not supported any major mining, sediment transported by the rivers and/or delivered to Coeur d'Alene Lake is likely to be relatively uncontaminated by metal-enriched sediment (Horowitz et al., 1992, as cited in Golder, 2004c; see also Table 5-25 in Section 5.5, *Water Quality*). Further, the overall sediment load of these rivers is expected to be less than that of the Coeur d'Alene River because, without the effects of mining waste inputs, sediment yields should be less on a volume-per-unit-area basis. Based on existing information and HEC-RAS modeling performed for relicensing (Golder, 2004c), sediment transport processes on the St. Joe River are expected to be similar to that of the Coeur d'Alene River, as discussed in previous sections. The conceptual model of sediment loading, transport, and deposition in the lower Coeur d'Alene River (see Figure 5-3) also applies to the lower St. Joe River and the lower St. Maries River.

Sediment Transport-Related Interactions between Coeur d'Alene Lake and Tributary Rivers—Coeur d'Alene Lake levels and the naturally low gradient nature of the lower reaches of the tributary rivers affect sediment transport through their influence on water velocities in the affected reaches. According to the intercept method[21] used on bathymetry data by Golder (2004c), the backwater transition zone on the Coeur d'Alene River is located at about river mile 32, or near where Interstate 90 crosses the river about 2 miles downstream of the town of Cataldo; at approximately river mile 34 on the St. Joe River, roughly 11 miles downstream of the town of Calder; and on the St. Maries River approximately 9 miles upstream of the town of St. Maries (which lies near the confluence with the St. Joe River) (see Figures 5-1 and 5-2). These areas are considered transition zones rather than distinct breaks because, even with a relatively static lake water level of 2,128 feet, the change from a "free-flowing" riverine character to a "slack-water" lake-influenced condition is a gradual change and varies depending on river flows and lake levels.

Sediment Supply and Transport in the Lateral Lakes of the Coeur d'Alene and St. Joe Rivers and Smaller Tributary Bays of Coeur d'Alene Lake

The lateral lakes bounding the Coeur d'Alene and St. Joe rivers receive sediment via deposition from river floodwaters spilling over the natural levees and from tributary streams entering the lateral lakes themselves. As a component of their water quality examination, Golder (2004c) modeled water velocities within these lateral lakes for natural and regulated (Post Falls HED operations) conditions. Modeled horizontal water velocities within the small bays and lateral lake areas are relatively low, typically falling within the order of 295 feet/day (Golder, 2004c). Settling velocities for the sediments seen in the small bays included in this assessment (i.e., medium silts, fine sands, and clay-silts) range from approximately 295 feet/day to 3.3 feet/day. The settling velocities are therefore approximately 1 to 2 orders of magnitude less than the predicted horizontal velocities.

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[21] The intercept method assumes a static lake level surface elevation of 2,128 feet and conservatively establishes the transition area based on the intercept of that lake level with the riverbed.

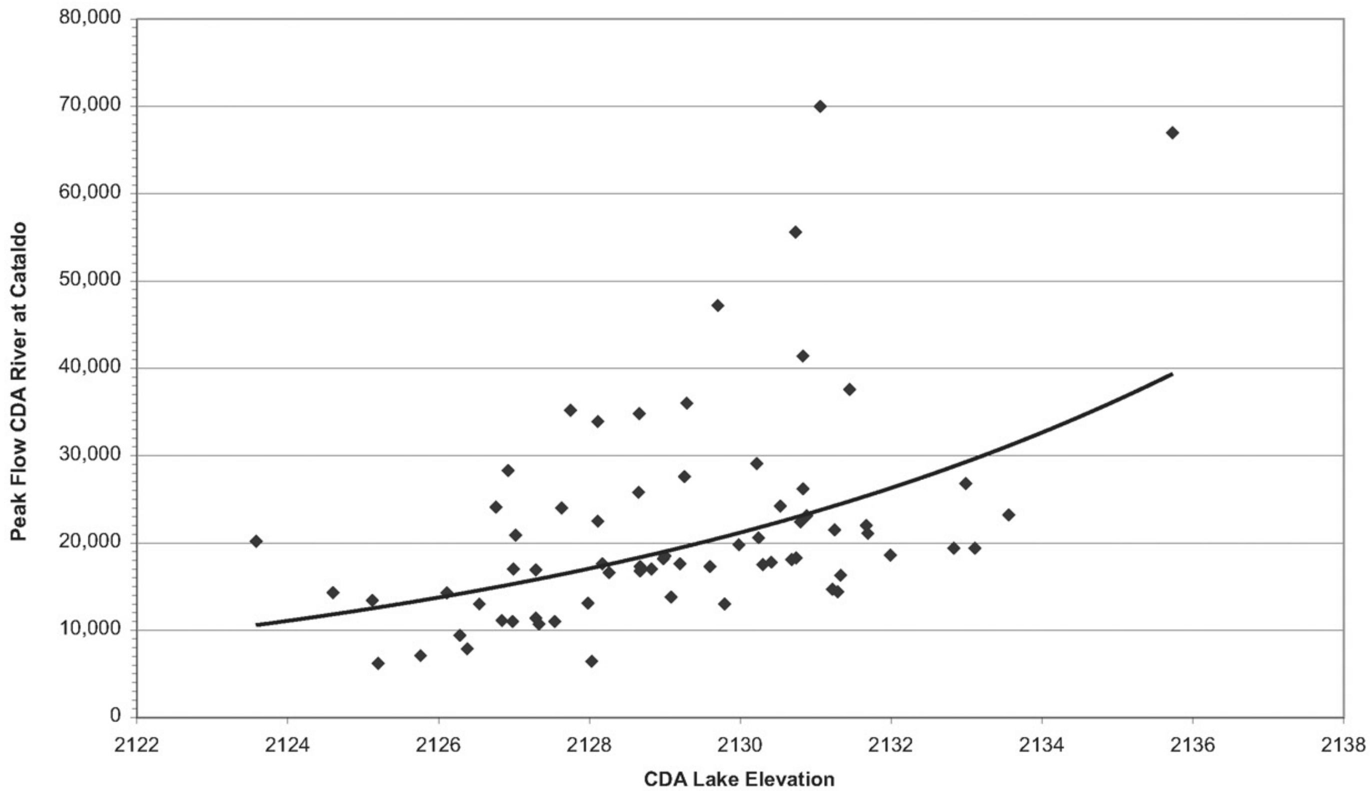


Figure 5-4. Peak Flows for the Coeur d'Alene River at Cataldo versus lake level (1911 to 2003). (Source: Adapted from Figure 3-24 in Golder [2004c])

This would suggest that the higher horizontal velocities relative to the lower settling velocities for the sediments would allow for movement of sediments in the lateral lakes and in the bays. This conceptual model is consistent with the substrate mapping results completed by Parametrix (2004f), showing that fine-grained sediments are typically present throughout the length of the bays (as opposed to a large mass of sediment settling out near the initial sediment sources).

Sediment Supply and Transport in Coeur d'Alene Lake

The results of bathymetric mapping for Coeur d'Alene Lake are included as Figure 5-5 (see Appendix A), with coloring schemes depicting varying water depths. Owing largely to the lake's legacy as a flooded river valley, the bathymetry depicts a generally flat-bottomed lake that becomes relatively deep (exceeding approximately 200 feet) in its center, just south of the constriction at Driftwood Point. This depth, as well as the substantial distance between the main sediment sources (the Coeur d'Alene and St. Joe rivers) at the southern end of the lake and the lake outlet at the far northern end, results in the lake functioning as a very effective sediment trap.

Sediment transport models are not available specific to Coeur d'Alene Lake (Golder, 2004c). Sediment supply information for lake tributaries other than the Coeur d'Alene River is also lacking. In response to the limited existing information for most of the lake tributaries, Golder (2004c) modeled sediment contribution for selected basins contributing to Coeur d'Alene Lake using the Automated Geospatial Watershed Assessment (AGWA) tool. Sediments supplied to the lake through the small bays and lateral lakes selected for the AGWA modeling are predicted to be predominately fine sands, medium silts, and clay silts (Golder, 2004c). This is confirmed by the substrate mapping completed by Parametrix (2004b). Of the contributing basins evaluated, Cougar Bay, Beauty Bay, Wolf Lodge Bay, and Carlin Bay were predicted as among the highest sediment producers on a per-unit-area basis. Cottonwood Bay, Kidd Island Bay, O'Gara Bay, and Carey Bay were predicted to produce the least amount of sediment of the basins evaluated

Sediment transport and deposition within the lake is largely governed by water velocities and their relationship to the settling velocities for suspended sediments. Therefore, given the types of sediment being input to the lake, sediment deposition throughout the lake is occurring only at relatively slow water velocities—ranging from 295 feet per day for medium silts to 3.3 feet per day for clay-silts (Golder, 2004c). Golder's modeling of velocities in the lake indicates that lake dynamics are very complicated (Golder, 2004c). Water velocities are most likely governed by a combination of topography, wind patterns, bathymetry, and hydrologic inputs. Surficial lake flow patterns are assumed to be largely governed by the wind (Golder, 2004c), although during high flows on the Coeur d'Alene and St. Joe rivers hydraulic head-generated currents are also likely a strong factor in at least the southern half of the lake.

Despite the complicated lake dynamics, Coeur d'Alene Lake is understood to have long acted as an effective sediment trap (Golder, 2004c). The sediment trapping capability of the lake is largely related to its configuration and the fact that the dominant source of sediment is located in the southern portion of the lake (i.e., from the St. Joe, St. Maries and Coeur d'Alene river systems). Golder (2004c) reviewed results of a variety of sediment samples collected from

Coeur d'Alene Lake and its bays (Horowitz et al., 1992, as cited in Golder, 2004c) and found the majority to be fine-grained in texture. Many of the samples from the main part of Coeur d'Alene Lake contained a thin layer of reddish material with black flecks. This material is believed to be either derived from mining waste in the floodplains and banks of the Coeur d'Alene River or composed of mineral grains coated with iron and manganese oxides formed in the anoxic conditions in the lake (Golder, 2004c). Many of the samples collected in the lake south of Rockford Bay up to the mouth of the St. Joe River contained a layer believed to be deposition of ash from the Mount St. Helen's eruption in 1980 (Golder, 2004c). Based on this layer, recent sedimentation rates in the lower part of the lake are believed to be on the order of 0.3 to 0.5 centimeters (cm) per year (Horowitz et al., 1992, as cited in Golder, 2004c).

Golder (2004c) developed a series of maps illustrating the concentration of various lakebed sediment metal contaminants to provide additional insight on sediment supply and transport in the lake. Maps for 16 different contaminants are provided in Appendix D of Golder's report (2004c). The majority of lakebed sediments north of Conkling Point are highly enriched in silver, copper, lead, zinc, cadmium, mercury, arsenic, and antimony relative to uncontaminated sediments. Observations of elevated metals concentrations have been found in the sediments of many of the shallower bays such as Mica Bay, Wolf Lodge Bay, and Squaw Bay (Golder, 2004c), all located far from the mouth of the Coeur d'Alene River. Transport to these locations is from at least two mechanisms: transport of metals on particulates (fine sediment) and transport within the water column as dissolved load. The presence, distribution, and concentration of metals indicate that the vast majority of the sediments in the lake originated from the Coeur d'Alene River, where mining operations have occurred for longer than a century (Golder, 2004c). The lower concentrations or even absence of metals in lakebed sediments south of the Coeur d'Alene River delta further supports this conclusion.

To summarize, sediment delivered to Coeur d'Alene Lake is generally deposited within the lake. Any transport through the lake is expected to consist of very fine suspended silts and clays and to occur only in very high-flow water years (for example, 1996 and 1999) (Box et al., 1998 [unpublished data]; Woods, 1999 [unpublished data]; both as cited by Bookstrom et al., 1999). This phenomenon is complex and little research has addressed metals transport within the lake. Definitive data are not available to determine the degree to which each transport process may operate.

Sediment Supply and Transport in the Spokane River

Historically and currently, Coeur d'Alene Lake has intercepted essentially all of the bedload sediment originating within the upper watershed (i.e., the Coeur d'Alene and St. Joe rivers and other smaller lake tributaries [NPPC, 2000c]). Some suspended sediment enters the Spokane River from Coeur d'Alene Lake, typically during high flow conditions in the winter and spring. The channel between the lake and Post Falls HED has a relatively flat cross-section, is low gradient, and maintains a single-thread morphology (Golder, 2004c). The channel bed consists of bedrock controls with sand, gravel, cobble, and small-boulder substrate. There are no significant gravel bars in this reach and generally it can be considered a sediment transport reach. This reach also includes the natural channel constriction/sill that controls lake outflows absent any control at Post Falls HED.

The approximately 17-mile-long reach of the Spokane River between Post Falls HED downstream to a point roughly 4.5 miles upstream the City of Spokane's Upriver Dam (not a part of this project) is a single-thread channel with occasional lateral and point gravel bars associated with channel bends or human-made structures that reach into the river. Sediment sources within this reach include normal bank erosion and bed scour during relatively high flows (Golder, 2004c). Beginning roughly 4.5 miles upstream of Upriver Dam, the Spokane River becomes a depositional reach (Golder, 2004c). Sediment sampling within the Upriver Dam impoundment (Johnson, 1999; Johnson and Norton, 2001, both as cited in Golder, 2004c) indicates that the majority of the substrate is cobble, gravel, and sands. These data suggest that much of the fine-grained sediment is moving through this reach (Golder, 2004c). The sediments in the Upriver Dam impoundment were found to have higher concentrations of PCBs and metals than other areas of the Spokane River (Golder, 2004c), reflecting the fact that this reach is the first significant depositional reach downstream of Coeur d'Alene Lake.

From Upriver Dam through Upper Falls HED and on downstream past Monroe Street HED, the Spokane River is again a transport reach (Golder, 2004c). Both Upper Falls HED and Monroe Street HED, located just downstream, were constructed on geologic knick points within a bedrock-controlled reach of river. Conceptual hydraulic modeling through this reach indicates an increased potential for sediment transport due to the steeper gradient and corresponding increase in stream power (Golder, 2004c). The Upper Falls impoundment is relatively small and shallow, and the north channel spillway gates generally match the bottom of the channel (Golder, 2004c). These factors are thought to facilitate sediment passage through this impoundment (personal communication, A. Kammereck, Golder, Redmond, WA, with E. Ginney, Geomorphologist, Louis Berger, Chico, CA, dated December 15, 2004). Monroe Street HED (located 0.2 mile downstream) has a single concrete gravity dam spanning the width of the river that creates a very small and shallow operating pool. Modeling undertaken in 2000 (Papnicolaou, 2000, as cited in Golder, 2004c) indicates that the bedrock channel in this reach allows for high water velocities and likely transports all sediment through this reach, except for large bedload material such as cobbles.

Downstream of Monroe Street HED, the river is also classified as a transport reach until it reaches the backwater from Nine Mile HED (located 47.5 miles downstream of Coeur d'Alene Lake) (Golder, 2004c). Hangman Creek enters the Spokane River on its south, or left bank, a short distance downstream of Monroe Street HED and approximately 38.5 miles downstream of Coeur d'Alene Lake. Hangman Creek is the single largest source of sediment in the Spokane River within the Project area, with 97 percent of the sediment being sand-sized or finer material (Golder, 2004c). The creek's estimated annual sediment discharge in the 4 years from 1998 to 2001 ranged from 4,750 tons in 2001 to 189,000 tons in 1999, with an estimated annual average of 82,334 tons (SCCD, 2002). These estimates are based on average annual flows of 209.4 cfs during the same period (SCCD, 2002).

Sediment Supply and Transport in Nine Mile Reservoir

The Nine Mile Reservoir is a depositional reach that extends more than 4 miles downstream to Nine Mile HED. Downstream of this dam, the Spokane River is free-flowing for approximately 1 mile, in a reach classified as a transport reach. At that point, and near the confluence of the Little Spokane and Spokane rivers, the river is characterized by the reservoir conditions created by Long Lake HED.

Within Nine Mile Reservoir, point and lateral bars are evident along the inside of bends in the relatively narrow reservoir, and, in some cases, these bars extend for considerable distances within the reservoir (Golder, 2004c). NHC (1999) estimated that approximately 2.2 million cubic yards of sediment have been deposited within Nine Mile Reservoir during its life span. The majority of deposition within the reservoir is coarse sand and gravel, with fine sand, silt, and clay being mostly transported through the reservoir (NHC, 1999). The ongoing and increasing sediment passage through the turbine generating units led to increased operating expense and development downtime (NHC, 1999). In 1997 and 1998, a diversion tunnel was installed at Nine Mile HED to help transport the coarser sediment downstream of the dam by bypassing turbines. This construction required initial excavation of the area leading up to the intake to remove accumulated sediment from the immediate area surrounding the intake (Golder, 2004c). The sediment bypass tunnel has proven to be an effective measure at protecting the turbines from the effects of coarse sediment. The tunnel does not affect the ultimate transport of sediments through the development.

In the approximately 1-mile-long reach downstream of Nine Mile HED, the river is again largely a transport reach until the backwater from Lake Spokane is encountered (Golder, 2004c). This short reach of channel is confined and relatively stable, with a bed of predominantly bedrock and cobbles (Golder, 2004c). Farther downstream, pocket beaches begin to occur. These pocket beaches tend to occur in the lee of boulders and other topographic features and are suspected to be formed of coarser sediments that passed through the Nine Mile HED turbines and bypass tunnel (NHC, 1999). Approximately 2.5 miles downstream of Nine Mile HED, the river channel widens to roughly 2,000 feet, coinciding with a large sediment deposition zone along the southern shoreline (Golder, 2004c). This deposition zone has been in place for many years and appears to be a deposition area for the fine sediment that has passed downstream, (NHC, 1999).

Sediment Supply and Transport in Lake Spokane

In Lake Spokane, sediment deposition has been dominated by fine sand, silt, and clay carried mostly as suspended load (NHC, 1999). NHC (1999) determined that the amount of coarser sediment (coarse sand and larger) passing Nine Mile Dam during the mid- to late-1990s was increasing and would continue to increase—despite the construction of the sediment bypass tunnel—as the reservoir pool approached equilibrium. Despite the continued increase in coarse sediment entering Lake Spokane, the dominant sediment deposition in the reservoir is fine-grained (by volume over 90 percent finer than 1.0 millimeter [mm] [NHC, 1999]). Golder (2004c) estimates sediment delivery to Lake Spokane averages roughly 83,000 cubic yards per year.

No detailed historical bathymetric surveys have been conducted for Lake Spokane; consequently, estimating the reservoir's long-term aggradation rate is not possible (Golder, 2004c). However, NHC (1999) addressed this in an alternative fashion by estimating the reservoir's sediment trapping efficiency. This analysis estimated that 35 to 50 percent of fine suspended sediments passing Nine Mile HED is deposited in the deeper portions of Lake

Spokane, and virtually all of the sand load is deposited near the head of the reservoir where the channel begins to deepen and water velocities slow (NHC, 1999). From these estimates, NHC (1999) projected that, during the next 50 years, silt and sand deposition could reduce the storage volume in Lake Spokane by as much as 20 percent.

Sediment transport past Long Lake HED is negligible and is limited almost entirely to fully suspended load that passes through the entire reservoir. Flow conditions downstream of Long Lake HED are largely governed by existing hydroelectric projects. As such, sediment transport and deposition downstream of Long lake HED are dictated by the downstream channel characteristics (i.e., a deeply incised bedrock channel) and the existence of hydroelectric projects. Any reduction in sediment load would likely have insignificant effects on this downstream reach.

5.3.1.5 Erosion

Natural and modified erosion processes in the Project area include wind- and boat-generated waves, stream current bank and bed erosion, freeze/thaw, rain splash, rill, and seepage erosion. Of these, the wind- and boat-generated wave erosion and stream current bank erosion are the primary shoreline erosion processes.

Coeur d'Alene and St. Joe Rivers[22]

On the Coeur d'Alene, St. Joe and St. Maries rivers, streambank erosion occurs naturally on the inside of the levees from stream currents during higher flow periods and is greatly increased by boat-generated waves. The summer lake level sets the elevation at which wind- and boat-generated waves influence shoreline erosion during that portion of the year. Post Falls HED regulates the lake level about 6 to 7 months of the year, depending on inflow, weather conditions, snow pack, and other factors. The lake level is typically held at the 2,128-foot elevation (the normal summer full-pool elevation) after the peak runoff period and is then maintained at that level through summer. Beginning sometime after Labor Day, Post Falls HED gradually releases the stored water over several months, typically resulting in a 1- to 1.5-foot drop per month. By early winter, the lake achieves a level that depends on the natural outlet rather than hydroelectric development operations. Mature trees and, to a lesser extent, dense brush help protect the banks from erosion and literally hold the soft St. Joe River stream banks together. Dense vegetation grows along the rivers and lakeshore because of moisture conditions and forms a pronounced tree line at the 2,128-foot elevation (the normal summer full-pool elevation). Trees, brush, and grass form a dense web of roots and trunks that buttress and hold the loose levee soils together. The dense vegetation also acts to slow near-shore water velocity, allowing more deposition of fine sand on the levee top. Trees growing along the St. Joe and Coeur d'Alene rivers are dominated by cottonwoods along with a mix of aspens, alders, pines, and cedars. The original forests along the stream banks were cut during the late 1800s and early part of the 1900s. Only one area in the lower 7 miles of the St. Joe River, located northwest of the swing bridge, is labeled as uncut on the 1908 map (Avista, 1909). Cedars and other conifers

[22] Our discussion of erosion of the levees on the lower St Joe and Coeur d'Alene rivers is adapted from Earth Systems and Parametrix (2004).

were cut during the late 1800s and very few remain along the riverbanks today. The cottonwoods were probably cleared later as the farms and towns developed along the rivers.

St. Joe River—The natural St. Joe River banks have a steep and eroding face on the inside (river side) levee banks. Erosion is primarily occurring along the inside of the levees where boat waves are the main erosion factor along with stream current bank erosion and to a lesser degree freeze/thaw, rain splash, and rill erosion during lower lake level periods. On the backside, the levees are wide and gently slope into the back marshes and lakes where overbank flood waters annually deposit sediment. On the downstream-most 2 to 3 miles of the river, the natural St. Joe River levees were only 1 to 2 feet higher than the 2,128-foot summer lake level. Boat-caused waves erode wave-cut ledges along the full length of the affected reaches of the St. Joe and St. Maries rivers. These ledges are an average of 46 feet wide from river mile 7 to river mile 1.9. From the Swing Bridge downstream to river mile 0, the right bank ledge width averages 86 feet, and the width of the left bank ledge averages about 216 feet, with most of the original levee top eroded on this side of the river. Stream currents also erode the channel banks, but only during floods and not in a continuous line along the entire river as the boat-caused waves do. The ledge shape, elevation, and in-place stumps indicate the ledge width has been eroded primarily by boat-caused waves. These waves cut a prominent notch at the 2,126-foot level that is still present. The main notch has now moved up to the 2,126- to 2,128-foot elevation as a result of the summer lake levels since 1942.

Erosion on the St. Joe River has been assessed in three ways: through erosion pin monitoring during the boating season; through analysis of historic aerial photographs, where available; and through analysis of the erosion ledge found on the inside of the natural levees. Because stream flow erosion is at a minimum during the summer and wind is not a significant factor in erosion along the insides of the levees, the erosion pin monitoring estimated erosion on the inside of the levees primarily from boat traffic, which is at its peak during the summer. The monitoring demonstrated that bank recession caused primarily by boat waves along the inside of the lower St. Joe River levees ranges between 0.1 and 0.7 foot per boating season and averages about 0.4 feet per boating season.

Historical aerial photograph erosion analysis assesses erosion from all causes on both sides of the levees and yields a long-term estimate of the changes in the width of the levee tops on a multi-decade scale. Aerial photograph analysis indicates that an average of 1.3 acres per year of levee top erosion and loss occurred along the lower St. Joe River from 1933 to 2003. This estimate includes both river banks and both sides of the levee tops. This is equivalent to an average of 1.5 feet per year. However, the erosion is not evenly distributed along the length of the river; there is more erosion on the river side of the levee banks and the downstream and lower-elevation portions of the levees (i.e., the lower 7 miles of the levee system). The lower 7 miles of the St. Joe River have far less land-use modifications compared to upstream locations, where dikes, roads, railroads, industrial, agricultural, recreation, and urban land-use modifications are the dominate influences on stream bank conditions. However, these upstream conditions have aggravated erosion effects in the lower St. Joe River. For the lower 7 miles of the St. Joe River, estimates of future erosion losses, based on the historical aerial photographs assessment, would be approximately 39 to 65 acres during the next 30 to 50 years.

The ledge approach to quantifying levee top erosion measures the amount of erosion that has occurred on the inside of the levees from all causes, averaged over many decades. The ledge analysis for the St. Joe River indicates an average erosion rate of about 1.3 feet per year of erosion (total, for both banks) of the inside face of the levees. This indicates that on the lower 7 miles of the St. Joe River approximately 1.3 acres erode each year, or approximately 39 to 65 acres would be lost to erosion over the next 30 to 50 years. From river mile 7 to river mile 24, the ledge analysis indicates only about 0.2 foot per year of erosion on each river bank. This is equivalent to approximately 27 to 45 acres during the next 30 to 50 years.

Wind-wave erosion of the back side of the St. Joe River levees occurs where there is open water and the levees are exposed to prevailing winds and significant wind fetch. The summer pool elevation increases fetch for portions of the Chatcolet Lake, Round Lake, and Coeur d'Alene River mouth portions of the levees. This increased fetch influences erosion mostly on the back sides of the levees, and adds to the rate that the narrow portions of the levee tops recede. Boat-wave-related erosion on the inside banks of the levees is much greater, however, because summer wind–wave-related erosion potential is relatively limited compared to that of the boat-wake waves.

Wave modeling and field observations indicate that winds exceeding 15 miles per hour typically produce wave heights of 0.5 foot or greater, which are large enough to erode the shoreline banks. The raised summer lake levels have placed the wind waves on Round and Chatcolet lakes near the levee tops. The wind waves erode undercuts and a ledge on the exposed outside levee segments, similar to the action of the boat waves on the inside banks. The wind erosion on the outside and ends of the levees is not as continuous or as wide as the inside levee boat-wave erosion because of levee orientation, the gradual back slope that spreads the wave energy out on the backside, and the presence of dense emergent wetland plants.

The condition of the levees varies with distance upstream. At the most downstream reach, the levees have experienced the greatest loss due to erosion and vegetation loss. From river mile 2 upstream to about river mile 3, the height and width of a portion of the levees provide adequate non-eroding and unsaturated soil for colonization by trees; yet in several reaches the levees are quite narrow. The levees between river mile 2 and river mile 3 are a transition from the lower reach where the nearly lost levee tops transition to the wider, higher, upstream levees that long-term boat-caused wave erosion will not be able to completely remove. Upstream of river mile 3, boat-wave erosion is estimated to continue to widen the erosion ledge but not erode the entire levee top away.

Coeur d'Alene River—The Coeur d'Alene River has levee and boat traffic conditions similar to the St. Joe River, but its levee banks are eroding more slowly, largely because of the metal-enriched mine wastes mixed in with the natural alluvium that make the surface soil units denser. On the Coeur d'Alene River, the boat-wave-cut ledges are narrower than on the St. Joe River, typically ranging from 20 to 30 feet wide. The lower mile of the Coeur d'Alene River has had less land-use modifications compared to upstream, and based on the ledge method, the estimated rate of bank erosion is about 0.6 foot per year (total, including both banks). The ledge analysis for the lower 4 miles of the Coeur d'Alene River indicates about 0.3 acre per year or approximately 9 to 14 acres will be lost to erosion over the next 30 to 50 years. From river mile 4 to river mile 27 about 1.4 acres will be lost to erosion per year or approximately 42 to 69 acres will erode during the next 30 to 50 years. Erosion along the river banks is related to multiple influences including boat waves, stream currents, freeze/thaw, rain splash, riling, and land use.

Coeur d'Alene Lake

Because lake fluctuations still occur within their natural range of variability (between the 2,118- and 2,140-foot elevations over the past several thousand years), much of the shore is already scoured to bedrock or is rocky in nature and therefore shore erosion has been fairly limited. The existing lake shoreline and beaches have been formed by wind-wave erosion and associated influences and conditions within this relatively large elevation zone. In addition, most road, railroad, building, and yard areas were armored decades ago (Earth Systems and Parametrix, 2004). Current summer lake levels are maintained by Post Falls HED and have shifted the upper extent of the summer beaches and associated vegetation line to the 2,128-foot elevation. A combination of wind- and boat-caused waves creates and maintains the beach and shore conditions around the lake. Summer lake level regulation has inundated the front row of trees that may have existed in some areas of the lakeshore prior to Post's or Avista's dams. This regulation, combined with early logging, clearing, and other activities, reduced the shoreline vegetation in many areas. During the past 95 years, the beaches have been forming, and humans have added various types of shore armor in some areas. Much of the shore now has redeveloped significant vegetative cover and is either rocky or armored, and erosion appears minimal.

Spokane River

The Spokane River banks above Post Falls HED have been highly modified by over 100 years of industrial, commercial, residential, and recreation development along and near the river. The greatest potential erosion energy along the upper Spokane River is from heavy summer boat traffic and winter floods. Much of the eroding shore has been armored with various combinations of rock, wood, and concrete bulkheads.

Downstream of Post Falls HED to Lake Spokane, the Spokane River is free-flowing for more than 25 miles, except for Upriver Dam Reservoir (operated by the City of Spokane), Upper Falls Reservoir, and Nine Mile Reservoir. River reaches upstream of those reservoirs are either dominated by the unsorted valley alluvial fill or bedrock morphology. In addition, a number of areas, especially areas upstream of Upper Falls, have experienced extensive channelization and fill associated with the development of the city of Spokane. Because higher flows in the Spokane River (those that are expected to be capable of causing erosion) are largely unaltered by Project operations, there appears to be minimal nexus between the Project and erosion on the river.

Lake Spokane[23]

Shoreline erosion around Lake Spokane is typical of natural lakes and reservoirs with erosive shore materials. During the early history of Long Lake HED, erosion of shoreline areas was greater than it is today because the vegetation and shore were not adjusted to the new water levels. Some of the natural steeper, sandy, unconsolidated slopes along the lakeshore of Lake

[23] Our discussion of erosion on the shores of Lake Spokane is adapted from Earth Systems and Parametrix (2004).

Spokane are near or at the limits of stability. The type and amount of vegetation in these areas is a key factor in the continuing stability of slopes, along with slope aspect, slope position, moisture conditions, and land use history. Vegetated shorelines slowly erode during wind storms and heavy boat traffic, allowing trees and brush to lean and fall into the lakeshore, which provides additional shoreline protection by buffering waves. Historical photographs indicate that the valley slopes had sparse vegetation and far fewer trees in the 1950s. The pines are now larger and denser along many of the valley walls, and Lake Spokane has large areas with well-vegetated shoreline.

Studies at various other reservoirs and field observations around Lake Spokane indicate that wind- and boat-generated waves are the predominant force eroding the reservoir banks. These waves erode the toe of the steep valley wall slopes, and localized areas have experienced shallow translational slides, some of which remain active today, while others have largely stabilized. Vegetation has taken hold on portions of these slides since about the 1950s and should continue to gradually provide more slope and shore structure and stability, thereby reducing slope erosion.

Erosion of the toe of steep slopes causes and maintains the slides around the shore. The steep valley wall slopes with shallow translational slides are typically located in the lower reservoir on slopes greater than 20 degrees. Based on the USGS topographic maps, there are about 200 acres of the reservoir shoreline with steeper slopes within 0.3 mile of the shore (Earth Systems and Parametrix, 2004). This is the zone that is most influenced by shoreline erosion processes. Slopes greater than about 28 degrees are near the edge of stability, and vegetation begins to play an important part in holding the surface together.

5.3.1.6 Turbidity

Reservoir wind- and boat-wave action, naturally high flows, rapid water-level fluctuations, rainsplash and rill bank erosion, chronic erosion sites, and human-caused disturbances can affect water quality by increasing bank erosion and resuspending fine sediments along river, lake, and reservoir shorelines.

Wind- and boat-generated waves and high runoff flows are the main factors that raise turbidity in the Project system. Introduction of sediment from basin erosion from roads, farms, and construction areas also changes turbidity in the system. Water level fluctuation rates are not considered an erosion factor causing water turbidity because of the relatively slower rates of level changes used for the Project reservoirs.

On Coeur d’Alene Lake, field observations and wave modeling indicate that winds of 1 to 15 mph would typically result in small waves on the shores that would not create turbidity or noticeable erosion (Earth Systems and Parametrix, 2004). Winds above 15 mph result in wave heights of 0.5 foot or greater. Wind- or boat-generated waves that are greater than 0.5 foot are large enough to create turbidity and begin to erode unarmored shoreline banks.

Water samples were taken to measure turbidity and total suspended solids at three sites along the lower St. Joe River before and during the 2003 Fourth of July holiday weekend to evaluate the influence of boat-wave erosion on the main river channel (Earth Systems and

Parametrix, 2004). The water quality monitoring sites were at the No Nest Site (river mile 2.55), Ore Car Site (river mile 5.03), and Big Bend Site (river mile 5.8). Samples were taken at the shore, on the surface in the center of the channel, and at a depth of 4 feet in the center of the channel. The samples were collected in the morning and during high boat traffic periods of the day.

Water quality sampling indicates that fine-grained sediment is being washed from the banks by boat waves. Eroded clay and fine silt remain suspended for hours or days as the stream current slowly moves it downstream, while fine and medium sand quickly settles on the erosion ledge where it is temporarily stored until resuspended during natural low water periods by wave erosion, freeze/thaw, seepage, and rain splash erosion. At the Big Bend Site, turbidity at the right bank ranged from 1 to 12 nephelometric turbidity units (NTUs) before boat traffic began and from 23 to 1,176 NTUs during periods of boat traffic. Total suspended solids ranged from 2 to 5 milligrams per liter (mg/l) before boat traffic and from 49 to 6,300 mg/l during boat traffic. The water was turbid near both the right bank (where the monitoring occurred) and the left bank but was visibly worse at the inside of the sharp right bank turn. The plume of turbid water was observed along the entire shoreline with boat traffic (Earth Systems and Parametrix, 2004).

5.3.1.7 Hazardous Materials

Bunker Hill Mining Complex and the Coeur d'Alene Basin Project

The Coeur d'Alene River Basin is one of the largest areas of historical mining operations in the world, with mining activities in the upper basin having contributed an estimated 100 million of tons of mine waste to the river system since the late 1880s. Until as recently as 1968, tailings were deposited directly in the river. Over time, these wastes have been distributed throughout more than 150 miles of the Coeur d'Alene and Spokane rivers, lakes, and floodplains.

The Bunker Hill Mining and Metallurgical Complex National Priorities List (Superfund) Site is located in the Coeur d'Alene River Basin. It was listed on U.S. Environmental Protection Agency's (EPA's) National Priorities List in 1983. Contaminants from mining operations spread harmful levels of heavy metals down the South Fork of the Coeur d'Alene River and into the floodplain. It is in this area (Operable Unit [OU] 3) that mining contamination overlaps with a portion of the Project area. In September 2002, EPA issued its plan to clean up mining contamination in OU 3 over a 30-year period (EPA, 2002). The Record of Decision (ROD) describes the proposed cleanup work.

Three environmental priorities were identified in the ROD: dissolved metals in surface water (particularly zinc and cadmium), lead in floodplain soil and sediment, and particulate lead in surface water (EPA, 2002). The selected remedy does not include remedial actions for Coeur d'Alene Lake. Instead, EPA (2002) notes that federal, state, tribal, and local governments are currently in the process of implementing a lake management plan outside the Superfund process using separate regulatory authorities.

Metal-Enriched Sediments in the Coeur d'Alene River

The pre-mining-era bed of the Coeur d'Alene River, along with its banks and floodplain, is mostly covered by deposits of metal-enriched sediments. Relative to median concentrations of metals in sediments of the region, the metal-bearing sediments are highly enriched in lead, zinc, silver, arsenic, antimony, and mercury; and enriched to a lesser degree in copper, cadmium, iron, and manganese (Fousek, 1996, as cited by Bookstrom et al., 1999). Compared to the regional background metal contents of sediments from the St. Joe River Valley, Abraham (1994, as cited by Bookstrom, et al., 1999) determined the following metal-enrichment factors for mining-derived sediments of the Coeur d'Alene River Valley: lead (211, indicating that there is 211 times more lead in the metal-enriched sediments than in the regional background sediments), silver (200), antimony (75), cadmium (41), zinc (39), arsenic (26), manganese (25), iron (3.5), and copper (3.0).

Metal-Enriched Sediments in the Spokane River

As previously mentioned, mine wastes have been distributed throughout more than 150 miles of the Coeur d'Alene/Spokane River Basin, including rivers and floodplains. EPA, in cooperation with WDOE and USGS, sampled sediments on beaches and banks of the Spokane River in the fall of 2000 (EPA, 2001a). The study report indicates that a health advisory was issued by the Spokane Regional Health District for the area between the Idaho-Washington border and Upriver Dam, encompassing two locations where reported lead concentrations were greater than 700 milligrams per kilogram (mg/kg).

5.3.2 Environmental Effects

5.3.2.1 Effects of Project Operations

Lake Level Management

Currently, erosion of sediment occurs along portions of the shoreline of the lateral lakes and lower river levees and within the drawdown zone of Project reservoirs (Coeur d'Alene Lake and Lake Spokane) (Earth Systems and Parametrix, 2004). The extent of shoreline erosion is influenced both by natural factors (soil type, bank configuration, and wind direction) and factors controlled by humans (creation of Project reservoirs, land-use activities, and recreational use such as the operation of motor boats). In addition, Project regulation of reservoir pool levels and flow releases affect sediment transport within the Project's lakes and rivers.

Post Falls HED—Post Falls HED currently regulates the upper Spokane River and Coeur d'Alene Lake level about 6 to 7 months of the year depending on inflow, weather conditions, snow pack, and other factors. Because the lake backs up into the Coeur d'Alene, St. Joe, and St. Maries rivers, Project operations also influence lower portions of these rivers. The summer lake level sets the elevation at which wind and boat waves influence shorelines during the Project-regulated periods (Earth Systems and Parametrix, 2004). Additionally, boat numbers, types, and sizes have increased significantly during the last 40 years on Coeur d'Alene Lake, with the lake currently receiving more than 1 million recreational visits per year, primarily for recreational and angler boating (Louis Berger, 2004b). Based on these recreation visitation trends, it is clear that boat-generated wave erosion on the lake and its tributaries would continue and could increase under current or proposed Project operations. The areas most affected by the erosion caused by boat wakes on the Coeur d'Alene and St. Joe rivers also have few, if any, boating restrictions.

On the St. Joe River levees,[24] the Project's maintenance of a summer lake level has resulted in inundation of the low, downstream ends and the front inside edge of the levees. This has resulted in narrowing of the levees and a change in vegetation, ultimately resulting in loss of the levee tops. Project-related inundation since construction has resulted in vegetation loss between the 2,122- and 2,128-foot elevations in these areas; however, many other factors are responsible for erosion, such as boat- and wind-generated waves and natural erosion mechanisms like vegetation removal, freeze/thaw, rain splash, rill erosion, and stream currents.

On the Coeur d'Alene River, a similar loss of vegetation in the 2,122- to 2,128-foot elevation zone has resulted, to a large degree, from the existence of Post's dams and Post Falls HED and the current summer pool. Erosion on the inside of the levees is more related to the loss of vegetation from agriculture, dike construction and maintenance, industrial sites, logging, and boat-wave erosion.

In summary, recent evaluation of shoreline erosion associated with the natural levees on the lower Coeur d'Alene and St. Joe rivers and Coeur d'Alene Lake (Earth Systems and Parametrix, 2004) indicates the following:

- Loss of vegetation in the 2,122- to 2,128-foot elevation zone is largely a result of inundation due to the existence of Post's dams and the Project operations for nearly 100 years.
- Bank erosion on the inside of the levees along the St. Joe River below river mile 2 is primarily due to boat-generated wave erosion and inundation associated with the Project's high summer lake levels; other erosion processes are relatively less important factors. From about river mile 2 and downstream, the natural levee was low and narrow, so inundation of the 2,122- to 2,128-foot elevation zone was the main change that resulted in the loss of upland vegetation. However, here the narrow remaining upland is limited and continuously eroded by boat-generated waves, so cottonwood survival is low and the rate of erosion is high.
- Overall, bank erosion on the outside of the levees downstream of river mile 2 is caused by a combination of wind- and boat-generated wave erosion.
- Along the St. Joe River levees between river mile 0 and river mile 7, erosion of the inside of the levees (from all causes) is occurring at a rate of about 1.3 acres per year (Earth Systems and Parametrix, 2004, Appendix C, Table C-1).
- Because of the metal-enriched mine wastes mixed in with the natural alluvium (making the surface soil units denser), the Coeur d'Alene River levee banks are eroding more slowly than the St. Joe River levees, with the boat-wave-cut ledges narrower along the

[24] Information and estimates in this and the following paragraph are adapted from Earth Systems and Parametrix (2004).

Coeur d'Alene River. The inside of the Coeur d'Alene River levees (river mile 0 to river mile 4) are eroding at the rate of about 0.3 acre per year (Earth Systems and Parametrix, 2004, Appendix C, Table C-1).

- Around Coeur d'Alene Lake, recent HED-related shoreline erosion has been fairly limited because the lake is operated within its natural range, much of the shore is bedrock or is rocky in nature, and most road, railroad, building, and yard areas were armored decades ago. A combination of wind- and boat-generated waves creates the beach and shore conditions around the lake.

Recent evaluation of sediment transport in the Coeur d'Alene River (Golder, 2004c) indicates that:

- The vast majority of sediment moving in the Coeur d'Alene River occurs during bankfull or greater flows. Bankfull flows in the lower reaches of the Coeur d'Alene River can transport approximately 3,000 to 7,000 metric tons per day of sediment. One-hundred-year flows in the lower reaches of the Coeur d'Alene River can transport approximately 150,000 to 250,000 metric tons per day of sediment.
- The river channel's bottom profile shows a definitive change in slope at a river bottom elevation of approximately 2,105 feet, corresponding to approximately river mile 29. This transition point is significantly lower than both the 2,128-foot managed level and the 2,120-foot level of the lake outlet sill (see Figure 5-6).
- A small, localized change (i.e., a bump) in the river channel profile exists about 30 miles upstream of the lake on the Coeur d'Alene River (see Figure 5-6). The small change in channel profile corresponds to a lake level elevation range of approximately 2,126 to 2,128 feet. There does not appear to be a significant upstream or downstream progression of the change in channel profile. This profile change may be a localized response to lake level management, resulting in deposition of sediments at this location. The source of sediment may be from less-frequent, lower-magnitude peak flows in the early fall season.
- Regulation of lake levels by Post Falls HED is not anticipated to significantly change or affect the transport and deposition of sediments in the Coeur d'Alene River because regulation typically does not occur when the majority of sediments are moving in the river system.

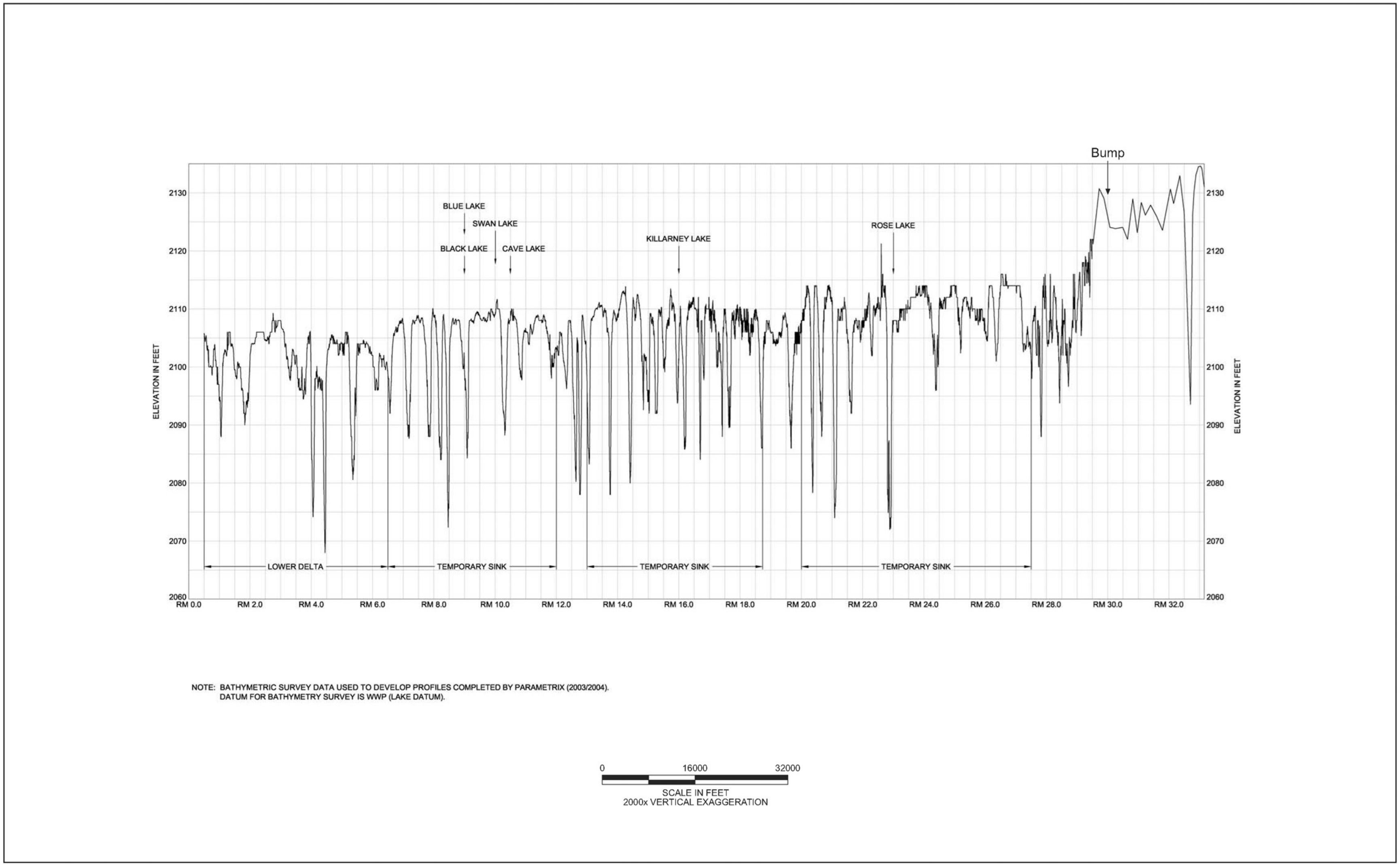


Figure 5-6. Longitudinal profile of lower Coeur d'Alene River. (Source: Adapted from Figure G-11 in Golder [2004c])

Recent evaluation of sediment transport in the St. Joe River (Golder, 2004c) indicates that:

- Sediment transport and deposition characteristics in the St. Joe River are anticipated to be similar to the Coeur d'Alene River. The contribution of sediment from boat-wake erosion that occurs between June and September when Post Falls HED operation controls lake levels is minimal compared to the suspended sediment contribution resulting from naturally occurring peak flows.

- Regulation of lake levels by Post Falls HED is not anticipated to significantly change or affect the transport and deposition of sediments in the St. Joe River because regulation typically does not occur when the majority of sediments are moving in the river system.

- The channel bottom profile shows a definitive change in slope at a river bottom elevation of approximately 2,105 feet, corresponding to river mile 26 (see Figure 5-7). This transition point is significantly lower than both the 2,128-foot managed level and the 2,120-foot level of the lake outlet sill.

- A small, localized change (i.e., a bump) in the river channel profile exists about 32 miles upstream of the lake on the St. Joe River (see Figure 5-7). The small change in channel profile corresponds to a lake level elevation range of 2,126 to 2,128 feet. There does not appear to be a significant upstream or downstream progression of the change in channel profile. This profile change may be a localized response to lake level management, resulting in deposition of sediments at this location. The source of sediment may be from less-frequent, lower-magnitude peak flows in the early fall season.

Under current Project operations, most of the lateral lakes along the two rivers also exhibit some erosion on shores exposed to wind waves. This erosion is on a scale similar to natural erosion; however, effects are at a higher elevation due to the raised summer lake level. On the back side and downstream ends of the levees, wind- and boat-generated waves and flood deposition have annually changed the upland and emergent wetland plant zones as deposition during high flows builds them out, and these waves then modify and redistribute the sediment.

It is difficult to identify erosion in the Spokane River upstream of the Post Falls dams that is directly related to HED operations because of the large number of development-related streambank modifications. The main Project-related change is the shift of the summer boat-wave erosion energy to a higher elevation. With the Project, this energy is focused above the lower, unconsolidated river bars and up onto the lower portion of the vegetated "flood stage banks" at the 2,128-foot elevation.

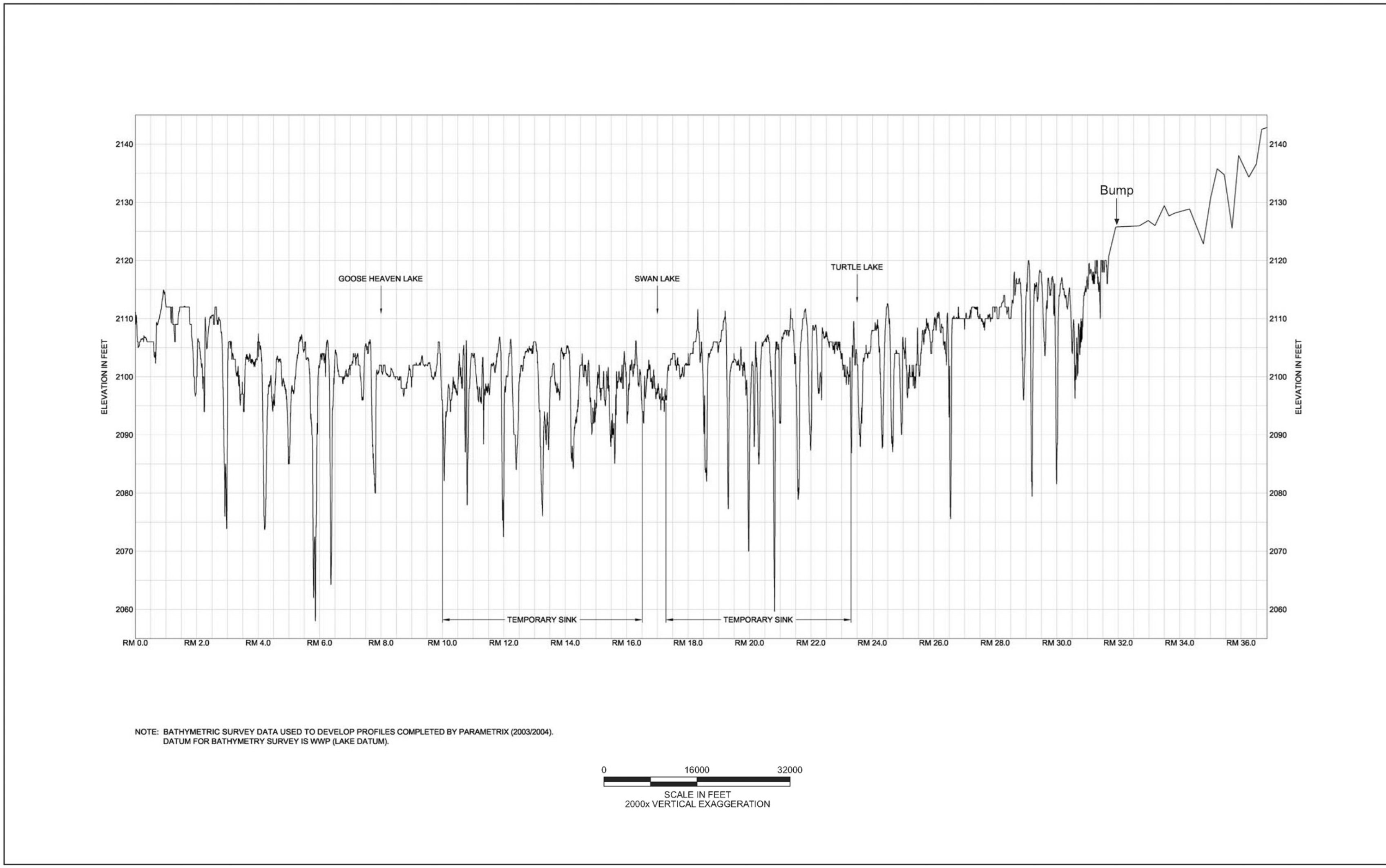


Figure 5-7. Longitudinal profile of lower St. Joe River. (Source: Adapted from Figure H-14 in Golder [2004c])

Upper Falls HED—Upper Falls HED is operated as a run-of-river facility, with little fluctuation in reservoir level. The shorelines around the reservoir for this HED are highly developed and greatly altered, typically characterized by large rock and boulder fill, other constructed materials, and/or are well vegetated with a shrub and deciduous tree riparian fringe. Reservoir level management associated with operation of Upper Falls HED has no significant effect on erosion, and little if any erosion is evident.

Monroe Street HED—Monroe Street HED creates a very small reservoir and is operated as a run-of-river facility, with very minimal reservoir fluctuations. The reservoir is located within the incised bedrock ledges that form the Spokane Falls, and its operation has no effect on erosion.

Nine Mile HED—Because Nine Mile Reservoir is aggrading in response to sediment inputs from Hangman Creek, bank erosion is generally minimal. Based on available sediment data, there is a net annual accumulation of between approximately 25,000 and 75,000 cubic yards of predominately coarse-grained sediments (gravel and finer) in Nine Mile Reservoir. The sediment bypass tube installed in 1990s allows movement of much of the coarse- and fine-grained sediments downstream without passing through the turbines. Nine Mile HED is expected to pass, on average, approximately 75 percent of the sediment entering the reservoir (Golder, 2004c).

Long Lake HED—The surface elevation of Lake Spokane is such that wind- and boat-waves have eroded some small, localized areas along the toe of the steep valley wall that were at the edge of stability prior to construction of the impoundment. Many of the steep slopes that were initially prone to erosion have since stabilized due to the natural creation of benches and/or beaches at their toes or intersections with the reservoir. Additionally, changes in land use (i.e., reduction of livestock grazing) since the 1950s have allowed for revegetation and toe-slope healing along many of the steep slopes. The few areas still prone to erosion have not been able to support vegetation due to their slope, soil, and aspect. Portions of these steep slope areas, estimated to cover a total of about 24 acres along the approximately 40 miles of lake shoreline, could continue to experience shallow translational slides and wave-related erosion over the next 30 to 50 years, with some areas healing and others failing again. Overall, the area subject to these slides is expected to stay relatively constant (Earth Systems and Parametrix, 2004).

Sediment deposition within Lake Spokane is anticipated to continue under current Project operations (Golder, 2004c). Deposition of sediments would be predominately finer-grained clays, silts, and sands. Coarse materials that have passed Nine Mile Dam would most likely accumulate within the first 1 to 3 miles downstream of Nine Mile HED. Finer-grained materials would most likely deposit within 1 to 8 miles downstream of Nine Mile HED. During the next 50 years, Golder (2004c) estimated that the elevation of the thalweg (deepest point in the channel) in the upper portions of Lake Spokane could fill in by approximately 2 feet about 2.5 miles downstream of Nine Mile HED, by approximately 4 to 5 feet about 3.5 miles downstream of Nine Mile HED, and by approximately 4 feet about 6.5 miles downstream of Nine Mile HED. Sediment accumulation in other areas outside the thalweg would also likely continue, but at lower rates than that within the thalweg (Golder, 2004c).

Sediment transport past Long Lake HED is negligible and limited almost entirely to fully suspended load that passes through the entire reservoir (Golder, 2004c). Sediment transport/deposition and flow conditions downstream of Long lake HED are governed by the downstream channel characteristics (i.e., deeply incised bedrock channel) and other downstream hydroelectric projects (i.e., Little Falls HED and Grand Coulee Dam). As such, effects from a relative reduction in sediment loading to downstream reaches as compared to natural river conditions are likely to be insignificant (Golder, 2004c).

In summary, future operation of the reservoirs under current Project operations would result in continued potential for minor erosion along reservoir shorelines, sediment deposition within the reservoirs, and reduced sediment supply to reaches of the Spokane River downstream of Long Lake HED.

Effects Analysis

Under the Proposed Action, lake levels would be controlled by operating the Project to satisfy proposed reservoir water level targets and several HED flow-discharge-related requirements. Target water levels would be set to balance support of current recreational uses on Coeur d'Alene Lake with downstream flow concerns by maintaining the lake elevation near 2,128 feet from as early as practicable each summer until September 15, but subject to several flow discharge requirements (i.e., trout spawning flows and minimum flow criteria). On Lake Spokane, the fall and winter drawdown would be limited to 14 feet. Proposed Action measures that could reduce Project–related operational effects on geology and soils are discussed in Sections 5.3.2.3 and 5.3.2.4. See Appendix B for the full description of these measures.

We base our effects analysis of Project lake-level management contained in the Proposed Action on the fact that the primary causes of erosion both along the shoreline and within the zone of reservoir fluctuation are wave action and/or stream flow. We evaluate Proposed Action water-level fluctuations to identify their potential for changing erosion and sediment transport rates compared to current Project operations. In our analysis, we make the following assumptions:

- Sediment in the Coeur d'Alene and St. Joe rivers is generally transported downstream to the lake in response to peak flows between November and May. Along the way, this sediment is both deposited and transported as it cycles between the bottom of the channel, the ledge, the banks, and overbank floodplain areas (see Figure 5-3).

- Natural peak flows in the Coeur d'Alene and St. Joe rivers occur between November and May and can cause the lake level to vary typically between about 2,126 and 2,134 feet. These same peak flows dominate sediment movement in the two largest tributaries (the Coeur d'Alene and St. Joe rivers) and the smaller tributaries that feed into small bays around the lake.

- Wave action, and to a lesser extent flood flows, are the principal causes of reservoir shoreline and levee erosion. Maintaining a reservoir water level at any one specific elevation, either naturally or through hydro operations, results in repeated wave action along the reservoir shoreline, thereby increasing the potential for erosion at that elevation.

Managing Project reservoir levels under the Proposed Action would not substantially change the current hydrologic characteristics or morphologic trends of Coeur d'Alene Lake, Nine Mile Reservoir, and Lake Spokane, or in the two smaller Project HED reservoirs.

Post Falls HED—In the Coeur d'Alene, St. Joe, and St. Maries rivers, the majority of sediment transport occurs during periods of high flows that do not coincide with the time that the HED influences water levels. Therefore, the Proposed Action would not have any effect on sediment transport and deposition as compared to the current conditions.

We anticipate that on the St. Joe River, any erosion-related effects from the Proposed Action would also be essentially the same as under current Project operations. Between river mile 0 and river mile 7, approximately 39 to 65 acres would erode during the next 30 to 50 years (Earth Systems and Parametrix, 2004) due primarily to boat-wave-generated erosion. These estimates would apply in the absence of the Proposed Action measure PF-TR-1, but could be reduced by implementation of the erosion control program included in that measure (as discussed in Section 5.3.2.3, *Erosion*).

On the Coeur d'Alene River, any erosion-related effects from the Proposed Action would continue at about the same rate as under current Project operations. Erosion along the lower 4 miles of the river during the next 30 to 50 years would total about 9 to 14 acres (Earth Systems and Parametrix, 2004, Appendix C, Table C-1). Between river mile 4 and river mile 27, erosion would total about 42 to 69 acres during the next 30 to 50 years (Earth Systems and Parametrix, 2004). These estimates would apply in the absence of Proposed Action PME measure PF-TR-1, but could be reduced by implementation of the erosion control program included in that measure (as discussed in Section 5.3.2.3, *Erosion*). In addition, erosion may be further reduced as EPA implements its Coeur d'Alene Basin Record of Decision, which calls for extensive bank stabilization efforts along the lower Coeur d'Alene River.

No data are available specific to the role of metals leaching from the stream banks or remobilizing from deposited sediments and the interaction between these processes and Project lake level management. However, the issue of metals contamination and the potential influence of lake level management on the transport of sediment and metals is discussed in detail in Golder (2005a) and is addressed in the water-quality-related sections of this document. Given the minimal changes in Project operations related to Coeur d'Alene Lake water levels and the associated processes affecting metals transport and mobilization, the effects of the Proposed Action would be largely the same as under current Project operations.

Upper Falls, Monroe Street, and Nine Mile HEDs—Erosion, sediment deposition, and sediment transport related to operation of these HEDs would continue unchanged under the Proposed Action.

Long Lake HED—In Lake Spokane, the Proposed Action would make the current voluntary practice of a 14-foot maximum drawdown a firm limit. Therefore, because the Proposed Action would change only the license language but not the way the Project is currently operated, the physical effects of the Proposed Action would be the same as under current Project operations. Erosion, sediment transport, and deposition would therefore be unaffected by the proposed Long Lake HED operations under the Proposed Action.

Project Flow Releases

Post Falls HED affects flows in the upper Spokane River about 6 to 7 months of the year depending on inflow, weather conditions, snow pack, and other factors (Earth Systems and Parametrix, 2004). The larger, sediment-competent flows that occur during winter and spring runoff events are unaltered by Project operations. The Proposed Action would set a minimum Post Falls HED discharge flow of 600 cfs, which would drop to 500 cfs during drier summers, per criteria in PF-AR-1, an increase of at least 300 cfs over the current minimum flow requirement during normal-water years. In addition, the Proposed Action includes other flow-related items, including a rainbow trout spawning and emergence flow target, downramping restrictions, aesthetic flows, and potential whitewater boating flows, which would represent changes in various Project HED flow release requirements and targets.

Effects Analysis

Under the Proposed Action, naturally occurring peak flows (those that drive sediment transport) would continue to occur on the Spokane River. Minimum discharge flows out of Post Falls HED would increase from 300 cfs or less to a minimum of 600 cfs with a trigger to 500 cfs during drier summers; however, flows of this size (i.e., 500 or 600 cfs) are still much lower than the dominant sediment transport flows. Under the Proposed Action, the Spokane River would continue to receive the same amount of sediment supply from Coeur d'Alene Lake and other sources, and sediment transport past and downstream of Post Falls HED would be similar to current conditions. All bedload and most suspended load traveling down the Spokane River would continue to be intercepted by the lower Project reservoirs, primarily Nine Mile Reservoir, Lake Spokane, and other hydroelectric facilities on or affecting the river.

Because the timing and nature of peak flows would be unaltered, the net effects of the Proposed Action on sediment transport and erosion would be negligible. Additionally, the increase in minimum flows from 300 to 600 cfs would not affect sediment transport in the lower Spokane River. Erosion on the Spokane River would remain similar to that found under current Project operations.

5.3.2.2 Sediment Transport

Sediment Transport in the Coeur d'Alene and St. Joe Rivers

The vast majority of sediment moving in the Coeur d'Alene and St. Joe rivers occurs during bankfull or greater flows. Figure 5-4 shows that bankfull or higher flow events typically occur between November and May, peak flows typically occur between March and June, and peak flows are rarely seen in the historical record during the period when Post Falls HED is regulating lake levels (between June and November). Since 1913, flows exceeded the bankfull flow during Post Falls HED control of the lake levels only 3 times, and there was one bankfull flow in the St. Joe River during the 86-year period of record that coincided with the time when

Post Falls HED controls lake levels. Mobilization of sediments occurs at almost all flows, but Golder (2004c) modeling results indicate that the most significant percentage of sediment movement occurs when limiting velocities[25] for source materials are overcome, corresponding approximately to the bankfull flow events.

Coeur d'Alene Lake levels relate to sediment transport by affecting tributary river velocities, a principal factor influencing the transport of the fine sediment in these rivers. Golder (2004c) conducted hydraulic modeling to examine the effects of altering lake levels on instream velocities—and hence sediment transport—in the Coeur d'Alene and St. Joe rivers. Two scenarios were run for each river: a constant lake level at a 2,124 elevation and a constant lake level near a 2,128 elevation. The lower lake level of 2,124 feet was selected because it represents approximately the mean daily lake level for an unregulated hydrograph over the period of record (i.e., 1913 to current). It also represents the typical lake level during peak flows in the Coeur d'Alene and St. Joe rivers between 1911 and 2003. The lake level of 2,128 feet represents current Project operations.

The results at river mile 10 (Table 5-1) for both the Coeur d'Alene and St. Joe rivers indicate that velocities decrease as lake levels increase. The decrease in velocity is consistent with the anticipated decrease in gradient that would result from an elevated lake level. However, the change in velocity is very small, and even the lowest velocities are within the range of limiting velocities for transporting fine-grained sediment.

Table 5-1. Modeled instream velocities at Coeur d'Alene and St. Joe rivers, river mile 10.

Coeur d'Alene River	**1.125-year event (11,848 cfs)**	**1.5-year event (15,019 cfs)**	**2-year event (18,189 cfs)**
Lake fixed at 2,124 feet	~3.3 fps	~3.7 fps	~4.1 fps
Lake fixed at 2,128 feet	~2.7 fps	~3.3 fps	~3.7 fps
St. Joe River	**1.125-year event (20,442 cfs)**	**1.5-year event (23,338 cfs)**	**2-year event (26,634 cfs)**
Lake fixed at 2,124 feet	~3.1 fps	~3.5 fps	~3.8 fps
Lake fixed at 2,128 feet	~2.7 fps	~3.1 fps	~3.4 fps

Notes: cfs – cubic feet per second
fps – feet per second

Finer-grained sediments such as silts and sands have a limiting velocity of approximately 2.5 to 3.0 fps. Based on these criteria, the decrease in flow velocity because of a higher lake level would not significantly affect the potential for sediment to move at the varied lake levels evaluated.

Current and proposed Project operations result in increased lake levels on Coeur d'Alene Lake. This results in decreased water velocities in the Coeur d'Alene and St. Joe rivers; however, the change in velocity is very small, and even the lowest velocities are within the range

[25] Limiting velocities are the approximate velocity required to initiate movement of the specified sediment type.

of limiting velocities for fine-grained sediment. In addition, bankfull and larger flows almost always occur when the lake is not regulated by Post Falls HED, resulting in little Project effect on sediment transport. Therefore, current Project operations are not believed to have a significant effect on the movement of sediment.

Effects Analysis

The Proposed Action lake levels would be essentially the same as under current Project operations, which do not appreciably affect sediment transport in the Coeur d'Alene and St. Joe rivers. Therefore, the Proposed Action would have little, if any, effect on sediment transport in these rivers.

Sediment Transport in the Lateral Lakes of the Coeur d'Alene and St. Joe Rivers

As part of water quality monitoring, Golder (2004c) modeled water velocities within the lateral lakes for unregulated and regulated conditions. The analysis examined horizontal water velocities and compared them to the settling velocities for suspended sediments. Modeled water velocities within the lateral lakes were relatively small, typically falling within the order of magnitude of 1×10^{-3} meters per second, which equates to about 295 feet per day. The settling velocities are therefore approximately 1 to 2 orders of magnitude less than the predicted horizontal velocities. Changes in velocity that occur for the modeled scenarios (i.e., unregulated versus regulated conditions) are typically relatively small and typically within the same order of magnitude, indicating that lake level has very little effect on sediment transport in the lateral lakes.

Project operation, through establishing a steady summer elevation, has decreased water velocities in the Coeur d'Alene and St. Joe rivers and altered the lake levels and velocities in the lateral lakes of these two rivers. However, the change in velocity is very small, and even the lowest velocities are within the range of limiting velocities for fine-grained sediment.

Effects Analysis

The Proposed Action would not be appreciably different than current Project operations. As such, the Proposed Action would have very little, if any, effect on sediment transport within the lateral lakes of the Coeur d'Alene and St. Joe rivers.

Sediment Supply and Transport in Coeur d'Alene Lake

Sediment supply and deposition in Coeur d'Alene Lake is a function of the lake's tributary streams. Sediment supply and transport in the two largest tributaries, the Coeur d'Alene and St. Joe rivers, is largely unaffected under current Project operations and would remain so under the Proposed Action. Sediment supply to the lake from its other tributaries is unaffected by the Project. This sediment transport to the lake is typically through the bays into which these tributaries discharge. Sediment transport through these bays was analyzed by Golder (2004c) using the same methods as for the lateral lakes (discussed previously). Results were the same as for the lateral lakes: modeled horizontal water velocities within the small bays were found to be relatively small, with settling velocities approximately 1 to 2 orders of magnitude less than the predicted horizontal velocities. Changes in velocity that occur for the modeled scenarios (i.e., regulated versus unregulated conditions) are typically relatively small and typically within the same order of magnitude, indicating that lake level has little effect on sediment transport in the bays. Hence, the Project has little, if any, effect on sediment supply and transport to the lake .

Overall, the Project currently causes no change in the net sediment flux in Coeur d'Alene Lake. The supply of sediment and its transport to the lake from its tributaries/bays does not appreciably change with the Project in place, and ultimately the same amount of sediment enters the lake through the course of a season. Deposition of coarse sediment may be at a higher elevation along the lakeshores and deltas if coarse sediment transport occurs during a time when lake levels are elevated by the Project, but winter and spring high flows subsequently transport this sediment to a lower elevation.

Effects Analysis

The Proposed Action would not appreciably change sediment supply and transport in Coeur d'Alene Lake compared to current Project operations.

Sediment Transport in the Spokane River

The Spokane River both upstream and downstream of Post Falls HED is largely a sediment transport reach until it reaches the upstream end of the City of Spokane's Upriver Project. The Project hydroelectric developments located downstream of the Upriver Project then have various effects on sediment transport, depending on the hydroelectric development's specific location and configuration.

Upper Falls HED—The Upper Falls diversion dam structure is located in line with the main river channel. The bottom elevation of the control gates generally match the river bottom level, and the impounded reservoir pool behind the dam is relatively small and operated in a run-of-the-river fashion. As a result, flows entering the hydroelectric development reservoir pass through and exit without decreasing in magnitude. Operation of Upper Falls HED therefore allows virtually all sediments to pass the hydroelectric development during flows when materials are moving in the channel.

Monroe Street HED—Monroe Street HED is constructed within a bedrock-controlled reach on the lower Spokane Falls. This portion of the river has always had a steep gradient and increased sediment transport potential. There is no evidence to suggest that Monroe Street HED's operations have significantly changed the pre-existing sediment transport or deposition conditions at this river location. All sediment supplied from upstream, aside from highly localized deposition of larger bedload material, is transported through this reach.

Nine Mile HED—Sediment transport related to Nine Mile HED under current Project operations is discussed in detail in Section 5.3.2.1. To summarize, the Hangman Creek Watershed is a substantial source of sediment to the Spokane River, and substantial sediment deposition in Nine Mile Reservoir is expected to continue, although Proposed Action measure SRP-TR-1 is intended to help reduce sediment inflow from Hangman Creek. No change in sediment transport through the reservoir associated with Post Falls HED minimum discharge flow increases under the Proposed Action is expected because it is the larger flow conditions that drive sediment transport through Nine Mile HED.

Long Lake HED—Under current Project operations, sediment deposition within Lake Spokane is predominately finer-grained clays, silts, and sands. Under the Proposed Action, drawdowns would be limited to 14 feet, which is not physically different from current Project operations. During drawdowns under the Proposed Action, sediment deposited in areas previously inundated by the reservoir backwater but still within the wetted river channel may become remobilized. This sediment is expected to be transported and deposited a short distance farther downstream, being redeposited once it again reaches the reservoir influence, as described in Section 5.3.2.1, *Effects of Project Operations*.

Sediment transport past Long Lake HED is currently negligible and limited almost entirely to fully suspended load that passes through the entire reservoir as would be the case under the Proposed Action.

Effects Analysis

Upper Falls and Monroe Street HEDs—Upper Falls and Monroe Street HEDs are currently passing all sediment, aside from highly localized deposition of larger bedload material at Monroe Street, and are not inhibiting natural sediment transport on that portion of the Spokane River. There is no evidence to suggest that the occasional increase in base flow during the summer months, or other proposed flow adjustments under the Proposed Action, would change the nature of how these hydroelectric developments influence sediment transport.

Nine Mile and Long Lake HEDs—The current sediment supply and transport rates in Nine Mile Reservoir and Lake Spokane would continue to be similar to current conditions under the Proposed Action. Proposed Action measure SRP-TR-1 is intended to support regional efforts to reduce erosion and sediment inflow from Hangman Creek, although the magnitude of the protential erosion reduction is not known.

5.3.2.3 Erosion[26]

Available studies and analysis specific to erosion and the geomorphic processes associated with the Spokane River Project indicate that operation of Post Falls HED is contributing to ongoing erosion by holding the summer lake level at or very near a constant elevation. Boat- and wind-related wave action are the primary causes of erosion and are concentrated at the approximately 2,128-foot water-surface/shoreline interface, as determined by the prevailing summer lake level. In the absence of the nearly constant summer lake level, the effects of boat- and wind-related wave action would still occur, but at lower shoreline elevations.

Operation of Post Falls HED affects the summer water level and thereby contributes in part to erosion along 34 miles of the St. Joe River, 32 miles of the Coeur d'Alene River, and 9 miles of the St. Maries River (Earth Systems and Parametrix, 2004). Extensive field work and

[26] Estimates of future erosion in this section are adapted from Earth Systems and Parametrix (2004), Appendix C, Table C-1 and are based on the ledge-width-assessment method discussed in Section 5.3.1.5.

analysis undertaken through the ALP (Earth Systems and Parametrix, 2004), indicates that erosion along the lower 24 miles of the St. Joe River, the lower 27 miles of the Coeur d'Alene River, and 9 miles of the St. Maries River is of most concern because of the link between erosion and its effect on habitat and archaeological sites. If current Project operations continue (i.e., stable summer lake levels at or near 2,128 feet and unrestricted boat traffic on the rivers), future erosion losses along the lower 7 miles of the St. Joe River are estimated to be about 1 to 1.3 acres per year or about 39 to 65 acres during the next 30 to 50 years; and for the upper 17 miles of river, about 28 to 47 acres during the next 30 to 50 years. On the lower 4 miles of the Coeur d'Alene River, about 9 to 14 acres should erode during the next 30 to 50 years. Erosion along the lower 9 miles of the St. Maries River is estimated at 14 to 23 acres over the next 30 to 50 years. These estimates are based on the best available information concerning past erosion losses and rates, which reflects all influences and causes of erosion, both Project and non-Project, with boat and wind waves identified as the most significant, current, and future direct causes of this erosion.

Under the Proposed Action, Avista, in consultation with relevant cooperating parties, would implement the Coeur d'Alene Lake and Tributary Erosion Control and Habitat Protection and Enhancement Measure (PF-TR-1), for the specific purpose of addressing the effects of continued operation of Post Falls HED on erosion processes, wetlands and riparian habitat, and associated resource impacts of particular importance. Within the first year of the new Project license, Avista would develop a plan to further identify and prioritize specific areas of concern for erosion-control opportunities and for wetlands and riparian habitat protection and enhancement needs. Preference would be given to protecting and/or enhancing unique or otherwise high-value wetland and riparian habitat, cultural sites of high significance, and other sensitive and high-value sites, primarily along the south end of Coeur d'Alene Lake. Based on stakeholder input to date, it is anticipated that an initial focus of this plan would be on the lower reaches of the St. Joe River and its natural levee system. Once target sites are identified and agreed upon and access is secured, Avista would design and implement agreed-upon erosion control and habitat protection and enhancement measures that meet the intended purpose and goal of this measure (see Appendix B for full text). Opportunities for coordinating with other erosion-control and habitat-protection efforts, programs, and/or funding sources would also be identified and explored (e.g., other erosion control grant sources or cost-share opportunities). Avista would also design and implement appropriate monitoring and evaluation programs to determine and document the current and ongoing biological and physical effectiveness of the habitat and erosion-control measures implemented under PF-TR-1.

Effects Analysis

The Proposed Action would provide substantial resources for protection of the most actively eroding portions of the shorelines associated with Post Falls HED. The exact nature and specific location of all the erosion control measures that would be implemented during the next 30 to 50 years has not be determined at this time; however, priority or "target" sites have been identified for protection during the initial years following issuance of the new license, as identified in PF-TR-1. Additional sites will be determined based on the current conditions and resource needs over the term of the new license. This approach is consistent with the fact that resource effects addressed by PF-TR-1 would also occur and vary over the term of the new license, and that other erosion control efforts are underway or planned in the basin. Measure PF-

TR-1 would provide adequate resources to reduce erosion and otherwise protect habitat along several miles of shoreline, significant cultural sites, and other sensitive and high-value sites. Additionally, measure PF-TR-1 also would include provisions for protection, enhancement, and restoration of tributary wetlands and riparian habitat. The Proposed Action's secondary effects on erosion, such as the temporary increase of erosion and sedimentation during installation of erosion control measures, would be expected to be minimal and offset by future benefits.

5.3.2.4 Turbidity

Reservoir water-level fluctuations, wind- and boat-wave action, and human-caused disturbances can affect water quality by increasing bank erosion and re-suspending fine sediments that have accumulated in reservoirs. Water quality sampling, erosion monitoring, and direct observations on the St. Joe River indicates that fine-grained sediment is being washed from the banks by boat-waves. Turbid water was observed during erosion studies along virtually the entire shoreline during periods of boating activity, especially along the inside of sharp river bends (Earth Systems and Parametrix, 2004).

Under the Proposed Action, Avista, in consultation with relevant cooperating parties, would implement the Coeur d'Alene Lake and Tributary Erosion Control and Wetlands and Riparian Habitat Protection and Enhancement Measure (PF-TR-1) to address the effects of erosion associated with the continued operation of Post Falls HED.

Effects Analysis

Although the actions to be taken under measure PF-TR-1 have not been specified in detail and are not specific to addressing water turbidity, implementation of this measure would likely assist in alleviating some turbidity in the rivers and the lower levees by protecting and restoring vegetation or otherwise stabilizing the shorelines along portions of the levee and riverbanks. This would result in levees and riverbanks that are less erodible and therefore less likely to contribute to suspended sediments and turbidity.

5.3.3 Secondary Effects of Environmental Measures

The Proposed Action includes several measures designed to protect or enhance fishery and recreation resources, but which may have minor secondary effects on soil erosion and/or turbidity.

In the Spokane River, Lake Spokane, or other waters near the Project, fishery enhancement, supported as a part of Proposed Action measure SRP-AR-1 may cause secondary effects such as short-term, localized increases in erosion, similar to the effects of measure PF-TR-1, discussed above. The Post Falls HED Fish Protection, Mitigation, and Enhancement Program (PF-AR-1) would provide assistance and financial support for the development and implementation of bull trout and westslope cutthroat trout habitat enhancement activities in the Coeur d'Alene River Basin and could also cause secondary effects similar to measure PF-TR-1.

Proposed Action measure SRP-AR-2 would provide site-specific and general weed control through the installation, maintenance, and/or replacement of bottom or physical barriers in Lake Spokane (see Section 5.7, *Terrestrial Resources*). These activities could result in short-term turbidity and disturbance of the lakebed.

Proposed Action measures SRP-REC-1, SRP-REC-4, PF-REC-1 and PF-REC-2 together involve abandoned dock/debris removal, shoreline stabilization measures, and the construction and/or improvement of trails, beaches, breakwaters, campsites, boat ramps, and access areas (see Section 5.10, *Recreation Resources*). These actions have the potential to result in minor, short-term, localized increases in the potential for erosion and/or turbidity.

All of the actions noted above have the potential to cause undesirable secondary effects on soil erosion and sediment supply. This potential would likely be minimized, however, through the use of best management practices.

5.3.4 Cumulative Effects

Implementing the Proposed Action would not alter the cumulative effects already in evidence under current Project operations. Boat-generated waves, when combined with Project operations that maintain Coeur d'Alene Lake levels higher in the summer than they would be under unregulated conditions, have an adverse cumulative effect on river levee bank erosion. The same proportional distribution of the causes of erosion occurring under current Project operations would likely continue under the Proposed Action.

Contaminated sediment from mine waste generated in the upper Coeur d'Alene River Basin would continue to be routed through and deposited within Project impoundments. However, Project facilities and operations only contribute to this effect in a small way, and contaminated sediment would continue to deposit within Coeur d'Alene Lake and portions of the Spokane River even in the absence of the Project. Sediment inputs from Hangman Creek, a tributary with substantial sediment supply resulting from a variety of land uses, combine with the reduction in stream gradient and increased depth in the Nine Mile and Long Lake HED reservoirs, resulting in some substantial areas of aggradation, a condition inherent to the existence of the reservoirs.

5.3.5 Unavoidable Adverse Effects

The removal of abandoned docks and debris, shoreline stabilization measures, habitat enhancement activities, and the construction and/or improvement of trails, beaches, breakwaters, campsites, boat ramps, access areas, which are all elements of the Proposed Action, have the potential to result in minor, unavoidable, short-term, localized increases in the potential for erosion and sediment input.

5.4 Water Quantity

5.4.1 Affected Environment

5.4.1.1 Surface Water

The Spokane River drains a 6,640-square-mile area at its confluence with the Columbia River at Lake Franklin D. Roosevelt (WDOE, 2004a), representing about 2.6 percent of the total drainage area of the Columbia River at Beaver Army Terminal near Quincy, Oregon (USGS Gage No. 14246900). The Spokane River traverses 111 miles from Coeur d'Alene Lake, which is about 15 miles east of the Washington-Idaho border, to the Columbia River, which is about 42 miles upstream of Grand Coulee Dam near Fort Spokane (Ebasco, 1987). The USGS indicates that about 122 square miles of drainage area near Hayden Lake, Idaho, do not contribute to surface water runoff in the Spokane River (USGS, 2003a). Eventually, some of this water may reach the Spokane River as groundwater, but the lake itself is a closed system with respect to surface water. As such, Avista's drainage area estimates cited below in the reach-by-reach descriptions differ slightly from those of the USGS.

There is a long period of USGS-gaged flow records for the Spokane River, beginning in 1913 at Post Falls and 1891 in the city of Spokane. Since 1977, Long Lake storage contents and elevations have been recorded on a daily basis; therefore, a complete data set for the Project exists for 1978 through the present. Data from August 1978 through July 2002 are used to describe flow conditions for the Project.

Avista and the consultants selected by the Water Resources Work Group (WRWG) developed a water budget model for the Spokane River based on USGS data that has been adjusted for storage changes in Coeur d'Alene Lake and Lake Spokane and adjusted for evaporation in Coeur d'Alene Lake, plus other modeling efforts and published research (NHC, 2003). As a result of this effort, there is a record of calculated inflow to most of the developments in the Spokane River Project. Several changes in the Project design, configurations, efficiencies, and regulated outflows of Post Falls HED, have made it desirable to use modeled water budget data rather than USGS data to characterize flow conditions. Therefore, tables in the following sections present minimum, mean, and maximum flows based on modeled conditions.

Several USGS gages are located on the Spokane River and its tributaries. Additional gages measure stream flows and elevations at Coeur d'Alene Lake and its major tributaries. Table 5-2 summarizes key USGS gage information for the Spokane River Project. Information in Table 5-2 is useful for understanding the approximate relative contribution of various tributaries within the Spokane River and Coeur d'Alene Lake subbasins. Information about smaller and more remote streams in the basin is available in USGS water data reports (USGS, 2003a,b).

Table 5-2. Streamflow surface water and reservoir station information near the Spokane River Project. (Source: USGS, 2003a)

USGS Gage Name (No.)	Period of Record[a]	Latitude	Longitude	Drainage Area (square miles)	Mean Annual Flow (cfs)	Annual Runoff (inches)
Coeur d'Alene River near Harrison, ID (12413860)	1991–present	47 28'43"	116 43'56"	1,475	Stages only	Stages only
Coeur d'Alene River at Cataldo, ID 12413500	1911–1912 1920–1972 1986–present	47 33'17"	116 19'26"	1,223	2,536	28.17
St. Joe River at Calder, ID (12414500)	1911–1912 1920–present	47 16'29"	116 11'17"	1,030	2,344	30.92
St. Maries River near Santa, ID (12414900)	1965–present	47 10'35"	116 29'30"	275	354.5	17.51
Coeur d'Alene Lake at Coeur d'Alene, ID (12415500)	1903–present	47 39'55"	116 46'13"	3,700	Stages only	Stages only
Spokane River near Post Falls, ID (12419000)	1912–present	47 42'11"	116 58'37"	3,840[b]	6,224	22.01
Spokane River above Liberty Bridge, near Otis Orchards, WA (12419500)	1930–1936 1938–1940, 1942 1944–1946 1951–1983 2000–present	47 40'56"	117 05'05"	3,880	6,097	21.38
Spokane River at Greenacres, WA (12420500)	1948–1952 1999–present	47 40'39"	117 09'04"	4,150	6,508	21.31
Spokane River at Spokane, WA (12422500)	1891–present	47 39'34"	117 26'53"	4,290[b]	6,742	21.35
Hangman Creek at Spokane, WA (12424000)	1948–present	47 39'10"	117 26'55"	689	235	4.64
Little Spokane River at Dartford, WA (12431000)	1929–1932 1946–present	47 47'05"	117 24'12"	665	304	6.21

USGS Gage Name (No.)	Period of Record[a]	Latitude	Longitude	Drainage Area (square miles)	Mean Annual Flow (cfs)	Annual Runoff (inches)
Little Spokane River near Dartford, WA (12431500)	1948–1952, 1997–present	47 46'52"	117 29'43"	698	599	11.66
Long Lake at Long Lake, WA (12432500)	1913–present[c]	47 50'12"	117 50'20"	6,020[b]	Stages only	Stages only
Spokane River at Long Lake, WA12433000	1939–present	47 50'12"	117 50'25"	6,020[b]	7,777	17.50
Chamokane Creek below Long Lake, WA (12433200)	1971–1978 1984–1987 1987–present	47 51'42"	117 51'28"	179	64.6	4.90

[a] Years are water years (August through July) unless otherwise noted.
[b] USGS estimate including non-contributing areas.
[c] Prior to 1950: month-end contents only; October 1950 to September 1977: month-end stage and contents only.

Basin Planning Efforts

Several basin planning initiatives relevant to the Spokane River Basin are underway at the state and regional level. At the state level, increasing concerns regarding water use and planning led to the passage of a watershed planning law in Washington in 1998. Through grants, Washington State supports the implementation of local watershed planning and requires that, at a minimum, local groups consider water quantity in their planning. The Watershed Planning Act (Revised Code of Washington [RCW] 90.82) provides a framework for comprehensive planning and execution of local solutions to watershed issues on a watershed level (WDOE, 2003a). The WDOE designated four water resources inventory areas (WRIA) in the basin, including the following:

1. WRIA 54, Lower Spokane;
2. WRIA 55, Little Spokane;
3. WRIA 56, Hangman; and
4. WRIA 57, Middle Spokane.

The watershed planning process is split into four phases: (1) organization, (2) technical assessment, (3) plan development and approval, and (4) plan implementation. WRIAs 55, 56, and 57 are in Phase 3 of the process, and Phase 1 work for WRIA 54 began in 2003. WRIA plans may include proposals for the construction of water storage facilities (for flow augmentation), development of water conservation strategies, and approaches to ensure that instream flows are maintained at healthy levels for fish (WDOE, 2004a).

At the regional level, NPCC also developed a subbasin planning process. Subbasin plans were introduced to implement the NPCC's fish and wildlife program and to develop action strategies to implement the NPCC's basin-wide vision for fish and wildlife that have been adversely affected by the development and operation of the Columbia River hydropower system (GEI, 2004). Two of the subbasins overlap with the Spokane River Project: the Spokane subbasin (downstream of Post Falls HED) and the Coeur d'Alene subbasin (upstream of Post Falls HED). These are two of the six subbasins that are defined by NPPC as the Intermountain Province. Figures 5-8 and 5-9 (Appendix A) illustrate the Coeur d'Alene River and the Spokane River subbasins, respectively.

Flood Management

The Spokane River Project plays an annual role in managing upstream flood potential. This role is limited by the Project's storage capacity (confined to the 7.5-foot depth between the low pool elevation of 2,120.5 feet and the full pool elevation of 2,128 feet) and by the outflow capacity of the natural outlet restriction of Coeur d'Alene Lake relative to flood flows in the Spokane River Basin. This same feature, the lake's natural outlet restriction, provides downstream flood protection, as described below.

Several flood control structures and projects, unrelated to the Spokane River Project, have been undertaken to reduce the incidence and effects of flooding along the Coeur d'Alene Lake tributaries. Approximately 10 miles of constructed levees protect residents from floods along the Coeur d'Alene River, although protection is below the 100-year flood recurrence interval (Kootenai County, 1998). Improvements to the Cataldo flood-protection works were completed in 1997. The St. Joe River also has levee protection and the city of St. Maries, at the confluence of the St. Maries River with the St. Joe River, is protected by constructed levees up to a 200-year flood event (Corps, 2001). These levees are under the regulatory jurisdiction of the U.S. Army Corps of Engineers (the Corps).

Coeur d'Alene Lake's natural outlet provides downstream flood attenuation, as demonstrated by the flood of December 1933, when flows peaked at 53,000 cfs in the St. Joe River at Calder, Idaho (USGS, 2003b), and 67,000 cfs in the Coeur d'Alene River at Cataldo, Idaho (USGS, 2004). These two inflows, representing slightly more than 60 percent of the drainage area contributing to the lake, are more than double the recorded outflow from Coeur d'Alene Lake during the flood (50,100 cfs, the highest recorded flow from Post Falls HED). During the same flood event, the peak water surface elevation in Coeur d'Alene Lake reached elevation 2,139.05 feet (Kootenai County, 1998). High lake levels were also reported in conjunction with the floods of 1894 (elevation 2,137.6 feet), 1974 (elevation 2,136.54 feet), and 1997 (elevation 2,136.14 feet) (Kootenai County, 1998).

USGS does not publish flood frequency data for the downstream Spokane River Project hydroelectric developments or the associated gaging stations. The historical record, however, shows major floods in the 50,000-cfs range for both the city of Spokane and downstream of Long Lake HED in 1894 and 1933.

Water Quantity Description

Upstream of Post Falls HED—The Spokane River drainage area is approximately 3,780 square miles at Post Falls HED (Ebasco, 1987). Most of the drainage area is above Coeur d'Alene Lake. The natural outlet of Coeur d'Alene Lake is 9 miles upstream of Post Falls HED. Prior to construction of the dams that preceded Post Falls HED, Coeur d'Alene Lake rose and fell depending on natural inflow, with a discharge determined by lake elevation and shaped only by the natural outlet. Lake elevations would approach elevation 2,120 feet in late summer. Today, Post Falls HED maintains a relatively constant summer lake level near elevation 2,128 feet for recreational purposes and energy production, and the lake is drawn down beginning in early September. During the summer, the Project reduces flow relative to natural conditions, creating a flow that is from 15.1 percent lower than natural conditions in June to 47.1 percent lower in August (Golder, 2004a). Drawdown of the lake increases flow in the Spokane River (ranging from 16 percent higher than natural conditions in December to 87 percent higher in October) and allows for additional storage capacity in the lake for fall and winter precipitation.

Once the lake has been drawn down to the degree that inflow, precipitation, and the natural lake outlet channel restriction will allow (typically by the end of December), Post Falls HED no longer controls upstream water levels, and nearly all flows reaching the dam are allowed to pass. At that time and extending through the spring runoff period, the facility does not significantly influence either lake levels or river flows downstream of Post Falls HED. The lake is subsequently restored to summer recreation levels, usually during June, to maintain a summer pool level near elevation 2,128 feet. Overall, the average annual effect of Post Falls HED is a slight flow reduction of about 0.4 percent (Golder, 2004a), primarily due to higher estimated evaporation quantities associated with higher lake elevations during the summer.

The primary tributaries to Coeur d'Alene Lake include the Coeur d'Alene and St. Joe rivers. Together, these two rivers account for about 90 percent of the inflow to the lake (Woods and Beckwith, 1997, as cited by Woods, 2001). The lake is approximately 30.9 miles long from the southern tip to the natural lake outlet and varies from 1 to 6 miles in width. The average depth is 72 feet. Within the proposed Project boundary, at normal summer full pool (elevation 2,128 feet), the lake itself covers about 31,618 acres, and at minimum pool (elevation 2,120.5 feet), it covers about 27,302 acres. Adding the area between the natural lake outlet and the Post Falls dams, the lateral lakes, and the affected portions of the St. Joe, St. Maries, and Coeur d'Alene rivers yields a total area of 40,580 acres at full pool and 31,587 acres at minimum pool. This represents an increase in area between minimum pool and full pool of about 28.5 percent.

In addition to affecting flows in the Spokane River, the Spokane River Project also affects water levels in Coeur d'Alene Lake and the associated chain lakes. The majority of water in Coeur d'Alene Lake originates as precipitation in the Bitterroot Mountain Range and reaches Coeur d'Alene Lake via the Coeur d'Alene, St. Joe, and St. Maries rivers. All three major rivers were free-flowing tributaries prior to construction of dams in the Post Falls area except when affected by Coeur d'Alene Lake levels that naturally produced a backwater effect during high river flows. The current Coeur d'Alene Lake backwater transition (maximum extent of backwater under normal conditions) on the Coeur d'Alene River is located at approximately river mile 32, or approximately where Interstate 90 crosses the river about 2 miles downstream of the town of Cataldo; at approximately river mile 34 on the St. Joe River, roughly 11 miles downstream of the town of Calder, and approximately 8.8 miles upstream of St. Maries (near the confluence with the St. Joe River) on the St. Maries River.

Numerous smaller tributaries flow into Coeur d'Alene Lake. Wolf Lodge Creek has a drainage area of 62 square miles, but the USGS does not actively monitor the creek. Cougar, Kidd, Mica, and Latour creeks are also minor tributaries to Coeur d'Alene Lake (IDHW, DEQ, 1999). Several additional creeks feeding into the lake include Fernan, Turner, Carlin, Lake, and Rockford creeks. Smaller lake tributaries are also subject to the backwater effects of the lake.

Minimum, mean, and maximum Coeur d'Alene Lake elevations are summarized in Table 5-3. Table 5-4 presents the monthly average surface area of the lake at daily mean elevations. The monthly average surface area is approximately 17 percent greater in May (40,598 acres) than in January (34,806 acres).

Table 5-3. Daily mean lake level elevation statistics (feet) for Coeur d'Alene Lake (August 1978 through July 2002).[a,b]

Month	Minimum	Mean	Maximum[c]
August	2,127.7	2,127.9	2,128.0
September	2,127.0	2,127.5	2,128.0
October	2,125.0	2,126.0	2,127.0
November	2,123.5	2,124.5	2,129.9
December	2,122.0	2,123.7	2,133.0
January	2,120.6	2,123.4	2,130.3
February	2,120.6	2,124.2	2,135.1
March	2,120.6	2,125.8	2,131.7
April	2,123.5	2,127.5	2,134.4
May	2,125.6	2,128.3	2,136.6
June	2,126.5	2,127.7	2,132.9
July	2,127.8	2,127.9	2,128.0
Year	2,120.6	2,126.2	2,136.6

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Values are based on modeled flows.

[c] Maximum values above elevation 2,128 feet are due to high water and flooding effects and not Post Falls HED.

Table 5-4. Daily mean elevation and corresponding surface area of Coeur d'Alene Lake (August 1978 through July 2002).

Month	Coeur d'Alene Lake Elevation (feet)	Total Area (acres)	Coeur d'Alene River Area (acres)	Coeur d'Alene Lake Area (acres)	Spokane River Area (acres)	St. Joe River Area (acres)	St. Maries River Area (acres)	Lateral Lakes (acres)
August	2,127.9	40,310	831	31,603	819	738	168	6,150
September	2,127.5	39,579	820	31,477	811	727	153	5,592
October	2,126.0	37,771	784	31,088	787	690	130	4,292
November	2,124.5	36,391	742	30,135	751	656	119	3,987
December	2,123.7	35,310	723	29,581	732	640	113	3,522
January	2,123.4	34,806	718	29,382	725	636	111	3,234
February	2,124.2	36,182	736	29,990	746	651	117	3,942
March	2,125.8	37,607	778	30,975	782	686	129	4,256
April	2,127.5	39,642	821	31,487	811	728	154	5,640
May	2,128.3	40,598	837	31,772	824	743	171	6,251
June	2,127.7	39,986	826	31,547	815	733	161	5,903
July	2,127.9	40,209	830	31,585	818	737	166	6,074
Year	2,126.2	38,006	789	31,146	790	696	132	4,453

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 23, 2004 combined with "Lake Surface Area (Golder 12-04).XLS" spreadsheet. The Golder spreadsheet uses a static pool approach to estimating inundated area under various pool elevations within Coeur d'Alene Lake. Intermediate values are linearly interpolated and values above elevation 2,128 feet are linearly extrapolated.

Downstream of Post Falls HED to Monroe Street HED—Monthly and annual flow characteristics, including daily, 3-day maximum, and 7-day minimum flows for Post Falls HED outflows, are summarized in Tables 5-5, 5-6, and 5-7, respectively.

The Spokane River drainage is approximately 4,225 square miles[27] at Upper Falls and Monroe Street HEDs (Ebasco, 1987). The 28-mile-long reach of the river between Post Falls HED and Monroe Street HED, which includes the City of Spokane's Upriver Project (FERC No. 3074),[28] encompasses a mix of free-flowing reaches and reservoir reaches. The free-flowing reaches include 17.8 miles between Post Falls HED and the upper end of the Upriver Reservoir and 2 miles between the Upriver Project dams and the upper end of Upper Falls Reservoir. The reservoir reaches include 4 miles behind Upriver Dam, 4 miles behind the Upper Falls south channel dam, and 0.2 mile behind Monroe Street Dam.

[27] Avista drainage areas may not be consistent with USGS areas because of the effects of non-contributing areas (USGS, 2003a). No tributaries enter the Spokane River between Upper Falls HED and Monroe Street HED, and these HEDs are nearly adjacent to one another; therefore, we hydrologically treat both developments as a single point.

[28] The City of Spokane's Upriver Project (FERC No. 3074) is located at river mile 80.2. The 17.7-MW Project impounds about 4 miles of the Spokane River, and the reservoir extends over 105 acres under normal flow conditions (FERC, 1997).

Table 5-5. Daily mean flow statistics (cfs) for Spokane River near Post Falls, Idaho (August 1978 through July 2002).[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	300	837	2,858
September	300	1,323	2,568
October	776	2,155	3,999
November	1,035	3,430	18,526
December	1,050	4,689	30,182
January	934	4,659	21,988
February	724	6,873	37,659
March	368	9,725	26,301
April	1,406	13,486	34,770
May	2,142	15,236	42,677
June	350	8,413	29,810
July	308	2,197	8,426
Year	300	6,073	42,677

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows.

Table 5-6. Spokane River near Post Falls, Idaho, regulated 3-day maximum flow (cfs).[a,b]

Month	Minimum	Mean	Maximum
August	390	1,473	2,603
September	1,102	2,018	4,078
October	1,835	3,113	5,403
November	2,219	5,686	18,996
December	2,257	7,127	29,686
January	1,979	7,211	21,899
February	1,284	11,016	36,782
March	4,966	13,899	26,526
April	7,121	18,950	34,490
May	8,717	19,631	42,261
June	2,717	14,156	29,722
July	1,203	4,065	7,799
Year[c,d]	10,177	23,425	42,261

Month	Minimum	Mean	Maximum

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Based on modeled flow values for August 1978 through July 2002.

[c] The average yearly value for mean 3-day maximum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Minimum yearly values do not necessarily match monthly values because the minimum 3-day maximum flow may occur during a different year than the monthly minimum 3-day maximum flows.

Table 5-7. Spokane River near Post Falls, Washington, regulated 7-day minimum flow (cfs).[a,b]

Month	Minimum	Mean	Maximum
August	300	552	1,043
September	300	943	1,603
October	1,041	1,740	2,766
November	1,354	2,220	4,730
December	1,266	3,166	9,815
January	1,239	3,176	7,816
February	908	4,118	10,429
March	599	6,398	14,404
April	2,131	8,946	15,640
May	2,496	11,593	30,113
June	459	3,622	8,833
July	318	1,050	2,225
Year[c,d]	300	1,181	16,668

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Based on modeled flow values for August 1978 through July 2002.

[c] The average yearly value for average 7-day minimum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Maximum yearly values do not necessarily match monthly values because the maximum 7-day minimum flow may occur during a different year than the maximum monthly minimum.

Avista's Upper Falls HED is located in downtown Spokane near river mile 74.2. The Upper Falls HED creates a small reservoir and includes two dams located on either side of a natural island, Havermale Island. The reservoir's normal full-pool elevation is 1,870.5 feet, and at this elevation, the impounded surface area is 150 acres. The reservoir provides storage of 800 acre-feet with a maximum 6-foot drawdown but is operated as a run-of-river facility. Typically, when inflow is below 2,500 cfs, all the flow is routed into the south channel and through the powerhouse. Under such conditions, flow in the north channel around Havermale Island consists of leakage of about 32 cfs through the control works and a small amount of groundwater flow contribution.

Monroe Street HED is also located in downtown Spokane (at river mile 74), about 1,000 feet downstream of Upper Falls HED. Monroe Street HED creates a very small reservoir and, like Upper Falls HED, is operated as a run-of-river facility. The reservoir extends approximately 0.2 mile upstream and has a normal full-pool elevation of 1,806 to 1,806.3 feet.[29] The dam creates an impounded surface area of 5 acres and provides 30 acre-feet of storage. The minimum pool corresponding to 30 acre-feet of storage (Ebasco, 1987) is elevation 1,800 feet. In accordance with the existing license, Avista maintains an aesthetic flow of 200 cfs over Monroe Street Dam and its downstream ledges during daily viewing hours that extend from 10:00 a.m. until one-half hour after sunset. Monthly and annual flow characteristics for the period of record (August 1978 through July 2002), including daily, 3-day maximum, and 7-day minimum flows for Upper Falls/Monroe Street HEDs, are summarized in Tables 5–8, 5–9, and 5-10, respectively.

Table 5-8. Daily mean flow statistics (cfs) for Spokane River at Upper Falls/Monroe Street (August 1978 through July 2002).[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	347	1,235	2,825
September	430	1,570	2,633
October	649	2,405	3,909
November	1,099	3,597	16,386
December	1,222	4,748	27,082
January	1,259	4,870	22,188
February	1,250	6,899	35,953
March	770	9,610	26,301
April	1,576	13,205	33,070
May	2,502	15,197	41,677
June	720	8,744	30,310
July	352	2,660	9,006
Year	347	6,217	41,677

[29] The additional 0.3 foot of elevation is maintained during viewing hours to provide a 200-cfs minimum flow over the spillway, as required by the existing license.

Month	Minimum[b]	Mean[b]	Maximum[b]

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows.

Table 5-9. Spokane River at Upper Falls/Monroe Street regulated 3-day maximum flow (cfs) (August 1978 through July 2002).[a,b]

Month	Minimum	Mean	Maximum
August	590	1,812	2,734
September	1,314	2,289	4,208
October	2,148	3,359	5,576
November	2,591	5,656	16,098
December	2,627	7,031	26,579
January	2,376	7,182	22,099
February	1,837	10,828	35,345
March	5,076	13,572	26,459
April	6,017	18,564	32,723
May	8,771	19,476	41,328
June	2,765	14,245	30,122
July	1,554	4,483	8,318
Year[c,d]	9,733	23,069	41,328

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows.

[c] The average yearly value for mean 3-day maximum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Minimum yearly values do not necessarily match monthly values since the minimum 3-day maximum flow may occur during a different year than the monthly minimum 3-day maximum flows.

Table 5-10. Spokane River at Upper Falls/Monroe Street, Washington, regulated 7-day minimum flow (cfs).[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	477	942	1,680
September	506	1,269	1,932
October	1,036	1,958	2,984
November	1,568	2,496	4,667
December	1,434	3,338	9,992
January	1,592	3,535	8,164
February	1,391	4,370	9,749
March	999	6,567	14,433
April	2,258	8,813	14,805
May	2,793	11,715	30,642
June	887	4,103	9,164
July	544	1,496	2,855
Year[c,d]	477	1,532	16,522

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows.

[c] The average yearly value for average 7-day minimum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Maximum yearly values do not necessarily match monthly values since the maximum 7-day minimum flow may occur during a different year than the maximum monthly minimum.

Downstream of Monroe Street HED to Nine Mile HED—The Spokane River drainage area is approximately 4,998 square miles at Nine Mile HED. The 16-mile-long reach between Monroe Street HED and Nine Mile HED includes about 10 miles of free-flowing river; the remaining 6 miles are affected by Nine Mile HED. The most significant tributary in this reach is Hangman Creek, with a drainage area of 689 square miles at the Hangman Creek gage (USGS Gage No. 12424000) and 705 square miles at the confluence with the Spokane River. Hangman Creek enters the Spokane River at river mile 72.4 in the free-flowing reach between Monroe Street powerhouse and Nine Mile Reservoir (NPPC, 2000c). Hangman Creek is flashy in nature, averaging close to only 200 cfs annually but peaking at nearly 20,000 cfs during extreme runoff conditions.

Nine Mile HED, located at river mile 58, has 3,130 acre-feet of storage and an area of 440 acres at the normal maximum pool elevation of 1,606.6 feet. The total maximum drawdown is 16 feet, resulting in a minimum normal pool elevation of 1,590.6 feet. Storage above the spillway crest at elevation 1,596.6 feet is augmented by two-tiered sections of removable flashboards with crests at elevations 1601.6 and 1,606.6 feet (Findlay Engineering Inc., 1999a). These flashboards are further subdivided into two subsections so that during high flow conditions, sections of the flashboards can be released in stages as needed (Ebasco, 1990). The effect of these releases is to create a small temporary pulsed flow in the Spokane River downstream of Nine Mile Dam until the flow and water surface elevation readjust to the lower setting. Because the flashboards are released under higher flow and stage conditions in the Spokane River and removed in stages, any effect is of limited duration and impact.

Given the high variability in Spokane River flows, flashboard removal also varies greatly, making generalizations regarding reservoir elevation difficult. Flashboard removal does not occur each year; and in some years, only the top section of flashboards is removed. With flashboards in place, as described above, the Nine Mile pool is maintained at 1606.6 feet. As flows increase above plant capacity, often by February, the top 5-foot section of flashboards is removed. In very high flow conditions, the lower section of flashboards is removed. Removal of the upper and lower flashboard sections can occur within the same week, or months apart, depending on flow conditions.

As long as flows continue to exceed plant capacity, the reservoir elevation is determined by a combination of the spillway crest elevation (1601.6 feet with the top section removed, 1596.6 feet with both sections removed) and river flow. Throughout these events, outflows from Nine Mile HED are equal to inflow. Once flows stabilize below plant capacity, flashboards are reinstalled (typically near the second week of July), and the Nine Mile pool is re-established and maintained at the 1606.6-foot level. Statistics on monthly and annual flow characteristics, including daily, 3-day maximum, and 7-day maximum, for flows downstream of Nine Mile HED are summarized in Tables 5-11, 5-12, and 5-13, respectively. Reservoir elevations for 3 recent years are depicted in Figure 5-10.

Table 5-11. Daily mean flow statistics (cfs) for Spokane River at Nine Mile.[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	643	1566	3181
September	683	1907	3148
October	917	2763	3500
November	1461	3993	17125
December	1555	5256	29080
January	1572	5576	22476
February	1599	7790	36796
March	1277	10569	26937
April	2146	13963	34992
May	2892	15821	42993
June	795	9312	31385
July	635	3056	9590
Year	635	6785	42993

Month	Minimum[b]	Mean[b]	Maximum[b]

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows from August 1978 through July 2002.

Table 5-12. Spokane River at Nine Mile regulated 3-day maximum flow (cfs) (August 1978 through July 2002).[a,b]

Month	Minimum	Mean	Maximum
August	874	2,160	3,182
September	1,649	2,648	4,580
October	2,499	3,739	5,990
November	2,979	6,097	16,963
December	3,104	7,522	27,782
January	2,837	7,959	22,449
February	2,393	11,731	36,105
March	5,430	14,491	27,366
April	6,410	19,297	34,671
May	9,110	20,025	42,203
June	3,170	14,837	31,243
July	1,885	4,931	8,925
Year[c,d]	10,159	23,656	42,203

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows from August 1978 through July 2002.

[c] The average yearly value for mean 3-day maximum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Minimum yearly values do not necessarily match monthly values because the minimum 3-day maximum flow may occur during a different year than the monthly minimum 3-day maximum flows.

Table 5-13. Spokane River at Nine Mile regulated 7-day minimum flow (cfs).[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	752	1,259	2,099
September	806	1,582	2,360
October	1,320	2,302	3,353
November	1,880	2,859	5,099
December	1,884	3,794	10,918
January	2,052	4,183	9,310
February	1,885	5,143	11,209
March	1,572	7,424	15,617
April	2,835	9,589	15,587
May	3,180	12,322	31,738
June	1,077	4,563	9,670
July	843	1,829	3,338
Year[c,d]	752	1,857	17,231

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows for August 1978 through July 2002

[c] The average yearly for average 7-day minimum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Maximum yearly values do not necessarily match monthly values because the maximum 7-day minimum flow may occur during a different year than the maximum monthly minimum.

Downstream of Nine Mile HED to Long Lake HED—The Spokane River drainage area is approximately 5,844 square miles at Long Lake HED (Ebasco, 1987). Between Nine Mile HED and Long Lake HED, the river traverses a distance of 24 miles, of which up to 23.5 miles are inundated by Lake Spokane under normal operating conditions. The Little Spokane River is the largest tributary in this reach, with a drainage area of 665 square miles at the Dartford gage (USGS Gage No. 12431000) and 710 square miles at the confluence with the Spokane River. It enters the Spokane River at river mile 56.5, downstream of Nine Mile Dam (river mile 58) (NPPC, 2000c). The Little Spokane River has an average annual mean flow of about 300 cfs (at the USGS Dartford Gage). The Little Spokane gains approximately an additional 300 cfs from the Spokane aquifer between Dartford and its confluence with the Spokane River. As a result, average annual inflows are close to 600 cfs from the Little Spokane River. Peak flows have ranged as high as over 4,000 cfs at the Dartford Gage.

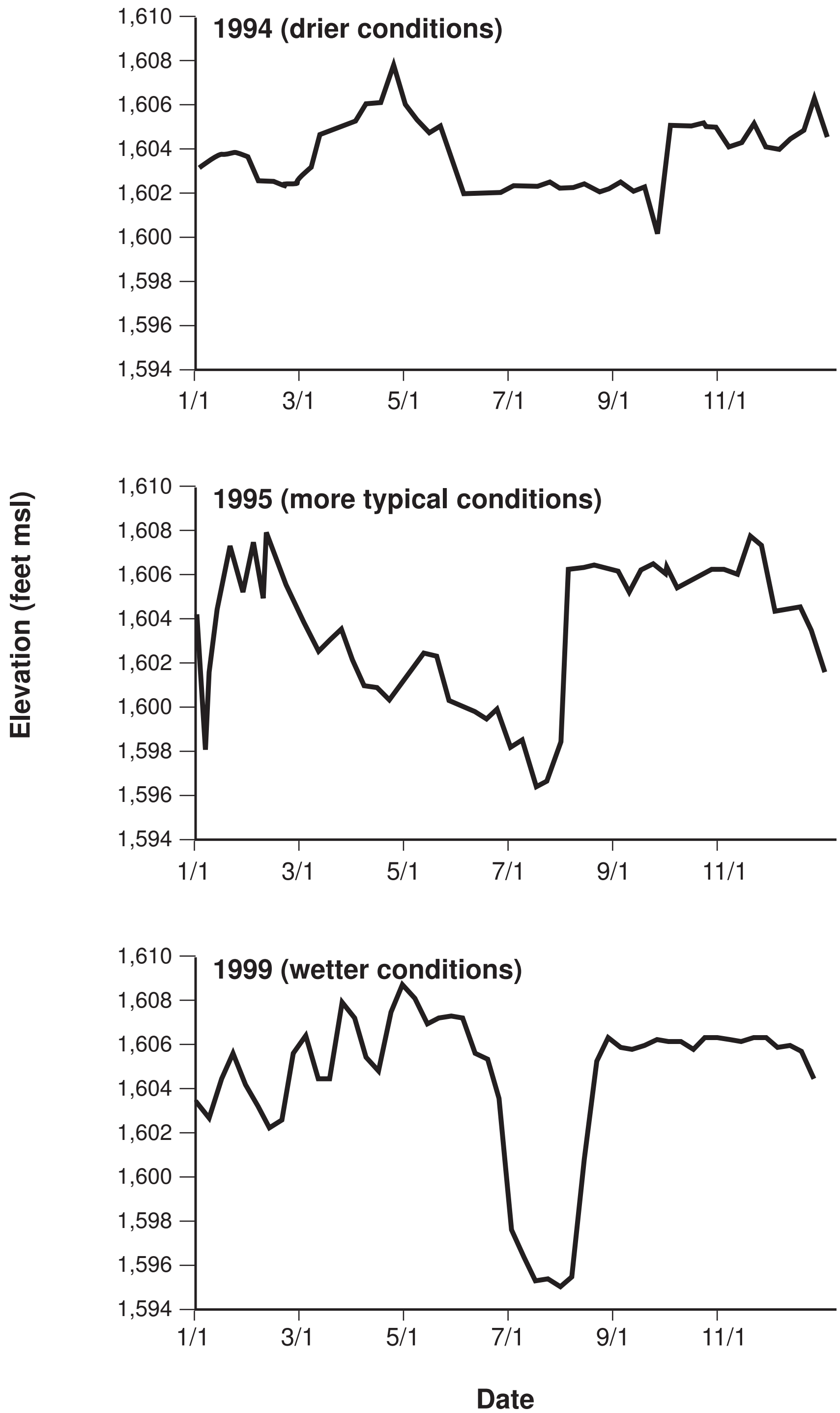


Figure 5-10. Nine Mile Reservoir weekly elevations. (Sources: E-mail from H. Nelson, Environmental Compliance Coordinator, Avista, Spokane, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated May 2004; e-mail from H. Nelson, Environmental Compliance Coordinator, Avista, Spokane, WA, to B. Mattax, Aquatic Scientist, Louis Berger, Bellevue, WA, dated February 15, 2004).

Long Lake HED, located near river mile 34, impounds 105,080 acre-feet of storage and an area of 5,060 acres at the normal maximum pool of 1,536 feet (Findlay Engineering, 1999b). The total licensed drawdown is 24 feet, resulting in a minimum pool elevation of 1,512 feet. Since the late 1980s, Avista has voluntarily limited drawdown to approximately 14 feet (elevation 1,522 feet), effectively reducing the active storage to 66,270 acre-feet. Monthly and annual flow characteristics, including daily, 3-day maximum, and 7-day minimum flows, are summarized in Tables 5-14, 5-15, and 5-16. Minimum, mean, and maximum Lake Spokane elevations are summarized in Table 5-17.

Table 5-14. Daily mean flow statistics (cfs) for the Spokane River downstream of Long Lake HED.[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	432	1,896	4,210
September	859	2,245	3,798
October	1,184	3,120	4,317
November	1,702	4,389	17,864
December	1,853	5,764	31,325
January	2,176	6,862	22,763
February	1,944	8,478	38,433
March	1,756	11,313	28,279
April	1,506	14,530	36,914
May	3,282	16,446	44,429
June	870	9,885	32,485
July	530	3,454	10,175
Year	432	7,352	44,429

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows from August 1978 through July 2002.

Table 5-15. Spokane River downstream of Long Lake regulated 3-day maximum flow (cfs).[a,b]

Month	Minimum	Mean	Maximum
August	1,224	2,522	3,631
September	1,986	3,011	4,952
October	2,849	4,141	6,403
November	3,367	6,573	17,996

Month	Minimum	Mean	Maximum
December	3,610	8,230	29,079
January	4,379	9,077	22,799
February	3,209	12,548	37,663
March	5,986	15,315	28,273
April	6,001	20,019	36,619
May	9,448	20,605	43,158
June	3,560	15,438	32,364
July	2,220	5,396	9,575
Year[c,d]	10,601	24,288	43,158

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows from August 1978 through July 2002.

[c] The average yearly value for mean 3-day maximum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Minimum yearly values do not necessarily match monthly values since the minimum 3-day maximum flow may occur during a different year than the monthly minimum 3-day maximum flows.

Table 5-16. Spokane River downstream of Long Lake HED regulated 7-day minimum flow (cfs).[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	1,024	1,565	2,515
September	1,099	1,892	2,787
October	1,580	2,642	3,721
November	2,193	3,220	5,530
December	2,334	4,259	11,844
January	3,076	5,363	9,854
February	2,340	5,890	11,749
March	2,134	8,240	16,801
April	2,319	10,153	16,369
May	3,567	12,930	32,834
June	1,268	5,022	10,175
July	1,142	2,160	3,820
Year[c,d]	1,024	2,172	17,940

Month	Minimum[b]	Mean[b]	Maximum[b]

Note: cfs – cubic feet per second

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows for August 1978 through July 2002.

[c] The average yearly for average 7-day minimum flow values is the average of all years of record, and not the average of the 12 months above.

[d] Maximum yearly values do not necessarily match monthly values because the maximum 7-day minimum flow may occur during a different year than the maximum monthly minimum.

Table 5-17. Daily mean simulated lake level elevation statistics (feet) for Lake Spokane (August 1978 through July 2002).[a,b]

Month	Minimum	Mean	Maximum
August	1,535.9	1,535.9	1,535.9
September	1,535.9	1,535.9	1,535.9
October	1,535.9	1,535.9	1,535.9
November	1,535.9	1,535.9	1,536.0
December	1,535.9	1,535.9	1,536.0
January	1,522.2	1,531.8	1,536.0
February	1,522.0	1,529.3	1,536.0
March	1,522.0	1,532.2	1,536.0
April	1,522.2	1,535.0	1,536.0
May	1,535.9	1,536.0	1,536.0
June	1,535.9	1,536.0	1,536.0
July	1,535.9	1,535.9	1,536.0
Year	1,522.0	1,534.7	1,536.0

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows for August 1978 through July 2002.

Downstream of Long Lake HED—The Spokane River drainage area is approximately 6,096 square miles at the non-licensed Little Falls Project, located 5 miles downstream of Long Lake Dam. Under normal maximum pool conditions at Little Falls, the entire 5-mile reach between Little Falls Dam and Long Lake Dam is inundated, and Long Lake discharges almost directly into the Little Falls pool. Downstream of Little Falls Dam, the last 29 miles of the Spokane River constitute the Spokane River arm of Lake Roosevelt. This area is typically affected by the backwater from Grand Coulee Dam and can vary from riverine to lacustrine, depending on the Grand Coulee Pool level (WDOE, 2004b).

5.4.1.2 Groundwater

Groundwater conditions in the main stem of the Coeur d'Alene River are not well known, although the aquifer is described as comprising mostly silts and clays (EPA, 2001b). Groundwater gradients are low and groundwater flows very slowly. Coeur d'Alene Lake is described as a regional groundwater discharge zone, although the northern end is characterized as a primary source of recharge into the Spokane Valley-Rathdrum Prairie Aquifer (EPA, 2001b).

Groundwater/surface-water interaction plays an important role in Spokane River flows. The unconfined Spokane Valley-Rathdrum Prairie Aquifer lies under a 325-square-mile area of the Idaho panhandle and eastern Washington and is the sole source of drinking water for more than 450,000 people. The aquifer is described as extremely permeable and high in groundwater velocity (1 to 50 feet per day). The aquifer was formed during the last ice age between 12,000 and 20,000 years ago during periods of massive flooding in northern Idaho and eastern Washington. Significant recharge to the river from the aquifer occurs in the form of springs in reaches of the river in Washington, as well as along the Little Spokane River (Panhandle Health District, 2004; EWU, 2004).

Numerous studies have established a direct hydraulic connection between the Spokane River and the Spokane Valley-Rathdrum Prairie Aquifer (Gibbons et al., 1984; WDOE, 1999; Gearhardt, 2001; Golder, 2001). In broad terms, the river generally loses water to the aquifer upstream of Barker Road (river mile 90) near Greenacres, Washington, but gains water from the aquifer in the more downstream reaches. Summer low flows in the Spokane River have declined over the period of record (1891 to present), although less so in recent years and although the overall mean annual flow has been steady (NHC, 2003). Causes for the summer low-flow declines could include aquifer and surface water withdrawals as well as urbanization and other land-use influences. Post Falls HED operations also have affected the timing and shape of summer low flows. The 7-day low flow with a recurrence interval of 10 years (7Q10) is 161 cfs at the USGS gage at Post Falls and 847 cfs at the USGS gage in the City of Spokane (Golder, 2001).

Johnson (1992), who describes the groundwater in the Lake Spokane vicinity extensively, reported piezometer readings that establish that nearby shallow groundwater levels are very responsive to changes in reservoir stage at Long Lake HED. At the upstream end of Lake Spokane, gradients are directed toward the lake, while, at the downstream end, gradients are directed away from the lake. These differential gradients suggest that Lake Spokane is a flow-through lake in terms of the groundwater contribution. Groundwater therefore plays a relatively minor role in the overall water budget of the lake, providing approximately 1 to 3 percent of the inflow to the Lake Spokane reach.

5.4.1.3 Water Rights

Operation of the Project requires non-consumptive water rights for power generation. In Idaho, the water right for Post Falls HED is 5,410 cfs. In Washington, non-consumptive water rights exist for Upper Falls (2,600 cfs), Monroe Street (2,900 cfs), Nine Mile (6,500 cfs), and Long Lake (6,300 cfs) HEDs. Most of the area's consumptive water withdrawals for municipal, domestic, agricultural, and industrial uses occur from the aquifer, although some also occur from the river, upstream tributaries, and Coeur d'Alene Lake. Both consumptive and non-consumptive water rights are regulated by the Idaho Department of Water Resources (IDWR) and WDOE. The Coeur d'Alene Tribe and Spokane Tribe of Indians also have water codes relevant to withdrawal on their respective reservations.

5.4.2 Environmental Effects

5.4.2.1 Lake Level Management and Flow Releases

Avista currently controls the Coeur d'Alene Lake level for about 6 months of the year, establishing full-pool elevation of 2,128 feet as early as practicable and typically beginning the fall drawdown of Coeur d'Alene Lake the week after Labor Day. Also under current Project operations, Avista is required to maintain a year-round minimum flow downstream of Post Falls of 300 cfs or an amount equal to Coeur d'Alene Lake inflow, whichever is less. Although flows lower than 300 cfs have occurred historically, Avista consistently attempts to meet a 300-cfs minimum flow downstream of Post Falls Dam at all times, and we have analyzed effects accordingly.

Under the Proposed Action, outflow from Coeur d'Alene Lake would continue to be managed so that the lake would reach a summer full-pool elevation of 2,128 feet as early as practicable each year. The lake elevation would be maintained near 2,128 feet until September 15, when the fall lake drawdown to an elevation as low as 2,120.5 feet would begin, providing room to accommodate winter precipitation and spring runoff and to generate power. This operation would be similar to the current drawdown regime, with the exception of providing a specific target date for initiation of the fall drawdown.

Avista also proposes to ensure a minimum discharge of 600 cfs under the Proposed Action, as measured at the gage just downstream of the Post Falls Dam with the exception of reducing minimum flows from 600 cfs to 500 cfs when Coeur d'Alene Lake falls below elevation 2,127.75 feet in August or early September due to the new proposed minimum flow. In addition, the Proposed Action includes other flow-related items, including a rainbow trout spawning and emergence flow target, downramping restrictions, aesthetic flows, and potential whitewater boating flows.

Effects Analysis

Post Falls HED

Implementation of the Proposed Action, including establishing September 15 as the date when drawdown begins and implementing the 600-cfs minimum discharge at Post Falls HED, would have a relatively minor effect on Coeur d'Alene Lake levels. We evaluated the changes that would result from implementing the Proposed Action by simulating what would have occurred if the operational changes associated with the Proposed Action had been in effect in the past and comparing those results to the results under current Project operations. For the 24 years that were modeled (August 1978 through July 2002), implementation of the Proposed Action would have affected the elevation of Coeur d'Alene Lake primarily in August and September. Table 5-18 indicates that the average minimum August lake level would drop 0.06 foot (0.7 inches), or from 2,127.94 feet under current Project operations to 2,127.88 feet under the Proposed Action. The modeled average September minimum lake level would rise 0.15 foot (1.8 inches) from 2,127.46 to 2,127.61 feet. However, actual September minimum lake levels would be even closer to current levels, given that September drawdowns have, and would continue to, slightly exceed the model-limited draft of 1 foot.

Table 5-18. Change in daily mean elevation statistics (feet) (Proposed Action minus current Project operations) for Coeur d'Alene Lake (August 1978 through July 2002).[a]

Month	Minimum[b]	Mean[b]	Maximum[b]
August	–0.42	–0.06	0.00
September	0.01	0.15	0.05
October	0.00	0.02	0.36
November	0.00	0.01	0.00
December	0.00	–0.01	0.00
January	0.00	0.00	0.00
February	0.00	0.00	0.00
March	0.00	0.00	0.00
April	0.00	0.00	0.00
May	0.00	0.00	0.00
June	0.00	0.00	0.00
July	–0.08	–0.01	0.00
Year	0.00	0.01	0.00

[a] Source: E-mail from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004. Modeled results are based on historical water resource data from USGS and Avista.

[b] Minimum, mean, and maximum values are based on modeled flows.

The Proposed Action would not appreciably change the area inundated by Coeur d'Alene Lake under current Project operations. Because of the increased minimum discharge at Post Falls HED, some shallow areas would experience a slightly earlier drawdown, but this would typically vary from current conditions by only a few inches at most. The Proposed Action would not cause any significant change in the location (i.e., river mile) where static pool levels in Coeur d'Alene Lake intersect the major tributaries (Coeur d'Alene, St. Joe, and St. Maries rivers).

With respect to Spokane River flows downstream of Post Falls HED, Figure 5-11 shows that the flow currently exceeds 600 cfs approximately 95.5 percent of the time. Under the

Proposed Action, flow would exceed 600 cfs about 96.9 percent of the time, a gain of 1.4 percent. Figure 5-11 also shows that the flow currently exceeds 500 cfs approximately 96.7 percent of the time. Under the Proposed Action, flow would exceed 500 cfs all the time, a gain of 3.3 percent. Thus, the proposed minimum discharge would provide increased downstream flows approximately 4.5 percent of the time. Seven-day minimum low flows would also be higher under the Proposed Action. This proposed increase in stream flows downstream of Post Falls HED between July and mid-September would be offset by a slight decrease of approximately one 100-cfs month in late fall or early winter.

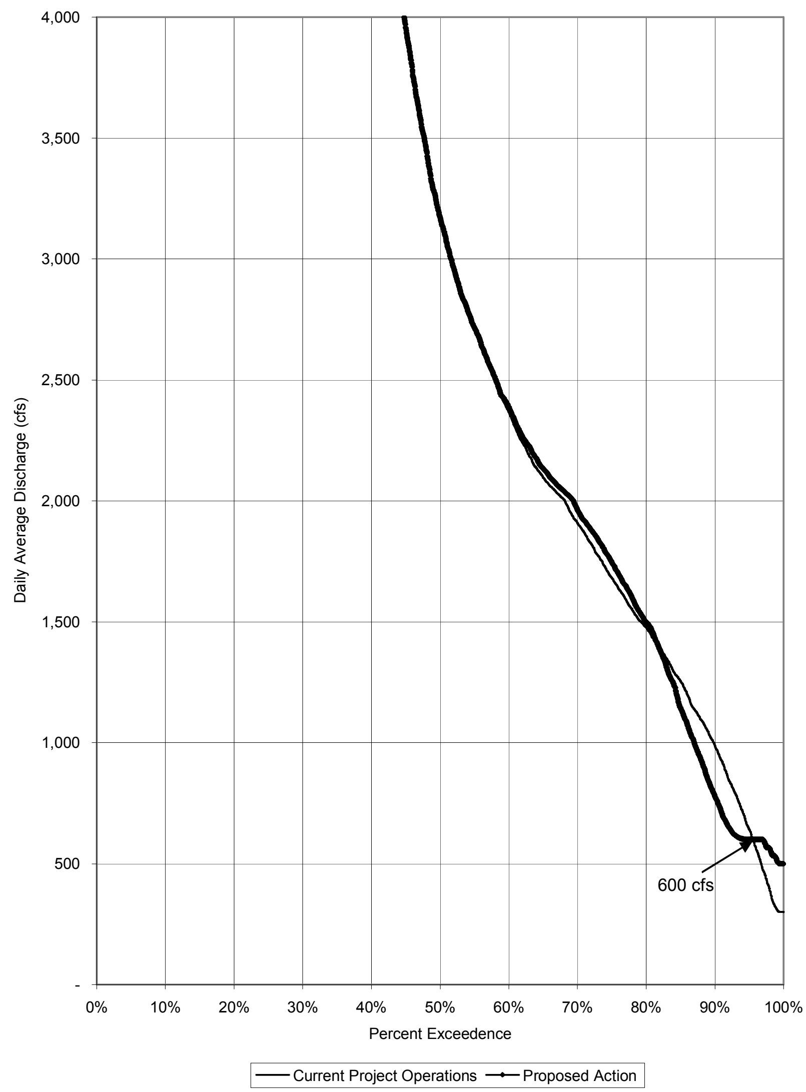
In the 24 years that were modeled (August 1978 through July 2002), we evaluated each day during which the flow was less than or equal to 600 cfs under current Project operations to assess how often improvements in flow would be evident under the Proposed Action. The improved effect on flow downstream of Post Falls HED was most evident during July through September. Flows downstream of Post Falls HED would be at least 100 cfs higher on at least 1 July day in 8 out of 24 years, at least 1 August day in 22 out of 24 years, and at least 1 September day in 7 out of 24 years. Flows downstream of Post Falls HED would be at least 300 cfs higher for at least 1 July day in 1 out of 24 years, at least 1 August day in 1 out of 24 years, and at least 1 September day in 2 out of 24 years. There would be little or no effect the remainder of the year.

Under current Project operations, there is no maximum downramping rate specified for the Post Falls HED. Under the Proposed Action, Avista would maintain a maximum allowable downramping rate of 4 inches per hour, as determined from rating tables for USGS Gage No. 12419000 (Spokane River near Post Falls). Compared to current Project operations, this ramping-rate restriction would result in a slightly more gradual change in downstream flow when the hydrograph is receding and Avista transitions to storing water in Coeur d'Alene Lake. This measure, which is discussed in Section 5.6.2.2, *Spawning and Emergence Flows*, would have no effect on water quantity.

Currently, no aesthetic flows are required at Post Falls HED. Under the Proposed Action, Avista would use the north channel to allow for a aesthetic spill through the gates for certain weekend hours throughout the summer. The aesthetic flow releases, which are discussed in Section 5.11.2.5, *Aesthetic Flows*, would have no effect on water quantity downstream of Post Falls. It would provide flow in a channel that would otherwise be dry under non-spill conditions

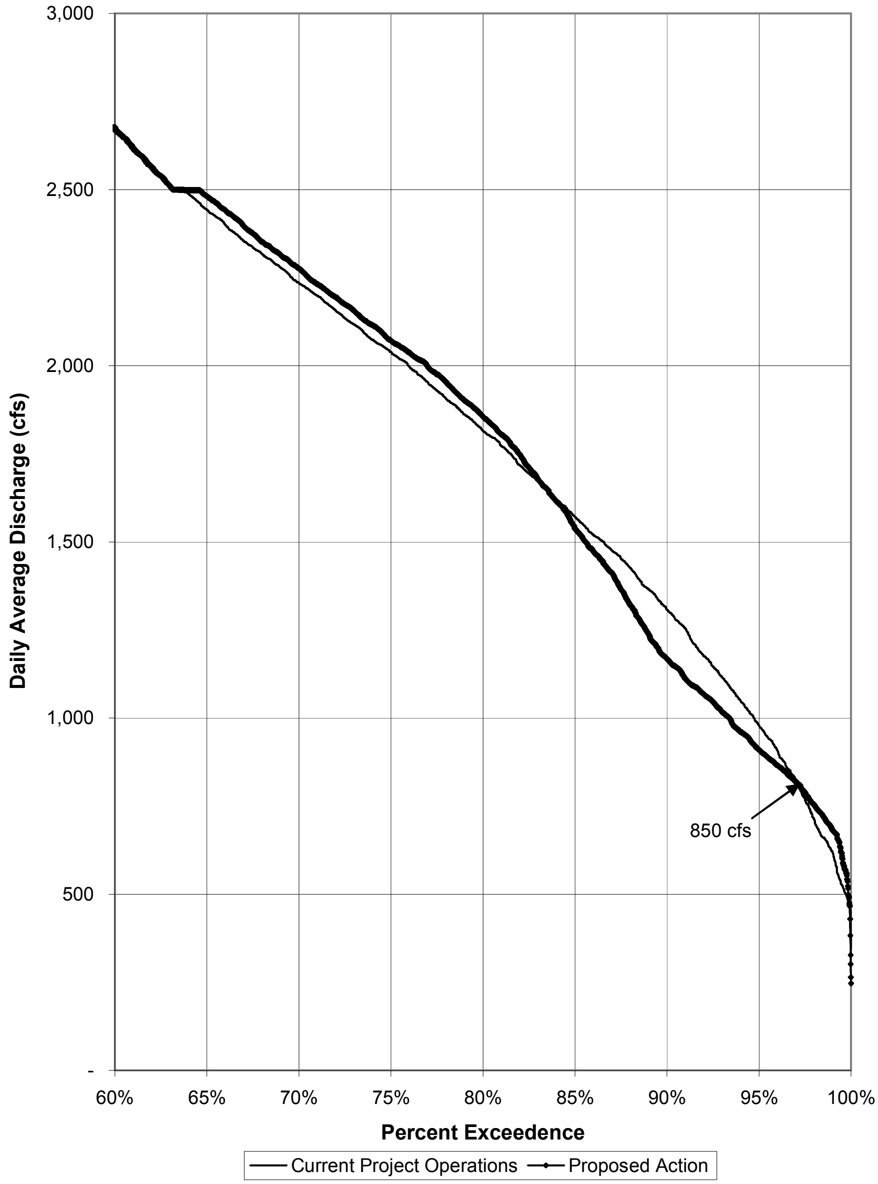
Upper Falls and Monroe Street HEDs

The effects of the combined 500/600-cfs minimum flow release at Post Falls HED would continue downstream to the vicinity of Upper Falls and Monroe Street HEDs. As Figure 5-12 shows, flow less than 850 cfs at downtown Spokane currently occur approximately 3.4 percent of the time. The benefit of the Proposed Action's 500/600-cfs minimum flow at Post Falls HED would be to increase the magnitude of flow in the range below 850 cfs. Flows through downtown Spokane can be affected by channel losses as well as by Post Falls HED discharges. Overall, an increase in the minimum Post Falls HED discharge would increase the 7-day average low flows through downtown Spokane.



Note: At daily average discharges greater than 4,000 cfs, current Project operations and the Proposed Action are nearly identical. The graph is truncated at that point to improve readability.

Figure 5-11. Flow duration curve for Spokane River near Post Falls, Idaho (August 1978 through July 2002). (Source: E-mails from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1, 2004)



Note: There is very little difference between current Project operations and the Proposed Action at flows higher than the 60 percent exceedance flow. The graph is truncated a that point to improve readability.

Figure 5-12. Flow duration curve for Spokane River at Upper Falls/Monroe Street HEDs (August 1978 through July 2002). (Source: E-mails from L. Karpack, Principal, NHC, Seattle, WA, to M. Killgore, Project Engineer, Louis Berger, Bellevue, WA, dated December 1 , 2004)

At downtown Spokane, under the Proposed Action, mean annual flows would not be affected. Seven-day minimum low flows would also be higher under the Proposed Action, increasing in July from 544 to 739 cfs (an increase of 195 cfs) and increasing in August from 477 to 665 cfs (an increase of 188 cfs). Three-day high flows would be affected primarily in the months of August (7 cfs lower on average), September (154 cfs higher on average), October (12 cfs higher), and December (28 cfs lower). Overall, under the Proposed Action, mean daily flows would be higher in July and August, and slightly lower in late fall or early winter.

Under current Project operations, aesthetic flows are not released at Upper Falls HED, although there is an existing release at Monroe Street HED. Aesthetic flow releases are proposed for Upper Falls HED and are described and analyzed in Section 5.11.2.5, *Aesthetic Flows*. Current aesthetic flow releases at Monroe Street HED would continue under the Proposed Action. Aesthetic flows would have no effect on total water quantity downstream of the HEDs, but would provide surface water flow where none currently exists.

Nine Mile HED

The effects of the Proposed Action's 500/600-cfs minimum-flow release downstream of the Post Falls HED would continue downstream to the Nine Mile HED vicinity. Overall, under the Proposed Action, mean daily flows would be higher in July and August, and slightly lower in late fall or early winter. Mean annual flows would not be affected.

There would be no effect on the elevation of Nine Mile Reservoir.

Long Lake HED

The effects of the Proposed Action's 500/600-cfs minimum-flow release at Post Falls HED would continue downstream to the Long Lake HED vicinity, where the mean daily flows would be higher in July and August, and slightly lower in late fall or early winter. Mean annual flows would not be affected.

There would be no effect on the elevation of Lake Spokane.

5.4.2.3 Groundwater

Lakes and rivers are considered hydraulic boundaries to groundwater systems, and the elevation of a lake or river determines, in part, the rate that groundwater flows into or out of the lake or river. The rate of groundwater discharge to the major inundated tributaries and lateral lakes of Coeur d'Alene Lake and the Spokane River is proportional to local hydraulic gradients. Avista's operation of Post Falls HED causes the Coeur d'Alene Lake level to stabilize near an elevation of 2,128 feet as early as practicable each year, depending on inflows, and to remain there until September. Beginning in September, the lake level is drawn down.

During the summer, the current conditions result in higher lake levels than would occur under unimpounded conditions. This results in less groundwater discharge into the lake as a result of a lower hydraulic gradient into the lake, compared to unimpounded conditions. This also results in more groundwater flow to the Spokane River during the summer as a result of a higher hydraulic gradient out of the lake, compared to unimpounded conditions. During the fall, drawdown of Coeur d'Alene Lake reduces the rate at which the level of Coeur d'Alene Lake recedes compared to the rate of lake level drop under unimpounded conditions. Therefore, the current conditions result in a more gradual decrease in hydraulic gradient than would occur without impoundment of the lake. The Proposed Action would not significantly alter the magnitude and pattern of lake level fluctuations and is therefore not expected to change groundwater dynamics compared to current conditions.

5.4.3 Cumulative Effects

As described in Section 2.2.2, *Regional Perspective,* the Spokane River Project is one of 250 hydroelectric developments in the Columbia River Basin. The Spokane River drains a 6,640-square mile area at its confluence with the Columbia River at Lake Franklin D. Roosevelt (WDOE, 2004a) and represents about 2.6 percent of the total drainage area of the Columbia River at Beaver Army Terminal near Quincy, Oregon (USGS Gage No. 14246900). In addition to the Spokane River Project, other dams on the river (Upriver and Little Falls, as well as Grand Coulee Dam) contribute to cumulative effects by changing riverine reaches to reservoir reaches.

Levees at various locations along the Spokane River and tributaries to Coeur d'Alene Lake also have a cumulative effect on the behavior of river stages. Extensive development in the greater Spokane area and bridges associated with transportation infrastructure represent an additional cumulative effect that has changed the behavior of the river, particularly under higher flow conditions. Local stream hydrographs also have been affected by land use, including transportation infrastructure, forest practices, mining, agriculture and extensive urbanization, in the region. Regulation of the Spokane River by the Project may affect the interaction of surface and groundwater on a seasonal basis because river stages throughout the Project area are affected by hydropower operations. The Proposed Action would not have any significant additional cumulative impact compared to current Project operations.

5.4.4 Unavoidable Adverse Effects

The Proposed Action would have no unavoidable adverse effects on water quantity compared to current Project operations.

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5.5 Water Quality

5.5.1 Affected Environment

As described in Section 5.4, *Water Quantity*, the presence, operation and maintenance of the Project alters Coeur d'Alene Lake level and flows in the Spokane River. These alterations have the potential to influence a range of water quality parameters, including water temperatures, dissolved oxygen (DO) concentrations and biological productivity (and associated parameters such as nutrient cycling and pH [potential hydrogen]), mobilization and transport of trace metals through the system, and TDG. Current water quality conditions in the Project area are addressed in this section following a discussion of water quality standards. Characterization of current water quality conditions in the Project area is based on existing information from a variety of sources, including state and tribal water quality monitoring programs, EPA and USGS monitoring and reports, and data and water quality modeling developed as part of the Project relicensing process (WDOE, 2004a; EPA, 2003; Woods and Beckwith, 1997; Golder, 2003, 2004d,e,f; Golder Associates Ltd., 2003, 2004; Golder and HDR, 2004).

The discussion of current conditions in many places within this section includes general statements characterizing certain conditions as exceedances of specific numeric water quality criteria. It is important to note that such characterizations do not necessarily equate to violations of water quality standards (which, in many cases, involve relative comparisons to natural conditions, not the numeric targets contained in the standards); further it should not be assumed that such exceedances are the result of Project-related effects. Effects of the Project and potential effects of the Proposed Actions related to the new license are discussed in Section 5.5.2.

5.5.1.1 Water Quality Standards

WDOE and IDEQ have water quality standards that address state surface waters within the Project area. The Coeur d'Alene Tribe has proposed water quality standards that will apply within their reservation at the lower one-third of Lake Coeur d'Alene, and the Spokane Tribe of Indians has water quality standards that apply downstream of the Project boundary.

The beneficial uses designated in each of the existing and proposed state and tribal water quality standards are presented in Table 5-19. Washington's current water quality standards follow a class system that describes characteristic uses for each class. In contrast, the other water quality standards (including Washington's proposed revised standards that are currently under review by EPA) designate beneficial uses for surface water-body reaches. Numeric water quality criteria for each of the existing and proposed water quality standards are presented in Table 5-20.

Numerous water quality concerns have been under investigation for years in the Spokane River Basin. Much of the concern results from human activities, including mining in the upper basin (EPA, 2003; Golder, 2004e) and nutrient-rich discharges from wastewater treatment systems (WDOE, 2003b). Section 303(d) of the CWA requires states to prepare a list of water-body segments that are not expected to meet applicable state surface water quality standards within the next 2 years. The states are then required to complete a total maximum daily load

(TMDL) for water-body segments on the 303(d) list that is approved by EPA. Table 5-21 presents the most recent EPA-approved 303(d) listings for surface waters in the Project area along with the status of corresponding TMDLs.[30]

5.5.1.2 Temperature

Upstream of Post Falls HED

In addition to reviewing water temperature data available from a range of existing sources, the consultants selected by the WRWG monitored water temperatures in Coeur d'Alene Lake and several of its tributaries during the summer of 2003 and developed a water quality modeling plan using the CE-QUAL-W2 model[31]. The 2003 water temperature effort included continuously monitoring temperatures between June 3 and October 22, 2003, at 42 stations located at representative locations throughout the lake and its major tributaries (including different depths at the same location). Temperature instruments were set to continuously record temperatures at 1- or 2-hour intervals. Results of the 2003 continuous-monitoring program are summarized in Table 5-22 (Golder, 2004d). CE-QUAL-W2 was used to model water quality conditions in the lake and its major tributaries under current regulated conditions as well as unregulated (i.e., unimpounded, natural hydrograph) conditions; the results of the modeling effort were reported by Golder (2004i). As previously noted, these models provide useful information for evaluating the factors that influence water quality but have limitations for comparisons to numeric criteria or specific water quality standards.

[30] Although TDG is not on the 1998 EPA-approved 303(d) list, WDOE proposes to list the Spokane River downstream of the Long Lake HED on the 2004 303(d) list, which is currently being reviewed by the EPA (Pickett, 2003).

[31] CE-QUAL-W2 is a two-dimensional hydrodynamic water quality model (Cole and Buchak, 1995) developed by ACOE that is commonly used for such evaluations.

Table 5-19. Designated beneficial uses of surface waters.

	Existing Standards[a]		Proposed Standards[b]	
Reach	**Beneficial Uses**	**Source**	**Beneficial Uses**	**Source**
Coeur d'Alene Lake	Coldwater communities; salmonid spawning; primary contact recreation; domestic, agricultural, and industrial water supply; wildlife habitat; aesthetics; and special resource water	IDAPA 58.01.02.100 and 58.01.02.110.10		
Coeur d'Alene Lake within Coeur d'Alene Indian Reservation		Coeur d'Alene Tribe (2000)[c]	Domestic and industrial water supply; recreational and cultural use; bull trout; aesthetics; and wildlife habitat	
Spokane River from Coeur d'Alene Lake to Idaho/Washington border (river mile 96.5)	Coldwater communities; salmonid spawning; primary contact recreation; and domestic, agricultural, and industrial water supply; wildlife habitat; and aesthetics	IDAPA 58.01.02.100 and 58.01.02.110.12		
Spokane River from Idaho/Washington border (river mile 96.5) to Nine Mile Bridge (river mile 58.0)	Class A—Characteristic uses of water supply, stock watering, fish and shellfish, wildlife habitat, recreation, commerce, and navigation	WAC 173-201A-130(108)	Non-core salmon/trout; primary contact recreation; domestic, industrial, agricultural, and stock water supply; wildlife habitat; harvesting, commerce and navigation; boating; and aesthetics	WAC 173-201a-602
Spokane River from Nine Mile Bridge (river mile 58.0) to Long Lake Dam (river mile 33.9)	Lake Class—Characteristic uses of water supply, stock watering, fish and shellfish, wildlife habitat, recreation, commerce and navigation	WAC 173-201A-130(107)	Core salmon/trout; extraordinary primary contact recreation; domestic, industrial, agricultural, and stock water supply; wildlife habitat; harvesting; commerce/ navigation; boating; and aesthetics	WAC 173-201a-602

Reach	Existing Standards[a]		Proposed Standards[b]	
	Beneficial Uses	Source	Beneficial Uses	Source
Spokane River from Long Lake Dam (river mile 33.9) to mouth	Class A—Characteristic uses of water supply, stock watering, fish and shellfish, wildlife habitat, recreation, commerce and navigation	WAC 173-201A-130(106)	Non-core salmon/trout; primary contact recreation; domestic, industrial, agricultural, and stock water supply; wildlife habitat; harvesting, commerce and navigation; boating; and aesthetics	WAC 173-201a-602
Spokane River on the Spokane Indian Reservation (approximately river mile 32.7 to river mile 0.0)	Class A—Designated uses of primary contact ceremonial and spiritual; cultural; domestic, industrial, and agricultural water supply; stock watering; fish and shellfish; primary contact recreation; and commerce and navigation	Spokane Tribe of Indians (2003)		

Notes: EPA – U.S. Environmental Protection Agency
IDAPA – Idaho Administrative Procedures Act
WAC – Washington Administrative Code

[a] Standards that are currently applicable.

[b] WDOE's proposed revision of the WAC 173-201A, which was adopted on June 24, 2003, and submitted to EPA on July 1, 2003.

[c] EPA has not yet approved the Coeur d'Alene Tribe's water quality standards.

Table 5-20. Existing and proposed water quality criteria for surface waters in the Project area.

Parameter	Idaho (IDAPA 58.01.02)	Washington (WAC 173-201A)	Coeur d'Alene Tribe (2000)	Spokane Tribe of Indians (2003)
Temperature	Cold: ≤22°C with a maximum daily average of ≤19ºC. No measurable change in lakes Salmonid spawning:[a] ≤13ºC with maximum daily average of ≤9ºC Bull trout: maximum weekly average of ≤13ºC during June–August and maximum daily average of ≤9ºC during September–October	Existing: ≤20.0°C due to human activities; no increase of >0.3°C when natural conditions >20.0°C; nor increase at any time of >34ºC (background temperature + 9ºC) Proposed: same as existing	Bull trout: daily maximum of ≤10ºC from June 1 to September 30 Cold: 7-day maximum of ≤14ºC and instantaneous maximum of <18ºC from February 1 to June 30, and 7-day maximum of ≤18ºC and instantaneous maximum of <21ºC from July 1 to January 31	Salmon/trout spawning and rearing: 7-day average of daily maximum temperatures of ≤16.5ºC from June 1 to September 1 and 7-day average of daily maximum temperatures of ≤13.5ºC between September 1 and October 1 and between April 1 and June 1, and ≤11ºC from October 1 to April 1 with no daily maximum of >18.5ºC[b]
TDG	≤110% of saturation	Existing: ≤110% of saturation[c] Proposed: ≤110% of saturation[c,d]	--	≤110% of saturation
DO	Cold:[e] >6 mg/l Salmonid spawning:[a] minimum of 6.0 mg/l or 90% of saturation, whichever is greater Below existing facilities:[f] 30-day mean of ≥6.0 mg/l, 7-day mean minimum of ≥4.7 mg/l, and instantaneous minimum of ≥3.5 mg/l	Existing: Class A: >8.0 mg/l Lake Class: no measurable decrease from natural conditions Proposed: Core salmon/trout: 1-day minimum of ≥9.5 mg/l Non-core salmon/trout: 1-day minimum of ≥8.0 mg/l	Bull trout:[g] 7-day average of >9.5 mg/l and >8.0 at all times	≥8.0 mg/l

Parameter	Idaho (IDAPA 58.01.02)	Washington (WAC 173-201A)	Coeur d'Alene Tribe (2000)	Spokane Tribe of Indians (2003)
pH	Within 6.5–9.0	Existing: Class A: within 6.5–8.5 Lake class: no measurable decrease from natural conditions. Proposed: Core salmon/trout: within 6.5–8.5, with a human-caused variation of <0.2 units Non-core salmon/trout: within 6.5–8.5, with a human-caused variation of <0.5 units	Domestic water supply and bull trout: within 6.5–8.5 with a human-caused variation of <0.5 unit over any 24-hour period	Within 6.5–8.5 with a human-caused variation of <0.5 unit
Turbidity	Cold: maximum instantaneous of ≤50 NTU over background, and maintain ≤25 NTU over background for 10-consecutive days	Existing: Class A: ≤5 NTU over background turbidity of ≤50 NTU, or ≤10% over background turbidity of >50 NTU Lake class: ≤5 NTU over background Proposed**:** ≤5 NTU over background turbidity of ≤50 NTU, or ≤10% over background turbidity of >50 NTU	Domestic water supply: ≤1 NTU over background turbidity of ≤10 NTU, or ≤10% over background turbidity of >10 NTU Bull trout: ≤5 NTU over background turbidity of ≤50 NTU, or ≤10% over background turbidity of >50 NTU	--
Total phosphorus	--[h]	Existing: Long Lake:[i] average euphotic zone concentration of ≤25μg phosphorus per liter during the period of June 1 to October 31	--	--

Parameter	Idaho (IDAPA 58.01.02)	Washington (WAC 173-201A)	Coeur d'Alene Tribe (2000)	Spokane Tribe of Indians (2003)
		Proposed: Long Lake:[i] Same as existing		
Coliform	*E. coli* levels with geometric mean[j] of ≤126/100 ml and maximum instantaneous value of ≤406/100 ml. In specified public swimming beaches, maximum instantaneous *E. coli* concentrations of ≤235/100 ml.	Existing: Class A: Fecal coliform levels shall not exceed a geometric mean of 100 colonies/100 ml or 200 colonies/100 ml for more than 10 percent of samples Lake class: Fecal coliform levels shall not exceed a geometric mean of 50 colonies/100 ml or 100 colonies/100 ml for more than 10 percent of samples Proposed: Extraordinary primary contact: fecal coliform geometric mean of ≤50/100 ml and no more than 10% of all samples (or any single sample when less than 10 samples exist) with ≥100/100 ml Primary contact: Fecal coliform geometric mean of ≤100/100 ml and no more than 10% of all samples (or any single sample when less than 10 samples exist) with ≥200/100 ml	Recreational and cultural: *E. coli* levels with 30-day geometric mean of ≤126/100 ml, based on a minimum of 5 samples	*E. coli* levels with geometric mean of ≤126/100 ml and no more than 10% of all samples (or any single sample when less than 10 samples exist) with ≥406/100 ml

Parameter	Idaho (IDAPA 58.01.02)	Washington (WAC 173-201A)	Coeur d'Alene Tribe (2000)	Spokane Tribe of Indians (2003)

Notes: -- – no applicable criterion
% – percent
ºC – degrees Celsius
DO – dissolved oxygen
EPA – U.S. Environmental Protection Agency
Exherichia coli – *E. coli*
IDAPA – Idaho Administrative Procedures Act
ml – milliliter
mg/l – milligrams per liter
NTU – nephelometric turbidity unit
pH – potential hydrogen
Proposed – WDOE's proposed revision of the WAC 173-201A, which was adopted by WDOE on June 24, 2003 and submitted to EPA on July 1, 2003
TDG – total dissolved gas
μg – microgram
WAC – Washington Administrative Code
WDOE – Washington Department of Ecology

[a] Criteria that are applicable to waters designated for salmonid spawning during the spawning and incubation periods for the particular species present.

[b] In waters where the only salmonid present is non-anadromous form of naturalized rainbow or redband trout, the 7-day average of the daily maximum temperature may be allowed to reach 18.5ºC.

[c] Criterion does not apply when the stream flow exceeds the 7-day, 10-year frequency flood.

[d] TDG criteria may be adjusted to aid fish passage over hydroelectric dams when consistent with a department-approved gas abatement plan.

[e] In lakes and reservoirs, does not apply to bottom 20 percent of water depth where depths are 35 meters or less, the bottom 7 meters of water depth where depths are greater than 35 meters, or hypolimnetic waters where stratification occurs.

[f] Applicable below dams, reservoirs, and hydroelectric facilities.

[g] In thermally stratified lakes, the hypolimnetic DO content shall be determined by natural conditions. This applies to the bottom 20 percent of the water column in lakes deeper than 35 meters, and the bottom 1 meter of the water column in lakes less than 35 meters deep.

Parameter	Idaho (IDAPA 58.01.02)	Washington (WAC 173-201A)	Coeur d'Alene Tribe (2000)	Spokane Tribe of Indians (2003)

[h] Narrative standard, IDAPA 58.01.02.200.06: Excess Nutrients. Surface waters of the state shall be free of excess nutrients that can cause visible slime growths or nuisance aquatic growths impairing designated beneficial uses.

[i] Spokane River from Nine Mile Bridge (river mile 58.0) to Long Lake Dam (river mile 33.9).

[j] Based on a minimum of 5 samples taken every 3 to 5 days over a 30-day period.

Table 5-21. EPA-approved 1998 303(d) listings and status of corresponding TMDLs. (Sources: IDEQ, 2003; WDOE, 2003cd)

Parameter	Location	TMDL Status
Temperature	Spokane River from Coeur d'Alene Lake to Idaho/ Washington border	No status reported
Temperature	Spokane River within Washington	No status reported
DO	Spokane River within Washington	In process
Total phosphorus	Spokane River within Washington	In process
pH	Spokane River within Washington	No status reported
Metals (unspecified)	Coeur d'Alene Lake and Spokane River from Coeur d'Alene Lake to Idaho/ Washington border	Approved
Metals (arsenic, cadmium, chromium,[a] lead, and zinc)	Spokane River within Washington	Approved
PCBs	Spokane River within Washington and Lake Spokane	In process
Sediments	Spokane River within Washington and Lake Spokane	No status reported

Notes: DO – dissolved oxygen
PCB – polychlorinated biphenyls
pH – potential hydrogen
TMDL – total maximum daily load

[a] Johnson and Golding (2002) recommend removing Spokane River chromium from the 303(d) listing because the listing is based on questionable data and because six samples collected between July 2001 and May 2002 were in compliance with water quality standards.

Table 5-22. Summary of water temperatures (ºC) recorded in Coeur d'Alene Lake and its tributaries with thermographs, June to October 2003. (Source: Golder, 2004d)

Site Name[a]	Seasonal Maximum		Seasonal Minimum		Seasonal Max. DT[b]		7-Day Average[c]			Warmest Day of 7-Day Max.[d]		
	Date	Value	Date	Value	Date	Value	Date	Max.	Min.	Date	Max.	Min.
Benewah Creek, 0.6 m	07/27/03	24.4	10/11/03	5.4	07/04/03	8.8	07/19/03	24.0	16.7	07/16/03	24.4	17.5
Carlin Creek, 0.6 m	07/27/03	23.6	10/11/03	5.8	07/28/03	9.2	07/29/03	23.1	14.6	07/27/03	23.6	14.9
Cougar Creek, 0.8 m	07/27/03	19.0	10/11/03	5.4	06/26/03	3.5	07/24/03	18.8	16.0	07/21/03	19.0	16.0
Fighting Creek, 0.2 m	07/22/03	26.3	10/11/03	4.6	07/19/03	11.5	07/29/03	25.7	15.5	07/27/03	26.0	16.0
Kid Creek, 0.1 m	08/14/03	24.0	10/09/03	2.5	09/02/03	15.8	08/11/03	22.5	10.7	08/08/03	24.0	11.0
Mica Creek, 0.5 m	07/16/03	22.5	10/11/03	4.6	06/17/03	9.2	07/19/03	21.8	15.6	07/16/03	22.5	16.8
Plummer Creek, 0.6 m	07/12/03	22.1	10/19/03	6.2	06/06/03	7.3	07/09/03	21.3	15.1	07/11/03	22.1	15.6
Turner Creek, 0.6 m	07/23/03	22.9	10/11/03	5.4	07/10/03	8.4	07/22/03	22.4	15.1	07/21/03	22.9	15.2
Wolf Lodge Creek, 0.6 m	07/27/03	19.0	10/11/03	7.8	06/17/03	6.9	07/24/03	18.8	15.4	07/21/03	19.0	15.2
Beauty Bay, 5.0 m	08/01/03	24.8	06/25/03	9.4	06/25/03	10.4	07/30/03	24.4	23.4	08/01/03	24.8	23.6
Beauty Bay, 9.0 m	08/11/03	23.6	06/25/03	7.4	06/25/03	10.5	08/03/03	23.4	19.9	08/02/03	23.6	18.3
Beauty Bay, 13.0 m	08/20/03	22.5	06/25/03	6.6	08/30/03	12.7	08/25/03	21.1	10.8	08/23/03	21.7	12.5
Beauty Bay, 17.0 m	08/27/03	20.6	06/25/03	6.2	09/12/03	12.0	09/11/03	16.5	8.3	09/08/03	20.2	9.4
Beauty Bay, 20.0 m	09/12/03	19.4	06/25/03	5.8	09/12/03	12.4	10/10/03	15.0	8.4	10/07/03	15.2	7.0
Carlin Bay, 5.0 m	08/01/03	25.5	06/09/03	12.8	06/10/03	5.7	07/30/03	25.0	23.1	08/01/03	25.5	23.8
Carlin Bay, 9.0 m	08/11/03	23.6	06/10/03	8.5	06/10/03	10.0	08/10/03	23.0	17.8	08/11/03	23.6	18.5
Carlin Bay 74484 13.0 m	09/08/03	20.0	06/22/03	7.0	09/12/03	10.6	09/11/03	18.6	10.3	09/08/03	20.0	10.7
Carlin Bay, 17.0 m	10/09/03	16.4	06/22/03	6.3	10/08/03	9.2	10/10/03	15.5	8.2	10/07/03	16.4	8.1
Cougar Bay, 5.0 m	08/10/03	24.2	06/24/03	9.0	06/17/03	8.9	08/01/03	23.9	22.4	07/31/03	24.2	22.8
Cougar Bay, 9.0 m	08/16/03	23.3	06/24/03	7.8	08/16/03	12.1	09/08/03	20.5	15.7	09/07/03	21.3	14.3
Cougar Bay, 13.0 m	09/09/03	20.5	07/19/03	7.3	09/09/03	11.8	09/23/03	17.1	9.2	09/20/03	17.6	10.5
Cougar Bay, 17.0 m	10/09/03	15.9	06/25/03	6.3	10/10/03	7.8	10/11/03	14.1	8.9	10/09/03	15.9	8.8

	Seasonal Maximum		Seasonal Minimum		Seasonal Max. DT[b]		7-Day Average[c]			Warmest Day of 7-Day Max.[d]		
Site Name[a]	Date	Value	Date	Value	Date	Value	Date	Max.	Min.	Date	Max.	Min.
Cougar Bay, 21.0 m	10/13/03	14.7	06/28/03	6.2	10/14/03	7.0	10/11/03	10.2	7.4	10/13/03	14.7	8.8
Cougar Bay, 22.0 m	10/13/03	14.7	06/28/03	6.2	10/13/03	7.0	10/11/03	9.9	7.1	10/13/03	14.7	7.8
Windy Bay, 5.0 m	07/30/03	24.0	06/22/03	9.6	07/08/03	7.0	08/08/03	23.5	22.9	08/10/03	23.8	23.1
Windy Bay, 9.0 m	08/07/03	22.7	06/22/03	8.6	07/08/03	9.7	08/07/03	22.5	20.4	08/06/03	22.7	20.5
Windy Bay, 5.0 m	08/15/03	21.9	10/13/03	7.0	08/15/03	9.8	08/31/03	19.3	14.1	08/29/03	20.9	17.7
Windy Bay, 17.0 m	09/13/03	17.3	06/21/03	6.8	09/22/03	8.4	09/27/03	15.7	11.3	09/29/03	17.0	12.1
Windy Bay, 21.0 m	09/29/03	13.9	06/11/03	6.4	09/29/03	6.1	10/17/03	11.1	8.2	10/15/03	13.1	7.8
Coeur d'Alene River upstream, 2.3 m	07/28/03	20.6	10/17/03	9.4	06/20/03	3.8	07/25/03	20.4	18.6	07/22/03	20.6	18.7
Coeur d'Alene River center, 3 m	07/28/03	20.9	10/11/03	8.7	06/20/03	3.4	07/29/03	20.6	17.8	07/28/03	20.9	17.9
Coeur d'Alene River mouth, 2 m	07/26/03	24.8	10/20/03	11.8	06/08/03	3.4	07/29/03	24.5	22.6	07/26/03	24.8	22.1
Coeur d'Alene River mouth, 8 m	08/19/03	21.7	10/20/03	11.8	10/11/03	1.9	08/21/03	21.4	21.1	08/19/03	21.7	21.3
Coeur d'Alene River downstream, 8.5 m	07/24/03	19.4	10/12/03	9.4	06/20/03	2.7	07/23/03	19.1	18.7	07/23/03	19.4	19.1
Coeur d'Alene River downstream, 2.5 m	07/29/03	20.6	10/17/03	9.4	06/20/03	2.7	07/26/03	20.4	19.1	07/23/03	20.6	19.4
St. Joe River downstream, 5.5 m	07/24/03	23.2	10/17/03	7.8	06/20/03	3.4	07/22/03	22.7	21.4	07/23/03	23.2	22.1
St. Joe River downstream, 2.5 m	07/24/03	23.2	10/17/03	7.8	06/20/03	3.4	07/22/03	22.8	21.4	07/22/03	23.2	21.7
St. Joe River mouth, 8.5 m	08/28/03	21.3	06/06/03	10.9	07/01/03	1.9	08/26/03	21.2	20.9	08/23/03	21.3	20.9
St. Joe River mouth, 2.5 m	07/27/03	24.4	06/06/03	10.9	07/21/03	1.9	07/30/03	24.1	23.6	07/27/03	24.4	23.6
St. Joe River center, 4.7 m	07/23/03	24.0	10/17/03	7.8	06/20/03	3.8	07/22/03	23.2	21.0	07/22/03	24.0	21.3
St. Joe River center, 2.5 m	07/22/03	24.0	10/17/03	7.8	06/20/03	3.8	07/22/03	23.1	21.0	07/22/03	24.0	21.3
St. Joe River upstream, 1 m	07/23/03	23.6	10/17/03	7.8	08/30/03	4.2	07/29/03	23.0	19.9	07/27/03	23.2	19.8

Site Name[a]	Seasonal Maximum		Seasonal Minimum		Seasonal Max. DT[b]		7-Day Average[c]			Warmest Day of 7-Day Max.[d]		
	Date	Value	Date	Value	Date	Value	Date	Max.	Min.	Date	Max.	Min.

Notes: ºC – degrees Celsius
m – meter

a Site name includes location and approximate depth of thermograph in meters.

b Seasonal max DT indicates maximum daily change in temperature.

c The 7-day averages reported are the maximum of the rolling 7-day averages of daily maximums and the average of the daily minimums for the same 7-day period. The date given is the centerpoint of the 7-day period.

d Values reported are the date, maximum temperature, and minimum temperature for the day that had the highest temperature within the 7-day period with the maximum daily maximum temperature.

Results of the 2003 monitoring indicate that water temperatures in the Coeur d'Alene and St. Joe rivers generally peak between mid-July and mid-August (Golder, 2004d). The seasonal and daily temperature patterns in the Coeur d'Alene and St. Joe rivers were similar as they entered the slack water of the lake, although the St. Joe River was warmer than the Coeur d'Alene River. Within the 2-mile-long reaches centered on the transition zone as the rivers enter the lake, both rivers exhibit little thermal stratification and experience little warming (+0.2 to 0.3 ºC[32] [0.4 to 0.5ºF]), based on differences in the average daily mean temperatures. At the transition points, Coeur d'Alene and St. Joe river temperatures exceeded Idaho's and the Coeur d'Alene Tribe's bull trout criteria for the entire applicable period (Golder, 2004j). They also exceeded IDEQ's coldwater criterion during most of the period from mid-July to late August, and exceeded the Coeur d'Alene Tribe's coldwater criterion from mid-June through mid-September. In addition, both rivers frequently exceeded the Coeur d'Alene Tribe's coldwater criteria through mid-August. Temperature data for the Coeur d'Alene River upstream of Coeur d'Alene Lake (between Cataldo and Harrison) between 1972 and 2003 indicate frequent exceedances of Idaho's salmonid spawning criterion between June and September, and less frequent exceedances of Idaho's coldwater criteria in July and August (Golder, 2004j). Temperature data for the St. Joe River upstream of Coeur d'Alene Lake at St. Maries between 1973 and 1992 indicate frequent exceedances of Idaho's salmonid spawning criterion between June and October, and regular exceedances of Idaho's coldwater criteria in July and August (Golder, 2004j).

During 2003, all of the monitored smaller tributaries to the lake (Benewah, Carlin, Cougar, Fighting, Kid, Mica, Plummer, Turner, and Wolf Lodge creeks) had water temperatures greater than Idaho's and the Coeur d'Alene Tribe's bull trout criteria for the entire applicable period (Golder, 2004j). Daily average tributary temperatures also exceeded Idaho's salmonid spawning criterion during the entire monitoring period. Between mid-July and mid-August 2003, three tributaries (i.e., Benewah, Fighting, and Mica creeks) also exceeded Idaho's coldwater instantaneous criterion. Golder (2004j) reported that Idaho's salmonid spawning criterion was exceeded in Cougar, Mica, and Wolf Lodge creeks during other years, but the reported values did not exceed the cold-water criteria.

Continuous seasonal temperature measurements made in four Coeur d'Alene Lake bays (i.e., Beauty, Carlin, Cougar, and Windy) during 2003 indicate that each bay thermally stratifies throughout the summer. Results indicate that Idaho's salmonid spawning criteria were met continuously at the deepest location measured in each of the four bays. In the three bays with maximum depths of about 20.5 to 22.5 meters[33] (67 to 74 feet) (i.e., Cougar, Windy, and Beauty), surface temperatures in excess of 20ºC (68°F) were observed much of the summer, and near-bottom temperatures remained at 7 to 9ºC (45 to 48°F) through at least August. In contrast, near-bottom temperatures in Carlin Bay, which has a maximum depth of about 16.5 meters (54 feet), began warming as early as June. Temperatures in the tributaries to the four monitored bays

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[32] Water temperature standards (see Table 5-20) and temperature monitoring data (see Table 5-24) are specified in °C.

[33] Water temperature monitoring data are reported for depths in meters (see Table 5-22). The equivalent depth expressed in feet is noted in parentheses in the text.

were generally cooler than in their corresponding bay as they enter the bays, first as interflow at depths of 8.8 to 12.8 meters (29 to 42 feet) during June through mid-October and then along the bottom after mid-October (Golder, 2004d). Near-surface 7-day averages of daily maximum temperature in the bays generally varied from about 18ºC (64°F) in June to a peak of 24 to 25ºC (75 to 77°F) in early August and then decreased to 13 to 14ºC (55 to 57°F) by mid-October. Idaho's bull trout criteria and the Coeur d'Alene Tribe's proposed bull trout criteria were exceeded throughout the majority of the water column during their applicable periods. In addition, Idaho's 22ºC (71.6°F) coldwater criterion was exceeded in the upper layers of each of the bays during the warmest summer months.

Numerous small lakes and wetlands adjacent to the Coeur d'Alene River are hydraulically linked to the river and likely were before construction of the Project. These waterbodies, referred to as lateral lakes, generally receive most of their inflow from the river during high flows that overtop the levee along the river (Golder, 2004j). Lateral lakes are generally hydraulically linked with the river through a narrow channel connecting them with the adjacent river. The rate and direction of flow through each of these channels depend on water elevations in the two waterbodies and are not well understood. The Coeur d'Alene Tribe monitored water temperatures in Black Lake, which is approximately 6.5 meters (21.3 feet) deep, during August 2002 and September 2001 and 2002. The results of this monitoring indicate that Black Lake exceeded the Coeur d'Alene Tribe's proposed salmonid spawning criteria, but satisfied the coldwater aquatic life criteria (Golder, 2004d). Because the hydraulic characteristics of the lateral lakes are not well understood, these results cannot be generalized to the other lateral lakes.

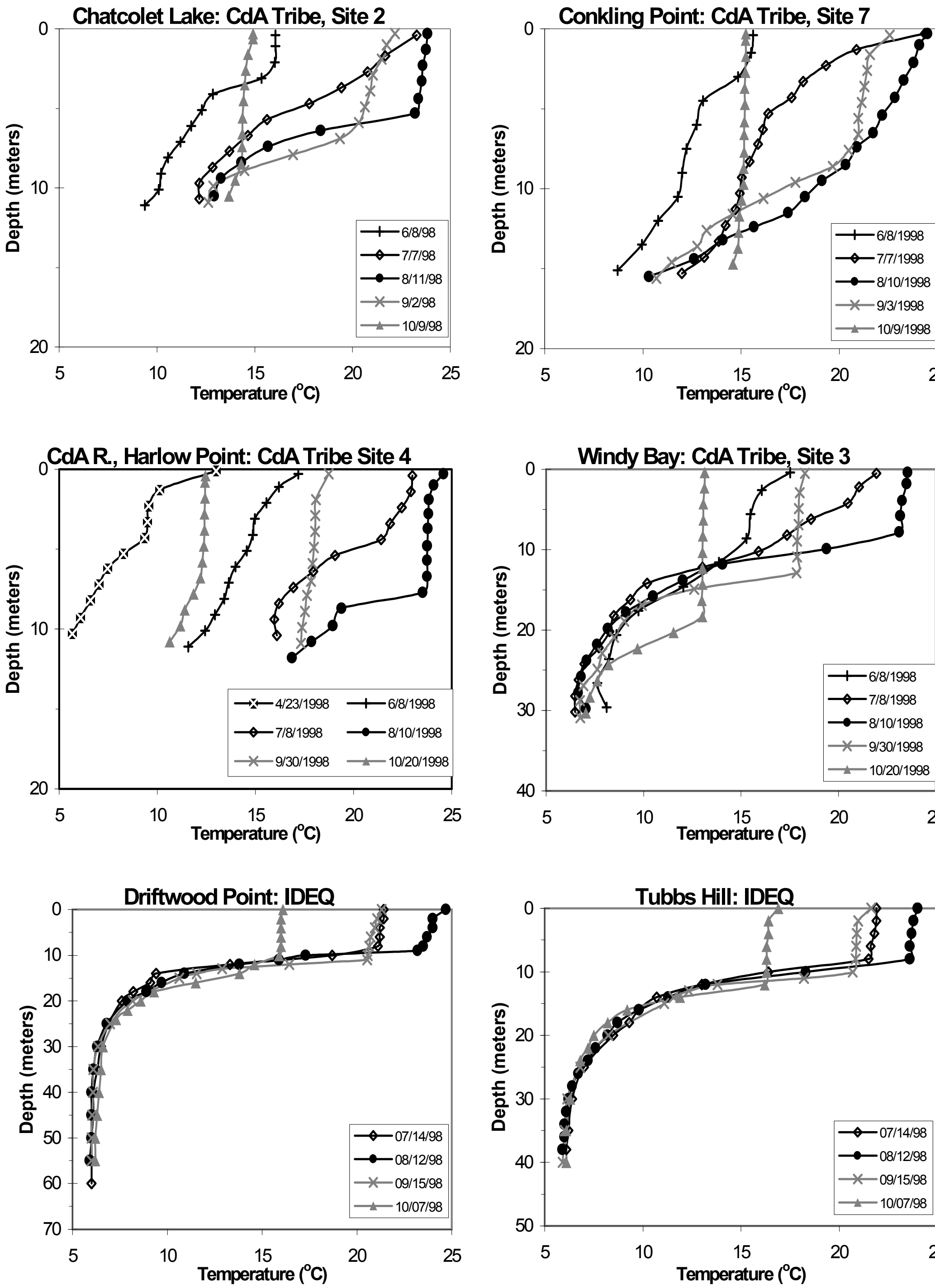
The 2003 monitoring effort, along with other water temperature study data, shows that Coeur d'Alene Lake follows a dimictic pattern of thermally stratifying in the summer and fully mixing throughout the water column during spring and fall. When the lake is stratified, it has a warm upper layer (epilimnion), cooler middle layer that has a large rate of temperature reduction associated with depth (metalimnion), and an even cooler layer with stable temperatures below (hypolimnion). The lake becomes thermally stratified by June or July and remains stratified into October (Golder, 2004j). EPA (2001a) reported that the depth of the epilimnion averaged about 10 meters (33 feet) and the upper depth of the hypolimnion averaged about 15 meters (49 feet) from July through September of 7 recent years (1991, 1992, 1995–1999) (Figure 5-13). Under these conditions, the approximate distribution of the total lake volume into these layers was 38 percent in the epilimnion, 12 percent in the metalimnion, and 50 percent in the hypolimnion. The depth of the maximum rate of temperature change in the water column (thermocline) varies spatially within the lake. In 1992, the thermocline was deepest at the north end of the lake (21.5 meters [71 feet]) and shallowest in the south end of the lake (4.5 to 8.5 meters [15 to 29 feet]) (Golder, 2004f). Based on measurements made in Coeur d'Alene Lake, including bays and shallow southern lake locations during 1992 and 1995 through 2002, annual maximum surface temperatures varied from 19.5 to 26.6ºC (67 to 80°F) (e-mail from S. Marxen, Project Engineer, Golder, Redmond, WA, to B. Mattax, Senior Aquatic Scientist, Louis Berger, Bellevue, WA, dated June 23, 2004). USGS monitoring in 1991 and 1992 indicated that minimum lake water temperatures were as low as 0ºC (32°F) in the shallow south end of the lake, but were 2 to 4ºC (36 to 39°F) throughout the rest of the lake (Golder, 2004j).

Water temperatures at the USGS Tubbs Hill station in Coeur d'Alene Lake, which is the closest monitoring station to the outlet of the lake, was used to represent the thermal conditions of outflow from the lake. Water temperatures measured by USGS and IDEQ at this location during 7 years in the 1990s ranged from about 2 to 24ºC (36 to 75°F), and indicate that summer outflow from the lake generally tends to range in the mid– to high 20sºC (73 to 81°F) (Golder, 2004d; e-mail from S. Marxen, Project Engineer, Golder, Redmond, WA, to B. Mattax, Senior Aquatic Scientist, Louis Berger, Bellevue, WA, dated June 13, 2004). Temperatures at this location vary from year to year but tend to follow the same seasonal thermal stratification patterns seen elsewhere in the lake. Temperatures are very similar throughout the water column in early spring and begin to thermally stratify during later spring (Figure 5-13). By early August, the epilimnion approaches 24ºC (75°F) to a depth of approximately 7 meters (23 feet) over a layer that becomes steadily cooler with depth. Near-bottom temperatures are generally about 7ºC (45°F) in August and slowly increase to near 8ºC (at a depth of 26 feet) by October. In the fall, near-surface water temperatures cool, eventually resulting in turnover, and similar temperatures throughout the water column.

The 9-mile-long Spokane River reach from the outlet of Coeur d'Alene Lake to Post Falls HED is an impounded reach for the portion of the year that includes the warmest summer months. This river reach receives Coeur d'Alene Lake outflow that is controlled by the natural outlet sill that starts at an elevation of 2,112 feet and rises to an elevation of 2,118 feet farther downstream. As a result of this natural sill, water entering the Spokane River comes from the top 16 feet of the lake when it is at its summer elevation of 2,128 feet. Therefore, it is only the epilimnion of Coeur d'Alene Lake that supplies the inflow to the Spokane River. The seasonal progression of water temperatures monitored in 1998 at elevation 2,112 feet near the lake outlet (at Tubbs Hill) is displayed in Figure 5-14. At these depths, water temperatures higher than Idaho's instantaneous maximum criterion of 22ºC (71.6°F) were reported for mid-August, and temperatures higher than Idaho's maximum daily average temperature of 19ºC (66.2°F) were common in July, August, and September. Results of monitoring conducted during August 1992, an extremely dry period, also indicate that the Spokane River reach upstream of the Post Falls HED only experienced small (about 0.3ºC [0.5°F]) daily fluctuations and that little temperature change occurs throughout the water column (Cochrane, 1994).

Downstream of Post Falls HED to Monroe Street HED

Water temperatures reported by USGS for the Spokane River immediately downstream of Post Falls HED (Gage No. 124189000) since 1973 are similar to temperatures in the upper 20 feet of Coeur d'Alene Lake and the river reach from the lake outflow to Post Falls HED. Water temperatures in the reach between Post Falls HED and the Idaho/Washington border, monitored during July through mid-September in 2001 (an extremely dry period used to assess near worst-case conditions), exceeded Idaho's coldwater criteria (i.e., instantaneous maximum of 22ºC [71.6°F] and daily average of 19ºC [66.2°F]) throughout the monitoring period (HDR, 2005).



Note: CdA – Coeur d'Alene

Figure 5-13. Selected vertical profiles of temperature at six locations associated with Coeur d'Alene Lake, 1998. (Source: Modified from Golder, 2004d)

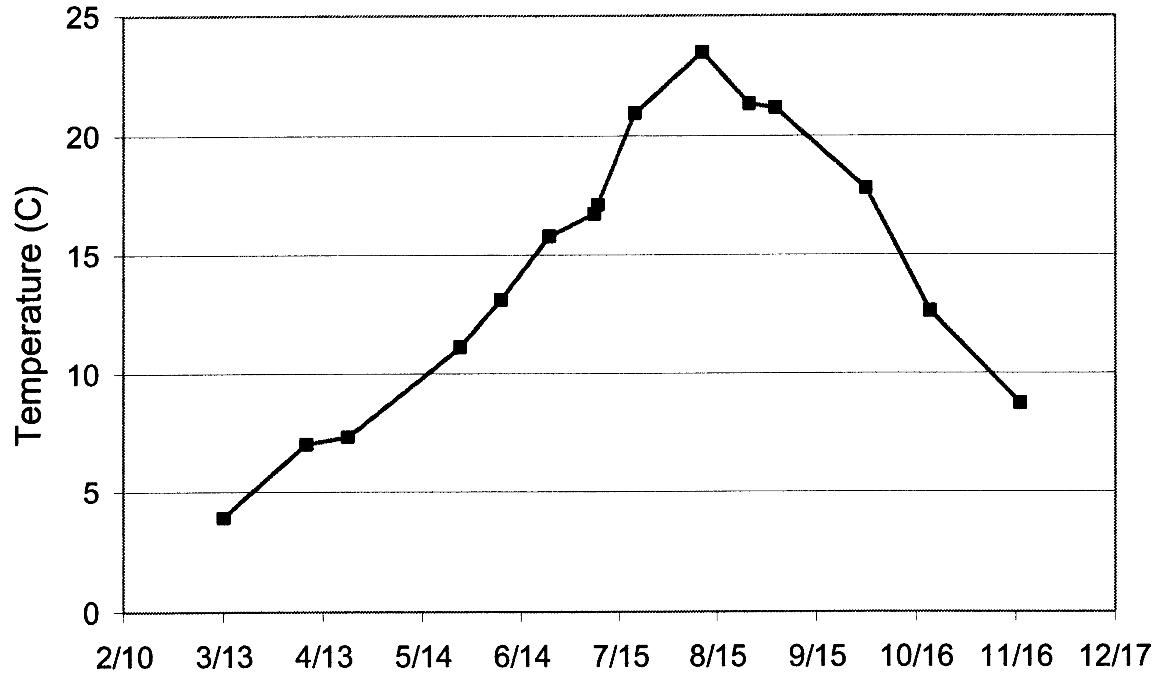


Figure 5-14. Temperature patterns monitored at elevation 2,112 feet in Coeur d'Alene Lake near Tubbs Hill, 1998. (Source: Golder and HDR, 2004)

HDR (2005) reports that water temperature data collected by WDOE at the Idaho/Washington border between 1959 and 2001 follow a consistent seasonal pattern, generally with minimum values of about 2ºC (36°F) and maximum values of about 22 to 25ºC (72 to 77°F). Washington's 20ºC (68°F) criterion is generally exceeded from July through early September for the first 11.5 river miles on the Spokane River in Washington. Water temperatures are highly influenced by interchange of surface and groundwater in the reach between the Sullivan River Bridge (river mile 87.5) and the Monroe Street diversion dam. Data collected during the drought conditions in 2001 indicate that temperatures of less than 20ºC (68ºF) occurred from near the Sullivan River Bridge to the Monroe Street diversion dam, with the exception of areas within the Upriver Dam Pool (WDOE, 2003b; Golder and HDR, 2004).

Downstream of Monroe Street HED to Nine Mile HED

Based on WDOE spot measurements of water temperature collected at five locations between Monroe Street HED and Nine Mile HED in 1991, 2000, and 2001, temperatures are generally less than 20ºC (68ºF) (Golder and HDR, 2004). Relatively cool temperatures in this reach during the summer appear to be largely due to the cool groundwater entering the river upstream as well as within this reach (WDOE, 2003b; Golder and HDR, 2004).

Downstream of Nine Mile HED to Long Lake HED

Temperature measurements made during 1991 and 2000 indicate that Lake Spokane thermally stratifies during a portion of the year. Water temperatures in the spring are relatively similar throughout the water column (Figure 5-15), largely because of high spring flows that move rapidly through Lake Spokane (WDOE, 2004a). During the summer months, hydraulic retention times in the lake are much longer, which promotes thermal stratification. In 1991, Lake Spokane hydraulic retention times averaged 7 days in May and increased to as high as 56 days in August. The average retention time for July through September was 44 days (WDOE, 2004b). During the summer, relatively cool, dense inflows remain near the bed in the upper end of the reservoir and proceed through most of the reservoir as interflow (HDR, 2005). In the forebay, the thermocline typically develops at a depth well above where the Long Lake HED power plant intake withdraws water; hence, cool water is routed through the lake during the summer. Lake surface temperatures have been reported to reach as high as 24 to 25°C (73 to 77ºF) in August 1991 and 2002. Starting in September, the flow entering the lake increases with the drawdown of Coeur d'Alene Lake. Also, the river cools more rapidly than Lake Spokane as days shorten and temperatures decrease.

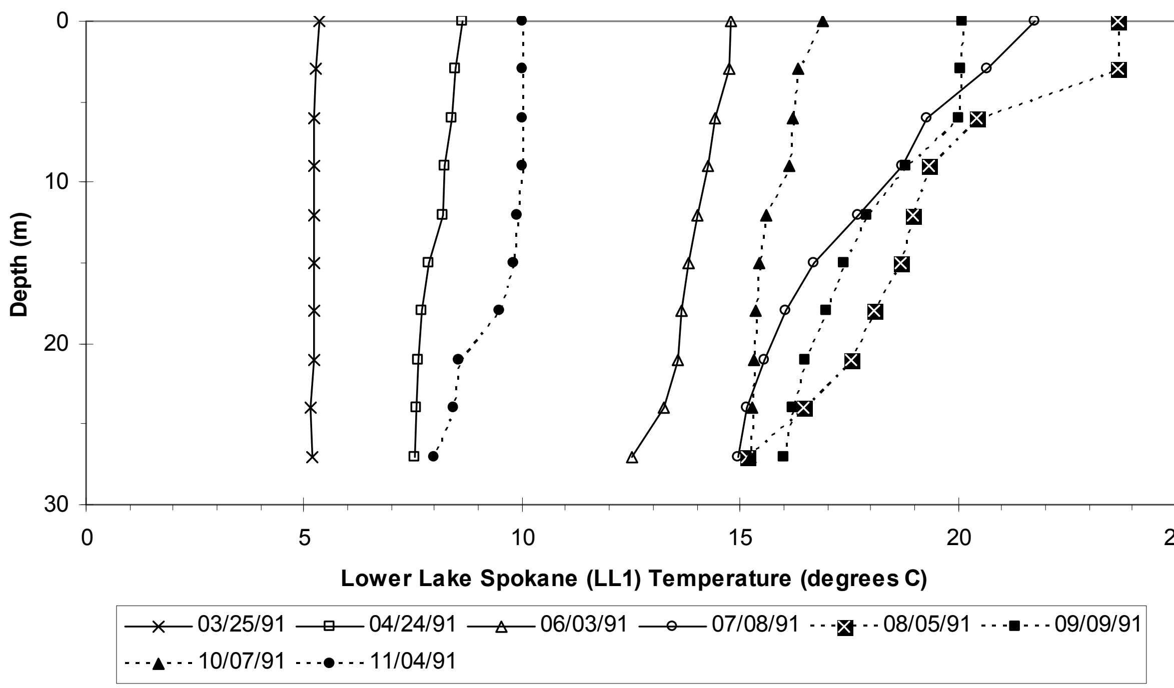


Figure 5-15. Vertical profile of temperature in Lake Spokane at river mile 37.6 as measured by WDOE in 1991. (Source: Golder and HDR, 2004)

Downstream of Long Lake HED

Water routed through the Long Lake HED penstocks is withdrawn from Lake Spokane through intake structures that are located between elevations 1,491 and 1,507 feet (i.e., a depth of about 30 to 45 feet when the reservoir is at its normal full-pool elevation of 1,536 feet). At the level of the intakes, Lake Spokane temperatures are approximately 18 to 19°C (64 to 66°F) during the summer; hence, summer discharges from Long Lake HED are substantially cooler than surface waters of Lake Spokane. Results of a long-term investigation of water temperatures measured approximately 0.6 mile downstream of Long Lake HED indicate that the river generally complies with Washington's 20ºC (68°F) criterion (HDR, 2005). At Little Falls HED (river mile 29.3), located approximately 4.6 miles downstream of the Long Lake HED tailrace, water temperatures during 2001 and 2002 remained below Washington's 20ºC (68°F) criterion; however, the Spokane Tribe of Indians' water temperature criteria of 11 to 18.5°C [52 to 65°F], depending on time of year, were exceeded between September and mid-October, even with the favorable influence of cooler water provided by the mid-level intake of Long Lake HED (HDR, 2005).

5.5.1.3 Biological Productivity and Related Water Quality Parameters

Upstream of Post Falls HED

Coeur d'Alene Lake's trophic status transitioned from mesotrophic (moderate primary productivity) in 1975 to oligotrophic (low primary productivity) by the early 1990s, representing improving water quality conditions.[34] Woods (1997) credits this change to a 50 percent reduction in nutrient loads, caused in part by elimination of direct discharges of mining and smelting wastes to the South Fork of the Coeur d'Alene River, diversion of untreated sewage to municipal wastewater treatment plants (WWTPs), and implementation of best management practices by timber harvest and agricultural industries. Results of an investigation of nutrient loading to the lake in the early 1990s indicate that the St. Joe River is currently the primary source of phosphorus. Harvey and Aparicio (2003a,b) indicate that the sources of nutrients in the St. Joe and St. Maries rivers subbasins are not readily apparent, although the City of St. Maries' WWTP and the Potlatch Corporation both discharge into the river downstream of the confluence with the St. Maries River and substantial areas of the lower St. Joe Basin are under agricultural use. Estimated loadings of phosphorus from the St. Joe and Coeur d'Alene rivers for 1991 were 72,100 kilogram (kg) and 22,000 kg (approximately 159,000 pounds and 48,500 pounds), respectively (Woods, 2001). For the drier year of 1992, estimated phosphorus loadings from the St. Joe and Coeur d'Alene rivers were 18,300 and 9,980 kg (approximately 40,300 and 22,000 pounds), respectively (Woods and Beckwith, 1997). Nitrogen loadings followed the same pattern, with the St. Joe River being the single largest source, although the relative difference of nitrogen loadings between the St. Joe and Coeur d'Alene rivers was not as large as for phosphorus (Golder, 2004f). The lake acts as a sink for both phosphorus and nitrogen, although the lake retains a much greater percentage of inflowing phosphorus (Golder, 2004d). Ratios of inorganic nitrogen to inorganic phosphorus suggest that there is a strong tendency for phytoplankton to be limited by phosphorus availability throughout the lake (Woods and Beckwith, 1997).

Woods and Beckwith (1997) reported that Secchi depths ranged between 0.7 and 9.5 meters (2.3 to 31.2 feet) in 1991 and 1.7 and 11.1 meters (5.6 to 36.4 feet) in 1992. The smallest Secchi depths occurred during late winter and spring when snowmelt runoff had

[34] This trophic status assessment was based on a system that was developed by the United Nation's Organization for Economic Cooperation and Development (Ryding and Rast, 1989) and uses annual geometric mean concentrations of chlorophyll-*a*, total phosphorus, and total nitrogen.

increased turbidity in the lake, whereas the highest values occurred in late summer and fall well after the high runoff season. Values were consistently lower in the southern end of the lake due to the proximity of the two major inflows (i.e., the St. Joe and Coeur d'Alene rivers); the shallow depths, which permit resuspension of bed sediments by wind-induced turbulence; and increased biological production (Woods and Beckwith, 1997).

Golder (2004j) compiled and summarized water quality data obtained from IDEQ, USGS, and the Coeur d'Alene Tribe. Figure 5-5 displays the bathymetry of the lake and denotes various landmarks that are useful in interpreting the summary of water quality data. Table 5-23 summarizes the data and frequency of discrete measurements that did not meet the corresponding numeric water quality criteria.

Table 5-23. Summary of nutrient and DO concentrations and pH values from Coeur d'Alene Lake and tributaries to the lake.[a]

Site	Depth	No. of Samples	Minimum	Maximum	Mean	Exceedance[b] (%)
DO (mg/l)	--					
St. Joe River	--	882	0.1	19.5	9.6	5.1
Coeur d'Alene River	--	997	6.5	14.0	10.2	0
Small Tributaries	--	--	--	--	--	--
Chatcolet Lake	All depths[c]	995	0.0	20.0	9.0	6.5
	Top[d]	68	7.9	20.0	10.6	0
	Bottom[e]	65	0.0	17.2	6.3	NA
Blue Point	All depths	1,537	2.6	19.5	9.5	0.4
	Top	87	7.3	19.0	10.0	0
	Bottom	86	2.6	17.9	7.8	NA
Driftwood Point	All depths	1,057	6.4	12.8	9.1	0
	Top	46	12.8	12.8	9.3	0
	Bottom	46	6.4	12.0	8.5	NA
Tubbs Hill[f]	All depths	824	7.5	12.8	9.1	0
	Top	41	7.5	12.8	9.4	0
	Bottom	43	6.3	11.9	8.2	NA
pH (standard units)						
St. Joe River	--	891	5.0	8.3	7.0	3
Coeur d'Alene River	--	1,081	5.0	8.2	7.2	1
Small Tributaries	--	2	7.0	7.5	7.1	0
Chatcolet Lake	All depths	989	6.1	9.3	7.2	6
	Top	67	6.9	8.8	7.6	0
	Bottom	64	6.1	8.1	6.8	20
Blue Point	All depths	1,458	6.0	9.9	7.3	4

Site	Depth	No. of Samples	Minimum	Maximum	Mean	Exceedance[b] (%)
	Top	88	6.8	9.0	7.5	0
	Bottom	87	6.0	9.9	7.0	7
Driftwood Point	All depths	1,073	6.3	8.1	7.3	3
	Top	46	[g]	8.1	7.4	0
	Bottom	46	6.3	8.0	7.0	13
Tubbs Hill	All depths	812	7.5	9.4	7.2	3
	Top	41	6.5	9.4	7.5	0.02
	Bottom	42	6.3	7.7	7.0	14
Ammonia (mg/l)						
St. Joe River	--	95	0.001	0.17	0.03	0
Coeur d'Alene River	--	206	0.005	0.46	0.05	0
Small Tributaries	--	133	0.001	0.28	0.03	0
Chatcolet Lake	All depths	38	0.001	0.21	0.03	0
Blue Point	All depths	66	0.001	0.13	0.01	0
Driftwood Point	All depths	81	0.001	0.13	0.01	0
Tubbs Hill	All depths	80	0.001	0.14	0.01	0
Nitrate+Nitrite (mg/l)[h]						
St. Joe River	--	38	0.0025	1.7	0.12	76
Coeur d'Alene River	--	116	0.0025	0.4	0.11	96
Small Tributaries	--	133	0.0025	2.3	0.24	71
Chatcolet Lake	All depths	38	0.003	0.2	0.02	3
Blue Point	All depths	57	0.003	0.1	0.03	0
Driftwood Point	All depths	81	0.003	0.1	0.05	0
Tubbs Hill	All depths	80	0.003	0.1	0.04	0
Total Phosphorous (mg/l)[i]						
St. Joe River	--	96	0.0005	0.10	0.017	69
Coeur d'Alene River	--	250	0.0005	2.0	0.062	81
Small Tributaries	--	130	0.003	0.19	0.035	2
Chatcolet Lake	All depths	38	0.003	0.19	0.017	84
Blue Point	All depths	64	0.0005	0.021	0.008	61

Site	Depth	No. of Samples	Minimum	Maximum	Mean	Exceedance[b] (%)
Driftwood Point	All depths	80	0.0004	0.016	0.004	7
Tubbs Hill	All depths	79	0.001	0.016	0.004	14

Note: % – percent
mg/l – milligrams per liter
NA – not applicable
pH – potential hydrogen

[a] Sources: Golder, 2004c; e-mail from S. Marxen, Project Engineer, Golder, Redmond, WA, to B. Mattax, Senior Aquatic Scientist, Louis Berger, Bellevue, WA, dated June 14, 2004.

[b] Percent exceedance is the percent of values that do not comply with the applicable criterion. Values do not apply to the bottom layer since DO criteria are not applicable to the hypolimnion.

[c] All depths include all information from vertical profile data.

[d] "Top" only includes values from the top layer of profiles.

[e] "Bottom" only includes values from the bottom layer of profiles

[f] The Tubbs Hill monitoring site is located southeast of Tubbs Point.

[g] Minimum value reported as 8.1 units, although mean value reported as 7.4 units, hence a minimum pH value is not reported in this table.

[h] Compared to EPA (2000) Default Reference Value Guidance for Ecoregion II of 0.01 mg/l (25th percentile) for rivers and 0.02 mg/l (25th percentile) for lakes.

[i] Compared to EPA (2000) Default Reference Value Guidance for Ecoregion II of 0.00625 mg/l (25th percentile) for rivers and 0.00775 mg/l (25th percentile) for lakes.

DO concentrations and pH exhibit a seasonal pattern in Coeur d'Alene Lake. In the spring, the density of the water becomes fairly uniform throughout the water column (the spring turnover), and DO concentrations are similar from the surface to the bottom. As thermal stratification is established in early summer, biological and chemical oxygen demand in the deeper hypolimnion lowers DO substantially in portions of the lake and its associated lateral lakes (Woods and Beckwith, 1997). In 1991 and 1992, hypolimnetic DO concentrations were lowered to less than 0.5 milligram per liter (mg/l) (anoxic) in Chatcolet Lake during parts of August and September. Very low DO concentrations also occurred in the lower portion of the water column of the shallow southern portion of Coeur d'Alene end of the lake, where submerged aquatic plants are common (Table 5-23). Decomposition of aquatic plants in this region of the lake is a contributing factor to these low DO concentrations. During fall turnover, mixing of the thermally stratified layers increases DO concentrations in the hypolimnion, eventually leading to complete mixing of the entire water column.

During spring turnover, the pH is near 7.5 units throughout the water column. As thermal stratification is established, hypolimnetic pH decreases to just below 7.0 units, and epilimnetic pH increases to greater than 8.0 units. Greater pH differences occur in shallow areas, as exhibited by reported values of 6.0 to 10.0 units (Golder, 2004j). Surface measurements from the lake generally meet Idaho's criteria, but pH levels outside the allowable limits sometimes occur in deeper water. These exceedances are generally pH values of less than the 6.5-unit lower limit and typically occur during late May and mid-September (Golder, 2004j). Deeper lake waters also experience infrequent exceedances of the 9.0-unit upper limit. Inflows from the Coeur d'Alene and St. Joe rivers are infrequently below the lower limit of 6.5 units.

Downstream of Post Falls HED to Long Lake HED Tailrace

The Spokane River receives nutrients from a number of substantial point sources as well as non-point sources. Excessive nutrient loading of the Spokane River in the state of Washington has resulted in its being included on Washington's 303(d) list as being threatened due to total phosphorous, DO, and pH levels (WDOE, 2003c,d). The river is currently the subject of a proceeding to develop a TMDL for DO. The WDOE (2004a) identified the following sources of nutrients in its draft TMDL for DO; however, stakeholders in the TMDL proceeding generally acknowledge this is an extremely complicated river system, making it difficult to isolate discrete effects of particular point and non-point source loads relative to the various gaining and losing reaches of the river and other influences on water quality:

- City of Coeur d'Alene Advanced Wastewater Treatment Plant (AWTP) at river mile 111.0.
- Hayden Area Regional Sewer Board Publicly Owned Treatment Works (POTW) at river mile 108.7.
- City of Post Falls POTW at river mile 100.5.
- Liberty Lake POTW at river mile 92.7.
- Kaiser Aluminum Industrial Wastewater Treatment Plant (IWTP) at Trentwood, river mile 86.0.
- Inland Empire Paper Company IWTP at river mile 82.6.
- City of Spokane AWTP at river mile 67.4.
- Hangman Creek (river mile 72.5), which receives small seasonal discharges from the communities of Cheney, Spangle, Rockford, Tekoa, and Fairfield POTWs.
- Little Spokane River (river mile 56.5), which receives discharges from Kaiser-Mead IWTP (currently not in operation), WDFW Spokane Fish Hatchery, and the Colbert Landfill Superfund Site groundwater pump and treatment system operated by Spokane County.
- Coulee/Deep Creek (river mile 59*)*, which indirectly receive a portion of the effluent discharges of the city of Medical Lake. Knight (1998, as cited by WDOE, 2004a) states "At current proposed design flows, the discharge will probably not affect the Spokane River. However, as the system is expanded there may be some winter

hydraulic capacity issues in Deep Creek and a potential for a new growing-season phosphorus load to the Spokane River."

- The Spokane Valley-Rathdrum Prairie Aquifer, which ultimately discharges to the Spokane River. Refer to Section 5.4, *Water Quantity*, for information on gaining and losing reaches of the Spokane River.

WDOE (2005a) recently proposed listing the Spokane River on its 2004 303(d) list for low DO concentrations as far upstream as the Stateline Gage. Between Post Falls HED and the Spokane AWTP, the Spokane River is very oligotrophic (that is, it has an abundance of DO and a deficiency of nutrients in plants) (Kadlec, 2000). Although the City of Coeur d'Alene AWTP discharges nutrients to the river, it does not appear to substantially increase primary productivity due to high metal concentrations that inhibit growth of algae Kadlec (2000). Woods (2001) estimated the primary nutrient loads of the Spokane River at three locations for water year 1999 (Table 5-24). These results indicate that the load of dissolved nitrate plus nitrite increases substantially between Post Falls and Spokane, and substantial loading of various forms of nitrogen and phosphorus occurs between Spokane and discharges from Lake Spokane. An evaluation of historical loadings of total phosphorus to Lake Spokane indicates that the Spokane AWTP currently supplies about 30 percent of the total phosphorus, in contrast to nearly 55 percent of the load accounted for by the city's treatment facilities prior to construction and initiation of operation of the AWTP in December 1977 (Soltero et al., 1992, as cited by WDOE, 2004a). Results of this evaluation by Soltero et al. (1992) also indicate that the Little Spokane River contributes about 12 to 13 percent of the total phosphorus load, and Hangman Creek contributes about 2 to 4 percent of the load. As part of the process for developing a TMDL for DO, WDOE monitored nutrient concentrations in the Spokane River at several locations between the Idaho/Washington border and river mile 58.1 (WDOE, 2004a). The results of this monitoring program (Figures 5-16 and 5-17) also indicate the substantial effects of the City of Spokane's AWTP on concentrations of total phosphorus and total per sulfate nitrogen.

Table 5-24. Annual loads and flow-weighted concentrations of nitrogen and phosphorus, water year 1999. (Source: Woods, 2001)

	Annual Load (pounds)			**Mean Flow-Weighted Concentration (mg/l)**		
	Near Post Falls (USGS No. 12419000)	**At Spokane (USGS No. 12422500)**	**At Long Lake (USGS No. 12433000)**	**Near Post Falls (USGS No. 12419000)**	**At Spokane (USGS No. 12422500)**	**At Long Lake (USGS No. 12433000)**
Total nitrogen	2,430,000	4,030,000	13,000,000	0.164	0.272	0.713
Dissolved ammonia	108,000	151,000	377,000	0.007	0.010	0.021
Total organic plus ammonia nitrogen	1,840,000	1,870,000	3,850,000	0.124	0.126	0.212
Dissolved nitrate plus nitrite	569,000	2,240,000	11,000,000	0.038	0.151	0.604

	Annual Load (pounds)			Mean Flow-Weighted Concentration (mg/l)		
	Near Post Falls (USGS No. 12419000)	At Spokane (USGS No. 12422500)	At Long Lake (USGS No. 12433000)	Near Post Falls (USGS No. 12419000)	At Spokane (USGS No. 12422500)	At Long Lake (USGS No. 12433000)
Total phosphorus	187,000	174,000	677,000	0.013	0.012	0.037
Dissolved orthophosphorus	37,100	58,100	464,000	0.002	0.004	0.026

Notes: mg/l – milligrams per liter
USGS – U.S. Geological Survey

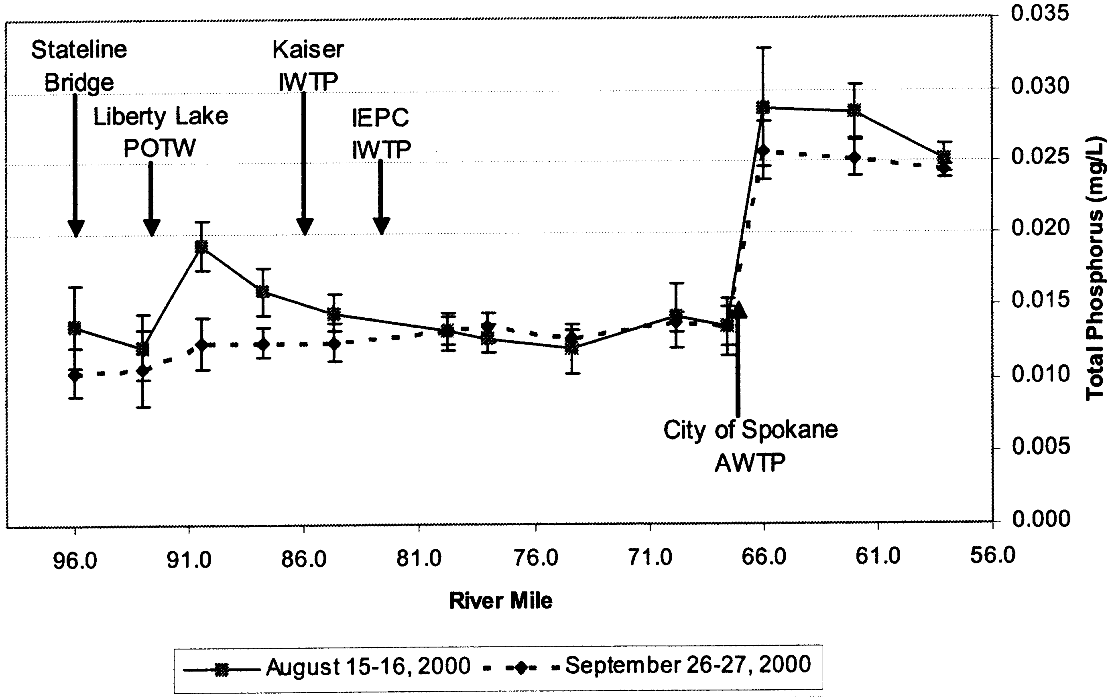


Figure 5-16. Average total phosphorus concentration data (n = 4) ± standard deviation by river mile for WDOE river surveys conducted on August 15–16 and September 26–27, 2000. (Source: WDOE, 2004a)

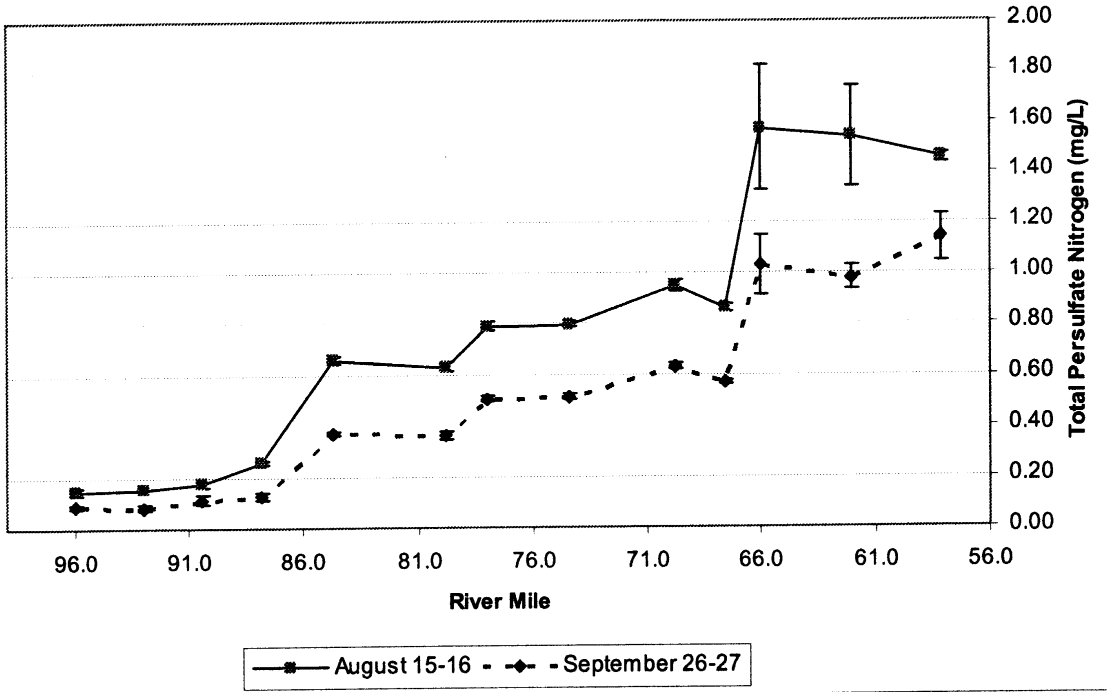


Figure 5-17. Average total persulfate nitrogen concentration data (n = 4) ± standard deviation by river mile for WDOE river surveys conducted on August 15–16 and September 26–27, 2000. (Source: WDOE, 2004a)

Hallock (2004) summarized water quality data collected year-round by WDOE at its long-term stations in the Spokane River Basin, and WDOE (2004a) summarized historical water quality data collected between June and October of 1977 to 2001. Table 5-25 provides summaries of year-round data collected by WDOE at the Washington/Idaho border (river mile 96.0), 1.4 miles downstream of the City of Spokane's AWTP (river mile 66.0), and in Hangman Creek near its mouth, as well as June to October data collected in the Little Spokane River near its mouth.

Table 5-25. Summary of DO, pH, conductivity, nutrient, and turbidity data for WDOE ambient monitoring stations at locations along the Spokane River in Washington. (Source: Modified from Hallock, 2004; WDOE, 2004a)

	No. of Samples	Minimum	Maximum	Median
DO (mg/l)				
Spokane River at Stateline Bridge	249	6.2	15.1	10.8
Riverside State Park	248	7.8	15.3	11.8
Hangman Creek	220	7.8	16.1	12.0
pH (standard units)				
Spokane River at Stateline Bridge	245	6.3	8.5	7.5
Riverside State Park	246	6.8	8.9	8.0
Hangman Creek	219	7.0	9.3	8.3

	No. of Samples	Minimum	Maximum	Median
Specific Conductance (μS/cm)				
Spokane River at Stateline Bridge	248	23	94	54
Riverside State Park	246	46	295	115
Hangman Creek	220	77	445	273
Little Spokane River [a]	54	NR	NR	254
Ammonia (mg/l)				
Spokane River at Stateline Bridge	241	0.010	0.19	0.010
Riverside State Park	239	0.010	0.700	0.036
Hangman Creek	211	0.010	0.320	0.022
Little Spokane River	56	NR	NR	0.017
Nitrate+Nitrite (mg/l)				
Spokane River at Stateline Bridge	168	0.010	0.253	0.040
Riverside State Park	167	0.060	3.300	0.541
Hangman Creek	139	0.190	11.000	1.220
Little Spokane River [a]	56	NR	NR	1.110
Soluble Reactive Phosphorus (mg/l)				
Spokane River at Stateline Bridge	242	0.001	0.120	0.010
Riverside State Park	237	0.003	0.130	0.020
Hangman Creek	207	0.005	0.150	0.038
Little Spokane River [a]	56	NR	NR	0.011
Total Phosphorus (mg/l)				
Spokane River at Stateline Bridge	238	0.008	0.150	0.019
Riverside State Park	234	0.010	0.693	0.040
Hangman Creek	208	0.010	1.740	0.072
Little Spokane River [a]	56	NR	NR	0.027
Turbidity (NTU)				
Spokane River at Stateline Bridge	244	0.5	14.0	1.2
Riverside State Park	238	0.5	1,000	1.6
Hangman Creek	209	0.6	2,300	6.0

Note: cm – centimeter
mg/l – milligrams per liter
pH – potential hydrogen
μS – micro-Siemens
NR – not reported
NTU – nephelometric turbidity unit

[a] Values were reported by WDOE (2004b) based on June to October measurements. Little Spokane River values in the medians column are means, not medians.

5.5.1.4 Metals

Upstream of Post Falls HED

Historical mining activities in the Coeur d'Alene River Basin have resulted in contamination of soil, sediment, surface water, and groundwater. In 1983, EPA established the 21-square-mile Bunker Hill Superfund Site, which includes the 365-acre abandoned former Bunker Hill Mining and Metallurgical Complex and five main communities located in the Silver Valley, which is located along the South Fork of the Coeur d'Alene River near Kellogg, more than 15 miles from the confluence with the mainstem Coeur d'Alene River. The South Fork of the Coeur d'Alene River joins the mainstem upstream of the Project Area. Numerous studies have been conducted to evaluate metal contamination in the Coeur d'Alene Basin, and these studies were summarized in the EPA's remedial investigation report (EPA, 2001b). Subsequently, the feasibility of several alternative clean-up approaches was evaluated, and a clean-up program was selected (EPA, 2002). The clean-up is being implemented by the Coeur d'Alene Basin Commission, which was set up under the Basin Environmental Improvement Act in 2001. The program is overseen by EPA and there is significant local involvement in the Basin Commission. EPA plans to issue a draft Five-Year Review report of cleanup activities in June 2005. Refer to Section 5.3.1.7, *Hazardous Materials,* for a description of the soil and geologic conditions related to metals contamination and cleanup of the Coeur d'Alene Basin. Streamflow and water velocity are the primary factors controlling sediment transport and, therefore, trace metal transport and deposition into the lake (Clark, 2003).

Investigators estimate that 75 million metric tons of trace-element-rich sediments have been deposited in Coeur d'Alene Lake, based on a sediment-deposition layer 17 to 119 cm thick (Horowitz et al., 1993). Results of sampling surface sediments of Coeur d'Alene Lake in 1989 and 1991 as reported by Horowitz et al. (1992) are presented in Table 5-26. The results of this study indicate that most of the surface sediments in the main body of Coeur d'Alene Lake (generally downstream of the mouth of the Coeur d'Alene River) have substantially higher concentrations of antimony, arsenic, cadmium, lead, mercury, silver, and zinc than in the more southern portion of the lake and St. Joe River (Horowitz et al., 1992). In addition, concentrations of copper, iron, and manganese are somewhat higher in the main body of Coeur d'Alene Lake than in the southern portion of the lake and St. Joe River. Results of a subsequent investigation of the location of sediments with elevated concentrations of trace elements in the lake and its tributaries indicate that 85 percent of Coeur d'Alene Lake is covered by trace metal-enriched sediments, primarily from mining-related activity in the Coeur d'Alene River Basin (Golder, 2005a). Elevated trace metal concentrations were widespread in the lake sediments and occurred in some areas that were not anticipated, including Wolf Lodge Bay and the main body of the lake between the Coeur d'Alene River inflow and Blue Point.

Table 5-26. Summary of surface sediment trace and major element concentrations in Coeur d'Alene Lake. (Source: modified from Horowitz et al., 1992)

Elements	Coeur d'Alene Arm and Main Body of Coeur d'Alene Lake			Southern Coeur d'Alene Lake and St. Joe River Median[a]
	Minimum	Maximum	Median	
Antimony (mg/kg)	0.5	96	19	1
Arsenic (mg/kg)	2.4	660	120	5
Cadmium (mg/kg)	<0.5	157	56	3
Chromium (mg/kg)	<1	102	41	41
Cobalt (mg/kg)	5	43	26	12
Copper (mg/kg)	9	215	70	25
Lead (mg/kg)	14	7,700	1,800	24
Mercury (mg/kg)	0.02	4.9	1.6	0.05
Nickel (mg/kg)	4	104	21	16
Silver (mg/kg)	<0.5	21	4	<1
Zinc (mg/kg)	63	9,100	3,500	110
Iron (weight %)	1.9	16.4	4.9	3
Manganese (weight %)	0.01	2.46	0.65	0.05
Aluminum (weight %)	2.9	9	8	6.8
Titanium (weight %)	0.13	0.64	0.34	0.4
Total organic carbon (weight %)	0.3	15.6	2.2	2.5

Notes: % – percent
mg/kg – milligrams per kilogram
[a] Based on 17 samples.

Table 5-27 presents estimates of annual metal loads of cadmium, lead, and zinc entering Coeur d'Alene Lake and discharged from Post Falls HED. Clark (2003) reported that the Coeur d'Alene River supplied more than 99 percent of the lake's total load of cadmium, lead, and zinc during water years 1999–2000. As expected, loadings of each of these metals increase proportionately with inflow and outflow discharges (Golder, 2004e). The amount of sediment and trace metals retained in the lake is also highly dependent on inflow and outflow to the lake. The percent of whole-water recoverable (total) cadmium loadings retained in Coeur d'Alene Lake was fairly constant, with a median of 51 percent. Retention of the dissolved cadmium loads were much more variable, ranging from –39 percent in 1997 to 57 percent in 1999, and having a median of –3 percent. The estimates indicate that more dissolved cadmium was discharged from Post Falls than entered the lake in 4 of the 7 years, and that the highest percent exported occurred in the 2 wettest years (1996 and 1997). Percent retention of total and dissolved lead loads was fairly constant, with median values of 91 and 71 percent, respectively. Percent retention of the total and dissolved fractions of zinc were generally fairly similar to one another, with median values of 35 percent retention for total zinc loads and 32 percent for dissolved loads. However, the inter-annual variability of retention of dissolved zinc ranged from 17 to 50 percent compared to 31 to 52 percent for total zinc. The cause of differences among the variable retention rates of cadmium, lead, and zinc has not been determined.

Table 5-27. Estimated budgets for whole-water recoverable (total) and dissolved metal loads, Water Years 1992–1997, and 1999. (Source: modified from EPA, 2001b)

		Whole-Water Recoverable Load			Dissolved Load		
Year	**Annual Mean Discharge (cfs)**	**Inflow (kg/year)**	**Outflow (kg/year)**	**Retention (%)**	**Inflow (kg/year)**	**Outflow (kg/year)**	**Retention (%)**
Cadmium							
1992	3,460	4,020	1,960	51	2,370	2,090	12
1993	5,330	5,610	3,020	46	3,120	3,220	–3
1994	2,970	3,810	1,690	56	2,220	1,800	19
1995	6,300	7,230	3,570	51	3,570	3,810	–7
1996	10,200	14,100	5,790	59	4,960	6,200	–25
1997	10,300	11,000	5,830	47	4,480	6,240	–39
1999	7,530	5,000	2,200	56	3,900	1,680	57
Lead							
1992	3,460	62,900	17,600	72	9,000	3,160	65
1993	5,330	340,000	37,600	89	15,900	5,910	63
1994	2,970	87,800	16,100	82	8,890	2,640	70
1995	6,300	472,000	37,000	92	24,500	7,040	71
1996	10,200	1,840,000	81,600	96	81,000	13,100	84
1997	10,300	1,330,000	100,000	92	55,300	13,700	75
1999	7,530	268,000	23,000	91	18,300	2,800	85
Zinc							
1992	3,460	485,000	321,000	34	484,000	272,000	44
1993	5,330	660,000	455,000	31	631,000	394,000	38
1994	2,970	458,000	263,000	43	453,000	225,000	50
1995	6,300	883,000	578,000	35	722,000	491,000	32
1996	10,200	1,860,000	890,000	52	996,000	767,000	23
1997	10,300	1,450,000	862,000	41	901,000	752,000	17
1999	7,530	716,000	490,000	32	580,000	480,000	17

Notes: % – percent
cfs – cubic feet per second
kg – kilogram
For those instances in which reported values were below detectable limits, concentrations for estimating mass loads were set equal to detection limit.

Metal concentrations reported for Coeur d'Alene Lake studies conducted between 1989 and 2002 indicate higher metals concentrations in the hypolimnion than in the euphotic zone (the near-surface zone corresponding to light penetration depth), suggesting that lake sediments may act as one of the sources for dissolved metals. However, lake sediments are not believed to be the primary source of metals to the lake water column (Balistrieri, 1998, as cited by Golder, 2004e). Table 5-28 presents a summary of metal concentrations reported for five different Coeur d'Alene Lake monitoring programs conducted since 1989. Golder (2004e) compared the summary values to applicable water quality criteria, based on the Idaho Administrative Procedures Act (IDAPA) statutory minimum hardness of 25 mg/l (as $CaCO_3$). Golder (2004d) indicated that the vast majority of hardness values reported for the lake were less than the 25 mg/l (as $CaCO_3$) statutory value. These data indicate that dissolved zinc concentrations in the lake frequently exceed Idaho's ambient freshwater Criterion Maximum Concentration (CMC) and Criterion Continuous Concentration (CCC) criteria. Results for dissolved lead and cadmium suggest that their corresponding Idaho criteria are exceeded less frequently, although concentrations greater than Idaho's CCC criteria do occur for both metals. The CMC for dissolved cadmium was exceeded in the results from both a 1989 USGS study and various IDEQ studies.

Table 5-28. Summary of metal concentrations (μg/l) and compliance with Idaho standards for various Coeur d'Alene Lake metals sampling programs.[a]

Parameter (Dissolved)[b]	Number of Samples	Minimum	Maximum	Median
IDEQ 1995–2002	184			
Cadmium		0.15	2.8[c,d]	< 0.5[e]
Lead		< 3[e]	6[c,d]	< 3[e]
Zinc		30	460[c,d]	64[c,d]
USGS 1989	86			
Cadmium		< 1[e]	2[c,d]	< 1[e]
Lead		**5**[c]	9[c,d]	5[c,d]
Zinc		10	200[c,d]	120[c,d]
USGS 1991–1992	145			
Total Cadmium		<1	<1	<1
Total Lead		<1	3	<1
Total Zinc		40	70	60
USGS 1999	45			
Cadmium		0.25	0.48[c]	0.34
Lead		< 1[e]	13[c]	4[c]
Zinc		44[c,d]	93[c,d]	58[c,d]

Parameter (Dissolved)[b]	Number of Samples	Minimum	Maximum	Median
Coeur d'Alene Tribe 1997–2002	30			
Total Cadmium		< 4[c,e]	30	< 5[c,e]
Total Lead		< 1[c,e]	63	3
Total Zinc		6	236.7	70

Notes: mg/l – milligrams per liter
CCC – Criterion Continuous Concentration
CMC – Criterion Maximum Concentration
μg/l – micrograms per liter

[a] Sources: Golder, 2004d; electronic mail from J.C. McCarthy, Hydrogeologist/Geochemist, Golder, Redmond, WA, to B. Mattax, Senior Aquatics Scientist, Louis Berger, Bellevue, WA, dated June 14, 2004.

[b] Dissolved fraction unless specified as total. Note that applicable water quality standards are set for dissolved fraction and are hardness dependent.

[c] Concentration exceeds the Idaho ambient freshwater CCC, chronic, criterion calculated at 25 mg/l as $CaCO_3$.

[d] Concentration exceeds the Idaho ambient freshwater CMC, acute, criterion calculated at 25 mg/l as $CaCO_3$.

[e] Detection limit is greater than the Idaho ambient freshwater CMC criterion.

Several of the metals that are found in Coeur d'Alene Lake have the potential to accumulate in aquatic organisms (including fish) and in some cases increase in concentration as they move up the food chain (biomagnify). Consumption of fish from the contaminated areas can be a risk to human health. The Agency for Toxic Substances and Disease Registry and the Idaho Department of Health and Welfare, Idaho Division of Health worked jointly to develop and implement an evaluation of the potential risk to human health associated with the metals found in Coeur d'Alene Lake. IDOH and ATSDR (2003) reported that 14 of the metals evaluated (i.e., antimony, barium, beryllium, chromium III, cobalt, copper, manganese, molybdenum, nickel, silver, selenium, thallium, vanadium, and zinc) are not a risk to human health, based on an evaluation of worst-case exposures. Four of the metals (arsenic, cadmium, lead, and mercury) were associated with some level of risk. Based on the results of this investigation, the State of Idaho and Coeur d'Alene Tribe issued a fish consumption advisory in June 2003 (IDOH and ATSDR, 2003).

Downstream of Post Falls HED to Long Lake HED Tailrace

Elevated concentrations of metals in the Spokane River resulted in the river being listed on the 1998 303(d) list of water-quality-limited waterbodies for both Idaho and Washington. In Idaho, the listing is for "metals" (IDEQ, 2003). The listing for Washington is specific to arsenic, cadmium, chromium, lead, and zinc (WDOE, 2003c), although Johnson and Golding (2002) recommended removing chromium from the 303(d) list based on results of a study conducted in

2001 and 2002. Note that the WDOE (2005a) did not propose listing the Spokane River for metals in its proposed 2004 303(d) list since EPA has approved TMDLs addressing metals for both Idaho and Washington. The TMDLs establish a “pollution budget” for the Coeur d’Alene River Basin including waters of the South Fork of the Coeur d’Alene River and tributaries, mainstem Coeur d’Alene River, Coeur d’Alene Lake, and Spokane River upstream of the Idaho-Washington border. The pollution budget determines the amount of a pollutant that can be introduced into basin waters without exceeding applicable water quality standards. It also allocates a portion of this budget to sources of pollution. Notably, contaminant sources within the Project area (i.e., Coeur d’Alene Lake itself) were not assigned pollutant loads because it is expected that the load allocations for sources upstream of the project area would achieve compliance with water quality standards. Due to the scale of the contamination problem, the cleanup is expected to take many years. EPA, IDEQ, and other governmental agencies continue to evaluate the effectiveness of cleanup projects in light of the TMDL goals. EPA plans to issue its Five Year Review report in June 2005.

Dissolved zinc concentrations generally exceed Washington water quality criteria throughout most of the year in the upper portion of the Spokane River between the Idaho/Washington border and the Trent Road Bridge (Golder, 2004i). Dissolved lead and cadmium concentrations also exceed Washington water quality criteria in the upper portion of the Spokane River between the Idaho/Washington border and the Trent Road Bridge, but seasonal or long-term trends are less evident due, in part, to variability in the method detection limits used in analyzing the water samples over the period of record (Golder, 2004e).

In Lake Spokane, the concentration of dissolved zinc has significantly reduced over time. The samples containing the highest zinc concentrations were measured in the 1960s and 1970s and are therefore not representative of current conditions (Golder, 2004e). These samples were measured before the source control regulations requiring the use of mine tailings dams on the Coeur d’Alene River were enacted in 1968. Prior to 1968, most mine tailings were deposited on the banks or discharged directly into the Coeur d’Alene River. This illustrates the significance of source control in managing metals water quality in the Spokane River system. USGS sampling in 1999 and 2000 shows mean flow-weighted concentrations for zinc that are generally below Washington water quality criteria in Lake Spokane (Clark, 2003).

Sediments with elevated concentrations of lead are deposited in slack water areas in the Spokane River (EPA, 2001b). The primary areas where this deposition occurs are in the slack water reaches upstream of dams. In addition, fine-grained sediments are deposited in pockets behind boulders and on small beaches throughout the Spokane River.

Woods (2001) conducted an analysis of concentrations and loadings of whole-water recoverable (total) and dissolved cadmium, lead, and zinc samples in the Spokane River during water year 1999 (October 1998–September 1999), which had a mean annual flow 20 percent greater than the long-term average. Results of this analysis are presented in Table 5-29. The annual load of cadmium, lead, and zinc generally decreased between the Post Falls HED discharge and 0.5 mile upstream of the confluence with Hangman Creek (USGS No. 12422500). However, the annual load of dissolved lead increased in this reach. For water years 1999–2000, Clark (2003) reported similar results showing reductions in cadmium and zinc loads and variable response in lead loads for this reach. Discharges from Long Lake HED (USGS No. 12433000) had much smaller loadings of cadmium, lead, and zinc for both whole-water and the dissolved fraction, indicating that the reservoir acts as a sink for these metals, which is consistent with the pattern for sediments (Clark, 2003). Overall during 1999–2000, metals loads were significantly reduced between the source areas entering Coeur d'Alene Lake and the outlet from Lake Spokane. Clark (2003) reports that 76 percent of the cadmium load, 95 percent of the lead load, and 48 percent of the zinc load delivered to Coeur d'Alene Lake during 1999–2000 was lost to Coeur d'Alene Lake, the Spokane River, and Long Lake.

Table 5-29. Annual loads of whole-water recoverable and dissolved cadmium, lead, and zinc within the Spokane River, water year 1999. (Source: Woods, 2001)

	Annual Load (pounds)			**Mean Flow-Weighted Concentration (µg/l)**		
	Near Post Falls (USGS No. 12419000)	**At Spokane (USGS No. 12422500)**	**At Long Lake (USGS No. 12433000)**	**Near Post Falls (USGS No. 12419000)**	**At Spokane (USGS No. 12422500)**	**At Long Lake (USGS No. 12433000)**
Cadmium						
WWR	4,940	4,310	2,110	0.33	0.29	0.12
Dissolved	3,700	3,940	1,960	0.25	0.27	0.11
Lead						
WWR	51,300	45,300	25,000	3.46	3.05	1.37
Dissolved	6,190	8,860	7,150	0.42	0.60	0.39
Zinc						
WWR	1,080,000	989,000	764,000	72.8	66.6	42.0
Dissolved	1,060,000	875,000	577,000	71.3	59.0	31.7

Notes: µg/l – micrograms per liter
WWR – whole-water recoverable (total)

WDOE recently conducted two evaluations of contaminant levels in Lake Spokane fish-tissue samples. The results of these studies suggest that Lake Spokane is not impaired by cadmium, lead, mercury, or zinc (Jack and Roose, 2002). In a review of the data reported for the statewide evaluation of mercury levels in bass (Fischnaller et al., 2003), the Washington State Department of Health concluded that it was not appropriate to issue a fish consumption advisory for largemouth bass from Lake Spokane (WDOH, 2003).

5.5.1.5 Total Dissolved Gas

Elevated levels of TDG have the potential to adversely affect aquatic organisms, and both Idaho and Washington have adopted a numeric TDG criterion of 110 percent of saturation. Elevated levels of TDG (above 100 percent saturation, commonly referred to as supersaturation) can result when water plunges into a pool, forcing entrained gases into saturation under elevated pressure. Supersaturation can occur at both natural falls or as a result of spill at dams. TDG levels can also be influenced by other chemical and biological processes.

Contractors selected by the WRWG investigated TDG levels in Project waters and the effect of the Project on TDG by monitoring conditions at several locations in the Project area. They deployed and regularly maintained continuously recording instruments at selected monitoring locations and also made spot measurements of TDG levels to supplement the continuous data collection programs and better understand overall TDG conditions (CH2M HILL, 2002; Golder Associates Ltd., 2003; Golder, 2004b). Continuous measurements generally were made at 1-hour intervals prior to 2003 and at 10-minute intervals in 2003 and 2004. In addition, Avista had conducted earlier TDG monitoring prior to the start of the relicensing process. To fill in data needed for development of a TDG TMDL, WDOE conducted seasonal monitoring of TDG upstream of Upriver Dam and provided support to the Spokane Tribe of Indians for TDG monitoring downstream of Little Falls HED. Results of monitoring conducted by the contractors selected by the WRWG between April 2001 and early July 2004 are summarized by calendar year in Table 5-30. Results of WDOE's and the Spokane Tribe's monitoring effort are not in a format that facilitated incorporating them into this analysis, although preliminary results of WDOE's 2003 monitoring effort are available on the Internet (WDOE, 2005b). We discuss the WDOE results below.

Post Falls HED

TDG measurements obtained in the Post Falls HED forebay ranged from 97 to 111 percent of saturation during the 2003 and 2004 monitoring periods. TDG levels generally remained below the 110-percent criterion, although levels exceeded 110 percent for brief periods in May 2003. Golder Associates Ltd. (2004) reported that TDG values followed a daily cyclical pattern and attributed this pattern to variation in water temperatures (with gas saturation proportional to temperature) and photosynthesis.

Avista and contractors monitored TDG levels in the river downstream of Post Falls HED through both continuous and spot measurements during 2001, 2002, 2003, and 2004. TDG levels measured in the Post Falls HED tailrace at the USGS gage 1.2 miles downstream of the dam) ranged from 92 to 120 percent and had values greater than 110 percent at various times from March to June. Results of continuous TDG monitoring in 2003 and 2004 suggest that spill at the south channel of Post Falls HED produces less downstream TDG than passing water through the north channel (Golder Associates Ltd., 2003, 2004).

Table 5-30. Summary of TDG measurements made by Avista between April 2001 and early July 2004, by calendar year. (Sources: CH2M HILL, 2002; modified from Golder Associates Ltd., 2003; Golder, 2004b)

Location	Year	Range (%)	Total No. of Samples	No. of Samples >110%[a]	Percent of Samples >110%[a]	Months with >110%[b]
Post Falls HED forebay	2003	97–111	14,290	70	0.5	May
	2004	97–110	16,890	0	0	None
Post Falls HED tailrace on right bank	2001	92–120	6,594	323	5	May
	2002	94–106	1,708	0	0	None
	2003	97–116	10,341	2,133	21	March–April
	2004	99–118	17,752	7,001	39	March–June
Post Falls north channel 500 feet downstream of power plant access bridge	2003	106–116	11	4	36	April–May
	2004	108–119	12	9	75	March–May
Washington/Idaho border on right bank	2004	100–113	17	4	24	April–May
Northbank/Buckeye Road on right bank	2004	101–112	18	2	11	April
Mirabeau Park on right bank	2004	101–112	18	2	11	April
Upriver forebay on right bank	2004	101–111	18	1	6	April
Upper Falls HED forebay	2003	98–109	15,781	0	0	None
Upstream of Upper Falls HED spill control structure on left bank	2003	102–107	7	0	0	None
Upper Falls HED plant tailrace	2003	102–109	6	0	0	None
Between Upper Falls HED spill control structure and first falls on left bank	2003	104–109	8	0	0	None
Between first falls and second falls on left bank	2003	105–111	7	2	29	April–May
Monroe Street HED forebay; site near trash rack	2003	103–114	7	1	14	April

Location	Year	Range (%)	Total No. of Samples	No. of Samples >110%[a]	Percent of Samples >110%[a]	Months with >110%[b]
Monroe Street HED plant tailrace; site (left bank) near shore beside tailrace	2003	105–114	7	1	14	April
0.7 mile downstream of lower falls on right bank	2003	108–127	10	8	80	March–May
	2004	104–128	16	14	88	February–June
Near old railroad bridge crossing at People’s Park (1.6 miles downstream of lower falls) on left bank	2003	107–124	10	7	70	March–May
	2004	104–123	16	8	50	April–May
Upstream of Class 5 rapids (8.9 miles downstream of lower falls) on right bank	2003	105–120	13	7	54	March–May
	2004	106–118	16	8	50	April–May
Plese Park on A White Rd (11.0 miles downstream of lower falls) on right bank	2003	105–118	15	9	60	March–May
	2004	104–117	14	8	57	March–May
Upstream of Seven Mile Bridge (13.0 miles downstream of lower falls) on right bank	2004	105–118	15	8	53	March–May
Nine Mile HED forebay station	2003	98–121	15,532	7,468	48	March–June
	2004	93–119	17,982	9,169	51	March–June
Nine Mile HED tailrace on left bank	2003	96–123	15,630	6,619	42	March–May
	2004	96–116	19,096	7,162	38	March–June
At picnic ground downstream of Nine Mile Dam on left bank	2003	104–120	13	5	38	March–May
	2004	104–114	13	6	46	March–May
Long Lake HED forebay	2003	102–123	14,498	8,029	55	March–June
	2004	101–123	18,911	6,589	35	March–July

Location	Year	Range (%)	Total No. of Samples	No. of Samples >110%[a]	Percent of Samples >110%[a]	Months with >110%[b]
Long Lake HED plant tailrace	2003	104–115	5	2	40	April–May
	2004	105–114	8	3	38	April–May
Long Lake HED tailrace on left bank	2001	90–127	6,228	406	7	May–June
	2002	97–121	2,160	411	19	January, March
	2003	100–129	15,515	7,627	49	March–May
	2004	93–125	17,977	8,859	49	March–June
Long Lake HED tailrace on right bank	2003	114–127	323	323	100	April
	2004	104–121	8,513	6,801	80	March–June
Long Lake HED spill channel	2003	106–124	3	2	67	April–May
	2004	117–125	5	5	100	March–May
0.1 mile upstream of Chamokane Creek	2004	104–118	12	7	58	March–May
Little Falls HED forebay on right bank	2004	103–118	15	7	47	March–May

Notes: % – percent
TDG – total dissolved gas

[a] Values greater than 110 percent are indicators of noncompliance with applicable TDG standards, although of Washington State has a caveat in its standard that allows TDG values of greater than 110 percent when flow exceeds the 7-day, 10-year frequency flood.

[b] Short-term continuous monitoring station used for spillgate evaluations.

Downstream of Post Falls HED to Monroe Street

Spot measurements of TDG indicate that elevated TDG levels dissipate approximately 5 percent between Post Falls HED and the reservoir of the City of Spokane's Upriver HED, and that approximately half of this dissipation occurs upstream of the Washington/Idaho border (Golder Associates Ltd., 2004). A preliminary evaluation of continuous measurements of TDG upstream of Upriver Dam indicates that TDG remained below 110 percent during the spill season of 2003 (WDOE, 2005a). All TDG measurements for the Upper Falls HED forebay, tailrace, and immediately downstream of the spillway were below the 110-percent criterion. Overall, TDG was approximately 3 percent higher immediately below the Upper Falls spill control structure than upstream of it (Golder Associates Ltd., 2003). Water flowing over the natural upper falls tended to increase TDG in the north channel by about 3 to 4 percent, and resulted in exceedances of the 110 percent criterion during two monitoring events. At the Monroe Street HED forebay, spot TDG measurements ranged from 103 to 114 percent. Because routing water through the power plants typically does not result in gas entrainment, the elevated TDG levels in the Monroe Street HED forebay are likely the result of water with naturally high TDG levels caused by the upper falls being mixed with water routed through the Upper Falls HED power plant (Golder Associates Ltd., 2003).

Downstream of Monroe Street HED to Nine Mile HED Reservoir

TDG measurements in the Monroe Street HED tailrace were nearly the same as in its forebay, indicating that Monroe Street HED has little influence on Spokane River TDG levels. Spot measurements made at five locations downstream of the HED and lower falls provide insight into the effect of the naturally occurring lower falls on TDG levels and the rate of the downstream dissipation of the elevated TDG. TDG measurements at a station 0.7 mile downstream of the lower falls ranged from 104 to 128 percent of saturation and were typically greater than the corresponding levels recorded in the Monroe Street HED forebay or tailrace. This indicates that flow over the lower falls resulted in elevated TDG levels. During peak flows in late March to early April 2003, TDG levels were reduced by nearly 10 percent in the 10.3-mile-long reach below this station (Golder Associates Ltd., 2003). Golder Associates Ltd. (2004) reported a similar decrease in TDG levels within this 10.3-mile-long reach in 2004. Measurements made 2 miles farther downstream indicate that little further dissipation occurs in this reach, and TDG levels of up to approximately 117 to 118 percent of saturation occurred. This reduced dissipation rate was attributed to increased river depth and the already-reduced TDG levels.

Nine Mile HED

TDG levels measured in the Nine Mile HED forebay ranged from 93 to 121 percent of saturation. This forebay experiences daily fluctuations in TDG (commonly 3 to 7 percent) with the highest values occurring in late afternoon and the lowest values occurring in the morning. Golder Associates Ltd. (2003) suggests that large daily fluctuations in TDG could be a result of high levels of photosynthetic activity due in part from nutrient supply from the Spokane sewage treatment plant and daily temperature fluctuations in the forebay.

Downstream of Nine Mile HED to Long Lake HED Reservoir

TDG measurements obtained 0.4 mile downstream of the dam ranged from 96 to 123 percent and typically had smaller daily fluctuations than in the Nine Mile HED forebay. These downstream TDG levels tended to be similar or below corresponding levels recorded in the forebay, indicating little, if any TDG production at the HED, and that the HED's spillway may reduce gas levels at times.

Long Lake HED

TDG measurements in the Long Lake HED forebay ranged from 101 to 123 percent, and typically had daily fluctuations of less than 5 percent before mid-spring and during summer. During mid-spring, daily fluctuations in TDG of 5 to 10 percent occurred. Golder Associates Ltd. (2003) also indicated that spot measurements made in the forebay and power plant tailrace during 2003 were not consistent with measurements recorded by the continuous measurement in the forebay. These observations suggest that the continuous forebay measurements are not always representative of TDG levels in the water actually being passed through the turbines. To better monitor TDG conditions of water being drafted into the intake and to avoid damaging the equipment used for monitoring, the TDG sensor was moved to other locations during 2004. Results of this monitoring indicate that large daily fluctuations in forebay TDG occurred erratically from spring to early summer. Golder Associates Ltd. (2003, 2004) reported that the variation in TDG levels correspond with fluctuations in water temperatures and appear to be related to disruption of thermal stratification in Lake Spokane.

Downstream of Long Lake HED

TDG measurements obtained 0.6 mile downstream of Long Lake HED ranged from 90 to 129 percent. These downstream levels were generally higher than the upstream forebay levels, substantially so during spill periods. During the 2003 and 2004 monitoring period, nearly half of the measured values exceeded 110 percent. Avista also tested various spill gate configurations during monitoring. These tests indicated the potential for reducing TDG super-saturation by preferential use of certain spill gates.

5.5.2 Environmental Effects

The ongoing effects of Project operations and the potential effects of the Proposed Action are discussed in Section 5.5.2.1. Measures designed to mitigate the Project's operational effects on water quality are discussed in Sections 5.5.2.2 and 5.5.2.3.

5.5.2.1 Effects of Project Operations

The effects of Avista HEDs on water quality was examined via a series of water quality models developed using CE-QUAL-W2. The selection and application of these models proceeded at the direction of the WRWG and the modeling was carried out by consultants (Golder Associates and HDR Engineering), with technical review by one of the developers of the CE-QUAL-W2 model (Dr. Scott Wells). Two CE-QUAL-W2 models of the Spokane River had been developed previously by others (Berger et al., 2001a,b; Wells et al., 2003). WDOE used these models to assess Spokane River water quality. The exact model setups from these models were the basis for the modeling requested by the WRWG. The CE-QUAL-W2 model for Coeur d'Alene Lake is a completely new model developed during this process that simulated water quality throughout the Coeur d'Alene Lake system, including the inundated reaches of the St. Joe River, Coeur d'Alene River, and lateral lakes. The objectives of the modeling were to develop a baseline water quality simulation of current conditions and to then compare a regulated and uninundated model scenario to better understand the relative effects of the presence and operations of HEDs.

In general, the use of the model to predict relative effects is consistent with standard modeling practice. The accuracy of the parameters and modeling coefficients used in a model is always subject to some uncertainty. However, the absolute accuracy of the model is not as important because the models were used to compare scenarios (regulated versus unregulated) and any error in the model results would be similar between scenarios. Most modeling protocols acknowledge this approach as a valid use of models. Although the models are representative of water quality conditions in the river, lake, and inundated areas, the primary use of the modeling was not to forecast absolute water quality conditions, and doing so would introduce additional uncertainty into conclusions reached. For this reason, model-based exceedances and numeric predictions have some uncertainty associated with them. Both modeling analyses (Golder, 2004i; HDR, 2005) describe the uncertainties, use, and limitations associated with these models.

Lake Level Management

Current Post Falls HED operation maintains an elevated Coeur d'Alene Lake water level on average from late June into December compared to what might occur under unimpounded conditions, or a natural hydrograph (it is worth noting that "pre-Project" conditions would have been represented by operations of Frederick Post's dams). Golder and HDR used the CE-QUAL-W2 model to evaluate Project effects on water temperature and water quality in Coeur d'Alene Lake. Modeling results indicate that the Project has resulted in slightly higher water temperatures in the shallow areas of the southern portion of the lake during June to November compared to what might occur under unimpounded conditions (Golder, 2004i). At Benewah Lake, temperatures may be as much as 2.4ºC (4.3ºF) warmer for periods of up to 15 days during August and September. The model predicts that the Spokane River at Post Falls HED experiences a warming effect, compared to an unimpounded condition, of about 1.1ºC (2.0ºF) during October and between 0.4 and 0.8ºC (0.7 and 1.4ºF) between June and September. However, modeled temperatures for bottom layers at Post Falls were often cooler between June and September under current conditions than the unimpounded condition.

Comparisons of the frequency that model results exceed the applicable temperature criteria were also made using the CE-QUAL-W2 modeled values by Golder (2004i). Again, Benewah Lake was predicted to have the greatest change in the frequency of exceedances (compared to an unimpounded condition) causing a 5 percent increase in the frequency of exceedance of Idaho's 19°C (66°F) chronic coldwater criteria and a 17 percent increase in the frequency of exceedance of Idaho's 9ºC (48°F) chronic salmonid spawning criteria. However, the applicability of these criteria to shallow water areas may be limited because, for example, salmonid spawning may not occur in shallow-water environments like Benewah Lake, which would experience exceedances under unimpounded conditions as well. The Spokane River at the

Post Falls HED forebay was predicted to have no change (compared to an unimpounded condition) in the frequency of exceeding Idaho's 19ºC (66°F) chronic coldwater criteria.

The model results were also used to compare the total volume of water in shallow and deep lake areas that exceed the temperature criteria. The model predicted that, under current conditions, the volume of water in shallow areas that satisfy Idaho's 19ºC (66°F) chronic coldwater criteria is reduced by 16 percent during August in comparison to unimpounded conditions. The relative differences in volumes of water meeting this temperature criteria is lower during all other months of the year. The model predicted that current conditions, compared to an unimpounded condition, <u>increase</u> the volume of water in deep areas that satisfy Idaho's 19ºC (66°F) chronic coldwater criteria by about 11 percent during August. Impoundment was predicted to result in a reduction of approximately 1,540 acre-feet of shallow water and an increase of approximately 211,600 acre-feet of deep water that satisfy Idaho's 19ºC (66°F) chronic coldwater criteria.

Model results indicate that operation of Post Falls HED has slightly reduced DO concentrations in Coeur d'Alene Lake compared to unimpounded or natural hydrograph conditions (Golder, 2004i). This appears to be primarily due to the corresponding reduction in oxygen saturation capacity caused by increasing water temperatures. At Benewah Lake, DO concentrations were predicted to be as much as 0.6 mg/l lower for current conditions than the unimpounded condition, although predicted DO concentrations were above Idaho's 6 mg/l criterion. In deep lake segments, such as Driftwood Point, DO concentrations were predicted to be less than 0.1 mg/l lower for current conditions than unimpounded conditions.

The model predicted periods of anoxic conditions at the bottom of Chatcolet Lake that have been observed during the summer. The model indicated that these conditions would also occur under an unimpounded condition. Therefore, HED operations do not appear to be the cause of observed anoxia in Chatcolet Lake. However, the model predicted that the length of time that anoxic conditions persist at the bottom of Chatcolet Lake under current conditions is longer than would occur under unimpounded conditions.

The model was also used to compare the total volume of water in shallow and deep lake areas that satisfy Idaho's 6 mg/l DO criterion. The model predicted that current conditions, compared to an unimpounded condition, reduce the total volume of water in shallow areas that satisfy the 6 mg/l criterion by about 22 percent during August and 15 percent in July. Relative differences in shallow water satisfying the DO criterion are smaller during all other months of the year. For deep lake areas, the model predicted that current conditions, compared to an unimpounded condition, <u>increase</u> the volume of water that satisfies the 6 mg/l criterion by about 9 percent during August and September. The current condition in comparison to an unimpounded condition reduces the volume of shallow water satisfying the 6 mg/l criterion by approximately 4,540 acre feet and increases the volume of deep water satisfying this criterion by about 194,570 acre feet.

Model results suggest that current Project operations have negligible effect on pH and nitrate concentrations within deep areas of Coeur d'Alene Lake (Golder, 2004i). Shallow areas are also very similar for pH and nitrate concentrations. The model predicted that Chatcolet Lake and the Spokane River upstream of Post Falls HED sometimes have moderately lower pH in mid-summer to fall than would occur under unimpounded conditions. This has resulted in a slight improvement in satisfying the pH criteria in these areas.

The model predicted total phosphorous concentrations for current conditions that were both higher and lower that under unimpounded conditions. Benewah Lake was predicted to have the greatest increase in frequency (10 percent) of satisfying EPA's 6.25-μg/l guidance levels for total phosphorous. Differences in the frequency of satisfying this criterion were less than 3 percent at all other locations. The model predicted that several locations satisfy the 6.25-μg/l guidance levels for total phosphorous more frequently under the current condition than under an unimpounded condition.

Large quantities of trace metals, primarily cadmium, lead, and zinc, that were introduced into the lake as a consequence of more than 100 years of mining and ore-processing activities occurring in the Coeur d'Alene River Basin have affected water quality in Coeur d'Alene Lake. The main mining district, often referred to as the "Silver Valley," began operation in 1880 and was one of the major commercial sources of silver, lead, and zinc in the United States. As late as 1964, estimates indicated approximately 2,200 tons of mining and processing wastes were entering the river per day (Reece et al., 1978). These materials were highly enriched with silver, arsenic, cadmium, lead, manganese, lead, antimony, and zinc (Horowitz et al., 1992). Until 1968, most of the mining and ore-processing wastes were deposited either on the banks or directly into the South Fork of the Coeur d'Alene River. Since 1968, tailings ponds have been used to contain mining waste thereby limiting these sediment sources. This has resulted in a significant and measurable reduction in metals concentrations in Coeur d'Alene Lake and Spokane River.

Golder (2005a) examined the processes that affect metals concentrations in water and sediment for primary metals of concern, including sediment load, mixing, adsorption/desorption, diffusion, sulfide oxidation, and reductive dissolution. The results of the water quality model (CE-QUAL-W2) were used to specifically simulate possible geochemical releases from sediment using a mass balance approach that included the use of a geochemical model (PHREEQC).[35] The objective of the modeling was to assess whether variations in lake level related to HED operations would have a significant effect on the mobilization of metals from the lakebed sediments. The modeling analysis included an assessment of sediment pore water data, modeling of spatial and temporal changes (relative to uninundated conditions) for parameters controlling metals release (CE-QUAL-W2 model), and geochemical modeling (PHREEQC) to changes in the benthic flux of metals.

Modeling results indicate that, to cause a significant change in metal concentrations, HED operations would need to impose a significant long-term change in geochemical conditions (DO, pH, and redox potential) at the sediment-water interface that is sustained over an extended period. The CE-QUAL-W2 model predicted that these types of changes have not occurred as a result of past HED operations (Golder, 2004i).

[35] PHREEQC is an equilibrium speciation and mass-transfer code that USGS developed. It is capable of simulating the pertinent geochemical processes occurring at the sediment-water interface, including the precipitation/dissolution of selected solids, oxidation/reduction reactions, and adsorption/desorption of metals.

Effects Analysis

Under the Proposed Action, Avista would begin drawdown of Coeur d'Alene Lake on September 15. This date, which is consistent with the historical range of the initiation of drawdown (typically around mid-September), would provide a specific date for the initiation of drawdown. Avista also proposes to increase the Post Falls HED minimum flow to 600 cfs during non-droughts conditions and 500-cfs during drier summer conditions. Implementing these proposed operations would have a very minor effect on Coeur d'Alene Lake levels (refer to Section 5.4.2.1, *Lake Level Management and Flow Releases*), and consequently little or no effect on water quality upstream of Post Falls HED. Avista also would continue to limit drawdown of Lake Spokane to 14 feet, as it has voluntarily done since the 1980s. Limiting the Lake Spokane drawdown to 14 feet would be generally consistent with current Project operations and would not affect water quality.

Project Flow Releases

Water Temperature—Water temperatures in the Spokane River from immediately downstream of Coeur d'Alene Lake to the Idaho/Washington border currently exceed Idaho's applicable water temperature criteria during much of the summer. Comparison of CE-QUAL-W2 modeling results for current and unimpounded conditions indicate that current Project operations have substantially reduced (by 35 percent) the frequency of daily maximum temperature exceedances of Idaho's 22°C (71.6°F) criterion that would otherwise occur immediately downstream of Post Falls HED absent Project influence (HDR, 2005). However, the HED has had little effect on the frequency of daily average temperature exceedances of Idaho's 19°C (66.2°F) criterion. Modeling also indicates that Project operations have little effect on the frequency of exceedances of Idaho's daily maximum and daily average temperature criteria farther downstream at the Idaho/Washington border.

Under current Project operations, water temperatures frequently exceed Washington's 20°C (68°F) criterion in the reach between the Idaho border and the upper end of the Upriver Reservoir from July through early September. However, the model predicts that Project operations have little effect on the frequency of these exceedances. Operation of the Project has slightly increased the frequency that the criterion is exceeded at Sullivan Road as compared to an unregulated condition, but has substantially reduced the frequency of exceedance of this criterion from the upper end of the Upriver Reservoir down to the upper end of the Upper Falls Reservoir. Current Project operations have virtually no effect on exceedance of the 20ºC (68ºF) criterion at the Upper Falls forebay and tailrace.

Based on CE-QUAL-W2 modeling, current Project operations somewhat reduce the frequency that daily maximum temperatures exceed Washington's 20°C (68°F) criterion in the area of the Nine Mile Reservoir and its tailwater compared to unregulated conditions (HDR, 2005).

Model results indicate that impounding water in Lake Spokane and operating the Project increase surface temperatures in this lake reach from mid-spring through summer compared to what temperatures would be without the Project impoundments. Average increases in summer (July through September) 2001 surface lake temperatures were in the 3.6 to 6.8ºC (6.5 to 12.2ºF) range compared to free-flowing river conditions (HDR, 2005). Water in the hypolimnion of

Lake Spokane was predicted to be cooler than corresponding modeled temperatures for unimpounded conditions. Based on modeled temperatures for Lake Spokane outflow, Project operations, which draw cooler water into the HED from well below the thermocline, have generally avoided exceedances of Washington's 20°C (68°F) criterion that might otherwise occur in an unimpounded river below the location of the HED. In addition, Project operations substantially reduce the frequency that the Spokane Tribe's temperature criteria would be exceeded, compared to unimpounded conditions (HDR, 2005).

Effects Analysis

The Proposed Action includes measures for minimum instream flow releases for aquatic and aesthetic resources (measures PF-AR-1 and PF-AES-1). Avista would release at least 600 cfs as measured at the gage just downstream of the Post Falls Dam year-round with the exception of periods in August or early September when it would reduce minimum flows to as low as 500 cfs if the minimum instream flow releases cause Coeur d'Alene Lake water levels to fall to an elevation of less than 2,127.75 feet. New aesthetic flow releases would be provided seasonally at Post Falls and Upper Falls HEDs and the year-round aesthetic flow release at Monroe Street HED would continue. In addition, Avista would manage flows at Post Falls HED to protect downstream trout spawning and fry emergence.

As noted above, Golder and HDR evaluated potential effects of different Project operations on water quality in the Spokane River between Post Falls and Long Lake HEDs using the CE-QUAL-W2 model. Various model runs were conducted, including one for current conditions and runs with 700-cfs and 800-cfs minimum flows at Post Falls HED. The modeled water quality conditions for a 700-cfs minimum flow release at Post Falls HED as compared to current operations were used to evaluate the effects of 600-cfs and 500-cfs minimum flow releases (Koreny, 2004; Koreny and Oppenheimer, 2004). Additional modeling of the 600-cfs and 500-cfs flows was not deemed necessary because the results of the 700-cfs modeling, compared to current conditions, suggests that such modeling would provide little additional valuable information. In addition, during the 2001 year on which modeling was based, current operations resulted in Post Falls flow releases of less than 700 cfs over a 34-day period from August 6 to September 8. Flow releases were below 600 cfs for nearly all of this period. These conditions further support the conclusion that the 700-cfs model run was sufficient for evaluating conditions under a 600-cfs minimum discharge.

The model results indicated that a 700-cfs minimum discharge at Post Falls HED would have no influence on water temperatures upstream of the Post Falls HED. The increase in minimum discharge would result in similar or slightly cooler temperatures downstream of the HED in the losing reaches of the Spokane River (Koreny and Oppenheimer, 2004). Where groundwater inflow begins to influence river water temperatures, the relatively warm lake outflow would result in warmer temperatures than under current low-flow conditions due to the increased volume of surface water compared to cooler groundwater.

To evaluate worst-case conditions under an increased minimum discharge at Post Falls HED, we used the characteristics of daily maximum temperatures modeled for August 2001 (Figure 5-18). These modeling results show that the effects of increasing the flow release from Post Falls HED would vary by reach depending on the interaction of surface water and groundwater. In the reach that loses water to the aquifer between Post Falls HED and Barker Road (river mile 90.4), increasing the flow release would somewhat lower daily maximum temperatures. In the reach downstream of Barker Road, the river receives substantial coolwater inflow from the aquifer. Increasing the flow release from the Post Falls HED would substantially reduce the cooling effect of this inflow and consequently increase daily maximum temperatures. Model results indicate that the largest increases in daily maximum temperatures would occur at the upper end of the Upriver Reservoir (river mile 84.6). A more moderate temperature increase of 1.5°C (2.7ºF) with a 700-cfs flow release would generally occur at Sullivan Road (river mile 87.5), although current temperatures at this site already exceed Washington's 20°C (68°F) criterion at times and would likely do so more frequently with an increased HED discharge. Increasing the flow release to 700 cfs would have lesser effects downstream of the Upriver Project and the Upper Falls and Monroe Street HEDs as additional groundwater enters the river; modeling results indicate negligible effects on daily maximum temperatures from the upper end of the Nine Mile Reservoir (river mile 63.4) on downstream.

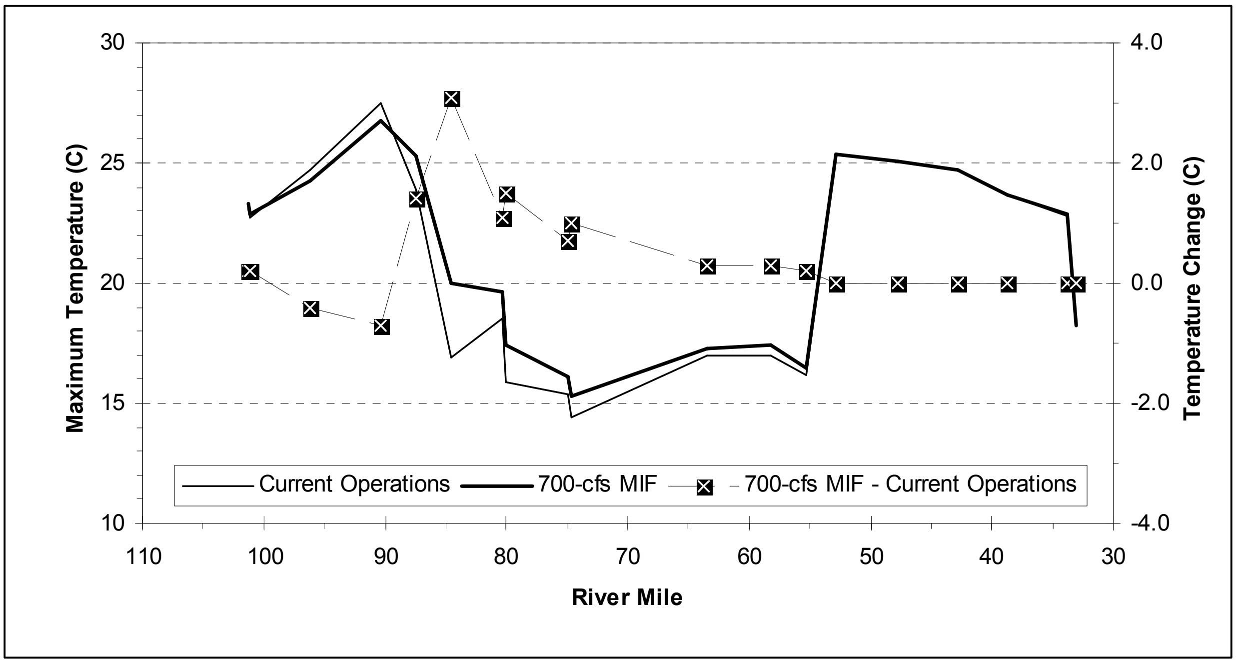


Figure 5-18. Average daily maximum temperatures and differences in temperatures modeled for current operations and 700-cfs minimum flow release at Post Falls HED, August 2001. (Source: modified from Koreny, 2004)

The effects of the Proposed Action's 600-cfs and 500-cfs flow releases on downstream water temperatures would somewhat parallel but be smaller than those for a 700-cfs flow release. Avista also gathered field data in August 2004 at a time when air temperatures were greater than 32°C (90°F) and flows of between approximately 500 and 700 cfs were released at Post Falls HED. Results of this evaluation corresponded with modeling results (Golder, 2004h). Releases of 700 cfs from Post Falls HED resulted in water temperature fluctuations of between 20 and 22.5°C (68 and 72.5°F) at Sullivan Road. Based on these results, Horner (2004) estimated that a 600-cfs release would result in temperatures of 19 to 21°C (66.2 to 69.8°F). These results indicate that water temperatures higher than Washington State's 20°C (68°F) criterion would likely still occur with a 600-cfs minimum discharge at Post Falls HED. At a 500-cfs minimum discharge, it is likely that less frequent exceedances of the 20°C (68°F) criterion would occur at Sullivan Road when compared to slightly higher flows. However, overall habitat suitability for rainbow trout was close to optimal when flows were close to 600 cfs, particularly when considered in conjunction with these temperature results (see Section 5.6).

Providing aesthetic flows into the north channel at Post Falls HED by opening two gates approximately 0.5 inch (providing a flow of approximately 46 cfs) and providing 200 cfs into the north and middle channels at Upper Falls HED could have minor short-term localized effects on flows and water temperature in these channels. Increasing flow through these channels would somewhat reduce the limited warming from solar input and ambient conditions that currently occurs in these reaches. Because current operations result in spill into these channels during many years, cooling effects would be most noticeable during below-normal river flows. However, these effects in these reaches would result in negligible effects downstream of the confluence of these channels with the rest of the river.

Biological Productivity and other Water Quality Parameters—Monitoring data for the Idaho reach of the Spokane River indicate that the 6-mg/l DO criterion and the 6.5 to 9.0 pH criteria are generally satisfied. HDR (2005) evaluated the effect that the Project currently has on DO concentrations and pH levels by comparing CE-QUAL-W2 model results for current Project operations to modeled values for unimpounded flows for 2001. The model indicates that current Project operations have little effect on minimum DO concentrations in the Idaho portion of the Spokane River. Model results also suggest that current Project operations reduce diurnal pH shifts during the spring and thereby reduce the frequency at which pH exceeds the 9.0 criterion compared to unimpounded conditions.

Monitoring data for the Spokane River between the Idaho/Washington border and Lake Spokane indicate that Washington's 8.0-mg/l DO criterion and its 6.5 to 8.5 pH criteria are usually satisfied. However, the data indicate that DO concentrations of less than the 8.0-mg/l criterion sometimes occur in the summer between the Idaho/Washington border and the Upriver Dam, and pH values fall outside the 6.5 to 8.5 pH criteria in this reach in August (HDR, 2005). Model results indicate that the frequency of days with DO concentrations of less than the 8.0-mg/l criterion under the current operations is virtually the same as unimpounded/free-flowing conditions in the Spokane River between the Idaho-Washington border and the upper end of the City of Spokane's Upriver Reservoir (HDR, 2005). For most of the reach between the Upriver forebay and Nine Mile tailrace, model results suggest that the impoundments contribute to DO concentrations falling below the 8.0-mg/l criterion during about 2 to 3 months of the summer. The model results suggest that the Project also has different effects on pH depending on the reach of the river. Between Barker Road and Sullivan Road, current Project operations appear to increase summer diurnal pH fluctuations and daily maximum pH. However, current Project operations appear to have reduced diurnal pH fluctuations and daily maximum pH in the Upper Falls Reservoir and the Nine Mile Reservoir. Because of potential model limitations in simulating periphyton, it is not practical to compare discrete modeled values to the applicable pH criteria.

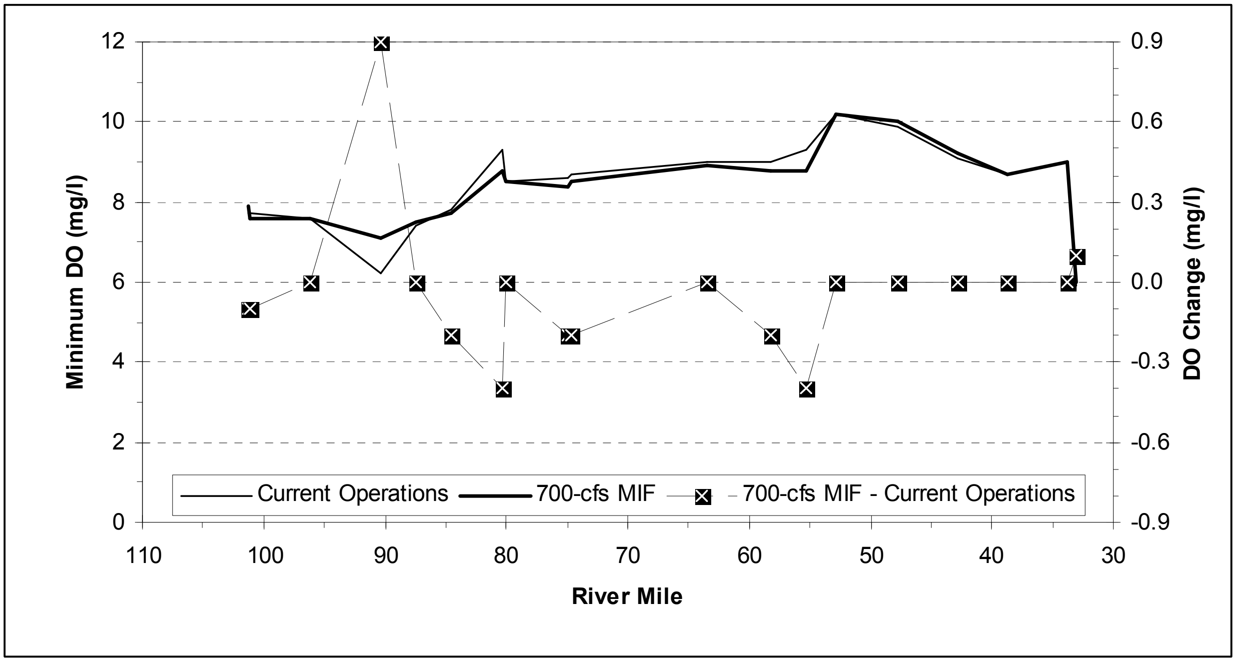
Lake Spokane thermally stratifies from June through September, and stagnation of deep water results in low DO concentrations near the bottom of the lower portion of the reservoir in the summer and early fall. The primary effects of current Project operations on DO concentrations are that concentrations are increased in the upper end of the lake during most of the spring and summer and decreased in the hypolimnion of the lower portion of the lake in comparison to free-flowing conditions. The model indicates that 8.0-mg/l concentrations would be met under unimpounded conditions, whereas the current impoundment of water behind Long Lake Dam and current Project operations, collectively, contribute to not satisfying the 8.0-mg/l criterion between 3 to 5 months per year in the interflow and hypolimnion of the lower portion of the lake under current conditions (HDR, 2005). Monitoring data indicate that pH levels are generally within the acceptable limits of 6.5 to 8.5 units, although pH exceeds the 8.5-unit criterion on occasion (HDR, 2005). The model predicted that, during August through October, pH levels exceed the upper limit of 8.5 units near the surface for both current Project operations and free-flowing conditions; however, higher pH values were predicted for current Project operations (HDR, 2005).

Monitored powerplant discharges from Long Lake HED have DO concentrations of less than the 8.0-mg/l criterion established for the Spokane River by Washington State and the Spokane Tribe of Indians for a period of about 120 to 130 days during the summer and fall (HDR, 2005). The model predicted that DO concentrations under unimpounded conditions would not drop below the 8.0-mg/l criterion, whereas current conditions result in DO concentrations of less than 8.0 mg/l for more than 108 days (HDR, 2005). HDR (2005) did not evaluate the relationship between pH values for current operations and unregulated conditions at this location.

Effects Analysis

The effects of the Proposed Action to increase the minimum discharge at Post Falls were evaluated through the use of the CE-QUAL-W2 model. Results indicate that increasing the Post Falls HED flow release to 700 cfs (used here to evaluate the approximate effects of the 600-cfs minimum flow proposed under the Proposed Action) would have little, if any, effect on upstream water quality conditions in Coeur d'Alene Lake, its tributaries and the upper Spokane River. Similarly, modeling results indicate that there would be little effect on DO and algae concentrations in the Spokane River and Lake Spokane (Koreny, 2004). Figure 5-19 displays the average daily minimum DO concentrations along with the average difference in daily minimum DO concentrations between current Project operations and a 700-cfs minimum discharge for August 2001. In the Spokane River, the average difference in daily minimum DO concentrations was within ± 0.5 mg/l at all sites other than Barker Road (river mile 90.4), where an increase of 0.9 mg/l was predicted (Figure 5-19). The change in DO concentrations at Barker Road is partially due to a corresponding cooling effect in the river in that reach which increases the water's capacity to retain oxygen. DO concentrations predicted for the surface of Lake Spokane are virtually the same for the 700-cfs release as for current Project operations. Modeled values for deeper layers generally indicated only negligible differences in DO concentrations, although minor differences of less than 1 mg/l were indicated for some water column profiles (Koreny, 2004). The effects of more than doubling the minimum flow releases from Post Falls HED (from 300 cfs or less to 700 cfs) resulted in only small differences in modeled daily minimum DO concentrations from the outflow of Lake Spokane, on average, approximately 0.1 mg/l.

Given the minimal effects predicted for a 700-cfs Post Falls HED minimum discharge and the fact that a smaller release would have even less effect, we conclude that Avista's proposed 600-cfs and 500-cfs releases would have negligible, if any, effects on DO levels in the Spokane River and Lake Spokane.



Note: Values plotted for river mile 55.3 to 33.8 are based on modeled values for the surface of Lake Spokane.

Figure 5-19. Average daily minimum dissolved oxygen concentrations and differences in dissolved oxygen concentrations modeled for current Project operations and 700-cfs minimum flow release at Post Falls HED, August 2001. (Source: modified from Koreny, 2004)

The CE-QUAL-W2 modeled chlorophyll-*a* concentrations serve to reflect the presence of algae in Lake Spokane. Results of modeling indicate that increasing the minimum discharge at Post Falls HED to 700 cfs would result in negligible effects on chlorophyll-*a* concentrations in Lake Spokane (Koreny, 2004). The average difference between Lake Spokane surface chlorophyll-*a* concentrations modeled for the 700-cfs release were within 6 μg/l of the levels for current Project operations. Because the Proposed Action's minimum flow releases of 600 cfs and 500 cfs would be even closer to the current operation's minimum discharge, they also would have negligible effects on chlorophyll-*a* concentrations.

Under the Proposed Action, the provision of an aesthetic flow of approximately 46 cfs in the north channel of Post Falls HED and the 200 cfs aesthetic flow at Upper Falls HED could result in minor increases in DO concentrations in the affected channels. As with temperature, effects of the aesthetic flows on DO concentrations and pH would be negligible downstream of the confluences of these channels with the remainder of the river.

Metals—Trace metal concentrations can be substantially influenced by high flows that mobilize and transport sediments, such as those during spring runoff and flooding events, and by changes in oxidation and reduction (redox) potentials and nutrient availability near the sediment-water interface (Elder, 1988; La Force, 1998, as cited by Kuwabara et al., 2003). The effects of high flows on metals are discussed more fully in Section 5.3.2.1.

Effects Analysis

As described above, the Proposed Action includes an increase in the minimum discharge from Post Falls HED, as well as new aesthetic flow releases at Post Falls and Upper Falls HEDs, and continued aesthetic releases at Monroe Street HED. Implementation of these proposed measures would not alter the DO regime or redox potential of water in Coeur d'Alene Lake or its tributaries, or change any relevant redox conditions downstream. Therefore, providing the minimum flow releases as proposed in the Proposed Action is not expected to result in noticeable changes of trace metal concentrations in Coeur d'Alene Lake or the Spokane River (including Lake Spokane).

5.5.2.2 Total Dissolved Gas

Under current conditions, various exceedances of the applicable 110-percent TDG criterion occur at the Project developments (see Section 5.5.1.5, *Total Dissolved Gas*). These TDG levels are linked to various causes, including high flows, spill over dams, natural waterfalls, increases in water temperature, and photosynthetic activity. In addition, impoundment of previously free-flowing river reaches by the construction of Project and non-Project dams has likely reduced the potential for the river to dissipate elevated TDG.

Evaluations of TDG characteristics and historical channel conditions have shown or suggested varied influences of the Project HEDs on TDG (Golder Associates Ltd., 2003, 2004). At Post Falls HED, available historical information on the characteristics of the middle channel is not sufficient to determine the influence of the HED on TDG levels in that channel. It is reasonable to conclude, however, that Post Falls HED has probably reduced TDG production in this channel by routing water through the power plant rather than over the natural ledge or falls which existed before. Available information indicates that TDG production in the north and south channels at Post Falls HED is largely unchanged as a result of the HED (Golder Associates Ltd., 2004). Overall, hydraulic conditions that influence TDG production are unchanged or improved due to construction of the HED, and approximately 5,000 cfs are routed through the powerhouse rather than spilled during high flows.

The situation is similar at the Upper Falls and Monroe Street HEDs, where evaluation of the Project facilities and the downstream channel morphology indicates that TDG production at the Spokane Falls is primarily driven by flows passing over natural falls and into the downstream pool rather than by any influence of the two developments. However, routing up to 2,500 cfs through the Upper Falls power plant and up to 2,850 cfs through the Monroe Street power plant instead of over the lower falls reduces the production of elevated TDG levels than would occur without the presence of the Project (Golder Associates Ltd., 2004).

Downstream of Monroe Street HED, TDG levels dissipate as water moves through the free-flowing reach upstream of the Nine Mile Reservoir. Data collected within this reach indicate that TDG dissipation is greatest in the upper portions of the reach and diminishes downstream as TDG levels decrease and river depth increases. It is unknown what degree of TDG dissipation may have occurred in these reaches prior to the construction of Nine Mile HED, or to what degree the natural falls at Nine Mile Falls may have affected TDG levels.

Peak flow and spill events at the Nine Mile HED in 2004 reflected TDG levels that were typically 2 to 4 percent lower in the tailrace than in the forebay. This indicates that spills of up to approximately 9,000 cfs coinciding with full generation may reduce TDG levels (Golder Associates Ltd., 2004). Although the available data for Nine Mile HED indicate that spills of up to 9,000 cfs do not increase TDG, higher flow conditions have not been available for evaluation.

The available data indicate that current conditions at Long Lake HED contribute to TDG production during spills and in downstream TDG levels greater than 110 percent of saturation. Available data also suggest that selective use of the eight spill gates at Long Lake HED can influence TDG production. The highest TDG levels measured in the tailrace coincide with spill discharge being split evenly between gates 4 and 5. In contrast, use of gates 1 and 2 tend to produce the least TDG of any of the gates. Spot monitoring of downstream TDG levels in the Little Falls Reservoir indicates that little TDG dissipation occurs within this reach, and thus elevated TDG levels experienced in the Long Lake HED tailrace can extend to the Little Falls HED forebay and into the Spokane arm of Lake Roosevelt. Continuation of current Project operations would result in similar spatial and temporal characteristics of TDG, including levels greater than the 110-percent criterion as described above.

Effects Analysis

Under the Proposed Action, Avista would implement water quality measures PF-WQ-1 and SRP-WQ-1, which are included in Appendix B. These measures would address the Project's effect on TDG by:

- implementing spillgate operating protocols at Post Falls and Long Lake HEDs designed to minimize TDG production;
- conducting additional TDG monitoring and evaluation; and
- developing and implementing a comprehensive Long Lake HED TDG abatement plan.

At Post Falls HED, the Proposed Action would include maximizing the use of the south channel for anticipated long-term spill events. Because spilling water through the south channel results in less TDG production than using the north channel (Golder Associates Ltd., 2003, 2004), this would reduce overall TDG production at the HED and result in lower TDG levels downstream. Development of interim protocols would facilitate selection of appropriate preferential uses of spill gates to be implemented in the near term, while preventing excessive erosion near the dam. Under current Project operations, Avista prefers to use gates 3 through 6, which were found to produce more TDG than gates 1, 2, 7, and 8 (Golder Associates Ltd., 2003, 2004). By avoiding use of gates 5 and 6 whenever possible and splitting flows among other gates, available data suggest that TDG production would be reduced at moderate spill levels. However, while use of gates 1, 2, 7, and 8 would produce the least TDG at moderate spills, the use of these "outer gates" may need to be limited to avoid excessive erosion near the dam. For the purposes of this analysis, we assume that some selective use of the existing spill gates at Long Lake HED would be possible, an improvement over current Project operations.

By developing and implementing TDG monitoring plans for Post Falls, Nine Mile, and Long Lake HEDs, Avista and the other parties would be better able to understand the relationship between flows, spill-gate usage, and downstream TDG levels at higher flows than occurred in 2003 and 2004. Results would indicate the different spill-gate operating protocols that should be implemented at Post Falls and Long Lake HEDs, or if development of TDG abatement measures for Nine Mile HED would be warranted by conditions at higher flows. The adaptive nature of the Proposed Action with respect to TDG monitoring, spill-gate use, and TDG abatement would facilitate making appropriate adjustments through the term of any new license.

Even with implementation of interim spill-gate operating protocols at Long Lake HED, TDG would likely exceed the 110-percent criterion during high-flow periods. Under the Proposed Action, Avista would evaluate other alternatives for reducing TDG production by developing a TDG abatement plan for the HED in consultation with WDOE and the Spokane Tribe. Following selection and WDOE approval of an appropriate abatement strategy, Avista would finalize and implement the strategy to further reduce or abate TDG production by the HED.

Under the Proposed Action, Avista would not alter its operations of Upper Falls or Monroe Street HEDs to address elevated TDG levels downstream of these developments because these developments make little if any contribution to TDG production. Therefore, TDG levels of greater than Washington State's 110-percent criterion would continue to occur at about the same frequency as under current Project operations at these developments, but would not represent an effect of the Project or the Proposed Action.

5.5.2.3 Water Quality Monitoring

Changing Project operations and implementing other various measures during the term of a new license would influence water quality in Coeur d'Alene Lake and the Spokane River. As discussed above, Avista has used CE-QUAL-W2 to simulate the effects that changing current Project operations would have on water quality and has evaluated the use of spill gates to reduce the Project's effects on TDG. Although these studies provide insight into likely changes in water quality, they may not accurately represent the actual effects that could occur once these changes are implemented.

Effects Analysis

In this section, we discuss the effects of Avista's proposed water quality measures for the state's of Idaho (PF-WQ-2) and Washington (SRP-WQ-2), which are included in Appendix B. Note that the Proposed Action also includes monitoring for TDG as described above. As described in measures PF-WQ-2 and SRP-WQ-2, Avista would:

- develop and implement separate Water Quality Monitoring Plans for the states of Idaho and Washington;

- conduct a feasibility study for enhancing DO levels in Long Lake HED discharges; and

- develop and implement a DO Enhancement Plan for the Long Lake HED discharges.

For the Idaho Water Quality Monitoring Plan, Avista would consult with IDEQ and the Coeur d'Alene Tribe. This plan would have three goals: (1) evaluate the effects of the new Post Falls minimum discharge on water temperatures in the Spokane River, (2) support expansion of current Coeur d'Alene Lake water quality monitoring efforts, and (3) enhance the predictive capabilities of the CE-QUAL-W2 model as a lake management tool. Avista plans to accomplish these goals through three separate actions. It proposes to evaluate the effects of the new minimum flows from Post Falls HED by developing a study to monitor Spokane River temperature and flow at the Idaho/Washington border during summer/fall periods for 5 years following implementation of the new minimum flows. Avista would support expansion of the current Coeur d'Alene Lake water quality monitoring efforts for broad water quality management by providing up to $25,000 per year for the period of the new license and fund the purchase and installation of two meteorological stations ($15,000) that could be used to improve the water quality modeling effort for Coeur d'Alene Lake.

For the Washington Water Quality Monitoring Plan, Avista would consult with WDOE and the Spokane Tribe of Indians about Long Lake HED, and with WDOE about the reach between Barker Road (river mile 90.4) and the upper end of the Upriver Reservoir (river mile 84). The primary goal of this plan would be to determine the effect of increased minimum flows from Post Falls HED on water temperature.

In these plans, Avista would indicate the monitoring protocol(s), reporting format, and schedule. Monitoring would be expected to be completed in 5 years. These plans would be adaptive so that appropriate annual changes could be made to focus on issues of concern and limit unnecessary efforts once compliance is demonstrated or other agreed-upon monitoring goals and objectives are satisfied.

Developing water quality monitoring plans in consultation with IDEQ, WDOE, the Coeur d'Alene Tribe, and the Spokane Tribe of Indians, as called for under the Proposed Action, would ensure that the monitoring plans address the concerns of the state agencies and tribes. The plans would address the effects of Post Falls HED minimum flow releases by monitoring downstream flows. Monitoring flows and temperature at the Idaho/Washington border and in the reach between Barker Road and the upper end of the Upriver Reservoir during multiple years would document conditions for varied hydrological and meteorological conditions and indicate any effects from increasing flow releases from Post Falls HED. Results of this monitoring effort could be used to suggest appropriate corrective action to be taken, if necessary. Avista's proposed funding of the purchase and installation of two meteorological stations and support of ongoing water quality monitoring efforts in Coeur d'Alene Lake would facilitate improvement of the water quality model developed for the lake and its use as a lake management tool.

As described above in Section 5.5.1.3, *Biological Productivity and other Water Quality Parameters*, the Proposed Action would be expected to continue to result in Long Lake HED discharges that frequently have DO concentrations of less than the 8.0-mg/l criterion during the summer and fall. These low DO concentrations would result from many factors including nutrient loading of the river, existence of the impoundment, and Project operations. In order to address this issue, Avista has proposed evaluating the feasibility of increasing DO concentrations in the Long Lake HED discharges and implementing reasonable and feasible measures to accomplish this goal. This has been accomplished at numerous other hydro projects through several different methods, including air injection, oxygen injection, and aerating weirs (TVA, 2005; Hauser and Morris, 1995; Hopping et al., 1997). Although the feasibility of increasing Long Lake HED tailwater DO concentrations has yet to be evaluated, it is reasonable to anticipate that at least one of the methods used at other hydropower dams would be successful at increasing DO concentrations at this site. However, there is a possibility that implementation of all reasonable and feasible measures may not always increase Long Lake HED tailwater DO concentrations to above the 8.0-mg/l criterion.

5.5.2.4 Secondary Effects of Proposed Measures on Water Quality

Coeur d'Alene Erosion Control Program

Under the Proposed Action, Avista would provide funding for projects that protect against and mitigate any shoreline erosion effects on resources of particular interest and value caused by current Project operations (PF-TR-1). The effects that implementing this action would have on water quality (especially turbidity) are discussed along with effects on geologic resources in Section 5.3.2.4.

Recreational Measures

Under the Proposed Action, Avista would try to provide flow releases to accommodate open-water boating and extend whitewater boating opportunities on the Spokane River (SRP-REC-3). During August, open-water boating flows of 1,250 cfs would be provided on one or two weekends when river flows at Post Falls exceed 800 cfs (this measure would not be applicable if flows were already at 1,250 cfs or higher). Avista would also coordinate flow releases for late spring and fall to enhance whitewater boating opportunities. Target releases would be between the minimum and maximum flow ranges for whitewater boating opportunities at park-and-play spots (Louis Berger, 2004a). These flows range from 1,350 to 5,500 cfs.

The effects of the Proposed Action open-water boating flows on water temperatures were predicted by Golder (2004h). To evaluate conditions for a wide range of hydrologic and meteorologic conditions, Golder used a statistically based evaluation of CE-QUAL-W2 modeling results for both the Spokane River and Coeur d'Alene Lake. Increasing flow releases from Post Falls HED would dilute cool groundwater inflow more in the gaining reach of the river (Table 5-31). Generally, the Proposed Action open-boating flows of 1,250 cfs would increase Spokane River temperatures by less than 1.0°C (1.8°F) compared to flow levels of 800 cfs during each of the proposed open-water boating flow releases in August. Based on the Post Falls flow exceedance curve for August and because these flows would be released no more than two weekends per year, implementation of the open-water boating flow releases would affect Project operations infrequently and additional exceedances of the temperature standard would seldom occur.

Table 5-31. Predicted water temperature effects of 1,250-cfs August flow releases if Post Falls flows are greater than 800 cfs. (Source: Golder, 2004h)

Location	>800 cfs at Post Falls
At Sullivan Road (river mile 87.5)	Decrease about 0.2°C
At Trent (river mile 85.4)	Increase 0.5 to 0.7°C
Between Trent and Upriver HED (river mile 85.4 to 80.3)	Increase 0.7 to 0.9°C

Effects on water temperature from late-spring and early-fall whitewater boating flows of between 1,350 and 5,500 cfs from Post Falls HED have not been modeled because flow and temperature conditions at these times do not warrant such evaluation. The late-spring flow releases would have minimal, if any, effect on the thermal regime of the Spokane River, because flows during this period are generally high, and temperatures at Post Falls HED are not excessive. Similarly, fall boating flows would be in the current range of flows under current operations; the goal would be to look for opportunities to coordinate such flow levels with boating opportunities. No secondary effects of such an effort would be expected.

5.5.3 Cumulative Effects

Water quality in the Spokane River-Coeur d'Alene River Basin has been and continues to be influenced by a wide range of human activities, including, for example, historical mining activities; population growth in the watershed and its related effect on land use patterns and industrial, commercial, and residential development; nutrient-rich discharges from numerous point and non-point sources; recreational boating and other recreational activities; and the presence and operation of the Project and other dams along the river. Numerous public policies and regulatory proceedings and community-initiated efforts, have been undertaken to improve the water quality of the Spokane River, Coeur d'Alene Lake, Lake Spokane, and their tributaries. Generally, water quality has been improving since the mid 1970s and is expected to continue to improve in the foreseeable future as a result of these cumulative efforts. The cumulative effects of currently foreseeable actions on various water quality parameters are discussed below.

TDG levels in the Spokane River are directly affected by water flowing over both natural falls and dams and indirectly affected by river channel characteristics and routing of water around the falls. Natural waterfalls in the Spokane River produce TDG at levels that sometimes exceed the applicable TDG criteria. Under current Project operations, spill over the Project's dams can increase the production of TDG, particularly Long Lake HED. However, routing water around the falls and through the turbines generally eliminates TDG production in that water and further reduces TDG once this water is mixed with water that has flowed over falls or spillways. Project and non-Project dams reduce velocities and natural dissipation rates in some impounded reaches, which can indirectly cause TDG levels to remain higher than if the impoundments did not exist. Under the Proposed Action, Avista would implement TDG abatement measures to reduce TDG production by spill at Long Lake HED, and possibly Nine Mile HED, if these measures are shown to elevate TDG levels at higher flows. TDG production at natural falls in the Project area (Post Falls and Spokane Falls) would continue similar to current conditions. The cumulative effect of these actions would be a long-term reduction in TDG levels in the Spokane River downstream of the Post Falls, Lake Spokane, and possibly Nine Mile HEDs, compared to current conditions, due primarily to measures proposed under the Proposed Action.

Current Project operations alter the thermal regime of Coeur d'Alene Lake and the Spokane River. Other human activities result in localized effects on water temperatures but have minimal influence on the overall regime. Therefore, cumulative effects on water temperature are generally determined by the effects of the Project and its operation.

Historically, wastewater treatment facilities in the basin have supplied nutrient-rich discharges to surface waters. Through time, many facilities have been upgraded to more effectively remove nutrients from wastewater prior to discharge. However, increased development in the Project area has increased the load on these facilities, which somewhat counteracts the benefits provided by upgrading them. Implementation of new shoreline management regulations is expected to minimize the adverse water quality effects caused by new development along the shoreline. The Spokane County Conservation District has coordinated efforts of numerous Spokane County stakeholders to successfully reduce erosion and sediment transport along Hangman Creek (WRWG meeting on March 7, 2005). Implementing Proposed Action measure SRP-TR-1 would support that effort. WDOE is in the process of finalizing a TMDL and implementation strategy to address nutrient issues in the Spokane River and Lake Spokane (Merrill and Cusimano, 2004). It is also in the process of developing TMDLs for the Spokane River's two primary tributaries, Hangman Creek and the Little Spokane River. Implementing the strategies developed as part of the Spokane River TMDL would improve water quality by 2016, particularly within Lake Spokane. Implementation of the strategies that would be developed for the Hangman Creek and Little Spokane River TMDLs may also improve water quality in the Spokane River and Lake Spokane. Implementation of the Proposed Action would result in negligible effects on nutrient loads and biological productivity, although increases in DO concentrations of the Long Lake HED discharges are expected to occur as a result of implementing reasonable and feasible tailwater enhancements. The cumulative effects of the aforementioned actions would therefore result in long-term improvement of nutrient and associated conditions in Coeur d'Alene Lake, the Spokane River, and Lake Spokane, and long-term improvement of DO concentrations downstream of the Long Lake HED.

As a result of historical mining activities, a considerable quantity of sediments with high metal concentrations has accumulated in Coeur d'Alene Lake. Implementation of EPA's plan to clean up mining contamination in the South Fork of the Coeur d'Alene River (EPA, 2002) is expected to reduce metal loadings to the lake. The Coeur d'Alene Tribe and State of Idaho are working on a Lake Management Plan, which may serve as an alternative to EPA cleanup actions in the lake. In addition, WDOE is developing a TMDL for PCBs for the Spokane River and oversees clean up of PCB-contaminated sediments and groundwater adjacent to the Spokane River. Implementation of such clean-up efforts would likely improve water quality. Implementation of the Proposed Action is not expected to appreciably affect trace metals or PCBs compared to current Project operations. As a result, we conclude that the cumulative effects of the above actions would be a long-term improvement in metal and PCB concentrations that would continue through the term of any new license.

5.5.4 Unavoidable Adverse Effects

Under the Proposed Action, some of the proposed flow releases from Post Falls HED would have mixed effects; however, on balance, state water quality agencies and the applicant believe they would be more beneficial than detrimental to for water quality. In addition to the many benefits of increasing the minimum flows discussed above, the greater minimum discharge would increase downstream summer water temperatures in the Spokane River. Consideration of this potential effect has been reflected in the proposed minimum discharge requirement for Post Falls HED. Other flow-related measures, such as recreational flows, also have provisions for revising such measures if needed to address water quality concerns.

Use of the spill gates at Long Lake HED would continue to produce elevated TDG and contribute to exceedances of the applicable 110-percent criterion. Following full implementation of TDG abatement measures included in the Proposed Action, TDG production is expected to be reduced to levels that would satisfy applicable standards.

5.6 Aquatic Resources

5.6.1 Affected Environment

5.6.1.1 Aquatic Habitat Conditions

Coeur d'Alene Lake Basin

Primary headwater tributaries of the combined Coeur d'Alene Lake-Spokane River Watershed drain the Bitterroot Mountains lying to the east of Coeur d'Alene Lake. These tributaries typically support coldwater resident, fluvial, and adfluvial fish assemblages. The Coeur d'Alene and St. Joe rivers have high-gradient mid- and upper reaches with low-gradient lower reaches and are the primary source of inflow to Coeur d'Alene Lake. Coeur d'Alene Lake is a natural lake with its surface elevation controlled by a combination of inflow, an outlet channel restriction, and operation of Post Falls HED. Lake levels naturally vary from spring runoff high elevations of over 2,134 feet to autumn-winter low elevations of about 2,120.5 feet. As a result, the lower elevation portions of the lake's tributaries are captured, or inundated, by lake elevations. Coeur d'Alene Lake naturally backwaters the lower 29 miles of the Coeur d'Alene River, the lower 31 miles of the St. Joe River, and about 6.5 miles of the lower St. Maries River at the low lake surface elevation of 2,120.5 feet (see Figures 5-6 and 5-7).

Operation of Post Falls HED maintains the normal summer lake elevation near 2,128 feet following the spring flood pulse runoff through August. At the normal summer elevation near 2,128 feet, the lake backwater effect extends up the Coeur d'Alene River to river mile 32, approximately 2 miles south of the town of Cataldo. The lake backwater effect extends up the St. Joe River to river mile 34 at summer elevation, roughly 11 miles downstream of the town of Calder. The St. Joe River is joined by the St. Maries River before it discharges into the southern end of Coeur d'Alene Lake. The low-gradient lower reach of the St. Maries River is also affected by the lake backwater effect at summer elevation for about 9 miles upstream from the confluence of the St. Joe River near the town of St. Maries.

Water temperatures are known to exceed 15^{o}C (59^{o}F) by mid- to late June in the Coeur d'Alene and St. Joe rivers. Summer water temperatures in the inundated portions of the Coeur d'Alene, St. Joe and St. Maries rivers routinely exceed 20ºC (68ºF) (see Table 5-22). Historical water temperature data for the St. Joe River upstream of Coeur d'Alene Lake indicate temperatures frequently in excess of 19^{o}C (66^{o}F) in July and August. These temperatures are in the upper range of suitable water temperatures for salmonids but are suitable for other species such as northern pike and smallmouth bass and warmwater species such as largemouth bass, sunfish, catfish, and bullheads. A number of lakes along the Coeur d'Alene River (collectively referred to as the chain lakes or lateral lakes) are hydrologically connected to the river, and variations in the water level of the river also result in variations in the water level of these lakes. Water temperatures in these lakes help support warmwater fish communities, and provide an excellent fishery for largemouth and smallmouth bass, northern pike, yellow perch, and crappie (Bennett and Rich, 1990). Fall water temperatures generally are below 15^{o}C (59^{o}F) by the end of September in the Coeur d'Alene and St. Joe rivers.

Mining and ore processing adjacent to the South Fork of the Coeur d'Alene River has contributed contaminants to downstream aquatic habitat (see Section 5.5.1.4, *Metals*). Metal concentrations measured in upper Beaver Creek, Big Creek, Canyon Creek, Ninemile Creek, Pine Creek, Prichard Creek, the entire South Fork of the Coeur d'Alene River, and the Coeur d'Alene River down to the town of Harrison have been reported to exceed the applicable water quality criteria for aquatic life (CH2M HILL and URS Corp., 2001). With the exception of the lower main stem of the Coeur d'Alene River lying between Harrison and Cataldo, all of these tributaries are upstream of the Project-influenced waters. Recent studies indicate that, as a result of metal enrichment, streams located downstream of hard-rock mining sites in the Coeur d'Alene River Basin contain fewer, and less abundant, native fish species than other areas (Maret and MacCoy, 2002).

By contrast, very little mining activity has occurred in the St. Joe River Basin, and the metals concentrations in this system are considered to represent background conditions (Golder, 2005a). Metals concentrations are therefore not considered a limiting factor with respect to aquatic habitat conditions in the St. Joe River Basin.

Coeur d'Alene Lake is a natural lake approximately 23 miles long. Water levels range from a low elevation of 2,120.5 feet to more than 2,130 feet during high-water runoff periods. Water elevations can be highly variable, rising 3 to 4 feet in less than a week, as a result of rapid increases in inflows during winter and spring high water events. Post Falls HED operated with storage elevation of 2,126.5 feet until the 1940s, when, in response to a federal call for additional generation, the operational pool elevation was increased to 2,128 feet. The current operations of Post Falls HED date back to the early 1950s, regulating water levels in Coeur d'Alene Lake during the summer and fall, maintaining a summer pool level near 2,128 feet, and typically initiating a gradual lake drawdown after Labor Day and continuing during the next several months. This current Post Falls HED operation maintains a larger littoral zone during the summer months along portions of the Coeur d'Alene Lake shoreline and associated water bodies (e.g., lateral lakes) than would otherwise occur without the HED. Such operation increases the amount of shallow-water habitat and results in Project-related localized summer water temperature that are warmer than would occur absent the Project (Golder, 2004j).

Coeur d'Alene Lake itself (not including the lateral lakes and inundated areas of the St. Joe, St. Maries, Coeur d'Alene, and Spokane rivers) covers approximately 34,000 acres at its current summer pool level of 2,128 feet and more than 29,000 acres when it is drawn down to elevation 2,120.5 (Golder, 2004k). At the 2,128-foot elevation, the average depth is 72 feet and the maximum depth is 209 feet (IDEQ, 1996, as cited by Avista, 2002b). The southern end of the lake is relatively shallow (typically less than 30 feet deep) and the middle and northern portions of the lake tend to be deeper. The shallow, southern portion of the lake has the most extensive beds of aquatic macrophytes. Cougar Bay, however, at the northern end of the lake is also heavily populated with aquatic macrophytes. In general, the majority of bays with sedimentary deltas also contain abundant macrophyte growth (IDEQ, 1996, as cited by Avista, 2002b). Such areas represent spawning and nursery habitat for many species of fish, including a number of introduced species such as northern pike, largemouth and smallmouth bass, yellow perch, black crappie, and pumpkinseed.

Coeur d'Alene Lake typically thermally stratifies in the summer and mixes completely in the spring and fall (CH2M HILL and URS Corp., 2001). Although winter air temperatures are often below freezing, Coeur d'Alene Lake generally has not frozen in recent decades, except in its shallow southern end (IDEQ, 1996, as cited by Avista, 2002b). Based on data collected in 1991, 1992, and 1995–1999, the depth of the upper stratified layer, or epilimnion, averaged 33 feet from July through September (CH2M HILL and URS Corp., 2001). The upper limit of the hypolimnion averaged 49 feet during the same period. Water temperature profiles measured during 1991 and 1992 indicate that thermal stratification can begin as early as May and continue into early November. In keeping with average lake depths, the thermocline is deeper in the northern portion of the lake, sometimes at depths of over 66 feet, compared to the southern, shallow end of the lake, where it was between 15 and 29 feet (IDEQ, 1996, as cited by Avista, 2002b).

During the warmest part of the summer, water temperature in the lake epilimnion is typically above 20ºC (68°F), and during particularly warm summers, the water temperature can reach 26ºC (79°F) (Woods, 1996). In the hypolimnion, however, it is rarely above 18ºC (64°F) and usually much cooler and therefore suitable for most salmonids (see Table 5-22). As a result of the naturally wide range of thermal and other habitat conditions available, Coeur d'Alene Lake supports a diverse array of coldwater and warmwater fish communities.

Spokane River – Coeur d'Alene Lake to Nine Mile HED Tailrace

Between Coeur d'Alene Lake and Post Falls HED, the Spokane River exhibits lake-like conditions during the summer when stable water levels are being maintained by Post Falls HED. At other times, it becomes more riverine in nature (i.e., during drawdown) and free-flowing during periods when Post Falls HED is not influencing upstream water levels. The Spokane River has naturally occurring, highly variable water levels and flows that can occur over a relatively short time (Avista et al., 2004). Seasonal high flows can range between 10,000 cfs and 48,000 cfs with low flows of just a few hundred cfs. Project-related discharge and subsequent river elevations are strongly influenced by this natural variability.

Downstream of Post Falls HED, the Spokane River is free-flowing for approximately 15 miles. The Spokane River is also free-flowing for approximately 10 miles downstream of Monroe Street HED and approximately 0.5 mile downstream of Nine Mile HED (Avista, 2002b). Project and non-Project dams along the stretch of river between Post Falls HED and Long Lake HED create impoundments of varying size and character, ranging from the very small, 5-acre Monroe Street HED Reservoir to the 23-mile long, 5,000-acre reservoir created by Long Lake HED (i.e., Lake Spokane).

In the free-flowing reach lying downstream of Post Falls HED, the Spokane River channel characteristics include relatively stable banks and direct hydrologic connections to the Spokane Valley-Rathdrum Prairie Aquifer (NPPC, 2000c). Although the dominant substrate is cobble and boulder, there are several large areas and many smaller pockets with gravel that are suitable for salmonid spawning. Large areas of such gravel (greater than 100 square meters), some of which are embedded with sand to varying degrees, occur near Corbin Park (river mile 99.8), the Island Complex (river miles 94.8 to 95.1), Starr Road Bar (river mile 94.7), Harvard Road Bridge (river mile 92.6), and Centennial Trail Bridge (river mile 84.0) (Parametrix, 2003d).

Instream flow loss to groundwater in the Spokane River upstream of Barker Road is expected to be nearly 160 cfs at Post Falls HED discharges of 500 to 600 cfs (HDI, 2005). At these flows, up to 400 cfs of groundwater can enter the Spokane River between Sullivan Road and Upper Falls HED. This groundwater inflow to the Spokane River downstream of Sullivan Road provides a substantial influence on water temperatures and habitat availability during low-flow periods and provides important thermal refugia for rainbow trout during warm summer months. Water temperatures in the Spokane River between the outlet of Coeur d'Alene Lake and the Sullivan Road Bridge (near river mile 87) typically exceed 21°C (70ºF) for much of the summer due to the dominant influence of warm surface water from Coeur d'Alene Lake. Groundwater inflow (typically around 6 to 8°C [43 to 46°F]) begins to enter the river in substantial quantities near the Sullivan Road Bridge and cools the river water in the downstream portion of this free-flowing reach to below 20ºC (68ºF). This groundwater influence continues downstream of Monroe Street HED (see Section 5.5.1.2, *Temperature,* for more detail about specific temperature conditions). Radio tracking and snorkeling studies confirmed anecdotal observations that trout occupy these coldwater refuge areas during the warmest part of summer (NHC and HDI, 2004; Parametrix, 2004e)**.**

The river channel at Spokane Falls, the location of Upper Falls and Monroe Street dams, is highly entrenched within a basalt-bedrock-dominant substrate. Upstream of Spokane Falls to the City of Spokane's Upriver Dam Project, both shoreline and instream activities (e.g., extensive development, bank stabilization and fill, bridge structures, etc.) have altered the river channel and shorelines. Upper Falls and Monroe Street HEDs create relatively small impoundments (150 acres and 5 acres, respectively) that are essentially isolated from the larger free-flowing portions of the river and have no tributary streams. As such, these areas provide aquatic habitat that is capable of meeting all life history requirements for relatively few of the fish species present in the Project area. The Upper Falls Reservoir is currently managed to provide a put-and-take fishery for hatchery rainbow trout.

Operation of both Upper Falls and the Monroe Street HEDs creates little, if any, water level fluctuations in either reservoir because both facilities generally pass inflow water directly downstream. At Upper Falls HED, there is a short half-mile stretch of bedrock bypass channel lying downstream of the north channel control works that provides minimal fish habitat and dewaters each year following high-water runoff.

Downstream of Spokane Falls and Monroe Street HED, the free-flowing river remains entrenched within a narrow valley, with instream substrate again dominated by unembedded cobble and boulder (NPPC, 2000c). As with the upper free-flowing reach of the Spokane River, there are several locations between Monroe Street HED and the Nine Mile HED impoundment that have gravel beds and pockets that are suitable for salmonid spawning. Large areas of gravel (greater than 100 square meters), some of which are embedded with sand to varying degrees, occur at Peaceful Valley (river mile 73.1 to 73.2), upper San Soucci (river mile 71.4), T.J. Meenach Springs (river mile 70.1), and Riverbend bar (river mile 68.4) (Parametrix, 2003a). A smaller gravel bar (less than 100 square meters) occurs at mid-San Soucci (river mile 71.0). Summer water temperatures from Monroe Street HED to the Nine Mile HED tailrace, including Nine Mile Reservoir, are generally less than 20ºC (68ºF), largely due to continued groundwater input along this reach (see Section 5.5.1.2, *Temperature*).

Just downstream of the Spokane Falls, Hangman Creek is a major source of sediments and nutrients to the Spokane River, particularly during high-flow periods (NPPC, 2000c, Soltero et al., 1992, as cited by Parametrix, 2003c). Sediment accumulation has occurred in the Nine Mile Reservoir and influences aquatic habitat characteristics in the reservoir. Water level fluctuations in the Nine Mile Reservoir are rarely more than 1 foot, except when sections of flashboards are removed or replaced. Downstream of Nine Mile HED, a short reach of free-flowing river is confined within a well-defined channel that is dominated by largely un-embedded cobble and boulder substrate. No areas of suitable salmonid spawning gravels are known to occur here.

Lake Spokane

The existing Lake Spokane aquatic ecosystem developed through operating conditions that included a winter drawdown for most of the 90 years since the lake was created in 1915. Drawdowns of up to 24 feet can occur under the terms of the existing license; however, during most of the past 15 years, Avista has limited the winter drawdown to approximately 14 feet or less. Typically, the lake elevation is held at or above elevation 1,533 feet, within 3 feet of full pool, throughout most of the year. Winter drawdowns may last for several days to more than a month, depending on weather and energy demands. During the summer, Lake Spokane is typically maintained within 1.5 feet of full pool. The lake stratifies during the summer, with surface water reaching temperatures of 22 to 25ºC (72 to 77°F) (see Figure 5-15).

Implementation of advanced wastewater treatment at the City of Spokane's upstream WWTP in 1977 significantly improved water quality conditions in Lake Spokane and has reduced the frequency and extent of summer anoxia (Parametrix, 2003c). Since the 1980s, anoxic conditions appear to occur in Lake Spokane only during extremely low-flow years and at depths greater than 75 feet (WDOE, 2004a). High nutrient levels in Lake Spokane still result in high levels of primary productivity associated with planktonic algae. Algal blooms have occurred in small areas of the lake in recent years, especially during warm, low-flow periods. Also, substantial portions of the lake's shallow-water areas experience dense aquatic and emergent plant growth. Submergent and floating aquatic macrophytes, including yellow floating heart and Eurasian watermilfoil, currently can cover as much as an estimated 1,100 acres of the 5,060 surface acres of Lake Spokane (Tetra Tech, 2001, as cited in Parametrix, 2003c). These nutrient and macrophyte conditions influence the aquatic habitat in Lake Spokane, providing substantial areas of suitable habitat for fish species that favor highly productive, vegetated habitat (Parametrix, 2003c). The relatively high suitability of these habitats is reflected in the fact that Lake Spokane supports popular and high-quality fisheries for largemouth bass, smallmouth bass, yellow perch, and crappie.

5.6.1.2 Anadromous Fish Populations

Historical records indicate that anadromous fish, including Chinook salmon (*Oncorhynchus tshawytscha),* and steelhead trout (*O. mykiss*), were found in the lower Spokane River, the Little Spokane River, and Hangman Creek (NPCC, 2004). Spokane Falls generally prevented anadromous species from ascending any farther upstream in the Spokane River (NPCC, 2004). Anadromous fish are no longer present in the Project area, with upstream passage to the mouth of the Spokane River currently precluded by the Chief Joseph and Grand

Coulee dams on the Columbia River. Fisheries management agencies and Native American tribes have expressed interest in restoration of anadromous fish to historical habitat in the Columbia River Basin, including portions of the Spokane River. If fish passage is ultimately provided at Chief Joseph and Grand Coulee dams, the issue of fish passage at Long Lake and Nine Mile HEDs would likely be revisited. There is no present or foreseeable future need for fish passage facilities at the Project developments related to anadromous fish passage.

5.6.1.3 Resident Fish Populations

Twelve native fish species and 16 introduced species currently are known to inhabit the Coeur d'Alene Lake Basin (Table 5-32). Native fish species include westslope cutthroat trout, bull trout, and mountain whitefish. The native fish species are all considered coldwater species, whereas many of the introduced species (e.g., bullheads, sunfish, yellow perch, and largemouth bass) are typically considered to be warmwater species. Non-native fish like bass, northern pike, yellow perch, Chinook salmon, and kokanee not only provide important recreational fisheries in Coeur d'Alene Lake but can also pose a threat to the remaining native fish assemblages from direct predation, competition, and hybridization (NPCC, 2004). IDFG management goals include increasing sport fishing opportunities, maintaining or enhancing quality fish populations and habitat, and maintaining or restoring wild native populations of fish in suitable waters (Kleinschmidt, 2004). The Coeur d'Alene Tribe has management goals for native fish species in Coeur d'Alene Lake that include restoring naturally maintained native fish and providing recreational fishing opportunities for the Tribe (Kleinschmidt, 2004).

Table 5-32. Fish of the Coeur d'Alene subbasin. (Source: NPCC, 2004)

Common Name	Scientific Name	Native
Longnose sucker	*Catostomus catostomus*	Yes
Bridgelip sucker	*Catostomus columbianus*	Yes
Largescale sucker	*Catostomus macrocheilus*	Yes
Shorthead sculpin	*Cottus confusus*	Yes
Torrent sculpin	*Cottus rhotheus*	Yes
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*	Yes
Mountain whitefish	*Prosopium williamsoni*	Yes
Northern pikeminnow	*Ptychocheilus oregonensis*	Yes
Longnose dace	*Rhinichthys cataractae*	Yes
Speckled dace	*Rhinichthys osculus*	Yes
Redside shiner	*Richardsonius balteatus*	Yes
Bull trout	*Salvelinus confluentus*	Yes
Lake superior whitefish	*Coregonis clupeaformis*	No
Northern pike	*Esox lucius*	No
Tiger muskie	*Esox masquinongy x E. lucius*	No
Black bullhead	*Ictalurus melas*	No
Brown bullhead	*Ictalurus nebulosus*	No

Common Name	Scientific Name	Native
Channel catfish	*Ictalurus punctata*	No
Pumpkinseed	*Lepomis gibbosus*	No
Smallmouth bass	*Micropterus dolomieui*	No
Largemouth bass	*Micropterus salmoides*	No
Rainbow trout	*Oncorhynchus mykiss*	No
Kokanee salmon	*Oncorhynchus nerka*	No
Chinook salmon	*Oncorhynchus tshawytscha*	No
Yellow perch	*Perca flavescens*	No
Black crappie	*Pomoxis nigromaculatus*	No
Brook trout	*Salvelinus fontinalis*	No
Tench	*Tinca tinca*	No

Native trout were considerably more abundant in the Coeur d'Alene Lake Basin prior to 1990. The spawning migration of cutthroat trout into Wolf Lodge Creek was relatively robust as late as 1977 with an estimated run size of 3,000 fish (Lukens, 1978). Significantly greater numbers of cutthroat trout than now occur were observed in the creeks that flow into the southern end of Coeur d'Alene Lake in the early 1980s (Matt and Horner, 2005). By 1990, far fewer cutthroat trout have been reported to have occurred and made up less than 1 percent of the catch sampled in Cougar Bay on Coeur d'Alene Lake (Rich, 1992). Northern pike were illegally introduced into Coeur d'Alene Lake in the 1970s, first appearing in catch data during 1980, and in 1982, IDFG introduced Chinook salmon (Rich, 1992; Avista, 2002b). Recently, smallmouth bass have also been illegally introduced and are seen in increasing numbers in Coeur d'Alene Lake (Bennett and Rich, 1990; Coeur d'Alene Tribe, 2003). Predation and competition from these introduced species are considered to have substantial effects on the population of native salmonids in the Coeur d'Alene Lake Basin (Weitkamp, 2003).

Viable populations of resident, fluvial, and adfluvial stocks of westslope cutthroat trout exist within the Coeur d'Alene Lake Basin (Kleinschmidt, 2004). Because viable populations of all three forms of westslope cutthroat trout are currently present in the system, researchers believe that recovery can be accomplished by reducing the effects of limiting factors, particularly habitat loss and competitive interactions with non-native species (Lillengreen et al., 1999). Other potential causes of population declines of native salmonids include reduced water quality and habitat conditions from land use practices, over-harvesting, and dams and other blockages (Kleinschmidt, 2004). Concern about the declining range and numbers of westslope cutthroat trout has resulted in this species being identified as a sensitive species in Idaho (IDFG, 1996). The Coeur d'Alene Tribe has also emphasized the importance of westslope cutthroat trout to its culture (Kleinschmidt, 2004).

Westslope cutthroat trout continue to spawn and rear in tributaries to Coeur d'Alene Lake. Spawning adfluvial adult trout are known to migrate into Lake Creek in early spring (March and April), and then migrate back to the Coeur d'Alene Lake in April (personal communication, D. Chess, Fisheries Biologist, Coeur d'Alene Tribe, Plummer, ID, with T. Vore, Environmental Specialist, Avista, Spokane, WA, on May 13, 2005). Averett (1962) reported that the majority of spawning adfluvial westslope cutthroat trout migrate up the St. Joe River in April and return to the lake by mid-June. Lukens (1978) indicated that adult cutthroat trout migrate into Wolf Lodge Creek from early April through mid-June. Parametrix (2005) found that radio-tagged adult adfluvial westslope cutthroat trout appeared to migrate downstream and upstream through the inundated reach of the Coeur d'Alene and St. Joe rivers relatively quickly and successfully. Juvenile westslope cutthroat trout are known to outmigrate from natal stream following declining spring flows (Downs and Jakubowski, 2003). The Coeur d'Alene Tribe has reported outmigration of juvenile westslope cutthroat trout in tributaries to Coeur d'Alene Lake in April and May (personal communication, D. Chess, Fisheries Biologist, Coeur d'Alene Tribe, Plummer, ID, with T. Vore, Environmental Specialist, Avista, Spokane, WA, on May 13, 2005). Lukens (1978) reported that juvenile cutthroat trout begin a lakeward migration in early May.

Bull trout are known to migrate up the St. Joe River in early spring, making it to the headwater tributaries by late summer (IDFG, 1999). Adfluvial bull trout typically spawn in September and then complete a relatively quick outmigration to Coeur d'Alene Lake (IDFG, 1999). Some evidence suggests that juvenile bull trout begin migration out of the upper St. Joe River before the middle of June but it is unclear when juvenile fish would reach the lower St. Joe River (Parametrix, 2003f). Both westslope cutthroat trout and bull trout would have successfully migrated through inundated lower river habitat under natural conditions (i.e., absent Post Falls HED regulating summer water levels) because 31 miles of the lower St. Joe River and 29 miles of the lower Coeur d'Alene River are inundated and relatively deep and slow moving at the lowest lake elevation (see Figures 5-6 and 5-7).

Downstream of Post Falls HED, the upper Spokane River is free-flowing and riverine in nature for approximately 15 miles before reaching the Upriver Dam impoundment and supports a fairly diverse assemblage of fish species. Bennett and Underwood (1988) identified 15 species of fish downstream of Post Falls HED, including six species of trout and salmon, largemouth bass, yellow perch, and pumpkinseed. Resident native fish are currently present in the Spokane River, both upstream and downstream of Spokane Falls, including largescale sucker, northern pikeminnow, redside shiner, resident rainbow trout, and mountain whitefish. Bennett and Underwood (1988) and Avista (2000a) reported a robust population of wild, self-sustaining rainbow trout in the upper Spokane River. Both IDFG and WDFW manage the upper Spokane River (from Post Falls HED to Upriver Dam) as a wild trout fishery with no supplemental stocking and have identified the self-sustaining rainbow trout population in this reach as a priority for protection.

Bennett and Underwood (1988) suggested that successful spawning and emergence of wild rainbow trout in the upper Spokane River in Washington could be linked to spring river flows above 4,000 to 6,000 cfs. More recent instream flow studies show that the total available spawning and incubation area for rainbow trout in the upper Spokane River declines rapidly as flows fall below about 7,000 cfs (NHC and HDI, 2004). The natural variability of spring flows in the Spokane River leads to variable water levels each year and subsequently influences variable year-class strength of rainbow trout.

In 1995, Avista began monitoring flows, water temperatures, and rainbow trout spawning and emergence in the Spokane River at key spawning sites (index spawning sites) in the free-flowing reach of river downstream of Post Falls HED. The majority of spawning in the upper Spokane River occurs at three reference sites designated as Island Complex, Starr Road , and Harvard Road, based on geographic landmarks (Avista, 2000a; Parametrix, 2003c). During the 1995, 1996, and 2003 studies in this upper reach of the river, between 87 and 96 percent of the observed spawning occurred in the 3-mile reach between the Island Complex area (river mile 95.1) and the Harvard Road river bend (river mile 92.1) (Avista, 2000a; Parametrix, 2003c).

Monitoring shows that rainbow trout spawning in the upper Spokane River begins in late March or early April and lasts about 2 to 3 weeks, when water temperatures range between 4 to 5ºC (39 to 41°F) (Avista, 2000a). Fry typically emerge from the spawning redds from May through early June. Detailed studies conducted under the ALP in 2003 confirmed previous findings on spawning locations, temperature triggers for spawning and fry emergence, duration of spawning, and timing of fry emergence (Parametrix, 2003d). These studies documented the initial observation of fry emergence on May 23 and 24 in 2003 (Parametrix, 2003d). In addition, these studies verified the overall distribution, extent, and timing of rainbow trout spawning and fry emergence in the upper Spokane River and in the free-flowing reach downstream of Monroe Street HED.

Avista currently operates Post Falls HED to maintain downstream river flows sufficient to keep the majority of the known spawning areas in the upper Spokane River wetted through the emergence period. Often this requires either no substantial change in operations or only a minor delay in closure of the spill gates or reduction in flow at Post Falls HED, with little associated effect on Avista's ability to reach the Coeur d'Alene Lake summer water level of near 2,128 feet (Avista, 2000a).

The wild rainbow trout population in the upper Spokane River is separated from downstream populations by the City of Spokane's Upriver Project. Downstream of the Upriver Project are Upper Falls and Monroe Street HEDs. Resident fish populations in these small reservoirs created by Upper Falls and Monroe Street HEDs consist of some salmonids, non-game species, and hatchery-produced rainbow trout that are annually stocked in the Upper Falls Reservoir for angling opportunities. The WDFW stocked a total of more than 1 million rainbow trout and 50,000 brown trout in the Spokane River downstream of the Upriver Dam from 1948 through 1987 to develop and maintain a resident salmonid fishery (Kleist, 1987; Anderson and Soltero, 1984). A few naturally produced trout from the upper river also drop downstream past the Upriver Project.

Fisheries surveys on the lower Spokane River (i.e., from Monroe Street HED to Lake Spokane), indicate a diverse overall fish species assemblage similar to the upper Spokane River (Pfeiffer, 1985; Kleist, 1987; Avista, 2000a, Parametrix, 2004e). Non-game fish species, including suckers and northern pikeminnow, appear to dominate the biomass of the fish community in the lower Spokane River (Pfeiffer, 1985; Johnson et al., 1992). Salmonids found in this lower reach include rainbow trout, brown trout, and mountain whitefish, with recent surveys reporting wild, self-sustaining rainbow trout and mountain whitefish being particularly abundant in the free-flowing reach downstream of Monroe Street HED (Parametrix, 2004e).

In the free-flowing reach of the Spokane River downstream of Monroe Street HED, preferred salmonid spawning habitat appears to be limited to "pockets" of suitable gravel that were frequently associated with inundated shoreline vegetation and in deeper water than the upper river reach (Parametrix, 2003c). In the lower reach, 84 percent of the observed spawning occurred between river mile 70 and river mile 74 (Parametrix, 2003c). Substrate composition ranged from a gravel/cobble mix to predominantly sand. Rainbow trout spawning sites in the lower reach were reflective of the generally deeper spawning preference and are less susceptible to flow changes than in the upper reach. Spawning in the lower reach occurred in early to mid April when water temperatures were about 7ºC (45°F). The initial observation of fry emergence occurred on May 29, 2003, in the lower reach (Parametrix 2003c).

From 1995 through 1997, WDFW stocked 65,000 to 75,000 2- to 3-inch rainbow trout in the lower Spokane River; and from 1999 through 2002, WDFW annually stocked between 4,000 and 10,000 rainbow trout in the Spokane River in downtown Spokane. In 2001, WDFW also began stocking approximately 2,500 non-sterile brown trout annually, but since 2003 have ceased stocking rainbow trout (WDFW, 2004). Since 1995, Avista has annually stocked several thousand 8- to 9-inch rainbow trout simultaneously with the WDFW releases in the Upper Falls Reservoir in downtown Spokane and at the upper end of the Nine Mile Reservoir. The rainbow trout stocked by Avista since 2003 were sterile triploids, thereby avoiding the potential for hybridization with the self-sustaining rainbow trout population occurring downstream of the Spokane Falls. The catchable-size trout released into the river provide a popular recreational fishery within the city of Spokane and downstream reach of the river. Continuing the stocking of sterile rainbow trout into the Upper Falls Reservoir and the Nine Mile Reservoir is an overall management objective of WDFW for fisheries in the Spokane River (Avista and WDFW, 2004).

Information from Kleist (1987) indicated that fish populations in the Nine Mile Reservoir were dominated by non-game species. Smith and Johnson (1992) also reported that fish populations in the Nine Mile Reservoir were dominated by non-game species while the few gamefish that were sampled were only found in the upper reservoir and not in the lower reservoir near Nine Mile HED. Smith and Johnson (1992) also reported that no anglers were counted, and no fish were harvested from Nine Mile Reservoir during a 1992 creel census. There is little information available regarding the fish community and habitat specific to the short, free-flowing river reach downstream of Nine Mile HED. However, although little suitable salmonid spawning habitat occurs here, any salmonids that might use this reach during part of their life cycle, as well as salmonids occurring in Lake Spokane, have access to the Little Spokane River and its tributaries for spawning, rearing, and thermal refuge (Parametrix, 2003c).

WDFW manages Lake Spokane as a mixed-species fishery and has stocked the lake with several species, including rainbow trout, brown trout, and eastern brook trout. Since 1999, WDFW has planted between 6,000 and 7,000 brown trout in the lake (WDFW, 2004). In 2001, WDFW conducted a survey of Lake Spokane that assessed the relative abundance of fish collected in nearshore habitats versus those collected or observed (via hydroacoustic survey) in offshore habitats (Osborne et al., 2003). Observed fish densities for all species combined were lowest near the dam with only 1.3 fish per 10,000 cubic yards of habitat, higher near the middle portion of the lake with 5.2 to 6.5 fish per 10,000 cubic yards, and highest in the upper portions of the lake at 12.4 fish per 10,000 cubic yards.

Fish were observed throughout the water column of Lake Spokane, with the highest concentrations between depths of 53 to 66 feet in the lower and middle lake transects, and between depths of 5 to 26 feet at the most upstream transects (Osborne et al., 2003). Based on the vertical distribution in gill net catches, pikeminnow were collected more frequently in the top 16 feet of the water column, while yellow perch were collected more frequently in water from 16 to 33 feet deep. Kokanee were collected at depths of 16 to 89 feet, but only seven individuals were collected, too few to draw definitive conclusions about depth preferences. The most common fish in the nearshore sampling was the largescale sucker, with yellow perch, largemouth bass, and smallmouth bass the most common game fish collected (Table 5-33). Northern pikeminnow was the most abundant offshore species and yellow perch was the most abundant game species observed offshore (Osborne et al., 2003). Northern pike were collected in Lake Spokane during previous surveys (Bennett and Hatch, 1991, 1989, as cited by Avista, 2002b), although Osborne et al. (2003) did not report finding pike in 2001. Yellow perch, bass, and crappie growth rates in Lake Spokane are considered to be good (Bennett and Hatch, 1991, as cited by Avista, 2002b; Osborne et al., 2003).

Table 5-33. Fish species collected in Lake Spokane in 2001. (Source: Osborne et al., 2003)

		% of Fish Collected	
Common Name	**Scientific Name**	**Inshore**	**Offshore**
Mountain whitefish	*Prosopium williamsoni*	1.3	2.5
Rainbow trout	*Oncorhynchus mykiss*	<0.1	0.5
Chinook salmon	*Oncorhynchus tshawytscha*	--	0.6
Kokanee	*Oncorhynchus nerka*	--	2.5
Brown trout	*Salmo trutta*	0.3	1.8
Black crappie	*Pomoxis nigromaculatus*	5.3	0.7
Channel catfish	*Ictalurus punctata*	<0.1	--
Brown bullhead	*Ictalurus nebulosus*	2.1	0.7
Yellow bullhead	*Ictalurus natalis*	2.0	--
Carp	*Cyprinus carpio*	1.6	--
Tench	*Tinca tinca*	4.0	--
Chiselmouth	*Acrohceilus alutaceus*	1.8	0.4
Northern pikeminnow	*Mylocheliyus caurinus*	13.5	49.3
Largescale sucker	*Catostomus macrocheilus*	32.4	2.1
Bridgelip sucker	*Catostomus columbianus*	0.7	--
Longnose sucker	*Catostomus catostomus*	0.5	--
Largemouth bass	*Micropterus salmoides*	2.3	--
Smallmouth bass	*Micropterus dolomieui*	8.4	--
Pumpkinseed	*Lepomis gibbosus*	0.2	--
Yellow perch	*Perca flavescens*	23.4	39.4
Sculpin	*Cottus* spp.	0.1	--
Total fish collected		4,733	282

Notes: % – percent
-- – no datum

WDFW overall management objectives for fisheries in Lake Spokane includes enhancing angling opportunities by stocking rainbow trout and maintaining the current warmwater fishery (Avista and WDFW, 2004).

5.6.2 Environmental Effects

5.6.2.1 Effects of Project Operations

Lake Water Level Management

Coeur d'Alene Lake Upstream of Post Falls HED—Post Falls HED controls water levels in Coeur d'Alene Lake typically for about 6 months of each year. Avista cannot begin controlling water levels until after spring flood pulse runoff flows have peaked and largely subsided, usually in late June or early July. Avista then maintains Coeur d'Alene Lake near elevation 2,128 feet throughout the summer recreation season. Avista generally begins a gradual drawdown of Coeur d'Alene Lake, typically at a rate of 1 to 1.5 feet per month, the week following Labor Day to as late as after September 15.

Post Falls HED control of water levels during the summer and the fall drawdown results in the seasonal (i.e., late spring, summer, and early fall) change of the Spokane River into a more lacustrine environment above the hydroelectric development and the lower tributary reaches to Coeur d'Alene Lake. Current Project-related effects may exist, however it is not possible to develop a reasonable means to specifically identify, define, or quantify the potential Project-related adverse effects on fish resources and to distinguish such effects from the various other non-Project effects (see Section 5.6.3, *Cumulative Effects*).

Spawning-run westslope cutthroat trout and bull trout are expected to migrate upstream out of Coeur d'Alene Lake and through the affected portions of the major tributaries when water temperatures are cool and in the early spring or later fall. Adult adfluvial westslope cutthroat trout migrate downstream to the lake in April and May after spawning, when Post Falls HED typically does not control the water level in Coeur d'Alene Lake. Adult adfluvial bull trout are known to migrate back to the lake soon after spawning in September and are expected to reach the Project-affected reach of the St. Joe River by early October. Observations of tagged cutthroat trout in 2003 indicated that there is not an effect on migration of fish through the inundated reaches and the free-flowing portions of Coeur d'Alene Lake's major tributaries (memorandum from D. Weitkamp, Ph.D., Fisheries Scientist, Kirkland, WA, to Tim Vore, Environmental Specialist, Avista, Spokane, WA, dated June 20 2005). Results showed about one-quarter to one-half of the cutthroat trout tagged upstream in the tributaries migrated into or through the inundated reaches (Parametrix, 2005).

While residing in Coeur d'Alene Lake, both westslope cutthroat trout and bull trout are known to occupy the deeper, cooler areas of the lake, below the 7.5 feet of the variable depth of the operation of the facility (Parametrix, 2005). Additionally, with the Post Falls HED controlling water levels during only a portion of the year, typically June through October, the continued operation of the facility is not considered a substantial limiting factor to the populations of westslope cutthroat trout and bull trout. Both westslope cutthroat trout and bull trout existed in substantially larger numbers as late as the 1980s, long after the current operation of Post Falls HED had begun to influence Coeur d'Alene Lake water levels. This further indicates that factors other than HED operations are likely responsible for the recent population declines of these native salmonids (memorandum from D. Weitkamp, Ph.D., Fisheries Scientist, Kirkland, WA, to Tim Vore, Environmental Specialist, Avista, Spokane, WA, dated June 20 2005).

Non-native fish species, particularly northern pike and Chinook salmon, likely compete with and prey upon native fish species in Coeur d'Alene Lake. A recent Parametrix (2004b) analysis indicates that maintaining the water elevation of Coeur d'Alene Lake near 2,128 feet during the summer is unlikely to have had an influence on shoreline habitat that would influence the rate of predation or competition sufficiently to have resulted in the recent population changes in native trout (memorandum from D. Weitkamp, Ph.D., Fisheries Scientist, Kirkland, WA, to Tim Vore, Environmental Specialist, Avista, Spokane, WA, dated June 20 2005). Weitkamp also suggests that the populations of the non-native major predators (northern pike and Chinook salmon) do not appear to be controlled by or substantially influenced by the regulated lake elevation (memorandum from D. Weitkamp, Ph.D., Fisheries Scientist, Kirkland, WA, to Tim Vore, Environmental Specialist, Avista, Spokane, WA, dated June 20 2005).

Under the Proposed Action, Avista does not propose to change upstream water level management at Post Falls HED in a manner that would substantially affect aquatic habitat or associated resources. Coeur d'Alene Lake would be filled to its normal summer elevation of about 2,128 feet as soon as practicable each summer and maintained near 2,128 feet until September 15, subject to proposed minimum discharge flows at Post Falls HED. Maintaining the minimum discharge flow is unlikely to result in lake levels dropping by more than a few inches during any year. A fall lake drawdown to provide storage for winter precipitation and spring runoff would continue similar to current conditions, beginning September 15, with elevations as low as 2120.5 feet possible in winter. Setting the drawdown date at September 15 does not represent an extension of the summer lake levels on Coeur d'Alene Lake.

Effects Analysis

The Proposed Action at Post Falls HED would result in Coeur d'Alene Lake levels that are the same as current conditions. The infrequent variation in Coeur d'Alene Lake water levels caused by maintaining an increased minimum discharge flow and/or by implementing the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan* (as discussed in Section 5.6.2.2) is not expected to create a discernable effect on fish habitat upstream of Post Falls HED. Consequently, we conclude that reservoir water level management by Post Falls HED under the Proposed Action would not affect aquatic habitat or fish populations compared with current conditions. Proposed Action measures designed to protect and enhance aquatic resources are presented in the Post Falls HED Fish PME Program (Appendix B) and discussed in Section 5.6.2.7, *Fishery Protection, Mitigation, and Enhancement Programs*.

Downstream of Post Falls HED—Current operation of Upper Falls HED and Monroe Street HED results in little or no reservoir fluctuation on a daily or seasonal basis, with any changes in reservoir water levels driven by high flows and the natural channel configuration. Consequently, Project-related reservoir management maintains a constant aquatic habitat at these two hydroelectric developments, as it has since their construction. These reaches do not include areas of quality aquatic habitat.

Operation of Nine Mile HED includes some daily and seasonal reservoir fluctuations. Forebay water level fluctuations related to daily load following are typically no more than 6 inches. However, water levels above the dam can drop by 5 or 10 feet in some years as a result of flashboard removal. Once flashboards are replaced, typically in July, the reservoir rises and reestablishes its full-pool elevation (see Figure 5-10). These water level changes influence the characteristics of the aquatic habitat within the reservoir, potentially affecting habitat use and suitability in areas of exposed substrates. Although the potential for adverse effects exists, attempting to quantify the effects of Nine Mile HED operations on associated fish populations would be difficult (Avista and WDFW, 2004). Wild rainbow trout, the species of particular concern, generally reside in more suitable, free-flowing reach of the river upstream of the Nine Mile Reservoir and are not affected by this operation. Smith and Johnson (1992) found rainbow trout, brown trout, and mountain whitefish occurring only in the upper Nine Mile Reservoir and absent in the lower reservoir near the Nine Mile HED. Additionally, Avista, in cooperation with WDFW, annually stocks this reservoir with catchable rainbow trout for angler opportunity. Consequently, any reservoir operation effects would likely occur on stocked fish.

Operation of Long Lake HED results in both short-term and seasonal changes in reservoir water levels, including daily, weekly, and seasonal drawdowns of Lake Spokane. Maximum drawdown of Lake Spokane under the current FERC license is limited to no more than 24 feet, although Avista has limited winter drawdown to no more than 14 feet in recent years. During the summer, Lake Spokane is generally kept within 1 to 1.5 feet of full pool (1,536 feet) (Figure 5-20; see also Table 5-17). An overall fisheries-management objective of WDFW is to maintain the current warmwater fishery in Lake Spokane in a manner that is not detrimental to native salmonid populations (e.g., wild rainbow trout in the Little Spokane River) (Avista and WDFW, 2004).

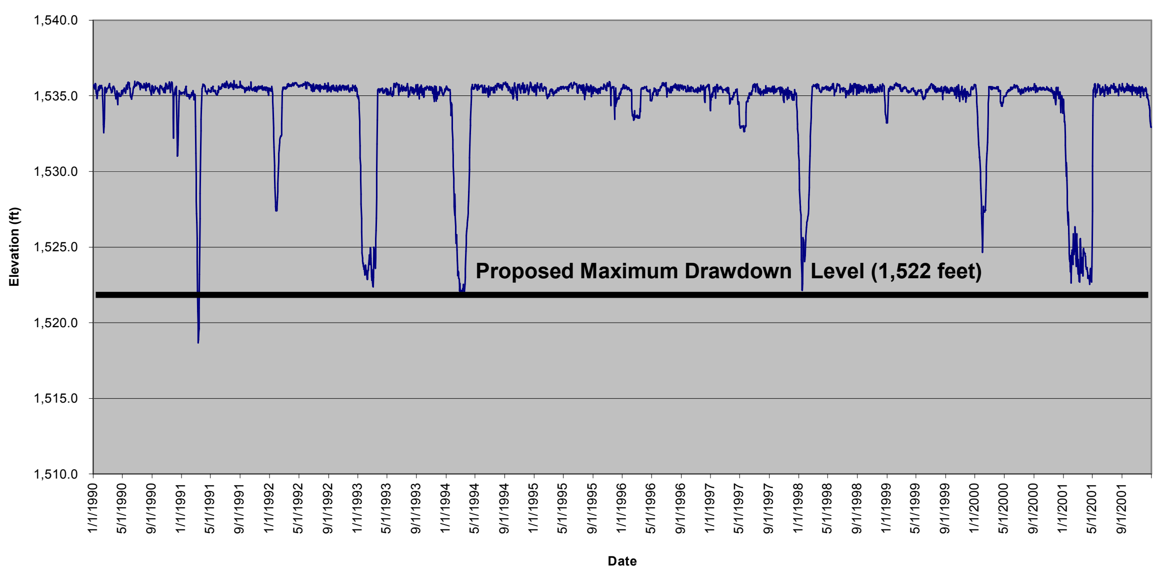


Figure 5-20. Lake Spokane surface elevation, 1990–2001. (Source: Parametrix, 2003c)

The existing winter drawdown discourages growth of aquatic vegetation in the shallower portions of the reservoir where substrates are frequently exposed to more extended periods of desiccation and freezing. Although this exposure could help prevent aquatic vegetation from reaching nuisance levels in these areas, it may also reduce the amount of cover available for young fish during the summer. Parametrix (2003c) identifies other factors besides reservoir water-level management that also influence the abundance of aquatic vegetation and fish populations that rely on or prefer these habitats, including water temperature, the duration of drawdowns, and the plant species. Parametrix (2003c) indicates that most available information focuses on the effects on warmwater fish species and that information specific to rainbow trout is generally lacking. Although it has been acknowledged that the Lake Spokane drawdowns have an effect on the aquatic habitat and fish populations, quantifying these effects would be difficult, and would require long-term analyses, with highly uncertain benefit (Avista and WDFW, 2004). Osborne et al. (2003) report the current water-level management regime of Lake Spokane provides the public with high quality populations of largemouth bass, smallmouth bass, yellow perch, and black crappie. The proposed operation of Long Lake HED is expected to continue to provide favorable habitat conditions for the current high quality fishery.

Effects Analysis

No proposed actions at Upper Falls HED, Monroe Street HED, or Nine Mile HED are expected to create any water-level management changes compared with the current Project operations. Avista proposes to limit drawdowns of Lake Spokane to 14 feet from the full-pool elevation. At Long Lake HED, current Project operations typically do not result in drawdowns greater than 14 feet. The last drawdown greater than 14 feet occurred for a brief period in 1991 (see Figure 5-20), and the last drawdown of 24 feet occurred during the winter of 1988–1989. By formalizing the current informal drawdown limit of 14 feet, adverse effects, if any, of deeper drawdowns that historically occurred would be avoided. The fish populations in Lake Spokane would be subject to essentially the same drawdown regimes as have existed for many years, and no new Project-related effects from management of the lake level would be expected for the term of the new license. Proposed Action measures designed to protect and enhance aquatic resources, and thereby offset any minor effects due to reservoir operations, are presented in the Spokane River Fish PME Program (Appendix B) and discussed in Section 5.6.2.7, *Fishery Protection, Mitigation, and Enhancement Programs*.

Project Releases

Minimum-discharge flow issues focus primarily on the operation of Post Falls HED, with the discharge from this HED influencing flow conditions in the two downstream free-flowing reaches that support wild rainbow trout populations. The actual flow and overall habitat conditions experienced in these reaches are also affected by the aquifer/groundwater interchange relationship as well as water withdrawals from the river and aquifer, particularly during low-flow, minimum-discharge periods. Stakeholders in the relicensing process identified wild rainbow trout as the primary fish species of interest in the Spokane River downstream of Post Falls HED, and an overall fisheries management objective of WDFW is to protect and enhance wild rainbow trout in the free-flowing reaches of the river (Avista and WDFW, 2004).

When Avista manages the flows at Post Falls HED, it currently operates this HED to meet the following needs: (1) minimum flow requirements (currently 300 cfs or an amount equal to the inflow to Coeur d'Alene Lake, whichever is less); (2) customer energy demands; (3) maximizing the amount of storage available in Coeur d'Alene Lake for absorbing run-off flows; (4) maintaining adequate flows through the rainbow trout spawning and fry emergence period each spring; and (5) recreational, residential, and commercial interests upstream of Post Falls HED (Avista et al., 2004).

Highly variable precipitation and meteorological conditions are natural occurrences in the Spokane River Watershed. Consequently, lake levels and flows can vary greatly as well. Project-related discharge and subsequent river elevations are strongly influenced by this natural variability (Avista et al., 2004). The flashy nature of the Spokane River results in considerable variation in river elevation over a relatively short time. At some point, after high spring flows into Coeur d'Alene Lake begin to decrease and the potential for upstream flooding has passed, Avista starts to restrict Post Falls HED discharge. When beginning to regulate lake levels and downstream flow releases in late spring, Avista attempts to maintain discharge flows at high enough levels to keep the majority of downstream rainbow trout spawning redds watered until fry have emerged from the gravels. As operated, current conditions already seek to reduce the potential operational effects on rainbow trout spawning and successful fry emergence (Avista et al., 2004). Stakeholders, including the IDFG, FWS, WDFW, and the Coeur d'Alene Tribe (as part of the Fisheries Work Group [FWG]), further developed this existing practice and approved an *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan* (Avista, 2004), discussed later in Section 5.6.2.2.

After the spring freshet, discharges from Post Falls HED generally decline as inflows to Coeur d'Alene Lake decline. Once the summer lake level is established, often by the end of June, Post Falls HED discharge tracks these inflows. Flows may continue to decline naturally over the course of the summer. In extremely dry years, the current minimum discharge requirement may be triggered, and discharges from Post Falls can be 300 cfs or, rarely, less. During the periods of low flows, rainbow trout move to areas of coldwater refuge downstream of Sullivan Road in Washington, where the cooling influence of groundwater affects water temperatures. The long-term presence and viability of a self-sustaining rainbow trout population in the free-flowing reaches of the river downstream of Post Falls HED indicate that suitable habitat exists even with current low-flow conditions. Under current Project operations, in most years, Post Falls HED discharge does not drop below 500 cfs.

Recent habitat suitability analysis conducted by NHC and HDI (2004) indicates that maximum downstream habitat suitability is obtained under Post Falls HED discharge flows higher than 300 cfs. NHC and HDI (2004) reported that adequate physical habitat protection of wild rainbow trout is accomplished with discharge flows from 400 cfs to 700 cfs. IDFG and WDFW further assessed the available information on water temperatures and refuge habitat and concluded that 600 cfs reduced to 500 cfs during low flow years was protective of rainbow trout and a significant improvement from the existing condition (Horner, 2004).

The proposed scenario for minimum discharge flow from Post Falls HED suggests that Avista shall maintain a 600-cfs minimum discharge flow at Post Falls HED under normal operating conditions. If the daily average inflow to Post Falls HED (calculated at midnight) is, and is projected to continue to be, less than 600 cfs and results in Coeur d'Alene Lake drafting below elevation 2127.75 feet as measured at the USGS gage at Coeur d'Alene Lake (Gage No. 12415500) between July 1 and September 15 of any year, Avista shall then maintain a 500-cfs interim minimum discharge flow at Post Falls HED until the start of the annual scheduled September 15 drawdown. Avista proposed this minimum discharge flow of 600/500 cfs because it:

- is scientifically based and provides for substantial useable habitat for rainbow trout in the Spokane River;
- represents a substantial improvement to fisheries habitat compared to current Project operations of 300 cfs or inflows to Coeur d'Alene Lake, whichever is less;
- uses Coeur d'Alene Lake levels as an indicator of low flow, and dry and warm conditions in the watershed;
- recognizes both upstream and downstream interests; and
- represents substantial stakeholder support.

Under the Proposed Action, measures specified in the Post Falls HED Fish PME Program would also implement an established criteria for identifying and achieving specific annual target flow levels related to rainbow trout spawning and successful fry emergence (discussed in Section 5.6.2.2), establish a maximum downramping rate downstream of Post Falls HED (discussed in Section 5.6.2.3), and implement a variety of other fisheries enhancement programs (discussed in Section 5.6.2.7). The effects of implementing the minimum discharge at Post Falls HED are discussed in this section.

Effects Analysis

Avista, WDFW, IDFG, and other stakeholders examined three factors that are important in defining appropriate minimum discharge flows for Post Falls HED: (1) what life stages of rainbow trout are important; (2) what type of river transect reflects a worst-case situation for minimum flows (i.e., if minimum flows protect representative habitat, then similar habitat elsewhere in the free-flowing reaches would also be expected to be protected); and (3) water temperature (Horner, 2004). Stakeholders also considered balancing the downstream flow regime with maintaining recreational water levels in Coeur d'Alene Lake.

Rainbow trout are territorial, and more water in a river often supports more fish. Bigger, dominant trout develop territories and will exclude smaller fish. As flows are reduced, the habitat's capacity to support a given number of adult trout can be reduced. This is especially true in a shallow, wide reach of habitat such as that represented by the instream flow assessment transect in the Barker Road area of the Spokane River (Horner, 2004). Large trout need a certain minimum depth of water, and as flows are reduced, habitat suitability for larger fish is generally lost at a greater rate than it is for smaller trout. Smaller trout, especially fry and young-of-the-year juveniles, tend to favor shallow, low-velocity water with a substrate that provides suitable cover. Shallow, low-velocity water and appropriate substrate and cover for small trout are generally sufficient along the margins of the Spokane River under most flows (Horner, 2004).

From a fisheries management standpoint, adult fish support reproduction and, along with older juvenile fish, are the life stages that maintain the fish population that supports the important wild rainbow trout fishery in the Spokane River (WDFW, 2004). These older age classes are important to protect and enhance with improved instream flow management. IDFG, WDFW, and other stakeholders concluded that it is appropriate to determine the appropriate minimum discharge flows for Post Falls HED based on the combined habitat suitability for adult and older juvenile rainbow trout (Horner, 2004).

Using information on instream flow habitat suitability developed by NHC and HDI (2004), IDFG, WDFW, WDOE, and other stakeholders selected a river transect in the vicinity of Barker Road as the area that would best reflect changes to fish habitat with different flows (Figure 5-21). The Spokane River near Barker Road is wide and shallow, and as flows change, the fish habitat characteristics and suitability change more than in deeper, more narrow areas. Table 5-34 summarizes the changes in physical habitat suitability for older juveniles and adults at the Barker Road site, estimated by weighted useable area (WUA) versus flow, based on information from the fish habitat and instream flow study (NHC and HDI, 2004). Physical habitat for older juvenile rainbow trout is optimized at a Post Falls discharge flow of 500 cfs, with discharge flows of 400 to 700 cfs all providing more than 90 percent of the maximum WUA. The existing minimum flow of 300 cfs provides 80 percent of the maximum WUA. Physical habitat for adults is optimized at discharge flows of 850 and 900 cfs, with discharge flows from 700 to 1,400 cfs providing more than 90 percent of the maximum WUA. The existing 300-cfs minimum flow provides only 27 percent of the maximum WUA for adults. IDFG and WDFW consider it most appropriate to use the combined juvenile II and adult life-stage WUA estimates to characterize the relationship of flow to habitat (WDFW et al., 2004; Horner, 2004). Optimum habitat for the combined life stages occurs at a discharge flow of 700 cfs, with discharge flows from 500 to 1,000 cfs providing more than 90 percent of the maximum WUA. Habitat availability drops below 90 percent at flows above 1,000 cfs and below 500 cfs. Under the existing 300-cfs minimum flow, 64 percent of the maximum WUA for older juveniles and adults is provided (see Table 5-34).

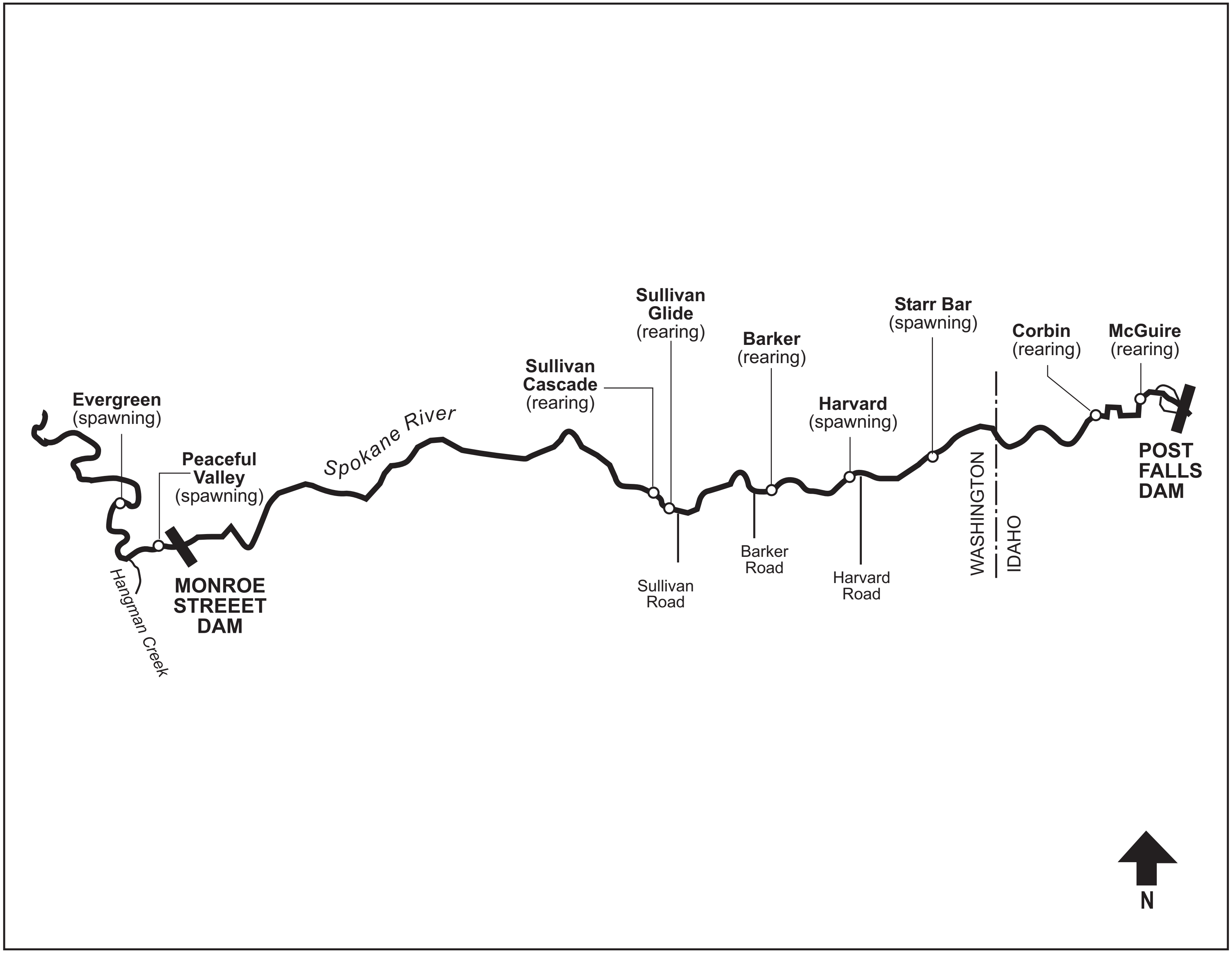


Figure 5-21. Instream flow and fish habitat assessment sites. (Source: NHC and HDI, 2004)

Table 5-34. Percent of maximum habitat (WUA) preserved for the Barker Road site for juvenile II and adult rainbow trout at various discharge flows from Post Falls HED. (Source: NHC and HDI, 2004)

Post Falls Discharge Flow	Barker Road Juvenile II WUA	% Max.[a] Juvenile II Habitat	Barker Road Adult WUA	% Max.[a] Adult	Adult/ Juvenile II Combined WUA	% Max.[a] Combined Juvenile II/Adult
300	62,028	80	14,640	27	38,334	64
400	76,805	99	26,678	50	51,741	86
500	77,350	100	36,844	69	57,097	95
600	73,650	95	45,061	84	59,355	99
700	70,219	91	50,270	94	60,244	100
800	66,486	86	52,928	98	59,707	99
850	643,20	83	53,658	100	58,989	98
900	62,024	80	53,757	100	57,890	96
1,000	57,350	74	53,236	99	55,293	92
1,100	52,306	68	52,542	98	52,424	87
1,200	46,990	61	51,706	96	49,348	82
1,300	42,354	55	50,392	94	46,373	77
1,400	38,752	50	49,036	91	43,894	73
1,500	35,909	46	47,873	89	41,891	70
2,000	30,833	40	39,991	74	35,412	59
2,500	35,638	46	33,695	63	34,667	58

Notes: WUA – weighted usable area

[a] Percentages are based on the maximum WUA for the individual life stage or for the Combined WUA values. Because the maximum WUA occurs at different flows for each of these, percentages for the individual life stages at a specific flow do not directly correlate with that for the Combined WUA at the same flow. For example, maximum Combined WUA (100%) is realized at a discharge flow of 700 cfs, representing 91% and 94%, respectively, of the maximum WUA for the juvenile and adult life stages.

Rainbow trout prefer water temperatures in the range of 10 to 14ºC (50 to 57°F) according to Horner (2004), although Raleigh et al. (1984) indicate a warmer optimal range for adult rainbow trout of 12 to 18ºC (53.6 to 64°F). In the Spokane River, rainbow trout can apparently tolerate daytime water temperatures up to 21ºC (69.8°F), as long as the water cools down at night (Horner, 2004; NHC and HDI, 2004). Water temperatures between 23 and 24ºC (73 and 75°F) are considered lethal for trout (Horner, 2004). Water temperatures measured in the free-flowing reach of the Spokane River downstream of Post Falls HED generally exceed 20ºC (68°F) at various times and specific locations from July to mid- or late September in most years (see Section 5.5.12, *Temperature*). Groundwater inflow appears to maintain average daily summer water temperatures below 20°C (68°F) between Sullivan Road and the Upriver Project, based on model simulations using 2001 flow conditions when the Post Falls HED discharge dropped below 400 cfs starting on August 15 (Figure 5-22) and recent field measurements obtained during several years (Golder and HDR, 2004). Therefore, the reach of river downstream of Sullivan Road represents an important summer coldwater refuge for the rainbow trout population in the upper free-flowing river under existing conditions. Spot temperature readings taken by WDOE during several years indicate that water temperatures in the free-flowing reach between Monroe Street HED and Nine Mile Dam, as well as downstream of Long Lake HED, are generally less than 20ºC (68°F) (WDOE, 2003b; Golder and HDR, 2004).

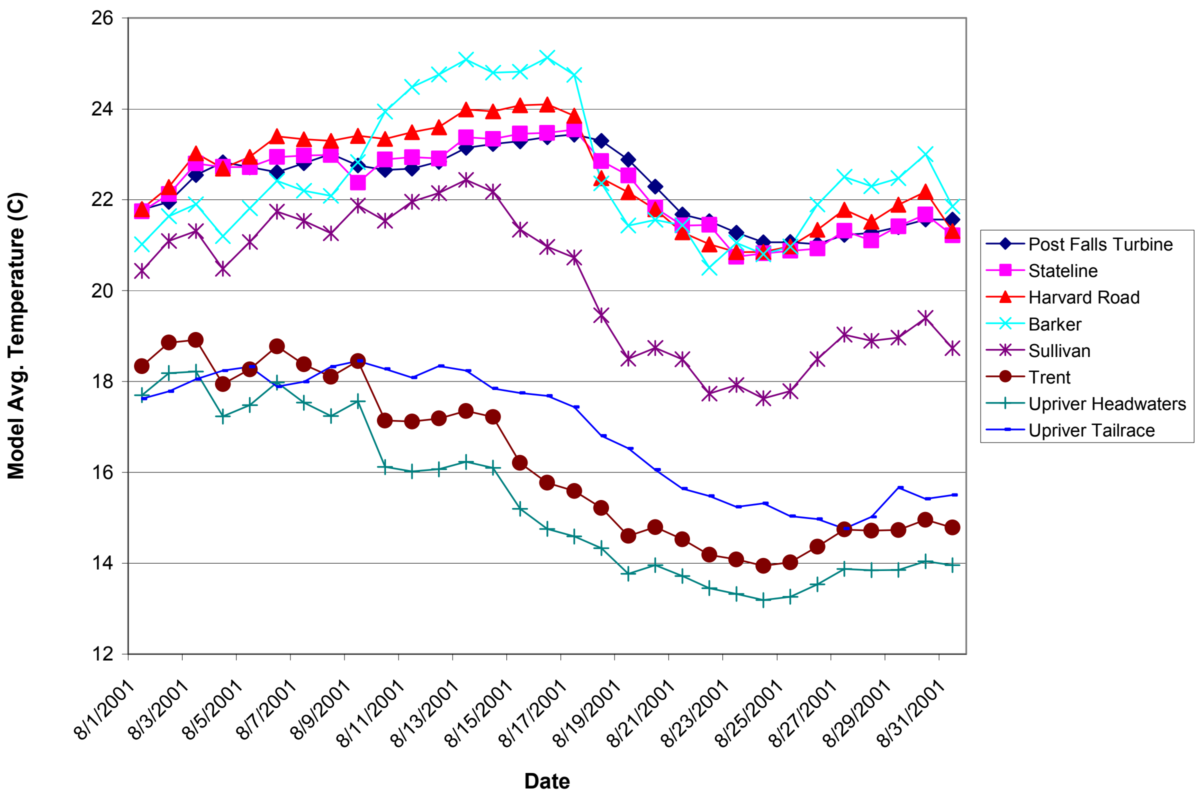


Figure 5-22. Predicted August average daily temperatures by station based on actual 2001 flow conditions. (Source: Golder, 2004h)

Stakeholders expressed concern that the benefits of Post Falls HED discharge flows that provide near-optimal physical habitat conditions at Barker Road (i.e., discharge flows of about 700 to 800 cfs) could actually reduce the total useable habitat available by warming the river downstream of Barker Road and adversely affecting the coldwater refuge habitat. To address this concern, Golder (2004h) modeled water temperature effects during August minimum-flow releases from Post Falls HED of 600, 700, and 800 cfs based on the 2001 hydrograph. This modeling indicates that downstream of Barker Road, water temperature generally increases as streamflow increases due to the relative decrease in the influence of cold groundwater inflow to the river (Golder, 2004h). Upstream of Sullivan Road, the average daily summer water temperature is relatively insensitive to streamflow and warmer than the threshold for rainbow trout survival. Water temperature monitoring during a model validation trial in August 2004 documented that when flows released from Post Falls HED were reduced from 700 to 500 cfs, there was a corresponding decrease in water temperature downstream of Sullivan Road (Golder, 2004h).

After reviewing the available information, IDFG, WDFW, and several other stakeholders concluded that releases of 700 cfs would likely reduce important rainbow trout habitat suitability by increasing water temperatures to greater than 21ºC (69.8°F) in areas that currently serve as important summer thermal refuge (Horner, 2004). Modeled average August daily water temperature based on a minimum flow release of 600 cfs from Post Falls HED (Golder, 2004h) indicates that, downstream of Barker Road, trout would find habitat of suitable thermal refuge (Figure 5-23). Reducing the discharge flow to 500 cfs would further enhance this useable coldwater thermal refuge habitat, especially during hot and dry conditions that would lead to implementation of this flow.

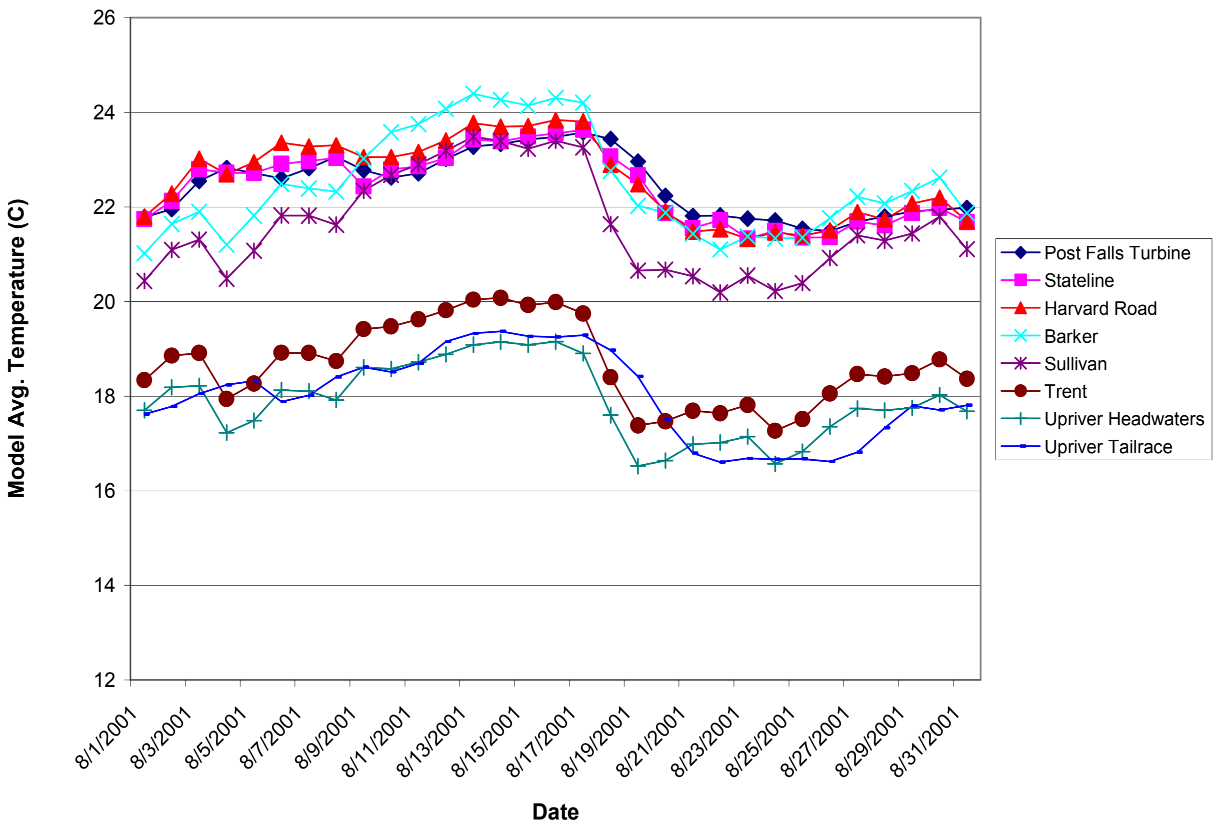


Figure 5-23. Predicted August average daily temperatures by station based on a 600-cfs Post Falls HED minimum discharge flow and 2001 flow conditions (a dry water year). (Source: Golder, 2004h)

In the river reach from Post Falls HED to Sullivan Road, physical habitat similar to that at Barker Road is of marginal to no value to rainbow trout during the warm summer because of high water temperatures, regardless of flow release volume at the Post Falls HED (see Section 3.5) (Golder, 2004h; Parametrix, 2004c). At flows less than 700 cfs, habitat features such as the Barker Road-type of habitat below the Sullivan Road area are not limited by water temperature and are also less limited by flow, since groundwater inflow provides additional water. Discharge flows of 500 cfs from Post Falls HED would provide near maximum useable habitat for rainbow trout below Sullivan Road. IDFG, WDFW, and other stakeholders of the FWG concluded that a 600-cfs discharge from Post Falls HED that decreases to 500 cfs during low flow and warm conditions would be protective of rainbow trout in the Spokane River. We conclude that the Proposed Action would improve conditions for rainbow trout populations compared to the current conditions. To address remaining concerns related to the potential effect of increased minimum flows on downstream water temperatures, Avista also proposes to monitor Spokane River water temperatures and then consult with the appropriate agencies on the results (see Section 5.5.2.3, *Water Quality Monitoring)*.

5.6.2.2 Spawning and Emergence Flows

Dewatering of rainbow trout redds prior to the emergence of fry from the gravel can result in mortality of developing eggs and fry and can adversely effect that year-class of trout. Rainbow trout spawning in the Spokane River has been documented to occur in the two free-flowing reaches of the river lying between Post Falls HED and the Upriver Project Reservoir, as well as downstream of Monroe Street HED to the headwaters of Nine Mile Reservoir (Johnson, 1997; Parametrix, 2003d).

Avista annually monitors rainbow trout spawning activity in the upper Spokane River at three reference sites and also monitors the timing of fry emergence. Based on monitoring results and anticipated streamflows, Avista attempts to regulate the Post Falls HED discharge to benefit rainbow trout spawning and fry recruitment by maintaining flows sufficient to keep the majority of redds wetted until fry have emerged. These efforts result in reducing the potential adverse effects of current Project operations on rainbow trout spawning and fry emergence, although varying amounts of spawning habitat and trout redds may still be dewatered, depending on variable annual flow conditions.

Under the Proposed Action, Avista would continue to operate Post Falls HED to protect and enhance rainbow trout spawning and fry emergence, but as expressly documented in the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan* (Avista, 2004). The plan was developed and approved by FWG stakeholders representing IDFG, WDFW, the Coeur d'Alene Tribe, and FWS as being protective of rainbow trout. The plan calls for first determining each year the flows that occur at Post Falls HED during the peak period of rainbow trout spawning, which has been shown to occur in the upper Spokane River between April 1 and April 15. In addition, forecasted streamflows for April through July would be developed from the *Streamflow Forecasts, Idaho Water Supply Outlook Report*, which the Natural Resource Conservation Service (NRCS) issues each year by April 1. The spawning-period flow and forecasted flows for April through July would be used to establish target discharge flows from Post Falls HED that would be protective of egg incubation and fry emergence and that Avista would seek to maintain through June 7 of that year. Target flows would be designed to keep the majority of suitable habitat and redds at the index spawning sites adequately watered, with the specific flow levels varying depending on forecasted flows.

Effects Analysis

Stakeholders and consultants identified and discussed a number of factors that make it impossible for Avista to maintain optimal flow conditions through the fry-emergence period. These conditions include the timing and variability of rainbow trout spawning and fry emergence, the inherent annual and shorter-term variability in flows, Avista's limited ability to regulate those flows, and the potential to adversely affect summer Coeur d'Alene Lake levels and later Spokane River flows. It was determined that a single, inflexible minimum flow requirement for Post Falls HED during the spawning and fry-emergence period would not be appropriate. Alternatively, recent instream flow information concerning spawning areas and the effect of various stream flows, combined with forecasted stream-flow information, could be used to determine and plan the Spokane River flow that keeps a majority of the index site redds wetted through the fry-emergence period (Avista, 2004).

Implementation of the Proposed Action would protect much of the suitable spawning area available in the index spawning sites each year, depending on forecasted streamflows for the Spokane River. The flows necessary to protect these sites are based on instream flow studies conducted during the relicensing process (NHC and HDI, 2004). Maintaining adequate flow over 50 to 70 percent of the suitable spawning area each year is reasonably protective of rainbow trout, given the natural variability that would be expected in an unregulated system and natural year-class variability typical of trout populations.

Flows that would be protective of the upper Spokane River spawning sites would also protect a higher percentage of spawning sites in the Spokane River downstream of Monroe Street HED because spawning generally occurs in deeper water in this river reach, flows are generally somewhat higher due to groundwater and other inflow, and spawning redds are less likely to be affected by decreasing flows. The Proposed Action would be similar to current conditions, but more protective of rainbow trout fry emergence by establishing anticipated target flows and formalizing elements of the voluntary program that Avista initiated in the mid-1990s.

We conclude that the Proposed Action would improve conditions for rainbow trout spawning and fry emergence compared to current conditions. The Proposed Action would help to ensure that rainbow trout fry survival is sufficient to protect and enhance the wild rainbow trout populations occurring in the upper and lower free-flowing reaches of the Spokane River. In addition, subsequent improvement in habitat conditions as a result of increased minimum discharge requirements at Post Falls HED would help to ensure that the benefits of providing these spawning and fry-emergence flows would ultimately be reflected in the overall population and in the recreational fishery.

5.6.2.3 Ramping and Potential Fish Stranding

Changes in river flow are normal and natural occurrences in all river systems (Leopold, 1994, as cited by Avista et al., 2004). Highly variable water levels and flows naturally occur in the Spokane River. Many hydroelectric projects, including Post Falls HED and the Spokane River Project, routinely use their storage capacity to modify both the timing and rate of change in river discharge. However, Project-related discharge and subsequent changes in river elevations are strongly influenced by the natural variability of flows in the Spokane River drainage basin (Avista et al., 2004). The primary effect of changes in river flow on fish habitat occurs with substantial decreases in flow as one or more spill gates are closed at Post Falls HED when inflow to Coeur d'Alene Lake drops below discharge.

Changes in river flows that might naturally occur over a number of days in unregulated rivers can occur over a much shorter timeframe in regulated rivers. The rate of change in discharge at hydroelectric projects (i.e., the ramping rate) can adversely affect fish resources. Adverse effects on downstream waters occur during decreasing flows primarily through the dewatering of spawning redds and the stranding of small fish in shallow-water or isolated habitats when flows rapidly decline (i.e., downramping). Older and larger fish are generally less likely to seek refuge in shallow-water areas or within the substrate as flows decline and are more likely to simply move to deeper water as flows decline. The rate of acceptable decrease in flow tends to be a function of channel configuration, substrate type, time of year, and the fish species and life stages present. Although the ramping rate at a dam can result in nearly instantaneous water level changes immediately downstream, the change in water elevation farther downstream is dampened by bank storage, resistance of the river channel, and the volume of water in the channel from the previous discharge level (Avista et al., 2004).

The primary issue identified for the Project with respect to ramping is whether the current rates of reducing the Post Falls HED discharges would result in an unacceptable risk to those fish that inhabit the downstream, shallow-water habitats occurring in the reach between the hydroelectric development and the Upriver Project Reservoir. Currently, Avista typically begins to control upstream water levels and restrict discharge at Post Falls HED after spring run-off has peaked and largely subsided. Avista may also on occasion briefly restrict flows through Post Falls HED to raise the level of Coeur d'Alene Lake at other times for commercial needs or to address public safety issues. Once the lake level reaches elevation 2,128 feet, Avista operates Post Falls HED in a run-of-river mode (outflow equals inflow to the facility, and the upstream water level remains relatively stable) throughout the remainder of the summer, subject to minimum flows (Avista et al., 2004). Based on current operations of Post Falls HED, downramping has the greatest potential to affect aquatic habitat during the spring and the brief periods when Avista may otherwise be asked to raise the water level of Coeur d'Alene Lake.

Rainbow trout is the species of greatest concern in the free-flowing reaches of the Spokane River. Rainbow trout fry and young juveniles would likely be the life stages most susceptible to declining river flows because older juveniles and adults are less likely to occur in the shallow water areas that are most influenced by falling water levels. Fry that have successfully emerged from the spawning gravels are present near spawning sites in June and July, at other shallow, gravel bar areas of the Spokane River suitable for rearing throughout the year (Avista et al., 2004). Therefore, the key habitats most susceptible to ramping effects are the reaches downstream of Post Falls during the late spring and early summer as run-off flows subside and when the greatest number of rainbow trout fry inhabit nearshore habitats. This is also when Post Falls HED is most likely to reduce discharge to control Coeur d'Alene Lake water levels (Avista et al., 2004). Currently, no site-specific data are available to quantify the effects, if any of current Post Falls HED downramping on rainbow trout or other fish species in the Spokane River.

Upper Falls and Monroe Street HEDs operate in a run-of-river mode, which means that flows from each development are dictated by releases from Post Falls HED and intervening hydrology, including the addition of about 300 to 400 cfs of groundwater. The rate of any changes in river flow occurring downstream of Upper Falls and Monroe Street HEDs as a result of Project operations would be considerably less than the rate of change immediately downstream of Post Falls HED. There is no known spawning and rearing habitat for rainbow trout in the reaches downstream of Nine Mile and Long Lake HEDs, and the effects of any ramping at these would likely be quite limited (Avista et al., 2004).

Under the Proposed Action, the Post Falls HED Fish PME Program specifies that normal operations at Post Falls HED would maintain a maximum allowable per-hour discharge downramping rate that corresponds to no more than a 4-inch drop in downstream water levels as measured at the USGS Gage No. 12419000 (Spokane River near Post Falls). This downramping rate would be expected to protect small fry and juveniles from stranding, and reflects the rate that can reasonably be achieved at Post Falls HED given the current flow control mechanisms at the HED (i.e., spill gate and turbine intake controls).

Effects Analysis

Under the Proposed Action (Post Falls HED Fish PME Program), a 4-inch-per-hour maximum downramping rate at Post Falls HED would provide enhanced protection for important fish populations occurring in downstream habitats. This ramping rate is consistent with the operational capabilities of the existing facility (Avista et al., 2004). The Proposed Action represents the results of a coordinated evaluation with IDFG and WDFW for the Spokane River Project and Post Falls HED. The primary benefit of this action would be to provide enhanced protection of rainbow trout fry and juvenile fish in the free-flowing reach of the Spokane River downstream of Post Falls HED. If facility upgrades at Post Falls HED allow for more gradual downramping rates in the future, down ramping for the Post Falls HED would be evaluated for further restrictions. Any potential remaining adverse effects of continued Project operations with the proposed downramping rate would be mitigated for by the Post Falls HED Fish PME Program as discussed in Section 5.6.2.7.

Upper Falls and Monroe Street HEDs are operated as run-of-river facilities and do not operate in a manner that results in downramping rate issues. At Nine Mile and Long Lake HEDs, the intakes and powerhouses are integral to the dam structures that span the single main river channel at these locations. Both of these hydroelectric developments discharge directly into the main river channel immediately downstream of the dam. After reviewing the available information, the resource agencies and other stakeholders concluded that there is no known spawning and rearing habitat for rainbow trout in the reaches immediately downstream of these facilities, and the effects on aquatic resources of any downramping would be limited (Avista et al., 2004). We conclude that there are no significant effects on fishery resources due to downramping at these HEDs.

5.6.2.4 Bypass Reaches

The project configuration and operation results in several short reaches of river channel that are variously dewatered and watered. The intermittent or seasonal occurrence, and otherwise variable nature, of the flow in these periodically bypassed channels affects the aquatic habitat conditions in these channels and has the potential to affect fish populations.

At Post Falls HED, the powerhouse is integral to the middle channel dam, and there is no bypassed reach in this channel as all powerhouse flows pass directly into the middle channel below. This channel converges into the single main river channel a short distance downstream. The north channel and south channel dam spillways discharge onto relatively steep bedrock waterfalls and associated pools before flowing through relatively short downstream channels prior to also reaching the main Spokane River channel. During times of lower flows, this short north channel reach provides several pool and riffle complexes that are suitable habitat for rainbow trout or other fish. Under current conditions, these pools and riffle areas remain wetted at all times as a result of leakage flows at the spillway gates and through the associated bedrock. Limited aquatic habitat of value is bypassed at the south channel because the dam is located on natural bedrock falls in the Spokane River.

Limited aquatic habitat of value is bypassed at Upper Falls or Monroe Street HEDs because the HEDs are located on natural steep bedrock ledges and falls in the Spokane River. At high flows, excess water at Upper Falls HED passes through the control works spill gates and into the north and middle channels of the upper Spokane Falls. As flows decline, the control works spill gates at the head of the north channel are closed, diverting all but minor leakage flows into the south channel. This affects approximately 0.5 and 0.2 mile of bedrock ledges and pools in the north and middle channels, respectively. There is the potential for fish to pass through the control works during spill and occupy the bedrock ledge and waterfall habitat in these channels before passing into the small Monroe Street HED impoundment. Fish that have passed into these channels may later drop down over the falls or become stranded in the few pools that remain here when the spill gates are closed.

Dewatering of the Upper Falls north and middle channels has no known negative effect on wild rainbow trout populations, the primary species of concern in the Spokane River. This is because of the limited expected occurrence of wild fish in the Upper Falls reservoir, the fact that any wild fish that drop past the Upriver Project and then the Upper Falls control works are already lost to the upstream population, the poor quality bedrock habitat in the bypassed reach, and the fact that any trout stranded here would likely originate from the ongoing stocking of hatchery rainbow trout in the Upper Falls Reservoir.

Immediately downstream of the Upper Falls bypassed channel, the north and middle channels and Upper Falls HED powerhouse discharge converge into the small Monroe Street HED impoundment, which is formed by a dam located immediately atop the lower Spokane Falls. Monroe Street HED diverts river flows up to the turbine capacity around the lower falls and into the HED powerhouse, although an aesthetic flow of at least 200 cfs is passed over the dam and onto the bedrock ledges below during daylight viewing hours. Only about 500 feet of very steep bedrock ledge with no useable fish habitat immediately downstream of the Monroe Street Dam is affected by routing water through the powerhouse. No bypassed reach exists at either the Nine Mile or Long Lake HEDs.

Effects Analysis

Any potential adverse effects on fish in the bypass reaches that exist in the north and south channels at the Post Falls HED are minimized by the nature of the habitat and leakage flows maintaining some wetted habitat. The bypass reach that exists at Upper Falls HED has little in the way of useable aquatic habitat and operation of this HED is expected to have no effect on wild rainbow trout populations. No useable fish habitat occurs in the bedrock falls lying below the Monroe Street Dam, and no effects on fish resources would occur as a result of bypassing flows around this area. There are no bypass reaches at Nine Mile and Long Lake HEDs. The Proposed Action includes no environmental measures specifically intended to address any potential effects of Project operations on aquatic habitat or fish in the bypassed reaches. However, actions implemented under the proposed Spokane River Fish PME Program, as discussed in Section 5.6.2.7, would offset any negative effects on aquatic habitat or fish resources related to flow regimes in the bypass reaches.

5.6.2.5 Upstream Fish Migration

The physical structures of a hydroelectric project can block upstream movement of fish, which restricts interchange among populations of fish to downstream movement where historically there may have also been upstream movement. Without the upstream movement component of population connectivity, one or both of the affected populations may be at risk or otherwise adversely affected. These effects can occur as a result of the direct loss of individuals from a population, as in the passing of fish downstream past the development which are subsequently precluded from returning upstream and contributing to the source population (Avista and WDFW, 2004).

A natural barrier to upstream passage of resident fish in the Spokane River historically existed at the Post Falls in Idaho and at the Spokane Falls in Washington. Post Falls HED, Upper Falls HED, and Monroe Street HED are all located at the sites of natural falls and do not represent a new obstacle to upstream movement of fish (Avista and WDFW, 2004). There is also no information to suggest that additional connectivity between the existing fish populations occurring upstream and downstream of these hydroelectric developments is needed, or even desirable.

Nine Mile and Long Lake HEDs do represent obstacles to population connectivity and complete barriers to upstream fish passage that were not historically present. Currently, this has the potential to negatively affect the existing fish populations by preventing fish in downstream waters from mixing with upstream populations. While few of the currently existing fish populations may be adversely affected, the rainbow trout population in the Little Spokane River can no longer contribute to the genetic structure of the population residing upstream of Nine Mile HED (Avista and WDFW, 2004). WDFW has identified protection and enhancement of the existing wild rainbow trout populations in the free-flowing stretch of the Spokane River downstream of Monroe Street HED as a high priority. Nine Mile HED provides protection to this reach of river from possible predatory fish or other undesirable species that reside in Lake Spokane. Upstream fish passage at Nine Mile and Long Lake HEDs has also not been identified as desirable at this time.

Effects Analysis

The Proposed Action includes no measures that would directly influence upstream fish migration at the Project. No additional adverse effects on upstream fish passage are anticipated under the Proposed Actions, although any existing effects would continue under either current conditions or the Proposed Action. No state or federal resource agency has indicated that upstream fish passage facilities are warranted at any of the Project HEDs at this time. FWS reserves Section 18 FPA authority to prescribe upstream fish passage at either Long Lake or Nine Mile HEDs but indicates that upstream passage is not necessary at this time (letter from R. J. Torquemadi, Supervisor, FWS, Spokane WA, to B. Howard, Spokane River License Manager, Avista, Spokane, WA, dated May 23, 2005).

5.6.2.6 Downstream Fish Migration

Entrainment of fish within the flows passing Post Falls HED and each of the Spokane River Project HEDs does occur, as evidenced by observations of fish downstream of the HEDs that clearly originated from upstream waters. Juvenile kokanee and Chinook salmon from Coeur d'Alene Lake have been observed downstream from Post Falls HED, with kokanee collected as far downstream as Lake Spokane (Parametrix, 2004d). Substantial numbers of kokanee can leave Coeur d'Alene Lake during the spring runoff in high-flow years (personal communication, N. Horner, Regional Fish Manager, IDFG, various FWG meeting summaries). This downstream movement of fish was recently confirmed for the wild rainbow trout in the upper Spokane River by tracking two radio-tagged fish in 2003 that passed downstream of the Upriver Project and Upper Falls and Monroe Street HEDs (Parametrix, 2004d).

Fish entrainment past Project HEDs can occur either by passage through the hydroelectric turbines or within the spill of excess water. Fish entrainment through the hydroelectric turbines poses the danger of collision with the various parts of the project works, exposure to potentially dangerous water pressure shear forces, and potential injury or death. In addition to the possibility of direct physical injury or mortality, fish can also become disoriented and subject to increased risk of predation. However, downstream passage is most likely when river flow is highest, which is the time when spill occurs at dams within the Project. Fish would have been similarly exposed to downstream passage at natural falls prior to Project construction.

A turbine entrainment evaluation was conducted based on fish population data from the Spokane River and entrainment results at similar hydroelectric projects elsewhere in the country (Parametrix, 2004d). This evaluation assessed the susceptibility of fish found throughout the Project area to turbine entrainment (Table 5-35). The fish species labeled as "unlikely" or "none" generally are those currently less abundant or absent in specific hydroelectric development impoundments, or at least in forebay areas, and therefore unlikely to be entrained. Among these species are several salmonids that are found principally in Coeur d'Alene Lake or its tributaries. Such spatial isolation of less common or habitat-specific species would tend to limit downstream dispersal of these fish to seasonal high-flow periods or other relatively infrequent hydrological events such as floods. At such times, spills at the HEDs would provide a likely alternative to turbines for downstream passage.

Table 5-35. Fish species present in the Spokane River Project HED forebays and susceptibility to entrainment in turbine flow. (Source: Parametrix, 2004d)

Common Name	Scientific Name	Post Falls	Upper Falls-Monroe Street	Nine Mile	Long Lake
Mountain whitefish	*Prosopium williamsoni*	Likely	Likely	Likely	Likely
Rainbow trout	*Oncorhynchus mykiss*	Likely	Likely	Likely	Likely
Chinook salmon	*Oncorhynchus tshawytscha*	Unlikely	None	None	Unlikely
Kokanee	*Oncorhynchus nerka*	Unlikely	None	None	None
Cutthroat trout	*Oncorhynchus clarki*	Unlikely	Unlikely	Unlikely	Unlikely
Brown trout	*Salmo trutta*	Likely	Likely	Likely	Likely
Brook char (trout)	*Salvelinus fontinalis*	Unlikely	Unlikely	Unlikely	Unlikely
Bull trout	*Salvelinus confluentus*	Unlikely	Unlikely	Unlikely	Unlikely
Black crappie	*Pomoxis nigromaculatus*	Unlikely	Unlikely	Likely	Likely
Brown bullhead	*Ictalurus nebulosus*	Unlikely	Unlikely	Unlikely	Unlikely
Yellow bullhead	*Ictalurus natalis*	Unlikely	Unlikely	Unlikely	Unlikely
Carp	*Cyprinus carpio*	Likely	Likely	Likely	Likely
Tench	*Tinca tinca*	Unlikely	Unlikely	Unlikely	Likely
Chiselmouth	*Acrocheilus alutaceus*	Likely	Likely	Likely	Likely
Northern pikeminnow	*Ptycocheilus oregonensis*	Likely	Likely	Likely	Likely
Largescale sucker	*Catostomus macrocheilus*	Likely	Likely	Likely	Likely
Bridgelip sucker	*Catostomus columbianus*	Likely	Likely	Likely	Likely
Longnose sucker	*Catostomus catostomus*	Likely	Likely	Likely	Likely
Bass, largemouth	*Micropterus salmoides*	Unlikely	Likely	Likely	Likely

Common Name	Scientific Name	Post Falls	Upper Falls-Monroe Street	Nine Mile	Long Lake
Bass, smallmouth	*Micropterus dolomieui*	Likely	Likely	Likely	Likely
Pumpkinseed	*Lepomis gibbosus*	Likely	Likely	Likely	Likely
Yellow perch	*Perca flavescens*	Likely	Likely	Likely	Likely
Sculpin	*Cottus* spp.	Unlikely	Unlikely	Unlikely	Unlikely

Parametrix (2004d) concluded that small (less than 4 inches long) suckers, crappie (where abundant), and probably yellow perch may comprise the bulk of the overall number of fish entrained at Spokane River HEDs based on a qualitative scale of entrainment potential developed by the Electric Power Research Institute (EPRI, 1997). Small northern pikeminnow and smallmouth bass entrainment potential was rated as moderate. The entrainment potential of small wild rainbow trout, brown trout, mountain whitefish, carp, and tench was judged to be low. Stocked brown and rainbow trout are known to readily move downstream after stocking, and their entrainment potential in the Spokane River is probably greater than that of wild fish (Parametrix, 2004d). The relatively narrow clear bar spacing of trash racks at the Post Falls and Long Lake HED powerhouse intakes (1.4 inches) and the Nine Mile HED powerhouse intake (1.5 inches) would likely preclude turbine entrainment of larger fish at these developments. The somewhat wider clear bar spacing at Upper Falls HED (2.5 inches) and Monroe Street HED (2.6 inches) would exclude fewer larger fish from turbine entrainment at these two powerhouses.

Parametrix (2004d) developed quantitative and qualitative estimates of fish survival by size class at each of the five Project developments, based on turbine survival estimates at similar projects (Table 5-36). Parametrix (2004d) also evaluated factors that have been linked to entrainment and associated survival at other hydroelectric facilities (Table 5-37). Based on this evaluation, Parametrix (2004d) concluded that overall survival of fish passing downstream through Project spillways and gates was about 98 to 99 percent.

Parametrix concluded that the combined passage of fish through the turbines and spillways would have a low overall effect on fish populations upstream of Post Falls, Upper Falls, Monroe Street, and Long Lake HEDs and a moderate effect on fish populations upstream of Nine Mile HED. Studies by Smith and Johnson (1992) found that the fishery of Nine Mile Reservoir consisted of primarily non-game species and no gamefish were collected in the lower reservoir near the Nine Mile Dam. Because wild rainbow trout apparently prefer free-flowing portions of the Spokane River, Project entrainment of these priority populations would likely be insubstantial and of little effect on the population (Parametrix, 2004d).

Table 5-36. Quantitative (%) and qualitative survival estimates for fish at Spokane River Project HEDs. (Source: Winchell et al., 2000, as shown in Parametrix, 2004d)

	Post Falls	Upper Falls	Monroe Street	Nine Mile	Nine Mile	Long Lake
Fish Size Class	**Francis Low Speed**	**Francis Low Speed**	**Kaplan Low Speed**	**Francis Low Speed**	**Francis High Speed**	**Francis Low Speed**
Small Fish (<100 mm)	94	94	95	94	70	94
Qualitative Survival Rating	High	High	High	High	Low	High
Small Fish (100–199 mm)	92	92	95	92	60	92
Qualitative Survival Rating	High	High	High	High	Low	High
Medium Fish (200–299 mm)	87	87	87	87	39	87
Qualitative Survival Rating	Moderate	Moderate	Moderate	Moderate	Low	Moderate
Large Fish (300+ mm)	73	73	93	73	19	73
Qualitative Survival Rating	Low	Low	High	Low	Low	Low

Notes: Rating System: High= >90%, Moderate = 80-89%, Low = <80%
mm - millimeter

Table 5-37. Comparison of factors that may influence turbine entrainment and survival at Spokane River Project HEDs. (Source: Parametrix, 2004d)

Influence Factors	Post Falls	Upper Falls	Monroe Street	Nine Mile	Lake Spokane
Entrainment rates					
Intake adjacent to shoreline	No	Yes	Yes	No	Yes
Intake location in littoral zone	No	No	No	No	No
Abundant littoral zone fishes (no. species)	No	No	No	No	Yes
Abundant littoral zone fishes (no. individuals)	No	No	No	No	Yes
Obligatory migrants	No	No	No	No	No
Intake depth-ft (at top, full pond)	14.25	9.1	5	15	29
Winter drawdown	No	No	No	No	Yes
Normal hydraulic capacity (cfs)	5,400	2,500	2,850	6,500	6,300
Approach velocity (ft/s, normal operation)	1.35	2.51	3.85	2.90	0.93
Water quality factor	No	No	No	No	No
Entrainment Risk	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**High**
Survival rates					
Turbine type	Francis	Francis	Kaplan	Francis	Francis
High turbine speed	No	No	No	Units 1,2-No Units 3,4-Yes	No
Survival rates of small fish (<8 in)	High	High	High	Units 1,2-Moderate Units 3,4-Low	High
Pressurized intake tunnel	No	No	No	No	No
Mortality Risk	**Low**	**Low**	**Low**	**Moderate-High**	**Low**

Effects Analysis

The Proposed Action includes no operational or structural measures that would directly influence fish entrainment at Project powerhouses. In Coeur d'Alene Lake, the populations of bull trout and westslope cutthroat trout, the native species of concern, are not anticipated to be entrained because their habitat preferences spatially isolate these populations of fish from the Post Falls HED powerhouse (preference for deeper habitat in the lake and upstream tributaries for spawning and rearing). Viable reproducing populations of wild rainbow trout have persisted for decades and exist in the free-flowing reaches both upstream and downstream of the Spokane River Project HEDs, so entrainment is not considered to have a discernable effect on these populations. However, actions implemented under measure Post Falls HED Fish PME Program and Spokane River Fish PME Program are intended and designed to offset any potential negative effects on these fish populations from continued Project operation.

5.6.2.7 Fishery Protection, Mitigation, and Enhancement Programs

Post Falls HED Fish Protection, Mitigation, and Enhancement Program

The purpose of this measure is to reduce and mitigate for potential and unavoidable adverse effects on aquatic habitat and associated fish resources associated with the continued operation of the Post Falls HED. Affected aquatic resources occur in Coeur d'Alene Lake and the affected tributary reaches, Spokane River upstream of Post Falls HED, and free-flowing reach of the Spokane River immediately downstream of Post Falls HED. This measure would be implemented through a combination of HED operating protocols intended to reduce and minimize effects on aquatic resources and a long-term commitment to support enhanced fisheries management, protection, and enhancement programs that would mitigate for any remaining effects.

The primary goals of this measure are to: (1) protect and enhance the long-term population viability of westslope cutthroat trout and bull trout populations in the Coeur d'Alene Basin; (2) protect and enhance downstream aquatic resources with an emphasis on the self-sustaining wild rainbow trout populations in the free-flowing reach of the Spokane River downstream of Post Falls HED; and (3) enhance Project-related recreational fisheries resources and associated angler opportunities and awareness. More detailed description of the Post Falls HED Fish PME Program is provided in Appendix B.

Specific components of the Post Falls HED Fish PME Program follow:

- Avista would maintain a 600-cfs minimum discharge flow at Post Falls HED under normal operating conditions with a defined trigger for reducing the minimum flow to 500 cfs (discussed previously in Section 5.6.2.1).

- Avista would comply with the Post Falls HED discharge levels as outlined in the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan* (discussed previously in Section 5.6.2.2).

- Avista would maintain a maximum allowable per hour discharge downramping rate at Post Falls HED that corresponds to no more than a 4-inch drop per hour in downstream water levels (discussed previously in Section 5.6.2.3).

- Avista would provide for a population and habitat protection and enhancement program for westslope cutthroat trout and bull trout in the Coeur d'Alene Lake Basin and wild rainbow trout in the free-flowing reach of the Spokane River. This component may also support wild salmonid protection by providing for alternative angling and harvest opportunities through recreational and fishery enhancement and supplementation.

- Avista would support a population and habitat assessment and monitoring for westslope cutthroat trout and bull trout in the Coeur d'Alene Lake Basin and/or wild rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED.

- Avista would provide assistance and support for a public information, education, and law enforcement program specific to bull trout and westslope cutthroat trout in the Coeur d'Alene Lake Basin and for wild rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED (discussed in detail later in Section 5.11.2.3).

Effects Analysis

Avista does not propose any significant changes to current Post Falls HED operations or configurations that are expected to have an adverse effect on current conditions for aquatic habitat or fish resources. Avista proposes several Post Falls HED discharge flow-related measures that are specifically intended to minimize Project effects and protect and enhance aquatic habitat conditions in the free-flowing reach of the Spokane River downstream of Post Falls HED. Any additional aquatic habitat and fish resources mitigation obligation related to the continued operation of Post Falls HED is adequately addressed through the components of this PME measure.

Avista would comply with the Post Falls HED minimum discharge flows, discharge levels as outlined in *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan*, and the Post Falls HED downramping rate as discussed previously and described in detail in Appendix B. These operational changes represent substantial improvements over current conditions and would enhance aquatic habitat.

Within the first year of implementing the new FERC license, Avista would consult with IDFG, the Coeur d'Alene Tribe, WDFW, and FWS to develop project-specific plans for implementing the protection and enhancement components of this PME measure. Development of project plans associated with the fish populations and aquatic resources upstream of Post Falls HED (Coeur d'Alene Lake Basin) would be based on and guided by the *Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout Protection, Mitigation, and Enhancement Implementation Plan* (Kleinschmidt, 2004). Project-specific plans for the free-flowing reach of the Spokane River downstream of Post Falls HED would focus on protection of the wild native rainbow trout population consistent with resource agencies' goals and objectives.

Avista would implement the programs outlined in this measure to mitigate for the effects of Post Falls HED operations on aquatic habitat and fish populations. The components of this PME program would serve to reduce the effects on aquatic habitat and fish resources associated with the continued operation of Post Falls HED and would provide mitigation for any remaining adverse Project effects. This PME measure addresses Project effects to (1) the two native fish species of primary concern in the Coeur d'Alene Lake Basin, westslope cutthroat trout, and bull trout; and (2) the aquatic habitat and native wild rainbow trout population(s) in the free-flowing reach of the Spokane River downstream of the Post Falls HED. The activities conducted under this PME measure are intended to address bull-trout-related ESA and biological opinion requirements that may be included in a new FERC license for this Project and to generally assist IDFG, WDFW, the Coeur d'Alene Tribe, and FWS with achieving their management and recovery goals for native salmonids.

Spokane River Fish Protection, Mitigation, and Enhancement Program

The purpose of this measure is to reduce and mitigate for potential adverse effects on aquatic habitat and associated fish resources associated with the continued operation of Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs. Affected aquatic resources occur in the Spokane River extending from the Upper Falls reservoir to Long Lake HED and Lake Spokane. This measure would be implemented through a long-term commitment to support enhanced fisheries management, fish population and aquatic habitat protection and enhancement, and fishery supplementation activities in appropriate areas of the Spokane River or nearby waters that would mitigate for any Project effects on aquatic resources.

The primary goals of this PME measure are to protect and enhance Project-associated aquatic resources with an emphasis on the native self-sustaining wild rainbow trout populations in the Spokane River and to enhance Project-related recreational fisheries resources and associated angler opportunities on the Spokane River, Lake Spokane and nearby waters. A more detailed description of the Spokane River Fish PME Program is provided in Appendix B.

Specific components of the Spokane River Fish PME Program include:

- Avista would provide for Spokane River Fishery Protection and Enhancement Programs for Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs. Avista would provide for fish-population and aquatic-habitat protection and enhancement efforts on the Spokane River and Lake Spokane.

- Avista would support the development and implementation of enhanced fish population and related aquatic habitat assessments and monitoring programs associated with Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs.

Effects Analysis

Avista does not propose any changes to current Upper Falls, Monroe Street, Nine Mile, and Long Lake HED operations or configurations that are expected to have an adverse effect on current conditions for aquatic habitat or fish resources. Any additional aquatic habitat and fish resources mitigation obligation related to the continued operation of the Upper Falls, Monroe

Street, Nine Mile, and Long Lake HEDs would be adequately provided for through the components of this PME measure. The activities conducted under this PME measure are also intended to assist WDFW in achieving its fisheries management objectives to protect wild rainbow trout in the Spokane River, maintain the popular sport fishery in Lake Spokane, and enhance angling opportunities by stocking rainbow trout into appropriate areas of the Spokane River and Lake Spokane.

Within the first year of implementing the new FERC license, Avista would consult with the WDFW and other interested parties to develop project-specific plans for implementing the components of this PME measure. Project-specific plans would focus on protection of wild native rainbow trout populations in the Spokane River and to enhancing recreational fishery resources and angler opportunities on the Spokane River, Lake Spokane, and nearby waters.

5.6.2.8 Secondary Effects of Proposed Measures

Scheduled Whitewater Releases during August

The Proposed Action recreation flow measure (PF-REC-3, discussed in detail in Section 5.10.2.5) would provide flows of 1,250 cfs during up to two weekends in August when river flows at Post Falls HED exceed 800 cfs.

Effects Analysis

Potential effects of these flows on water temperatures downstream of Post Falls HED are discussed in detail in Section 5.5.2.4. When flows are naturally above 800 cfs in August, it is an indication of either August precipitation or a high water year. Modeling results suggest the 1,250 cfs flow release would increase Spokane River temperatures by less than 1.0°C (1.8°F) compared to flow levels of 800 cfs. Because of the conditions for such releases and their relatively short duration and infrequency, these proposed whitewater boating releases should not have an adverse effect on resident trout populations. Consultation with appropriate agencies will occur prior to such releases.

Aesthetic Flow Releases

Proposed Action measures SRP-AES-1 and PF-AES-1 call for a continuation of the year-round aesthetic flow at Monroe Street Dam and the initiation of aesthetic flows at Post Falls and Upper Falls HEDs (see Section 5.11.2.5, *Aesthetic Flows*).

Effects Analysis

Providing aesthetic flows to the indicated river channels would represent a slight enhancement to what little aquatic habitat exists in those channels. However, as discussed above, the habitat that would be affected by these releases is primarily bedrock, with no important aquatic habitat. Fish that may become stranded in isolated pools in these reaches would be better able to survive during the summer with the proposed daytime aesthetic flows, and the flows would allow fish to pass safely downstream out of the reach in which they might otherwise be trapped.

5.6.3 Cumulative Effects

Major factors that have affected and would continue to affect aquatic habitat and associated resources in the Project area include pre-Project, and non-Project dam construction and operation; timber harvesting, agriculture, animal husbandry, residential and commercial development, other infrastructure and land-use activities; mining-related discharges and related inputs of heavy metals; introduction of non-native fish and aquatic plant species; point and non-point discharges and inputs; and both legal and illegal fish harvest (Kleinschmidt, 2004; WDFW, 2004).

Prior to construction of the Nine Mile Dam on the Spokane River, anadromous fish were present in the Spokane River as far upstream as the Spokane Falls, the current location of Monroe Street HED. These anadromous fish runs provided both an important biological component of the river ecosystem and a culturally important fishery for native tribes (UCUT, 1985). Historically, used habitats for anadromous fish species such as Chinook salmon and steelhead trout included the Spokane River below the Spokane Falls, the Little Spokane River, and Hangman Creek. As a result of dam construction and a lack of fish passage, anadromous fish and other migratory life forms have been blocked from the Spokane River for decades.

If reintroduction of anadromous fish into the historically used areas of the Spokane River is someday pursued, fish passage past the 57-foot-high Little Falls Dam, the first dam on the Spokane River (not part of the Spokane River Project), and the dams at Long Lake and Nine Mile HEDs (which are 213 and 58 feet high, respectively) would then be necessary. Anadromous fishway planning for Long Lake and Nine Mile HEDs would benefit from the most current research in upstream and downstream fish passage if it occurred once anadromous fish have actually been restored to Lake Roosevelt. The Secretaries of Commerce and Interior have sufficient mandatory authority under Section 18 of the FPA to ensure that proper planning and implementation of appropriate fishways occurs on the Spokane River as future conditions might warrant.

Resident fish species and other aquatic resources have also been and would continue to be affected by the factors noted above. Aquatic habitat and associated bull trout, westslope cutthroat trout, rainbow trout, mountain whitefish, and other native species have generally experienced habitat degradation and reduced populations as a result of these cumulative effects. While dam construction and operation have not resulted in as serious an effect on resident species as it did to anadromous species, these activities have still affected habitat characteristics and the associated aquatic resources. These many factors create an overall adverse cumulative effect on populations of many native fish species in the basin, including native salmonids in the Project area. Despite the extensive cumulative factors affecting these native fish populations, most if not all still maintain self-sustaining, although reduced, populations. These native populations now exist within fish species assemblages that also contain a large number of non-native species representing both competitor and predatory species. All of these factors would likely continue to cumulatively affect native and non-native fish species in the Project area.

5.6.4 Unavoidable Adverse Effects

Stranding of fish in the Spokane River is a potential adverse effect of continued Project operations regardless of the operational mode of Post Falls HED and other Project HEDs.

Ramping at any rate and magnitude naturally caused or otherwise, may strand some fish and aquatic invertebrates. Generally, stranding increases with ramping rate, frequency, and magnitude; however, quantifying actual stranding for various species is difficult. Although fish stranding would likely be a long-term phenomenon regardless of the ramping rate that is included in a new license for this Project, it would likely have an insignificant effect on the aquatic community. The proposed ramping rate restriction is sufficiently close to natural ramping rates that the effects on the aquatic populations would likely be within the range of natural effects. There is also the potential to dewater some number of rainbow trout spawning redds in the upper and lower Spokane River under any Project operational scenario. Redd dewatering also occurs naturally in unregulated systems. Implementation of the proposed spawning and fry emergence protection plan would be expected to improve population response from the current conditions. Some dewatering of eggs and/or fry is still a potential adverse effect of continued operation. Maintaining relatively constant river discharge at Post Falls HED has the potential to increase survival of trout embryos over what would occur with natural declines in river flow at the end of the spring runoff period.

Continued Project operation would continue to entrain fish regardless of any protective measures that may be implemented. Some entrained fish would experience turbine mortality, although no direct evidence of fish mortality from entrainment has been observed. Given the HED powerhouse turbine configurations and entrainment potential for the fish species of greatest concern discussed in Section 5.6.2.6, *Downstream Fish Migration*, turbine entrainment and any associated mortality would have an insignificant effect on aquatic resources over the long term.

5.7 Terrestrial Resources

5.7.1 Affected Environment

Avista and the consultants selected by the Terrestrial Resources Work Group (TRWG) conducted several studies of terrestrial resources in and adjacent to the Project. Parametrix (2004a) reported that the Project lies within the transition zone between the Columbia Basin ecozone to the south and west and the Northern Rockies ecozone to the north and east. The ponderosa pine, Grand fir-Douglas fir, and Steppe zones encompass the Project area, with the ponderosa pine zone being the principal vegetation zone (Parametrix, 2003b). Vegetation in the Coeur d'Alene subbasin is dominated by interior mixed conifer forest, with small amounts of montane mixed conifer and lodgepole forests at the highest elevations and interior grasslands along the western boundary. The Spokane subbasin ranges from pine savannas at mid-elevations to mixed conifer forests in the north and far southeast (GEI, 2004). Broadleaf-deciduous-forested, scrub-shrub, open-water, aquatic-bed, emergent-marsh, and riparian wetlands are the primary wetland types; however, much of the shoreline along the bays and north end of Coeur d'Alene Lake, the Spokane River, and Lake Spokane is developed, altering the shoreline habitats and plant communities (Parametrix, 2003b).

5.7.1.1 Plant Communities

As part of a wetland and riparian habitat inventory, Parametrix (2004a) mapped 26,493 acres of wetlands and associated habitat types using aerial and other photographs (including digital orthophotos), historical survey maps, and field observations in 2003. The study area for the wetland and riparian habitat inventory encompassed 150 square miles, including the lower reaches of the Coeur d'Alene, St. Joe, and St. Maries rivers; associated waterbodies and lateral lakes; the bays of Coeur d'Alene Lake; the free-flowing reaches of the Spokane River from Post Falls HED to the Upriver pool and from Upper Falls and Monroe Street HEDs to Nine Mile Reservoir; vegetated shorelines of Nine Mile Reservoir; and Lake Spokane. The habitats were classified and described according to the Cowardin system (Cowardin et al., 1979), the system that FWS uses for mapping wetlands. The inventory identified areas of forest, scrub-shrub, emergent, and aquatic bed wetland and riparian habitats. Consistent with the Cowardin system, some deepwater habitats and open-water areas, such as off-channel ponds, the lateral lakes, and the southern portion of Coeur d'Alene Lake near the St. Joe River levee were also mapped. These open-water areas are included in the following discussion of wetland and riparian habitats because of their proximity and functional association with each other. The inventory did not include the deeper, non-vegetated portions of Coeur d'Alene Lake, Lake Spokane, and Nine Mile Reservoir or the main channel areas of the major rivers. Uplands and agricultural areas were only mapped if adjacent to or associated with wetland and riparian habitats.

Upland Habitat

Uplands constitute less than 1 percent of mapped habitats within the study area (240 acres) occurring primarily in the highest terraces of the floodplain habitats. Table 5-38 provides acreage for all the habitat types mapped in 2003. In addition to showing the quantity of upland areas and wetlands, Table 5-38 indicates that the mapped area includes 7,523 acres of agricultural land, or about 28 percent of the mapped area.

Parametrix (2004a) noted that ponderosa pine and Douglas fir forests dominate the undeveloped, steep slopes bordering the lakes and rivers. In the Coeur d'Alene subbasin, upland forests are dominated by interior mixed conifer forests. Lodgepole, western hemlock, western red cedar, western white pine, and western larch tend to more often occupy north-facing slopes, which are cooler and moister than south- and west-facing slopes. South- and west-facing slopes tend to be dominated by more open forests of Douglas fir, grand fir, and ponderosa pine with significant understory shrub and grass components. In the Spokane subbasin, upland forests are dominated by ponderosa pine and mixed-conifer forests. Ponderosa pine is found throughout the subbasin, while mixed-conifer forests are mainly found at higher elevations in the northern portion of the subbasin (GEI, 2004).

Wetland/Riparian Habitat

A total of 18,747 acres, or 71 percent of the total mapped habitats 26,510 acres, are wetland and riparian habitat types. The 9,506 acres of palustrine wetlands, including small ponds, aquatic-bed, emergent, scrub-shrub, and forested palustrine wetlands, make up 51 percent of the total wetland area. Emergent wetlands are the most common palustrine type, with 6,907 acres (73 percent of the palustrine wetland area and 37 percent of total wetland area). Lacustrine habitats, which occur primarily in the lateral lakes of the Coeur d'Alene River floodplain and in Chatcolet Lake, Benewah Lake, and Hepton Lake, cover 9,103 acres or 49 percent of the total wetland area. Riverine wetlands are the least abundant wetland type in the study area, covering less than 1 percent (138 acres) of the total wetland area.

Table 5-38. Habitat types mapped in 2003 in study area (acres). (Source: Parametrix, 2004a)

Habitat Type	St. Maries River	St. Joe River	Coeur d'Alene River	Coeur d'Alene Lake	Spokane River	Little Spokane River	Lake Spokane	Total
Riverine–Lower Perennial								
Open water	2	42	47	26	6	--	--	123
Emergent	--	--	15	--	--	--	--	15
Subtotal	2	42	62	26	6	--	--	138
Lacustrine								
Open water	--	2,400	2,911	--	--	--	--	5,311
Limnetic aquatic bed	--	1,678	513	11	--	--	3	2,205
Littoral aquatic bed	--	82	860	144	--	--	370	1,456
Littoral emergent	--	--	127	4	--	--	--	131
Subtotal	--	4,160	4,411	159	--	--	373	9,103

Habitat Type	St. Maries River	St. Joe River	Coeur d'Alene River	Coeur d'Alene Lake	Spokane River	Little Spokane River	Lake Spokane	Total
Palustrine								
Open water	--	65	42	--	--	--	--	107
Aquatic bed	<1	19	251	17	--	--	2	289
Emergent other	182	862	953	105	35	2	30	2,167
Emergent inundated	33	93	2,381	135	1	-	38	2,681
Emergent inundate/ aquatic bed	--	--	499	5	--	--	--	504
Emergent tule	--	9	27	49	--	--	--	85
Emergent Wapato	--	322	821	45	--	--	--	1,188
Emergent reed canarygrass	59	42	77	104	--	--	--	282
Scrub-shrub	95	207	622	151	39	16	12	1,142
Forested other	4	101	108	9	60	1	10	293
Forested aspen	5	33	1	1	--	--	--	40
Forested cottonwood	73	316	286	48	5	--	--	728
Subtotal	451	2,069	6,068	669	138	--	92	9,506
Total Wetlands	**453**	**6,271**	**10,541**	**854**	**144**	**19**	**465**	**18,747**
Other								
Agriculture	474	4,334	2,588	127	--	--	--	7,523
Upland	8	22	207	1	--	--	2	240
Total Mapped Area	**935**	**10,627**	**13,336**	**982**	**144**	**19**	**467**	**26,510**

Upstream of Post Falls HED—The St. Joe River floodplain that is within the study area has 6,271 acres of wetlands and riparian habitats (59 percent of the surveyed St. Joe River area), 4,334 acres of agricultural land (41 percent), and 22 acres of uplands (less than 1 percent). Emergent wetlands are the most common palustrine wetland type, equaling 64 percent of the surveyed St. Joe River wetland area, with large areas near Bells Lake, between Bells and Turtle lakes, and around Goose Heaven and Benewah lakes. Forested and shrub wetlands equal 10 percent of the palustrine wetland area surveyed and open-water and aquatic bed equal 4 percent. Scrub-shrub wetlands occur along many of the tributaries and the river levees, including notable stands where Benewah Creek enters the inundated areas south of Benewah Lake and along the lower St. Joe levees. The majority of the lacustrine system comprises open-water, including Chatcolet Lake, Round Lake, Benewah Lake, and Hempton Lake. Hempton Lake was a former agricultural area that was flooded by a breech in the St. Joe River levee in 1997. Only a small amount of riverine habitat is present (Parametrix, 2004a).

Wetland and riparian habitats cover 453 acres (48 percent) of the St. Maries River Valley floodplain within the study area. Agricultural lands are slightly more prevalent with 474 acres (51 percent). A small amount of upland habitat (8 acres) also occurs there. Virtually all of the wetlands within the St. Maries River floodplain are palustrine, with a tiny number of riverine. Emergent wetland types cover 61 percent of the area and are extensive near the confluence with the St. Joe River. Scrub-shrub types cover 21 percent; and forested types cover 18 percent (Parametrix, 2004a).

Black cottonwood forests cover 316 acres and are found on the banks and top of the narrow levee along the St. Joe River between Round Lake and Benewah Lake. Other mixed palustrine forested habitats on the levee support birch, alder, and cottonwood. On the St. Maries River between river mile 7 and river mile 9, there is a relatively undisturbed forested and scrub-shrub wetland dominated by black cottonwood, red-osier dogwood, and Douglas' spirea (Parametrix, 2004a).

The Coeur d'Alene River floodplain that is within the study area comprises 10,541 acres of wetland and riparian habitat (79 percent of the surveyed Coeur d'Alene River area), 2,588 acres of agricultural land (19 percent), and 207 acres of upland (2 percent). Palustrine systems cover 58 percent of the wetland area; lacustrine systems, 42 percent; and riverine systems, 1 percent. Emergent wetlands are the most plentiful palustrine wetland type (78 percent) and include large inundated stands of wild rice and water horsetail along with water potato, broad-leaf plantain, and tule; marsh areas contain wool-grass, small-fruit bulrush, cattail, common reed, and spikerushes. Inundated emergent habitats are widespread in the wetland complexes southwest of Killarney Lake, Swan Lake, and Thomson Lake (Parametrix, 2004a). Peatlands at Hidden Lake and Thompson Lake have been identified as priorities for conservation (Jankovsky-Jones, 1999).

Scrub-shrub and forested wetlands are less plentiful in the Coeur d'Alene River area, covering only 17 percent of the palustrine wetland area. They occur primarily along levees containing water birch, alder, black cottonwood, aspen, Douglas' spirea, red-osier dogwood, Douglas' hawthorn, Sitka alder, and various willows (Parametrix, 2004a).

The lacustrine system includes primarily the open-water areas of the lateral lakes. Lacustrine aquatic bed habitats are abundant in the shallows of the lateral lakes and in Harrison Slough.

Because much of the Coeur d'Alene Lake shoreline is too steep to support wetlands, the majority of wetlands on the lake are in or adjacent to bays associated with stream outlets. Of the 982 acres of mapped habitat associated with the bays, 854 acres are wetlands (87 percent), 127 acres are agriculture (13 percent), and 1 acre is upland. Of these wetlands, 78 percent are palustrine, 19 percent are lacustrine, and 3 percent are riverine. Emergent wetland types comprise 66 percent of the palustrine wetlands; scrub-shrub types, 23 percent; and forested, 9 percent. Water horsetail and wild rice are dominant emergent species, followed by reed canarygrass, which is most prevalent in Cougar and Wolf Lodge bays. Scrub-shrub species include willow, red-osier dogwood, and mountain alder, while forested wetlands dominated by black cottonwood and Pacific willow occur along the southwest shoreline of Plummer Bay (Parametrix, 2004a).

Downstream of Post Falls HED—From Post Falls HED downstream to Nine Mile Dam, palustrine wetlands occur intermittently in narrow bands on the Spokane River. Agriculture, residences, and other development on both sides of the Spokane River have modified or eliminated much of the wetland and riparian habitat. There are approximately 65 acres of forested wetlands (45 percent of the total wetland acres), 39 acres of scrub-shrub wetlands (27 percent), and 36 acres of emergent wetlands (18 percent) in this part of the study area. The largest concentration of mixed forested wetlands is associated with Nine Mile Reservoir along the shoreline. Scrub-shrub wetlands are also scattered along the shoreline of the Spokane River with narrow but sometimes dense stands of willows and mixed woody-stemmed species. There is a large scrub-shrub wetland just upstream of Nine Mile HED.

Wetland and riparian habitats are sparse in and along Lake Spokane, encompassing just 467 acres. Most of these (370 acres, or 80 percent) are lacustrine littoral aquatic bed wetlands. These aquatic bed wetlands occur primarily in the shallower areas of Lake Spokane and are almost all dominated by non-native species, especially yellow floating heart. Other non-native aquatic species found in Lake Spokane include Eurasian watermilfoil, purple loosestrife, and yellow flag iris. Native aquatic species include pondweeds, Canadian waterweed, and coontail. Along the shores of Lake Spokane, a narrow wetland fringe has developed in some locations, consisting primarily of emergent wetlands but comprising only 68 acres, or 15 percent of the wetlands mapped here. The largest concentration of forested and scrub-shrub wetlands around Lake Spokane are in the delta at the mouth of the Little Spokane River (Parametrix, 2004a).

5.7.1.2 Plant Species of Special Concern

Parametrix (2003b) conducted a sensitive, threatened, and endangered plant survey (i.e., rare plant survey) throughout the entire Project area. These surveys focused on those areas having suitable habitat for federally listed threatened and endangered species, state species of special status or concern, and culturally significant plants for the Coeur d'Alene and Spokane Indian tribes. These areas included the lower reaches of the Coeur D'Alene, St. Joe, and St. Maries rivers; around the shoreline of Coeur d'Alene Lake; and along the Spokane River from Post Falls HED downstream to Long Lake HED, including around Nine Mile Reservoir; and Lake Spokane. Federally listed plant species are discussed in Section 5.8.1 of this document. Specific survey sites selected for field investigation due to the potential to harbor rare plant species are shown on Figure 5-24 (Appendix A).

State-Listed Threatened, Endangered, Sensitive, and Rare Species

During the Parametrix (2003b) rare-plant surveys, only one state-listed species was found. Seven populations of prairie cordgrass (*Spartina pectinata*), a Washington state-listed sensitive species, were found on the river banks in Riverside State Park between the Bowl and Pitcher and the Spokane Gun Club, approximately 2 miles upstream of Nine Mile Dam (between survey sites 25 and 30 as shown on Figure 5-24, Appendix A). These populations were found in moist soil above the water's edge (Parametrix, 2003b). Prairie cordgrass is typically found in lower, poorly drained soils along roadsides, ditches, streams, marshes, and potholes, as well as in wet meadows and floodplains (NRCS, 2002). It grows on seasonally dry sites and tolerates a high water table but is not suited to prolonged flooding.

Two other potential rare plant habitats, comprising peatland habitats at Hidden Lake and Thompson Lake (survey sites 72 and 17, respectively, on Figure 5-24, Appendix A), had previously documented occurrences of state-listed species but could not be field surveyed because of access limitations. Many-fruit false loosestrife (*Ludwigia polycarpa*) was previously found at Thompson Lake while swamp willow weed (*Epilobium palustre*) and water club-rush (*Scirpus subterminalis*) were found at both Thomson and Hidden lakes in prior surveys (Jankovsky-Jones, 1999). However, it is unknown if these species still occur at these sites (Parametrix, 2003b) because the area was unable to be surveyed in 2003.

Culturally Significant Plants

The Coeur d'Alene Tribe and Spokane Tribe of Indians identified culturally significant plants, which were included in the rare plant surveys. Field surveys located 18 of these species at 54 sites where detailed searches were conducted (Table 5-39) (Parametrix, 2003b). Thirteen species were located downstream and 15 species were located upstream from Post Falls HED. The majority of the culturally significant plants identified were wetland or riparian species that were most plentiful along the Coeur d'Alene and St. Joe rivers where the most extensive wetland and riparian habitats are found. Black cottonwood (*Populus trichocarpa*), red-osier dogwood (*Cornus sericea*), water potato (*Sagittaria cuneata/latifolia*), and hardstem bulrush (tule) (*Scirpus acutus*) were the most frequently identified species in the survey sites. Red-osier dogwood and black cottonwoods were found throughout the survey area and were widespread in riparian habitats throughout the Project area. Tule was most common in the wetlands and lateral lakes along the Coeur d'Alene River, and water potato was not found west of Coeur d'Alene Lake.

Table 5-39. Culturally important species observed during field surveys, July, and August 2003. (Source: Parametrix, 2003b)

Common Name	Scientific Name	Sites Where Observed[a]
Lodgepole pine	*Pinus contorta*	8, 19
Western white pine	*Pinus monticola*	16, 19
Ponderosa pine	*Pinus ponderosa*	18, 14, 38
Black cottonwood	*Populus balsamifera*	1,2, 6, 7, 11, 14, 16, 20, 26, 31, 32, 34, 35, 36, 37, 38, 40, 43, 44, 49, 61, 62, 69, 71
Aspen	*Populus tremuloides*	3, 4, 14, 40, 57, 58, 71
Black hawthorn	*Crataegus douglasii*	15, 22, 24, 27, 36, 38
Chokecherry	*Prunus virginiana*	14

Common Name	Scientific Name	Sites Where Observed[a]
Red-osier dogwood	*Cornus sericea*	10, 14, 20, 21, 26, 27, 29, 30, 31, 33, 36, 49, 50, 53, 54, 55, 60
Serviceberry	*Amelanchier alnifolia*	14
Golden currant	*Ribes aureum*	24
Woods' rose	*Rosa woodsii*	33, 36, 38
Black raspberry	*Rubus leucodermis*	24
Tall Oregon grape	*Mahonia aquifolium*	25, 33, 38
Creeping Oregon grape	*Mahonia repens*	38, 36
Nodding onion	*Allium cernuum*	25, 33
Cow-parsnip	*Heracleum lanatum*	23
Water potato/wapato	*Sagittaria cuneata/latifolia*	1, 2, 3, 4, 6, 8, 9, 13, 14, 15, 17, 19, 27, 31, 32, 41, 52, 54, 56, 69
Hardstem bulrush (tule)	*Schoenoplectus acutus*	2, 3, 4, 6, 9, 16, 17, 19, 21, 24, 27, 28, 29, 41

[a] See Figure 5-24, Appendix A, for site locations.

Camas (*Camassia quamash*) was notably absent from the surveyed areas. It is found primarily in undisturbed wet meadows that are subject to spring flooding and summer drying, which are rare in the Project area. Historically, large camas meadows were reported in the Coeur d'Alene, St. Joe, and St. Maries River valleys (Parametrix, 2003b). However, Project-related inundation during the growing season, agricultural activities, grazing, and active drainage of the wet meadows greatly reduced the amount of camas in the area during Euroamerican settlement and through the 1930s (Weddell, undated).

5.7.1.3 Noxious Weeds and Other Invasive, Non-native Plant Species

Eighteen species of noxious weeds were identified at 25 sites during the plant surveys (Table 5-40) (Parametrix, 2003b). Reed canarygrass (*Phalaris arundinacea*), which is classified as a noxious weed in Washington but not in Idaho, was found at 13 sites throughout the Project area, making it the most-frequently encountered noxious weed. It forms extensive stands in Cougar, Blue Creek, Wolf Lodge, and Beauty bays on Coeur d'Alene Lake and is most plentiful in the driest emergent marsh wetland zone. Reed canarygrass is very aggressive, forming monotypic stands that pose a major threat to native plants in wetland and riparian areas (WDOE, 2004c). Once established, reed canarygrass is difficult to eradicate because it spreads rapidly by rhizomes.

Table 5-40. Noxious weeds observed during field surveys in July and August 2003. (Source: Parametrix, 2003b)

Common Name	Scientific Name	Sites Where Observed[a]	State Noxious Weed Status
Russian knapweed	*Acroptilon repens*	38	Idaho, Washington
Spotted knapweed	*Centaurea biebersteinii*	1, 8, 20, 38, 71	Idaho, Washington
White knapweed	*Centaurea diffusa*	38	Idaho, Washington
Creeping thistle	*Cirsium arvense*	12, 21, 24, 28, 29, 53	Idaho, Washington
Bull thistle	*Cirsium vulgare*	21, 22, 29	Washington
Evergreen clematis	*Clematis vitalba*	24	Idaho, Washington
Orchard morning glory	*Convolvulus arvensis*	25, 30, 33	Washington
Common St. John's wort	*Hypericum perforatum*	1, 30, 33, 34	Washington
Yellow iris	*Iris pseudacorus*	20, 21, 22, 29, 30, 33	Washington
Dalmatian toadflax	*Linaria dalmatica*	21	Idaho, Washington
Purple loosestrife	*Lythrum salicaria*	21, 24, 29	Idaho, Washington
Eurasian watermilfoil	*Myriophyllum spicatum*	67	Washington
White water lily	*Nymphaea odorata*	21, 29, 31	Washington
Yellow floatingheart	*Nymphoides peltata*	21, 29, 59	Washington
Reed canarygrass	*Phalaris arundinacea*	6, 8, 13, 20, 21, 22, 26, 27, 28, 30, 31, 32, 33	Washington
Common reed	*Phragmites australis*	47	Washington
Common tansy	*Tanacetum vulgare*	24, 30	Washington
Common mullein	*Verbascum thapsus*	21	Washington

[a] See Figure 5-24, Appendix A, for site locations.

Other notable noxious weeds located during the survey included Eurasian watermilfoil (*Myriophyllum spicatum*) and yellow floating heart (*Nymphoides peltata*) in Lake Spokane. Eurasian watermilfoil is considered a highly problematic plant in Washington because it is so difficult to control. It can greatly alter a waterbody's ecology by forming dense mats on the surface of the water (WDOE, 2004d). Like milfoil, yellow floating heart grows in dense mats on the water surface, excluding native species and restricting water activities (WDOE, 2004e).

In addition to the noxious weeds identified during the Parametrix survey, the Coeur d'Alene Tribe has recently identified occurrences of Eurasian watermilfoil in the southern portion of Coeur d'Alene Lake (personal communication, D. Lamb, Lake Ecologist, Coeur d'Alene Tribe, Plummer, ID, with the TRWG and S. Fitzhugh, Relicensing Specialist, Avista, Spokane, WA, during a TRWG meeting, October 6, 2004).

5.7.1.4 Wildlife Species

Above Post Falls HED

The St. Joe and Coeur d'Alene rivers, Coeur d'Alene Lake, and the lateral lakes provide abundant waterfowl breeding, migration, and wintering habitat (Avista, 2002b). Nesting duck species include mallards, wood ducks, green-winged teal, ring-necked ducks, cinnamon teal, lesser scaups, northern shovelers, ruddy ducks, and redheads. Other birds that nest in the wetlands and lateral lakes of the area include Canada geese, red-necked grebes, western grebes, American coots, pied-billed grebes, black terns, common snipe, and sora. Birds of prey found in this area include bald eagle, osprey, American kestrel, red-tailed hawk, northern harrier, sharp-shinned hawk, northern goshawk, great-horned owl, barred owl, and western screech owl (Stratus Consulting, 2000). Great blue heron rookeries occur along the lower St. Joe (Parametrix, 2003e).

Upland game birds such as ruffed grouse, California quail, ring-necked pheasant, and wild turkey also inhabit the floodplain and upland habitats. Songbirds and other neotropical species in the Coeur d'Alene area include thrushes, sparrows, kingbirds, warblers, flycatchers, swallows, hummingbirds, and blackbirds (Stratus Consulting, 2000).

Amphibians present in the basin include Colombian spotted frogs (*Rana luteiventris*), bullfrogs, Pacific treefrogs, western toads, long-toed salamanders, giant salamanders, and tailed frogs (Beck et al., 1997).

Mammals inhabiting the Coeur d'Alene Lake area include beaver, mink, muskrat, raccoon, and river otter. Larger mammals include black bear, bobcat, cougar, coyote, elk, gray wolf, moose, mule deer, and white-tailed deer. Small mammals in the basin include meadow voles, shrews, and deer mice (Stratus Consulting, 2000). White-tailed deer, mule deer, and elk have increased in population size in recent years (GEI, 2004). According to the Coeur d'Alene Tribe (letter from Chief J. Allan, Chairman, Coeur d'Alene Tribe, Plummer, ID to B. Howard, Spokane River License Manager, Avista, Spokane, WA, dated May 23, 2005), the Tribe has mapped many of the hillsides surrounding Coeur d'Alene Lake, and along the Coeur d'Alene, St. Joe, and St. Maries rivers as big game winter range.

Downstream of Post Falls HED

Waterfowl species that breed throughout the Spokane River corridor include mallards, Canada geese, wood ducks, western grebes, hooded mergansers, green-winged teal, pied-billed grebes, common mergansers, American coots, and cinnamon teal. Additional wildlife species sighted in the area are blue-winged teal, northern shovelers, American wigeons, ring-necked ducks, lesser scaups, and buffleheads. Waterfowl are particularly common during the spring through fall periods along the Little Spokane River, Nine Mile Reservoir, and Lake Spokane, while in winter most of the waterfowl use is concentrated in free-flowing and open-water reaches of the lower Spokane River lying downstream of the city of Spokane. In addition to waterfowl, riparian habitats in the Project area are used by California gulls, spotted sandpipers, yellow warblers, Wilson's warblers, and red-winged blackbirds.

Great blue heron rookeries occur along the lower Little Spokane River in Washington (Parametrix, 2003e). Parametrix consultation with WDFW (2003, as cited in Parametrix, 2003e) identified the wetland complex near river mile 49 and river mile 50 at Lake Spokane to be an important western grebe breeding area and waterfowl concentration area.

Osprey, Cooper's hawk, turkey vulture, red-tailed hawk, golden eagle, and bald eagle are raptors that nest along the Spokane River. In a 2-year study (1992–1993), 53 osprey nests were identified along the Spokane River from the outflow of the river at Coeur d'Alene Lake to the Little Falls Dam, located downstream of Long Lake HED (Parametrix, 2003e).

Mammals that occur in riparian areas downstream of Post Falls HED include chipmunks, beavers, muskrats, coyotes, raccoons, minks, porcupines, and striped skunks. The wetland complex along Lake Spokane near river mile 49 and river mile 50 contains a high density of muskrats. Big game species, primarily white-tailed and mule deer, are common along the Spokane River. Rocky Mountain elk use the riparian area and uplands along Lake Spokane and lower Hangman Creek and uplands near the Washington-Idaho state line year-round (Parametrix, 2003e). White-tailed and mule deer populations, as well as moose, have increased within the last few years, indicating good or very good habitat and favorable weather conditions (Parametrix, 2003e; GEI, 2004).

Consultation with WDFW indicates that deer winter range in the Project area in Washington includes riparian and upland habitat adjacent to Lake Spokane, Little Falls Reservoir (downstream of Long Lake HED), the lower Little Spokane River, and lower Deep Creek, as well as uplands near the Washington-Idaho border (Parametrix, 2003e). White-tailed deer fawning areas include the riparian and upland areas around the lower Little Spokane River and lower Deep Creek.

Amphibians and reptiles known to occur along Lake Spokane and Nine Mile Reservoir include painted turtle, western rattlesnake, and western terrestrial garter snake (Parametrix, 2003e).

5.7.1.5 Special Status Wildlife Species

State-Listed Threatened, Endangered, Sensitive, and Rare Species

Table 5-41 identifies the federally and state-listed endangered, threatened, and special concern wildlife species that occur within the Coeur d'Alene and Spokane subbasins. Federally listed wildlife species that were identified by FWS as potentially occurring in the vicinity of the Project (letter from S. Andet, FWS, Upper Columbia Fish and Wildlife Office, Spokane WA, to B. Howard, License Manager, Avista Utilities, Spokane, WA, dated March 9, 2005) are discussed in Section 5.8.3 of this document.

Peregrine falcons are state-listed as endangered in Idaho and as a sensitive species in Washington; they are also listed as a federal species of special concern and a sensitive species in Washington. There have been no documented peregrine sightings in the Idaho portion of the Project area. One eyrie exists along lower Hangman Creek in Washington (Parametrix, 2003e).

Table 5-41. Federally and state-listed endangered, threatened, and special concern wildlife species potentially occurring within the Project area in the Coeur d'Alene and Spokane subbasins. (Source: GEI, 2004; letter from R. Torquemada, Supervisor, FWS, Spokane, WA, to B. Howard, Spokane River License Manager, Avista, Spokane, WA, dated May 23, 2005)

Common Name	Scientific Name	Status (Federal/Idaho/Washington)[a]
Bald eagle	*Haliaeetus leucocephalus*	T/e/t
Fisher	*Martes penannti*	SC/-/e
Golden eagle	*Aquila chrysaetos*	-/-/c
Gray wolf	*Canis lupus*	E/e/e
Harlequin duck	*Histrionicus histrionicus*	-/sc/-
Northern goshawk	*Accipiter gentiles*	SC/sc/c
Peregrine falcon	*Falco peregrinus*	SC/e/s
Pileated woodpecker	*Dryocopus pileatus*	-/-/c
Sage sparrow	*Amphispiza belli*	-/-/c
Sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	-/-/t
Upland sandpiper	*Bartramia longicauda*	-/sc/e
White-headed woodpecker	*Picoides albolarvatus*	-/sc/c
Wolverine	*Gulo gulo*	SC/-/c

[a] - – no special status

C – federal candidate species

c – state candidate species

E – federal endangered

e – state endangered

SC – federal species of special concern

sc – state species of special concern

s – state sensitive species

T – federal threatened

t – state threatened

Fisher and upland sandpiper are listed as endangered in Washington State. The most recent record of a fisher in the Project area was in 1998 within a tributary drainage east of the Little Spokane River (WDFW, 2003); occurrence of this species in immediate proximity to the Project would not generally be expected, given habitat preferences. Upland sandpipers were observed west of Spokane in 2003 (GEI, 2004); however, they are not known to have reproduced in Spokane County since 1993 (GEI, 2004). Sage and sharp-tailed grouse are both listed as threatened in Washington. Neither species is known to currently breed within the Spokane subbasin (GEI, 2004). Many of the species noted in Table 5-41 (other than the federally listed species discussed in Section 5.8) have habitat preferences and needs that would make their occurrence in proximity to the Project unlikely or very infrequent (e.g., wolverine, woodland caribou). Others may in fact find favorable habitat conditions and be present (e.g., northern goshawk, woodpecker species), but no documented information is available concerning specific frequency of their occurrence or distribution.

5.7.1.6 Contaminant Levels in Wildlife

The Coeur d'Alene River Basin contains elevated concentrations of metals from historical mining activities (refer to Sections 5.3.1.7, *Hazardous Materials*, and 5.5.1.4, *Metals*). Lead exposure has been found in numerous wildlife species due to the ingestion of contaminated sediments, plants, and/or prey species. Species that have been found with lead exposure include Canada geese, mallards, tundra swans, wood ducks, song sparrows, American kestrels, northern harriers, great horned owls, bald eagles, muskrats, mink, raccoons, deer, mice, and spotted frog tadpoles. Waterfowl mortality related to lead exposure has been reported frequently since the early 1900s. The majority of waterfowl mortality is associated with the highly contaminated wetland and lakes areas of the lower Coeur d'Alene River. In addition to lead, zinc and cadmium have been found to present the most risk to bird species in the area, while arsenic, cadmium, copper, lead, and zinc present the most risk to mammals. Amphibian species are at risk from cadmium, copper, lead, and zinc. Soil containing elevated concentrations of arsenic, cadmium, copper, lead, and zinc presents a risk to the plant communities in this area (Parametrix, 2003e).

Contaminant levels in the St. Joe and St. Maries rivers are significantly lower than those in the Coeur d'Alene River. Lead concentrations in wildlife and plants are at levels not considered toxic (Parametrix, 2003e).

Coeur d'Alene Lake sediment and surface water contaminant concentrations frequently exceed ecological screening criteria, which could indicate a potential for effects on terrestrial resources. Although still elevated, contaminant concentrations are lower in the lake than they are in the Coeur d'Alene River. Information about the contaminant concentrations in plants and wildlife using the lake is not available; however, the risks identified for the river would be expected to occur in the lake, but to a lesser extent (Parametrix, 2003e).

Although metal contaminant levels in the Spokane River from Post Falls HED to Lake Roosevelt generally decrease with increased distance from Coeur d'Alene Lake, organic chemicals including PCBs and PAHs occur in the river system, most likely introduced by industrial sources along the river. Fish tissue samples from the Spokane River have shown elevated zinc and PCBs concentrations that may pose a risk to fish-eating wildlife. Additionally, cadmium, zinc, and lead concentrations in soil and sediments pose a risk to birds; zinc, mercury, and lead concentrations pose a risk to mammals; and cadmium, zinc, and lead pose a risk to plants in and along the Spokane River (Parametrix, 2003e).

5.7.2 Environmental Effects

5.7.2.1 Project Operations

Lake Level Management

Post Falls HED

Avista typically maintains the Coeur d'Alene Lake summer elevation level at or near full pool (2,128 feet) from as early as practicable until the week after Labor Day when it begins a gradual drawdown, typically 1 to 2 feet per month. The stable high-water level during the summer months results in shallow-water zones in shallow bays and backwater areas of Coeur d'Alene Lake that provide favorable conditions for aquatic plant growth. Additionally, the stable water level concentrates erosional forces and effects on the shoreline at elevation 2,128 feet. This is especially evident on the St. Joe River levees, where the summer lake level of 2,128 feet has inundated the low, downstream ends and the front inside edge of the levees. As a result of inundation and other forces, the levees have narrowed and vegetation has been lost or changed. Section 5.3.2.1, *Effects of Project Operations* in *Geology and Soils*, provides a more detailed description of the effects of reservoir level on erosion in the Project area.

Nine Mile HED

Nine Mile HED is generally operated at a relatively stable water level during the summer and fall, although some pool fluctuations have occurred in the past. During high-water years, the flashboards are removed during the high spring runoff period. As a result, the Nine Mile Reservoir water level drops as runoff subsides and remains at a lower level until the flashboards can be safely replaced, delaying the attainment of the normal summer full-pool level.

Long Lake HED

Currently, the maximum drawdown of the Long Lake HED operating reservoir (Lake Spokane) is limited to no more than 24 feet (elevation 1,512 feet, compared to a normal full-pool elevation of 1,536 feet); in practice, however, the winter drawdown is generally limited to 14 feet.

The Proposed Action would formalize drawdown times and elevations for both Coeur d'Alene Lake and Lake Spokane, reflecting operations that are the same or close to those that are currently followed. Under the Proposed Action, Coeur d'Alene Lake would be filled to its full-pool level of 2,128 feet by as early as practicable each summer and maintained near 2,128 feet, subject to minimum flows, until September 15. A fall lake drawdown, to as low as 2,120.5 feet to provide storage for winter precipitation and spring runoff, would begin on September 15. As part of the Proposed Action, a maximum 14-foot winter drawdown at Lake Spokane, with exceptions under certain conditions, would be formalized under the new license.

Effects Analysis

Project lake-level management under the Proposed Action would have essentially the same effect on terrestrial resources as current Project operations. As discussed in Section 5.3.2.1, *Effects of Project Operations*, in *Geology and Soils*, fixing a September 15 date when drawdown of Coeur d'Alene Lake would begin each fall would have little or no effect on the erosion that occurs at the St. Joe and Coeur d'Alene River levees. Under current Project operations, the September drawdown date is variable but generally begins the week following Labor Day. The proposed September 15 drawdown date would be within the range of existing conditions, especially considering the increased minimum flow at Post Falls HED. Therefore, although stable, high-pool elevations throughout the summer encourage aquatic bed growth, including noxious aquatic weeds, fixing a September 15 date for drawdown to begin would not be expected to change this effect. As such, there would be little or no operational effect on wetlands, riparian habitat, and associated wildlife from keeping Coeur d'Alene Lake at full pool until September 15 each year.

No changes have been proposed to the Nine Mile Reservoir level and, as such, the fluctuations resulting from flashboard removal would continue. Because this has been an ongoing occurrence for decades, the wetland and riparian habitats in the fluctuation zone have acclimated to this process. Furthermore, any loss of habitat would be mitigated for as provided in Proposed Action measure SRP-TR-1, discussed in greater detail in Section 5.7.2.2.

Formalizing the winter drawdown at Lake Spokane to no more than 14 feet would respond to WDFW requests that the 14-foot limit be included in the license and would potentially be more protective of terrestrial resources. Because the 14-foot drawdown limit reflects the current operating practice, there would be no change in the effects on terrestrial resources.

Proposed Action measures designed to protect terrestrial resources from, or enhance existing conditions as a result of, reservoir operations are presented in later sections. Measures that respond in whole or in part to specific operations concerns include PF-AR-2, SRP-AR-2, PF-TR-1, and SRP-TR-1.

Project Releases

Current Project operations require a 300-cfs minimum flow or an amount equal to Coeur d'Alene Lake inflow, whichever is less, to be released from Post Falls HED.

Under the Proposed Action, measure PF-AR-1 would set the year-round minimum flow from Post Falls HED at 600 cfs (reduced to 500 cfs if Coeur d'Alene Lake is lowered more than three inches), as measured at USGS gage No. 12419000 (Spokane River near Post Falls). As discussed in Section 5.4.2, *Environmental Effects* in *Water Quantity,* changing the minimum flow from 300 to 600 cfs would produce some small changes on the Coeur d'Alene Lake water level and downstream flows. As a result of this change in minimum flow, the largest decrease in Coeur d'Alene Lake elevation would typically occur in August when the elevations would decrease by as much as 6 inches in dry years. The change in minimum flow would typically result in downstream flows that are within the range of current low flows.

Effects Analysis

Only minimal or insignificant effects are expected on terrestrial resources because changing the minimum discharge from Post Falls HED from 300 to 600 cfs would result in only small differences in Coeur d'Alene Lake elevation and downstream Spokane River flows.

5.7.2.2 Plant Communities and Wildlife Habitats

Wetlands

Upstream of Post Falls HED—Project operations upstream of Post Falls HED have remained relatively unchanged since 1941. As a result, wetland communities have adjusted to current Project operations and have become relatively stable in both acreage and distribution of wetland and riparian habitat types throughout most of the area. Ongoing wetland losses, however, may be found along 34 miles of the St. Joe River, 9 miles of the St. Maries River and 32 miles of the Coeur d'Alene River, primarily due to erosion from a variety of sources. Based on current Project operations, estimated future erosion rates on the inner banks of the St. Joe River are 2.4 to 4 inches per year (Earth Systems and Parametrix, 2004). Erosion along the Coeur d'Alene River is less, estimated to be 1.2 to 3.6 inches per year. As a result, small amounts of forested and scrub-shrub wetland and riparian habitats may continue to be lost each year. This erosion is caused by boat- and wind-generated waves and natural erosion influences. Erosion and its causes are discussed in greater detail in Section 5.3.1.5, *Erosion*, in *Geology and Soils*.

Under the Proposed Action, Project operations would continue relatively unchanged, and wetland and riparian habitat hydrologically connected to the Project would continue to be influenced by the same reservoir fluctuations. The Proposed Action would not change the general pattern of high summer reservoir levels with gradual drawdown in the fall. Wetland and riparian habitat would experience the same range and timing of fluctuations as under current Project operations; therefore, implementation of the Proposed Action is not expected to change the characteristics of wetland plant communities from their current Project operations.

Holding the summer lake level near an elevation of 2,128 feet, as proposed in the Proposed Action, would continue to result in the loss of some wetland and riparian habitat as the result of erosion-related effects. The 2004 erosion study (Earth Systems and Parametrix, 2004) estimated that, if current Project operations continue (i.e., stable summer lake levels near 2,128 feet and unrestricted boat traffic on the rivers), erosional losses could be as much as 66 to 110 acres along the St. Joe River, 51 to 83 acres along the Coeur d'Alene River, and 14 to 23 acres along the St. Maries River during the next 30 to 50 years. Non-Project related factors contributing to erosion include boat- and wind-generated wave action and natural erosion influences such as vegetation removal, freeze/thaw, rain splash, and stream currents.

Although the distribution, structure, and extent of wetland and riparian habitat types have adapted to and are in equilibrium with current hydrological conditions, baseline conditions are substantially changed from historical, pre-Project conditions. Historically, the naturally occurring wetland and riparian habitats were subjected to a hydrologic regime that included high water levels during the spring or early summer runoff period followed by a fairly rapid decline in water levels during the summer and early fall growing period. Both areas that were cyclically flooded and then dewatered and shallow-water areas tended to support lush emergent growth, and frequently important plant species such as water potato, tule, and camas.

Operation of Post Falls HED maintains water levels in Coeur d'Alene Lake at a higher and more stable level during the summer than would naturally occur. Maintaining this level throughout the growing season altered the hydrologic conditions in the affected wetland and near-shore riparian habitats. As a result of the altered hydrograph, habitats generally shifted from scrub-shrub and emergent to those adapted to deeper water conditions, such as emergent inundated wetlands and open-water/aquatic bed habitat. Overall, however, wetland acreage is only slightly changed from historical numbers to current conditions, except where agriculture has altered habitat.

Stakeholders in the TRWG expressed concern about the effects of the Post Falls HED construction and operation. Under the Proposed Action, measure PF-TR-1 would provide wetland and riparian habitat protection and enhancement, along with erosion control. The goal of this measure, developed by Avista in conjunction with the TRWG, is to provide a means for long-term (perpetual protection is preferred) protection of specific wetland and riparian areas, providing relatively high-quality habitat while also identifying and evaluating opportunities for additional wetland acquisition, restoration, and/or enhancement for the term of the new license. This measure includes a specific focus on protecting wetland areas that cannot be easily replaced (levee systems, for example) and protecting and restoring wetland and riparian habitats representative of the historical wetland and riparian communities that existed prior to initial Post Falls HED construction and operation.

Additionally, measure PF-TR-1 would implement projects that would mitigate for ongoing erosion-related effects on areas of important cultural, wetland, and riparian value and would protect those resources from future erosion-related effects. Erosion control projects that address shoreline erosion and habitat loss and that offer long-term benefits would be emphasized. This measure would identify and prioritize specific areas of concern for protection needs and erosion control opportunities, with preference given to protecting wetland and riparian habitat, cultural sites, and other sensitive and high-value sites, primarily along the south end of Coeur d'Alene Lake and with an initial focus on the lower reaches of the St. Joe River and its natural levee system. The potential erosion control sites include the low, narrow sections of the St. Joe River levee system, with the highest priority going to the sites with the greatest boat- and wind-wave erosion potential. Once the initial sites are identified and agreed upon, Avista, in consultation with landowners and the cooperating parties, would design and implement agreed-upon erosion control measures that would meet the intended purpose and goal of this measure.

Downstream of Post Falls HED—A comparison of 1948 aerial photos with current conditions indicates that aquatic bed wetlands in Lake Spokane have increased by approximately 150 acres. This indicates that these wetland communities continue to adjust to Project operations and other influences, such as sediment deposition.

Sedimentation in Nine Mile Reservoir and Lake Spokane is an ongoing concern because of its potential to alter wetland and riparian habitat. Substantial amounts of sediment are transported into Nine Mile Reservoir and Lake Spokane, with the majority of the sediment originating in the Hangman Creek drainage, which empties into the Spokane River upstream of Nine Mile Reservoir. Sediment deposition has resulted in new and altered wetland and riparian habitats and islands in Nine Mile Reservoir. The sedimentation also causes infilling, which alters shallow-water habitats in Lake Spokane and may facilitate the establishment and spread of non-native, invasive aquatic plants. These effects, both positive and negative, are expected to continue under the Proposed Action.

Various stakeholders have expressed concern about the effects of sediment deposition in wetland and shallow-water areas and the need to protect the remaining, relatively undeveloped, riparian and other near-shore habitats occurring along the lower portions of Lake Spokane. As a result, Avista proposes implementing measure SRP-TR-1, Lake Spokane and Nine Mile HED Terrestrial, Riparian, and Wetland Habitat Protection and Enhancement Program, as part of the Proposed Action. As part of this measure, Avista may acquire (in fee simple or easement), protect, or enhance existing wetland and riparian site(s) associated with or near Nine Mile or Long Lake HEDs.

Effects Analysis

The Proposed Action, with measures PF-TR-1 and SRP-TR-1, would result in benefits to wetland and riparian habitat compared to existing conditions. Although continued elevated summer pool levels upstream of Post Falls HED would contribute to ongoing erosion-related wetland and riparian habitat loss, measure PF-TR-1 would mitigate for these effects by identifying and prioritizing sites for protection and erosion control opportunities. Additionally, measure PF-TR-1 would identify, evaluate, acquire, protect, and/or develop wetland and riparian sites in or around Coeur d’Alene Lake and its tributaries. This would enhance existing wetland and riparian habitat with the potential for restoring some areas to pre-Project conditions.

The Proposed Action would not result in any substantial adverse effects on wetland and riparian habitats downstream of Post Falls HED, given the similarity between the proposed and current operations. Measure SRP-TR-1 would benefit existing conditions by protecting high-value wetland/riparian habitat and by developing and implementing site-specific wetland and habitat enhancement measures on or adjacent to Nine Mile and Long Lake HEDs.

5.7.2.3 Plant Species of Special Concern

State-Listed Species

Prairie cordgrass, the one state-listed species observed in the Project area during rare-species surveys, has persisted and perhaps benefited under current Project operations. The population found on the banks of the Spokane River in Riverside State Park, upstream of the Nine Mile HED Project boundary, has shifted and apparently expanded since a 1992 plant survey (Parametrix, 2003b).

Under the Proposed Action, Project operations would continue to provide hydrologic conditions similar to those under current Project operations.

Effects Analysis

Because hydrologic conditions would not change appreciably under the Proposed Action, no effects on prairie cordgrass are anticipated.

Culturally Significant Plant Species

Culturally significant species, with the exception of camas, are currently found throughout the Coeur d'Alene Lake area. The effects of Project operations upstream of Post Falls HED have remained relatively unchanged since 1941. As a result, the wetland communities that include culturally significant species have adjusted to the current Project operations and have become relatively stable in both acreage and distribution of wetland and riparian habitat types throughout most of the area. Within some areas, as discussed in Section 5.7.2.2, erosion continues to cause the loss of some wetland and riparian habitat, which could include some culturally significant species. Although water potato is extensive in the Project area upstream of Post Falls HED, it is not available for harvest in the Coeur d'Alene River Basin due to inundation and reduced access during harvest time, and non-Project-related heavy-metals contamination from past mining and smelting operations.

Under the Proposed Action, Project operations would continue to provide hydrologic conditions similar to current Project operations, resulting in no changes to the distribution and abundance of culturally significant species.

Prior to Project construction, the naturally occurring wetland and riparian habitats were subjected to a hydrologic regime that included high water levels during the spring or early summer runoff period followed by a fairly rapid decline in water levels during the summer and early fall growing season. These cyclically flooded and then dewatered or shallow-water areas tended to support lush woody-stem and emergent wetland and riparian vegetation and frequently included culturally important plant species such as cottonwood, willow, water potato, tule (hard-stem bulrush), and camas.

Although quantifying the loss of culturally significant species from the original construction and operation of the Project is not possible in all areas due to the lack of historical information, the *Wetland and Riparian Habitat Mapping and Assessment* (Parametrix, 2004a) was able to estimate losses along the St. Joe River. The assessment indicates that 802 acres of emergent wetlands dominated by tule were inundated and lost due to Project construction and the area was converted to lacustrine emergent and aquatic bed wetlands. Also, 42 acres of cottonwood were inundated and lost along the northern shoreline of what is now Round Lake, and the area was converted to aquatic bed wetlands with Project construction.

As a result of these concerns, along with the potential for ongoing erosion-related losses, Avista proposes to implement measure PF-TR-1 to provide wetland and riparian habitat protection and enhancement, along with erosion control. This measure is discussed in greater detail in Section 5.7.2.2.

Effects Analysis

Implementation of measure PF-TR-1 under the Proposed Action would result in enhancements to some culturally significant plant species and their habitat compared to existing conditions. Although continued elevated summer-pool levels upstream of Post Falls HED contribute to ongoing erosion-related habitat loss, measure PF-TR-1 would mitigate these effects by identifying and prioritizing sites for protection and erosion control opportunities. Additionally, measure PF-TR-1 would identify, evaluate, acquire, protect, and/or develop wetland and riparian sites that would provide habitat for culturally significant species in or around Coeur d'Alene Lake and its tributaries. This would enhance existing wetland and riparian habitat, with the goal for restoring certain areas to pre-Project-like conditions, especially sites with culturally significant plant species.

5.7.2.4 Noxious Aquatic Weed and Invasive Non-native Plant Species

Coeur d'Alene Lake

Currently, Post Falls HED maintains stable water levels throughout the summer growing season, resulting in large expanses of shallow bays and backwater areas on Coeur d'Alene Lake. These shallow-water zones provide highly favorable conditions for aquatic plant growth and are susceptible to noxious aquatic plants. Eurasian watermilfoil has been identified by the Coeur d'Alene Tribe in the south end of Coeur d'Alene Lake. Boating in and around the lake provides a means of spreading the weeds to other areas of the lake and tributaries.

As a result of these concerns, Avista is proposing the Coeur d'Alene Lake Aquatic Weed Management Program (measure PF-AR-2) as part of the Proposed Action. This program was developed by Avista, along with the TRWG, to address the concerns related to exotic/noxious aquatic weeds by providing for Avista's assistance and financial support for exotic/noxious aquatic weed monitoring and control efforts in partnership with local, state, and tribal entities. Avista would also provide a boat for work associated with the weed monitoring and control effort.

The TRWG's exotic/noxious aquatic weed subgroup determined that the primary focus should be on Avista's working with the cooperating parties to educate the public and to monitor for the presence of exotic/noxious aquatic weeds on Coeur d'Alene Lake and the Coeur d'Alene, St. Joe, and St. Maries rivers. Avista would develop a detailed weed-monitoring plan in consultation with the cooperating parties and establish management strategies for the various exotic/noxious weed species as they are identified. Annual reports would be prepared to summarize the results and activities funded and/or conducted under this program and the results achieved.

Lake Spokane

Currently, Long Lake HED maintains water levels on Lake Spokane within 1 foot of the full-pool elevation during the summer. This provides favorable conditions for aquatic plant growth in shallow-water areas that have suitable substrate. This is reflected in the extensive and sometimes dense beds of aquatic vegetation that occur in areas of the lake. These areas are often dominated by non-native, highly invasive species such as Eurasian watermilfoil and yellow floating heart.

Prior to the initiation of the Project relicensing effort, concerns about the occurrence of non-native invasive aquatic plants (weeds) in Lake Spokane had already resulted in the development of the *Lake Spokane Integrated Aquatic Plant Management Plan* (Stevens County Conservation District, 2001). This plan was developed to address concerns related to the substantial aquatic weed growth in several areas of Lake Spokane, with a primary focus on Eurasian watermilfoil. However, only very limited resources have been available to implement this plan to date.

As part of the Proposed Action, Avista proposes to establish the Lake Spokane Aquatic Weed Management Program (measure SRP-AR-2). Avista, the Recreation, Land Use, and Aesthetics Work Group (RLUAWG), and the TRWG developed measure SRP-AR-2 to provide financial support for and assist in monitoring and managing exotic aquatic weeds within and adjacent to Lake Spokane. As part of this measure, Avista would cooperate with implementation of the Lake Spokane Integrated Aquatic Plant Management Plan, any revised versions of this plan, or other aquatic weed control activities consistent with this plan. This measure provides for Avista's assistance and financial support for in-field aquatic weed control efforts, aquatic weed monitoring, and educational efforts in consultation with appropriate local, state, tribal, and federal entities. The primary focus of this program would be to work with the cooperating parties to manage Eurasian watermilfoil and other known noxious aquatic weed species at the primary access sites on the lake. These sites currently include the Nine Mile Resort, Forshee's Last Resort, and the Lake Spokane Campground.

Specific in-field weed control actions supported by or implemented under this measure would include, but not be limited to, any or all of the following: mechanical removal of plants, installation of bottom barriers, chemical treatments, biological treatments, and Project operational measures. Project operational measures would include scheduled drawdowns of Lake Spokane on a multi-year (3- to 5-year) cycle of up to 10 to 14 feet to accommodate the installation, maintenance, and/or replacement of bottom or physical barriers. Avista would target anticipated periods of below-freezing temperatures during the months of January or February for these scheduled drawdowns for the specific purpose of aquatic weed control. Scheduled drawdowns during freezing conditions could kill or otherwise adversely affect the exposed aquatic weeds on a reservoir-wide basis.

Effects Analysis

Implementation of measures PF-AR-2 and SRP-AR-2 under the Proposed Action would reduce the introduction, establishment, and spread of noxious weeds in the Project area. Through the use of education, in-field aquatic weed control efforts, and aquatic weed monitoring, this measure would reduce the abundance of noxious weeds, and encouraging the reestablishment of native species.

5.7.2.5 Wildlife Species

Current Project operations have minor effects on wildlife and special wildlife habitat. There are minor losses of habitat associated with shoreline erosion, as discussed in Section 5.7.2.2, that could result in some displacement of wildlife species that inhabit those areas. No known bird interactions (i.e., collisions or electrocutions) have occurred on any Project transmission line. However, one bald eagle was killed by contacting a distribution line that leads to the employee-housing complex at Long Lake HED. Effects on the bald eagle are discussed in Section 5.8.2.5. Osprey are also known to build nests or perch on non-Project transmission pole structures. In recent years, Avista has implemented a program for minimizing the potential for adverse interactions. These efforts have included identifying bird-nesting activities on transmission lines that pose a potential problem, nest removal where necessary, providing alternative nesting platform structures at problem locations, reconfiguring existing pole structures that are found to present a significant threat of bird electrocution to increase the spacing between hot wires and neutral wires, and construction of any new transmission lines in accordance with state-of-the-art guidelines. As part of its current vegetation management under the Long Lake HED transmission lines, Avista occasionally removes potentially problematic vegetation by mechanical methods.

Under the Proposed Action, Avista proposes three measures that would provide protection and enhancement of wildlife species. Measure PF-TR-1 would identify and prioritize specific areas for protection and erosion control within Coeur d'Alene Lake and associated tributaries. Measure SRP-TR-2, the Project Transmission Line Management Program, would formalize raptor protection and non-chemical vegetation management on approximately 1.84 miles of existing Project transmission lines and any new lines that may become part of the Project in the future. Under this measure, the potential for adverse interactions among avian species and transmission lines and poles would be minimized by (1) configuring all new or replacement Project transmission line structures consistent with the current state-of-the-art guidelines; (2) visually inspecting the Project transmission lines during the nest-building period each year and taking appropriate actions in compliance with the Migratory Bird Treaty Act and, where appropriate, providing a nearby nesting platform; and (3) taking remedial actions in the event of a bird injury, mortality, or other indications that a particular pole structure and/or transmission line poses a threat to an avian species. Avista also proposes to include the 1.84 miles of Project transmission lines in the Project boundary.

As part of the Proposed Action, Avista also proposes to implement the Lake Spokane and Nine Mile HED Terrestrial, Riparian, and Wetland Habitat Protection and Enhancement Program (measure SRP-TR-1). Several stakeholders, as part of the TRWG, noted the largely undeveloped nature of many near-shore areas along the lower portions of Lake Spokane. They expressed concerns that, without some specific protective measures, these areas would be subject to developmental pressures in the future and associated reductions in wildlife habitat and other values.

As a result, as part of this measure, Avista would add to, protect from future development, and manage its Project lands to protect wildlife habitat values while still allowing for other appropriate uses in certain areas. Other agreed-upon uses could include limited and appropriate recreational development in accordance with the LUMP land-use categories (measure SRP-LU-1). This measure would include incorporating additional, currently owned Avista lands located within 200 feet (measured horizontally) of the Lake Spokane shoreline into the FERC Project boundary and managing them under the Project LUMP as Conservation lands, where appropriate. Managing these lands, as subsequently deemed appropriate by the cooperating parties, could require a variety of wetland, forest, and/or range management activities, including but not limited to wetland enhancements, erosion control and remediation or other shoreline protection and enhancement measures, tree and shrub plantings, tree thinning, weed management, road management, wildlife habitat monitoring and assessments, etc.

Effects Analysis

By formalizing and implementing measure SRP-TR-2, the Project transmission lines and transmission line corridors would continue to be managed in a manner that eliminates or minimizes the potential for bird injury or mortality and associated transmission line damage. Additionally, it would ensure a minimally invasive, non-chemical approach to vegetation management within the transmission line corridor. As a result, any adverse effects on wildlife species because of Project transmission line interactions would be minimized or eliminated.

As discussed in Section 5.7.2.2, measure PF-TR-1 would mitigate for any ongoing erosion-related wetland and riparian habitat loss associated with Post Falls HED. Any displaced wildlife species would re-inhabit protected and enhanced wetland and riparian habitat gained as a result of this measure.

Measure SRP-TR-1 would benefit existing wildlife species by protecting wildlife habitat along the Lake Spokane shoreline. These lands would be managed as Conservation lands, where appropriate, under the LUMP and would be protected from incompatible development. The inclusion of additional Avista-owned lands along the Lake Spokane shoreline within the Project boundary would increase the amount of high-quality, protected wildlife habitat included in the Project.

5.7.2.6 Special-Status Wildlife Species

Because Project operations have remained relatively constant for decades, special-status wildlife species are likely to have adapted to the current Project operations. None of the special-status wildlife species that could occur in the Project area are specifically wetland or riparian species, so ongoing erosion-related habitat loss and aquatic bed wetland alterations at Lake Spokane are unlikely to affect any special-status wildlife species.

In recent years, Avista has implemented a program for minimizing the potential for adverse interactions associated with birds and its transmission lines, as discussed above. Under the Proposed Action, Avista proposes measure SRP-TR-2, the Project Transmission Line Management Program, to formalize raptor protection and non-chemical vegetation management on approximately 1.84 miles of existing Project transmission lines and any new lines that may become part of the Project in the future. Avista also proposes the implementation of the Lake Spokane and Nine Mile HED Terrestrial, Riparian, and Wetland Habitat Protection and

Enhancement Program (measure SRP-TR-1), which would protect wildlife habitat along the Lake Spokane shoreline.

Effects Analysis

Implementation of measure SRP-TR-2 would ensure that the Project transmission lines and Project transmission line corridors would continue to be managed in a manner that eliminates or minimizes the potential for special-status raptor injury or mortality and associated transmission line damage. Furthermore, the protection and enhancement of wildlife habitat as part of measure SRP-TR-1 could provide a benefit to special-status species. Consequently, no adverse effects on special-status wildlife species are anticipated as a result of the Proposed Action.

5.7.2.7 Secondary Effects of Proposed Measures

Coeur d'Alene Recreation (PF-REC-2)

Implementation of measure PF-REC-2 would include funding for improvements at several parks and on BLM, FS, and Coeur d'Alene Tribe lands; boat ramp extensions; Higgens Point breakwater and shoreline stabilization; and construction of trail spurs on the Trail of the Coeur d'Alenes. All of these activities could result in the clearing of some vegetation; however, the effect is expected to be minimal because the clearing would occur within areas already being used as parks. The shoreline stabilization project at Higgens Point would contribute to the reduction of erosion at this particular point. Overall, the increase in recreation use as a result of these recreation improvements could result in some minor potential for additional disturbance to wildlife and habitat.

Post Falls/Spokane River Recreation (PF-REC-3) and Spokane River Recreation (SRP-REC-2)

Implementation of measures PF-REC-3 and SRP-REC-2 would include funding for improvements at the Trailer Park Wave access site, Corbin Park boat ramp, and the Water Avenue access site. The efforts at Trailer Park Wave and the Water Avenue access site would require the clearing of vegetation. Overall, the increase in recreation use as a result of these recreation improvements could result in some additional disturbance to wildlife and habitat.

Lake Spokane/Nine Mile Reservoir Recreation (SRP-REC-4)

Implementation of measure SRP-REC-4 would include funding for Nine Mile portage parking, Centennial Trail extension, Nine Mile Resort development, WDNR's Lake Spokane campground improvements, boat-in-only campgrounds, and the Long Lake Dam river access site development. All of these plans would likely require the clearing of some vegetation. The Centennial Trail extension would be approximately 1 mile long. Assuming a construction width of 12 feet, approximately 1.45 acres would need to be cleared. The establishment of boat-in-only campgrounds has the potential to bring human disturbance to areas that currently are seldom used. However, these sites would be identified in consultation with Washington State Parks and WDNR and therefore would likely be chosen to minimize effects on habitat. Overall, the increase in recreational use as a result of these recreational improvements could result in some minor potential for additional disturbance to wildlife and habitat.

Project Land Use Management Plan Implementation (PF-LU-1 and SRP-LU-1)

Implementation of measures PF-LU-1 and SRP-LU-1 would contribute to terrestrial resource protection by providing a means to manage Project lands as Conservation lands, Public Recreation lands, Private Recreation lands, Closed/Restricted lands, or Shoreline lands. The LUMP would provide a systematic approach to land stewardship, conservation, habitat protection, and public access on Avista-owned Project lands.

5.7.3 Cumulative Effects

Cumulative effects on wetland and riparian habitat in the Coeur d'Alene Lake-Spokane River Basin have occurred as a result of initial Project operation, agriculture, residential development, and a range of other human-caused disturbances. As a result of the original development of the Project, along with subsequent operations changes, wetland habitat has been altered throughout the Project area. Habitat types have shifted from scrub-shrub, forested, and emergent wetlands to deeper water inundated wetlands such as aquatic beds. Aquatic noxious weeds have thrived under these conditions. The Proposed Action would not cause any further wetland habitat changes or losses because the current system has adapted to the current operations. Measures PF-TR-1and SRP-TR-1 would result in acquisition, protection, and/or enhancement of terrestrial resources throughout the Project.

Wildlife habitat has been lost throughout the Coeur d'Alene Lake-Spokane River Basin as a result of development, agriculture, and a range of other human-caused disturbances. Recreational measures to improve and construct sites would result in some vegetation clearing and could contribute to a minor adverse effect on terrestrial resources in the basin.

The Project has affected the distribution of sediment flowing into the Project waters because the dams form barriers to downstream sediment transport and Project operations alter the natural river flows. As a result, sediment has been deposited in Nine Mile Reservoir and Lake Spokane instead of being transported downstream to the next barrier. Wetland and wildlife resources have been affected by the change in sediment transport and deposition. The sediment deposition in Nine Mile Reservoir and Lake Spokane has resulted in new and altered wetland and riparian habitats and islands; however, it has also resulted in the infilling and associated alteration of various aquatic and shallow water habitats in Lake Spokane, which may facilitate the establishment and spread of non-native aquatic plants.

5.7.4 Unavoidable Adverse Effects

The Proposed Action would have no unavoidable adverse effects on terrestrial resources.

5.8 Threatened and Endangered Species

5.8.1 Affected Environment

In its March 9, 2005 letter, FWS identified federally listed species and designated critical habitat that may occur in the vicinity of the Project and could potentially be affected by it. Those species are the federally listed endangered gray wolf (*Canis lupis*) and the federally listed threatened bull trout (*Salvelinus confluentus*), water howellia (*Howellia aquatilis*), Ute ladies'-tresses (*Spiranthes diluvialis*), Spalding's catchfly (*Silene spaldingii*), and bald eagle (*Haliaeetus leucocephalus*). Critical information pertaining to federally listed threatened and endangered species is provided below. A formal biological assessment will be developed by FERC, either as a separate document or in conjunction with FERC's subsequent environmental review.

5.8.1.1 Bull Trout

The FWS listed the Columbia River population segment of bull trout as a threatened species under the ESA (63 FR 31647), effective July 10, 1998. Threats to bull trout populations in the Coeur d'Alene Lake Basin have been identified by both the FWS and the Panhandle Bull Trout Technical Advisory Team and include habitat degradation and fragmentation, blockage of migratory corridors (e.g., improperly constructed culverts, remnant splash dams created during historical logging operations in the Marble Creek Watershed, and various dikes and barriers at the mouths of tributaries that obstruct previously used habitat), reduced water quality, and past fisheries management practices, including the introduction of non-native species (Kleinschmidt, 2004). Data about historical bull trout distribution in the Coeur d'Alene Lake Basin are limited and insufficient to provide abundance estimates (NPCC, 2004). Although bull trout are known to currently occur in Coeur d'Alene Lake and the St. Joe River subbasin, there are no known populations associated with the Spokane River drainage downstream of Post Falls HED.

Bull Trout Life History

Bull trout are native salmonids found in the Columbia River Basin. Bull trout were long considered an inland form of Dolly Varden trout (*Salvelinus malma*) until Cavender (1978) identified them as a distinct species. They were officially recognized as *Salvelinus confluentus* by the American Fisheries Society in 1980.

Bull trout may express three life history forms: adfluvial, fluvial, and resident. Resident fish spend their entire lives in small headwater streams, living upstream from natural and anthropogenic barriers. Migratory stocks of bull trout rear in tributary streams for one to four years before moving to larger river systems (fluvial) or lake systems (adfluvial). These migratory bull trout reside for several years in larger rivers or lakes before returning to the smaller tributaries to spawn. Currently, only fluvial and adfluvial life strategies are known to be present in the Coeur d'Alene subbasin.

Bull trout mature between ages 4 and 7 and generally spawn in second- to fourth-order tributary streams (Rieman and McIntyre, 1995). Bull trout growth appears to vary with life history strategy, with resident adults ranging from 6 to 12 inches in total length and migratory adults reaching 24 inches or more (Wydoski and Whitney, 2003). Juvenile migratory bull trout are expected to be about 4 to 6 inches long. Primary prey items for juvenile bull trout are terrestrial and aquatic insects. Larger bull trout feed on insects and fish, including sculpins, salmon fry, and other bull trout. Adult bull trout often prey upon whitefish, yellow perch, kokanee, and mysids (Pratt, 1992; Wydoski and Whitney, 2003).

Upstream spawning migrations may span several seasons, starting as early as late winter (early March), and often peaking during high flows in May and June (Graham et al., 1981; Shepard et al., 1984; Pratt, 1992). Elle (1995) suggests this movement begins when water temperatures increase from 1 to 6°C (34 to 43°F). Water temperatures greater than 15ºC (59ºF) are believed to negatively influence bull trout distribution (FWS, 1999). IDFG (1999) reported that radio-tagged adult adfluvial bull trout in the St. Joe River were located primarily in water of 16°C (61°F) or less, with few exceptions. Bull trout are known to migrate up the St. Joe River in early spring (April and May), arriving at headwater tributaries by late summer (IDFG, 1999).

Adfluvial bull trout typically spawn from late August into October (Rieman and McIntyre, 1995). IDFG (1999) reported that radio-tagged adfluvial bull trout remained in the spawning areas of the upper St. Joe River from August 26 to September 18 in 1998. Spawning is known to occur at temperatures from 4 to 11ºC (39 to 51ºF), but the preferred water temperature range is 5 to 9ºC (41 to 48ºF) (FWS, 1999). After spawning, adfluvial and fluvial adult bull trout rapidly return to the lake or river where they grew to adulthood (Shepard et al., 1984; Pratt, 1992). IDFG (1999) suggested that after spawning in the upper St. Joe River, bull trout probably migrated downstream immediately and radio-tagged fish may have reached Coeur d'Alene Lake in less than 32 days (about October 15). While residing in Coeur d'Alene Lake, bull trout are believed to occupy the deeper, cooler areas of the lake. At these depths, bull trout reside below the variable zone of Coeur d'Alene Lake that is influenced by the operation of Post Falls HED.

Bull trout fry typically emerge from the gravel in April or May, depending on water temperature (Pratt, 1992; FWS, 1999). Downs and Jakubowski (2003, as cited by Parametrix, 2003f) reported that between 50 and 75 percent of age 1 and older bull trout migrated from Trestle Creek to Lake Pend Oreille between April and May during periods of increasing temperature and flow. The timing of juvenile bull trout outmigration in the St. Joe River is believed to be similar to that of other salmonids and to coincide with spring runoff and cool water temperatures (Parametrix, 2003f). Efforts to determine outmigration behavior of juvenile bull trout from the St. Joe River to Coeur d'Alene Lake in 2003 provided inconclusive results from a small sample size (Parametrix, 2003f). It is possible that adfluvial juvenile bull trout migrated downstream prior to the initiation of the sampling in June during higher runoff flows (Parametrix, 2003f).

Bull trout are known to migrate through several miles of inundated habitat of the lower St. Joe River. Even under unregulated historical conditions (i.e., absent Post Falls HED regulating summer water levels in the lake and lower tributary reaches), bull trout in the St. Joe River would have migrated through extensive reaches of backwatered river. Even at a low lake surface elevation of 2,120.5 feet (reflective of pre-dam conditions), 31 miles of the lower St. Joe River are affected by the lake water level (see Figure 5-7).

In an effort to identify and protect coldwater refugia that are important for juvenile bull trout rearing, the EPA proposed that streams with water temperature of 10ºC (50ºF) or less from June through September be afforded protection as bull trout rearing habitat (Hillman and Essig, 1998). Others suggest that optimal bull trout growth can occur at water temperatures that reach 14ºC (57ºF) or slightly higher (Hillman and Essig, 1998; McMahon et al., 1999). Historical temperature data for the St. Joe River upstream of Coeur d'Alene Lake indicate exceedances of 13ºC (55ºF) in May through October (see Section 5.5.1.2). Compared to the natural, historical condition, the lower St. Joe River is predicted to be less than 1ºC warmer under the current operating conditions (Golder, 2004j).

Bull Trout Management

IDFG and the Coeur d'Alene Tribe manage fish resources in the Coeur d'Alene subbasin. FWS also has a specific interest in bull trout populations in the subbasin because they are listed as threatened under the ESA. Recovery criteria for bull trout in the Coeur d'Alene Recovery Unit, specifically encompassing the St. Joe River and North Fork Coeur d'Alene River drainages, are available in the Draft Recovery Plan (FWS, 2002a,b) and are also incorporated in the strategies and objectives in the Coeur d'Alene Subbasin Management Plan (Avista, 2004).

Recovery Planning

With the listing of bull trout as threatened under the ESA in 1998, FWS developed draft recovery plans separated geographically into recovery units (RUs). Bull trout in the Project area fall under two separate RUs. The Coeur d'Alene Lake Basin RU encompasses the entire Coeur d'Alene Lake, St. Joe, and Coeur d'Alene river subbasins, and all tributaries within these systems. FWS also designated the Coeur d'Alene Lake Basin as a core area for bull trout. Core areas contain habitat for all life stages of bull trout and have one or more existing populations of bull trout. Currently, three known local bull trout populations survive in the Coeur d'Alene Lake Basin RU in Medicine Creek, Wisdom Creek, and the St. Joe River between Heller Creek and St. Joe Lake. Although the Coeur d'Alene River subbasin is included in the designated core area, surveys of 75 streams in the North Fork Coeur d'Alene River drainage conducted from 1994 to 1995 did not find bull trout (Dunnigan and Bennett, 1997, as cited by FWS, 2002a).

The second bull trout RU in the Project area is the Northeast Washington RU, which includes the Spokane River and its tributaries downstream of Post Falls HED. However, there currently are no known populations of bull trout in the Spokane River downstream of Post Falls HED, and FWS currently does not include the Spokane River downstream of Post Falls HED in its recovery planning efforts. FWS indicates that the Northeast Washington RU Team recommends that additional survey work be conducted in order to evaluate whether these areas could contribute to future species recovery (FWS, 2002b).

5.8.1.2 Water Howellia

Water howellia is federally listed as threatened. It inhabits palustrine wetlands such as vernal pools, ponds, and backwater stream channels prone to a cycle of flooding in spring and drying out by late summer. Within eastern Washington, water howellia has been found in kettle wetlands and wetlands within conifer forests below elevation 2,300 feet. It is known to occur in sites in Spokane County, Washington, and Latah County, Idaho. None of the identified populations are within the Project area. The closest documented population to the Project area is in the Dishman Hills Natural Area, approximately 3 miles south of the Spokane River in east Spokane. No water howellia were observed during intensive field surveys of potential habitats in July and August 2003, the time of year when this plant is most likely to be observed (Parametrix, 2003b)

5.8.1.3 Ute Ladies'-tresses

Ute ladies'-tresses is federally listed as threatened. It occurs in wet meadows and stream bars with relatively low-vegetation density that are subject to seasonal inundation and drying. In Washington, Ute ladies'-tresses have been found at sites ranging in elevation from 700 to 1,500 feet. Although it is known to exist in Washington and Idaho and suitable habitat occurs in the Project area, there are no records of Ute ladies'-tresses in the Project vicinity. No Ute ladies'-tresses were observed during intensive field surveys of potential habitats in July and August 2003, the time of year when this plant is most likely to be observed (Parametrix, 2003b)

5.8.1.4 Spalding's Catchfly

Spalding's catchfly is federally listed as threatened. In Washington, this species occurs primarily within open grasslands with a minor shrub component and occasionally with scattered conifers. It is found most commonly in the Idaho fescue/snowberry association at elevations of 1,900 to 3,050 feet. These sites are typically dominated by Idaho fescue with a sparse cover of snowberry (*Symphoricarpos albus*). Some of these sites occur in a mosaic of grassland and ponderosa pine forest. Although populations have been found on all aspects, there seems to be a preference for slopes which face north. It occurs in the Blue Mountains and Columbia Basin physiographic provinces in Asotin, Lincoln, Spokane and Whitman counties (WDNR, 2005). Potential Spalding's catchfly habitat occurs near western portions of Lake Spokane within ponderosa pine/grassland habitat found atop cliffs and plateaus overlooking the lake. These upland areas are outside of the zone of Project influence.

5.8.1.5 Gray Wolf

In Idaho, the gray wolf is federally listed as endangered north of I-90; however, there is only a non-essential experimental population within the Project area south of I-90 in Idaho. In Washington, the gray wolf is federally listed as threatened. No federally designated wolf recovery areas are located within the Project area, although the Project area is within the Central Idaho Non-essential Experimental Population Area. Within the Idaho portion of the Project area, the closest known wolves are the Marble Mountain pack in the St. Joe River Basin on the central border between Benewah and Shoshone counties. Wolf sightings within the Washington portion of the Project area are extremely rare. There was one unconfirmed sighting of an adult in 1991 near Long Lake HED (GEI, 2004).

5.8.1.6 Bald Eagle

The bald eagle is federally listed as threatened. The Coeur d'Alene Lake and St. Joe River shorelines have several active bald eagle nests and are major concentration areas for wintering eagles. The Coeur d'Alene River is also known to support wintering eagles

(Parametrix, 2003e). Wintering use in the Coeur d'Alene area is believed to peak when the kokanee spawning occurs in mid-November (GEI, 2004). Six nesting territories and one active bald eagle nest are located along the Spokane River between Long Lake Dam and Nine Mile Dam. The nest is located approximately one-quarter mile from Lake Spokane on Washington State Parks property (e-mail from S. Fitzhugh, Relicensing Specialist, Avista, Spokane, WA, to E. Hall, Senior Project Manager, Louis Berger Group, Boise, ID, dated August 5, 2004). There are no bald eagle nests located on Avista-owned property within the Project area. Wintering eagle use along the Spokane River usually peaks in January or February and most eagles leave the area by April. Wintering eagle use is more abundant west of the city of Spokane, especially around Long Lake HED (Parametrix, 2003e).

Avista has developed a company-wide Avian and Raptor Protection Plan. In June 2002, a bald eagle was electrocuted on a distribution pole near Long Lake HED. Avista has since retrofitted six poles along this distribution line for the protection of birds in accordance with raptor protection standards. To further minimize risk, a dumpster was relocated to discourage eagles from foraging in the area (Parametrix, 2003e).

5.8.2 Environmental Effects

5.8.2.1 Bull Trout

Direct Effects

No direct adverse effects on bull trout are documented or suspected to occur under current Project operations or under the Proposed Action and its measures.

Indirect Effects

Maintaining the stable water level of Coeur d'Alene Lake during the late spring and summer could potentially decrease the velocity of flow in inundated portions of rivers that flow into the lake, including the St. Joe River. Bull trout spawning and rearing habitat is known to occur in the upper St. Joe River Basin, and the affected lower reach of the river is a migratory corridor for both spawning run adults and downstream migrating juveniles.

Upstream migration of adult bull trout from Coeur d'Alene Lake is expected to begin in March and April when water temperature in the lake increases to about 4 to 6°C (39 to 43°F), the suspected trigger for adult migration, and during periods of high inflow to Coeur d'Alene Lake (Elle, 1995; IDFG, 1999). IDFG (1999) reported adult adfluvial bull trout in the St. Joe River above the inundated reach in mid-May. Therefore, upstream adult bull trout migration is expected to occur prior to the time that Avista controls the water levels of Coeur d'Alene Lake.

After spawning, downstream migrating adult adfluvial bull trout are expected to reach the inundated portions of the St. Joe River and Coeur d'Alene Lake in October (IDFG, 1999). Water temperatures in the lower St. Joe River are typically less than 15°C (59°F) by the middle of September under current conditions, and this temperature pattern is expected to continue under the Proposed Action (Golder, 2004j). Consequently, water temperatures in the inundated portion of the St. Joe River would not pose a barrier to post-spawning adults returning to Coeur d'Alene

Lake. Additionally, downstream migrating adult adfluvial bull trout would also encounter water velocity conditions in the inundated portion of the St. Joe River that would be similar under the Proposed Action to those that would be encountered under existing conditions or even the unregulated, historical condition.

It is not known exactly when juvenile adfluvial bull trout outmigrate through the inundated portions of the lower St. Joe River and into Coeur d'Alene Lake. Water temperatures within and above the Project-influenced inundated reach generally exceeded 15°C (59°F) from late June through early September in 2004 (Parametrix, 2005). Therefore, during the summer, juvenile bull trout would be expected to remain in the cooler portions of the upper St. Joe River and headwater tributaries. Studies in the nearby Pend Oreille River Basin showed that most juvenile bull trout migrated from Trestle Creek into Lake Pend Oreille during spring high-flow periods with a second, smaller outmigration spike during the fall (Downs and Jakubowki, 2003; as cited by Parametrix, 2003f). Assuming the same migration pattern in the St. Joe River subbasin, most juvenile adfluvial bull trout would migrate to Coeur d'Alene Lake during periods when Avista either is not regulating lake water levels in the spring or when Avista is allowing the lake level to drop in the fall. During these migration periods, water temperatures are known to be below 15°C (59°F) and are not considered a barrier to bull trout movement. Under the Proposed Action, the water level and temperature regimes are expected to remain similar to current conditions (Golder, 2004j).

Predation on bull trout from non-native species like northern pike and Chinook salmon has not been documented. Weitkamp suggests that the populations of the non-native major predators, northern pike and Chinook salmon, do not appear to be controlled by or substantially influenced by the regulated lake elevation (memorandum from D. Weitkamp, Ph.D. Fisheries Scientist, Parametrix, Kirkland, WA, to Tim Vore, Environmental Specialist, Avista, Spokane, WA, dated June 20 2005). Chinook salmon do not reproduce or rely on rearing within the portion of the lake and tributary habitat influenced by lake elevations between 2,120 feet and 2,128 feet. Northern pike do likely rely on shallow vegetated habitat within this elevation range. However, northern pike most likely spawn in late winter to early spring (late February through March) when lake elevations are high due to runoff and lake elevation control is provided by the natural Spokane River channel characteristics and not Post Falls HED. Northern pike also spawn in vegetated habitats as deep as 20 feet, which includes the shallow-water vegetated habitat below the 2,120-foot lake elevation. It is unlikely the lake level fluctuations in the range of 2,128 feet to 2,120 feet following the spring runoff would provide substantial control of northern pike populations in Coeur d'Alene Lake.

Avista's Proposed Action would include implementation of a Post Falls HED Fish PME Program (see Appendix B for complete text), which would mitigate any adverse Project effects, help protect and enhance the long-term population viability of bull trout, address bull-trout-related ESA and biological opinion requirements that may be included in a new FERC license, and generally assist the IDFG, Coeur d'Alene Tribe, and FWS with achieving their management and recovery goals for native salmonids. The effects of measures implemented under this program would benefit bull trout and westslope cutthroat trout and are discussed in Section 5.6.2.1, *Effects of Project Operations* and Section 5.6.2.7, *Fishery Protection, Mitigation, and Enhancement Programs*. Although implementation of the program is expected to protect and enhance bull trout habitat, it is not possible to quantify the benefits of those actions since the specific actions to be implemented have not yet been defined.

FERC will provide its biological assessment for bull trout to the FWS pursuant to its Section 7 consultation requirements.

5.8.2.2 Water Howellia

Direct and Indirect Effects

Water howellia have not been documented within 3 miles of the Project area, and no direct or indirect effects on the species would be expected to occur under the Proposed Action.

5.8.2.3 Ute Ladies'-tresses

Direct and Indirect Effects

There are no records of Ute ladies'-tresses in the Project area, and no direct or indirect effects on the species would be expected to occur under the Proposed Action.

5.8.2.4 Spalding's Catchfly

Direct and Indirect Effects

Although potential habitat for Spalding's catchfly occurs in the Project vicinity, no direct or indirect effects on the species would be expected to occur under the Proposed Action. This species occurs only in upland areas that would be outside of the zone of Project influence. Implementation of the Proposed Action and its measures would have no effect on Spalding's catchfly individuals or populations or their habitat.

5.8.2.5 Gray Wolf

Direct and Indirect Effects

There are no indications of direct or indirect effects of the Project on gray wolves, and no direct or indirect effects on the species would be expected to occur under the Proposed Action.

5.8.2.6 Bald Eagle

Direct Effects

In May 2004, Avista implemented the company-wide Avian and Raptor Protection Plan to define the methods for effectively reporting bird nesting and fatalities. If problem bald eagle nests (nests that interfere with power production or could be harmed due to electrical fire) are found, FWS would be contacted to approve and supervise any subsequent action. There was a bald eagle electrocution in 2002 on a distribution line near Long Lake HED. To minimize the risk of reoccurrence, Avista implemented a program for minimizing the potential for these adverse interactions. These efforts include identifying bird-nesting activities on transmission poles that pose a potential problem, nest removal where necessary, providing alternative nesting platform structures at problem locations, and reconfiguring existing pole structures that are found to present a significant threat of bird electrocution to increase the spacing between hot wires and neutral wires to meet Avian Power Line Interaction Committee (APLIC) guidelines presented in *Suggested Practice for Raptor Protection on Power Lines: The State of the Art in 1996.* Any new Project transmission lines would also be constructed in accordance with APLIC guidelines.

In conjunction with the company-wide Avian and Raptor Protection Plan, the Spokane River Project Transmission Line Management Program (measure SRP-TR-2) would formalize raptor protection on approximately 1.84 miles of existing Project transmission lines and any new lines that may become part of the Project in the future. Under this measure, the potential for adverse interactions between the bald eagle and transmission lines and poles would be minimized by (1) configuring all new or replacement Project transmission line structures consistent with the current state-of-the-art guidelines at that time; (2) visually inspecting the Project transmission lines during the nest-building period each year, taking appropriate actions in compliance with the Migratory Bird Treaty Act and, where appropriate, providing a nearby nesting platform; and (3) taking remedial actions under the supervision of FWS in the event of a bird injury, mortality, or other indication that a particular pole structure and/or transmission line poses a threat to an avian species.

In response to the 2002 bald eagle mortality referenced above, establishing the Avian and Raptor Protection Plan and reconfiguring the related distribution line to meet state-of-the-art AFLIC standards would minimize the risk of future problems. Proposed Action measure SRP-TR-2 formalizes this commitment to minimizing adverse interactions.

Indirect Effects

The Project currently maintains the Coeur d'Alene Lake summer elevation level at or near full pool (2,128 feet) from as early as practicable until the week after Labor Day when a gradual drawdown, typically 1 to 2 feet per month, begins. The maximum drawdown of Long Lake HED operating reservoir (Lake Spokane) is generally held to 14 feet whenever possible. These conditions have remained relatively unchanged for several decades. As a result, bald eagles in the Project area are acclimated to these conditions.

Under the Proposed Action, the Project would continue to be operated similarly to current Project operations, identifying formalized drawdown times and/or elevations for both Coeur d'Alene Lake and Lake Spokane and increasing the minimum flow from Post Falls HED to 600 cfs, with a trigger to 500 cfs during dryer summers. Under the Proposed Action, Coeur d'Alene Lake would be filled to its full-pool level of 2,128 feet by as early as practicable each summer and maintained near 2,128 feet until September 15. A fall lake drawdown to as low as 2,120.5 feet to provide storage for winter precipitation and spring runoff would begin on September 15. The maximum 14-foot winter drawdown of Lake Spokane would be formalized as part of the new license.

Formalizing a date for the drawdown of Coeur d'Alene Lake in September would not affect bald eagle habitat or its prey base. Formalizing the 14-foot winter drawdown at Lake Spokane would not result in a change from existing operations. As discussed in Section 5.4.2, *Environmental Effects* in *Water Quantity,* changing the minimum flow from 300 to 600 cfs would have minimal effect on the Coeur d'Alene Lake water level or downstream flows. For the most part, this change in minimum flow would result in downstream flows that are within the current natural fluctuations and would not affect bald eagle habitat or the prey base. Under the Proposed Action, the slight changes to Project operations would be unlikely to result in any adverse effects on the bald eagle.

Maintaining Coeur d'Alene Lake's summer level near 2,128 feet, as proposed, may continue to result in erosion-related loss of some wetland and riparian habitat along the shorelines of the lake and affected tributaries. This could result in the loss of some of the large conifers and cottonwoods used by bald eagles; however, numerous alternative perch and roost trees would still remain. Measure PF-TR-1 would provide erosion control and wetland and riparian habitat protection and enhancement, which would reduce the potential for habitat loss.

The Spokane River fish measure (SRP-AR-1) would support fishery enhancement in the Spokane River, Lake Spokane, and other waters near the Project. It would be beneficial to the bald eagle by increasing its prey base.

Under the Proposed Action, the Coeur d'Alene Recreation PME (PF-REC-2), Spokane River Project Recreation PME (SRP-REC-2), Post Falls/Spokane River Recreation PME (PF-REC-3), and Lake Spokane/Nine Mile Reservoir Recreation PME (SRP-REC-4) would provide funding for various recreation improvements and development, including campgrounds, boat ramps, parks, and trail extensions. See Section 5.10.2 for a full description of these activities. Although recreation enhancements would likely result in a slight increase in human activity, the bald eagles that occur in the Project area are already acclimated to the wide range of existing recreational activities. On a Project-wide basis, the additional disturbance resulting from the enhancements would be minimal. As long as the recreation site expansions and developments are outside of the bald eagle nesting, perching, and roosting areas, it is unlikely that the additional human disturbance would adversely affect bald eagles.

These enhancements would, however, require some vegetation clearing, including some tree cutting. Most enhancements would be on developed lands owned by Avista, public agencies, or municipalities. As such, these entities would be responsible for ensuring that no nesting, roosting, or perching trees would be cut as part of the recreation enhancements.

5.8.3 Unavoidable Adverse Effects

The Proposed Action would have no unavoidable adverse effects on threatened or endangered species.

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5.9 Cultural Resources

Cultural resources include the physical remains and places (e.g., sites, structures, or objects) left by people who occupied or visited areas during prehistoric and historic times. The cultural resources of the Spokane River Project area include three types of cultural resources: prehistoric sites relating to American Indian cultural history; historic sites, buildings, and linear resources associated with Euroamerican settlement and development since the mid-nineteenth century; and TCPs of importance to ethnic groups. As part of the relicensing process for the Spokane River Project, Commission staff designated Avista to conduct consultation, under Section 106 of the NHPA, with the SHPOs, Tribal Historic Preservation Offices (THPO) and tribes, and other interested parties.

5.9.1 Affected Environment[36]

Traces and stories providing evidence of American Indian cultures exist all along the Spokane River corridor and throughout the Project area. At the time of European contact, this area formed part of the original homelands of the Spokane and Coeur d'Alene Tribes, both Interior Salish-speaking peoples. Other tribes (for example, the Confederated Tribes of the Colville Reservation) share the resources associated with the Spokane River and Columbia River watersheds (Bruce and Holstine, 1991). The Project area is located in the east-central portion of the Plateau culture area and straddles the boundary between two sub-regions, the Southern Plateau and the Eastern Plateau, as defined in the Plateau volume of the Smithsonian *Handbook of North American Indians* (Walker, 1998). The Project area encompasses overlapping environmental and cultural features of both sub-regions, as reflected in archaeologically defined prehistoric ways of life (Entrix and Western Historical Services, 2004).

The Spokane Tribe of Indians traditionally occupied an area centered on the Spokane River between the Columbia River and the Idaho border. Their traditional use lands extended north into the Okanogan Highlands and the upper stretch of the Colville River. The Spokane Tribe of Indians comprises three bands: the Lower Spokane with the principal settlement near Little Falls, the Middle Spokane, and the Upper Spokane on the Little Spokane River and upstream from the Spokane River's confluence with Hangman Creek. Two possible locations of the principal Middle Spokane village have been identified. It may have been located near the mouth of the Little Spokane River (memorandum from K. Arneson, Anthropologist, Spokane Tribal Cultural Preservation Program, to Tribal Business Council, Spokane Tribe of Indians, Wellpinit, WA, dated May 23, 2005) or it may have been a year-round encampment at the confluence of Hangman Creek and the Spokane River (Ross, 1998). The Coeur d'Alene Tribe traditionally occupied more than 4 million acres of camas-prairie, mountain, lake, and riverine habitat around Coeur d'Alene Lake and the drainages of the Coeur d'Alene, St. Joe, and St. Maries rivers in what is now the northern panhandle of Idaho, and the upper Spokane River in eastern Washington. Coeur d'Alene villages were grouped into three bands: one on the Spokane River, a second on the Coeur d'Alene River, and a third on the St. Joe River.

The Spokane country was abundant with roots, berries, medicinal plants, fish, and game animals, with berry picking and hunting focused on Mount Spokane, roots and camas available

[36] Except as noted, this description is taken from *Cultural Resources Overview for the Spokane River Hydroelectric Project Report* (Entrix and Western Historical Services, 2004).

in the prairie country south of the Spokane River, and salmon in the Spokane River. Ways of life involved seasonal cycles of gathering, fishing, and hunting in the spring; fishing, root digging, and berry picking in the summer; and regrouping into winter camps in the fall after the killing frost. Salish tribes joined together during the summers to socialize and gather food and to hunt buffalo east of the Rockies.

Fur traders and trappers were the first Caucasians to reach the current-day Spokane area. In 1810, Jacques (Jaco) Findlay, under the supervision of David Thompson of the North West Company, established the Spokan House, a fur trapping and trading depot, at the confluence of the Spokane and Little Spokane rivers. Large gatherings of Spokane Indians and other Native groups had long used this location as a place to catch and dry salmon and trout and to socialize and gamble (Bruce and Holstine, 1991). In 1812, 2 years after construction of Spokan House, the rival American-owned Pacific Fur Company built Fort Spokane within sight of the Spokan House. Because of the outbreak of the War of 1812, the Pacific Fur Company sold Fort Spokane to the North West Company in 1814. The North West Company abandoned the Spokan House to occupy the much more substantial Fort Spokane and eventually merged with the London-based Hudson's Bay Company in 1821 (Entrix and Western Historical Services, 2004). The fur trade had declined by the 1840s due to over-trapping and changes in fashion. During the great westward migration of the 1840s, settlers traveled on the roads established years earlier by fur trappers and traders (Entrix and Western Historical Services, 2004).

Effects of the fur trade on Native peoples occurred before actual contact with Euroamericans through the introduction of European, British, and American trade goods that were passed from tribe to tribe. A second and more devastating effect was the introduction of diseases. Many of these diseases—including smallpox, malaria, and measles—were not formerly experienced by Native peoples, who had very little resistance to them. Successive outbreaks of smallpox decimated populations of both the Spokane and Coeur d'Alene Tribes.

The period of western migration coincided with a great spirit of religious revivalism. Fur traders and trappers introduced Christianity to Native Americans in the Northwest beginning in the late eighteenth century. Through their contact with the French Canadian Catholic trappers, many tribes of the Northwest learned of the Black Robes (Catholic missionaries) and waited for them to enter their territories to teach their religious beliefs. In 1842, Jesuit missionaries established the first Jesuit mission among the Coeur d'Alene Tribe on land at the confluence of the St. Joe River and Coeur d'Alene Lake (Entrix and Western Historical Services, 2004). The mission proved to be of religious, strategic, and economic importance to the Coeur d'Alene. The Indian Treaty of 1873 excluded the Coeur d'Alene from the mission, and a new mission was established in DeSmet, Idaho, in 1877. Protestant missionaries also traveled west to expose Native Americans to non-Catholic Christian doctrine.

The first Colville Reservation was established by Executive Order on April 9, 1872, to accommodate about 4,200 Native Americans including the Methow (316), Okanogan (340), Sanpoil (538), Lake (230), Colville (631), Kalispel (420), Coeur d'Alene (700), and other Native Americans. It was a large reservation bounded by the Spokane River to the south, Columbia River to the west, Pend Oreille River and Idaho state border to the east, and the Canadian border to the north. Within 3 months, a second Executive Order revised the boundary of the reservation, removing the rich bottomlands east of the Columbia River as well as excluding several of the tribes placed on the original reservation, including the Spokane, Coeur d'Alene, and Pend Oreille.

The federal government established the Coeur d'Alene Indian Reservation upstream of the current Post Falls HED location on November 8, 1873, and established the Spokane Indian Reservation downstream of the current Long Lake HED location on August 16, 1877. Intense Euroamerican settlement in eastern Washington and northern Idaho marked the decades following the 1880s. The Euroamerican settlement period brought about drastic change in the area.

Graziers (farmers) and homesteaders were the first group of Euroamericans to settle in large numbers in Spokane country. By 1910, little more than 40 years after the first concerted agricultural immigration into the farming country of the region, almost no land was left unclaimed, including the most marginal lands. Early graziers had been pushed out of the area by bad weather and the increasing number of homesteaders. The city of Spokane had become the major urban center for the region, with the agricultural industry leading as the major supplier of resources.

Mining was a second major impetus to the development of towns, power generation, and transportation systems. Mineral extraction from the Coeur d'Alene Mining District began in 1882 when Andrew J. Prichard established the first silver lode location upstream of Coeur d'Alene Lake, and miners rushed to the area. The Coeur d'Alene Mining District eventually became the world's largest silver-producing mining district.

With access to the region by rail and then automobile, tourism reached the region by the early twentieth century. Travelers were drawn to places that featured spas and hot springs, including Medicine Lake. Autocamps and campgrounds sprang up in towns and cities and along major highways. In the 1930s, the Civilian Conservation Corps constructed numerous public campgrounds, including several along the shoreline of Coeur d'Alene Lake.

In the community of Post Falls, population growth associated with mining spurred the development of hydroelectric power. In the late 1800s, Frederick Post, for whom the community was named, dammed the Spokane River at the location of a waterfall to provide power for his sawmill and gristmill. By 1900, Post sold his land to R.K. Neill, who in turn sold his interest to the Washington Water Power Company.

Washington Water Power used the natural deep rock gorges in the Spokane River to develop hydropower plants, beginning with Monroe Street HED in 1889. During a period of 35 years, the company completed or acquired five more plants including Post Falls HED (constructed 1904–1906); Nine Mile HED (constructed 1906–1910 by the Spokane and Inland Empire Railway Company and purchased by Washington Water Power in 1925); Little Falls HED (constructed 1908–1910); Long Lake HED (constructed 1911–1915); and Upper Falls HED (constructed 1921–1922). The City of Spokane owns and operates Upriver Dam (constructed in 1936), located upstream of Upper Falls and Monroe Street HEDs.

5.9.1.1 Area of Potential Effects

An area of potential effect (APE), as defined in the implementing regulations for the NHPA, means the geographic area within which an undertaking may cause changes in the character of or use of historic properties. The Cultural Resources Work Group (CRWG) defined the APE for the Spokane River Project as follows:

The APE includes, at a minimum, the lands within the Spokane River Project FERC boundary. Also included in the APE are the penstocks, powerhouses, dams, recreational sites, a limited number of power transmission lines, access roads, and other ancillary facilities as described in the FERC license. The APE also includes lands outside the Project boundary where Project operations may affect the character or use of historic properties or TCPs. The APE is a flexible boundary that may be adjusted as conditions change or additional effects are identified.

This large APE study area, encompassing several vegetation zones, portions of both the City of Spokane and rural areas, reservoirs and Coeur d'Alene Lake, reflects a complex history of cultural use.

5.9.1.2 Archaeological Resources

A total of 117 previously recorded archaeological sites are reported within 1 mile of the Project boundary. A total of 72 of these previously recorded sites may extend into the Project's APE. Fifty-nine sites are within the APE at Post Falls HED, four are within the APE at Nine Mile HED, and nine are within the APE at Long Lake HED. Two of these previously recorded sites have been found eligible for inclusion in the NRHP.

Avista and the consultants selected by the CRWG conducted a survey of the Project APE addressing both archaeological and above-ground historic resources. Archaeological sites are defined as any feature or structure older than 50 years of age, and/or any scatter of 10 or more artifacts older than 50 years of age found within a 20 by 20 meter area.

The survey has identified 247 archaeological sites and 119 isolated finds, as reported by Entrix and Western Historical Services (2004). Ninety-three percent of the archaeological sites (231) and 97 percent of the isolated finds occur within the APE at Post Falls HED. Thirteen archaeological sites and three isolated finds occur within the APE at Long Lake HED. Three archaeological sites occur within the APE at Upper Falls HED. There are no recorded archaeological sites within the APEs of the Monroe and Nine-Mile HED Project areas. Fifty-eight percent of the archaeological sites are located on river shorelines, 36 percent of the archaeological sites are located on lake shorelines and 6 percent of the archaeological sites are located on interlake zones between lake and river shorelines, most in the low-lying areas between the chain lakes.

Based on field observations, two archaeological sites that contain petroglyphs and 58 other archaeological sites are considered potentially eligible for listing in the NRHP.[37] Table 5-42 provides information on the archaeological sites considered potentially eligible for listing in the NRHP located within the APE in Idaho and Washington. Twenty-five of the

[37] Determinations of eligibility are made by the SHPOs/THPOs in consultation with FERC.

247 archaeological sites are likely not eligible for listing. NRHP eligibility for the remaining 162 sites is unknown because the visible contents at these sites were not of sufficient density or richness, or of apparent integrity, for the surveyors to confidently judge them as either retaining or not retaining important information. Of the162 sites for which eligibility is currently unknown, the 8 historic period sites offered little information that could be collected through testing and were evaluated using methods for above-ground resources. The sites with unknown eligibility were classified within 27 different site designations and a sample of site classes was selected for further investigation through test excavations. Archaeologists conducted subsurface investigations on 30 archaeological sites for which eligibility was undetermined to evaluate their potential NRHP eligibility.

Table 5-42. NHRP-eligible archaeological sites located within the Spokane River Project APE in Idaho and Washington. (Source: Entrix, 2005, as modified by Avista staff)

Site No.	Site Class	Degree of Impacts	Potential Effects
ENT-124	PS	M	Recreation, Vandalism, Erosion
10BW28	PS	M	Recreation, Vandalism, Erosion
10BW23	PS	M	Recreation, Vandalism, Erosion
ENT-225	PS	M	Erosion(F), Erosion
ENT-226	PF	M	Erosion(F), Erosion
ENT-224	PF	M	Erosion(F), Erosion
10BW33	PF	M	Erosion(F), Erosion
10BW22	HF, PS	M	Recreation, Vandalism, Erosion
ENT-122	PS, PF	M	Recreation, Development, Erosion(F), Erosion
ENT-155	PS, PF	M	Erosion
ENT-159	PS	M	Development, Erosion
10KA47	PS	M	Recreation, Erosion
ENT EG-02	PS	M	Erosion(F), Erosion
ENT-009	PF	H	Recreation, Erosion
ENT-008	PF	H	Recreation, Erosion
ENT-006	PF	H	Recreation, Erosion
ENT-005	PF	H	Recreation, Erosion
ENT-011	PF	H	Recreation, Erosion
ENT-010	PF	H	Recreation, Erosion
ENT-004	PF	H	Recreation, Erosion(F), Erosion
10BW120	PS	H	Recreation, Vandalism, Erosion
ENT-103	PS	H	Recreation, Vandalism, Erosion
ENT-210	PS	H	Erosion
ENT-236	PF, PS, HS	H	Erosion(F)
ENT-221	PF, HF	H	Erosion(F), Vandalism, Erosion

Site No.	Site Class	Degree of Impacts	Potential Effects
ENT-235	PF	H	Erosion
ENT-222	PF	H	Erosion(F), Vandalism, Erosion
ENT-213	PF	H	Erosion(F), Erosion
10BW32/31	PF	H	Development, Erosion(F), Erosion
ENT-214	PF	H	Erosion
10KA334	PS	H	Vandalism, Erosion
ENT-187	PS, PF	H	Erosion
ENT-152	PS, HS	H	Development, Erosion
ENT-Black 1	PS	H	Development, Erosion(F), Vandalism, Erosion
ENT-BL2	PS	H	Recreation, Erosion(F), Erosion
ENT-184	PS	H	Erosion
ENT-126	PS	H	Recreation, Erosion
ENT-118	PS	H	Recreation, Development, Erosion
ENT-157	PF, HS	H	Development, Erosion
ENT-191	PF	H	Erosion
ENT-175	PF	H	Recreation, Development, Erosion
ENT-141	PF	H	Recreation, Erosion
ENT-121	PF	H	Recreation, Erosion(F), Vandalism, Erosion
ENT-116	PF	H	Recreation, Vandalism, Erosion
ENT-115	PF	H	Recreation, Vandalism, Erosion
ENT-113	PF	H	Recreation, Erosion
ENT-112	PF	H	Recreation, Erosion
ENT-110	PF	H	Recreation, Erosion
ENT-162	HF, HS, PS	H	Erosion, Development, Vandalism
10KA35	PS	H	Recreation, Development, Vandalism, Erosion
ENT-EA 006	PF	H	Recreation, Development, Erosion(F), Erosion
ENT-217	PF	H	Erosion
ENT-144	Pet	H	Erosion
ENT-130	PS	H	Recreation, Development, Vandalism, Erosion
10KA5	PF	H	Development, Erosion(F), Vandalism, Erosion
ENT-131	PF	H	Recreation, Development, Erosion(F), Vandalism, Erosion
10KA48	HF, PS	H	Development, Recreation, Vandalism, Erosion
45SP14	PS	H	Development, Vandalism, Erosion(F), Erosion
ENT LL-04	PF, PS, HS	H	Development, Erosion(F), Erosion
ENT-136 WA	PF	H	Recreation, Erosion(F), Erosion

Site No.	Site Class	Degree of Impacts	Potential Effects
Notes: Erosion – shoreline erosion Erosion(F) – deflation (movement) of sediments HF – historic feature HS – historic scatter HSt – historic structure Pet – petroglyph PF – prehistoric feature PQ – prehistoric quarry PS – prehistoric scatter			

Avista will provide the results of the Cultural Resource Evaluation Report to the CRWG and will incorporate the findings of that report into the proposed HPMP following CRWG review.

5.9.1.3 Historic Buildings and Structures

Forty-four historic buildings and structures have been identified within the APE or within 100 feet of the APE that may be eligible for listing in the NRHP. Four of the five Project developments are either eligible for listing or listed in the NRHP. Post Falls HED was determined eligible in July 1981 (Bruce, 1997). Upper Falls HED was determined eligible in 1988 (Bruce, 1998). Nine Mile HED was listed in the NRHP in 1990 as part of the Nine Mile Power Plant Historic District. The historic district includes the dam, powerhouse, generating equipment, and the village complex. Constructed in 1906–1910 by the Spokane and Inland Empire Railway Company, Nine Mile HED was acquired by Washington Water Power in 1925. The village complex consists of 8 (of an original 10) brick cottages in the craftsman or English cottage style built between 1928 and 1930 to house company employees. Seven of the cottages are now leased by the Washington State Parks and Recreation Commission (WSPRC). Long Lake HED was listed in the NRHP in 1988.

Turbine generator units 4 and 5 of Monroe Street HED were determined eligible for listing in the NRHP in 1983. Following demolition of the Monroe Street plant in 1992, unit 5 was donated to the Henry Ford Museum in Dearborn, Michigan, as part of a permanent interpretative display that illustrates early twentieth century hydroelectric development in the western United States.

Of the 44 buildings and structures located within the APE or within 100 feet of the APE, 39 are listed or considered potentially eligible for listing in the NRHP. Twenty of these properties are located in the state of Idaho and 19 are located in the state of Washington. Table 5-43 provides the NRHP status, criteria for listing, and historic theme for each of the 39 listed or eligible buildings and structures.

Table 5-43. NRHP evaluation of historic buildings and structures located within the APE or within 100 feet of the APE in Idaho and Washington. (Source: Entrix, 2005, as modified by Avista staff).

Historic Resource No.	Resource Name/Location	Date Built	National Register Status/Relevant Criteria	Theme
Idaho Historic Resources				
HR-45	St. Maries River Railroad Bridge Milwaukee St. Paul Railroad and St. Maries Creek, St. Maries	1909	Eligible for NRHP (2005) Criteria A and C	Transportation
HR-44	Omega Gospel Hall St. Maries	1909	Eligible for NRHP (2005) Criteria A and C	Town Building
HR-43	Benewah Lake Bridge West of St. Maries		Recommended Eligible for NRHP (1982) Criterion C	Transportation
HR-42	Hunting Cabin West of Mission point on St. Joe Levee	c. 1940	Not eligible for NRHP (2005)	Recreation
HR-41	Rocky Point CCC Properties Heyburn State Park	1936	Listed in NRHP (1994) Criteria A and C	Recreation
HR-40	Chatcolet CCC Picnic & Camping Area Heyburn State Park	1936	Listed in NRHP (1994) Criteria A and C	Recreation
HR-39	Plummer Point CCC Picnic & Hiking Area Heyburn State Park	1936	Listed in NRHP (1994) Criteria A and C	Recreation
HR-38	Rose Lake Grocery Rose Lake	1910	Eligible for NRHP (2005) Criterion A	Town Building
HR-37	Moe/Klein Farm Medicine Lake	1894	Eligible for NRHP (2005) Criteria A and C	Agriculture
HR-36	Medimont Grocery Medimont	1910	Not eligible for NRHP (2005)	Town Building

Historic Resource No.	Resource Name/Location	Date Built	National Register Status/Relevant Criteria	Theme
HR-35	Union Pacific Railroad, Wallace Branch Linear Resource beginning in Plummer, ID extending east along edge of Coeur d'Alene Lake		Eligible for NRHP Criteria A and C (confirming with SHPO)	Transportation
HR-34	Coeur d'Alene River Bridge Harrison	1930	Not Eligible for NRHP (2000)	Transportation
HR-33	Harrison Historic District Harrison	Post 1917	Listed in NRHP (1996) Criteria A and C	Town Building
HR-32	Mullan Road St. Maries	1853-1916	Listed in NRHP (1990) Criterion A	Transportation
HR-31	Beauty Creek Bridge Coeur d'Alene	1939	Recommended Eligible for NRHP (1999) Criteria A and C	Transportation
HR-30	Camp Easton Cabin Coeur d'Alene Lake waterfront, North of Gotham Bay	1929	Eligible for NRHP (2005) Criteria A and C	Recreation
HR-29	Log House Turner Bay	1925	Eligible for NRHP (2005) Criterion C	Town Building
HR-28	Residence 5702 Mica Shore Road, Coeur d'Alene	1949	Eligible for NRHP (2005) Criterion C	Town Building
HR-26	Coeur d'Alene City Park Coeur d'Alene waterfront	1904	Eligible for NRHP (2005) Criterion A	Recreation
HR-25	Washington Water Power Concrete Arch Bridge .5 mile west of intersection of Spokane and 4th Street, Post Falls	1929	Listed in NRHP (1996) Criterion A	Transportation
HR-24	Spokane Valley Land and Water Company Canal Diverts in Falls Park, 4th Street, Post Falls	1907	Listed in NRHP (2003) Criterion A	Town Building

Historic Resource No.	Resource Name/Location	Date Built	National Register Status/Relevant Criteria	Theme
Washington Historic Resources				
HR-23	Ross Park Steam Plant 1605 E. Upriver Drive, Spokane	1907	Eligible for NRHP (2005) Criteria A and C	Hydroelectric Power
HR-22	Residence 1002 N. South Riverton Avenue, Spokane	1906	Eligible for NRHP (2005) Criterion C	Town Building
HR-21	Residence 1008 N. South Riverton Avenue, Spokane	1907	Eligible for NRHP (2005) Criterion C	Town Building
HR-20	Residence 920 N. Perry Street, Spokane	1908	Not eligible for NRHP (2005)	Town Building
HR-19	Residence 924 N. Perry Street, Spokane	1906	Eligible for NRHP (2005) Criterion C	Town Building
HR-18	Residence 928 N. Perry Street, Spokane	1909	Not eligible for NRHP (2005)	Town Building
HR-17	Spokane River Railroad Bridge Union Pacific Railroad and Spokane River, vicinity of Spokane	1902	Eligible for NRHP (2005) Criterion C	Transportation
HR-16	Spokane Toilet Supply/Sunrise Wood Products Lumber Company 629 N. Erie Street, Spokane	1913	Eligible for NRHP (2005) Criteria A and C	Town Building
HR-15	Cascade Laundry/ Northern Lights Brewery Building 1003 E. Trent Avenue, Spokane	1915	Eligible for NRHP (2005) Criterion C	Town Building
HR-14	Spokane & Inland Empire RR Co. Car Barns and Repair Shops/ Taylor Edwards Warehouse 800 E. Front Avenue, Spokane	1895	Determined Eligible for NRHP (1979) Criterion A	Town Building
HR-13	Upper Falls Power Plant 600 N. Wall, Spokane	1922	Listed in NRHP (1998) Criterion A	Hydroelectric Power
HR-12	Great Northern Railway Passenger Depot Tower West 400 Block S. Bank of Havermale Island, Spokane	1902	Listed in NRHP (1972): WA Register of Historic Places	Transportation

Historic Resource No.	Resource Name/Location	Date Built	National Register Status/Relevant Criteria	Theme
HR-11	Natatorium Carousel Spokane Falls Boulevard Opposite Howard, Spokane	1909	Listed in NRHP (1976) No Criteria identified	Recreation
HR-10	Spokane Flour Mill West 621 Mallon Avenue	1895	Listed in NRHP (1977)	Town Building
HR-9	Lincoln Street Bridge Intersection BNSF mainline and Lincoln St., Spokane	c. 1915	Listed in NRHP (Awaiting OAHP concurrence)	Transportation
HR-8	West Downtown Historic Transportation Corridor Spokane	1900s	Listed in NRHP (1999) Criteria A and C	Transportation
HR-7	Montgomery Ward West 808 Spokane Falls Boulevard	1929	Eligible for NRHP (1980) Criteria A and C Washington Heritage Register (1980)	Town Building
HR-6	Washington Water Power Post Street Substation 333 N. Post Street	1909	Eligible for NRHP (1979) Criteria A and C	Hydroelectric Power
HR-5	Post Street Bridge Post Street and Spokane River, Spokane	1917	Determined Not Eligible for NRHP (1979)	Transportation
HR-4	Monroe Street Bridge Monroe Street Between Ide Avenue and Riverfalls Boulevard, Spokane	1911	Listed in NRHP (1976) No Criteria identified	Transportation
HR-3	Nine-Mile Hydroelectric Power Plant Historic District Charles Road near River Mile 58 on Spokane River, Nine Mile Falls	1906–1908	Listed in NRHP (1990) Criterion A	Hydroelectric Power
HR-2	Long Lake Hydroelectric Power Plant Facility, Spokane River .5 mile east of intersection with SR 231, Long Lake	1915	Listed in NRHP (1988) Criteria A and C	Hydroelectric Power
HR-1	Spokane River Bridge at Long Lake Dam SR 231/101 and Spokane River, Long Lake	1949	Listed in NRHP (1995) Criterion C	Transportation

On June 9, 2005, Avista submitted documentation for buildings and structures considered potentially eligible for listing in the NRHP to the Idaho and Washington SHPOs and requested concurrence with the evaluation study finding.

5.9.1.4 Traditional Cultural Properties and Sacred Sites

TCPs may include, but are not limited to, religious and sacred areas; burial locations and cemeteries; resource gathering areas, including plant, animal, fish, and mineral resources; locations associated with legends and traditional stories; archaeological and ethnographic sites, including habitation sites, campsites, rock art locations, special-use sites, and trails; and places with traditional Indian names (Entrix and Western Historical Services, 2004).

TCP studies are being conducted through the combined efforts of Avista, the Coeur d'Alene Tribe, the Confederated Tribes of the Colville Reservation, and the Spokane Tribe of Indians. These studies are not completed. The results of the TCP studies will be reviewed by the CRWG and incorporated into the proposed HPMP for the Project as appropriate.

5.9.2 Environmental Effects

5.9.2.1 Effects of Project Operations

Lake Level Management

The Project area includes Coeur d'Alene Lake, a natural lake that attracted Native American use and settlement activities that left rich deposits of cultural materials along the shoreline of the lake and its tributaries. The Coeur d'Alene Indian Reservation occupies approximately the southern one-third of Coeur d'Alene Lake. Operation of the Project has reduced the seasonal fluctuation range of the lake by maintaining the lake level of Coeur d'Alene Lake near 2,128 feet during the summer recreation season from late June until after Labor Day in September. Under existing conditions, shoreline erosion has had detrimental effects on areas that exhibit high concentrations of material artifacts associated with early use and settlement. The Proposed Action would formalize the summer lake elevation of 2,128 feet, with a drawdown beginning September 15, which would be generally consistent with current practice.

Effects Analysis

The potential for erosion along the shoreline under the Proposed Action is analyzed in Section 5.3.2. This analysis concludes that the change in reservoir operations under the Proposed Action would result in some continued erosion along the shoreline and along the Coeur d'Alene, St. Joe, and St. Maries rivers that would be similar to existing conditions. Some of this erosion would occur with or without Project operations. The beneficial effect of proposed erosion control measures (measure PF-TR-1) with respect to cultural resources is discussed below in Section 5.9.2.3. In addition, the HPMP will include management recommendations for archaeological sites considered potentially eligible for listing in the NRHP and will address ongoing cultural resources protection and management under the Proposed Action.

Project Releases

The Proposed Action would increase the minimum flow at Post Falls HED from 300 to 600 cfs with a trigger to reduce minimum flows to 500 cfs under certain conditions. This measure could slightly increase the average daily releases at Post Falls HED from June through November.

Effects Analysis

Avista would not expect this slight increase in the average daily releases at Post Falls HED to affect the downstream shorelines or any archaeological sites that may be located along downstream shorelines beyond existing conditions. Provision of a 600-cfs minimum flow would slightly reduce Coeur d'Alene Lake levels in August and September in some years. We would not expect a minor change in elevation to affect the Coeur d'Alene shoreline or any archaeological sites located along the shoreline beyond existing conditions. The proposed 600 cfs minimum flow with a trigger to change the flow to 500 cfs when low-flow conditions occur, would result in essentially the same effects on cultural resources around Coeur d'Alene Lake and downstream of Post Falls Dam as the effects associated with the provision of a 300-cfs minimum flow. Minimum flow releases would not effect any historic building or structure listed or considered potentially eligible for listing in the NRHP as none are located along the immediate shoreline.

5.9.2.2 Ongoing Cultural Resource Needs

Avista currently maintains character-defining features of the four NRHP-eligible HEDs. Current plans exist for managing the Nine Mile cottages and some specific additional properties; however, there is no overall formal plan for the management of historic properties within the Project. During the pre-license application collaborative process, the CRWG identified the need for an HPMP. The Proposed Action includes measures PF-CR-1 and SRP-CR-1, which address the ongoing identification, evaluation, and protection of historic properties during the term of any license through implementation of an HPMP. These efforts would be coordinated with stakeholders concerned about the management of historic properties affected by the Project. Execution of a PA that stipulates the implementation of the HPMP would satisfy Avista's responsibilities to take into account effects on historic properties, as required under Section 106 of the NHPA.

The HPMP is currently being developed in consultation with the CRWG and will be consistent with the *Guidelines for the Development of Historic Properties Management Plans* issued by the Commission and the Advisory Council (May 2002). The HPMP will describe the regulatory context and applicable laws including the NHPA, the Native American Graves Protection Act, the Archaeological Resources Protection Act, and the American Indian Religious Freedom Act, provide background information on the prehistory and history of the region and Project area, describe the results of previous cultural resource surveys, and explain the method employed by the Cultural Resource Work Group's consultants for completing Project-specific cultural resources surveys and site-specific evaluations. The HPMP will set forth management principles, goals, and standards for the treatment of historic properties, and will identify decision-making responsibilities for determining and addressing Project-related effects, both current and future, on historic properties. The HPMP will also include procedures for consultation, unanticipated discoveries, annual reporting, periodic updates of the HPMP, coordination with other resource plans involving ground-disturbing activities, and interpretation and educational opportunities. Avista and the CRWG are currently developing one HPMP that would encompass all the current developments. However, Avista may develop two separate HPMPs—one for Post Falls and one for the remaining four developments on the Spokane River, depending on the outcome of the relicensing proceeding. Either way, the scope and content would be the same. Coordination with Section 106 compliance activities conducted under the auspices of EPA's Recod of Decision, including the lower Coeur d'Alene River Basin, would also occur.

Effects Analysis

The HPMP will contain all of the essential components of a plan designed to manage the effects of Project operations and environmental measures on historic properties in the Project area. The HPMP would implement a process for ongoing review of Project operations and potential future actions that would include analysis of potential effects to eligible sites and other properties to which the tribes may attach religious or cultural significance.

5.9.2.3 Secondary Effects of Proposed Measures

Erosion Control Program

The Proposed Action includes an erosion control program (PF-TR-1) designed to protect high-value habitats and culturally sensitive sites currently affected by shoreline erosion. Particular areas of concern are the south end of Coeur d'Alene Lake and along the lower reaches of the Coeur d'Alene, St. Joe, and St. Maries rivers. Cultural resource surveys found considerable disturbance of archaeological sites, especially along the St. Joe levee system. While portions of some sites have eroded away, the erosion control program would benefit cultural resources by reducing the rate of erosion of shorelines containing remaining eligible archaeological sites. The erosion control program would have no effect on historic buildings and structures listed or considered eligible for listing in the NRHP because none are located along the immediate shoreline. The HPMP will provide for coordination with relevant cooperating parties in establishing priority locations for the implementation of shoreline erosion control measures. [p1]This coordination would ensure that culturally sensitive areas are afforded protection under the erosion control program.

Terrestrial Measures

Wetlands and Riparian Habitat Protection—The Proposed Action includes measures designed to protect and enhance wetlands and riparian habitat along the shoreline of Coeur d'Alene Lake (PF-TR-1) and terrestrial, wetlands, and riparian habitat along the shoreline of Lake Spokane (SRP-TR-1). These measures would provide long-term protection of specific wetland and riparian habitat areas and would identify, evaluate, and acquire parcels for additional wetlands restoration and enhancement opportunities. Ground disturbance associated with wetlands and riparian habitat restoration could affect eligible archaeological sites along the shorelines of both lakes. The HPMP will include procedures for managing future Project-related effects resulting from implementation of protection and enhancement measures. Implementation of the procedures in the HPMP would ensure that potential effects from the Proposed Action to eligible archaeological sites and other properties to which the tribes may attach religious or cultural significance would be considered. Restoration of wetland and riparian areas around Coeur d'Alene Lake would benefit cultural resources by increasing woody stem and emergent-wetland vegetation necessary to support plant species of culturally significant resources that represent tribal trust resources, including cottonwood, willow, water potato, tule, and camas (see discussion in Section 5.7.2).

Noxious Aquatic Weed Control—The Proposed Action includes programs for the management of aquatic weeds at Coeur d'Alene Lake (measure PF-AR-2) and Lake Spokane (measure SRP-AR-2). Specific control methods, such as mechanical removal, have the potential to disturb partially submerged NRHP-eligible archaeological sites. The HPMP would provide a process for reviewing future actions to ensure that potential effects of the weed control measures on eligible sites and other properties to which the tribes may attach religious or cultural significance would be considered. To the degree noxious weed management promotes the establishment of native species, the Proposed Action could enhance cultural resources.

Migratory Bird Protection—The Proposed Action includes continued protection for migratory birds, including relocating nests and providing alternative nesting platforms (measure SPR-TR-2). Ground disturbance associated with the installation of alternative nesting platforms has the potential to affect NRHP-eligible archaeological sites and other properties to which the tribes may attach religious or cultural significance. The HPMP would provide a process for reviewing future actions, such as locations for new nesting platforms, to ensure that potential effects on eligible sites would be considered. Migratory bird protection also affords protection for culturally significant species.

Recreational Facility Improvements

The Proposed Action would provide planning assistance and funding to land managers for new or upgraded facilities located adjacent to Coeur d'Alene Lake (PF-REC-2), the Spokane River (SRP-REC-2), Lake Spokane, and Nine Mile Reservoir (SRP-REC-4). New or expanded facilities would include an additional trail segment to connect Mill River Park to the Centennial Trail and to extend the Centennial Trail from Sontag Park to the Nine Mile Resort, the extension of 6 boat ramps at various locations to accommodate "off-season" recreation use on Coeur d'Alene Lake, three barrier-free trail spurs and associated interpretive and picnic facilities located along the Trail of the Coeur d'Alenes, an access site at Water Avenue, a floater take-out site immediately upstream of Nine Mile HED with parking and signage, a campground on state park property immediately south of Avista's Nine Mile Resort, additional camping opportunities at Lake Spokane campground, 10 boat-in-only campsites on Lake Spokane, and a carry-in-only boat launch with parking and picnic facilities downstream of Long Lake Dam picnic area. Ground disturbance associated with the construction of these new or expanded facilities could affect eligible archaeological sites. The HPMP would provide a process for reviewing future activities, including the location of new recreational facility development, to ensure that potential effects on eligible sites and other properties to which the tribes may attach religious or cultural significance would be considered.

5.9.3 Cumulative Effects

The Spokane River Project is one of several hydroelectric projects in eastern Washington and western Idaho that affect prehistoric and historic archaeological resources located along the shorelines and in the drawdown zones of reservoirs. Within the Spokane River, Columbia River, Snake River, and Pend Oreille watersheds, the ongoing operation of the respective projects and the continued erosion of shorelines associated with them contribute to the cumulative negative effect on cultural resources by reducing the number of potential sites that can yield information about the traditional lifeways of the Native American tribal groups associated with the watersheds. Because excavation is an inherently destructive process, any evaluative testing or other archaeological excavations recommended in the HPMP would have some negative effect on the excavated site. The net effect would likely be positive, however, because data recovery measures would retain information that might otherwise be lost (e.g., to erosion), even in the absence of hydroelectric projects, and over time the accumulated knowledge of site contents and patterning, and landform and sediment types, should lead to more proactive site protection methods reducing the instances requiring excavation.

Within the eastern Washington and western Idaho watersheds, the cultural resources surveys conducted as part of the relicensing process have identified hundreds of prehistoric and historic archaeological resources. Other surveys conducted by federal and state land-managing agencies (BOR, the Corps, BLM, FS, Washington Department of Parks and Recreation, etc.) and utilities (Idaho Power and Pend Oreille Public Utility District No. 1) have added to the number of known sites within these watersheds. However, archaeological information from the Spokane River Project area is generally lacking to address most of the research themes and questions pursued by Plateau researchers during the past two decades (Entrix and Western Historical Services, 2004). These themes include cultural chronology, effects of climate and environmental change on adaptation, site functions within settlement and subsistence models, and trade. Given the relative lack of previous cultural resources research, much of the information generated through the surveys and evaluative testing for this relicensing process applies to the identified data gaps and major research themes in the region, and contributes to a cumulative benefit that will continue with implementation of the HPMP. This information should also support similar work under the NHPA that may be required as EPA implements its Record of Decision for the Coeur d'Alene Basin clean up.

5.9.4 Unavoidable Adverse Effects

Implementation of the Proposed Action would have no unavoidable adverse effects on cultural resources.

5.10 Recreation Resources

5.10.1 Affected Environment

The Project is located in Benewah and Kootenai counties in Idaho, and Spokane, Stevens, and Lincoln counties in Washington (see Figure 1-1). Recreational lands within a 100-mile radius of the Project are extensive and include diverse rural and urban landscapes that support a wide range of recreational opportunities (Louis Berger, 2004b).

The 100-mile radius includes six FS-managed national forests (Colville, Okanogan, Clearwater, Idaho Panhandle, Nez Perce, and Kootenai forests) in Washington, Idaho, and Montana and five wilderness areas. These forests provide a broad range of primitive, semi-primitive, and developed recreational opportunities, including camping, boating, swimming, hiking, fishing, hunting, picnicking, environmental education, sightseeing, off-road vehicle use, and other activities. Other federal land management agencies that provide public recreational opportunities in the region and adjacent to the Project include the BLM and the Corps.

Numerous state parks are located within 100 miles of the Project, including 20 Washington state parks, 11 Idaho state parks, and 2 Montana state parks. Recreational opportunities and resources at these parks include camping, lodging, picnicking, interpretive programs, swimming, fishing, boating, hiking, horseback riding, rock climbing, playgrounds, golf, tennis, nature trails, natural and historic attractions, and community buildings. County and city parks also provide extensive public recreational opportunities within the region.

The 100-mile radius also includes more than 500 river miles designated as Wild and Scenic, as well as numerous non-designated rivers, lakes, and reservoirs, such as Lake Pend Oreille in Idaho and Franklin D. Roosevelt Lake in Washington. These water resources provide extensive whitewater boating, motor boating, and angling opportunities.

5.10.1.1 Recreational Resources

The Project includes five distinct hydroelectric developments located along the Spokane River in northern Idaho and eastern Washington. The most upstream of the five hydroelectric developments is Post Falls (river mile 102), which is located in Idaho and controls the top 7.5 feet of Coeur d'Alene Lake during the summer season. The remaining four hydroelectric developments, from upstream to downstream, include Upper Falls (river mile 74.2), Monroe Street (river mile 74), Nine Mile (river mile 58), and Long Lake (river mile 34), all located in Washington. A total of 90 public recreational sites that are within or adjacent to the Project boundary provide public access to Project lands and waters, many of which are owned and managed by federal agencies, including the BLM and FS. These sites are listed and described in detail in Louis Berger (2004b). Avista owns eight recreational sites (seven public sites and one commercial site) within or adjacent to the Project boundary (Table 5-44).

Table 5-44. Project recreational sites owned by Avista. (Source: Louis Berger, 2004b)

Development	Site Name	Parking Spaces Total	Boat Ramp	Boat Ramp Lanes	Boat Dock	Boat Dock Slips	Angling Formal	Angling Bank	Picnic Tables	Trail Miles	Campsites	Swimming Beach	Rock Climbing	Scenic Viewpoint	Playground	Access to Spokane River	Parking Lot	Toilet	Acreage
Post Falls HED	Q'emiln Park	173	Yes	4	Yes	0	Yes	Yes	75	2	0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	78.5
Post Falls HED	Falls Park	36	No	NA	No	NA	No	No	10	1.5	0	No	No	Yes	Yes	Yes	Yes	Yes	22
Monroe Street HED	Huntington Park	0	No	NA	No	NA	No	No	0	0	0	No	No	Yes	No	No	No	No	1
Nine Mile HED	Nine Mile Dam overlook	3	No	NA	No	NA	No	No	0	0	0	No	No	Yes	No	No	Yes	No	0.1
Long Lake HED	Nine Mile Resort [a]	110	Yes	2	Yes	8	Yes	Yes	70	0.25	35	Yes	No	Yes	Yes	Yes	Yes	Yes	6
Long Lake HED	North Shore campsites	3	No	NA	No	NA	Yes	Yes	0	0.5	2	No	No	Yes	No	Yes	Yes	No	3
Long Lake HED	Long Lake Dam and overlook	30	No	NA	No	NA	No	No	0	0.99	0	No	No	Yes	No	Yes	Yes	No	1
Long Lake HED	Long Lake picnic area	150	No	NA	No	NA	Yes	Yes	6	0	0	No	No	No	Yes	Yes	No	Yes	3

Note: NA – not applicable
No – facility not present
Yes – at least one facility present

[a] Source: Personal communication, P. Konecny, Manager, Nine Mile Resort, Nine Mile Falls, WA, with E. Hall, Project Manager, Louis Berger, Boise, ID, dated July 27, 2004.

The Project area provides a wide range of recreational opportunities and resources. Recreational resources are generally developed commensurate with each site's proximity to urban and rural resources. Sixty-eight sites within or adjacent to the Project boundary provide recreational access to the Project at Post Falls HED, most of these are associated with Coeur d'Alene Lake (Louis Berger, 2004b, Appendix C). Coeur d'Alene Lake recreational resources range from urban parks associated with the cities of Coeur d'Alene and Post Falls to primitive campsites, numerous formal boat launch areas, and informal road-side pull-outs. Immediately adjacent to Post Falls HED, Avista provides lands for two recreational sites (Falls Park and Q'emiln Park) to the City of Post Falls. Together, these two sites provide trails, a barrier-free viewpoint, playground equipment, picnic facilities, interpretive signs, and swimming and boat-launching facilities.

Upper Falls HED and Monroe Street HED are located in downtown Spokane. Five sites within or adjacent to the Project boundary provide public access to the Project in downtown Spokane. Huntington Park, which provides an urban wildlife refuge, is located adjacent to the Monroe Street Dam and powerhouse. Huntington Park provides pedestrian access to the falls adjacent to Monroe Street HED and directly connects to the downtown Spokane pathways network. Avista and the City of Spokane developed the Thornton/Murphy Overlook to provide Americans with Disabilities Act-compliant access to views of the dam and lower falls. Avista and the City are currently working together to construct a Centennial Trail underpass at the north end of the Monroe Street Bridge by the end of 2005.

The entire Upper Falls facility is surrounded by Riverfront Park, a city park established as part of the 1974 World's Fair. The park provides scenic views of the river and contains numerous recreational resources, including open-air amphitheaters, an IMAX theater, a seasonal ice skating rink and carnival rides, a fully functioning antique carousel, pedestrian paths, and scheduled interpretive tours of the Upper Falls powerhouse. The city prohibits boating and swimming within the Project boundary downstream of the Division Street Bridge because of the dams and the dangerous currents associated with the river channels and falls. Monroe Street HED is located just downstream of Upper Falls. Spokane's Riverfront Park is adjacent to the development and provides pedestrian access to numerous viewpoints and a city-operated seasonal gondola ride over the lower falls.

Nine Mile and Long Lake HEDs are downstream of the city of Spokane and are located in less-developed parts of the Spokane River. Nine Mile Reservoir is narrow and relatively short, while Lake Spokane, formed by Long Lake HED, is approximately 24 miles long, though fairly narrow. These reservoirs provide different and distinct recreational opportunities. Most of Nine Mile HED lies within or adjacent to the 10,000-acre Riverside State Park. The park includes seven formal recreational sites within the Project boundary, one of which, Nine Mile Dam Overlook, is owned and managed by Avista (Louis Berger, 2004b, Appendix C). Together, these recreational sites provide visitors with non-motorized boating, hiking, bicycling, picnicking, fishing, and equestrian trail-riding opportunities.

Lake Spokane is a 24-mile-long reservoir that provides a multitude of recreational opportunities. Slightly more than 1 mile of the lake is adjacent to Riverside State Park. Public access to the Project is achieved through nine recreational sites within or adjacent to the Project boundary. Avista owns and maintains four of these sites: Nine Mile Resort, Long Lake Picnic

Area, Long Lake Dam Overlook, and the North Shore Campsites (Louis Berger, 2004b, Appendix A). Recreational sites at Long Lake HED provide visitors with camping, picnicking, swimming, boating, hiking, fishing, and sight-seeing opportunities.

The Centennial Trail is an important public recreational resource that links the Project developments as it follows the Spokane River more than 60 miles from the city of Coeur d'Alene downstream through the heart of Post Falls HED to its western terminus near Lake Spokane (City of Post Falls, 2004). The trail is paved and accessible, links numerous urban and rural parks, and provides public access to activities, such as walking, running, cycling, rollerblading, horseback riding, picnicking, fishing, canoeing, kayaking, and rafting.

5.10.1.2 Recreational Use

Avista and the consultant selected by the RLUAWG conducted an inventory and user survey of 142 public recreational sites that range from roadside pull-offs to highly developed parks, 90 of which are within or adjacent to the Project boundary (Louis Berger, 2004b). The inventory also included 20 commercial sites and 14 recreational sites operated by private associations, although those sites were not included in the user survey (Louis Berger, 2004b). The primary purposes of the study were to identify and inventory existing public recreational sites and opportunities, collect information regarding recreational use at existing formal and informal sites in and adjacent to the Project area, collect information about recreational users and potential users of the Project area, provide information for the evaluation of recreational needs in the Project area, and identify and assess effects on downstream and lake or reservoir-based recreation due to Project operations.

The facility inventory included 12 sites on Lake Spokane,[38] 53 sites on the Spokane River between Post Falls Dam and Nine Mile Dam, and 77 sites on the Coeur d'Alene waterway,[39] some of which are outside of the Project boundary. Table 5-45 summarizes annual recreational use at the 90 sites within or adjacent to the Project boundary that provide public access to Project lands and waters and shows that approximately 70 percent of the total recreational use at the Project takes place on weekends and weekdays during the summer.

Table 5-45. Use at primary recreational sites that provide public access to Project lands and waters.[a] (Source: Louis Berger, 2004b)

Estimated Seasonal Use	Coeur d'Alene Waterway Sites		Upper Falls/Monroe Street/Nine Mile Reservoir Sites		Lake Spokane Sites		Total	
	Number of Users	% of Area Total	Number of Users	% of Area Total	Number of Users	% of Area Total	Number of Users	%
Rec. Season Weekday[b]	316,807	31	36,836	31	27,716	35	381,358	32

[38] Lake Spokane was defined as all formal recreational sites between Nine Mile Dam and Long Lake Dam.

[39] Coeur d'Alene waterway was defined as all sites adjacent to the Project and on Coeur d'Alene Lake and the St. Joe River, St. Maries River, Coeur d'Alene River, and Spokane River upstream of Post Falls Dam.

Estimated Seasonal Use	Coeur d'Alene Waterway Sites		Upper Falls/Monroe Street/Nine Mile Reservoir Sites		Lake Spokane Sites		Total	
	Number of Users	% of Area Total	Number of Users	% of Area Total	Number of Users	% of Area Total	Number of Users	%
Rec. Season Weekend[b]	393,389	39	51,405	43	20,732	27	465,526	38
Off-season Weekday[b]	163,309	16	19,387	16	16,584	21	199,280	16
Off-season Weekend[b]	139,310	14	11,693	10	13,190	17	164,193	14
Total Estimated Annual Use	**1,012,814**		**119,321**		**78,222**		**1,210,358**	**100**

Notes: % – percent

RLUAWG – Recreation, Land Use, and Aesthetics Work Group

[a] Riverfront Park in Spokane and Coeur d'Alene City Park are not included because the study was not able to make dependable vehicle or users counts at these busy downtown sites. Louis Berger estimates that including these two sites in recreational use estimates would bring the total annual use to more than 2 million visits.

[b]

Season	Definition	Number of Days
Rec. season weekday	Non-holiday weekdays between May 24 and September 1, 2003	68
Rec. season weekend	Weekends and holidays from May 24 through September 1, 2003	33
Off-season weekday	Weekdays from September 2 through May 23	189
Off-season weekend	Weekends from September 2 through May 23	76

5.10.1.3 Recreational Activities

Recreational activities that take place in the Project area are varied and generally site specific. Overall, jogging and walking, sightseeing, and bank- and boat-fishing are the most important activities. However, the importance of these activities varies between developments. For example, at Coeur d'Alene Lake, most of the recreational use (more than 50 percent) is associated with boating, boat-fishing, and other water sports, with less overall emphasis on jogging, walking, and biking. Conversely, for those recreational sites along the Spokane River through the city of Spokane, trail-related recreational activities such as jogging, walking, biking, mountain biking and rollerblading represent more than 55 percent of total use with essentially no boat-fishing and little angling occurring on the river. Recreational activities at Nine Mile Reservoir and Lake Spokane include a mix of the primary activities found at the upstream developments with prominent water recreation, such as bank angling, swimming, picnicking, and trail-related recreation on the Centennial Trail, such as jogging, walking, and biking.
Figure 5-25 summarizes recreational activities at the primary recreational areas associated with the Project.

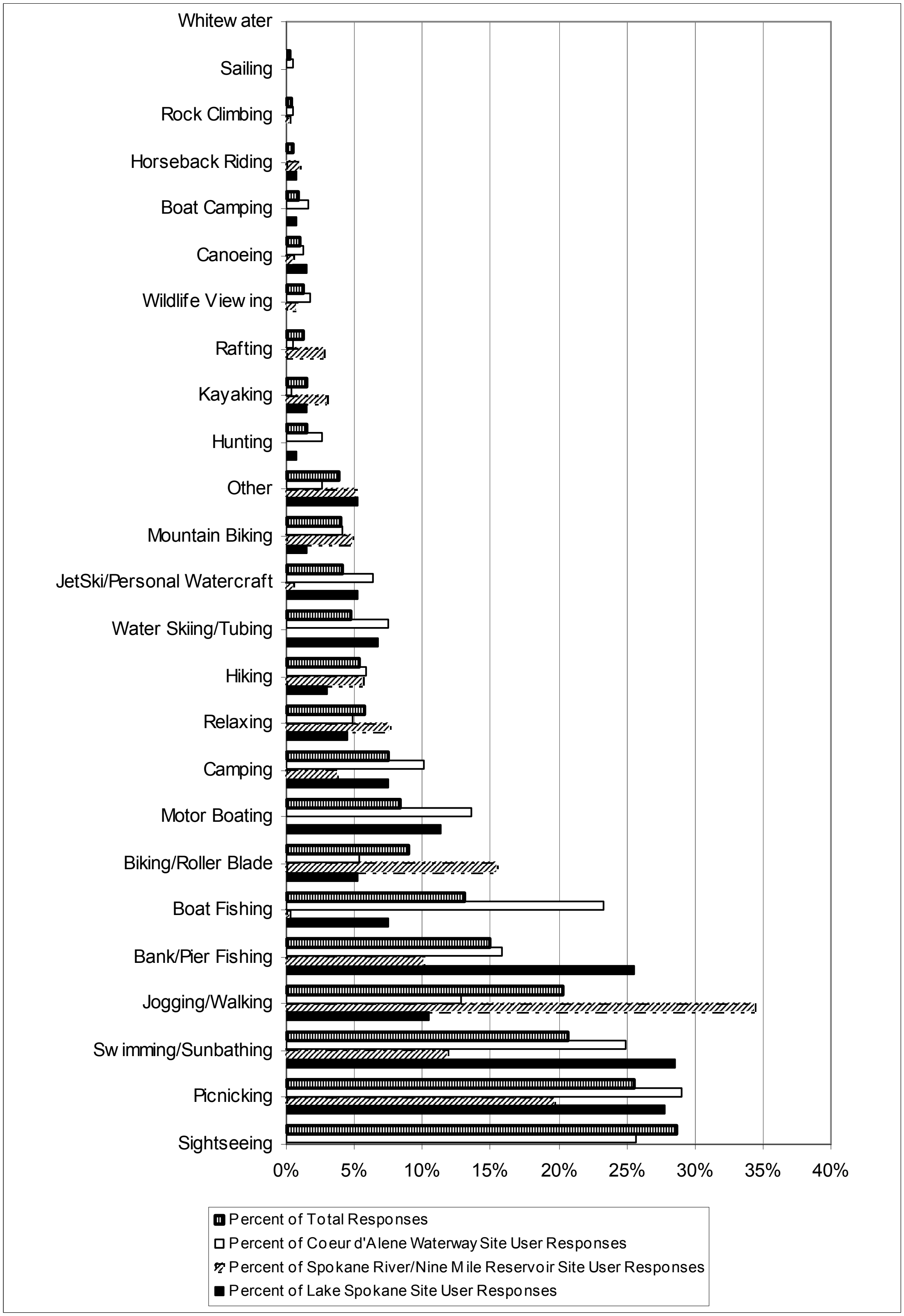

Figure 5-25. Distribution of recreational activity within the Project area.

Future use of the Project area waterways and the inventoried recreation sites is a function of the future population, their recreational habits, and the quality and quantity of opportunities provided both in the Project area and at nearby sites (Louis Berger, 2004b). By some estimates, five activities that occur at Project area recreation sites are expected to show a 30+ percent increase in participation during the next 20 years: nature activities (37 percent), walking (34 percent), visiting a beach (33 percent), picnicking (31 percent), and canoeing/kayaking (30 percent) (ICOR, 2003). Additionally, most other activities available at the Idaho sites are expected to experience an increase in participants (IDPR, 2003).

5.10.1.4 Recreational Site Needs

As part of the recreational facilities inventory, interviewers asked site visitors and area residents about the quality of the recreational experience, including recreational site needs and crowding on the water and at the recreational sites. Overall, most visitors indicated that the recreational sites and lake are not crowded. Table 5-46 shows that approximately 98 percent of all visitors indicated that the recreational sites are either not crowded or are only slightly crowded.

Table 5-46. Visitor perceptions of crowding.

Survey Issue	Lake Spokane	Percent of Lake Spokane Responses	Spokane River	Percent of Spokane River Responses	Coeur d'Alene Lake	Percent of Coeur d'Alene Lake Responses	Total	Total (percent)
Not at all crowded	119	89	389	98	478	85	986	90
Slightly crowded	10	8	2	1	77	14	89	8
Moderately crowded	1	1	3	1	7	1	11	1
Very crowded	3	2	1	0	0	0	4	0
Extremely crowded	0	0	0	0	0	0	0	0
Total	133	100	395	100	562	100	1,090	100

Figure 5-26 shows that overall visitor satisfaction with the number and type of recreational facilities is generally high. More than 80 percent of all visitors to all sites indicated that they are satisfied or very satisfied with the number and type of recreational facilities.

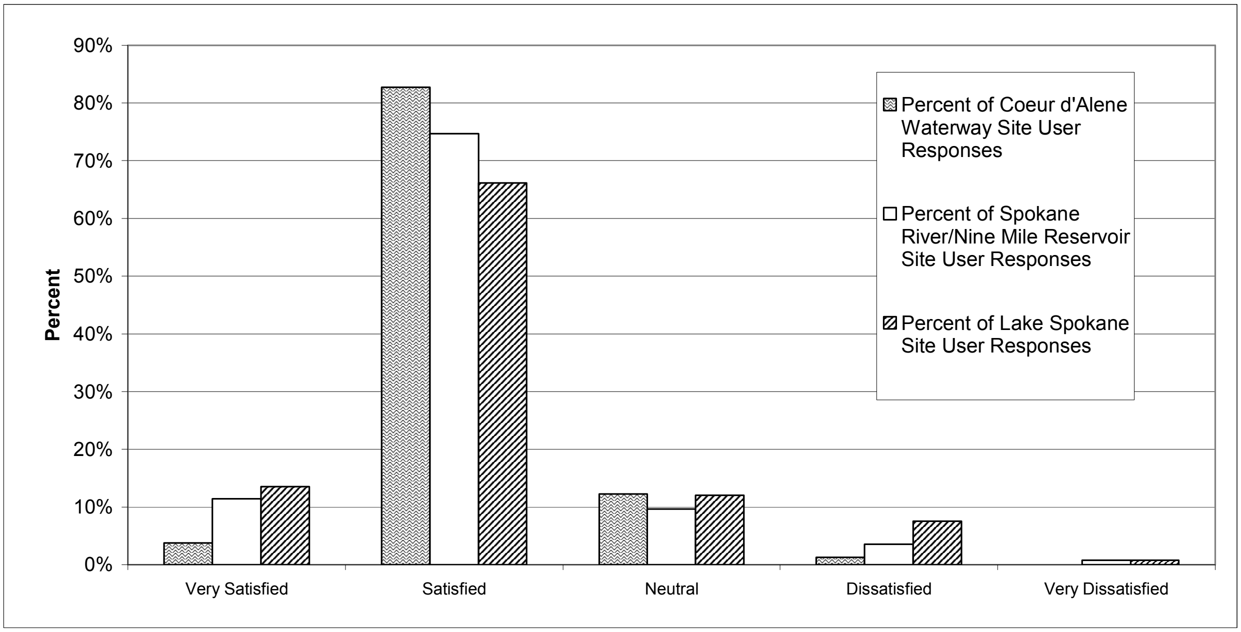

Figure 5-26. Overall satisfaction with the number and type of recreational facilities.

Of those few visitors who were dissatisfied with the recreational resources available at Project-related sites, recommendations for additional facilities were generally site specific and are summarized in Table 5-47 and in the recreation inventory (Louis Berger, 2004b). At Coeur d'Alene Lake and Lake Spokane, most of those who made a recommendation indicated a desire for lengthening or adding more public boat ramps. At the Spokane River sites, most of those who made a recommendation indicated a desire for additional pathways that access the river.

Table 5-47. Visitor perception of recreational needs.

	Coeur d'Alene Lake (n) = 562		Spokane River (n) = 395		Lake Spokane (n) = 133		Total (n) = 1090	
Need	**# of Responses**	**% of Responses**	**# of Responses**	**% of Responses**	**# of Responses**	**% of Responses**	**Total**	**% of Total**
Additional public boat ramps	5	0.89	1	0.25	4	3.01	10	0.92
Additional restrooms	1	0.18	0	0.00	0	0.00	1	0.09
Repair or renovation of existing facilities	0	0.00	1	0.25	0	0.00	1	0.09
Additional parking	0	0.00	1	0.25	0	0.00	1	0.09
Additional trails	0	0.00	2	0.51	0	0.00	2	0.18

Need	Coeur d'Alene Lake (n) = 562		Spokane River (n) = 395		Lake Spokane (n) = 133		Total (n) = 1090	
	# of Responses	% of Responses	# of Responses	% of Responses	# of Responses	% of Responses	Total	% of Total
Improved access at low water levels	1	0.18	0	0.00	0	0.00	1	0.09
Other	0	0.00	12	3.04	7	5.26	19	1.74
Total	7	1.25	17	4.30	11	8.27	35	3.21

5.10.1.5 Whitewater Boating

The Spokane River downstream of Post Falls HED runs through the center of an urbanized area and local residents and visitors from the region use the river for boating, tubing, and swimming. Avista and the RLUAWG conducted a Whitewater Paddling Instream Flow Assessment to address issues pertaining to the effects of Post Falls HED operations on whitewater resources in the Spokane River (Louis Berger, 2004a). Avista and the RLUAWG were interested in determining (1) the existing character of whitewater opportunities on the free-flowing sections of the Spokane River that are outside the Post Falls HED boundary but are influenced by operation of Post Falls HED, (2) the quality of access to whitewater resources on the river, and (3) the Post Falls HED effects on whitewater opportunities.

Avista and the RLUAWG found that whitewater boating opportunities associated with the Project include the upper and lower Spokane River reaches that boaters use for downriver runs and numerous "park-and-play" areas, where they can find specific waves or hydraulics for freestyle boating (Figure 5-27, Appendix A). The upper Spokane River reach includes whitewater that extends from Post Falls Dam to Mirabeau Point or Plantes Ferry, with Barker Road to Plantes Ferry being the most popular section to run. There are multiple access points along the upper Spokane River reach that provide for longer or shorter runs. Park-and-play opportunities, which are mostly associated with the upper Spokane River reach, include Trailer Park Wave, Corbin Park, Dead Dog Hole, Climax Wave, Sullivan Hole, and Zoo Hole.

The lower Spokane River reach extends from Peaceful Valley to the Plese Flats access area in Riverside State Park, with the most challenging run being from Meenach Bridge to Plese Flats. As with the upper Spokane River reach, there are a number of commonly used access points that can shorten the trip. Although there are no recognized park-and-play areas in the lower Spokane River reach, waves and hydraulics develop and recede throughout the reach at various flows.

The Post Falls HED powerhouse can regulate flows in the Spokane River when flows are at or below the powerhouse's hydraulic capacity (i.e., 5,400 cfs). Flows above 5,400 cfs are spilled through the north and south channel dams. Whitewater boating opportunities are generally available at flows above 1,500 cfs as measured at the USGS gage (Gage No. 12422500) located in downtown Spokane. Park-and-play boating opportunities generally exist when flows exceed 2,500 cfs. During low-water years, boating opportunities are often limited in the late summer and early fall when flows can drop below 1,000 cfs at the Spokane gage.

Table 5-48 summarizes key findings of the whitewater paddling instream flow assessment and shows the estimated optimum release for the downriver runs and play areas influenced by Post Falls HED operations.

Table 5-48. Minimum, maximum, and optimum releases from Post Falls HED for river runs and play spots. (Source: Louis Berger, 2004a).

Location	Minimum (cfs)[a]	Maximum (cfs)[b]	Optimum (cfs)[a]
Downriver Reach			
Upper Spokane River	1,350	Spring runoff	3,000
Lower Spokane River	1,350	Spring runoff	3,700
Play Spot			
Trailer Park Wave	3,300	6,500[c]	4,500+
Sullivan Hole	2,500	3,100	2,800–3,100
Zoo Hole	2,200	3,500	2,500–2,800

Note: cfs – cubic feet per second

[a] Flow measurements are from the USGS gage (Gage No. 12422500) located in downtown Spokane for all reaches and play spots except Zoo Hole, which was measured at the Post Falls Dam.

[b] Maximum flow is above the hydraulic capacity of the powerhouse.

[c] When spill is released through the north channel, backwater into the middle channel washes out the feature.

Avista and the RLUAWG determined that access to the whitewater boating resources influenced by Post Falls HED operations is generally good, allowing boaters to reach the put-in with relative ease and, in most cases, just minutes from downtown Spokane. The exception is Trailer Park Wave, just downstream of Post Falls HED and adjacent to the Post Falls Project boundary. Typically, boaters park at the Falls Park parking area within the Post Falls HED boundary and carry their kayaks approximately 0.25 mile to a rocky and relatively steep bank that provides access to the north bypass channel. Boaters then paddle down the bypassed reach approximately 0.5 mile to the wave for a total distance of about 0.75 mile. Boaters also park at McGuire Park, approximately 0.33 mile downstream of the wave, paddle across the river, and portage up the shoreline to the wave.

5.10.2 Environmental Effects

5.10.2.1 Post Falls Project Operations

The current Project license allows Avista to operate Coeur d'Alene Lake within a 7.5-foot range, but Avista has historically operated the lake at or near 2128 feet during the summer months. Starting after Labor Day, Avista begins to release water at Post Falls HED, resulting in a gradual drawdown of Coeur d'Alene Lake, typically 1 to 2 feet per month, until it reaches the minimum-pool elevation of 2,120.5 feet.

The RLUAWG indicated that the September drawdown limits access to some boat launches and private docks in the shallow bays and the Spokane River upstream of Post Falls HED. The RLUAWG also identified a desire for scheduled recreational boating events downstream of Post Falls HED. Under existing conditions, recreational boating opportunities during late summer months are limited by low flows in the Spokane River. Although optimal flows are typically above 2,500 cfs, the RLUAWG determined that the river is navigable at flows down to 1,000 cfs. In most water years, flows drop below 1,000 cfs in late July and August, reducing boating opportunities in the Spokane River.

In consideration of these and other concerns under the Proposed Action, Avista would adjust its Post Falls HED operations. Within 1 year of being issued a new license, Avista would adjust operations at Post Falls HED to maintain a minimum discharge flow of 600 cfs at Post Falls HED as the normal operating condition reducing flows to 500 cfs in dry years. Avista would also attempt to maintain Coeur d'Alene Lake near the 2,128-foot elevation from as early as practicable each summer until September 15.

Avista would also attempt to provide scheduled flows downstream of Post Falls HED to accommodate open-water boating on selected weekends in August (measure PF-REC-3). Flows of approximately 1,250 cfs would be provided during two weekends in August (for example, the first and last weekends) when average and projected river flows at Post Falls HED exceed 800 cfs. Avista would coordinate the flow releases with the relevant cooperating parties and resource agencies to reduce or eliminate adverse effects on fish and aquatic resources. Avista would make the flow schedule and release dates and times available to the public via telephone or Internet access.

Effects Analysis

The operational regime defined by the Proposed Action would have a slight beneficial effect on flat-water boating opportunities on Coeur d'Alene Lake by replacing the current variable date on which the September drawdown begins with a firm date (September 15). This would ensure that visitors, shoreline homeowners, shoreline business owners, and others would know the exact date when drawdown would begin.

The whitewater boating flow-release measures included in the Proposed Action would provide new boating opportunities during some years, adding on average about one new boating event in August of each year.

5.10.2.2 Recreation Plan

Avista currently manages company-owned recreational resources to provide public access consistent with the terms of the existing license. Avista manages its recreational facilities based on institutional understanding of recreational needs in the Project area.

The Proposed Action includes a Post Falls HED Recreation Plan (PF-REC-1) as well as a Spokane River Project Recreation Plan (SRP-REC-1) that would provide vehicles for implementing Avista's recreation-related PME measures. Avista, in consultation with the relevant cooperating parties, would develop these recreation plans that would include (1) recreational facility improvements throughout the Project; (2) a program to improve access and safety for boaters on Coeur d'Alene Lake; and (3) a program to improve whitewater boating flows, access, and the flow information system outside of the Post Falls Project boundary (details of the recreation measures are described in Sections 5.10.2.3 through 5.10.2.5). The recreation plans would be submitted to the Commission for approval within 1 year of new license issuance, and the new measures would be carried out over a 10-year period, beginning within 1 year of the new license issuance.

At a minimum, the plans would include:

1. a general description of the recreational sites;

2. a discussion of the facilities that would be designed or redesigned to take into account the needs of disabled persons;

3. a description of the erosion- and-sediment control measures where ground-disturbing activities are proposed;

4. a means for monitoring and reporting recreational use;

5. a means to conduct consultation with stakeholders; and

6. an implementation schedule, estimated construction costs, and estimated annual operation and maintenance costs for all measures.

Many of the recreational measures that would be detailed in recreation plans would affect properties owned or managed by public agencies. To ensure that the measures are completed within the proposed timeline, the plans would include an outline of agreements and general terms and conditions for cooperating with other land managers. At this time, Avista anticipates developing memoranda of understanding (MOUs) or contracts that would be prepared within the first year of the new license and included as attachments to the recreation plans. Key elements of the MOUs would include the following requirements:

1. The enhancement measure must be located on lands adjacent to, or within the defined buffer zone of the Project and must provide public access to the Project.

2. Avista would partner with the land manager in the planning and design of the enhancement measure.

3. Avista funds would be used only for visitor interpretation or education programs and new or enhanced recreational facilities adjacent to or within the Project.

4. The recreational measures would be completed no later than year 10 of the new license.

Under the Proposed Action, Avista would start working with the appropriate land managers within 1 year of new license issuance to implement the site enhancements. To accommodate the partnering agencies' management goals, objectives, and priorities, the implementation schedule to complete the enhancements would remain flexible; however, under the Proposed Action, Avista's commitment to site improvements would be satisfied within the first 10 years of the new license. As part of the recreation plans, Avista would define the terms of the working relationship with the land management agencies, as well as contingencies if matching funds are not available.

At the recommendation of the land managers (including BLM, FS, and Idaho and Washington agencies) and the RLUAWG, the Proposed Action includes a provision that Avista would contribute a portion of the total funds needed for the site enhancement measures. For most site enhancement measures, Avista's portion would be about 25 percent of the total cost. The remaining funds necessary to complete the enhancement measures would come from the agency with principal ownership or management responsibilities for the site. As discussed below, most of the sites, for which partial funding is proposed, are owned or managed by public agencies. At these sites, the Project boundary typically includes components below the Project high-water mark, such as docks, slips, and boat ramps. Avista, the RLUAWG, and the land managers believe that the proposal to fund a portion of the capital and operation and maintenance costs recognizes the nexus between Project-related operations and that portion of the sites that is within or provides access to the Project. Further, because of the complexity of jurisdictional oversight, Avista, the RLUAWG, and the land managers believe that the Project boundary should not be altered in response to this proposal; altering the Project boundary would lead to additional jurisdiction oversight by FERC, which could both act in cross-purposes with the jurisdictional responsibilities of the land mangers and could further reduce the efficiency and effectiveness of implementing the proposed PME measures. The RLUAWG members also believe these facilities are not Project-dependant, as most, if not all, would exist without the Project.

As part of the plans, if for some unknown reason, a project cannot be completed within the first 10 years of the new license, Avista would place its contribution for the enhancement measure into Recreation Enhancement Funds, one for Post Falls HED and one for the other Spokane River Projects. Avista would use the funds to pay the full cost or a higher percentage of the cost of some of the remaining (or replacement) recreational enhancements at the Project, as agreed upon by Avista and the cooperating parties. Avista and the relevant cooperating parties would identify and earmark funds for those projects that provide the most public benefit and that could be completed in a timely manner with the partnering agency. The full value of the enhancement funds would be expended, and all projects funded through the Recreation Enhancement Funds would be completed no later than year 12 of the new license. The recreation plans would include details of who would participate in allocating funds and under what condition outstanding projects would be completed.

Site-specific elements of the plans would be developed in consultation with the primary land managers and stakeholders associated with each development, many of whom are members of the RLUAWG. Avista would meet with the cooperating parties at least semi-annually, once in the spring and once in the fall, to determine enhancement priorities and to ensure that the measures are satisfactorily completed. Once the initial projects are completed, Avista and the cooperating parties would continue to meet on a semi-annual basis for the term of the new license to ensure that long-term Project-related recreational needs are met.

For site-specific measures at Coeur d'Alene Lake, Avista would consult with the cities or towns of Coeur d'Alene, Post Falls, Harrison and St. Maries; Kootenai County Parks and Waterways; IDPR; IDFG; BLM; FS; and the Coeur d'Alene Tribe, as appropriate.

For site-specific measures along the Spokane River between Post Falls HED and the inflow to Nine Mile Reservoir, Avista would consult with Spokane Canoe and Kayak Club; Northwest Whitewater Association; Friends of the Falls (Great Gorge Park Steering Committee); Spokane Mountaineers; Idaho Parks and Recreation; Kootenai County Parks and Waterways; the cities of Post Falls and Spokane; Washington State Parks; Spokane County; the Spokane Tribe of Indians; and Friends of the Centennial Trail, as appropriate.

For site-specific measures at the Nine Mile and Long Lake HEDs, Avista would consult with WDNR; WDFW; Washington State Parks; Spokane County; Stevens County; the Spokane Tribe of Indians; Friends of the Centennial Trail; and the Lake Spokane Protection Association, as appropriate.

Avista would include documentation of consultation, copies of comments and recommendations on the completed plans after they have been prepared and provided to the consulted parties for review, and specific descriptions of how the consulted parties' comments are accommodated by the plans. If needed, Avista would update the recreation plans every 6 years in association with visitor surveys and the FERC Form 80 filing.

Avista would not initiate any ground-disturbing or land-clearing activities for new recreational facilities until the Commission notifies Avista that the recreation plans are approved. Upon approval, Avista would implement the plans, including any changes required by the Commission.

Effects Analysis

The recreation plans described in the Proposed Action would provide a framework for Avista to implement the recreational site improvements (discussed in Sections 5.10.2.2 through 5.10.2.4) and coordinate management of recreational resources with the many land managers that have jurisdiction over Project lands. The proposed monitoring, consultation, and updates to the plans would provide the basis for collaborative approaches to updating the plans and adjusting management measures in the face of changing recreational needs over the term of the new license. Overall, the recommended site improvement and management measures that would be included in the recreation plans are extensive and would provide a basis for substantial improvements to recreational resources associated with the Project.

Some of the measures included in the Proposed Action would require partnering with public agencies and municipalities to plan, partially fund, and implement the measures. Avista, the RLUAWG, and the land managers reached general consensus that Avista should assist through planning and funding specific sites with the cooperating parties actively involved in recreation management, rather than developing or enhancing sites on its own. Avista and the land managers agreed that funding 25 percent of these measures is a reasonable contribution that recognizes that portion of the link or nexus between Project operations and use of public recreational lands adjacent to Coeur d'Alene Lake. This proposal reflects the unique character and management responsibilities of public recreational sites around the Project. The Proposed Action recognizes that, while Avista has no legal authority to redevelop public access sites owned or managed by others, it does have some responsibility to ensure reasonable public access to the Project waters for the portion of the site that is within the Project boundary. The assistance and funding included in the Proposed Action would substantially improve recreational opportunities by streamlining implementation of the enhancement measures, minimizing jurisdictional conflicts between the Commission and the various land management agencies, and providing a mechanism for earmarking Avista funds to specific Project-related enhancements.

Many of these agencies have limited funds to contribute to capital improvements, and some of the agencies are required to conduct public consultation and environmental permitting before expanding sites or improving public access to the Project. The implementation schedule, based on MOUs with complete implementation of the recreational measures no later than year 10 of the new license, should provide ample time for the agencies to plan, consult with the public, source the necessary matching funds, and implement the recreational measures. However, if the agencies are unable to meet the terms of an MOU and default on the agreement, the Recreation Enhancement Funds would provide a means for Avista, through consultation with stakeholders, to redirect funds to specific recreational needs that can be implemented no later than year 12 of the new license.

5.10.2.3 Recreational Facility Improvements

Early in the relicensing process, stakeholders involved in the RLUAWG expressed concern about the lack of adequate public access to Coeur d'Alene Lake and indicated that there is a need for public education about recreational and natural resource issues in the Coeur d'Alene Lake area. In addition, the RLUAWG indicated that there is a desire for new facilities and facility enhancements associated with the other Spokane River HEDs. These concerns are reflected in the results of the *Recreation Facility Inventory and User Survey for the Spokane River Project* (Louis Berger, 2004b). The surveys and inventory indicate that recreational use and deferred maintenance have degraded the overall condition of many of the Spokane River HEDs recreational sites, with some access roads, boat launch pads, docks, and picnic facilities in need of repair and modernization.

As part of the Recreation Plans (PF-REC-1 and SRP-REC-1), Avista would support extensive recreational facility upgrades at recreational sites within or adjacent to the Project boundary, including sites at Coeur d'Alene Lake, Monroe Street HED, Nine Mile Reservoir, and Lake Spokane. Most upgrades would be located at facilities owned or managed by the Avista, public agencies, or municipalities. As such, the facility enhancement measures included in PF-REC-2, PF-REC-3, SRP-REC-2, and SRP-REC-4 include assisting the appropriate land manager in planning and implementing improvements, contributing partial funding at a level agreed upon by stakeholders to implement the environmental measure, and contributing funds to support annual operation and maintenance, if necessary, through separate agreements.

The following paragraphs summarize the specific measures included in the Proposed Action for recreational facilities at Coeur d'Alene Lake (PF-REC-2), Monroe Street HED (SRP-REC-2), and Lake Spokane/Nine Mile HEDs (SRP-REC-4). Additional details concerning these measures, including the level of funding proposed, appear in Appendix B.

Coeur d'Alene Lake

City of Coeur d'Alene Parks—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with the City of Coeur d'Alene to develop new recreational sites and/or improve existing recreational facilities at city parks adjacent to Coeur d'Alene Lake and the upper Spokane River. Measures would include (1) installing showers at Coeur d'Alene City Park for beach users; (2) installing a new restroom shelter at McEuen Field and Park; and (3) connecting Mill River Park to the Idaho Centennial Trail at the Huetter Road Overpass.

Falls Park and Q'emiln Park—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with the City of Post Falls to improve the existing recreational facilities at Falls Park and Q'emiln Park by improving the trail system, scenic overlooks, interpretive displays, and fencing at both sites. Where feasible, Avista would consider the parks' natural features and incorporate these features into the improvements.

Avista is currently negotiating new leases with the City of Post Falls, which desires to operate and manage the parks as a component of its citywide park system. If new leases cannot be negotiated with the city, Avista would either seek a new managing partner or assume management responsibilities for the parks.

Boat Ramp Extensions—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with IDFG, Kootenai County Parks and Waterways, IDPR, and the Coeur d'Alene Tribe to extend six motorboat ramps to accommodate off-season recreational use on Coeur d'Alene Lake and the Coeur d'Alene and the St. Joe rivers. The boat ramps include those at Anderson Lake, Round Lake, Sun Up Bay, Loffs Bay, Harrison, Chatcolet, and Rocky Point.

BLM Recreation Lands—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with BLM to develop or enhance water-based recreational facilities on Coeur d'Alene Lake and its tributaries.

Coeur d'Alene Tribe Recreation Lands—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with the Coeur d'Alene Tribe to develop or enhance water-based recreational facilities on the lake and its tributaries. Avista would provide funding to support the development of a recreational site that would be used in part to educate tribal members and the general public regarding current and historic cultural practices of the Coeur d'Alene Tribe.

Higgens Point—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with IDPR to construct a breakwater for the boat launch area, stabilize the shoreline that is eroding due to wind fetch, and reconstruct the docks at the boat-in-only sites.

FS Recreation Lands—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with FS to enhance the Bell Bay Campground, Medimont Recreation Area, and Rainy Hill Recreation Area.

Trail of the Coeur d'Alenes Trail Spurs—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with the Coeur d'Alene Tribe and IDPR to develop three barrier-free trail spurs located along the Trail of the Coeur d'Alenes between Harrison and Plummer, with one spur in Heyburn State Park. The trail spurs would include interpretive displays depicting tribal history and natural history of the lake area, and the spurs would include other amenities such as picnic tables or park benches. Avista would also cooperate with the Coeur d'Alene Tribe to develop a pedestrian pullout along the trail at the Plummer Trailhead that would include an interpretive/educational display, picnic tables, and/or park benches.

Heyburn State Park—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with IDPR to reconstruct the pedestrian trail from the campground to the Trail of the Coeur d'Alenes and install a sealed vault toilet to accommodate off-season use.

Hawleys Landing—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with IDPR to extend the boat docks to accommodate off-season use.

Plummer and Rocky Points—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with IDPR to provide sand at the two swimming beaches.

Future Coeur d'Alene Recreation Projects—Under the Proposed Action, Avista would work with the relevant cooperating parties to plan and develop new and/or reconstructed recreation projects after the initial projects are completed. The ongoing visitor studies, agency input, and input from the cooperating parties would provide guidance on the projects.

Monroe Street HED

Avista owns land in downtown Spokane adjacent to Monroe Street HED that is used for public viewing of the lower falls. No formal public boater or angler access exists immediately downstream of Monroe Street HED due to the topography.

Huntington Park—Under the Proposed Action, Avista would continue operating Huntington Park at Monroe Street HED as a natural area/buffer within the city of Spokane. Avista would also cooperate with the Friends of the Falls Association (Great Gorge Project Steering Committee) to allow possible enhancements to Huntington Park related to the Great Gorge Park plan so long as the enhancements are in keeping with the park's current level and type of development.

Water Avenue Access Site—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with Washington State Parks, Spokane County, the City of Spokane, the Spokane Canoe and Kayak Club, the Northwest Whitewater Association, and the Friends of the Falls to develop the Water Avenue Access Site. The access site would include designated parking, a gravel carry-in-only boat launch with emergency vehicle and boat access gate, portable seasonal toilets, changing area, and appropriate signage.

The Spokane Parks and Recreation Department owns the land and manages the site and must approve all facility improvements.

Nine Mile Reservoir

Nine Mile Cottages—Under the Proposed Action, Avista would either enter into a long-term lease with Washington State Parks or transfer ownership of the cottages to them in fee through a separate agreement. Avista is also proposing to remove the cottage compound from the Project boundary because as a State Park residential compound, it does not serve Project purposes (see Section 5.11).

Nine Mile/Spokane House Interpretation and Education—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with Washington State Parks to develop an interpretive center with a focus on hydroelectric generation and the history of Riverside State Park. Avista also proposes to relocate the existing Nine Mile Overlook to the Charles Road Bridge to accommodate disabled individuals and to include interpretive signage. In addition, Avista would cooperate with Washington State Parks to redevelop the interpretive displays at the Spokane House in accordance with the HPMP.

Nine Mile Portage Parking and Signage—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with Washington State Parks to identify and develop a floater take-out immediately upstream of the Nine Mile HED boat restraining system. Avista would cooperate with Washington State Parks to construct a four- or five-stall parking area near the take-out and to install informational and warning signs at the Plese Flats Access Site and upstream of Nine Mile Dam. The signs would warn floaters that they should exit the river on the left (south) side as they approach the boat restraining system. The Nine Mile Portage would be identified with a "Portage Here" or "Take Out Here" sign. Avista would also work with Washington State Parks to recommend and identify timeframes, based on river flows, when the public should not use the portage due to safety concerns.

Centennial Trail Extension—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with Washington State Parks and the Friends of the Centennial Trail to improve pedestrian and bicycle access to Lake Spokane by extending the Centennial Trail by approximately 1 mile from Sontag Park to the Nine Mile Resort. Avista would also cooperate with Washington State Parks and the Friends of the Centennial Trail as new trail opportunities to or adjacent to the reservoirs present themselves in the future.

Lake Spokane

Nine Mile Resort—Under the Proposed Action, Avista would reconfigure the Nine Mile Resort to provide expanded day-use and seasonally extended boating opportunities, which would be operated in conjunction with Washington State Park's Riverside State Park. Avista would retain ownership of the Nine Mile Resort property and would either manage the property with a concessionaire or enter into a long-term management agreement with Washington State Parks.

Washington Department of Natural Resources' Lake Spokane Campground—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with WDNR to expand camping opportunities and extend seasonal boating opportunities at the Lake Spokane Campground. The nature of the improvements would be consistent with the current level of development at the site.

Boat-in-Only Campgrounds—Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with Washington State Parks and WDNR to identify, plan, and develop up to 10 boat-in-only campsites on Lake Spokane. Avista would also consult with WDFW to minimize potential effects on wildlife when selecting the locations of the boat-in-only sites. The campsites would be developed in groups, located on property belonging to Washington State Parks, WDNR, or Avista, and developed to provide semi-primitive camping experiences.

Long Lake Dam Overlook—Under the Proposed Action, Avista would reconstruct the Avista-owned Long Lake Dam Overlook to be more harmonious with the natural surroundings. Interpretive signs pertaining to hydroelectric generation and the river's natural features would be installed, and the parking area would be reconfigured.

Long Lake Dam River Access Site—Under the Proposed Action, Avista would develop a carry-in-only boat launch with improved parking and picnic facilities at a point immediately downstream of its Long Lake Dam picnic area on Avista lands.

Devil's Gap Trailhead—The trailhead site is located on the southern edge of Avista property along the Long Lake Road. The site provides pedestrian access to the southwestern-most Project lands for wildlife viewing, hiking, fishing, etc. Under the Proposed Action, Avista would continue providing public access to the site and would provide funding for annual operation and maintenance.

Future Lake Spokane/Nine Mile Recreation Projects—Under the Proposed Action, Avista would work with relevant cooperating parties to plan and develop new and/or reconstructed recreation projects after the initial projects are completed. The ongoing visitor studies, agency input, and input from other cooperating parties would provide guidance on the projects.

Effects Analysis

Coeur d'Alene Lake

Under the Proposed Action, improvements included to existing recreational facilities would be site specific and derived from the needs assessment (Louis Berger, 2004b) and consultation with the RLUAWG. Existing facility enhancements would include lengthening and improving boat ramps, which would improve and increase flat-water boating opportunities by providing public access during periods when Coeur d'Alene Lake is low. Other facility improvements in the Proposed Action would include adding new showers, restrooms, and interpretive signs, as well as adding and improving trails, parking areas, boat and swimming docks, beaches, and scenic overlooks. At Higgens Point, the breakwater and shoreline protection measures would help reduce the effect of motorboat- and wind-fetch-caused waves on the shoreline. Together, these measures would improve the aesthetic quality of the recreational facilities, improve site sanitation, and improve the physical conditions of Project-related recreational facilities, as well as reduce erosion and other recreation-related effects on environmental resources.

The development of new water-based recreational facilities on the lake and its tributaries through cooperation with the Coeur d'Alene Tribe and BLM would improve public access to Project waters. While numerous public access sites already exist along the lake, long areas of the shoreline, both within the reservation and just north of it, have only informal recreational sites. Many of these sites have been established by general use, rather than by systematic planning or development. The measures included in the Proposed Action would allow the Coeur d'Alene Tribe and BLM to improve existing access sites and increase recreational opportunities by adding new facilities, as needed.

Overall, the Proposed Action measures at Coeur d'Alene Lake would substantially improve the existing condition of recreational sites and enhance public access to Project waters. The Proposed Action would improve the quality of the day-use and camping facilities by enhancing and expanding existing facilities and addressing deferred maintenance needs; improve flat-water boater access when the lake is low by lengthening boat launch ramps; improve and expand educational and interpretive opportunities associated with Avista, the lake, and the Coeur d'Alene Tribe; reduce riparian and shoreline resource damage associated with motorboat- and wind-fetch-caused wave action by stabilizing shoreline areas at critical sites; improve sanitation by developing new restroom facilities at some sites; increase biking and pedestrian opportunities; and increase opportunities for disabled persons by extending and improving trails.

Monroe Street HED

Continued operation of Huntington Park would maintain important public access to the lower falls and allow visitors to observe Project features at Monroe Street HED. While numerous viewpoints allow visitors to look at the lower falls from a distance, Huntington Park is the only public access facility immediately adjacent to the falls, providing unique viewing opportunities for visitors. Continued operation of the park would ensure that the site is available for public use during the term of the new license.

There are currently no formal river access sites between Avista's Monroe Street HED and the TJ Meenach Bridge, approximately 3 miles downstream of the lower falls. Boaters typically launch at a number of informal sites along the upper reach of the lower Spokane River. Informal use has caused conflicts between boaters and adjoining landowners and has, in some cases, led to resource damage such as shoreline erosion and the establishment of prohibited "pull-off"-type parking areas. The Water Avenue Access Site, which is owned by the City of Spokane, is already established as an informal boat launch site. Boaters park on the road and portage along a gravel path to the river. Access at this site is easy, with a short, level path; a narrow, gravel beach; a small eddy; and slow-moving water. Avista's Proposed Action would assist the Spokane Parks and Recreation Department in developing the site into a formal recreational site for anglers, boaters, and other visitors. Establishing a more formal site at Water Avenue would improve the quality of the existing site by providing hardened surfaces and amenities appropriate for a public put-in. In addition, establishment of the site would increase boating opportunities by establishing a legal put-in at the upstream end of the Spokane River run and allowing boaters to access an additional 3 miles of gentle whitewater.

Nine Mile Reservoir

Except for the lands immediately surrounding Nine Mile HED, recreational access to Project waters associated with the development is achieved from Riverside State Park. The park surrounds the development and a significant portion of the impoundment and provides camping, boating, and trail-related recreational opportunities. The Proposed Action would provide increased funding to the park to assist in site enhancements and to develop new recreational opportunities associated with the Project.

The Proposed Action measure to continue to lease the Nine Mile cottages to the state park would allow continued use of these facilities by a public agency. Avista currently leases the cottages to the state park for no fee, which allows the park to house park employees and helps the park meet its operation and maintenance responsibilities at the western end of Riverside State Park. While the cottages were originally constructed to house Project operators, the cottages have not been used by Avista or for operational purposes for many decades.

The educational measures included in the Proposed Action, including the interpretive center and overlook at Nine Mile, and the interpretive display at the Spokane House would improve public education associated with the Project and provide information about the architectural and operational history of the Project. Nine Mile HED is a unique structure with historical significance, and the interpretive information, as well as the improved quality of the sites, would improve visitors' experiences.

The Proposed Action measures at the portage area, including the boater take-out and improved signage, would improve safety for down-river boaters by identifying the portage area and providing facilities and resources necessary to portage safely and efficiently.

The Proposed Action's Centennial Trail extension would improve trail-related recreational opportunities by extending the Centennial Trail from Avista's Upper Falls HED to the Nine Mile Resort on Lake Spokane. One of the key findings of the visitor survey is that visitors appreciate the Centennial Trail system and support expanding public trails into new areas (Louis Berger, 2004b). Currently, the trail ends at Sontag Park near Nine Mile HED. The extension would provide new pedestrian and biking opportunities and link the city of Spokane via the trail system to Lake Spokane.

Lake Spokane

Under the Proposed Action, Avista would implement extensive site improvement measures and contribute to the development of new facilities on Lake Spokane. The Proposed Action would improve recreational experiences by enhancing the quality of the existing recreational resources and expand recreational opportunities by both extending the flat-water boating season during periods when the reservoir is low and creating new day-use and overnight recreational sites.

The Proposed Action's expanded day-use area within Nine Mile Resort would provide new recreational resources, including sites that provide public access to Project waters. Nine Mile Resort is at capacity during much of the summer season, and Washington State Parks plans to develop a larger campground immediately adjacent to the resort that would accommodate camping needs near the upriver end of Lake Spokane. Under the Proposed Action, Avista would partner with Washington State Parks to reconfigure the resort as a day-use area that would complement their new campground and use at Riverside State Park in general. The resort currently provides fee-based recreational access to the existing 35-unit campground, the two-lane boat launch, and the swimming beach. The measure, when coupled with Washington State Park's new campground would substantially expand public recreational opportunities at the upstream end of the lake.

The Proposed Action's assistance to WDNR to expand the campground would also improve and expand recreational opportunities at Lake Spokane. As with Nine Mile Resort, the WDNR campground is at capacity throughout the summer, and visitors frequently camp at informal sites along the highway near Tum Tum. The measure would expand camping and boating facilities in this area and would help reduce pressure on illegal and informal camping sites.

The Proposed Action's site enhancements at Lake Spokane Campground and Long Lake Dam Overlook and River Access Site would improve the existing conditions of these facilities and add new recreational resources. These improvements would not change the overall character or level of development of the existing facilities, but would provide an improved experience by addressing deferred maintenance needs, improving the public information system, and expanding the existing day-use and overnight camping facilities.

The Proposed Action's development of 10 boat-in camping facilities would provide new recreational opportunities that currently do not exist on Lake Spokane. Lake Spokane is a remote, narrow impoundment with long sections of undeveloped shoreline. Boaters currently leave the boat launch areas for more remote sections of the reservoir. Over time, boaters have established informal and illegal campsites that are scattered along the shoreline and are unmanaged. This type of use has caused shoreline erosion, damage to the understory vegetation, compaction of the soils, and created litter. The new campgrounds would allow motorized and paddle boaters to continue camping, but would also allow land managers to define where the camping takes place to help prevent further environmental resource damage.

The Proposed Action's improvements to the Devil's Gap Trailhead would improve recreational opportunities for day-use visitors. Currently, the primary recreational resources at the trailhead are the parking area and trail access. The measure would enhance the site by enabling visitors to take advantage of wildlife viewing opportunities in the area.

5.10.2.4 Boating Opportunities on Coeur d'Alene Lake

Vertical pilings and floating debris, as well as insufficient navigational aids, currently create some safety concerns for flat-water boaters on Coeur d'Alene Lake. Historically, Coeur d'Alene Lake was used as a gathering and storage area for timber harvested in the upper Spokane River Watershed. Over the years, vertical pilings were placed along the shoreline and used for timber tie-downs and chutes. Now abandoned, many of the timber pilings create navigational hazards. Further, the RLUAWG identified other abandoned human-made structures that float near the water surface and are difficult to see from motorboats. In addition to these safety concerns, the visitor survey indicates that overnight moorings at Mowry State Park are needed to address some flat-water boater recreational demand. To address these issues, Avista proposes to implement measures to improve safety under the Proposed Action (measure PF-REC-2).

Abandoned Dock/Debris Removal

Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with the Coeur d'Alene Tribe, Kootenai County Parks and Waterways, IDPR, and IDFG to remove abandoned docks, other human-made structures, and debris from Coeur d'Alene Lake. This work would be conducted over a 2-year period to accommodate removal during spring runoff.

Private Aids to Navigation

Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with the Coeur d'Alene Tribe, Kootenai County Parks and Waterways, Benewah County, and the U.S. Coast Guard to install private navigational aids on Coeur d'Alene Lake and at the mouth of the Coeur d'Alene and St. Joe rivers where they enter the lake.

Mowry State Park

Under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with Kootenai County Parks and Waterways and IDPR to provide mooring buoys and support for annual operation and maintenance.

Effects Analysis

The Proposed Action measure to remove some large human-made debris from the lake, such as abandoned docks, gangways, and pilings, would improve safety for flat-water boaters. Removing a portion of this refuse from the lake would reduce the likelihood of collisions and other boating accidents associated with these structures.

The Proposed Action measure to add navigational aids at the mouths of the Coeur d'Alene and St. Joe rivers would provide assistance to boaters in the area, particularly when the pool is low. While the channel in these areas is adequate for large-sized motorboats to access the rivers, shallow waters surround the channels and can be difficult to see from a motorboat. The navigational aids would help to identify the safe route through these areas and reduce the likelihood of stranding or accidents in the shallow areas.

Visitors surveyed for the recreation study indicated that overnight moorage areas are needed on the lake (Louis Berger, 2004b). The proposed buoys at Mowry State Park would expand recreational opportunities by providing overnight moorage in a relatively undeveloped portion of the lake.

5.10.2.5 Whitewater Boating

Whitewater boating opportunities are limited by natural conditions a well as current Post Falls HED operations during the late summer months, when flows in the Spokane River can drop below the navigable range. In addition, flows released from Post Falls HED are often very close to, but just out of, the preferred flow range at the primary whitewater park-and-play areas.

To address this issue under the Proposed Action (measure PF-REC-3), Avista would improve whitewater boating opportunities downstream of Post Falls HED by developing a public flow information system, improving public access to some park-and-play freestyle sites, and augmenting flows to improve the quality of the freestyle features. Avista would develop these measures as part of the Recreation Plan, implement them in consultation with the relevant cooperating parties, and prepare annual reports that summarize implementation of the measures.

Flow Information System

Stakeholders indicated that the lack of real-time flow information at appropriate sites along the river limits the boaters' ability to take advantage of whitewater boating opportunities. Boaters currently use the Spokane Gage (USGS No. 12422500), which is approximately 20 miles downstream of Post Falls HED, as the primary source of public flow information for the Spokane River. However, the complex hydrology of the Spokane River cannot be adequately summarized by flows measured at the Spokane gage; depending on the wateryear, the aquifer may contribute to or reduce flows in the upper Spokane River, which can lead to inaccurate flow estimates at the primary park-and-play sites on the upper Spokane River. Boaters are known to drive to the site only to find that the river level is not adequate for boating (Louis Berger, 2004a). Further, many of the park-and-play sites are sensitive to small changes in flow; because of the variable quantity of groundwater inflow from the aquifer, it is difficult for boaters to use the available flow information to predict the conditions at the freestyle sites.

To address this recreational need under the Proposed Action, Avista would contribute funds to and collaborate in the planning and design with USGS to modify the Post Falls Gage (Gage No. 12419000, just downstream of Post Falls HED) to provide real-time flow information. This includes assisting USGS with upgrades and ongoing maintenance to provide near real-time flow information that would be published on the USGS Internet site.

Upper Spokane River Facility Improvements

The overall condition of some of the recreational access sites on the upper Spokane River has been degraded by recreational use and deferred maintenance. Under the Proposed Action, Avista would work with local municipalities to provide or improve public access at a number of important recreational sites along the upper Spokane River, including Trailer Park Wave and Corbin Park.

Trailer Park Wave Access Site—Currently, public access to Trailer Park Wave is either achieved illegally across private lands or requires difficult and lengthy portaging from Post Falls HED. The wave is considered to be an excellent freestyle boating opportunity when flows are between 4,500 and 6,500 cfs (Louis Berger, 2004a). However, the lack of good public access, in combination with the lack of adequate flow information, has limited recreational opportunities at the wave.

Under the Proposed Action, Avista would cooperate with the City of Post Falls, Kootenai County Parks and Waterways, Idaho Parks and Recreation, Spokane Canoe and Kayak Club, and the Northwest Whitewater Association to develop public access to Trailer Park Wave. The best location for the access site appears to be on the south side of the river on private lands. Avista would work with the landowner to secure fee-simple ownership or public access easements to the property. Facilities that would be developed at the access site include parking, an access trail connecting the parking lot to the shoreline, a toilet, and appropriate signage. Avista would enter into a long-term agreement with one of the above-mentioned recreation management entities to manage the property. If negotiations with the landowner are unsuccessful, Avista would work with the partnering entities to develop an alternative access approach.

Corbin Park Boat Ramp—Corbin Park is a popular, city-owned, public access site on the upper Spokane River. Public use is dominated by shoreline and boat angling, with picnicking, swimming, and whitewater boating as other important recreational activities (Louis Berger, 2004b). Corbin Park is the most upstream boat launch on the upper Spokane River and because of the boat ramp, the park is used as the primary upstream put-in for downriver boaters, emergency river access, and drift-boat anglers. The RLUAWG identified the need for boat ramp improvements to ensure that public access continues at Corbin Park.

Under the Proposed Action Avista would contribute funds to and collaborate in the planning and design with, the City of Post Falls, Kootenai County Parks and Waterways, and Idaho Parks and Recreation to improve and/or reconstruct the concrete boat ramp at Corbin Park. The City of Post Falls would continue to own and manage the site.

Flow Augmentation

After the completion of annual spill from Post Falls HED, the power generation flows are currently often within a few hundred cfs of optimum for Trailer Park Wave, Sullivan Hole, and Zoo Hole. These sites are of local and regional importance when flows are optimized; however, the quality of these freestyle boating sites is very sensitive to small changes in flow (Louis Berger, 2004a). For example, while Sullivan Hole is optimized between 2,900 and 3,000 cfs, when flows reach 3,100 cfs or drop below 2,700 cfs, the feature provides little attraction for intermediate and advanced boaters. Also, at Trailer Park Wave, any significant spill in the north bypassed channel reduces or precludes freestyle boating opportunities by backwatering the feature.

Under the Proposed Action, Avista would start optimizing flows from Post Falls HED for freestyle boating sites in the Spokane River within the first year of the new license. During the late spring, summer, and fall, Avista would target flows released from Post Falls HED to fit within the minimum and maximum flow ranges for freestyle boating opportunities at Trailer Park Wave, Sullivan Hole, and Zoo Hole. Avista would incorporate other natural resource needs into the planning efforts for the flow augmentation measure. To the extent that flow augmentation would adversely affect another environmental resource, the needs of the other resource would take precedence over the flow augmentation measure.

Avista would hold semi-annual coordination meetings, once in the spring and once in the fall, to coordinate the whitewater and open-water flow releases with interested stakeholders and the parties responsible for augmenting flows and managing the recreational resource along the Spokane River between Post Falls and Nine Mile HEDs.

Scheduled Boating Flows During August

Avista will attempt to provide scheduled flows downstream of Post Falls HED to accommodate open-water boating on select weekends during August when flows allow. Avista would provide flows of approximately 1,250 cfs for up to two weekends when average and projected river flows at Post Falls exceed 800 cfs. Avista will coordinate the proposed flow releases with the FWG and WRWG or their successors to help ensure that recreational releases are not environmentally damaging. Avista anticipates that these scheduled releases may vary year-to-year depending on the water year and that they should have minimal effect on Coeur d'Alene Lake. Avista will publish the flow schedules, including release dates and times, via telephone and internet service.

Effects Analysis

Flow Information System

The Proposed Action measure to automate and publish flows at the Post Falls gage would provide a more accurate measure of flow in the upper Spokane River. By comparing and tracking variation between the Post Falls gage and the Spokane River gage over time, boaters would develop a more complete understanding of the influence of the aquifer and develop more sensitive estimates of the flow at specific park-and-play sites. In addition, boaters from the region could use the improved and projected flow information to plan trips to the Spokane River, with some assurance that appropriate river flows would be available when they arrive.

Facility Improvements

Developing legal public access to Trailer Park Wave would substantially improve whitewater boating opportunities along the upper Spokane River. The improvements included in the Proposed Action would allow establishment of Trailer Park Wave as a regionally significant whitewater boating destination. The measures included in the Proposed Action for Corbin Park would assist the City of Post Falls in maintaining the site to help ensure that public access to the Spokane River is maintained for trailerable boats.

The Proposed Action improvements and new facilities discussed in this section are outside of the Post Falls HED boundary and on lands owned by other agencies, municipalities, and private landowners. Implementing any site improvement measures for whitewater boating at these sites would require close coordination and cooperation with landowners. Also, while the access sites are outside of the Post Falls HED boundary, these sites represent primary access points at the upstream end of boating runs. Without these facilities, boating runs are shortened and boating opportunities are reduced. Therefore, there is a nexus between flows from Post Falls HED and the need to establish and preserve public access to the Spokane River at the most reasonable upstream locations. The Proposed Action measures meet this test.

Flow Augmentation

The flow augmentation measure included in the Proposed Action would significantly enhance freestyle boating opportunities by optimizing flows to meet the unique requirements of the park-and-play sites. Under current conditions, flows often just miss the optimum levels at the park-and-play sites. Given the sensitivity of the park-and-play sites to slight changes in flow, optimizing flow for these sites would allow boaters to engage in freestyle paddling and substantially increase freestyle boating opportunities.

Scheduled Boating Flows During August

Currently, August flows in the Spokane River are typically below the navigable range, which precludes late summer boating opportunities. The proposed recreational release would provide new recreational opportunities during late summer months in close coordination with aquatic resource constraints.

5.10.3 Cumulative Effects

The recreational measures included in the Proposed Action would contribute to the beneficial effect on recreational resources. A primary goal of the recommended measures, including funding for both short-term projects and longer-term projects over the term of the new license, is to improve the recreational experience and manage recreational resources without significantly increasing the number of recreational facilities or the number of visitors. The improvements to facilities and the management measures would help to achieve these goals by reducing user conflicts, distributing recreational visitors more evenly throughout the Project area, and improving the quality of the recreational facilities. However, as recreational demand for boating and camping opportunities at the Project increases over time, some recreational visitors may be displaced to dispersed sites adjacent to the Project. Although individually minor, the cumulative effect of increased use of the dispersed sites may adversely affect wildlife and recreational values of these sites. The site stabilization measures, development of new campsites, and closures of dispersed recreational areas on Lake Spokane should help preserve the recreational and wildlife attributes of these sites as demand increases. Overall, the site improvements and improved management strategies within and adjacent to the Project would offset any cumulative adverse effects of increased dispersed recreational use.

5.10.4 Unavoidable Adverse Effects

Implementing the Proposed Action would have no unavoidable adverse effects on recreation.

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5.11 Land Use and Aesthetic Resources

5.11.1 Affected Environment

5.11.1.1 Land Use

The topography of the region varies from rolling fields to mountains and includes lush forests, grasslands, deserts, lakes, and rivers. The area west of the Project includes the gradually sloping Columbia River Basin with agricultural lands and upland deserts. The area north and east of the Project includes heavily forested foothills and mountains associated with the northern Rocky Mountains. The area to the south includes the rolling hills and upland agricultural lands known as the Palouse.

5.11.1.2 Regional Land Use

Land use in southeastern Washington is dominated by agriculture, including 49 percent cropland, 21 percent rangeland, and 8 percent private forestland (NRCS, 2000). The area is considered the world's leading producer of peas and lentils and is an important international producer of wheat and other agricultural products (WSU, 2004a,b). In contrast, regional land use in northeastern Washington and northern Idaho is dominated by federal forestlands (40 percent) and private forestlands (27 percent) (NRCS, 2000). In Kootenai County, Idaho—which includes Post Falls HED and most of Coeur d'Alene Lake—approximately 77 percent of land use is forestry, with 62 percent of the forests privately owned, 32 percent under federal management, and 6 percent state owned (University of Idaho, 2003). Most of the agricultural uses in Kootenai County are associated with approximately 600 small- to medium-sized farms that produce wheat, bluegrass seed, ornamental nursery stock, Christmas trees, and beef cattle, among other products.

The Coeur d'Alene Tribe is an important land manager in the region. The Coeur d'Alene Indian Reservation includes approximately 345,000 acres of mountainous lands, as well as lands around much of the southern end of Coeur d'Alene Lake (ITD, 2002). The reservation's land-based economy is based on agriculture, with some selective logging of the forestlands. The Tribal Council, which comprises seven elected officials, manages land use on the reservation.

Much of the area around the Project, particularly along the Interstate 90 corridor around the cities of Coeur d'Alene, Post Falls, and Spokane, has experienced rapid growth during the last 20 years, including residential, commercial, and industrial development (ITD, 2002). The majority of the development has occurred in Spokane County, Washington, and Kootenai County, Idaho. Comprehensive plans and zoning guide land use within these counties. In an effort to contain development consistent with Washington's Growth Management Act, Spokane County has defined an urban growth boundary around the city of Spokane that includes density nodes outside of the city on primary transportation routes (Spokane County, 2003). Land uses surrounding the urban growth boundary include rural, forest, and agricultural uses.

5.11.1.3 Land Use within the Project Boundary

Land use adjacent to the Project boundary varies from rural, rural conservation, and agricultural lands around Coeur d'Alene Lake, Nine Mile Reservoir, and Lake Spokane to residential and urban growth areas around downtown Spokane and the cities of Coeur d'Alene and Post Falls.

Figures 3-1 through 3-4 (Appendix A) show the location of the primary Project features and the proposed Project boundary. Both the current and proposed Project boundary generally follow the normal high water line of the Project reservoirs, with some additional lands included around the Project dams, powerhouses, and tailraces. At Post Falls, Nine Mile, and Long Lake HEDs, the Project boundary also encompasses some additional parcels of Avista-owned lands. Table 5-49 summarizes the primary ownership of lands within the current Project boundary. Information for the proposed Project boundary is provided in Section 5.11.2.4, *Change in Project Boundary*.

Table 5-49. Ownership of lands within the current Project boundaries (inundated and non-inundated).[a,b,c]

	Avista Acreage		BLM Acreage		FS Acreage		State Acreage		Tribal Acreage	
HED	**Inun.**	**Non-Inund.**	**Inund.**	**Non-Inund.**	**Inund.**	**Non-Inund.**	**Inund.**	**Non-Inund.**	**Inund.**	**Non-Inund.**
Post Falls	0	163	228	0	28	0	30,639	0	7,589	0
Monroe Street/Upper Falls	31	10	0	0	0	0	0	0	0	0
Nine Mile	91	32	0	0	0	0	22	0	0	0
Long Lake	2,945	436	0	0	0	0	0.2	0	0	0

[a] The extent of federal lands within the Post Falls HED boundary is unclear. The acreage shown in the table reflects calculations based on the surveyor's certified Project boundary as it appears in Exhibit G of the Post Falls HED license application. In general, lands not specifically reserved by the federal government that were located at or below the ordinary high water mark (OHWM) transferred to state ownership at the time of Idaho statehood. However, in the case of the Coeur d'Alene Indian Reservation, the United States reserved as part of the reservation, *inter alia*, the bed and banks of Coeur d'Alene Lake (which extends up to the OHWM). The table above lists acreage inundated at elevation 2,128 feet, the summer pool elevation for Post Falls HED. In *Erickson v. State of Idaho*, 132 Idaho 208, 970 P.2d 1 (1998), the State of Idaho contended that the OHWM of Coeur d'Alene Lake is at an elevation of 2,128 feet. In *Erickson v. State of Idaho*, the Idaho Supreme Court held that the OHWM was not at 2,121 feet, or the federally surveyed meander line, but the Court did not determine the OHWM. Thus, the elevation of the OHWM is currently an unresolved legal issue. Given this uncertainty, acreage below the OHWM listed as owned by the United States (managed by BLM or FS) is counted in the state ownership as well because Avista cannot resolve the OHWM and related ownership issues. Any future determination of OHWM for Coeur d'Alene Lake may affect any of the inundated acreages indicated in the table.

[b] Total acres by HED appear in Table 5-50. For Post Falls HED, the total acreage within the current surveyor-certified Project boundary equals 38,391.0 acres, of which 163 acres are Avista-owned non-inundated lands, 30,639 acres are state inundated lands (or state and federal inundated lands, as noted above), and 7,589 acres are inundated lands owned by the Coeur d'Alene Tribe. The state lands total also includes the approximately 606 inundated acres of Heyburn State Park that lie within the Coeur d'Alene Indian Reservation. Thus total Project acreage within the reservation equals 8,195 acres.

[c] The acres shown for BLM and FS differ from acreages noted in correspondence from the BLM (316 acres) and FS (79 acres) because the surveyor-certified Project boundary differs from that shown on earlier Project boundary maps that have been used as reference maps in Avista's discussion with BLM and FS.

Post Falls HED

At Post Falls HED, the Project boundary (Appendix A, Figure 3-1) abuts a wide variety of land uses around the Project development and Coeur d'Alene Lake. Post Falls HED is located 9 miles downstream of the outlet of Coeur d'Alene Lake, a natural lake. Much of Coeur d'Alene Lake's shoreline is used for primary homes, particularly near the cities of Coeur d'Alene and Post Falls and the towns of Harrison and St. Maries, as well as secondary recreational homes in the more rural areas. The shoreline also has large tracts of undeveloped private lands, as well as 70 public, 18 commercial, and 13 private association recreational sites (Louis Berger, 2004b). The full-pool lake level maintained by Post Falls HED in the summer also supports commercial logging activities, including the storage and transport of logs to mills located on the Spokane River above the Post Falls dams, though this activity has declined in recent years.

Post Falls HED maintains Coeur d'Alene Lake at a stable summer lake elevation as much as 7.5 feet higher than it would be under natural conditions. The only Project lands that Avista owns are located immediately adjacent to the Post Falls dams. The lands adjacent to Coeur d'Alene Lake and the upper Spokane River outside of the Project boundary are owned by the abutting property owners. The lands that are inundated by the lake or river to the ordinary high water mark (OHWM) are owned by the State of Idaho or the United States in trust for the Coeur d'Alene Tribe. BLM and FS claim ownership of some of the lands within the Post Falls HED boundary (letter from L. Brown, District Manager, BLM, Coeur d'Alene, ID, to B. Howard, Project Manager, Avista, Spokane, WA, dated May 23, 2005; letter from R. McNair, Forest Supervisor, Coeur d'Alene, ID, to B. Howard, Project Manager, Avista, Spokane, WA, dated May 23, 3005).

Shoreline construction, as well as the installation of docks, moorings and floating structures located inside the Coeur d'Alene Indian Reservation are overseen and approved by the Coeur d'Alene Tribe. Similar activities located outside the Coeur d'Alene Indian Reservation are permitted, overseen, and approved by the Corps, IDWR, and/or the Idaho Department of Lands.

Post Falls HED started operating in 1906 and was constructed at the site of existing dams, where the Spokane River branches into three separate channels. Post Falls HED includes three dams (north channel, middle channel, and south channel), spillways along the tops of the north channel and south channel dams, a powerhouse integral to the middle channel dam, and various appurtenant structures. Falls Park and Q'emiln Park, located adjacent to the north channel and south channel dams, together provide picnic areas, playground equipment, interpretive signs, swimming and boat-launching facilities, and a system of trails for public hiking. The Project boundary includes the two islands connecting the north and south channels. Avista maintains private access to the powerhouse and company housing on the north island. The south island is accessible only via the south channel dam or the powerhouse.

Upper Falls and Monroe Street HEDs

Upper Falls and Monroe Street HEDs are located in downtown Spokane. Land use within and adjacent to the Project boundary at these HEDs is primarily hydroelectric and commercial development and recreation, including five public recreational sites. Upper Falls HED includes two dams located on either side of a natural island (Havermale Island). A dam and headgate structure are located on the south channel, and a dam and control works structure for water level and spill control are located on the north channel. The north channel downstream of the dam splits into two branches around Canada Island. The southern branch has a lower elevation than the northern branch and, consequently, accepts most of the water coming past the control works while the northern branch has little flow during low-flow periods. This flow pattern is also a result of channels that were cut into the riverbed during the late nineteenth century in an effort to funnel water, during low flows, to the various mills that were located along this river reach.

Appendix A, Figure 3-2, and more detailed maps included in Exhibit G of the license application show that Avista-owned lands within the Upper Falls Project boundary consists of numerous scattered tracts, most of which are available for public recreational purposes. Avista and the City of Spokane provide public access to pathways, scenic overlooks, fishing areas, and other recreational facilities. The entire Upper Falls facility is surrounded by Riverfront Park, and numerous hotels/motels and businesses are located immediately adjacent to the Project boundary or are separated from the Project boundary only by a sidewalk or trail in the downtown area. Seven primary vehicle bridges and nine pedestrian bridges cross the various river channels and provide public access to the area’s features. All of the pedestrian bridges except for one are part of Riverfront Park and all are outside of the Project boundary. The park offers visitors scenic views of the falls and contains numerous recreational opportunities, including open-air concerts, an IMAX theatre, a seasonal ice skating rink and amusement park rides, and an antique carousel. The park also provides a self-guided scenic tour of Upper Falls HED.

At Monroe Street HED, the Project development and Huntington Park are the only public access lands within the Project boundary. Avista provides public access to the tailrace area and lower falls at Monroe Street HED via Huntington Park, and the City of Spokane operates seasonal gondola rides starting at Riverfront Park and continuing over the lower falls. In 2004, Avista also cooperated with the City of Spokane to develop the Thorton Murphy Overlook along Spokane Falls Boulevard to provide viewing opportunities of the lower falls for people with physical disabilities. Because of dangerous river currents, the City of Spokane prohibits boating and swimming in the area.

Nine Mile and Long Lake HEDs

Land use within and adjacent to the Project boundary at Nine Mile HED includes hydroelectric development and recreation, with six public recreational sites. Nine Mile HED began operating in 1908 and was purchased by Avista (then Washington Water Power) in 1925. Between 1928 and 1930, 10 brick cottages were constructed just northwest of the dam to provide housing for company employees. The dam, powerhouse, and cottages are now listed on the NRHP. Avista currently leases seven of the cottages to Washington State Parks for park employee residences.

The only Project lands that Avista owns are located in the vicinity of the dam (Appendix A, Figure 3-3). Most of the shoreline of Nine Mile Reservoir is owned by the State of Washington and is undeveloped. The state manages the shoreline as a component of the 10,000-acre Riverside State Park, which provides camping, boating, hiking, biking, sightseeing, and equestrian trail-riding opportunities. There are scattered residential developments along the reservoir, outside the Riverside State Park boundary. Shoreline construction and installation of docks, moorings, and floating structures are overseen and approved by the Corps, Spokane County, WDOE, and WDFW.

Land use at Long Lake HED includes hydroelectric development, agriculture, residential development, conservation, and recreation with nine public, two commercial, and one private recreational sites. The Long Lake Dam and powerhouse were completed in 1915. The facility can be viewed from a public overlook on the canyon rim.

Lake Spokane is 23.5 miles long and has a linear character defined by the topography of the natural course of the Spokane River (Appendix A, Figure 3-4). The lake provides fishing, boating, picnicking, swimming, and camping opportunities. Both sides of the shoreline between the upper reaches of the lake and the community of Tum Tum are developed with scattered residential tracts with various levels of development. In contrast, the area downstream of Tum Tum is largely undeveloped, in part because Avista owns over 15 miles of shoreline and the State of Washington owns about 3 miles of shoreline. The remaining shoreline lands that abut the Project are privately owned. Shoreline construction and installation of docks, moorings, and floating structures are overseen and approved by the Corps, WDOE, WDFW, and Spokane, Stevens, and Lincoln counties, depending on the facility location.

5.11.1.4 Aesthetics

Aesthetic resources within the Project are site-specific and reflective of the character found at each of the developments. Recreational sites, scenic overlooks, and roads adjacent to Post Falls HED and Coeur d'Alene Lake provide a wide variety of views. Around Post Falls HED, the viewshed is typically foreground to mid-range, with views of Project facilities and the Spokane River gorge. Mid-range to long-range views are typical at Coeur d'Alene Lake, with forested and developed shorelines in the mid-range view and forests and mountains in the long-range view.

The White Pine and Lake Coeur d'Alene scenic byways cross Project lands near Coeur d'Alene Lake (ITD, 2001). The White Pine Scenic Byway follows Highway 3 through Benewah and Kootenai counties, across the St. Joe and Coeur d'Alene rivers, and along the upper reaches of Coeur d'Alene Lake (Figure 3-1). The Lake Coeur d'Alene Scenic Byway begins at the junction of Interstate 90 and Highway 97 and follows Highway 97 south and east along Coeur d'Alene Lake to Highway 3.

At Upper Falls HED, views are generally within the foreground and mid-range, and aesthetic resources are mostly associated with the river channels and falls, industrial works of the hydroelectric facilities, and urban development along the Spokane River. Adjacent hotels/motels, restaurants, the YMCA and other businesses, exclusive condominium developments, recreational facilities, and numerous vehicular and pedestrian bridges are important factors related to the Upper Falls aesthetic resource. Spill typically occurs at Upper Falls HED through June and into mid-July, when river flows exceed the turbine's hydraulic capacity of 2,500 cfs. Flows in excess of 2,500 cfs are spilled down the middle and north channels of the river, with most of the water going down the middle channel. In the middle channel, the flow follows the course of human-made channels that were cut into the riverbed in the late nineteenth century to funnel water to the mills that once occupied the riverbanks. With higher flows, more water goes down the north channel of the river. Leakage of approximately 40 cfs flows into the middle channel of the river when flows drop below 2,500 cfs, typically after late-June to mid-July. Flows increase in the channels once Avista begins drafting Coeur d'Alene Lake in September. Visitors can view the channels and falls from parks, overlooks, roads, bridges, and paths within and adjacent to the Project boundary. At Monroe Street HED, views are similarly within the foreground and mid-range. Under the terms of the current license, Avista maintains a aesthetic flows of at least 200 cfs over the Monroe Street Dam and downstream ledges during normal viewing hours (10:00 a.m. to one-half hour after sunset) every day, year-round. Shortly before the World's Fair was held near the site in 1974, the Monroe Street Dam was reconstructed and designed to enhance this aesthetic flow. The nearby Monroe Street Bridge is currently being rebuilt and will provide pedestrian viewing opportunities of the dam, downstream ledges, river channel, and lower falls in the same manner as the previous bridge. The city-operated gondola ride also affords views of this area, especially as it passes across the river immediately below the lower falls.

The landscape adjacent to Nine Mile and Long Lake HEDs have primarily a rural character, with recreational facilities and roads providing mid-range views of undeveloped shorelines. A substantial portion of the Nine Mile Reservoir is flanked by Riverside State Park, which is primarily undeveloped. The park has limited recreational developments, including the Centennial Trail, which parallels the reservoir for its entire length.

As part of the collaborative relicensing process, consultants to the RLUAWG conducted interviews at 142 recreational sites in the Project area. Among the questions, visitors were asked to indicate their impression of the scenery, shoreline, and water. Most respondents gave either a neutral response or expressed satisfaction with the views, with only 2 percent expressing dissatisfaction (Louis Berger, 2004b). The few negative comments generally concerned litter, particularly on holiday weekends.

Consultants to the RLUAWG also conducted an aesthetic study of lands where Project operations may influence aesthetic resources (Louis Berger, 2003). Post Falls HED and Upper Falls HED were identified as developments that could adversely affect aesthetics because water is diverted from the falls in the bypassed reaches of both developments. The study found that summer low flows often create a view of exposed rocks in the channels. Typically, the flows in the north channel at Upper Falls HED are reduced to their lowest level (i.e., leakage flow of approximately 40 cfs) from mid-July until after the September drawdown begins at Post Falls HED. At Post Falls HED, the flows in the north channel are typically at their lowest level (leakage) between early July and mid-January.

The consultants videotaped the bypassed channels at six flows at Upper Falls and seven flows at Post Falls (including leakage) and had study participants answer questionnaires to identify the aesthetic quality of the flows. When looking at the bypassed reach at Post Falls HED, most study participants did not associate the leakage flow with pleasing aesthetic attributes. The most common comments were about the artificial character of the waterway in its dewatered state and the desire to hear and see water flowing over rocks. However, even at the leakage flow, some study participants identified the rocky gorge and cliffs as visually pleasing.

At Upper Falls, study participants commented about the lack of water in the north channel at the leakage flow and indicated that they did not like to see the channel's exposed angular rocks in the riverbed resulting from the lack of water. The most common attributes that were least pleasing included the exposed rocks and the overall bare appearance of the north channel without water. Participants indicated that water flowing around the large rock in the center of the south (middle) channel was a pleasing attribute.

Overall, the study found that the aesthetic quality of the bypassed reaches is enhanced with higher flows than exist as seepage.

5.11.2 Environmental Effects

5.11.2.1 Land Use Management Plan

There are no specific provisions in the existing license to guide land management. During the pre-application collaborative phase, stakeholders expressed concern about the lack of a systematic LUMP for Avista-owned Project lands. Other stakeholders expressed a desire for periodic financial assistance to ensure public compliance with laws and regulations on Project lands and waters. Stakeholders were concerned about possible encroachments by adjacent property owners onto Avista-owned Project lands and had questions and concerns about the future management of Avista-owned Project lands.

Under the Proposed Action (measures PF-LU-1 and SRP-LU-1), Avista proposes to finalize and implement LUMPs for both Post Falls HED and the other Spokane River HEDs within 1 year of new license issuance. Avista and the RLUAWG prepared a draft LUMP (Avista, 2005) during the pre-filing consultation phase. The proposed final LUMP would include management goals, objectives, and implementation measures for the following specific land-use categories on Avista-owned Project lands.

1. Conservation Lands—lands that possess general wildlife, botanical, cultural, aesthetic, or other natural resource values.

2. Public Recreation Lands—lands that contain existing recreational facilities or possess desirable and currently recognized recreational facility developmental potential.

3. Private Recreation Lands—lands that are available for permitted uses by adjacent landowners.

4. Closed/Restricted Lands—lands where the public is not allowed or is severely restricted due to security, operational, or safety concerns; to ensure residential privacy at Avista's employee housing; or for resource protection concerns.

5. Shoreline Lands—shoreline lands where any recreational use occurs. Measures may include erosion or bank stabilization, shoreline buffers, and public outreach.

Avista anticipates funding on-the-ground management each year, including annual inspections of the Project lands, fence and gate repairs, weed management, forest thinning, sign management, permitting, etc.

In addition, the final LUMPs would outline procedures for Avista to partner with land managers actively involved in ensuring compliance with current and future land- and water-based laws and regulations. Specifically, Avista would provide assistance and financial support for enforcement of land- and water-based laws and regulations administered by federal, state, and local governmental entities. The parties listed in the final LUMP would include, but are not necessarily limited to, WDNR; WDOE; WDFW; and Spokane, Stevens, and Lincoln counties in Washington; and the Coeur d'Alene Tribe, IDFG, and Kootenai and Benewah counties in Idaho. Avista would prepare annual reports for submittal to the Commission summarizing activities funded by Avista.

Effects Analysis

Finalization and implementation of the LUMP would improve land management on Avista-owned Project lands. The LUMP would provide a systematic approach to land stewardship, conservation, habitat protection, and public access on Avista-owned Project lands. The proposed shoreline management measures to be included in the final LUMP would also address shoreline development and balance development with important environmental resources on Avista-owned lands.

In addition, the LUMP measure of working with public land managers to implement the goals of the LUMP on lands not owned by Avista would improve land management within the Project. This would provide a means for Avista to assist with the enforcement of federal, state, and local shoreline regulations on and adjacent to Project waters and would provide a means to coordinate land management efforts and goals in the Project area.

5.11.2.2 Public Outreach

During the ALP, Avista and stakeholders identified public concerns and a general lack of understanding regarding how and why Avista operates the Spokane River Project as it does. This was readily apparent in the *Whitewater Paddling In-Stream Flow Assessment* (Louis Berger, 2004a), where study participants were confused about why the annual hydrograph downstream of Post Falls HED reflected low flows in August and higher flows in the fall. Additionally, a number of stakeholders indicated that there is a need for better coordination between Avista and resource management agencies to educate the public and shoreline homeowners about resource laws and regulations, public safety, shoreline protection, recreation, fisheries, and terrestrial and cultural resources management concerns.

Under the Proposed Action (PF-REC-4 and SRP-REC-3), Avista would implement public outreach programs at both Post Falls HED and the Spokane River Project by developing Interpretation and Education (I&E) Plans and by conducting visitor surveys. The primary purpose of the public outreach programs would be to educate the recreating public about acceptable and prohibited recreational activities, as well as to identify the recreational resources available at Project developments and provide information about environmental and cultural resources associated with Post Falls HED and the Spokane River Project. Implementation of the public outreach measures would be coordinated through the relevant cooperating parties. Avista and/or the partnering agencies would obtain all necessary permits and approvals necessary to implement the public outreach measures and would coordinate implementation with the HPMP for Post Falls HED and the Spokane River Project. Avista would prepare annual reports summarizing the activities funded and/or conducted under the public outreach measures and would provide copies of the report upon request.

Interpretation and Education Plan

Under the Proposed Action, Avista would work with relevant cooperating parties to develop I&E Plans for both Post Falls HED and the Spokane River Project within 1 year of new license issuance. The plans would provide consistency in the messages and media used at recreational and primary public access sites throughout the Project.

Interpretive aspects addressed by the plans would explain recreational opportunities, cultural and historic resources, and natural resources through the use of signage, brochures, and maps. In addition, the plans would provide for special events, such as a Coeur d'Alene cultural event, that would vary each year based on the partnering entities' goals and objectives. Any cultural components of this measure would be coordinated with the HPMP. Educational components of the plans would include, as examples, Project operational information such as river flows, lake levels, public safety, and regulatory issues and authorities, as well as information on natural resource concerns such as bank stabilization. Electronic media, signage, brochures, maps, and workshops are examples of potential outreach forums. Avista would also update the I&E Plans every 6 years based on visitor survey results.

Visitor Surveys

Under the Proposed Action, Avista would conduct follow-up visitor surveys every 6 years beginning in year 2008, with input from the relevant cooperating parties, (measures PF-REC-4 and SRP-REC-3). The surveys, based largely on the approach used in the 2003 baseline visitor survey (Louis Berger, 2004b), would be used to evaluate recreational opportunities at both Post Falls HED and the Spokane River Project, identify recreational trends over time, and comply with FERC Form-80 requirements. Avista would also coordinate its efforts with those cooperating parties that conduct related surveys along the free-flowing section of the Spokane River.

Effects Analysis

The RLUAWG-recommended I&E Plans included in the Proposed Action (measures PF-REC-4 and SRP-REC-3) would improve the recreational experience by providing information about the Project and Project-related recreational, wildlife, aquatic, and cultural resources. Much of the I&E Program included in this measure would be focused on recreational sites that provide primary access to Project lands and waters, which is an appropriate place to reach the majority of recreational visitors. The program would educate visitors about appropriate uses and areas for recreational activities and would subsequently help protect Project environmental resources.

The visitor survey included in the Proposed Action would provide accurate estimates of total recreational use and recreational use by activity, as well as assessments of recreational issues, collected on 6-year intervals in coordination with the FERC Form-80 filing. Visitor survey information would provide data for assessing site capacity and adjusting recreational resource management practices to fit future recreational needs within the Project area. In addition, as part of the Recreation Plans (measures PF-REC-1 and SRP-REC-1), Avista would define the scope and timeline of recreational monitoring and would develop a basis to adjust management decisions in the face of changing needs.

5.11.2.3 Fisheries Public Information, Education, and Law Enforcement Programs

During the pre-filing phase of the relicensing process, stakeholders indicated that illegal harvest of wild rainbow trout in the upper Spokane River negatively affects trout populations in the river (Parametrix, 2004c). Stakeholders also indicated that increased public information, education, and law enforcement activities in the Post Falls HED Project area would provide a desirable means of mitigating for adverse project effects and reduce illegal harvest of bull trout and westslope cutthroat trout.

To address these concerns under the Proposed Action, Avista would implement both the Post Falls HED Fish PME Program and the Spokane River Fish PME Program (PF-AR-1 and SRP-AR-1), which primarily address specific operations, monitoring, and habitat enhancement measures that are considered in Section 5.6, *Aquatic Resources*, of this document. However, in this section, we consider one component of the measure, the Fisheries Resources Public Information, Education and Law Enforcement Programs, which focus primarily on public outreach.

The program is designed to work with and educate anglers and other recreational visitors about the importance of legal and appropriate recreational etiquette in helping to preserve healthy salmonid populations. Specifically, under the Proposed Action, Avista would consult with the IDFG, FWS, Coeur d'Alene Tribe, and WDFW to develop appropriate information and education programs and enhanced law enforcement programs. These programs would be coordinated with other similar efforts developed and implemented in the Coeur d'Alene Lake Basin and for the free-flowing reach of the Spokane River downstream of Post Falls and Monroe Street HEDs. Specific activities supported by or implemented under this component of the PME measure may include species identification information, landowner education, educational signage and brochures, public presentations, and support of enhanced law enforcement activities. The information and education programs would be coordinated with the Public Outreach Program measures (PF-REC-4 and SRP- REC-3), and the enforcement program would be implemented in coordination with WDFW, Coeur d'Alene Tribe, and IDFG using appropriate personnel.

Effects Analysis

The fisheries public information and education components of Post Falls HED and Spokane River Fish Protection, Mitigation, and Enhancement Programs would provide public benefits similar to the I&E Plan discussed above. The programs could provide information to anglers and other recreational visitors about important practices to help protect the rainbow trout population in the free-flowing reaches of the Spokane River downstream of Post Falls HED. The radio-tracking study indicated that illegal harvest of wild rainbow trout in the free-flowing reach of the upper Spokane River is more prevalent than previously thought and is a potential factor in adult rainbow trout mortality (Parametrix, 2004c). These findings are consistent with earlier creel surveys of the lower Spokane River that found limited compliance with fishing regulations (Avista, 2000a). These results suggested that an enhanced public education program specific to fishery resources that includes information about applicable regulations could provide substantial benefit to rainbow trout. An enhanced public education program could also help with the protection and enhancement of bull trout and westslope cutthroat trout in the Coeur d'Alene Lake Basin.

The law enforcement component of Post Falls HED and Spokane River Fish Protection, Mitigation, and Enhancement Programs would help encourage angler compliance with fishery regulations. The fisheries studies suggest that more visible law enforcement efforts could provide substantial benefit to rainbow trout populations by reducing illegal harvest. Funding additional patrols at primary angler areas where illegal harvesting has been observed would improve management of fishery resources by increasing visitor contact with enforcement agencies and help to educate visitors about appropriate and restricted uses. The law enforcement program could help increase compliance with applicable rules and regulations and would be one important component of the protection of fisheries resources in the Coeur d'Alene Lake Basin and along the upper Spokane River.

5.11.2.4 Change in Project Boundary

As part of the Proposed Action, Avista intends to change the Post Falls HED Project boundary and the Spokane River Project boundary at Monroe Street/Upper Falls, Nine Mile and Long Lake HEDs. At Post Falls HED, Avista proposes to add 2,352 acres in the Thompson, Benewah, Chatcolet, and Hepton lake and other areas and remove approximately 0.5 acre east of the abandoned Corbin Ditch. Avista proposes to remove 2.8 acres from the Monroe Street/Upper Falls Project boundary and 66 acres of land at Nine Mile HED because these lands serve no Project purpose. At Long Lake HED, Avista proposes to add 350.1 acres of Avista-owned lands, including a shoreline buffer, the Nine Mile Resort, and two short sections of Project transmission lines. The proposed Project boundary is shown in Figures 3-1 through 3-4 (Appendix A). The proposed changes from the existing Project boundary are summarized in Table 5-50 and described in the text below.

Table 5-50. Proposed incremental and net change in acres of lands contained in the Project boundary by HED (acres).

Land Areas	Post Falls HED	Long Lake HED	Nine Mile HED	Monroe and Upper Falls HEDs
Lands within the existing Project boundary	38,391.0	5,612.8	413.9	138.2
Lands to be added for Project purposes	2,352.0	350.1		

Land Areas	Post Falls HED	Long Lake HED	Nine Mile HED	Monroe and Upper Falls HEDs
Lands to be removed from the Project	.5		66	2.8
Total Proposed Project boundary acres	40,742.5	5,962.9	347.9	135.4

At Post Falls HED, Avista proposes to add 2,352 acres into the Project boundary. These lands include small scattered tracts throughout the Project and larger tracts in the Thompson, Benewah, Chatcolet, and Hepton lakes areas. All of these lands are inundated when Coeur d'Alene Lake is at its full pool elevation and, except for Hepton Lake, have been seasonally inundated by the HED at least since Coeur d'Alene Lake's elevation was raised to 2,128 feet in the 1940s. Hepton Lake is a large tract (approximately 1,100 acres) of land on the Coeur d'Alene Indian Reservation adjacent to the lower St. Joe River levee. The land is just below the 2,128-foot elevation contour. When the Project was first developed, the Hepton Lake lands were drained for agricultural purposes and a levee prevented the land from flooding. The levee was breeched at this location on May 16, 1997. Now, these lands are no longer used for agricultural purposes and are flooded when Coeur d'Alene Lake is at its full pool elevation. This is the largest proposed change in the Project boundary, and, when combined with other areas, would bring the acreage within the Project boundary that is also within the Coeur d'Alene Indian Reservation to 9,512 acres (7,589 tribal-owned acres within the reservation and in the current Project boundary plus 606 state-owned acres within the reservation and the current Project boundary plus 1,317 acres within the reservation and proposed for addition to the Project boundary) .

Also at Post Falls HED, Avista proposes to remove a small, approximately 0.5-acre parcel of private land located east of the abandoned Corbin Ditch that separates Falls Park from land previously occupied by the Louisiana Pacific mill site. The 0.5 -acre parcel was used for log storage by the Louisiana Pacific lumber mill, which was closed and subsequently removed from the property. The land was originally included in the boundary because the mill required access to the reservoir to extract and store logs that were cut in the upper tributaries and floated across the reservoir. The old mill site, including the 0.5-acre parcel, is currently being developed for commercial and residential purposes. The proposed boundary adjustment would exclude these private lands by following the 2128-foot contour, similar to adjacent properties.

At Monroe Street and Upper Falls HEDs, Avista proposes to remove approximately 2.8 acres of land that was originally included in the Project boundary based on a metes and bounds survey. Much of the shoreline area originally included in the Project boundary has been modified over the years, especially during the preparation for Expo 74, when this heavily industrialized area was completely redeveloped. The Proposed Action would provide a Project boundary that would follow pool elevations pertinent to the two HEDs.

At Nine Mile HED, Avista proposes to remove 66 acres from the Project boundary. The Proposed Action includes removing 19.1 acres on the east side of the HED that is separated from the Project by State Highway 291, an area that includes a non-Project transmission line right-of-way. Avista also proposes to remove 5.4 acres on the west side of the river that includes the old overlook and cottage compound used by Washington State Parks for employee housing and 3.3 acres from the Project boundary that is located downstream of the HED facility and is separated from the HED by Charles Road, because these lands serve no Project purpose. Finally, Avista proposes to remove 38.2 acres of private and state-owned land in small scattered parcels located adjacent to the Project boundary. These private lands serve no Project purpose, and the small state-owned parcels are managed as part of the 10,000-acre Riverside State Park.

At Long Lake HED, Avista proposes to expand the Project boundary by adding 350.1 acres of Avista-owned lands. This addition would include 319.9 acres in a 200-foot-wide shoreline buffer, 15.4 acres for the Nine Mile Resort property, and 3.0 acres at a dredged boat area. Avista also proposes to add 11.8 acres for the 1.8-mile-long section of transmission line associated with Long Lake HED, which as a result of transmission system changes, serves to deliver Project-generated power to the regional system.

Our Analysis

Avista is required to provide safe public access to Project lands and waters and include those lands necessary for Project operations in the Project boundary. Avista's proposed changes would meet this test. At Post Falls HED, the proposed boundary change, including the changes in the Thompson, Chatcolet, Benewah, and Hepton lake areas, would include water storage and terrestrial and aquatic resource benefits. In contrast, the small parcel that is being proposed for removal from the Post Falls Project boundary does not serve any Project purposes or provide any public benefits. Currently, these private lands are scheduled for re-development as commercial, residential, or related uses. The proposed Project boundary would exclude this small area and follow the 2,128-foot contour, consistent with the Project boundary at neighboring private and public properties.

At Monroe Street and Upper Falls HEDs, re-establishing the Project boundary to include only those lands that are useful for Project operations, in lieu of those originally included in the metes and bounds survey, would be consistent with the FPA, because there is no public access to Project waters in the area where the Project boundary would be modified.

At Nine Mile HED, Avista's proposal to remove the lands around the non-Project transmission line and the old overlook/cottages area would be consistent with the FPA. The transmission line right-of-way no longer transfers any Project power and is unrelated to current Project operations. Visitors currently access the overlook area near the old bridge abutment by following the road between the cottages to reach the overlook platform. As part of the Proposed Action, Avista proposes to close the existing overlook and relocate the overlook platform and interpretive facilities to the Charles Road Bridge. The cottages, which are currently leased to Washington State Parks for Riverside State Park employee housing, were originally built to house workers for the dam, but have not been used for Project purposes for many years. In conjunction with the new overlook, the old overlook and the cottages would not serve any Project purposes and removing these lands would be consistent with FPA. Additionally, removing the other small scattered tracts of private land and the small parcel of state land from the Project boundary would be consistent with the FPA because they serve no Project purpose.

At Long Lake HED, the proposed inclusion of the 200-foot-wide buffer and the Nine Mile Resort would incorporate Avista-owned shoreline lands and Avista-owned recreational lands that are not currently within the Project boundary. Expanding the Project boundary to include the shoreline buffer as proposed would ensure that Avista-owned shoreline lands at Lake Spokane are managed and protected consistent with the LUMP. Expanding the boundary to include the Nine Mile Resort would ensure that this primary Avista-owned recreational site provides public access to Project waters for the term of the new license. Including the two segments of Project transmission lines into the Project boundary would be consistent with the FPA.

5.11.2.5 Aesthetic Flows

During summer months when the developments are not spilling, there are only leakage flows in the north channel at Post Falls HED and leakage flows of about 40 cfs through the control works at Upper Falls HED, most of which reaches only the middle channel downstream. Avista currently releases a minimum aesthetic flow of 200 cfs over the Monroe Street Dam and the lower falls as required under the current license. During collaborative workgroup meetings, stakeholders expressed concern about the lack of water flowing through the north channels at Post Falls HED and Upper Falls HED and expressed desires that Avista continue releasing aesthetic flows over the Monroe Street Dam.

As a result of stakeholder concern about the need for aesthetic flows at Post Falls HED and Upper Falls HED, Avista and the RLUAWG directed an aesthetics study to help determine acceptable viewing experiences and preferred viewing times at the two hydroelectric developments (Louis Berger, 2003). The study focused specifically on the waterfalls at Post Falls HED and on the north and middle channels and Upper Falls at the Upper Falls HED because the Project controls the flows in these reaches and the adjacent parks are popular viewing areas. The primary objectives of the study were to determine desirable viewing times and the attributes that the public liked about the flows.

At Post Falls, Avista worked with a subgroup of stakeholders to further assess possible flow scenarios. During the process, numerous complicating factors became apparent, including high operating costs associated with manually controlling the gates, potentially excessive wear and tear on the tainter gate seals, and bank erosion downstream of one gate. With this in mind, the subgroup viewed a number of different flow scenarios and the RLUAWG ultimately selected flows through gates 2 and 5, with gate openings of 0.5 inch because that combination of gates and opening dimensions would provide the audible and visual attributes that the initial study identified as desirable.

Avista also worked with a subgroup of Spokane-area stakeholders to determine how best to provide flows that would create desirable audible and visual attributes similar to the higher 300- to 400-cfs study flows at Upper Falls HED. The RLUAWG agreed that aesthetic flows in the 200-cfs range could provide desirable attributes that would enhance visitors' experiences by diverting water from the human-made channels that once led water to the early mill sites. The goal would be to split the 200 cfs between the two channels so that approximately 100 cfs passes through each channel. This would be two and one-half to three times as much water as currently passes through the middle channel as leakage. The aesthetic appeal in the north channel would be significantly improved because it is generally dry in the summer months under current conditions.

Under the Proposed Action, upon issuance of the new FERC license, Avista would release aesthetic flows of approximately 46 cfs over the north channel waterfalls at Post Falls HED (PF-AES-1). The flows would typically be released through the second and fifth tainter gates, with both gates open approximately 0.5 inch (estimated to be 23 cfs per gate). Avista would provide aesthetic flows on Saturdays and Sundays between the hours of 12:00 p.m. and 6:00 p.m. (daily) from Memorial Day weekend through Labor Day, recognizing that high spring runoff conditions in most years would provide north channel flows that exceed the desired aesthetic flows at the hydroelectric development into June and sometimes into July.

Under the Proposed Action, Avista would implement the recommendations that arise from the Upper Falls Aesthetics Flow Plan, a plan that would be developed in consultation with relevant cooperating parties (SRP-AES-1). The plan would address a minimum 200-cfs flow release through the bypass reach (i.e., north and middle channels), as well as efforts to direct leakage and/or the aesthetic flows through both the north and middle channels. These efforts may include, but not be limited to, a pilot study that would use sandbags to direct flows, documentation of the related visual and audible effects, an evaluation of the pilot study, and engineering documents. Avista would pursue permitting and construction once the plan is complete and the new FERC license is issued, with a goal of implementing the plan within 1 year of issuance of the new FERC license.

Even though focus group participants indicated they would be most likely to visit the area to view the falls on Friday, Saturday, and Sunday between the hours of 12:00 p.m. and 7:00 p.m. (Louis Berger, 2003), Avista would provide the daily minimum aesthetic flows of 200 cfs between 10:00 a.m. and one-half hour after sunset annually between Memorial Day weekend and September 30. This schedule recognizes the value in providing consistent aesthetic flows between the upper and lower falls in the downtown Spokane area and that high spring runoff conditions in most years would provide flows that exceed the desired aesthetic flows at the hydroelectric development into June and sometimes into mid-July and that flows would increase in the fall after the annual drawdown of Coeur d'Alene Lake begins. The aesthetic flows would be provided for the term of the new FERC license and would be coordinated with and included in flows identified in other environmental measures.

At Monroe Street HED, Avista would continue the current daily minimum aesthetic flows of 200 cfs over the Monroe Street Dam between 10:00 a.m. and one-half hour after sunset, year-round.

Effects Analysis

At Post Falls HED, the Proposed Action's aesthetic release would provide substantial improvements over existing conditions. In most years, Avista spills flows that exceed the Post Falls HED hydraulic capacity in the north channel. Typically, spill exceeds the proposed aesthetic flows in the north channel well into June and sometimes July. The measure would ensure that aesthetic releases into the north channel continue when Post Falls HED is not spilling. Avista and the RLUAWG selected the Post Falls aesthetic flow measure to minimize wear on the gate seals and reduce operational costs while releasing flows that provide many of the desired attributes identified in the aesthetic study. The release into the north channel would improve aesthetic resources beyond existing conditions, balance lost generation with aesthetic needs, and provide aesthetic flows on a schedule that would be used by many visitors to the Project.

At Upper Falls HED, the Proposed Action's aesthetic flows would provide substantial improvements over existing conditions. Currently, no aesthetic flows are released from the Upper Falls Dam and leakage flows and spill are channeled through narrow human-made flumes in the bedrock, bypassing most of the cascades in the middle channel and essentially all of the cascades in the north channel. The 200-cfs release would provide substantial improvements to existing conditions. In addition, the release schedule would provide visual benefits throughout the summer when the public is most likely to have the time and inclination to view them.

In addition, the Proposed Action measure to redirect flows in the middle and north channels would make better use of the 200-cfs release by diverting the aesthetic releases and leakage flows away from or out of the human-made channels that once led water to early mill sites and redirecting the flows toward natural falls and cascades. Avista anticipates that redirecting flows from the channels would achieve the desired features or attributes identified at flows of 300 to 400 cfs by the aesthetics study's focus group (Louis Berger, 2003). To accomplish diversion of flows out of the human-made flumes, Avista would perform some in-channel construction. Avista anticipates that the construction effort would include small diversions, likely only inches high, to direct water away from the man-made channels to a few feet high inside a few of the narrow and deep human-made channels. The diversions would be established with aesthetically-consistent materials and would likely be inundated most of the time from leakage and spill. Avista would secure all necessary permits before implementing any construction activities in the channel. The aesthetic release of 200 cfs, engineered to avoid the human-made flumes, would provide visual benefits that exceed existing conditions and would create visual and auditory experiences that mimic spills in the range of 300 to 400 cfs.

At Monroe Street HED, an aesthetic flow of 200 cfs over the dam would ensure that existing visual benefits of the lower falls are preserved for the term of the new license.

5.11.3 Unavoidable Adverse Effects

Implementing the Proposed Action would have no unavoidable adverse effects on land uses or aesthetic resources.

5.12 Socioeconomics

In this section, we review current demographic and market conditions in the region in order to establish a baseline from which to consider the effects of Avista's Proposed Action on socioeconomic resources in the project area. This background profile includes population, employment and income trends in the five-county Project area. Unless otherwise noted, the information in this section comes from the Socioeconomic Base Study Report for the Spokane River Hydroelectric Project Relicensing (NEA, 2004).

5.12.1 Affected Environment

As noted in previous sections, the current Project consists of five HEDs and their associated reservoirs along the Spokane River and spans five counties in two states, including Spokane, Lincoln, and Stevens counties in Washington, and Kootenai and Benewah counties in Idaho. The counties are a mix of rural and developed lands. Industrial and urban uses are generally concentrated in the Spokane River valley and are associated with the city and suburbs of Spokane, Post Falls, and Coeur d'Alene.

5.12.1.1 Population

Population trends are one indicator of growth, and can act as a proxy to understand whether the economy is expanding at a sufficient rate to attract new residents and workers to the area. Population trends show growth in all five counties from 1980 to 2003, with Kootenai County almost doubling its population (95.8 percent increase) and Benewah and Lincoln counties showing very little growth (8.6 percent and 6.1 percent population increase, respectively). Over the same period, Idaho's total population increased by 44.7 percent, which is a more moderate growth rate than the two extremes represented by Benewah and Kootenai counties. The total population in Washington increased by 48.4 percent, a greater rate than the three Washington counties in the Project area.

Table 5-51 summarizes population density and shows that population of the five counties reflects the rural and urban character of the area. At 4 people per square mile, Lincoln County has a very low population density compared to the 224 people per square mile in Spokane County.

Table 5-51. Population density for the five counties within the Project area. (Source: NEA, 2004)

Region	2003 Population estimates	Total land area in square miles	Population density (people per square mile)
Lincoln County	10,201	2,311	4.41
Spokane County	431,027	1,764	224.35
Stevens County	40,776	2,478	16.45
Benewah County	9,029	776	11.64
Kootenai County	117,481	1,245	94.36

5.12.1.2 Employment

The number of jobs is another aspect of the socioeconomic conditions for each county in the study area. The Bureau of Economic Analysis (BEA) defines county employment as "...the number of jobs, full-time plus part-time, by place of work." This includes employees, sole proprietors, and active partners. Employment trends in the five counties show a steady decline in agricultural and resource extraction jobs and growth in service and manufacturing jobs, a trend that reflects the urbanization and industrial growth along the Spokane River valley. Table 5-52 summarizes the type of employment by industry for each county.

Table 5-52. Percent share of each industry to total employment in the five Spokane River study area counties. (Source: NEA, 2004)

	Percent Share of Total Employment 2002				
Industry	**Lincoln**	**Spokane**	**Stevens**	**Benewah**	**Kootenai**
Farm employment	22.3	1.0	8.6	5.9	1.1
Agricultural services, forestry, fishing, and other	3.4	0.9	2.6	(D)	1.8
Mining	(L)	0.1	0.5	(D)	0.3
Construction	3.8	6.0	5.2	4.8	8.7
Manufacturing	1.9	9.5	16.5	23.0	9.9
Transportation and public utilities	2.1	4.0	3.2	7.0	3.6
Wholesale trade	5.5	5.6	1.9	1.6	3.4
Retail trade	12.2	17.9	15.2	13.4	20.5
Finance, insurance, and real estate (FIRE)	6.4	8.3	4.4	3.0	8.0
Services	16.8	32.2	25.7	24.7	29.1
Government and government enterprises	25.6	14.4	16.2	16.6	13.5

Notes: (L) – less than 10 jobs
(D) – not shown to avoid disclosure of confidential information, but estimates for this item are included in the totals.

In Lincoln County, the least populated of the five counties, farm employment contributed approximately 40 percent to total employment in 1980, but by1987, farm employment decreased to almost 20 percent of total employment. From 1990 to 2000, industries that contributed larger shares of employment to the county with large increases in growth included: Services (50 percent increase), Government (13 percent increase), and Retail Trade (13 percent increase). Total jobs grew from 4,266 in 1990 to 5,101 in 2000.

In Spokane County, the number of jobs increased from 164,740 in 1980 to 249,578 in 2000, with the Services and Retail Trade industries showing the greatest number of jobs and the greatest percentage increase in jobs. Services industry recorded a 35 percent increase in employment and contributed a 32 percent share to total county employment in 2002. Retail trade recorded a 25 percent increase in employment and contributed 18 percent to total county employment in 2002.

Stevens County experienced a steady increase in employment from 1980 to 2000, with the total number of job increasing from 10,777 in 1980 to 15,962 in 2000. Industries contributing the most in terms of number of jobs and the rate of growth from 1990 to 2000 include: Services (50 percent increase, with a 26 percent share of total employment in 2002), Retail Trade (41 percent increase, with a 15 percent share of total employment I 2002), and Government (19 percent increase, with a 16 percent share of total employment in 2002).

Total employment for Benewah County increased 11 percent from 1980 to 1990 and 18 percent from 1990 to 2000, for a total increase of 1,082 jobs. From 1990 to 2000, the largest growth occurred in the Construction industry (86 percent) and the Services industry (75 percent), while manufacturing jobs decreased by 13 percent.

Employment in Kootenai County has grown from 23,588 in 1980 to 60,772 in 2000, a 52 percent increase from 1980 to 1990 and a 70 percent increase from 1990 to 2000. Industries that experienced the greatest expansion in jobs from 1990 to 2000 include: Retail Trade (82 percent), FIRE (85 percent), and Services (83 percent). The industry Agricultural Services, Forestry, Fishing and Other expanded jobs by 188 percent (from 383 jobs to 1,102 jobs), but it contributes only two percent to the employment totals in Kootenai County.

Historically, Stevens County has had a high unemployment rate compared to other counties, the state, and the nation, with rates measuring a low of 8.6 percent in 1999 to a high of 11.3 percent in 1999. Spokane County experienced a high unemployment rate of 6.9 percent in 2002, with the 2003 level declining to 6.8 percent. Lincoln County has the lowest annual unemployment rates of the three Washington counties, with its highest rate of 5.7 percent occurring in the years 1996 and 2002. The state and county levels have been historically higher than the national average in the same time period.

The unemployment trends for the period 1992 to 2003 for Benewah and Kootenai counties show higher rates of unemployment than Idaho or the nation. Benewah County consistently has a 10 to 12 percent unemployment rate, with the 2003 rate at 10.1 percent. Kootenai County is slightly lower, with its unemployment rate in the range of 7 to 8 percent.

5.12.1.3 Local Economy and Income Trends

BEA calculates per capita income by totaling the income of residents in an area and dividing total income by the resident population of the area. Table 5-53 summarizes per capita income levels for the counties and shows that income in the more populated and urban counties of Spokane and Kootenai, with the highest per capita incomes in the Project area, is less than their respective state averages.

Table 5-53. Per capita income in the five counties within the Project area, 2002. (Source: NEA, 2004)

Location	Per Capita Income 2002	Percent of State Average
Washington State	$32,638	
Lincoln County	$24,528	75.2
Spokane County	$26,637	81.6
Stevens County	$20,610	63.1
Idaho State	$25,476	
Benewah County	$22,271	87.4
Kootenai County	$24,164	94.9

Total personal income includes adjusted earnings by place of work; dividends, interest, and rent; and transfer payments. In the five counties, dividends, interest and rent, and transfer payments represent approximately one-third of total personal income, a relatively large source of income, as compared to the states and the nation, for each county. In 2000, total personal income for the five-county area totaled $15 billion. Of this total, transfer payments contributed 15 percent or $2.3 billion, dividends, interest, and rent contributed 19 percent or $2.8 billion, and earnings by place of work made up the remaining 66 percent, or $10 billion.

Overall, the five counties in the Project area depend mainly on the earnings from three industries, including Government (federal, state, and local), Services, and Manufacturing. While these industries do not necessarily have the highest employment levels for the counties, they generate the highest wages and income.

5.12.1.4 Project Ties to the Economy

The Project produces an annual average of 861,500 MWh (95 aMW), or approximately 10 percent of Avista Utilities' power requirements, with 137 MW of capacity. This is enough energy for more than 60,000 households per year in the Project area. The power is generated on a seasonal basis, in consideration of several regional factors, including consistent summer lake levels at Coeur d'Alene Lake for recreational and other uses, and a drawdown of up to 7.5 feet between September and January to meet power generation objectives and provide flood control assistance.

The Project directly employs 31 people, as well as other corporate Avista employees who provide support for, but are not fully employed by, the Project. The Project also creates indirect employment, which includes a variety of jobs such as recreation-based employment, service industries such as restaurants and hotels/motels, and those who provide supplies to each of the direct and indirect employers. The jobs provided directly and indirectly by the Project provide an income and in turn a source of revenue for the community. With an estimated average disposable income of $36,000 per job, the direct labor income into the community associated with the Project is estimated at $1.12 million, and the indirect labor income associated with the Project is estimated to be $603,000.

There is also a direct tie between the Project and housing in the area. The Project directly employs 31 people, which can be interpreted as 31 households, or the equivalent of 31 houses within the study area.

There are several industrial ties to the Project, including Stimson Lumber Company, which is located on Coeur d'Alene Lake in the Post Falls area. The lake is a vital part of their operations because it is the most cost-effective means of log transportation. In addition, the lake is used to store the company's log inventory, which operates on a first-in/first-out basis.

Tourism is a key industry for the region, especially for Kootenai County, Idaho, when the existence of Coeur d'Alene Lake, as affected by the Project, enhances the draw of tourists to the region. The region counts on revenues from the various tourist industries including lodging, restaurants, tour guides, rental equipment, gift shops, and others. Tourism is also an important part of the economy due to the taxes associated with those types of activities, which help pay for community services such as police, fire, ambulance, schools, and infrastructure.

Other ties between the Project and the local economy include recreation, cultural, aquatic, and terrestrial resources that provide leisure and natural resource benefits to the local economy. While difficult to measure in economic terms, theses services are important contributors to socioeconomic resources in the region.

5.12.2 Environmental Effects

Without the Proposed Action, there would be no new Project-related changes in the current socioeconomic conditions of the local communities. Any changes in population growth, employment, property tax payments, and recreation expenditures would be unrelated to Project relicensing, and there would be no change in government revenue related to the Project. The Government, Manufacturing, and Services industries, including those associated with outdoor recreation in the Project area, would likely continue to make up a substantial portion of the local economy.

Avista's Proposed Action does not include any specific socioeconomic measures. However, it is likely that the environmental measures included in the Proposed Action would have positive or negative effects on socioeconomic resources in the Project area. Possible effects include direct changes in employment, tax revenue, and local expenditures, as well as indirect influences on the local economy.

The Proposed Action includes extensive environmental measures (see Appendix B for complete text), the cost of which would be paid for through some combination of reduction in other operating costs and increases in electricity rates. Increased electricity rates could adversely affect users in the region, particularly those businesses and industries that depend on low-cost electricity as a primary factor in maintaining their competitive position.

Some measures that are part of Avista's Proposed Action, including finalizing and implementing the Recreation Management Plan; making improvements in accessibility for the disabled; improving existing and providing new campground facilities, day-use facilities, boat launches, and trails; implementing river recreation flows and targeting releases toward levels appropriate for free-style whitewater boating; improving the fishery downstream of Post Falls

HED; maintaining the summer level of Coeur d'Alene Lake through September 15 each year; and improving the aesthetics of some Project features would have beneficial economic effects on the area. These measures would help meet future recreation demand and could encourage additional tourism to the area, thereby increasing expenditures in the region. In addition, maintaining the Coeur d'Alene Lake level through a fixed date (September 15) each year could benefit shoreline residential property values and flat-water recreation-related businesses, as well as the broader tourism industry.

Additional environmental measures designed to enhance the native fishery upstream of Post Falls HED would reduce erosion, provide improved aesthetic experience, and pursue similar goals with the potential to provide indirect benefits to the Project area's economy.

5.12.3 Unavoidable Adverse Effects

None.

5.13 Effects of No-action Alternative

Under the No-action Alternative, Avista would continue to operate the Spokane River Project generally as it has operated the Project in the recent past (refer to Section 3.1.2, *Current Project Operation*). With no change to the operating mode, the Project would continue to provide electrical generation and dependable capacity at current levels. No new environmental measures would be implemented, and the Project would continue to affect the Spokane River as it has over the recent past. Land uses in the Project area would be similar to existing uses. Management of some Project lands could change, depending on utility goals during the term of any new license issued.

These and other effects of the No-action Alternative are summarized in Section 7.0, *Comprehensive Development and Recommended Alternative*, Tables 7-1 and 7-2.

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6.0 DEVELOPMENTAL ANALYSIS

The purpose of this section is to evaluate the effect that various environmental measures would have on the Project's costs and power benefits. Because all of the costs of operating and maintaining the Spokane River Project developments into the future and beyond the issuance of a new license(s) cannot be adequately determined at this time[40], this analysis will reflect only the current Spokane River Project costs (escalated to 2007 values), likely future plant capital costs, and the proposed environmental measures.

Section 10(e) of the FPA requires annual charges for the use of inundated federal reservations. The southern portion of Coeur d'Alene Lake is within such a reservation, as determined in the United States Supreme Court's decision in *Idaho vs. United States*. Avista cannot predict the costs associated with Section 10(e) requirements or future FERC annual fees, and cannot estimate the future value of the Project at this time. Furthermore, because of the unique approach that FERC follows in performing developmental analysis, the costs and benefits presented herein are not appropriate for conventional utility economic analysis or filings with WUTC or IPUC. As such, any conclusions regarding "net benefits" should be viewed as hypothetical. These net benefits do not represent a reasonable threshold for adding costs through new environmental measures. Under its approach to evaluating the economics of hydropower projects, as articulated in Mead Corporation, Publishing Paper Division (72 FERC ¶ 61,027, July 13, 1995), the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power with no consideration for potential future inflation, escalation, or deflation beyond the license issuance date. Avista's economic analysis provides a general estimate of the potential power benefits and costs of current Project operations and Avista's Proposed Action. For our economic analysis of alternatives, we used the assumptions, values, and sources shown in Table 6-1, and these values are consistent with the Mead Decision.

Table 6-1. Assumptions for economic analysis of the Spokane River Project.

Assumption	Value
Base year for costs and benefits	2007
Energy value ($/MWh)	50[a]
Capacity value ($/kW)	Included in energy value
Period of analysis	30 years
Term of financing	20 years
Federal and state tax rate	35.00%
Local tax rate	1.25%
Long term inflation	0.00%
Insurance	0.25%
Discount rate	8.22%
Short-term debt	9.72%
Long-term debt	8.75%
Weighted cost of capital	9.72%

[40] For example, several environmental measures require implementation plans that have yet to be developed, which will, in turn, trigger additional activities.

Assumption	Value
Return on equity	10.64%
Debt ratio	49%

[a] Energy value is based on Avista's in-house estimate of short-term forward pricing and is consistent with alternative power costs based on a combined cycle combustion turbine operating at a 92 percent plant factor.

6.1 Project Investment and Current Annual Costs

The No-Action Alternative includes current Project operations, represented by current costs and benefits, plus future capital costs that would be necessary to preserve the Project at its current capacity. Under this alternative, there would be no change in current operation or facilities, and Avista would provide no environmental enhancement measures. Because there would be no enhancement under this alternative, there would be no added costs. Current costs are summarized in Table 6-2 for Post Falls HED and Table 6-3 for the four Spokane River Project developments in Washington.

Table 6-2. Current annual costs for Post Falls HED.

	Capital Cost ($)	Annual Cost ($)	Annualized Cost ($)
Total net investment[a]	6,578,800		902,100
Total relicensing cost[b]	7,874,100		954,900
Total future investment[c]	10,603,000		878,000
Total net investment[d]	25,055,900		2,735,000
O&M[e]		814,100	814,100
Annual FERC fees[f]		59,600	59,600
Total			3,608,700

[a] Net investment is the depreciated project investment.
[b] This value is based on relicensing costs expended through December 31, 2004, and projected budget to completion. Our best estimate is that 50 percent of relicensing costs accrue to Post Falls HED and the balance to the other four HEDs.
[c] Avista has estimated the cost of future upgrades that will be necessary to maintain the Project at its current capacity. The cashflow is irregular between 2007 and 2016.
[d] This value is the sum of basic project net investment and Avista's relicensing costs.
[e] O&M costs are based on 2003 values escalated to a 2007 cost basis. More than $84,000 is spent on environmental measures under the current license for all five Spokane River developments.
[f] FERC fees include both federal lands fees of $12,400 and FERC charges of $43,700, escalated at 2 percent per year from 2004 to 2007.

Table 6-3. Current annual costs for the Spokane River Project (four Washington HEDs).

	Capital Cost ($)	Annual Cost ($)	Annualized Cost ($)
Total net investment[a]	68,732,000	--	9,424,800
Total relicensing cost[b]	7,874,100	--	954,900
Total future investment[c]	46,336,000	--	4,836,000
Total net investment[d]	122,942,100	--	15,215,700
O&M[e]	--	3,375,500	3,375,500
Annual FERC fees[f]	--	436,600	436,600
Total			19,027,800

[a] Basic project net investment is the depreciated project investment allocated to power purposes.

[b] This value is based on relicensing costs expended through December 31, 2004, and projected budget to completion. Our best estimates are that 50 percent of relicensing costs accrue to Post Falls HED and the balance to the other four HEDs.

[c] Avista has estimated the cost of future upgrades that will be necessary to maintain the Project at its current capacity. This figure includes an estimated cost for replacing flashboards at Nine Mile HED with a rubber dam. The cashflow is irregular between 2007 and 2016.

[d] This value is the sum of basic project net investment and Avista's relicensing costs.

[e] O&M costs are based on 2003 values, escalated at 2.5 percent per year to a 2007 cost basis. More than $84,000 is spent on environmental measures under the current license for all five Spokane River developments.

[f] FERC fees include FERC charges of $411,400, escalated at 2 percent per year from 2005 to 2007.

6.2 Cost of Environmental Measures

Avista proposes to implement a variety of environmental measures under the Proposed Action. Tables 6-4 and 6-5 show the potential costs of individual measures (where known) proposed by Avista for Post Falls HED and for the four Spokane River Project developments in Washington, respectively.

Measures that would affect energy generation include the addition of aesthetic flows at Post Falls HED (energy reduction of 19.2 MWh) and aesthetic flows at Upper Falls HED (energy reduction of 691.0 MWh). The corresponding dependable capacity loss is 0.003 MW at Post Falls and 0.10 MW at the four Spokane River Project developments in Washington. The dependable capacity loss would be proportional to energy loss, permitting the use of a single combined value to represent both energy and capacity losses. Dependable capacity loss is based on modeling estimates using conditions during energy year 2001 (August 2000 through July 2001), which is the most critical recent water year on record.

The total annual cost for environmental measures at Post Falls HED is $1,669,900 plus an additional loss of energy revenues amounting to $21,300. The total annual cost for environmental measures at the four Spokane River Project developments in Washington is $1,497,100 plus an additional loss of energy revenues amounting to $33,900.

Table 6-4. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures proposed by Avista for Post Falls HED.[a]

Environmental Measures	Capital and One-time Costs (2007$)	Annual O&M Costs (2007$)	Periodic O&M Costs	Total Average Annual Cost (2007$)	Reduction in Annual Energy Benefits (2007$)	Notes
Water Resources Measures						
Total Dissolved Gas Control and Mitigation Program (PF-WQ-1)	--	--	$5,400	$5,400	--	b,c
Idaho Water Quality PME (PF-WQ-2)	$15,000	$25,000	$5,400	$32,200	$0	b,c
Aquatic Resources Measures						
Post Falls Fish Protection, Mitigation, and Enhancement Program (PF-AR-1)	--	--	--	--	--	
Spawning and emergence plan compliance	--	--	--	--	--	d
Implementation of 500- to 600-cfs minimum flow below Post Falls, including fixing the drawdown of Coeur d'Alene Lake to begin September 15 each year	--	--	--	--	$20,300	
Support for fishery enhancement	--	$260,000	--	$260,000	--	
Coeur d'Alene Lake Aquatic Weed Management Program (PF-AR-2)	--	$50,000	--	$50,000	--	
Terrestrial Resources Measures						
Coeur d'Alene Lake and tributary erosion control and wetlands and riparian habitat protection and enhancement (PF-TR-1)	--	$500,000	--	$500,000	--	

Environmental Measures	Capital and One-time Costs (2007$)	Annual O&M Costs (2007$)	Periodic O&M Costs	Total Average Annual Cost (2007$)	Reduction in Annual Energy Benefits (2007$)	Notes
Aesthetic Resources Measures						
Post Falls HED aesthetic flows (PF-AES-1)	--	--	$11,100	$11,100	$1,000	d,e
Land Use Measures						
Post Falls HED Land Use Management Plan Implementation PME (PF-LU-1)	--	--	--	--	--	
Land use plan implementation on Project lands	--	$5,000	--	$5,000	--	
Assistance and financial support for enforcement of land and water-based laws and regulations administered by federal, state, local, and tribal governments within their jurisdiction on lands near the Project	--	$12,500	--	$12,500	--	
Recreation Resources						
Post Falls HED Recreation Plan (PF-REC-1)	$15,000	$5,000	--	$6,800	--	
Coeur d'Alene Lake Recreation PME (PF-REC-2)	--	--	--	--	--	
Future recreation project construction or rehabilitation of existing projects at Post Falls HED	--	--	$26,300	$26,300	--	f
Recreation programs and site improvements, operation, and maintenance for Post Falls HED	$982,300	$110,000	$34,700	$227,000	--	g
Post Falls/Spokane River Recreation PME (PF-REC-3)	$215,000	$17,500	--	$43,600	--	h

Environmental Measures	Capital and One-time Costs (2007$)	Annual O&M Costs (2007$)	Periodic O&M Costs	Total Average Annual Cost (2007$)	Reduction in Annual Energy Benefits (2007$)	Notes
Open water boating flows in August	--	--	--	--	--	d,h
Post Falls HED public outreach (PF-REC-4)	--	--	--	--	--	
Interpretation and Education Plan	$25,000	$5,000	--	$8,000	--	
Visitor surveys	$0	--	$12,200	$12,200	--	i
Cultural Resources Measures				--		
Historic Properties Management Plan (PF-CR-1)	--	--	--	--	--	c
Subtotal	$1,252,300	$990,000	$95,100	$1,200,100	$21,300	
Other Items						
Purchase and maintain boat for PME measure implementation (total cost shared 50/50 with four Spokane River Project developments)	$50,000	$5,000	--	$11,100	--	
Support office staff time and expenses associated with new PME measures	--	$406,000	--	$406,000	--	
Provide for administrative overhead costs for new PME measures	--	$52,700	--	$52,700	--	
Total	$1,302,300	$1,441,200	$95,100	$1,669,900	$21,300	

[a] Costs are rounded to the nearest $100 and are in constant 2007 dollars.
[b] Irregular O&M cashflow includes $15,000 per year for the first 5 years of any new license.
[c] Additional costs for aspects of this measure still remain to be determined because the implementation plan has not been developed.
[d] Some costs for this measure are included in the existing facility O&M costs.
[e] Irregular O&M cashflow includes gate maintenance every four years at a cost of $48,600
[f] This irregular cash flow includes an O&M cost of $60,000 per year for years 10 through 30.
[g] This irregular cash flow includes capital cost cash flows of $196,450 in years 1, 3, 5, 7, and 9 and irregular O&M costs of $49,500 for years 5 through 30.
[h] This measure has a negligible energy loss.
[i] Irregular O&M cashflow includes visitor surveys every 6 years costing $90,000 each.

Table 6-5. Summary of capital and one-time costs, annual costs, annual energy costs, and total annualized costs of environmental measures proposed by Avista for the four Spokane River Project developments in Washington.[a]

Environmental Measures	Capital and One-time Costs (2007$)	Annual O&M Costs (2007$)	Periodic Costs	Total Average Annual Cost (2007$)	Reduction in Annual Energy Benefits (2007$)	Notes
Water Resources Measures						
Total Dissolved Gas Control and Mitigation Program (SRP-WQ-1)	--	$50,000	--	$50,000	--	b
Washington Water Quality PME (SRP-WQ-2)	$50,000	--	$5,400	$11,500	--	
Aquatic Resources Measures						
Spokane River Fish Protection, Mitigation, and Enhancement Program (SRP-AR-1)	--	$125,000	--	$125,000	--	
Lake Spokane Aquatic Weed Management Program PME (SRP-AR-2)	--	$25,000	--	$25,000	--	
Terrestrial Resources Measures						
Lake Spokane-Nine Mile terrestrial, riparian and wetland habitat protection (SRP-TR-1)	--	--	--	--	--	
Purchase or acquire easement for new wetland and subsequent restoration	$350,000	--	--	$42,400	--	
200-foot buffer for Avista Project lands	$4,050,000	$20,000	--	$511,100	--	c
Financial support for watershed restoration	--	$10,000	--	$10,000	--	
Project Transmission Line Management Program PME (SRP-TR-2)	--	$6,100	--	$6,100	--	
Aesthetic Resources Measures						
Spokane River Project aesthetic flows (SRP-AES-1)	--	--	--	--	--	
Aesthetic flows at Upper Falls	--	--	$30,900	$30,900	$34,500	b,d
Aesthetic flows at Monroe Street	--	--	--	--	–$600	e

Environmental Measures	Capital and One-time Costs (2007$)	Annual O&M Costs (2007$)	Periodic Costs	Total Average Annual Cost (2007$)	Reduction in Annual Energy Benefits (2007$)	Notes
Land Use Measures						
Project Land Use Management Plan Implementation PME (SRP-LU-1)	--	--	--	--	--	
Land use plan implementation on Project lands	$0	$15,000	--	$15,000	$0	
Assistance and financial support for enforcement of land and water-based laws and regulations administered by federal, state, local, and tribal governments within their jurisdiction on lands near the Project	--	$12,500	--	$12,500	--	
Recreation Resources						
Spokane River Project Recreation Plan (SRP-REC-1)	$10,000	$5,000	--	$6,200	--	
Spokane River recreation (SRP-REC-2)	--	--	--	--	--	
Huntington Park	--	$10,000	--	$10,000	--	d,f
Water Avenue access	$20,000	$5,000	--	$7,400	--	d,f
Spokane River public outreach (SRP-REC-3)	--	--	--	--	--	
Interpretation and Education Plan	$25,000	$3,500	--	$6,500	--	
Visitor surveys	--	--	$11,500	$11,500	--	g
Lake Spokane/Nine Mile Reservoir Recreation PME (SRP-REC-4)	--	--	--	--	--	
Nine Mile Resort development	$250,000	--	--	$33,600	--	h
Ensure continued public access	--	--	$20,500	$20,500	--	i
Recreation programs and site improvements, operation, and maintenance at Nine Mile and Long Lake HEDs	$540,000	$85,000	--	$139,800	--	j
Cultural Resources Measures						
Historic Properties Management Plan (SRP-CR-1)	--	--	--	--	--	b

Environmental Measures	Capital and One-time Costs (2007$)	Annual O&M Costs (2007$)	Periodic Costs	Total Average Annual Cost (2007$)	Reduction in Annual Energy Benefits (2007$)	Notes
Subtotal	$5,295,000	$372,100	$68,300	$1,075,000	$33,900	
Other Items						
Purchase and maintain boat for PME measure implementation (total cost shared 50/50 with Post Falls HED)	$50,000	$5,000	--	$11,100	--	
Support office staff time and expenses associated with new PME measures	--	$363,700	--	$363,700	--	
Provide for administrative overhead costs for new PME measures	--	$47,300	--	$47,300	--	
Total	$5,345,000	$788,100	$68,300	$1,497,100	$33,900	

[a] Costs are rounded the nearest $100 and are in constant 2007 dollars.
[b] Costs for aspects of this measure still remain to be determined because the implementation plan has not been developed.
[c] The capital cost for this measure could range from $1.6 to $6.5 million. We have assumed the midpoint.
[d] Some costs for this measure are included in the existing facility O&M costs.
[e] There is a slight gain in energy under the Proposed Action for this measure, hence the reduction in energy benefits is a negative value.
[f] This measure has a negligible energy loss.
[g] Irregular O&M cashflow includes visitor surveys every 6 years costing $90,000 each.
[h] This measure includes local taxes and insurance applied to the annualized capital cost.
[i] Irregular O&M cashflow includes $300,000 in years 10, 20, and 30 of any new license.
[j] This irregular cash flow includes capital cost cash flows of $125,000 in year 1; $140,000 in year 2; and $275,000 in year 3.

6.3 Comparison of Alternatives

In this section, Avista compares the Project benefits, alternative costs, and net benefits for two alternatives (the No-action Alternative (current Project Operations) and the Proposed Action). We use a consistent set of economic assumptions, as presented in Table 6-1.

6.3.1 No-action Alternative

The annual operating cost of the existing Post Fall HED is about $3,608,700 (46.7 mills/kWh) as summarized in Table 6-6. Under the No-action Alternative, the Post Falls HED would generate an average of 77,281 MWh of electricity annually, and have an annual power value of $3,864,000 (50 mills/kWh). This results in a net annual benefit of $255,300 (3.3 mills/kWh).

The annual operating cost of the existing Project is about $19,027,800 (23.9 mills/kWh) as summarized in Table 6-7. Under the No-action Alternative, the four Spokane River Project developments in Washington would generate an average of 796,639 MWh of electricity annually, and have an annual power value of $39,831,900 (50 mills/kWh). This results in a net annual benefit of $20,804,100 (26.11 mills/kWh).

6.3.2 Proposed Action

Tables 6-6 and 6-7 compare the power value, annual costs, and net benefits for the No-action Alternative to the Proposed Actions for Post Falls HED and four Spokane River Project developments in Washington, respectively.

The annual operating cost of the Post Fall HED Proposed Action is about $5,278,600 (68.6 mills/kWh) as summarized in Table 6-6. Under the Proposed Action, the Post Falls HED would generate an average of 76,855 MWh of electricity annually, and have an annual power value of $3,842,700 (50 mills/kWh). This results in a negative net annual benefit of -$1,435,900 (–18.7 mills/kWh).

The annual operating cost of the four Spokane River Project developments in Washington under the Proposed Action is about $20,524.900 (25.8 mills/kWh) as summarized in Table 6-7. Under the Proposed Action, the four Spokane River Project developments in Washington would generate an average of 795,961 MWh of electricity annually, and have an annual power value of $39,798,000 (50 mills/kWh). This results in a net annual benefit of $19,273,100 (24.2 mills/kWh).

Table 6-6. Summary of the annual net benefits for the No-action Alternative and the Proposed Action for Post Falls HED.

	No Action (current Project operations)	Proposed Action
On-peak energy (MWh)[a]	44,161	43,917
Off-peak energy (MWh)	33,120	32,938
Average annual energy (MWh)[b]	77,281	76,855
Change in average annual energy (MWh)	--	–426
Change of energy relative to current conditions (%)	--	–0.55%
Dependable capacity (MW)	5.85	5.76
Change in dependable capacity (MW)	--	–0.09
Change of dependable capacity relative to current conditions (%)	--	–1.59%
Annual benefit ($)[c]	$3,864,000	$3,842,700
Change in annual benefit from No-action Alternative	--	–$21,300
Annual cost ($)[d]	$3,608,700	$5,278,600
Change in annual cost from No-action Alternative	--	$1,669,900
Change in annual cost from No-action Alternative (%)	--	46.27%
Net annual benefit ($)	$255,300	–$1,435,900
Change in net annual benefit from No-action Alternative	--	–$1,691,200
Change in net annual benefit from No-action Alternative (%)	--	–662.44%

[a] Peak energy is estimated based on Monday through Saturday generation between 6 a.m. and 10 p.m. and is equal to 57.14 percent of average annual energy.

[b] Annual energy value is based on energy years 1979 through 2002 as simulated using an operations model by NHC.

[c] Annual benefits are equal to the current conditions benefit of $3,864,000 plus the corresponding change in benefit for the Proposed Action relative to current Project operations.

[d] This annual cost is the total cost of measures shown in Tables 6-4 and 6-5, plus the No-action annual cost.

Table 6-7. Summary of the annual net benefits for the No-action Alternative and the Proposed Action for four Spokane River Project developments in Washington.

	No Action (current Project operations)	Proposed Action
On-peak energy (MWh)[a]	455,222	454,835
Off-peak energy (MWh)	341,417	341,126
Average annual energy (MWh)[b]	796,639	795,961
Change in average annual energy (MWh)	--	–678
Change of energy relative to current conditions (%)	--	–0.09%
Dependable capacity (MW)	69.47	69.40
Change in dependable capacity (MW)	--	–0.07
Change of dependable capacity relative to current conditions (%)	--	–0.10%
Annual benefit ($)[c]	$39,831,900	$39,798,300
Change in annual benefit from No-action Alternative	--	–$33,900
Annual cost ($)[d]	$19,027,800	$20,524,900
Change in annual cost from No-action Alternative	--	$1,497,100
Change in annual cost from No-action Alternative (%)	--	7.87%
Net annual benefit ($)	$20,804,100	$19,273,100
Change in net annual benefit from No-action Alternative	--	-$1,531,000
Change in net annual benefit from No-action Alternative (%)	--	–7.36%

[a] Peak energy is estimated based on Monday through Saturday generation between 6 a.m. and 10 p.m. and is equal to 57.14 percent of average annual energy.

[b] Annual energy value is based on energy years 1979 through 2002 as simulated using an operations model by NHC. The current conditions baseline includes providing aesthetic flows at Monroe Street, reducing generation by 1,357 MWh, which is equivalent to $67,800 in reduced benefits.

[c] Annual benefits are equal to the current conditions benefit of $39,831,900 plus the corresponding change in benefit for the Proposed Action relative to current Project operations.

[d] This annual cost is the total cost of measures shown as recommended by Avista from Table 6-5 plus the No-action annual cost.

7.0 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Section 4(e) of the FPA provides that, in issuing licenses for non-federal hydropower projects, the Commission shall give equal consideration to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Furthermore, Section 10(a)(1) of the FPA provides that licensed projects "will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, [for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat)], and for other beneficial public uses, including irrigation, flood control, water supply, and recreation [and other purposes referred to in Section 4(e) of the FPA]."

7.1 Summary Environmental and Developmental Effects

In the preceding sections, we have evaluated the environmental and developmental effects of the No-Action and Proposed Action Alternatives. Table 7-1 summarizes key differences related to proposed operational changes regarding lake level management and flow releases; Table 7-2 summarizes the effects of non-operational measures, including PME measures associated with the Proposed Action.

7.2 Recommended Alternative

This section is reserved for later use by Commission staff to identify and explain the alternative recommended by staff to the Commission. It will contain the basis for, and summary of, the Commission staff's recommendations to the Commission for relicensing the Spokane River Project. The Commission staff analysis will consider the comparative environmental effects of the alternatives, their economic effects, and their consistency with relevant agency recommendations, comprehensive plans, and laws and policies.

Table 7-1. Summary comparison of effects of Project operations (lake level management and flow releases).

Resource Area	No-action Alternative (Current Operation)	Proposed Action
Geology and Soils		
Lake level management—erosion	Coeur d'Alene Lake levels would continue to fluctuate following the current pattern. Erosion by boat- and wind-generated waves would continue on the shoreline at the 2,128-foot elevation.	No appreciable changes in shoreline erosion in Coeur d'Alene Lake or along its tributary rivers are anticipated as a result of operational changes. Implementation of the Coeur d'Alene Lake erosion control, riparian and wetland habitat enhancement, and LUMPs would mitigate for any operational effects and provide for resource protection and enhancement (see Table 7-2).
	Lake Spokane would continue to experience isolated areas of erosion along the intercept of steep slopes and the reservoir.	At Lake Spokane, no appreciable change in shoreline erosion is anticipated. Implementation of the riparian and wetland habitat enhancement plan would mitigate for any operational effects and provide for resource protection and enhancement (see Table 7-2). Implementation of the LUMP would further protect remaining undeveloped shorelines from erosion due to development.
Lake level management and flow releases—sediment transport and deposition in Project reservoirs	Sediment would continue to be routed through the upper Spokane River in a relatively natural sediment transport regime. Sediment would continue to deposit within the Nine Mile Reservoir, and Long Lake HED would continue to capture all sediment except for a small amount of suspended sediment.	Sediment deposition characteristics in the reservoirs and sediment transport through the lower Spokane River would be essentially unchanged. Implementation of the Spokane River riparian and habitat management PME measure could help prevent deposition of new sediments from source areas (see Table 7-2).

Resource Area	No-action Alternative (Current Operation)	Proposed Action
Water Quantity		
Lake level management and flow releases	Project reservoirs would continue to be managed as they are currently. Drawdown of Coeur d'Alene Lake would continue to begin in early September. A minimum flow of 300 cfs or an amount equal to the inflow to Coeur d'Alene Lake, whichever is less, would continue to be provided from Post Falls HED.	The Coeur d'Alene Lake drawdown would begin on September 15 each year. A minimum discharge of 600 cfs would be provided year-round from Post Falls HED, with the exception that Avista would reduce the minimum flow to 500 cfs if the lake were drafted more than 3 inches from July through September 15 due to low inflow.
Water Quality		
Lake level management and flow releases	Maintaining Coeur d'Alene Lake at its pool elevation of 2,128 feet through the summer would continue to increase water temperatures at the lake surface. Reduced summer flows released from Post Falls HED would continue. Spilling water at the Long Lake Dam would continue to increase the frequency with which the river downstream exceeds the 110-percent TDG criterion.	Increasing the Post Falls minimum discharge could help reduce summertime maximum temperatures in the Spokane River between Post Falls HED and Barker Road. Increasing the minimum instream flow would also increase minimum DO concentrations downstream. Interim operational measures would be implemented for TDG reduction, and long-term TDG abatement would be pursued (see Table 7-2). Implementation of new water quality measures (see Table 7-2) would mitigate for Project operational effects.

Resource Area	No-action Alternative (Current Operation)	Proposed Action
Aquatic Resources		
Coeur d'Alene Lake water level management	Operation of Post Falls HED would continue to hold Coeur d'Alene Lake water levels near full operating elevation in the summer.	No significant change in water level management would occur. The Post Falls HED fish protection, mitigation, and enhancement measure would mitigate Project-related effects, help protect and enhance the long-term population viability of westslope cutthroat trout and bull trout, and assist the Coeur d'Alene Tribe, IDFG, and FWS in achieving management and recovery goals for native salmonids.
Lake Spokane lake level management	Operation of Long Lake HED could continue to cause winter drawdowns of up to 24 feet, although the current voluntary 14-foot restriction would likely continue.	The 14-foot drawdown restriction would be formalized. Operations that maintain stable reservoir levels in non-winter months would continue to provide favorable habitat for the high-quality warmwater fishery, and support fishery enhancement efforts.
Flow releases	The Post Falls HED minimum-discharge operations could lead to a dewatered shallow fish habitat and loss of favorable habitat for juvenile and adult trout during warm, dry periods when 300 cfs or less is released from Post Falls HED.	The proposed changes in minimum-discharge operations would improve habitat availability for adult and juvenile trout downstream of Post Falls HED compared to current Project operations.
Ramping and potential for stranding	Having no defined ramping rate could result in some stranding of fry and juveniles when flows from Post Falls HED are reduced.	Establishment of a maximum downramping rate at Post Falls HED would reduce the likelihood of fry and juvenile stranding.

Resource Area	No-action Alternative (Current Operation)	Proposed Action
Spawning and fry emergence	Avista would continue to attempt to maintain flows sufficient to keep the majority of redds wetted until fry have emerged. However, there is no certainty the program would continue. Dewatering of rainbow trout spawning redds prior to fry emergence could result in mortality.	The Post Fall HED discharge would be managed based on a defined program to support trout spawning and fry emergence. Based on annual monitoring and consultation with resource agencies, the plan would improve trout fry emergence. Plan updates would be provided at 5-year intervals.
Terrestrial Resources		
Lake level management and flow releases	Coeur d'Alene Lake levels would continue to fluctuate following the current pattern. Erosion would continue on the shoreline at elevation 2,128 feet, with potential loss of habitat. Aquatic plants, including nuisance species, would continue to persist in shallow water zones.	Changes to Project operations would have no additional effects. Implementation of erosion control, habitat enhancement, and weed management measures (see Table 7-2) would mitigate operational effects and enhance current resource conditions.
	Lake Spokane would continue to fluctuate following the current pattern, but with no certainty of a 14-foot drawdown limit.	At Lake Spokane, the 14-foot drawdown limit would be certain. Implementation of riparian and wetland habitat protection and enhancement measures (see Table 7-2) would mitigate for any operational effects and enhance current resource conditions.
Federally Listed Threatened and Endangered Species		
Lake level management and flow releases	There are no known direct Project-related effects on bull trout. Indirect effects of unknown significance include increased water temperatures and some conditions favorable to introduced species.	The Post Falls HED aquatic protection, mitigation, and enhancement measure (see Table 7-2) would compensate for any Project-related effects, help protect and enhance populations of bull trout, and support resource agency and tribal native salmonid management goals.

Resource Area	No-action Alternative (Current Operation)	Proposed Action
	Ongoing wind- and boat-wave erosion could result in potential loss of perch trees for bald eagles.	Implementation of the erosion control and riparian habitat enhancement measures would reduce potential loss of perch trees.
	A continuation of current operations would have no adverse effect on the gray wolf, water howellia, Ute ladies'-tresses, and Spalding's catchfly.	No adverse effects. Implementation of erosion control and habitat enhancement measures could improve conditions for these species.
Cultural Resources		
Lake level management and flow releases	Erosion of archaeological sites, especially along the southern portion of Coeur d'Alene Lake and along the St. Joe and Coeur d'Alene riverbanks, would continue.	Operational changes are not expected to change effects of erosion on archaeological sites. Implementation of the Coeur d'Alene Lake erosion control plan (see Table 7-2) would compensate for operational effects, if any.
Recreational Resources		
Lake level management	There would be no certainty of summer lake level maintenance that supports recreational use.	Fixing the beginning date for the fall drawdown at September 15 would ensure that Coeur d'Alene Lake users know when the drawdown is to begin. Operational changes would not affect the recreational attributes of the lakes.
Flow releases	Navigable flows in the Spokane River would continue to occur during spring, fall, and winter months.	Improved whitewater boating opportunities would be achieved with flows targeted to meet site-specific needs at park-and-play areas. Improved boating opportunities would result from recreational releases during late summer months.
Land Use and Aesthetic Resources		
Lake level management and flow releases	There would be no change in land use or flood management.	There would be no change in land use or flood management related to operational changes. Implementation of the LUMP (see Table 7-2) would improve shoreline management on Avista-owned Project lands.

Resource Area	No-action Alternative (Current Operation)	Proposed Action
Flow releases	There would be no aesthetic flow releases at Post Falls HED or Upper Falls HED. Aesthetic flow releases at Monroe Street HED would continue.	Improved visual resources would be achieved with scheduled aesthetic flow releases in bypassed channels at Post Falls and Upper Falls HEDs. Visual benefits associated with aesthetic flow releases at Monroe Street HED would continue.

Table 7-2. Summary comparison of non-operation effects.

Resource Area	No-action Alternative	Proposed Action
Geology and Soils		
Erosion	Coeur d'Alene Lake levels would continue to fluctuate following the current pattern. Erosion by boat- and wind-generated waves would continue on the shoreline at the 2,128-foot elevation.	Implementation of the Coeur d'Alene Lake erosion control plan would protect specific areas of concern from erosion and would enable the revegetation of sensitive areas.
	Lake Spokane would continue to experience isolated areas of erosion along the intercept of steep slopes and the reservoir.	Implementation of the Lake Spokane riparian and wetland habitat protection and enhancement plan would mitigate any localized erosion and enhance the resource.
Water Quality		
TDG	Spilling water over Long Lake Dam would continue to increase the frequency of exceeding the 110-percent TDG criterion compared to natural conditions. Natural conditions would continue to result in exceedance of the 110-percent criterion at the other hydroelectric developments.	Implementation of interim spill gate protocols for Post Falls and Long Lake HEDs and development and implementation of a TDG abatement plan for Long Lake HED would reduce (and possibly eliminate) the frequency of exceeding water quality standards. Water quality would be enhanced.
Dissolved oxygen	Dissolved oxygen levels below Long Lake would continue to be below water quality standards.	Implementation of a dissolved oxygen enhancement plan would improve water quality downstream and support beneficial uses.
Water quality monitoring	No information would be available to monitor Project-related conditions, and less information would be available to support broader water quality management goals. .	Implementation of a water quality monitoring plan would assist in evaluating the effects of various environmental measures, and support broader agency and tribal water quality management goals.

Resource Area	No-action Alternative	Proposed Action
Aquatic Resources		
Upstream fish migration	Project dams at Long Lake and Nine Mile HEDs would continue to present barriers to upstream resident fish migration, preventing fish in downstream waters from mixing with upstream populations.	No change; upstream migration is not currently seen as a limiting factor on populations.
Entrainment	Although some turbine entrainment may occur at the five Project hydroelectric developments, the risk of the effects of such entrainment influencing affected fish populations would continue to be moderate at Nine Mile HED, and low at the other four HEDs. Populations with potential to be affected at Nine Mile HED are native suckers and minnows, though no evidence suggests current adverse impacts. Survival of fish passing downstream through Project spillways and gates would continue to be about 98 to 99 percent.	Fishery enhancement programs (see below) would mitigate adverse effects if any are identified.
Fishery protection, mitigation, and enhancement programs	The continuation of cooperative activities with WDFW to stock rainbow trout in the Spokane River would continue to provide increased success for anglers and reduce angling pressure on stocks of wild trout.	Providing a long-term commitment for fishery protection and enhancement programs, identified in consultation with the Coeur d'Alene Tribe, WDFW, and IDFG, would benefit westslope cutthroat trout and bull trout in the Coeur d'Alene Basin and wild rainbow trout populations in the Spokane River, maintain and enhance the warmwater fishery in Lake Spokane, enhance angler opportunities, and compensate for any Project-related effects on fish populations.

Resource Area	No-action Alternative	Proposed Action
Terrestrial Resources		
Wetlands	Some wetland/riparian losses would continue due to erosion. There would be no erosion control measures and no wetland and riparian habitat protection and enhancement.	Wetland and riparian areas would be identified for acquisition and/or protection/enhancement. Minor erosion-related wetland/riparian losses would continue. Erosion control measures would reduce wetland/riparian losses and additional riparian and wetland habitat protection and enhancement measures would protect, enhance, and restore habitat areas.
Noxious aquatic weed and invasive plant species	The spread and proliferation of noxious aquatic weeds would continue. There would be no aquatic weed management funding and assistance.	Coeur d'Alene Lake and Lake Spokane aquatic weed management programs would provide funding, assistance for education, monitoring, and management of aquatic weeds.
State-listed plants	Prairie cordgrass would not be adversely affected.	Prairie cordgrass would not be adversely affected.
Culturally significant plant species	Some potential loss of culturally significant species due to erosion would continue. There would be no erosion control measures and no wetland and riparian habitat protection and enhancement measures.	Minor erosion-related wetland/riparian losses, which could include culturally significant species, would continue. Coeur d'Alene Lake erosion control measures would reduce wetland/riparian losses. Wetland and riparian areas, including areas containing culturally significant species, would be identified for acquisition, protection, and/or enhancement.

Resource Area	No-action Alternative	Proposed Action
Wildlife species	Minor losses of habitat due to erosion would continue. There would be no erosion control measures or habitat acquisition and protection plans. Additionally, there would be no formal Avista transmission line policy applied to the Project transmission line.	Minor losses of habitat due to erosion would continue. Erosion control measures would be implemented in specific areas upstream of Post Falls HED. Avista-owned lands within 200 feet of the Lake Spokane shoreline would be included within the Project boundary and managed as appropriate under Avista's LUMP. Project transmission line policies would be formalized.
Special status wildlife species	There would be no protection of wildlife habitat along the Lake Spokane shoreline and no formalization of Avista transmission line policies.	An additional 320 acres of land, including some wildlife habitat, would be protected along the Lake Spokane shoreline. Avista's Project transmission line and policies would be formalized.
Federally Listed Threatened and Endangered Species and Essential Fish Habitat		
Wildlife species	There would be no formalization of Avista transmission line policies.	Project transmission line management and policies would be formalized, potentially benefiting wildlife species. Implementation of erosion control and habitat protection and enhancement plans would improve conditions for wildlife.
Cultural Resources		
Ongoing cultural resources needs	There would be no HPMP and cultural resources would continue to be managed when specific projects trigger regulatory requirements.	HPMPs would provide for ongoing identification, evaluation, and protection of historic properties and management of cultural resources important to the Coeur d'Alene Tribe, Spokane Tribe of Indians, Confederated Tribes of the Colville Reservation, and the community.

Resource Area	No-action Alternative	Proposed Action
Recreational Resources		
Developed recreation	The Project would continue to provide recreational opportunities at existing developed recreational facilities, some of which do not meet user needs and are in poor condition.	Significant and diverse improvements would be made at numerous recreational sites along the Project waters. Additional improvements over the term of the license would address changing use levels and trends.
	No funds would be provided to address deferred maintenance at developed recreation facilities.	Funding reconstruction of facilities would enhance visitor experiences and safety.
	No new recreational facilities would be provided in the Project	New public access sites, camping, mooring and boat launch facilities would be provided throughout the Project area, including Coeur d'Alene Lake, the Spokane River, and Lake Spokane.
Dispersed recreation	Informal dispersed campsites associated with Lake Spokane, some of which are located in environmentally sensitive areas, would continue to be used.	Informal campsites located on Lake Spokane would be hardened or closed and new campsites would be built where compatible with natural and cultural resource protection goals.
Recreational safety	There would be no plan to address boating safety on Coeur d'Alene Lake.	Providing boating safety information and signage and removing pilings, stumps, and abandoned docks would reduce the incidence of boating accidents and improve public safety.
Public Education and Law Enforcement	Illegal fishing pressure on wild rainbow trout would continue to have a negative impact on fish populations in the Spokane River.	Providing funds to develop public information, education, and law enforcement programs in the Project area would reduce the incidence of illegal help harvest in the Spokane River and benefit resident fish populations.

Resource Area	No-action Alternative	Proposed Action
Flow information system	There would be no plan to provide public flow information about releases from Post Falls HED.	Publishing flows from Post Falls gaging station would improve real-time flow information.
Land Use and Aesthetic Resources		
Land management and use	Current land uses and management would continue with no provisions in the existing license to guide land management decisions or to support compliance with applicable land use requirements.	Public access to Project lands would be enhanced through education and interpretation measures and the development of new recreation facilities. The LUMP would provide a systematic approach to land stewardship, resource, habitat protection, and public access on Avista-owned Project lands. Compliance with applicable land use requirements and policies would improve through LUMP and I&E Plan implementation.
Aesthetics	There would be no new aesthetic flows. The 200 cfs aesthetic spill would continue at Monroe Street HED.	Aesthetic flows would be provided at Post Falls and Upper Falls, improving Project aesthetics and visitor experience. The current Monroe Street spill would continue.
Public information, interpretation, and education	There would be no plan to provide information to visitors about low-impact uses, and visitors would continue to litter, cause noise, damage vegetation, contribute to shoreline erosion and water pollution, and disturb wildlife.	A comprehensive interpretation and education plan would be developed to encourage appropriate behavior, thereby reducing trash, sanitation problems, and other actions that could degrade natural or cultural resources.
	Avista would lack information to identify trends in visitor use.	Visitor surveys would track trends and help ensure that public recreation and information needs are met.

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8.0 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We have identified 17 comprehensive plans that are applicable to the Spokane River Project; they are analyzed below.

8.1 Plans Applicable in Both Washington and Idaho

8.1.1 Northwest Conservation and Electric Power Plan, Columbia River Basin Fish and Wildlife Program

The Northwest Power Act of 1980 mandated that Idaho, Montana, Oregon, and Washington prepare and adopt "a regional conservation and electric power plan." The states formed the NPPC to implement the Act, and subsequently issued the 1986 *Northwest Conservation and Electric Power Plan* (NPPC, 1986) and the 1987 *Columbia River Basin Fish and Wildlife Program* (NPPC, 1987). Refer to Section 4.3.7, *Pacific Northwest Power Planning and Conservation Act*, for a description of the federal agency requirements under this program.

8.1.2 North American Waterfowl Management Plan

The North American Waterfowl Management Plan (FWS, 1986), signed by Canada and the United States in 1986, included a Strategy for Cooperation in the conservation of waterfowl. The plan emphasized the importance of setting out a blueprint to develop public-private partnerships to conserve habitats important to waterfowl, to continually improve the scientific understanding of waterfowl populations and their interactions with habitats, and to periodically update the plan. In 1994, the plan (*1994 Update: Expanding the Commitment*) was updated and became a truly continental effort when Mexico joined Canada and the United States as a signatory. Although the principles and the waterfowl population goals in *Expanding the Commitment* remained the same as in the 1986 plan, habitat objectives increased fourfold. In 1998, the plan was again updated *(1998 Update: Expanding the Vision),* recognizing that the socioeconomic context for waterfowl conservation in North America is changing rapidly, with waterfowl conservation linked to a wide range of social and economic policies and programs and to other international wildlife conservation interests. Measures included in the Proposed Action would be consistent with the objectives of this plan to conserve waterfowl habitat.

8.1.3 Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service

The National Recreational Fisheries Policy (National Policy) was adopted by the FWS in 1988 and structured as a rallying point for agencies, organizations, and individuals across the nation to enhance the vitality of recreational fisheries at the local, state, and national levels (FWS, 1989). *Fisheries USA* is the title given to the Service Recreational Fisheries Policy, the policy through which the FWS recognizes its role and responsibilities in the National Policy. *Fisheries USA* includes four goals: (1) effect the preservation and/or increased productivity of fishery resources; (2) ensure and enhance the quality, quantity, and diversity of recreational fishing opportunities; (3) develop and enhance partnerships between governments and the private sector for conserving and managing recreational fisheries; and (4) cooperate to maintain a healthy recreational fisheries industry. The policy also provides specific strategies for each goal. Measures included in the Proposed Action would be consistent with the objectives of this policy to enhance the vitality of recreational fisheries.

8.2 Plans Applicable in Idaho

8.2.1 Idaho Panhandle National Forest Plan

Each national forest has a Land and Resource Management Plan. This document, often referred to as the Forest Plan, describes how the forest will be managed for the 10- to15-year period after it is adopted. The Forest Plan for the Idaho Panhandle National Forests was adopted in September 1987 (FS, 1987). Since then, there have been a number of programmatic amendments to the plan, with each programmatic amendment changing the Forest Plan direction for the duration of the plan. Measures included in the Proposed Action would be consistent with the objectives of the Forest Plan, including recreation-related objectives.

8.2.2 Idaho Fisheries Management Plan, 1986–1990

This plan (IDFG, 1986) is updated periodically to provide agency direction for 5-year periods, most recently for 2001–2006 (IDFG, 2001). This plan provides the following detailed objectives for the fishery resource: (1) increase emphasis on habitat protection; (2) continue emphasis on protecting and enhancing wild trout; (3) continue emphasis on hatchery trout programs in streams, lakes, and reservoirs; and (4) continue emphasis on protecting and enhancing salmon and steelhead. The plan also provides specific management direction for, and lists objectives and programs specific to, each drainage. Measures included in the Proposed Action would be consistent with the objectives of this plan to protect and enhance wild trout.

8.2.3 Idaho Water Quality Standards [IDAPA 58.01.02] and Wastewater Treatment Requirements

This document is updated annually or more frequently (letter from E. Tulloch, Water Quality Regional Manager, IDEQ, Coeur d'Alene, Idaho, to B. Howard, Project Manager, Avista, Spokane, Washington, May 23, 2005). It establishes water quality standards applicable to the Project reservoirs and downstream flows. Idaho subbasins within the Project area include the Coeur d'Alene Lake, St. Joe, and Upper Spokane subbasins). Each of these subbasins includes a number of "waterbody units," some of which include Idaho waterbody designations to protect water quality for existing or designated uses. Uses applicable to at least one of the Project area waterbodies include coldwater communities; salmonid spawning; primary contact recreation; recreational and cultural use; domestic, agricultural, and industrial water supply; wildlife habitat; aesthetics; bull trout; and special resource water. Measures included in the Proposed Action are designed to improve compliance with water quality standards, and thus would be consistent with the plan.

8.2.4 Idaho Outdoor Recreation Plan and Idaho Comprehensive Outdoor Recreation and Tourism Plan

The 1983 *Idaho Outdoor Recreation Plan* was replaced by the 1997 *Idaho Comprehensive Outdoor Recreation and Tourism Plan*, which was updated in 1998 under the title *State Comprehensive Outdoor Recreation and Tourism Plan* and in 2003 as the *Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan 2003–2007* (IDPR, 1983, 1997, 1998, 2003). Each plan assesses recreation needs throughout the state and discusses how they should be met. The latest document (IDPR, 2003) reports the projections made for the Rocky Mountain Region as part of the National Survey on Recreation and the Environment. Participation in water-based recreational activities is projected to grow faster than population growth in the Rocky Mountain region for at least the next several years. Activities available at the Project-area sites that are expected to see a 30+ percent increase in the number of participants over 20 years include cross-country skiing, visiting historic sites, sightseeing, and non-consumptive wildlife-related activities, such as wildlife viewing. The Rocky Mountain region projections also show an increase in hunting and fishing. Measures included in the Proposed Action would be consistent with the objectives of this plan to accommodate growing participation in water-based recreation.

8.2.5 State Water Plan

The 1986 State Water Plan was revised in 1992 (IWRB, 1986, 1992). The plan establishes objectives and policies that apply generally throughout the state. Objectives and policies are directed at water use, conservation, protection, management, and river basins. Among the objectives and policies relevant to the Spokane River Project are the following: (1) include certain non-consumptive water uses (including fish and wildlife habitat and hydropower) as beneficial uses; (2) protect against "unreasonable contamination or deterioration in quality" to maintain designated beneficial uses; (3) consider public interests in decision making to maintain sustainable populations of species threatened by human actions and cooperate in efforts to conserve and restore listed species; (4) protect "the ecological viability of riparian habitat and wetlands," (5) consider public interest, existing water rights, related settlement agreements, and future water and energy needs of the state in hydropower licensing; and (6) allow for the establishment of minimum flows for rivers and streams within the state.

The plan lists licensed water rights for minimum stream flows on selected rivers within the Project area, including the Coeur d'Alene, St. Joe, St. Maries, and Spokane rivers (IDWR, 2004). Measures included in the Proposed Action would be consistent with the objectives of this plan.

8.3 Plans Applicable in Washington

8.3.1 Spokane Resource Area Management Plan and Final Environmental Impact Statement

This amended plan (BLM, 1992) supplements the Spokane District Resource Area Management Plan/Environmental Impact Statement and Record of Decision of May 1987. It addresses the leasing of all the Federal Mineral Estate in eastern Washington except for land administered by the FS and Indian Lands. Other resource programs addressed in this plan include off-road vehicle designations and special management areas. Measures included in the Proposed Action would be consistent with the objectives of this plan with respect to special management areas.

8.3.2 Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy

In 1994, the FS and BLM developed an ecosystem-based aquatic-habitat and riparian-area management strategy on lands they administer (commonly referred to as PACFISH) for Pacific salmon, steelhead, and sea-run cutthroat trout habitat. The strategy was developed in response to information documenting broad declines in naturally reproducing Pacific salmon, steelhead, and sea-run cutthroat trout, and widespread degradation of habitat upon which these anadromous fish depend. The assessment analyzed a range of interim strategies for arresting the degradation and beginning the restoration of aquatic and riparian ecosystems during the 18 months following adoption of the document while a longer-term strategy was developed and evaluated.

As a companion document to the protection provided for anadromous fish by PACFISH, the Inland Native Fish Strategy environmental assessment (FS, 1995) is intended to provide interim direction to protect habitat and populations of resident native fish outside of anadromous fish habitat. Long-term management direction is being developed through two ecosystem-based environmental impact statements that are being developed for National Forest System lands and lands administered by the BLM in the Interior and Upper Columbia River basins. Measures included in the Proposed Action would be consistent with the objectives of this plan to protect and enhance native fish, including wild trout.

8.3.3 An Assessment of Outdoor Recreation in Washington State: A State Comprehensive Outdoor Recreation Planning (SCORP) Document 2002–2007

This document, along with its implementing legislation (RCW 79A.25.020 (3)), presents the state's strategic plan for the acquisition, renovation, and development of recreational resources and preservation of open space (ICOR, 2002). It specifically recommends that hydropower operators "…enhance inventory with trails and paths for walking and bicycling, manage shoreline camping, improve access for on-water recreation, and improve opportunities for non-consumptive interaction with nature, including fish and wildlife." Measures included in the Proposed Action would be consistent with the objectives of this plan with respect to all of the noted recommendations for hydropower operators.

8.3.4 Statute Establishing the State Scenic River System, Chapter 79.72 RCW

The Washington State Scenic Rivers Program was created by the Legislature in 1977 (RCW 79.72) for the purpose of balancing the use and development of rivers with an effort to protect some of Washington's rivers (Chapter 79.72 RCW). The list of scenic rivers does not include the Spokane River (WSPRC, 1988a,b); however, RCW 79.72.080 was later re-codified as RCW 79A.55.070, which includes the Little Spokane River from the upstream boundary of the boat put-in site near Rutter Parkway and downstream to its confluence with the Spokane River. Measures included in the Proposed Action would be consistent with the objectives of this plan to protect the values for which scenic rivers were established.

8.3.5 Water Resources Management Program—Little Spokane River Basin

This program document sets forth the management policies on water resources in the Little Spokane River Basin. The program (1) establishes "base flows" necessary for preserving instream values, (2) declares beneficial-use priorities, (3) closes certain streams and all natural lakes in the basin to further consumptive appropriation except for domestic and stock watering uses, (4) allocates public water by specific quantities to specific stream management units and specific use priority categories, and (5) sets forth water resources administrative procedures.

The primary goal of the Little Spokane River Basin Water Resources Management Program is "to protect and fully utilize" the basin surface and groundwater resources "for the greatest benefit to the people of the State of Washington." This management policy establishes base flows necessary to provide for preservation of wildlife, fish, and scenic, aesthetic, and other environmental values of the perennial stream and rivers at four control stations along the Little Spokane River. All future water rights are to be restricted by these flow levels. Where there are surface waters available in excess of the base flows and actual consumption under existing water rights, priorities are established among different uses and the amounts of water are specified for future appropriation for beneficial uses. This management policy also declares closures (except for domestic and riparian livestock uses) from future surface water appropriation on certain streams in cases where sufficient water is not available. Measures included in the Proposed Action would be consistent with the objectives of this plan to protect and fully use the Little Spokane River Basin surface and groundwater resources.

8.3.6 State Wetlands Integration Strategy

The Washington State Wetlands Integration Strategy was established to develop and implement a more coordinated system for protecting state wetland resources (WDOE, 1994). Measures included in the Proposed Action would be consistent with the objectives of this strategy to protect state wetland resources.

8.3.7 Application of Shoreline Management to Hydroelectric Developments

The purpose of the Washington State Shorelands and Water Resources Program, pursuant to the Water Resources Act of 1971, is to provide guidelines to facilitate development of the water resources to the extent they are available for further appropriation (WDOE, 1986). Measures included in the Proposed Action would be consistent with the objectives of this program to facilitate reasonable development while protecting state shorelands and water resources.

8.3.8 Hydroelectric Project Assessment Guidelines

These guidelines, originally issued by the Washington Department of Game in 1987, were updated in 1995 to explain management goals and provide instructions for gathering information that the WDFW considers necessary to assess potential impacts on fish and wildlife and their habitat (WDG, 1986; WDF, 1987; WDFW, 1995). WDFW was an active participant in formulating many of the resource studies conducted for the Spokane River Project relicensing; therefore, its data collection guidance has been considered in the study process.

8.3.9 State of Washington Natural Heritage Plan

The Washington Natural Heritage Plan identifies natural areas for potential preservation under state law (WDNR, 1987). Areas are selected for protection based on the presence of priority ecosystems and species. The plan also identifies methods of protection and responsible agencies. It is periodically updated to reflect current listings under the Washington Natural Heritage Program (WDNR, 1995, 2003). The program identifies special plants and some animals, terrestrial ecosystems, wetland and aquatic ecosystems, and unique geologic features throughout the state. This program identifies rare, threatened, and endangered species in the Project area. Measures included in the Proposed Action would be consistent with the objectives of this plan to protect rare, threatened, and endangered species in the Project area.

9.0 FINDING OF (NO) SIGNIFICANT IMPACT

This section is reserved for later Commission staff use. It will include a finding as to whether the proposed action would likely have a significant effect on the environment. If so, an EIS may need to be prepared. If not, a Finding of No Significant Impact is prepared.

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APPENDIX A

Spokane River Hydroelectric Project

Maps

APPENDIX A—MAPS

Appendix A consists of Project plan drawings and color maps that support the analysis contained in the Applicant-Prepared Preliminary Draft Environmental Assessment along with Project plan drawings.

The maps and drawings contained in this appendix are listed in the table below.

Spokane River Project maps.

Figure Number	Figure Title
3-1	Spokane River Project boundary—Post Falls HED
3-2	Spokane River Project boundary—Upper Falls and Monroe Street HEDs
3-3	Spokane River Project boundary—Nine Mile HED
3-4	Spokane River Project—Long Lake HED
3-5	Spokane River Project—Post Falls HED general plan
3-6	Spokane River Project—Monroe Street HED general plan
3-7	Spokane River Project—Nine Mile HED general plan
3-8	Spokane River Project—Long Lake HED general plan
5-5	Bathymetry of Coeur d'Alene Lake
5-8	Coeur d'Alene River subbasin
5-9	Spokane River subbasin
5-24	Plant survey sites in the Spokane River Project area
5-27	Spokane area whitewater boating resources

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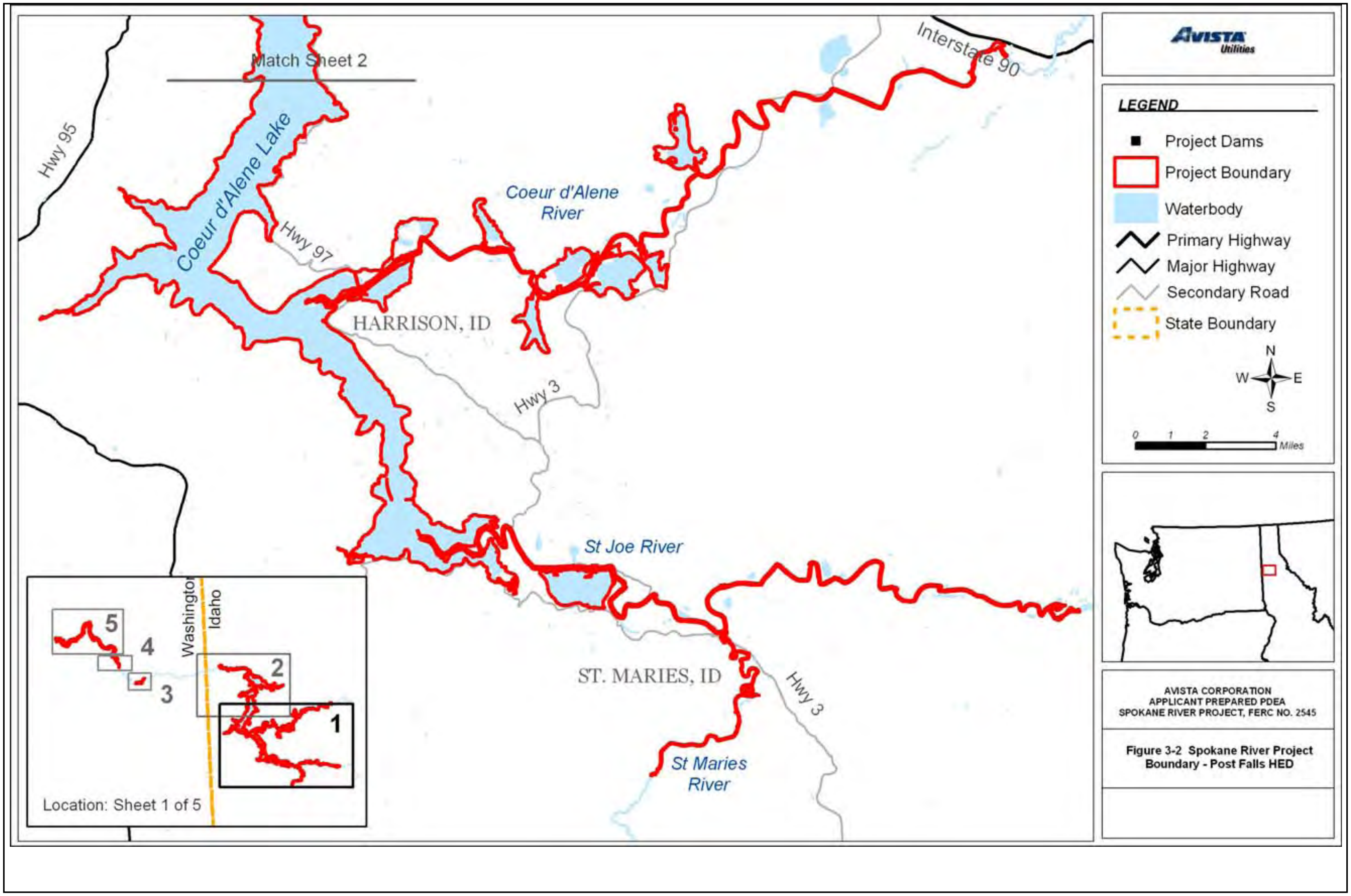

Figure 3-1a. Spokane River Project boundary—Post Falls HED. (Source: Avista, 2002)

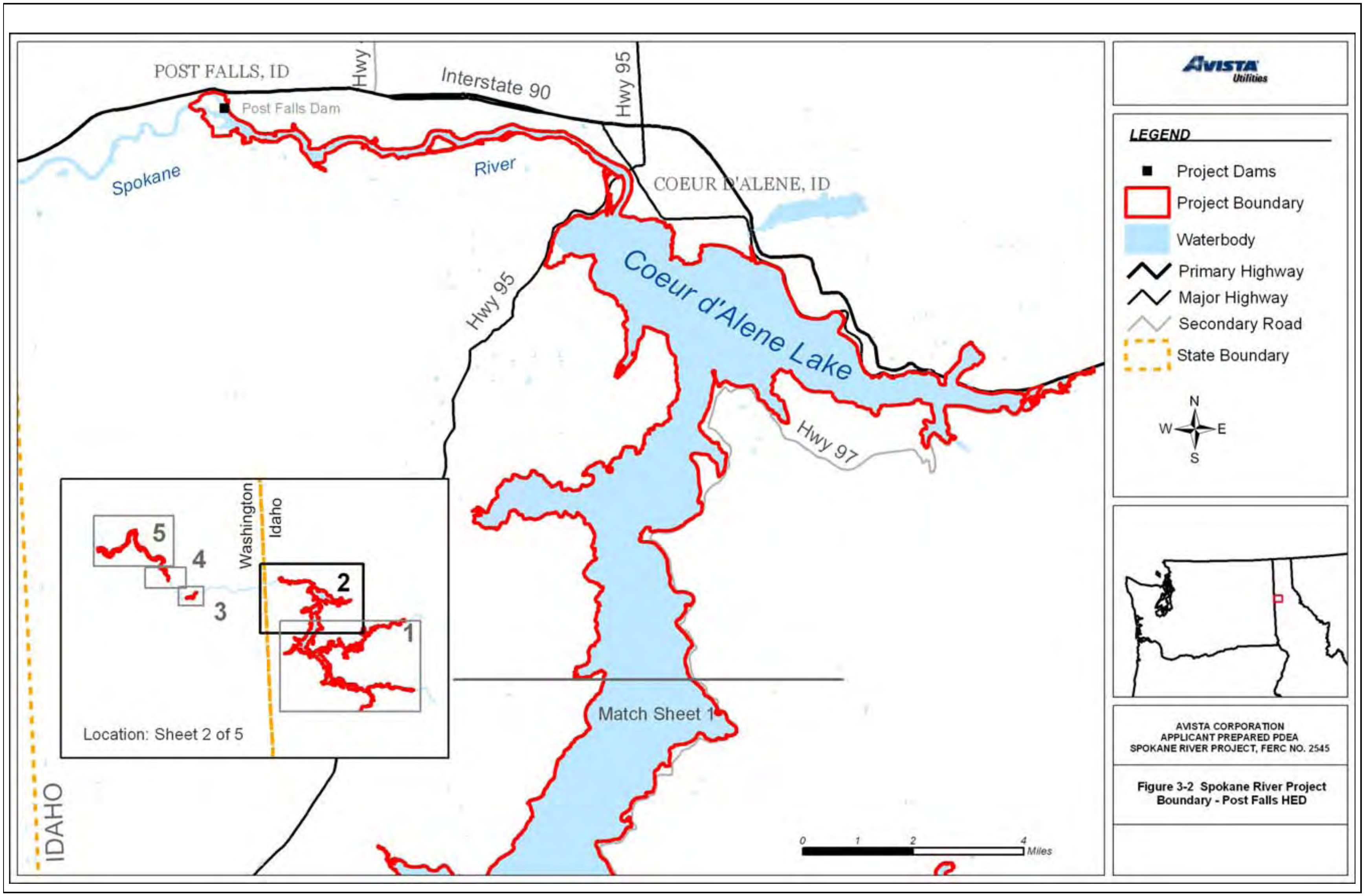

Figure 3-1b. Spokane River Project boundary—Post Falls HED (continued). (Source: Avista, 2002)

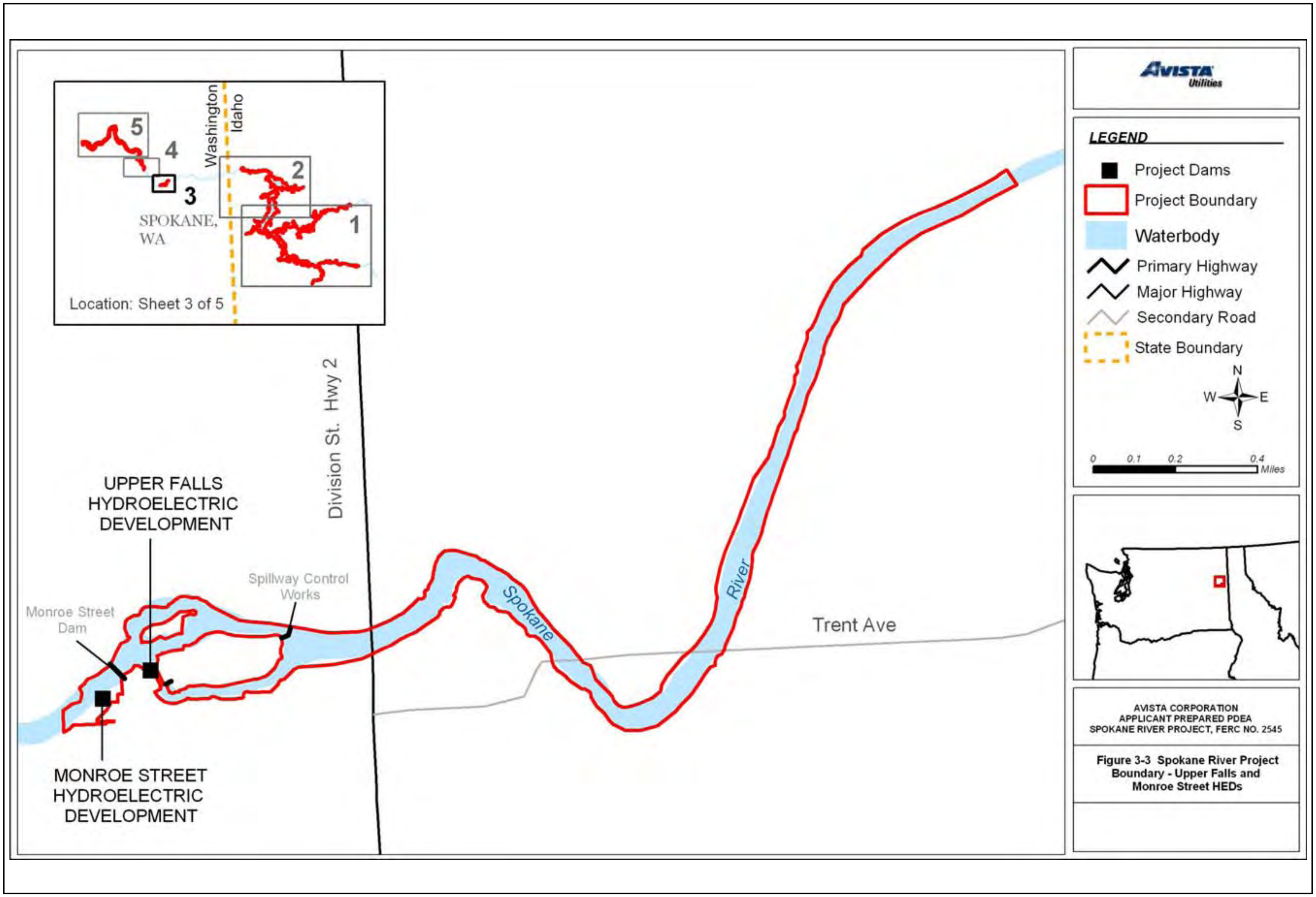

Figure 3-2. Spokane River Project boundary—Upper Falls and Monroe Street HEDs. (Source: Avista, 2002)

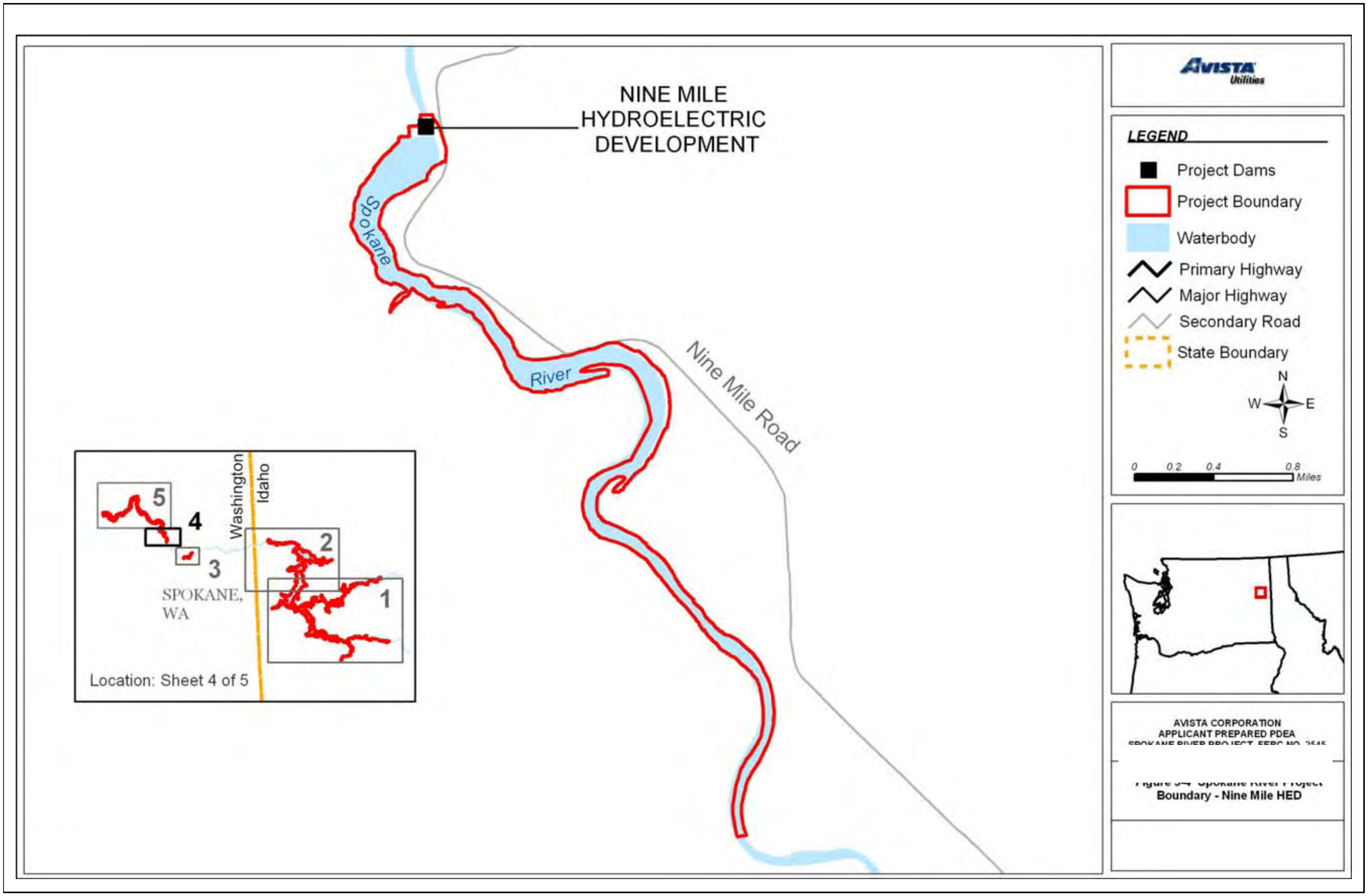

Figure 3-3. Spokane River Project—Nine Mile HED. (Source: Avista, 2002)

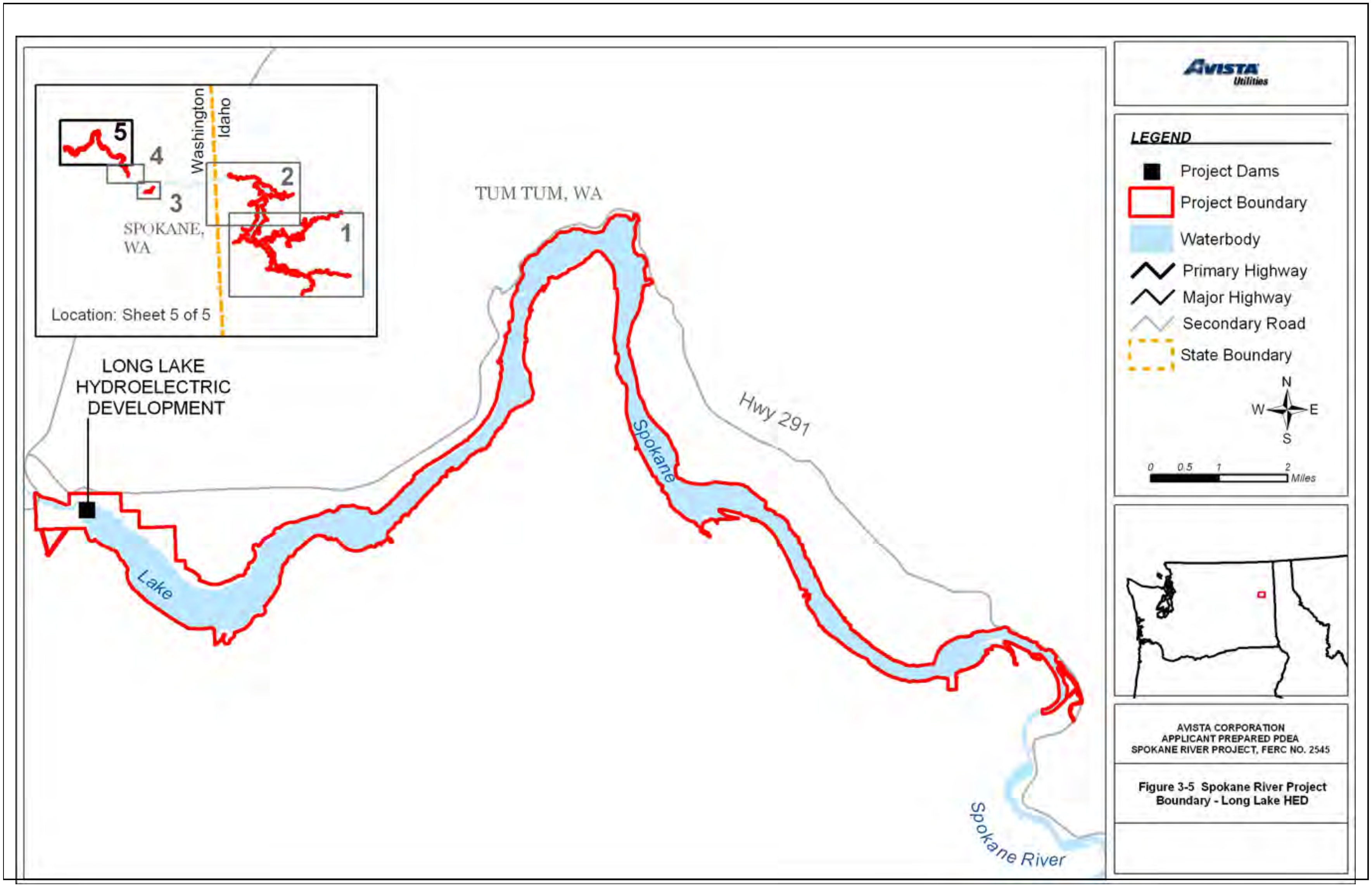

Figure 3-4. Spokane River Project—Long Lake HED. (Source: Avista, 2002)

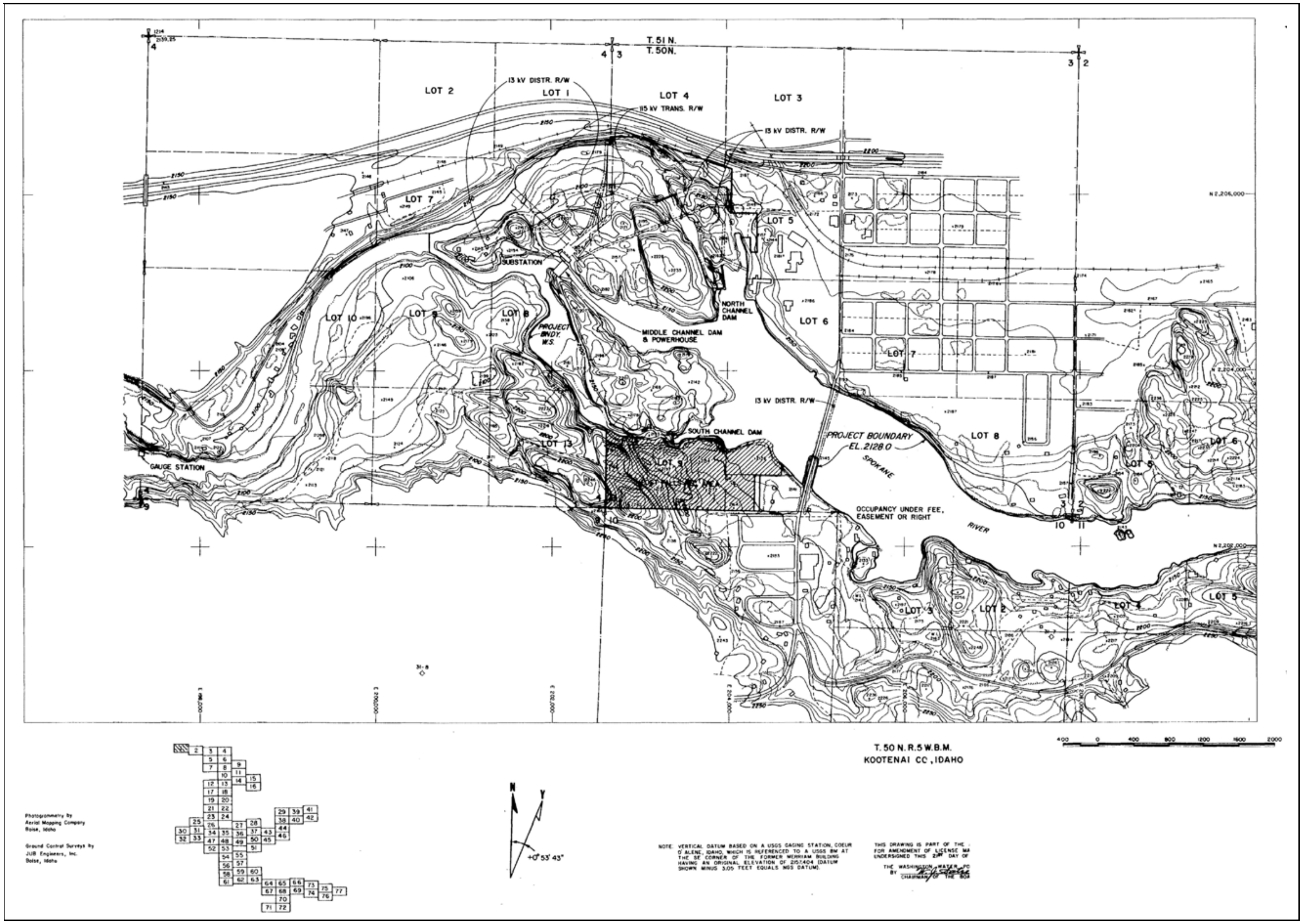

Figure 3-5. Spokane River Project Post Falls HED general plan. (Source: Avista, 2002)

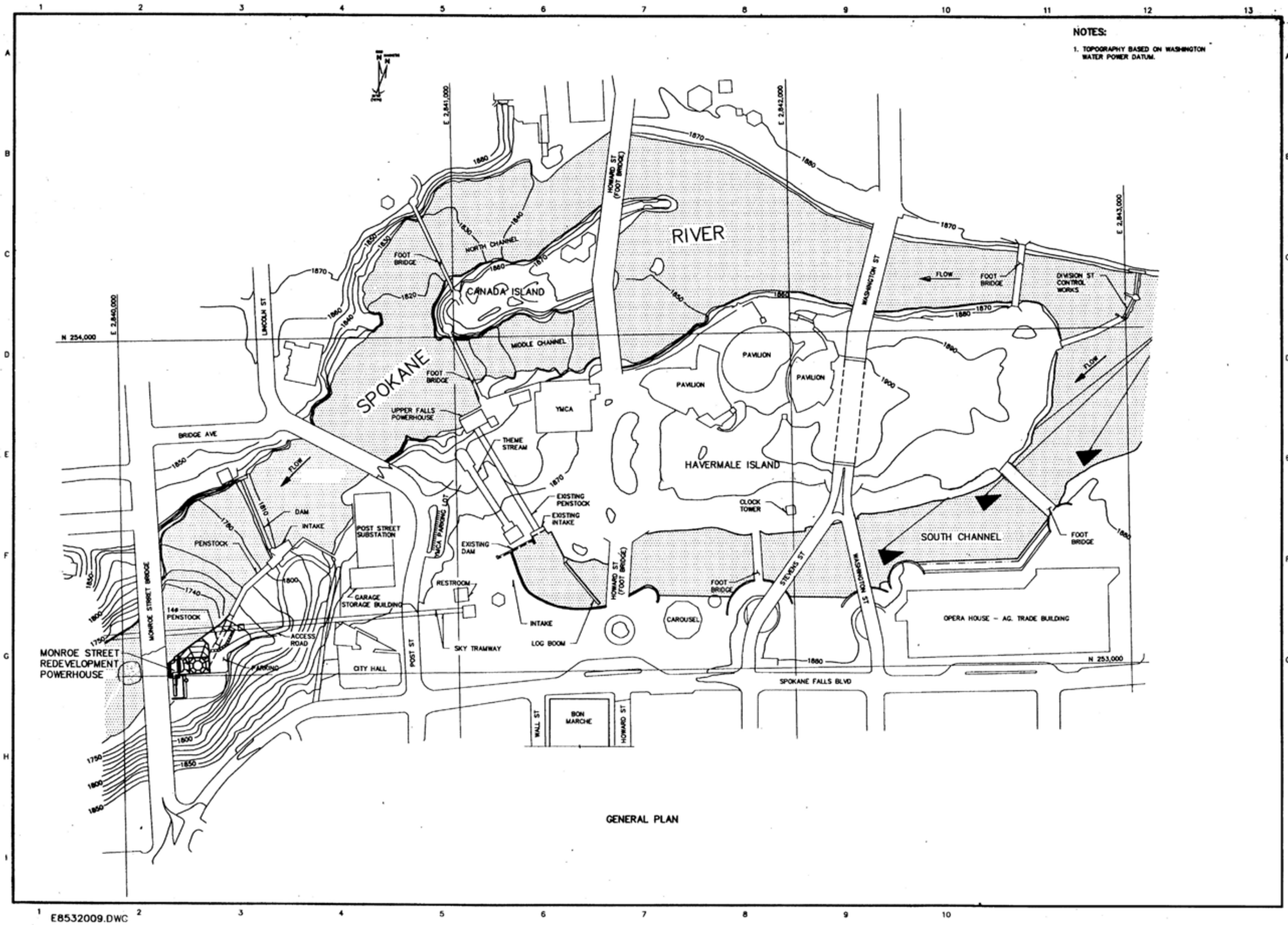

Figure 3-6. Spokane River Project Monroe Street HED general plan. (Source: Avista, 2002)

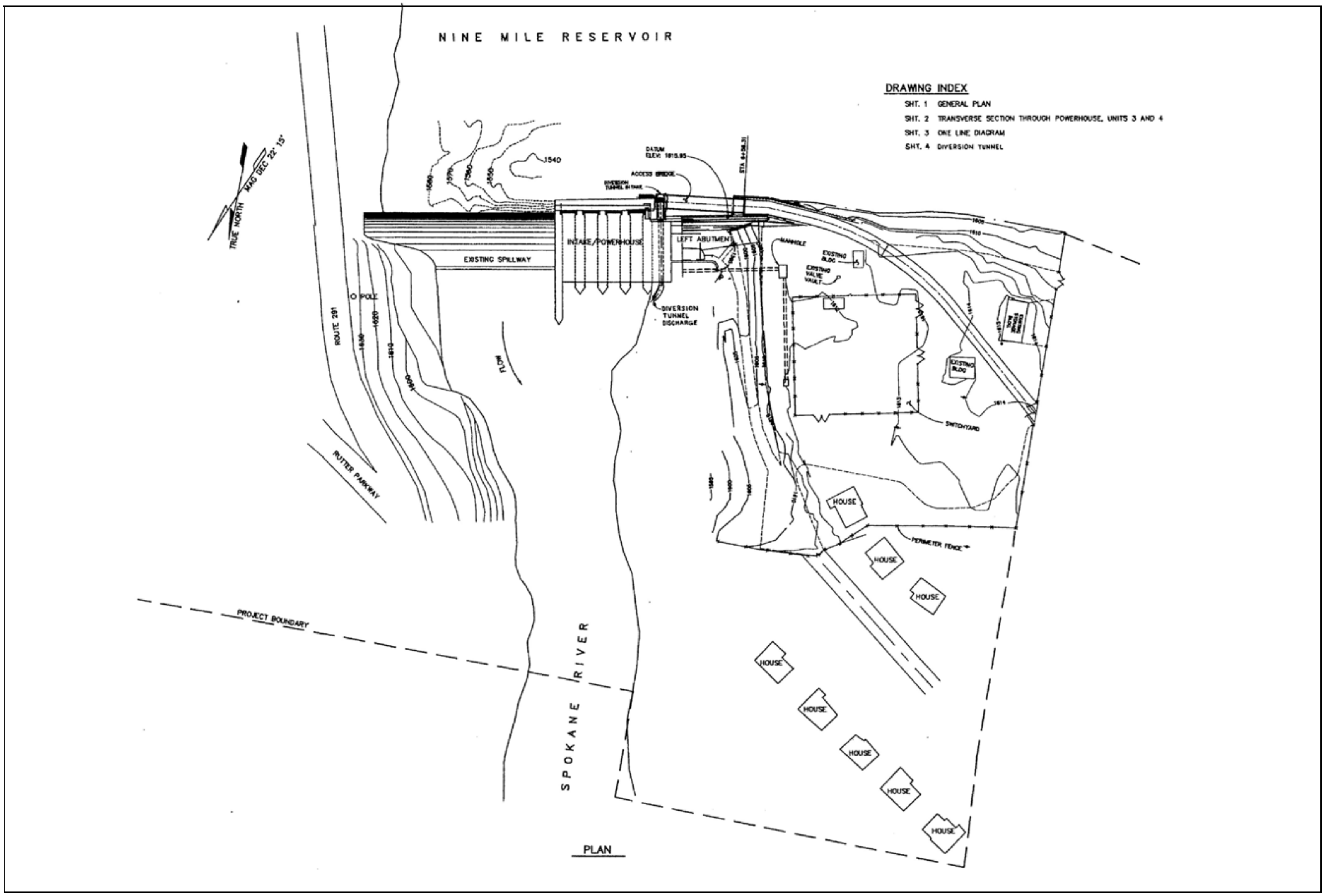

Figure 3-7. Spokane River Project Nine Mile HED general plan. (Source: Avista, 2002)

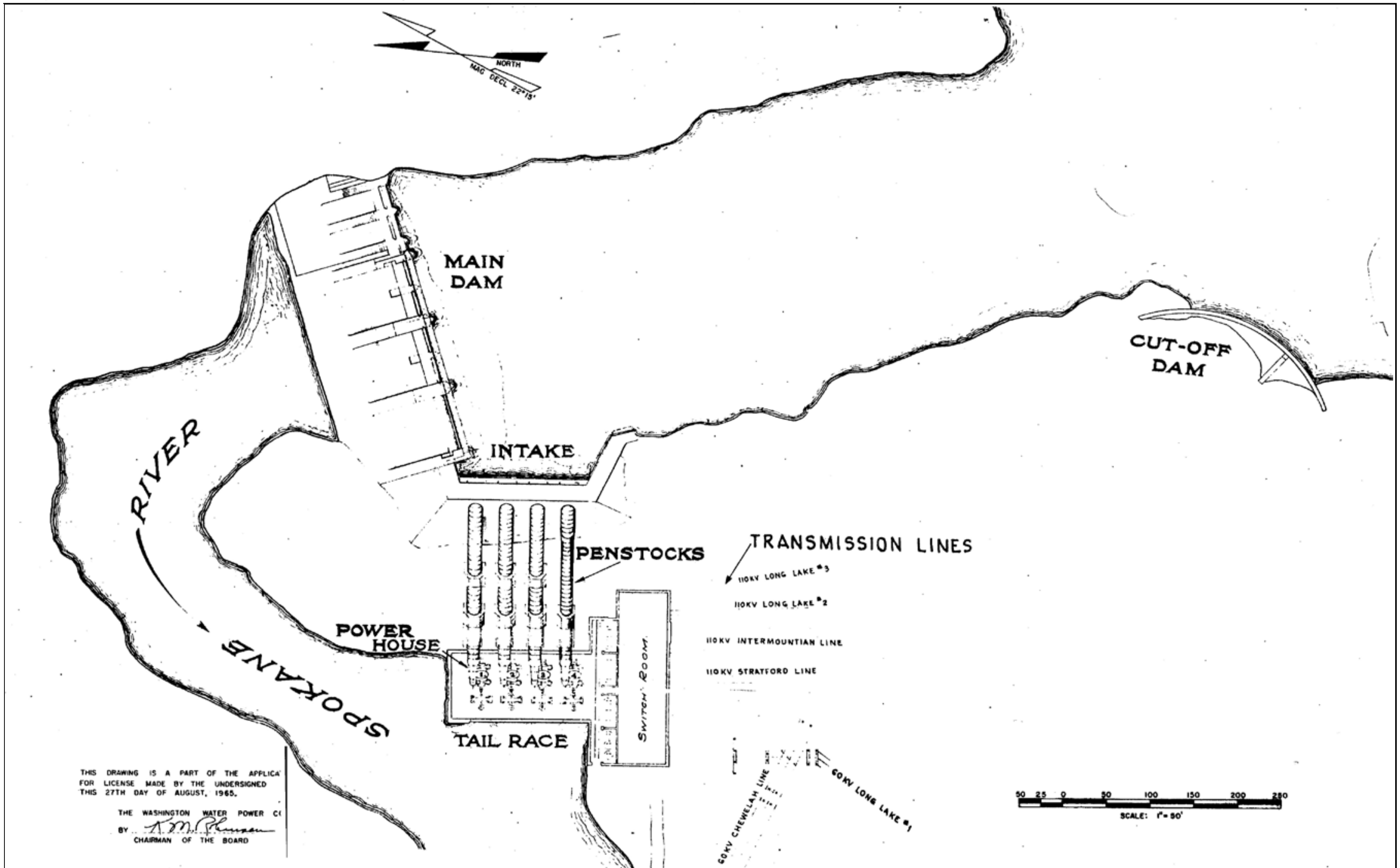

Figure 3-8. Spokane River Project Long Lake HED general plan. (Source: Avista, 2002)

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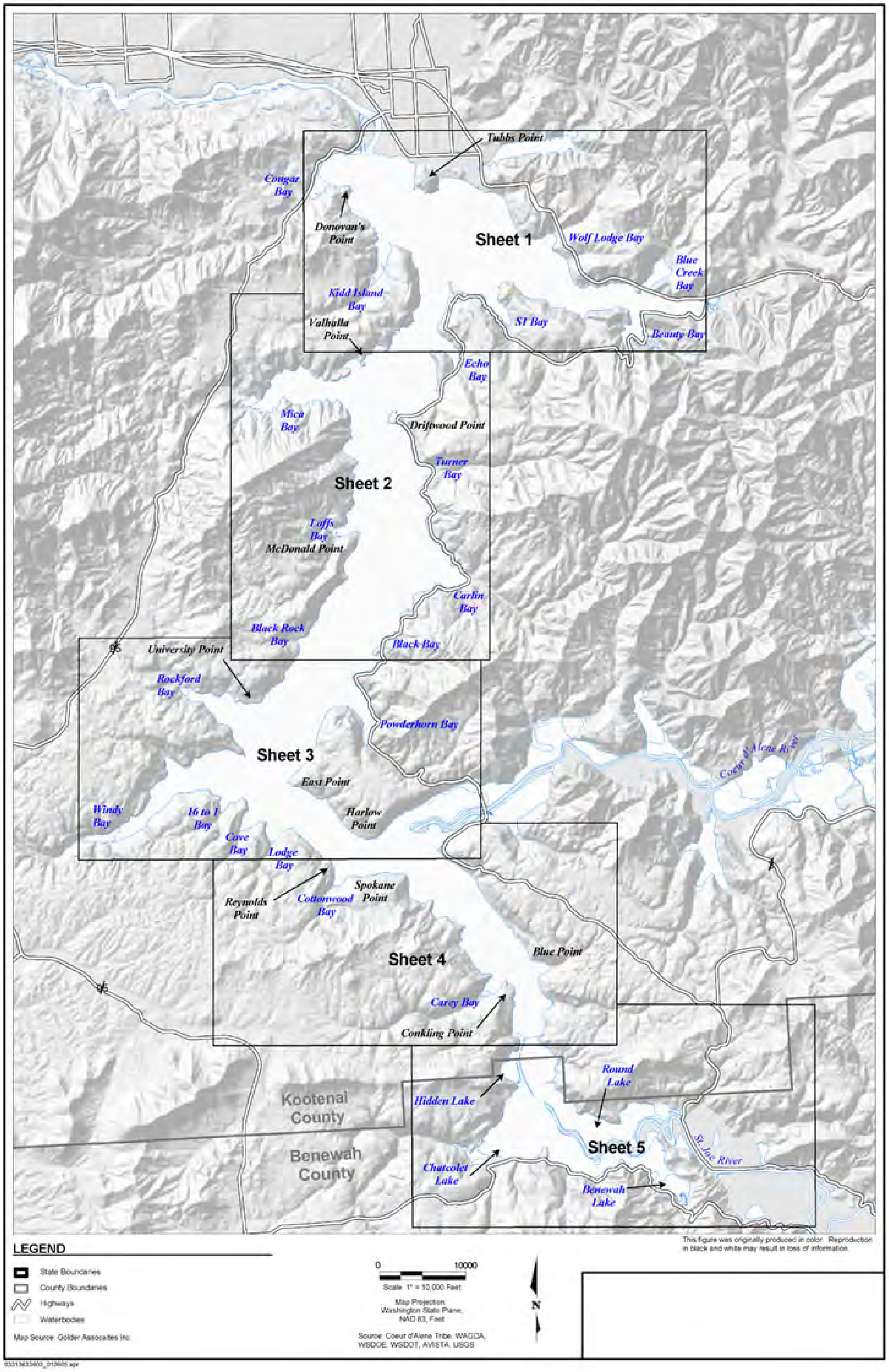


Figure 5-5. Bathymetry of Coeur d'Alene Lake (see following series of 5 maps).

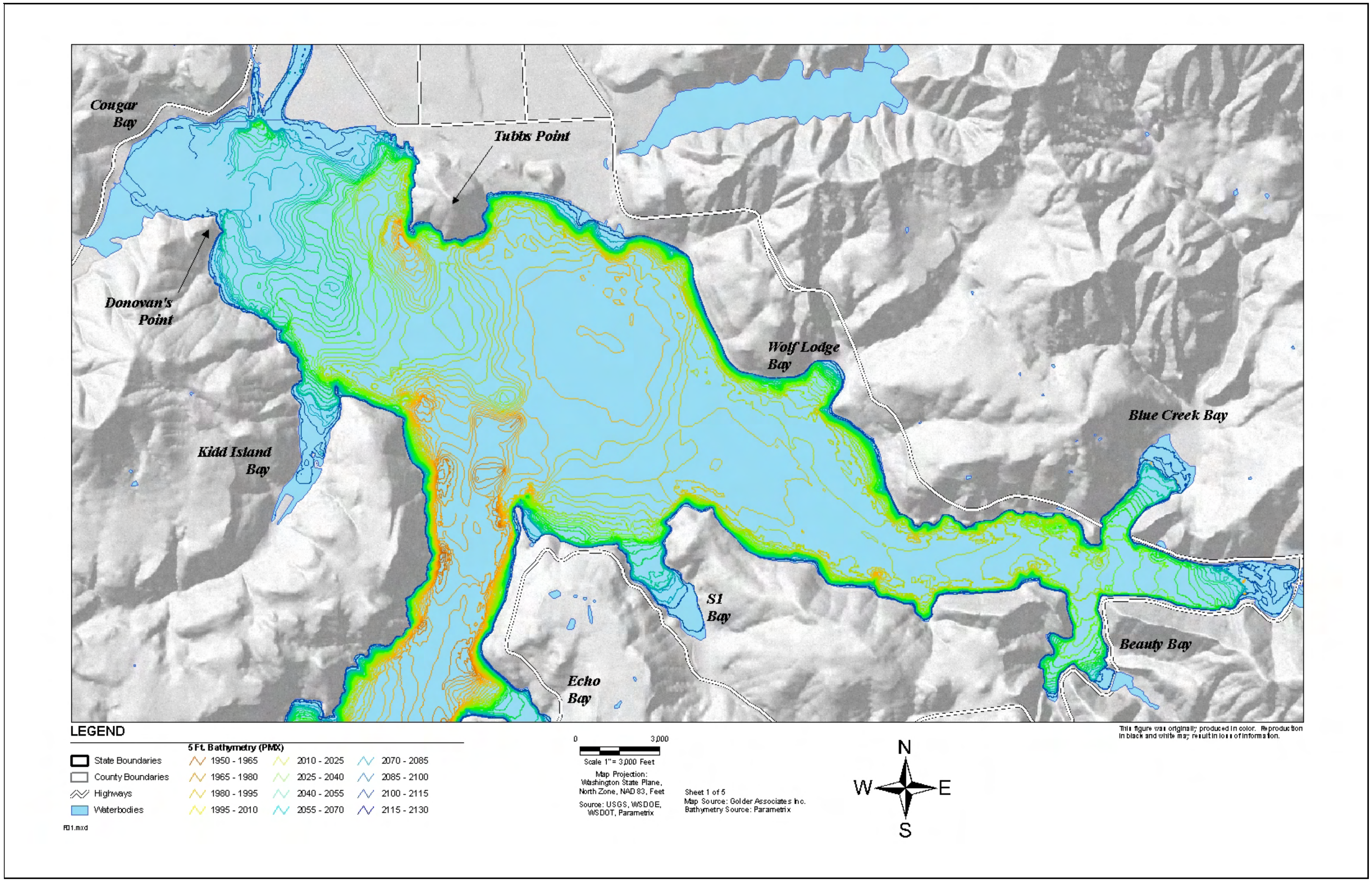


Figure 5-5 (1 of 5). Bathymetry of Coeur d'Alene Lake. (Source: Adapted from Golder (Sediment Routing Report, November 18, 2004 draft) Appendix F-1)

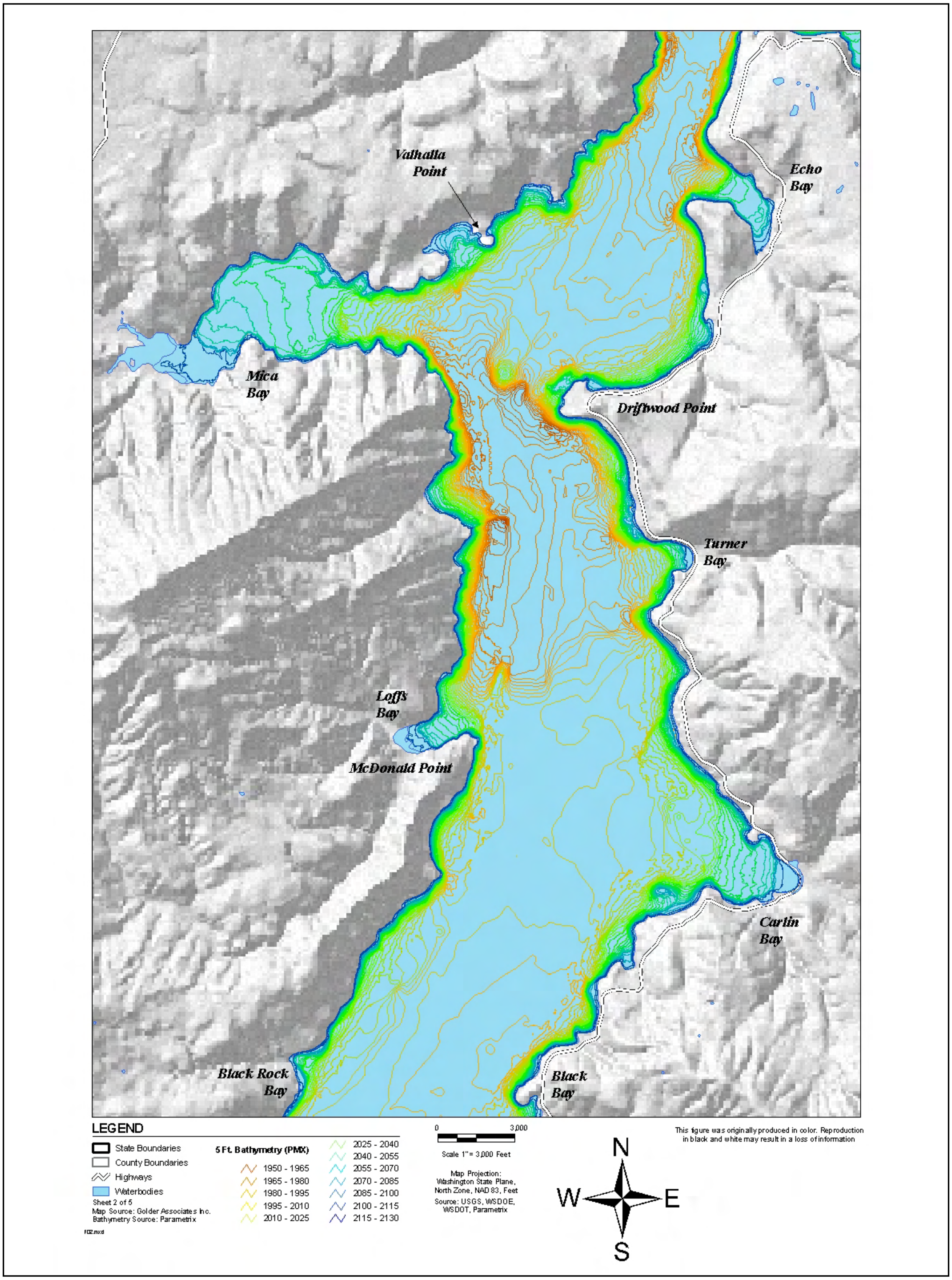


Figure 5-5 (2 of 5). Bathymetry of Coeur d'Alene Lake.

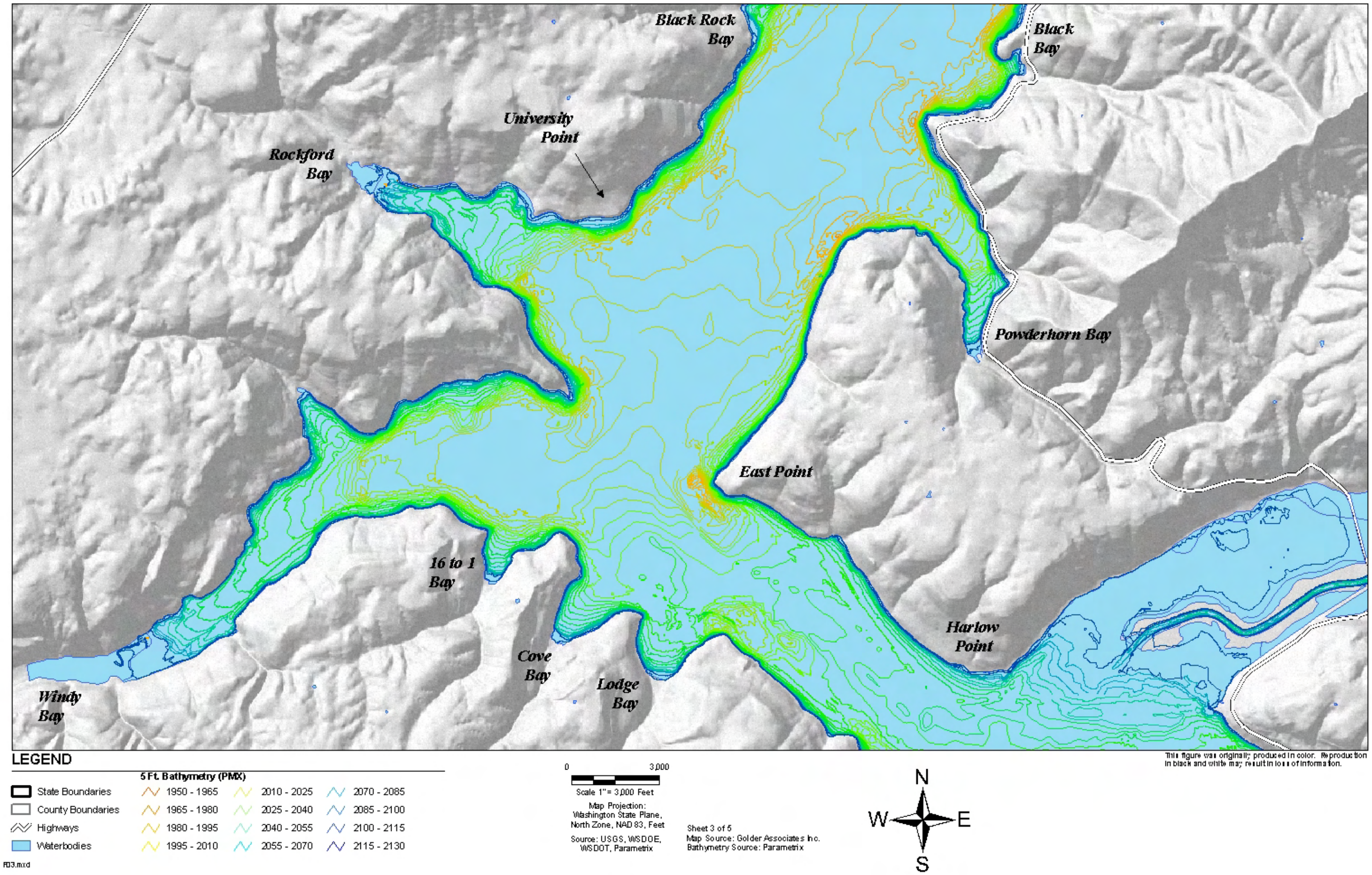


Figure 5-5 (3 of 5). Bathymetry of Coeur d'Alene Lake.

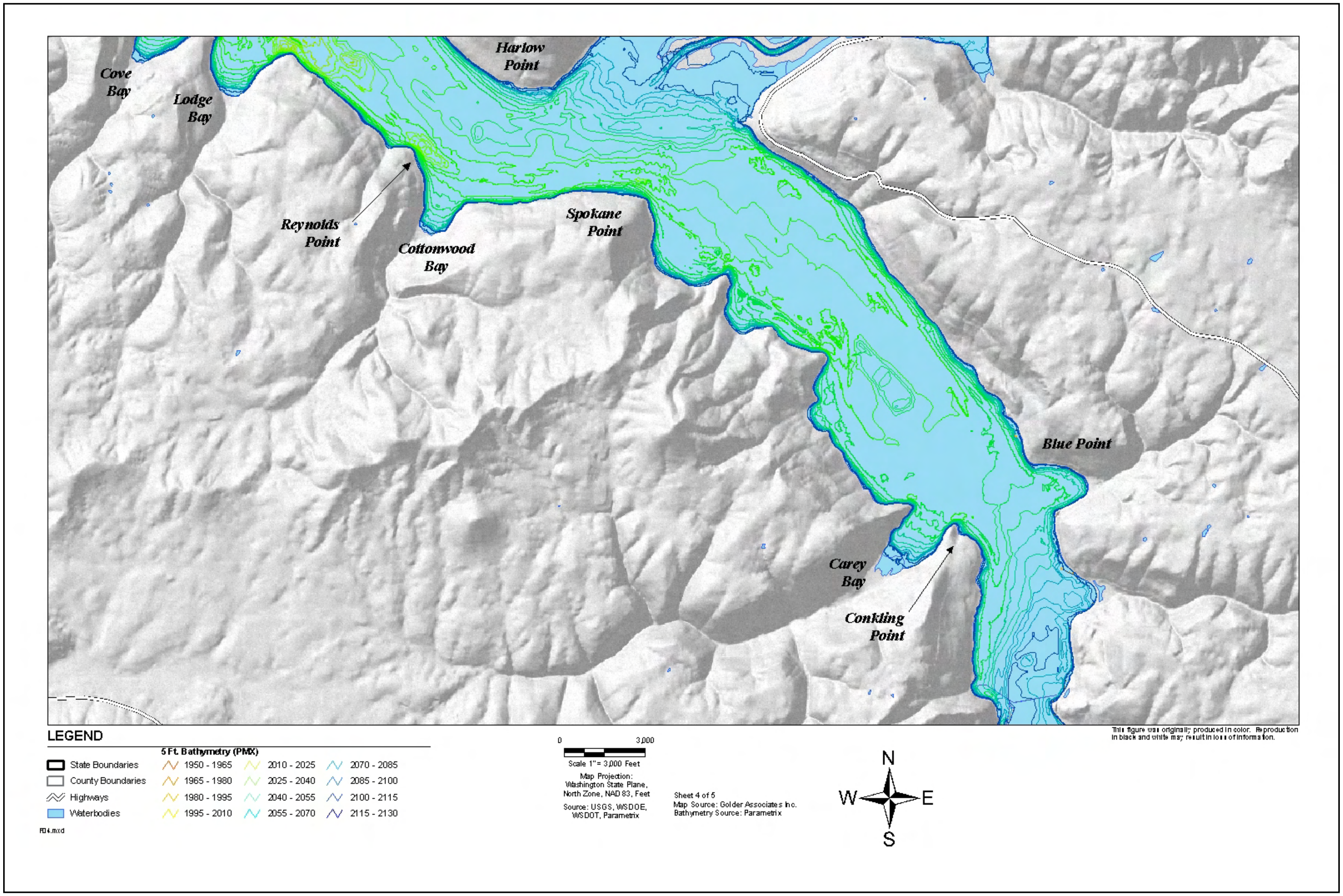


Figure 5-5 (4 of 5). Bathymetry of Coeur d'Alene Lake.

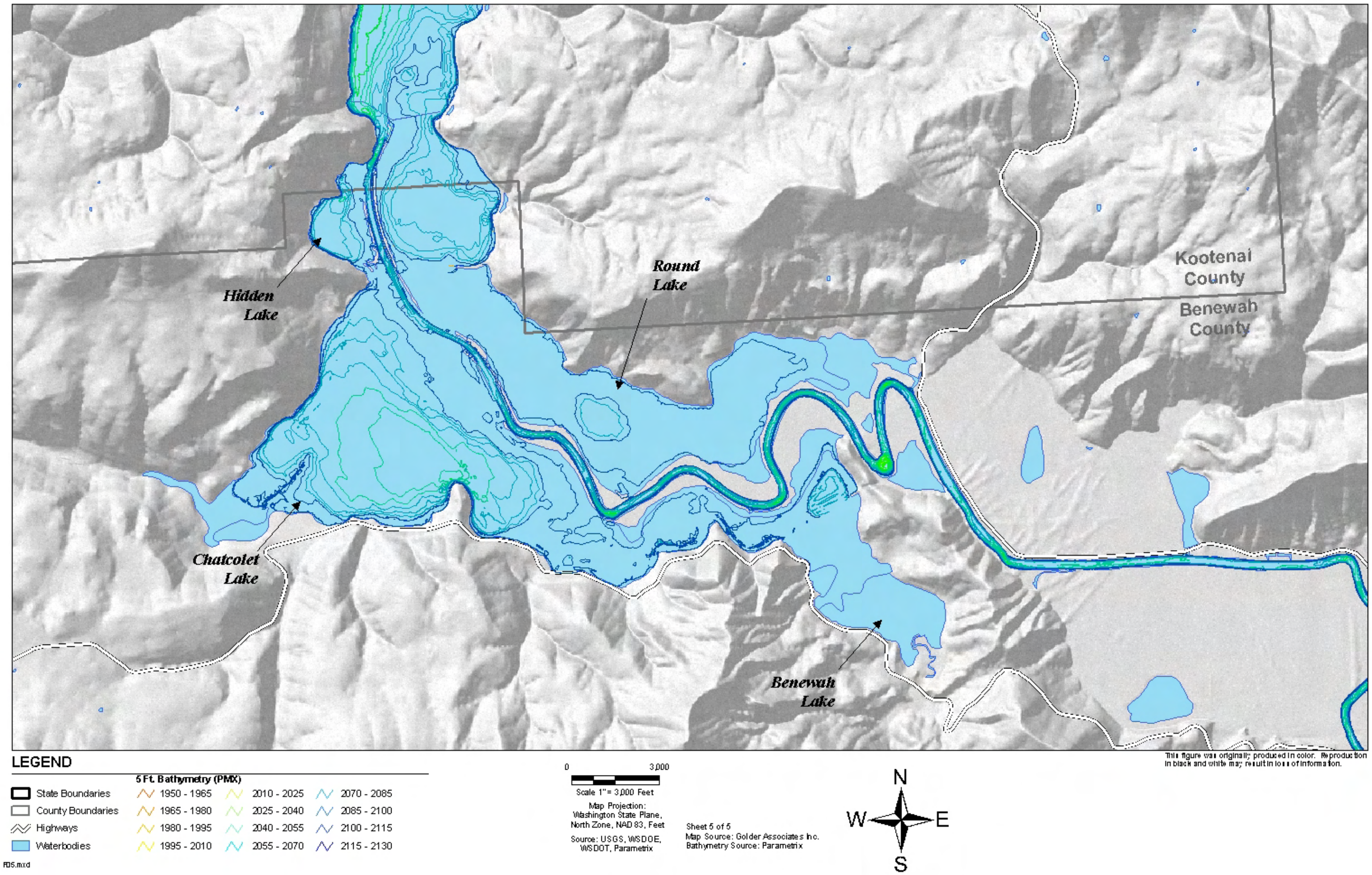


Figure 5-5 (5 of 5). Bathymetry of Coeur d'Alene Lake.

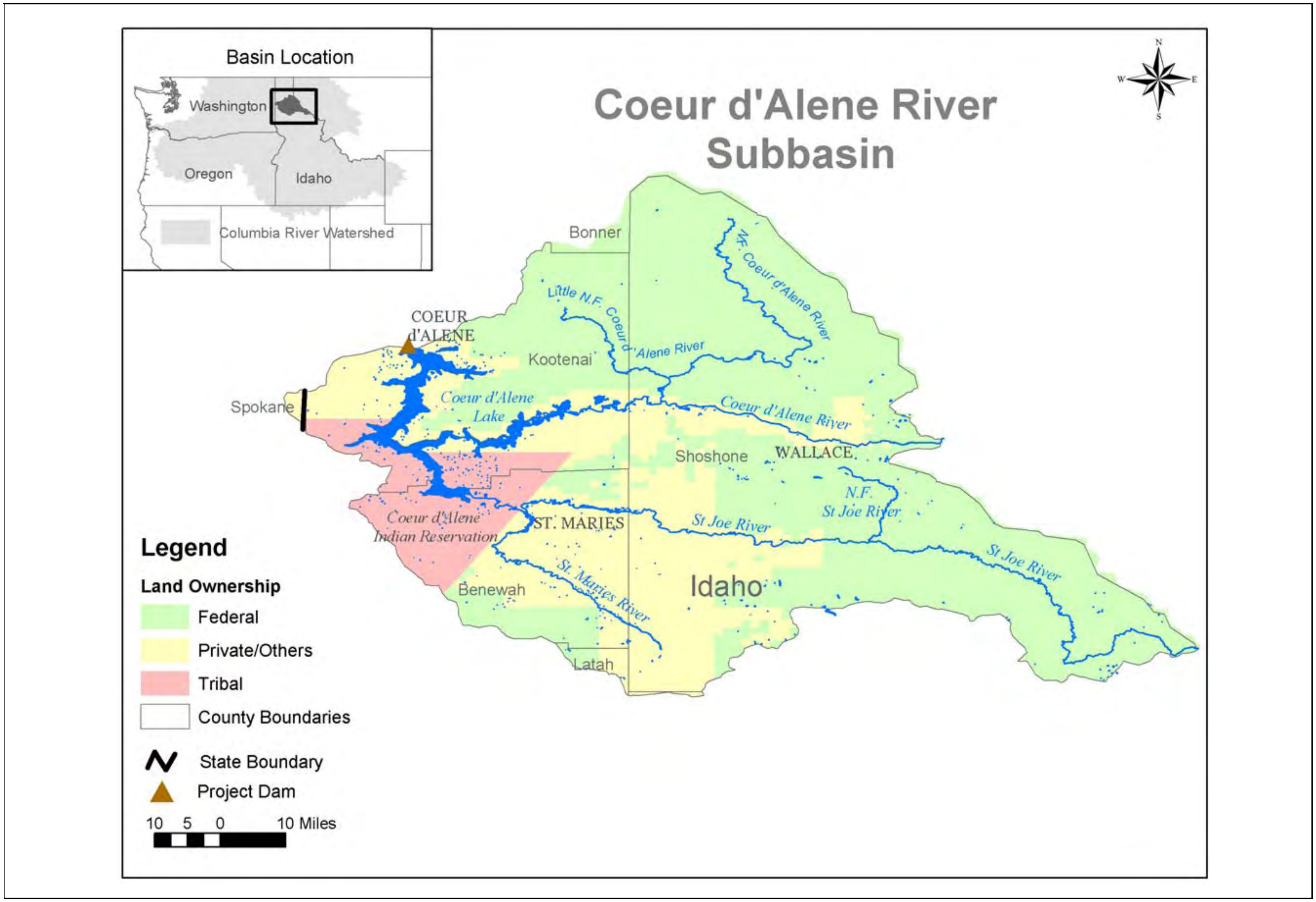


Figure 5-8. Coeur d'Alene River subbasin. (Source: NWPCC, 2004)

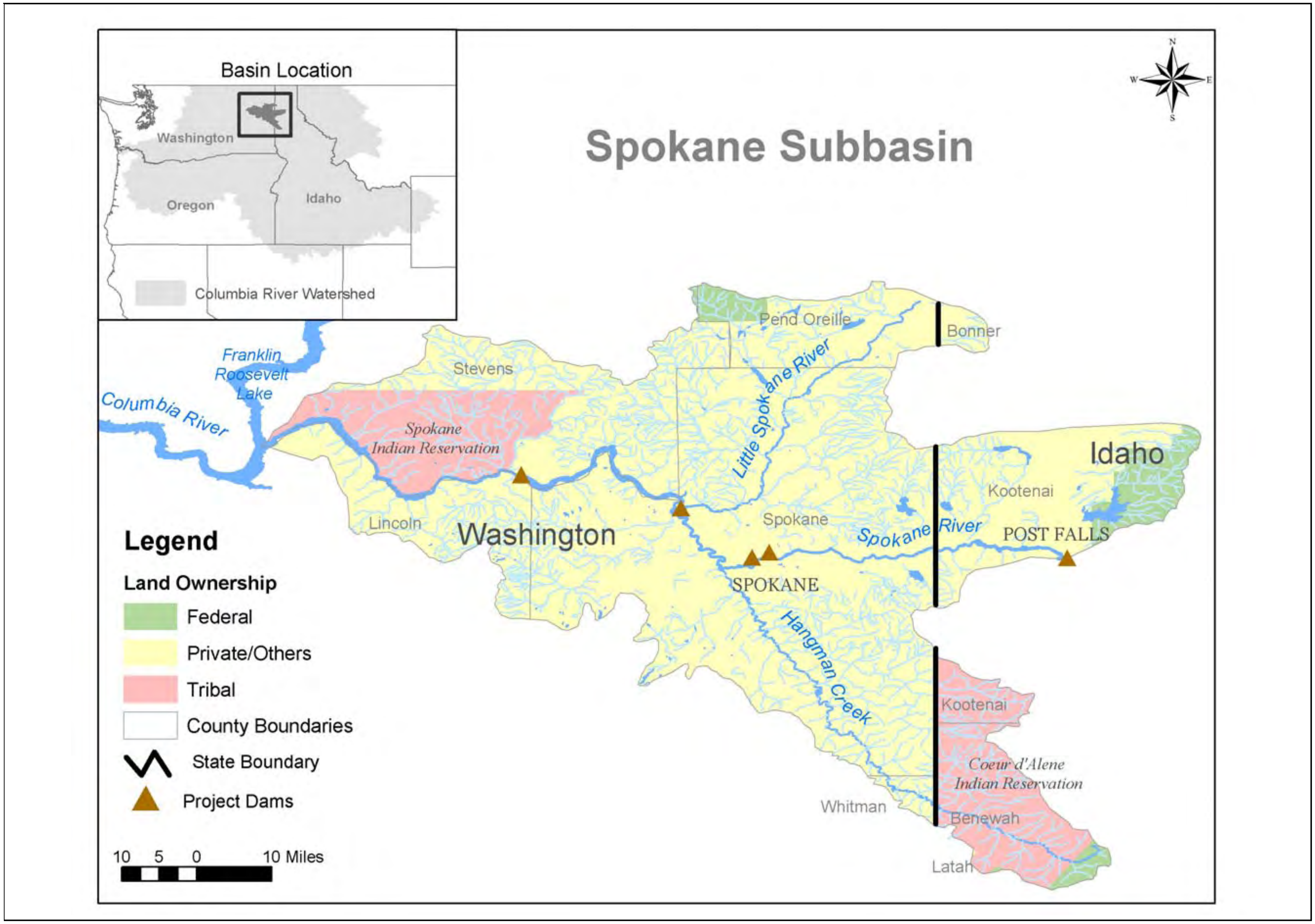


Figure 5-9. Spokane River subbasin. (Source: NWPCC, 2004)

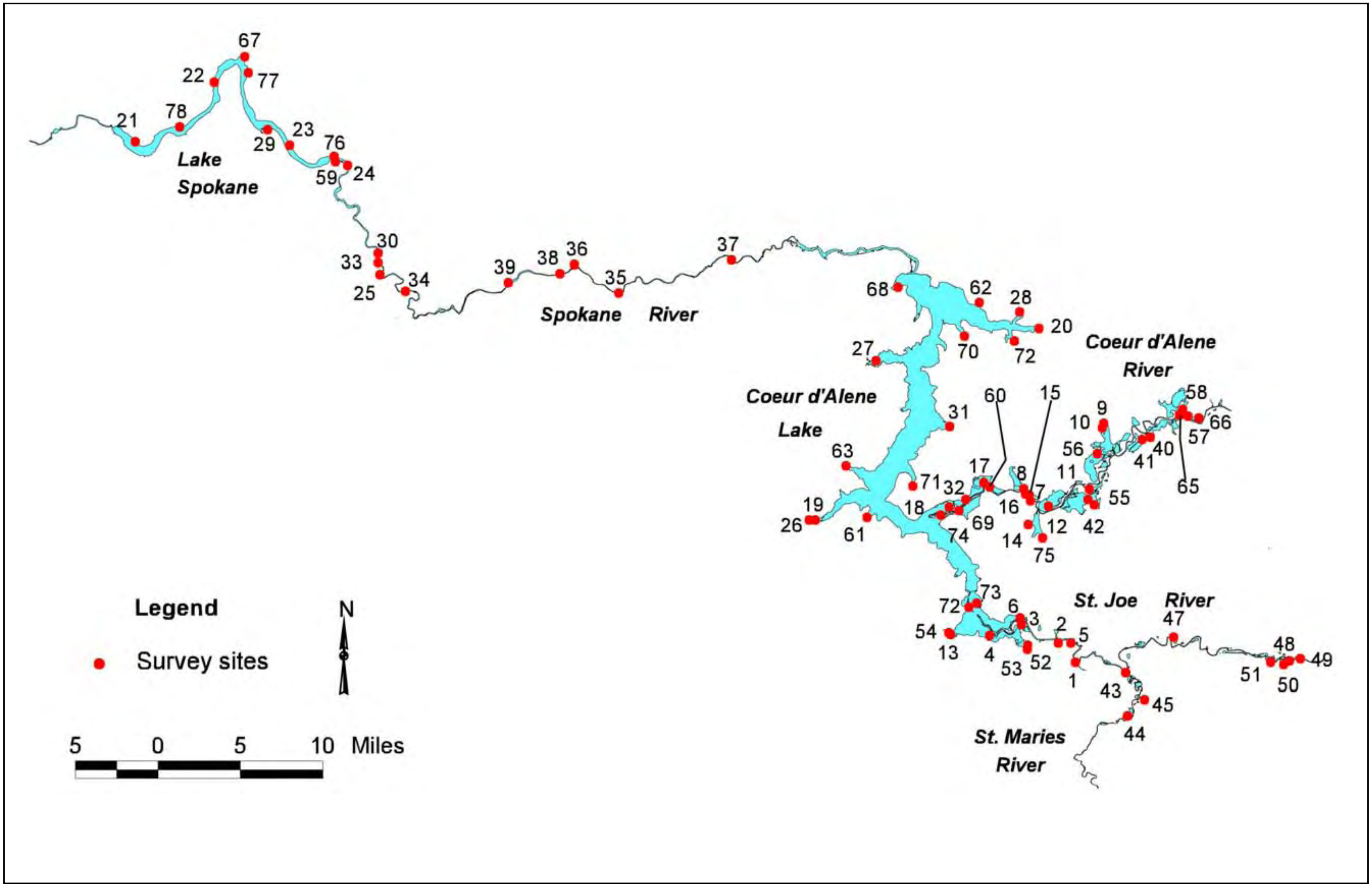
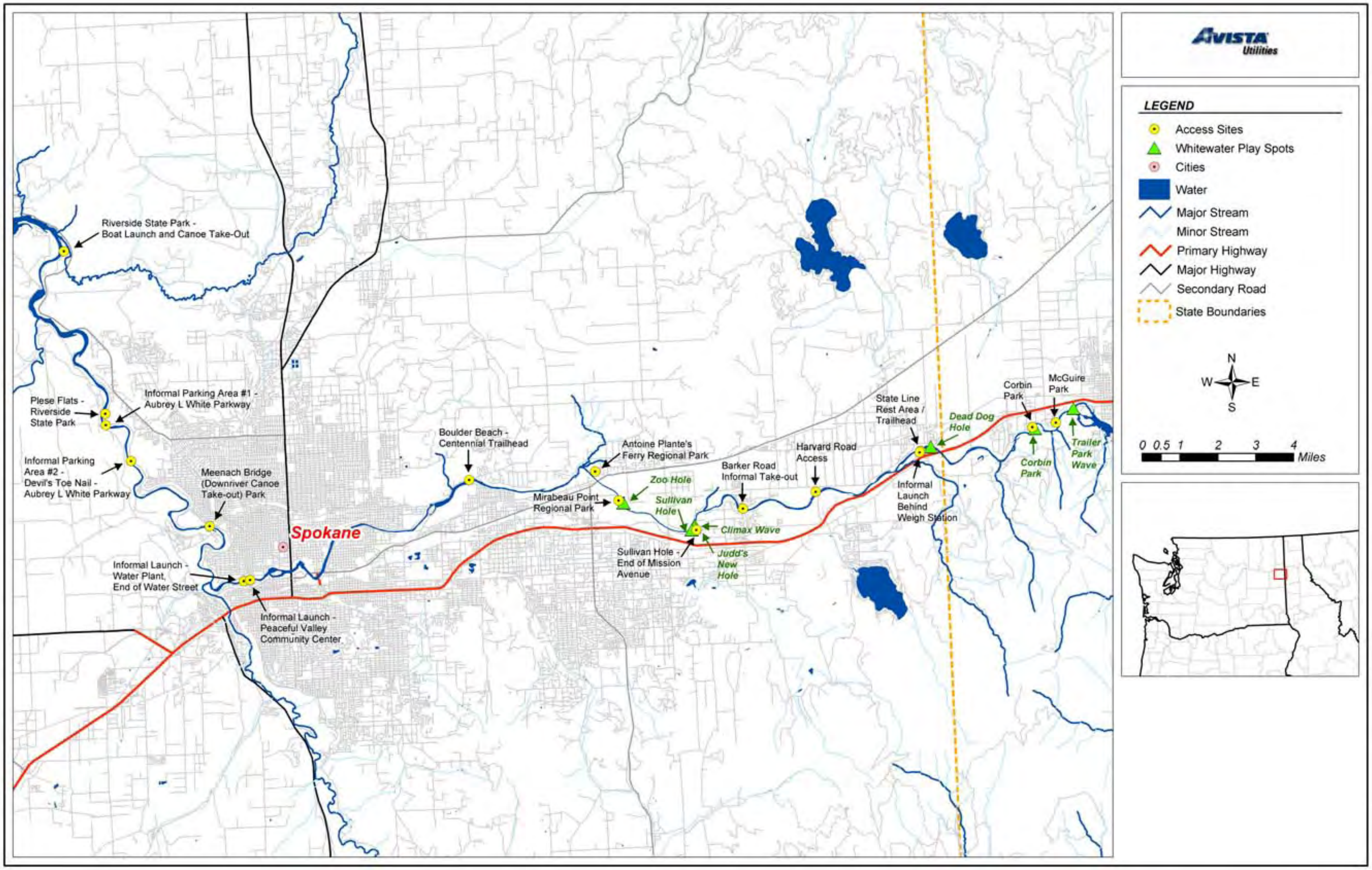


Figure 5-24. Plant survey sites in the Spokane River Project area. (Source: Parametrix, 2003a)


AVISTA Utilities
LEGEND
Access Sites
Whitewater Play Spots
Cities
Water
Major Stream
Minor Stream
Primary Highway
Major Highway
Secondary Road
State Boundaries
N
W
E
S
0 0.5 1 2 3 4 Miles
Spokane
Riverside State Park - Boat Launch and Canoe Take-Out
Plese Flats - Riverside State Park
Informal Parking Area #1 - Aubrey L White Parkway
Informal Parking Area #2 - Devil's Toe Nail - Aubrey L White Parkway
Meenach Bridge (Downriver Canoe Take-out) Park
Informal Launch - Water Plant, End of Water Street
Informal Launch - Peaceful Valley Community Center
Boulder Beach - Centennial Trailhead
Antoine Plante's Ferry Regional Park
Mirabeau Point Regional Park
Zoo Hole
Sullivan Hole
Climax Wave
Judd's New Hole
Sullivan Hole - End of Mission Avenue
Barker Road Informal Take-out
Harvard Road Access
State Line Rest Area / Trailhead
Dead Dog Hole
Informal Launch Behind Weigh Station
Corbin Park
McGuire Park
Corbin Park
Trailer Park Wave

APPENDIX B

Protection, Mitigation, and Enhancement Measures Included in the Proposed Action

Notes: The measures included in this appendix are those that Avista has included in the Proposed Action. They are similar, but not necessarily identical, to measures that have been discussed, and in some cases approved by, the working groups involved in the ALP.

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Appendix B describes the measures reflected in the Proposed Action. Avista's proposed funding level or estimated cost of each measure is presented in Tables B-1 and B-2. The measures reflect protection, mitigation, and enhancement (PME) measures that have been developed in consultation with stakeholders within the various technical work groups under the ALP.[1]

Table B-1. Protection, mitigation, and enhancement measures for Post Falls HED.

Post Falls HED Measures	Proposed Funding or Estimated Cost
Water Resource Measures	
Total Dissolved Gas Control and Mitigation Program (PF-WQ-1)	
Annual funding for 5 years	$15,000
Idaho Water Quality PME (PF-WQ-2)	
Upfront funding	$15,000
Annual funding	$25,000
Annual funding for 5 years	$15,000
Aquatic Resource Measures	
Post Falls HED Fish Protection, Mitigation, and Enhancement Program (PF-AR-1)	
Annual funding	$260,000
Coeur d'Alene Lake Aquatic Weed Management Program (PF-AR-2)	
Annual funding	$50,000
Terrestrial Resource Measures	
Coeur d'Alene Lake and Tributary Erosion Control and Wetlands and Riparian Habitat Protection and Enhancement (PF-TR-1)	
Annual funding	$500,000
Aesthetic Resource Measures[2]	
Post Falls HED Aesthetic Flows (PF-AES-1)	
Funding every 3 to 5 years	$51,000
Land Use Measures	
Post Falls HED Land Use Management Plan Implementation PME (PF-LU-1)	
Annual funding	$17,500
Recreation Resource Measures	
Post Falls HED Recreation Plan (PF-REC-1)	

[1] Throughout this document, references are made to efforts made to date by various technical work groups participating in the ALP. In discussions of the Proposed Action, implementation is discussed in terms of consultation with "cooperating parties." If a settlement agreement is reached, the technical work groups may be involved in future license implementation, in some structure yet to be determined. Absent an agreement, Avista expects that a new license will include requirements for ongoing consultation with appropriate regulatory entities. For simplicity, this document refers to implementation with "cooperating parties."

[2] Estimates do not include costs for lost generation at Post Falls HED.

Post Falls HED Measures	Proposed Funding or Estimated Cost
Upfront funding	$15,000
Annual funding	$5,000
Coeur d'Alene Recreation PME (PF-REC-2)	
Upfront funding	$982,250
Annual funding	$159,500
Annual funding after 10 years	$60,000
Post Falls/Spokane River Recreation PME (PF-REC-3)	
Upfront funding	$215,000
Annual funding	$17,500
Post Falls HED Public Outreach (PF-REC-4)	
Upfront funding	$25,000
Annual funding	$5,000
Funding every 6 years	$90,000
Cultural Resources Measures	
Historic Properties Management Plan (PF-CR-1)	
Upfront funding	To be determined
Annual funding	To be determined

Table B-2. Protection, mitigation, and enhancement measures for Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs.

Spokane Project River HED Measures	Proposed Funding or Estimated Cost
Water Resource Measures	
Total Dissolved Gas Control and Mitigation Program (SRP-WQ-1)	
Upfront funding	$50,000
Annual funding	To be determined
Washington Water Quality PME (SRP-WQ-2)	
Upfront funding	$50,000
Annual funding for 5 years	$15,000
Aquatic Resource Measures	
Spokane River Fish Protection, Mitigation, and Enhancement Program (SRP-AR-1)	
Annual funding	$125,000
Lake Spokane Aquatic Weed Management Program PME (SRP-AR-2)	
Annual funding	$20,000
Terrestrial Resource Measures	
Lake Spokane/Nine Mile Terrestrial, Riparian and Wetlands Habitat Protection and Enhancement PME (SRP-TR-1)	
Upfront funding (land value)	$1.6 to 6.5 million
Annual funding	$30,000
Project Transmission Line Management Program PME (SRP-TR-2)	
Annual funding	$6,125
Aesthetic Resource Measures[3]	
Spokane River Project Aesthetic Flows PME (SRP-AES-1)	
Funding every 1 to 2 years	$64,300
Land Use Measures	
Project Land Use Management Plan Implementation PME (SRP-LU-1)	
Annual funding	$27,500

[3] Estimate does not include lost generation at Upper Falls or Monroe Street HEDs.

Spokane Project River HED Measures	Proposed Funding or Estimated Cost
Recreation Resource Measures	
Spokane River Recreation Plan (SRP-REC-1)	
Upfront funding	$10,000
Annual funding	$5,000
Spokane River Recreation PME (SRP-REC-2)	
Upfront funding	$20,000
Annual funding	$15,000
Spokane River Public Outreach PME (SRP-REC-3)	
Upfront funding	$25,000
Annual funding	$3,500
Funding every 6 years	$85,000
Lake Spokane/Nine Mile Reservoir Recreation PME (SRP-REC-4)	
Upfront funding	$790,000
Annual funding	$85,000
Funding every 10 years	$300,000
Cultural Resources Measures	
Historic Properties Management Plan (SRP-CR-1)	
Upfront funding	To be determined
Annual funding	To be determined

WATER QUALITY

PF-WQ-1 Total Dissolved Gas Control and Mitigation Program

Purpose and Goal

The purpose of this Total Dissolved Gas Control and Mitigation Program is to provide for the monitoring, evaluation, control and/or mitigation of dissolved gas supersaturation associated with the continued operation of Post Falls HED. The overall goal of the prevention, mitigation, and enhancement (PME) measure is to reduce the production of elevated dissolved gas levels caused by Post Falls HED.

Description of Measure

To address total dissolved gas (TDG) supersaturation issues and concerns associated with the continued operation of Post Falls HED, Avista will implement a variety of activities under this PME measure that shall include:

- Interim spill gate operating protocols, while continuing additional data collection and analysis; and
- Ongoing TDG monitoring and evaluation to better determine specific HED influence(s) on TDG levels, preferred spill gate operating protocols, and to evaluate HED-related TDG control and abatement measures.

Interim Spill Gate Operating Protocols

The available data indicate that there are specific spill gate operating protocols that could be employed at Post Falls HED to help minimize downstream TDG levels, other considerations notwithstanding (e.g., operational limitations, structural or erosion concerns, etc.). The preferred spill gate operating protocols that Avista will attempt to use at this HED are outlined below and will be considered “interim” protocols pending additional TDG data collection and other evaluations.

As additional data and information are obtained, Avista will review these operating protocols and propose appropriate revisions. At a minimum, Avista will prepare and submit a report on the implementation of these spill gate operating protocols and any proposed revisions following the first 5 years of their implementation under the new FERC license, and on a 10-year cycle thereafter. Both interim and revised spill gate operating protocols may be suspended or otherwise altered by Avista in the event of emergency circumstances, safety or structural concerns, the occurrence of significant downstream erosion, or other unforeseen circumstances that warrant such action. Avista will immediately notify IDEQ of any such variations. Documentation of variations from the current operating protocols will be provided to IDEQ along with any proposed revisions to the operating protocols that Avista believes are warranted within 6 months of such occurrences.

Interim Spill Gate Operating Protocols shall be as follows:

- **Post Falls HED**—The currently available site-specific studies and data indicate that use of the south channel to pass flows in excess of powerhouse capacity can slightly reduce downstream TDG levels in the Spokane River as compared to passing the same water through the north channel. Avista will therefore maximize the use of the south channel to the degree reasonably possible given the requirements for manual operation of these gates. Avista shall use the south channel gates when the stream flows into Post Falls HED exceed the hydraulic capacity of the plant plus the rated capacity of the south channel gates, and when flows are anticipated to remain so for an extended period of time. Short-term requirements for spill at Post Falls HED will still be accomplished using the north channel spill gates, given safety concerns and the difficulty of repeated or partial opening and closing of the south channel gates. Avista will continue to make closing the south channel a priority and will divert water to the north channel during the summer season. This practice saves Avista energy and helps address safety issues at Q'emiln Park including the beach and boat launch.

Implementation and Evaluation

Within 1 year of a new FERC license, Avista, in consultation with and subject to the approval of IDEQ, will develop and implement an appropriate TDG monitoring plan to:

- Further evaluate TDG conditions at higher flows than those experienced in 2003 and 2004;
- Evaluate the effectiveness and refine the Interim Spill Gate Operating Protocols; and
- Evaluate potential TDG abatement options if needed.

After 5 years of operating under the interim spill gate protocols, Avista shall submit a report to IDEQ that summarizes the monitoring data and evaluates the effectiveness of the plan.

Funding

Upon issuance of a new FERC license, Avista will fund $15,000 annually for 5 years to implement this PME measure.

PF-WQ-2 Idaho Water Quality PME

Purpose and Goals

The purpose of this water quality prevention, mitigation, and enhancement (PME) measure is to meet water quality standards and support existing beneficial uses of the Spokane River and Coeur d'Alene Lake. Specifically, this PME measure is designed to meet the following goals:

- Monitor and evaluate the effects on water quality of a new minimum discharge flow from Post Falls HED in the Spokane River;

- Support expansion of current water quality monitoring efforts on Coeur d'Alene Lake, as a part of ongoing water quality management by Idaho Department of Environmental Quality (IDEQ) and the Coeur d'Alene Tribe; and

- Enhance the predictive qualities of the CE-QUAL model (and other models) for use as a lake management tool by IDEQ and the Coeur d'Alene Tribe, through improving current efforts to collect meteorological data that are useful for water quality modeling.

Description of Measure

To meet the goals identified above, Avista shall:

- Develop a Water Quality Monitoring Plan for the Spokane River and provide annual funding to implement it for a 5-year period. The plan shall focus on collecting temperature and flow data between the HED and Idaho/Washington border under a range of flow conditions less than 800 cfs at Post Falls HED and evaluating the effects of the new minimum discharge on protecting and enhancing aquatic habitat. This portion of the PME measure shall complement the Water Quality Monitoring Plan measure found in the Washington Water Quality PME (SRP-WQ-2).

- Provide annual funding to support expansion of IDEQ's and/or the Coeur d'Alene Tribe's existing water quality monitoring in Coeur d'Alene Lake. The support shall be used for selecting and monitoring additional water quality parameters or criteria beyond those parameters or criteria currently being monitored by the IDEQ and the Coeur d'Alene Tribe.

- Fund the purchase and installation of two meteorological stations near Coeur d'Alene Lake for the collection of data related to input parameters for the CE-QUAL model, including but not limited to solar radiation and wind speed and direction.

Implementation

Within 1 year of the issuance of a new FERC license, Avista shall develop, in consultation with appropriate parties, an Idaho Water Quality Monitoring Plan, which shall consist of the following three components: (1) a plan for Spokane River monitoring for flow and temperature at the Idaho/Washington border; (2) a plan for supporting the expansion of existing water quality monitoring on Coeur d'Alene Lake; and (3) a plan for installing the meteorological stations near Coeur d'Alene Lake.

Within 1 year of plan approval, Avista shall begin implementation of monitoring on the Spokane River, and funding expansion of existing water quality monitoring on Coeur d'Alene Lake.

Within 2 years of plan approval, Avista shall complete installation of the meteorological stations. Avista shall collaborate with IDEQ and the Coeur d'Alene Tribe during site selection, equipment purchase, and installation. Avista shall not be responsible for data collection, monitoring, or maintenance of these stations.

Reporting and Evaluation

Avista shall prepare an annual report after each year of the 5 years of the Water Quality Monitoring Plan's implementation, documenting the results of the monitoring and evaluation. Avista shall consult with IDEQ regarding the results of the annual reports in order to modify and improve, if necessary, the monitoring effort. As requested by IDEQ or the Coeur d'Alene Tribe, Avista shall consult on an annual basis with either or both entities regarding the results of, and ways to modify or improve, if necessary, the water quality monitoring on Coeur d'Alene Lake that Avista is supporting through this PME measure. Avista's responsibility for the meteorological stations shall be complete with their installation.

Funding

Upon issuance of a new FERC license, Avista shall provide funding, in an amount not to exceed $15,000 per year for a period of 5 years, to implement the Idaho Water Quality Monitoring Plan on the Spokane River. In addition, Avista shall provide funding, in an amount not to exceed $25,000 per year for the term of the license to support monitoring in Coeur d'Alene Lake. Lastly, Avista shall purchase and install the two meteorological stations on Coeur d'Alene Lake for a total cost not to exceed $15,000. This funding level assumes sites can be located on lands that do not require lease or purchase and does not include any funding for data collection, monitoring, or maintenance of these stations.

SRP-WQ-1 Total Dissolved Gas Control and Mitigation Program

Purpose and Goal

The purpose of this Total Dissolved Gas Control and Mitigation Program is to provide for the monitoring, evaluation, control and/or mitigation of dissolved gas supersaturation associated with the continued operation of the Spokane River Hydroelectric Project (Project). The overall goal of the PME measure is to reduce the production of elevated dissolved gas levels caused by the Project hydroelectric developments (HEDs) to the degree necessary for Project compliance with applicable water quality standards.

Description of Measure

To address TDG supersaturation issues and concerns associated with the continued operation of the Spokane River Hydroelectric Project, Avista will implement a variety of activities under this PME measure that shall include:

- Interim spill gate operating protocols at appropriate Project HEDs, while continuing additional data collection and analysis;

- Ongoing total dissolved gas (TDG) monitoring and evaluation to better determine specific HED influence(s) on TDG levels, preferred spill gate operating protocols, and to evaluate Project-related TDG control and abatement measures; and

- Development of a comprehensive Long Lake HED TDG Abatement Plan to include spill gate operating protocols, appropriate TDG monitoring and evaluation, and a multi-phase TDG Abatement Feasibility Study for Long Lake HED, leading to the development and implementation of a Long Lake HED TDG Abatement Strategy.

Interim Spill Gate Operating Protocols

The available data indicate that there are specific spill gate operating protocols that could be employed at Long Lake HED to help minimize downstream TDG levels, other considerations notwithstanding (e.g., operational limitations, structural or erosion concerns, etc.). The preferred spill gate operating protocols that Avista will attempt to use at this HED are outlined below and will be considered “interim” protocols pending additional TDG data collection and other evaluations.

As additional data and information are obtained, Avista will review these operating protocols and propose appropriate revisions. At a minimum, Avista will prepare and submit a report on the implementation of these spill gate operating protocols and any proposed revisions following the first 5 years of their implementation under the new FERC license, and on a 10-year cycle thereafter. Both interim and revised spill gate operating protocols may be suspended or otherwise altered by Avista in the event of emergency circumstances, safety or structural concerns, the occurrence of significant downstream erosion, or other unforeseen circumstances that warrant such action. Avista will immediately notify Washington Department of Ecology (WDOE) and the Spokane Tribe of Indians (in the case of Long Lake HED) of any such variations. Documentation of variations from the current operating protocols will be provided to

WDOE, the Spokane Tribe of Indians, FERC, and other appropriate entities, along with any proposed revisions to the operating protocols that Avista believes are warranted within 6 months of such occurrences.

Interim Spill Gate Operating Protocols shall be as follows:

- **Long Lake HED**—At Long Lake HED, available data indicate that prioritizing the use of certain spill gates serves to reduce the TDG production that occurs at this facility during spill periods. Spill gate testing to date has shown that the use of Gates 1, 2, 7, and 8 produced lower levels of downstream TDG than comparable spill volumes through Gates 3-6. However, total river flows and therefore spill volumes were only in the middle range of the potential peak flows for this HED during the 2003 and 2004 TDG monitoring and spill gate evaluations. Additional data at higher flow occurrences are needed (as called for below) to better understand relationships between specific spill gate usage and resulting downstream TDG levels. Selective use of certain gates, such as Gates 7 and 8, which are located closest to the downstream shoreline, may result in increased and significant erosion of the downstream shoreline or the concrete floor of the stilling basin. Avista will monitor and evaluate the risk of increased erosion.

- Avista will consult with WDOE, the Spokane Tribe of Indians, and other interested parties to continue developing interim spill gate-operating protocols for Long Lake HED. Any changes to these protocols will be subject to WDOE review, revision, and approval, and will be followed during all periods of spill at this HED, subject to any exceptions required for emergency or other unforeseen circumstances. It is anticipated that proposed spillgate operating protocols for long term application will evolve through testing, monitoring, and evaluation.

TDG Monitoring and Evaluation

Avista, in consultation with and subject to the approval of WDOE and the Spokane Tribe of Indians for those aspects specific to their respective areas of authority, will develop and implement appropriate TDG monitoring plans for Nine Mile and Long Lake HED to:

- Further evaluate TDG conditions at higher flows than those experienced in 2003 and 2004;

- Evaluate the effectiveness and refine the interim spill gate operating protocols; and

- Evaluate potential TDG abatement options.

The additional data collection at Nine Mile HED during higher flow conditions may also result in the need to develop and implement a TDG Abatement Plan for that facility similar to the one provided for below Long Lake HED, but tailored to the specific conditions at and relative influence of the operation of Nine Mile HED on TDG production.

Once additional data has been collected concerning TDG conditions at Nine Mile HED during high flow conditions, it may also be necessary to evaluate in more detail the potential influence of Long Lake HED operations and the Long Lake reservoir (Lake Spokane) on dissipation of elevated TDG levels downstream of Nine Mile HED. Depending on the TDG conditions observed at Nine Mile HED during high flows, a decision could be made whether or not additional evaluation and consideration of the influence of Long Lake HED Reservoir is warranted. Such additional evaluation could include a spreadsheet model of the reach of the river between Spokane Falls and Long Lake dam specific to TDG dynamics pre-and post HED construction and operation. Other tools and assessment methodologies may be used if deemed more appropriate.

Long Lake HED 10-year TDG Abatement Plan

WDOE guidelines and proposed regulations suggest a maximum of 10 years for addressing dam-related water quality issues. Given the complexity of the TDG issue at Long Lake HED and the extended time frame required to appropriately evaluate, design, and implement/construct agreed upon TDG abatement measures that may include substantial structural modifications at the HED, a 10-year time frame for a TDG abatement plan is considered reasonable and appropriate.

Within the first 6 months of PME implementation (beginning on the effective date of the new FERC license), Avista will initiate development of a "Long Lake HED 10-year TDG Abatement Plan" (TDG Abatement Plan). It is anticipated that the TDG Abatement Plan will include at least four components:

- TDG abatement feasibility studies;
- Development of an agreed upon TDG abatement strategy, including spill gate operating protocols, structural measures and modifications, and/or alternative mitigation actions as warranted;
- Final design, implementation, and construction schedule for the TDG abatement strategy; and
- Development and implementation of appropriate monitoring and evaluation to determine effectiveness of the TDG abatement strategy.

These four anticipated components of the TDG Abatement Plan are discussed in more detail below.

TDG Abatement Feasibility Studies and Evaluations

Abatement options to be considered will include, but not necessarily be limited to, flip lips or other spill deflectors, stilling basin and/or downstream channel modifications, new spill structures/routes, changes to upstream water levels, etc. It is anticipated that the results of an initial Feasibility Study will be ready at or near the time Clean Water Act Section 401 application is submitted.

The initial TDG feasibility study will identify and preliminarily evaluate a range of potential options for reducing TDG production at Long Lake HED, or otherwise reducing the downstream TDG levels. The identified options will be subjected to a preliminary conceptual evaluation and screening based on existing information, site constraints and opportunities, and preliminary estimates of TDG abatement effectiveness. The study report will likely include potential options for TDG abatement at Long Lake HED that merit more detailed evaluation, along with "preliminary" estimates of their anticipated effectiveness in reducing TDG production at this facility as well as potential costs.

The initial feasibility study will be submitted to WDOE for review. Based upon that review, more detailed feasibility analysis may be necessary prior to the development of the overall TDG Abatement Strategy.

Long Lake HED TDG Abatement Strategy

Based on the results of the TDG monitoring and feasibility studies Avista will develop and submit to WDOE a proposed Long Lake HED TDG Abatement Strategy for review and comment. Avista anticipates that it will submit the proposed Abatement Strategy to WDOE within 3–5 years following initiation of the PME measure (i.e., depending on the timeframe necessary to complete the required feasibility study(s)). This period of time will allow for the collection of additional TDG data and site-specific information to support the TDG abatement feasibility studies, and development of the proposed Abatement Strategy in consultation with the WDOE, Spokane Tribe of Indians, and other interested parties.

The purpose of the TDG Abatement Strategy will be to identify the proposed mechanisms, structures, or other measures that will achieve the TDG abatement goal. In the event that the available data and the abatement feasibility study determine that meeting that goal is not feasible, Avista will include within the proposed Abatement Strategy both proposed TDG abatement measures and/or additional mitigation that can reasonably and feasibly be implemented to improve downstream TDG levels or to achieve relevant biological objectives associated with reduced TDG.

The proposed strategy may include the following elements:

- A detailed description of the proposed TDG abatement or mitigation measures;
- Spill gate operating protocols as developed in consultation with other parties;
- The anticipated effectiveness of each measure in reducing downstream TDG levels or achieving biological objectives as may be agreed to in the future;
- A schedule for conducting final design work and associated physical modeling and analysis;
- An anticipated construction schedule for any structural modifications or similar activities; and
- An estimated cost of each measure contained in the proposed TDG Abatement Strategy.

Following WDOE review and comment, Avista will work with WDOE to incorporate its comments into a revised TDG Abatement Strategy proposal and to prioritize the most cost-effective measures. Avista will submit the revised Abatement Strategy to WDOE for final review and approval. Following subsequent review and approval of the revised strategy by WDOE, Avista will proceed with final design and implementation of the prioritized TDG abatement measures and additional mitigation actions as outlined in the TDG Abatement Strategy.

Final Design and Implementation of the Long Lake HED TDG Abatement Strategy

Once a TDG Abatement Strategy has been agreed to and approved by WDOE, Avista will proceed with final design and construction tasks, such as additional site surveys and evaluations, physical modeling, final design and development of pre-construction documents, contractor selection, and various construction activities and phases (e.g., mobilization and site prep., actual on-site construction activities, and post-construction activities). Implementation of spill gate operating protocols and any ongoing TDG monitoring as called for in the approved Abatement Strategy will begin immediately. It is anticipated that final design activities could require 2–3 years, and another 2–3 years may be necessary before substantial structural modifications at the HED can be completed.

Monitoring and Evaluation of the Long Lake HED TDG Abatement Strategy

Following the completion of any new or modified structures and implementation of any other measures associated with spill and/or TDG production at Long Lake HED, Avista will develop and implement appropriate TDG monitoring and evaluation programs to determine if the anticipated benefits of the measures are being realized. These TDG monitoring and evaluation programs will be developed sufficiently prior to the actual abatement measures being implemented or new or modified structures becoming operational such that the agreed upon programs can be implemented at the first subsequent occurrence of spill conditions. These monitoring and evaluation programs will be developed in consultation with WDOE and the Spokane Tribe of Indians, and subject to review and approval by WDOE. These programs will be implemented and maintained over whatever agreed-upon timeframe is necessary to adequately evaluate the effectiveness of the implemented measures, determine appropriate modifications, identify the need for additional and/or new TDG abatement or mitigation measures, or the appropriateness of a site-specific TDG standard, development of appropriate biological objectives, or a use attainability analysis (UAA).

Compliance Review

Avista anticipates that at appropriate times during implementation of the TDG Abatement Plan WDOE will make a determination on whether the state TDG water quality standards have been met. If WDOE determines that the TDG standard has not been met, but Avista has undertaken all reasonable and feasible measures to achieve compliance with the standard, then Avista will propose an alternative means of complying with the standard. Setting a site specific criterion or conducting a use attainability analysis (UAA) are two possible alternative approaches to coming into compliance at the end of the ten year compliance schedule period. However, it is noted that these two options may not be available for meeting the Spokane Tribe of Indians standard.

Funding

Upon issuance of a new FERC license, Avista shall provide funding to develop interim operating protocols, collect additional data, and develop a Long Lake HED TDG Abatement

Strategy. Included in this strategy is the TDG Feasibility Study. Avista estimates the cost to complete these tasks at $50,000. Once the feasibility study is completed and the abatement option(s) have been selected, Avista will fund the implementation of the reasonable and feasible option(s).

When determined, the funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contractor thereto to implement this PME measure.

Avista's administrative costs to implement this PME measure shall be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above, when determined.

SRP-WQ-2 Washington Water Quality PME

Purpose and Goals

The purpose of this water quality PME measure is to meet water quality standards and support existing beneficial uses of the Spokane River. Specifically, this PME measure is designed to meet the following goals:

- Monitor and evaluate the effects on water quality of a new minimum discharge flow from Post Falls HED in the Spokane River; and

- Improve the dissolved oxygen levels at the discharge of Long Lake HED.

Description of Measure

To meet the goals identified above, Avista shall:

- Develop and implement a Water Quality Monitoring Plan in the Spokane River for a 5-year period. This effort shall be focused on collecting temperature and flow data between river mile 90.4 and river mile 84 for a range of flow conditions less than 800 cfs at Post Falls HED to evaluate the effects of the new minimum discharge on water quality and protecting and enhancing aquatic habitat, including downstream trout spawning and fry emergence. This portion of the PME measure shall complement the Water Quality Plan measure found in the Idaho Water Quality PME (PF-WQ-2).

- Conduct a feasibility study to identify potential mechanisms for improving the dissolved oxygen levels in the discharge at Long Lake HED and evaluate which alternatives are reasonable and feasible to improve dissolved oxygen levels. Using these study results, Avista shall develop and implement a dissolved oxygen Enhancement Plan for discharges at Long Lake HED. Included in this plan will be dissolved oxygen monitoring.

Implementation

- Within 1 year of the issuance of a new FERC license, Avista shall develop, in consultation with appropriate parties, a Washington Water Quality Monitoring Plan. Avista shall fund implementation of the Plan for a period of 5 years.

- Within 1 year of the issuance of a new FERC license, Avista shall initiate a feasibility study for enhancing dissolved oxygen levels in the Long Lake discharge. Avista will consult with WDOE, the Spokane Tribe of Indians, and others as appropriate, regarding the feasibility study and its results. Avista then shall also develop, in consultation with WDOE and the Spokane Tribe of Indians, the Dissolved Oxygen Enhancement Plan and anticipates that it can be submitted to FERC for approval by the end of year 2. When approved, Avista shall begin implementing the reasonable and feasible measures contained in the Dissolved Oxygen Enhancement Plan (expected to be in year 3).

Reporting and Evaluation

- Avista shall prepare an annual report after each year of the 5 years of the Water Quality Monitoring Plan's implementation documenting the results of the monitoring and evaluation. The report shall be submitted to WDOE and FERC, and will be provided to the Spokane Tribe of Indians.

- Avista shall prepare annual progress reports beginning after the first year of implementation of the Dissolved Oxygen Enhancement Plan and ending with a final report 2 years after completion of the reasonable and feasible measures contained in the Dissolved Oxygen Enhancement Plan. Results of the dissolved oxygen monitoring will be included in this report.

Funding

- Avista shall provide funding, in an amount not to exceed $15,000 per year for 5 years, to implement the Washington Water Quality Monitoring Plan.

- Avista shall provide funding, in an amount not to exceed $50,000 to conduct the feasibility study for improving dissolved oxygen at the Long Lake HED discharge and to develop the Dissolved Oxygen Enhancement Plan. Avista shall further provide sufficient funding to implement the reasonable and feasible measures contained in the Dissolved Oxygen Enhancement Plan, and to conduct the monitoring and reporting required upon implementation of the Plan. Implementation, monitoring, and reporting costs shall be determined once the study is completed.

AQUATIC RESOURCES

PF-AR-1 Post Falls HED Fish Protection, Mitigation, and Enhancement Program

Purpose and Goals

The purpose of this protection, mitigation, and enhancement (PME) measure is to reduce and mitigate for potential and unavoidable adverse effects on aquatic habitat and associated fish resources associated with the continued operation of Post Falls HED and to enhance those affected resources. Affected aquatic resources occur in Coeur d'Alene Lake and the affected tributary reaches, the Spokane River upstream of Post Falls HED, and in the free-flowing reach of the Spokane River immediately downstream of Post Falls HED. This PME measure will be implemented through a combination of HED operating protocols intended to reduce and minimize effects to aquatic resources and a long-term commitment to support enhanced fisheries management, protection, and enhancement programs that will mitigate for any remaining effects.

The primary goals of this PME measure are to (1) protect and enhance the long-term population viability of westslope cutthroat trout and bull trout populations in the Coeur d'Alene Basin; (2) protect and enhance downstream aquatic resources with an emphasis on the self-sustaining wild rainbow trout populations in the free-flowing reach of the Spokane River downstream of Post Falls HED; and (3) enhance Project-related recreational fisheries resources and associated angler opportunities and awareness.

Description of Measure

Avista will implement the programs outlined below in order to mitigate for the effects of the Post Falls HED operations on aquatic habitat and fish populations in two distinct geographic areas. The area lying upstream of Post Falls HED includes Coeur d'Alene Lake and the associated tributaries, and the Nine Mile reach of the Spokane River upstream of Post Falls HED. This geographic area is located entirely within Idaho and also includes waters within the Coeur d'Alene Indian Reservation. The free-flowing reach of the Spokane River downstream of Post Falls HED includes a 15-mile long reach of free-flowing river extending from the tailrace of Post Falls HED in Idaho downstream to the influence of the Upriver Dam Reservoir in Washington.

The components of this PME program will serve to reduce the effects on aquatic habitat and fish resources associated with the continued operation of Post Falls HED and provide mitigation for any remaining adverse Project effects. This PME addresses Project effects on (1) the two native fish species of primary concern in the Coeur d'Alene Lake Basin; westslope cutthroat trout and bull trout, and (2) the aquatic habitat and native wild rainbow trout population(s) in the free-flowing reach of the Spokane River downstream of Post Falls HED. The activities conducted under this PME are intended to address bull trout-related Endangered Species Act and biological opinion requirements that may be included in a new FERC license for this Project, to address recommendations and mandatory conditions under the Federal Power Act, and to generally assist the Idaho Department of Fish and Game (IDFG), Washington

Department of Fish and Wildlife (WDFW), Coeur d'Alene Tribe, and U.S. Fish and Wildlife Service (FWS) with achieving their management and recovery goals for native salmonids.

Specific components of the Post Falls Fish PME Program include:

1. **Post Falls HED Minimum Discharge Flow—**Avista shall maintain a 600 cfs minimum discharge flow at Post Falls HED under normal operating conditions. If the daily average inflow as calculated at 2400 hours to Post Falls HED is, and projected to remain, less than 600 cfs and results in Coeur d'Alene Lake drafting below elevation 2127.75 feet as measured at the USGS gage at Coeur d'Alene Lake (Station No. 12415500) between July 1 and September 15 of any year, Avista shall then maintain a 500-cfs interim minimum discharge flow at Post Falls HED until the start of the annual scheduled September 15 drawdown.

2. **Post Falls HED Spawning and Emergence Flows—**Avista will comply with the Post Falls HED discharge levels as outlined in the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan* (Avista, 2004), or as this Plan may be revised through consultation with cooperating resource agencies and subject to FERC approval. This plan outlines the manner in which Avista will operate Post Falls HED following the spring rainbow trout spawning period in order to protect the majority of the trout redds through the fry emergence period, based on flows that occur during the spawning period.

3. **Post Falls HED Ramping Rate—**Avista shall maintain a maximum allowable per hour discharge down ramping rate at Post Falls HED that corresponds to no more than a 4-inch drop per hour in downstream water levels at the USGS gage located on the Spokane River near Post Falls (USGS Gage No. 12419000). Allowable Post Falls HED discharge ramping rates will be determined from USGS rating tables for this gage. In the event that future upgrades at Post Falls HED may reasonably allow for a more restrictive down ramping rate this maximum down ramping rate may be revised as agreed to by Avista and the cooperating resource agencies and as approved by FERC.

   Exceptions: Post Falls HED discharge flow conditions and restrictions described in components 1, 2, and 3 of this PME measure are to be in effect under normal operating conditions. Exceptions to these normal operating conditions include operating emergencies beyond the reasonable control of the licensee, such as might occur due to safety concerns or unexpected mechanical failure at Post Falls HED, or for other requested variations to the normal operation of Post Falls HED as agreed to by Avista and the natural resource and/or public safety agencies.

   Implementation: On the effective date of the new FERC license for Post Falls HED, Avista will implement components 1, 2, and 3 of this PME.

4. **Post Falls Fisheries Resources Public Information, Education, and Law Enforcement Program—**Avista will provide assistance and support for the development and implementation of a public information, education, and law

enforcement program specific to bull trout and westslope cutthroat trout in the Coeur d'Alene Lake Basin and wild rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED.

Stakeholders indicated that increased public information, education and law enforcement activities in the Project area would provide a desirable and cost-effective means of mitigating for adverse Project effects and reduce illegal harvest on bull trout, westslope cutthroat trout and wild rainbow trout. Studies conducted in support of the relicensing effort and previous creel surveys have documented that regulations intended to protect the wild rainbow trout population in the free-flowing reach of the Spokane River downstream of Post Falls HED are commonly violated. Illegal harvest of this important fishery resource appears to be a significant mortality factor for the adult spawning age fish and could negate other protection and enhancement measures proposed by Avista. Avista agrees that reducing such losses represents a desirable means of mitigating for any adverse effects related to the continued operation of Post Falls HED.

Avista will consult with the IDFG, FWS, Coeur d'Alene Tribe, and WDFW to develop appropriate public information and education initiatives and an enhanced law enforcement program. The public information, education, and law enforcement program will be coordinated with other similar programs developed and implemented in the Coeur d'Alene Lake Basin and for the free-flowing reach of the Spokane River downstream of Post Falls HED (e.g., including PF-REC-4). Specific activities supported by or implemented under this component of the PME measure may include species identification and conservation information, landowner education, educational signage and brochures, public presentations, and support of enhanced law enforcement activities specific to the target species and waters. The law enforcement program will be implemented in coordination with WDFW, IDFG, and the Coeur d'Alene Tribe using appropriate personnel.

5. **Post Falls Fishery Protection and Enhancement Program—**This component of the PME will provide for a population and habitat protection and enhancement efforts specifically directed at (1) westslope cutthroat trout and bull trout in the Coeur d'Alene Lake Basin and (2) wild rainbow trout in the free-flowing reach of the Spokane River downstream of Post Falls HED. This component may also support wild salmonid protection by providing for alternative angling and harvest opportunities through recreational and fishery enhancement and supplementation.

   Avista has already developed a *Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout Protection, Mitigation, and Enhancement Implementation Plan* (Kleinschmidt, 2004) to help guide the activities to be developed and implemented under this component of the PME measure. This plan was developed in consultation with the IDFG, FWS, and the Coeur d'Alene Tribe, representing resource agencies and managers that have fishery management and other authority related to these species and other stakeholders. The plan provides a framework for determining appropriate activities for Avista to support as a means of mitigating for Project related effects and to assist the management agencies and Coeur d'Alene Tribe achieve their management and recovery goals for native fish species in the Coeur d'Alene Lake Basin.

The Implementation Plan also outlines a process for implementing and modifying the plan over the term of a new license in consultation with appropriate agencies and other cooperating parties. The potential activities and a process for identifying, developing, and prioritizing the specific activities to be conducted under this measure are outlined further in the Plan. Potential activities can include aquatic habitat protection and restoration specifically directed at westslope cutthroat trout and bull trout populations in the Coeur d'Alene Lake Basin that include mainstem-river and riparian habitat restoration and protection projects; acquisition and long-term protection of private lands where aquatic habitat important to these species exists; suppression of exotic species; collection of required or relevant baseline data; and fish stocking programs to deflect recreational angling pressure away from wild populations of bull trout and westslope cutthroat trout.

Population and habitat protection and enhancement activities directed at wild rainbow trout in the free-flowing reach of the Spokane River immediately downstream of Post Falls HED are also addressed by this component of the PME measure. Potential activities could include, but would not be limited to (1) habitat protection and enhancement in this 15 mile reach of the Spokane River; (2) additional fishery management activities supporting the protection and enhancement of the wild rainbow trout population in this reach; and (3) provisions for new or improved fishing opportunities in nearby waters as a potential means of diverting illegal angler harvest of wild rainbow trout from the Spokane River.

6. **Post Falls Fishery Assessment and Monitoring Program**—Under this component of the PME measure, Avista will support population and related aquatic habitat assessments and monitoring for westslope cutthroat trout, bull trout, and wild rainbow trout in the Coeur d'Alene Lake Basin and the free-flowing reach of the Spokane River downstream of Post Falls HED to the influence of the Upriver Project Reservoir. Avista will support specific fishery and aquatic habitat assessment and monitoring activities that are designed to address Project-related population and habitat trends pertaining to the three target species of salmonids under the terms of a new license. Proposed assessment and monitoring activities will be developed in consultation with the IDFG, WDFW, Coeur d'Alene Tribe and FWS.

   Specific monitoring and assessment activities will be prioritized to address any required biological opinion requirements or other mandatory conditions that may be included in a new FERC license for this Project, activities in areas directly influenced by Project operations, and activities relevant to implementation of the Post Falls Fishery Protection and Enhancement Program discussed in component 5 above.

Implementation of Components 4, 5 and 6

Within the first year of implementing the new FERC license, Avista will consult with the IDFG, Coeur d'Alene Tribe, WDFW, and FWS to develop project-specific plans for implementing components 4, 5 and 6 of this PME measure. Development of project plans associated with the fish populations and aquatic resources upstream of Post Falls HED (Coeur d'Alene Lake Basin) will be based on and guided by the *Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout Protection, Mitigation, and Enhancement Implementation Plan* (Kleinschmidt, 2004). Project-specific plans for the free-flowing reach of the Spokane River downstream of Post Falls HED will focus on protection of the wild rainbow trout population consistent with resource agencies goals and objectives.

Site-specific projects and other activities are best determined in consultation with the resource agencies shortly before implementation and adapted to changing conditions and resource needs over the term of the new FERC license. Specific activities with defined goals would be developed by Avista in consultation with the IDFG, FWS, Coeur d'Alene Tribe, WDFW and other appropriate stakeholders, through project implementation proposals. Activities conducted through this PME measure will be prioritized to address any biological opinion requirements or other mandatory conditions that may be included in a new FERC license, and activities in areas directly influenced by Project operations. The adaptive nature of the components of the PME measure, including monitoring and associated reporting and consultation provisions, will ensure that implemented measures reflect evolving scientific principles, changing resource management goals, objectives and priorities and will optimize benefits to the three targeted species of native salmonids.

Specific project plans will be developed within an overall 5-year implementation period. Flexibility will be retained to appropriately modify or revise the implemented projects and activities annually based on new information, changing conditions, and prior implementation experience. Specific project implementation plans would be implemented by Avista or otherwise supported as soon as practical following agreement with the resource agencies and/or Tribe, and consistent with the funding commitments identified below. The agreed upon project implementation plans would be submitted to FERC. Avista will consult with the IDFG, WDFW, Coeur d'Alene Tribe, and FWS and other cooperating parties annually to review the project implementation activities and create or revise activities as appropriate. In the event that Avista and the other parties are unable to reach agreement on appropriate implementation plans within the first year of license implementation, Avista will then develop and submit proposed project-plans for FERC review and action within 3 months.

Reporting

Avista will prepare reports every 5 years that summarize the activities that were conducted and/or funded under this PME measure during the preceding period. These reports will be filed with the Commission within 6 months of the end of each reporting period and will be available to other parties upon request. The reports will include a description of aquatic habitat, fish populations, and other fishery protection and enhancement measures that were completed, status reports of ongoing measures, results of fishery assessment and monitoring activities, any proposed changes or adjustments to ongoing activities and programs, and any new programs that are proposed for implementation. The fishery and habitat assessment and monitoring data, project specific evaluations, and summary reports will be used to develop and direct the cooperating parties' efforts for upcoming year(s). The 5-year summary reports are intended to provide the Commission with documentation that appropriate progress is being made towards achieving the intended resource protection and enhancement goals specified in the approved implementation plan, thereby mitigating for any unavoidable adverse Project effects on fishery resources.

Costs/Funding

Avista has not attempted to quantify the indirect costs associated with the proposed Post Falls HED spawning and emergence flows, minimum discharge flow and ramping rate restrictions specified above. These costs would include additional labor and effort required to evaluate spawning flows each year and determine appropriate post-spawning flow targets, monitor and ensure compliance with minimum discharge and ramping rate requirements, and cover any additional facility maintenance or other costs. Avista does not anticipate significant additional costs related to these measures, or as a result of any lost power generation or additional equipment maintenance.

Avista does not propose any significant changes to current Post Falls HED operations or configurations that are expected to have an adverse effect on current conditions for aquatic habitat or fish resources. Avista is proposing several Post Falls HED discharge flow related measures that are specifically intended to minimize HED effects and protect and enhance aquatic habitat conditions in the free-flowing reach of the Spokane River downstream of Post Falls HED. Any additional aquatic habitat and fish resources mitigation related to the continued operation of Post Falls HED is adequately provided for through components 4, 5 and 6 of this PME.

Avista proposes a specific funding level to be made available each year over the term of the new FERC license for purposes of implementing the activities outlined in the components of the PME measure. This is a reasonable and appropriate approach to establishing a long-term commitment to resource protection and enhancement and ensure adequate and appropriate mitigation for HED effects. In addition, the need to retain flexibility to respond to changing conditions, resource needs, and new information and technology supports a long-term commitment but adaptive approach to define the specific activities that will be implemented through this PME measure over the term of a new FERC license. Appropriate consultation with the resource agencies and other parties and ongoing reporting and Commission oversight will ensure adequate and appropriate resource mitigation and enhancement benefits are achieved.

Avista shall provide $260,000 annually for the term of the new FERC license for purposes of implementing components 4, 5 and 6 as identified in this PME measure. Funds that are not expended in the year provided shall carry over and accumulate for expenditure in any subsequent years.

This funding shall be further allocated as described below to ensure an appropriate distribution of PME benefits:

Coeur d'Alene Lake Basin

Of the total annual amount to be provided by Avista each year in support of components 4, 5, and 6 of this PME measure as outlined above, $240,000 of the funds shall be specifically applied to resource protection and enhancement efforts within Idaho in the Coeur d'Alene Lake Basin upstream of Post Falls HED. By the end of each 5-year implementation period, at least 70 percent ($840,000) of the funds provided during that period are intended for on-the-ground resource protection and enhancement activities as identified in Components 4 and 5 of this PME. In recognition of the adaptive needs of the various PME programs, specific annual allocations to the individual PME components are not identified at this time.

Free-flowing Reach of the Spokane River Downstream of Post Falls HED

Of the total amount to be provided by Avista each year in support of components 4, 5, and 6 of this PME as outlined above, $20,000 of the funds shall be specifically applied to resource protection and enhancement efforts on the free-flowing reach of the Spokane River in Idaho and Washington immediately downstream of Post Falls HED. By the end of each 5-year implementation period, at least 70 percent ($70,000) of the funds provided during that period are intended for on-the-ground resource protection and enhancement activities as identified in components 4 and 5 of this PME measure. In recognition of the adaptive needs of the PME programs, specific allocations to the individual components are not identified at this time.

The funding provided by Avista shall be used to pay for work by Avista or any other party or contractor for implementing activities pursuant to this PME, as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure, including all costs associated with the discharge flow and ramping rate requirements, periodic 5-year reports, and documenting license compliance, shall be part of Avista's internal overall costs for license implementation and compliance, and are not to be supported by the funding identified above.

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PF-AR-2 Coeur d'Alene Lake Aquatic Weed Management Program

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is to educate the public about, monitor for, and control the establishment and spread of exotic/noxious aquatic weeds within and adjacent to the waters affected by Post Falls HED (Coeur d'Alene Lake, and the Coeur d'Alene, St. Joe, and St. Maries rivers). The goal is to minimize the infestation and spread of noxious aquatic weeds in Coeur d'Alene Lake and its tributaries.

Description of Measure

Avista, in consultation with relevant cooperating parties, will implement the Aquatic Weed Management Program outlined below. The program has been developed to help address the concerns related to exotic/noxious aquatic weeds with respect to waters affected by Post Falls HED. This program provides for Avista's assistance and financial support with exotic/noxious aquatic weed monitoring and control efforts in partnership with federal, state, tribal, and local entities, and other interested stakeholders.

The Terrestrial Resource Work Group's (TRWG's) exotic/noxious aquatic weed subgroup was established specifically to develop and refine Avista's role with regard to managing exotic/noxious aquatic weeds in the waters affected by Post Falls HED. The subgroup determined that the primary focus for Avista should be to work with and assist the cooperating parties who have an interest in and/or who have existing programs dealing with aquatic weeds on Coeur d'Alene Lake and the Coeur d'Alene, St. Joe, and St. Maries rivers. Avista will also work with the cooperating parties to assist in managing established or new exotic/noxious weeds within the HED-affected water bodies. All activities are contingent upon approval from the cooperating parties with ownership, managerial, regulatory and/or other jurisdictional authorities.

Education

Within 1 year of the issuance or effective date of the new FERC license, Avista will work with the cooperating parties to establish or expand educational programs with respect to exotic/noxious aquatic weeds in the waters affected by Post Falls HED. This includes educating the recreating public about the threats posed by the spread of exotic/noxious aquatic weeds and the actions they can take to assist in weed prevention and control.

Avista will assess the information obtained through the Recreation Facility Inventory and User Demand Surveys to determine which other water bodies recreationists use and that are known to be contaminated with exotic/noxious aquatic weeds. If the other water bodies that are frequently used by Project recreationists are known to be infested with weeds of concern, Avista will work with the appropriate entities to educate recreationists about controlling spread of weeds to Project waters.

Monitoring

Within 1 year of the issuance of the new FERC license, Avista will cooperate in the development of a weed-monitoring plan with the cooperating parties. The monitoring plan will couple input between the resource managers and other interested stakeholders and will be reviewed by the cooperating parties prior to implementation.

The plan will be implemented through the use of trained seasonal technicians who may work for Avista or for one of the cooperating parties. Avista will provide a boat of its choosing as needed for these seasonal weed monitoring efforts separate from the funding provided for below.

Management

Avista and the cooperating parties will establish cost-effective management strategies for the various exotic/noxious weed species as they are identified within Post Falls HED-affected waters. These strategies will vary depending on the weed type, level of infestation and the area in which the weeds are identified.

Avista's implementation and/or support of the selected weed control strategies relative to this PME measure will be developed and coordinated through the relevant cooperating parties and regulatory entities. These strategies will be revisited as needed if unanticipated outbreaks of existing or new exotic/noxious aquatic weeds occur in the future on the waters affected by Post Falls HED.

Additionally, Avista and/or the cooperating parties will obtain all necessary permits and approvals for the agreed-upon activities conducted under this PME measure and will coordinate the PME measure implementation with the Project's Historic Properties Management Plan as may be appropriate.

Avista will also review and revise the education, monitoring and weed control strategies, as appropriate on a 10-year cycle over the term of the new FERC license. This review process will be reflected in the relevant 10-year annual reports.

Reporting

Avista will prepare annual reports that summarize the activities funded and/or conducted under this PME measure, the results achieved, and the activities anticipated for implementation/ support in the coming year. These reports will be developed by Avista and will be available to any party upon request.

Funding

Avista shall provide funding, in an amount not to exceed $50,000 per year, in support of the implementation of this PME measure.

Funds that are not expended in the year provided for shall carry over and accumulate up to a maximum amount of $150,000, for expenditure in any subsequent years. Annual and accumulated funds, combined, shall not exceed $150,000. This funding criteria ensures that funds will not accrue unnecessarily, and encourages and allows the cooperating parties to develop and implement the appropriate aquatic weed related programs on an ongoing basis over the new license term.

Avista shall also provide for a boat to be used for the monitoring component of this PME.

The funding provided by Avista shall be used to pay for any element of this measure whether conducted by Avista or any other party or contractor thereto to implement this PME measure as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure, including the reporting requirements, shall be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

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SRP-AR-1 Spokane River Fish Protection, Mitigation, and Enhancement Program

Purpose and Goal

The purpose of this protection, mitigation, and enhancement (PME) measure is to reduce and mitigate for potential adverse effects on aquatic habitat and associated fish resources associated with the continued operation of the Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs and to enhance those resources. Affected aquatic resources occur in the Spokane River extending from the Upper Falls HED Reservoir to Long Lake HED, and Lake Spokane. This PME measure will be implemented through a long-term commitment to support enhanced fisheries management, fish population and aquatic habitat protection and enhancement, and fishery supplementation activities in appropriate areas of the Spokane River or nearby waters that will mitigate for Project effects on aquatic resources.

The primary goals of this PME measure are to protect and enhance Project-associated aquatic resources with an emphasis on the native self-sustaining wild rainbow trout populations in the Spokane River and to enhance Project-related recreational fisheries resources and associated angler opportunities on the Spokane River, Lake Spokane, and nearby waters.

Description of Measure

The geographic areas addressed by this PME measure include the Upper Falls Reservoir, the free-flowing reaches of the Spokane River downstream of Monroe Street HED, the Nine Mile Reservoir, and Lake Spokane.

Avista does not propose any significant changes to current Upper Falls, Monroe Street, Nine Mile, and Long Lake HED operations or configurations that are expected to have an adverse effect on current conditions for aquatic habitat or fish resources.

The components of the Spokane River Fish PME Program will serve to mitigate for any Project effects on aquatic habitat and fish resources associated with the continued operation of Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs. The activities conducted under this PME measure are also intended to assist WDFW in achieving their fisheries management objectives to protect wild rainbow trout in the Spokane River, maintain the popular warm water fishery in Lake Spokane, and enhance angling opportunities by stocking rainbow trout in appropriate areas of the Spokane River and Lake Spokane without conflicting with the protection of wild rainbow trout.

Specific components of the Spokane River Fish PME Program include:

1. **Spokane River Fishery Protection and Enhancement Program—**This component of the PME measure will provide for fish population and aquatic habitat protection and enhancement efforts specifically directed at (a) wild rainbow trout in the Spokane River; (b) maintaining the current warm water fishery in Lake Spokane; (c) enhanced angling opportunity in the Spokane River,

Lake Spokane and nearby waters; and (d) angler awareness of conservation needs in the Spokane River and Lake Spokane.

Naturally self-sustaining wild rainbow trout inhabit the free-flowing reach of the Spokane River downstream of Monroe Street HED. Stakeholders expressed interest in providing protection and enhancement for this important fish population, and the Washington Department of Fish and Wildlife (WDFW) has identified protection of this population of fish as a priority management objective. Population and habitat protection and enhancement activities directed at wild rainbow trout in the free-flowing reach of the Spokane River downstream of Monroe Street HED are a key focus of this component of the PME measure. Specific activities supported or implemented by Avista under this component of the PME measure may include habitat and population protection and enhancement in the Spokane River or in associated tributaries used by wild rainbow trout that also inhabit the Spokane River.

Stakeholders also indicated that increased public information and education and enhanced law enforcement activities in the Project area specific to the wild rainbow trout population(s) would provide a desirable means of mitigating for Project effects to this resource. Studies conducted in support of the relicensing effort and previous creel surveys have documented that compliance with regulations intended to protect wild rainbow trout population in the free-flowing reaches of the Spokane River are frequently violated. Illegal harvest of this important fishery resource appears to be a significant mortality factor for the adult spawning age fish and could negate other protection and enhancement measures proposed by Avista. Avista agrees that reducing such losses represents a desirable means of mitigating for any potential adverse effects of the continued operation of the Project on wild rainbow trout.

Specific activities implemented under this component of the PME measure may include educational signage and brochures, public presentations, and support of enhanced Spokane River law enforcement activities. Elements of an enhanced law enforcement program requiring law enforcement authority will be implemented in coordination with WDFW using appropriate personnel. Public outreach aspects of the information and education efforts will be coordinated with the information and education plan described later in the Spokane River Project Public Outreach Program (PME SRP-REC-4).

Maintaining the current warmwater fishery in Lake Spokane is an important interest of sportsman and a current management objective of the WDFW. This interest will be addressed in part by Avista proposing to maintain the current operating conditions at Long Lake HED, which includes restricting the maximum seasonal drawdown to 14 feet from the full pool water level. This operational condition is a factor in producing the current quality fishery for bass, crappie, and perch in Lake Spokane.

Another fisheries management objective of WDFW is to enhance angling opportunities for salmonids in the Project area. WDFW seeks to accomplish this goal by stocking rainbow trout into appropriate areas of the Spokane River and Lake Spokane but without conflicting with the protection of wild rainbow trout (Avista and WDFW, 2004). Avista currently cooperates with WDFW to stock several thousand catchable-size (8- to 9-inch) rainbow trout in the Upper Falls impoundment and in the Nine Mile Reservoir (Parametrix, 2004d). WDFW has indicated that developing a hatchery supported cold-water species fishery in Lake Spokane is a current top priority for the Spokane River system. This component of the PME is intended to support enhanced angler opportunity by stocking of rainbow trout into appropriate areas of the Spokane River, Lake Spokane, or other waters nearby the Project.

Avista will develop a fish supplementation plan for Lake Spokane, the Nine Mile Reservoir, and/or the Upper Falls Reservoir and the supplementation of trout into waters nearby the Spokane River in consultation with the WDFW. The supplementation plan will include (1) the species, number, size and type (fertile, sterile, or genetically similar) of fish to be stocked; (2) when and where fish supplementation will occur; (3) the source of any fish to be stocked; (4) any proposed improvements to existing hatchery facilities that would be necessary to produced the fish proposed to be stocked and the entity that will fund any such improvements; and (5) any purchase of necessary equipment directly relevant to the supplementation activity.

2. **Spokane River Aquatic Resources Assessment and Monitoring Program—** Under this component of the PME measure, Avista will support the development and implementation of enhanced fish population and related aquatic habitat assessments and monitoring programs associated with Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs. Specific activities could include assistance and financial support to WDFW or other selected entity to develop enhanced fish population monitoring and assessment programs associated with the Project reservoirs and the Spokane River. These programs will focus on high priority species and resources identified by WDFW management objectives, such as the wild rainbow trout population in the Spokane River and warmwater fisheries in Lake Spokane. Activities could include baseline assessments which may be necessary in order to better identify, develop, and design subsequent fishery enhancement measures. Other specific activities conducted under and supported by this component of the PME measure may include identifying, designing, and conducting assessments relevant to any aquatic habitat and fish population enhancement activities implemented under item 1 of this PME measure. Fish population and aquatic habitat assessment and monitoring plans will be developed in consultation with WDFW and other appropriate entities.

   Specific assessment and monitoring activities conducted through this component of the PME measure will be prioritized to address the terms and conditions that may be included in a new FERC license, activities in areas directly influenced by

Project operations, and activities relevant to implementation of the Spokane River Fishery Protection and Enhancement Program discussed in item 1 above.

Implementation

Within the first year of implementing the new FERC license, Avista will consult with the WDFW and other interested parties to develop project-specific plans for implementing components 1 and 2 of this PME measure. Specific post-licensing activities to protect and enhance wild rainbow trout populations have not been identified at this time. Site specific projects, resource protection efforts, detailed resource assessment and monitoring programs, and other activities are best determined in consultation with the resource agencies shortly before implementation and adapted to changing conditions and needs over the term of the new license. Specific activities with defined goals will be developed by Avista, in consultation with WDFW and other appropriate stakeholders, through program and specific project implementation plans. Activities conducted through this PME measure will be prioritized to address protection of wild rainbow trout populations, mandatory conditions that may be included in a new FERC license for the Project, and activities in areas directly influenced by Project operations. The adaptive nature of the components of this PME measure, including habitat and population enhancements, monitoring, and associated reporting and consultation provisions, will ensure that implemented measures reflect evolving scientific principles, changing resource management goals, objectives, and priorities and will optimize benefits to wild rainbow trout, other important resources, and angling opportunities.

Avista or its contractors will obtain the necessary permits and regulatory approvals for the activities being implemented through this PME measure and activities will be coordinated with the Spokane River Project Historic Properties Management Plan as appropriate.

Specific project implementation plans will be developed within an overall 5-year implementation period. Flexibility will be retained to appropriately modify or revise the identified projects and activities annually based on new information, changing conditions, and prior implementation experience. Specific project implementation plans would be implemented by Avista or otherwise supported as soon as practical following agreement with WDFW and any cooperating agencies, consistent with the funding commitments identified below. The agreed upon project implementation plans would be submitted to FERC. Avista will consult with the WDFW and other cooperating parties annually to review the project implementation activities and create or revise activities as appropriate. In the event that Avista and the consulting parties are unable to reach agreement on appropriate implementation plans within the first year of license implementation, Avista will then develop and submit proposed project-plans for FERC review and action within 3 months.

Reporting

Avista will prepare reports every 5 years that summarize the activities that were conducted and/or funded under this PME measure during the preceding period. These reports will be filed with the Commission within 6 months of the end of each reporting period and will be available to other parties upon request. The reports will include a description of aquatic habitat, fish populations, and other fishery protection and enhancement measures that were completed, status reports of ongoing measures, results of fishery assessment and monitoring activities, any proposed changes or adjustments to ongoing activities and programs, and any new programs that are proposed for implementation. The fishery and habitat assessment and monitoring data, project specific evaluations, and summary reports will be used to develop and direct the cooperating parties' efforts for upcoming year(s). The 5-year summary reports are intended to provide the Commission with documentation that appropriate progress is being made towards achieving the intended resource protection and enhancement goals outlined through this PME measure and as specified in the project implementation plans, thereby mitigating for any unavoidable adverse Project effects and providing for additional enhancement on fishery resources.

Costs/Funding

Avista is not proposing any significant changes to current Upper Falls, Monroe Street, Nine Mile, and Long Lake HED operations or configurations that are expected to have an adverse effect on current conditions for aquatic habitat or fish resources. Any aquatic habitat and fish resources mitigation obligation related to the continued operation of Upper Falls, Monroe Street, Nine Mile, and Long Lake HEDs is adequately provided for through components 1 and 2 of this PME measure and the funding commitments identified below.

Avista is proposing a specific funding level to be made available each year over the term of the new FERC license for purposes of implementing the activities outlined in the components of the PME measure. This is a reasonable and appropriate approach to establishing a long-term commitment to resource protection and enhancement and ensure adequate and appropriate mitigation for Project effects. In addition, the need to retain flexibility to respond to changing conditions, resource needs, and new information and technology supports a long-term commitment but adaptive approach to define the specific activities that will be implemented through this PME measure over the term of a new FERC license. Appropriate consultation with the resource agencies and other parties and ongoing reporting and Commission oversight will ensure adequate and appropriate resource mitigation and enhancement benefits are achieved.

Avista shall provide $125,000 annually for the term of the new FERC license for purposes of implementing components 1 and 2 as identified in this PME measure. Funds that are not expended in the year provided shall carry over and accumulate for expenditure in any subsequent years. This funding shall be further allocated as follows to ensure an appropriate distribution of PME benefits:

By the end of each 5-year implementation period, at least 70 percent ($437,500) of the funds expended during that period are intended for on-the-ground resource protection and enhancement activities as identified in component 1 of this PME measure. Specific allocations to the individual components are not identified at this time in recognition of the adaptive needs of the various PME components and programs.

The funding provided by Avista shall be used to pay for work by Avista or any other party or contractor for implementing activities pursuant to this PME measure, as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure, including all costs associated with periodic 5-year reports, and documenting license compliance, shall be part of

Avista's internal overall costs for license implementation and compliance, and are not to be supported by the funding identified above.

SRP-AR-2 Lake Spokane Aquatic Weed Management Program

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is to support the monitoring and control of exotic aquatic weeds within and adjacent to Lake Spokane (the operating reservoir for Long Lake HED). The goal is to minimize the infestation and spread of noxious aquatic weeds in Lake Spokane.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Lake Spokane Integrated Aquatic Plant Management Plan (Stevens County Conservation District, 2001), any revised such plan, or in other aquatic weed control activities consistent with these plans, as outlined below. This PME measure provides for Avista's assistance and financial support for in-field aquatic weed control efforts, aquatic weed monitoring, and educational efforts in cooperation with appropriate local, state, tribal and federal entities.

The Recreation, Land Use, and Aesthetics Work Group and Terrestrial Resource Work Group exotic weed subgroup, which was established specifically to define Avista's role with regard to managing exotic aquatic weeds on Lake Spokane, determined the primary focus of this PME measure should be for Avista to work with the cooperating parties to manage Eurasian watermilfoil at the primary access sites on the lake. These sites currently include the Nine Mile Resort, Forshee's Last Resort and the Lake Spokane Campground. Additionally, the weed subgroup determined that Avista should continue to work with the cooperating parties to manage the other known noxious aquatic weed species that currently exist on the lake, as well as to address any new noxious aquatic weed species that become established in the future.

Implementation

Within 1 year of the issuance or effective date of the new FERC license, Avista will cooperate with the Stevens County Conservation District, Stevens County Noxious Weed Control Board, Spokane County Conservation District, Spokane County Noxious Weed Control Board, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Washington State Parks, Washington Department of Ecology, and the Lake Spokane Protection Association (cooperating parties) to identify and begin implementing weed control measures under this PME measure. This will include the development of a monitoring plan, and identifying, designing, and implementing agreed-upon in-field actions to manage the spread and occurrence of Eurasian watermilfoil at the public access sites. Avista will also work with the cooperating parties to monitor and manage the other existing exotic aquatic weeds and any new exotic aquatic weeds that may become established in the future. This may include educating the public and area landowners about the threats posed by the spread of aquatic weeds and the appropriate means of limiting their spread or reducing their occurrence.

Specific in-field weed control actions supported by or implemented under this PME measure may include but not be limited to any or all of the following: mechanical removal of plants, bottom barriers, chemical treatments, biological treatments, and Project operational measures. It is anticipated that as new technologies for weed control are developed, they will be implemented when and where appropriate as determined by the cooperating parties. Bottom barriers are likely the most effective method currently available for weed control at the public access sites.

Site-specific Weed Control Measures

Avista will work with the cooperating parties to coordinate Project operations with the implementation of site specific weed control activities related to this PME measure. This includes periodic scheduled drawdowns of Lake Spokane on a multi-year cycle as necessary to accommodate the installation, maintenance and/or replacement of bottom or physical barriers (e.g., 10 to 14 feet drawdown every 3 to 5 years to place/replace). Avista will attempt to coordinate these scheduled drawdowns with those provided for below.

Weed Control Lake Drawdowns

In addition to scheduled drawdowns associated with placement and maintenance of bottom barriers or other site-specific weed control efforts, Avista will also implement periodic lake drawdowns for the specific purpose of more widespread aquatic weed control. This type of operational measure will entail periodic winter drawdowns of Lake Spokane specifically intended to take advantage of freezing conditions that can kill or otherwise adversely affect the exposed aquatic weeds on a reservoir-wide basis. To maximize the effectiveness of these drawdowns for reservoir-wide weed control purposes, Avista will seek to:

- Achieve a 13- to 14-foot drawdown to maximize the amount of exposed aquatic weeds;

- Achieve the desired drawdown level at a time when an extended period of below-freezing temperatures are anticipated;

- Maintain the desired drawdown level for a sufficient period of time to achieve the desired adverse effects on the targeted weed species (i.e., freezing and mortality of the plants); and

- Conduct these types of drawdowns on a frequency sufficient to achieve a beneficial level of ongoing aquatic weed control in the exposed areas (i.e., between 0- to 14-foot depths), as determined appropriate by follow-up monitoring.

Avista and the cooperating parties recognize that flexibility and adaptability are needed relative to a winter drawdown for purposes of achieving widespread weed control in order to accommodate varying and unpredictable weather conditions, water availability, and other potential considerations such as the effect on sediment mobilization and transport, total maximum daily load requirements, other water quality effects, and potential effects on fish or other aquatic organisms. It is initially believed that drawdowns for the specific purpose of lake-wide weed control may need to occur at least once every 3 to 5 years and will need to be maintained up to a week or more, if possible. The most effective drawdown regime for the intended purpose can best be determined following initial drawdown efforts for this specific purpose and the results of subsequent weed-response monitoring. Specific commitments on the appropriate frequency and duration of these drawdowns over the term of the new license can therefore not be determined at this time. However, as long as the results of the post-drawdown monitoring indicates a reasonable level of weed control is being achieved in the affected margins of the reservoir, Avista is committed to conducting these weed control drawdowns in the manner determined necessary for ongoing weed control over the term of the new license.

All of Avista's implementation actions relevant to this PME measure will be developed and coordinated with the cooperating parties. Additionally, Avista and/or the cooperating parties will obtain all necessary permits and approvals for the agreed-upon activities conducted under this PME measure and will coordinate the PME measure implementation with the Project's Historic Properties Management Plan as may be appropriate (e.g., for any ground disturbing activities, if potential impacts to culturally significant species may occur as a result of weed control efforts, etc.).

Monitoring

Monitoring plans specific to evaluating bottom barriers and winter drawdowns will be developed and implemented by Avista. The cooperating parties will assist with selecting representative sites (reservoir-wide and at the public access sites) to assess the effectiveness of the weed control strategies. An initial base-line assessment will be conducted at the sites to assess weed species occurrence, stem densities, plant heights, etc. Water level, air temperature, subsurface temperature, and other relevant variables will be monitored and recorded during the winter lake drawdowns for specific purpose of weed control. During the growing season following the winter drawdown or implementation of other weed control strategies, the sites will be reassessed to evaluate weed species occurrence and density. Following this, periodic monitoring will be conducted as determined appropriate based on the previous year's monitoring results. The monitoring results will be included in the annual report and will be used in the decision-making process for future years.

Reporting

Avista will prepare annual reports that summarize the activities funded and/or conducted under this PME measure, the results achieved, and the activities anticipated for implementation/ support in the coming year. These reports will be developed by Avista and will be available to any party upon request.

Funding

Avista shall provide funding, in an amount not to exceed $20,000 per year, for annual implementation of this PME measure. In the event the entire $20,000 is used for site-specific weed control measures, Avista shall also provide an additional amount not to exceed $5,000 per year, to ensure appropriate monitoring occurs.

Funds, excluding the monitoring funds, that are not expended in the year provided for shall carry over and accumulate for expenditure in any subsequent years.

The funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contractor thereto to implement this PME measure, as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure, including the reporting provisions, and operational costs associated with winter drawdowns shall be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

Terrestrial Resources

PF-TR-1 Coeur d'Alene Lake and Tributary Erosion Control and Wetland and Riparian Habitat Protection and Enhancement PME

Purpose and Goals

The purpose of this PME measure is to provide for erosion control measures and to reduce the potential for adverse effects to wetland and riparian habitats associated with continued operation of Post Falls HED, and to otherwise protect and enhance these and other important resources.

The overall goals of this PME measure are to assist in preventing or reducing erosion-related losses of particularly significant wetland and riparian habitats and other associated resources, to otherwise protect and enhance high quality wetland and riparian habitats from future habitat degradation or conversion, and to enhance and restore previously converted wetland habitats where reasonably possible in the HED area.

Description of Measure

Avista believes that the effects to wetland habitats due to continued HED operations as proposed would be relatively minor (i.e., Post Falls HED operations would be similar to current operations, and wetland habitats are unlikely to change much as a direct result of simply continuing those operations). In addition, while erosion and loss of riparian habitat is occurring in some areas due to a variety of causes and influences, Avista does not believe that it has a substantial obligation to necessarily address all such erosion simply as a result of creating and maintaining the operating reservoir for Post Falls HED.[4] However, Avista also recognizes the relatively high habitat values and cultural significance of the wetland, riparian, and other shoreline habitats associated with Post Falls HED, and acknowledges that it has a role to play in protecting and enhancing these resources as well as in protecting significant archeological sites. This proposed PME measure is intended to acknowledge that role and establish a reasonable commitment to addressing these issues and concerns over the term of the new FERC license.

This proposed PME measure consists of two basic yet inter-related components: an Erosion Control Program and a Wetland and Riparian Habitat Protection and Enhancement Program. Both of these programs would be encompassed within and described more fully in a Coeur d'Alene Lake and Tributary Erosion Control and Habitat Protection and Enhancement Plan. This plan will be developed by Avista or a contractor as part of the first year of PME measure implementation, in consultation with the Coeur d'Alene Tribe, resource agencies and other parties (cooperating parties), and will encompass the first 5 years of PME measure implementation. The plan will identify and prioritize areas of particular interest for protection needs, specific erosion-control activities and projects, and other opportunities for protection, enhancement and/or restoration of wetland and riparian habitats that should be pursued. Actual implementation of identified erosion control and habitat enhancement projects would be

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[4] FERC has held that licensees are not responsible for erosion caused by the mere existence of an impoundment *Bangor Hydro-Electric Co.*, 83 FERC ¶ 61,037 (1998), or for erosion caused by natural phenomena (wind and wave action) acting on a reservoir *Duke Power Co.*, 33 FERC ¶ 61,321 (1985).

contingent on securing all necessary landowner permissions, property rights, and regulatory permits and approvals. The plan would be reviewed and updated on a 5-year cycle or as otherwise agreed to by Avista and the cooperating parties.

Erosion Control Program

While site-specific erosion control measures to be pursued under this PME measure would be determined as part of developing the 5-year plan, consultation with stakeholders through the alternative licensing process (ALP) has already provided guidance on the areas and types of activities the Erosion Control Program is likely to focus on. The 5-year plan(s) will likely include an initial preference for addressing erosion and protecting wetland and riparian habitats, along the south end of Coeur d'Alene Lake, with a particular focus on the lower reaches of the St. Joe River and its natural levee system. Potential sites and erosion control measures that may be included in the initial Plan, based on the 2004 erosion study (Stoker, 2004), are presented in Table PF-TR-1 below. These sites include the low, narrow sections of the St. Joe River levee system, with the highest priority going to the sites with the greatest boat and wind-wave erosion potential. Erosion control sites are also likely to be prioritized based on the presence and condition of NRHP-eligible archeological sites. Such prioritization will occur in consultation with the Coeur d'Alene Tribe.

Table PF-TR-1. Example of 15-year erosion control cost estimates. (Source: Earth Systems, 2004)

Project Priority	Year Built	River	Treatment Type	Length (feet)	Unit Cost	Total Cost
1	Varies	Varies	Planting	32,591	$6	$195,550
1	Year 2	St. Joe	River bank wedge and backside	4,162	$35	$145,670
1	Year 3	St. Joe	River bank wedge and backside	4,162	$35	$145,670
2	Year 4	St. Joe	River bank wedge	4,147	$30	$124,410
3	Year 5	St. Joe	River bank wedge	3,441	$30	$103,230
4	Year 5	St. Joe	River bank wedge	1,348	$30	$40,440
5	Year 6	St. Joe	River bank wedge	2,144	$30	$64,320
6	Year 7	St. Joe	River bank wedge	1,448	$30	$43,440
7	Year 8	St. Joe	River bank wedge	2,884	$30	$86,520
8	Year 9	St. Joe	Planting	1,300	$10	$13,000
9	Year 10	St. Joe	Planting	1,200	$10	$12,000
10	Year 11	St. Joe	Planting	1,600	$10	$16,000
11	Year 12	St. Joe	River bank wedge	350	$30	$10,500
12	Year 13	St. Joe	River bank wedge	350	$30	$10,500
13	Year 14	St. Joe	Island building	1,555	$250	$388,750
Specific Sites	Varies	Varies	Varies	2,500	$40	$100,000
Total						**$1,500,000**
Average Annual Cost Over 15 Years						**$100,000**

Once the plan's "target" sites are further identified and agreed upon, and sufficient rights are secured, Avista and/or its contractors, in cooperation with the cooperating parties, will design and implement site-specific erosion control measures that will meet the intended purpose and goal of this PME measure. This will include obtaining the necessary permits and regulatory approvals for any work to be completed as part of this PME measure, in coordination with the Historic Properties Management Plan as appropriate. The Erosion Control Program will also include appropriate monitoring and evaluation activities. These monitoring efforts shall evaluate the biological and physical effectiveness of the specific erosion-control measures implemented under this PME measure.

Opportunities for coordinating with other erosion-control efforts, programs, and/or funding sources will also be identified and explored (e.g., other erosion control grant sources, cost-share opportunities, etc.). Potential cooperating entities and funding sources include U.S. Environmental Protection Agency programs, the Coeur d'Alene Tribe, Idaho Fish and Game, U.S. Fish and Wildlife Service, and other public or private organizations or parties.

Wetlands and Riparian Habitat Protection and Enhancement Program

The 5-year plan(s), will also include provisions for implementing an integrated Wetlands and Riparian Habitat Protection and Enhancement Program (Habitat Enhancement Program). This program will be designed in consultation with the cooperating parties and is intended to protect and enhance existing wetland and riparian habitats, including those affected by or occurring in association with areas experiencing erosion. It is also intended to identify, evaluate and undertake additional wetland restoration, creation, and enhancement opportunities. This latter component includes evaluating the feasibility and potential benefits of acquiring, constructing and/or altering the operation of existing water control mechanisms in selected areas (e.g., in new or currently diked and drained areas) to more closely mimic the historic water regime cycle and plant communities. Preference will be given to sites where perpetual protection is possible; to existing wetlands associated with or in proximity to Post Falls HED, with an emphasis on those that cannot be easily replaced through mitigation; and to sites that are "in basin" and "in kind" to the HED-affected wetlands.

1. Protection of Existing Wetland and Riparian Habitat

In consultation with the cooperating parties, Avista will develop and implement the Habitat Enhancement Program component of the plan as generally outlined below.

Within the first year of the effective date of the new FERC license, Avista, in consultation with the cooperating parties, will identify and prioritize high quality or otherwise significant wetlands and riparian habitat associated with or in proximity to the Post Falls HED for protection needs and opportunities. This candidate site habitat inventory will be reviewed and additional inventory and site prioritization conducted at least every 10 years, although the candidate site list and site prioritization may be revised at any time upon approval of the cooperating parties. Areas such as the large wetland and riparian complexes associated with the Coeur d'Alene and St. Joe rivers, the St. Joe River levee system, and the various lateral lakes are expected to be among the initial candidate sites for this program based on stakeholder input during the ALP.

Using the inventory and prioritized list of candidate sites Avista will then seek to secure sites through such measures as fee simple site acquisition, long-term leases, conservation easements, and agreements or voluntary efforts with cooperating landowners.

Once sites are secured, Avista will develop site-specific wetland protection and enhancement and monitoring plans, in coordination with the cooperating parties.

2. Wetland and Riparian Habitat Enhancement and Restoration

The purpose of this component of the PME measure is to identify wetland and riparian habitat sites that can be enhanced or restored to conditions more closely resembling wetland and riparian habitat that existed historically. Once these sites are identified and prioritized (within 1 year of the effective date of the new FERC license), Avista will seek to secure the sites. Upon receiving sufficient permission, title or ownership interest, Avista, in consultation with the cooperating parties, will develop and implement detailed site-specific enhancement and restoration plans.

The site-specific plans will include project goals and objectives and desired future conditions for hydrologic, vegetative, and other habitat components as applicable, and will outline the evaluation and monitoring criteria and methods that will be used to assess habitat conditions over time. The development and implementation of site restoration and enhancement plans will begin within 1 year of securing the site. Implementing the site-specific plans will include obtaining the necessary permits and regulatory approvals for any work to be completed as part of this PME measure, and coordination with the Historic Properties Management Plan as appropriate.

Avista will monitor the success of the wetland projects for the first 5 years after completion, as outlined in monitoring and evaluation criteria included in the site-specific plans.

Reporting

Avista will prepare and submit to FERC summary reports every 5 years concerning implementation of this PME measure. The reports will also be made available to any other party upon request. The reports will summarize the activities conducted under this PME during the preceding 5 years and the results achieved, the overall results achieved to date (subsequent to first 5-year period), and the general nature of the activities anticipated for the next 5-year period. These reports will provide FERC with appropriate documentation that the purpose and goals of the PME measure are being achieved.

Cost/Funding

Avista shall provide annual funding of $500,000 per year over the term of the new FERC license for development and implementation of the Coeur d'Alene Lake and Tributary Erosion Control and Habitat Protection and Enhancement Plan, as identified in this PME measure. Avista believes that this level of annual commitment to erosion and wetland related projects on Coeur d'Alene Lake and its tributaries, extending over the term of the new FERC license, is substantial and more than adequate to address HED-related effects. The proposed funding will be adequate to support substantial erosion control efforts and still provide for additional wetlands and riparian habitat protection and enhancement work, as indicated by Table PF-TR-1.

Funds that are not expended in the year provided for shall carry over and accumulate for expenditure in any subsequent years.

The funding provided by Avista shall be used to pay for work conducted by Avista or any other party or contractor thereto specific to implementing activities under this PME measure.

Avista's administrative costs to implement this PME measure, including preparation of the periodic 5-year summary reports shall be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

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SRP-TR-1 Lake Spokane/Nine Mile Terrestrial, Riparian and Wetland Habitat Protection and Enhancement PME

Purpose and Goal

The purpose of this protection, mitigation, and enhancement measure (PME) is to provide for the protection and enhancement of selected terrestrial, riparian, and wetland resources associated with Long Lake and Nine Mile HEDs. The goal is to provide for the long-term protection of specific terrestrial, riparian, and wetland areas having relatively high quality habitat, while also identifying, evaluating and supporting agreed upon opportunities for additional habitat acquisition, restoration and/or enhancement activities over the term of the new FERC license.

Another goal is to enhance ongoing community efforts to reduce sediment loads entering the Spokane River from the Hangman Creek Watershed.

Description of Measure

Avista, in consultation with the Washington Department of Fish and Wildlife, Washington Department of Energy, Washington State Parks, Washington Department of Natural Resources, U.S. Fish and Wildlife Service, and the Spokane Tribe of Indians (cooperating parties), will implement the Lake Spokane and Nine Mile HED Terrestrial, Riparian and Wetland Habitat Protection and Enhancement Program PME as outlined below. This PME measure provides for Avista's assistance and financial support in the planning, permitting, enhancement, protection, and ongoing management of various wetland, riparian, and other high-value habitats.

Existing Wetland and Riparian Habitat Protection and Enhancement

Avista, in consultation with the cooperating parties and the other stakeholders in the Terrestrial Resource Work Group (TRWG), identified a high-value wetland complex located immediately adjacent to Lake Spokane.[5] This site has a well developed aquatic and emergent habitat component within the wettest portions, but is under intensive agricultural use near the emergent areas. The TRWG agreed that this site has strong potential for habitat restoration leading to a more diverse and extensive wetland/riparian complex, including additional scrub-shrub and eventually bottomland forested habitats. This site was identified as a high priority for protection and enhancement.

As a component of this PME measure, Avista will seek to acquire, otherwise protect, and enhance that portion of the above noted property lying within 300 feet of the lake shoreline (approximately 47 acres), consistent with the proposed funding identified below (see Cost/Funding). This may be accomplished through such measures as fee simple site acquisition, long-term lease, conservation easement or such other agreement that the landowner may agree to consistent with fair market value for the acquired rights and interests. Once the property or sufficient management rights are acquired, Avista, in consultation with the cooperating parties,

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5 The specific property is well known to the cooperating parties and more information can be provided upon request.

will develop a site-specific habitat protection and enhancement plan for the property. Avista will begin implementing the plan's recommended actions within one year of completing the plan, using the funding identified below.

In the event that sufficient rights to the property referred to above cannot be acquired, Avista and the cooperating parties will seek to identify other high quality wetland and riparian habitats associated with or in close proximity to Nine Mile or Long Lake HEDs for potential protection and enhancement opportunities. Subsequent alternative site acquisition and/or enhancement would be undertaken consistent with the funding that Avista was otherwise proposing to make available to support acquisition and enhancement of the property noted above.

Potential alternative sites may include portions of WSP's Riverside State Park property, located immediately adjacent to Lake Spokane and the Spokane and Little Spokane Rivers. WSP has already expressed an interest in working with Avista and the cooperating parties in wetland restoration projects on its property.

Enhancement and Management of Wildlife Habitat on Avista Project Lands

Under this component of the PME measure, Avista will add to, protect from future development, and manage its Project lands to protect and enhance wildlife habitat values while still allowing for other appropriate uses in certain areas. Other acceptable uses may include limited and appropriate recreational use and development per the Conservation lands category identified in the Land Use Management Plan, consistent with the Project HPMP.

This component of the PME measure specifically includes incorporating 320 acres of Avista-owned lands located within 200 feet, measured horizontally, of the Lake Spokane shoreline into the FERC Project boundary. These new Project lands would be managed as "Conservation" lands, or as otherwise determined appropriate under the Land Use Management Plan. The value of this currently non-Project land is roughly estimated to be between $1.6 million and $6.5 million based on current land values in the Project area.

In addition, Avista will also support additional habitat management and enhancement activities on new Project lands as well as on existing Project lands, as determined appropriate in consultation with the cooperating parties and consistent with the funding provided for below. These habitat management and enhancement activities may include wetland, forest, and/or range management efforts such as wetland creation and enhancement, erosion control and remediation or other shoreline/riparian habitat protection measures, tree and shrub plantings, tree thinning, weed management, etc.

Avista, its contractors, and/or the cooperating parties will obtain all necessary permits and approvals for the agreed-upon habitat management and enhancement activities provided for under this PME measure, and will also coordinate these activities with the Project's Historic Properties Management Plan as appropriate.

Hangman Creek Watershed Restoration

Avista will also continue its recent voluntary financial support of the existing Hangman Creek Watershed restoration program, or similar program.

Reporting

Avista will prepare and submit to FERC summary reports every 5 years concerning the implementation of this PME measure and will make the reports available to others upon request. The reports will summarize the activities and the results achieved under this PME measure during the preceding 5 years, the overall results achieved to date, and the general nature of the activities anticipated for the next 5-year period. These reports will provide FERC with appropriate documentation that the purpose and goals of the PME measure are being achieved.

Cost/Funding

Avista shall provide funding in an amount not to exceed $350,000 to implement the existing wetlands and riparian habitat protection and enhancement component of this PME measure, as outlined above. Avista believes this amount of funding represents a substantial commitment in support of acquiring the desired rights, title and/or interests to, and restoring or enhancing the specific wetland complex of interest referred to above. In the event that the primary property of interest is unavailable (due to an unwilling seller), then this funding would be expected to provide for wetland protection, enhancement or creation on approximately 50 acres if easements are obtainable at a reasonable price, or on approximately 30 acres if land can be purchased "in fee" at a reasonable price.

The value of Avista's placing the 320 acres of additional land within the Project boundary and protecting it under the Land Use Management Plan is estimated to be $1.6 million to $6.5 million given that these lands will essentially be lost to Avista as an asset. Avista shall also provide annual funding of $20,000 per year for the implementation of the Enhancement and Management of Wildlife Habitat on Avista's Project lands component of this PME measure.

Funds that are not expended in the year provided for shall carry over and accumulate for expenditure in any subsequent years.

The funding provided by Avista shall be used to pay for work conducted by Avista or any other party or contractor thereto to implement activities under this PME measure, as agreed to by the cooperating parties.

Beginning within 1 year of new license issuance, Avista shall provide funding in the amount of $10,000 annually to support the regional efforts to reduce erosion (and downstream sedimentation) in the Hangman Creek Watershed, or in the Project area.

Avista's administrative costs to implement this PME measure, including preparation of the summary reports, shall be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

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SPR-TR-2 Spokane River Project Transmission Line Management Program PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is to provide for the continued management of the Spokane River Project (Project) transmission lines and transmission line corridors. The goal is to manage Project transmission lines in a manner that eliminates or minimizes the potential for bird injury or mortality and associated transmission line damage, and ensures a minimally invasive, non-chemical approach to vegetation management consistent with maintaining habitat values and an adequate transmission line corridor.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will implement the following Project Transmission Line Management Program:

Vegetation Management

To maintain an adequate corridor for Project-related, overhead transmission lines, Avista shall implement the following vegetation management guidelines:

- Removal or suppression of vegetative growth shall be limited to plants representing a direct threat to the overhead lines or pole structures, noxious weeds, or to those where removal is needed for adequate vehicular or other access for line construction and maintenance;

- Vegetation removal or suppression shall be accomplished through mechanical means to the degree possible, with herbicide application in rare instances such as to individual plant stumps for purposes of minimizing re-growth; and

- Erosion prevention and revegetation techniques shall be conducted following "best management practices."

Exceptions to this approach shall be allowed only in the event of unusual circumstances (e.g., widespread noxious weed infestation, fire control, etc.) or for specific habitat management purposes. Where time permits, any such exceptions shall be conducted only after close consultation with and concurrence of the appropriate local, state, federal, and tribal resource agencies.

Transmission Lines and Poles

To minimize the potential for adverse interactions among avian species and Project transmission lines and poles, Avista will implement the following actions:

- Configure all new or replacement transmission line structures consistent with the then-current guidelines for minimizing the potential for avian injury or mortality to the maximum extent possible or subsequent revisions or comparable replacement(s);

- Visually inspect the Project transmission lines during the bird nesting season each year for signs of nesting activity, and take appropriate actions to preclude such nesting and, where appropriate provide a nearby alternative nesting platform; and

- Take remedial actions in the event of a bird injury, mortality, or other indication(s) that a particular pole structure and/or section of transmission line poses a threat to avian species. These actions shall be implemented as soon as possible to eliminate or minimize the potential for future adverse interactions, again in accordance with the then-current guidelines for minimizing the potential for avian injury or mortality to the extent possible or subsequent revisions or comparable replacement(s). Occupied bird nests with eggs or young birds will not be relocated unless it is critical to prevent fires or to protect the birds, and only after consultation with the appropriate resource agencies.

Monitoring and Reporting

Avista will conduct visual inspections at an appropriate time of each year of the aforementioned and any newly-constructed Project transmission lines to determine the presence of potentially problematic nesting activities and the need for remedial actions. Avista will also prepare annual reports that summarize the activities conducted under this PME and any known or suspected incidents of avian injury or mortality associated with the Project-related transmission lines. The reports will be made available to any party upon request.

Cost/Funding

Avista estimates the cost for implementing this measure to be approximately $6,125 per year.

Aesthetic Resources

PF-AES-1 Post Falls Project Aesthetic Flows

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to assist in enhancing the aesthetic resource at Post Falls HED. This will be achieved through flow release into the north bypassed reach. The goal of the PME measure is to enhance the public's views of the falls and north bypass reach.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Post Falls HED aesthetics PME measures. This PME measure provides for Avista's assistance and financial support for the planning, development and annual operation and maintenance of the following program.

Implementation

Avista will work with stakeholders including the City of Post Falls , Idaho Department of Parks and Recreation, Kootenai County, and other interested government, business and non-profit organizations, to begin planning and implementing the following measures. The cooperating parties will meet at least semi-annually, once in the spring and once in the fall, as long as is deemed necessary to ensure the following measures are satisfactorily completed. The cooperating parties will use the visitor surveys (referenced in the Post Falls Project Public Outreach PME) to monitor and evaluate the public's ongoing perspective relative to the proposed aesthetics flows. Avista will implement changes to the aesthetics flows identified in this PME measure to accommodate public perspectives, fishery resource, or operational needs, as may be deemed necessary or appropriate in the future.

Avista will release aesthetic flows over the north channel waterfalls at Post Falls HED upon issuance of the new FERC license. The flows will be released through one or two gates, with the preferred gates being the second and fifth tainter gates, unless they are not available for operational or maintenance reasons. Gates would be opened approximately one-half inch (estimated to be 23 cfs per gate). Avista will provide the aesthetic flows on Saturdays and Sundays between the hours of 12:00 p.m. and 6:00 p.m. (daily) from Memorial Day weekend to Labor Day annually, recognizing that in most years north channel flows will exceed the desired aesthetic flows at Post Falls HED into June and sometimes into July due to runoff conditions. The aesthetic flows will be provided for the term of the new FERC license and will be coordinated with and included in flows identified in other PMEs.

Reporting

Avista will prepare and submit to FERC annual reports that summarize the activities funded and/or conducted under this PME. The reports will be available to others upon request.

Funding

To provide the aesthetic flows at Post Falls, Avista anticipates it will cost approximately $51,000 (in 2007 dollars) for gate maintenance every 3 to 5 years and approximately $1,000 in 2007 dollars for lost generation (estimate based on NHC's December 2004 modeling study). Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

SRP-AES-1 Spokane River Project Aesthetic Flows PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to assist in enhancing the aesthetics resource at its Upper Falls and Monroe Street HEDs. This will be achieved through flow releases at the dam and potential channel alterations in Upper Falls HED's bypass reaches (north and middle river channels). The goal of the PME is to enhance the public's views of the upper and lower Spokane Falls and bypass reaches.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Spokane River Project Aesthetics PME measures. This PME measure provides for Avista's assistance and financial support for the planning, development and annual operation and maintenance of the following program.

Implementation

Avista will work with stakeholders including the City of Spokane, Spokane County, Washington Department of Fish and Wildlife, Washington Department of Ecology, and other interested government, business and non-profit organizations to begin planning and implementing the following measure. The cooperating parties will meet at least semi-annually, once in the spring and once in the fall, as long as is deemed necessary to ensure the following measures are satisfactorily completed. The cooperating parties will use the visitor surveys (referenced in the Spokane River Project Public Outreach PME [SRP-REC-3]) to monitor and evaluate the public's ongoing perspective relative to the proposed aesthetics flows. Avista will implement changes to the aesthetics flows identified in this PME to accommodate public perspectives, fishery resource, or operational needs, as may be deemed necessary or appropriate in the future.

Upper Falls

Upon issuance of the new FERC license, Avista will develop an Upper Falls Aesthetics Flow Plan, in consultation with the cooperating parties, to release a minimum of 200 cfs through the bypass reach (i.e., north and middle channels). The plan, which will address efforts to direct leakage and/or the aesthetics flows through both the north and middle channels and provisions for monitoring possible effects on rainbow trout in the bypass reach, will include but not be limited to a pilot study that uses sand bags to direct flows, documentation of the related visual and audible effects, an evaluation of the pilot study, and engineering documents. Once the plan is completed, Avista will submit it to FERC for approval. Permitting and construction will occur once FERC approves the plan, with the goal of implementing the flows within 1 year of the issuance of the new FERC license.

Avista will provide the daily minimum aesthetic flows of 200 cfs between 10:00 a.m. and one-half hour after sunset between Memorial Day weekend and September 30 annually. This schedule recognizes that in most years bypass reach flows will exceed the desired aesthetic flows at the HED from late June to mid-July due to runoff conditions and that flows increase in the fall once the annual drawdown of Coeur d'Alene Lake begins. The aesthetic flows will be provided for the term of the new FERC license and will be coordinated with flows identified in other PME measures.

Monroe Street

Avista will continue the current minimum daily aesthetic flows of 200 cfs over the Monroe Street Dam between 10:00 a.m. and one-half hour after sunset. The aesthetic flows will be provided for the term of the new FERC license and coordinated with flows identified in other PME measures.

Avista's implementation actions relevant to this PME measure will be developed and coordinated through the cooperating parties. All proposed site improvements are contingent upon approval from the cooperating entities with ownership, managerial and/or other jurisdictional authorities.

Reporting

Avista will prepare and submit to FERC annual reports that summarize the activities funded and/or conducted under this PME measure. The reports will be available to others upon request.

Funding

To provide the 200 cfs aesthetic flows at Upper Falls, Avista anticipates it will cost approximately $64,300 (in 2007 dollars) for gate maintenance every 1 to 2 years and approximately $34,500 in 2007 dollars for lost generation (estimate based on NHC's December 2004 modeling study).

The costs associated with planning, permitting and constructing the channel modifications at Upper Falls are unknown at this time, but will be included in the implementation costs for this PME measure.

To provide the 200-cfs aesthetic flows at Monroe Street, Avista anticipates it will continue to lose approximately $67,300 in 2007 dollars in lost generation (estimate based on NHC's December 2004 modeling study). Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

Land Use

PF-LU-1 Post Falls HED Land Use Management Plan Implementation PME

Purpose and Goal

The purpose of this protection, mitigation, and enhancement measure (PME) is to implement land management practices, as referenced in Avista's Post Falls HED Land Use Management Plan (LUMP), on Avista-owned Project lands and to provide financial assistance to the appropriate regulatory authorities with land use management responsibilities on and adjacent to the Project lands and waters. The goal of the PME measure is to manage Project lands in a manner consistent with the terms and conditions of the FERC license, to protect the resource, and provide reasonable public access to the Project.

Description of Measure

Land Use Management Plan

Avista, in consultation with the relevant cooperating parties, will implement the LUMP upon issuance of the new FERC license. The cooperating parties will meet at least semi-annually, once in the spring and once in the fall, for the term of the new FERC license to ensure the LUMP is implemented effectively. On-the-ground management actions that may be employed under the LUMP include, but are not necessarily limited to, annual inspections of the Project lands, fence and gate repairs, forest thinning, weed management, road management, sign management, etc.

Regulatory Compliance

Avista will provide assistance and financial support for enforcement of land- and water-based laws and regulations administered by federal, state, local, and tribal governments within their jurisdictions. The entities will apply for Avista funds prior to the spring meeting of the cooperating parties in order to allow the group time to evaluate the proposals. Avista, in consultation with the cooperating parties, will develop a formal application procedure for allocating the funds within 1 year of the issuance of the new FERC license. The entities that Avista will work with include, but are not necessarily limited to, Kootenai and Benewah counties, the City of Post Falls, the various conservation districts, the Coeur d'Alene Tribe, Idaho Department of Fish and Game, Idaho Department of Lands, U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers.

Reporting

Avista will prepare and submit to FERC annual reports that summarize the activities conducted under this PME measure. The reports will be available to others upon request.

Funding

Avista shall provide funding, in an amount not to exceed $5,000 annually, to implement the LUMP component of this PME measure.

Avista shall provide funding, in an amount not to exceed $12,500 annually, for financial assistance to the federal, state, local, and tribal entities to enhance compliance of the existing and future Project-related shoreline and water-based regulations. The $12,500 will be available through application to Avista, as approved by the cooperating parties.

The funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contactor thereto to implement this PME measure, as agreed by the cooperating parties.

Avista's administrative costs of implementing this PME measure will be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

SRP-LU-1 Spokane River Project Land Use Management Plan Implementation

Purpose and Goal

The purpose of this protection, mitigation, and enhancement (PME) measure is to implement land management practices, as referenced in Avista's Spokane River Project Land Use Management Plan (LUMP), on Avista owned Project lands and to provide financial assistance to the appropriate regulatory authorities with land use management responsibilities on and adjacent to the Project lands and waters. The goal of the PME is to manage Project lands in a manner consistent with the terms and conditions of the FERC license, to protect the resource, and provide reasonable public access to the Project.

Description of Measure

Land Use Management Plan

Avista, in consultation with the relevant cooperating parties, will implement the LUMP upon issuance of the new FERC license. The cooperating parties will meet at least semi-annually, once in the spring and once in the fall, for the term of the new FERC license to ensure the LUMP is implemented effectively. On-the-ground management actions that may be employed under the LUMP include, but are not necessarily limited to, annual inspections of the Project lands, fence and gate repairs, forest thinning, weed management, road management, sign management, etc.

Regulatory Compliance

Avista will provide assistance and financial support for enforcement of land and water-based laws and regulations administered by federal, state, local, and tribal governments within their jurisdictions. The entities will apply for Avista funds prior to the spring meeting of the cooperating parties in order to allow the group time to evaluate the proposals. Avista, in consultation with the cooperating parties, will develop a formal application procedure for allocating the funds within 1 year of the issuance of the new FERC license. The entities that Avista will work with include, but are not necessarily limited to Spokane, Stevens and Lincoln counties in Washington, the City of Spokane, the various conservation districts in Washington, Washington Department of Natural Resource, Washington Department of Ecology, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers.

Reporting

Avista will prepare and submit to FERC annual reports that summarize the activities conducted under this PME measure. The reports will be available to others upon request.

Funding

Avista shall provide funding, in an amount not to exceed $15,000 annually, to implement the LUMP component of this PME measure.

Avista shall provide funding, in an amount not to exceed $12,500 annually, for financial assistance to the federal, state, local, and tribal entities to enhance compliance with the existing and future Project-related shoreline and water-based regulations. The $12,500 will be available through application to Avista, as approved by the cooperating parties.

The funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contactor thereto to implement this PME measure, as agreed by the cooperating parties.

Avista's administrative costs of implementing this PME measure will be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

Recreational Resources

PF-REC-1 Post Falls HED Recreation Plan

Purpose and Goal

The purpose of this protection, mitigation, and enhancement (PME) measure is to provide a framework for Avista to implement the recreational site improvements described in the Coeur d'Alene Lake Recreation PME and the Post Falls/Spokane River Recreation PME, and coordinate management of recreational resources with the various land managers with jurisdiction over project lands. The site improvement and management measures included in the recreation plan are extensive and would provide a basis for substantial improvements to recreational resources associated with the Project. The goal of the PME measure is to provide for the coordinated development or Project-related recreation improvements.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Recreation Plan, as outlined below.

Avista will develop a Recreation Plan that includes (1) recreational facility improvements throughout the project; (2) a program to improve access and safety for boaters on Coeur d'Alene Lake; and (3) a program to improve whitewater boating flows, access, and the flow information system outside of the Project boundary. The Recreation Plan will be submitted to the Commission for approval within 1 year of new license issuance and the measures will be developed over a 10 year period, beginning within 1 year of the new license issuance.

At a minimum, the Recreation Plan will include the following:

a. A general description of the recreational sites;

b. A discussion of the facilities that would be designed or redesigned to take into account the needs of disabled persons;

c. A description of the erosion and sediment control measures where ground disturbing activities are proposed;

d. A means for monitoring and reporting recreational use;

e. A means to conduct consultation with stakeholders; and

f. An implementation schedule, construction costs, and annual operation and maintenance costs for all measures. The implementation schedule and costs will be estimated due to the nature and complexity of the various projects.

Many of the recreational measures that will be detailed in the Recreation Plan are located on properties owned or managed by public agencies. In order to ensure that the measures are completed within the proposed timeline, the plan will include an outline of agreements and general terms and conditions for cooperating with other land managers. At this time, Avista anticipates developing memoranda of understanding (MOUs) or contracts that will be prepared within the first year of the new license and included as attachments to the Recreation Plan. Key elements of the MOUs will include the following requirements:

a. The enhancement measure must be located on lands adjacent to, or within a defined buffer zone of, the Project and must relate to public access to the Project;

b. Avista will partner with the land manager in the planning and design of the enhancement measure;

c. Avista funds will be used only for visitor education programs and new or enhanced recreational facilities adjacent to the Project waters; and

d. The recreational measures will be completed no later than year 10 of the new license.

At the recommendation of the various land managers and the Recreation, Land Use, and Aesthetics Work Group (RLUAWG), the Proposed Action includes a provision that Avista provide a portion of the total funds needed for specific site enhancement measures, an amount that is commensurate with Avista's responsibility to ensure reasonable public access to the Project. For many of the site-enhancement measures, particularly those adjacent to Coeur d'Alene Lake, Avista's portion will be approximately 25 percent of the total cost of the measure. The remaining funds necessary to complete the enhancement measure will come from the agency with principal ownership or management responsibilities for the sites. If, within the first 10 years of the new license, the agencies cannot secure the necessary matching funds to complete the project, Avista will place its contribution for the enhancement measure into a Recreation Enhancement Fund. Avista and cooperating parties will use the fund to pay the full cost or a higher percentage of the cost for some of the remaining or replacement projects. Avista and cooperating parties will identify and earmark funds for those projects that provide the most public benefit and that could be completed in a timely manner with the partnering agencies. The value of the enhancement fund will be fully expended and all projects funded through the Recreation Enhancement Fund will be completed no later than year 12 of the new license. Details of who will participate in allocating funds and under what conditions outstanding projects will be completed will be described in the Recreation Plan.

Avista will prepare the Recreation Plan in collaboration with the cooperating parties. Site-specific elements of the Recreation Plan will be developed in consultation with the primary land managers and stakeholders associated with each development, many of whom are already members of the RLUAWG. For site-specific measures at Coeur d'Alene Lake, Avista will consult with: the cities or towns of Coeur d'Alene, Post Falls, Harrison and St. Maries; Kootenai County Parks and Waterways; Idaho Department of Parks and Recreation , Idaho Department of Fish and Game, U.S. Bureau of Land Management, U.S. Forest Service, and the Coeur d'Alene Tribe.

For site-specific measures along the Spokane River between Post Falls HED and Upper Falls, Avista will consult with Spokane Canoe and Kayak Club; Northwest Whitewater Association; Spokane Mountaineers; Idaho Parks and Recreation; Kootenai County Parks and Waterways; the cities of Post Falls and Spokane; Washington State Parks; Spokane County; and Friends of the Centennial Trail.

Avista will include documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the consulted parties for review, as well as specific descriptions of how the consulted parties' comments are accommodated by the plan. If Avista chooses not to adopt a recommendation, the filing will include the reasons, based on project-specific information.

Avista will not initiate any ground-disturbing or land-clearing activities for new recreational facilities until the Commission notifies Avista that the Recreational Plan is approved. Upon approval, Avista will implement the plan, including any changes required by the Commission.

Funding

Avista shall provide funding, in an amount not to exceed $15,000, to develop the Recreation Plan within the first year of the issuance of the new FERC license.

Avista shall provide funding, in an amount not to exceed $5,000 annually, for annual implementation of the Recreation Plan, once it is developed. (Note: Funding relevant to the various recreation programs as site-specific projects is identified in PME measures PF-REC-2, PF-REC-3, and PF-REC-4).

The funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contactor thereto to implement this PME measure, as agreed by the cooperating parties.

Avista's administrative costs of implementing this PME measure will be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

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PF-REC-2 Coeur d'Alene Lake Recreation PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to assist and provide financial support in the development of and ongoing operation and maintenance of specific recreation facilities associated with Coeur d'Alene Lake, a component of the Spokane River Hydroelectric Project (Project). The goal of the PME is to provide reasonable public access to Project lands and waters.

Description of Measure

Avista, in consultation with the cooperating parties, will cooperate in the implementation of the Coeur d'Alene Lake Recreation PME, as outlined below. This PME measure provides for Avista's assistance and financial support for the planning, development, and annual operation and maintenance of the following recreation facilities and programs associated with the HED. The Recreation, Land Use, and Aesthetics Work Group (RLUAWG) determined that Avista's financial responsibility is approximately 25 percent of total project cost for many of the agreed-upon PME measures. This is further described in PF-REC-1 and specified below, as appropriate.

This PME measure recognizes that Memorandums of Understanding may be necessary for one or more of the cooperating parties to participate in the implementation of the PME. In addition, all proposed site improvements are contingent upon approval from the cooperating entities with ownership, managerial and/or other jurisdictional authorities.

Implementation

Within 1 year of the effective date of the new FERC license, or as may be otherwise agreed to, Avista will work with the cities or towns of Coeur d'Alene, Post Falls, Harrison, and St. Maries; Kootenai County Parks and Waterways; Idaho Department of Parks and Recreation (IDPR); Idaho Department of Fish and Game (IDFG); U.S. Bureau of Land Management (BLM); U.S. Forest Service (FS); and the Coeur d'Alene Tribe, as appropriate, to begin planning the following and/or future recreation projects. In order to accommodate the partnering agencies' management goals, objectives and priorities, Avista agrees that the schedule to complete the following projects needs to remain flexible; however, Avista's commitments to site improvements need to be satisfied within the first 10 years of the issuance of the new FERC license. Avista and this PME measure's cooperating parties will meet at least semi-annually, once in the spring and once in the fall, to determine project priorities and to ensure the following measures are satisfactorily completed. Once the initial projects are completed, Avista and the cooperating parties will continue to meet on a semi-annual basis for the term of the new FERC license to ensure the public's recreational needs are met relative to the Project. Avista's future annual dollar contributions will also be used to help fund new or enhanced facilities that Avista and the cooperating parties determine are necessary to meet the public's needs.

City of Coeur d'Alene Parks

Avista will cooperate with the City of Coeur d'Alene to develop new and/or improve existing recreation facilities at numerous city parks adjacent to Coeur d'Alene Lake and the upper Spokane River. This includes (1) installing showers at Coeur d'Alene City Park for beach users, (2) installing a new restroom shelter at McEuen Field and Park, and (3) connecting Mill River Park to the Idaho Centennial Trail at the Huetter Road Overpass. Avista shall collaborate in the planning and design and provide funding in an amount not to exceed $27,750 for constructing the three projects (approximately 25 percent of the total project cost per the RLUAWG). Avista shall also enter into a separate agreement with the City to provide $3,500 annually to supplement its costs for operation and maintenance.

Falls Park

Avista will cooperate with the City of Post Falls to improve the existing recreation facilities at Falls Park. This includes improving the trail system, scenic overlooks, interpretive displays, fencing, etc. The park's natural features will be considered and incorporated into the improvements where feasible. Avista is currently negotiating a new lease with the City, which desires to operate and manage the park as a component of its city-wide park system. (Note: If a new lease cannot be negotiated with the City, Avista will either seek a new partner or manage the park itself.) Avista will also provide annual operation and maintenance dollars to the City if they manage the park in the future. Avista shall collaborate in the planning and design and provide funding in amounts not to exceed $75,000 for project development and $20,000 annually for operation and maintenance.

Q'emiln Park

Avista will cooperate with the City of Post Falls to improve Q'emiln Parks' existing recreation facilities and to develop new recreational facilities within the park. This includes the trail system, scenic overlooks, interpretive displays, fencing, parking, etc. The park's natural features will be considered and incorporated into the improvements where feasible. Avista is currently negotiating a new lease with the City, which desires to operate and manage the park as a component of its city-wide park system. (Note: If a new lease cannot be negotiated with the City, Avista will either seek a new partner or manage the park itself.) Avista will also provide annual operation and maintenance dollars to the City if they manage the park in the future. Avista shall collaborate in the planning and design and provide funding in amounts not to exceed $75,000 for project development and $30,000 annually for operation and maintenance.

Boat Ramp Extensions

Avista will cooperate with IDFG, Kootenai County Parks and Waterways, IDPR, and the Coeur d'Alene Tribe to extend six motorboat ramps to accommodate "off-season" recreational use on Coeur d'Alene Lake and the Coeur d'Alene and the St. Joe rivers. The specific boat ramps include those at Anderson Lake ($10,000), Round Lake ($10,000), Sun Up Bay ($15,000), Loffs Bay ($10,000), Harrison ($10,000), Chatcolet ($10,000), and Rocky Point ($10,000). Avista shall collaborate in the planning and design and provide funding in an amount not to exceed $75,000 for all of the boat ramp extension projects (approximately 25 percent of the total project cost per the RLUAWG).

Private Aids to Navigation

Avista will cooperate with the Coeur d'Alene Tribe, Kootenai County Parks and Waterways, Benewah County, and the U.S. Coast Guard to install private aids to navigation on Coeur d'Alene Lake and along the Coeur d'Alene and St. Joe rivers as they enter the lake. Avista shall collaborate in the planning, and provide funding, in an amount not to exceed $20,000 for new or enhanced navigational aids and $1,000 annually to supplement the parties' costs for operation and maintenance (approximately 25 percent of the total project cost per the RLUAWG).

BLM Recreation Lands

Avista will cooperate with the BLM to develop or enhance water-based recreational facilities on Coeur d'Alene Lake and its tributaries. Avista shall collaborate in the planning and design and provide funding in an amount not to exceed $200,000 for project development (approximately 25 percent of the total project cost per the RLUAWG). Avista shall also enter into a separate agreement with the BLM to provide $33,000 annually to supplement its costs for operation and maintenance.

Coeur d'Alene Tribe Recreation Lands

Avista will cooperate with the Coeur d'Alene Tribe to develop or enhance water-based recreational facilities on Coeur d'Alene Lake and its tributaries. Avista shall collaborate in the planning and design and provide funding in amounts not to exceed $200,000 to support the development of a recreational site that will in part educate tribal members and the general public regarding current and historic cultural practices of the Coeur d'Alene Tribe. Avista shall also enter into a separate agreement with the Coeur d'Alene Tribe to provide $30,000 annually to supplement the Tribe's costs for operation and maintenance of facilities within or adjacent the Project.

Abandoned Dock/Debris Removal

Avista will cooperate with the Coeur d'Alene Tribe, Kootenai County Parks and Waterways, IDPR, IDFG, and private landowners to remove abandoned docks, other human-made structures, and debris from Coeur d'Alene Lake. This will occur over a 2-year period to accommodate removal during the spring runoff season. Avista shall collaborate in the planning and provide funding in amounts not to exceed $40,000 a year, during the first 2 years after the issuance of the new license, and $6,000 annually for debris removal thereafter.

Higgens Point

Avista will cooperate with IDPR to construct a breakwater for the boat-launch area and to stabilize the shoreline that is eroding due to wind fetch and reconstruct the docks at the boat-in-only sites. Avista shall collaborate in the planning and design and provide funding in amounts not to exceed $100,000 for project redevelopment (approximately 25 percent of the total project cost per the RLUAWG). Avista shall also enter into a separate agreement with the IDPR to provide $10,000 annually to supplement its costs for operation and maintenance.

U.S. Forest Service Recreation Lands

Avista will cooperate with FS to enhance and maintain water-based facilities at the Bell Bay Campground, Medimont Recreation Area, and Rainy Hill Recreation Area. Avista shall collaborate in the planning and design and provide funding in an amount not to exceed $54,000 for project redevelopment (approximately 25 percent of the total project cost per the RLUAWG). Avista shall also enter into a separate agreement with the FS to provide $15,000 annually to supplement its operation and maintenance costs.

Mowry State Park

Avista will cooperate with Kootenai County Parks and Waterways and IDPR to provide mooring buoys and annual operation and maintenance dollars. Avista shall provide funding in amounts not to exceed $1,500 for project redevelopment (approximately 25 percent of the total project cost per the RLUAWG) and $3,500 annually to supplement the County's costs for operation and maintenance of the facilities.

Trail of the Coeur d'Alenes, Trail Spurs

Avista will cooperate with the Coeur d'Alene Tribe and IDPR to develop three trail spurs that will provide access for people with disabilities. The spurs will be located along the Trail of the Coeur d'Alenes between Harrison and Plummer, with one spur in Heyburn State Park. The trail spurs will include interpretive displays depicting tribal history, the lake and/or wildlife, and other amenities such as picnic tables or park benches. Avista will also cooperate with the Coeur d'Alene Tribe to develop a pedestrian pullout along the trail at the Plummer Trailhead that will include an interpretive/educational display, picnic tables and/or park benches. Avista shall collaborate in the planning and design and provide funding in amounts not to exceed $60,000 for project development. Avista will also enter into a separate agreement with the Coeur d'Alene Tribe to provide $7,500 annually to supplement the Tribe's costs for operation and maintenance of the facilities within or adjacent the Project.

Heyburn State Park

Avista will cooperate with IDPR to reconstruct the pedestrian trail from the campground to the Trail of the Coeur d'Alenes and install a sealed-vault toilet to accommodate off-season use. Avista shall collaborate in the planning and design, and shall provide funding in an amount not to exceed $8,000 for project development (approximately 25 percent of the total project cost per the RLUAWG).

Hawleys Landing

Avista will cooperate with IDPR to extend the boat docks to accommodate "off-season" use. Avista shall collaborate in the planning and design, and shall provide funding in an amount not to exceed $4,000 for project development (approximately 25 percent of the total project cost per the RLUAWG).

Plummer and Rocky Points

Avista will cooperate with IDPR to provide sand at the two swimming beaches. Avista shall provide funding, in an amount not to exceed $2,000 for placing sand on the two beaches (approximately 25 percent of the total project cost per the RLUAWG).

Future Recreation Projects

Avista will consult with the cooperating parties to ensure continued reasonable public access to the Project by assisting in the planning and development of new and/or reconstructed recreation facilities after the projects identified in this PME measure are completed. Avista shall provide funding, in an amount not to exceed $60,000 annually, after the initial recreation projects are completed to ensure continued public access and for new and/or reconstructed recreation facilities on or adjacent to the Project waters upstream of Post Falls HED.

Avista's implementation actions, relevant to this PME measure, will be developed and coordinated with the cooperating parties. Additionally, Avista and/or the partnering agencies will obtain all necessary permits and approvals for the agreed-upon PME measures and will coordinate the PME implementation with the Historic Properties Management Plan. Funding to implement this PME measure, including the planning, permitting, construction, and operation and maintenance costs are identified below.

Reporting

Avista will prepare and submit to FERC annual reports that summarize the activities funded and/or conducted under this PME measure. The reports will be available to others upon request.

Funding

Avista shall provide funding, in an amount not to exceed $982,250 to assist in planning and constructing all of the recreation projects included in this PME measure. The funding for each individual project is identified in the above description.

Avista shall provide annual funding, in an amount not to exceed $159,500 per year, to supplement the cooperating parties' costs for operation and maintenance of the relevant recreation projects identified in the above description, once they are completed. The agency that owns and manages the recreation site will be responsible for all operation and maintenance. Avista's operation and maintenance commitment is intended to supplement the cooperating parties' operation and maintenance costs where the agencies have demonstrated a nexus with the Project. This allows the respective agency the flexibility on where to best spend the dollars in any given year. Avista will enter into cooperative management agreements and a separate agreement with respective agencies to ensure the facilities within the Project boundary are adequately managed.

After the initial projects are completed (anticipated in year 10 of the new license), Avista shall provide funding, in an amount not to exceed $60,000 per year, to ensure continued public access and for new and/or reconstructed recreation projects on or adjacent to the Project waters upstream of Post Falls HED.

Planning and construction funds not expended in the year provided shall carry over and accumulate for expenditure in any subsequent years.

All costs for conducting agreed-upon work, including but not limited to planning, permitting, construction, and operation and maintenance costs, associated with this PME measure are included in the above funding. The funding provided by Avista shall be used to pay Avista or any stakeholder or contractor thereto to implement this PME measure, as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

PF-REC-3 Post Falls/Spokane River Recreation PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to enhance river-based recreation opportunities on the Spokane River downstream of Post Falls HED by enhancing the boating season, providing the public with current and projected flow information, and assisting and providing financial support to develop and maintain specific river access sites along the Spokane River. An additional purpose is to provide a mechanism for continued dialog between Avista, other recreation providers, and river user groups to track, monitor and modify, if necessary, the recommendations in this PME measure. The goal of the PME measure is to provide reasonable public access to Project lands and waters.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Post Falls/Spokane River Recreation PME, as outlined below. This PME measure provides for Avista's assistance and financial support for the planning, development and annual operation and maintenance of the following operational programs, recreation facilities and associated flow-related information programs.

This PME recognizes that Memoranda of Understanding may be necessary for one or more of the above-mentioned stakeholders to participate in the implementation of the PME measure.

Implementation

Within 1 year of the effective date of the new FERC license, or as may be otherwise agreed to, Avista will work with the stakeholders, including the Spokane Canoe and Kayak Club, Inc., the Northwest Whitewater Association, the Spokane Mountaineers, Idaho Parks and Recreation (IDPR), Kootenai County Parks and Waterways, the cities of Post Falls and Spokane, Washington State Parks, Spokane County, and the Friends of the Centennial Trail, to begin planning the following projects. In order to accommodate the partnering agencies' management goals, objectives and priorities, Avista agrees that the schedule to complete the following projects needs to remain flexible; however, Avista's commitments to site improvements should be satisfied within the first 5 years of the issuance of the new FERC license.

Whitewater Paddling Flows

Avista will coordinate the late spring and fall flow releases from its Post Falls HED to extend whitewater boating opportunities on the Spokane River. Other considerations such as water quality, flood control, erosion, safety, fisheries, and planning for Coeur d'Alene Lake's summer level, will be incorporated through consultation with relevant agencies, into the planning efforts and they will take precedence over the whitewater flow releases. The target discharges will provide flows that fit within the minimum and maximum flow ranges for whitewater boating opportunities at the Trailer Park Wave, Sullivan Hole and the Zoo Hole, with a goal of achieving the optimum flows for the specific "park and play" spots. The Trailer Park Wave's water features may also be enhanced by releasing water through the south channel in lieu of the north channel. The specific "park and play" spots and their relevant flows are identified in the *Whitewater Paddling Instream Flow Assessment* (Louis Berger, 2004a) and in the following table. Avista will coordinate the proposed flow releases with the cooperating parties.

It is anticipated that these scheduled releases may vary year-to-year depending on the water year. Avista will make the above flow schedules, including release dates and times, once known, available to the public via telephone or internet access.

Optimum whitewater Flow. (Source: Louis Berger, 2004a)

Location	Minimum (cfs)	Maximum (cfs)	Optimum (cfs)
River Reach			
Upper Spokane River	1,350	Spring runoff	3,000
Lower Spokane River	1,350	Spring runoff	3,700
Play Spot			
Trailer Park Wave	3,300	5,500	4,500+
Sullivan Hole	2,500	3,100	2,800–3,100
Zoo Hole	2,200	3,500	2,500–2,800

Scheduled Open-Water Boating Flows During August

Avista will attempt to provide scheduled flows downstream of Post Falls HED to accommodate open-water boating on selected weekends during the month of August when flows allow. This entails providing flows of approximately 1,250 cfs during up to two weekends when average and projected river flows at Post Falls exceed 800 cfs. Avista will coordinate the proposed flow releases with the Fisheries and Water Resources work groups or their successors.

It is anticipated that these scheduled releases may vary year-to-year depending on the water year and that they should have minimal impact on Coeur d'Alene Lake. Avista will make the above flow schedules, , including release dates and times, once known, available to the public via telephone or internet access.

USGS Gage near Post Falls (McGuire Road)

Avista will cooperate with the USGS to modify the Post Falls Gage (Gage No. 12419000) on the Spokane River to provide real-time flow information. This includes assisting with the upgrade and ongoing maintenance of the existing USGS gaging station to provide digital real-time flow information. Avista shall provide funding in amounts not to exceed $15,000 for upgrading the gaging station and, through a separate agreement with USGS, $2,500 annually for operation and maintenance.

Trailer Park Wave Access Site

Avista will cooperate with the City of Post Falls, Kootenai County Parks and Waterways, IDPR, Spokane Canoe and Kayak Club, Inc., and the Northwest Whitewater Association to develop the Trailer Park Wave Access Site. The preferred location for the access site is on the south side of the river, on land that is presently in private ownership. Alternative locations will be considered if reasonable acquisition or easement negotiations with the landowner are not successful. Facilities will include parking, a carry-in-only boat launch, a toilet, and appropriate signage. Avista will work with one of the above-mentioned recreation management entities to acquire either an access easement or fee ownership of the access road and parking area and will enter into a long-term agreement with an appropriate entity to manage the property, or manage it directly. Avista shall collaborate in the planning and design and provide funding, in amounts not to exceed $150,000, for site acquisition and/or project development and $15,000 annually for operation and maintenance. If negotiations with the landowner are unsuccessful, Avista will work with the partnering entities to develop an alternative approach for site access.

Corbin Park Boat Ramp

Avista will cooperate with the City of Post Falls, Kootenai County Parks and Waterways, and IDPR to improve and/or reconstruct the concrete boat ramp at Corbin Park. The City of Post Falls owns and manages the site. Avista shall provide funding, in an amount not to exceed $50,000, for the project.

Avista's implementation actions, relevant to this PME measure, will be developed and coordinated with the cooperating parties. All proposed site improvements are contingent upon approval from the cooperating entities or others with ownership, managerial and/or other jurisdictional authorities.

Coordination Meetings

Avista will hold semi-annual coordination meetings, once in the spring and once in the fall, to coordinate the whitewater and open-water flow releases with interested stakeholders and the parties responsible for managing the recreation resource along the Spokane River between Post Falls HED and inflow to the Upper Falls HED pool. These meetings may also provide a forum for developing a recreation management plan for that section of the Spokane River.

Reporting

Avista will prepare and submit to FERC an annual report that summarizes the activities funded and/or conducted under this PME and results achieved. The report will be available to others upon request.

Funding

Avista shall provide funding, in an amount not to exceed $215,000 to assist in planning and constructing all of the recreation projects included in this PME measure. The funding for each individual project is identified in the above description.

Avista shall provide annual funding, in an amount not to exceed $17,500 per year, for operation and maintenance of the all of the relevant recreation projects once they are completed. The funding for each relevant project is identified in the above description.

Planning and construction funds not expended in the year provided shall carry over and accumulate for expenditure in any subsequent years.

All costs for conducting agreed-upon work, including but not limited to planning, permitting, construction, and operation and maintenance costs, associated with this PME measure are included in the above funding. The funding provided by Avista shall be used to pay Avista or any stakeholder or contractor thereto to implement this PME measure, as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

PF-REC-4 Post Falls HED Public Outreach PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to assist in public education of Spokane River Project users through Interpretive and Educational (I&E) Programs about the Post Falls Project and related recreation and natural resource management and opportunities; cultural heritage; public safety concerns; and relevant laws and regulations. This will be achieved through a number of project-specific funding mechanisms and by working collaboratively with the appropriate resource management entities. The goal of the PME measure is to inform the public, through educational and interpretative media about Project-related natural and cultural resources and related laws and regulations.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Public Outreach PME, as outlined below.

This PME measure recognizes that Memoranda of Understanding may be necessary for one or more of the above-mentioned stakeholders to participate in the implementation of the PME measure. In addition, any proposed site improvements are contingent upon approval from the cooperating entities with ownership, managerial and/or other jurisdictional authorities.

Implementation

Within 1 year of the effective date of the new FERC license, or as may be otherwise agreed to, Avista will cooperate with interested stakeholders, including the Coeur d'Alene Tribe; Idaho Department of Parks and Recreation; Idaho Department of Fish and Game; Idaho Department of Lands; Kootenai and Benewah counties; the cities of Coeur d'Alene, and Post Falls; U.S. Fish and Wildlife Service; U.S. Bureau of Land Management; U.S. Forest Service; and other interested government, business and non-profit organizations, to begin planning and implementing the following measures. Public safety, jurisdictional and regulatory issues will be coordinated through the appropriate federal, state, and local governmental agencies and tribal departments. Avista and this PME measure's cooperating parties will meet at least semi-annually for the term of the new FERC license, once in the spring and once in the fall, to determine project priorities and to ensure the following measures are satisfactorily completed.

Avista and/or the partnering agencies will obtain all necessary permits and approvals for the agreed-upon PME measures and will coordinate PME measure implementation with the Historic Properties Management Plan.

Interpretation and Education

Avista will develop an Interpretation and Education plan (I&E Plan) for the Post Falls Project in consultation with the cooperating parties. The I&E Plan will be developed to provide consistency in the messages and media used to convey interpretation and education on a Project–

wide basis. The I&E Plan provides a forum and mechanism for Avista and the cooperating parties to convey important relevant information to the public.

If necessary, the I&E Plan will be updated every 6 years, based on the results from the visitor surveys described below.

Visitor Surveys

Avista will conduct follow-up visitor surveys, in consultation with the cooperating parties, every 6 years beginning in year 2008. The surveys, predicated largely on the 2003 baseline visitor survey (Louis Berger, 2003), will be used to provide information to assist in evaluating Project-related recreational opportunities, identify recreational trends over time, and to comply with Avista's Federal Energy Regulatory Commission Form 80 requirements. Avista will also coordinate its efforts with those cooperating entities that conduct related surveys along the free-flowing sections of the Spokane River.

Reporting

Avista will prepare and submit to FERC annual reports that summarize the activities funded and/or conducted under this PME measure. The reports will be available to others upon request.

Funding

Avista estimates the cost of developing the I&E Plan to be approximately $25,000. The I&E Plan will be developed within the first year of the issuance of the new FERC license.

Avista shall provide funding, in an amount not to exceed $5,000 per year, for annual implementation of the I&E Plan, once it is developed.

Avista shall provide funding, in an amount not to exceed $15,000 every 6 years, for updating the I&E Plan.

Avista shall provide funding, in an amount not to exceed $75,000 every 6 years, for conducting the visitor survey component of this PME measure.

The funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contractor thereto to implement this PME measure as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

SRP-REC-1 Spokane River Recreation Plan

Purpose and Goal

The purpose of this protection, mitigation, and enhancement (PME) measure is to provide a framework for Avista to implement the recreational site improvements described in the Spokane River Recreation PME and coordinate management of recreational resources with the many land managers with jurisdiction over Project lands. The site improvement and management measures included in the Recreation Plan are extensive and would provide a basis for substantial improvements to recreational resources associated with the Project. The goal of the PME measure is to provide for the coordinated development of Project-related recreation improvements.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Recreation Plan, as outlined below.

Avista, in consultation with the cooperating parties, will develop a Recreation Plan that includes recreational facility improvements throughout the Project. The Recreation Plan will be submitted to the Commission for approval within 1 year of new license issuance and the measures will be implemented over a 10-year period, beginning within 1 year of the new license issuance.

At a minimum, the Recreation Plan will include the following:

1. A general description of the recreation sites;
2. A discussion of the facilities that would be designed or redesigned to take into account the needs of disabled persons;
3. A description of the erosion and sediment control measures where ground-disturbing activities are proposed;
4. A means for monitoring and reporting recreational use;
5. A means to conduct consultation with stakeholders; and
6. An implementation schedule, construction costs, and annual operation and maintenance costs for all measures. The implementation schedule and costs will be estimated due to the nature and complexity of the various projects.

Avista will prepare the Recreation Plan in collaboration with the cooperating parties. Site-specific elements of the Recreation Plan will be developed in consultation with the primary land managers and stakeholders associated with each development, many of whom are currently members of the Recreation, Land Use, and Aesthetics Work Group (RLUAWG). For site-specific measures along the Spokane River between Upper Falls HED and the inflow to Nine Mile Reservoir, Avista will consult with Spokane Canoe and Kayak Club; Northwest Whitewater Association; Friends of the Falls (Great Gorge Park Steering Committee); Spokane Mountaineers; the city of Spokane; Washington State Parks; Spokane County; Spokane Tribe of Indians; and Friends of the Centennial Trail.

For site-specific measures at the Nine Mile and Lake Spokane developments, Avista will consult with Washington Department of Natural Resources; Washington Department of Fish and Wildlife; Washington State Parks; Spokane County; Stevens County; Spokane Tribe of Indians; Spokane Mountaineers; Friends of the Centennial Trail; and the Lake Spokane Protection Association.

Avista will include documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the consulted parties for review, and specific descriptions of how the consulted parties' comments are accommodated by the plan. If Avista chooses not to adopt a recommendation, the submittal will include the reasons, based on project-specific information.

Avista will not initiate any ground-disturbing or land-clearing activities for new recreational facilities until the Commission notifies Avista that the Recreational Plan is approved. Upon approval, Avista will implement the Plan, including any changes required by the Commission.

Funding

Avista shall provide funding, in an amount not to exceed $10,000, to develop the Recreation Plan within the first year of the issuance of the new FERC license.

Avista shall provide funding, in an amount not to exceed $5,000 annually, for annual implementation of the Recreation Plan, once it is developed. (Note: Funding relevant to the various recreation programs and site-specific projects is identified in PME measures SRP-REC-2, SRP-REC-3, and SRP-REC-4).

The funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contactor thereto to implement this PME measure, as agreed by the cooperating parties.

Avista's administrative costs of implementing this PME will be part of Avista's internal overall costs for license implementation and compliance and are not included in the funding identified above.

SRP-REC-2 Spokane River Recreation PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to enhance river-based recreational opportunities on the Spokane River between Upper Falls HED and Nine Mile Reservoir by assisting and providing financial support to develop and maintain specific river access sites as components of the continued operation of the Spokane River Hydroelectric Project (Project). An additional purpose is to provide a mechanism for continued dialog between Avista, other recreational providers and river user groups to track, monitor and modify, if necessary, the recommendations in this PME measure. The goal of the PME measure is to provide reasonable public access to Project lands and waters.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Spokane River Recreation PME, as outlined below. This PME measure provides for Avista's assistance and financial support for the planning, development and annual operation and maintenance of the following operational programs, recreational facilities and associated flow-related information programs.

Implementation

Within 1 year of the effective date of the new FERC license, or as may be otherwise agreed to, Avista will work with the stakeholders, including the Spokane Canoe and Kayak Club, Inc., the Northwest Whitewater Association, the Friends of the Falls (Great Gorge Park Steering Committee), the Spokane Mountaineers, the City of Spokane, Washington State Parks, Spokane County, Spokane Tribe of Indians, and the Friends of the Centennial Trail, to begin planning the following projects. In order to accommodate the partnering agencies' management goals, objectives and priorities, Avista agrees that the schedule to complete the following projects needs to remain flexible; however, Avista's commitments to site improvements should be satisfied within the first 5 years of the issuance of the new FERC license.

Huntington Park

Avista will continue to operate Huntington Park at Monroe Street HED as a natural area/buffer within the City of Spokane. Avista will also cooperate with the Friends of the Falls (Great Gorge Project Steering Committee) regarding possible project-compatible enhancements to Huntington Park. This does not include a financial commitment by Avista to develop any future enhancements. Avista operation and maintenance will not exceed $10,000 annually.

Water Avenue Access Site

Avista will cooperate with Washington State Parks, Spokane County, the City of Spokane, the Spokane Canoe and Kayak Club, Inc., the Northwest Whitewater Association, and the Friends of the Falls to develop the Water Avenue Access Site. The preferred location for the access site is at the west end of Water Avenue near its intersection with Ash Street. The access site will include designated parking, a gravel carry-in-only boat launch with emergency vehicle and boat access gate, portable seasonal toilets, changing area and appropriate signage. The Spokane Parks and Recreation Department owns the land and manages the site, and must approve all facility improvements. Avista shall collaborate in the planning and design, and provide funding, in an amount not to exceed $20,000 for project development. Avista will enter into a separate agreement with the City to provide $5,000 annually to supplement its operation and maintenance costs.

Avista's implementation actions relevant to this PME measure, will be developed and coordinated with the cooperating parties. All proposed site improvements are contingent upon approval from the cooperating entities with ownership, managerial and/or other jurisdictional authorities.

Reporting

Avista will prepare and submit to FERC an annual report that summarizes the activities funded and/or conducted under this PME measure and results achieved. The report will be available to others upon request.

Funding

Avista shall provide funding, in an amount not to exceed $20,000, to assist in planning and constructing all of the recreational projects included in this PME measure. The funding for each individual project is identified in the above description.

Avista shall provide annual funding, in an amount not to exceed $15,000 per year, for operation and maintenance of the relevant recreation projects identified in the above description. The City of Spokane, which owns and manages the Water Avenue Access Site, will continue to be responsible for all operation and maintenance. Avista's $5,000 operation and maintenance commitment is intended to supplement the City's operation and maintenance costs where they have demonstrated a nexus with the Project. This allows the City the flexibility in where to best spend the dollars in any given year. Avista will enter into a cooperative management agreement with the City to ensure the facility is adequately managed.

Planning and construction funds not expended in the year they are provided shall carry over and accumulate for expenditure in any subsequent years.

All costs for conducting agreed-upon work, including but not limited to planning, permitting, construction, and operation and maintenance costs, associated with this PME measure are included in the above funding. The funding provided by Avista shall be used to pay Avista or any stakeholder or contractor thereto to implement this PME measure, as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

SRP-REC-3 Spokane River Public Outreach PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to assist in public education, through interpretation and education programs, of Spokane River Project users about the Spokane River Project HEDs and related recreation, fisheries and terrestrial resources management and opportunities; cultural heritage; public safety concerns; and relevant laws and regulations. This will be achieved through a number of project-specific funding mechanisms and by working collaboratively with the appropriate resource management entities. The goal of the PME measure is to inform the public, through educational and interpretative media, about Project related natural and cultural resources and related laws and regulations.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Public Outreach PME, as outlined below.

This PME measure recognizes that Memorandums of Understanding may be necessary for one or more of the above-mentioned stakeholders to participate in the implementation of the PME measure. In addition, all proposed site improvements are contingent upon approval from the cooperating entities with ownership, managerial and/or other jurisdictional authorities.

Implementation

Within 1 year of the effective date of the new FERC license, or as may be otherwise agreed to, Avista will cooperate with interested stakeholders, including the Spokane Tribe of Indians; Washington Department of Natural Resources; Washington Department of Fish and Wildlife; Washington Department of Ecology; Kootenai and Benewah counties; the cities of Liberty Lake, Spokane Valley; and Spokane; Washington State Parks and Recreation; Spokane, Stevens and Lincoln counties; U.S. Fish and Wildlife Service; U.S. Bureau of Land Management; U.S. Forest Service; and other interested government, business and non-profit organizations, to begin planning and implementing the following measures. Public safety, jurisdictional and regulatory issues will be coordinated through the appropriate federal, state and local governmental agencies, and tribal departments. Avista and this PME measure's cooperating parties will meet at least semi-annually for the term of the new FERC license, once in the spring and once in the fall, to determine project priorities and to ensure the following measures are satisfactorily completed.

Avista and/or the partnering agencies will obtain all necessary permits and approvals for the agreed-upon PME measures and will coordinate the PME measure implementation with the Historic Properties Management Plan.

Interpretation and Education

Avista will develop an Interpretation and Education Plan (I&E Plan) for the Spokane River Project in cooperation with the cooperating parties. The I&E Plan will be developed to provide consistency in the messages and media used to convey interpretation and education on a Project–wide basis. The I&E Plan provides a forum and mechanism for Avista and the cooperating parties to convey important relevant information to the public.

If necessary, the I&E Plan will be updated every 6 years, based on the results from the visitor surveys described below.

Visitor Surveys

Avista will conduct follow-up visitor surveys, with input from the cooperating parties, every 6 years beginning in year 2008. The surveys, which were predicated largely on the 2003 baseline visitor survey (Louis Berger, 2003), will be used to provide information to assist in evaluating Project-related recreation opportunities, identifying recreational trends over time, and to comply with Avista's Federal Energy Regulatory Commission Form 80 requirements. Avista will also coordinate its efforts with those cooperating entities that conduct related surveys along the free-flowing section of the Spokane River from Upper Falls HED to Nine Mile Reservoir.

Avista's implementation actions, relevant to this PME measure, will be developed and coordinated through the cooperating parties. Additionally, Avista and/or the partnering agencies will obtain all necessary permits and approvals for the agreed-upon PME measures and will coordinate the PME measure implementation with the Spokane River Project's Historic Properties Management Plan.

Reporting

Avista will prepare and submit to FERC annual reports that summarize the activities funded and/or conducted under this PME measure. The reports will be available to others upon request.

Funding

Avista shall provide funding, in an amount not to exceed $25,000, to develop the I&E Plan within the first year of the issuance of the new FERC license.

Avista shall provide funding, in an amount not to exceed $3,500 per year, for annual implementation of the I&E Plan, once it is developed.

Avista shall provide funding, in an amount not to exceed $10,000 every 6 years, for updating the I&E Plan.

Avista shall provide funding, in an amount not to exceed $75,000 every 6 years, for conducting the visitor survey component of this PME measure.

The funding provided by Avista shall be used to pay for work by Avista or any stakeholder or contractor thereto to implement this PME measure as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

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SRP-REC-4 Lake Spokane/Nine Mile Reservoir Recreation PME

Purpose and Goal

The purpose of this protection, mitigation and enhancement (PME) measure is for Avista to assist and provide financial support in the development of and ongoing operation and maintenance of specific recreational facilities associated with Nine Mile and Lake Spokane reservoirs, both of which are components of the Spokane River Hydroelectric Project (Project). The goal of the PME measure is to provide reasonable public access to Project lands and waters.

Description of Measure

Avista, in consultation with the relevant cooperating parties, will cooperate in the implementation of the Lake Spokane/Nine Mile Reservoir Recreation PME as outlined below. This PME measure provides for Avista's assistance and financial support for the planning, permitting, construction, and annual operation and maintenance of the following recreation facilities and programs associated with the two HEDs.

This PME measure recognizes that Memorandums of Understanding (MOU) may be necessary for one or more of the above-mentioned stakeholders to participate in the implementation of the PME measure. Additionally, all proposed site improvements are contingent upon approval from the cooperating entities with ownership, managerial and/or other jurisdictional authorities.

Implementation

Within 1 year of the effective date of the new FERC license, or as may be otherwise agreed to, Avista will work with the Washington Department of Natural Resources, Washington Department of Fish and Wildlife, Washington State Parks, Spokane County, Stevens County, Friends of the Centennial Trail, and the Lake Spokane Protection Association to begin planning the following recreation projects. To accommodate the partnering agencies' management goals, objectives, and priorities, Avista agrees that the schedule to complete the following projects needs to remain flexible; however, Avista's commitments to site improvements need to be satisfied within the first 10 years of the issuance of the new FERC license. Avista and this PME measure's cooperating parties will meet at least semiannually for the term of the new FERC license, once in the spring and once in the fall, to determine project priorities and to ensure the following measures are satisfactorily completed.

Nine Mile Cottages

Avista will enter into a long-term lease with Washington State Parks or transfer ownership of the cottages "in fee" to them through a separate agreement.

Nine Mile/Spokane House Interpretation

Avista will cooperate with Washington State Parks to develop an interpretive center that will be used to interpret hydroelectric generation and the history of Riverside State Park. The Nine Mile Overlook will also be relocated to the Charles Road Bridge to accommodate disabled individuals, and to include interpretive signage. Avista will also work with Washington State Parks to redevelop the interpretive displays at the Spokane House in accordance with the Historic Properties Management Plan. Avista shall collaborate in the planning and design, and provide funding, in amounts not to exceed $150,000 for the Nine Mile project and $20,000 annually for operation and maintenance. Avista shall also provide funding, in an amount not to exceed $25,000 for the Spokane House interpretive project.

Nine Mile Portage Parking and Signage

Avista will cooperate with Washington State Parks to develop and identify the floater take-out immediately upstream of the Nine Mile boat-restraining system. Avista will also cooperate with Washington State Parks to construct a four- or five-stall parking area near the take-out and to install informational and warning signs at the Plese Flats Access Site and upstream of the Nine Mile Dam. The signs will warn floaters that they should exit the river on the left (south) side as they approach the boat-restraining system. The Nine Mile Portage will be identified with a "Portage Here" or "Take Out Here" sign. Avista will also work with Washington State Parks to recommend and identify timeframes, based on river flows, when the public should not use the portage due to safety concerns. Avista shall collaborate in the planning and design, and provide funding, in amounts not to exceed $15,000 for project development and $5,000 annually for operation and maintenance.

Centennial Trail Extension

Avista will cooperate with Washington State Parks and the Friends of the Centennial Trail to improve pedestrian/bicycle access to Lake Spokane by extending the Centennial Trail from Sontag Park to the Nine Mile Resort, a distance of approximately 1 mile. Avista will also cooperate with Washington State Parks and the Friends of the Centennial Trail as new trail opportunities to or adjacent to the reservoirs present themselves in the future. Avista shall collaborate in the planning and design, and provide funding, in an amount not to exceed $100,000 for project development.

Nine Mile Resort

Avista will collaborate with Washington State Parks to reconfigure the Nine Mile Resort to provide expanded day-use and seasonally extended boating opportunities in conjunction with the development of Washington State Parks' proposed new campground. The resort will also be operated in conjunction with campground once it is developed. Avista will retain ownership of the resort property and will either manage the property with a concessionaire or enter into a long-term management agreement or MOU with Washington State Parks. Avista shall provide funding, in an amount not to exceed $250,000 for this project.

Washington Department of Natural Resource's Lake Spokane Campground

Avista will cooperate with the Washington Department of Natural Resources to expand camping opportunities and extend seasonal boating and day-use opportunities at their Lake Spokane Campground. The nature of the improvements will remain consistent with the site's current level of development. Avista shall collaborate in the planning and design, and provide funding, in amounts not to exceed $140,000 for project development. Avista shall also enter into a separate agreement with WDNR to provide $30,000 annually to supplement its costs for operation and maintenance.

Boat-in-Only Campgrounds

Avista will cooperate with Washington State Parks and the Washington Department of Natural Resources to identify, plan, and develop up to ten boat-in-only campsites on Lake Spokane. The campsites, which will be developed in groups, will be located on property belonging to Washington State Parks, Washington Department of Natural Resources or Avista. Avista will also consult with Washington Department of Fish and Wildlife to minimize potential impacts to wildlife when selecting the location of the boat-in-only sites. The sites will be developed to provide semi-primitive type experiences. Avista shall collaborate in the planning and design, and provide funding, in amounts not to exceed $50,000 for project development and $10,000 annually for operation and maintenance.

Long Lake Dam Overlook

The Long Lake Dam Overlook will be reconstructed to be more harmonious with the natural surroundings. Interpretive signs pertaining to hydroelectric generation and the river's natural features will be installed at the overlook. The parking area will also be reconfigured. Avista shall provide funding not to exceed $50,000 for project development and estimates $10,000 is needed annually for operation and maintenance.

Long Lake Dam River Access Site

Avista will develop a carry-in-only boat launch immediately downstream of its Long Lake Dam picnic area. This will also include improved parking and picnic facilities. Avista shall provide funding not to exceed $10,000 for project development and estimates $5,000 is needed annually for operation and maintenance.

Devil's Gap Trailhead

Avista will cooperate with Washington State Parks and the Washington Department of Fish and Wildlife to provide parking, hiking and watchable-wildlife opportunities at the trailhead and surrounding area. Avista estimates $5,000 is needed annually for operation and maintenance.

Future Recreation Projects

Avista will work with the cooperating parties to ensure continued public access to the Project by assisting in the planning and development of new and/or reconstructed recreational facilities after the facilities identified in this PME measure are completed. Avista shall provide funding, in an amount not to exceed $300,000, every 10 years after the initial recreation projects are completed, to ensure continued public access and for new and/or reconstructed Lake Spokane or Nine Mile Reservoir recreation facilities.

Avista's implementation actions relevant to this PME measure will be developed and coordinated with the cooperating parties. Additionally, Avista and/or the partnering agencies will obtain all necessary permits and approvals for the agreed-upon PME measures and will coordinate the PME implementation with the Spokane River Project's Historic Properties Management Plan.

Reporting

Avista will prepare and submit to FERC an annual report that summarizes the activities funded and/or conducted and results achieved under this PME measure. The report will be available to others upon request.

Funding

Avista shall provide funding, in an amount not to exceed $790,000 to assist in planning and constructing all of the recreation projects included in this PME measure. The funding for each individual project is identified in the above description.

Avista shall provide funding, in an amount not to exceed $85,000 per year, annually for operation and maintenance of the all of the relevant recreation projects, once they are completed. The funding for each relevant project is identified in the above description.

Avista shall provide funding, in an amount not to exceed $300,000, every 10 years after the initial projects are completed, to ensure continued public access and for new and/or reconstructed Lake Spokane or Nine Mile Reservoir recreation projects.

Planning and construction funds not expended in the year provided shall carry over and accumulate for expenditure in any subsequent years.

All costs for conducting agreed-upon work, including but not limited to planning, permitting, construction, and operation and maintenance costs, associated with this PME are included in the above funding. The funding provided by Avista shall be used to pay Avista or any stakeholder or contractor thereto to implement this PME measure, as agreed to by the cooperating parties.

Avista's administrative costs to implement this PME measure will be part of Avista's internal overall costs for license implementation and compliance, and are not included in the funding identified above.

Cultural Resources

PF-CR-1 Historic Properties Management Plan

Purpose and Goal

The purpose of this protection, mitigation, and enhancement (PME) measure is to provide protection and enhancement of Historic Properties, as identified and evaluation through the cultural resources assessments. The goal is to provide a formal plan for the management of Historic Properties within the Project area.

Description of Measure

The cooperating parties will develop a Historic Properties Management Plan (HPMP) that would (1) explain the legal and regulatory context for the HPMP and Cultural Resources Work Group's role in developing the HPMP; (2) describe the project, location, area of potential effect, and provide background information on the prehistory and history of the region and project area; (3) describe the results of previous cultural resource surveys, explain the methodology and results of project-specific surveys conducted during relicensing, and summarize the resources and their significance; (4) provide management principles, goals, standards for the project management structure for decision-making, determining project effects, and addressing project effects by type, class, or specific properties, including future project-related effects; and (5) specify implementation procedures for staffing, scheduling, consulting, handling unanticipated discoveries, annual reporting, periodic review and update of the HPMP, and interpretation and education opportunities.

The following is a draft table of contents for the HPMP that will be developed.

TABLE OF CONTENTS

3.0 PROJECT AREA CULTURAL RESOURCES

3.1 Previous work and results
3.2 Relicensing related work
3.3 Summary of resources and significance

4.0 PLANNING CONSIDERATIONS AND RECOMMENDATIONS

4.1 Management principles, goals and standards
4.2 Project management structure – decision making
4.3 Project effects
4.4 Addressing identified effects (by type, classes or specific properties)
4.5 Prioritization of activities
4.6 Future project-related effects

5.0 IMPLEMENTATION PROCEDURES

5.1 Staff roles and training
5.2 Schedule
5.3 Consultation
5.4 Unanticipated discoveries
5.5 Annual reporting
5.6 Periodic meetings and review of the HPMP
5.7 Interpretation and Educational opportunities

6.0 REFERENCES

Appendices and Tables

Funding

The costs associated with this PME measure are currently being developed and are unknown at this time. Once determined, the costs will be included in the implementation costs for this PME measure.

SRP-CR-1 Historic Properties Management Plan

Purpose and Goal

The purpose of this protection, mitigation, and enhancement (PME) measure is to provide protection and enhancement of Historic Properties, as identified and evaluation through the cultural resources assessments. The goal is to provide a formal plan for the management of Historic Properties within the Project area.

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The following is a draft table of contents for the HPMP that will be developed.

TABLE OF CONTENTS

1.0 INTRODUCTION

- 1.1 Purpose
- 1.2 Legal and regulatory context
- 1.3 Existing management plans
- 1.4 CRWG development and participation
- 1.5 Confidentiality and maintaining sensitive information

2.0 BACKGROUND

- 2.1 Description of project and location
- 2.2 Definition of Area of Potential Effect
- 2.3 Context of resources

3.0 PROJECT AREA CULTURAL RESOURCES

- 3.1 Previous work and results
- 3.2 Relicensing related work
- 3.3 Summary of resources and significance

4.0 PLANNING CONSIDERATIONS AND RECOMMENDATIONS

- 4.1 Management principles, goals and standards
- 4.2 Project management structure – decision making
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APPENDIX C

Comments on the Draft Preliminary Draft Environmental Assessment and Avista's Responses

On February 21, 2005, Avista distributed a draft PDEA for public review and comment. In response, Avista received the 41 comment letters listed below, as well as several hundred form letters and postcards that expressed a common point of view supporting the "Idaho Compromise." Copies of the original comment letters are available on the Project web site at http://www.avistautilities.com/resources/relicensing/spokane/. Each comment in the letters was given a unique alpha-numeric identifier (Comment ID) and was assigned to one or more staff members to read the comment, prepare a response, and if appropriate, change the content of the PDEA to reflect the information provided in the comment. Comments from the following parties are included in this appendix, along with Avista's responses.

Commentor ID	Commentor
AWC	American Whitewater
BB	Bret Bowers Consulting Services on behalf of the Coeur d'Alene Lakeshore Property Owners Association; the Hagadone Corporation; Black Rock Development, Inc.; and the Spokane River Association
BIA–G	Bureau of Indian Affairs – general comments
BIA–S	Bureau of Indian Affairs – specific comments
BLM	Bureau of Land Management
CCDA	City Coeur d'Alene
CDAC	Coeur d'Alene Chamber of Commerce
CDAT–I	Coeur d'Alene Tribe – Part I, general comments
CDAT–II	Coeur d'Alene Tribe – Part II, specific comments
CELP	The Center for Environmental Law and Policy
CJSC	Center for Justice, Sierra Club
CS	City of Spokane
DB	Don Barbieri
DM	Delevan's Marina
FCT	Friends of Centennial Trail
FS	Forest Service
FWS	Fish and Wildlife Service
HHC	Hagadone Hospitality Corporation
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDPR	Idaho Department of Parks and Recreation
IL	Idaho Legislators

Commentor ID	Commentor
IRU	Idaho Rivers United
JRPO	John and Rachael Paschal Osborn
KCC	Kootenai County Commissioners
KCPW	Kootenai County Parks and Waterways
KCWB	Kootenai County Waterways Board
LPOA	Coeur d'Alene Lakeshore Property Owners Association
LSPA	Lake Spokane Protection Association
NWASCKC	Northwest Whitewater Association (NWA) and the Spokane Canoe and Kayak Club (SCKC)
PF	City of Post Falls
PFCC	Post Falls Chamber of Commerce
SC	Upper Columbia Group of the Sierra Club
SCT	Spokane County
SMI	Spokane Mountaineers, Inc. – Lorna Ream
SRA	Spokane River Association
STI	Spokane Tribe of Indians
TLC	The Lands Council
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WSPR	Washington State Parks and Recreation Commission

Comment ID	Comment	Response
AWC-1	The current Project boundary is not sufficient to include all the land necessary for project operation and maintenance and other project purposes, such as recreation, shoreline control, or protection of environmental resources. The boundary should be continuous from the most upstream, to the most downstream development and should include all lands necessary for mitigation measures and within which mitigation measures will take place, and all lands necessary for recreation.	The proposed Project boundary includes the lands and waters necessary for Project purposes, consistent with established FERC policies. The existing Project boundaries include those lands necessary for the construction, operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources. Project boundaries do not need to be contiguous as long as they satisfy these requirements.
AWC-2	The description of the flow augmentation is inadequate for decision-making and analysis. It is unclear to what extent flow will be augmented with regard to flow triggers, number of days of augmentation, specific flow targets, specific season of augmentation, etc. We require a significantly more detailed commitment in order to determine whether or not the Proposed Action meets our interests and those of our partner organizations.	The RLUAWG stakeholders who participated in the whitewater study (Louis Berger, 2004a) recognized that a relatively high degree of flexibility is needed, relative to the flow releases, given the variability associated with the spring and fall hydrograph. Measure PF-REC-3 provides this flexibility. We estimate that, on average, additional releases will provide one new weekend release per year.
AWC-3	Splitting Post Falls HED from the project would not be good for the river, the relicensing process, or the stakeholders, barring a very good mutually agreed upon reason.	Please see response BIA-S-006.
AWC-4	The Natural Hydrograph scenario was not given due consideration or analysis. In essence, the analysis in the PDEA is insufficient to justify its elimination as an alternative. It is critical that an exhaustive analysis is completed in order to eliminate an alternative as ecologically beneficial as the Natural Hydrograph.	Please see responses CDAT-II-50 and IRU-15.
BB-01	The comments of Mr. Bowers are offered on behalf of the Coeur d'Alene Lakeshore Property Owners Association, the Hagadone Corporation, Black Rock Development Inc., and the Spokane River Association.	Comment noted.
BB-02	Mr. Bowers states formal support of a stable Coeur d'Alene Lake summer pool level of 2,128 feet msl; also supports measure AR-1.	Comment noted.
BB-03	The 600/500 cfs tiered minimum flow should be implemented.	Comment noted.
BB-04	Mr. Bowers is concerned over any drop in Coeur d'Alene Lake levels during the summer recreation season, and states concern over merely considering a switch in flows, and instead appears to favor a definitive trigger.	Comment noted. Avista's proposal includes a definitive trigger for switching to a 500-cfs flow.
BB-05	Mr. Bowers believes that there is unfairness for stakeholders upstream of Post Falls HED because Avista has "changed CDA Lake from a natural lake into a reservoir to support hydropower operations" and downstream (WA state) needs for wastewater effluent dilution in the Spokane River.	Comment noted.
BB-06	Mr. Bowers states that most of the studies related to water quality, fish needs and recreation (completed to date), all appear to support the notion that existing hydropower operations are not causing acute water quality concerns in the project area. Also notes that these efforts show that additional flows in the Upper Spokane River reach could cause negative effects on the fishery because of increased water temperatures.	Comment noted.

Comment ID	Comment	Response
BB-07	Mr. Bowers believes that Avista has made a critical error in not considering historic inflow to Coeur d'Alene Lake when formulating its proposal for determining the minimum flow discharge and lake level related to Post Falls HED operations.	Comment noted.
BB-08	Mr. Bowers is concerned over operating Post Falls HED under Natural Hydrograph conditions and believes that there are extreme negative impacts for waterfront property owners and recreation users of Coeur d'Alene Lake under that scenario.	Comment noted.
BB-09a	Mr. Bowers is concerned about the concept of adaptive management, specifically the lack of a defined decision-making process, the potential impacts on 401 certification, and the lack of certainty that stakeholders would be able to engage in the process with agencies, tribes, and the utility. Some benefit is recognized in using data as it becomes available; however, attempting to define the process of adaptive management has already produced the concerns listed above.	Comment noted. Avista will continue to work with stakeholders as described in the proposed PME measures.
BB-09b	Mr. Bowers states that "Idaho stakeholders" strongly believe an adaptive management component must not be attached to Avista's new license and operating condition for Post Falls HED.	Comment noted.
BIA-G-01	The PDEA discusses many Project impacts separately, but does not necessarily accurately reflect the interactive, synergistic, and cumulative effects the Project on shoreline soils and vegetation, wetlands, erosion, water temperatures, aquatic weeds, riverine habitat, native salmonids and other aquatic species, cultural resources, and recreation.	Comment noted.
BIA-G-02	The PDEA inappropriately restricts its cumulative effects analysis to comparisons between the Proposed Action and current operations, focusing solely on the incremental difference. This ignores the requirements of NEPA and the Commission to consider the effects of past actions, including Project construction.	Avista believes that the assessment of cumulative impacts provided in the PDEA complies with applicable NEPA and FERC requirements and adequately considers the pertinent temporal and geographic scope of original and ongoing impacts of the Project. In Section 5, *Environmental Analysis*, each resource discussion includes a description of cumulative effects on that resource. The discussion indicates, in a general fashion, the cumulative effects on the resource of Project construction and Project operation in combination with other past, present, and reasonably foreseeable future actions. Avista does not believe that a more detailed assessment of the original construction impacts of hydro development or other industrial activities that have occurred in the river basin would serve any purpose in the circumstances here.
BIA-G-03	Avista has not satisfactorily explained why it dismissed the Natural Hydrograph as a reasonably alternative. The PDEA indicates that the loss of generation at Post Falls HED would be only 3.86 MW; therefore, the alternative would not have a major impact on the need for power in the region. The Natural Hydrograph scenario should receive a rigorous analysis.	Please see responses CDAT-II-50 and IRU-15.

Comment ID	Comment	Response
BIA-G-04	The PDEA does not address the Project's effects in light of the Tribe's unique rights in fish, game, water, and other resources that serve to fulfill the purpose of the Reservation. The PDEA needs to have adequate information in this regard so that the Commission can makes its determination about whether the Project's use of Reservation lands will interfere or be inconsistent with the purposes for which the Reservation was created.	Avista acknowledges the Tribe's unique relationship to natural resources in the Project area. The analysis conducted was done in consultation with affected tribes, and we believe the PDEA does contain adequate information for Commission decisions.
BIA-S-001	Under NEPA, regardless of the baseline, the cumulative effects analysis must include assessment of incremental effects added to past effects, including Project construction.	Please see response BIA-G-02.
BIA-S-002	It is unclear how the HEDs are operated in an integrated manner to meet both base load and peak load on an hourly basis.	The Spokane River Project is operated primarily as a base-load system with limited load following occurring only at Long Lake and using the top 1 foot of Lake Spokane at certain times of the year. Avista's main load-following capability is provided by other generation resources.
BIA-S-003	The Proposed Action would postpone the beginning of Coeur d'Alene Lake drawdown by as much as 14 days, which would exacerbate all of the negative effects of the Project's operations on native fisheries, water quality, and aquatic invasive plants.	Please see response CDAT-II-042.
BIA-S-004	The list of existing environmental measures should reference Article 20, which states that Avista shall be responsible for and shall take reasonable measures to prevent erosion.	Please see response CDAT-II-039.
BIA-S-005	Maintenance of the Coeur d'Alene Lake level at 2,128 feet during the summer should not be characterized as a protection and enhancement measure; it is purely for recreation, to the detriment of other resources.	Many environmental measures include trade-offs among resources, including the recreation and socioeconomic resources that benefit from Avista's voluntary lake level management.
BIA-S-006	BIA is not in favor of separating Post Falls HED from the other developments. The PDEA and license application contain numerous references to the fact that the developments are integrally connected.	Avista believes there are compelling reasons for the issuance of separate licenses, including the fact that the licensing issues that have been raised with respect to Post Falls and the Spokane River developments are distinct. In addition, the likelihood is that those issues can be resolved more quickly for the latter developments than they can be for Post Falls. Although several of the commentors indicated a preference for a single license, the actual comments on the open licensing issues tended to reinforce Avista's views that there are considerable differences between the issues relating to Post Falls and those relating to the downstream developments. If necessary, license conditions can be imposed, as they have been in other FERC cases, to ensure coordination of separately licensed projects on the same river system.
BIA-S-007	The Natural Hydrograph scenario is a reasonable alternative that should be fully discussed.	Please see responses CDAT-II-050 and IRU-15.
BIA-S-008	BIA suggests discussing all effects of the Natural Hydrograph in one section.	All effects related to a Natural Hydrograph scenario are discussed in Section 3.3.4. Specific studies done in the context of work group discussions are discussed in relevant resource sections.
BIA-S-009	Change 1998 to 1978.	Section 3.3.4.1 has been corrected.

Comment ID	Comment	Response
BIA-S-010	BIA suggests (1) providing a figure that shows the conditions under which releases are constrained by dam operations vs. the natural outlet restriction, and (2) that Avista provide the method for estimating both lake levels for the Natural Hydrograph and flows below Post Falls HED.	The natural constriction that controls flow under certain high flow conditions was discussed in the "Water Budget and Identification of Potential Beneficial Uses" prepared by NHC. Presentations on the NHC modeling explaining the methodology were also made to the work group.
BIA-S-011	BIA requests more information about whether the Natural Hydrograph scenario described by Avista would result in a natural lake hydrograph; that is, with the dam in place, would there still be a backwater effect on the lake, even though the flow would pass through. A more detailed hydraulic analysis is needed.	The Natural Hydrograph scenario would replicate the flow and stage hydrographs that would occur in the absence of Post Falls Dam. The text of Section 3.3.4.1 has been changed to clarify this point.
BIA-S-012	BIA believes that more analysis is needed to determine if additional groundwater seepage under the Natural Hydrograph would improve water temperature conditions for fish.	Please see responses CDAT-II-053 and CDAT-II-055.
BIA-S-013	BIA recommends that Avista use the standard 10th, 50th, and 90th percentile approach for specifying dry, normal, and wet years and indicate how the years were selected ; they also note a difference between the narrative and Figure 3-10, and between the PDEA and NHC's report.	We sorted the 23 years by average flow below Post Falls over the calendar year and concluded that the values are all within 7 percent of the BIA recommended standards. We will continue to use 3 representative years. See response BIA-S-014 for why these numbers differ from the NHC report.
BIA-S-014	BIA notes that the PDEA figures are different from those in the NHC report, and also believes that the lake level under regulated conditions would be equal to or higher than under the Natural Hydrograph.	The NHC report was based on the period of record August 1913 through July 2002. The PDEA is based on the period of record August 1978 through July 2002; therefore, the results would be expected to be different from earlier studies based on a different period of record. Also see response CDAT-II-050. We agree that lake level under regulated conditions would be equal to or higher than conditions under the Natural Hydrograph.
BIA-S-015	Given the benefits to be derived by implementation of the Natural Hydrograph, Avista needs to explain why it is not a reasonable alternative.	Please see responses CDAT-II-050 and IRU-15.
BIA-S-016	BIA notes that the PDEA figures are different from those in the NHC report, and also believes that the demonstrated benefits to be derived from allowing the tributary mouths to return to riverine conditions would benefit fish; the Natural Hydrograph scenario should be thoroughly analyzed.	Please see responses BIA-S-14 and IRU-15.
BIA-S-017	The small difference of mean annual flows between regulated conditions and the Natural Hydrograph primarily results from the assumption of constant groundwater seepage. See BIA-S-012.	Please see responses CDAT-II-053 and CDAT-II-055.
BIA-S-018	Please resolve the discrepancy in the inundated acreage (8,567 vs. 8,915).	When we subtract 31,587 from 40,402, we obtain a difference of 8,815 acres between full pool and minimum pool. Our August values for the Natural Hydrograph Scenario were computed based on an elevation of 2,120.87 (the average August elevation) and not 2,120.50 feet which accounts for the slight difference.

Comment ID	Comment	Response
BIA-S-019	BIA indicates that (1) the calculation of average capacity loss under the Natural Hydrograph was recalculated several times, (2) it is unclear how those calculations and calculations of power generation loss are being made, and (3) the small amount of power loss suggests that the Natural Hydrograph is a reasonable alternative that should be thoroughly analyzed.	The average capacity loss was calculated based on energy year 2001 (August 1, 2000, through July 31, 2001) and computed by dividing the total energy produced during that period by 8,760 hours (the number of hours in a year). These computations would be expected to be different than any earlier computations. Also see responses CDAT-II-050 and BIA-S-016.
BIA-S-020	Avista should not assume that it would have no obligation to restore exposed shorelines under the Natural Hydrograph; the Commission would likely require Avista to restore areas affected by years of Project-related inundation.	Opinion noted. Avista has stated its position, but the Commission would decide this point.
BIA-S-021	The lake at 2,128 feet is nearly a third larger than the lake at 2,120 feet; therefore, boat traffic would likely decrease, not stay the same or increase as stated by Avista. The conclusions with respect to effects on erosion should receive thorough analysis.	As indicated in Louis Berger (2004b), Recreation Facility Inventory and User Survey for the Spokane River Project, boating occurs on the lake year- round. SCORP projections indicate that boating use in Washington and Idaho is going to increase. Developmental pressures along the Coeur d'Alene Lake shoreline, as well as the numerous secondary lot developments that are underway and/or planned for the future, will contribute further to increases in recreational use of the lake. We do not agree that a lower lake level would discourage boating. Rather, we anticipate that boat use would simply be more concentrated in the boatable areas, potentially causing safety and crowding issues, as well as concentrated impacts of boating.
BIA-S-022	Eliminating emergent wetlands and increasing the amount of open water increases wind erosion, pointing out a benefit to be derived under the Natural Hydrograph by expanding emerging wetlands and decreasing the amount of open water.	The PDEA text is consistent with this comment.
BIA-S-023	More detailed data analysis is needed to demonstrate the effects of Post Falls operations on external and internal loadings of metals.	Please see response CDAT-II-068.
BIA-S-024	BIA indicates that there are many technical uncertainties about the CE-QUAL-W2 model that make it difficult to evaluate conclusions based on the model.	The WRWG developed the study plans and selected the consultant to do the work. All stakeholders had input to the choice of study methods and models. In the case of CE-QUAL-W2, an independent consultant who was one of the developers of the model (Dr. Scott Wells) was selected to review the consultants work. The study results provide an adequate understanding for relicensing the Project.
BIA-S-025	There is sufficient literature available to allow Avista to estimate population responses to changes in habitat quantity and quality under the Natural Hydrograph.	Avista and its contractors are not aware of sufficient literature or reasonably accurate methods to estimate project-related fish population responses that could occur under a Natural Hydrograph operating mode at Coeur d'Alene Lake.

Comment ID	Comment	Response
BIA-S-026	BIA disagrees that there would necessarily be a short-term increase in erosion of archaeological sites under the Natural Hydrograph.	BIA correctly points out that archaeological sites would be exposed in the fall under the No-action and Proposed Action operations. However, under the Natural Hydrograph scenario, the water level elevation would be reduced earlier in the year and would stay at a lower lever for a longer period. This would expose more unvegetated shoreline for at least the first full season and would increase the potential for wind and wave erosion at a lower water elevation and for exposure of artifacts at certain archaeological sites. The text under Section 3.3.4.3, *Cultural Resources*, has been revised to state that the short-term increase in erosion along the shoreline of Coeur d'Alene Lake, the lateral lakes, and the St. Joe, Coeur d'Alene, and St. Maries rivers would increase the potential for erosion of certain archaeological sites. The text is further revised to state that factors over the long term could reduce the rate of loss of archaeological sites along the shoreline at elevation 2,128 feet.
BIA-S-027	BIA disagrees that sites would necessarily be exposed to degrading and potential vandalism for a longer duration under the Natural Hydrograph.	Although the range of fluctuation would remain the same, the seasonality would change such that a larger portion of the fluctuation zone would be exposed over a longer period of time under Natural Hydrograph and artifacts would be subject to greater looting, but probably not additional loss of site integrity given the amount of deflation that has already occurred in this zone.
BIA-S-028	The reference to decreased public recreational access and implied reduction in boating under the Natural Hydrograph contradicts other statements that boating would remain the same or increase. Additionally, although recreation access would decrease, the Natural Hydrograph would increase Tribal access for resource collection, hunting, fishing, and traditional gaming.	Decreased public access does not necessarily equate to a decrease in boater use. Boaters would be more concentrated in the navigable portions of the lake, which would shift as the water level drops. Boat access sites would need to be modified to accommodate the change in lake levels during the summer months. We can draw no conclusions regarding the potential for increases or decreases in resource collection, hunting, fishing, and traditional gaming by tribal members under a Natural Hydrograph.
BIA-S-029	The text of Section 3.3.4.3 should read that the lakeshore would continue to be unavailable for development under the Natural Hydrograph, since it is already unavailable under the Proposed Action.	Comment noted. The text has been changed to reflect this point.
BIA-S-030	The section on applicable laws should include the Native American Graves Protection and Repatriation Act (NAGPRA), the Archaeological Resources Protection Act (ARPA), and 36 CFR 79—Curation of Federally Owned and Administered Archaeological Collections	The HPMP currently in preparation will indicate that surveys conducted on federal or Indian lands require permits under the ARPA and that any remains located as a result of permitted surveys would be subject to the provisions of the NAGPRA.
BIA-S-031	BIA suggests rewording the discussion of Section 106 requirements.	The Commission has invited BIA to be a concurring party to a PA involving lands where BIA has trust authorities and when BIA has been party to the consultation. Consequently, we will include BIA as a concurring party to the proposed PA. The existing description of the Commission's responsibilities relative to Section 106 of the NHPA is consistent with other NEPA documents for the relicensing of hydroelectric projects issued by the Commission.
BIA-S-032	BIA believes that the Natural Hydrograph should be evaluated in equivalent depth and detail with the Proposed Action.	Please see responses CDAT-II-050 and IRU-15.

Comment ID	Comment	Response
BIA-S-033	BIA believes that the statements with respect to summer lake levels and wave action substantiates their point that the Project's maintenance of the summer lake level is the primary factor in creating the erosion that is occurring and that is expected to continue to occur during the new license term.	Opinion noted. The extent and severity of erosion along the lake shoreline and the St Joe, St Maries, and Coeur d'Alene rivers is the result of the combined influences of numerous factors, including bank materials, climate, lake levels, past land management, animal browsing, boat and wind waves, freeze thaw erosion, rain splash, stream currents, and rilling. Of these, the factor most relevant for levee bank erosion is boat waves. The excess erosion beyond natural rates is not attributable to just the 2,128-foot summer lake level.
BIA-S-034	There is an incorrect citation in this section, and the same reference is used repeatedly. The correct citations and references should be used.	The cited references have been corrected.
BIA-S-035	The statement with respect to anadromous fish being blocked by Columbia River dams is correct, but misleading. Anadromous fish in the Spokane River were blocked by construction of the Nine Mile HED in 1908. If fish passage were provided downstream, it may become appropriate to consider fish passage at the Spokane River HEDs at the same time.	Comment noted. Please see response STI-14.
BIA-S-036	Section 5.2.1.5 acknowledges the significant impact of Project-induced inundation on wetlands and riparian habitat in the southern part of the lake and tributaries.	Comment noted.
BIA-S-037	Section 5.2.1.5 acknowledges the impact of Project operations on wildlife species through habitat alteration.	Comment noted.
BIA-S-038	Section 5.2.1.5 should include reference to Project impacts on metals concentrations.	We have revised Section 5.2.1.5 of the PDEA to include a reference to Section 5.5.1.4, *Water Quality*, where metals concentration is discussed.
BIA-S-039	BIA indicates that while the range of elevations may not have changed in thousands of years, the high summer lake level is a significant change from the pattern of lake level elevations that have occurred over the previous several thousand years.	Comment noted. Specific discussion of lake levels (in concert with the BIA's opinion) occur in the *Existing Environment* section of the PDEA.
BIA-S-040	BIA indicates that erosion of levees in Coeur d'Alene Lake is a result of the altered hydrograph, and therefore is a result of the Project.	Opinion noted. Please see response BIA-S-033.
BIA-S-041	In BIA's view, the project does more than just "play a role" in shifting vegetation. Rather, the project dictates the elevation at which inundation and erosion act upon shoreline vegetation and erosion. Vegetation and wetlands have disappeared, not just moved, because the project inundates the varial zone during the summer growing season.	Please see response BIA-S-033.
BIA-S-042	BIA states that because the Project dictates lake elevation, wave energy/erosive forces are concentrated at a particular level (2,128 feet).	Please see response BIA-S-033.
BIA-S-043	BIA notes that, as mentioned in other portions of the PDEA, streambanks on the Coeur d'Alene River are laden with metal-enriched sediments, causing these banks to erode more slowly than those in the St. Joe. Given these seemingly significant differences, it is unclear to BIA why Avista assumes sediment transport in both rivers "to be similar."	Sediment transport in the two rivers is quite similar. Bank erosion, as a source of sediment, is a very small portion of the sediment transported by both rivers, and the smaller amount eroded from the Coeur d'Alene River (because of the cohesive nature of these sediments) does not significantly change this conclusion.

Comment ID	Comment	Response
BIA-S-044	BIA notes that the PDEA does not state the lake elevation for which Golder applied the intercept method in determining river backwater lengths. BIA also notes that these lengths appear different from those reported at pages 5-42 in Section 5.3.2.3.	Comment noted. We have clarified the PDEA to note that the intercept method was for a pool elevation of 2,128 feet. Distances discussed on page 5-42 of the draft PDEA are related only to portions of the river where erosion rates were estimated.
BIA-S-045a	BIA is concerned that the PDEA does not adequately analyze the project effects on the fluxes of metal-contaminated sediment into and out of the lake. BIA notes that Ellis (1940) observed that some 'mine slime' is not only carried across the lake, but out of the lake as well. USGS researchers (e.g., Wood, personal communication) have monitored discharge from the St Joe and Coeur d'Alene rivers frequently transiting the lake as an overflow plume, capable of carrying silt-sized sediment.	Comment noted. Under existing baseline conditions, as well as the Proposed Action, Project operations do not significantly alter the peak flows that transport sediment in the river and potentially across the lake as well. The phenomenon of transport of "mine slime" does not occur at a time when the Project is having an effect on the lake level.
BIA-S-045b	BIA is of the view that the sediment routing study should be substantially revised, and consideration should be given to obtaining a new contractor experienced with sediment transport aspects of river and lake hydrodynamic modeling. The new study should include the effects of river and lake hydrodynamics on metals-contaminated sediment transport into and through Coeur d'Alene Lake.	We respectfully disagree with BIA's opinion and believe Golder (2005b), the sediment routing study, is sufficient for purposes of evaluating project effects.
BIA-S-046	BIA notes that at Page 5-21, paragraph 4, it appears that the word "not" has been left out of the text in the first paragraph.	Comment noted. Please see revised Section 5.3.1.4, *Sediment Supply and Transport*.
BIA-S-047	BIA states that the sediment trapping capability of the lake is due to the combined effects of the configuration of the lake, the limited potential for the hypolimnion to become anoxic, and the source and grain size of depositional material from the rivers and southern portion of the lake. These are in addition to the shape of the lake as the factor stated in the PDEA. What BIA terms "anecdotal evidence" is stated to be insufficient grounds for evaluating project affects on metals-contaminated sediment in the lake.	Avista notes the comments regarding additional sediment trapping characteristics and has amended Section 5.3.1.4 accordingly. The evidence regarded by BIA as "anecdotal" is in fact based on modeling. The metals study (Golder, 2005a, 2004e) examined the potential for release of metals based on available metals concentrations and water chemistry evaluated in the water quality model. There is a linkage in this model between the hypolimnetic oxygen deficit and the metals within the sediment.
BIA-S-048	BIA states that the issue of sediment transport and transport of sediment-bonded metals is too important an issue to be summarily dismissed for lack of available data.	Comment noted. Please see response BIA-S-045b.
BIA-S-049	BIA states that it is current project operations that hold the water level constant at the 2,128-foot elevation for three months; therefore, it is current project operations that expose soils at this elevation around the lake and in the tributaries and lateral lakes to extensive erosion.	Comment noted. Please see response BIA-S-033.
BIA-S-050	BIA notes that the characterization of the Coeur d'Alene Lake shoreline as rocky and scoured is appropriate only for the northern part of the lake. The southern portion—where the Coeur d'Alene Indian Reservation is located—contains numerous shallow bays that are typically sandy and muddy. BIA notes that there is currently no way to compare erosion in the bedrock areas to that of the shallow, sandy/muddy bays of the south lake. BIA suggests a comparison of aerial photographs of these two distinctly different areas.	Comment noted. The erosion study (Earth Systems and Parametrix, 2004) assessed both shoreline and levee erosion according to the study plan developed under the Terrestrial Resources Working Group.

Comment ID	Comment	Response
BIA-S-051	BIA states that to quantify Project-caused impacts on sediment and heavy metals storage in the lake, it will be necessary to revise the sediment routing study.	Opinion noted. Please see responses BIA-S-45b and BIA-S-051d.
BIA-S-051a	BIA notes that the *Environmental Effects* section sometimes compares "unregulated" with "regulated" conditions, and at other times compares conditions under the "Proposed Action" with those under "current project conditions." The analysis should clarify which alternatives are being compared.	Unregulated conditions represent a Natural Hydrograph condition. Regulated conditions represent current Project operations. The Proposed Action represents Avista's proposed alternative, as described in the PDEA.
BIA-S-051b	The environmental effects associated with implementing the Natural Hydrograph should be evaluated along with those associated with implementing the Proposed Action Alternative.	Please see response CDAT-II-050.
BIA-S-051c	The flux of sediment and metals into and out of Coeur d'Alene Lake should be quantified for regulated and Natural Hydrograph conditions.	Sediment transport events capable of moving sediment across the lake are rare and occur only during low frequency/high magnitude flow events during the winter and spring when Project operations have little or no effect on lake levels. Also see response CDAT-II-050.
BIA-S-051d	Project-caused effects on sediment and heavy metals storage in Coeur d'Alene Lake relative to the Natural Hydrograph should be quantified.	Comment noted. Because project-induced changes in sediment deposition within the lake and lower portions of the Coeur d'Alene and St Joe rivers are only temporary (larger winter and spring flows move any sediment deposited in the pool backwater during summer), there is no net change in the yearly flux of metals into the lake. Also see responses BIA-S-051c and CDAT-II-050.
BIA-S-052	BIA states that the estimates assigning the causes of erosion are arbitrary and unsupported. BIA again notes that the project determines the elevation at which erosive forces, such as wind and boat waves, impact shorelines and levees.	Opinion noted. The TRWG requested the contractor to provide the percentage estimates for the sources of erosion, based on professional judgment, to help the group in its settlement discussions. Also see response BIA-S-033.
BIA-S-053a	BIA states that the estimates assigning the causes of erosion and predictions of future boating use are arbitrary and unsupported, and that the studies assigning these estimates do not provide a technical basis for these estimates. BIA suggests using these arbitrary estimates more judiciously. For example, how the PDEA analysis distinguishes between project-caused erosion and that caused by boat- and wind-waves should be explained.	Please see responses BIA-S-033 and BIA-S-052. The study completed on levee and shoreline erosion contains a discussion of the assignment of the erosion causes. The PDEA is not the appropriate location to discuss the details of fieldwork and analysis undertaken for this assessment, and readers of the PDEA are referred to the source documents for this information.
BIA-S-053b	BIA notes that the project increases the Coeur d'Alene Lake surface area by nearly 30% at full pool, which increases both wind fetch and recreational boating opportunities, then maintains these conditions for the entire summer. So, while the project is not solely responsible for wind and boat wave erosion, it certainly adds to them. It is inconsistent for Avista to tout its "voluntary" maintenance of summer lake levels for recreation while, at the same time, assuming no responsibility for boating and the associated boat-wave erosion that occurs as a result of the boating/recreation that it fosters. Further, if not for the project, the boat/wind wave erosion would not concentrate at the 2,128-foot level for roughly 3 months.	Comments and opinions noted.

Comment ID	Comment	Response
BIA-S-054	BIA states that annual sustained inundation and loss of vegetation in the varial zone is solely (as opposed to largely) the result of current project operations that maintain a stable summer pool elevation at or about 2,128 feet.	Opinion noted. Please see response BIA-S-033.
BIA-S-055	BIA maintains that in order to state that shoreline erosion rates are "fairly limited" in areas dominated by bedrock, Avista must contrast these areas with actual quantitative estimates of the shoreline erosion rates in the more erodible portions of the lakeshore.	Assessments of erosion (as provided in Earth Systems and Parametrix [2004]) were both quantitative and qualitative and included analysis of historical aerial photographs, analysis of the eroded ledge and stumps, short-term erosion pin studies, and professional interpretation of geomorphic processes based on direct field observations. Please refer to Earth Systems and Parametrix (2004) for more detail.
BIA-S-056	BIA notes that the PDEA does not present a synthesis of data allowing a comparison that would substantiate the conclusion that suspended sediment from shoreline sources is significantly less than suspended sediment contributed from upland watershed sources. BIA suggests a table containing individual values of metals-contaminated sediment transport into and out of Coeur d'Alene Lake under the alternative actions.	Please see responses BIA-S-051c and BIA-S-051d.
BIA-S-057	BIA comments that because the PDEA does not cite an analysis of natural erosion, the PDEA statements that erosion along the lateral lakes is on a scale similar to natural erosion, but at a higher elevation because of the raised pool, are unsupported.	Although the PDEA does not directly cite a study of "natural erosion," Earth Systems and Parametrix (2004) do address this subject in their Phase II Erosion Study report. That document is the source of information for this statement.
BIA-S-058	BIA takes issue with the statement that "sediment supply and transport in the lake is relatively unaffected by the Project" and believes that it is an important Tribal resource issue. In support of this claim, BIA cites specific sections of the PDEA that contradict the quote above; specifically sections that indicate that the project increases the supply of sediment through project-caused erosion along shorelines of the lake and tributaries, and sections that attempt to quantify the erosion that would take place were current operations to continue.	Avista stands by the conclusion stated in the PDEA. The volume of eroded sediment from the levees is a very small volume relative to the amount of sediment supplied and transported by the river during periods of annual high flow, which are the periods of sediment transport.
BIA-S-059	This BIA comment refers back to BIA-S-058 and cites an additional PDEA Section regarding no net change in sediment flux that BIA maintains is not consistent with other information in Section 5.3.	Please see response BIA-S-058.

Comment ID	Comment	Response
BIA-S-060	BIA notes that the PDEA provides information stating that a total of 111 miles of shoreline along the CDA, St Joe and St Maries rivers are affected by the project. This does not include the lake shoreline. Based on Avista's assessment of 30-50% of levee erosion stemming from project operations, BIA notes that this is ~33-55 miles of shoreline; yet on page 5-43 Avista proposes only to protect "several miles" of shoreline. BIA questions how Avista can consider this appropriate protection when by Avista's own estimates in the PDEA the project is responsible for much more.	Determining a specific level of mitigation "obligation" based on the impacts attributable to Post Falls HED is not possible, given the complex and numerous interacting factors that are causing erosion. Erosion control efforts are most appropriately focused on those areas of significant habitat or other resource impact. Available information and previous discussions with stakeholders have clearly identified the lower St. Joe River levee system as a priority area for erosion control efforts. Avista recognizes that in locations such as the lower St. Joe River levee system, continued Project operations are a significant factor in the habitat losses that could occur in the future due to erosion. For these reasons, Avista has proposed a substantial commitment of $500,000 per year to support erosion control efforts, habitat protection and enhancement, and associated monitoring efforts. The proposed funding is more than sufficient to provide substantial resource benefits and thereby mitigate for Project impacts. In the absence of some other justifiable performance measure, which we do not believe can be readily determined and agreed to, this approach seems reasonable.
BIA-S-061	BIA reiterates that protecting only several miles of shoreline is inadequate protection, particularly when the PDEA notes that far greater amounts of erosion are attributable to the project. BIA also states that more detail is needed on how the $500k would be split between erosion and wetland programs.	The contention that Avista is responsible for addressing all erosion caused by keeping Coeur d' Alene Lake at elevation 2,128 feet during the summer is incorrect. FERC has held that licensees are not responsible for erosion caused by the mere existence of an impoundment (Bangor Hydro-Electric Co., 83 FERC ¶ 61,037 [1998]), or for erosion caused by natural phenomena (wind and wave action) acting on a reservoir. (Duke Power Co., 33 FERC ¶ 61,321 [1985]). Also see response BIA-S-060.
BIA-S-062	BIA states that the PDEA fails to address the question of the effect that continued erosion will have when added to erosion that has occurred in the past. For example, an additional 2 to 21 feet of eroded shoreline has a different significance when considered with the estimated 46 to 216 feet of erosion that has already occurred. See also BIA's General Comment No. 2.	Please see response BIA-G-02. Past erosion is discussed in the *Affected Environment* section of the PDEA, and detailed predictions of future erosion are summarized in the PDEA (*Environmental Effects*) and discussed at length in the Phase II Erosion Study (Earth Systems and Parametrix, 2004).
BIA-S-063	Without specifics regarding which changes in Project operations would affect flow conditions, it is difficult to evaluate Avista's decision to model the water budget instead of using actual data. The BIA is of the view that USGS gauge data would more accurately reflect the variability in flow conditions throughout the history of the Project. It is also unclear why historical records of minimum flows are acceptable, while those for maximum and mean flows are not.	Language to clarify this point has been added to PDEA Section 5.4.1.1.
BIA-S-064	The USGS gage in Spokane River at Spokane, WA, is 12422500, not 12419500.	This correction has been made.
BIA-S-065	According to these figures, the area of the Lake expands by 8,915 acres, making it nearly a third larger, at full pool. This increase in area is significant, especially given the contribution of increased surface area to greater recreational boat use, and to greater erosion from wind-fetch over a larger area.	The text has been modified to reflect that the area represents a 28.5 percent increase between minimum pool and full pool.

Comment ID	Comment	Response
BIA-S-066	The PDEA notes that extension of the higher Lake level later into September (proposed as part of the new license) is "similar" to current operations. As noted in the BIA's General Comment No.1, and throughout this document, however, inundation by the higher Lake level under current operations causes significant adverse effects in Coeur d'Alene Lake and the surrounding areas. These effects include, but are not limited to, erosion, submergence of wetlands, increased macrophyte beds, warmer water, decreased dissolved oxygen, and possible mobilization of metals from sediments. Therefore, any extension of the higher Lake level further into September would only exacerbate these adverse effects. The PDEA should evaluate the incremental effects of extending the Lake level further into September, as well as the cumulative effect of this change when added to adverse effects that have already occurred.	The Proposed Action, including a defined drawdown date of September 15, is not considered a significant change when assessing ongoing operational effects. Please see revised Section 5.4.2.1 and response CDAT-II-042.
BIA-S-067	Holding the Lake inundation until September 15 each year would exacerbate many Project-caused impacts including extending the period of erosion further into the fall; erosion deleteriously impacts most other resource areas. The BIA's comments throughout this document make clear the problems associated with sustained inundation. Extending the period of inundation further into September only exacerbates these problems and impacts. I n the BIA's view, Avista's license application should propose measures that reduce negative impacts to tribal Trust resources, not ones that exacerbate them.	Please see response CDAT-II-042.
BIA-S-068	IDEQ and the Coeur d'Alene Tribe have separately established water quality criteria for water in the state and within tribal jurisdiction. The routine exceedance of a number of water quality parameters (including temperature, dissolved oxygen, and pH) under both the state and tribal criteria is reported in the PDEA. However, the PDEA does not discuss the potential impacts associated with these exceedances, and because "natural" conditions do not really exist, it appears that the Project is not in compliance with water quality criteria.	Please see response IRU-23.
BIA-S-069	Impact analysis is severely lacking for the potential impacts associated with water quality exceedances for temperature. The PDEA implies that the increase summer lake level under current operations or the Proposed Action would increase water temperature at the mouths of the Coeur d'Alene and St. Joe rivers compared with the Natural Hydrograph, creating thermal barriers for fish. BIA feels that temperature monitoring data are more reliable than temperature modeling results and that Avista should discuss the potential effect in the PDEA.	Thermal conditions related to potential aquatic resource effects are addressed in Section 5.6.
BIA-S-070	The status of the trophic structure of the Coeur d'Alene Lake has been over-simplified in the PDEA and the internal cycling of nutrients from the decomposition of increased plant growth in the southern portion of the lake is not discussed	We have revised the PDEA to indicate that the tropic status assessment is based on a system that was developed by the United Nation's Organization for Economic Cooperation and Development (Ryding and Rast, 1989), and that aquatic plants are common in the southern end of the lake as well

Comment ID	Comment	Response
BIA-S-071	Anoxic conditions in Chatcolet Lake, particularly in the southern portion of the lake, significantly affects the ecosystem, and these effects need to be further clarified.	Based on monitoring data and current CE-QUAL-W2 modeling, Chatcolet Lake is the only area that regularly experiences anoxia. The modeling also indicates that anoxia would occur in Chatcolet Lake under a Natural Hydrograph as well.
BIA-S-072	In Table 5-25, the minimum value from the data set for ammonia was 0.001 mg/L, while the maximum value was 0.17 mg/L. The entire data set used to determine the maximum and minimum values was not presented. An average value of 7.02 mg/L could not be calculated from the data presented, and because it is higher than the indicated maximum value, it appears that the maximum value is incorrect. The maximum and minimum values are very low and do not represent any significant toxic potential to fish in the river at the observed pH levels.	The table has been revised.
BIA-S-073	There appears to be conflicting statements in the PDEA about metals concentrations. BIA feels that more detailed data analysis needs to be conducted to address the important issue of whether the increased summer-time Lake inundation level under current operations or the Proposed Action increases sediment release of metals compare with the Natural Hydrograph.	Metals analysis has been conducted in a study report by Golder (2005a, 2004e) and is referenced in the PDEA. Section 5.5.1.4 has been expanded to address this comment.
BIA-S-074	BIA questions why Avista chose to model using CE-QUAL, which has not been properly calibrated and is thus inadequate for estimating water quality.	The Coeur d'Alene Tribe and IDEQ were among the parties that selected CE-QUAL-W2. Also see response BIA-S-024.
BIA-S-075	BIA questions why Avista has capped funding for the Water Quality Monitoring Plan at $50,000 per year.	Avista maintains that funding is adequate to address the level of Project impacts.
BIA-S-076	The BIA suggests adfluvial fish should be referenced in the discussion of headwater tributaries.	The text of Section 5.6.1.1 of the PDEA has been revised to include "adfluvial."
BIA-S-077	The state of Idaho does not recognize "coolwater" fishes. BIA points out that we acknowledge that current conditions during the summer in backwatered tributaries to Coeur d'Alene Lake are unsuitable for native salmonids.	The word "coolwater" has been removed from the text.
BIA-S-078	The Project contributes to depredation on native salmonids by providing spawning and nursery habitat for northern pike and largemouth bass.	Please see response CDAT-II-160, items 6 and 7.
BIA-S-079	The hypolimnion is not highly suitable for salmonids. Native salmonids are relegated to a habitat that has tolerable water temperature, but is stressful due to limited oxygen and food.	Comment noted. The text has been revised to remove "highly." Suitable habitat exists in Coeur d'Alene Lake for native fish, as evidenced by their ongoing existence and, until recently, substantial abundance.
BIA-S-080	Salmon runs have been blocked in the Spokane River since the construction of the Nine Mile HED in 1908.	Please see response STI-40.

Comment ID	Comment	Response
BIA-S-081	(1) Increased shallow water habitat results in increased water temperatures. (2) Disputes contention that thermal and other changes "may" affect the native fishery. (3) A documented ongoing decline of native fish and the contributing role of introduced fish. (4) These and other effects of impoundment have and continue to affect native fish. (5) Temperatures in the St. Joe River are in excess of those preferred by native trout especially during spawning. (6) Project maintains conditions that are near optimal for non-native predators and at best survivable for native salmonids. (7) Post Falls HED operations contribute to the current habitat conditions and maintain them well beyond the Natural Hydrograph.	(1) The PDEA reflects this point. (2) A variety of factors are listed and "may" is appropriate to describe some of these factors. (3) Comment noted. (4) The PDEA reflects this point. (5) Water quality modeling indicates preferred temperatures would be exceeded absent Project regulation. Bull trout and westslope cutthroat trout are not known to spawn in the Project-affected lower reaches. (6) Opinion noted. See response BIA-79. (7) The PDEA acknowledges current habitat conditions, although we disagree with the characterization that these conditions are "well beyond" what might occur under a Natural Hydrograph.
BIA-S-082	The proposed implementation of the Coeur d'Alene Lake Basin Westslope Cutthroat Trout Protection and Enhancement Program is meaningless without a set of measurable goals and an implementation strategy.	Please see response CDAT-II-164.
BIA-S-083	The BIA disagrees that extending the full-pool elevation to September 15 would not affect aquatic resources.	Please see responses CDAT-II-042 and CDAT-II-162.
BIA-S-084	The proposed measure needs to identify the number, type, geographic extent and duration of the proposed projects.	Please see response CDAT-164.
BIA-S-085	Avista must develop an effective mitigation plan	Please see response CDAT-164.
BIA-S-086	Past degradation caused by the Project will continue under the Proposed action. By definition, these are cumulative effects and a cumulative effects analysis must address the effects.	Past effects are not considered continuing effects under the Proposed Action or new license. The cumulative effects section of the PDEA acknowledges past effects.
BIA-S-087	Vegetative diversity inherent in the ecosystem under the Natural Hydrograph has been lost and these microhabitats have been replaced with an abrupt edge due to erosion caused by the extended period of inundation. These narrow bands of vegetation that naturally occurred along the aquatic/terrestrial interface (Junk et al., 1989) have been lost.	Past effects on wetlands and riparian habitat are acknowledged in the PDEA in Section 5.7.2.
BIA-S-088	The PDEA focuses on the overall number of acres of wetlands, ignoring the fundamental changes in species composition, structure and function brought about by Project operations and does not sufficiently explore the complex relationship of wetland type conversion and loss or alteration of riparian areas with the loss of wildlife habitat. BIA also notes the disproportionate effect that changes in wetlands has had on the Coeur d' Alene Reservation	Past effects on wetlands and riparian habitat are acknowledged in Section 5.7.2 of the PDEA. We removed the information on changes in wetland vegetation from pre-Project conditions to current conditions from Section 5.7.1.1, because it is not a part of the current affected environment. Please see response TLC-1.
BIA-S-089	The dense growth of milfoil occurs in the upper segment of the water column, likely obscuring prey from foraging eagles.	Comment noted. Avista is unaware of any scientific data related to the effect of Eurasian watermilfoil on eagle foraging.
BIA-S-090	BIA agrees that Project operations result in the propagation and spread of noxious weeds such as Eurasian watermilfoil.	Comment noted. The PDEA states that the summer habitat conditions are favorable for Eurasian watermilfoil.
BIA-S-091	The cumulative effect of adding the future effects that would occur under the Proposed Action to adverse effects that have occurred in the past should be addressed in the PDEA's cumulative effects Section on this resource (Section 5.7.3).	Please see response BIA-G-02.

Comment ID	Comment	Response
BIA-S-092	BIA disagrees that wetland communities have simply "adjusted" to the Project, conversion is still occurring in the inundated reaches of the Lake, and recovery has been prevented by continued inundation.	The available studies indicate that the existing wetland communities are in fact relatively stable, with the exception of successional or erosion related changes and would remain so under the Proposed Action.
BIA-S-093	The overall purpose of measure AR-2 should be to mitigate for the impacts of the Project on the establishment and spread of aquatic weeds within and adjacent to waters affected by Post Falls HED. BIA believes the measure should include additional plant surveys and specific weed control strategies for known and existing weeds. Additionally, education and monitoring, while necessary and helpful, will not mitigate for Project effects. If the Project were operated under a Natural Hydrograph, the stable water levels in the shallow bays during the summer growing season would not be maintained, thereby eliminating, or at least greatly reducing, areas in the Lake that provide highly favorable conditions for aquatic weeds.	The TRWG included agency representatives with weed control responsibilities and expertise who worked together with Avista to develop the measure as proposed. Avista is also providing $58,656 to the Coeur d'Alene Tribe to conduct the second phase of its Baseline Coeur d'Alene Lake Aquatic Vegetation Survey, which would be completed in fall 2005.
BIA-S-094	In the context of the 100 year period of Project operations, many of the biological systems affected by the Project are still undergoing changes due to hydrographic alteration, and it is possible that these systems could re-establish themselves in a relatively short time period under the Natural Hydrograph (Nilsson and Svedmark, 2002).	Avista believes that any ongoing changes to biological conditions that are occurring are largely due to causes other than Project operations and would not be affected by the Proposed Action.
BIA-S-095	BIA notes that the thermal barriers created by inundation in the Coeur d'Alene and St. Joe rivers can be migration barriers.	Project-induced changes in water temperatures in the St. Joe and Coeur d'Alene rivers are relatively minimal (~1°C). The Project is not known to create a migration barrier.
BIA-S-096	BIA suggests repeating the juvenile bull trout out-migration study.	Comment noted.
BIA-S-097	FWS still considers the Coeur d'Alene River subbasin a core recovery area for bull trout.	We acknowledged in Section 5.8.1.1 of the PDEA that the Coeur d'Alene Lake Basin (which would include the Coeur d'Alene River) is a core area for bull trout.
BIA-S-098	It is the view of the BIA that habitat for these two federally listed plant species could well have existed within the Project area under the Natural Hydrograph without the Project and that the Natural Hydrograph scenario could provide critical habitat for both of these listed species, significantly improving their densities and distributions in the region.	Please see response BIA-S-104.
BIA-S-099	The statement that there are no direct effects on bull trout suspected to occur under current and Proposed Action is not correct.	Please see response TLC-48.
BIA-S-100	Increased travel time in ponded reaches exposes outmigrating salmonids to higher predation. Understanding how inundation affects bull trout is critical.	Comment noted. Predation on bull trout from non-native species has not been documented.
BIA-S-101	BIA submits that implementation proposed in AR-2 cannot evaluate whether AR-2 will actually provide the benefits it supposes.	Specific activities with defined goals would be developed by Avista in consultation with the agencies and other appropriate stakeholders through project implementation proposals. The specific projects and activities are best determined shortly before implementation.
BIA-S-102	Information on bull trout movement and recruitment is integral to understanding how the Project affects these fish.	Comment noted.
BIA-S-103	Please see Comment BIA-S-104.	Please see response BIA-S-104.

Comment ID	Comment	Response
BIA-S-104	BIA notes significant changes in the biota have occurred due to project operations and Avista has neglected to adequately evaluate this. It is the BIA's opinion that consideration of the context of over 100 years of operational history of the project is essential to determining Project impacts. Indeed, operation under a Natural Hydrograph scenario could provide critical habitat for both of these listed species (water howellia and Ute's-ladies tresses), significantly improving their densities and distributions in the region.	The PDEA acknowledges that changes in the biota have occurred due to project construction and operation.
BIA-S-105	Avista fails to provide an evaluation of the Project's cumulative effects on bald eagles throughout the Lake ecosystem, in which roosting and foraging opportunities for bald eagles have been reduced. Continuing current operations under the Proposed Action will perpetuate these adverse effects.	See revised Section 5.8.2.5 of the PDEA for additional discussion of effects on bald eagles.
BIA-S-106	The PDEA lacks sufficient information on cultural resources for BIA to comment on the adequacy of the surveys and evaluations.	Additional information became available following completion of the draft PDEA and is included in the final PDEA.
BIA-S-107	BIA should be included as a consulting party.	The text in Section 4.3.8 has been revised to include BIA as a consulting party.
BIA-S-108	BIA feels the description of the APE is vague; it questions what specific areas outside the Project boundary are included in the APE and what criteria were used to determine inclusion. A large amount of land within the APE defined by the Cultural Resource TWG was excluded from inventory and evaluation even though cultural resources above the 2,128 foot level will be potentially affected by Project operations and PME projects.	The CRWG defined the APE to include lands within the Project boundary, as well as lands associated with Project facilities and recreational sites. The CRWG's definition provides for lands outside the Project boundary where Project operations may affect the character or use of historic properties and TCPs. As such, the APE is a flexible boundary that may be adjusted as conditions change or additional effects are identified. Adjustments to the APE would be made during the implementation of the HPMP, as appropriate, following concurrences by the SHPOs and THPOs on the eligibility of properties and agreement on appropriate management strategies.
BIA-S-108		
BIA-S-109	Avista must be responsible for full funding of Section 110/106 compliance for recreation site improvement projects.	Avista would be responsible for implementation of the HPMP, including compliance with Section 106 over the term of the license. Avista is not a federal land managing agency and would not be responsible for all Section 110 compliance for recreational site improvement projects. However, addressing cultural resources with respect to the proposed recreational improvements has been thoroughly discussed within the RLUAWG and would be addressed prior to any ground-disturbing activity.
BIA-S-110	Please reconcile or explain the discrepancy between the costs presented in Table 6-1 and DLA page H-5, paragraph 3 ($2,117,200 vs. $1,939,700). BIA is concerned about the lack of cost information for eight measures, including some major elements such as the HPMP.	The costs presented in Table 6-1 of the PDEA were correct. The final PDEA and license application should be free of such discrepancies. Costs are included for all PME measures for which costs can be estimated at this time.
BIA-S-111	Avista should revise the statement that there would be "no change in water level management". The delay in the fall drawdown of Coeur d'Alene Lake would extend the period of inundation.	Please see response CDAT-II-042.

Comment ID	Comment	Response
BIA-S-112 and BIA-S-113	BIA disagrees with the conclusion that PME AR-2 would compensate for Project-related effects on westslope cutthroat trout and bull trout.	The funding proposed to support the Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout PME (now included in measure PF-AR-1) is adequate to meet the appropriate mitigation and enhancement obligations of Avista. It is not the responsibility of Avista to meet all of the fishery program funding needs identified by agencies and the Coeur d'Alene Tribe.
BIA-S-114	There is no substantial documentation to support the contention that implementation of the erosion control plan would compensate for operational effects with respect to erosion.	The terrestrial resources work group evaluated past erosion control approaches along the St. Joe and Coeur d' Alene rivers. The various hard and mixed soft/hard bank protection approaches that have been used in the past, specific tests by the NRCS of the "rock wedge" approach, and other more extensive armoring approaches, have all been shown to slow bank erosion from boat waves, stream currents, freeze thaw, rilling, and rain splash erosion on the upper eroding part of the levee. Please see responses BIA-S-060 and BIA-S-061.
BIA-S-115	Entrainment may become more of a problem as native fisheries increase in response to mitigation efforts. Avista should consider screening or fish diversion structures to prevent entrainment.	Comment noted. No structures or facilities related to downstream fish passage are warranted at this time.
BIA-S-116	There are no data to support the conclusion that the proposed erosion control measures (TR-1) would reduce wetland/riparian losses.	The statements in the table are supported by the available information and best professional judgment. Activities implemented through the PME measures will be based on accepted and proven methods, as determined in consultation with the stakeholders.
BIA-S-117	Table 7-2 does not mention fish habitat, although it is included in the heading.	There is designated critical habitat for bull trout in the Project area, and Table 7-1 has been revised to reflect this. Table 7-2 concerns non-operational effects, and none have been identified for bull trout or the designated critical habitat.
BIA-S-118	REC-1 is not sufficiently specific to provide assurance that cultural and natural resources will receive adequate protection.	Avista agrees that compliance with Section 106 requires coordination among the various plans that involve ground-disturbance. The text in Section 5.9.2.2 has been revised to state that the plans for activities that include ground-disturbance will be coordinated with the HPMP. The HPMP would provide procedures to coordinate the implementation of other PME measures that involve ground-disturbance. Also see BIA-S-109. All applicable permits would be obtained prior to the implementation of any specific recreation project identified in the recreation measures. Further, all measures would be coordinated appropriately with implementation of a Historical Properties Management Plan.
BIA-S-119	BIA doubts that the current ALP process will produce a proposal consistent with the forthcoming 10(j) recommendations.	Comment noted. Because the 10(j) recommendations are unknown at this time, the *Fish and Wildlife Agency Recommendations* section does not appear in the final PDEA.
BIA-S-120	The section on comprehensive plans should address the Coeur d'Alene Tribe's fisheries management plan or the Intermountain Province Subbasin Plan.	Plans accepted by FERC as comprehensive plans are included in Section 8 of the PDEA. We include relevant information from other plans in the appropriate resource sections.

Comment ID	Comment	Response
BIA-S-121	The BIA believes that mitigating for Project impacts on wetland and riparian habitat and controlling or reducing milfoil is critical to consistency with the North American Waterfowl Management Plan.	Opinion noted. The proposed PME measures are consistent with this objective
BLM-1	BLM has 4(e) authority because the Project seasonally inundates 316 acres of public land administered by the BLM.	The text of Sections 4.3.3, *Section 4(e) Land Management Conditions*, and Section 5.11.1.1, *Land Use,* has been amended to identify lands that federal agencies believe are inundated by the Project. This is an issue that must be resolved between the State of Idaho and the BLM and FS. Avista does not have authority to determine land ownership.
BLM-2	This section of the PDEA should reference the role of federal agencies, including BLM, in providing recreation opportunities.	We have revised Section 5.10, *Recreational Resources*, as recommended by BLM
BLM-3	BLM does not promote a certain lake level, but any substantial deviation from 2,128' would negatively affect recreation opportunities at Blackwell Island and other LWCA-funded activities, and possibly create a "conversion" situation under 36 CFR 59.3, requiring Avista to provide replacement properties or facilities.	Comment noted.
BLM-4	The recreation plan should be updated every 6 years beginning 2014 to coincide with the proposed visitor use survey.	Please see response FS-4.
BLM-5	This section should recognize the BLM's land base surrounding the project boundary, and BLM's ability to provide recreation opportunities associated with the project.	We have revised Section 5.10, *Recreational Resources*, as recommended by BLM
BLM-6	BLM supports the fisheries public outreach program; notes edit needed to change measure REC-5 to REC-4.	Comment noted; the editorial correction has been made.
BLM-7	BLM supports AES-1, REC-3, and REC-5.	Comment noted.
BLM-8	The recreation plan should be updated every 6 years beginning 2014 to coincide with the proposed visitor use survey.	Please see response FS-4.
BLM-9	BLM supports REC-2 and REC-4.	Comment noted.
CCDA-1	This comment supports the Idaho Compromise, which would include a 2,128-foot lake level through Labor Day and an increased minimum flow through Post Falls HED.	Comment noted.
CDAC-1	This comment supports the Idaho Compromise, which would include a 2,128-foot lake level through Labor Day and an increased minimum flow through Post Falls HED.	Comment noted.
CDAT-I-01	The Coeur d'Alene Tribe requests Avista hold a meeting that meets the requirements of 18 CFR 16.8(c)(6)(i).	Avista believes that inviting other Plenary members to the meeting held on June 10, 2005, was consistent with the intent of the dispute resolution meeting and the ALP. Additionally, Avista has met many times with the Coeur d'Alene Tribe in an attempt to resolve areas of disagreement.
CDAT-I-02	The PDEA is inadequate and incomplete because it does not sufficiently analyze the Project effects; an EIS is required; more study and analysis is needed of Project-related impacts both on- and off-Reservation.	Please see responses BIA-G-02 and TLC-1. Note that completion of the NEPA process, including preparation of an EA or EIS, will be the responsibility of FERC, not Avista, once Avista files the license application and PDEA.

Comment ID	Comment	Response
CDAT-I-03	The Applicant has not adequately addressed the Project's impacts on the Tribe related to No-action as well as the Proposed Action and the Natural Hydrograph.	Please see responses IRU-15, CDAT-II-023, and TLC-1.
CDAT-I-04	The PDEA analysis is inadequate because of (1) insufficient data, (2) reliance on incomplete or poor quality studies, (3) poor use of existing data, (4) failure to coordinate study efforts, (5) unwillingness to reach agreement on information requests, (6) unwillingness to work collaboratively on the PDEA and DLA, (7) unequal consideration of resource values, and (8) ignoring important resource issues or failing to address them adequately.	Although Avista and the Tribe have had many discussions on these points through the course of the ALP, we have been unable to reach agreement on several issues. Avista supports the adequacy of the studies, which were based on study plans that were approved by members of the work groups. Appropriate studies were done, although not every study requested by work group members were undertaken. It remains Avista's position that some of the requested studies are either unrelated to the effects of Project operation or are more detailed than needed to characterize the effects of Project operation.
CDAT-I-05	The Coeur d'Alene Tribe recommends additional studies and analysis related to water quality because (1) there are major Project-related water quality issues, (2) the technical validity of the CE-QUAL-W2 model is questionable, (3) the sediment transport study is flawed, and (4) metals transport is not adequately addressed.	Please see responses BIA-S-024 and CDAT-I-04.
CDAT-I-06	The Coeur d'Alene Tribe recommends additional studies and analysis related to fisheries because (1) fisheries issues are not adequately addressed, (2) the effects of flooding on habitat are oversimplified, (3) the effects of Project-related inundation on fish migration is not addressed, (4) there is very little analysis of effects on native fisheries, and (5) more information is needed do address Project effects on native fisheries and to create effective PME measures for native fisheries.	Appropriate and adequate studies have been conducted to characterize the environment and evaluate Project effects for the purposes of the PDEA and the license application. Additional fish habitat information may be gathered under the Fish PME programs. Also see responses CDAT-II-146 and CDAT-II-147.
CDAT-I-07	In light of the Project-related effects of inundation on aquatic plant growth that impairs water quality and fish habitat, and on the expanding impact of Eurasian watermilfoil, the Applicant should reconsider its minimal funding of efforts to address these effects.	We believe the level of funding is appropriate for supporting weed management activities. Please see response BIA-S-093.
CDAT-I-08	The Coeur d'Alene Tribe recommends additional studies and analysis related to erosion and habitat loss because (1) Project-related erosion is a serious ongoing issue that contributes to a high rate of erosion and loss of riparian, wetland, and terrestrial habitat and cultural resources; (2) the Applicant fails to meet or discuss its requirements for erosion control under current license Article 20; (3) the PDEA underestimates the rate of continuing erosion; (4) the Applicant's rough estimates of the Project's role in ongoing erosion is inadequate and unsubstantiated; and (5) the Applicant's proposed commitment to erosion control and protection, mitigation and enhancement measures is not commensurate with the Project's impacts.	Please see responses CDAT-I-04, CDAT-II-039, BIA-S-033, BIA-S-052, BIA-S-060, and BIA-S-061.
CDAT-I-09	The PDEA does not adequately address the impacts of the Project, including the effects of initial Project construction and ongoing operation, when added to other past, present, and reasonably foreseeable future actions,	Please see responses BIA-G-02 and TLC-1.

Comment ID	Comment	Response
CDAT-I-10	The analysis of alternatives is inadequate because (1) current conditions are not adequately described to define No-action, (2) the range of alternatives is insufficient, (3) the alternatives are not clearly and objectively analyzed, (4) the impacts of proposed operational changes (longer period at full pool) are not discussed, (5) the Natural Hydrograph scenario is dismissed without adequate consideration, (6) the PDEA does not adequately analyze or explain why some alternatives are considered unreasonable, and (7) more rigorous analysis is needed for the Natural Hydrograph with power generation, as well as for decommissioning both with and without the Project HEDs.	Avista believes that the PDEA adequately evaluates an appropriate range of alternatives, in keeping with NEPA requirements and FERC standards. Also see responses CDAT-II-023, IRU-15, CDAT-II-050, and TLC-1.
CDAT-I-11	The Applicant's approach to PME measures needs to change from a focus on commitments of financial support without explanation of how the funding levels were derived to an approach that emphasizes the nexus between Project impacts and the proposed measures, with the proposed funding commensurate with the Project impacts, with success targets and measurable criteria.	Avista believes that the PME measures provide adequate detail concerning Avista's intent, and backup is provided by the analysis in the PDEA.
CDAT-II-001	The Applicant should clearly state the license term being sought.	Comment noted. Avista will seek a 50-year license for each license.
CDAT-II-002	The description of the ALP process needs to be updated to indicate that meetings are less frequent, and that the ALP process has largely ended.	Page xix has been corrected.
CDAT-II-003	Change characterization of PME measures to reflect the fact that they are not final work products of the working groups.	Page xix has been corrected.
CDAT-II-004	There should be a single license for all the HEDs.	Please see response BIA-S-006.
CDAT-II-005	PME measures should be commensurate with Project impacts, and the nexus between the level of impact and the level of PME funding should be established.	Comment noted.
CDAT-II-006	The proposed water quality monitoring program should follow the current protocol and should identify and evaluate attainment of tribal water quality standards.	Please see response IDEQ-01a.
CDAT-II-007	The text should clarify that the Applicant's funding share varies from project to project; the 25% share on recreation projects should be considered a minimum, not a maximum.	Section 5.10, *Recreational Resources*, describes the nexus between project operations and the proposed contribution to land management agencies at Coeur d'Alene Lake. The proposed 25 percent match should not be considered a minimum; rather, cooperating parties agree and understand that the match meets or exceeds project-related effects on these lands that have some facilities that touch the Project boundary.
CDAT-II-008	PME measures should be labeled to correspond to the labels used in Appendix B.	Page xxi has been corrected.
CDAT-II-009	All recreation measures should include education about and protection of cultural resources.	We propose a public outreach program (measures PF-REC-4 and SRP-REC-3) that includes measures to provide visitors with interpretation and educational materials about cultural resources.

Comment ID	Comment	Response
CDAT-II-010	More time is needed to develop the HPMP.	Avista agrees and notes that several chapters of the HPMP have been drafted and reviewed by the CRWG since the draft PDEA was issued. The draft HPMP will be developed over the next several months, and we expect that the final HPMP would be required within 1 year of license issuance.
CDAT-II-011	The Project boundary will continue to change because erosion will continue to affect where the 2,128-foot elevation contour occurs; cultural resources are affected well beyond the 2,128-foot contour.	Comment noted. The Project boundary is set by the 2,128-foot contour, wherever it occurs.
CDAT-II-012	The Applicant should clearly state the license term being sought.	Please see response CDAT-II-001.
CDAT-II-013	The analysis of the Natural Hydrograph should clearly indicate that it is considered with continued power generation at Post Falls.	The text of Section 2.1 appears to be clear on this point, in that it refers to "operating part of the Project. . . under the Natural Hydrograph."
CDAT-II-014	The PDEA does not adequately address the impacts of the Project, and the proposed PME funding is not commensurate with Project impacts.	Please see response CDAT-I-04.
CDAT-II-015	The HPMP should be renamed to acknowledge a broader definition of cultural resources; e.g., Cultural and Historical Resources Management Plan or Heritage Resource Management Plan.	FERC and the Advisory Council on Historic Preservation's guidelines for the preparation of HPMPs specifically define the scope of interest under Section 106 of the NHPA as "historic properties." Historic properties are defined as properties listed or eligible for listing in the National Register of Historic Places. We will continue to use FERC/ACHP's title "Historic Properties Management Plan" in the PDEA, subject to further discussions within the CRWG during development of the HPMP.
CDAT-II-016	The description of Avista's regional generation indicates that the Natural Hydrograph and decommissioning are reasonable alternatives.	Please see response CDAT-II-50.
CDAT-II-017	The fact that the five developments are operated in a coordinated manner supports a single license for all five developments.	Please see response BIA-S-006.
CDAT-II-018	The PDEA should discuss the cumulative effect of coordinated water releases.	Please see response BIA -G-02.
CDAT-II-019	The small amount of storage associated with the Project supports the concept that the Natural Hydrograph and decommissioning are reasonable alternatives.	Please see response CDAT-II-50.
CDAT-II-020	Please explain the reduced prediction of hydroelectric resources from 2006 to 2023; explain the significance of the Spokane River Project's 137 MW.	The expected reduced availability of hydro resources is the result of the expiration of mid-Columbia hydro contracts. The Spokane River Project provides approximately 10 percent of Avista's generation needs.
CDAT-II-021	A full range of alternatives should be analyzed, including the impacts of original construction.	Please see response TLC-1. Also refer to the cumulative effects discussions in Sections 5.3 through 5.12.
CDAT-II-022	The Applicant should acknowledge that there are no environmental measures being pursued currently.	PDEA Section 3.1.3 identifies the Project's current environmental measures, which would continue under the No-action Alternative.
CDAT-II-023	The description of the baseline should include a discussion of cumulative impacts and impacts on the Tribe's resources.	The PDEA is arranged so that the description of the alternatives appears in Section 3.0 and the discussion of impacts appears in Section 5.0. For a description of cumulative effects on resources of interest to the Tribe, please see the cumulative effects discussion under each resource heading in Section 5.0.

Comment ID	Comment	Response
CDAT-II-024	The Applicant should acknowledge that there are no environmental measures being pursued currently.	Please see response CDAT-II-022.
CDAT-II-025	The Coeur d'Alene Tribe estimates Tribal lands within the Project boundary at approximately 9,600 acres, not 8,670 as indicated in the PDEA. This figure should be corrected.	The draft PDEA did not include the proposed Project boundary area, only the documented existing Project boundary, which does not include Hepton Lake and some other proposed changes to the Project boundary. We have adjusted our maps to show a proposed boundary that would include Hepton Lake and other changes. The draft PDEA cited the acreage in the existing Project boundary, and the final PDEA cites the acreage in the proposed Project boundary. See revisions in Section 5.11.1.1, *Land Use Within the Project Boundary,* and Section 5.11.2.4, *Changes in Project Boundary*, for corrected acreages. The proposed Project boundary includes 9,511 inundated acres of the Coeur d'Alene Indian Reservation.
CDAT-II-026	The Spokane River is not free-flowing and cannot be without removal of the dams; please correct this text.	PDEA Section 3.1.1.1, *Project Location and General Setting*, accurately describes the free-flowing stretches of the Spokane River as occurring downstream of Post Falls HED (approximately 15 miles), the Upriver Project (approximately 2 miles), Monroe Street HED (approximately 10 miles), and Nine Mile HED (approximately 0.5 mile). Those stretches meet the definition of free flowing defined for the National Wild and Scenic River System (U.S.C. 1286) as "existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway." The definition requires that a free-flowing river segment be free of impoundment but not that it be free of any flow effect from upstream dams.
CDAT-II-027	The text reference, in Section 3.1.1.1 and elsewhere, to the Project affecting Coeur d'Alene Lake and tributaries "at times" should be corrected; the effect is year-round.	Comment noted. Avista believes the characterization of water levels is accurate for the intended use of the description. Figure 3-12 of the PDEA illustrates that from February through sometime in May, water levels are similar under the both the Natural Hydrograph and recent observed conditions.
CDAT-II-028	Tribal acreage within the Project boundary is approximately 9,600 acres; the text should be corrected to reflect that.	Please see response CDAT-II-025
CDAT-II-029	The text of Section 3.1.1.1 points to the coordination of the HEDs and supports a single license for all 5 HEDs.	Please see response BIA-S-006.
CDAT-II-030	The shallow southern areas of the lake should be analyzed separately from the deeper northern portion of the lake; the Applicant should provide a summary of the total number of surface acres in the Project boundary and discuss the relationship of proposed measures and the Project boundary.	Comment noted. Avista believes that the PDEA accomplishes this objective.
CDAT-II-031	The description of the operating reservoir in Section 3.1.1.4 should include the chain lakes and Hepton Lake; this description should be coordinated with review of the Tribe's GIS and bathymetric data.	Please see response CDAT-II-025. The text of Section 3.1.1.4 has been changed to mention Hepton Lake and the lateral lakes.
CDAT-II-032	Coeur d'Alene Tribe GIS data indicate that the Coeur d'Alene Lake estimates of surface area and storage volume are greater than shown in the PDEA; please reconcile.	Please see response CDAT-II-025.

Comment ID	Comment	Response
CDAT-II-033	The Project's role in load shaping supports the concept of a single license for all five developments.	Please see response BIA-S-006.
CDAT-II-034	Please discuss how the Project currently provides for natural resource protection upstream from Post Falls Dam.	Please see response CDAT-II-022.
CDAT-II-035	Please explain how resource protection is considered when the Applicant decides to begin control of the reservoir and begins the fall drawdown; this does not appear to be the case.	Please see Section 3.1.2.5, *Fishery Management Operations*, and Section 5.6.2.1, *Effects of Project Operations*, under the heading *Project Releases*, for a description of how resource protection is considered when Avista begins the fall drawdown.
CDAT-II-036	Please explain how there can be free-flowing reaches between HEDs.	Please see response CDAT-II-026.
CDAT-II-037	The Coeur d'Alene Tribe concurs with the description of drawdown timing, with exception of the emphasis on upstream flooding.	Comment noted.
CDAT-II-038	The Applicant should acknowledge the Project's direct role in the flooding of Tribally owned beds, banks, and waters below 2,128 feet.	Section 3.1.2.3, *Flood Control Operations*, is not an appropriate place to discuss the role of Project construction or operations. Those issues are discussed in Section 5, in subsections such as Section 5.7.2.3, *Plant Species of Special Concern*, under the heading *Culturally Significant Plant Species*. Additionally, inundated tribal lands are addressed in a new table in Section 5.11.1.1, *Land Use*, and in Section 5.11.2.4, *Change in Project Boundary*.
CDAT-II-039	Please explain the Applicant's obligations under current license Article 20 and why those obligations have been ignored.	Avista believes that the Project is being operated in compliance with the terms and conditions of the current license, including Article 20.
CDAT-II-040	Please explain why there are no current resource protection measures upstream of Post Falls Dam.	Please see response CDAT-II-22.
CDAT-II-041	There should be a single license for all the HEDs.	Please see response BIA-S-006.
CDAT-II-042	Maintaining the lake level at 2,128 until September 15 is not a PME measure, it is a change in project operations, and must be analyzed as such.	Avista agrees that maintaining the lake level at 2,128 feet until September 15 is not a PME measure, but is a change in operations, which is why it is described in Section 3.2.2, *Project Operations*. However, fixing the drawdown date to begin on September 15 is primarily designed to provide an assurance as to when the drawdown would begin, something lake users have not had in the past. It does not constitute a substantial change from the current practice of beginning drawdown at various dates in September. For example, records for the last 11 years (1994 through 2004) indicate that the Coeur d'Alene Lake level throughout August and early September was approximately 2,127.85 feet, or about 1.8 inches below full pool, and that the median date for the beginning of drawdown was September 10. At the median for the 11 years, the lake was within 3 inches of full pool until September 13 and within 6 inches of full pool until September 18. Thus, fixing September 15 as the beginning date for drawdown would not constitute a substantial change from current practice. Avista believes that the analysis in the PDEA adequately captures the effects of Project operations, and that a separate analysis would not yield any measurable difference in effects compared to No Action.

Comment ID	Comment	Response
CDAT-II-043	The proposed level of funding in measure AR-3 is inadequate to address the milfoil infestation.	Please see response BIA-S-093.
CDAT-II-044	The proposed funding of $50,000 for monitoring under measure WQ-2 is inadequate; the Applicant should provide a detailed explanation of the basis for funding; any monitoring done should follow the protocol provided by the Coeur d'Alene Tribe.	See response IDEQ-01a. Note that the Coeur d'Alene Tribe has not publicly provided a complete monitoring protocol to date.
CDAT-II-045	The proposed funding for measure TR-1 is inadequate to address impacts related to erosion and wetland protection and enhancement.	Please see responses BIA-S-060, BIA-S-061, BIA-S-116, and BIA-S-114.
CDAT-II-046	Explain why the Applicant is proposing a Project-wide recreation plan when there is no similar plan to coordinate resource protection measures; the proposed level of funding for recreation and resource protection are not commensurate with Project impacts.	The project-wide plans (PF-REC-1 and SRP-REC-1) would provide the framework for implementation of the various recreation developments identified in other recreation measures. We believe the level of funding is appropriate.
CDAT-II-047	Please develop an overall coordination PME for resource protection, similar to REC-1.	We have modified several PME measures to clarify elements for plan development and coordinated implementation.
CDAT-II-048	The PDEA fails to disclose sufficient data to determine whether the Applicant is adequately assessing Project impacts to cultural resources.	The draft inventory report has been provided to the CRWG and the findings have been incorporated into the final PDEA. The draft evaluation report will be distributed to the CRWG this summer. The preliminary findings of the draft evaluation report have been incorporated into the final PDEA and are subject to continued consultation with the CRWG and SHPOs.
CDAT-II-049	Please use the GIS data supplied by the Coeur d'Alene Tribe to update the Project boundary.	Please see response CDAT-II-025.
CDAT-II-050	Please explain in detail why certain alternatives are not considered reasonable; both decommissioning and the Natural Hydrograph are reasonable, given the size of the reservoir and need for power.	As noted in Section 3.3.3, *Project Retirement*, Avista does not believe that decommissioning is a reasonable alternative because project retirement, or decommissioning, would not achieve the Project's purpose, which is to produce power. Section 3.3.4, *Natural Hydrograph at Post Falls HED*, has been amended to indicate why Avista does not believe that the Natural Hydrograph is a reasonable alternative; specifically because the analysis in Section 3.3.4 indicates that the adverse effects of the Natural Hydrograph would be greater than the beneficial effects, because Avista and the overwhelming majority of stakeholders do not view the Natural Hydrograph as a reasonable alternative, and because no agency has recommended it as a reasonable alternative in ALP discussions.
CDAT-II-051	Please provide a more complete analysis of the Natural Hydrograph, including more than four years of flow data.	The flow data used in the analysis were for a period of 24 years, 1978–2002. A typographical error in the draft PDEA (1998–2002) has been corrected.
CDAT-II-052	Please analyze a smaller increment of flows for the Natural Hydrograph scenario.	The increment used in the analysis is 1day, so there are more than 8,760 (365 times 24 years) data points. The flow increments that were used to analyze the ranges of flow are set by the resulting graphs themselves since these flow rates correspond to crossover points on the graph.

Comment ID	Comment	Response
CDAT-II-053	Please correct misleading statements concerning natural flow regimes, accounting for potential groundwater flow augmentation from wetland areas, and addressing potential evaporation.	Avista notes that the WRWG reviewed and agreed to the approaches that were used to develop the water budget upon which the model is based. Please also see the text added to Section 5.4.2.3, *Groundwater*, for a description of groundwater flows.
CDAT-II-054	Please correct misleading statements concerning evaporation differences between the Proposed Action and the Natural Hydrograph.	Please see response CDAT-II-053. We reviewed our modeling and stand by our analysis of net evaporation losses.
CDAT-II-055	Please correct misleading statements concerning flows in drier years, taking into account potential groundwater recharge.	Our modeling and subsequent results reflects the consensus with the WRWG to use the limited groundwater information developed by NHC in the water budget model.
CDAT-II-056	The scale of the graphs is not sufficient to show the true differences between natural and regulated conditions.	We believe that differences in flow are visible. The scale based on 45,000 cfs was selected so that the areas under each of the three graphs can be directly compared with respect to the equivalent volume of water passing Post Falls HED.
CDAT-II-057	It is not clear if the years depicted in Figure 3-12 are representative or not; also, there is some apparent inconsistency in the beginning and ending lake level elevations.	Early 1997 was indeed a wet period and USGS records show that Coeur d'Alene Lake rose from elevation 2,122.86 feet on December 30, 1996, to elevation 2,125.24 on January 1, 1996, and eventually surpassed 2,128 feet a few days later. Our overall analysis does not depend only on these three representative years, but includes an analysis of the period August 1978 through July 2002. Unlike summer lake levels, which are relatively stable from year to year, lake levels on January 1 are subject to flooding conditions and can very considerably.
CDAT-II-058	The statement that the power loss associated with the Natural Hydrograph would not be significant enough to replace does not appear to reflect the historical record of investment in Post Falls HED, and should be explained further.	We assume that any lost energy or capacity under the Natural Hydrograph scenario would be replaced by alternative thermal energy resources. The text of the PDEA has been corrected accordingly.
CDAT-II-059	The Coeur d'Alene Tribe does not agree that a Natural Hydrograph scenario would free the Applicant of legal responsibility for Project-related injury to the Tribe.	The PDEA states only that Sections 4(e) and 10(e) would not apply under a Natural Hydrograph scenario. Also see response SC-046.
CDAT-II-060	The Applicant incorrectly includes areas of open water as wetlands.	We have revised the Section 5.7.1.1 of the PDEA to clarify that open-water habitats are included in the wetland and riparian habitat mapping, which is consistent with the Cowardin classification system that was used.
CDAT-II-061	The applicant incorrectly concludes that it is not responsible for costs associated with implementation of the Natural Hydrograph; the Applicant must be responsible for those costs because it is the entity that profited from the Project. Also, citations are needed for the conclusions regarding resource impacts of implementing the Natural Hydrograph.	Opinions noted. Please see response SC-046. The conclusions in Section 3.3.4.3 are based on the professional judgment of Avista environmental and engineering staff and the environmental consultants who prepared the PDEA and background studies. Citations have been added where applicable.
CDAT-II-062	The analysis of alternatives should specifically address Project impacts on resources of the Coeur d'Alene Tribe.	Please see response BIA-G-04
CDAT-II-063	The estimate of inundated acreage under current Project operations is not correct.	Please see response CDAT-II-025.
CDAT-II-064	See CDAT-II-54. The effects of groundwater must be accounted for.	Please see responses CDAT-II-053 and CDAT-II 055.

Comment ID	Comment	Response
CDAT-II-065	The Coeur d'Alene Tribe has a long-standing disagreement with the Applicant regarding the conclusions of the erosion report. The text reference to "newly exposed areas" should be corrected.	Comment noted.
CDAT-II-066	The Applicant has not demonstrated that the Natural Hydrograph is not a reasonable alternative.	Please see response CDAT-II-50.
CDAT-II-067	The concept that erosion would continue is speculative; natural vegetation could stop most erosion.	Field observations indicate that this is not speculation. Natural vegetation in the area of the waterline is relatively dense and provides the only protection the soft streambanks have from erosion. Long stretches of the rivers have dense vegetation with mature trees, but still boat wave ledges formed, indicating that boat waves, combined with winter rain splash, rilling, and stream currents still cause erosion.
CDAT-II-068	The discussion of sediment exposure and metal loading under the Natural Hydrograph is unsubstantiated; numerous papers suggest otherwise; an alternative hypothesis is that the Project-related inundation cycle promotes metals mobilization and transport.	Please see response CDAT-II-050 and refer to the metals study (Golder, 2005a), which (1) acknowledges that different modes of metal release depend on the mineral phase of those minerals present; and (2) documents the presence of both mineral phases inside the Project area. In addition, sediment volumes eroded during large winter/spring flow events (when the majority of sediment transport occurs) are quite large compared to volumes eroded by wind, boat wakes, etc.
CDAT-II-069	The sediment transport discussion ignores Project-induced bank erosion as a source of sediment.	Please see response BIA-S-058 and review the findings presented in Golder (2005a) and Earth Systems and Parametrix (2004).
CDAT-II-070	The Coeur d'Alene Tribe has numerous concerns about the quality of the modeling reports used to estimate effects on the thermal regime.	Please see response SC-049.
CDAT-II-071	The discussion of effects on water temperature between Barker Road and Nine Mile HED ignores evidence that there is a natural factor that could sustain water temperatures suitable for a healthy salmonid population under the Natural Hydrograph.	Water temperature is discussed adequately for the purposes of the PDEA and the license application. It is unclear what "natural factor" refers too.
CDAT-II-072	The conclusion concerning average flows under the Natural Hydrograph does not take account of potential groundwater input.	Please see responses CDAT-II-053 and CDAT-II-055.
CDAT-II-073	The discussion of flow velocity ignores evidence that there is a natural factor that could make the water suitable for a healthy salmonid population under the Natural Hydrograph.	The PDEA acknowledges a very slight increase in water velocity under the Natural Hydrograph. It is unclear what "natural factor" refers to.
CDAT-II-074	The conclusion that vegetation might not reestablish on the inside banks of the levees is unsubstantiated and biased.	The conclusion is based on sound professional judgment.
CDAT-II-075	The conclusion that sediment transport and erosion under the Natural Hydrograph would be similar to current conditions is unsubstantiated and biased.	Because the main source of erosion is boat-generated waves, erosion would be similar to current conditions, though at a different elevation. Sediment transport would also be similar because high-flow regimes in the Coeur d'Alene and St. Joe rivers would not change with the Natural Hydrograph.
CDAT-II-076	The discussion of water quality impacts of the Project here and elsewhere in the PDEA is inadequate.	Please see response SC-049.

Comment ID	Comment	Response
CDAT-II-077	The discussion of cultural resources seems to assume that a pre-dam cultural resource environment would re-establish under the Natural Hydrograph; that is not correct.	The text in this section does not suggest that pre-dam conditions would return under the Natural Hydrograph, only that the potential to restore some native vegetation would exist.
CDAT-II-078	The working groups no longer meet "approximately monthly."	Section 4.1 has been corrected
CDAT-II-079	The PDEA should discuss the Native American Graves Protection and Repatriation Act, Archaeological Resource Protection Act, 36 CFR 79—Curation of Federally-Owned and Administered Archaeological Collections, and American Indian Religious Freedom Act (AIRFA).	Please see response BIA-S-030. The HPMP will include a description of AIRFA as well.
CDAT-II-080	Please correct and clarify the number of acres of Coeur d'Alene Indian Reservation lands within the Project boundary.	Please see response CDAT-II-025.
CDAT-II-081	Please correct and clarify the number of acres of Coeur d'Alene Indian Reservation lands within the Project boundary.	Please see response CDAT-II-025.
CDAT-II-082	The Commission must determine that the Project is consistent with comprehensive plans for improving and developing the waterway, not just developing the waterway.	Section 4.3.5 has been corrected.
CDAT-II-083	The Applicant should consider preparing a supplemental EA to address the issue of Project effects on T&E species, because the current assessment is inadequate.	Avista believes that the PDEA as revised is adequate for its purposes. Avista will also submit a draft BA to FERC, and FERC will prepare a final BA later in the relicensing process.
CDAT-II-084	The Northwest Power Planning and Conservation Act warrants a cumulative impact assessment; see comment CDAT-II-18.	Please see response BIA-G-02.
CDAT-II-085	Without more information concerning cultural resource impacts and the Applicant's proposed measures with respect to cultural resources, it is not possible to evaluate compliance with Section 106 of the NHPA.	Please see response CDAT-II-048.
CDAT-II-086	Without more information, it is not clear how or if the Applicant will adequately protect cultural resources important to the Coeur d'Alene Tribe; the APE may need to be redefined and resurveyed.	Please see response CDAT-II-048.
CDAT-II-087	The Bookstrom et al., 1999 citation is misused throughout the document, and other sources about the basin are not cited; such practices are inconsistent with sound scholarship.	Opinion noted. To clarify, Bookstrom et al. (1999), which cites Long (1998), states "Approximately 51 percent of the tailings generated in the CdA district [elsewhere in the Bookstrom document stated as 109, not 107 tonnes as asserted in the Coeur d'Alene Tribe comment] were discarded directly into creeks that are tributary to the CdA River" (page 16). This equates to the approximately 57 tons stated in the PDEA. Depending on rounding of the estimates, a volume of between 55 million and 57 millions tons appears reasonable.
CDAT-II-088	The Project effects on terrestrial resources should be rephrased to acknowledge that the Project converts wetland and riparian habitats to open water and deep water habitats.	The PDEA acknowledges that the Project has converted wetland habitats. Please see response TLC-1.
CDAT-II-089	The Project effects on wildlife species should be rephrased to acknowledge that the Project converts wetland and riparian habitats.	Please see responses CDAT-II-088 and TLC-1.

Comment ID	Comment	Response
CDAT-II-090	The discussion of cumulative effects on cultural resources does not adequately address the role of other influences vs. the role of the Project in such effects; the PDEA lacks the thorough analysis required by NEPA and FERC.	Please see response BIA-G-02.
CDAT-II-091	The Coeur d'Alene Tribe reiterates its objections to the erosion and sediment transport reports, water quality data and modeling, and metals-contaminants reports on which the PDEA analysis is based, and cites its earlier comments on these documents.	Comment noted.
CDAT-II-092	The Coeur d'Alene Tribe states that additional text should clarify the reason for the elimination of vegetation; that is, it is not only erosion but the saturation caused by higher summer lake level.	Please see revised Section 5.3.1.1.
CDAT-II-093	The boxes labeled as “Backwater Transition Point” would be more accurately labeled “Backwater Transition Area” because even with static water at 2,128 during the summer, the change from “slack water” to a “free-flowing” river is a gradual change, from a biological and physical perspective.	Please see revised Section 5.3.1.1, *Geology*. The words "transition area" have been substituted on the referenced figures.
CDAT-II-094	The Coeur d'Alene Tribe states that not enough is known about the sediment production of the St. Joe watershed to assess statements in the PDEA (quoted in their comment) that say that because no major mining is/has occurring/ed, the sediment load is therefore expected to be less than the Coeur d'Alene River. The Coeur d'Alene Tribe states that data which would address this issue was not collected by the Applicant in the ALP and the Applicant is making unsupported conclusions and statements.	Comment noted. The statement in the PDEA was based on the interpretation that the increased sediment supply and resulting storage along the Coeur d'Alene River channel from past mine waste management activities increased the amount of primarily suspended sediment during that period.
CDAT-II-095	The Coeur d'Alene Tribe states that although substrate analysis of the entire Coeur d'Alene Lake Basin was requested on numerous occasions in the ALP, it was never provided to the Coeur d'Alene Tribe or any of the workgroups. Furthermore, the Coeur d'Alene Tribe states that the citation [Parametrix (2004f)] was not found in the *Literature Cited* section of the PDEA.	Substrate analysis of the “entire Coeur d’Alene Lake Basin” is not necessary for the purposes of this environmental analysis. However, as part of the EPA's cleanup efforts, extensive USGS sampling has been conducted; results are summarized in Section 5.5.1.4, *Metals*. In addition, Earth Systems and Parametrix (2004) (in the *Methods* section) discuss grain size analysis conducted under that effort. The missing citation has been added to Section 10, *Literature Cited*.
CDAT-II-096	The Coeur d'Alene Tribe maintains that the statement regarding sediment yields from those basins examined in the study are "grossly misleading" and do not take the "Tribe’s substantial comments on the sediment report into account." They also note that the Water Resources Work Group has not approved the report.	Opinion and comments noted.
CDAT-II-097	Coeur d'Alene Tribe believes that the conclusions of the AGWA modeling are invalid (because several other major tributary bays were not included in the analysis due to “data input problems”), and are contrary to real-world observations and professional experience. They also maintain that in order to adequately assess Project related impacts, the objective should have been to ascertain the effect of Post Falls Dam operation on sediment transport from or in the vicinities of the mouths of the tributary streams.	According to Golder (2005b), not all lake tributaries could be modeled because of data input problems. Avista does not agree that not modeling all tributaries invalidates the findings for those tributaries that were modeled. The Project effects on sediment transport from the tributaries was appropriately described and assessed within Golder (2005b) and the PDEA.

Comment ID	Comment	Response
CDAT-II-098	Since the late 1980s, significant hypolimnetic dissolved oxygen deficits (down to ~50% saturation) have been observed at the Lake's deepest point and in the shallow southern areas (between the mouths of the Coeur d'Alene and St. Joe rivers); however, complete anoxia has been observed only in Chatcolet Lake (Woods and Beckwith, 1997).	Comment noted. These facts have been incorporated into the study reports and PDEA analysis.
CDAT-II-099	The Coeur d'Alene Tribe agrees that sediment transport is extremely complex and states that studies conducted by contractors for this ALP are not capable of adequately evaluating the effects of Post Falls Dam operation on sediment transport for the duration of the proposed license. The Tribe therefore requests that "technically sound assessments" of the effects of Post Falls Dam operation on past, current, and future erosional, geomorphological, and sediment transport processes be completed. The Tribe further indicates that completion of such studies, as well as continued monitoring of sediment transport and erosion processes for the duration of the license must be conditions for re-issuance of the license to operate Post Falls Dam.	Opinion noted. Golder (2005b) addressed the complex issue of sediment transport to a degree that is completely adequate for the purposes of this environmental analysis.
CDAT-II-100	Boat caused waves are a major factor in the ongoing erosion processes occurring in these rivers, but this statement is misleading as it insinuates that holding the pool elevation static is not part of the problem, when in fact it is the major underlying factor causing the extent and severity of the erosion in the Project area today, as acknowledged by the Applicant's contractors. Coeur d'Alene Tribe cites the Earth Systems and Parametrix, 2004 study and the Coeur D'Alene Tribe Impacts Assessment, 2005.	Please see response BIA-S-033.
CDAT-II-101	This section of the document fails to mention that operation of Post Falls Dam is a major cause of the lack of recruitment of woody species, which are critical to the persistence of these levees (Earth Systems and Parametrix. 2004. Final Spokane River Hydroelectric Project Phase 2 Erosion Assessment).	Several factors have been identified in study reports as being related to the lack of younger trees, including water levels, boat wave erosion, invasive grass, heavy browsing, beavers, shallow soils, and land management.
CDAT-II-102	Coeur d'Alene Tribe notes that it is important to acknowledge that the levees were only one to two feet higher than 2,128 prior to the construction of Post Falls Dam, thus setting the stage for the susceptibility of these levees to continuing erosion from the Project when the water is raised and held at 2,128 through the summer months.	This fact was acknowledged on page 5-25 and 5-26 of the PDEA, last and first paragraphs, respectively.
CDAT-II-103	The matter of erosion on the levees cannot be blamed solely on boat-caused waves. There are interactions taking place that make these banks more susceptible to erosion, including project operations prohibiting the growth of vegetation in this erosion zone. Erosion rates are higher because there is little vegetative protection left on these banks. In the absence of Project operations, erosion during the peak recreation season would be spread out over an 8-foot zone, over banks that would most likely be more protected with vegetation (See Coeur d'Alene Tribe comment letters dated March 19, 2004 and May 7, 2004 for additional information).	Opinion noted. Please see response BIA-S-033.

Comment ID	Comment	Response
CDAT-II-104	Coeur d'Alene Tribe notes that Section 5.3 should acknowledge that wind fetch has also increased as a result of Project operations (e.g., there are an additional 13,519 acres as a result of the artificial pool (Coeur d'Alene Tribe Impacts Assessment 2005, Parametrix, unpublished bathymetry data, 2004). This increased fetch will also increase erosion above rates that would occur in the absence of operations (See comment letter dated March 19, 2004 for additional information).	We have revised PDEA Section 5.3 to acknowledge this.
CDAT-II-105	This paragraph (page 5-26, paragraph 3) minimizes the effects of Project related erosion. It should be stated that Project related erosion is occurring along 48 miles of the St. Joe River and 18 miles of the St. Maries River (Parametrix, Earth Systems, Phase 2 Erosion Assessment 2004).	Comment noted. We have revised the PDEA to reflect both shoreline miles where erosion is occurring, as well as the potential acreage loss.
CDAT-II-106	This paragraph (page 5-26, paragraph 4) minimizes the effects of Project related erosion. It should be stated that Project related erosion is occurring along 54 miles of the Coeur d'Alene River (Parametrix, Earth Systems, Phase 2 Erosion Assessment 2004).	Please see response CDAT-II-105.
CDAT-II-107	This paragraph (page 5-26, paragraph 5) minimizes the effects of Project related erosion. The Project related erosion that is occurring at the mouths and up the smaller lake tributaries should be addressed. Project related erosion that is occurring up these smaller tributaries was not completely examined (Parametrix, Earth Systems, Phase 2 Erosion Assessment 2004). Summer boat access is now available up many of these small streams due to the seasonal pool level. Therefore, all boat wave erosion in these instances would be entirely due to Project operations (See Coeur d'Alene Tribe comment letter dated March 19, 2004 for additional information).	The smaller lake and stream tributary areas are also accessible to small boats when the lake is at various lake levels. This is also true for the primary river tributaries. Further, any erosion occurring along these rivers and creeks is not all necessarily Project-related erosion.
CDAT-II-108	The "% responsible" figures attributed to Post Falls Dam operation are entirely arbitrary and unsubstantiated speculation. Post Falls Dam is 100% responsible for the effects described because if it were not in existence and operated as it is, the increased opportunity for boat traffic and other erosional/geomorphological as well as associated ecological effects described in the cited paragraphs (on page 5-30) would not have occurred, and the physical features such as lateral lakes, levees and riverbanks as well as the vegetation would still be intact.	Opinion noted. Please see responses BIA-S-033 and BIA-S-052.
CDAT-II-109	Coeur d'Alene Tribe agrees with assessments made in the PDEA regarding inundation and loss of vegetation in the 2,122- to 2,128-foot elevation zone largely as a result of the summer pool elevation. Coeur d'Alene Tribe then states that therefore adequate mitigation commensurate with the scope of Project impacts is required. The summer pool level is entirely due to Project operations and causes continuing impacts to resources.	Opinion noted. Available studies indicate minimal future impacts to wetland and riparian vegetation due to direct project operations. Also see response BIA-S-061.
CDAT-II-110	Bank erosion on the inside of the levees along the St. Joe River below river mile 2 is primarily due to boat-generated wave erosion and inundation associated with the Project's high summer lake levels; other erosion processes are relatively less important.	Comment noted.

Comment ID	Comment	Response
CDAT-II-111	Coeur d'Alene Tribe states that Post Falls Dam operation causes the main erosion effects, which must be adequately mitigated.	Please see responses BIA-S-033, BIA-S-060, and BIA-S-061.
CDAT-II-112	Coeur d'Alene Tribe states that "clearly, Post Falls Dam operation is implicated "in the formation of the small, localized change (i.e., a bump) in the river channel profile that exists about 30 miles upstream of the lake on the Coeur d'Alene River.	Comment noted. However, the change in profile pattern is related to the upstream end of the delta that forms during the higher flow periods when channel bedforms are built.
CDAT-II-113	Coeur d'Alene Tribe states that statements made on page 5-33 (related to the project nexus to effects on transport/deposition of sediment and also suspended sediment) are an unacceptable attempt to dismiss any responsibility or role that Post Falls Dam operation plays in sediment transport.	Opinion noted. Please see responses BIA-S-051C, BIA-S-051D, BIA-S-058, and CDAT-II-099.
CDAT-II-114	The Coeur d'Alene Tribe states that operation of Post Falls Dam is implicated in the observed effects (the "bump" in the river channel profile that exists about 32 miles upstream of the lake on the St. Joe River, shown in Figure 5-7) and requires adequate mitigation.	Please see response CDAT-II-112.
CDAT-II-115	Coeur d'Alene Tribe maintains that the statement on page 5-36 of the PDEA (this statement describes the effects of the Proposed Action) is largely unsubstantiated and is an unacceptable attempt to dismiss any responsibility or role that Post Falls Dam operation plays in sediment transport.	Comment noted. Please see response CDAT-II-113.
CDAT-II-116	Coeur d'Alene Tribe maintains that the statement that "In the Coeur d'Alene, St. Joe, and St. Maries Rivers, the majority of sediment transport occurs during periods of high flows that do not coincide with the September date when drawdown would begin" is largely unsubstantiated and is an unacceptable attempt to dismiss any responsibility or role that Post Falls Dam operation plays in sediment transport.	Comment noted; however, hydrologic data and hydraulic modeling undertaken as a part of the ALP indicate that the PDEA statement is accurate: sediment-competent flow events occur during the winter and spring when Project operations have little, if any, effect on lake levels.
CDAT-II-117	The erosional and geomorphological trends initiated by construction and operation of Post Falls Dam can be expected to continue under the Proposed Action, and must be adequately mitigated.	Comment noted. Please see response IRU-23.
CDAT-II-118	The Coeur d'Alene Tribe states that Post Falls Dam operation clearly is implicated in the observed effects (the role of metals leaching from the stream banks and the interaction between this process and Project lake level management) described for the Coeur d'Alene River, but its role in these effects and their magnitude were not adequately explained or investigated in the contractor reports, in the ALP, or in the PDEA. The Tribe is concerned about increased toxic metals mobilization and transport by physical and geochemical processes associated with extended summertime inundation and saturation/de-saturation of contaminated riverbank and floodplain sediments.	Opinion noted. Please see responses BIA-S-045A, BIA-S-047, BIA-S-051C, BIA-S-051D, and CDAT-II-068.
CDAT-II-119	The Coeur d'Alene Tribe states that the Project does not simply set the level at which boat and wind wave erosion occur; rather there are Project related interactions taking place that make these banks more susceptible to erosion. See also CDAT-II-103 and CDAT-II-104.	Comment noted. Please see responses BIA-S-033 and BIA-S-061.

Comment ID	Comment	Response
CDAT-II-120	The Coeur d'Alene Tribe maintains that the summer lake level resulting from Project operations has inundated all of the levee shorelines, not just the "low, downstream ends and the front inside edge". This inundation prohibits the growth of vegetation that would slow down the erosion process.	Comment noted.
CDAT-II-121	It is not accurate to blame most of the erosion in the Coeur d'Alene River that is occurring on the insides of the levees on loss of vegetation from agriculture, dike construction, logging, etc. Project operations are still prohibiting the growth of vegetation in the 2,120-2,128 foot zone that would protect against erosion.	Comment noted. Please see responses BIA-S-033, CDAT-II-067, and CDAT-II-101.
CDAT-II-122	The Coeur d'Alene Tribe asserts that bullet 2, paragraph 5 on page 5-30 of the PDEA is misleading in its assessment of the causes of erosion and references CDAT-II-103 for additional information.	Comment noted. Also see responses BIA-S-033 and CDAT-II-105. The lower, narrow, and finer-grained downstream ends of the natural levees are the main areas where Project operations have influenced bank erosion. Dike construction, roads, yards, urban and industrial land use practices, and boat waves are the major influences on bank conditions in upstream areas.
CDAT-II-123	The Coeur d'Alene Tribe asserts that bullet 1, on page 5-31 of the PDEA is misleading in its assessment of the causes of erosion and references CDAT-II-103 for additional information.	Comment noted. Also see response CDAT-II-122.
CDAT-II-124	The Coeur d'Alene Tribe notes that on page 5-31, bullet 2 states that "Along the St. Joe River levees between river mile 0 and river mile 7, erosion of the inside of the levees by boat-generated waves is occurring at around 2.4 to 4 inches/year on the straighter reaches, and 4 to 8 inches/year on the inside of bends.", but the statement should also include a note that 16 miles of shoreline in this reach are experiencing erosion caused by Project operations. The Tribe cites Earth Systems' Phase 2 Erosion Assessment (2004).	Comment noted.
CDAT-II-125	It should be noted that although erosion rates are slower on the Coeur d'Alene River, 54 miles of shoreline are experiencing erosion caused by Project operations (Earth Systems Phase 2 Erosion Assessment, 2004).	Comment noted. The discussion in the PDEA is about the rates of erosion relative to each river.
CDAT-II-126	The Coeur d'Alene Tribe notes that the PDEA should, in addition to the description of shore conditions, describe how Project operations are responsible for some erosion that occurs along the shoreline of Coeur d'Alene Lake. The Tribe references CDAT-II-107 for additional information.	A strong link between project operations and increased lakeshore erosion was not indicated by the erosion studies. The project operations set the level that summer waves move onshore. The low-elevation, downstream ends of the river levees are the main locations where the Project has changed vegetation and partly influences erosion.
CDAT-II-127 and CDAT-II-128	With respect to the PDEA's discussion of effects of the erosion control program (a part of PME measure TR-1), the Coeur d'Alene Tribe states that the ongoing erosion caused by the Project will continue and likely increase under the Proposed Action. 48 miles of shoreline on the St. Joe River and 18 miles on the St. Maries River will continue to experience Project related erosion (Earth Systems Phase 2 Erosion Assessment, 2004). In addition, erosion may increase by holding the summer pool for a longer period of time. Recreation may increase with the longer opportunity, and wave action would be concentrated at the vulnerable 2,128 foot level for a longer period of time.	Opinion noted. The proposed operations are within the range and duration of current Project operations. We expect that boating activity would increase over the term of the new license in response to population growth in the vicinity. Any boating-related erosion associated with existing and future use would be best addressed through enforcement of no-wake zones along the shoreline buffer and in the narrow riverine areas between the natural levees, which falls under the authority of the local, state, and tribal authorities.

Comment ID	Comment	Response
CDAT-II-129	Coeur d'Alene Tribe maintains that statements in the PDEA regarding the results of project backwater effects are largely unsubstantiated and are an unacceptable attempt to dismiss any responsibility or role that Post Falls Dam operation plays in sediment transport.	Comment noted. The statements referred to are substantiated by sediment routing, hydrologic, and bathymetric studies and data in the Project record.
CDAT-II-130	The Coeur d'Alene Tribe states that statements in the PDEA evaluating sediment transport under the Proposed Action are largely unsubstantiated and are an unacceptable attempt to dismiss any responsibility or role that Post Falls Dam operation plays in sediment transport. Coeur d'Alene Tribe maintains that construction and operation of Post Falls Dam has profoundly affected physical conditions and geomorphological processes in the lower reaches of the Coeur d'Alene and St. Joe rivers and their associated floodplains influenced by dam-induced backwater, and especially in the shallow southern portion of the Coeur d'Alene Lake under Tribal jurisdiction.	Comment noted. Section 5.3 of the PDEA discusses the effects of the Proposed Action on sediment transport, which has been demonstrated to be negligible, based on the sediment routing, hydrologic, and bathymetric studies.
CDAT-II-131 and CDAT-II-132	The Coeur d'Alene Tribe cites pages 5-40 and 5-41 of the PDEA, which ends the discussion of conclusions regarding Project effects on sediment transport in Coeur d'Alene Lake. The Tribe maintains that there are serious technical deficiencies in the Sediment Routing study and water quality model by Avista contractors (as described in Tribal comment letters already entered into the record as documents on the Avista website 2005-0021.pdf and 2004-0703.pdf, and comments submitted by letter dated March 22, 2005, respectively) and hence the PDEA conclusions are unsubstantiated.	Opinion noted. We respectfully disagree and believe the PDEA analysis and conclusions are supported by the available studies and other pertinent information.
CDAT-II-133	The Coeur d'Alene Tribe states that the statement that the Proposed Action would not appreciably change sediment supply and transport in Coeur d'Alene Lake compared to current Project operations may or may not be true. The Tribe states that this is because the effects of Project operation on erosional, sediment transport, etc., were not adequately assessed by the Applicant in the ALP and have not been adequately analyzed in this PDEA. The Tribe advocates more study before relicensing, and references the Coeur d'Alene Tribe comment letters listed above in comment #91.	Opinion noted. Please see response CDAT-II-132.
CDAT-II-134	The Coeur d'Alene Tribe notes that there are a variety of interrelated impacts occurring besides just holding the water level at a constant elevation. The inundation is prohibiting the growth of vegetation that would protect against erosion. Recreation has increased due to the higher summer pool level, which increases boat wake. Wind fetch has also increased as a result of the elevated summer pool. This paragraph oversimplifies the role of Project operations in erosion (See comment letters dated March 19, 2004 and May 7, 2004 for additional information).	Comment noted. Please see response IRU-23. The factors mentioned in the comment are discussed in the PDEA.
CDAT-II-135	If Project operations continue, it should be noted that 48 miles of shoreline of the St. Joe River, 18 miles of the St. Maries and 54 miles of the Coeur d'Alene will continue to experience erosion caused by Project operation. To protect against the loss of the identified acreages, the entire length of shoreline needs to be protected.	Comment noted. Protection of the entire length of the river shoreline is unwarranted; erosion control efforts should be focused on areas of significant resource impact. Please see responses BIA-S-033, BIA-S-060, and BIA-S-061.

Comment ID	Comment	Response
CDAT-II-136	The Coeur d'Alene Tribe states that, as it is currently written, the proposed PME measure described in paragraph 6 on page 5-42 will not mitigate for the continuing erosion that will occur due to Project operations. The Tribe maintains that the measure is not performance-based, does not assure protection of all eroding shorelines, is not funded at an adequate level, and is not adequately explained in the context of a connection to impacts and as a means to achieve adequate protection, mitigation and/or enhancements.	Comment noted. Please see responses BIA-S-060, BIA-S-061, and CDAT-II-135.
CDAT-II-137	The Coeur d'Alene Tribe states that, as it is currently written, the proposed PME measure described in paragraph 2 on page 5-43 will not protect all currently eroding shorelines caused by Project operations. The Tribe maintains that the measure is not performance-based, does not assure protection of all eroding shorelines, is not funded at an adequate level, and is not adequately explained in the context of a connection to impacts and as a means to achieve adequate protection, mitigation and/or enhancements.	Please see revised Section 5.3.2.3, *Erosion*. Also see responses BIA-S-060, BIA-S-061, and CDAT-II-135.
CDAT-II-138	The Coeur d'Alene Tribe maintains that the statement that implementing the Proposed Action would not alter the cumulative effects already in evidence under current Project operations is unsubstantiated. Collapse of the levee and riverbank cottonwood community (because it has not successfully regenerated since the summertime lake level was raised from approximately 2,126.5 feet in the 1940s to the current 2,128 feet) could lead to rapid increases in erosion rates and further geomorphological destabilization in the very near future. The Tribe states that the Applicant's Proposed Action would exacerbate the continuing direct, indirect, and cumulative impacts that are adversely affecting these resources in the Project.	Comment noted. The PDEA appropriately addresses cumulative effects. Please see response BIA-G-02.
CDAT-II-139	Contaminated sediment from mine waste generated in the upper Coeur d'Alene River Basin would continue to be routed through and deposited within Project impoundments. However, Project facilities and operations only contribute to this effect in a small way, and contaminated sediment would continue to deposit within Coeur d'Alene Lake and portions of the Spokane River even in the absence of the Project.	Comment noted. Please see responses CDAT-II-130 and CDAT-II-132.
CDAT-II-140	Discussion of the issues in the Project Operations section of the PDEA is largely based on reviews of existing data, collection of limited additional field (temperature) data, and a computer lake model (CE-Qual-W2) developed by an Avista contractor. Therefore, conclusions and statements regarding the effects of Post Falls Dam operation on lake water quality in this PDEA are based on an incomplete and/or flawed model and are likely to be of questionable validity.	The WRWG developed the study plans and selected the consultant to do the work. All stakeholders had input to the choice of study methods and models. In the case of CE-QUAL, an independent consultant (Dr. Scott Wells) was hired to review the consultants' work. The study results provide an adequate understanding for relicensing the project. Please see response CDAT-I-06.
CDAT-II-141	Future water quality monitoring must be coordinated between agencies and the Tribe.	Avista agrees with this comment. It is our intent that monitoring be coordinated with agencies and the Coeur d'Alene Tribe. This intent is illustrated in the Idaho Water Quality PME (PF-WQ-2).

Comment ID	Comment	Response
CDAT-II-142	The PDEA is inadequate for assessing HED impacts and mitigation measures.	A significant effort by the stakeholder work groups lead to the study plans for assessing HED impacts. These same work groups hired the contractors and provided input and feedback on the study findings. Avista believes that the impacts were adequately assessed for the purpose of relicensing the HEDs. Avista also believes the PMEs adequately mitigates for these impacts.
CDAT-II-143	The Coeur d'Alene Tribe requests a listing of related studies.	Please see Section 10.0, *Literature Cited*.
CDAT-II-144	The Coeur d'Alene Tribe suggests adding a description of aboriginal territory.	Please see Section 5.9.1, *Cultural Resources*.
CDAT-II-145	The text should be modified to include important life history forms.	The text of Section 5.6.1.1, *Aquatic Habitat Conditions*, has been revised to include all three life forms of native salmonids.
CDAT-II-146	The Coeur d'Alene Tribe suggests the backwater effect of the Project is underestimated.	The backwater effect of Coeur d'Alene Lake water levels, including those related to Project operations, are described in the PDEA based on the most recent bathymetric surveys and other available information.
CDAT-II-147	The Coeur d'Alene Tribe suggests effects of inundation on the natural flood pulse, and riverine and lakeshore habitat are oversimplified.	The operation of Post Falls HED has little or no effect on the flood pulse process in Coeur d'Alene Lake. Please see response CDAT-11-146.
CDAT-II-148	By EPA's definition, there are no "coolwater" species in Idaho; northern pike and smallmouth bass are considered warmwater species by EPA.	The word "coolwater" has been removed from the text.
CDAT-II-149	The Coeur d'Alene Tribe suggests that Project operations have restructured exotic warmwater fisheries and eliminated a fishery for native salmonids in riverine and tributary habitat.	The PDEA acknowledges that Project operations affect aquatic habitat and fish species. There is no evidence to suggest that Project operations have "eliminated" a native salmonid fishery.
CDAT-II-150	The Coeur d'Alene Tribe suggests the statement on mining in the St. Joe River Basin is accurate but incomplete	Comment noted.
CDAT-II-151	The Coeur d'Alene Tribe suggests that the statement on diverse habitat conditions in Coeur d'Alene Lake is misleading.	Opinion noted.
CDAT-II-152	The Coeur d'Alene Tribe suggests that the Spokane River upstream of Post Falls HED exhibits characteristics that are riverine and not lake-like.	Opinion noted.
CDAT-II-153	The Coeur d'Alene Tribe suggests an addition to the text about broad interest in restoration of anadromous fish.	The text of Section 5.6.1.2 has been modified to reflect the interest of a variety of stakeholders in anadromous fish restoration.
CDAT-II-154	The Coeur d'Alene Tribe makes a general comment on equal consideration of resources.	Comment noted.
CDAT-II-155	The Coeur d'Alene Tribe makes a statement that native fish species are important in the Coeur d'Alene Lake Basin.	Comment noted. Native fish species are a primary focus of proposed resource enhancement and protection measures.
CDAT-II-156	The Coeur d'Alene Tribe notes that EPA identifies all native species in Idaho as coldwater.	Please see response CDAT-II-148.
CDAT-II-157	The Coeur d'Alene Tribe makes a general comment that the discussion of environmental effects is inadequate.	The environmental effects discussion is adequate for the purposes of the PDEA and license application. The discussion has been clarified and expanded where appropriate.
CDAT-II-158	The Coeur d'Alene Tribe says that project operations do not extend the natural impounding action of the lake.	Post Falls HED holds the summer elevation at 2,128 foot, thereby extending in time the impounding action of the lake. The word "natural" has been removed from the text of the sentence in question.

Comment ID	Comment	Response
CDAT-II-159	The Coeur d'Alene Tribe asserts that the statement that "Post Falls HED does not impound water to a higher level than would occur naturally…" should be removed because it is false.	Post Falls HED does not regulate water levels above elevation 2,128 feet. Consequently, the maximum Coeur d'Alene Lake levels, which typically occur in the spring, are not the result of Project operations and the original PDEA statement was intended to reflect this. The statement has been clarified in the text.
CDAT-II-160	The Coeur d'Alene Tribe states that the description of Project effects is overly simplified. The Coeur d'Alene Tribe suggests that operation of Post Falls HED has resulted in seven major effects: (1) traditional fishing activities have been precluded; (2) fish management activities have become focused on conservation of fish species; (3) riverine habitats are converted to lacustrine habitat; (4) Project operation inundates lake shoreline and low-lying adjacent lands; (5) inundation provides productive habitat for non-native species; (6) inundation has altered aquatic habitat; and (7) alteration has an overall adverse effect on native species.	(1) The Project does not preclude fishing in the Project area; (2) declining numbers of native trout in the Project area are likely the result of effects from sources other than the Project, as indicated by substantial native trout occurrence in Coeur d'Alene Lake into the early 1980s, 80 years after the initial operation of Post Falls HED; (3) no conversion of riverine habitat is proposed from the current condition; (4) no additional inundation of adjacent lands is proposed from the current condition; (5) the specific influence of Project operations on non-native fish is unknown; (6&7) the PDEA acknowledges prior project-related habitat alterations; no additional alteration of riverine or lacustrine habitat is proposed.
CDAT-II-161	The sentence that shallow water habitat may result in localized water temperature increases is inconclusive and inaccurate.	The indicated sentence has been revised to remove the word "may."
CDAT-II-162	The Coeur d'Alene Tribe states that the analysis of water level management under the Proposed Action that leads us to conclude that there would be no effect on aquatic habitat or fish populations compared to current conditions is flawed.	Avista is not proposing substantive water level management changes for Post Falls HED and no habitat or population changes are expected. Initiating the fall drawdown of Coeur d'Alene Lake on September 15 does not represent a significant change from the current condition as it relates to aquatic habitat conditions. Also see response CDAT-II-042.
CDAT-II-163	The Coeur d'Alene Tribe asserts that the Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout Implementation Plan fails to establish a mitigation ledger.	Developing a "mitigation ledger" was never a goal of the Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout PME Implementation Plan and is not necessary to develop and implement appropriate protection and enhancement activities in the Coeur d'Alene Basin. See response FWS-73.
CDAT-II-164	The Coeur d'Alene Tribe states that the Implementation Plan does not provide for evaluating project effectiveness.	Appropriate monitoring of project effectiveness is provided for in the Post Falls Fish PME Program.
CDAT-II-165	The Coeur d'Alene Tribe states that the *Cumulative Effects* section of the PDEA is insufficient.	This section of the PDEA has been revised. Also see response BIA-G-02.
CDAT-II-166	The Coeur d'Alene Tribe states that the *Unavoidable Adverse Effects* section does not discuss the effects of the annual prolonged inundation of riverine, tributary, and terrestrial habitat upstream of Post Falls HED.	No substantive water-level management changes are being proposed so no unavoidable effects are discussed.
CDAT-II-167	Total area of wetlands presented in Section 5.7 (18,730 ac) does not agree with the total of individual categories (18,747 ac). Also in table, totals for different areas total to 18,728. The paragraph greatly downplays the loss of habitat that formerly supported camas, water potato, and tule and downplays the displacement or elimination of former (pre-Project) harvest or use areas	We have revised Section 5.7.1.1 of the PDEA to correct the minor discrepancies in wetland acreages. Please see response CDAT-II-088.
CDAT-II-168	The studies that were performed for the Terrestrial Resources Workgroup should be listed.	The studies that were conducted can be accessed via Avista's web site at: http://www.avistautilities.com/resources/relicensing. The studies are cited in the PDEA as appropriate.

Comment ID	Comment	Response
CDAT-II-169	The indicated wetland acreages include open water, which is misleading about actual vegetated wetland acreage.	Please see response CDAT-II-060.
CDAT-II-170	The acreage should be given for the amount of open water in the St. Joe area because these areas are non-vegetated. There is more open water than aquatic bed, emergent, scrub-shrub or forested wetlands.	Please see response CDAT-II-060.
CDAT-II-171	The 10,541 acres of wetlands mapped in the Coeur d'Alene River area include 3,000 acres of open water, which are devoid of vegetation.	Please see response CDAT-II-060.
CDAT-II-172	The statement that the overall acreage of wetlands has not decreased is not true. The overall acreage of wetlands in the study area has changed, if open water areas that are devoid of vegetation are not included. The amount of open water has significantly increased under current operations, reducing the amount of aquatic bed, emergent, scrub-shrub and forested wetlands.	Comment noted. The methodology used to assess changes in wetland habitats was consistent in that open-water habitat was included in the mapping of current habitats as well as for pre-Project and later periods. It is true that if one looks at sub-sets of the overall habitat mapping that the results will differ from the comparison of the overall mapping results. The analysis that was conducted did in fact assess differences in specific habitat types and locations. However, the information on wetland changes has been removed from this section because it is not relevant to characterizing the current affected environment.
CDAT-II-173	No evaluations can be made in the Coeur d'Alene River system regarding changes to wetlands since project start-up because no data was available for this area before 1933.	Please see response CDAT-II-172.
CDAT-II-174	No evaluations can be made in the Coeur d'Alene River system regarding changes to wetlands since project start-up because no data was available for this area before 1933.	Please see response CDAT-II-172.
CDAT-II-175	The information in Section 5.7.1.2 concerning culturally significant plants is misleading.	The paragraph in question merely summarized the actual results of the plant surveys. We have revised Section 5.7.1.2 of the PDEA to further clarify the occurrence of culturally significant plants.
CDAT-II-176	The impacts from the loss of camas to the Tribe are not adequately analyzed or assessed in the PDEA and must be addressed.	Discussion of the status of individual species is provided in the study report and more detailed, species-specific analysis concerning past impacts is not warranted for the PDEA.
CDAT-II-177	The Coeur d'Alene Tribe has produced big game winter range maps that cover the Idaho portion of the Project area. Many of the hillsides surrounding Coeur d'Alene Lake, the Coeur d'Alene River, the St. Joe River and the St. Maries River are also classified as big game winter range.	We have revised the PDEA to reflect this point.
CDAT-II-178	The effects from Project operations on wetlands, erosion, wildlife species, and culturally significant species are seriously downplayed in this paragraph. One paragraph is not adequate to describe these effects in detail.	Past effects are appropriately acknowledged in the PDEA. More detailed analysis is not warranted for purposes of the environmental review. Please see response SC-029.
CDAT-II-179	Under the Applicant's Proposed Action, there will be additional erosion that occurs from holding the pool at elevation 2,128 until September 15. There are significant continuing effects on these resources that would continue and slightly increase under the Proposed Action. Those impacts must be adequately analyzed and mitigated.	Please see response CDAT-II-042 and revised discussion of the Proposed Action.

Comment ID	Comment	Response
CDAT-II-180	Small differences in the elevation of Lake Coeur d'Alene do not necessarily mean no effect to plant and animal resources that utilize the lake. A small difference in elevation can translate to a lot of acreage, especially in areas of relatively flat topography. The timing of the elevation change is also important to plant and wildlife species. No data is given to substantiate this claim of no effect on terrestrial resources.	Please see response CDT-II-042.
CDAT-II-181	It cannot be claimed that wetlands are in a stable state. Impacts to wetland habitat types are occurring on a continuing, annual basis, and operations are prohibiting the growth of certain species, and promoting the growth of others. It should also be added to the discussion that shoreline erosion is an ongoing affect of Project operations affecting many miles of shoreline.	Please see response BIA-S-092 concerning current wetland conditions. We do not view past conversion of wetland types to represent a continuing effect; see response TLC-1. The PDEA acknowledges that boat-caused waves erode wave-cut ledges along the full length of the affected reaches of the St. Joe and St. Maries rivers.
CDAT-II-182	The Proposed Action would continue to have the same continuing negative impacts on wetland communities as current operations. In addition, comment CDAT-11-179 addresses further impacts that may occur under the Proposed Action.	Please see responses CDAT-II-042 and BIA-S-092.
CDAT-II-183	A paragraph in Section 5.7 is somewhat misleading as to the extent of the erosion problems facing the lake tributaries. Erosion is occurring along 48 miles of the St. Joe River, 18 miles of the St. Maries River, and 54 miles of the Coeur d'Alene River, as well as numerous other smaller lake tributaries (Parametrix, Earth Systems, Phase 2 Erosion Assessment 2004).	Comment noted. The PDEA acknowledges that boat-caused waves erode wave-cut ledges along the full length of the affected reaches of the St. Joe and St. Maries rivers.
CDAT-II-184	Impacts to wetland habitat types are occurring on a continuing, annual basis, and operations are prohibiting the growth of certain species and promoting the growth of others. In addition, the continuing spread of aquatic weeds is displacing other native species.	Please see response CDAT-II-181. Aquatic weeds are discussed in the PDEA and addressed in measure PF-AR-2.
CDAT-II-185	It is not accurate to claim overall wetland acreage in the project is unchanged from historical numbers to current conditions. GIS analysis performed by the Coeur d'Alene Tribe indicates that wetland acreage upstream of Post Falls HED below the elevation of 2,128 feet has decreased from 20,231 to 10,991 acres (Coeur d'Alene Tribe Impacts Assessment 2005). This includes aquatic bed, emergent, scrub-shrub and forested wetlands.	Please see responses CDAT-II-172 and SC-029.
CDAT-II-186	As it is currently written, measure TR-1 would not mitigate the ongoing effects to wetland communities and losses due to erosion. The measure is not performance based, and the funding level is not sufficiently explained or linked to obvious continuing impacts.	Please see response BIA-S-060.
CDAT-II-187	Culturally significant species are not found throughout the area, and current wetland communities are not adjusted to current Project operations.	Please see responses BIA-S-092 and CDAT-II-175.
CDAT-II-188	Project operations under the Proposed Action will continue to prohibit culturally significant plant species from occurring in areas that they would in the absence of operations.	We do not view past conversion of wetland types to represent a continuing effect. Please see response SC-029.

Comment ID	Comment	Response
CDAT-II-189	Project operations are prohibiting and will continue to prohibit culturally significant plant and animal species from occurring in areas that they would in the absence of operations. The impacts to cultural plants from other human activities besides operations that are mentioned in this paragraph should not be a part of this discussion.	We do not view past conversion of wetland types to represent a continuing effect; please see response SC-029. To obtain a complete understanding of the context of Project-related effects on a resource, it is also important to discuss other sources of effects on that resource.
CDAT-II-190	There are currently 13,519 acres in the zone from 2,120 to 2,128 feet that would have the potential to support many of the culturally significant plant species identified by the Coeur d'Alene Tribe (Coeur d'Alene Tribe Impacts Assessment 2005).	Please see response SC-029.
CDAT-II-191	Measure TR-1 would probably result in enhancements to culturally significant plant species and their habitats when compared to existing conditions. However, it will not completely mitigate for the ongoing impacts to wetland communities and the associated loss of culturally significant plant species. The measure is not performance based, and the funding level is not sufficiently explained or linked to obvious continuing impacts.	We do not view past conversion of wetland types to represent a continuing effect; please see responses SC-029 and BIA-S-060.
CDAT-II-192	Camas is again noted as absent from the Coeur d'Alene Lake area. See above comment CDAT-II-176.	Please see response CDAT-II-176.
CDAT-II-193	Water potato harvest is disrupted by mudflats created during the drawdown period, not just inundation. With the change in seasonal water levels, the water potato areas are now mudflats at the time of harvest so people must walk/wade out to dig the potatoes, instead of by boat as was done pre-Project. The distribution of metals and decreased exploitation of water potato beds is attributed to project operations.	Available information indicates the Project has little, if any, effect on sediment and metals distribution in the Coeur d'Alene Lake system. It is not possible to know the precise distribution of water potato habitat prior to Project construction.
CDAT-II-194	The statement that culturally significant species have adjusted to current Project is simply not true. Some culturally significant species have not adjusted at all and have been completely lost in some of the Coeur d'Alene Tribe's traditional gathering areas affected by the Project.	Please see responses SC-029 and BIA-S-092.
CDAT-II-195	In order to provide adequate analysis, mention should be made to the effect (or potential effect) of nutrients released from enhanced aquatic vegetation growth areas on water quality in the lake.	Please see water quality discussions in Section 5.5.
CDAT-II-196	Weed monitoring methods, control strategies, and the funding ability of cooperating entities will significantly affect the cost of the AR-3 PME and must be addressed to adequately mitigate continuing Project impacts.	Please see responses BIA-S-093, CDAT-II-232, CDAT-II-245, CDAT-II-246, and CDAT-II-247.
CDAT-II-197	It cannot be claimed that current Project operations have minor effects on wildlife species and habitat, as many of the effects on wildlife species were not studied. These effects must be adequately analyzed so that adequate mitigation can be implemented to address continuing Project impacts. A list of potential effects and other issues are presented.	As noted in other responses, the available information indicates that the project-affected habitats have largely adjusted to current conditions and are relatively stable aside from successional changes and the acknowledged erosion losses. Given minimal effects on habitat, minor effects on wildlife is a reasonable conclusion. The effects on wildlife due to changes in habitat from initial Project construction and operation are not effects based on current conditions. Wildlife habitat is not anticipated to be significantly affected by the Proposed Action compared to current conditions.

Comment ID	Comment	Response
CDAT-II-198	TR-1 will not mitigate for the ongoing impacts to wetland communities and losses due to erosion. The measure is not performance based, and the funding level is not sufficiently explained or linked to obvious continuing impacts.	Please see response BIA-S-060.
CDAT-II-199	It is not accurate to say that special status species have adapted to Project operations, as no research has been done on this topic in the Project Area. Bald eagles, for example, are a species that are known to avoid human disturbance. Recreation, the loss of cottonwood trees, and the increase in aquatic weeds all likely affect bald eagles.	We believe this is a reasonable statement given that the Project has been in place for nearly 100 years, and current summer water levels for more than 60 years, and the species have therefore accommodated these conditions in order to be present today. In the case of bald eagles, the species is even more common today than it was several years ago, and is even proposed for delisting.
CDAT-II-200	It is misleading to state that the current system has adapted to current Project operations.	Please see response BIA-S-092.
CDAT-II-201	The statement that wildlife habitat has been lost due to agriculture, development and other human disturbances should not be used to diminish the continuing impacts that Project operations are having on habitat.	The discussion on cumulative effects is intended to look at all sources of impacts relative to the Project effects.
CDAT-II-202	The statement of no direct effect on bull trout is not supported.	Avista believes that the PDEA discussion does support the statement.
CDAT-II-203	The effects determination on bull trout is not supported.	The determination has been removed from the text. The formal effects determination will be included in a biological assessment prepared by FERC.
CDAT-II-204	See discussion above.	See responses CDAT-II-202 and CDAT-II-203.
CDAT-II-205	The Coeur d'Alene Tribe makes additional comments related to the status of bald eagles.	Please see responses BIA-S-105 and CDAT-II-199.
CDAT-II-206	The Coeur d'Alene Tribe suggests that Avista avoid terminology such as past inhabitants that plays into the vanishing Indian stereotypes.	The text has been revised to delete "past inhabitants" and substitute "evidence of American Indian cultures."
CDAT-II-207	The Coeur d'Alene Tribe questions the characterization of intense settlement after the 1880's as suggesting that previous cultures were nomadic only.	The text has been revised to eliminate the inconsistency.
CDAT-II-208	The APE should be extended to include the expected areas of erosion and sedimentation beyond the 2,128 foot contour.	Please see response BIA-S-108 explaining the APE definition.
CDAT-II-209	The archaeological survey is out of date and requires clarification.	Section 5.9 has been updated based on the completed Phase I inventory report.
CDAT-II-210	Avista needs to clarify whether the seasonal fluctuation in water level has been reduced compared to the Natural Hydrograph or the seasonality of the fluctuation has been changed or both.	Current operations do not appear to affect the seasonality or extent of fluctuations in the lake level.
CDAT-II-211	The Coeur d'Alene Tribe notes that Avista needs to clarify exactly how similar to existing conditions erosion would be under the Proposed Action.	Avista continues to conclude that the Proposed Action would result in conditions similar to current Project operations regarding water elevation. The Proposed Action, by addressing erosion (see PME PF-TR-1), should reduce erosion compared to current Project operations. Also see response CDAT-II-042.
CDAT-II-212	Existing conditions include Project-induced erosion and, without proper study of the effects on cultural resources, it is unknown what further effects there will be from erosion.	Avista continues to conclude that differences would be minor. Please see response CDAT-II-042.

Comment ID	Comment	Response
CDAT-II-213	The analysis of effects of the proposed operations on cultural resources in inadequate.	Avista continues to conclude that differences would be minor.
CDAT-II-214	The HPMP does not exist at this time. Therefore it does not address the ongoing identification, evaluation, and protection of historic properties during the term of the license.	The HPMP will address ongoing identification, evaluation, and protection of historic properties once it is completed.
CDAT-II-215	The stated make-up of the CRWG is misleading, clarification is needed.	Because the membership of the CRWG is provided on Avista's relicensing web site, this footnote has been deleted.
CDAT-II-216	The archaeological report is not complete and has not been seen by the CRWG members or others. At this time, the statement can only be an assumption based on discussions of preliminary results. To assert that a site has no integrity based on a sample of a small portion of the site in an area of high disturbance is not good science.	Avista recognizes that the cultural resources evaluation report has not been reviewed by the CRWG as yet. The preliminary results show that portions of some sites have been eroded. However, Avista did not intend to imply in the PDEA that these sites have lost integrity. The text in Section 5.9.2.3 of the PDEA has been revised to clarify this. The HPMP, developed in consultation with the CRWG, will provide management proposals for historic properties.
CDAT-II-217	A full working draft of the HPMP does not exist at this time, so it is not clear exactly what it will provide for.	Avista recognizes that the HPMP is not complete; however, it is reasonable to say that it will include provisions for consultation in determining priority locations for implementing some shoreline management.
CDAT-II-218	The reference to eligible archaeological sites needs to be expanded to include all eligible sites such as TCPs , resource gathering areas, and resources covered under laws other than Section 106 (of the NHPA).	The text has been revised to include other types of eligible sites.
CDAT-II-219	Use of "would" rather than "will" gives the impression that the eventual production of the HPMP is in doubt.	All PME measures would take effect only with the issuance of a new license for the project. If Avista receives a new license, the HPMP will be implemented.
CDAT-II-220	The cultural resources research is inadequate to address the identified data gaps and major research themes in the region.	Avista disagrees. The data obtained through the cultural resource surveys add to the available information and can apply to data gaps and regional themes.
CDAT-II-221	It has not been established that adverse effects on cultural resources are unavoidable. Without complete studies, adverse effects, both direct and indirect, cannot be determined, nor can the requisite cumulative effects analysis be accomplished.	Avista anticipates that completion of the cultural resource inventory and evaluation, and the execution of a PA and implementation of the HPMP, would consider ways to avoid, minimize, or mitigate adverse effects.
CDAT-II-222	On page 5-206, the text points to “most of those” wanting additional and/or longer boat ramps is an overstatement as is seen in the accompanying table. The actual number desiring longer ramps is one person in a total of over 1,000.	The comment is made out of context. The sentence that precedes the one the Tribe references states “Of the few visitors who were dissatisfied with the recreational resources …..” Only 5 visitors indicated a need for additional boat ramps on Coeur d’Alene Lake.
CDAT-II-223	Section 5.10.2.1, *Project Operations*, pages 5-210 and 5-211, Regarding the reduced access to docks During RLUWG meetings some descriptions of limitations were circulated. Restricted access was assumed to be less than 3 feet of water, which would depend on the type of use for the dock (canoe for example). The configuration of the dock was significant in some examples (e.g., a slip oriented toward shore was not accessible but if turned sideways would be). Please discuss.	There are a number of potential restrictions to access to Coeur d’Alene Lake that are generally dependent on the depth of the bays. There is no one lake level elevation that restricts boat access to the entire body of water and no single configuration for boat slips would be appropriate.

Comment ID	Comment	Response
CDAT-II-224	As the FERC licensee, Avista is responsible for carrying out required elements of Section 110/106 of the National Historic Preservation Act. To this end, Avista must include and be responsible for all costs of cultural resources inventories, significance determinations, eligibility assessments, and mitigation efforts related to its license and Project. In this case, recreation facility improvements must include appropriate measures for Section 106 compliance planning and evaluations. Simply "partnering" with other entities does not relieve the licensee's obligation under the Section 110/106 process.	Comment noted. Avista notes that the NHPA does not require mitigation, only "addressing" impacts. Land management agencies also have cultural resource obligations. Avista is not solely responsible for addressing all such issues; funding is intended to cost-share for all costs. Additionally, the PME measures PF-CR-1 and SRP-CR-1 state that implementation of the PME will be coordinated with the HPMP.
CDAT-II-225	Page 5-212, Number 1 in the second list on this page: This section refers to recreation project MOUs and states that they "must" provide "public" access. Please correct to include Tribal access as well.	The public access measures are all-inclusive and do not differentiate among recreational visitors to the project.
CDAT-II-226	Pgs 5-212 and 5-213. There is significant discussion of an overall Recreation Plan that seems to be a way to get all the recreation PMEs back on the table and redirect funding. In addition, it includes submittal of the plan to the commission one year after the license is issued, and no new facilities will be initiated until after approval of the recreation plan by the Commission. Please discuss how long this process will take.	The Recreation Plan is not intended to "get all the recreation PMEs back on the table and redirect funding." It will be submitted to FERC within 1 year of the issuance of the new license. Avista does not control the amount of time that FERC may require for review and approval of the plan.
CDAT-II-227	Section 5.10.2.3, Recreational Facility Improvements page 5-220. The PDEA characterizes "substantial" improvements with respect to recreation while at the same time pointing to work that addresses deferred maintenance and longer boat ramps as requested by one person in a thousand per table on page 5-206. It is hardly "substantial" to fix what already exists, satisfy one individuals request and not develop any new sites beyond the first 10 years of a 30 to 50 year license (per statement on page 2-214 second to last paragraph).	Please see response CDAT-II-222. The comment misrepresents of the recreational study findings, and the RLUAWG's justifications for the proposed PME measures. The proposed PME measures are substantial and many will address deferred maintenance problems associated with the public access sites around the lake. The recreation survey is a tool, that when coupled with the facility inventory, resource managers' assessments of the resource and professional in-field observations, provides direction on what facilities are needed with a clear nexus to the project. Additionally, long-term recreational needs associated with the Project would be addressed for the term of the new FERC license as clearly identified in various proposed PME measures.
CDAT-II-228	The second paragraph in Section 5.11 under Regional Land Use states that there are nine Tribal Council members. There are seven.	We have revised Section 5.11.1.1, *Land Use*, to reflect this correction.
CDAT-II-229	Page 5-234 states that interpretive aspects addressed by the plan would explain recreational opportunities, cultural and historical resources, and natural resources through the use of signage, brochures, and maps. This statement does not accurately capture the Applicant's obligations with respect to Cultural resources in the Project. Explanation of cultural resources must avoid disclosure of sensitive information or grooming of looters and needs to include information on relevant cultural resource laws and policies. Cultural and historical resource information must go through the CRWG or its successor for review.	Comment noted. The proposed measure PF-REC-4 states that the implementation of all agreed-upon measures will be coordinated with the HPMP.
CDAT-II-230	The environmental measures proposed by the Applicant emphasize enhancing recreation and Project lands, giving much less consideration to environmental effects.	Avista does not agree that its proposal emphasizes recreation and Project lands to the detriment of other environmental effects. Avista has tried to appropriately address all resources associated with Project operation.

Comment ID	Comment	Response
CDAT-II-231	The funding for measure WQ-2 is inadequate to address Project impacts to water quality.	Please see response IDEQ-01a.
CDAT-II-232	The funding for measure AR-3 is inadequate to address aquatic weed management problems.	Avista believes $50,000 a year for measure PF-AR-2 is adequate to mitigate for Project-related impacts over the term of the new license. Please see response BIA-S-093.
CDAT-II-233	There is no substantiation for the conclusion that the proposed erosion control plan would compensate for continuing erosion impacts to cultural resources; there are other Project-related effects to cultural resources that are not addressed at all by the proposed PME measures.	Avista continues to believe that the proposed erosion control plan outlined in measure PF-TR-1 provides adequate mitigation for Project effects. Please see responses BIA-S-114 and BIA-S-060.
CDAT-II-234	Plans for recreational developments make little or no provision for preventing adverse effects to cultural resources.	In Section 5.11, *Land Use and Aesthetic Resources*, we describe the public outreach and Interpretation and Education Program that includes measures to educate the public about cultural resources. In Section 5.11, as well as in measures PF-AES-1 and SRP-AES-1, we state that the proposed PME measures would be implemented in close coordination with the HPMP.
CDAT-II-235	The PDEA should address the consistency of the Proposed Action with the Northwest Power and Conservation Council Intermountain Province Subbasin Plan and the Coeur d'Alene Tribe Fisheries Management Plans.	Please see comment response BIA-S-120
CDAT-II-236	The proposed funding of $50,000 for monitoring under WQ-2 is inadequate; the Applicant should provide a detailed explanation of the basis for funding; any monitoring done should follow the protocol provided by the Coeur d'Alene Tribe.	See response IDEQ-01a. Avista notes that Coeur d'Alene Tribe has not publicly provided a complete monitoring protocol to date.
CDAT-II-237	The text of REC-1 needs to be amended to clarify that the 25% funding share is project-specific and not an overall cap.	As detailed in measure PF-REC-2, the 25 percent funding applies to those management agencies that participated in planning, demonstrated a nexus between their site and the Project, and proposed cost-share measures to coordinate related enhancements on their lands outside of but adjacent to the Project boundary. The funding is intended to be a cap for specific projects.
CDAT-II-238	Clarify the amount of funding that the Applicant would provide if the City does not manage Falls Park and/or Q'emiln Park.	In such case, Avista would take over all active management of the two sites.
CDAT-II-239	Funds should not be used to pay the Applicant for work in the Project area unless it is direct labor or materials approved by the RLUAWG.	Comment noted. Refer to measures PF-REC-1–5 for information about funding the measures. Avista believes that it is completely appropriate for funds to be spent on Avista lands within the Project boundary.
CDAT-II-240	Measure AR-2 is flawed because it does not include a mitigation ledger to help establish the enforceable and trackable conditions necessary to ensure that Tribal trust resources are protected and impacts are mitigated.	Please see response CDAT-II-163.
CDAT-II-241	Measure AR-2 needs a mitigation ledger to assess whether the funding level is adequate to ensure that Tribal trust resources are protected and impacts are mitigated.	Please see response CDAT-II-163.
CDAT-II-242	Recreation measures need to reference the HPMP and address the need for consultation with CRWG, Tribes, SHPO, THPOs, and other relevant agencies to avoid adverse impacts on cultural resources.	Measure PF-LU-1, as well as the recreation measures, states that the implementation of all the agreed-upon measures would be coordinated with the HPMP.

Comment ID	Comment	Response
CDAT-II-243	More detail should be provided to describe the proposed education program with respect to the spread of exotic/noxious aquatic weeds.	Details for educating the public about weeds will be developed as part of implementing measure PF-AR-2 and measure PF-REC-4 as appropriate over the term of the new license.
CDAT-II-244	Measure AR-3 should acknowledge that Eurasian watermilfoil is known to exist in the southern portion of the lake; educational efforts should address all water-based recreationists in eastern Washington and northern Idaho.	The PDEA specifically acknowledges that Eurasian watermilfoil is present in the southern portion of Coeur d'Alene Lake. Measure PF-AR-2 identifies Avista's proposed commitment to assisting with weed management, and does not need to include detailed information on current weed occurrence. Please see response CDAT-II-243.
CDAT-II-245	Measure AR-3 should include an option to hire the Tribe or a firm with aquatic vegetation monitoring experience to carry out monitoring; SCUBA divers are needed to adequately monitor weed infestations at their pioneering stage.	Implementation of measure PF-AR-2 would be accomplished with qualified people.
CDAT-II-246	The Applicant should prepare an Integrated Aquatic Vegetation Management Plan following Washington state guidelines, and use the plan to guide its aquatic weed control program.	Appropriate plans will be developed as deemed necessary by the cooperating parties, as provided for in measure PF-AR-2.
CDAT-II-247	The funds allocated to measure AR-3 are not sufficient to control the spread of invasive aquatic weeds, particularly given the current extent of the Eurasian watermilfoil infestation; the Applicant should implement a performance-based control program.	Avista believes the level of funding is appropriate for supporting weed management activities. Please see response BIA-S-093.
CDAT-II-248	Combining three PME measures discussed by the TRWG into a single measure (TR-1) will compound the difficulties involved with implementation, given the combined funding for erosion control and wetland/riparian enhancements.	Comment noted. Avista would implement measure PF-TR-1 in consultation with the Tribe and resource agencies.
CDAT-II-249	The funding for erosion control may not be adequate; it would be better if these measures were performance-based rather than funding-based.	Opinion noted. Please see response BIA-S-060.
CDAT-II-250	A reason for having two separate wetland/riparian PME measures is so that the Tribe can focus on projects that would protect Trust resources; this focus is lost by combining the wetland/riparian PME measures into measure TR-1.	Comment noted. Avista will implement measure PF-TR-1 in consultation with the Tribe and resource agencies, but believe that separate measures are not needed.
CDAT-II-251	The funding for measure TR-1 is not adequate for the many tasks it addresses.	Opinion noted. Please see response BIA-S-060.
CELP-1	Avista must address Long Lake water quality. Long Lake is a 303(d) water quality limited water body for both temperature and dissolved oxygen. Avista must address water quality concerns for Long Lake and devise a plan to mitigate the impacts of its operations on water quality. Impounded water impacts the ability of a river to assimilate nutrients, which contributes to low levels of dissolved oxygen. Avista must propose measures to ensure dissolved oxygen levels are within the parameters of both Washington state and Spokane Tribe water quality standards both within Long Lake reservoir and downstream from its facilities.	Please see response WDOE-36.

Comment ID	Comment	Response
CELP-2	Avista has a responsibility to mitigate sedimentation in reservoirs behind the dams it operates in the Spokane River Project. The PDEA acknowledges substantial sedimentation behind Nine Mile and Long Lake HEDs but indicates there will be no change to present sedimentation patterns and fails to address the impacts of this sedimentation. In its final license application, Avista should propose measures to address the impacts of increased sedimentation on recreation, wildlife, water quality, and fisheries.	Please see response WDFW-06.
CELP-3	Avista should commit to increasing flows to a level that will have a true beneficial impact on the fish populations. A minimum flow of 700 cfs would provide a greater benefit for healthy fish populations. The additional flows will also help to mitigate poor water quality in Long Lake.	Please see responses STI-44 and JRPO-2.
CELP-4	Avista should eliminate the option of reducing the minimum flow to 500 cfs to maintain summer water levels in Coeur d'Alene Lake. While this measure could have positive recreational impacts, it provides no environmental benefit and will instead have a detrimental effect on water quality and instream fish when exercised.	Please see responses STI-44 and JRPO-2.
CELP-5	The PDEA proposes no change in the barriers to downstream fish migration presented by Long Lake and Nine Mile HEDs. Although it recognizes the tribal goal of restoring salmon upstream of Grand Coulee Dam, the PDEA fails to propose measures to ensure fish passage facilities will be available when downstream fish return. Such measures should be explored and added.	Please see response STI-14.
CELP-6	The proposed discharge levels for aesthetic flows at Spokane Falls are inadequate. Avista's proposal of a minimum aesthetic flow level of 200 cfs for Upper Spokane Falls from 10 a.m. to an hour after sunset should be increased in volume to 500 cfs and expanded in duration to flow from at least 5 a.m. until midnight. Avista should eliminate the proposed cut-off if the water level is below 600 cfs at the Spokane USGS gage. In addition, Avista should never permit the falls to completely run dry, and it should ensure any changes in flow remain protective of resident fish.	Please see responses SC-015, TLC-13, and WDFW-04.
CELP-7	The PDEA fails to take into account the economic benefits from increased aesthetic appeal of Spokane Falls, and this omission should be remedied. In addition, Avista should consider the economic benefits of a restored Spokane River with improved water quality, greater recreation opportunities, better-stocked fisheries, and dramatic waterfalls in its final proposal.	Please see response IRU-33 for a discussion of quantifying non-power benefits. Consistent with FPA and FERC requirements, we did not conduct an economic assessment of non-power values. However, we recognize in Section 5.12 of the PDEA that aesthetic flows could benefit local economic resources.
CELP-8	CELP vigorously objects to the proposed separation of the Post Falls HED licensing from the remainder of the project. It will be impossible to accurately evaluate the full impact of the Spokane River Project if the Post Falls HED operations are not included in the assessment. Operation of Post Falls Dam is integral to the operation of the four project dams downriver from it, which is operated as run of the river. Separation of licenses would decrease government efficiency and increase government workload and runs contrary to FERC trends toward coordinating facility management.	Please see response BIA-S-006.

Comment ID	Comment	Response
CJSC-1	The Sierra Club submitted initial comments on Water Quality Modeling and attached a report titled, *Review and assessment of the predictive capabilities of the Spokane River Models*, prepared for CFJ/the Sierra Club by Joel Massmann with Keta Waters. No comments; just referenced the report to accommodate finalization of Avista's water quality studies.	Comment noted
CS-01	Page xix should be amended to note that meeting frequency has dropped off.	Page xix has been corrected.
CS-02	There should be a single license for all the HEDs.	Please see response BIA-S-006.
CS-03	The City of Spokane supports the minimum instream flow proposed.	Comment noted.
CS-04	There should be a single license for all the HEDs.	Please see response BIA-S-006.
CS-05	The City of Spokane recommends that Avista seek FERC's approval for making use of the proposed aesthetic flow of 200 cfs using micro-hydro generators.	Given the setting of the north channel, we are unaware of any economical designs to accomplish generation via "microturbines."
CS-06	Section 5.5.1.3 should be amended so that it does not imply that there are no water quality problems resulting from point sources in Idaho.	The PDEA has been revised.
CS-07	Avista should continue to participate in the TMDL process and assist the state and the dischargers in meeting the state water quality standards for dissolved oxygen.	Comment noted.
CS-08	Section 5.5.1.3 should be amended so that it does not imply that there are no water quality problems resulting from point sources in Idaho.	The PDEA has been revised.
CS-09	Section 5.5.3 should be amended to include information about dissolved oxygen concentration effects of Long Lake Dam.	Please see response WDFW-14.
CS-10	Would use of micro-hydro generators with the 200 cfs aesthetic flow improve the bottom line?	Please see response CS-5.
DB-1	Avista should develop and analyze an alternative to current Project operations that is responsive to the changed value of the Spokane River Project, particularly compared to competing environmental values, and which does not have maximizing power production as its primary objective. At a minimum, this new alternative should give non-power values equal consideration with power values over the term of any new license, provide a real balance of power and non-power values over the term of any new license, and seek to maximize the future net social benefits of the Spokane River.	Please see response JRPO-3.
DB-2	The PDEA proposes no measures to ensure that fish passage facilities will be available when fish return. I support a mitigation measure to study the engineering feasibility o fish passage structures on all project dams for the term of the next license, and require installation of fish passage facilities at such time as salmon do return to the Spokane River, if that occurs before license expiration.	Please see response STI-14.

Comment ID	Comment	Response
DB-3	I object to the proposal for limited aesthetic flows at Spokane Falls. I am proposing to develop $24 million of residential condominiums at the Upper Falls; Aesthetic flows, year round, are vital to encourage economic development in the heart of our city. Flows should be to 5:00 a.m. to midnight year-round, water in sufficient quantity to provide an aesthetically pleasing visual and aural experience that is not simply channelized in the riverbed as currently modified. Unless the pilot study for modifying the historic mill channels is successful, the Falls will likely require at least 500 cfs during late summer months. In addition, Avista should never completely dewater the falls, and should ramp any changes in flow in a manner that is protective of resident fish.	Please see responses SC-015 and WDFW-04. Aesthetic flows are proposed for the period between Memorial Day and September 30 on an annual basis. Flows in excess of the proposed aesthetic flows typically occur between fall and mid-June to early-July annually.
DB-4	The PDEA is lacking for failure to include a comprehensive analysis of the power and non-power values of both the Upper and Lower Spokane Falls. Given the minimal impact on ratepayers, it may be that the best public interest outcome is full dedication of water to both the Upper and Lower Spokane Falls. Economic analysis is needed to evaluate this alternative and economic data adequate to analyze this scenario should be provided in the final license application.	Please see responses IRU-33 and JRPO-3. In Section 5.10, *Recreational Resources*, we discuss how the proposed measures would provide benefits over existing conditions and would improve aesthetic conditions in downtown Spokane. In Section 7.0, *Comprehensive Development*, we conclude that our proposal balances power and non-power values while improving important socioeconomic, economic, and environmental resources.
DB-5	The PDEA is lacking in its failure to adequately analyze and develop mitigation measures for several water quality parameters, including sedimentation of Nine Mile and Long Lake HEDs, the impact of Long Lake HED on dissolved oxygen, and water quality problems caused by project operations, such as discharge of turbine oil into the Spokane River.	Please see response WDOE-36.
DB-6	Avista should not separate Post Falls from the other dams in the relicensing proceeding.	Please see response BIA-S-006.
DM-1	Avista and FERC must not ignore the very real threat difference between a three-inch "trigger" to reduce summer minimum discharge flow from Post Falls HED from 600 cfs to 500 cfs - when compared to waiting for a 6-inch drop before reducing flows to 500 cfs. Avista's proposal will release additional flows that, under the current license, would not occur. This is a critical error on Avista's part by not honoring the effort that has produced majority support for a tiered minimum discharge flow and reduction of summer season lake levels of a maximum of 3". Avista should maintain 2128' from June 1 through September 30.	The 6-inch reference in the draft PDEA was an error, which was noted in the "Errata" sheet issued by Avista shortly after the draft PDEA went out. The final PDEA has been corrected to refer to a 3-inch drop in the lake level.
FCT-1	The Friends of Centennial Trail supports the cost-share development of the Centennial Trail extension, as described in the PDEA.	Comment noted.
FCT-2	The Friends of Centennial Trail supports the partnership and collaboration with WA State Parks as described in the PDEA.	Comment noted.
FCT-3	The Friends of Centennial Trail supports the 200 cfs aesthetic flow at Upper Falls in combination with channel restoration to enhance visual conditions at the site.	Comment noted.
FCT-4	The Friends of Centennial Trail supports the public outreach program and interpretive signage proposed by Avista.	Comment noted.

Comment ID	Comment	Response
FCT-5	FCT feels it is imperative that Avista continue to manage its shoreline lands to provide open access to the river.	Comment noted. The Land Use Management Plan addresses public access to Avista's property. Avista has no plans to change its current access policies in support of public access.
FS-1	FS has FPA Section 4(e) authority because the Project seasonally inundates national forest system lands.	Please see response BLM-1.
FS-2	Section 5.10.1.1 should reference the role of federal agencies, including the FS, in providing recreation opportunities	We have revised Section 5.10, *Recreational Resources*, as recommended by FS.
FS-3	Section 5.10.23 should recognize FS lands adjacent to the Project boundary and acknowledge the recreation opportunities provided there.	We have revised Section 5.10, *Recreational Resources*, as recommended by FS.
FS-4	Section 5.10.2.2 should indicate that the recreation plan should be updated every 6 years.	Comment noted. We have revised measures PF-REC-1 and SRP-REC-1 to include updating the plan every 6 years in conjunction with the visitor surveys.
FS-5	The FS supports the idea of a recreation plan, and suggests it be updated every 6 years.	Please see response FS-4.
FS-6	The FS supports REC-2 as written.	Comment noted.
FWS-G-1	A full analysis of the Natural Hydrograph scenario should be included in the PDEA, unless Avista satisfactorily explains why it was eliminated from detailed study, because it is valuable for evaluating the effects of the Project under current and proposed conditions.	Please see responses CDAT-II-50 and IRU-15.
FWS-G-2	The PDEA compares the Proposed Action to current operations; however, NEPA requires analysis of a project's cumulative (present, future, and past) effects. Therefore cumulative effects analysis must include assessment of past effects.	Please see responses BIA-G-02 and TLC-1.
FWS-01	FWS does not believe that the present minimum discharge from Post Falls HED is adequate to protect fish resources in the Spokane River below the dam.	Comment noted.
FWS-02	Include details of the "Bald Eagle Nest Territory Management Plan" along with decision to continue implementation of this plan or not in the PDEA.	The Bald Eagle Nest Territory Management Plan was implemented by WDFW to manage an eagle nest site in the vicinity of Lake Spokane but located outside the Project boundary. The nest has since deteriorated and been abandoned. Currently, there are no known eagle nests on Avista property. We have revised the PDEA to clarify this point.
FWS-03	FWS does not support separating Post Falls HED from the other four HEDs in the new license application because they are integrally connected. If they are separated a separate Section 7 ESA consultation may be necessary for each license.	Please see response BIA-S-006.
FWS-04	FWS supports a minimum discharge of 600 cfs from Post Falls HED.	Comment noted.
FWS-05	FWS supports the management of Post Falls HED to comply with the discharge approaches outlined in the "Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan".	Comment noted.

Comment ID	Comment	Response
FWS-06	FWS does not support the proposal to extend until September 15 the 2,128 Coeur d'Alene Lake level because it would cause adverse effects to fish, wildlife, and their habitats. The PDEA does not assess these impacts.	Please see response CDAT-II-042.
FWS-07	FWS supports the proposed recommendation to maintain a downramping rate at Post Falls HED that corresponds to no more than a 4-inch drop per hour in downstream water levels.	Comment noted.
FWS-08	FWS would support the proposed aesthetic flows at Monroe Street Dam and Post Falls and Upper Falls HEDs if the PDEA included an assessment or disclosure of impacts to aquatic life that demonstrated that negative impacts to fish or their habitat are minimal.	Please see response WDFW-04.
FWS-09	FWS does not support the whitewater paddling flows from Post Falls HED due to concerns that artificial increases in flows may cause unnecessary harm to aquatic life.	Comment noted. The whitewater paddling flows would not be implemented if they are determined to be detrimental to fish populations. Please see responses FWS-32 and IDFG-07b.
FWS-10	FWS supports the proposal to limit the drawdown of Lake Spokane to 14 feet, except under emergency conditions.	Comment noted.
FWS-11	FWS supports the proposal to periodically draw down Lake Spokane during winter to reduce the occurrence of aquatic weeds, with the stipulation that adequate monitoring is conducted to ensure success and effectiveness of reducing milfoil and that the intervals and duration of future drawdowns are reduced.	Measure SRP-AR-2 provides for the development of monitoring plans to evaluate the effectiveness of drawdown and other control methods. The monitoring results will be used to assess the frequency and duration of the drawdown.
FWS-12	The re-establishment of a Natural Hydrograph would reduce erosion on natural levees during the time of year the lake is currently regulated, and existing vegetation loss would be minimized at the 2,128 level.	Comment noted. A re-establishment of the Natural Hydrograph would change the elevation at which erosion would occur, as reflected in the PDEA
FWS-13	FWS agrees with the statement that the Natural Hydrograph would improve conditions for westslope cutthroat trout and bull trout.	Comment noted.
FWS-14	FWS agrees that the present operation of Post Falls HED benefits non-native predatory fish that are detrimental to native salmonids in Coeur d'Alene Lake.	Comment noted.
FWS-15	FWS agrees that the Natural Hydrograph would have a slight negative effect on the wild rainbow trout population in the Spokane River; however, FWS adds that a properly regulated flow in the Spokane River may benefit rainbow trout over the long term.	Comment noted.
FWS-16	FWS agrees that the Natural Hydrograph would result in less aquatic bed acreage, more emergent marsh, increased waterfowl nesting habitat, expansion of cottonwood trees, and continued bald eagle habitat; however, FWS would add that any change toward a Natural Hydrograph would benefit emergent wetlands, riparian habitat, waterfowl nesting habitat, cottonwoods, and native plants above Post Falls HED.	Comment noted.
FWS-17	FWS states that it is correct that they reserve Section 18 FPA authority to prescribe fishways at Spokane HEDs.	Comment noted.
FWS-18	FWS provides several suggested sentences for inclusion in Section 4.3.6.	Spalding's catchfly has been added to the listed species. We believe the PDEA text is otherwise adequate.

Comment ID	Comment	Response
FWS-19	FWS provides several suggested sentences for inclusion in Section 4.3.6.	We believe the PDEA as written is adequate to summarize the ESA consultation process.
FWS-20	FWS makes one editorial comment about geology and soils cumulative effects.	Comment noted. Avista believes the PDEA adequately acknowledges the effects of the altered hydrograph.
FWS-21	Identify the various ways that project operations have affected fish associated with reservoir levels and regulated water flows.	The *Environmental Effects* text of Sections 5.6.2, *Aquatic Resources*, and 5.8.2, *Threatened and Endangered Species*, addresses the effects of Project operations on aquatic habitat and associated fish populations.
FWS-22	FWS suggests a sentence in Section 5.2.1.5 be revised to reference "high" and "low" habitat values.	We believe the PDEA as written is adequate, and we do not believe it would be helpful to include subjective habitat values (i.e., "high" or "low" values) as FWS suggests.
FWS-23	FWS suggests an additional sentence concerning non-native aquatic species for inclusion in Section 5.2.1.5.	We have revised Section 5.2.1.5 to acknowledge that the project maintains or creates favorable habitat for these species.
FWS-24	FWS suggests adding a sentence to this section that indicates that if fish passage is provided at Chief Joseph and Grand Coulee dams, fish passage at the Spokane River HEDs would likely be revisited.	We have made the suggested revision to the PDEA.
FWS-25	FWS agrees that current operations create a larger littoral zone than would occur absent the Project.	Comment noted.
FWS-26	FWS anticipates that the proposed extension of the summer pool will likely have an adverse effect.	The Proposed Action of initiating a drawdown of Coeur d'Alene Lake on September 15 of each year does not represent a significant change from current Project operations. Further analysis of this drawdown date is not necessary. Please see response CDAT-II-042.
FWS-27	FWS states that the impacts on westslope cutthroat trout, bull trout, and recreational fish were not quantified.	Please see response FWS-73.
FWS-28	The 600-cfs discharge from Post Falls HED is a reasonable recommendation that FWS can support.	Comment noted.
FWS-29	FWS states that the proposed maximum 4-inch-per-hour downramping rate should minimize impacts on the fishery downstream.	Comment noted.
FWS-30	FWS plans to reserve its authority to prescribe fishways under Section 18 of the FPA.	Comment noted.
FWS-31	FWS supports fish enhancements proposed in AR-1 to mitigate for current entrainment of fish.	Comment noted. PME AR-1 is referred to as PF-AR-1 in the final PDEA.
FWS-32	FWS asks for the basis for the conclusion that proposed whitewater releases during August would not represent an adverse effect on resident trout populations.	We have expanded the text of Section of 5.6.2.8 to clarify our conclusion that proposed whitewater releases are not likely to have an adverse effect on resident trout populations.
FWS-33	FWS recommends that Avista monitor fish stranding, dewatering of rainbow trout redds, and entrainment over the term of the new license.	Fish stranding, protection of trout redds, and entrainment have been evaluated and are addressed by proposed project operation requirements and PME measures. Additional monitoring is not warranted at this time.

Comment ID	Comment	Response
FWS-34	Changes in the plant community need to consider the changes that occurred in habitat function and value and they need to be quantified in order to propose adequate compensation for project impacts.	The PDEA acknowledges past habitat changes that have occurred; additional analysis or quantification is not needed for past effects. However, the information on wetland changes has been removed from this section because it is not relevant to characterizing the current affected environment.
FWS-35	Changes in the plant community need to consider the changes that occurred in habitat function and value and they need to be quantified in order to propose adequate mitigation for project impacts.	Please see response FWS-34.
FWS-36	FWS recommends changing a sentence in Section 5.7.1.2 to read as follows: Parametrix (2003b) conducted plant surveys within the Project area having suitable habitat for federally listed threatened and endangered species, State species of special status or concern, and culturally significant plants for the Coeur d'Alene and Spokane Indian Tribes.	We have revised Section 5.7.1.2 of the PDEA to clarify this sentence.
FWS-37	Include a discussion on federally listed plant species and add the following sentence: Plant surveys were conducted by Parametrix in 2003 for Ute ladies'-tresses and water howellia during the time of the year when these plants are most likely to be observed. Neither of these threatened plant species was observed during the surveys.	Federally listed species are discussed in Section 5.8 of the PDEA.
FWS-38	The peregrine falcon has been recovered and is presently a federal species of special concern.	We have revised Section 5.7.1.5 of the PDEA to clarify this point.
FWS-39	Delete woodland caribou, Canada lynx, grizzly bear and sage grouse; they do not potentially occur in the Project area. The list should be revised to indicate that the sharp-tailed grouse is no longer a federal species of special concern; however, fisher remains under that status. Gray wolf is listed endangered north of Interstate 90 and considered non-essential experimental south of Interstate 90. In regard to bull trout, Coeur d' Alene Lake, the Coeur d' Alene and St. Joe Rivers are designated bull trout critical habitat.	Table 5-43 in the PDEA has been updated to reflect this comment.
FWS-40	The Service disagrees with the conclusions presented in Section 5.7.2.1 related to lake level management and contends that project operations will continue to exacerbate erosion in lacustrine and riverine habitats.	Please see response CDAT-II-179.
FWS-41	In regard to the effects of the proposed Post Falls minimum discharge on terrestrial resources, change "there would be no effect" to "would have an insignificant or minimal effect"	We have revised Section 5.7.2.1 to reflect this change.
FWS-42	The anticipated losses due to erosion should be factored into an appropriate mitigation proposal.	Measure PF-TR-1 represents an appropriate mitigation proposal. Also see responses BIA-S-060 and BIA-S-061.
FWS-43, FWS-44, FWS-45, and FWS-47	Measure TR-l would provide wetland and riparian habitat protection and enhancement, along with erosion control, however it is uncertain if it would adequately mitigate project impacts, which have not been adequately quantified.	Current erosion rates and loss of habitat from erosion have been quantified. Also see responses BIA-S-060 and BIA-S-061.
FWS-46	Quantify impacts on wetland and riparian habitats downstream of Post Falls HED to determine if, or to what extent, any mitigation would be required.	Please see revised Section 5.7.2.2.

Comment ID	Comment	Response
FWS-48	Change the 2nd sentence (D.5-177. 1st paragraph.) to the following: Measure TR-1 would provide wetland and riparian habitat protection and enhancement, along with erosion control, however these impacts will need to be adequately quantified to determine the appropriate level of mitigation.	We do not agree with the suggested revision. Please see response FWS-43.
FWS-49	The Service supports TR-3.	Comment noted.
FWS-50	Impacts to Special Status wildlife species will need to be adequately quantified to determine the appropriate level of mitigation.	As stated in the PDEA, the Proposed Action would not have any significant effects on these species compared to current conditions; no mitigation is required.
FWS-51	Proposed recreation developments need to be reviewed by state fish and wildlife agencies, the affected Tribes, and the Service to avoid or minimize additional impacts of vegetation removal and human disturbance to wetlands, riparian habitats, cottonwood, bald eagle nests, and other sensitive important habitats.	The fish and wildlife agencies and the Coeur d'Alene Tribe are identified in the PME measures as consulting parties and would be involved in relevant developmental decisions.
FWS-52	FWS notes there is a potential for conflicts between recreationists and wildlife habitat.	Comment noted.
FWS-53	The gray wolf is endangered north of I-90, not threatened, and the PDEA should be changed to reflect this.	Please see revised Section 5.8.1.4.
FWS-54	For a more accurate portrayal, this sentence should read "Studies conducted by Avista to assess whether outmigrating bull trout were actually experiencing delayed outmigration were not completed and therefore inconclusive."	The sentence will remain as written. The juvenile bull trout outmigration study was completed but was inconclusive because the contractor could not capture sufficient numbers of juvenile bull trout (n=6) or track the fish for an extended period of time.
FWS-55		
FWS-55	The impacts on westslope cutthroat trout and bull trout were not adequately quantified.	Please see response FWS-73.
FWS-56	The Commission will need to initiate consultation pursuant to Section 7 of the ESA and provide a BA.	Please see response FWS-71.
FWS-57	FWS suggests revising a sentence in Section 5.8.2.2 to read "Recent plant surveys conducted for Avista did not find any evidence that water howellia is present within the Project area."	This is consistent with the current text; no revision is necessary.
FWS-58	The effects determination in Section 5.8.2.2 does not constitute a Section 7 ESA consultation for water howellia.	Comment noted. Effects determinations have been removed from the PDEA.
FWS-59	FWS suggests revising a sentence in Section 5.8.2.2 to read "Recent plant surveys conducted for Avista did not find any evidence that Ute ladies'-tresses is present within the Project area."	This is consistent with the current text; no revision is necessary.
FWS-60	The effects determination in Section 5.8.2.2 does not constitute a Section 7 ESA consultation for Ute ladies'-tresses.	Comment noted. Effects determinations have been removed from the PDEA.
FWS-61	This effects determination does not constitute a Section 7 ESA consultation for gray wolves.	Comment noted. Effects determinations have been removed from the PDEA.
FWS-62	This effects determination does not constitute a Section 7 ESA consultation for bald eagles. However, we do anticipate the level of effect would exceed the threshold of no effect to bald eagle.	Comment noted. Effects determinations have been removed from the PDEA.

Comment ID	Comment	Response
FWS-63	Revise the PDEA to include a discussion regarding the loss of vegetation, i.e., large conifers and cottonwoods, due to the inundation of Coeur d'Alene Lake and the Coeur d'Alene and St. Joe rivers that continues to result in lake shore, levee, and river bank erosion.	The PDEA acknowledges past habitat losses and the effects of future erosion.
FWS-64	Maintaining the lake level for additional days would affect bald eagles and their habitat, e.g., riparian, cottonwood and wetlands. These losses over the term of the new license would be significant on a cumulative basis.	Please see responses BIA-S-105 and CDAT-II-042.
FWS-65	Revise the PDEA to include that the entities responsible for ensuring that no nesting, roosting, or perching trees would be cut as part of recreation enhancements would also retain some trees for long term maintenance of nest, roost, and perch trees.	Please see response FWS-51.
FWS-66	The effects determination in Section 5.8.2.5 does not constitute a Section 7 ESA consultation for bald eagles.	Comment noted. Effects determinations have been removed from the PDEA.
FWS-67	Augmenting flows to accommodate recreational activities may cause unnecessary impacts (e.g. stranding and alteration of foraging activities) to the fisheries in the Spokane River below Post Falls HED.	Please see responses FWS-32 and IDFG-07b.
FWS-68	To ensure wildlife and recreational values are maintained over the term of the new license, wildlife and recreational conflicts will need to be monitored. If necessary, measures should be implemented to ensure wildlife habitat and recreational objectives are met. This should be addressed through the appropriate technical work group(s) during the term of the new license.	Comment noted. One of the primary goals for measures PF-REC-4 and SRP-REC-3 is to educate the recreating public about aquatic, terrestrial, and other resources to help prevent human-wildlife conflicts. Wildlife and terrestrial resources will be considered as part of the planning process for all proposed recreational improvements.
FWS-69	FWS supports the Fisheries Public Information, Education, and Law Enforcement Programs, measures AR-1 and REC-3.	Comment noted.
FWS-70	There is only minimal discussion on the benefits of protecting and enhancing fish and wildlife habitats and the positive effects on the local economy.	Please see response IRU-33 for a discussion of quantifying non-power benefits. Section 5.12, *Socioeconomics*, primarily established baseline conditions in the project area. Consistent with FERC requirements, we did not conduct an economic assessment of the direct change in rates associated with alternatives, and we did not attempt to apply contingent values to non-use benefits associated with alternatives considered in the PDEA. However, Section 6.0, *Developmental Analysis*, includes the direct costs of the mitigation measures and the reduction in net benefits associated with proposed measures.
FWS-71	FWS identifies direct and indirect project effects on the bull trout, which are not in agreement with the statement in Table 7-1.	Based on water quality modeling and fish tracking studies, there is no evidence to suggest that continued Project operation as proposed would result in a thermal barrier to bull trout migration.
FWS-72	FWS disagrees with the statement that the bald eagle would not be affected because inundation of Coeur d'Alene Lake and the Coeur d'Alene and St. Joe rivers results in loss of important bald eagle habitat.	Opinion noted.

Comment ID	Comment	Response
FWS-73	Project-related impacts on bull trout and westslope cutthroat trout will need to be adequately quantified to determine mitigation. Significant habitat mitigation will need to be conducted in the St. Joe and Coeur d'Alene rivers and their tributaries.	Quantification of impacts specifically related to the continued operation of the Project amid the multitude of factors affecting bull trout and westslope cutthroat trout in the Coeur d'Alene basin is not possible. There is no clear information to suggest that continued operation of the Project is a significant limiting factor to the population of bull trout and westslope cutthroat trout in the Coeur d'Alene basin.
FWS-74	FWS states that the bald eagle would be affected by maintaining the lake level for additional days due to the increased erosion and loss of levees, river banks, and lake shore and their associated habitats. The increased recreational activities could also impact the bald eagle.	Please see responses CDAT-II-042, CDAT-II-179, and FWS-51.
FWS-75	The North American Waterfowl Plan objectives should be disclosed in a subsequent NEPA document.	Comment noted.
FWS-76	The Bull Trout Draft Recovery Plan should be addressed in Section 9.	Please see response BIA-S-120.
FWS-77	The state of Idaho does not recognize "coolwater" fishes. BIA points out that the PDEA acknowledges that current conditions during the summer in backwatered tributaries to Coeur d'Alene Lake are unsuitable for native salmonids.	The word "coolwater" has been removed from the text.
FWS-78	The Service indicates that the 600 cfs minimum discharge from Post Falls HED reduced to 500 cfs will maintain a productive rainbow trout fishery over the long term.	Comment noted.
FWS-79	The Service does not object to the maximum allowable per hour discharge down ramping rate at Post Falls HED that corresponds to a no more that 4-inch drop in downstream water levels.	Comment noted.
FWS-80	The Service supports as proposed the Spokane River Fisheries Public Information, Education, and Law Enforcement Program.	Comment noted.
FWS-81	The Service supports as proposed the Spokane River Fishery Enhancement Program.	Comment noted.
FWS-82	Project related impacts to bull trout and westslope cutthroat trout will need to be adequately quantified to determine mitigation. The Service needs assurance that bull trout and westslope cutthroat trout are priority species for Program implementation activities.	Please see response FWS-73.
FWS-83	Project-related impacts to wetlands and riparian areas will need to be adequately quantified to determine the appropriate level of mitigation. FWS may recommend a comprehensive evaluation of wetland losses be implemented after licensing to quantify ongoing impacts and develop mitigation.	We do not believe the Proposed Action would have a significant effect on wetland and riparian habitat other than that related to future erosion, given that there would be little or no difference in the summer water levels in many years, and no more than a few inches in others.
FWS-84	The proposed measure needs to identify the number, type, geographic extent and duration of the proposed projects.	Please see response CDAT-II-164.
FWS-85	Avista must develop an effective mitigation plan	Please see response CDAT-II-164.

Comment ID	Comment	Response
FWS-86	Past degradation caused by the Project will continue under the Proposed action. By definition, these are cumulative effects and a cumulative effects analysis must address the effects.	Past effects are not considered continuing effects under the Proposed Action or new license. The *Cumulative Effects* section of the PDEA acknowledges past effects.
HHC-1	The 600/500 cfs tiered minimum flow should be implemented.	Comment noted.
HHC-2	The Coeur d'Alene Lake summer lake level should be maintained through the end on September.	Comment noted.
IDEQ-01a	It is IDEQ's opinion that Post Falls HED negatively affects water quality and the Proposed Action should include additional assistance and financial support to address impaired water quality.	Avista has developed a new Idaho Water Quality PME, which is titled PF-WQ-2 and is described in Appendix B.
IDEQ-01b	IDEQ does not believe that the modification of Avista operations such as increased flows during summer will improve dissolved oxygen concentrations in Lake Spokane.	Comment noted.
IDEQ-02	IDEQ suggests that Avista keep Post Falls HED as a part of the Spokane River Project rather than relicense the project separate from the other HEDs.	Please see response BIA-S-006.
IDEQ-03a	IDEQ supports minimum flow from Post Falls HED being set at 600 cfs year round.	Comment noted.
IDEQ-03b	IDEQ supports reducing minimum flows to 500 cfs if Coeur d'Alene Lake is drafted more than three inches below full pool (2,128 feet msl).	Comment noted.
IDEQ-04	IDEQ supports managing the operations at Post Falls HED in a way that complies with the discharge approaches outlined in the Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan.	Comment noted.
IDEQ-05	IDFG supports the proposed downramping rate of no more than a 4-inch drop per hour.	Comment noted.
IDEQ-06	IDEQ supports aesthetic flows at Post Falls HED as long as those flows do not lead to impairment of other beneficial uses.	Comment noted.
IDEQ-07	IDEQ supports the development and implementation of water quality monitoring programs for Idaho's waterbodies.	Comment noted.
IDEQ-08	IDEQ supports Water Quality Monitoring measure WQ-2.	Comment noted.
IDEQ-09	IDEQ supports the first bullet portion of the Coeur d'Alene Lake Basin Westslope Cutthroat Trout and Bull Trout Protection and Enhancement Program PME (AR-2)	Comment noted.
IDEQ-10	IDEQ supports Coeur d'Alene Lake Aquatic Weed Management Program measure AR-3.	Comment noted.
IDEQ-11a	IDEQ supports Coeur d'Alene Lake and Tributary Erosion Control and Wetland and Riparian Habitat Protection and Enhancement PME (TR-1).	Comment noted.
IDEQ-11b	IDEQ believes that the operation of Post Falls HED has caused the generation and mobilization of excess sediment generated as a result of the project and will impose certification conditions to address those quantities.	Comment noted.

Comment ID	Comment	Response
IDEQ-12	IDEQ supports the elements of the Spokane River Project Aesthetic Flows PME (AES-1) that pertain to providing a 200-cfs minimum daily aesthetic flow through Upper Falls HED only if the release does not adversely effect cold water aquatic life beneficial uses at the state line and Barker Road.	Comment noted.
IDEQ-13	IDEQ supports measures that improve recreation without adversely affecting water quality related to aquatic life beneficial uses.	Comment noted.
IDEQ-14a	IDEQ is concerned that the modeling efforts and associated reports may not answer all the questions that may have to be addressed during their water quality certification evaluation. IDEQ specifically states that the modeling reports are missing clear concise discussions of HED effects on water quality.	Comment noted.
IDEQ-14b	IDEQ has moderate confidence that both the lake and river models perform well for water temperature and dissolved oxygen. However, IDEQ believes these models do not perform well in the prediction of nutrient, algae, and pH concentration and may leave IDEQ with uncertainty in upcoming certification evaluations.	Comment noted.
IDEQ-15a	IDEQ believes that the operation of Post Falls HED negatively affects water quality in the Coeur d'Alene Lake and adjoining water bodies. IDEQ has requested and received its own custom water quality reports that show significant water quality impairments in water temperatures and moderate dissolved oxygen. IDEQ provides 3 separate attachments (Attachments 1, 2, & 3) of reports and interpretations related to water quality.	Comment noted. The effects of the HED have been assessed in study reports, as requested by IDEQ.
IDEQ-15b	IDEQ provides a list of 15 potential water quality impairments it expects to evaluate for water quality certification.	Comment noted.
IDEQ-16	IDEQ states that it has discussed the following inconsistencies with Avista and is under the expectation that they will be corrected in final drafts of the reports: (1) The tables in the lake water quality report are not always accurate and computer outputs need correction; (2) The modeling reports contain limnological inconsistencies; (3) IDEQ disagrees with the use of coefficients and input regressions; (4) All outputs need to match data; (5) Further sensitivity analysis should be performed (i.e. IDEQ believes the 10% variation used in simulation is too little).	Comment noted.
IDEQ-17	IDEQ has included modeling comments generated by the IDEQ consultant asked to evaluate the technical validity of the Avista documents. IDEQ has included these comments as Attachments 4, 5, & 6 and requests that Avista consider them.	Comment noted.
IDEQ-18a	IDEQ states that they are not aware of any evaluation of the effects of macrophytes and related nutrient concentrations in the southern portion of the lake; this may be of concern during water quality certification evaluation.	Macrophyte and nutrient concentrations are addressed in study reports (e.g., Golder, 2004i) and referenced in the PDEA.
IDEQ-18b	IDEQ states that there are no forecasts of future conditions and the project effects in the future; this may be of concern during water quality certification evaluation.	Comment noted. Avista believes the modeling conducted in response to IDEQ's requests provides adequate forward-looking evaluations relative to Post Falls HED operations.

Comment ID	Comment	Response
IDEQ-18c	IDEQ states that there are no modeling scenarios for proposed operation conditions--modeling is currently limited to current and unimpounded scenarios; this may be of concern during water quality certification evaluation.	Available modeling results were used to evaluate the effects of proposed operations. Available modeling of the current and Natural Hydrograph provides a range of expected water quality for potential operational conditions. Please see response IDEQ-01a.
IDEQ-19	IDEQ made comments on the August 2004 PDEA and here again note that they still do not see any reference to the influence of HEDs on the CDA, St. Joe and St. Maries rivers.	Project effects are not discussed in the *Affected Environment* sections of the PDEA, which are the sections on which IDEQ commented in August 2004. Please see the *Environmental Effects* sections under each resource topic for the discussion of Project effects. Also see response TLC-1.
IDEQ-20a	IDIQ made comments on the August 2004 PDEA and here again note that Thompson Creek is still listed as a tributary to Coeur d'Alene Lake; it should instead be listed as a tributary to the Coeur d'Alene River. (same comment made on Plenary Review draft)	Comment noted and change made. We have deleted Thompson Creek from our list of streams flowing into Coeur d'Alene Lake.
IDEQ-20b	IDIQ made comments on the August 2004 PDEA and here again note that the *Affected Environment* section of the PDEA does not discuss the effects of the HED on creeks such as Thompson and Latour.	Please see response IDEQ-19.
IDEQ-21	IDEQ made comments on the August 2004 PDEA and here again note that they still do not see any discussion as to why the parameters examined in this section (dissolved oxygen, pH, nutrients, and clarity) are significant to an HED. IDEQ also asks what effect does the HED have on these parameters.	Section 5.5.1.3 is a discussion of the affected environment. Section 5.5.2 contains a discussion of environmental effects. CE-QUAL-W2 modeling of Lake Coeur d'Alene and inundated tributary areas suggests that operation of Post Falls HED has had some effect on dissolved oxygen, pH and nutrient concentrations compared to a Natural Hydrograph (Golder, 2005a). Please see response IDEQ-19.
IDEQ-22a	IDEQ would like Chatcolet Lake, Blue Point, etc., to be located on a map that would accompany the table. IDEQ notes that percentage of exceedance is not always a meaningful indication of the seriousness of the violation. IDEQ notes spelling errors in the table and suggests reviewing their attached reports for improvements that could be made to the tables.	A map has been referenced that indicates landmarks near station locations to accompany Table 5-25.
IDEQ-22b	IDEQ requests a description of the "water quality standard referenced in the orthophosphate exceedance column" as well as the "applicable criterion" referenced in footnote "b."	Table 5-25 has been revised to indicate total phosphorous criteria and reference the EPA (2000) Ecoregion II Nutrient Guidelines.
IDEQ-23	IDEQ comments that there is no discussion in Section 5.5.1.4 relating the influence of the HED on metals in the water column or sediments.	Please see response IDEQ-19.
IDEQ-24	IDEQ comments that column headings in Table BM-14 should be more descriptive and provides several examples.	We have revised Table 5-32.
IDEQ-25a	IDEQ notes that while the first sentence of Section 9.2.9 implies that the last time the Idaho Water Quality Standards and Wastewater Treatment Requirements were changed was in 2001, this is incorrect. These requirements are continually changing on a yearly or more frequent basis. (same comment made on Plenary Review draft)	The text of Section 8.2.4 has been corrected.

Comment ID	Comment	Response
IDEQ-25b	IDEQ states that beneficial uses should be correctly named (e.g. cold water aquatic life, and primary and secondary contact recreation). The citation for the water quality standards is: IDAPA 58.01.02. (same comment made on Plenary Review draft)	The text of Section 8.2.4 has been corrected.
IDEQ-26	IDEQ requests that the PDEA indicate the affiliation of each of the writers (i.e. Avista, a consultant, etc.) and asks how they can be contacted. (same comment was made on the Plenary Review draft)	Avista and consultant personnel are now identified in Section 11.0, *List of Preparers*.
IDEQ-27	IDEQ views the explanation in this section to be "very puzzling." IDEQ believes that maps and diagrams are needed to understand the data presented in the EA and should be placed in the appropriate sections. (same comment made on Plenary Review draft)	Avista understands IDEQ's position, but has elected to leave all maps except the general project location map (Figure 1-1) in an appendix. This facilitates the Commission practice of providing Internet access (via eLibrary) to most text and tables, but maintaining maps in separate, Non-internet Public (NIP) files.
IDEQ-28	IDEQ states that the rules that address the preparation of an environmental assessment are at 18 CFR Part 380-Regulations Implementing NEPA, and as such ask if this section should not also be cited on the cover and in the text of the PDEA.	Avista has followed standard FERC practice in preparing the cover of the PDEA.
IDEQ-29	IDEQ states that the proposed term of the license is not disclosed within the PDEA and notes that the term is an important factor in analysis of the PDEA and draft license application.	Please see response CDAT-II-001.
IDEQ-30	IDEQ states that Table 5-30 should show the Criteria Maximum Concentration (CMC, or acute criterion) and Critical Continuous Concentration (CCC or chronic criterion), values required by Idaho Water Quality Standards. In addition, the total number of samples (upon which the maximum, minimum, and median values were based, should also be noted.	Comment noted. The table has been revised.
IDFG-01	Separate PME measures should be developed for primary agencies charged with fish and wildlife responsibilities in their various jurisdictions, including IDFG, FWS, and Coeur d'Alene Tribe	Avista does not agree that multiple PME measures are needed to deal with multiple agency responsibilities. The PME measures clearly indicate which actions require coordination with various agencies.
IDFG-02	IDFG supports a tiered 600/500 cfs minimum flow, with the 500 cfs flow implemented rather than just considered	Comment noted. The tiered flow is included in the Proposed Action.
IDFG-03	If a tiered 600/500 cfs minimum flow proves to be unworkable due to problems cited by WDOE, IDFG supports a flow of 550 cfs	Comment noted.
IDFG-04	IDFG supports adoption of the Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan.	Comment noted.
IDFG-05	IDFG supports the compromise lake level plan of elevation 2,128 feet through September 15 each year	Comment noted.
IDFG-06	IDFG supports the proposed downramping rate of no more than a 4-inch drop per hour.	Comment noted.
IDFG-07a	IDFG does not object to providing preferred whitewater paddling flows in the late spring provided that it does not interfere with the provisions in the Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan.	Comment noted. Also see response IDFG-07b.

Comment ID	Comment	Response
IDFG-07b	IDFG is concerned about providing whitewater flows in the fall unless the water temperatures are suitable and flow changes are managed to avoid stranding fish.	The whitewater paddling flows will not be implemented if they are determined to be detrimental to fish populations. In addition, proposed ramping rates would apply to measure PF-REC-3, which states that water quality and fisheries considerations will take precedence over whitewater boating.
IDFG-07c	IDFG is concerned about summer whitewater flows and believes the license should clearly articulate whether or not whitewater boating flows to be provided during the summer will depend on whether the scientific evidence clearly indicates that the flows will have no impact on fish.	The whitewater paddling flows will not be implemented if it is determined detrimental to fish populations.
IDFG-08	IDFG supports measure WQ-1, Total Dissolved Gas Control and Mitigation PME.	Comment noted.
IDFG-09	IDFG supports AR-1, Spokane River Fish PME, at a funding level of $245,000 annually, not $125,000 as stated in the PDEA.	Please see response WDFW-03.
IDFG-10	IDFG supports measure AR-2, Coeur d'Alene Lake Basin Westslope Cutthroat Trout and Bull Trout Protection and Enhancement Program PME with respect to the measures and priorities.	Comment noted.
IDFG-11	With respect to measure AR-2, IDFG believes that the complete funding package needs to be presented, with shares going to IDFG and the Coeur d'Alene Tribe spelled out, so that the adequacy of the entire package can be determined.	The indicated PME measures reflect the full extent of the proposed PME package. Implementation of bull trout measures, now included in measure PF-AR-1, are expected to be conducted through consultation with the State of Idaho, Coeur d'Alene Tribe, and FWS.
IDFG-12	IDFG does not agree with the PDEA's assessment that (1) boat induced waves are not an operational impact and (2) in the absence of project maintained pool elevations, similar levels of erosion would occur at a different elevation. Erosion assessment on the St. Joe River is adequate, but more is needed on the Coeur d'Alene and St. Maries rivers.	Comment noted. The PDEA is consistent with the information and conclusions in the erosion study report. Additional erosion assessments are not warranted.
IDFG-13	IDFG disagrees with the PDEA statement that wetlands are in a state of equilibrium and that further impacts are not occurring; rather, they indicate that there is an ongoing operational impact that should be mitigated with PME measures that allow for conservation and restoration of forested and scrub-shrub wetlands.	Please see responses BIA-S-092, CDAT-II-181, and FWS-83. Measure PF-TR-1 provides for erosion control and wetland protection and enhancement for the term of the new license.
IDFG-14a	IDFG recommends that measure TR-1 be split to address on-reservation and off-reservation needs and to address separate purposes such as wetlands, erosion, and cultural resources, and that the funding for each be clarified.	We believe measure PF-TR-1 is appropriately structured because the erosion and wetlands issues are closely linked and protecting cultural resources is a reasonable consideration when implementing erosion control strategies. Please see response CDAT-II-248.
IDFG-14b	IDFG recommends that measure AR-2 be set up to have IDFG lead off-reservation projects and the Coeur d'Alene Tribe lead on-reservation projects, providing a mechanism for the state and Coeur d'Alene Tribe to share funds for mutually agreed upon projects anywhere in the basin.	Please see response IDFG-11.
IDFG-14c	IDFG supports separating erosion and cultural issues into separate PME measures so that each can be addressed more effectively.	Please see response IDFG-14a.
IDFG-15	IDFG supports measure AR-3 as is.	Comment noted.
IDFG-16	IDFG supports LU-1 as written.	Comment noted.

Comment ID	Comment	Response
IDFG-17	IDFG supports REC-1 and REC-2, with the additional provision of mitigation for negative effects on recreation; measures could include establishment or improvement of access sites for float boats on river sites and non-motorized boat access sites on flat water.	Measure PF-REC-2 includes provisions for future recreation site development per the direction of the RLUAWG. The need for such development would likely be identified in future recreation studies per the Public Outreach PME (measure PF-REC-4).
IDFG-18a	IDFG recommends that cultural resource PME measures be designed to address cultural resource protection needs without the use of funds from natural resource or recreation PME measures.	Avista intends to fund Section 106 compliance activities primarily through HPMP implementation. However, for recreational site development, such compliance costs are expected to be part of the specific project funding, not all of which is Avista's responsibility. In addition, erosion protection funds may be directed to areas that include cultural resources, and those costs should be borne by the erosion effort.
IDFG-18b	If significant cultural resources were found or projects are proposed on IDFG ownership, IDFG is open to discussion on how best to approach issues or implement projects.	Land managers would need to grant permission for surveys to be conducted on their lands and would be involved in any consultation concerning how sites would be treated or protected.
IDFG-19	There is no clear picture of how implementation will proceed. IDFG believes it is the best entity for effectively implementing projects that directly affect the fish and wildlife resources they manage, and that the Clark Fork example should be followed in designating leads for various projects.	Comment noted. Absent an agreement that spells out an implementation approach, Avista expects FERC to require that PME measures be implemented in consultation with appropriate entities, including IDFG.
IDFG-20	IDFG recommends Avista provide funding for 1 FTE biologist to implement AR-1, AR-2, and TR-1.	Avista does not believe it is appropriate to provide funding that agencies may require to meet their responsibilities, and notes that the Commission does not support such funding mechanisms in its licensing decisions.
IDFG-21	IDFG recommends establishment of a natural resource PME implementation team comprising IDFG, Coeur d'Alene Tribe, Avista, FWS, and possibly others.	Avista supports the idea of cooperative implementation, and has promoted this approach in settlement discussions within the ALP.
IDFG-22	IDFG believes the ALP process has been beneficial and suggests that the PME measures developed by the work groups should be used as the foundation for relicensing decisions.	Comment noted.
IDL-1	IDL's impression of the process was that Avista was very responsive to the stakeholders' interests and concerns. IDL is a permitting agency and need to stay objective, so they cannot offer any comments on the PDEA.	Comment noted.
IDPR-1	The inventory and user survey of public recreation sites was very thorough and will be an excellent baseline tool for determining future needs and facility improvements.	Comment noted.
IDPR-2	IDPR staff participated in the data collection for the Whitewater Paddling Instream Flow Assessment. We feel that the conclusions provided on 5-209 and 5-210 are accurate, and we support the recommendations as stated.	Comment noted.
IDPR-3	We did not see a schedule for when the recreation plan will be updated. We suggest that it is updated every 6 years in conjunction with the FERC Form-80 reporting requirements.	Please see response FS-4.
IDPR-4	We are in agreement with the other agencies and with Avista that funding recreation facilities on Lake Coeur d'Alene at the 25% level is appropriate.	Comment noted.

Comment ID	Comment	Response
IDPR-5	We concur with Avista's suggestion that the land management agencies meet twice annually through the first twelve years of the license until the obligated money is spent to ensure that the recreation needs are met. We concur with the recommendations as stated that impact IDPR facilities. These recommendations, as listed on 5-216 of the PDEA, were developed cooperatively, and are accurately represented.	Comment noted.
IDPR-6	We concur that there is a need for overnight boat moorings at Mowry State Park, and that woody debris in the lake, as well as abandoned dock and other man made debris, does have a negative impact on boating safety, and that some of the material needs to be removed.	Comment noted.
IDPR-7	Aesthetic flow releases from Post Falls HED and Upper Falls HED became the topic of numerous Recreation Land Use and Aesthetic Work Group (RLUAWG) meetings, particularly after the aesthetic study had been conducted. Avista went above and beyond what the study suggested for duration of releases at Upper Falls. At several of the RLUAWG meetings, the attendees voiced their frustration that what Avista had proposed was not accepted through the consensus process due to one party's dissent. IDPR staff believes that the Avista personnel did their best to understand the dissent, and provided a generous solution that is reflected in the proposal for aesthetic flows at Upper Falls HED.	Comment noted.
IDPR-8	IDPR staff worked with Avista staff in the development of LU-1, and it accurately reflects our goals and concerns.	Comment noted.
IDPR-9	We look forward to working with Avista in implementing the Interpretation and Education Plan. We hope to provide input on the visitor survey conducted in part to comply with the FERC Form-80.	Comment noted.
IL-1	Idaho State Representatives Bob Nononi, Dick Harwood, and Frank Henderson, all representing Kootenai County, support the Idaho Compromise.	Comment noted.
IRU-01	As we stated in our comments on the first draft PDEA, the current project boundary is not sufficient. At a minimum, the project boundary should include the areas below each dam, which are directly affected by Project impacts. The PDEA should suggest expanding the Project boundary given the wide-reaching impacts of the project and given that mitigation measures will likely need to be implemented outside of the current project boundary in order to adequately mitigate for project impacts. At minimum, the Project boundary should be continuous from the most upstream, to the most downstream development in the Project, and should include all lands necessary for mitigation measures and within which mitigation measures will take place, and all lands necessary for recreation.	Please see response AWC-1.

Comment ID	Comment	Response
IRU-02	On page 3-11, the PDEA includes maintenance of Coeur d'Alene Lake level at or close to 2,128 feet in the summer as a current environmental measure. However, this measure is much more of a recreational measure to satisfy lake-users than an environmental measure and should be characterized as such.	Recreation is considered a resource, and measures designed to address the recreation resource are commonly referred to as environmental measures.
IRU-03	At minimum Avista should have made it more clear that the Proposed Action is solely the proposal of Avista and is in no way endorsed by settlement parties. It was repeatedly made clear during the plenary sessions by Avista and the facilitators that this was the case, and it is extremely disingenuous and misleading to imply that any PME measures discussed in the spirit of compromise, absent a full settlement agreement, are supported by participants in the ALP, unless explicitly stated.	Avista believes that the PDEA clearly indicates that the proposal is Avista's. At the same time, it reflects more than 3 years of consultation with stakeholders and includes many measures agreed upon with stakeholders. It reflects stakeholder collaboration, but not necessarily stakeholder agreement.
IRU-04	A common issue with many of the mitigation measures, in particular to address water quality and fisheries, is the lack of specificity in quantifying, and then mitigating actual impacts of current (and proposed) project operations to these resources. While we are aware of extensive discussions in the ALP process, the PDEA and proposed PME measures in the draft license application must better present 1) The impacts of the project on fisheries and water quality resources compared to a conservation or Natural Hydrograph scenario and 2) Base mitigation on these impacts, not on the difference between current operation and the proposed alternative.	Please see responses CDAT-II-050, SC-029, and TLC-1.
IRU-05	Because of the cumulative impacts to the River from all of Avista's projects on the Spokane River, it does not make sense to split off Post Falls. For instance, the flow from Post Falls regulates flows through the rest of the projects, and impacts water quality and fisheries habitat downstream to other projects.	Please see response BIA-S-006.
IRU-06	Additional Measures: Avista must include analysis of and mitigation measures to account for the temperature impacts on inundated reaches of the St. Joe and other upstream tributaries as a result of artificially high lake levels. Mitigation measures for downstream temperature impacts are also completely lacking.	Please see responses IDEQ-01a and WDOE-36.
IRU-07	As proposed, AR-1 seems to be a catchall measure that fails to clearly outline the protection and mitigation goals under the new license. However, each portion of the measure is reliant upon the other, and it is hard to analyze the mitigation benefits on aquatic resources without real analysis of the impacts of the project. While each measure will have benefit for fisheries, the analysis does not support this as adequate to mitigate for all project impacts.	Specific project goals will be described in project implementation proposals. Also see response WDFW-03.
IRU-08	Idaho Rivers United supports the ramping rate of 4 inches per hour maximum to protect spawning and emergence habitat at Post Falls HED, as outlined in the Spawning and Emergence Flows report.	Comment noted.

Comment ID	Comment	Response
IRU-09	Idaho Rivers United supports a minimum flow at Post Falls to restore fisheries habitat at a level of approximately 700-800 cfs from Post Falls (and equivalent to 500 cfs at Barker Road). The June 2004 joint analysis, based upon the studies done by Hardin to support the ALP process, also notes that "as flows drop below 600 cfs [at Barker Road], habitat begins to rapidly decline." It is disturbing that Avista's proposed minimum flow at Post Falls is well below the drop-off point for habitat protection.	Please see responses STI-44 and JRPO-2.
IRU-10	In reality, the lower minimum flows are not being suggested to protect fisheries, but to try to reach a compromise so as not to affect lake levels. IRU recognizes the need to consider recreational values of the lake, but this does not remove Avista's responsibility to protect and mitigate its significant impacts on Spokane River fisheries. A comprehensive adaptive management and monitoring plan is needed that looks at both the actual impacts (or lack of impact) on lake levels and dock access, and the actual impacts (or lack of impacts) on available fisheries habitat and on the actual fish populations. Desired outcomes and acceptable rates of change must be defined by Avista and other stakeholders in the process (resource agencies and interested parties).	The proposed minimum flow is based on a variety of factors, including fish habitat, protection and enhancement, water quality, and lake level and recreational concerns and interests. Current information and studies are adequate to support the proposed minimum flow.
IRU-11	We support Avista's financial commitment to Spokane River fisheries public information, education and law enforcement programs. The funds committed to the implementation plan of AR-1 are not sufficient to meet the goals and objectives of the plan. Estimates from the Idaho Department of Fish and Game and the Coeur d'Alene Tribe ranged from $400,000 -$800,000 to implement these measures. A mitigation measure that recognizes the potential for restoration of anadromous fish to the project area due to efforts downstream of the project and studies of fish passage measures that would be necessary to accommodate for this restoration should be included in the PDEA.	Please see response WDFW-03. The funding proposed to support the Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout PME is adequate to meet the appropriate mitigation and enhancement obligations of Avista. With respect to anadromous fish, see response STI-14.
IRU-12	Avista proposes to extend the maintenance of full pool on Lake Coeur d'Alene until September 15. While we do not object to this proposal, there should be stipulations to study the impacts on fisheries and water quality if flows are reduced in the river. Especially after Labor Day, priority should be given to maintaining the minimum flow commitments, and there should be no "tier down" of flows to maintain the lake level at its artificially high level later into the season without an adaptive management provision to study the impacts on both recreational access and fisheries and water quality downstream.	The Proposed Action includes a minimum discharge flow. Please see response CDAT-II-042.
IRU-13	Avista includes a very rudimentary analysis of the Natural Hydrograph at Post Falls HED, while still including it in the alternatives considered but eliminated category. If this option was truly not worthy of consideration, then there would be no need to include analysis.	Please see responses CDAT-II-50 and IRU-15.

Comment ID	Comment	Response
IRU-14	The discussion of socioeconomics concludes that "the net result of a Natural Hydrograph scenario would be negative for the Project area." It is very speculative to assume that lower lake levels for what is predicted to be a few days, and not every year, would create a mass exodus of water based tourism and home purchases. River-based recreation and fishing opportunities are also an attraction, and they would be positively impacted by a Natural Hydrograph. However, the PDEA fails to even discuss any possible socioeconomic benefits of this alternative, addressing only potential socioeconomic harms. Furthermore, the PDEA predetermines the answer to the question of socioeconomic impacts by only addressing impacts "for the Project area" which does not include the river downstream of the project –the very area which would benefit from such an alternative.	The PDEA makes no reference to a "mass exodus" of water-based tourism. Rather, the PDEA discusses probable changes in recreational use as a result of change in summer water levels. Figure 3-11 makes it clear that the lower lake level would not occur just "a few days, and not every year." The 2,128-foot level that is now reached or exceeded 20 percent of the time would occur 10 percent of the time under the Natural Hydrograph. The 2,124-foot level that is now reached or exceeded 80 percent of the time would be exceeded only 40 percent of the time under the Natural Hydrograph. The text indicates that, under a Natural Hydrograph, waterfowl hunting opportunities would increase at the south end of Coeur d'Alene Lake and that there would be an increase in open-water canoeing opportunities during July and August downstream of Post Falls HED on the Spokane River. These changes are not likely to offset the economic effect of the lower lake level.
IRU-15	There was also no discussion or meaningful analysis of partial or total project decommissioning. Due to the relatively low power production and the increasingly high resource values of the Spokane River, its fisheries, and recreation, a decommissioning alternative that includes analysis of a Natural Hydrograph—and perhaps a range of operational flows that comes closer to the Natural Hydrograph—would be illustrative and allow for readers to better understand the actual impacts of current and proposed operations. The PDEA is wholly lacking in detailed analysis of current project impacts, which makes it hard to meaningfully review the PDEA.	Please see response CDAT-II-50. Avista agrees that analysis of the Natural Hydrograph provides useful information for readers to understand the environment that existed pre-Project, and that is why the effects are described in Section 3.3.4, *Natural Hydrograph at Post Falls HED*, in much more detail than would usually be given for a scenario that does not constitute a reasonable alternative. Also see response TLC-1.
IRU-16	In the list of applicable laws and regulations, the PDEA fails to mention Section 402 of the Clean Water Act, which requires an NPDES permit for any discharge of pollutants into navigable water. If any amount of oil, grease, pH, temperature, or other pollutants from the power production process reach the river from any of Avista's powerhouses, then Avista must obtain NPDES permits for such discharges.	Please see response SC-054.
IRU-17	As with the first draft PDEA, the PDEA establishes an inappropriately small geographic scope for the environmental analysis. NEPA requires analysis of cumulative impacts on natural resources, regardless of the cause of the impact. Thus, it is inappropriate to restrict the environmental analysis to the FERC Project boundary. Indeed, the FERC Project boundary is irrelevant to the cumulative impacts analysis.	Please see response BIA-G-02.
IRU-18	The geographic scope of the cumulative effects analysis for aquatic species and habitat should encompass the entire range of any species affected by the Project. The PDEA does not state whether the proposed geographic scope of Coeur d'Alene Lake to Little Falls Project Pool covers the entire range of species affected by the Project.	Section 5.2.1.4 of the PDEA provides our rationale for the geographic scope of our cumulative effects analysis, which includes fish habitat and fish populations that could be influenced by Project operations. Also see response BIA-G-02.

Comment ID	Comment	Response
IRU-19	Avista proposes that the geographic scope of the terrestrial cumulative impacts analysis stop at Long Lake Dam. The geographic scope should extend downstream of all project developments as far as any terrestrial effects are felt from the project. It is highly unlikely that there are no terrestrial impacts downstream of Long Lake Dam.	The geographic scope of the cumulative effects analysis with respect to terrestrial resources is appropriate; no project-related downstream effects to these resources are anticipated. Please see response BIA-G-02.
IRU-20	The PDEA states that the cumulative effects analysis will include "the effects of other past, present, and reasonably foreseeable future actions." This statement implies that Avista need only consider past impacts from other actions. In fact NEPA requires consideration of all past, present and reasonably foreseeable future actions, including past impacts from the Avista projects. Yet throughout the PDEA, Avista fails to assess past Project impacts, focusing only on potential changes in impacts from the proposed versus current operations (for example, see pages 5-72, 5-124).	Please see responses BIA-G-02 and TLC-1.
IRU-21	The PDEA also completely fails to discuss continuing impacts from project operations, instead asserting in several places that the Proposed Action would have "no effect" because impacts from the Proposed Action would not differ from impacts under current operations. Simply because impacts under proposed operations would not be significantly different than those under current operations does not mean that the project would not continue to impact natural resources. Cumulative impacts must include assessment of reasonably foreseeable future actions, including future impacts from project operations.	Please see responses BIA-G-02 and TLC-1.
IRU-22	The PDEA repeatedly concludes that the Proposed Action would have little or no impact on sediment transport based on the fact that effects of the Proposed Action would not be significantly different from effects of current operations. However, NEPA requires that the cumulative impacts analysis include an assessment of the impacts of past actions. 40 CFR § 1508.7. Therefore, whether or not the Natural Hydrograph is an action alternative, the cumulative impact analysis must consider how the project has impacted resources since project construction. While it is certainly appropriate to compare the environmental impacts of current operations with the Proposed Action, to comply with NEPA the cumulative impacts analysis must also address how the current and proposed operations have affected natural resources since project operation and how project impacts would differ under proposed operations versus more environmentally protective operations.	Please see responses IRU-23, BIA-G-02, and TLC-1.
IRU-23	Avista only compares environmental impacts of the proposed operation against current Project operations.	Current Project operations have been established by FERC as the baseline to which a Proposed Action should be compared.
IRU-24	The relationship between extending the drawdown of the Lake to mid-September (versus early September under current operations) should be more closely analyzed in relationship to the perceived impacts to lake levels from an increased minimum flow (600 cfs) from Post Falls. We do not feel it is appropriate to reduce the minimum flow based upon lake levels, in particular during the time that the expanded season for a raised lake level is proposed.	Please see response CDAT-II-042.

Comment ID	Comment	Response
IRU-25	The PDEA states that historical temperature data for the Coeur d'Alene River upstream of the Coeur d'Alene Lake show that salmonid spawning criteria were "frequently exceeded" in the summer. What historical period is addressed—pre-Project, pre-European development? And what, if any, conditions have changed since those historical data were gathered?	All data presented in the PDEA were collected after construction of Post Falls HED.
IRU-26	The PDEA states that project operations have decreased dissolved oxygen and increased water temperatures in the surface of Coeur d'Alene Lake, causing more frequent violations of water quality standards. However, the PDEA does not discuss or evaluate any measures to address these project impacts. This is a serious flaw in the PDEA and Avista must propose mitigation measures to address the temperature and dissolved oxygen impacts caused directly by the project inundating portions of the upstream tributaries.	Please see response IDEQ-01a.
IRU-27	The PDEA states that the project reduces total dissolved gas (TDG) by routing water through the powerhouse rather than the natural falls or spill gates. However, the PDEA also acknowledges that the project can keep TDG levels artificially high by reducing natural dissipation rates. The PDEA does not evaluate how these two factors on balance affect overall TDG levels and the impacts of TDG on aquatic life. Would total TDG levels be higher or lower under natural conditions? During what periods of the year? Even if total TDG levels would be higher immediately downstream of the dams under natural conditions, would the effects on aquatic species be less than with the project in place since the TDG levels would dissipate more quickly under natural conditions? Do differing seasonal flows over the dam site between natural conditions and conditions with the project in place affect the amount and/or impact of TDG levels?	No overall mass balance-type analysis was done relative to TDG. The studies acknowledged natural and dam-created TDG increases, as well as natural and hydro-related TDG reductions.
IRU-28	The PDEA notes that it cannot quantify the exact benefits from the proposed bull trout and westslope cutthroat trout protection activities since specific activities have not been identified. However, the PDEA asserts that the proposed protection program will "ensure that substantial positive population and habitat protection and enhancement measures are implemented." It is unclear how Avista can make such promises of "substantial" mitigation measures when the program is so undefined.	Please see responses FWS-73 and SC-094.

Comment ID	Comment	Response
IRU-29	While IRU supports undertaking measures to improve bull trout and westslope cutthroat trout habitat, it is premature to make any assessment of the environmental benefits of the program proposed by Avista. Given that Idaho Fish and Game, when helping to develop the plan, estimated annually $400,000 for westslope cutthroat mitigation on State of Idaho lands, and the Tribe estimates over $800,000 per year to implement the plan developed by the agencies, Avista's funding is inadequate. Simply proposing a plan for mitigation, while significantly under-funding that plan, does not mitigate for the impacts of Avista's operations. A meaningful analysis, an implementation plan and ACTUAL implementation of mitigation measures are needed. The cumulative impact of not actually funding the full implementation and therefore, slowing down when potential benefits will be achieved, should be analyzed.	Please see responses TLC-9 and FWS-73.
IRU-30	The discussion of cumulative effects on aquatic resources is entirely inadequate. It mentions only anadromous fish and does not discuss cumulative effects from anything other than non-Avista dam construction. The PDEA must also analyze cumulative impacts on resident fish and cumulative impacts from the many activities throughout the basin that impact resident fish. This includes how project impacts interact with other activities to impact aquatic species.	Please see response SC-097.
IRU-31	The PDEA asserts that there are no direct effects of the project on bull trout, classifying all impacts on bull trout as indirect effects, including reduced flow velocities. Alteration of the flow regime is a direct effect of project operations and should be classified as such. NEPA regulations define indirect effects as those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" 40 CFR. § 1508.8(b). Altering river flows is not removed in time or distance from project operations.	Please see response TLC-48.
IRU-32	Furthermore, the PDEA fails to mention that the Spokane River itself was historically habitat for bull trout or to discuss any potential role of the Spokane River projects in the decline of Bull Trout. Indeed the Post Falls Dam is specifically identified as one of the reasons for decline of Bull Trout in the Fish and Wildlife Service's Draft Bull Trout Recovery Plan. As mentioned above, the cumulative impacts analysis must include discussion of past impacts. (http://pacific.fws.gov/bulltrout/Recovery.html)	Please see response TLC-48.

Comment ID	Comment	Response
IRU-33	The socioeconomics discussion fails to acknowledge that improved project operations and mitigation measures could have socioeconomic benefits by improving fisheries and other river- based recreation. The PDEA specifically addresses the project's socioeconomic impacts on tourism but only mentions potential economic benefits from the project without addressing potential economic benefits from increased recreation and tourism with greater environmental protections. Sport fishing is a substantial component of Idaho's recreation and tourism industry. "In 1996, 483,459 anglers spent more than 4,411,000 angler days fishing in Idaho Waters. These anglers spent about $280 million, which generated an economic output of more than $461 million and supported almost 7,000 full time jobs." Idaho Department of Fish and Game's Fisheries Management Plan (2001-2006)	Consistent with the Federal Power Act (FPA), our economic analysis (Section 6.0, *Developmental Analysis*) includes only those costs (including foregone power costs) associated with the construction, maintenance and operation of new facilities, ongoing maintenance and operation of existing facilities, and implementation of various plans and measures to protect and enhance project environmental resources. FPA does not require that we place a dollar value on non-power benefits when balancing those benefits against economic costs. Efforts to quantify such benefits and costs are expensive, the results are highly speculative and often controversial, and the benefits provided to our analysis do not appear to outweigh the costs. Therefore, we do not attempt to place a dollar value on other benefits and costs, such as benefits to the local economy as a result of potential improvements to water quality or river fisheries, and other such measures. Nor did we attempt to place an economic value on personal experiences, such as the value of a day spent fishing or partaking of other recreational opportunities in areas affected by the project or enhanced as a result of the relicensing process. Nonetheless, in Section 5.12, *Socioeconomics*, of the PDEA, we acknowledge that environmental enhancements can have a positive (or negative) influence on the local economy. Please see that section for details.
JRPO-1	We ask that you revisit the decision to eliminate the Natural Hydrograph. The final EA should seriously examine the benefits of restoring the river to its natural flow conditions.	Please see responses CDAT-II-50 and IRU-15.
JRPO-2	The discharge from Post Falls should be based on downstream water quality and fisheries habitat benefits, period. It should not be based on upstream recreational usage because whatever the lake level is, local industries will adjust. It is not clear that 600 cfs is an adequate flow to protect fisheries. Avista should examine higher flows in the mid-Spokane reach for fisheries and to improve dissolved oxygen throughout the river, including Lake Spokane	Avista believes that the 600-cfs flow proposal with a trigger to 500 cfs provides the proper balance among several resource interests, primarily related to fisheries and water quality, with consideration of recreation.
JRPO-3	It is time to restore the Spokane Falls to the city and people of Spokane. We encourage you to examine the alternative of removing both Upper Falls and Monroe Street dams, and a related alternative of retiring their usage during summer months when flows are low. When sharing of water between power generation and the falls will deprive water from the falls, the priority should be to retain water in the waterfalls.	Based on consultation efforts with stakeholders and the comments of stakeholders, Avista believes that the proposal described in the license application properly balances power and aesthetic interests and that the majority of stakeholders agree on this balance.
JRPO-4	The PDEA does not adequately examine the role of the dams in water quality degradation, including sediment loading and dissolved oxygen depletion. Our community is facing expenditure of hundreds of millions of dollars for sewage treatment plan upgrades for lack of flow and because of the changes in water quality perpetuated by the Long Lake Dam. This should be acknowledged and addressed in the EA.	Both sediment loading (Golder, 2005b, 2004c) and dissolved oxygen dynamics (HDR, 2005) have been evaluated in study reports and are referenced in the PDEA.

Comment ID	Comment	Response
JRPO-5	The PDEA should acknowledge the role of the Avista dams in blocking anadromous fish from the Spokane River, and should examine an alternative of preparing a passage feasibility study for Long Lake and Nine Mile Falls dams during the term of the new license, and restoring fish passage once passage issues are resolved at Chief Joseph, Grand Coulee, and Little Falls dams.	Please see response STI-14.
JRPO-6	Avista should fully disclose the value of these dams to the company, the power grid, to ratepayers and to shareholders so that as a community we may fully and competently evaluate the costs of mitigation.	The operational, investment, and replacement costs of the Spokane River Project are described in Exhibit D and Exhibit H. Where economic data were not available due to the unknown costs associated with future FERC fees, Avista has provided as complete an analysis as possible with current data in the final license application.
KCC-1	The Kootenai County Board of Commissioners support the Idaho Compromise.	Comment noted.
KCPW-1	Kootenai County has worked closely with Avista and supports its recommendations. Maintaining a stable lake level of 2128' through summer months is critical for the county to manage the waterways and continue to attract important recreational visitors.	Comment noted.
KCWB-1	This comment supports the Idaho Compromise, which would include a 2,128-foot lake level through Labor Day and an increased minimum flow through Post Falls HED.	Comment noted.
LPOA-1	The Coeur d'Alene Lake summer lake level should be maintained from as soon as practicable from June 1st through the end on September.	Comment noted.
LPOA-2	The 600/500 cfs tiered minimum flow should be implemented, and should be made definitive rather than something that Avista "would consider".	Comment noted.
LSPA-1	A Sediment Management Plan for Nine Mile and Lake Spokane reservoirs along the lines proposed by the WA Department of Ecology (at the 4/14/04 WRWG meeting) should be included as part of the new license.	Please see response WDFW-06.
LSPA-2	The Lake Spokane Protection Association supports the minimum year round flow of 600 cfs from Post Falls HED; opposes delaying the fall drawdown of Coeur d'Alene Lake beyond September 15.	Comment noted.
LSPA-3	The Lake Spokane Protection Association recommends a 300-foot buffer zone abutting Lake Spokane.	Please see response WDOE-19.
LSPA-4	The Lake Spokane Protection Association supports all of the PME measures that are in the "parking lot" and look forward to working on unresolved issues post filing.	Comment noted.

Comment ID	Comment	Response
NWASCKC-01	We agree with the 600 cfs minimum stream flow. While the 600 cfs flow limits river based recreation, it should be sufficient (at current aquifer withdrawal rates) to provide aesthetic flows in the upper Spokane River that goes nearly dry at lower flows between Harvard and Sullivan Roads. The increased minimum flow (from the current 300 cfs or less) should improve water quality in the river system and appears to provide a satisfactory balance between instream fisheries, water quality, and Coeur d'Alene Lake elevations needed to support recreation and property values.	Comment noted.
NWASCKC-02	We agree with target dates for Coeur d'Alene full pool elevation, with the July 1 to September 15 full pool elevation target for Coeur d'Alene Lake subject to minimum stream flows. It is important to recognize that the Spokane River system will be operated based upon minimum flows due to the new license, not lake elevation as is the current practice. This operational change appears to meet the recreational and land use needs of the Coeur d'Alene Lake owners while providing minimum acceptable flows for downstream interests.	Comment noted.
NWASCKC-03	We agree with the aesthetic flow releases at Monroe Street Dam and Post Falls and Upper Falls HEDs as proposed.	Comment noted.
NWASCKC-04	We agree with the proposal to slightly adjust river flows in the late spring and fall to provide preferred whitewater paddling flows. This proposal will require continued planning and coordination between the paddling community and Avista. The mechanism's proposed through annual meetings and preparation of the Recreation Plan provides the opportunity for community input.	Comment noted.
NWASCKC-05	We agree with scheduling increased flows for open-water boating for one or more weekends in August. These flows are important to improve recreational opportunities during the peak summer season and may help improve water quality in the system by providing some flushing of stagnant areas. Additional monitoring through the proposed Water Quality Monitoring plan and coordination with fisheries is needed to further define these flows.	Comment noted. We believe measure PF-REC-3 and is consistent with this comment.
NWASCKC-06	Please change page 3-2 - paragraph 3 to read: "Downstream of Post Falls HED, the shorelines are currently lightly developed and include a mix of agricultural, residential, and open lands, with a small public beach area and other public access sites near scattered residential areas. Open lands adjacent to the river between Post Falls HED and Upper Falls and Monroe Street HED's are being developed at an increasing rate for mostly residential use.	We have revised Section 3.1.1, *Existing Project Facilities*, to accommodate the recommended change.

Comment ID	Comment	Response
NWASCKC-07	Please change Page 3-2 paragraph 4 to read: Near Spokane, development along the shoreline intensifies as residential, commercial and industrial uses increase. Both Upper Falls and Monroe Street HEDs are located within downtown Spokane. Riverfront Park, a city-owned public park, is located along the river in downtown Spokane. Another small public area, Huntington Park, is located immediately adjacent to Monroe Street HED. Downstream of the city of Spokane, Riverside State Park, located adjacent to the river and Nine Mile Reservoir is the dominant land owner, including approximately 9 miles of shoreline, allowing public access to much of the river between the City and Nine Mile HED. Other adjacent land uses shifts back toward more are predominately scattered residential, development, along with some agricultural or otherwise undeveloped open-space lands. Riverside State Park is located along the shoreline of the Spokane River and adjacent to the Nine Mile Reservoir. Several homes are located on the Nine Mile Reservoir as well. Lake Spokane, the reservoir created by Long Lake HED, includes numerous year-round and seasonal residences, as well as public land access points and private facilities."	We have revised Section 3.1.1, *Existing Project Facilities*, to accommodate the recommended change
NWASCKC-08	Please change page 3-3 paragraph 1 to read: Post Falls HED is located on the Spokane River at river mile 102, in Post Falls, Idaho, approximately 9 miles downstream of the river headwaters at Coeur d'Alene Lake. This development impounds several miles of the upper Spokane River, and influences the water levels in Coeur d'Alene Lake, and the lower reaches of lake tributaries, and flow in the Spokane River depending on volume of tributary inflow and time of year.	We have revised Section 3.1.1, *Existing Project Facilities*, to accommodate the recommended change
NWASCKC-09	We would like to see a general comment on the interrelationship between Coeur d'Alene Lake, river flow, and the aquifer A paragraph similar to the one included below would be appropriate as part of Section 5.2.1.1 or possibly in Section 5-4: Project operation may have an impact on regional water resources. Coeur d'Alene Lake elevations and river flows in the upper Spokane River provide water to the Spokane-Rathdrum aquifer that is used as the sole source water supply for the region. Additionally, the aquifer provides inflow into the river below Sullivan Road, providing the cold water needed to support salmonid fisheries during the summer. Reductions in river flows and/or lake elevations may have a long-term impact on the regions' water supply that is not yet defined. The increased surface area of Coeur d'Alene Lake due to project operations increases summer evaporation, slightly reducing the quantity of water. While not necessarily Avista's responsibility, land use management in the upstream river basins of the Coeur d'Alene, St. Joe, and St Maries rivers will likely be necessary to ensure a continued water supply for the system in the future.	Proposed changes to Spokane River Project operations are not expected to adversely affect groundwater or regional water supplies. The County and City of Spokane and others have conducted several long term studies of the aquifer and have not noted a concern in this area.
NWASCKC-10	Please change 5.2.1.7 Recreational Resources page 5-6 to read: In the last several decades….. Current Project operations also affect downstream flows and the associated recreational resources and opportunities. Decreased downstream flows due to project operations during the summer season reduce recreational opportunities on the river.	Comment noted. Summer flows are variably lower, higher, or the same as they would be under a Natural Hydrograph scenario.

Comment ID	Comment	Response
NWASCKC-11	Please Change 5.4.1.2 Groundwater page 5-64 to read: Groundwater therefore plays a relatively minor role in the overall water budget of the lake, providing approximately 1 to 3 percent of the inflow to the Lake Spokane reach. Is this statement true and does it include only the groundwater entering at the lake or does it include all groundwater influences from the Spokane and Little Spokane. If I recall, there is somewhere between 400 and 600+ cfs entering the system that enters Lake Spokane.	The referenced statement is true and includes only groundwater directly entering the lake, not discharging to the rivers upstream.
NWASCKC-12	Please change, *Effects Analysis*, page 5-114 to read: Under the Proposed Action, Avista would continue to draw down Coeur d'Alene Lake in late summer to fall, with the initiation of drawdown to begin on September 15. Implementing this firm date for beginning drawdown would have little or no effect on existing water quality. Limiting the Lake Spokane drawdown to 14 feet would be generally consistent with current Project operations and would not change the existing affect water quality.	We believe that the text is correct as written.
NWASCKC-13	Please change 5.5.4, *Unavoidable Adverse Effects*, page 5-125 to read: Under the Proposed Action, some of the proposed flow releases from Post Falls HED would slightly increase downstream summer water temperatures in the Spokane River. Consideration of this potential effect is reflected in the proposed minimum discharge requirement for Post Falls HED. Nonetheless, Washington state water quality agencies have expressed a desire for an increase in the minimum discharge. The water quality monitoring plan is intended to better understand the impacts of the proposed flow releases on the river. Other flow-related measures, such as recreational flows, have provisions for revising such measures if needed to address water quality and fishery concerns.	We believe that the text is clear as written.
NWASCKC-14	Please change 5.10.1.2, *Recreational Use*, Table 5-45 to include the river site summaries from the recreation report. I don't think much discussion is needed, but I would like to see the river sites included in order to show a more complete picture of the recreational opportunities available in the system.	This section specifically pertains to recreational facilities and opportunities in and adjacent to the Project boundary. The sites along the river do not fit these criteria.

Comment ID	Comment	Response
NWASCKC-15	Please change 5.10.2.1, *Project Operations*, page 5-211 to read: Paragraph 1: The RLUAWG also identified a need for scheduled recreational boating events downstream of Post Falls HED. Under existing conditions, recreational boating opportunities during late summer months are limited by low flows in the Spokane River. While optimal flows are typically above 2,500 cfs, the RLUAWG finds that the river is navigable at flows down 1,000 1,350 cfs. In most water years, flows drop below 1,000 cfs in late July and August, reducing boating opportunities in the Spokane River. Paragraph 3: Avista would also provide scheduled flows downstream of Post Falls HED to accommodate open-water boating on selected weekends in August (measure REC-3). Flows of approximately 1,250 cfs (1,350 cfs) would be provided. *Effects Analysis*, paragraph 5: The whitewater-boating flow-release measures included in the Proposed Action would provide new late summer boating opportunities during low-water years, with the goal of adding two August weekend releases on average about one new boating event in August of each year.	The RWLAWG stakeholders who participated in the whitewater study (Louis Berger, 2004a) concluded that the river is navigable at 1,000 cfs for open-water boating and that August flow releases of 1,250 were sufficient for open-water boating. We have revised Section 5.10, *Recreational Resources*, to accommodate the recommended language about weekend releases.
NWASCKC-16	Please change 5.10.2.2, *Recreation Plan*. Is the intent to include the River Recreation Management Plan described in the WW PME included in this? If not, please add a statement that says Avista will participate in the River Recreation Management Plan along with representatives of local governments and interests groups.	Although we currently intend to participate in the river management plan, we do not reference that process in the Recreation Plan because it is outside of the Project boundary and not directly related to the Project.
NWASCKC-17	Please change 5.10.2.5, *Whitewater Boating*, page 5-225, paragraph 1 with respect to Corbin Park Boat Ramp—Add, and emergency craft after drift boat anglers.	We revised Section 5.10, *Recreational Resources*, to accommodate the recommendation.
PF-01	Post Falls HED is partially surrounded by properties owned and/or managed by the City of Post Falls and its residents; discharges from Post Falls HED directly affect the usability of parks and boat launches, private docks, property values, tax revenues, and riverside development opportunities. The HED indirectly affects the City's share of regional recreation and tourism revenues through summer lake levels and river flows, and affects growth and economic stability within the City limits through the availability of competitively priced and reliable electric utility service.	Comment noted.
PF-02	The city will continue to support Avista's relicensing activities and commends the company for the process to date, inclusion of stakeholders in the process, and good stewardship.	Comment noted.
PF-03	Supports a single license	Please see response BIA-S-006.
PF-04	The City supports the proposal for a 2,128-foot summer lake level through September 15.	Comment noted.
PF-05	The City of Post Falls supports the proposal for minimum flow below Post Falls dam of 600 cfs with 500 cfs trigger under certain drought conditions.	Comment noted.

Comment ID	Comment	Response
PF-06	The City supports PME measures that have gone to the Plenary Group parking lot, including (1) Coeur d'Alene Lake Aquatic Weed Management Program, (2) Coeur d'Alene Lake Recreation PME, (3) Spokane River Project Public Outreach PME, (4) Lake Spokane Aquatic Weed Management Program, (5) Lake Spokane/Nine Mile Reservoir Recreation PME, (6) Project Transmission Line Management Program, and (7) the most recent draft of the Aesthetics Flow PME.	Comment noted.
PF-07	The PDEA should include sufficient evidence to support a FERC conclusion that Avista is the only logical license holder for the Project.	Comment noted.
PF-08	PDEA should include an unambiguous request for a single license to be issued to Avista, with no reference to a separate process for Post Falls HED.	Please see response BIA-S-006.
PF-09	The PDEA should include a clearly stated intent to fully use the Project's generation, consistent with new operational constraints agreed to with stakeholders.	Comment noted.
PF-10	The PDEA should include a method and specific provisions for continued settlement dialogue and an ongoing collaborative effort, even after the application is filed.	Comment noted.
PF-11	The PDEA should include specific acknowledgement of the City of Post Falls' unique status as a significant stakeholder with rights to sit at the negotiating table with Avista, the Tribes, and the state and federal agencies when issues affecting the City arise.	Comment noted.
PF-12	The PDEA should include specific provisions for a post-license management committee, even in the absence of settlement, comprising major stockholders, including the City of Post Falls.	Comment noted.
PF-13	If the PME measures referred to in comment PF-5 are not included in the license application, the PDEA should included specific details of Avista's lease arrangement with the City of Post Falls.	Comment noted.
PF-14	Avista has done a good job to date balancing the value of the Project with the cost of proposed operational changes and environmental measures. The City urges Avista to stand fast where the links between the Project and alleged effects appear to be overstated, even if such disputes must be defended in court.	Comment noted.
PF-15	The City reserves the right to revisit and critically challenge data and conclusions from scientific and technical studies associated with the relicensing process if the results are ever interpreted in a manner that could be detrimental to the City.	Comment noted.
PFCC-1	This comment supports the Idaho Compromise, which would include a 2,128-foot lake level through Labor Day and an increased minimum flow through Post Falls HED.	Comment noted.
SC-001	The PDEA often does not show how PME measures will address impacts caused by the project. The final license application must clarify the effectiveness of the PME measures at mitigating project impacts.	The final license application more clearly indicates the effects of the PME measures, insofar as they can be determined at this point.

Comment ID	Comment	Response
SC-002	The PDEA fails to substantially assess project impacts on water quality parameters such as dissolved oxygen, temperature, sediment.	Dissolved oxygen dynamics and effects of the HEDs have been evaluated (HDR, 2005) and are referenced in the PDEA.
SC-003	The PDEA does not contain an assessment of the impacts of sediment on fisheries resources and water quality.	The PDEA acknowledges various potential effects of sediment on aquatic and wetland habitats. Please see response WDFW-06. Turbidity is discussed in Section 5.3.2.4 of the PDEA.
SC-004	There is no assessment of how Long Lake HED impacts dissolved oxygen.	HED effects on dissolved oxygen in Long Lake are addressed in a study report by HDR (2005). Please see response TLC-1.
SC-005	There is no discussion of water quality issues related to the release of turbine oil.	All HEDs in the project have Spill Prevention Control and Countermeasures Plans regarding potential release and clean-up of turbine oil. There is no evidence that such releases have occurred in the Spokane River Project.
SC-006	The PDEA must clarify the nature and extent of project-related impacts and benefits in quantitative terms.	The PDEA addresses Project-related effects in a quantitative manner where appropriate, and otherwise addresses effects qualitatively.
SC-007	The PDEA fails to adequately address cumulative effects. The PDEA should address in detail all past, present, and future, project and non-project effects. The scope of cumulative effects should be expanded to the entire Coeur d' Alene Lake-Spokane River watershed to at least below Little Falls HED to adequately consider the cumulative impacts of all hydropower facilities on water quantity, water quality, aquatic resources, and terrestrial resources. NEPA cumulative impacts analysis requirement mandates that the analysis must compare current versus pre-project conditions and assess how the Project has impacted the environment since its construction	Please see response BIA-G-02.
SC-008	Avista has failed to provide adequate financial data to assess its proposal. Without knowing the value of the power produced by the Project and the realistic cost of replacement power, it is impossible to assess the economic value to Avista of each of the developments and the project as a whole, the replacement cost of value foregone to meet mitigation needs, and the amount of mitigation that each development and the project as a whole might support without becoming uneconomic to operate. Such information is critical, and Avista should be required to provide economic data.	Please see response JRPO-6.
SC-009	The Sierra Club strongly objects to the separation of Post Falls HED. Operation of Post Falls HED is integral to the operation of the other four project dams. Separation of Post Falls from the other projects would result in poor environmental decisions and would decrease government efficiency.	Please see response BIA-S-006.
SC-010	What factors would lead Avista to consider a separate license for Post Falls HED. What are the operational, environmental and socio-economic impacts of separating Post Falls HED.	Please see response BIA-S-006.
SC-011	The final license applications must identify sedimentation impacts and contain PME measures to address continuing impacts from sediment impoundment.	Comment noted. Please see response WDFW-06.
SC-012	The final license application must contain measures to address adversely high water temperatures and to ensure compliance with Washington water quality standards.	Please see response WDOE-36.

Comment ID	Comment	Response
SC-013	Avista must propose PME measures to address dissolved oxygen within the reservoir and downstream to ensure compliance with Washington and Spokane Tribe water quality standards.	Please see response WDOE-36.
SC-014	The Sierra Club supports a PME to study the engineering feasibility of fish passage structures on all of Avista's Spokane River dams and to require fish passage measures at such time as salmon do return to the Spokane River.	Please see response STI-14.
SC-015	The Sierra Club objects to PME AES-1 for limited aesthetic flows at Spokane Falls. The Sierra Club supports the release of 500 cfs to the Upper Falls and the falls should never be completely dewatered. Any changes should be ramped in a manner to protect resident fish.	The RLUAWG, through two studies and numerous work group and sub-group meetings determined the aesthetic flow recommendations identified in the Aesthetic Flow PME (SRP-AES-1). Also see response WDFW-04.
SC-016	The PDEA is deficient for failure to include a comprehensive analysis of the power and non-power values of the upper and lower Spokane Falls.	The PDEA reflects the studies agreed upon by the technical workgroups over the 3 years of collaborative decision-making. We do not believe such analysis is warranted. Also see response IRU-33.
SC-017	Avista should evaluate full dedication of water to the Spokane Falls as an alternative to the current Project operations.	Please see response JRPO-3.
SC-018	The Sierra Club strongly supports the recommendations contained in the draft Little Spokane River/Middle Spokane River Watershed Management Plan, which calls for minimum release at Post Falls HED that would result in 500 cfs at Baker Road.	Comment noted.
SC-019	There is no comment SC-019.	
SC-020	The Sierra Club renews its request for studies and information regarding the impacts/benefits of full or partial decommissioning of the Spokane River Project.	Please see response CDAT-II-050.
SC-021	The Sierra Club requests comprehensive economic data to evaluate the true costs of devoting all water to the Spokane Falls and/or the cost of sharing the water with the falls during the four months of peak productivity at Upper Falls and Monroe Street HEDs.	We have added additional detail to Section 6.0, *Developmental Analysis*, and Exhibit D of the license application.
SC-022	PDEA lacks a summary of other alternatives analyzed, major issues analyzed, and justification for conclusions made, including trade-offs.	Comment noted.
SC-023	What criteria did Avista use to determine which of the PME measures to include and why were some of the PME measures altered?	The ALP is designed to foster agreements among many parties, which necessarily entails compromise on all sides. In the absence of a Settlement Agreement, it is Avista's responsibility to submit a proposal that, in the eyes of Avista's management, most directly addresses issues with a clear nexus to the Project and is in the best interests of its customers, shareholders, and stakeholders.
SC-024	The PDEA does not provide a description of federal lands that the project occupies, or state that it does not occupy federal lands.	We have modified Section 5.11, *Land Use and Aesthetic Resources*, of the PDEA, to include a concise description of federal lands within the Project boundary.
SC-025	The average energy production of 100 aMW stated on page 1-1 is different than the number provided on page xix (95 aMW).	Comment noted. The 100-aMW figure is correct. We have corrected the other figure.

Comment ID	Comment	Response
SC-026	What percentage of Avista's resource portfolio does the Spokane River project account for and what population is served by these projects.	The Spokane River Project provides about 10 percent of Avista's annual average generation mix and helps meet the electrical needs of customers in northeastern Washington and northern Idaho. We show the relative contribution of the Spokane River Project compared to other Avista resources in Exhibit H, Table H-1, of the license application. Generation from the Spokane River Projects meets the electrical needs of about 72,000 residential customers. Also see response license application comment SC-09.
SC-027	The information in Section 2.2.2 should be updated with BPA's most current information in the BPA 2003 white book.	We have updated Section 2.2.2 using the December 2004 revisions to BPA's 2003 White Book.
SC-028	Section 2.2.3 should be updated using Avista's most current information from the 2005 IRP development process. What are the Project rate implications; how would major changes in Project operation affect projected rates; what would be the effect of the existence or absence of the project have on the need for additional capacity; what type of conservation strategies are included in the demand-side and supply-side options; how does the additional of Coyote Springs 2 affect Avista's generating capacity, and how does this additional generation affect analysis in Section 2.2.3?	Any changes that require replacement or a major shift in operations would create upward rate pressure and a need for additional generating resources. The conservation measures described in Exhibit H would remain but would not replace loss of Spokane River generation. The purchase of Coyote Springs II meets an objective of the 2003 IRP to acquire additional energy (140 MW). Avista's 2005 IRP has not been completed for submittal to the state rate commissions.
SC-029	A separate alternative should examine license denial, which includes analysis of a without Project scenario. This alternative should be used as the basis for comparing the impacts of all other alternatives considered.	In keeping with Commission guidance, Avista has defined the existing license (No-action) as the baseline to which all other alternatives are compared. Also see response TLC-1.
SC-030	Avista must provide information on continuing environmental effects of the Spokane River HEDs, individually and collectively (operational and from physical facilities), in sufficient detail to evaluate the PME measures.	Please see response TLC-1.
SC-031	The Project boundary should include at a minimum the areas below each dam that are directly affected by project impacts and should be continuous from the most upstream to the most downstream development, including the area the head of the Little Falls reservoir, and should include all lands necessary for mitigation measures, and all lands necessary for recreation.	Please see response AWC-1.
SC-032	The EA should contain a description of all project lands, access roads, and transmission lines.	Please see the revised text of Section 3.1.1.4, *Project Hydroelectric Developments*. The description of Long Lake HED now includes the 1.8-mile-long transmission line determined to be Project-dependent. The proposed Project boundary is depicted in Figures 3-1 through 3-4, Appendix A, and is described in Section 5.11.2.4, *Change in Project Boundary*.
SC-033	How many customers are served by the individual projects; who are the customers; are the customer's needs met entirely by the project power, and if not where does the other power come from; and what are the rates?	The Spokane River Project provides only a portion of the electrical needs of Avista's electric customers in eastern Washington and northern Idaho. A portfolio of other generating resources are described in Exhibit H, Section H.3.2. Please see response SC-026 and response to license application comment SC-08.
SC-034	Quantify the Project's role in load shaping and explain in detail how the HEDs serve in load shaping; how would that change if one or more of the HEDs was no longer in operation?	Please see response BIA-S-002.

Comment ID	Comment	Response
SC-035	To what extent and under what circumstances may current operations be modified?	Please see the remaining text of Section 3.1.2.2, *Current Spokane River Operations*, for more detailed descriptions of how the HEDs operate. An extreme power shortage, a threat to human life, or a similar emergency would dictate modifying operations significantly for a short period of time beyond the license requirements.
SC-036	Maintaining Coeur d' Alene Lake at 2,128 is a recreational measure, not an environmental measure, and studies have indicated that the measure results in adverse environmental impacts.	Please see response BIA-S-005.
SC-037	The Proposed Action does not give equal consideration to non-power values as required by the FPA, and as such is not an alternative to the No-action Alternative.	Please see response JRPO-3.
SC-038	A new alternative should be developed to give non-power values equal consideration with power values, which seeks to maximize the future net social benefits.	Please see response JRPO-3.
SC-039	The PDEA contains no analysis of what impact delayed release (after September 15) has on flushing of nutrients from Lake Spokane and associated algal blooms. The Sierra Club supports an earlier release date to ensure high flushing flows exist at Lake Spokane.	Please see response CDAT-II-042.
SC-040	The Sierra Club strongly supports the revised ramping rates for Post Falls HED, but the PDEA should contain a discussion of ramping downstream of Long Lake HED and of current ramping rates and a proposed ramping rate that is fish-protective.	Comment noted.
SC-041	Under what circumstances would recreational flows be provided for open-water boating in August?	Please refer to measure SRP-REC-3, Spokane River Recreation PME, for a discussion of recreational flows. Also see response IDFG-07b.
SC-042	Measure WQ-1 should be revised to require structural fixes at Long Lake HED and the implementation of alternative spill gate operations with effectiveness monitoring. Avista must outline a detailed plan with identifiable targets and benchmarks to meet all water quality standards.	The TDG feasibility studies will identify the potential structural and operational "fixes."
SC-043	What specific actions will occur under PME measures TR-1 and TR-2, and will these actions fully mitigate project impacts?	Avista would implement measure PF-TR-1, including specific actions, in consultation with the Tribe and resource agencies. Please see response BIA-S-060.
SC-044	The Natural Hydrograph scenario should be developed into a full stand alone alternative with full analysis.	Please see responses CDAT-II-050 and IRU-15.
SC-045	The water quantity analysis should be completed using a greater set of data instead of just 1998 to 2002.	Please see response CDAT-II-051.
SC-046	Operating Post Falls HED pursuant to the Natural Hydrograph scenario does not lessen or elevate 4(e) or 10(j) requirements.	Comment noted. Avista maintains its position that neither 10(j) nor 4(e) authorities would be triggered for a project with no water storage but notes that the terms of such a license would be determined by the Commission.

Comment ID	Comment	Response
SC-047	The EA needs a discussion of the impacts of the Natural Hydrograph on the available area for boating and corresponding erosion impacts.	Comment noted. Boaters would continue to boat on the lake and tributaries in much the same manner that they do today when the lake is full or nearly full. We believe that if the lake dropped in elevation, the shallow areas would be dewatered, causing an increase or concentration in boat traffic in the remaining deep-water sections of the lake and tributaries. As the areas are seasonally dewatered, the boat waves would continue to cause erosion until the areas were no longer navigable. We do not believe additional discussion in the PDEA is warranted.
SC-048	How negligible is the TDG exceedance frequency; provide numeric figures.	For additional detail on TDG, please see Golder Associates Ltd. (2004).
SC-049	The temperature analysis that projects maximum daily temperature increases is not supported by competent scientific analysis.	Temperature differences associated with the Natural Hydrograph are described in a study report (HDR, 2005), and are cited in Section 3.3.4.3. Avista maintains its position that the studies were professionally conducted and support the conclusions reached in the PDEA.
SC-050	How slight would increased outmigration of bull trout and cutthroat be? Provide numeric figures and describe quantitative benefits to these species; estimate the net effects on bull trout and cutthroat trout. What impact or benefit do higher flows have on adult trout in quantitative terms?	Increased outmigration rates of bull trout and westslope cutthroat trout might occur as a result of slightly increased water velocities, but such rates cannot be quantified or predicted.
SC-051	Why would there be no increase in total wetland acres as a result of the Natural Hydrograph scenario?	As noted in the PDEA, the wetland and riparian habitat assessment concluded that "total" wetland acres were largely similar in the areas evaluated for pre-Project versus current conditions. However, we revised Section 3.3.4.3 to indicate wetland acres may increase as a result of the Natural Hydrograph.
SC-052	Quantify all vague statements in the recreation section.	The RLUAWG conducted an assessment of the usability of boat launch sites during low, high, and normal water levels on Coeur d'Alene Lake (please see the Recreation Facility Inventory and User Surveys Report). We believe that the recreation section provides adequate clarity.
SC-053	When would riparian vegetation reestablish and how do residents currently deal with vegetation blocking their views or access to water?	The shallow bays would be dewatered during the summer months, thereby allowing some vegetation to seasonally re-establish itself as the water level drops. Shoreline owners do not typically own the lake bottom below the 2,128-foot contour, so they may not remove emergent vegetation without permission from the state or Tribe, depending on where they live.
SC-054	Discuss Section 402 NPDES requirements.	Avista believes that a discussion of Clean Water Act Section 402 NPDES requirements is not pertinent here because FERC does not administer Section 402. Avista does, however, adhere to Section 402 as it applies to the Project.

Comment ID	Comment	Response
SC-055	What is the reasonable range of probable mandatory conditions that DOI may place on the project license and what are the implications on Post Falls HED operation, lake levels, and stream flows?	Interior's mandatory conditions will be submitted to the Commission following Avista's filing of the application and the Commission's request for agencies to submit mandatory conditions. Please see Interior BIA's and Coeur d'Alene Tribe's comment letters on the Project web site (http://www.avistautilities.com/resources/relicensing/spokane) for a statement of their current positions on Post Falls HED operation, lake levels, and stream flows.
SC-056	TDG originating in the Spokane River contributes to TDG in the Columbia River; effects further downstream than the Spokane-Columbia confluence must be identified and analyzed.	Please see response BIA-G-02.
SC-057	The PDEA should provide details regarding the historic salmon fisheries of the Spokane River.	We describe the anadromous fish that historically occurred in the Spokane River in Section 5.6.1.2 of the PDEA.
SC-058	There is no comment SC-058.	
SC-059	The PDEA fails to address the ongoing and reasonably foreseeable actions of FS and other land management agencies in the watershed including logging and road-building and cumulative contributions of sedimentation to the watershed.	Please see response BIA-G-02. Potential sediment sources are discussed in the PDEA.
SC-060	The description of past, present, and future actions impacting resources is vague and generalized; this lack of specificity renders the PDEA insufficient as a NEPA document.	Comment noted. Please see response BIA-G-02.
SC-061	Has post Falls HED affected the inundation of larger portions of the Coeur d' Alene River; are such events more frequent?	Project operations keep the lake and lower river levels higher during the summer, but inundation is within the natural levels of the lake during periods of high runoff.
SC-062	Why is sediment supply information lacking; were any studies conducted to gather this information? Describe how dam operations impact cleanup of contaminated sediments. How is it that Nine Mile does not impact sediment transport? Describe the biological and water quality impacts associated with continued sedimentation of the reservoirs and the impact on generation.	(1) Empirical data for sediment yield from the numerous lake tributaries is unavailable, hence the AGWA modeling (as described in the PDEA). (2) Sediment transport at Post Falls HED is examined in Section 5.3.1.4 of the PDEA, including discussion that indicates that transport of finer sediment occurs in this area. Further, because metals transport can be both in solution and via attachment to mobile sediment, downstream contamination is not simply a function of sediment transport. (3) Sediment that would pass through the turbines passes through the tunnel instead. (4) The biological effects associated with continued sedimentation of the reservoirs are site specific and highly variable; and the effects are generally acknowledged in the PDEA. Also see response WDFW-06.
SC-063, SC-064, SC-065	There are no comments SC-063, SC-064, and SC-065.	
SC-066	The creation of reservoirs is a project impact and the resulting increased boating area is a direct result and project impact. To what extent has the project increased boating opportunities and the area which is subject to wake/wave erosion?	We have revised Section 5.4.1.1 to indicate that impounding the lake increases the area by 28.5 percent.

Comment ID	Comment	Response
SC-067	Is Coeur D' Alene Lake shore armoring effective and what are the biological impacts of this armoring?	The armoring of the Coeur d'Alene Lake shoreline was implemented by others and is not a Project effect.
SC-068	What is the basis for the minimum nexus between the Project and erosion on the Spokane River?	There is minimal nexus because peak flows on the Spokane River; that is, those flows that are most likely to cause erosion, occur in the winter and spring and are not substantively altered by Project operations under either existing baseline or proposed conditions.
SC-069	Provide additional information regarding PCBs and how project operations directly or cumulatively impact the fate and transport of these materials.	HED operations are not a source of PCBs in the Spokane River. Current plans for clean-up of PCBs are based on current operations of HEDs.
SC-070	Is the small, localized change (i.e. bump) in both the Coeur d' Alene and St. Joe rivers really occurring and if so is it a result of project operations? What is the impact on sediments associated with this feature?	Please see response CDAT-II-112.
SC-071	Do Upper Falls and Monroe Street HEDs have impacts on sediment transport?	Please see response WDFW-11.
SC-072	(1) Does lack of sediment transport impact beaches/spawning areas downstream? Provide an analysis of Post Falls HED impacts on sediment transport. (2) What are the effects of limited sediment transport past Long Lake HED?	(1) The geomorphic function of Post Falls HED is practically identical to that of pre-project conditions and has little, if any, effect on sediment transport. (2) The area immediately downstream of Long Lake HED is a steep, deeply incised bedrock channel, with the operating reservoir for Little Falls HED extending upstream into the Long Lake HED tailrace. As a result, sediment retention in the Long Lake HED Reservoir would not likely adversely affect downstream conditions.
SC-073	There is no comment SC-073.	
SC-074	What are secondary effects of other PME measures on soil erosion and turbidity? What is the nature and extent of these impacts?	These effects are discussed in Section 5.3.3, *Secondary Effects of Environmental Measures*.
SC-075	Describe all unavoidable short and long-term, minor or major, cumulative or site-specific adverse effects of the proposal to be implemented.	These effects are discussed in appropriate detail in Section 5.3.5, *Unavoidable Adverse Effects*.
SC-076	There is no comment SC-076.	
SC-077	What role does fall/winter drawdown at Post Falls HED play in flood control?	The fall/winter drawdown provides the same natural flood control benefits as described on page 5-48 of the draft PDEA.
SC-078	The last sentence of the third paragraph on page 5-49 is incomplete and does not make sense.	Comment noted and change made.
SC-079	How often does normal maximum pool occur, and what is the condition under normal operating pool? How does flow from Long Lake HED impact this stretch of river under low, normal, and high river/reservoir conditions?	Little Falls Reservoir is operated at the normal full pool elevation except when the flashboards are not in place. Discharge flows from Long Lake HED pass directly into Little Falls Reservoir and pass downstream of Little Falls with minimum regulation.
SC-080	How will Avista's proposed CCCT Rathdrum Prairie plant and other planned development utilizing the aquifer cumulatively impact groundwater resources; how will these impact the losing reaches downstream of the state line?	Avista has placed on hold plans to develop a CCCT unit at Rathdrum Prairie, awaiting the results of the aquifer study.
SC-081	Aesthetic flow will impact water quantity by putting water into what is often a dry riverbed during summer months; this positive effect should be acknowledged in the PDEA.	Comment noted.

Comment ID	Comment	Response
SC-082	Avista should analyze potential benefits of increased flows on dissolved oxygen, temperature, algal blooms, and sediment in Lake Spokane.	Effects of increased flows were evaluated in a technical memorandum (Koreny, 2004) and are referenced in the PDEA.
SC-083	The Sierra Club supports the conclusions made by Dr. Joel Massmann in critique of the water quality and temperature monitoring and modeling used by Avista for the PDEA. In general, the Sierra Club believes that the monitoring and modeling is not of good scientific quality.	The WRWG developed the study plans and hired the consultant to do the work. All stakeholders had input to the choice of study methods and models. In the case of CE-QUAL, the same model being used by WDOE for the TMDL was run, and an independent consultant (Dr. Scott Wells) was hired to review the consultants work. The study results provide an adequate understanding for relicensing the project.
SC-084	There is no comment SC-084.	
SC-085	What historical period is addressed regarding historical temperature data? What conditions have changed since the historical data was collected? Where is this information in the Golder report?	Data presented in the PDEA have been collected after the construction of Post Falls HED.
SC-086	How did Avista determine that monitoring in Black Lake cannot be generalized to apply to other lateral lakes.	Black Lake has distinct bathymetric and hydraulic characteristics when compared to other lateral lakes.
SC-087	The PDEA incorrectly states that the Spokane WWTP has an abundance of dissolved oxygen and deficiency of nutrients; to the contrary, most of the river violates Washington standards for dissolved oxygen.	The PDEA is discussing Spokane River water quality, not effluent water quality.
SC-088	Would using the south spill gates of Post Falls HED to reduce TGE result in meeting the water quality standards?	At the flow levels monitored in 2004, TDG levels were still near or slightly above TDG standards with use of the South Spill gates. Avista has committed to developing and implementing a TDG abatement plan.
SC-089	Why did the PDEA not include the Spokane Tribe and WDOE water quality monitoring data?	WDOE data are cited on Table 5-27.
SC-090	Did any modeling scenario set inflow to outflow from Long Lake HED to achieve flushing of the reservoir? How would additional flows with additional reservoir drawdown impact dissolved oxygen and temperature? Is it possible that higher flows over time would likely have a beneficial effect?	All modeling runs assumed current load factoring operations at Long Lake, except for Natural Hydrograph runs. The effects of increasing flow to 700 cfs were evaluated and referenced in the PDEA and showed negligible improvements in water quality.
SC-091	Would total TDG be higher or lower under natural conditions, and would the overall effects on aquatic species be less than with the project in place? Do differing seasonal flows over the dam site with and without the project affect TDG levels?	Avista has committed to a TDG abatement plan. The natural condition for TDG is addressed in a study report (Golder Associates Ltd., 2004).
SC-092	The PDEA fails to include a discussion of the recreation value of fisheries, state fishery and fish habitat management objectives, and sport fishery maintenance as required by FERC guidance.	The PDEA recognizes recreational and other important fishery resources. Fishery management objectives are discussed in Section 5.6.1.3, *Resident Fish Populations*. The management objectives of IDFG, FWS and the Coeur d'Alene Tribe are described in the Coeur d'Alene Lake Basin Bull Trout and Cutthroat Trout PME Implementation Plan and are referenced in the Fish PME Program. Additionally, the PDEA references the local and regional importance of fishing throughout Section 5.10, *Recreational Resources*. The PDEA also discusses how the proposed measures would affect the recreational fishery in the Project area.

Comment ID	Comment	Response
SC-093	Avista should collect and provide macroinvertebrate data, fish population/habitat information, and quantitative fish population/density information, along with historical fish population data for all Project-affected reaches.	Appropriate and adequate studies have been conducted to characterize the environment and evaluate Project effects for the purposes of the PDEA and license application. Pertinent historical information is discussed in the PDEA.
SC-094	The bull trout PME should describe specific actions that would be carried out.	Specific project goals and actions will be described in specific project implementation proposals over the term of the new license. Please see response CDAT-II-164 .
SC-095	Historical data indicate that fish populations were much larger prior to the dams when flows where higher; the PDEA states that higher flows would be detrimental, which is not consistent with this historical information.	Current information indicates higher flows during summer can result in higher water temperatures, which could reduce useable habitat for rainbow trout in the Spokane River.
SC-096	The Sierra Club strongly supports the implementation of a 4-inch-per-hour ramping rate at Post Falls HED.	Comment noted.
SC-097	The PDEA must analyze cumulative impacts on resident fish and how the Project impacts interact with other activities to impact aquatic species.	The cumulative effects Section 5.6.3 has been expanded to include discussion of resident fish.
SC-098	There is no comment SC-098.	
SC-099	What will be the impact on wetlands over the course of the next license term with respect to continued sedimentation of the reservoirs? Will the PME measures mitigate all impacts?	Effects on wetlands vary. Avista has no responsibility to mitigate for all effects. Please see response BIA-S-061.
SC-100	All impacts to bull trout resulting from alteration of the flow regime should be considered direct effects on the species. The PDEA fails to state that the Spokane River was historical habitat for bull trout or discuss the role of the project in the decline of bull trout. Post Falls HED is identified by the FWS draft recovery plan as a factor for decline of bull trout.	Please see response TLC-48.
SC-101	There is no comment SC-10.	
SC-102	Unavoidable adverse effects on cultural resources should take into consideration the cultural value of anadromous fish and cultural values of the Spokane Falls.	These values are taken into account in the aquatic and aesthetic resource sections of the PDEA.
SC-103	Monroe Street bridge pedestrian structures are most likely being built to view the falls, not the dams.	The primary purpose of the Monroe Street Bridge pedestrian structures is to allow pedestrians to cross the river. Viewing the river, falls, and dam is an ancillary benefit.
SC-104	The PDEA's evaluation of alternative aesthetic flows is inadequate and the conclusion regarding "appropriate balance" is unsupported.	We respectfully disagree with the Sierra Club's assessment. The RLUAWG conducted a year-round recreation survey and an aesthetic study at Upper Falls to determine desirable attributes and preferred viewing times. Additionally the RLUAWG held numerous meetings to determine flows that represented a balance between aesthetics, recreation and other resource needs. Our proposal is based on these findings.
SC-105	Avista should show the effect on the economy of replacing the Project's power individually and collectively, with the lowest reasonable cost alternative.	Please see responses FWS-70 and SC-026.
SC-106	Clarify the 0.2% reduction in annual energy and dependable capacity.	We have added sentences to clarify this point.

Comment ID	Comment	Response
SC-107	The PDEA should assess consistency with the NPCC watershed assessments and TMDL studies and other applicable plans.	Please see Section 4.3.7 for a description of the federal agency requirements under the Northwest Power Planning and Conservation Act.
SC-108 through SC-119	See Table C-2, Responses to Comments on the License Application.	
SC-120	The Sierra Club believes the ALP process is flawed in many areas, including procedural process to safeguard and create a full and complete record that supports the PME measures; facilitators lack of neutrality; and discouragement of honesty and open exchange of personal perspectives.	Avista disagrees with the Sierra Club's characterization of the process and notes the organization's late and spotty participation in the process.
SC-121	Critical information was not provided in a timely fashion.	Comment noted. Please see response SC-120.
SC-122	The Sierra Club experienced that the facilitators on numerous occasions failed to channel discussion and allowed personal attacks and inappropriate comments and undue pressure during meetings.	Comment noted. Please see response SC-120.
SC-123	The Sierra Club believes that further negotiations can be productive and lead to a license protective of both power and non-power needs.	Comment noted.
SCT-1	Spokane County supports a minimum instream flow of 500 cfs at Barker Rd as a means to provide summer rearing habitat. While there are some questions regarding the discharge necessary at Post Falls HED to support a flow of 500 cfs at Barker Road , Spokane County supports a discharge of at least 600 cfs at Post Falls HED. Additionally, the County supports the concept of lowering Post Falls HED discharge to 500 cfs during low runoff years. Since the recommended control point for instream flow in the Spokane River is the Barker Road transect, the County supports upgrading the Barker Road gauge to a real-time gauge.	Comment noted.
SCT-2	Spokane County supports developing a total dissolved oxygen mitigation plan for discharges from Long Lake Dam. The county also supports developing and implementing a water quality monitoring plan. This plan should be developed in cooperation with local governmental and industrial discharges, and state resource management agencies.	Please see response WDOE-36.
SCT-3	While Spokane County is sensitive to the economic and recreational concerns associated with the maintenance of water levels in Coeur d'Alene Lake, and is supportive of lowering minimum discharges at Post Falls HED in low runoff years, the county is not in support of extending the summer recreation level through the end of September. The county is concerned that lower instream flows during the last half of September could negatively impact Lake Spokane water quality.	Comment noted. Proposed Project operation does not include extending the summer lake level of Coeur d'Alene Lake through the end of September.
SCT-4	Spokane County supports efforts to improve recreational opportunities on and around Lake Spokane, Nine Mile Reservoir, and along the free-flowing Sections of the Spokane River. The county also supports coordination of late spring and fall flow releases from Post Falls HED to extend the whitewater boating opportunities on the Spokane River, providing water temperature impacts do not occur.	Comment noted. Also see response IDFG-07b.

Comment ID	Comment	Response
SCT-5	Spokane County supports efforts to improve wetland and riparian zone areas on Lake Spokane and Nine Mile Reservoir. The County also supports enhanced aquatic weed management measures for Lake Spokane, including direct management techniques involving bottom barriers to control weeds at access sites, and using winter drawdown for general control of weeds.	Comment noted.
SMI-01	The final EA should include the conservation merits of hydropower as a renewable resource. Cite a corollary socioeconomic value to consumers (e.g., $45/mw less to produce hydro over gas).	Comment noted.
SMI-02	With the proposed 50-year license period, stress the value of adaptive management as an essential to adjust to the unknown future needs of the community served. A standard twice-a-year meeting schedule of cooperating parties throughout the full gamut of measures/programs to monitor and readjust appears desirable, if not mandatory, to fulfill the adaptive management goal, which should require careful review of changing circumstances and collaboration over the life of the license.	Comment noted. Also see response BB-09a.
SMI-03	Do not separate Post Falls HED into a separate license.	Please see response BIA-S-006.
SMI-04	Keep Post Falls HED minimum at 600 cfs unless subsequent studies/monitoring (e.g., fish, TMDL) determine incontrovertibly that 500 cfs would be acceptable from a water quality standpoint.	Please see responses STI-44 and JRPO-2.
SMI-05	Continue 2128' as the Coeur d'Alene Lake summer elevation to preserve economic investment and protect the environment, but it would be unwise to extend the season. Use adaptive management based on seasonal climate/low water circumstances to continue present practice. Announce a drawdown date annually and as early in the year as may be feasible.	Comment noted.
SMI-06	Augment flows at Post Falls HED for whitewater paddling and schedule August boating only when not environmentally damaging. Qualify operational change in summary with language akin to that in full paragraph 4, line 6-8.	We have modified Section 5.10, *Recreational Resources*, to address this comment.
SMI-07	Upper Falls generation should take precedence over aesthetic flows during low-flow years.	As described in Section 7.0, *Comprehensive Development*, we have balanced aesthetic resource needs with competing demands on the water by proposing the Upper Falls aesthetic flow release indicated in measure SRP-AES-1.
SMI-08	If it is anticipated that the Long Lake HED drawdown might lower Lake Spokane below the 14' normal in recent years, the "certain emergency conditions" in paragraph 1, line 2 (summary xxi) should be itemized.	Please see response SC-035.
SMI-09	Add rock climbing as an activity in paragraph 2, line 8 (5-229)	We have modified Section 5.10 to include rock climbing as an important recreational activity.
SMI-10	Add "Spokane Mountaineers" to the consultation list in full paragraph 4, line 4 (5-213)	We have revised measures PF-REC-1 and SRP-REC-1 to include the Spokane Mountaineers.
SMI-11	Substitute "and" for "or" in the last line on Summary xxi.	Page xxi has been corrected.

Comment ID	Comment	Response
SMI-12	Add Federal standards for lead concentrations as a comparison in 5.3.1.7.	The text of Section 5.3.1.7 has sufficient detail concerning the metal-enrichment factors for mining-derived sediments for the purposes of the PDEA. Please refer to the source documents (Abraham, 1994; Bookstrom et al., 1999) for additional information.
SMI-13	Define "relatively small" under Upper Falls HED paragraph, line 3.	The first bullet of the text in Section 3.1.1.4 under the Upper Falls HED heading indicates that the reservoir has a surface area of just 150 acres.
SRA-1	This comment supports the Idaho Compromise, which would include a 2,128-foot lake level through Labor Day and an increased minimum flow through Post Falls HED.	Comment noted.
STI-01	The cover letter of the Spokane Tribe of Indians' comments summarizes the unique position of the Tribes with respect to hydroelectric project relicensing, citing requirements of the Federal Power Act, National Environmental Policy Act, Clean Water Act, National Historic Preservation Act, and their implementing regulations. The Tribe's view is that the PDEA is deficient and fails to take a hard look at Project impacts to resources valued by the Tribe, including impacts to water resources, fish, wildlife, plants, cultural and historic resources, transportation and recreation, and use of shoreline and lands.	Please see response BIA-G-04.
STI-02	The Spokane Tribe of Indians summarizes the Tribe's position with respect to project impacts on aquatic resources, particularly including effects associated with water quality, total dissolved gas and related gas bubble trauma, dissolved oxygen, water temperature, heavy metals and contaminated sediment, non-native plants and fishes, sediment buildup in reservoirs, blockage of historic fish runs, and changes in the historical hydrograph.	Comment noted. These issues are all discussed in the PDEA.
STI-03	Maintaining the Coeur d'Alene Lake level through September 15 would provide very little recreational gain because boat use falls off after Labor Day.	Comment noted.
STI-04	Carefully consider the impacts of whitewater flows on fisheries and water quality.	We agree this is important and believe it is reflected in the PDEA. Please see response IDFG-07b.
STI-05	Avista should retain the option of drawing Lake Spokane down 24 feet as a means of aquatic weed control.	Comment noted.
STI-06	Project effects on water quality both above Post Falls Dam and below Long Lake Dam need additional development to include the managers of those waters. The Project limits the Spokane Tribe of Indians opportunities by violating water quality standards.	Please see responses IDEQ-01a and WDOE-36.
STI-07	Water quality monitoring and fishery enhancement measures should specifically address the area below Long Lake because it has the highest dissolved gas and lowest dissolved oxygen for the entire water column.	Please see response STI-48.

Comment ID	Comment	Response
STI-08	The Spokane Tribe of Indians requests clarification of several points with respect to aesthetic flows, and notes the beneficial effects of aesthetic flows on dissolved oxygen levels.	As described in Section 5.11.2.4, *Aesthetic Flows*, aesthetic flows are river flows that are being proposed in the north channel at Upper Falls between Memorial Day and September 30th on an annual basis when flows would not otherwise exist. Flows in excess of the proposed aesthetic flows typically occur between fall and mid June to early July or about 8 months of the year. Increased flows through the turbines would not improve dissolved oxygen significantly. However, increased flows over the dam would not likely improve dissolved oxygen either, since oxygen levels are already at or near saturation. Thus, aesthetic flows are not expected to have any significant water quality benefit.
STI-09	The description of the existing Project should acknowledge that the Project affects the entire Spokane River, not just to Long Lake Dam.	Please see response BIA -G-02.
STI-10	Please clarify that the Spokane Indian Reservation is less than 2 miles below Long Lake Dam, not several miles.	Section 3.1 has been corrected.
STI-11	Please clarify how flows would increase under the Natural Hydrograph in June through August in wet years.	Flows out of Coeur d'Alene Lake would remain higher most of this period because the lake would take longer to reach the minimum summer natural elevation than under current Project operations.
STI-12	Increased aquifer discharge under the Natural Hydrograph could negate the effects of higher warm flows.	Please see responses CDAT-II-053 and CDAT-II-055.
STI-13	Please clarify how the Natural Hydrograph could be detrimental to wild trout if there were more wild trout historically than there are now.	The statement about wild trout refers to the population existing under current operating conditions. Section 3.3.4.3 clarifies this. Also see response SC-095.
STI-14	Agencies and Tribes have supported development of a fish passage PME that would develop passage when anadromous fish runs are restored above Grand Coulee Dam; the Spokane Tribe of Indians considers this a fishway prescription.	Anadromous fish are not currently present in the Project area, and fish passage facilities are not necessary at this time. Avista anticipates that the FWS will reserve Section 18 FPA authority to prescribe fishways at the Spokane River HEDs in the future if it becomes necessary.
STI-15	The text of Section 4.3.7 should be amended to indicate that the NPPC "directed" or "authorized."	Section 4.3.7 has been corrected.
STI-16	The cumulative effects analysis should include the Spokane River below Little Falls Dam, because that area is affected by the Project.	Please see response BIA -G-02.
STI-17	The Spokane Tribe of Indians makes several specific comments concerning the geology and soils analysis, addressing grain size, sediment capacity at Nine Mile Reservoir, and sediment deposition.	Opinion noted. The PDEA and Golder (2005b) provide information pertaining to sediments.
STI-18	The Spokane Tribe of Indians believes that the 600 cfs minimum flow is a good starting point but that it should be studied further.	Comment noted.
STI-19	Table 5-2 Gauging Station Information. Shamokin Creek station has operated since 02 and is a current real-time station.	Comment noted and change made.

Comment ID	Comment	Response
STI-20	Lake Coeur d' Alene is held at higher levels than naturally and causes increases in temperature and evaporation. These numbers are out there from your own studies; why not put the cfs (200- 300?) instead of 0.4 percent to make it clearer what amount is lost due to operations. Why doesn't Avista have a consumptive water right for this use? Although this may not be a concern to many, Tribal water rights are supercede all others, and an accounting of all water should be made.	The loss of water by evaporation and other factors is depicted as a percentage to provide a relative comparison given the magnitude of the runoff each year. A consumptive water right by definition does not include evaporation calculations.
STI-21	Sedimentation of the upper portions of Long Lake will directly influence the amount of storage the reservoir has. Is the 105,080 acre feet of storage based on when the dam was constructed, currently, or after it has been filled in by 20%?	The storage figure is a calculation dating back to construction.
STI-22	The hourly flow should be shown at some point in this section because daily flow is hiding the nightly 200 cfs flows when dissolved oxygen levels really plummet.	Flow levels are provided to reflect typical operations. Avista proposes to evaluate dissolved oxygen enhancement options at the Long Lake HED discharge.
STI-23	Although declines in summer low-flow can be partially attributed to aquifer and surface water withdrawals, urbanization, and other land-use influences, it should be identified that dryer hotter summers increase evaporation rates on the reservoirs.	Comment noted. The hydrological modeling includes evaporation.
STI-24	Although the minimum 600 cfs Post Falls flow proposal is a starting point, to consider a 500 cfs minimum flow only in dry years is unacceptable. In a region dominated by reservoirs, what is 3 inches drop in lake elevation? When everyone is suffering from a drought, the burden should be distributed to all.	Please see response WDOE-36.
STI-25	Although the increased June through August flows are attractive, the larger decreases in September and October are of concern. Dissolved oxygen levels below Long Lake Dam are still well below the standards (8 mg/l) and the increase of cool water may cause Long Lake to overturn quicker and provide adequate dissolved oxygen levels downstream. This is why we do not support the delaying of water from Lake Coeur d' Alene in September. We also support the further analysis of this proposal on downstream water quality because these estimated changes of nearly 500 cfs or a drop of nearly 38% at Nine Mile and 31% at Long Lake is substantial.	Comments noted. The Proposed Action, combining new minimum flows with a date-certain drawdown start, creates conditions in September very similar to current operations. In addition, upon initiation of drawdown, flows will immediately increase from 600/500 cfs to September and October flows equivalent to current operations. Also see response CDAT-II-042.
STI-26	There is no discussion on the sediment buildup in the reservoir bottoms affecting groundwater recharge rates. And the cumulative effect of increased evaporation is not addressed.	There is no evidence to suggest that sediment buildup affects ground water recharge. The evaporation rates are a component of the hydrological modeling analysis.
STI-27	WDOE is aware that the Spokane River exceeds total dissolved gas standards but has chosen to address the issue in the 401 certification process.	Comment noted
STI-28	River mile 29.3 is Little Falls Dam, approximately 4.6 miles downstream of Long Lake Dam tailrace.	The text has been revised.

Comment ID	Comment	Response
STI-29	Table 5-32, *Summary of TDG Measurements*, needs to reflect earlier data collected by CH2M HILL in 1999 and 2000. Dissolved gas data were collected in 1992 by EWU and the Little Falls Settlement Agreement relies on these data. This table should reflect the data collected downstream of Little Falls Dam that was collected during the same study by CH2M HILL.	CH2M HILL data from 1999–2000 are included in the data report referenced as CH2M Hill (2002).
STI-30	In Section 5.5.2.1, *Effects of Project Operations-Lake Level Management*, the Spokane Tribe of Indians feels that the term "slightly" is not a quantitative term that adequately identifies Project effects.	The text has been revised.
STI-31	Regarding Project releases, the 600-cfs flow is anticipated only 4.5% of the time. This is a relatively small effort to enhance and protect aquatic habitat.	Please see responses WDOE-05 and CDAT-II-053.
STI-32	Clearly state that the 4-5 mg/l is actually as low as just 4 mg/l and it is measured at the tailrace of Long Lake Dam. Also, having all current dischargers remain as they currently exist is important when showing that the unimpounded condition meets the 8 mg/l.	The text has been revised.
STI-33	Saying the model shows there will be "no significant effect on downstream DO levels" is incorrect because there is still discussion about this specific point. The only other agency that has run this model on the river has shown outputs to the contrary. If the point is resolved, it could be included in this discussion. If not, it should be left out because there is still serious disagreement.	Please see response CDAT-I-06. The quotation referenced in the comment could not be found in this section of the PDEA. The model is the same model used previously by WDOE and is accurate for its intended uses.
STI-34	Nine Mile Falls, like many others along the Spokane River, was a natural constriction of the channel and an increase in gradient and turbulence. Like Little Falls and at the location of Long Lake Dam, the rapids were not actual falls. Rapids decrease dissolved gas because of the lack of deep plunge pools. Many historical photos of the rapids and "falls" along the Spokane River show that Nine Mile Falls was a short series of rapids that significantly de-gassed the natural production from Spokane Falls.	The PDEA indicates that the degree to which Nine Mile Falls affected TDG prior to HED construction is unknown.
STI-35	TDG levels extend to the Little Falls fore bay and throughout the Spokane arm of Lake Roosevelt.	Comment noted.
STI-36	Effects Analysis flows and Monitoring flow (typographical error)	The text has been revised.
STI-37	Although the *Cumulative Effects* section talks about effects other than Project effects, it should discuss how each effect interacts and the ultimate or end result of this effect. The second paragraph in this section should provide a clearer picture of how reservoirs affect dissolved oxygen levels through stratification, macrophyte and periphyton growth, and nutrient cycling. The statement the "the Proposed Action would result in negligible effects on nutrient loads and biological productivity" has no grounding or proof. In discussing temperature effects, Avista should include cumulative effects of temperature increases related to reservoir creation and temperature effects on TDG production.	Please see response BIA-G-02.
STI-38	The Spokane Tribe of Indians notes that the excellent fishery for bass, pike and perch has negative on the native salmonid fishery because of predation.	Comment noted. This is acknowledged in the PDEA.

Comment ID	Comment	Response
STI-39	Salmonid presence in Lake Spokane needs to be addressed.	The PDEA addressed salmonids in Section 5.6.1.3, *Resident Fish Populations*. Table 3-35 of the PDEA characterizes the proportion of salmonids compared to other species in Lake Spokane.
STI-40	The Spokane Tribe of Indians questions when the Nine Mile HED was completed. The Spokane Tribe of Indians also comments that other entities besides Native American tribes have expressed an interest in restoring anadromous fish upstream of Grand Coulee Dam.	Nine Mile Dam was first operational in 1908. The text will be revised to indicate that various stakeholders have expressed an interest in restoring anadromous fish to the Spokane River.
STI-41	(1) Do the fisheries surveys include Lake Spokane. (2) Adding appropriate sized gravels for salmonid spawning could be a PM&E measure. (3) Were fish observed in the anoxic areas down by the Long Lake Dam?	(1) Several surveys have been completed on Lake Spokane and are identified in the discussion of Lake Spokane in Section 5.6.1.3 and the literature cited section. (2) Adding gravels or other habitat improvement activities could be conducted through the Spokane River Fish Protection and Enhancement Program. (3) Fish were observed throughout the water column of Lake Spokane, with the highest concentrations between depths of 53 to 66 feet in the lower and middle transects (Osborne et al. 2003). Observed fish densities for all species were lowest near the dam. See this WDFW report for more detail.
STI-42	What is the difference between the Coeur d'Alene Lake water level management discussion and that of the Spokane River below Long Lake.	Water Level management for Lake Spokane as it pertains to aquatic habitat is discussed in Section 5.6.2.1 of the PDEA. As indicated in response STI-16, we consider aquatic habitat influences from discharge from Long Lake HED to be water quality related. Such affects are therefore discussed in Sections 5.5.2.1, 5.5.2.2, and 5.5.3 of the *Water Quality* section of the PDEA.
STI-43	The Spokane Tribe of Indians questions the phrase in the first paragraph on page 5-141 of the PDEA that reads "...more fish Bigger."	We have corrected this typographical error by inserting a period after the word "fish."
STI-44	The Spokane Tribe of Indians asks that if habitat for the combined life states of adult and juvenile rainbow trout is optimized at 700 cfs then why are there considerations for 600 or even 500 cfs?	Physical habitat at the Barker Road site for the combined life stages of rainbow trout is optimized at 700 cfs. However, as flows increase, temperatures downstream of this site also increase, diminishing the total amount of suitable habitat for trout. The minimum discharge flow of 600/500 cfs represents a balance of protecting trout habitat and other resource interests.
STI-45	The Spokane Tribe of Indians speculates that although higher Post Falls HED discharges seem to increase water temperatures downstream of Barker Road during a relatively short, over a longer time frame, higher flows could result in higher flows into the aquifer and later increases in cool water releases into the Spokane River.	Currently, there is no evidence to support the Spokane Tribe of Indians' hypothesis. See comment response STI-44
STI-46	The Spokane Tribe of Indians asks if PME AR-1 is designed to offset any project-related negative effects from the loss of connectivity from Long Lake and Nine Mile HEDs.	The PME AR-1 is designed to mitigate for project effects. No significant connectivity loss with respect to current fish populations is known to occur at the Long Lake and Nine Mile HED.
STI-47	What does "likely to be about" mean when referring to the expected survival of fish passing through Project spillways and gates?	·We have removed the word "likely" from the PDEA; the exact deviation from the expected 98 to 99 percent survival rate is unknown.
STI-48	Does the Fishery Enhancement Program include fish below Long Lake Dam?	The proposed Spokane River Fish PM&E Program could include measures that pertain to fish below Long Lake Dam, however no specific measures have been identified.

Comment ID	Comment	Response
STI-49	The Cumulative Effects discussion needs to include information of the effect of total dissolved gas and dissolved oxygen.	See response STI-16
STI-50	The Spokane Tribe of Indians references previous comments contained in attached documents, including comments on SD1 (July 1, 2003), the draft Current Operations Water Quality Report (March 24, 2005) , the TDG PME Proposal (July 26, 2004), the 2004 Interim TDG Report (July 26, 2004), and two undated markups of the Spokane River PME.	Comment noted. Comments on SD1 were responded to when SD2 was released. Other comments were considered at the time they were submitted and are not responded to again at this time.
STI-51	The APE has been very narrowly defined and has prevented the recovery of cultural information for the river outside of specific areas. Flow is not the only impact created by dams and reservoirs, only the simplest one.	Please see response BIA-S-108.
STI-52	The Spokane Tribe of Indians is not considered one of the stakeholders dealing with the Spokane River west of downtown Spokane. The Spokane Tribe of Indians is omitted consistently with respect to the overall recreation plan.	We are happy to include the Spokane Tribe of Indians as a stakeholder per their request and have revised measure SRP-REC-1 accordingly. Avista notes, however, that the Spokane Tribe of Indians has not previously expressed an interest in the efforts of the RLUAWG, though they have had an open invitation to participate in and have been notified of all pre-filing workgroup meetings.
STI-53	The Spokane Tribe of Indians is concerned that Avista is not giving sufficient attention to the current bank sliding occurring near Long Lake Dam, the potential for new recreational activity to exacerbate the slides, and the potential that ancestral burials may be eroded, plant communities may be displaced by modern cultivars or weeds, and holy places may be invaded by recreationists.	Comment noted. The PDEA reflects the fact that very little bank slumping or active erosion is occurring on Lake Spokane, as described in the erosion reports. Under the HPMP, new recreational activities would be planned to avoid adverse effects on cultural resources.
STI-54	No provisions have been made to address Project impacts on cultural resources between Long Lake and Little Falls dams, although the impacts have been acknowledged.	Please see response BIA-S-108 concerning the definition of the APE.
STI-55	The HPMP is not yet available for review, so its details are not known. There is no assurance that the planned cultural resource oversight of recreation plans will be adequate to protect cultural resource sites.	Please see responses BIA-S-118 and CDAT-11-217
STI-56a	Avista should contract cultural resource management to the Tribes and/or include tribal persons on the cultural resource management staff in order to provide appropriate management for traditional cultural properties.	Avista is currently contracting with the Spokane Tribe of Indians, Coeur d'Alene Tribe, and Confederated Tribes of the Colville Reservation. The Tribes are involved to varying degrees in the cultural resource activities to date, including Traditional Cultural Properties studies and inventory field work. Avista will continue to consider opportunities for tribal participation in future cultural resource management activities.
STI-56b	There is no discussion in the PDEA about traditional plants important to the Spokane tribal members, although a list of such plants was submitted to the cultural resources working group.	Please see response CDAT-II-175. Parametrix (2003b) reported that plant species important to the Spokane Tribe of Indians were included in Table 1 of the rare plant survey. Surveys were conducted on Spokane tribal lands. Results are presented in Section 5.7.1.2 of the PDEA.
STI-57	Salmon are an important traditional cultural property and an integral part of Spokan(e) cultural identity. Salmon re-introduction during the term of the new license must be considered.	The discussion of salmon is found in the aquatics and threatened and endangered species sections of the PDEA. Also see response STI-14.

Comment ID	Comment	Response
STI-58	The Spokane Tribe of Indians corrects the record with respect to the principle Middle Spokane village.	The text has been revised to include both Ross (1998) and Spokane Tribe of Indians information about the principal Middle Spokane village.
STI-59	The APE should be expanded to include the Spokane River corridor, and the Spokane Tribe of Indians should be considered a stakeholder.	Please see response BIA-S-108
STI-60	The Spokane Tribe of Indians should be mentioned with respect to its role in the Interpretation and Education Plan.	The Spokane Tribe of Indians is listed in measure SRP-REC-3 as one of the many entities that Avista will consult to plan and implement the Interpretation and Education Plan as well as the other components of the broader PME measure.
TLC-01	If the No-action Alternative is to serve as the baseline to compare the Proposed Action, Avista should provide information on continuing environmental effects that have been occurring and building for the past 100 years.	For a complete description of the Project's effects on various resources, please see the *Environmental Effects* section for each resource in Section 5.0. Each resource topic (for example, Section 5.5.2.2, *Total Dissolved Gas*) begins with a description of the Project's effect with respect to that resource topic.
TLC-02	At minimum Avista should have made it more clear that the Proposed Action is solely the proposal of Avista and is in no way endorsed by settlement parties. During the ALP, it was made clear that "parking lot" issues were not to be presented as consensus.	Please see response IRU-3.
TLC-03	WQ-1 should be revised to include structural fixes (such as spillway deflectors) at Long Lake HED and the implementation of alternative spill gate operations (with monitoring for effectiveness).	Please see response SC-042.
TLC-04	Funds for measures WQ-1 should be flexible and Avista should set aside funds to be used to mitigate for any effects found from its operations on water quality throughout the watershed (i.e., Spokane River, Lake CDA, CDA, St. Joe and St. Maries rivers and lateral lakes).	Measures PF-WQ-1 and SRP-WQ-1 address TDG only.
TLC-05	Avista must include mitigation measures to account for the temperature impacts on inundated reaches of the St. Joe and other upstream tributaries as a result of artificially high lake levels. Avista should proposed structural and/or operational changes to its dams to address Long Lake water quality (temperature or dissolved oxygen) concerns.	Please see responses WDOE-36 and IDEQ-01a.
TLC-06	While the measures outlined in AR-1 clearly have benefits for fish, the analysis does not support this as adequate to mitigate for project impacts.	Please see response WDFW-03.
TLC-07	In the absence of a settlement, the minimum flow should be based on recommendations from Fish and Wildlife Management agencies, and the data from Avista's own reports, which is 700 cfs. Avista should set minimum flows to achieve 500 cfs at Barker Road to meet the needs of both juvenile and adult rainbow trout, as suggested by agencies. This would mean setting the minimum flows at Post Falls HED between 670 and 770 cfs. TLC does not disagree with drawing down Lake Coeur d'Alene Lake after September 15 as long as the flows are met.	Please see responses TLC-8, STI-44, and JRPO-2.

Comment ID	Comment	Response
TLC-08	To verify adequacy of the minimum instream flow, Avista should create an adaptive management strategy for at least 5 years to monitor and assess the impact of flows above 600 cfs on water temperatures downstream of Barker Road near Sullivan, where aquifer water recharges and mixes and also monitor the losing/gaining reach downstream of Post Falls HED to better understand and predict the amount of flow lost/gained.	Avista proposes to monitor temperatures at selected areas between Post Falls HED and Plantes Ferry Park to provide more information concerning effects of different HED flow discharges on downstream water temperatures, and we have modified Section 5.6.2 of the PDEA and appropriate PME measures to reflect this.
TLC-09	Post Falls HED impacts Bull Trout and Westslope Cutthroat Trout significantly and the $240,000 is not adequate to meet the needs of up to $800,000 annually in funding estimated by the agencies and the Coeur d'Alene Tribe to implement the entire Fishery Protection Program. A description of specific projects that would be carried out in the future is necessary for an accurate review of he PME measures effectiveness. Additional detail is needed regarding what type of projects will occur and what substantive benefits will occur.	The funding proposed to support the Coeur d'Alene Lake Basin Bull Trout and Westslope Cutthroat Trout PME (now included as an element of measure PF-AR-1) is adequate to meet the appropriate mitigation and enhancement obligations of Avista. It is not the responsibility of Avista to meet all of the fishery program funding needs identified by agencies and the Coeur d'Alene Tribe. Also see responses CDAT-II-164 and SC-094.
TLC-10	The up to $500,000 Avista proposes to spend annually on erosion controls and riparian habitat protection and enhancement is not adequate to complete more than a few miles of restoration. Avista needs to dedicate enough funds to cover at least half of the restoration costs associated with erosion due to its dam operations.	Opinion noted. Please see responses BIA-S-060 and BIA-S-061.
TLC-11	Avista should pursue joining with local agencies and governments to reduce the amount of boat traffic in the tributaries and the southern portion of the Lake to reduce boat wakes and erosion.	Comment noted. Neither the Tribe nor the managing agencies have proposed reducing the amount of boat traffic in the tributaries or the southern portion of Coeur d'Alene Lake.
TLC-12	Avista proposes nothing to address sedimentation of Nine Mile and Long Lake reservoirs, claiming it is not their responsibility. Avista should propose measures to address the impacts of increased sedimentation on recreation, wildlife, water quality and fishery resources.	Please see response WDFW-06.
TLC-13	Avista should eliminate the 600 cfs cut-off, explore providing more water, and expand the period that water is running through the waterfalls.	The 600-cfs limit has been removed and measure SRP-AES-1 has been modified.
TLC-14	We support the proposed improvements to recreational facilities along the Spokane River and Coeur d'Alene Lake and the paddling flows in the spring and fall. Avista needs to make a commitment to provide several paddling flow dates in August, with coordination with the fish and wildlife agencies.	Comment noted. As described in measure PF-REC-3, Avista will consult with WDFW in determining the timing and duration of August flows. Also see responses FWS-32 and IDFG-07b.
TLC-15	Because of the cumulative impacts to the river from all Avista's projects, it does not make sense to split off Post Falls from other dams in the license.	Please see response BIA-S-006.
TLC-16	If Avista wants to respond to stakeholder concerns, it should have truly considered the Natural Hydrograph scenario, not eliminate it.	Please see responses CDAT-II-50 and IRU-15.
TLC-17	TLC strongly disagrees with the Natural Hydrograph conclusions in land use and aesthetics and socioeconomics. TLC is not aware of any study that determined the Natural Hydrograph short-term shoreline visual effects would displease some residents and visitors. Avista provides no data that would conclude that tourism would drop or that the result of the Natural Hydrograph scenario would be negative.	Opinion noted. Please see responses IRU-14 and CDAT-II-061.

Comment ID	Comment	Response
TLC-18	Due to the relative low power production and the increasingly high resources values of the Spokane River, its fisheries, and recreation, a decommissioning alternative that includes analysis of the Natural Hydrograph and perhaps a range of flows that comes closer to the Natural Hydrograph would be illustrative and allow for readers to better understand the actual impacts of current and proposed operations.	Please see responses CDAT-II-50 and IRU-15.
TLC-19	The PDEA contains limited economic data to understand how much Avista is actually profiting from its use of the river. Does it make economic sense to run these dams for the long term, knowing all the past, current, and future impacts? It may be economically feasible for Avista to continue operating the dams, but how much more would the average ratepayer pay for Avista to shut them down and provide energy from another source? Ratepayers deserve to know this information and weigh it against all environmental, economic and social impacts of the Project.	The economic analysis as required by FERC is shown in Exhibit D and Exhibit H and in Section 6.0, *Developmental Analysis*, of the PDEA. The cost of an alternative power source to replace the Spokane River Project is described in Exhibit D.
TLC-20	The geographic scope is inappropriately small for the environmental analysis. NEPA requires analysis of cumulative impacts on natural resources, regardless of the cause of the impact. Thus, it is inappropriate to restrict the environmental analysis to the FERC project boundary.	Please see response BIA-G-02.
TLC-21	THE PDEA does not consider impacts from past and current operations in the two alternatives. NEPA's cumulative impacts analysis requirement mandates that it assessing impacts, the EA compare current versus pre-project conditions and assess how the project has impacted the environment since its construction.	Please see responses BIA-G-02 and TLC-1.
TLC-22	Avista must include an assessment of the impact of past actions on sedimentation and erosion in the Spokane/Coeur d'Alene watershed.	Please see responses BIA-G-02 and TLC-1.
TLC-23	The PDEA fails to discuss ongoing and reasonably foreseeable actions of the FS and other land management agencies in the upper Coeur d'Alene watershed, including logging and road building, and its cumulative contribution of sedimentation to the watershed.	Please see response BIA-G-02.
TLC-24	Using studies that are not approved by the working groups is problematic- these studies need to be finalized if they are to be used as documentation for Avista's final licensing application.	Please see response CDAT-I-06 regarding adequacy of the studies. Work group approval of contractor studies was desirable under the ALP but is not required.
TLC-25	The $500,000 max per year for erosion control and wetlands restoration seems woefully inadequate to try and make a dent in the over 100 shoreline miles impacted by Post Falls HED operations. What will this plan entail? Avista needs to explain in more detail how it plans to address erosion control and wetlands restoration.	Please see responses BIA-S-060 and BIA-S-061.
TLC-26	Golder (2005b), the sediment routing study, does not adequately address the changed hydrologic conditions. Avista needs to include additional sampling and monitoring to back up the conclusions of the study or provide funding for long-term sediment transport and erosion monitoring based on actual field data and modeling methods such as those used by USGS.	Golder (2005b) addresses existing, future and "unimpacted" conditions. As such, it provides an adequate analysis of "changed" hydrologic conditions.

Comment ID	Comment	Response
TLC-27	Post Falls HED has obvious impacts on sediment routing during the summer months and Avista should mitigate for effects or pay for further study that can pinpoint impacts of dam operations on sedimentation more adequately.	Current Project operations influence Coeur d'Alene Lake pool elevations in the summer and fall; however, sediment transport is relatively small or nonexistent during those times.
TLC-28	Although Project operations are only one piece of the pie, Avista is responsible for a percentage of the mitigation costs.	Opinion noted.
TLC-29	Avista should estimate additional boat traffic when anticipating future erosion effects when discussing erosion and sedimentation in the PDEA. To say any erosion effects from the Proposed Action would be essentially the same as under current Project conditions on the St. Joe and Coeur d'Alene rivers or in the lake is not adequately planning for increased boat traffic.	The PDEA acknowledges that erosion could increase under the Proposed Action as a result of increased boating; attempting to specifically estimate this would be highly speculative and is unnecessary. The reference to erosion related effects remaining “essentially the same” under the Proposed Action is specifically comparing Project-related effects under current conditions to the Proposed Action. Given that no changes to Post Falls operations are proposed that would cause an increase in erosion, this characterization is reasonable.
TLC-30	Even though the PDEA calls Lake Coeur d'Alene an "effective sediment trap," heavy metals have migrated down the Spokane River. Avista should clarify this statement.	As stated in the PDEA, metals can be transported in other ways besides being affixed to sediment; for example, in solution. The PDEA acknowledges that metals have migrated down the Spokane River (see PDEA Section 5.3.1.4).
TLC-31	Avista is a potentially liable party of the cleanup of at least two sites near Upriver Dam for PCBs and metals. How will dam operations impact cleanup activities and impact the possibility of recontamination of these sites?	Avista, through its past ownership of the Spokane Industrial Park, is a PLP at the Upriver Dam cleanup site. Spokane River Project operations do not affect the site or planned cleanup activities there. The clean-up will be conducted under normal HED operating conditions.
TLC-32	Section 5.3 fails to assess the biological and water quality impacts associated with the continuing sedimentation of Nine Mile and long Lake HED.	Please see responses WDFW-06 and SC-003.
TLC-33	Avista must collect or show date to prove that its operations of Post Falls HED do not contribute to leaching of metals from contaminated shoreline sediments. If they cannot, they must participate in mitigation efforts.	Opinion noted. The cycle of saturation and de-saturation of shoreline sediments occurs regardless of the Project operations and can extend well beyond the zone of Project influence during high flows.
TLC-34	Avista must substantiate metals assessment conclusions with site-specific data.	Opinion noted. The metals study (Golder, 2005a, 2004e) examined specific pore water chemistry in the bottom sediments and how those metals are transported up into the water column.
TLC-35	The metals assessment lacks any discussion about other potential effects of continually saturating and desaturating the Coeur d'Alene riverbanks, floodplains, and wetlands. This must be addressed.	Please see response TLC-34.
TLC-36	Does the extended period of inundation during the summer and the subsequent drawdown result in increased sloughing of the riverbank material? If so, what is Avista's mitigation?	Please see responses BIA-S-060 and CDAT-II-127.
TLC-37	Additional study is needed to determine how toxic metals are mobilized in the lake and how current and future Post Falls dam operation might be related.	The topic of metals mobilization is adequately addressed and discussed in the metals study (Golder, 2005a, 2004e) as cited in the PDEA.
TLC-38	The PDEA is deficient in describing the effects dam operations have on metals concentration and transport in the Coeur d'Alene River and Coeur d'Alene Lake.	Opinion noted. We respectfully disagree with the comment. Please see response BIA-S-045a.

Comment ID	Comment	Response
TLC-39	The relationship between extending the drawdown of Coeur d'Alene Lake to mid-September should be more closely analyzed in relationship to perceived impacts to lake levels from increased minimum flow, whatever that flow will be.	Please see response CDAT-II-042.
TLC-40	Any discussion of the proposal to reduce minimum flow would have to consider, among other factors, the actual impact on public resources and the likelihood that lake users would find alternative means to access the lake during drawdowns that affect recreational docks.	Comment noted.
TLC-41	Long Lake HED adversely impacts temperatures on Lake Spokane. Avista has not proposed any operational measures to address the high temperatures. The final EA must contain measures to address adversely high temps to ensure compliance with Washington's water quality standards.	Please see response WDOE-36.
TLC-42	Avista must propose measures to address dissolved oxygen either within the reservoir or downstream of Long Lake HED to ensure compliance with Washington and Spokane Tribe water quality standards. These measures could include turbine venting to address downstream dissolved oxygen and reservoir aeration.	Please see response WDOE-36.
TLC-43	The EA must assess the cumulative effects of the project on PCB contamination, biological/water quality impacts associated with sediment as well as water quality issues associated with dam facilities and operations, such as turbine oil releases. Avista must assess these factors and develop appropriate PME measures.	Please see response BIA-G-02.
TLC-44	It is unclear how Avista can promise substantial mitigation measures to bull trout when the program is so undefined.	Please see response SC-094.
TLC-45	The discussion of cumulative effects is inadequate in that it only includes anadromous fish and does not include a discussion of anything other than non-Avista dam construction. The EA must also analyze cumulative impacts on resident fish and cumulative impacts from many activities throughout the basin, which impact resident fish.	Please see response SC-097.
TLC-46	The PDEA fails to evaluate non-power values of Spokane Falls. It does not identify past, present and future effects on the falls. Nor does it account for the opportunity costs of non-owner values that would be lost under either future scenario.	Please see response IRU-33 for a discussion of quantifying non-power benefits. Consistent with FPA and FERC requirements, we did not conduct an economic assessment of non-power values. Following FERC guidelines, we used existing conditions as baseline for our environmental review.
TLC-47	The PDEA asserts that there are no direct effects of the Project on bull trout. However, alteration of the flow regime is a direct effect of Project operations and should be classified as such.	Please see response TLC-48.
TLC-48	The PDEA fails to mention that the Spokane River was historically habitat for bull trout or to assess any potential role the projects played in the decline of bull trout. The cumulative impact analysis must include discussion of past impacts.	Avista knows of no evidence to support the notion that the Spokane River historically supported bull trout or that the Project has played a role in the decline of bull trout in the Spokane River. The PDEA discussion supports the conclusion that no direct effects are documented or suspected to occur.

Comment ID	Comment	Response
WDFW-01	Additional temperature data should be collected to analyze the effects of minimum flows on fishery and aquatic habitat and a flow management protocol should be developed from this data.	Please see response TLC-08.
WDFW-02	Clarify what the limitations of flow control mechanisms are at the HED and why 4-inches per hour is the rate limitation.	These limitations relate to the gate structure and inherent design at Post Falls HED, as discussed in the FWG.
WDFW-03	Funding proposed in the PDEA for AR-1 is not sufficient.	Given the habitat protection and enhancements provided by the proposed operational requirements, the proposed funding is sufficient to support adequate mitigation for any adverse effects of the continued operation of the Project on fish resources. The proposed measure would help address agency objectives for fish resource protection and recreational fishery enhancement through population and habitat protection, enhancement and monitoring, supplementation of rainbow trout, and fisheries management.
WDFW-04	The effects of aesthetic flows on fish should be determined prior to license issuance.	We qualitatively addressed the effects of aesthetic flow on fish in Section 3.6.2.8, *Secondary Effects of the Proposed Project*, of the PDEA. As described in Section 5.11.2.4, *Aesthetic Flows*, and in measure PF-AES-1, our proposal would include monitoring possible effects on rainbow trout.
WDFW-05	The level of protection and funding for Avista owned lands is inadequate to meet WDFW's wildlife habitat goals and objectives for the project area.	The level of protection and funding proposed for management and enhancement of Avista's Project lands is sufficient and consistent with WDFW's goals and objectives for the Project area. Avista, however, does not have a responsibility to meet WDFW's goals and objectives for the overall Project area.
WDFW-06	Sediment deposition in Nine Mile and Lake Spokane impoundments has a significant impact on fish and wildlife habitat that needs to be addressed by gathering additional data and developing a mitigation strategy or PME.	Hangman Creek is the principal source of sediment entering the Spokane River. This source is not within the Project boundary. Current Project operations do not influence the sediment load coming into the Project. Therefore, Avista is not obligated to develop a sediment management plan.
WDFW-07	Avista should develop a mitigation strategy or a PME in coordination with WDFW, Ecology, and FWS to address the issue of erosion along the shorelines of Lake Spokane and the impacts on riparian habitat.	Please see response STI-53. The small amount of erosion and lack of any significant resource effects on Lake Spokane do not warrant a specific PME to address erosion here.
WDFW-08	All project HEDs should be considered in the relicensing process at the same time since they are inter-related.	Please see response BIA-S-006.
WDFW-09	Include WDFW's *Goals and Objectives for Habitat Protection and Enhancement in the Spokane River Hydroelectric Project Area, Management Planning Framework* as a comprehensive plan.	Please see response BIA-S-120.
WDFW-10	Clarify the specified conditions where the current voluntary 14-foot maximum drawdown would not be a firm limit.	Please see response SC-035.
WDFW-11	The PDEA is not correct in stating that the Upper Falls and Monroe Street HEDs are passing all sediment and not inhibiting natural transport. Avista has an approval from WDFW to dredge bedload from the Monroe Street HED forebay.	Aside from highly localized deposition of larger bedload material (i.e., cobbles), these HEDs have little if any effect on sediment transport. We have revised the PDEA to clarify this point.

Comment ID	Comment	Response
WDFW-12	Clarify statement that Post Falls HED no longer controls upstream water levels once the lake has been drawn down. Would Avista continue to occasionally raise Coeur d'Alene Lake to assist log transportation?	A natural channel restriction at the lake outlet limits, by elevation, the amount of water that can flow from the lake at certain times of the year. Avista drafts Coeur d'Alene Lake on a schedule that accommodates log transportation through the end of November. No change is proposed to the fall/winter drawdown schedule. It is unknown if log transport will be a navigation use of the lake into the future.
WDFW-13	Revise the discussion on operation of flashboards at Nine Mile HED to reflect actual size of pulse to be up to 7,700 cfs and the resultant effects.	Under normal operations, the removal of flashboards are as follows: The flashboards are constructed in two tiers, each tier being five feet tall. Each tier is divided into two sections. The first section on the left bank of the spillway is approximately 155 feet long and the second section is 70 feet. As forecasted flows are expected to increase above plant capacity, the 70-foot section of top boards is removed. The initial increase in flows is approximately 2,500 cfs as the reservoir reestablishes. This initial removal can accommodate flows up to 8,500 to 9,000 cfs. When stream flows are forecasted to exceed these levels, the remaining section of boards is removed. The removal of one or both of the top sections of flashboards is similar to opening spill gates at other HEDs. Typically, bottom boards are not removed unless flows exceed 26,000 cfs.
WDFW-14	It should be noted that depressed oxygen conditions in Lake Spokane occur relatively frequently in the summer months and affect aquatic habitat and fisheries. Avista needs to recognize the relationship the project has on dissolved oxygen in Lake Spokane and mitigate for the impacts it's having on aquatic habitat.	Dissolved oxygen conditions in Lake Spokane are discussed in the PDEA. Creation of an impoundment that functions as a lake, with depressed dissolved oxygen in the hypolimnion, does not in itself create a mitigation requirement. Please see response WDOE-36.
WDFW-15	Clarify the statement, "The model results indicated that a 700-cfs minimum discharge at Post Falls HED would have no influence on upstream water temperatures." to indicate whether this means upstream of the HED.	This sentence has been clarified.
WDFW-16	Remove the statement on the bottom of page 5-129 regarding the fishery habitat in the pool created by Upper Falls HED because it is unclear and unsubstantiated.	This statement is supported by the preceding text. We have modified the text of the PDEA to clarify and further support this statement.
WDFW-17	Include the effects of the growth and expansion of Eurasian watermilfoil in the discussion of aquatic habitat conditions.	We acknowledge the presence of Eurasian watermilfoil in Lake Spokane in Section 5.6.1.1. We discuss the invasive nature of this aquatic weed in Section 5.7.1.3, *Noxious Weeds and Other Invasive, Non-native Plant Species*. Additional text is not needed.
WDFW-18	It is subjective to say that it would be impossible to quantify the effects of Nine Mile HED operation on aquatic habitat.	The text has been amended to remove the words "if not impossible" and "aquatic habitat." Also see page 10 of Avista and WDFW (2004), which acknowledges that it would be difficult to quantify the effects of project operations on fish populations.
WDFW-19	Include WDFW in the consultation process for site selection of boat-in-only campgrounds found in measure REC-5.	We will consult with WDFW in the site selection for the sites. We have revised measure SRP-REC-4 to reflect this change.

Comment ID	Comment	Response
WDFW-20	The *Fisheries Public Information, Education, and Law Enforcement Programs* in AR-1 lack funding; however, it is important that they be implemented to protect the rainbow trout fishery.	The Interpretation and Education Plan included in the Public Outreach PME (SRP-REC-3) will be used to coordinate information needs and projects. Also see response WDFW-03.
WDFW-21	Costs should not be attributed to riparian and wetland enhancement and management of Avista project lands other than annual O&M. There is no funding associated with lands Avista already owns, therefore this artificially inflates the cost of measure TR-2.	Avista's non-Project lands represent assets of substantial value. Moving these lands into the Project boundary and managing them per the LUMP for wildlife, public recreation, etc. represents a substantial loss in value that should be recognized.
WDFW-22	The PDEA is lacking in coverage and mitigation measures for issues that were rejected by Avista during workgroup meetings.	Avista believes that the PDEA addresses the broad interests of the stakeholders, as expressed by the issues that the work groups agreed were relevant to ongoing Project operations. Avista agrees that this does not include every issue raised by every stakeholder in the work groups.
WDFW-23	WDFW supports the Post Falls HED Spawning and Emergence Flows measure, the Spokane Fishery Enhancement Program, and operating the project in a way that is more suitable for whitewater boating in the fall and spring as long as operations are consistent with provisions in the *Upper Spokane River Rainbow Trout Spawning and Fry Emergence Protection Plan*.	Comment noted. The Proposed Action includes these measures.
WDNR-1	WDNR supports measure REC-5.	Comment noted.
WDNR-2	WDNR supports LU-1 and the fact that it will enhance the local visiting and residential safety from wildland fire while still allowing for excellent wildlife habitat and opportunities.	Comment noted.
WDNR-3	WDNR supports AES-1 as written.	Comment noted.
WDNR-4	Local interested parties anticipate implementing an Interpretation and Education Plan that will improve the Project area's opportunities for learning, recreating, and safety.	Comment noted.
WDOE-01	Conclusions presented in the PDEA regarding boating impacts, recreational use, and socioeconomics appear to be without basis and many are unsubstantiated or ill-defined. Terms such as *many*, *significant*, and *useful* are subjective terms; references need to be given to support conclusions. Boating impacts are not consistent between sections, and boating impacts need to be analyzed for the entire system.	Comment noted. We believe the PDEA accurately depicts boating-related impacts and other Project-related recreation activities and opportunities for each alternative.
WDOE-02	The study cited in the PDEA made no determination about impacts to the economy from fluctuating lake levels. WDOE does not know of a study that supports conclusions about adverse impacts to recreation, accessibility, or land values as a result of lower lake levels. While lake levels are a concern, a study would have to be conducted to make conclusions. If a study was conducted, the scope would have to address impacts to users downstream.	Comment noted. We do not believe that the benefits of the recommended study outweigh the cost. The work group engaged in extensive discussions about the effects of the Natural Hydrograph on lake access, and concluded that major alterations would be required at the majority of public access sites, especially in the shallow bays, to continue to provide reasonable public access. This was the basis of our conclusions. Also see BLM's comment BLM-3, which supports our conclusion.
WDOE-03	A minimum flow should only refer to one flow, in the PDEA this would be 500 cfs not 600 cfs.	Comment noted. Avista believes that the 600/500-cfs minimum flow terminology more clearly represents Avista's intent.

Comment ID	Comment	Response
WDOE-04	Ecology supports setting an interim minimum discharge at Post Falls HED of 600 cfs all year. Ecology recommends a 5-year adaptive management approach to set the final minimum discharge with monitoring to determine the optimum flow.	Comment noted. Our proposed minimum flows for Post Falls HED is described in the PDEA Section 5.6 and Appendix B. To address concerns related to the potential effect of increased minimum flows on downstream water temperatures, Avista also proposes to monitor Spokane River water temperatures for five years and consult with the appropriate agencies on the results. Ecology also questions (1) The flow relationship was based on a linear regression and contains variability. The linear regression is the most useful method, (2) Table 1 flows were actually recorded and well within the range of flows used in the regression, (3) This table shows flows used as input data and not results, (4) This value fits within the flow distribution used in the report, and (5) This WDOE comment mirrors a statement made in the report. The section on project releases in the PDEA will be revised.
WDOE-05	The assumption on the flow relationship between Post Falls HED and Barker Road in table 5-36 is unclear.	Historical accretions and diminutions as measured by the USGS form the basis of the relationship between flows at Post Falls and flows at Barker Road. Also see additional text in Section 5.4.2.3, *Groundwater*. The flow relationship was derived from the habitat data provided in the report.
WDOE-06	The PDEA is inconsistent in its discussion of minimum discharge at Post Falls; some sections do not even mention the proposed 100 cfs decrease. There is no evidence, data, or studies supporting the drop from 600 cfs to 500 cfs. This flow reduction may significantly affect fish habitat in the Spokane River.	The text has been revised to achieve more consistency with respect to treatment of the minimum flow. Contrary to WDOE's assertion, the WRWG had sufficient data to support the 600/500-cfs flow recommendation.
WDOE-07	Discussion of gaining and losing reaches and groundwater/surface water interactions does not incorporate the best available information.	The information provided in the PDEA reflects the information shared with and reviewed by the work group. Cites of newer information were not provided in WDOE's comments. Also see response WDOE-05.
WDOE-08	There is no comment WDOE-08.	
WDOE-09	WDOE believes that the PDEA should analyze consistency with the Washington State Shoreline Management Act of 1971 and the local watershed planning process. The watershed plan is expected to be finalized before a new license is issued. Ecology will forward a hardcopy of the approved watershed plan to FERC for consideration under Section 10(a)(2)(A) of the FPA.	Comment noted. Please see response BIA-S-120.
WDOE-10	Several comments are made throughout this section that wetlands downstream of Post Falls HED have "adjusted, stabilized, adapted etc.". Ecology believes this to be inaccurate. The study conducted by Parametrix did not accomplish the objective of determining the changes in wetland/riparian habitat types and areas from the Spokane River project. Based on Ecology's calculations, the project has resulted in a loss of 20.66 acres of scrub shrub wetland, loss of 40.14 acres of Forested wetland, loss of 4.37 acres of forested cottonwood wetland, and resulted in a gain of 22.66 acres of emergent wetland.	Please see revised Section 5.7.2.2 that identifies on-going changes to Lake Spokane wetlands. Past losses in habitat are acknowledged but do not represent a mitigation baseline. Please see response TLC-1.

Comment ID	Comment	Response
WDOE-11	LUMP needs a definition. The PDEA should clarify how this will control future PME measure implementation.	LUMP is the acronym for Land Use Management Plan. Refer to the Land Use PME SRP-LU-1 for details.
WDOE-12	Define "capital one time costs in table 6-1. Define "periodic costs."	Footnotes clarifying definitions have been added.
WDOE-13	A fixed annual sum will rapidly deteriorate in real buying power over 30 years. A CPI adjustment should be implemented.	Under FERC's Mead Decision of 1995, adjustments for future inflation are not included in either the costs or benefits. As a practical matter, operations and maintenance costs and future capital costs would be expected to escalate over time and Avista recognizes this.
WDOE-14	Performance standards and monitoring should be incorporated with the dollar amount expenditures to ensure that money spent will actually result in the mitigation of project impacts.	The recreation improvements identified in REC 2-5 would be developed and reported upon to FERC per the Recreation Plan (REC-1).
WDOE-15	Avista should create, enhance, or restore 42.51 acres of wetlands within the Long Lake Corridor, Little Spokane River or Hangman Creek watersheds. The focus should be to create scrub-shrub, forested, and forested cottonwood habitats. Creation from uplands would be allowed at 1:1 and enhancement of existing wetlands purchased and protected in perpetuity would be credited at 3:1. A mitigation plan based on Ecology guidance should be prepared.	Measure SRP-TR-2 provides significant opportunities for wetland protection and enhancement. Please see response WDOE-10.
WDOE-16	An analysis of the operations and shoreline impacts should be conducted in the context of the applicable county Shoreline Master Program.	In Section 5.11, *Land Use and Aesthetic Resources*, we describe how Avista will administer shoreline lands within the Project boundary. Very little shoreline land is actually in the Project boundary and, as such, it would be subject to local and state shoreline management authority rather than the proposed LUMP. Avista believes that its proposal is consistent with Avista's management obligations, and does not see the benefit of either expanding the proposal or developing a discussion of county shoreline zoning.
WDOE-17	The 23 miles of shoreline that have been affected by residential development is due in large part to the creation of the forebay pool behind Long Lake HED, which has resulted in cumulative impacts.	In Section 5.11 and in PME SRP-LU-1, we describe our LUMP proposal that includes provisions to protect Avista-owned shoreline lands. At Lake Spokane, Avista is proposing to protect approximately 18 miles of shoreline from future development.
WDOE-18	Avista should provide the funding necessary to fund 1/2 of one full-time employee to enforce shoreline development regulations along Lake Spokane and the Spokane River for the duration of the new license.	Avista would manage its lands in accordance with all applicable local, state, and federal regulations and would assist the regulatory agencies in accordance with the Land Use Management Plan. Avista is in no way responsible for augmenting state agencies' budgets.
WDOE-19	Avista-owned properties in the Project area should include setbacks and buffer widths measured from the OHWM that are protective of shoreline habitat and in compliance with locally adopted shoreline master programs. The setbacks and buffer widths should be attached to the property title.	As described in measure SRP-LU-1, the 200-foot buffer on Avista's non-project lands adjacent to Lake Spokane are measured from the OHWM. The buffer is proposed to be included in the Project boundary and managed in accordance with the LUMP.
WDOE-20	Section 5.3.2.2 should discuss the methods used to come up with conclusions.	Reiteration of the methods used in the sediment transport analysis and the multitude of other referenced studies is not necessary in the PDEA. Please see the original reports for these details.
WDOE-21	No measures are included to address monitoring and management of sediments.	Comment noted. Please see response WDFW-06.

Comment ID	Comment	Response
WDOE-22	No evidence supports the contention that upland use, rather than in-channel conditions, have the most significant effect on sediment transport.	Nothing in the referenced section refers to land use as affecting sediment "transport." All references here to land use are specifically tied to sediment "supply."
WDOE-23	Is bedload transport negligible or just not measured? Flood return intervals need to be defined. The type and quantity of sediment transported at the lower range of flow needs to be identified. Water depths need to be discussed in terms of sediment transport, not just velocities.	Golder (2005b), which discusses sediment routing, addresses many of the details requested by this comment. Additional detail in the PDEA is not warranted.
WDOE-24	Sediment transport assumptions ignore other land uses that may influence sediment supply.	The PDEA acknowledges that a variety of factors are responsible for erosion and sediment supply.
WDOE-25	Where do sediments passed through the "tunnel" go and what are the impacts?	The sediment bypass tunnel at the Nine Mile HED routes sediment that would otherwise pass through the turbines into a sluice pipe that discharges this sediment into the river downstream of the dam, as would also happen without the tunnel. The tunnel does not affect the ultimate transport of sediments through the HED.
WDOE-26	"Free flowing" needs better definition for the way it is used in this document.	Please see response CDAT-II-056.
WDOE-27	How will the proposed vegetation and erosion control be successful in areas affected by the operations and other impacts caused by pool levels since the operations will not change much? How will erosion be reduced if the cause is not addressed?	A variety of proven vegetative and other bank stabilization and erosion control methods are available that would not require a change in operations to be successful.
WDOE-28	(1) Peak flows transport sediment, they are not the source of sediment; flows and return intervals that transport sediment need to be defined. (2) Discuss effects of sediment deposition. (3) How does the Nine Mile sediment bypass tunnel affect this analysis?	(1) Comment noted; flows are discussed in detail in Golder (2005b). (2) Sediment deposition is described in Section 5.3.1 of the PDEA. (3) Sediment bypass operations and their effects are described in the PDEA and the Sediment Routing Report (Golder, 2005b). Also see response WDOE-25.
WDOE-29	What is the return interval used for bankfull flow and what are the criteria to define this? Why is sediment being transported at gauges at other flows? What is the effect of the sediment transport even though it is not the maximum transport quantity?	The bankfull flow is approximately 17, 000 cfs; additional details are contained in the sediment routing report (Golder, 2005b, 2004c).
WDOE-30	Clarify sediment transport modeling.	The results of sediment transport modeling are discussed in detail in Golder (2005b).
WDOE-31	The effects conclusions regarding sediment transport are confusing. The result of "no effect" is over-optimistic. What does the statement "would not appreciably change sediment supply and transport" mean?	We have revised the PDEA text to read "little if any effect," as supported by the sediment routing study (Golder, 2005b). Under the Proposed Action, sediment transport would be similar to current conditions under the No-action Alternative.
WDOE-32a	The impacts of sediment deposition on water quantity need to be identified and discussed. Avista has not accounted for how operations will address the impacts of the Project on the natural sediment transport and deposition process.	Because Nine Mile is generally operated as a run-of-river project, sediment accumulation does not affect the quantity of water flowing past Nine Mile Dam. The effects of the Project on sediment transport and deposition processes have been examined in both Golder (2005b) and Section 5.3.2.2, *Sediment Transport*, of the PDEA.

Comment ID	Comment	Response
WDOE-32b	Ecology recommends that Avista develop a sediment management plan for the Nine Mile and Long Lake reservoirs and the two related HEDs. The plan should address sediment transport and proper functioning conditions. Monitoring should be conducted to evaluate current deposition and to evaluate options for mitigation, then implement the chosen option.	Please see response WDFW-06.
WDOE-33	Without Long Lake HED the river would remain well mixed and shallower throughout the reach and, according to the model water temperatures, would most often stay at or below the state standards for temperature.	Comment noted
WDOE-34	Questions exist concerning the statistical significance of the water temperature monitoring and conclusions cited. Descriptions of the sampling program should be included in the discussion.	Water temperatures recorded from August 7 through 15 of 2004 clearly showed a decrease in water temperatures with decreased flow. The word "confirmed" has been replaced by "documented."
WDOE-35	Ecology feels that Avista needs to develop measures to address both the effects of Post Falls HED on temperature in the river from the state line to Barker Road and also effects of Long Lake HED on reservoir waters. A minimum instream flow release from Post Falls HED may be the best solution. It would be helpful for the PDEA to include a detailed discussion of temperature effects related to increasing minimum flows.	Please see response WDOE-36. Effects of a 700-cfs minimum instream flow on temperature at Barker Road (river mile 90) are shown on Figure 5-18 in the PDEA.
WDOE-36	Ecology recommends that Avista develop a PME measure to address the effects of Long Lake HED on low dissolved oxygen in the reservoir and the Spokane River immediately downstream of the dam.	Avista has developed a new Washington Water Quality PME, which is titled SRP-WQ-2 and is described in Appendix B.
WDOE-37	Ecology supports the February 28, 2005 version of the TDG measure and inclusion into the final license application. The version of the TDG PME (measure WQ-1) in the PDEA has been modified and Ecology does not support the modification.	Comment noted. The version of the PME measure proposed by Avista appears in the final application.
WDOE-38	Ecology supports the inclusion of the water quality monitoring PME measure in the final license application. The general concept appears to be reasonable, but much of the detail will need to be worked out in consultation with Ecology. In addition to the general stated PME goals, monitoring needs to be designed to determine the effects of water quality improvement measures taken to improve dissolved oxygen and temperature in the Spokane River.	Please see response WDOE-36
WDOE-39	Ecology believes that the Natural Hydrograph would have significant implications for conversion and creation of wetlands along the Spokane River corridor and throughout the current Lake Spokane stretch of the river. A Natural Hydrograph would result in a total loss of wetland acres, but would promote an increase in diversification of habitat types.	Opinion noted. However, the referenced section is discussing operating only Post Falls HED in a Natural Hydrograph manner; this would have little if any effect on the wetland conditions at Lake Spokane.
WDOE-40	The PDEA lacks information on invertebrates and effects on invertebrates.	Please see response SC-093.
WDOE-41	The PDEA needs to characterize juvenile and adult rainbow trout habitat downstream of Monroe Street HED.	Please see response SC-093.

Comment ID	Comment	Response
WSPR-1	The PDEA's recommendation for land and recreational management complements Washington State Parks vision for Lake Spokane and the management of resources. Additionally, it supports priority recreation needs identified in SCORP.	Comment noted.
WSPR-2	The Nine Mile recreation measures address overnight camping facilities; plans for a public boat take out upstream of the Nine Mile Dam, improved interpretive opportunities at the Spokane House Interpretive Center, and the addition of one mile to the Centennial Trail. State Parks is in full support of these measures and is looking forward to the mutual benefit of our partnership. The Agency is pleased with Avista's continued dialogue associated with exploring the potential for additional trail links in the Lake Spokane area. We encourage Avista to continue to be involved in that effort and attempt to find a leadership role for Avista, related to that topic, in the final license articles.	Comment noted.
WSPR-3	The way in which Avista and the work groups approached the aesthetic flows is commendable. The research and time spent with work group, agencies, interest groups, and individuals was considerable. Every effort was made to obtain the visual, audible and natural waterfall effect that we were working towards. The improvements blend aesthetics while preserving river channels that are of regional historical significance.	Comment noted.