



April 7, 2011

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St. N.E.
Washington, DC 20426

Subject: Spokane River Hydroelectric Project, FERC Project No. 2545
Submittal of the Revised Coeur d'Alene Reservation Aquatic Weed Management Plan

Dear Ms. Bose:

On June 18, 2009 the Federal Energy Regulatory Commission (FERC) issued a new license for the Spokane River Hydroelectric Project, FERC Project No. 2545-091 (License). Ordering Paragraph G of the License incorporated the U.S. Department of Interior's (Interior) January 27, 2009 Federal Power Act 4(e) Conditions as Appendix D. Condition No. 7 of Appendix D requires that Avista file an Interior approved Coeur d'Alene Reservation Aquatic Weed Management Plan (AWMP) to FERC within one year of License issuance for review and approval.

During 2010, Avista and the Tribe worked collaboratively to develop and implement the AWMP following Interior's and FERC's approval. On March 31, 2011, Avista submitted an Aquatic Weed Annual Summary Report (ASR), which summarized the work that was completed in 2010.

Upon Interior's request, Avista revised Section 11 of the AWMP to incorporate the following revision:

The 2010 AIR, approved by FERC and Interior, specified the Annual Summary Report would be submitted to Interior by March 1st and to FERC by April 1st on an annual basis and therefore will not be included in the AIR as indicated above.

If you have any questions regarding this filing, feel free to call me at (509) 495-4998.

Sincerely,

Elvin "Speed" Fitzhugh
Spokane River License Manager

Enclosure

cc: Bob Dach, BIA Portland
Phillip Cernera, Coeur d'Alene Tribe
Dave Lamb, Coeur d'Alene Tribe

Doc. No. 2011-0119



IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Northwest Regional Office
911 N.E. 11th Avenue
Portland, Oregon 97232-4169



JUN 17 2010

Elvin Fitzhugh
Spokane River License Manager
Avista Corporation
1141 East Mission Ave.
Spokane, Washington 99220-3727

RE: Approval of Water Quality Monitoring, Wetland and Riparian Habitat, and Aquatic Weed Management Plans for the Spokane River Hydroelectric Project, FERC No. 2545

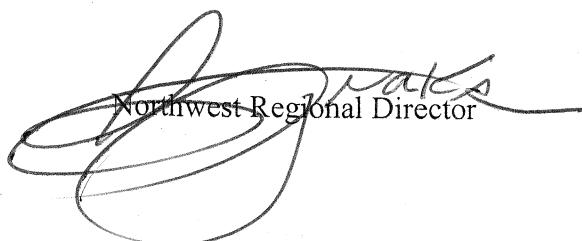
Dear Mr. Fitzhugh:

Thank you for your March 2010 draft Plan submittals, May 2010 revisions, and June 2010 final Plans addressing section 4(e) license requirements for the Spokane River Hydroelectric Project. These Plans have been developed by Avista Corporation pursuant to the Federal Energy Regulatory Commission's *Order Issuing New License and Approving Annual Charges for use of Reservation Lands* (Issued June 18, 2009); and to the Secretary of the Interior's conditions included as Appendix D to the Commission's order. Specifically, the Plans have been developed to address requirements under sections 5, 7 and 8 of the Secretary's conditions – Water Quality Standards and Water Quality Monitoring, Coeur d'Alene Reservation Aquatic Weed Management, and Wetland and Riparian Habitat Replacement and Maintenance, respectively.

We appreciate your efforts to coordinate with the Coeur d'Alene Tribe and the Bureau of Indian Affairs throughout the development of these Plans and look forward to working with Avista and the Tribe during implementation. Although we believe the Plans adequately address sections 5, 7, and 8 of the Secretary's conditions at this time, we reserve the right to require changes to the Plans at any time during the license term as needed to meet the intent of the conditions, to address new information, or to address changing circumstances – as provided under the Federal Power Act and other applicable authorities. Any necessary changes will be pursued consistent with the terms of our December 2008 Settlement Agreement.

Pursuant to section 10 of the conditions, I approve the June 14, 2010, final Plans on behalf of the Secretary. If I can be of any further assistance at this time, please do not hesitate to contact me.

Sincerely,



Northwest Regional Director

cc: Chairman, Coeur d'Alene Tribal Council
Secretary, Federal Energy Regulatory Commission

AVISTA CORPORATION

COEUR D'ALENE RESERVATION
AQUATIC WEED MANAGEMENT PLAN

4(e) CONDITION NO. 7

**Spokane River Hydroelectric Project
FERC Project No. 2545**

Prepared By:
Coeur d'Alene Tribe

In Cooperation With:
Avista Corporation

Revised April 1, 2011

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Appendix A Aquatic Weed Control Considerations and Alternatives

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1.0 INTRODUCTION

On June 18, 2009, the Federal Energy Regulatory Commission (FERC) issued Avista Corporation (Avista) a new license for the Spokane River Hydroelectric Project (Spokane River Project), FERC Project No. 2545 for a 50-year license term. The new FERC license (“License”) was issued on June 18, 2009 and includes operation of the Post Falls Hydroelectric Development (HED) in Idaho. Ordering Paragraph G of the License incorporated the U.S. Department of Interior’s January 27, 2009 Federal Power Act 4(e) Conditions (“Conditions”). The Conditions can be found in Appendix D of the License.

This Coeur d’Alene Reservation Aquatic Weed Management Plan (AWMP) was developed in accordance with Condition No. 7 of Appendix D of the License regarding Aquatic Weed Management (“Condition No. 7”). Condition No. 7 requires Avista to complete the AWMP, in collaboration with the Coeur d’Alene Tribe (“Tribe”), to control aquatic nuisance species in waters affected by the Project that are within or immediately adjoining the Coeur d’Alene Reservation (“Reservation”) within one year of License issuance (June 18, 2010). The License specifies:

The Licensee shall submit the Plan to the Secretary for review and approval at least 60 days before filing it with the Commission. When filing the Plan with the Commission, the Licensee shall include documentation of collaboration with the Tribe, and copies of any comments and recommendations from the Tribe. If the Licensee files the Plan with the Commission without first obtaining the Secretary’s approval, the Licensee shall include specific reasons for doing so. The Licensee shall implement the Plan upon its approval by the Secretary and the Commission.

The Secretary reserves the right to require changes to this AWMP at any time during the License term.

1.1 Post Falls HED

The Post Falls HED includes three dams located on the Spokane River approximately nine miles downstream from the outlet of Coeur d’Alene Lake. Coeur d’Alene Lake is a natural lake created by a channel restriction at the outlet, with the outlet serving as the headwaters of the Spokane River. The Post Falls HED Project boundary encompasses the large geographic area of Coeur d’Alene Lake, the Spokane River upstream of the Post Falls Dams, and the lower reaches of the St. Joe, Coeur d’Alene and St. Maries rivers as well as other tributaries to Coeur d’Alene Lake to the normal full pool water elevation of 2,128 feet (Figure 1).

1.2 Background

This AWMP has been prepared to present an integrated approach to controlling and managing exotic and noxious aquatic weeds in waters affected by the Project that are within or immediately adjoining the Reservation. The phrase “exotic and noxious aquatic weeds” is interchangeable with, and will be used throughout the remainder of the document as, “aquatic nuisance species” (ANS).

The geographic focus of this AWMP is those surface waters located within the Project and Reservation boundaries, which amounts to approximately the southern third of Coeur d'Alene Lake and the portions of the St. Joe River downstream of the City of St. Maries (Figure 1). This AWMP outlines an organized effort to protect the beneficial uses of this lake/river area, including cultural resources of the Tribe, hydropower potential, human recreation, fish and wildlife habitat, and water quality. The following documents were used as references in the preparation of this AWMP: *A Citizen's Manual for Developing Integrated Aquatic Vegetation Management Plans* (Washington Department of Ecology [WDOE] 1994), *Aquatic Weeds Management Fund Program Guidelines* (WDOE 2001) and the 2008 Statewide Strategic Plan for Eurasian Watermilfoil in Idaho (Idaho Invasive Species Council [IISC] 2007).

1.3 Previous Studies

The following provides a summary of the aquatic vegetation studies completed in the Coeur d'Alene Lake system.

Project Completion Report for the Baseline Coeur d'Alene Lake Aquatic Vegetation Survey,
(Coeur d'Alene Tribe Lake Management Department [CDAT] 2006)

Funded by Avista as part of the Post Falls HED relicensing effort, the Tribe completed a baseline assessment of submerged aquatic vegetation to address existing information gaps on aquatic vegetation present in Coeur d'Alene Lake. The study was conducted in 2005 and included an extensive assessment of species presence, biomass, and nutrient content across the Coeur d'Alene Lake system. The study's conclusion, directly relevant to this AWMP, was that growth of submerged aquatic vegetation in Coeur d'Alene Lake was healthy, very productive in certain areas (primarily the bays), and moderately diverse. The plants identified were all native species with the exception of Eurasian Watermilfoil (*Myriophyllum spicatum*) which was identified in three transects located in the southern portion of the lake.

Project Completion Report for the Lower Lakes Aquatic Vegetation Survey Project (CDAT 2007)

Funded by the Basin Environmental Improvement Project Commission (BEIPC), the Tribe conducted a baseline assessment of submersed aquatic plant species distribution and biomass during 2004 and 2005. The focus area for this study is collectively referred to as the "lower lakes" and more specifically as Chatcolet, Benewah, and Round Lakes, which are located at the south end of Coeur d'Alene Lake, along the outer banks of the St. Joe River. The study also estimated nutrient (phosphorus and nitrogen) release from the existing plant beds into the lakes' water columns, and subsequently into Coeur d'Alene Lake. In addition, the three lakes were inspected for the presence of ANS.

The study's conclusion, directly relevant to this AWMP, was that growth of submerged aquatic vegetation in the lower lakes was healthy, productive, and diverse. The plants identified were all native species with the exception of Eurasian Watermilfoil which was found to be widely distributed throughout the lower lakes area with limited dense growth areas in Chatcolet and Round Lakes.

Eurasian Watermilfoil Control Program Project Completion Report, (CDAT 2009)

Funded by the Idaho State Department of Agriculture (ISDA), the Tribe implemented this aquatic weed control project from 2006 and through 2009. The purpose of the project was to complete annual surveys for Eurasian Watermilfoil, as well as to implement control efforts in the southern portion of Coeur d'Alene Lake, including the "lower lakes".

Results of the work completed for this project include the following:

- Diver inspection of over 50 miles of lake and river shorelines;
- Initial identification of up to 4,000 acres of susceptible aquatic weed growth areas that will need to be further evaluated (surveyed) for possible treatments;
- Herbicide treatments on 1,365 acres using granular and liquid 2,4-D formulations which resulted in between 40% and 100% Eurasian Watermilfoil removal. The lower effectiveness was suspected to be due, at least in part, to presence of a hybrid form of Watermilfoil and to difficulties obtaining the desired herbicide dosage in deeper areas;
- Diver suction removal of an estimated 1,600 cubic feet of Eurasian Watermilfoil from approximately 60 acres. Suction removal was very selective for Eurasian Watermilfoil and estimated to be 80% to 100% effective, but had difficulty removing the plant mixed within dense native plant beds;
- Placement of 2,000 square feet of bottom barrier which eliminated 100% of the Eurasian Watermilfoil in the areas treated;
- Diver hand removal of approximately 150 cubic feet of Eurasian Watermilfoil from the two high-use boat launch/marina areas that were treated. Dense native plant growth again hindered effective removal of Eurasian Watermilfoil where it was mixed within other plants; and
- An analysis of the 2009 milfoil survey indicates approximately 1,000 acres of milfoil infestation within St. Joe River, St. Maries River, and the lower lakes area.

2.0 PROBLEM STATEMENT

2.1 Aquatic Plant Species of Concern

The southern portions of Coeur d'Alene Lake and the lower portions of the St. Joe River are supporting infestations of Eurasian Watermilfoil and a "hybrid species" which consist of Eurasian Watermilfoil and the native Northern milfoil (*Myriophyllum sibiricum*). The Eurasian Watermilfoil and its hybrid will collectively be referred to as "milfoil" for the duration of this AWMP. Further, both forms of milfoil are considered invasive aquatic weeds, and therefore fall under this AWMP.

These invasive milfoils are good examples of ANS in that they can grow quickly, produce large numbers of fragments which disperse easily within a water body, and can be transported between water bodies on boats and boat trailers. As past surveys indicate, the primary source of milfoil fragments is within Tribal waters. However, milfoil has also been documented in Harrison Slough (located at the mouth of the Coeur d'Alene River, just outside of the Reservation boundary), as well as in the St. Maries and St. Joe Rivers (upstream of the Reservation boundary, as identified in the Tribe's ISDA funded 2007 and 2008 surveys). These infestations have the potential to spread northward due to plant fragmentation and wind/water movement. If not controlled, they have the potential to significantly impact the human, fisheries, and wildlife uses of the greater Coeur d'Alene Lake system.

To date, milfoil is the only ANS known to exist in the Reservation portions of the Coeur d'Alene Lake system. As such the control methods identified in Section 5.0 of this AWMP are applicable to milfoil only. If another invasive aquatic plant is identified in this Lake System this Plan will be modified to incorporate control methods to address any additional invasive aquatic plant species identified.

2.2 Other Potential Aquatic Plant Species of Concern

The extensive shallow water areas and numerous boat launches in the southern portions of the Lake and lower portions of the St. Joe River are susceptible to invasion of other invasive aquatic plants due to their regional proximity. These include Brazilian Elodea (*Egeria densa*, in Latah County, ID), Hydrilla (*Hydrilla verticillata*, in Owyhee County, ID) and Parrotfeather Milfoil (*Myriophyllum aquaticum*, in Payette, Gem, Ada and Jerome Counties, ID). Another invasive aquatic species, Water Hyacinth (*Eichhornia crassipes*), while not yet documented in Idaho, is of concern.

ISDA maintains a list of noxious weeds of concern which can be found at the following website: <http://www.idahoag.us/Categories/PlantsInsects/NoxiousWeeds/watchlist.php>. The weed list is designated into the following three levels of concern: Statewide Early Detection Rapid Response List; Statewide Control List; and Statewide Containment List. At the time of this writing, Brazilian elodea, hydrilla and water hyacinth are on the Statewide Early Detection Rapid Response List while Eurasian Watermilfoil and Parrotfeather Milfoil are on the Statewide Control List. Note that Hydrilla and Water Hyacinth are not believed to be able to survive in the temperate climate of Northern Idaho but it is still important to watch for these plants. Other

ANS which are not yet listed, however, have been identified by ISDA as candidates for listing due to their invasive growth patterns include:

- Fanwort (*Cabomba caroliniana*) and Water Chestnut (*Trapa natans*); and
- Emergent species including Flowering Rush (*Butomus umbellatus*), Yellow Floating-Heart (*Nymphoides peltata*) and Yellow Flag Iris (*Iris pseudacorus*).

3.0 COORDINATION WITH MANAGEMENT OF OTHER RESOURCES

There is no physical boundary within Coeur d'Alene Lake that separates Reservation waters from non-Reservation waters so aquatic weeds that spread by fragmentation (like milfoil) could migrate via wind and water into or out of Tribal areas. Given that milfoil has infested many other water bodies in the region, the re-introduction via boat access presents an additional challenge for the control and management of these invasive aquatic plants. In addition, the presence of milfoil in the St. Maries and St. Joe Rivers upstream of the Reservation increases the potential for further infestation into Tribal waters.

3.1 Agencies and Entities

Besides Avista and the Tribe, additional agencies and entities are directly involved in the management of ANS in the Coeur d'Alene Lake system and include the Idaho Department of Environmental Quality (IDEQ), the Inland Empire Cooperative Weed Management Area (IECWMA), and the Idaho State Department of Agriculture (ISDA). These agencies and entities have undertaken the following programs and activities for the control of aquatic noxious weeds.

3.1.1 IDEQ

IDEQ and the Coeur d'Alene Tribe developed the Coeur d'Alene Lake Management Plan (DEQ/CDAT 2009), which includes a framework for public education and control of aquatic noxious weeds. Through implementation of the Lake Management Plan, IDEQ plans to expand upon earlier work conducted by the Tribe to further understand and monitor the migration of aquatic noxious weeds and the nutrient content in submerged macrophytes in waters currently outside of the exterior boundary of the Reservation in Coeur d'Alene Lake.

3.1.2 IECWMA

Kootenai, Benewah, and Shoshone counties are members of the Inland Empire Cooperative Weed Management Area (IECWMA), which jointly coordinates the management of noxious aquatic weeds with the Tribe, state and federal agencies, municipalities, landowners, and other interest groups. The IECWMA has been actively coordinating the control of aquatic noxious weeds in the region since 2002. IECWMA has led surveys for aquatic noxious weeds where habitat conditions indicate susceptibility to infestation. They have also managed herbicide treatment of Eurasian Watermilfoil in Cave and Medicine lakes (located along the Coeur d'Alene River). IECWMA includes public outreach and education efforts in their management programs and uses local media and speaking engagements to educate the public on aquatic noxious weed issues (IECWMA 2007, 2008, 2009).

3.1.3 ISDA

ISDA administers the state's Eurasian Watermilfoil Control Program. In this capacity, ISDA provides funding to IECWMA through grants for Eurasian Watermilfoil management. ISDA also cooperated with IECWMA in the initial herbicide treatment for Eurasian Watermilfoil control in Cave and Medicine lakes from 2007 through 2009. As part of the Eurasian Watermilfoil Control Program, ISDA developed standard protocols for aquatic noxious weed surveys and procedures for the safe application of herbicide in public waters (ISDA 2008).

3.2 Coeur d'Alene Lake Aquatic Weed Management Plan for Non-tribal Waters

For waters outside the Reservation boundary, Avista is also developing a Coeur d'Alene Lake Aquatic Weed Management Plan for Non-tribal Waters (Non-Tribal AWMP) as required by Article 410 of the FERC License. The purpose of this AWMP is to control the spread and reduce the distribution of aquatic noxious weeds in waters of the Post Falls HED Project boundary that are outside of the exterior boundaries of the Coeur d'Alene Reservation. This purpose will be met through the following program elements:

- Expansion of aquatic noxious weed education programs;
- Annual monitoring of aquatic noxious weed distribution; and
- Management of noxious aquatic weeds through identified control strategies.

The Non-Tribal AWMP proposes the following annual schedule:

Avista Non-Tribal AWMP Proposed Task List	Date
Identify geographic areas for upcoming surveys	December 31
Review funding available	January - February
Annual meeting with participating agencies/entities	February
Review funding requests from participating agencies/entities for outreach, monitoring, and control activities	March - April
Finalize support with the participating agencies/entities to include funding, staff and equipment	May 1
Gather project-completion information from the participating agencies/entities for Avista-supported activities	September - November
Provide annual report to participating agencies/entities	December 31

3.3 Coeur d'Alene Reservation AWMP

This AWMP is consistent with the goals, programs, and objectives contained within the Coeur d'Alene Lake Management Plan (DEQ/CDAT 2009), the 2008 Statewide Eurasian Watermilfoil Control Strategy for Idaho (ISDA 2007), and Avista's Non-Tribal AWMP.

Through the implementation of this AWMP, the management of milfoil and any other identified ANS will be coordinated with IDEQ, IECWMA, and ISDA through the attendance at annual meetings coordinated through Avista's Non-Tribal AWMP. The objectives of these annual meetings will include identification of the location, schedule, cost, and estimated efficacy of each entity's management actions and public education and awareness activities proposed for the upcoming year. In addition, the parties will review the effectiveness of the milfoil management and outreach programs implemented during the previous year.

The annual meetings will act as a pre-planning event so that all the different lake managers can better understand the presence of the ANS infestation(s) throughout the Coeur d'Alene Lake system and make more informed decisions regarding the management of ANS. All management decisions will be made on an annual basis in response to current conditions and the previous year's activities and efficacy's.

4.0 MANAGEMENT OBJECTIVES

The overall objectives of this AWMP are to: (1) reduce the current milfoil infestation of approximately 1,000 acres by 90% within 10 years of program implementation; (2) implement strategies to maintain ANS at less than 100 acres total presence within or immediately joining the reservation boundary for the term of the License; (3) prevent spread of ANS to waters outside of reservation boundary; (4) prevent infestation of new ANS from outside waters to within the reservation boundary; and (5) evaluate efficacy of all measures implemented to meet these objectives and modify procedures as appropriate with the approval of the Secretary and FERC. Measures to accomplish these objectives include the following:

1. Initial treatment of infested sites, including biological, physical, mechanical, and chemical treatments as determined appropriate.
2. Subsequent monitoring and retreatment as needed..
3. Annual monitoring and mapping of ANS in Project waters within and near the Reservation boundary.
4. Public awareness and education.
5. Adaptive management to address new information.

These are consistent with the Tribe's lake management objectives (Goal No. 36, Objectives 36.1 and 36.2, CDA Tribe, 2005).

4.1 Implementation Schedule

Avista, in cooperation with the Tribe, has developed an annual implementation schedule for these actions, as identified in Figure 2. The schedule, which is general in nature, will be modified each year according to the survey results and the success of implemented control and public awareness and education activities.

While the overall management objective is to reduce the current infestation of ANS by 90% within the first 10 years of program implementation, Avista and the Tribe anticipate achieving a 70% efficacy of milfoil reduction by the end of the third year of the AWMP's initiation. The initial reduction will be achieved by targeting large areas of milfoil within the southern portion of Coeur d'Alene Lake and the lower lakes with large-scale herbicide applications. After this initial effort we anticipate targeting smaller concentrated and/or dispersed areas of milfoil through the use of diver suctioning, hand pulling, bottom barriers, and/or weevils to achieve the 90% reduction by the end of the 10 year period.

5.0 REDUCTION OF INFESTED SITES

Actions under this AWMP will be site specific and based on the type of plant problem present and the needs of the water body users. All control options available will be assessed and the best mix will be used to solve the ANS problem over time. Appendix A includes an evaluation of all the potential aquatic weed control alternatives and considerations. Only those controls which are specifically applicable to reducing current milfoil infestations within Coeur d'Alene Lake and the lower lakes are discussed in detail within this section.

It is important to note the selection of the appropriate control methods to be implemented for each upcoming year will be highly dependent upon available funding, annual weather conditions, flow forecasts, pre-and post treatment survey results, and growth conditions.

5.1 Chemical Control

Treatment Protocols

Chemical control includes the application of herbicides to aquatic weed infestations and can produce large-scale prolonged, effective control. Based on past milfoil control efforts at Coeur d'Alene and other regional lakes, it appears that spot applications of fast-acting systemic herbicides present the greatest opportunity to break the current milfoil growth cycle and meet the Management Objectives.

Herbicide applications are not appropriate for water bodies with a swift current, such as the St. Joe and St. Maries rivers. As such, herbicide applications will be targeted for the southern portions of Coeur d'Alene Lake and the lower lakes area as these areas represent relatively shallow, nutrient rich waters with no significant current.

Based upon efficacy results from herbicide application treatments conducted by the Tribe from 2006 to 2009, the two preferred herbicide active ingredients are 2,4-D and triclopyr. When applied correctly these herbicides have little impact to native, non-target, beneficial vegetation. The use of pre-treatment diver inspections allows for precise placement of herbicides and thus a control on the amount of chemical that is used at any one time and place. The use of systemic products further limits the amount of chemical used because susceptible target plants do not regrow if they receive a lethal dose of the chemical. Finally, each of the recommended herbicides has a limited life in the water; these chemicals are broken down into harmless compounds by sunlight and microbial action. Herbicide treatments will follow applicable laws and product EPA label guidance in the use of chemicals. Appendix B includes US EPA-approved herbicide labels for 2,4-D and triclopyr as well as water use restrictions applicable to the identified herbicides.

Wetland areas in the lower lakes area will not be impacted by milfoil control treatments because the treatments are focused on the lake and there are few opportunities for potentially degrading 'elements' (either chemicals or human disruption) to move into the wetland areas. Additionally, these wetlands are vegetated primarily by grasses and grass-like plants, which are not susceptible to either 2,4-D or triclopyr.

The preferred application method for liquid herbicide products is to inject the product into the lake to the depth where the target weed is growing. This involves using boats mounted with a storage tank, a pump, and weighted injection hoses. This protocol also typically involves limits

on boat speeds such that the weighted hoses stay at the desired treatment depth. The preferred application method for solid (granular or pellet formulations) is to broadcast the spread of the product across the water surface. Applications of both liquid and solid formulations typically require the use of GPS to plan and document the uniform delivery of the herbicide product across the treatment areas.

Prior to any herbicide application, the following public notifications will be completed:

- A public notice will be posted in the local newspaper and mailed to all shoreline property owners within one mile of the planned treatment area.
- A shoreline notice will be posted along shoreline public and private access points within ¼ mile of the treatment areas.

Measurable Success Criteria

The measurable success criteria for herbicide applications are a 90% efficacy within each designated treatment area. The anticipated 2010 treatment consists of between 400 and 538 acres located in Chatcolet Lake, Round Lake, and the southern end of the Coeur d'Alene Lake. Figure 3 identifies the planned herbicide application treatment areas for the 2010 season. Treatment needs for subsequent years, if any, will be determined based on the results of the diver surveys (see Section 6.0 below).

Schedule

Herbicide application treatments are best performed early in the growing season, typically in June or July, when most aquatic weeds are actively growing and will quickly take up herbicide in the water. This is also the time when plant biomass is lower and die-off of killed weeds would have less effect on water quality (especially dissolved oxygen). Therefore Avista and the Tribe will target mid-June for the 2010 herbicide application treatments.

Monitoring

Treatment effectiveness monitoring will include pre-and post treatment rake surveys and a post-treatment diver inspection. Rake surveys utilize a “rake-on-a- rope” to collect plants at a network of specific points laid out across the planned treatment areas (see Section 6.2, below). Post-treatment diver inspections involve towing a diver through the treated areas and mapping remaining aquatic weed plants (see also Section 6.2). These efforts are focused within the designated treatment areas. Note that treatment areas are established following the completion of an aquatic weed inspection and mapping effort, which is typically performed the year prior to any given treatment (as described in Section 6.1, below). In addition to the rake surveys and diver inspection, water quality monitoring and herbicide residue testing will be conducted immediately after the herbicide treatment for a period of two weeks to one month. A more detailed explanation of the water quality and residue monitoring protocols that will be conducted for the herbicide application are provided in Sections 6.3 and 6.4, below.

Adaptive Management

The treatment acreage and schedule will be modified on an annual basis dependent upon the results of the effectiveness monitoring, inspection and mapping efforts, annual weather conditions, flow forecasts, growth conditions, and available funding. Adaptive management also

includes an on-going assessment of new developments in aquatic weed treatment methods and monitoring advances in new products, such as aerial photography, etc.

5.2 Mechanical Control

5.2.1 Diver Suction Removal

Treatment Protocols

Diver suction removal uses a pump system to suction plants and roots from the sediment. The pump is mounted on a barge or pontoon boat and the diver uses a hose to remove the plants and vacuum them to a basket or hopper on the support vessel. Impacts from diver suction removal are minimized because the divers direct the suction to individual target plants, avoiding other vegetation to the extent possible. While some sediment materials can be picked up with the suctioning and released with excess water near the lake surface, these materials generally settle fairly quickly back to the lake bottom and do not leave a long-term plume of turbidity. Re-suspension of sediment is also minimized by the fact that the divers actually lift the plant root wad up to the suction intake as opposed to placing the intake into the sediments to collect the roots. Due to the relatively high cost of diver suction removal, this treatment option will not be used for large-scale aquatic weed control, but this does have applicability to small area treatments.

Diver suction removal will be used along the inner banks of the St. Joe and St. Maries rivers because of the difficulty in achieving appropriate herbicide doses in flowing waters. The Tribe estimates that approximately two acres of these waters are infested with milfoil but that this infestation is generally sparse to moderate and patchy, at this time (see Figure 4).

Measurable Success Criteria

The measurable success criteria for diver suction removal is an 80% efficacy for any area treated by this method. This will be accessed following the treatment season by reviewing diver GPS records of harvest areas and post-treatment diver inspections of these areas.

Schedule

Diver suction removal can be performed any time after the target weeds are up and growing but is most effective before non-target plants become dense, late in the summer season. Therefore, the schedule of diver suction treatments is during July and August. For the 2010 season, Avista and the Tribe anticipate the timeframe for diver suction removal extending from July 1 through August 15th.

Monitoring

Measuring the efficacy of this treatment can be challenging as diver suction targets specific aquatic weeds and dense non-target vegetation can lessen the effectiveness of this technique. The progress of the diver suction contractor will be monitored periodically during the work period in order to evaluate the efficacy of diver suction treatments using diver survey's following any years' diver suction treatments. Each year's results will be compared with the overall measurable objective and specific success criteria to determine whether diver suction removal is the most effective technique to control infestations in the St. Joe and St. Maries river systems. Post-treatment diver surveys are described in greater detail in Section 6.0.

Adaptive Management

The treatment acreage and schedule will be modified on an annual basis dependent upon the results of the effectiveness monitoring, inspection and mapping efforts, annual weather conditions, flow forecasts, growth conditions, and available funding. Adaptive management also includes an on-going assessment of new developments in aquatic weed treatment methods and monitoring advances in new products, such as aerial photography, etc.

5.3 Biological Control

Treatment Protocols

Avista and the Tribe will pursue trials of milfoil weevil (*Euhrychiopsis lecontei*) stocking to provide long-term control of milfoil in Harrison Slough, where milfoil weevils were identified in 2009. The slough is located just outside the Reservation boundary near the mouth of the Coeur d'Alene River. Since Harrison Slough is located in non-tribal waters, this project will be coordinated with IECWMA, ISDA, and Avista's Non-Tribal AWMP.

Milfoil weevil treatments involve snorkelers or divers placing large numbers of the larvae of this organism onto growing milfoil plants in the treatment area(s). Because the initial applications of this treatment will be on a trial basis, a frequent monitoring effort will be implemented to document the effects this has on milfoil through the summer growing season. The trial will likely be a two- to three-year program since first year results are reportedly mixed. As indicated in the information presented in Appendix A, the milfoil weevil has been reported to be very effective on Eurasian Watermilfoil in some, but not all, situations.

A contractor will be selected to implement the milfoil weevil study. The following technical considerations will be evaluated during the course of this project.

Host specificity: The contractor will research and evaluate if the weevil species can survive on Eurasian Watermilfoil and the Eurasian x Northern hybrid

Number of Sites and weevils: The contractor will determine the potential acreage of milfoil that is suitable for treatment with weevils.

Source of weevils and location of culturing: To eliminate the possibility of transporting unwanted and potentially harmful "hitchhiker" organisms from other parts of the country, the contractor will establish a regional culturing operation from indigenous populations known to exist in these areas. Milfoil plants used in the culturing process will also be collected locally.

Selection of stocking sites: The contractor will work closely with Avista and the Tribe to select appropriate sites for the stocking activities. An attempt will be made to identify and stock an area known to have a mix of both Eurasian and the hybrid watermilfoil.

Measurable Success Criteria

It is not possible to give a predetermined effectiveness for using milfoil weevils at this time. It will, however be better defined upon the completion of this initial study.

Schedule

Milfoil weevil applications are typically performed during the summer based on when they are available from the culturing facility (which was established in 2009 near Sandpoint, ID). The initial Harrison Slough weevil biocontrol treatment would be targeted for July or early August of 2010. Subsequent applications will be made based on monitoring results of each previous year.

Monitoring

Results of the efficacy of this biocontrol treatment will be measured through the extensive monitoring and data collection to be completed by the selected contractor. Data will be collected via pre-and post-application snorkeler surveys for a minimum of two years. In addition to selecting stocking locations, the contractor will establish more than one untreated monitoring location which will be used for comparative purposes. Stocking and untreated monitoring sites will be analyzed, at a minimum, of three times. This includes an event prior to stocking, one in late summer, and one in the following summer. All stocking will utilize sampling transects to evaluate the following: 1) milfoil and milfoil hybrid stem density; 2) enumeration of all weevil life stages; 3) identification and relative abundance of all macrophytes along transects; and 4) average plant height.

Adaptive Management

Results will be evaluated to determine whether this treatment was successful and to determine its applicability for additional treatments in the Coeur d'Alene Lake system.

5.4 Physical Control

While physical control methods (i.e. diver hand removal and bottom barriers) will not be utilized for the 2010 growth season, Avista and the Tribe anticipate these methods may be utilized in upcoming years. These control methods are most suitable for small-scale areas, and may be utilized more frequently as the spread of milfoil is confined to smaller geographic areas.

5.4.1 Diver Hand Removal

Treatment Protocols

Diver hand removal involves plants pulled and removed from the water by hand and is recommended for performance in areas of sparse aquatic weed infestation. The environmental impact of diver hand removal is negligible due to the anticipated limited applicability of this technique and the target-specific nature of this work.

Typically, divers swim through an area with a mesh bag and carefully remove target plants leaves, stems and roots. The collected plant material is placed in the mesh bag and when full this is taken to a support boat for transfer to a disposal area on the shore.

Measurable Success Criteria

Diver hand removal is not anticipated for 2010, however is a viable small-scale management option that may be utilized in future years. Geographic areas targeted for diver hand removal will include areas where the spread of milfoil has been confined to very small areas (i.e. less than 1 acre). The measurable success criteria of diver hand removal is to attain a milfoil removal efficacy of 80%.

Schedule

This control method can be scheduled almost anytime during the growing season. Due to hindrance of hand removal by dense native plants, the optimum time for this technique to be used is during the mid-June to mid-August period.

Monitoring

When implemented, the efficacy of the diver hand removal control method will be monitored with pre- and post-treatment rake and/or diver surveys, which are more thoroughly defined in Section 6.0.

Adaptive Management

The need for diver hand removal will be evaluated on an annual basis and will be dependent upon the results of the effectiveness monitoring, inspection and mapping efforts, annual weather conditions, flow forecasts, growth conditions, and available funding. Adaptive management also includes an on-going assessment of new developments in aquatic weed treatment methods and monitoring advances in new products, such as aerial photography, etc.

5.4.2 Bottom Barrier

Treatment Protocols

Bottom barriers are a viable small-scale treatment option and can be 100% effective where placed, which is typically at recreational sites where the infestation area is limited. The installation of bottom barriers will not interfere with boat traffic or other recreation. While the implementation of bottom barriers is not anticipated for the 2010 season, when utilized in future years, bottom barriers will likely be targeted primarily at Heyburn State Park's primary recreation sites.

As described in Appendix A, bottom barriers are usually geotextile fabrics which are laid by divers on the lake bottom to smother any plants growth. The preferred technique in North Idaho is to mount this fabric on 10-ft by 10-ft PVC pipe frames which can be easily placed and removed from the shore or a support boat. The barriers are usually left in place for eight to 10 weeks and then removed, or moved to other treatment areas.

Measurable Success Criteria

Geographic areas targeted for bottom barrier installation would include areas where the spread of milfoil has been confined to very small areas (i.e. less than 1 acre), with a goal to attain a milfoil removal efficacy of 100% where applied.

Schedule

This treatment involves placing occlusive material on the lakebed over an infestation for a period of approximately 10 weeks with the initial installation typically occurring in early to mid-summer. Where implemented, bottom barriers will be removed after an appropriate time (i.e. eight to ten weeks) to preserve fish habitat and to prevent plants from growing on top of the barrier material.

Monitoring

The efficacy of the bottom barrier control method will be monitored using diver observations following removal of the barrier panels.

Adaptive Management

The need for bottom barriers will be evaluated on an annual basis and will be dependent upon the results of the effectiveness monitoring, inspection and mapping efforts, annual weather conditions, flow forecasts, growth conditions, and available funding. Adaptive management also includes an on-going assessment of new developments in aquatic weed treatment methods and monitoring advances in new products, such as aerial photography, etc.

6.0 MONITORING

Continued monitoring of aquatic plant populations is necessary to help guide the implementation of desired control measures and to evaluate the effectiveness of these measures. Monitoring will focus on an annual milfoil survey, pre- and post-treatment site specific diver and weed rake inspections, and sampling/analysis of herbicide residues and basic water quality parameters following herbicide treatments.

6.1 Annual Inspection and Mapping

Annual mapping will be completed in the southern portion of Coeur d'Alene Lake and the lower lakes area in order to document where and at what densities milfoil species are growing, to insure areas aren't being re-infested with milfoil, and to identify any additional ANS infestation(s). Completion of the annual mapping is anticipated for June through July of each year.

All areas susceptible to ANS, especially milfoil, within tribal waters (approximately 4,000 acres) will be mapped on a three year rotation. Each annual mapping will cover approximately 1,300 acres. The inspection schedule is as follows:

Year 1 of Rotation (i.e. starting in 2010):

West shoreline of Coeur d'Alene Lake, Hidden Lake, Benewah Lake and the St. Joe and St. Maries Rivers.

Year 2 of Rotation:

Chatcolet Lake.

Year 3 of Rotation:

Round Lake, east shoreline of Coeur d'Alene Lake, and Harrison Slough (located adjacent to, but outside the Reservation).

The annual inspection and mapping work will be performed by a typical crew of two divers, a boat operator, and a GPS Technician. Divers will most often be towed behind the survey boat using underwater tow boards. The boat operator will direct the boat through littoral areas (typically in depths less than 20 feet) spacing successive passes, if needed, 50 to 100 feet apart using a GPS Tracklog function. When the divers observe milfoil plants, they report to the boat using a wireless, electronic diver-to-boat communications system. Observed milfoil will be classified in the following density categories:

- ‘1’ for a single plant;
- ‘2’ for several plants;
- ‘3’ for dense growth; and
- A code ‘0’ will be used to indicate where a milfoil plant (or plants) were found but were removed by the divers.

Milfoil locations and their associated density code will be recorded using a hand held GPS unit and a compatible laptop computer using ArcMap® software. Figure 3 shows the milfoil densities identified in the 2009 diver survey.

This diver inspection process can take two to four weeks per year. The use of underwater communication devices, as well as GPS/GIS mapping, are integral to the preparation of detailed maps showing aquatic weed location and density data. Since the GPS unit will be located in the survey boat, a coordinate correction will be performed following completion of the field work using measured compass headings and the distance between the GPS unit and the divers.

6.2 Treatment Effectiveness Monitoring

Treatment effectiveness monitoring will be used to measure the efficacy of control methods implemented and to determine whether subsequent treatments of the same areas are needed. The treatment effectiveness monitoring will include pre- and post-treatment surveys, which will consist of rake throws and diver inspections. Treatment effectiveness monitoring may be modified in future years to adapt to the ANS present and the appropriate control method.

Rake Throw Survey

Rake throws consist of personnel throwing a rake-on-a-rope at set grid points immediately before and approximately one month after treatments. The grid points are pre-established GPS points that have been used in past surveys completed by the Tribe as a requirement of the ISDA Milfoil Control Program grants. Rake throws are an effective measurement tool if the aquatic weed presence is fairly high prior to the survey. However, rake throws are not an effective measurement tool if milfoil density and distribution are fairly low before the treatments, simply because the chance of collecting the target weed with the rake is reduced. If a pre-treatment rake survey finds little milfoil/aquatic weed presence, a pre-treatment diver survey effort may be performed to verify the weed presence (which was documented the year before from the annual inspection effort).

Diver Survey

As with the annual inspection and mapping effort, the post-treatment diver survey is performed by towing a diver or divers through the treated area and documenting any remaining weed presence using underwater communications and GPS equipment. The resulting map can then be compared to the pre-treatment weed distribution map (i.e. the map resulting from the annual inspection effort the previous year) and an estimate of treatment efficacy made. **Note** that while the post-treatment diver survey could be incorporated into the annual inspection effort, the timing of the treatment and the lag time before herbicide treatment effectiveness can be seen (i.e. dying plants) typically does not allow this to be coordinated.

6.3 Herbicide Residue Monitoring

Monitoring of herbicide residues will occur in order to respond to possible concerns expressed by residents, visitors, or others about the usability of the water or potential non-target impacts following an herbicide treatment. Herbicide residue results will also provide an assessment of the achievement of the target dose within the treated areas. The minimum recommended herbicide sampling program will be conducted which includes the collection of four samples following each treatment, typically a grab sample from the two-meter depth. The first two samples will be collected the day after treatment, one sample from within a treated area and one sample outside (within 200 feet of) that treated area. Two additional samples will be collected from the same two locations three or four days after treatment. All samples will be submitted to an accredited laboratory for analysis on the day of collection and the fastest analytical turnaround

possible (optimally next day) will be pursued in order to quickly determine if more sampling is needed.

If one or more areas are treated at the same time, the minimum sampling will be conducted in/near the largest treatment area. If results indicate that herbicide residues are still present at concentrations at or above the respective EPA drinking water tolerance concentrations (0.07 ppm for 2,4-D and 0.4 ppm for triclopyr) after four days, additional samplings will be performed until residue levels are below these criteria. The EPA drinking water tolerances were obtained from the herbicide manufacturers labels (Appendix B).

Residue testing results and any related water use restrictions will be posted on a website maintained by the Tribe. If adverse water quality conditions are discovered through this work, this information will be reported to the Tribe's Water Resources Program for possible further monitoring or action. This information will be used in subsequent years to help determine the most appropriate control methods for the reduction of ANS.

Sampling and analytical methods used will conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 or to the latest revision of the *Standard Methods for Examining Water and Wastewater* (APHA). In addition, sampling shall be performed by, or with oversight by, a qualified water quality specialist.

6.4 Water Quality Monitoring

Monitoring of selected water quality parameters will be done as an additional effort whenever aquatic herbicide treatments are performed to document specific treatment impacts (or the lack thereof). This effort will consist of field water analysis at a depth of 2-meters at each of the herbicide residue sampling sites. Additional sites or depths may be added so that data is obtained from representative areas within and outside of treated areas. The following field parameters will be analyzed in-situ: temperature, dissolved oxygen, pH conductivity (specific conductance), and Secchi Disk transparency.

Water quality monitoring results will be reported in an annual aquatic weed management summary report as documentation of the program. If adverse water quality conditions are discovered through this work, the information will be reported to the Tribe's Water Resources Program for possible further monitoring or action as appropriate. This information will be used in subsequent years to help determine the most appropriate control methods for the reduction of ANS.

7.0 EVALUATION OF COLLECTED DATA

All survey results, estimated treatment efficacies and water monitoring data will be reported, along with a summary of the treatment work performed, in an annual summary report. This will provide a record of activities conducted under this AWMP. In addition, each annual summary report will contain an overview of proposed activities for the following year and an assessment of the long-term progress towards the objectives of this program.

8.0 PREVENTION EFFORTS

8.1 Public Awareness and Education

An outreach program will be implemented with the goal of educating recreationists and lakeshore property owners about threats posed by Eurasian Watermilfoil and actions that can be taken to prevent its spread. The outreach program will include the following elements:

- Brochures placed at public access points such as the Heyburn State Park Headquarters, the Coeur d'Alene, Harrison and St. Maries Chambers of Commerce and Conklin Marina.
- Articles in local newspapers, including the Tribe's Council Fires will be published on an annual basis (to the extent possible).
- One to two localized workshop(s) will be held on an annual basis and will include education in aquatic vegetation identification, aquatic weed survey and removal techniques as well as the results of completed weed control efforts.
- Presentation to the Tribal Council on planned activities.

Effectiveness Monitoring

The effectiveness of the outreach program will be dependent on notification of workshops, successful messaging and public responsiveness, participation, and feedback. As such, the success of the outreach program will be monitored and modified based upon workshop participation and feedback on an annual basis.

Coordination

Avista will coordinate its outreach commitments with its comprehensive Interpretation and Education Plan required under License Article 418 as well as the Non-Tribal AWMP which includes the following outreach elements:

- Preparation and distribution of an annual informational newsletter to residents who own shoreline property adjacent to bays classified as high-priority suitable habitat within non-tribal Project waters.
- Informational presentations to groups likely composed of Coeur d'Alene Lake recreationists, such as members of lakeshore community associations, sporting groups, boat clubs, and marina groups. One to two presentations will be targeted per year initially. The frequency of presentations may be modified over time in coordination with the cooperating parties.

9.0 PERFORMANCE STANDARDS

Performance standards will be used throughout the implementation of the AWMP for both survey and management actions implemented for this program. Herbicide treatments will follow applicable laws and product EPA label guidance in the use of chemicals. Application of herbicides to Tribal waters will be monitored for performance using surveys, water quality monitoring and herbicide residue testing, as previously described in Section 6.0. Manual aquatic weed control techniques (SCUBA diver hand removal and suction removal) will be monitored using observation and pre-post treatment rake or diver surveys.

The efficacy (i.e., percent aquatic weed removal) of treatments will be determined through pre- and post-treatment surveys. This will include both diver surveys/mapping and weed rake surveys of designated, randomly established grid points. Performance standards appropriate for the survey portion of the Aquatic Weed Management Program relate to the use of highly trained and experienced aquatic weed specialists to survey for aquatic weeds using the best available technologies. In this case, SCUBA techniques will be used as the primary method of surveying for aquatic weeds. These surveys will also utilize GPS techniques to record aquatic weed sightings and to delineate and map weed infestations.

10.0 SUCCESS CRITERIA

For the 2010 growth season, success criteria will be specifically evaluated by the measurable objectives for each of the control methods as previously identified in Section 5.0, which identifies the following efficacies for milfoil reduction.

Control	Treatment	Efficacy Percentage	2010 Acreage
Biological	Milfoil weevils	TBD ⁽¹⁾	TBD
Chemical	Herbicide application	90%	400-538 acres
Mechanical	Diver suction	80%	2 acres
Physical	Hand pulling	80%	< 1 acre
	Bottom barriers	100%	< 1 acre

Note: (1) TBD = To be determined based upon results of initial milfoil weevil study

These specific control options will be re-evaluated for retreatment on an annual basis and modified based upon treatment effectiveness monitoring, identification of new ANS, management actions of other entities, and annual growth and weather conditions.

11.0 SUMMARY REPORT

As required, Avista in cooperation with the Tribe will complete a summary report following implementation of work completed during each work year. The report will summarize the following:

- Results of annual milfoil/ANS inspection and pre-treatment survey;
- Locations and acreage of each treatment action;
- Results of post-treatment rake and diver surveys and treatment monitoring;
- Progress with education and awareness program;
- Overview of proposed activities for the following year; and
- An assessment of the long-term progress towards the objectives of this AWMP.

The summary report will be included in the Annual Implementation Report (AIR) following each year's implemented actions (i.e. the 2010 implementation summary report would be incorporated in the 2011 AIR). The AIR is required by Condition No. 3 of Appendix D, of the License.

The 2010 AIR, approved by FERC and Interior, specified the Annual Summary Report would be submitted to Interior by March 1st and to FERC by April 1st on an annual basis and therefore will not be included in the AIR as indicated above.

12.0 ADAPTIVE MANAGEMENT

The long-term nature of this AWMP necessitates an adaptive approach, wherein information from the results of the effectiveness monitoring, inspection and mapping efforts, annual weather conditions, flow forecasts, growth conditions, and available funding will be used as a basis for future adjustments. The previous season's efforts and efficacy's will be reviewed by March of the following year. Based upon this review, Avista in cooperation with the Tribe will propose adjustments to education, monitoring, and control strategies described in this AWMP, as needed. Changes to the approach and methods described in this management AWMP will be considered annually and will be based on mutual agreement between Avista and the Tribe.

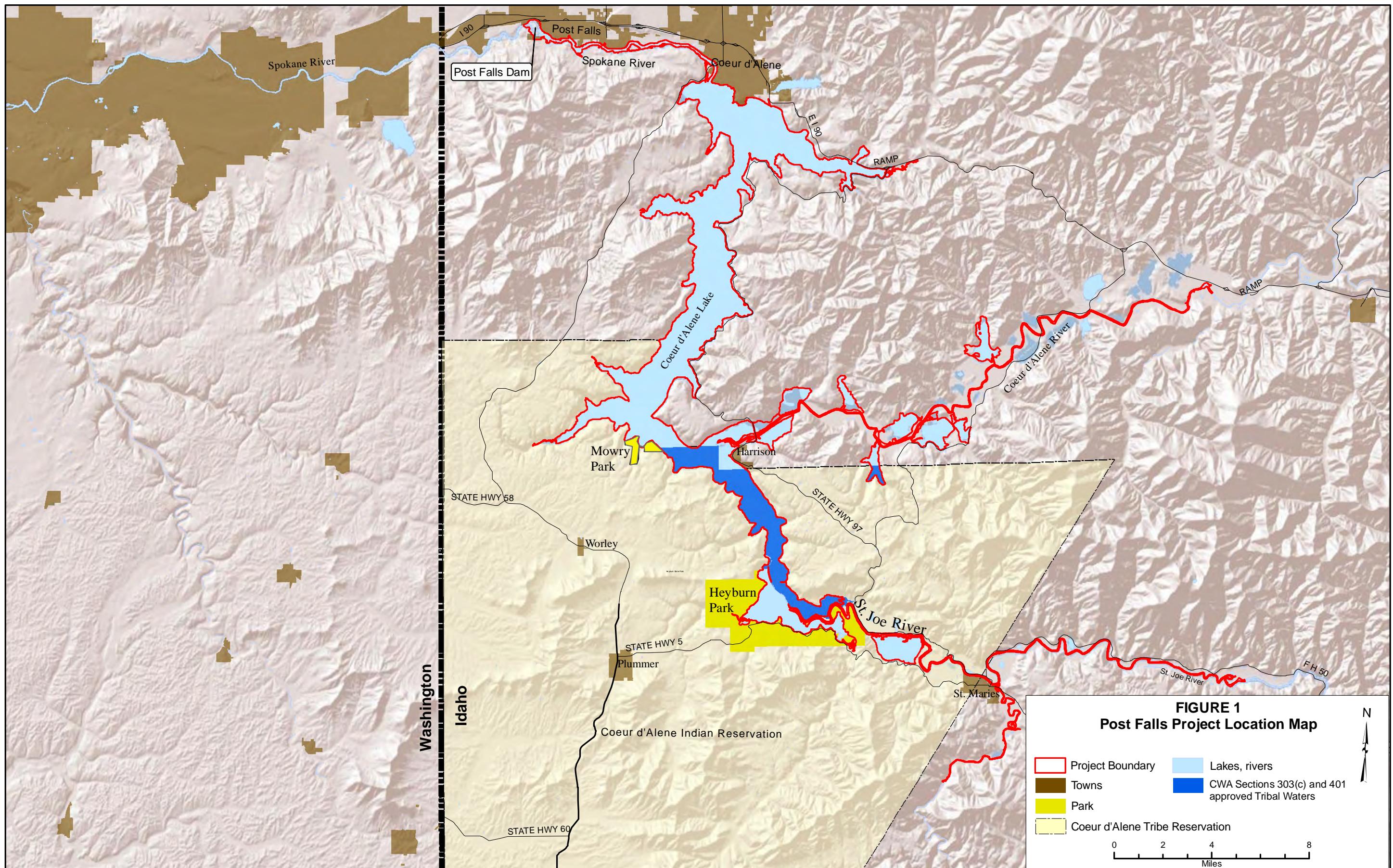
In addition, the review of management approaches will be coordinated with agencies/entities that are directly involved with the management of ANS in the Coeur d'Alene Lake system on an annual basis.

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FIGURES

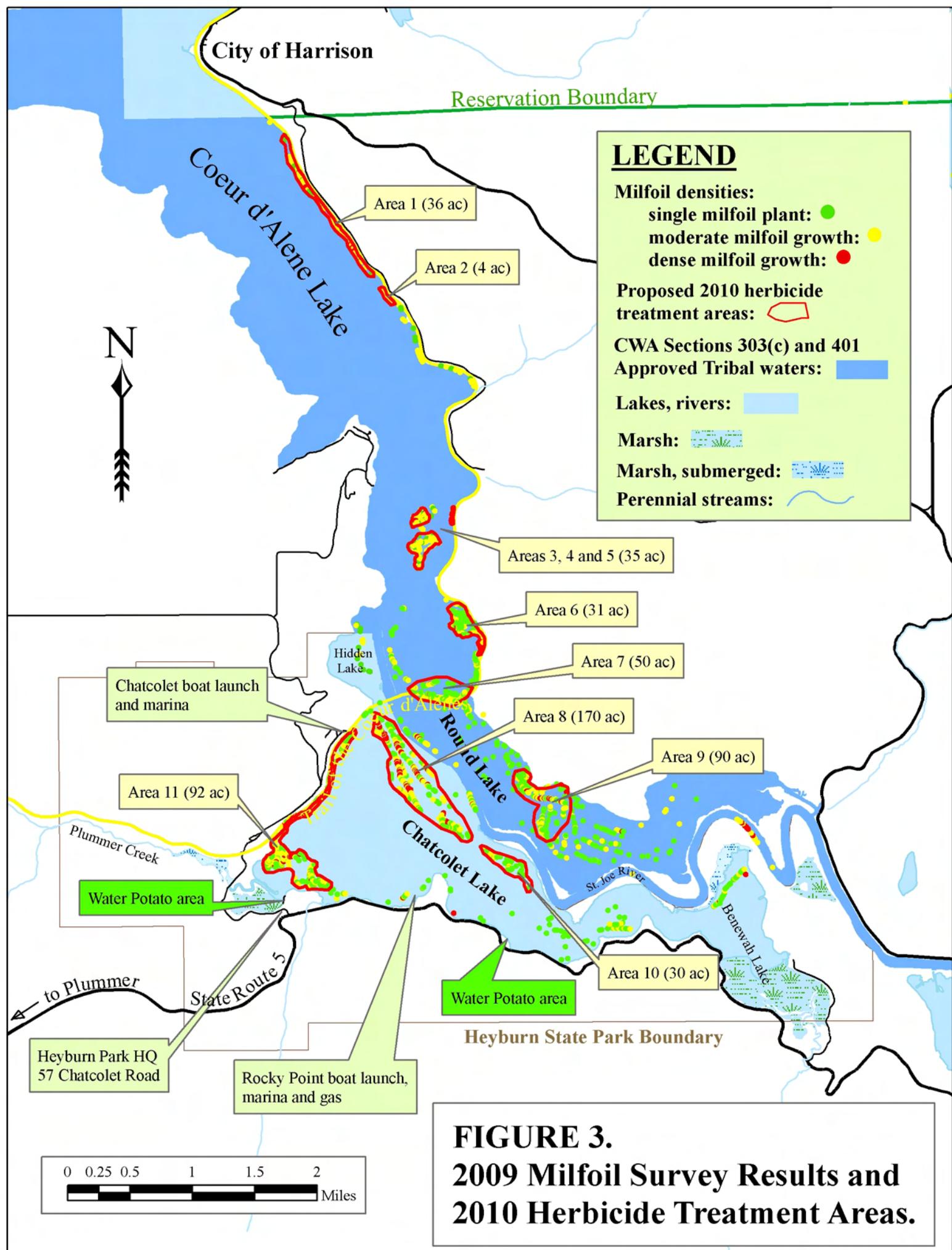


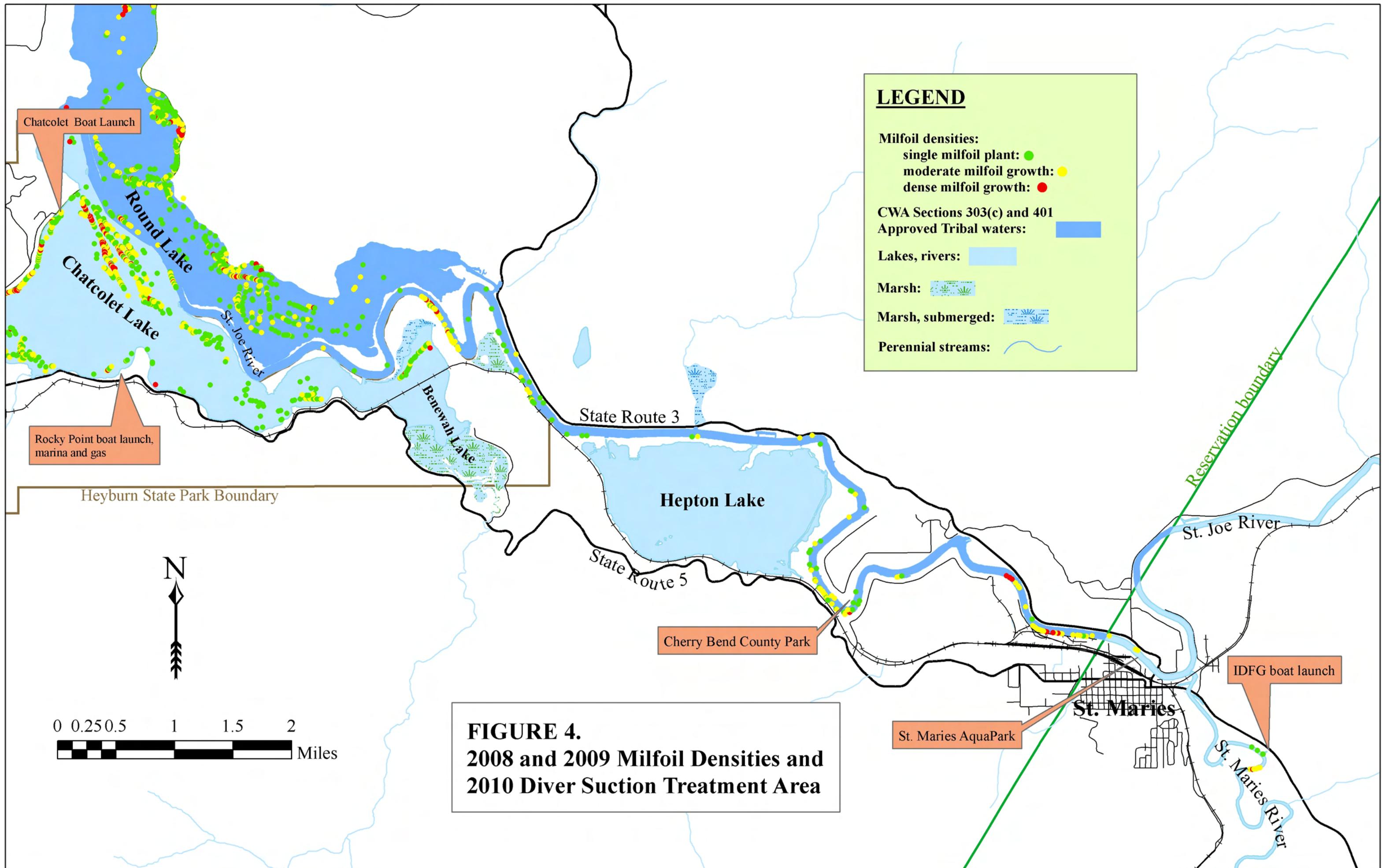
Task No.	Task Description	Schedule ¹											
		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
1 ²	Finalize Tribe Work Authorization	#C8512E											
	Develop AWMP	#00AEEF	#00AEEF										
	Submit AWMP to DOI			#00AEEF									
	Incorporate DOI comments				#00AEEF	#00AEEF							
	Submit AWMP to FERC						#00AEEF						
2	Plan treatments per previous years survey & surveillance results	#B0C4DE	#B0C4DE										
	Contractor selection			#FFFF00	#FFFF00								
	Pre-treatment rake survey							#6495ED					
3	Targeted herbicide application							#A52A2A					
	Targeted diver suction removal							#A52A2A	#A52A2A				
	Targeted biocontrol (weevils)							#A52A2A	#A52A2A				
4	Annual surveillance & mapping						#6495ED	#6495ED					
	Treatment effectiveness monitoring						#D2B48C	#D2B48C	#D2B48C				
5	Education and awareness program						#800080	#800080	#800080				
6	Draft AIR									#808000			
	Submit 2010 AIR to DOI									#808000			
	Incorporate DOI comments										#808000		
	Submit 2010 AIR to FERC											#808000	
	Final summary report completed												#808000

Note: (1) = Schedule may be modified on an annual basis per ANS infestation(s) & selected control methods

(2) = Task 1 is only applicable until the AWMP is approved by Interior and FERC.

FIGURE 2
General Aquatic Weed Management Annual Schedule





APPENDIX A

Aquatic Weed Control Alternatives and Considerations

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CONTROL ALTERNATIVES

General Considerations and Regulatory Approvals

This section of the Integrated Aquatic Weed Management Plan presents information on available techniques which can be used in the management of listed noxious weeds or nuisance growths of native plants. Much of this information in this section is excerpted from A Citizen's Manual for Developing Integrated Aquatic Plant Management Plans (WDOE 1994), the Supplemental Environmental Impact Statements for the Washington Department of Ecology's Aquatic Plant Management Program (WDOE 2001) and the 2008 Statewide Strategic Plan for Eurasian watermilfoil in Idaho (IISC/ISDA 2007). Additional information on new and developing control technologies is also presented where it appears to be appropriate in the near future (two to five years). While all possible techniques are addressed here, only those which are specifically applicable to Coeur d'Alene Lake and the Lower Lakes, the developed Problem Statement and the Management Goals are discussed in detail. Following from the review of appropriate techniques, an "Action Plan" has been developed which is presented in the next main section of this Management Plan. The Action Plan is focused on controlling the growth of invasive milfoils since these are the only aquatic weed currently in this system.

For each technique listed, a description of the method is given, then advantages, disadvantages, costs and appropriateness for Coeur d'Alene Tribal waters. Note that costs can vary widely depending on size of treatment, products used, suppliers and other factors. Therefore, costs are for general reference only.

It is important to mention at this point, that aquatic plant management control efforts must be approved by the Tribe's Lake Management Department Director prior to implementation. This follows from Tribal Code Chapter 42, Section 1.01, which states: "... the regulation of use of the submerged lands and waters are an essential governmental function of the Tribe. The Tribal and public health, safety and welfare requires that any allowed use of and encroachment upon these waters and submerged lands be regulated to protect water quality and quantity, navigation, fish and wildlife habitat, aquatic life, aesthetic beauty and Tribal values." Further, Section 16 of the Tribe's proposed Water Quality Standards (CDAT 2005) directs that the standards may be modified on a short-term basis in order to "respond to emergencies, to accommodate essential activities, or to otherwise protect the public health and welfare". Aquatic weed control efforts are considered protection of the public health and welfare but aquatic pesticide applications are specifically listed as requiring that a short-term modification be granted prior to application. Required conditions for a modification related to pesticide applications are (from Section 16 paragraph 5):

- (a) such pesticide application shall be in accordance with all federal, state, tribal and local regulations;
- (b) such application shall be in accordance with the label provisions promulgated by EPA under the Federal Insecticide, Fungicide and Rodenticide Act as amended (FIFRA; 7 USC 136, et seq);

- (c) such application shall not result in conditions injurious to indigenous aquatic biota, wildlife, humans, cultural resources or other existing or designated uses of the water body;
- (d) public notice, including identification of the pesticide, applicator, location where the pesticide will be applied, proposed timing and method of application and any water use restrictions shall be provided by the applicator;
- (e) the Department shall be notified at least three business days prior to pesticide application; and
- (f) any additional conditions required by the Department.

In addition to Chapter 42, and the related water quality standards, Tribal Code Chapter 46 addresses the general use of pesticides within the Reservation. Chapter 46, Section 1.01 states that: “The Coeur d’Alene Tribe’s pesticide laws have been developed and are hereby implemented in order to protect groundwater, to protect and/or improve the quality of surface waters, and to minimize the potentially harmful effects resulting from the exposure of people and animals to pesticides, pesticide residues, or metabolites.” The application and distribution of pesticides on the Coeur d’Alene Reservation will be permitted, provided the product has been registered by the EPA (per Section 3.01) and labeled for use in Idaho (per Section 14.01). Certification is required of individuals or commercial applicators who apply or distribute restricted use pesticides (per Section 4.01).

Submersed Plant Controls

The No-Action Alternative

The focus of this Plan is on the aquatic weed species which have been shown, in other areas of the North America, to negatively affect the beneficial uses of lakes and rivers. Based on the knowledge that invasive milfoils, in particular, can present serious problems if not controlled, the Tribe’s Lake Management staff have investigated and implemented options for controlling or eliminating this plant pest. In order to maintain a perspective on the costs and benefits of the full range of plant control options, the costs and benefits of the “no-action” alternative must also be kept in mind.

If organized action is not taken against invasive plant growth, there is a potential that these plants will spread and annual growth will reach the water surface causing problems with recreation, aesthetics and lake quality. The impact of continued, excessive submersed plant growth on fish habitat could include effects on water quality, on fish themselves and on fish food organisms.

Impacts on water quality include pronounced stratification of temperature due to interception of solar radiation and reduction in water circulation, as well as changes in chemical factors such as dissolved oxygen, pH and alkalinity due to daily cycles of photosynthesis and respiration. Perhaps a more significant impact to water quality can result from the rapid die-off (senescence) of dense plant beds which can happen on a seasonal basis. Die-off of excessive aquatic plant biomass in a shallow lake system can directly contribute to significant declines in dissolved oxygen levels.

The reduction in oxygen levels can have direct negative effects on fish and fish food organisms. Low oxygen also causes the production of hydrogen sulfide and ammonia, both of which can have toxic effects on fish and fish food. In Coeur d'Alene Lake, low oxygen levels can allow increased release of toxic heavy metals from the lake sediments and potentially result in significant human health issues. Maintenance of dense beds of submersed plants can also foster the growth of mosquitoes and possibly other nuisance organisms.

Advantages of No-Action alternative:

- no treatment cost

Disadvantages of No-Action alternative:

- lake quality likely to decline,
- recreational opportunities likely to decline,
- fish and wildlife habitat likely to be reduced or impaired,
- property values likely to decline.

Appropriateness for Coeur d'Alene Lake:

The “no-action” alternative is not acceptable due to the potential impacts to the beneficial uses of the lake and potential negative environmental impacts. In addition, the “no-action” alternative is not appropriate due to the degradation that uncontrolled aquatic weed growth will cause and the desire of the lake residents and managers to protect the identified beneficial uses. Finally, since Eurasian milfoil is a listed noxious weed, treatment is considered mandatory per Idaho Weed Law (Title 22, Chapter 24).

Currently Available Techniques - Preventive

Watershed Controls

The preventative techniques which may have utility in Coeur d'Alene Lake's aquatic weed control efforts focus on control of inputs of the growth nutrient phosphorus. These techniques include both structural and non-structural (Best Management Practice) options which generally work to prevent erosion and sediment generation by controlling surface runoff.

Advantages of Watershed controls (in general):

- reduce nutrient loading at their sources,
- provides shade and lowers stream temperatures,
- reduces stream bank erosion and sedimentation in lake,
- reduces toxic chemicals and other pollutants in streams and the lake,
- provides benefits over wider area than the lake.

Disadvantages of Watershed controls (in general):

- may require changes in land use,
- may require construction or modification of facilities, purchasing of property and hiring of maintenance personnel,

- may require regulatory support and personnel.

Costs of Watershed Controls:

- vary greatly (not determined)

Appropriateness for Coeur d'Alene Lake:

Watershed controls are appropriate for water quality protection at Coeur d'Alene Lake but would not be expected to effect the growth of aquatic weeds in either the short or long term. This is due in part to the fact that most aquatic plants draw nutrients out of the sediments (as opposed to from the water column) and also the apparent fact that many weeds can grow well in low nutrient (oligotrophic) as well as high nutrient (eutrophic) lakes. Therefore watershed controls are not recommended for inclusion in the Integrated Treatment Action Plan. Note that watershed nutrient controls are the subject of the Coeur d'Alene Lake Management Plan. As described in that plan, implementation of actions that protect lake water quality will be necessary across a broad spectrum of this region.

In-Lake Nutrient Controls

The primary focus of many of the lake management alternatives outlined in the Coeur d'Alene Lake Management Plan is the reduction in nutrients (primarily phosphorus) as a means of limiting algae growth and preserving high dissolved oxygen levels. This, in turn, is necessary to limit the release of potentially toxic levels of heavy metals from the lake sediments. This is a valid approach and should be considered, especially for long term reduction in productivity. It is, however, beyond the scope of this Plan to evaluate the technical merit or costs of these nutrient-focused alternatives. Several recommended techniques will be discussed herein, however, because they also control or remove the actual aquatic plant growth.

Public Awareness, Education and Involvement Program

The understanding and involvement of lake and watershed residents and lake users will be necessary if the process of nutrient, algae and aquatic plant growth controls is to succeed. This is also referred to as "cultural control". Therefore, a public awareness, education and involvement program is strongly recommended. Such a program would focus on, and promote, lake stewardship, but would also keep the lake "community" informed about measures that are to be, and have been, performed in and around the lake. Especially important will be evaluation of control program effectiveness and program "adjustments" over time. Through newsletters, public meetings, exhibits at fairs and local media coverage (to name a few), information on the lake should be disseminated and opportunities given for reply from the community.

Human recreational activities account for the majority of aquatic weed spread and this is especially true with invasive milfoils. Milfoil fragments can be carried on boat propellers, in personal watercraft jets and on vessel trailers and can start new infestations when these are put into other waterbodies. Therefore, it is imperative that people do all they can to be aware of problems associated with all "aquatic nuisance species" and to prevent their movement across the land.

Some subjects which can interest lake residents and users are: simplified algae and aquatic weed information; sources of, and solutions to, nutrient enrichment; shoreline stabilization and revegetation; options for lawn fertilizer use; pet waste management; non-phosphate detergent use and discouraging bird and waterfowl feeding. Training on plant identification can be very pertinent as well.

Whenever possible, the lake community should be directly included in information collection and synthesis as part of the public involvement program. This can include citizen representatives performing monitoring (data collection) efforts.

Advantages of a Public Awareness, Education and Involvement Program:

- provides education and public awareness,
- provides opportunity to gather consensus and public support,
- provides opportunity to involve the lake residents and users in the lake management process.

Disadvantages of a Public Awareness and Involvement Program:

- requires committed organization to implement and provide continuity.

Costs of a Public Education and Awareness Program:

- \$5,000 to \$10,000 per year.

Appropriateness for Coeur d'Alene Lake:

An ongoing Public Awareness and Involvement Program is very appropriate for Coeur d'Alene Lake and is recommended to be included in the Integrated Treatment Action Plan described below.

Currently Available Techniques - Physical Control

These techniques include manual or mechanical efforts that can remove, cover, shade or dry out all or part of problem plant growth.

Hand Removal

Removal of submerged vegetation by hand digging or pulling is an intensive and generally small-scale management option. This method involves removing the entire plant (leaves, stems and roots) by hand or with a hand-held gardening tool and collecting the plant materials in a storage bag for transport and disposal on shore. In water depths greater than about three feet, the use of SCUBA divers is typically needed to effectively manage a location by hand.

The effectiveness of plant removal depends on sediment type, visibility (water clarity), plant type, and thoroughness in removing the entire plant. Based upon these variables, the level of plant control will vary from one month to multi-year management.

Advantages of Hand Removal:

- immediate clearing of the water column,
- highly selective technique, in that individual plants are removed,

- can be implemented in sensitive area where disruption must be kept to a minimum,
- effective in aggressive control of sparse or small infestations in the lake, around docks or in swim areas.

Disadvantages of Hand Removal:

- technique is time consuming and labor intensive,
- visibility may become reduced by the disturbance (re-suspension) of sediments during harvesting thus delaying or preventing complete plant removal,
- management can be costly in deeper water, especially when divers are used,
- control may only be short-term or seasonal; based on location and surrounding infestations.

Costs of Hand Removal:

- no cost if performed by volunteers,
- \$800 - \$1,600 per day for two divers and a support boat & operator,
- typical coverage from 400 to 2,000 square feet per day.

Appropriateness for Coeur d'Alene Lake:

Hand removal of aquatic weeds is appropriate for Coeur d'Alene Lake if target weed infestations and fairly sparse and native plant densities are also low. Therefore, hand removal is included in the Integrated Treatment Action Plan described below.

Bottom Barrier Installation

Bottom barriers are highly effective in the small to moderate scale control of aquatic vegetation. The barriers are typically synthetic (geo-textile) fabrics, or burlap, but a variety of other materials have been used including sand and gravel, polyethylene, polypropylene, synthetic rubber, fiberglass screens and nylon film. These materials cover the lake sediments and existing plants and prevent further growth. By covering the lake bottom that the plants emerge from, all plants are effectively prevented from growing in those areas. These barriers are typically 100% effective in the installed areas initially and installation can be conducted at any depth with the assistance of divers and a support vessel for deeper installations. Bottom conditions do not typically impede most barrier installations, but logs and debris are typically cleared from the treated area before placement of barriers. Duration of control is dependent upon type of material used, application techniques, sediment deposition and permit requirements. Research work performed in 2006 in Chatcolet Lake for the Idaho Milfoil Task Force showed that an eight week installation resulted in the greatest reduction of Eurasian watermilfoil biomass with the least reduction in native plant biomass (Idaho Milfoil Task Force, 2006).

Since gases are produced in the sediments under the barrier, the barrier must be attached or weighted to the bottom and allow these gasses to pass through it. Over time, these barriers can lose effectiveness if sediment builds up on top of them, providing a substrate for plants to root. Yearly maintenance or removal to other areas can prolong the

effectiveness of this technique indefinitely (except with burlap which will decompose and must be replaced to maintain effectiveness).

The operational bottom barrier technique used by the contractor in Chatcolet Lake in 2006 was to assemble 10 foot x 10 foot panels using Typar® spun geo-textile attached to 1 inch PVC pipe frames. The PVC pipes were partially filled with sand to provide sufficient weight to hold the panels on the bottom. Once assembled, a diver would swim the panel to the desired location and direct it into place as it sank. A one to two foot overlap was used to prevent plant growth between adjacent panels. After an eight to ten week period the barrier panels were disassembled and rolled up, removed from the lake, cleaned and made ready for other installations.

Bottom barriers are expensive when used on a large scale. In addition, there can be environmental impacts if large areas of a lake bottom are covered with these materials. Bottom barriers are most applicable for individual properties and are recommended for around docks. Bottom barriers may not work well in swimming areas when placed over soft sediments, however. If swimmers walk on them, they tend to push the mats into the sediment.

Advantages of Bottom Barriers:

- no toxic chemicals are placed in the water,
- provides immediate removal of nuisance plant conditions upon placement,
- easily applied to small, confined areas around docks, moorage's or beaches,
- they are hidden from view (in deeper waters),
- effective in isolated management practices,
- some materials are reusable.

Disadvantages of Bottom Barriers:

- potentially high material cost for synthetic products,
- labor intensive and high costs for utilizing divers,
- limited durability of certain materials,
- not species specific,
- potential permit restrictions on location of barrier (spawning areas), type of material, type of plants attempting to control and length of time barrier will be allowed in place,
- gas accumulation under barrier can cause barrier to be lifted hindering boat passage or swimmers,
- periodic maintenance needed to remove sediment build up and secure placement,
- may need to be removed after one year to allow native vegetation to re-establish.

Costs of Bottom Barriers:

- \$0.35 to \$0.85 per square foot for materials (burlap or geo-textile),
- \$0.35 to \$0.60 per square foot for labor to place barriers,
- \$0.30 to \$0.50 per square foot for labor to remove barrier.

Appropriateness for Coeur d'Alene Lake:

Bottom barriers are considered appropriate for use at Coeur d'Alene Lake based on the stated management goals.

Water Column Dyes

This technique involves the addition of dark colored dyes to the lake to suppress aquatic growth by shading plants or algae from sunlight. These can be blue or a blend of blue and yellow to absorb key portions of the visible light spectrum needed by submersed plant and algae growth. Dyes are most effective at depths of two feet and greater. Use of this technique is limited to lakes or ponds which have minimal dilution with clear water and no outflow.

Advantages of Water Column Dyes:

- treatment could control both aquatic plants and algae,
- no water use restrictions; treated water will not harm fish, waterfowl, pets or wildlife,
- no special equipment or applicator certification required.

Disadvantages of Water Column Dyes:

- not species specific (can effect all plants and algae),
- not effective when plants or algae are near the water surface,
- dilution from inflowing creeks would necessitate frequent re-application,
- dyes may not be allowed due to outflow and domestic water rights.

Costs for Water Column Dyes:

- \$12.00 to \$15.00 per acre foot for materials.

Appropriateness for Coeur d'Alene Lake:

Water column dyes are not appropriate for use at Coeur d'Alene Lake due to their lack of target specificity and their limited expected efficacy in large lakes.

Sediment Removal

Removal of lake sediments can provide a nutrient and plant control option. Stormwater drainage, surface runoff, stream inputs, erosion and aquatic plant growth can all contribute to the buildup of sediments in lakes and ponds. These sediments represent a pool of nutrients which can stimulate the growth of aquatic plants and algae. In shallow lake areas the establishment of significant aquatic plant populations can result in accelerated accumulation of sediments and filling of the lake. The purposes of sediment removal, therefore, are to remove nutrients and aquatic plants and to deepen shallow areas so that future plant growth is reduced (both by reducing nutrient availability and by increasing the water depth and thus potential shading).

Sediment removal operations can be conducted using a variety of mechanical equipment from backhoes and drag lines which dig the sediment from the shore, to floating barge hydraulic systems that remove a slurry of sediment and water and pump it to a settling pond on-shore. A significant consideration with sediment removal is the disposal of

removed sediments, plant materials and water. Lakes act as sinks for not only nutrients but also potentially toxic materials. Sediment testing is often required prior to establishing an appropriate sediment disposal plan. The water contained in the removed sediment is often substantial as well, which adds to the challenge of moving and disposing of the dredged material.

Advantages of Sediment Removal:

- effective in removing existing plants and nutrient rich sediments,
- increases the depth of the system and reduces the areas available for plant growth,
- site-specific management.

Disadvantages of Sediment Removal:

- operation costs are typically high and labor intensive,
- problems with equipment access and location for disposal,
- potential for turbidity release and short-term impacts to water quality,
- not species specific,
- may remove beneficial habitat.

Costs for Sediment Removal:

- \$200,000 to \$400,000 for design, inspection, environmental monitoring,
- \$0.50 to \$1.80 per cubic foot for hydraulic dredge,
- disposal costs not possible to estimate; can be significant.

Appropriateness for Coeur d'Alene Lake:

Sediment removal is not considered appropriate for Milfoil control at Coeur d'Alene Lake due to the lack of target specificity, the need for sediment disposal areas and its high cost.

Water Level Drawdown

Drawdown (or pump down) of the lake water levels, especially during the winter months, can have a dramatic impact on some aquatic weed problems. This methodology is possible where there is a water control structure which will allow lakes or reservoirs to be drained. Alternatively, high capacity pumps must be used to draw water levels down.

Drawdown will expose the lake sediments to loss of water and, depending on location and season, to freezing. Freezing in particular can have an impact on aquatic plants that have no over-wintering structure like seeds, turions, tubers or winter buds. The impact on the root crowns of prolonged exposure to sub-zero temperatures is often fatal. As the lake is refilled, re-growth from these crowns either does not occur or is severely stunted. There can also be a reduction in some other types of problematic vegetation using this technology if the drawdown is prolonged. The loss of water, and concurrent sediment compaction that can result from drawdown can also be a benefit as it can slow the colonization and growth of some rooted plants.

This technique is not one that can claim eradication normally, and plants will survive in portions of the lake where water remains over the sediments. If the drawdown can extend

to the deep edge of the plant communities it is obviously more effective than shallower drawdown that only expose near-shore areas.

Drawdown can have minimal cost if an outlet control structure of sufficient height is in place. This is not the case in the Coeur d'Alene Lake. Given the lake size, bottom topography and expected groundwater inflows, it is unlikely that the lake could be drawn down more than eight feet without pumping and pumping would be impractical. This technique can negatively affect the fish and wildlife habitat in the lake and would have obvious implications for water rights users. Finally, Coeur d'Alene Lake is drawn down approximately eight feet each winter and this does not appear to presents any limitation on the growth of aquatic vegetation, either of native species or of milfoil (as evidenced by the dense growths seen in areas exposed in the Lower Lakes area).

Advantages of Drawdown:

- no addition of toxic chemicals to the water,
- useful to allow repair and maintenance of shoreline features.

Disadvantages of Drawdown:

- likely adverse environmental impacts,
- temporary loss of recreation,
- low probability of success given lake morphology and climate.

Costs of Drawdown:

(not determined).

Appropriateness for Coeur d'Alene Lake:

Coeur d'Alene Lake is currently drawn down every winter and this is not seen to control aquatic vegetation within the draw-down areas. Therefore drawdown is not considered to be a viable aquatic weed management technique in this area.

Currently Available Techniques - Mechanical Control

Hand Cutting

This technique involves cutting of plants below the water surface, but roots are not generally removed. Tools used in cutting include scythes, thin cables, rakes or other specialized devices that can be pulled through the plant beds by boat or from shore. One popular device consists of two single-sided stainless steel blades forming a "V" shape which are connected to a four foot handle and tied to a rope.

Advantages of Hand Cutting:

- immediate removal of nuisance submerged plant growth,
- costs are minimal,
- can be performed throughout the season as needed.

Disadvantages of Hand Cutting:

- labor intensive and time consuming,
- generally not species specific
- visibility may become impaired by turbidity generated by cutting,
- short-term plant control as the root system is not removed; cutting is typically needed multiple times each season,
- may be difficult to contain and remove plant fragments.

Costs of Hand Cutting:

- cutting devices range from \$200 to \$800
- no labor cost if performed by volunteers,

Appropriateness for Coeur d'Alene Lake:

Hand cutting is not considered appropriate for Coeur d'Alene Lake due to the intensity of the labor involved and the likelihood that plant fragments would be released, thus spreading an infestation (especially for milfoil).

Automatic Mechanical Plant Control Products

Several automatic plant control products are commercially available that mechanically disturb the lake bottom to remove aquatic plants and prevent their re-growth within a well defined area. They sweep, roll, or drag repetitively over sediments to keep the area free of aquatic plant growth. These devices must be attached to a dock or post to work properly and each product requires electricity to operate. Depending on the product, up to a 42 foot radius around the dock or post can be controlled. Some products have a reversing capability, whereas others spin around a post.

The Weed Roller® uses a low-voltage power unit (attached to the dock) to slowly drive a long roller (metal cylinder or pipe) set on the lake bottom through an adjustable arc of up to 270 degrees. A reversing action built into the drive automatically brings the roller back to complete the cycle. Fin-like projections on the rollers help detach plants from the sediment and remove roots. The Beach Groomer® attaches to a lawn pump to propel two seven foot arms engineered with chains that turn to clear the lake bottom of weeds. The Lake Sweeper® uses light weight rakes and a submerged pump to clear the lake bottom of weeds.

The ease of installation and operation varies depending upon the product. The type of lake bottom is also an important factor in selecting an automatic plant control device. It is best to install and start operating these devices in the spring before plants begin actively growing. If they are operated after plants have grown, the detached plants should be removed from the water with a rake or gathered by hand. Some manufacturers suggest preparing the area before installation by removing weeds and debris from the site and some products don't work very well after the plants have grown.

Once the plants are cleared from the area, these products can be used as little as one day per week or less to keep plants from re-colonizing the area. When not in use, the equipment should be stored along side a dock or in a place where people can not

accidentally injure themselves. Little maintenance is required, but these units must be removed from the water in winter in areas where lakes are expected to freeze.

Advantages of Automatic Plant Control:

- Repetitive sediment agitation suppresses the re-growth of plants in areas where it is regularly used.
- Open water adjacent to docks can be created and maintained
- With some devices the treatment area can be modified by adding additional cylinders or rakes or by adjusting the travel arc.
- Some products can easily be moved and can be shared by neighbors.
- Operating costs are low - about the same as operating an ordinary pump.

Disadvantages of Automatic Plant Control:

- Repetitive sediment agitation will disturb some bottom dwelling animals and may interfere with fish spawning.
- If plants are present, sediment agitation can cause plant fragmentation, which may increase the spread of some invasive weeds.
- Sediment agitation devices can cause a depression to develop where the unit operates as the fine sediment is dispersed to other areas of the waterbody.
- When the cleared area is to be used for activities such as swimming or wading, the equipment should be unplugged from the power source and moved and stored under or along side a dock. People may injure themselves if they step on the device.
- These products should be removed in the winter from lakes that freeze.

Costs of Automatic Plant Control:

- Purchase cost varies between products. The Beach Groomer® starts at \$999, but you also need to purchase a one to two horsepower pump (about \$300) to operate the unit.
- The other products cost approximately \$2,000.

Appropriateness for Coeur d'Alene Lake:

The automatic, mechanical devices described appear to be appropriate only to small scale situations around shoreline structures, and therefore have limited utility within Tribal waters. Automatic plant control devices are not chosen to be part of the Integrated Treatment Action Plan.

Water Circulators

Water circulators, some of which are also aerators, are well known in water treatment, and are particularly useful for algae control. One such device (or series of devices) is the SolarBee™. This is a floating solar-powered circulator. Depending on the model, the SolarBee is 10-17 feet in diameter and generates a flow rate of 1,250-10,000 gallons per minute. The SolarBee creates a four to six-foot diameter column of rising water below the machine and spreads this water gently across the top of the lake or reservoir in a long

distance flow pattern. While most mixers and aerators can influence only 0.5 surface acres, SolarBee™s can reportedly impact up to 45 surface acres per machine. SolarBee™ (2008) indicates that its models have utility in reducing invasive aquatic weed growth. The continual oxidation of littoral sediments and overlying waters is believed to negatively impact the health and growth of invasive submerged aquatic plants by limiting ammonia-nitrogen availability. Since the science of controlling aquatic vegetation using the SolarBee is undergoing further study, this technique warrants additional investigation.

Advantages of water circulators:

- non-toxic,
- potential long-term effectiveness.

Disadvantages of water circulators:

- no documentation of effectiveness on aquatic plants.

Costs of water circulators:

- (not determined).

Appropriateness for Silver Lake:

Due to the lack of documented use to control aquatic weeds, water circulators are not considered appropriate for Coeur d'Alene Lake.

Mechanical Harvesting

An extension of the hand cutting discussed above involves the use of larger equipment that can cut or mow aquatic plants below the water surface. Barge mounted weed cutters, for instance, will cut the stems of submerged vegetation over large areas, with that vegetation typically floating off or being collected by the operator with some other implement. Aquatic weed harvesters are an improved version of a large weed cutter. These systems cut, collect and transport the vegetation for disposal on shore. A typical weed harvesting system will consist of the harvester and a shore station for unloading the harvested vegetation into a transport system for disposal.

Aquatic harvesters have a number of cutting blades located on the harvesting head and a conveyor system behind the blades that collects the plants and deposits them on a barge. There is typically a storage conveyor system that the plants fall onto when cut which facilitates unloading the machine at the shore station. The shore station equipment is usually either a shore conveyor that mates to the harvester and lifts the cut plants into a dump truck or other transport system, or a trailer conveyor that performs the same function as well as transports the harvester from lake to lake. Harvesting systems normally cut the plants from five to seven feet below the surface and can harvest up to two acres per day depending on the distances to off-loading sites.

Aquatic plant harvesters work well at cutting the plants and removing the bulk of the plant material from the lake. They do allow some plant fragments to escape, however, and they do not necessarily inhibit the continued growth of the cut plants. Harvesting is also not species specific (unless used in single species dominated areas). Aquatic plant harvesters can remove significant amounts of young fish and invertebrates during harvesting operations. Harvesters should not be used on lakes that are infested with milfoil in the pioneering or early colonization stages since additional fragments will accelerate the spread of the plant.

Advantages of Mechanical Harvesting:

- no toxic chemicals added to lake,
- immediate removal of plants and contained nutrients,
- limited interference with use of the water body,
- minimal bottom disturbance,
- reduction in sediment accumulation by removing organic matter which normally decays and adds to the bottom sediments,
- harvested plants can be used as compost.

Disadvantages of Mechanical Harvesting:

- slow process (two acres per day under ideal operating conditions), dependent on availability of off-loading sites,
- labor and equipment intensive; must involve cutting and collection of plant material,
- typically requires repeat cutting for full season control,
- creates plant fragments which have potential to spread and establish in other portions of the lake (especially a concern in between docks where cutter must back away from shore),
- non-selective and can be detrimental to non-target plants and animals,
- high capital costs for machine purchase or use by service provider.

Costs of Mechanical Harvesting:

- \$600 to \$900 per acre for contract commercial aquatic plant harvesters,
- \$100,000 to \$180,000 for harvester/off-loader purchase,
- cost of disposal not determined.

Appropriateness for Coeur d'Alene Lake:

Mechanical harvesting is not considered appropriate for Coeur d'Alene Lake because of the need for regular, repeat cuttings, the difficulty in cutting effectively in the rocky shoreline areas, potential fragment spreading and the high cost.

Rotovation

Rotovation, or underwater cultivation, is a newer concept in mechanical aquatic plant management. It can provide for longer term control of some aquatic plants (than with harvesting) and it can remove plants to greater depths than conventional harvesters can (approximately 12 feet versus five to seven feet). Rotovators are basically underwater

rototillers which churn the bottom sediments to a depth of up to 12 inches. This action dislodges plants and root crowns. Typical rotovation will provide one to three years of acceptable weed control.

Dislodged plants must be collected as they float to the surface. As with plant cutting or harvesting, rotovation should not be considered in lake or river systems where plants are in the pioneering stages of an infestation and/or spread by fragmentation. Rotovation would not be expected to control non-rooted plants such as coontail (*Ceratophyllum demersum*).

Advantages of Rotovation:

- removes entire plant including roots,
- longer effectiveness than with harvesting,
- plant density becomes reduced after successive treatments.

Disadvantages of Rotovation:

- does not collect plants or fragments which are uprooted,
- may not work well in rocky or heavy sediment areas,
- temporarily destroys bottom habitat and potentially fish spawning areas,
- causes turbidity and potential release of nutrients,

Costs of Rotovation:

- \$1,000 to \$2,000 per acre for contract commercial operator.

Appropriateness for Coeur d'Alene Lake:

Rotovation is not considered appropriate for Coeur d'Alene Lake due to the lack of target specificity, the potential that this will significantly spread the milfoil problem through fragment generation and the difficulty in using this technique in rocky shoreline areas. In areas of Coeur d'Alene Lake where sediments are contaminated with heavy metals from mining waste, there is also the potential for re-suspension of these materials into the water column with rotovation.

Diver directed suction removal

Diver suction removal has been used since the 1970's as an improvement to hand removal of sparse colonies of milfoil. Diver suction removal was used in Chatcolet and Round Lakes as part of the 2006 milfoil control program. The technique utilizes a small barge or boat carrying a portable pump with suction hoses that are directed by SCUBA divers. Divers dislodge the plant tissue and root system from the sediments and basically vacuum up the plant material which is carried back to the barge. On the barge, plant parts are sieved out and retained for land disposal while water and sediment materials are allowed to drop back into the lake.

Diver suction removal can be highly effective under the appropriate conditions. Efficiency of removal is dependent on sediment condition, plant size and density, and underwater visibility. It is best used for localized infestations of low plant density where

fragmentation must be minimized. This technique is also selective in that divers can target a single species in a mixed population area.

An environmental concern with diver suction removal is that of turbidity and nutrient release from disturbed sediments. This is primarily applicable with light, organic sediments that often accumulate in dense weed bed areas. However, the divers typically do not let the suction intake come near the sediments, rather they pull the target plants up out of the sediment and direct the plant into the suction intake. While sediment curtains can be used to minimize the drift of re-suspended sediment materials and also escaped plant fragments, there is no practical way of controlling nutrient release. Placement of sediment curtains is also time consuming and, thus, costly. Diver suction removal performed for the Coeur d'Alene Tribe in 2006, 2008 and 2009 created only minimal visible sediment re-suspension.

Advantages of Diver Suction Removal:

- species selective and site-specific control,
- minimal disruption of sediments and surrounding habitat with non-rooted plants,
- minimal release of plant fragments,
- no depth constraints, effective near obstacles,

Disadvantages of Diver Suction Removal:

- labor intensive and expensive,
- may not be appropriate control method in dense plant beds,
- potential release of nutrients and sediments, potential short-term increased turbidity.
- may not work well in gravelly or rocky areas due to the difficulty in pulling up all root fragments

Costs of Diver Suction removal:

- \$1,000 to \$2,000 a day for two divers and support boat,
- typical coverage from 0.25 to 1.0 acre per day.

Appropriateness for Coeur d'Alene Lake:

Diver operated suction removal has applicability in Coeur d'Alene Lake and the St Maries and St. Joe rivers and is therefore included in the Integrated Treatment Action Plan described below. However, due to the expected cost of this type of treatment, as well as the difficulty in removing aquatic weeds growing among dense native plants, it is considered as a backup technique in the lake. This method does have good applicability to the narrow bands of plants found along the rivers, however.

Currently Available Techniques - Biological Control

The biological control ("biocontrol") of aquatic plant problems focuses on the selection of organisms that have an impact on the growth of a target plant. By stocking a lake with these organisms, or "agents", the population of the target plant can be reduced.

Biological control is not an exact science at this time. There have been a number of

dramatic success stories with the control of aquatic weeds using some organisms. There have also been some undesirable effects from their use. The majority of the potential biological controls are in the experimental or review stage at this time.

Biological control agents are generally of two types. There are general agents like grass carp that will consume most aquatic vegetation. As such, they are of limited use when trying to target specific plants. The second type of biocontrol agent is that which is target-specific for the problematic specie(s). Many of these agents focus on exotic plants that have been introduced to this country. Research typically starts in the region of the world where these plants are native, and focuses on the organisms that keep them in check there. Once identified, these organisms are brought through a quarantine protocol into this country where further research is conducted to determine if there is operational potential for control.

Grass Carp

Grass carp (or White Amur) are plant consuming fish native to China and Siberia. There are a wide range of aquatic plants that these fish will eat, but they have definite feeding preferences and will generally eat the plants they prefer first. Stocking rates are dependent on climate, water temperature, type and extent of plant species and other site-specific conditions. The recommended maximum stocking rate in Washington State is 25 fish per acre and the typical stocking rate is nine fish per acre (Bonar et al. 1996). A study of grass carp usage in Washington has indicated that in most cases grass carp either have little effect or will eat all submersed plants (Hamel 2002).

Periodic restocking is generally necessary to replace fish lost to predation or disease and to maintain the number of young, actively growing (and thus actively eating) fish. Only triploid (sterile) fish can be planted in Idaho and by permit only. Grass carp must be imported by approved suppliers and be certified to be disease and Zebra/Quagga mussel free and sterile. Inlet and outlet screens must be installed in the lake or pond prior to stocking. In Idaho, the Department of Fish and Game must issue a release permit before grass carp can be shipped from a Federally-approved culture facility and DFG personnel must inspect the receiving water prior to stocking.

Water quality is seen to generally improve after introduction of grass carp; with the elimination of large mats of vegetation, bottom dissolved oxygen levels generally increase from levels lethal to fish and pH generally decreases with decreases in photosynthesis (WDFW 1990). However, water turbidity increases have also been documented due to grass carp stirring up bottom sediments. Effectiveness of grass carp in controlling aquatic weeds depends on feeding preferences and metabolism which vary from region to region. Some plant species which appear to be preferred include pondweed species, Coontail and Elodea; milfoils appear to be not preferred and will be eaten only after other vegetation has been removed. Plant control effectiveness is site specific and significant control of vegetation may not be apparent until two to four years following introduction.

Advantages of Grass Carp:

- non-toxic
- long-term effectiveness

Disadvantages of Grass Carp:

- may not control the specific plant (weed) that is problematic in a lake,
- may alter composition of plant community without decreasing overall biomass,
- may decimate submersed aquatic plants and result in worse algae problems, and disruption of native fish habitat,
- inlet and outlet screens must be constructed and must allow passage of native salmonid fishes (if present),
- carp foraging may cause turbidity and foster algal growth through re-suspension of sediment materials.

Costs of Grass Carp:

- \$10.00 to \$15.00 per fish (plus delivery),
- typical stocking rates are 9 to 15 fish per acre,
- inlet / outlet screen costs not determined.

Appropriateness for Coeur d'Alene Lake:

Grass carp are not considered appropriate for use in Coeur d'Alene Lake due to their uncontrollable nature, lack of target specificity and, thus, potential adverse effects on the native plant populations and fish habitat in the lake.

Plant Eating Insects

There are a number of terrestrial weeds for which insect biocontrols have been found, resulting in effective control (but seldom eradication) of these weeds. Included are terrestrial insects that control purple loosestrife (an emergent wetland plant), water hyacinth (a floating aquatic plant) and the terrestrial weeds dalmatian toadflax, leafy spurge, spotted knapweed and musk thistle. As far as aquatic weeds which can occur in northern latitudes, most of the recent research has focused on the milfoil weevil. The following paragraphs illustrate some of the challenges involved in finding effective agents and summarize the current knowledge about milfoil biocontrol agents.

Following a survey of published literature performed for the US Army Corps of Engineers, a total of 44 phytophagous (plant eating) insects were found to associate with *Myriophyllum* species in Eurasia (Cock et al, 2006). Although only limited information is available for most of these species, none appears to be feeding and developing strictly on *M. spicatum*. However, only a small portion of the native range of *M. spicatum* has been surveyed, so it is likely that other natural enemies of this plant may exist. Eight of the insects recorded in the literature also occur in North America, and three of these, a pyralid moth *Acentria ephemerella*, the native weevil *Euhrychiopsis lecontei* and the chironomid *Cricotopus myriophylli*, are known to cause a decline in Eurasian milfoil in some lakes but not others (IISC, 2007). Considerable research work needs to be performed before any insect can be used for milfoil control with any assurance of efficacy. In addition, any potential biological control agent must be tested on native

milfoils as well as the *M. spicatum* x *M. sibiricum* hybrid to determine feeding preferences and potential resistance to insect attack.

Of the three insect species listed above, the weevil has received considerable research attention in several northwest, northeast and mid-western states. As indicated, this organism is a native of North America and has been associated with declines of milfoil in Illinois, Minnesota, Vermont, and Wisconsin. Researchers in Vermont found that this weevil can negatively impact milfoil by suppressing the plants' growth and reducing its buoyancy (Creed and Sheldon 1995). The following description is excerpted from a University of Minnesota, Department of Fish and Wildlife website (<http://www.fw.umn.edu/research/Milfoil/Milfoilbc.html>) to provide a description of the weevil's interaction with milfoil plants:

The milfoil weevil is native to North America and is a specialist herbivore of watermilfoil. Adult weevils live submersed and lay eggs on milfoil meristems. The larvae eat the meristem and bore down through the stem, consuming the cortex, and then pupate (metamorphose) lower on the stem. Development from egg to adult occurs in 18-30 days at summer temperatures. The consumption of meristem and stem mining by larvae are the two main effects of weevils on the plant and this damage can suppress plant growth, reduce root biomass and carbohydrate stores and cause the plant to sink from the water column. Although the weevil has been quite effective at some sites, it has not been effective at other sites. Currently, we cannot predict when, where and how the weevils will or will not be effective. The aim of our work is to improve our understanding so we can predict effects and appropriate circumstances for use of biocontrol.

In Washington State, the milfoil weevil is present primarily in eastern Washington and occurs on both *M. spicatum* and *M. sibiricum* (Tamayo et. al. 1999). During the summer of 1999, researchers from the University of Washington determined the abundance of the milfoil weevil in 11 lakes in Washington. They found that weevil abundance ranged from undetectable levels to 0.3 weevils (adults and larvae) per stem. Fan Lake, Pend Oreille County had the greatest density per stem or 0.6 weevils (adults, larvae and eggs per stem) although the weevils there were present on northern watermilfoil not *M. spicatum*. These abundance results are well below the recommendations made by other researchers in Minnesota, Ohio, Vermont, and Wisconsin of having at least 1.5 - 2.0 weevils per stem in order to control *M. spicatum*.

To date, there have not been any documented declines of Eurasian watermilfoil in Washington State that can be attributed to the milfoil weevil, although Creed & Sheldon speculated that declines in Lake Osoyoos and the Okanagan River may have been caused by the milfoil weevil. The Washington Department of Ecology has been performing augmentation research since 2002 but has not documented consistent control to date (Parsons 2008). There are, however, various lakes in Michigan, Illinois, New York and Vermont where control of milfoil using this weevil has been reported by the Ohio company, EnviroScience, Inc., which cultures and markets these weevils as a viable control agent under the trade name Middfoil®.

Advantages of weevils:

- non-toxic,
- potential long-term effectiveness.

Disadvantages of weevils:

- weevils may not control *M. spicatum* in lakes with populations of native watermilfoil,
- effectiveness on hybrid milfoil is not known,
- weevil densities may be reduced below effective levels due to predation by sunfish and other environmental factors; therefore periodic restocking may be necessary.

Costs of Milfoil weevils:

- milfoil weevils currently cost \$1 each from the commercial producer EnviroScience, Inc.

Appropriateness for Coeur d'Alene Lake:

Milfoil weevils are not currently considered appropriate for primary treatments in Coeur d'Alene Lake due to uncertainties regarding their effectiveness, both in this lake generally and on the milfoil hybrid. However, in 2009 EnviroScience, Inc. staff found some weevils on milfoil in Harrison Slough so this may be a good opportunity for a trial augmentation treatment there. This technique should be re-evaluated when more is known about the weevils growth and effects.

Currently Available Techniques - Chemical Control

Chemical herbicides are one of the leading methods of controlling, and in some cases, eradicating, noxious aquatic plant growth. The herbicides which are approved for aquatic use by the EPA and the ISDA are well studied and considered compatible with the aquatic environment when used according to label directions. In addition to the review and regulation provided by the EPA, the Washington Department of Ecology completed an Environmental Impact Statement (EIS) in 1992 for their aquatic plant management program which allows for the introduction of a number of compounds into State waters. That EIS was recently updated by WDOE and information contained in the Supplemental EISs (WDOE 2001c) has been used in the preparation of this Plan. The DEQ also evaluates the use of herbicides on a case-by-case basis through Short Term Activity Exemptions (Bergquist, 2005). Note that the application of chemicals for aquatic pest control can only be performed by an applicator who is licensed in the State where the treatment is taking place (i.e. by ISDA) with an aquatics endorsement.

There are two general types of aquatic herbicides in use; referred to as "contact" and "systemic" products. Contact herbicides kill susceptible plant stems and leaves while typically leaving roots and some reproductive structures alive and capable of re-growth. As such, a contact herbicide is generally considered a maintenance tool, one that can provide relief from aquatic plant problems, but not something that can eliminate the problem from the lake system. Systemic herbicides are absorbed and carried throughout the plants thereby making them capable of killing the entire plant.

The contact herbicides approved for use in Idaho are Endothall and Diquat. The three systemic herbicides which are registered and approved for use in Idaho are Fluridone, 2,4-D and Triclopyr. These “active ingredients” and the products they are found in are described below. Note that herbicide products have labels that describe in detail the use of the product including application rates for various plants and appropriate treated water use restrictions.

Copper Compounds

There are currently two products containing copper that may be used for control of aquatic weeds and which are currently allowed in Idaho. They are both liquid products: Cutrine-Plus®, manufactured by Applied Biochemists and Nautique®, manufactured by SePRO Corporation. These are both “chelated” or complexed compounds.

Although copper is an essential element for plant growth, high concentrations of copper will inhibit photosynthesis and result in death of plants and algae. Chelated copper complexes were developed to maintain concentrations of the copper ion in the water column over a longer period of time than simple elemental copper (i.e. copper sulfate). The extended exposure of the copper ion in solution provided improved control of plants and algae. Copper products for aquatic weed control are applied by subsurface injection. Effectiveness of applications is enhanced by warm temperatures and sunlight. These conditions stimulate copper uptake by plant cells and increase the rate at which the plants will be controlled.

Given the known toxicity of copper compounds to aquatic life, primarily fish, and given the recent Endangered Species Act listings of several salmonid species in Pacific Northwest waters, the WDOE made a policy decision in March 2000 to disallow the use of copper in Washington’s salmon-bearing waters. Copper products are allowed throughout Idaho.

Advantages of Copper:

- relatively low cost treatments,
- no water use restrictions,
- provide effective and rapid control of algae blooms.

Disadvantages of Copper:

- acts as contact herbicide therefore does not kill plant roots,
- not allowed for use in waters discharging to or occupied by salmonid species (requirement of WDOE, not part of EPA label),
- remains bound to sediments and organic matter over a long period of time,
- limited to treatments in hard water lakes and ponds,
- may require extensive water testing and monitoring in systems with outflow.

Costs of Copper:

- \$730 per acre for Nautique (water depth of 8 feet and target dose of 0.8 ppm)
- Add \$50 to \$150 per acre for application of the product.

Appropriateness for Coeur d'Alene Lake:

Copper compounds are not considered to be appropriate for use in Coeur d'Alene Lake due to their lack of systemic actions and potential environmental concerns over accumulation and potential fishery impacts.

Diquat

Diquat dibromide is a fast acting, broad spectrum contact herbicide and algaecide found in the product Reward® which is manufactured by Syngenta (formerly Zeneca Ag Products, Inc). In 2002 the WDOE completed a formal Risk Assessment and Final Supplemental EIS for Diquat (WDOE 2002) which has additional information on this chemical.

Diquat is effective on a variety of submersed plants, including milfoil, and also some types of filamentous algae. Diquat's mode of action is to generate "reactive oxygen radicals" which disrupt photosynthesis. Diquat kills plants rapidly so depletion of oxygen and release of nutrients from plant decay is a potential problem. As with all contact herbicides, plant roots are not affected and repeated applications may be needed for complete season control.

Contrary to this general efficacy, Diquat was reported to have been used in Hayden Lake, ID with some apparent systemic effect. In this case, Reward® was applied by a diver or a "drop hose" to the lower third of plants in dense milfoil beds. The diver used a wand and nozzle connected to a pressure tank onboard a nearby support boat to treat one acre while the boat treatment involved holding the wand and nozzle down into the water while traveling across a two-acre bed. Follow-up diver inspection of these treatment areas one year later found only occasional milfoil sprigs (new plants) in the diver-treated area and approximately one-half acre of live plants in the boat treatment area (Daniel 2002).

Diquat has slight toxicity to most animals and freshwater fish. It is slightly to highly toxic to aquatic invertebrates. It is for this reason that diquat was not permitted by WDOE for use in Washington State waters from 1992 to 2003. The effectiveness of diquat on target plants such as Eurasian watermilfoil is found to be heightened through the use of tank mixes with copper containing products. Water use restrictions which would be in force with diquat applications for milfoil control (two gallons Reward per surface acre) are three days for drinking, one day for livestock drinking, three days for irrigation to turf and ornamental and five days for irrigation to food crops. There is no restriction for fishing or swimming in treated water (Syngenta 2009).

Advantages of Diquat:

- effective against many plant species,
- rapid action,
- no bioaccumulation,
- no fishing or swimming restriction in treated water.

Disadvantages of Diquat:

- persistent, especially in sediments,

- drinking and irrigation water use restrictions in place,
- potentially toxic to aquatic organisms,
- repeat applications needed to maintain control
- rapid action may cause oxygen depletion and rapid release of nutrients into water.

Costs of Diquat:

- \$100 - \$200 per acre; 1 to 2 gallons per acre,
- add \$50 to \$150 per acre for application of the product.

Appropriateness for Coeur d'Alene Lake:

Diquat is not considered appropriate for use at Coeur d'Alene Lake due to the lack of systemic action and the lack of target specificity.

Endothall

Endothall is a contact herbicide available in the CerexAgri, Inc. products Aquathol K® (a liquid formulation), Aquathol Super K® (a granular formulation), and Hydrothol 191® (both liquid and granular formulations).

Endothall compounds are used primarily for short term (one season) control of a variety of aquatic plants (and algae in the case of Hydrothol 191®). The mode of action of endothall is not fully understood although the hypotheses indicate that this chemical disrupts biochemical processes at the cellular level (WDOE 2001c). Target plants for Aquathol K® and Aquathol Super K® include Coontail, pondweeds, milfoil and hydrilla (CerexAgri 2008). Duration of control with endothall products is dependent upon target species, contact efficiency, lake conditions and re-growth from unaffected root masses.

Endothall can be toxic to fish, although there is reportedly a wide margin of safety between allowed application rates (typically 5 ppm or less) and rates that are toxic (typically greater than 100 ppm) (CerexAgri 2008). Use of endothall does involve several water use restrictions. At application rates needed to control milfoil (2.0 to 4.0 ppm) the water use restrictions are: do not use fish from treated areas for food for three days and do not use water from treated areas for watering livestock, preparing agricultural sprays for food crops, for irrigation or for domestic purposes for seven to 14 days after application. There is no swimming restriction for endothall products.

Advantages of Endothall:

- fast acting injury to plant tissue which is typically apparent in one to two weeks,
- little or no off-target drift impacts,
- spot treatments possible.

Disadvantages of Endothall:

- only provides temporary reductions in plant growth,
- non-target plant impacts are difficult to mitigate as this is a fairly broad spectrum herbicide,
- water use restrictions in place,

- rapid action may cause oxygen depletion and rapid release of nutrients into water.

Costs of Endothall:

- \$120 - \$160 per acre using liquid formulation (assuming average water depth of 5 feet); 1.9 to 2.6 gallons per acre foot (3 to 4 ppm),
- \$210 - \$280 per acre using granular formulation (assuming average water depth of 5 feet); 13.2 to 17.6 pounds per acre foot (3 to 4 ppm),
- add \$50 to \$150 per acre for application of either product.

Appropriateness for Coeur d'Alene Lake:

Endothall products are not considered appropriate for use at Coeur d'Alene Lake due to the lack of systemic action and the lack of target specificity.

Fluridone

Fluridone is available in the SePRO Corporation products Sonar AS® (a liquid formulation), Sonar SRP® (a slow release pellet formulation), Sonar Q (a pellet formulation) and Sonar PR® (a "precision release" pellet formulation). Fluridone is also available in the Griffin LLC liquid product Avast®.

Fluridone can show good control of a range of submersed and emergent plants, including milfoil, where there is little water movement and an extended time for the treatment. It is most applicable to whole-lake or isolated bay treatments where dilution can be minimized. Because of the eight- to ten-week recommended treatment period, treatments should take place in early spring or fall.

Fluridone interferes with the synthesis of RNA, proteins and carotenoid pigments and thereby affects photosynthesis (WDOE 2001c). Use of fluridone does not pose a threat to human health or to fish or wildlife when used according to the label (SePRO 2008).

While there is a short term (seven to 30 days) precaution when using treated waters for irrigation, there are no other water use restrictions when using the liquid formulation of fluridone.

Advantages of Fluridone:

- systemic herbicide, will kill entire target plants,
- a variety of plants are susceptible, based on treatment rates and program design,
- species specificity achievable with correct application rates,
- non-toxic to humans, pets, fish and wildlife,
- no water use restrictions for fishing, swimming or livestock/pet consumption.

Disadvantages of Fluridone:

- long exposure period required in order to effectively control plants (typically requiring multiple applications or minimizing water movement),
- potential for drift from application area, requires whole lake or enclosed area treatments.

Costs of Fluridone:

- \$81 – \$710 per acre (assuming five feet average depth) for liquid product; for application rate between 10 and 90 ppb (0.14 – 1.22 quarts per acre)
- \$114 – \$666 per acre for pellet product; for application rate between 16 and 90 ppb (4.3 – 25 pounds per acre),
- add \$50 to \$150 per acre for application of either product.

Appropriateness for Coeur d'Alene Lake:

Fluridone products are considered appropriate for use in Coeur d'Alene Lake because of their systemic action and lack of adverse environmental effects. However, due to the limited but spread-out extent of the infestation (i.e. the need for spot treatments), the long contact time required and the cost, fluridone products are not be the preferred products in most cases.

Triclopyr

This is a systemic herbicide that received full registration for aquatic uses in Idaho in 2005. Triclopyr is the active ingredient in the aquatic products Renovate® (SePRO Corporation) and Ecotriclopyr 3 SL® (Alligare LLC), which are both water-soluble triethylamine salt formulations containing three pounds of triclopyr acid equivalent per gallon (see Ecotriclopyr and Renovate labels in Appendix C). SePRO also makes a flake formulation of triclopyr (Renovate® OTF, for “on-target flake”) for use in aquatic treatments. This formulation contains 1.6 ounces active ingredient per pound.

Triclopyr is a product that has been tested and found to be effective on broad-leaved (dicotyledonous) plants such as milfoil. This product is specific for this type of plant and can be used in habitat recovery programs focusing on selective removal of these plant pests. It will not affect plant species in the monocot family, which is the majority of native aquatic and wetland plant types. Triclopyr products have a contact time requirement of 24 to 48 hours so they have applicability in spot treatments. Susceptible submersed plants exhibit epanasty (bending and twisting of plant tissue) in six to 12 hours after treatment. Treated plants begin to sink slowly three to five days after treatment and one to three weeks later plants should be well below the surface, often near the bottom. The Washington Department of Ecology issued an Environmental Impact Statement in 2004 which allowed the use of this chemical in Washington waters (WDOE 2004)

Photo-degradation is the major route of triclopyr degradation in aquatic environments. The first order half-life for Renovate® is 0.5 - 3.0 days. No accumulation occurs on sediment and no bio-concentration is believed to occur in sport fish or bottom feeding species. Toxicity testing on fish and other non-target organisms performed by or for the manufacturer has indicated that Renovate® has a low toxicity potential (SePRO Corporation 2004).

Renovate has been used locally in Hayden Lake, Pend Oreille Lake and the Pend Oreille River in 2006 and 2007. The observed efficacy of this product was reported to be good to very good, triclopyr reportedly reduced the presence of Eurasian watermilfoil by 70% in treated sites (Madsen and Wersel, 2008). The presence of Eurasian watermilfoil in

Bonner County's 2007 triclopyr treatment areas during the pre-treatment survey was 61% and decreased to 18% during the post treatment survey.

Advantages of Triclopyr:

- selective for broad leafed plants,
- short contact time needed,
- rapid breakdown to non-toxic products,
- systemic action so entire plant is killed.

Disadvantages of Triclopyr:

- potential drift from treatment area.

Costs of Triclopyr:

- \$280 - \$600 per acre using liquid formulation (assuming average water depth of 5 feet); target dose of 0.75 to 2.5 ppm (3.4 to 9 gallons per acre),
- \$325 - \$880 per acre using flake formulation (assuming average water depth of 5 feet); target dose of 0.75 to 2.5 ppm (100 to 270 pounds per acre),
- add \$50 to \$150 per acre for application of either product.

Appropriateness for Coeur d'Alene Lake:

Triclopyr (Renovate® or Ecorenovate®) is appropriate for use in Coeur d'Alene Lake due to its systemic action, short contact time requirement and rapid dissipation from the water.

2,4-D

2,4-D is a fast-acting systemic herbicide with two formulations approved for freshwater applications in Idaho. The two formulations are the butoxyethyl ester (BEE) formulation found in the granular product Navigate® (marketed by Applied Biochemists); and the dimethylamine (DMA) formulation found in the liquid product DMA4 IVM®, produced by Dow AgroSciences LLC. Product labels for Navigate® and DMA4® are included in Appendix C.

The mode of action of this chemical is primarily as a stimulant of plant elongation and cell division (WDOE 2001c). 2,4-D is a post-emergent herbicide that is primarily used to control watermilfoil and water stargrass. Typical submersed monocot plants (i.e. the pondweeds) are not susceptible to 2,4-D so this product can be used for selective weed control. 2,4-D can be effectively used in spot-treatment programs in lakes or ponds. Effectiveness of the treatment is dependent upon the timing of the application and density of the target plant community. Two treatments may be required when targeting dense communities. Susceptible plants will begin to show signs of injury one to two weeks after treatment, followed by plant breakdown and death in three to four weeks.

There is no fishing or swimming restriction associated with the use of 2,4-D although the WDOE recommends "that due to risk of dermal contact, a swimming advisory shall be posted advising swimmers to wait 24 hours before reentering directly treated areas to

allow time for granules to disperse" (WDOE 2001c). 2,4-D cannot be used in waters used for irrigation, agricultural sprays, watering dairy animals or domestic water supplies (which is to say that treated water cannot be used for these things). The recent risk assessment prepared for WDOE as part of the 2001 Final Supplemental Environmental Impact Statement for the aquatic plant management program (WDOE 2001c) indicated that "no significant adverse impacts on fish, free swimming invertebrates or benthic invertebrates" should be expected from 2,4-D applications (either formulation) at appropriate label rates.

Advantages of 2,4-D:

- fast-acting systemic herbicide which is effective in removing selected plants with little or no impact on certain non-target plants at labeled rates,
- applications conducted easily with granular or liquid material in a large or small scale applications,
- treated waters can be used for swimming,
- no fish consumption restrictions.

Disadvantages of 2,4-D:

- application must be conducted 0.5 miles or greater from active drinking/domestic water withdrawals or those withdrawals must be shut off during the treatment (i.e. until the concentration of 2,4-D in the water is less than the drinking water tolerance of 0.7 ppb).

Costs of 2,4-D:

- \$260 - \$530 per acre applied, granular formulation, (100 to 200 pounds per acre).
- \$120 - \$250 per acre, liquid formulation applied (assuming average water depth of 5 feet), target dose 2 to 4 ppm (7.1 to 14.2 gallons per acre),
- add \$50 to \$150 per acre for application of either product.

Appropriateness for Coeur d'Alene Lake:

2,4-D (either of the listed formulations) is appropriate for use in Coeur d'Alene Lake due to the specificity for the target species (milfoil), the rapid systemic action and dissipation of the herbicide, the demonstrated efficacy in Coeur d'Alene and the general acceptance of this chemical based on past uses. This is the preferred treatment method as described in the Integrated Treatment Action Plan, below.

Developing Techniques

There are a number of techniques which are under investigation as possible milfoil control agents; these being primarily biological agents, or "biocontrols". The principal of classical biocontrol is to find natural enemies of a target plant in regions of the world where the plant and its enemies co-evolved. These enemies potentially include plant pathogens, herbivorous insects, competitive plants and plant growth regulators. The research with these agents, which is typically divided into several phases including foreign exploration, pathogenicity screening, efficacy evaluation and host specificity

testing, has focused primarily on their effect on noxious submersed plants such as Eurasian watermilfoil and hydrilla.

Pathogens

In 1994 a classical pathogen biological control effort was launched by the US Army Corps of Engineers Waterways Experiment Station. Survey work was initiated in Europe for milfoil pathogens (Harvey and Evans, 1997) and in China for milfoil and hydrilla (Shearer, 1997a). The China survey, in particular, offered the opportunity to search for potential biocontrol agents in temperate areas where climatic conditions more closely match areas in the US where these plants have invaded.

Following the China survey, 200 fungal isolates were collected and returned to the US for testing. Of these, 67 were submitted to the screening using 15 cm milfoil apical segments and 48 were found to induce some damage in the initial screen (Shearer, 1999). The seven isolates which induced the most significant damage were re-tested and of these five produced comparable disease ratings. Only three of the five isolates could be induced to grow before the second screening, and these three were all identified as *Mycoleptodiscus terrestris*, or ‘*Mt*’. *Mt* is commonly isolated from both hydrilla and milfoil within the US and has been intensively investigated as a biocontrol agent (Shearer 1997b).

Interestingly, *Mt* was not isolated during the European survey work (Harvey and Evans, 1997). Thus *Mt* is one fungal pathogen that is being submitted for additional evaluations.

In a recent review of plant pathogen issues, Hoagland (1996) stated that although many pathogens have been characterized as “bioherbicidal”, most lack the aggressiveness to overcome weed defense mechanisms and achieve adequate control. However, some herbicides and plant growth regulators can act to weaken natural plant defense systems making them more susceptible to pathogen attack (Hoagland, 1996). As a result, studies have been performed using *Mt* and various herbicides on both milfoil and hydrilla. A growth chamber study using 2,4-D and *Mt* indicated that herbicide and pathogen combinations provide better control of milfoil than either agent used alone (Nelson and Shearer, 2005). However, a mesocosm study which submitted several plants to combinations of fluridone and *Mt* found that there was no advantage to integrating the two on milfoil (Nelson et al. 1998). Obviously, the use of *Mt* or other fungal pathogens is not ready for field usage.

Herbicide Combinations

There is another realm of developing aquatic weed control techniques which is receiving some research attention and that is the combining of contact and systemic herbicide chemistries. As described under the ‘Currently Available Techniques - Chemical Control’ section above, there are two general types of herbicides, ‘contact’ and ‘systemic’. Contact herbicides are fast acting, typically causing extensive cellular damage at the point of uptake but not affecting areas untouched by the herbicide (such as the roots). Contact herbicides generally relieve nuisance problems quickly, but may allow re-growth of nuisance plants. Alternatively, systemic herbicides often will kill the entire plant through translocation of the active ingredient to plant tissue not affected by contact

APPENDIX A

herbicides. Systemic herbicides, although effective in killing the entire plant, are generally slower acting and limited to longer contact times.

Studies conducted in small plots and whole lake scenarios have documented the efficacy of a range of rates for the systemic herbicides 2,4-D and triclopyr, as well as selectivity in removing *M. spicatum* populations and leaving native plant communities (Getsinger et al. 1982, Getsinger et al. 1997, Poovey et al. 2004). Similarly, empirical evidence suggests that some selectivity may be achieved when applying the contact herbicide endothall (Skogerboe and Getsinger, 2002, Parsons et al. 2004).

A recent study by Madsen et al (2008 review draft) looked specifically at the effectiveness of mixtures of endothall with 2,4-D and endothall with triclopyr. The objective of this study was to determine whether combinations of a contact and a systemic herbicide might exploit the strengths of each herbicide class, and minimize their weaknesses. This study found that combinations of endothall with either 2,4-D or triclopyr provided the benefits of immediate action and complete control within four weeks. Triclopyr and 2,4-D alone provided 100% control after two to three weeks, but initial control was less than 20%. With endothall alone, there was greater than 60% reduction in milfoil biomass one week after treatment but this dropped to 52% by two weeks after treatment and re-growth was evident. Thus, it appeared from this research that the combinations of these herbicides had additive (synergistic) effect with one another and could lead to increased efficacy in large-scale treatments or reduce the amount of herbicide needed to achieve similar control using only one of these products alone. The effect of such combinations on non-target plants has not been determined, however. Thus, more research is needed before herbicide combinations can be used in full scale field treatments.

One combination herbicide product that is expected to be registered in 2009 is SePRO Corporation's MAXG®. This is a granular formulation of 2,4-D and triclopyr. This product will bear some performance monitoring and may be a good match for milfoil controls in Coeur d'Alene Lake.

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APPENDIX B

Water Use Restrictions and Herbicide Labels

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WATER USE RESTRICTIONS**2,4-D**

The following restrictions are applicable to the use of 2,4-D (either liquid or granular formulations) in aquatic systems:

- Unless an approved assay indicates the 2,4-D concentration is 100 ppb (0.1 ppm) or less, do not use water from treated areas for irrigation other than non-crop areas or those crops or plants labeled for direct application of 2,4-D; or for mixing sprays for agricultural or ornamental plants.
- Unless an approved assay indicates that the 2,4-D concentration is 70 ppb (0.07 ppm) or less, do not use water from treated areas for potable water (drinking water).
- Except as noted above, there are no restrictions on the use of water from treated areas for fishing, watering of livestock or other domestic purposes.

There are no swimming restrictions stated on the 2,4-D product labels but, as noted in the 2,4-D section (Appendix B), the WDOE recommends that "due to risk of dermal contact, a swimming advisory shall be posted advising swimmers to wait 24 hours before re-entering directly treated areas to allow time for the chemical to disperse".

Triclopyr

The following restrictions are applicable to the use of triclopyr in aquatic systems:

- Do not use treated water for irrigation for 120 days following application. As an alternative to waiting 120 days, treated water may be used for irrigation once the level of triclopyr in the intake water is determined to be non-detectable by laboratory analysis. There is no restriction on the use of water from the treated area to irrigate established grasses.
- Minimum setback distances from functioning potable water intakes for human consumption ... must be observed when controlling submerged weeds in lakes, reservoirs and ponds. (A table of setback distances based on area treated and concentration of triclopyr in the water, is provided on the label.) Triclopyr can be applied around functioning potable water intakes or closer than the setback distances as long as the intake is turned off until the level of triclopyr is determined to be less than or equal to 400 ppb (0.4 ppm) as determined by laboratory analysis or immunoassay.
- There are no restrictions on water use in the treatment area for recreational purposes, including fishing and swimming.
- There are no restrictions on consumption of water from treated areas by livestock.

HERBICIDE LABELS

The following documents are the EPA-approved manufacturer's labels for herbicides which are recommended for this AWMP.

Specimen Label

Renovate® OTF

Aquatic Herbicide



Aquatic Sites: For control of emersed, submersed and floating aquatic weeds in the following aquatic sites: ponds; lakes; reservoirs; marshes; wetlands; impounded rivers, streams and other bodies of water that are quiescent; non-irrigation canals, seasonal irrigation waters and ditches which have little or no continuous outflow.

For use in New York State, comply with Section 24(c)
Special Local Need labeling for Renovate® OTF,
SLN NY-070004

Active Ingredient:

triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid,	
triethylamine salt.....	14.0%
Other Ingredients.....	86.0%
TOTAL	100.0%
Acid equivalent: triclopyr - 10.0%.	

Keep Out of Reach of Children **CAUTION/PRECAUCIÓN**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Causes moderate eye irritation. Avoid contact with eyes or clothing.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside, then wash thoroughly and put on clean clothing.

First Aid	
If in eyes	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.• Call a poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none">• Take off contaminated clothing.• Rinse skin immediately with plenty of water for 15 - 20 minutes.• Call a poison control center or doctor for treatment advice.
If swallowed	<ul style="list-style-type: none">• Call a poison control center or doctor immediately for treatment advice.• Have person sip a glass of water if able to swallow.• Do not induce vomiting unless told to do so by a poison control center or doctor.• Do not give anything by mouth to an unconscious person.
If inhaled	<ul style="list-style-type: none">• Move person to fresh air.• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.• Call a poison control center or doctor for further treatment advice.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. In case of emergency endangering health or the environment involving this product, call INFOTRAC at 1-800-535-5053.	

Notice: Read the entire label. Use only according to label directions. Before using this product, read "Warranty Disclaimer", "Inherent Risks of Use", and "Limitation of Remedies" at end of label booklet. If terms are unacceptable, return at once unopened.

If you wish to obtain additional product information, please visit our web site at www.sepro.com.

EPA Reg. No. 67690-42
FPL 011808

Renovate is a registered trademark of Dow AgroSciences LLC.
Manufactured by: **SePRO Corporation** 11550 North Meridian Street, Suite 600
Carmel, IN 46032 U.S.A.

ENVIRONMENTAL HAZARDS

Under certain conditions, treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants, which may cause fish suffocation. Therefore, to minimize this hazard **DO NOT** treat more than one-half (1/2) of the water area in a single operation *and wait at least 10 days between treatments when susceptible plants are mature and have grown to the water's surface, or when the treatment would result in significant reductions in total plant biomass.* Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State agency for fish and game before applying to public water to determine if a permit is needed.

AGRICULTURAL CHEMICAL: **Do not** ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all *Directions for Use* carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

General Information

When applying this product follow all applicable use directions, precautions and limitations.

For Aquatic and Wetland Sites: Use Renovate OTF Granular herbicide for control of emersed, submersed and floating aquatic weeds in the following aquatic sites: ponds; lakes; reservoirs; marshes; wetlands; impounded rivers, streams and other bodies of water that are quiescent; non-irrigation canals, seasonal irrigation waters and ditches which have little or no continuous outflow.

Obtain Required Permits: Consult with appropriate state or local water authorities before applying this product in and around public waters. State or local public agencies may require permits.

Recreational Use of Water in Treatment Area: There are no restrictions on use of water in the treatment area for recreational purposes, including swimming and fishing.

Livestock Use of Water from Treatment Area: There are no restrictions on livestock consumption of water from the treatment area.

GENERAL USE PRECAUTIONS AND RESTRICTIONS

Chemigation: **Do not** apply this product through any type of irrigation system.

Irrigation: Water treated with Renovate OTF may not be used for irrigation purposes for 120 days after application or until triclopyr residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less. This label describes both required and recommended uses of a chemical analysis for the active ingredient, triclopyr. SePRO Corporation recommends the use of an Enzyme-Linked Immunoassay (ELISA) test for the determination of the active ingredient concentration in water. Contact SePRO Corporation for the incorporation of this analysis in your treatment program. Other proven chemical analysis for the active ingredient may also be used. The ELISA analysis is referenced in this label as the preferred method for the rapid determination of the concentration of the active ingredient in the water.

– Seasonal Irrigation Waters: Renovate OTF may be applied during the off-season to surface waters that are used for irrigation on a seasonal basis, provided that there is a minimum of 120 days between Renovate OTF application and the first use of treated water for irrigation purposes

or until triclopyr residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

– Irrigation Canals/Ditches: **Do not** apply Renovate OTF to irrigation canals/ditches unless the 120 day restriction on irrigation water usage can be observed or triclopyr residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

– There is no restriction on use of treated water to irrigate established grasses.

- **Do not** apply Renovate OTF directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants, and do not permit dust to drift into these areas.
- **Do not** apply to salt water bays or estuaries.
- **Do not** apply directly to un-impounded rivers or streams.
- **Do not** apply on ditches or canals currently being used to transport irrigation water or that will be used for irrigation within 120 days following treatment or until triclopyr residue levels are determined to be 1.0 ppb or less.
- **Do not** apply where runoff water may flow onto agricultural land as injury to crops may result.

Grazing and Haying Restrictions:

Except for lactating dairy animals, there are no grazing restrictions following application of this product.

- **Grazing Lactating Dairy Animals:** **Do not** allow lactating dairy animals to graze treated areas until the next growing season following application of this product.
- **Do not** harvest hay for 14 days after application.
- Grazed areas of non-cropland and forestry sites may be spot treated if they comprise no more than 10% of the total grazable area.

Slaughter Restrictions: During the season of application, withdraw livestock from grazing treated grass at least 3 days before slaughter.

BEST MANAGEMENT PRACTICES FOR DRIFT MANAGEMENT

Equipment used in the application of Renovate OTF should be carefully calibrated to be sure it is working properly and delivering a uniform distribution pattern. Aerial application should be made only when the wind velocity is 2 to 10 mph.

Applications should be made only when there is little or no hazard for volatility or dust drift, and when application can maintain Renovate OTF placement in the intended area. Very small quantities of dust, which may not be visible, may seriously injure susceptible plants, and Renovate OTF may be blown outside of the intended treatment area under extreme conditions. **Do not** spread Renovate OTF when wind is blowing toward susceptible crops or ornamental plants that are near enough to be injured.

Avoiding drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for drift. The applicator is responsible for considering all these factors when making decisions.

Ground Application Equipment: To aid in reducing drift, Renovate OTF should be applied when wind velocity is low (follow state regulations; see *Sensitive Area* under *Aerial Drift Reduction Advisory* below) or using a slurry injection system.

AERIAL DRIFT REDUCTION ADVISORY

This section is advisory in nature and does not supersede the mandatory label requirements.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces drift potential.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by

adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (e.g. higher wind).

Wind: Drift potential is lowest between wind speeds of 2 - 10 mph (follow state regulations). However, many factors, including equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect drift.

Sensitive Areas: Renovate OTF should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

AQUATIC WEEDS CONTROLLED BY RENOVATE OTF

alligatorweed	pennywort
American lotus	smartweed
bladderwort	water chestnut ^{†,††}
Eurasian watermilfoil	yellow water lily (<i>Nuphar spp.</i> , spatterdock)
milfoil species	white water lily (<i>Nymphaea spp.</i>)
parrotfeather ^{††}	water primrose (<i>Ludwigia spp.</i>)
pickerelweed	watershield (<i>Brasenia spp.</i>)

[†] Not for use in California.

^{††}Treatment may be needed to achieve desired level of control.

Application Methods

Surface Application

Use a mechanical spreader such as a fertilizer spreader or mechanical seeder, or similar equipment capable of uniformly applying Renovate OTF. Before spreading any product, carefully calibrate the application equipment. When using boats and power equipment, you must determine the proper combination of (1) boat speed, (2) rate of delivery from the spreader, and (3) width of swath covered by the granules.

Use the following formula to calibrate the spreader's delivery in pounds of Renovate OTF per minute:

$$\frac{\text{miles per hour} \times \text{swath width (feet)} \times \text{pounds per acre}}{495} = \text{pounds per minute}$$

Aerial Application (Helicopter Only)

Ensure uniform application. All equipment should be properly calibrated using blanks with similar physical characteristics to Renovate OTF. To avoid streaked, uneven or overlapped application, use an appropriate tracking device (e.g. GPS). Refer to the *Aerial Drift Reduction Advisory* section of this label for additional precautions and instructions for aerial application.

Floating and Emerged Weeds

For control of water lily's (*Nymphaea spp.* and *Nuphar spp.*), watershield (*Brasenia spp.*), and other susceptible emerged and floating herbaceous weeds, apply 1.0 to 2.5 ppm a.e. triclopyr per acre. Apply when plants are actively growing.

Use higher rates in the rate range when plants are mature, when the weed mass is dense, in areas of greater water exchange, or for difficult to control species. Repeat as necessary to control regrowth, but do not exceed a total of 2.5 ppm a.e. triclopyr for the treatment area per annual growing season.

Submersed Weeds

For control of Eurasian watermilfoil (*Myriophyllum spicatum*) and other susceptible submersed weeds in ponds, lakes, reservoirs, impounded rivers, streams, and other bodies of water that are quiescent; non-irrigation canals, and seasonal irrigation waters, or ditches that have little or no continuous outflow, apply Renovate OTF using mechanical or portable granule spreading equipment. Rates should be selected according to the rate chart below to provide a triclopyr concentration of 0.50 to 2.5 ppm a.e. in treated water. Use of higher rates in the rate range is recommended in areas of greater water exchange. These areas may require a repeat application. However, total application

of Renovate OTF must not exceed an application rate of 2.5 ppm a.e. triclopyr for the treatment area per annual growing season.

For optimal control, apply when Eurasian watermilfoil or other submersed weeds are actively growing.

Concentration of Triclopyr Acid in Water (ppm a.e.)

Avg. Water Depth (ft)	Pounds Renovate OTF / acre					
	0.5 ppm	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
1	14	20	27	41	54	67
2	27	41	54	81	108	135
3	41	61	81	122	162	202
4	54	81	108	162	216	270

For applications greater in depth than 4 feet, when targeting difficult to control species and/or in sites with high dilution potential, the following formula should be used to calculate applications rates should greater than 270 pounds of Renovate OTF be needed to achieve desired weed control. NOTE: Do not exceed 2.5 ppm a.e. triclopyr for the treatment area per annual growing season.

average depth x target ppm x 27 = pounds of Renovate OTF per acre

Example Calculation:

6 foot average depth x 2.5 ppm x 27 = 405 pounds of Renovate OTF per acre

SMALL SITE (LESS THAN 1/2 ACRE) / SPOT TREATMENT APPLICATION

For small treatment sites of 1/2 acre or less use the rate chart below to determine the application rate depending on average water depth to achieve a concentration of 1.25 to 2.5 ppm a.e. Do not exceed 2.5 ppm a.e. triclopyr for the treatment area per annual growing season. Use higher rates in small treatment areas and in areas prone to higher dilution and for heavy weed infestation. Use the lower rates for spot treatment application of areas less prone to dilution and lighter weed infestations. For best results, split the total application rate into three equal applications 8 to 12 hours apart. Apply when water is calm.

Example: A 100 ft. by 40 ft. lakeshore swimming area with a 4 ft. average depth, heavily infested with Eurasian watermilfoil

Step 1: Determine the area to be treated in square feet (ft²) by multiplying the length of the area by the width.
– 100 ft. x 40 ft. = 4,000 ft²

Step 2: Determine the amount of Renovate OTF to be used by consulting the Renovate OTF Rate Chart for Areas Less than 1/2 Acre.
– Use 24.7 lbs. of Renovate OTF total based on 4 foot average depth in Rate Chart below.

Step 3: Apply Renovate OTF uniformly over weeds in treatment site in three equal applications of 8.2 lbs. each, 8 - 12 hours apart.

Renovate OTF Rate Chart for Areas Less than 1/2 Acre

Area (ft ²)	Pounds Renovate OTF			
	3 foot average depth		4 foot average depth	
	1.25 ppm a.e.	2.5 ppm a.e.	1.25 ppm a.e.	2.5 ppm a.e.
500	1.2	2.3	1.5	3.0
1,000	2.3	4.6	3.1	6.1
4,000	9.3	18.6	12.4	24.7
10,000	23.2	46.5	31.0	61.9
20,000	46.5	93.0	62.0	123.9

For applications with an area or depth not included in the above chart, the following formula should be used to calculate application rates.

area (ft²)/43,560 x average depth x target ppm x 27 = pounds of Renovate OTF

Example Calculation:

$8,250 \text{ ft}^2 / 43,560 \times 4 \text{ foot average depth} \times 1.25 \text{ ppm} \times 27 = 25.6 \text{ pounds of Renovate OTF}$

Small treatment application of Renovate OTF is recommended with waterproof gloves or a hand spreader to uniformly distribute flakes on target weeds.

Precautions for Potable Water Intakes:

For applications of Renovate OTF to control floating, emersed, and submersed weeds in sites that contain a functioning potable water intake for human consumption, see the chart below to determine the minimum setback distances of the application from the functioning potable water intakes.

Concentration of Triclopyr Acid in Water (ppm a.e.)					
Area Treated (acres)	Required Setback Distance (ft) from Potable Water Intake				
	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
< 4	300	400	600	800	1000
> 4 - 8	420	560	840	1120	1400
> 8 - 16	600	800	1200	1600	2000
> 16 - 32	780	1040	1560	2080	2600
> 32 acres, calculate a setback using the formula for the appropriate rate	Setback (ft) = $(800 \ln(\text{acres}) - 160) / 3.33$	Setback (ft) = $(800 \ln(\text{acres}) - 160) / 2.50$	Setback (ft) = $(800 \ln(\text{acres}) - 160) / 1.67$	Setback (ft) = $(800 \ln(\text{acres}) - 160) / 1.25$	

Note: \ln = natural logarithm

Example Calculation 1:

to apply 2.5 ppm Renovate OTF to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= (800 \times \ln(50 \text{ acres}) - 160) \\ &= (800 \times 3.912) - 160 \\ &= 2970 \text{ feet} \end{aligned}$$

Example Calculation 2:

to apply 0.75 ppm Renovate OTF to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= (800 \times \ln(50 \text{ acres}) - 160) \\ &\quad \frac{3.33}{3.33} \\ &= (800 \times 3.912) - 160 \\ &\quad \frac{3.33}{3.33} \\ &= 892 \text{ feet} \end{aligned}$$

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes.

To apply Renovate OTF around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

WETLAND SITES

Wetlands include flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Wetlands may occur within forests, wildlife habitat restoration and management areas and similar sites as well as areas adjacent to or surrounding domestic water supply reservoirs, lakes and ponds.

For control of emersed, floating or submersed aquatic weeds in wetland sites, follow use directions and application methods associated with the *Floating and Emersed Weeds* or *Submersed Weeds* sections on this label.

Use Precautions

Minimize unintentional application to open water when treating target vegetation in wetland sites. Note: Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat such areas.

IF ANY CONTENT ON THIS LABEL IS NOT UNDERSTOOD, OR YOU NEED FURTHER ASSISTANCE, CONTACT A SEPRO AQUATIC SPECIALIST WITH QUESTIONS SPECIFIC TO YOUR APPLICATION.

Terms and Conditions of Use

If terms of the following *Warranty Disclaimer*, *Inherent Risks of Use*, and *Limitation of Remedies* are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under *Warranty Disclaimer*, *Inherent Risks of Use* and *Limitations of Remedies*.

Warranty Disclaimer

SePRO Corporation warrants that the product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. SEPRO CORPORATION MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of SePRO Corporation as the seller. To the extent permitted by applicable law all such risks shall be assumed by buyer.

Limitation of Remedies

To the fullest extent permitted by law, SePRO Corporation shall not be liable for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories) shall be limited to, at SePRO Corporation's election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

SePRO Corporation shall not be liable for losses or damages resulting from handling or use of this product unless SePRO Corporation is promptly notified of such losses or damages in writing. In no case shall SePRO Corporation be liable for consequential or incidental damages or losses.

The terms of the *Warranty Disclaimer* above and this *Limitation of Remedies* cannot be varied by any written or verbal statements or agreements. No employee or sales agent of SePRO Corporation or the seller is authorized to vary or exceed the terms of the *Warranty Disclaimer* or *Limitations of Remedies* in any manner.

Storage and Disposal

Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available. Do not contaminate water, food, or feed by storage and disposal. Open dumping is prohibited.

Pesticide Storage: Store in original container. Do not store near food or feed. In case of leak or spill, contain material and dispose as waste.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Disposal (Plastic Bags): Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

General: Consult federal, state, or local disposal authorities for approved alternative procedures.

VegetationManager®



ECOTRICLOPYR 3 SL

SPECIMEN LABEL

Herbicide for Control of Woody Plants, Aquatic Plants, Vines, and Annual and Perennial Broadleaf Weeds in Non-irrigation Ditch Banks; on Wetland Sites in production forests and industrial non-crop areas; and in Aquatic Sites such as ponds, lakes, reservoirs, non-irrigation canals, and ditches which have little or no continuous outflow.

ACTIVE INGREDIENT:

Triclopyr: (3,5,6-Inchloro-2-pyridinyl) Oxyacetic acid, triethylamine salt* ... 44.4%

INERT INGREDIENTS 55.6%

TOTAL 100.0%

*Contains 3 pounds of Triclopyr Acid equivalent per gallon (31.05%)

EPA Reg. No 72167-49-74477

(B) EPA Est. No 37429-GA-02

(BT) EPA Est. No. 37429-GA-01

KEEP OUT OF REACH OF CHILDREN

DANGER / PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.

(If you DO NOT understand the label, find someone to explain it to you in detail.)

FIRST AID	
If in eyes	<ul style="list-style-type: none">Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.Call a poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none">Take off contaminated clothing.Rinse skin immediately with plenty of water for 15-20 minutes.Call a poison control center or doctor for treatment advice.
If swallowed	<ul style="list-style-type: none">Call a poison control center or doctor immediately for treatment advice.Have person sip a glass of water if able to swallow.DO NOT induce vomiting unless told to do so by a poison control center or doctor.DO NOT give anything by mouth to an unconscious person.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. In case of a Medical Emergency involving this product, call 1-800-308-5391.	
NOTE TO APPLICATOR: Allergic skin reaction is not expected from exposure to spray solutions of ECOTRICLOPYR 3 SL herbicide when used as directed.	
NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.	

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals
DANGER / PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you DO NOT understand the label, find someone to explain it to you in detail.)

Corrosive: Causes irreversible eye damage. Harmful if absorbed through skin or swallowed. DO NOT get in eyes or on clothing. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers who handle this pesticide must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Protective eyewear
- Chemical-resistant gloves (> 14 mils) such as butyl rubber, natural rubber, neoprene rubber, or nitrile rubber.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. DO NOT reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables are given, use detergent and hot water. Keep and wash PPE separately from other laundry.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

DO NOT contaminate water when cleaning equipment or disposing of equipment washwaters.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

For aquatic uses, under certain conditions, treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants, which may contribute to fish suffocation. This loss can cause fish suffocation. Therefore, to minimize this hazard, DO NOT treat more than one-third to one-half of the water area in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State agency for fish and game before applying to public water to determine if a permit is needed.

PHYSICAL OR CHEMICAL HAZARDS

Combustible. DO NOT use or store the product near heat or open flame.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval (REI). The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

DO NOT enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves (> 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber.
- Shoes plus socks
- Protective eyewear

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forest, nurseries, or greenhouses.

For applications to non-cropland areas, DO NOT enter or allow others to enter the treated area until sprays have dried.

GENERAL INFORMATION

ECOTRICLOPYR 3 SL herbicide is used to control unwanted woody plants, aquatic plants and annual and perennial broadleaf weeds.

- on Non-irrigation Ditch Banks
- on Wetland Sites in production forests and industrial non-crop areas
- in Aquatic Sites such as ponds, lakes, reservoirs, non-irrigation canals, and ditches which have little or no continuous outflow.

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ECOTRICLOPYR 3 SL use on these sites may include application to grazed areas as well as for the establishment and maintenance of wildlife openings.

GENERAL USE PRECAUTIONS

- **Obtain required permits.** Consult with appropriate state or local water authorities before applying this product to public waters. State or local public agencies may require permits.
- **DO NOT apply this product through any type of irrigation system.**
- **DO NOT apply to ditches or canals used to transport irrigation water.** It is permissible to treat non-irrigation ditch banks.
- **DO NOT apply where runoff or irrigation water may flow onto agricultural land other than rice fields as injury to crops may result.**
- It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs) and transitional areas between upland and lowland sites.
- **DO NOT apply directly to un-impounded rivers or streams.**
- **DO NOT apply to salt water bays or estuaries.**
- When making application to banks or shorelines of moving water sites, minimize overspray to open water.
- Application through a mist blower is not recommended.
- **DO NOT make direct applications or allow spray mists to drift onto cotton; grapes; soybeans; tobacco; vegetable crops; flowers; ornamental shrubs or trees, or other desirable broadleaf plants.**
- For range and pasture sites where grazing and harvesting is allowed, **DO NOT apply more than 2 lb a.e. of triclopyr (2/3 gallon of ECOTRICLOPYR 3 SL) per acre per year.**
- For forestry uses, **DO NOT apply more than 6 lb a.e. of triclopyr (2 gallons of ECOTRICLOPYR 3 SL) per acre per year.**
- All livestock, except lactating dairy animals, can graze at any time.
- Lactating dairy animals cannot graze forage until the next growing season after application.
- For all livestock, wait 14 days after application before harvesting hay.
- Grazed areas of non-cropland and forestry sites may be spot treated if they comprise no more than 10% of the total grazable area.
- Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter.
- **Arizona:** ECOTRICLOPYR 3 SL has not been approved for use on plants grown for commercial production, specifically forests grown for commercial timber production, or on designated grazing areas.

APPLICATION DIRECTIONS

RATES

This table assists in determining proper volumes of ECOTRICLOPYR 3 SL in the spray tank to avoid exceeding the maximum use rates using varying spray volumes.

Maximum Application Rates

Spray Volume Gallons/Acre	Maximum Rate of ECOTRICLOPYR 3 SL Gallons per 100 gallons of spray volume	
	Rangeland, Pasture Sites, and Other Grazed Areas ^a	Forestry Sites ^b
400	DO NOT use	0.5
300	DO NOT use	0.67
200	DO NOT use	1
100	0.67	2
50	1.33	4
40	1.67	5
30	2.33	6.65
20	3.33	10
10	6.67	20

^a For range and pasture sites where grazing and harvesting is allowed, **DO NOT apply more than 2 lb a.e. of triclopyr (2/3 gallon of ECOTRICLOPYR 3 SL) per acre per year.**

^b For forestry uses, **DO NOT apply more than 6 lb a.e. of triclopyr (2 gallons of ECOTRICLOPYR 3 SL) per acre per year.**

SPRAY ADDITIVES

All surfactants and drift control agents must be approved for food and feed use when used on food and feed sites.

Surfactants: When using surfactants, follow the use directions and precautions listed on the surfactant manufacturer's label. Use the higher recommended concentrations of surfactant in the spray mixture when applying lower sprayer volumes per acre.

Drift Control Agents: Agriculturally approved spray thickening drift control agents or high viscosity invert systems may be used with ECOTRICLOPYR 3 SL. When using these agents, follow all use directions and precautions on the product label. **DO NOT use a thickening agent with the Microfoil boom, Thru-Valve boom, or other systems that cannot accommodate thick sprays.**

TANK MIXES

Always refer to labels of other pesticide products for mixing directions and precautions which may differ from those outlined here. Use in accordance with the most restrictive of label limitations and precautions. No label dosage rates may be exceeded. This product cannot be mixed with any product containing a label prohibition against such mixing.

Tank Mixing Recommendations:

1. Fill spray tank 1/2 full with water.
2. Add spray thickening agent (if used).
3. Add additional herbicide (if used).
4. Add ECOTRICLOPYR 3 SL.
5. Add surfactant (if used).

6. Fill remainder of spray tank.

If combined with emulsifiable concentrate herbicides, moderate continuous adequate agitation is required.

SPRAY DRIFT MANAGEMENT

AVOID INJURIOUS DRIFT

Applications should only be made when there is little or no hazard from spray drift. Very small quantities of spray may seriously injure susceptible plants.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outer most operating nozzles on the boom must not exceed 3/4 the length of the rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they must be observed.

The applicator should be familiar with and take into account the information covered in the following **AERIAL DRIFT REDUCTION ADVISORY** [This information is advisory in nature and does not supersede mandatory label requirements.]

AERIAL DRIFT REDUCTION ADVISORY

Information on Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions)

Controlling Droplet Size:

1. **Volume** – Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
2. **Pressure** – **DO NOT** exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
3. **Number of Nozzles** – Use the minimum number of nozzles that provide uniform coverage.
4. **Nozzle Orientation** – Orienting nozzles so that the spray is released parallel to the air stream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
5. **Nozzle Type** – Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.)

Wind: Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Applications should be avoided below 2 mph due to variable wind direction and high inversion potential. Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Applications should not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sunsets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

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APPLICATION EQUIPMENT AND TECHNIQUES

BROADCAST APPLICATIONS

Aerial Application: When making aerial applications on rights-of-way or other areas near susceptible crops, apply through a Microfoil® or Thru-Valve boom, or use an agriculturally approved drift control agent. Other drift reducing systems or thickened sprays prepared by using high viscosity invert systems may be used if they are made as drift-free as are mixtures containing agriculturally approved thickening agents or applications made with the Microfoil or Thru-Valve boom. Keep spray pressures low enough to provide coarse spray droplets. Spray boom should be no longer than 3/4 of the rotor length. Spray only when the wind velocity is low (follow state regulations). Avoid application during air inversions. If a spray thickening agent is used, follow all use recommendations and precautions on the product label.

Note: Reference within this label to equipment produced by or available from other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by Vegetation Management LLC is not intended as an endorsement of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than is advised in directions available from the equipment's manufacturer. The reader is responsible for exercising their own judgment and expertise, or consulting with sources other than Vegetation Management LLC, in selecting and determining how to use its equipment.

Ground Application: To aid in reducing spray drift, ECOTRICLOPYR 3 SL should be applied in thickened (high viscosity) spray mixtures using an agriculturally approved drift control additive, high viscosity invert system, or equivalent as directed by the manufacturer. Use of low pressure nozzles, and operating nozzles in the lower end of the manufacturer's recommendations is advised. To minimize drift, keep the spray boom as low as possible, apply in >20 gallons of spray volume per acre, spray when wind velocities are low, or use an approved drift control agent.

In Hand Gun Applications, select the minimum spray pressure that will provide adequate plant coverage (without forming a mist). **DO NOT** apply with nozzles that produce a fine droplet spray.

High Volume Leaf-Stem Treatment. To minimize spray drift, **DO NOT** use pressure exceeding 50 PSI at the spray nozzle and keep sprays no higher than brush tops. An agriculturally approved thickening agent may be used to reduce spray drift.

WETLAND SITES IN PRODUCTION FORESTS AND INDUSTRIAL NON-CROP AREAS
ECOTRICLOPYR 3 SL may be used in wetlands within forests, wildlife habitat restoration, wildlife management areas, and industrial non-crop sites, as well as areas adjacent to or surrounding domestic water supply reservoirs, lakes and ponds to control target vegetation in and around standing water sites, such as flood plains, delta, marshes, wetlands, swamps, bogs, and transitional areas between upland and lowland sites, and the banks of ponds and lakes and transition areas between upland and lowland sites.

For control of woody plants and broadleaf weeds in these sites, follow use directions and application methods on this label. Refer to Tables 1 and 2 (below) for lists of woody plants and broadleaf weeds that are controlled by ECOTRICLOPYR 3 SL.

General Use Precautions for Wetland Sites

- Refer to the **GENERAL USE PRECAUTIONS** section for additional precautions.
- **Minimize overspray to open water** when treating target vegetation in and around non-flowing, quiescent or transient water. When making applications to control unwanted plants on banks or shorelines of flowing water, minimize over spray to open water.
- **Obtain Required Permits:** Before applying this product in and around public water, consult appropriate local public water control authorities. Permits may be required to treat such areas.
- **Recreational Use of Water in the Treatment Area:** There are no restrictions on water use in the treatment area for recreational purposes, including swimming and fishing.
- **Livestock Use of Water from Treatment Area:** There are no restrictions on consumption of water from treated areas by livestock.

Table 1
Woody Plants Controlled by ECOTRICLOPYR 3 SL

Alder	Chinquapin	Maleleuca (seedlings)	Sweetbay Magnolia
Arrowwood	Choke Cherry	Maples	Sweet Gum
Ash	Cottonwood	Mulberry	Sycamore
Aspen	<i>Crataegus</i> (hawthorn)	Oaks	Tan Oak
Bear Clover (Bearmat)	Dogwood	Persimmon	Thimbleberry
Beech	Douglas fir	Pine	Tulip Poplar
Birch	Elderberry	Poison Ivy	Wax Myrtle
Blackberry	Elm	Poison Oak	Western Hemlock
Black gum	Gallberry	Poplar	Wild Rose
Brazilian Pepper	Hazel	Salmonberry	Willow
Cascara	Hornbeam	Salt-bush (<i>Bracharis</i> spp)	Winged elm
Ceanothus	Kudzu'	Sassafras	
Cherry	Locust	Scotch Broom	
Chinese Tallow	Madrone	Sumac	

For complete control, retreatment may be necessary.

Table 2
Annual and Perennial Broadleaf Weeds Controlled by ECOTRICLOPYR 3 SL

Bindweed	Dandelion	Plantain	Tropical Sodaapple
Burdock	Elephant Ear	Purple Loosestrife	Vetch
Canada Thistle	Field Bindweed	Ragweed	Wild Lettuce
Chicory	Lambsquarter	Smartweed	
Curly Dock	Ligodium	Tansey Ragwort	

Purple Loosestrife (*Lythrum salicaria*)

Purple loosestrife can be controlled with broadcast foliar applications of ECOTRICLOPYR 3 SL at a minimum of 6 to 8 quarts per acre. Apply when purple loosestrife is at the bud to mid-flowering stage of growth. Follow-up applications for control of regrowth should be made the following year to achieve increased control of this weed species. For all applications, add a nonionic surfactant labeled for aquatics to the spray mixture.

Follow all directions and use precautions on the surfactant label.

Thorough wetting of the foliage and stems is necessary to achieve satisfactory control. A minimum spray volume of 50 gallons per acre is recommended for ground broadcast applications.

For backpack applications, a spray solution of 1 to 1.5% ECOTRICLOPYR 3 SL (5 to 7.6 fl oz of ECOTRICLOPYR 3 SL per 4 gallons of water) should be used. All purple loosestrife plants should be thoroughly wetted.

Aerial application by helicopter may be needed when treating restoration sites that are inaccessible, remote, difficult to traverse, isolated, or otherwise unsuitable to ground application, or in circumstances where invasive exotic weeds dominate native plant populations over extensive areas and efforts to restore native plant diversity are being conducted. By air, apply in a minimum spray volume of 30 gallons per acre using Thru-Valve or Microfoil boom only.

Terrestrial Sites Associated with Wetland Areas

Refer to Tables 1 and 2 (above) for a list of woody plants and broadleaf weeds that are controlled by ECOTRICLOPYR 3 SL.

Apply ECOTRICLOPYR 3 SL at rates of 0.25 to 2 gallons per acre for the control of broadleaf weeds and woody plants. Apply in enough water to provide uniform and complete coverage of the plants to be controlled. Use only water suitable for spraying. Use of an agriculturally approved nonionic surfactant is recommended for all foliar applications. Refer to **SPRAY ADDITIVES** in the **APPLICATION DIRECTIONS** section. Refer to **TANK MIXES** in the **APPLICATION DIRECTIONS** section for the order of addition of surfactants. For best results make applications when woody plants and weeds are actively growing.

Use higher rates within the range when brush averages 15 feet or more in height or when brush covers >60% of the area to be treated. Re-sprouting may occur the year following treatment if lower rates are used on hard-to-control species.

For hard-to-control species such as ash, black gum, choke cherry, maples, or oaks, during late summer applications when plants are mature, or during drought conditions, use higher rates of ECOTRICLOPYR 3 SL alone or use in combination with a 2,4-D approved for aquatic use, such as DMA 4 IVM, generally the higher rates should be used for satisfactory brush control. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

General Use Precautions for Wetland Sites

- Refer to the **GENERAL USE PRECAUTIONS** section for additional precautions.
- If applied to areas where livestock will graze, **DO NOT** apply more than 2/3 gallon of ECOTRICLOPYR 3 SL per acre per year.
- For forestry uses, **DO NOT** apply more than 2 gallons of ECOTRICLOPYR 3 SL per acre per year.

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High Volume Foliage Applications

For control of woody plants, apply ECOTRICLOPYR 3 SL at 1 to 2 gallons per 100 gallons of spray solution. Make applications in 100 to 400 gallons of total spray per acre depending on size and density of woody plants. Coverage should be thorough to wet all leaves, stems, and root collars.

Tank Mixing: 1 to 4 quarts of ECOTRICLOPYR 3 SL may be tank mixed with 1 to 2 quarts of 2, 4-D 3.8 lb amine, like DMA 4 IVM, diluted to make 100 gallons of spray solution. Make applications in 100 to 400 gallons of total spray per acre depending on size and density of woody plants. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Low Volume Foliage Applications

For control of woody plants, mix up to 5 gallons of ECOTRICLOPYR 3 SL in 10 to 100 gallons of spray solution. Adjust the spray concentration of ECOTRICLOPYR 3 SL and total spray volume per acre to match the size and density of target woody plants and kinds of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars. For best results, a labeled aquatic surfactant should be added to all spray mixtures.

Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a truck mounted spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 PSI may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush.

Cut Surface Treatments (Woody Plants)

To control unwanted trees and other listed woody plants in Table 1 (above), apply ECOTRICLOPYR 3 SL, either undiluted or diluted in a 1:1 ratio with water by one of the following methods.

Tre Injector Method: Inject 1/2 milliliter (ml) of undiluted ECOTRICLOPYR 3 SL or 1 ml of the diluted (1:1) solution through the bark at intervals of 3-4 inches between injection wounds. The tree injections should completely surround the tree at any convenient height.

Note: Worker Protection Standard AGRICULTURAL USE REQUIREMENTS reentry restrictions DO NOT apply for this application method. Refer to the NONAGRICULTURAL USE REQUIREMENTS box.

Hack and Squirt Method: Use a hatchet or similar equipment to make cuts in the bark at intervals of 3-4 inches at a convenient height around the circumference of the tree trunk. Spray 1/2 milliliter (ml) of undiluted ECOTRICLOPYR 3 SL or 1 ml of the diluted (1:1) solution into each cut.

Frill or Girdle Method: Make a single girdle through the bark completely around the tree at a convenient height. Wet the cut surface with undiluted ECOTRICLOPYR 3 SL or the diluted (1:1) solution.

Both the Hack and Squirt Method and the Frill or Girdle Method may be successfully used during any season except during periods of heavy sap flow of certain species such as maples.

Stump Treatment: Spray or paint undiluted ECOTRICLOPYR 3 SL on to the freshly cut surfaces of cut stumps and stubs. The cambium area next to the bark is the most vital area to wet.

AQUATIC SITES – Other than RICE

ECOTRICLOPYR 3 SL can be used to control emerged, submersed, and floating aquatic plants in aquatic sites such as ponds, lakes, reservoirs, non-irrigation canals, and ditches (with little or no continuous outflow), marshes, and wetlands. ECOTRICLOPYR 3 SL can also be used to control broadleaf and woody vegetation on banks and shores within or adjacent to these and other aquatic sites.

Aquatic Weeds Controlled by ECOTRICLOPYR 3 SL

Alligatorweed	Milfoil species	Purple loosestrife
American lotus	Nuphar (spatterdock)	Waterhyacinth
American frogbit	Parrotfeather	Waterlily
Aquatic sodaapple	Pickeralweed	Waterprimrose
Eurasian watermilfoil	Pennywort	

Retreatment may be needed to achieve desired level of control.

General Use Precautions for Aquatic Sites

- Refer to the GENERAL USE PRECAUTIONS section for additional precautions.
- Obtain Required Permits:** Before applying this product to public waters, consult with appropriate state or local water authorities. State or local public agencies may require permits.
- DO NOT use treated water for irrigation for 120 days following application.** As an alternative to waiting 120 days, treated water may be used for irrigation once the level of triclopyr in the intake water is determined to be non-detectable by laboratory analysis (immunoassay). There is no restriction on use of water from the treatment area to irrigate established grasses.
- Recreational Use of Water in the Treatment Area:** There are no restrictions on water use in the treatment area for recreational purposes, including swimming and fishing.
- Livestock Use of Water from Treatment Area:** There are no restrictions on consumption of water from treated areas by livestock.

Floating and Emerged Aquatic Weeds

Surface Application: Use a spray boom, handgun or other similar suitable equipment mounted on a boat or vehicle. Thorough wetting of foliage is essential for maximum

effectiveness. Use 20 to 200 gallons per acre of spray mixture. Special precautions such as the use of low spray pressure, large droplet producing nozzles or addition of a labeled thickening agent may minimize spray drift in areas near sensitive crops.

Aerial Application (Helicopter only): Apply using a Microfoil or Thru-Valve boom, or a drift control additive in the spray solution. Apply in a minimum of 10 gallons of total spray solution per acre. DO NOT apply when weather conditions favor drift to sensitive areas. See the SPRAY DRIFT MANAGEMENT section for drift control advice.

Apply 0.5 to 2 gallons of ECOTRICLOPYR 3 SL per acre as a foliar application for control of waterhyacinth, alligatorweed (see specific directions below), and other susceptible emerged and floating herbaceous weeds and woody plants. Make applications using surface or aerial equipment. Use higher rates in the rate range when plants are mature, when the weed mass is dense, or for difficult to control species. Repeat treatments may be necessary to control regrowth and weeds which escaped spray, but DO NOT apply more than 2 gallons of ECOTRICLOPYR 3 SL per acre per annual growing season. Make applications when plants are actively growing.

Use of a nonionic surfactant in the spray solution is recommended to improve control. Follow all directions and use precautions on the aquatic surfactant label.

Floating and Emerged Weed Control – ECOTRICLOPYR 3 SL Rates

Weed Species	Scientific Name	Gallons Per Acre	Application Timing and Remarks
Waterhyacinth	<i>Eichhornia crassipes</i>	0.5 – 2	Apply when plants are actively growing. Use the higher rate when the weed mass is dense. Thoroughly wet all foliage. Repeat treatments may be needed to control regrowth or escaped plants.
Alligatorweed	<i>Alternanthera philoxeroides</i>	0.75 – 2	Thoroughly wet all foliage. Weeds growing outside the margins of a body of water can be controlled. Alligatorweed growing in water will be only partially controlled. Top growth above water will be controlled, but plants will likely regrow from underwater tissue. Use a nonionic aquatic surfactant for best results.

Potable Water Intake Setbacks for Control of Floating and Emerged Weeds – Lakes, Reservoirs, or Ponds

Minimum setback distances from functioning potable water intakes for human consumption for the application of ECOTRICLOPYR 3 SL must be observed when controlling floating and emerged weeds in lakes, reservoirs or ponds. These setback restrictions DO NOT apply to terrestrial applications made adjacent to potable water intakes. Existing potable water intakes which are no longer in use are not considered to be functioning and these setback restrictions DO NOT apply. Examples of this would be potable water intakes replaced by potable water wells or connections to a municipal water system.

The following table provides the minimum setback distances based on the ECOTRICLOPYR 3 SL rate and the area treated for floating and emerged weed control.

Potable Water Intake Setback Distances for Application of ECOTRICLOPYR 3 SL for Control of Floating and Emerged Weeds in Lakes, Reservoirs, or Ponds

Area Treated (acres)	Minimum Setback Distances (feet)			
	ECOTRICLOPYR 3 SL Rate (quarts/acre)			
2	4	6	8	
<4	0	200	400	500
>4 – 8	0	200	700	900
>8 – 16	0	200	700	1000
>16	0	200	900	1300

ECOTRICLOPYR 3 SL can be applied around functioning potable water intakes or closer than these setback distances as long as the intake is turned off until the level of triclopyr in the intake water is determined to be less than or equal to 0.4 parts per million (ppm) as determined by laboratory analysis or immunoassay.

Submerged Weeds – Control of Eurasian Watermilfoil and other Susceptible Species
Subsurface Application: ECOTRICLOPYR 3 SL can be applied directly into the water through boat-mounted distribution systems. Subsurface application may be desirable near areas of susceptible crops or other desirable broadleaf plants to avoid spray drift. Refer to the Rate Table below to determine the desired amount.

Surface Application: ECOTRICLOPYR 3 SL can be applied either as a concentrate or as a spray solution diluted in water. Use a minimum spray volume of 5 gallons per acre. DO NOT apply when weather conditions favor drift to sensitive areas. See the SPRAY DRIFT MANAGEMENT section for drift control advice.

Apply 0.75 to 2.5 ppm acid equivalent (a.e.) of ECOTRICLOPYR 3 SL for control of Eurasian watermilfoil (*Myriophyllum spicatum*) and other susceptible submerged weeds in ponds, lakes, reservoirs, and in non-irrigation canals or ditches that have little or no continuous outflow. Make applications using surface or subsurface application. Use higher rates within the rate range in areas of greater water exchange. Repeat treatments may be necessary, but DO NOT apply more than 2.5 ppm acid equivalent of ECOTRICLOPYR 3 SL per acre per annual growing season. Refer to following table to determine the desired amount.

Make applications in spring or early summer when Eurasian watermilfoil or other submerged weeds are actively growing.

ECOTRICLOPYR 3 SL

Specimen Label

ECOTRICLOPYR 3 SL Rates for Control of Submerged Weeds in Ponds, Lakes, Reservoirs, and in Non-irrigation Canals or Ditches

Concentration of Triclopyr Acid Equivalent in Water (ppm a.e.)					
	ECOTRICLOPYR 3 SL gallons per surface area at specified depth				
Water Depth (feet)	0.75 ppm	1 ppm	1.5 ppm	2 ppm	2.5 ppm
1	0.7	0.9	1.4	1.8	2.3
2	1.4	1.8	3.3	3.6	4.6
3	2.1	2.9	4.1	5.4	6.6
4	2.7	3.6	5.4	7.2	9.1
5	3.4	4.5	6.8	9.0	11.3
6	4.1	5.4	8.1	10.9	13.6
7	4.8	6.3	9.5	12.7	15.8
8	5.5	7.2	10.9	14.5	18.1
9	6.1	8.1	12.2	16.3	20.4
10	6.8	9.0	13.6	18.1	22.6
15	10.2	13.6	20.4	27.2	33.9
20	13.6	18.1	27.2	36.2	45.3

Potable Water Intake Setbacks for Control of Submerged Weeds – Lakes, Reservoirs, or Ponds

Minimum setback distances from functioning potable water intakes for human consumption for the application of ECOTRICLOPYR 3 SL must be observed when controlling submerged weeds in lakes, reservoirs or ponds. These setback restrictions **DO NOT** apply to terrestrial applications made adjacent to potable water intakes. Existing potable water intakes which are no longer in use are not considered to be functioning and these setback restrictions **DO NOT** apply. Examples of this would be potable water intakes replaced by potable water wells or connections to a municipal water system.

The following table provides the minimum setback distances based on the ECOTRICLOPYR 3 SL rate and the area treated for submerged weed control.

Potable Water Intake Setback Distances for Application of ECOTRICLOPYR 3 SL for Control of Submerged Weeds in Lakes, Reservoirs, or Ponds

Minimum Setback Distances (feet)					
	Concentration of Triclopyr Acid Equivalent in Water (ppm a.e.)				
Area Treated (acres)	0.75 ppm	1 ppm	1.5 ppm	2 ppm	2.5 ppm
<4	300	400	600	800	1000
>4 – 8	420	560	840	1120	1400
>8 – 16	600	800	1200	1600	2000
>16 – 32	780	1040	1560	2080	2600
>32 acres, calculate the minimum setback distance using formula given for chosen application rate	Setback (ft) = [800 X In (acres) – 160]/3.33	Setback (ft) = [800 X In (acres) – 160]/2.5	Setback (ft) = [800 X In (acres) – 160]/1.67	Setback (ft) = [800 X In (acres) – 160]/1.25	Setback (ft) = [800 X In (acres) – 160]

Example Calculations:

To apply ECOTRICLOPYR 3 SL at 2.5 PPM a.e. to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= [800 \times \ln(50 \text{ acres})] - 160 \\ &= [800 \times 3.912] - 160 \\ &= 2970 \text{ feet} \end{aligned}$$

To apply ECOTRICLOPYR 3 SL at 0.75 PPM a.e. to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= [800 \times \ln(50 \text{ acres})] - 160 \\ &\quad 3.33 \\ &= [800 \times 3.912] - 160 \\ &\quad 3.33 \\ &= 892 \text{ feet} \end{aligned}$$

ECOTRICLOPYR 3 SL can be applied around functioning potable water intakes or closer than these setback distances as long as the intake is turned off until the level of triclopyr in the intake water is determined to be less than or equal to 0.4 parts per million (ppm) as determined by laboratory analysis or immunoassay.

STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Plastic Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities by burning. If burned, stay out of smoke.

Metal Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

LIMITED WARRANTY, TERMS OF SALE, AND LIMITATION OF LIABILITY

Upon purchase or use of this product, purchaser and user agree to the following terms:

Warranty: Vegetation Management, LLC. (the Company) warrants that this product conforms to the chemical description on the label in all material respects and is reasonably fit for the purpose referred to in the directions for use, subject to the exceptions noted below, which are beyond the Company's control. The Company makes no other representation or warranty, express or implied, concerning the product, including no implied warranty of merchantability or fitness for a particular purpose. No such warranty shall be implied by law, and no agent or representative is authorized to make any such warranty on the Company's behalf.

Terms of Sale: The Company's directions for use of this product should be followed carefully. It is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, and the manner of use or application (including failure to adhere to label directions), all of which are beyond the Company's control. To the extent permitted by law, all such risks are assumed by the user.

Limitation of Liability: To the extent permitted by law, the exclusive remedy against the Company for any cause of action relating to the handling or use of this product is a claim for damages, and in no event shall damages or any other recovery of any kind exceed the price of the product which caused the alleged loss, damage, injury or other claim. To the extent permitted by law, under no circumstances shall the Company be liable for any special, indirect, incidental or consequential damages of any kind, including loss of profits or income, and any such claims are hereby waived. Some states **DO NOT** allow the exclusion or limitation of incidental or consequential damages.

The Company and the seller offer this product, and the purchaser and user accept this product, subject to the foregoing warranty, terms of sale and limitation of liability, which may be varied or modified only by an agreement in writing signed on behalf of the Company by an authorized representative.

Vegetation Management, LLC
P.O. Box 21365
Seattle, WA 98111

EPA 110405

Specimen Label



DMA[®] 4 VM

Herbicide

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For selective control of many broadleaf weeds in forests, non-cropland, turf and aquatic areas. Also for control of trees by injection.

Active Ingredient:

2,4-Dichlorophenoxyacetic acid, dimethylamine salt	46.3%
Other Ingredients	53.7%
Total Ingredients	100.0%

2,4-dichlorophenoxyacetic acid - 38.4% - 3.8 lb/gal

EPA Reg. No. 62719-3

Keep Out of Reach of Children

DANGER PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Corrosive • Causes Irreversible Eye Damage • Harmful If Swallowed, Inhaled or Absorbed Through The Skin.

Do not get in eyes, on skin, or on clothing. Avoid breathing vapor or spray mist. Wash thoroughly with soap and water after handling.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are made of any waterproof material. If you want more options, follow the instructions for category A on an EPA chemical resistance category selections chart.

All pilots must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

All mixers, loaders, flaggers, other applicators and handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical-resistant gloves,
- Goggles or face shield, and
- Chemical resistant apron when mixing or loading, cleaning up spills or equipment, or otherwise exposed to the concentrate

See engineering controls for additional requirements

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls Statements

When handlers use closed systems or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)].

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Environmental Hazards

This product is toxic to aquatic invertebrates and may be toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift or runoff may adversely affect aquatic invertebrates and non-target plants. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Do not contaminate water when disposing of equipment washwaters or rinsate.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Application around a cistern or well may result in contamination of drinking water or groundwater.

Aquatic Weed Control: Fish breathe dissolved oxygen in the water and decaying weeds also use oxygen. When treating continuous, dense weed masses, it may be appropriate to treat only part of the infestation at a time. For example, apply the product in lanes separated by untreated strips that can be treated after vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Waters having limited and less dense weed infestations may not require partial treatments.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Agricultural Use Requirements (Cont.)

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- coveralls
- chemical-resistant gloves made of any waterproof material
- shoes plus socks
- protective eyewear

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Entry Restrictions for Non-WPS Uses: Do not enter or allow people (or pets) to enter the treated area until sprays have dried.

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage: Keep container tightly closed when not in use.

If exposed to subfreezing temperatures, the product should be warmed to at least 40°F and mixed thoroughly before using.

Pesticide Disposal: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law and may contaminate groundwater. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

Nonrefillable containers 5 gallons or less:

Container Reuse: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers larger than 5 gallons:

Container Reuse: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose.

Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

Storage and Disposal (Cont.)

Nonrefillable containers larger than 5 gallons:

Container Reuse: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds.

Stand the container on its end and tip it back and forth several times.

Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

General Information

DMA® 4 IVM herbicide is intended for selective control of many broadleaf weeds in forests, non-cropland, ornamental turf, and aquatic areas. Also for control of trees by injection.

Apply DMA 4 IVM as a water or oil-water spray during warm weather when target weeds or woody plants are actively growing. Application under drought conditions will often give poor results. Use low spray pressure to minimize drift. Generally, the lower dosages recommended on this label will be satisfactory for young, succulent growth of susceptible weed species. For less susceptible species and under conditions where control is more difficult, use higher recommended rates. Deep-rooted perennial weeds such as Canada thistle and field bindweed and many woody plants usually require repeated applications for satisfactory control. Consult your State Agricultural Experiment stations or Extension Service Weed Specialists for recommendations from this label that best fit local conditions.

Use Precautions and Restrictions

Be sure that use of DMA 4 IVM conforms to all application regulations.

Chemigation: Do not apply this product through any type of irrigation system.

Excessive amounts of 2,4-D in the soil may temporarily inhibit seed germination and plant growth.

Use of this product in certain portions of California, Oregon, and Washington is subject to the January 22, 2004 Order for injunctive relief in Washington Toxics Coalition et al. v. EPA, C01-0132C, (W.D. W.A.). For further information, please refer to EPA website: <http://www.epa.gov/espp>.

Spray Drift Management

A variety of factors including weather conditions (e.g., wind direction, wind speed, temperature, relative humidity) and method of application (e.g., ground, aerial, airblast) can influence pesticide drift. The applicator must evaluate all factors and make appropriate adjustments when applying this product.

Droplet Size

When applying sprays that contain 2,4-D as the sole active ingredient, or when applying sprays that contain 2,4-D mixed with active ingredients that require a Coarse or coarser spray, apply only as a Coarse or coarser spray (ASAE standard 572) or a volume mean diameter of 385 microns or greater for spinning atomizer nozzles.

When applying sprays that contain 2,4-D mixed with other active ingredients that require a Medium or more fine spray, apply only as a Medium or coarser spray (ASAE standard 572) or a volume mean diameter of 300 microns or greater for spinning atomizer nozzles.

Wind Speed

Do not apply at wind speeds greater than 15 mph. Only apply this product if the wind direction favors on-target deposition and there are not sensitive areas (including, but not limited to, residential areas, bodies of water, known habitat for nontarget species, nontarget crops) within 250 feet downwind. If applying a Medium spray, leave one swath unsprayed at the downwind edge of the treated field.

Temperature Inversions

If applying at wind speeds less than 3 mph, the applicator must determine if: a) conditions of temperature inversion exist, or b) stable atmospheric conditions exist at or below nozzle height. Do not make applications into areas of temperature inversions or stable atmospheric conditions.

Susceptible Plants

Do not apply under circumstances where spray drift may occur to food, forage, or other plantings that might be damaged or crops thereof rendered unfit for sale, use or consumption. Susceptible crops include, but are not limited to, cotton, okra, flowers, fruit trees, grapes (in growing stage), fruit trees (foliage), soybeans (vegetative stage), ornamentals, sunflowers, tomatoes, beans, and other vegetables, or tobacco. Small amounts of spray drift that may not be visible may injure susceptible broadleaf plants.

Other State and Local Requirements

Applicators must follow all state and local pesticide drift requirements regarding application of 2,4-D herbicides. Where states have more stringent regulations, they must be observed.

Equipment

All aerial and ground application equipment must be properly maintained and calibrated using appropriate carriers or surrogates.

Aerial Application

The boom length must not exceed 75% of the wingspan or 90% of the rotor blade diameter.

Release spray at the lowest height consistent with efficacy and flight safety. Do not release spray at a height greater than 10 feet above the crop canopy unless a greater height is required for aircraft safety. This requirement does not apply to forestry or rights-of-way applications.

When applications are made with a crosswind, the swath will be displaced downwind. The applicator must compensate for this by adjusting the path of the aircraft upwind.

Ground Boom Application

Do not apply with a nozzle height greater than 4 feet above the crop canopy.

Mixing

Mix DMA 4 IVM only with water, unless otherwise directed on this label. Add about half the water to the mixing tank, then add the DMA 4 IVM with agitation, and finally the rest of the water with continuing agitation.

Note: Adding oil, wetting agent, or other surfactant to the spray mixture may increase effectiveness on weeds, but also may reduce selectivity to crops resulting in crop damage.

Tank Mixing: When tank mixing, read and follow the label of each tank mix product used for precautionary statements, directions for use, weeds controlled, and geographic and other restrictions. Use in accordance with the most restrictive of label limitations and precautions. No label dosages should be exceeded. Do not tank mix this product with any product containing a label prohibition against tank mixing with 2,4-D.

Tank Mix Compatibility Testing: A jar test is recommended prior to tank mixing to ensure compatibility of this product and other pesticides. Use a clear glass quart jar with lid and mix the tank mix ingredients in their relative proportions. Invert the jar containing the mixture several times and observe the mixture for approximately 1/2 hour. If the mixture balls-up, forms flakes, sludges, jels, oily films or layers, or other precipitates, it is not compatible and the tank mix combination should not be used.

Mixing with Liquid Nitrogen Fertilizer

This product may be combined with liquid nitrogen fertilizer suitable for foliar application to accomplish broadleaf weed control and fertilization of corn, small grains or pastures in a single operation. Use DMA 4 IVM in accordance with recommendations for these crops provided in this label. Use liquid fertilizer at rates recommended by the supplier or Extension Service Specialist. Test for mixing compatibility as describe above before mixing in spray tank. A compatibility aid such as Unite or Compex may be needed in some situations. Compatibility is best with liquid fertilizer solutions containing only nitrogen. Mixing with N-P-K solutions may not be satisfactory, even with the addition of a compatibility aid. Pre-mixing 1 part DMA 4 IVM with up to 4 parts water may help in situations when mixing difficulty occurs.

Fill the tank about half full with the liquid fertilizer, then add the required amount of DMA 4 IVM with agitation.. Maintain agitation and complete filling the tank with liquid fertilizer. Apply immediately and continue agitation in spray tank during application. **Do not store the spray mixture.** Application during very cold weather (near freezing) is not advisable.

Sprayer Clean-Out

To avoid injury to desirable plants, equipment used to apply this product should be thoroughly cleaned before re-use or applying other chemicals.

1. Rinse and flush application equipment thoroughly after use at least three times with water. Dispose of all rinse water by application to treatment area or apply to non-cropland area away from water supplies.
2. During the second rinse, add 1 qt of household ammonia for every 25 gallons of water. Circulate the solution through the entire system so that all internal surfaces are contacted (15-20 min). Let the solution stand for several hours, preferably overnight.
3. Flush the solution out of the spray tank through the boom.
4. Rinse the system twice with clean water, recirculating and draining each time.
5. Remove nozzles and screens and clean separately.
6. If equipment is to be used to apply another pesticide or agricultural chemical to a 2,4-D susceptible crop, additional steps may be required to remove all traces of 2,4-D, including cleaning of disassembled parts and replacement of hoses or other fittings that may contain absorbed 2,4-D.

Application

Apply with calibrated air or ground equipment using sufficient spray volume to provide adequate coverage of target weeds or as otherwise directed in specific use directions. For broadcast application, use a spray volume of 3 or more gallons per acre by air and 10 or more gallons per acre for ground equipment. Where states have regulations which specify minimum spray volumes, they should be observed. In general, spray volume should be increased as crop canopy, height and weed density increase in order to obtain adequate spray coverage. **Do not apply less than 3 gallons total spray volume per acre.**

Rate Ranges and Application Timing

Generally, the lower dosages given will be satisfactory for young, succulent growth of sensitive weed species. For less sensitive species and under conditions where control is more difficult, the higher dosages will be needed. Apply DMA 4 IVM during warm weather when weeds are young and actively growing.

Spot Treatments

To prevent misapplication, spot treatments should be applied with a calibrated boom or with hand sprayers using a fixed spray volume per 1,000 sq ft as indicated below.

Hand-Held Sprayers: Hand-held sprayers may be used for spot applications of DMA 4 IVM. Care should be taken to apply the spray uniformly and at a rate equivalent to a broadcast application. Application rates in the table are based on the application rate for an area of 1,000 sq ft. Mix the amount of DMA 4 IVM (fl oz or ml) corresponding to the desired broadcast rate in 1 to 3 gallons of spray. To calculate the amount of DMA 4 IVM required for larger areas, multiply the table value (fl oz or ml) by the thousands of sq ft to be treated. An area of 1000 sq ft is approximately 10.5 X 10.5 yards (strides) in size.

Rate Conversion Table for Spot Treatment:

Label Broadcast Rate (pt/acre)							
1/2	2/3	3/4	1	2	3	4	8
Equivalent Amount of DMA 4 IVM per 1000 sq ft							
1/5 fl oz [†] (5.5 ml)	1/4 fl oz (7.3 ml)	1/3 fl oz (8.3 ml)	3/8 fl oz (11 ml)	3/4 fl oz (22 ml)	1 fl oz (33 ml)	1 1/2 fl oz (44 ml)	3 fl oz (88 ml)

[†]Conversion factors: 1fl oz = 29.6 (30) ml

Band Application: DMA 4 IVM may be applied as a band treatment. Use the formulas below to determine the appropriate rate and volume per treated acre.

Band width in inches

$$\text{Row width in inches} \quad X \quad \text{Broadcast rate per acre} \quad = \quad \text{Band rate per treated acre}$$

Band width in inches

$$\text{Row width in inches} \quad X \quad \text{Broadcast volume per acre} \quad = \quad \text{Band volume per treated acre}$$

Weeds Controlled

Annual or Biennial Weeds

Beggarticks[†]
Bittercress, smallflowered bitterweed
broomweed, common[†]
burdock, common
buttercup, smallflowered[†]
carpetweed
cinquefoil, common
cinquefoil, rough
cocklebur, common
coffeeweed
copperleaf, Virginia
croton, Texas
croton, woolly
flixweed
galinsoga
geranium, Carolina
hemp, wild
horseweed (maretail)
jewelweed
jimsonweed
knotweed[†]
kochia
lambsquarters, common
lettuce, prickly[†]
lettuce, wild
lupines
mallow, little[†]
mallow, Venice[†]
marshelder
morningglory, annual
morningglory, ivy
morningglory, woolly
 mousetail
 mustards (except blue mustard)

parsnip, wild
Pennycress, field
Pepperweed[†]
pigweeds (Amaranthus spp.)[†]
poorjoe
primrose, common
purslane, common
pusley, Florida
radish, wild
ragweed, common
ragweed, giant
rape, wild
rocket, yellow
salsify, common[†]
salsify, western[†]
shepherdspurse
sicklepod
smartweed (annual species)[†]
sneezeweed, bitter
sowthistle, annual
sowthistle, spiny
spanishneedles
sunflower
sweetclover
tansymustard
thistle, bull
thistle, musk[†]
thistle, Russian (tumbleweed)[†]
velvetleaf
vetches

Perennial Weeds

alfalfa[†]
artichoke, Jerusalem[†]
aster, many-flower[†]
Austrian fieldcress[†]
bindweed (hedge, field and European)[†]
blue lettuce
blueweed, Texas
broomweed
bulldettle[†]
carrot, wild[†]
catnip
chicory
clover, red[†]
coffeeweed
cress, hoary[†]
dandelion[†]
docks[†]
dogbanes[†]
goldenrod

eveningprimrose, cutleaf
garlic, wild[†]
hawkweed, orange[†]
healal
ironweed, western
ivy, ground[†]
Jerusalem-artichoke
loco, bigbend
nettles (including stinging)[†]
onion, wild[†]
pennywort
plantains
ragwort, tansy[†]
sowthistle, perennial
thistle, Canada[†]
vervains[†]
waterplantain
wormwood

[†] These weeds are only partially controlled and may require repeat applications and/or use of higher recommended rates of this product even under ideal conditions of application.

Specific Use Directions

Forestry and Non-cropland Uses

Agricultural Use Requirements for Forest Use (Except Tree Injection Use): For use in forests, follow PPE and Reentry instructions in the "Agricultural Use Requirements" section under the "Directions for Use" heading of this label.

Agricultural Use Requirements for Rangeland, Pasture, Forest (Tree Injection Only) and Non-cropland Areas: When this product is applied to rangeland and established pastures not harvested for hay or seed; non-cropland areas, and when applied by tree injection in forest sites, follow reentry requirements given in the "Non-Agricultural Use Requirements" section under the "Directions for Use" heading of this label.

Forestry Uses

Forest site preparation, forest roadsides, brush control, established conifer release (including Christmas trees and reforestation areas)

Treatment Site Method of Application	DMA 4 IVM	Specific Use Directions
Annual Weeds	2 to 4 pt/acre	Apply when weeds are small and growing actively before the bud stage. Apply when biennial and perennial species are in the seedling to rosette stage and before flower stalks appear. For difficult to control perennial broadleaf weeds and woody species, use up to 1 gallon DMA 4 IVM and 1 to 4 qt. Garlon* 3A herbicide per acre.
Biennial and perennial broadleaf weeds and susceptible woody plants	4 to 8 pt/acre	For conifer release, make application in early spring before budbreak of conifers when weeds are small and actively growing.
Spot Treatment to control broadleaf weeds	1.28 fl oz / gal of spray solution (See Instructions for "Spot Treatment")	Note: To control broadleaf weeds in small areas with a hand sprayer, use an application rate equivalent to the recommended broadcast rate and spray to thoroughly wet all foliage. Mix 1.28 fl oz per gal of spray solution and apply through pump up sprayer or backpack sprayer. Addition of a non ionic surfactant is recommended to improve coverage. See rate conversion table and instructions for "Spot Treatment" and use of hand-held sprayers under "Application".
Conifer Release: Species such as white pine, ponderosa pine, jack pine, red pine, black spruce, white spruce, red spruce, and balsam fir	1 1/2 to 3 qt/acre	To control competing hardwood species such as alder, aspen, birch, hazel, and willow, apply from mid to late summer when growth of conifer trees has hardened off and woody plants are still actively growing. Apply with ground or air equipment, using sufficient spray volume to ensure complete coverage. Because this treatment may cause occasional conifer injury, do not apply if such injury cannot be tolerated.
Directed Spray: Conifer plantations including pine	4 qt/100 gal	Apply when brush or weeds are actively growing by directing the spray so as to avoid contact with conifer foliage and injurious amounts of spray. Apply in oil, oil-water, or water carrier in a spray volume of 10 to 100 gallons per acre.
Basal Spray (May also be used in rangeland, pastures, and noncropland)	8 qt/100 gal or	Thoroughly wet the base and root collar of all stems until the spray begins to accumulate around the root collar at the ground line. Wetting stems with the mixture may also aid in control.
Surface of Cut Stumps (May also be used in rangeland, pastures, and noncropland)	2.5 fl oz/gal of water	Apply as soon as possible after cutting trees. Thoroughly soak the entire stump with the 2,4-D mixture including cut surface, bark and exposed roots.
Frill and Girdle (May also be used in rangeland, pastures, and noncropland)		Cut frills (overlapping V-shaped notches cut downward through the bark in a continuous ring around the base of the tree) using an axe or other suitable tool. Treat freshly cut frills with as much of the 2,4-D mixture as they will hold.
Tree Injection Application (May also be used in rangeland, pastures, and noncropland)	(1 to 2 ml per injection site)	To control unwanted hardwood trees such as elm, hickory, oak, and sweetgum in forests and other non-crop areas, apply by injecting at a rate of 1 ml of undiluted DMA 4 IVM per inch of trunk diameter at breast height (DBH) as measured approximately 4 1/2 ft above the ground. However, injection should occur as close to the root collar as possible and the injection bit must penetrate the inner bark. Applications may be made throughout the year, but for best results apply between May 15 and October 15. Maples should not be treated during the spring sap flow. For hard to control species such as ash, maple, and dogwood use 2 ml of undiluted DMA 4 IVM per injection site or double the number of 1 ml injections. Note: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is directly injected into agricultural plants.

Precautions and Restrictions:

- Do not allow sprays to contact conifer shoot growth (current year's new growth) or injury may occur.
- Do not apply to nursery seed beds.
- For conifer release, do not use on plantations where pine or larch are among the desired species.
- For broadcast applications, do not apply more than 8.42 pt/acre of DMA 4 IVM (4.0 lb of acid equivalent) per 12 month period.
- Limited to 1 broadcast application per year
- For basal spray, cut surface stumps, and frill applications, do not apply more than 16.84 pints of DMA 4 IVM (8.0 lb of acid equivalent) per 100 gallons of spray solution.

Non-cropland Areas

Such as fencerows, hedgerows, roadsides, drainage ditches, rights-of way, utility power lines, railroads, airports, and other non-crop areas

Treatment Site Method of Application	DMA 4 IVM (pt/acre)	Specific Use Directions
Annual broadleaf weeds	2 to 4	Apply when annual weeds are small and growing actively before the bud stage. Biennial and perennial weeds should be rosette to bud stage, but not flowering at the time of application. For difficult to control perennial broadleaf weeds and woody species, tank mix up to 1 gallon DMA 4 IVM plus 1 to 4 qt. Garlon 3A herbicide per acre.
Biennial and perennial broadleaf weeds	4	
Susceptible woody plants on rights-of-way	4 - 8	For ground application: (High volume) apply a total of 100 to 400 gal per acre; (low volume) apply a total of 10 to 100 gal per acre. For helicopter: Apply a total of 5 to 30 gal per acre spray volume.
Spot Treatment to control broadleaf weeds	1.28 fl oz / gal of spray solution (See Instructions for "Spot Treatment")	Note: To control broadleaf weeds in small areas with a hand sprayer, use an application rate equivalent to the broadcast rate recommended for this treatment site and spray to thoroughly wet all foliage. Mix 1.28 fl oz per gal of spray solution and apply through pump up sprayer or backpack sprayer. Addition of a non ionic surfactant is recommended to improve coverage. See rate conversion table and instructions for "Spot Treatment" and use of hand-held sprayers under "Application".
Tree Injection Application		See instructions for tree injection application in "Forestry Uses" section.
Southern wild rose Broadcast application	up to 4	Broadcast: Apply in a spray volume of 5 or more gallons per acre by aircraft or 10 or more gallons per acre by ground equipment.
Spot treatment	1.28 fl oz / gal of spray solution	Apply when foliage is well developed. Thorough coverage is required. Mix 1.28 fl oz per gal of spray solution and apply through pump up sprayer or backpack sprayer. Addition of a non ionic surfactant is recommended to improve coverage. Two or more treatments may be required.

Precautions and Restrictions:

- Do not apply to newly seeded areas until grass is well established.
- Bentgrass, St. Augustine, clover, legumes and dichondra may be severely injured or killed by this treatment.
- Annual and perennial weeds:** Do not apply more than 4.21 pt/acre of DMA 4 IVM (2.0 lb of acid equivalent per application). Do not make more than two applications per season. Do not reapply to a treated area within 30 days of a previous application.
- Woody plants:** Do not apply more than 8.42 pt/acre of DMA 4 IVM (4.0 lb of acid equivalent) per use season. Do not make more than one application per season

Turf Uses

Includes cemeteries and parks, airfields, roadsides, vacant lots, drainage ditch banks

Use Requirements for Ornamental Turf Areas: When this product is applied to ornamental turf areas, follow PPE and reentry instructions in the "Non-agricultural Use Requirements" section of this label.

Treatment Site (Application Timing)	DMA 4 (pt/acre)	Specific Use Directions
Ornamental Turf (Postemergence) Seedling grass (five-leaf stage or later)	3/4 to 1	Apply when weeds are small and actively growing. For best results, apply when soil moisture is adequate for active weed growth. Deep-rooted perennial weeds such as bindweed and Canada thistle may require repeat applications.
Well-established grasses	2 to 3	Do not apply to newly seeded grasses until well established (five-leaf stage or later) and then use a maximum of 1 pt/acre. Cool season grasses are tolerant of higher rates.
Biennial and perennial broadleaf weeds	3	

Precautions, Restrictions:

- Do not use on creeping grasses such as bent except as a spot treatment.
- Do not use on injury-sensitive southern grasses such as St. Augustinegrass.
- Do not use on dichondra or other herbaceous ground covers. Legumes may be damaged or killed.
- Do not reapply within 21 days of a previous application.
- **Reseeding:** Delay reseeding at least 30 days following application. Preferably, with spring application, reseed in the fall and with fall application, reseed in the spring.
- Do not apply more than 2 broadcast applications per year per treatment site (does not include spot treatments).
- Do not apply more than 6.32 pt/acre of DMA 4 (3.0 lb of acid equivalent) per year.

Aquatic Uses

Use Requirements for Aquatic Areas: When this product is applied to aquatic areas, follow PPE and reentry instructions in the "Non-agricultural Use Requirements" section of this label.

Control of Weeds and Brush on Banks of Irrigation Canals and Ditches

Target Plants	DMA 4 IVM (pt/acre)	Specific Use Directions
Annual Weeds	2 to 4	Apply using low pressure spray (10 to 40 psi) in a spray volume of 20 to 100 gallons per acre using power operated spray equipment. Apply when wind speed is low, 5 mph or less. Apply working upstream to avoid accidental concentration of spray into water. Cross-stream spraying to opposite banks is not permitted and avoid boom spraying over water surface. When spraying shoreline weeds, allow no more than 2 foot overspray onto water surface with an average of less than 1 foot of overspray to prevent significant water contamination.
Biennial and perennial broadleaf weeds and susceptible wood plants	4	Apply when weeds are small and growing actively before the bud stage. Apply when biennial and perennial species are in the seedling to rosette stage and before flower stalks appear. For hard-to-control weeds, a repeat application after 30 days at the same rate may be needed. For woody species and patches of perennial weeds, mix 1 gallon of DMA 4 IVM per 64 to 150 gallons of total spray. Wet foliage by applying about 3 to 4 gallons of spray per 1000 sq ft (10.5 X 10.5 steps).

Restrictions and Limitations:

- Do not apply more than 2 treatments per season or reapply within 30 days.
- Use 2 or more gallons of spray solution per acre.
- Do not apply more than 4.21 pt/acre (2.0 lb of acid equivalent) per application or more than 8.42 pt/acre (4.0 lb of acid equivalent) per use season.

Do not use on small canals with a flow rate less than 10 cubic feet per second (CFS) where water will be used for drinking purposes. CFS may be estimated by using the formula below. The approximate velocity needed for the calculation can be determined by observing the length of time that it takes a floating object to travel a defined distance. Divide the distance (ft.) by the time (sec.) to estimate velocity (ft. per sec.). Repeat 3 times and use the average to calculate CFS.

$$\text{Average Width (ft.)} \times \text{Average Depth (ft.)} \times \text{Average Velocity (ft. per sec.)} = \text{CFS}$$

For ditchbank weeds: Do not spray cross-stream to opposite bank. Do not allow boom spray to be directed onto water.

For shoreline weeds: Boom spraying onto water surface must be held to a minimum and allow no more than 2 foot overspray onto water with an average of less than 1 foot overspray to prevent introduction of greater than negligible amounts of chemical into the water.

Aquatic Weed Control in Ponds, Lakes, Reservoirs, Marshes, Bayous, Drainage Ditches, Canals, Rivers and Streams that are Quiescent or Slow Moving, Including Programs of the Tennessee Valley Authority

Notice to Applicators: Before application, coordination and approval of local and state authorities may be required, either by letter or agreement or issuance of special permits for aquatic applications.

Emergent and Floating Aquatic Weeds: Including Water hyacinth (*Eichornia crassipes*)

Application Rate: 2 to 4 qt/acre.

Specific Use Directions

Application Timing: Spray weed mass only. Apply when water hyacinth plants are actively growing. Repeat application as necessary to kill regrowth and plants missed in previous operation. Use 4 qt/acre rate when plants are mature or when weed mass is dense.

Surface Application: Use power operated sprayers with boom or spray gun mounted on boat, tractor or truck. Thorough wetting of foliage is essential for maximum control. Use 100 to 400 gallons of spray mixture per acre. Special precautions such as use of low pressure, large nozzles and spray thickening agents should be taken to avoid spray drift to susceptible crops. Follow label directions for use of any drift control agent.

Aerial Application: Use drift control spray equipment or thickening agent mixed in the spray mixture. Apply 1 gallon of DMA 4 IVM per acre using standard boom systems using a minimum spray volume of 5 gallons per acre. For Microfoil® drift control spray systems, apply DMA 4 IVM in a total spray volume of 12 to 15 gallons per acre.

Restrictions and Limitations for Surface Applications to Emergent Aquatic Weeds

- Do not exceed 8.42 pt/acre (4.0 lb of acid equivalent) per surface acre per
- Do not make a broadcast application within 21 days of previous broadcast application. Spot treatments are permitted.

Fish breathe dissolved oxygen in the water and decaying weeds also use oxygen. When treating continuous, dense weed masses, it may be appropriate to treat only part of the infestation at a time. For example, apply the product in lanes separated by untreated strips that can be treated after vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment. Waters having limited and less dense weed infestations may not require partial treatments. Other local factors such as water exchange and sediment load can also influence the dissolved oxygen level. Coordination and approval of local and state authorities may be required, either by letter of agreement or issuance of special permits for aquatic applications.

Water Use:

1. Water for irrigation or sprays:

- A. If treated water is intended to be used only for crops or non-crop areas that are labeled for direct treatment with 2,4-D such as pastures, turf or cereal grains, the treated water may be used to irrigate and/or mix sprays for these sites at anytime after the 2,4-D aquatic application.
- B. Due to potential phytotoxicity considerations, the following restrictions are applicable: If treated water is intended to be used to irrigate or mix sprays for plants grown in commercial nurseries and greenhouses; and other plants or crops that are not labeled for direct treatment with 2,4-D, the water must not be used unless one of the following restrictions has been observed:
 - i. A setback distance from functional water intake(s) of ≥600 ft. was used for the application, or,
 - ii. A waiting period of 7 days from the time of application has elapsed, or,
 - iii. An approved assay indicates that the 2,4-D concentration is 100 ppb (0.1 ppm) or less at the water intake. Wait at least 3 days after application before initial sampling at water intake.

2. Drinking water (potable water):

- A. Consult with appropriate state or local water authorities before applying this product to public waters. State or local agencies may require permits. The potable water use restrictions on this label are to ensure that consumption of water by the public is allowed only when the concentration of 2,4-D in the water is less than the MCL (Maximum Contaminant Level) of 70 ppb. Applicators should consider the unique characteristics of the treated waters to assure that 2,4-D concentrations in potable water do not exceed 70 ppb at the time of consumption.
- B. For floating and emergent weed applications, the drinking water setback distance from functioning potable water intakes is ≥600 ft.
- C. If no setback distance of ≥600 ft. is used for the application, applicators or the authorizing organization must provide a drinking water notification prior to a 2,4-D application to the party responsible for a public water supply or to individual private water users. Notification to the party responsible for a public water supply or to individual private water users must be done in a manner to assure that the party is aware of a water use restrictions when this product is applied to potable water.

The following is an example of an example of notification via posting, but other methods of notification which convey the above restrictions may be used and may be required in some cases under state or local law or as a condition of a permit.

Example:

Posting notification should be located every 250 feet including the shoreline of the treated area and up to 250 feet of shoreline past the application site to include immediate public access points. Posting must include the day and time of application. Posting may be removed if analysis of a sample collected at the intake 3 or more days following application shows that the concentration in the water is less than 70 ppb (100 ppb for irrigation or sprays), or after 7 days following application, whichever occurs first.

Text of notification: Wait 7 days before diverting functioning surface water intakes from the treated aquatic site to use as drinking water, irrigation, or sprays, unless water at functioning drinking water intakes is tested at least 3 days after application and is demonstrated by assay to contain not more than 70 ppb 2,4-D (100 ppb for irrigation or sprays).

Application Date: _____ Time: _____ .

- D. Following each application of this product, treated water must not be used for drinking water unless one of the following restrictions has been observed:

- i. A setback distance from functional water intake(s) of ≥600 ft. was used for the application, or,
- ii. A waiting period of at least 7 days from the time of application has elapsed, or,
- iii. An approved assay indicates that the 2,4-D concentration is 70 ppb (0.07 ppm) or less at the water intake. Sampling for drinking water analysis should occur no sooner than 3 days after 2,4-D application. Analysis of samples must be completed by a laboratory that is certified under the Safe Drinking Water Act to perform drinking water analysis using a currently approved version of analytical Method Number 515, 555, other methods for 2,4-D as may be listed in Title 40CFR, Part 141.24, or Method Number 4015 (immunoassay of 2,4-D) from U.S. EPA Test Methods for Evaluating Solid Waste SW-846.

E. Note: Existing potable water intakes that are no longer in use, such as those replaced by a connection to a municipal water system or a potable water well, are not considered to be functioning potable water intakes.

F. Drinking water setback distances do not apply to terrestrial applications of 2,4-D adjacent to water bodies with potable water intakes.

Submerged Aquatic Weeds: Including Eurasian Water Milfoil (*Myriophyllum spicatum*)

Treatment Site	Maximum Application Rate [†]	Specific Use Directions
Aquatic Weed Control in Ponds, Lakes, Reservoirs, Marshes, Bayous, Drainage Ditches, Canals, Rivers and Streams that are Quiescent or Slow Moving, Including Programs of the Tennessee Valley Authority	2.84 gallons (10.8 lb of acid equivalent) per acre foot	<p>Application Timing: For best results, apply in spring or early summer when aquatic weeds appear. Check for weed growth in areas heavily infested the previous year. A second application may be needed when weeds show signs of recovery, but no later than mid-August in most areas.</p> <p>Subsurface Application: Apply DMA 4 IVM undiluted directly to the water through a boat mounted distribution system. Shoreline areas should be treated by subsurface injection application by boat to avoid aerial drift.</p> <p>Surface Application: Use power operated boat mounted boom sprayer. If rate is less than 5 gallons per acre, dilute to a minimum spray volume of 5 gallons per surface acre.</p> <p>Aerial Application: Use drift control spray equipment or thickening agents mixed with sprays to reduce drift. Apply through standard boom systems in a minimum spray volume of 5 gallons per surface acre. For Microfoil® drift control spray systems, apply DMA 4 IVM in a total spray volume of 12 to 15 gallons per acre.</p> <p>Apply to attain a concentration of 2 to 4 ppm (see table below).</p>

[†]DMA 4 IVM contains 3.8 lb of acid equivalent per gallon of product.

Table 1: Amount to Apply for a Target Subsurface Concentration					
Surface Area	Average Depth (ft)	For typical conditions – 2 ppm (2,4-D a.e./acre)	For typical conditions – 2 ppm (DMA 4 IVM gal/acre)	For difficult conditions – 4 ppm* (2,4-D a.e./acre)	For difficult conditions – 4 ppm* (DMA 4 IVM gal/acre)
1 acre	1	5.4	1.42	10.8	2.84
	2	10.8	2.84	21.6	5.68
	3	16.2	4.26	32.4	8.53
	4	21.6	5.68	43.2	11.37
	5	27.0	7.10	54.0	14.21

- Examples include spot treatments of pioneer colonies of Eurasian Water Milfoil and certain difficult to control aquatic species.

RESTRICTIONS AND LIMITATIONS FOR AQUATIC SITES WITH SUBMERSED WEEDS

Do not exceed 10.8 lbs. acid equivalent per acre foot.

Fish breathe oxygen in the water and a water-oxygen ratio must be maintained. Decaying weeds use up oxygen, but during the period when applications should be made, the weed mass is fairly sparse and the weed decomposition rate is slow enough that the water-oxygen ratio is not disturbed by treating the entire area at one time. If treatments must be applied later in the season when the weed mass is dense and repeat treatments are needed, apply product in lanes, leaving buffer strips which can then be treated when vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment.

Do not apply within 21 days of previous application. Limited to 2 applications per season.

When treating moving bodies of water, applications must be made while traveling upstream to prevent concentration of 2,4-D downstream from the application.

Coordination and approval of local and state authorities may be required, either by letter of agreement or issuance of special permits for such use.

Water Use:**1. Water for irrigation or sprays:**

- A. If treated water is intended to be used only for crops or non-crop areas that are labeled for direct treatment with 2,4-D such as pastures, turf or cereal grains, the treated water may be used to irrigate and/or mix sprays for these sites at anytime after the 2,4-D aquatic application.
- B. Due to potential phytotoxicity and/or residue considerations, the following restrictions are applicable:

If treated water is intended to be used to irrigate or mix sprays for unlabeled crops, non-crop areas or other plants not labeled for direct treatment with 2,4-D, the water must not be used unless one of the following restrictions has been observed:

- i) A setback distance described in the Drinking Water Setback Table was used for the application, or,
- ii) A waiting period of 21 days from the time of application has elapsed, or,
- iii) An approved assay indicates that the 2,4-D concentration is 100 ppb (0.1 ppm) or less at the water intake. See Table 3 for the waiting period after application but before taking the initial sampling at water intake.

2. Drinking water (potable water):

- A. Consult with appropriate state or local water authorities before applying this product to public waters. State or local agencies may require permits. The potable water use restrictions on this label are to ensure that consumption of water by the public is allowed only when the concentration of 2,4-D in the water is less than the MCL (Maximum Contaminant Level) of 70 ppb. Applicators should consider the unique characteristics of the treated waters to assure that 2,4-D concentrations in potable water do not exceed 70 ppb at the time of consumption.
- B. For submersed weed applications, the drinking water setback distances from functioning potable water intakes are provided in Table 2 Drinking Water Setback Distance (below).
- C. If no setback distance from the Drinking Water Setback Table (Table 2) is to be used for the application, applicators or the authorizing organization must provide a drinking water notification and an advisory to shut off all potable water intakes prior to a 2,4-D application. Notification to the party responsible for a public water supply or to individual private water users must be done in a manner to assure that the party is aware of the water use restrictions when this product is applied to potable water.

The following is an example of an example of notification via posting, but other methods of notification which convey the above restrictions may be used and may be required in some cases under state or local law or as a condition of a permit.

Example:

Posting notification should be located every 250 feet including the shoreline of the treated area and up to 250 feet of shoreline past the application site to include immediate public access points. Posting should include the day and time of application. Posting may be removed if analysis of a sample collected at the intake no sooner than stated in Table 3 (below) shows that the concentration in the water is less than 70 ppb (100 ppb for irrigation or sprays), or after 21 days following application, whichever occurs first.

Text of notification: Wait 21 days before diverting functioning surface water intakes from the treated aquatic site to use as drinking water, irrigation, or sprays, unless water at functioning drinking water intakes is tested no sooner than (insert days from Table 3) and is demonstrated by assay to contain not more than 70 ppb 2,4-D (100 ppb for irrigation or sprays).

Application Date: _____ Time: _____ .

- D. Following each application of this product, treated water must not be used for drinking water unless one of the following restrictions has been observed:
 - i) A setback distance described in the Drinking Water Setback Distance Table was used for the application, or,
 - ii) A waiting period of at least 21 days from the time of application has elapsed, or,
 - iii) An approved assay indicates that the 2,4-D concentration is 70 ppb (0.07 ppm) or less at the water intake. Sampling for drinking water analysis should occur no sooner than stated in Table 3. Analysis of samples must be completed by a laboratory that is certified under The Safe Drinking Water Act to perform drinking water analysis using a currently approved version of analytical Method Number 515, 555, other methods for 2,4-D as may be listed in Title 40CFR, Part 141.24, or Method Number 4015 (immunoassay of 2,4-D) from U.S. EPA Test Methods for Evaluating Solid Waste SW-846.
- E. Note: Existing potable water intakes that are no longer in use, such as those replaced by a connection to a municipal water system or a potable water well, are not considered to be functioning potable water intakes.
- F. Drinking water setback distances do not apply to terrestrial applications of 2,4-D adjacent to water bodies with potable water intakes.

Table 2: Drinking Water Setback Distance For Submersed Weed Applications

Application Rate and Minimum Setback Distance (feet) from functioning potable water intake			
1 ppm*	2 ppm*	3 ppm*	4 ppm*
600	1200	1800	2400

* ppm acid equivalent target water concentration

Table 3: Sampling for Drinking Water Analysis After 2,4-D Application For Submersed Weed Applications

Minimum Days After Application Before Initial Water Sampling at the functioning potable water intake			
1 ppm*	2 ppm*	3 ppm*	4 ppm*
5	10	10	14

* ppm acid equivalent target water concentration

Terms and Conditions of Use

If terms of the following Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. To the extent permitted by law, otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies.

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Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. To the extent permitted by law, Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

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It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. To the extent permitted by law, all such risks shall be assumed by buyer.

Limitation of Remedies

To the extent permitted by law, the exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

To the extent permitted by law, Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. To the extent permitted by law, in no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

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NAVIGATE®

A SELECTIVE HERBICIDE FOR CONTROLLING CERTAIN UNWANTED AQUATIC PLANTS

ACTIVE INGREDIENTS:

Butoxyethyl ester, 2,4-Dichlorophenoxyacetic acid, 27.6%

INERT INGREDIENTS: 72.4%

TOTAL 100.0%

*Isomer specific by AOAC Method, Equivalent to 2,4-Dichlorophenoxyacetic Acid 19%

EPA Reg. No. 228-378-8959

EPA Est. No. 228-IL-1

KEEP OUT OF REACH OF CHILDREN CAUTION

For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident call Chemtrec Day or Night 1-800-424-9300

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION

Harmful if swallowed, absorbed through skin, or inhaled. Causes eye irritation. Avoid contact with skin, eyes or clothing. Avoid breathing dust. When handling this product, wear chemical resistant gloves. Wash thoroughly with soap and water after handling. When mixing, loading, or applying this product or repairing or cleaning equipment used with this product, wear eye protection (face shield or safety glasses), chemical resistant gloves, long-sleeved shirt, long pants, socks and shoes. It is recommended that safety glasses include front, brow and temple protection. Wash hands, face and arms with soap and water as soon as possible after mixing, loading, or applying this product. Wash hands, face and hands with soap and water before eating, smoking or drinking. Wash hands and arms before using toilet. After work, remove all clothing and shower using soap and water. Do not reuse clothing worn during the previous day's mixing and loading or application of this product without cleaning first. Clothing must be kept and washed separately from other household laundry. Remove saturated clothing as soon as possible and shower.

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. If person is unconscious, do not give anything by mouth and do not induce vomiting.

IF ON SKIN: Wash with plenty of soap and water. Get medical attention.

IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

IF IN EYES: Flush eyes with plenty of water. Call a physician if irritation persists.

ENVIRONMENTAL HAZARDS

This product is toxic to fish. Drift or runoff may adversely affect fish and non-target plants. Do not apply to water except as specified on this label. Do not contaminate water when disposing of equipment washwaters. Unless an approved assay indicates the 2,4-D concentration is 100 ppb (0.1 ppm) or less, or, only growing crops and non-crop areas labeled for direct treatment with 2,4-D will be affected, do not use water from treated areas for irrigating plants or mixing sprays for agricultural or ornamental plants. Unless an approved assay indicates the 2,4-D concentration is 70 ppb (0.07 ppm) or less, do not use water from treated areas for potable water (drinking water).

Clean spreader equipment thoroughly before using it for any other purposes. Vapors from this product may injure susceptible plants.

Most cases of ground water contamination involving phenoxy herbicides such as 2,4-D have been associated with mixing/loading and disposal sites. Caution should be exercised when handling 2,4-D pesticides at such sites to prevent contamination of ground water supplies. Use of closed systems for mixing or transferring this pesticide will reduce the probability of spills. Placement of the mixing/loading equipment on an impervious pad to contain spills will help prevent ground water contamination.

STORAGE AND DISPOSAL

STORAGE

Always use original container to store pesticides in a secure warehouse or building. Do not store near seeds, fertilizers, insecticides or fungicides. Do not stack more than two pallets high. Do not contaminate water, food or feed by storage or disposal. It is recommended that a SARA Title III emergency response plan be created for storage facilities. Do not transport in passenger compartment of any vehicle.

PESTICIDE DISPOSAL

Pesticide wastes are toxic. If container is damaged or if pesticide has leaked, clean up spilled material. Improper disposal of excess pesticide is a violation of Federal law and may contaminate ground water. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL

Do not reuse empty bag. Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If bag is burned, stay out of smoke.

MANUFACTURED FOR:

 applied biochemists

Milwaukee, WI 53022

1-800-558-5106

SEE ADDITIONAL PRECAUTIONS
AND DIRECTIONS ON BACK

www.appliedbiochemists.com

NAVIGATE is a trademark of Applied Biochemists

NET WT. 50 LBS. (22.68 KG)

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DIRECTIONS FOR USE

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING.

READ THIS ENTIRE LABEL BEFORE USING THIS PRODUCT

GENERAL PRECAUTIONS AND RESTRICTIONS

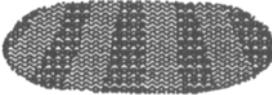
Do not use in or near a greenhouse.

OXYGEN RATIO

Fish breathe oxygen in the water and a water-oxygen ratio must be maintained. Decaying weeds use up oxygen, but during the period when NAVIGATE® should be used, the weed mass is fairly sparse and the weed decomposition rate is slow enough so that the water-oxygen ratio is not disturbed by treating the entire area at one time.

If treatments must be applied later in the season when the weed mass is dense and repeat treatments are needed spread granules in lanes, leaving buffer strips which can then be treated when vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment.

Buffer lanes should be 50 to 100 feet wide. Treated lanes should be as wide as the buffer strips. (See illustration below)



WATER pH

Best results are generally obtained if the water to be treated has a pH less than 8. A pH of 8 or higher may reduce weed control. If regrowth occurs within a period of 6 to 8 weeks, a second application may be needed.

PERMIT TO USE CHEMICALS IN WATER

In many states, permits are required to control weeds by chemical means in public water. If permits are required, they may be obtained from the Chief, Fish Division, State Department of Conservation or the State Department of Public Health.

GENERAL INFORMATION

NAVIGATE® is formulated on special heat treated attaclay granules that resist rapid decomposition in water, sink quickly to lake or pond bottoms and release the weed killing chemical in the critical root zone area. This product is designed to selectively control the weeds listed on the label. While certain other weeds may be suppressed, control may be incomplete. Reduced control may occur in lakes where water replacement comes from bottom springs.

WHEN TO APPLY

For best results, spread NAVIGATE® in the spring and early summer, during the time weeds start to grow. If desired, this timing can be checked by sampling the lake bottom in areas heavily infested with weeds the year before. If treatments are delayed until weeds form a dense mat or reach the surface, two treatments may be necessary. Make the second treatment when weeds show signs of recovery. Treatments made after September may be less effective depending upon water temperatures and weed growth. Occasionally, a second application will be necessary if heavy regrowth occurs or weeds reinfest from untreated areas.

HOW TO APPLY

FOR LARGE AREAS: Use a fertilizer spreader or mechanical seeder such as the Gerber or Gandy or other equipment capable of uniformly applying this product. Before spreading any chemical, calibrate your method of application to be sure of spreading the proper amount. When using boats and power equipment, you must determine the proper combination of (1) boat speed (2) rate of delivery from the spreader, and (3) width of swath covered by the granules.

FOR SMALL AREAS: (Around Docks or Isolated Patches of Weeds): Use a portable spreader such as the Cyclone seeder or other equipment capable of uniformly applying this product. Estimate or measure out the area you want to treat. Weight out the amount of material needed and spread this uniformly over the area. More uniform coverage is obtained by dividing the required amount in two and covering the area twice, applying the second half at right angles to the first.

Use the following formula to calibrate your spreader's delivery in pounds of NAVIGATE PER MINUTE:

$$\frac{\text{Miles per hour} \times \text{spreader width} \times \text{pounds per acre}}{495} = \text{pounds per minute}$$

Example: To apply 100 pounds of NAVIGATE per acre using a spreader that covers a 20 foot swath from a boat traveling at 4 miles per hour, set the spreader to deliver 16 pounds of NAVIGATE granules per minute.

$$\frac{4 \text{ mph} \times 20 \text{ feet} \times 100 \text{ Lbs./A}}{495} = 16 \text{ Lbs./Min.}$$

AMOUNTS TO USE

Rates of application vary with resistance of weed species to the chemical, density of weed mass at time of treatment, stage of growth, water depth, and rate of water flow through the treated area. Use the higher rate for dense weeds, when water is more than 8 feet deep and where there is a large volume turnover.

	NAVIGATE POUNDS PER ACRE	NAVIGATE POUNDS PER 2000 SQ. FT.
SUSCEPTIBLE WEEDS		
Water Milfoil (Myriophyllum spp.)	100 TO 200	5
Water stargrass (Heteranthera dubia)		
SLIGHTLY TO MODERATELY RESISTANT WEEDS		
Bladderwort (Utricularia spp.)		
White water Lily (Nymphaea spp.)		
Yellow water lily (Nuphar spp.)		
Or spatterdock*	150 to 200	7-1/2 to 10
Water shield (Brasenia spp.)		
Water chestnut (Trapa natans)		
Coontail* (Ceratophyllum Demersum)		

*Repeat treatments may be needed

LIMITED WARRANTY AND DISCLAIMER

The manufacturer warrants that this material conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use and Buyer assumes all risk of any use contrary to such directions. SELLER MAKES NO OTHER WARRANTY EXPRESSED OR IMPLIED AS TO FITNESS OR MERCHANTABILITY, AND NO AGENT OF SELLER IS AUTHORIZED TO DO SO EXCEPT IN WRITING WITH SPECIFIC REFERENCE TO THIS WARRANTY. In no event shall the Seller's liability for any breach of warranty exceed the purchase price of the material as to which a claim is made.