June 16, 2010

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

Subject: Spokane River Hydroelectric Project (FERC Project No. 2545)
Article 401 and License Appendix B, Section 5.3.E,
Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program

Dear Secretary 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 (License). Ordering Paragraph E of the License incorporated the *Washington Department of Ecology (Ecology) Certification under Section 401 of the Federal Clean Water Act (filed on May 11, 2009)*. The conditions pertaining to the certification can be found in Appendix B of the License.

Section 5.3.E of Appendix B in the License requires Avista to submit an Ecology and Washington Department of Fish and Wildlife (WDFW) approved Lake Spokane Aquatic Weed Management Program (AWMP) to FERC within one year of License issuance. Article 401 of the License requires Avista to consult with WDFW and the Washington Department of Natural Resources as it developed the AWMP. Copies of the agencies' comments and recommendations, and Avista's responses to them are included in Appendix C of the AWMP.

With this, Avista is submitting the Ecology and WDFW approved AWMP for approval. Upon FERC's approval Avista will begin implementing the AWMP. If you have any questions regarding this filing, please feel free to contact me at (509) 495-4998.

Sincerely,

Speed Fitzhugh

Elvin "Speed" Fitzhugh
Spokane River License Manager

Enclosure

cc: Heather Campbell, FERC
Marcie Mangold, Ecology
Doug Robison, WDFW
Todd Palzer, DNR
Andrew Stenbeck, DNR

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the **Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Plan** on Washington Department of Ecology and the Washington Department of Fish and Wildlife in compliance with Ordering Paragraph J of the Spokane River Project FERC License (P-2545).

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Dated this 16 day of June, 2010

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AVISTA CORPORATION

LAKE SPOKANE AND NINE MILE RESERVOIR AQUATIC WEED MANAGEMENT PROGRAM

APPENDIX B, SECTION 5.3(E)

Spokane River Hydroelectric Project
FERC Project No. 2545-091

Prepared By:
Golder Associates Inc.
Spokane Valley, WA

June 15, 2010

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Acronyms and Abbreviations

Avista	Avista Corporation
cooperating parties	entities involved in Lake Spokane aquatic weed management
DNR	Washington Department of Natural Resources
Ecology	Washington Department of Ecology
FERC	Federal Energy Regulatory Commission
HED	hydroelectric development
IAPMP	Integrated Aquatic Plant Management Plan
I&E Plan	Interpretation and Education Plan
IWPCC	Inland Water Pest Control and Consulting
Project	Spokane River Hydroelectric Project
RM	river mile
WQC	Washington Section 401 Water Quality Certification
WDFW	Washington Department of Fish and Wildlife

1.0 INTRODUCTION

Washington Department of Ecology's (Ecology) Section 401 Water Quality Certification (WQC) for Avista's Spokane River Project (Project) requires the development of a Lake Spokane Aquatic Weed Management Program (Appendix A). The new 50-year FERC License (License) for the Project, issued on June 18, 2009, incorporates Ecology's WQC as Ordering Paragraph E. The WQC requires the Lake Spokane Aquatic Weed Management Program (Program) be developed in consultation with Ecology and WDFW; License Article 401 requires that Washington Department of Natural Resources (DNR) also be consulted during development of this Program. This Program has been prepared in consultation with Ecology, WDFW, and DNR. Avista will begin implementing the Program upon FERC approval.

1.1 Background

This Program has been developed as directed in the WQC to control non-native, invasive aquatic weeds in Lake Spokane, a 5,060-acre, 23.5-mile-long reservoir, created by Long Lake Dam at River Mile (RM) 33.9. The Program also includes monitoring for invasive aquatic weeds in Nine Mile Reservoir, a 440-acre, 6-mile-long reservoir created by Nine Mile Dam (located at RM 58.1).

In 2001, an Integrated Aquatic Plant Management Plan was prepared for Lake Spokane under a grant from Ecology (IAPMP, TetraTech 2001). Avista developed this Program to be consistent with the goals, programs, and objectives described within the IAPMP and with Washington Department of Fish and Wildlife (WDFW) guidance on aquatic plants and fish (WDFW 1997), and Ecology's Eurasian watermilfoil (*Myriophyllum spicatum*) eradication and control strategies (Ecology 2010). This Program does not supersede existing management or jurisdictional authorities.

1.1.1 Surveys

Lake Spokane was surveyed for aquatic weeds in 2000, and again in 2007. Surveys in 2000 (TetraTech 2001) documented 11 aquatic plants, five of which were noxious weeds. Mapping indicated 715 acres of introduced aquatic weeds, including 230 acres of Eurasian watermilfoil (*Myriophyllum spicatum*, Table 1). Mapping in 2007 (AquaTechnex 2007) showed 634 acres of introduced aquatic weeds, including 242 acres of Eurasian watermilfoil (Table 1). The same aquatic plant species were documented in 2000 and 2007 surveys, along with one additional native aquatic plant noted in 2007 (tape grass, *Vallisneriaa americana)*.

TABLE 1

LAKE SPOKANE AQUATIC NOXIOUS WEEDS

Common Name	Scientific Name	Noxious Weed Status[1]	2001 Survey Acreage	2007 Survey Acreage
Curly-leaf pondweed	*Potamogeton crispus*	Class C	not determined	not determined
Eurasian watermilfoil	*Myriophyllum spicatum*	Class B	230	242
White lily	*Nymphaea odorata*	Class C	15	--
Yellow floatingheart	*Nymphoides peltata*	Class B	470	392[2]
Approximate area of aquatic noxious weeds			715	634
Total acres of aquatic vegetation			1,095	943

1- Based on 2010 Washington State Noxious Weed List
2 - Area for yellow floatingheart in 2007 includes areas of white lily.
Sources: TetraTech 2001, AquaTechnex 2007

Aquatic weeds within Lake Spokane exhibit a consistent growth pattern. Native and introduced pondweeds (*Potamogeton spp*.) form beds where water is relatively shallow (< 6 feet). In deeper water adjacent to these beds, Eurasian watermilfoil is the dominant aquatic plant. These two bands of aquatic vegetation line roughly 40 percent of the shoreline. Another 30 percent of the shoreline is occupied by either native and introduced pondweeds, or Eurasian watermilfoil. In these cases, Eurasian watermilfoil appears to have colonized littoral habitats where shorelines drop off rapidly, and pondweeds are found where shallows are more extensive. Large beds of yellow floatingheart (*Nymphoides peltata*) and white lily (*Nymphaea odorata*) are established in shallow bays and along shorelines with a slow current (Figure 1, AquaTechnex 2007, TetraTech 2001).

1.1.2 Management Actions

Public concern over increasing infestations of Eurasian watermilfoil and other aquatic weeds prompted development of the Lake Spokane Integrated Aquatic Plant Management Plan in 2001 (TetraTech 2001) through a grant from Ecology. Funding has not been available to implement actions recommended in the IAPMP (Winterowd 2009). One boat wash station (with a capacity of 4 to 6 boats at one time) is available at the Nine Mile Recreation Area for boats accessing Lake Spokane. Lakeshore residents have contracted with Inland Water Pest Control and Consulting (IWPCC) for localized aquatic herbicide treatment since 2007 (Wimpy 2010). Results of these treatments are presented in Table 2.

TABLE 2

IWPCC HERBICIDE TREATMENTS IN LAKE SPOKANE

Year	Vegetation Type[1]	Acres	Herbicide	Results
2007	Submerged plants	40.3	Diquat	Good control, except in areas of flowing current
	Floating plants	7.9	Glyphosate	Poor control
2008	Submerged plants	28.5	Diquat	Good control, except in areas of flowing current
	Floating plants	3.7	2,4-D	Poor control
2009	Submerged plants	31.8	Diquat	Less effective than previous treatments, potentially due to a shift in the composition of the aquatic plant community
	Floating plants	15	Diquat & 2,4-D	Effective on yellow floatingheart, but not on white lily
2010	Submerged plants	3	Fluoridone (dewatered treatment)	Results not yet available
	Floating plants			

1 – Submerged plants include curly-leaf pondweed and nuisance native plants (*P. pectinatus* and other native plants). Floating plants include yellow floatingheart and white lily.
Source: Wimpy 2010

2.0 PROGRAM

2.1 Purpose and Objectives

The goals of this Program are to (1) reduce the cover of invasive aquatic weeds at public and community boat access points, (2) maintain a moderate level of ongoing control of aquatic weeds in areas from 0 to 14 feet in depth through the use of weed-control reservoir drawdowns, and (3) support weed control and facilitate coordination among the entities involved in aquatic weed control on Lake Spokane.

The IAPMP includes a detailed analysis of the efficacy of potential aquatic weed management strategies in Lake Spokane and proposes an integrated approach based on those strategies deemed most appropriate for the system. This Program tiers off of the IAPMP recommendations and describes management actions that Avista will undertake. Elements of this Program include:

- Coordination with cooperating parties
- Implementation of site-specific aquatic weed control actions at the primary recreation access points on the lake (Table 3)
- Implementation of reservoir-wide winter drawdowns for the purpose of aquatic weed control
- Monitoring to evaluate the effectiveness of site-specific aquatic weed control actions and reservoir-wide winter drawdowns
- Periodic monitoring for invasive, non-native aquatic plants in Nine Mile Reservoir
- Preparation of one report annually which summarizes aquatic weed management activities and their effectiveness

2.2 Cooperation and Coordination

Avista will coordinate this program with entities currently involved in aquatic weed management on Lake Spokane. These entities include, but are not limited to: Avista, Ecology, WDFW, DNR, Washington State Parks, Stevens County Conservation District, Stevens County Noxious Weed Control Board, Spokane County Conservation District, Spokane County Noxious Weed Control Board, Lincoln County Weed Control Board, and the newly formed Lake Spokane Chamber of Commerce's Stewardship Committee (collectively referred to as "cooperating parties").

Avista will implement aquatic weed control actions and monitoring and will coordinate these actions through the development of a prioritized list of site-specific aquatic weed control and monitoring tasks. This Program Task List will be developed in coordination with the cooperating parties and will include proposed activities that Avista is directly responsible for and other tasks that Avista may support. Items on the Program Task List will include, but are not limited to: education and outreach related to aquatic weed control, monitoring or surveys for aquatic weeds, and site-specific control activities targeting specific public and private lake access points. Priorities described in Sections 2.3 and 2.5 will guide development of the Program Task List. In consultation with the cooperating parties, Avista will rank items on the Program Task List by priority and assign an estimated cost to each task. This will assist the cooperating

parties in planning cost-share projects. As described in Section 2.7, Avista will fund and support tasks identified on the Program Task List, whether implemented by Avista or another cooperating party. Table 4 shows an initial Program Task List (limited to Avista-implemented actions). This initial Program Task List will be revised in coordination with the cooperating parties within 90 days of FERC approval of this Plan. Updates and/or revisions to the Program Task List will be included in the subsequent Annual Reports and will not require amendments to this AWMP.

Avista will also implement education and outreach activities relevant to minimizing the spread of aquatic weeds as part of its comprehensive Interpretation and Education Plan (I&E Plan, required by License Article 418). As described in the I&E Plan, Avista will cooperate with agencies to develop brochures and other outreach materials that explain how to minimize the spread of invasive aquatic species. Brochures and other relevant information will be posted at boat launches on Lake Spokane and available at Avista and agency field offices.

Avista will meet with the cooperating parties annually to discuss and, if necessary, modify the tasks, priority rankings, and cost estimates presented on the Program Task List. Changes to the Program Task List will be based on the results of monitoring and needs identified by the cooperating parties. To facilitate the timing of aquatic weed control actions that require an exposed lakebed, Avista will provide estimated weed-control winter drawdown date(s) at the annual meetings. All necessary permits and approvals will be obtained for activities conducted under this program.

2.3 Site-Specific Weed Control

Aquatic weed control at lake access points provides unique benefits, such as enhanced recreation opportunities and reduced spread of invasive aquatic plants to other waterbodies (relative to treatment outside of recreational access points). For this reason, Avista will support the implementation of site-specific weed control actions at the primary public and community lake access sites (Table 3; Figure 3). Avista's ability to implement aquatic weed control measures at privately-owned community access sites will be contingent upon collaboration and landowner permission. In addition to in-water weed control, Avista will cooperate with DNR to install a boat wash station at the Lake Spokane Campground. Installation will require development of a new well and will be dependent on the availability of a suitable water supply.

Based on the IAPMP, bottom barriers may provide the most effective measure for achieving weed control at boat access sites. Initial in-field actions will focus on bottom barriers. Once installed, bottom barriers will be maintained and/or replaced as appropriate to achieve a 90 percent reduction in the cover of aquatic weeds. Biennial monitoring will determine when bottom barrier maintenance or replacement is necessary (Section 2.5.2).

Avista may also conduct and/or support site-specific aquatic weed control actions in other areas where surveys have documented invasive aquatic weed infestations. Support will be prioritized for actions that

(1) maximize sustained reduction in the biomass of aquatic weeds, (2) remove treated plants from the system to avoid a reduction in dissolved oxygen and release of phosphorus caused by decay, and (3) target beds of aquatic plants that induce localized conditions where phosphorus bound in sediments may be mobilized (Owens and Cornwell 2009). Mechanical harvesting, bottom barriers, and diver suction removal (or a combination of these methods) are three weed-control strategies that may meet these three criteria (Table 5, *at end of document*).

TABLE 3

PRIMARY PUBLIC AND COMMUNITY LAKE ACCESS SITES[1]

Site	Ownership/ Management	Notes
Riverside State Park	Washington State Parks	Aquatic weeds are not known from this site due to high water velocity. Should conditions change, Avista will implement site-specific weed control.
Nine Mile Recreation Area	Avista	Site-specific aquatic weed control will focus on the boat launch, docks, and swimming area.
DNR Campground	Washington State Department of Natural Resources	Site-specific aquatic weed control will focus on the boat launch, docks, and swimming area.
Suncrest Community Boat Launch	Private	Private land, actions are contingent upon collaboration and landowner approval.
West Shore Drive Community Boat Launch	Private	Private land, actions are contingent upon collaboration and landowner approval.
Waterview Drive Community Boat Launch	Private	Private land, actions are contingent upon collaboration and landowner approval.
Willow Bay Resort	Private	Private land, actions are contingent upon collaboration and landowner approval.
Lakeshore Estates/Forshee's	Private	Private land, actions are contingent upon collaboration and landowner approval.

1 – Locations are shown in Figure 2.

2.4 Weed Control Drawdowns

Lake Spokane is managed as a water storage facility for power generation, with several other considerations taken into account. Normal operation often includes a winter drawdown, depending on weather, energy demand, and operating conditions. Drawdown of as much as 24 feet took place prior to 1989. More recent drawdowns have been less extensive, and the drawdowns proposed under this Program are limited to 14 feet in accordance with License requirements.

The effect of winter drawdowns on aquatic plant communities varies (sometime unpredictably), and is generally species-specific (Cooke et al. 1993, Hoyer and Canfield 1997). Lake Chelan, Nine Mile Reservoir, and Lake Roosevelt have apparently avoided nuisance-level infestations of Eurasian watermilfoil due to large seasonal water fluctuations (Ecology 2010). In Lake Spokane, aquatic plant growth patterns indicate that winter drawdowns reduce cover by Eurasian watermilfoil and increase cover

by native and introduced pondweeds in exposed areas; yellow floatingheart is apparently unaffected by drawdowns (TetraTech 2001).

Avista plans to implement periodic winter drawdowns of 13 to 14 feet for purposes of weed control. Initially, these drawdowns will be scheduled for a three- to six-week duration during early to mid-winter (late December through February) at least once per four-year-period. The frequency and duration of drawdowns may be modified (in consultation with Ecology and WDFW) based on the results of monitoring (Section 2.5.1). The first weed-control drawdown will take place within two years following FERC approval of this program (expected to be either the winter of 2010/2011 or the winter of 2011/2012 depending on weather patterns and Project operating conditions). The duration, timing, and frequency of drawdowns will be adjusted to achieve a moderate level of ongoing weed control based on the results of monitoring and on mutual agreement among Avista, Ecology, and WDFW. Avista will coordinate with the cooperating parties to facilitate the implementation of weed control tasks (e.g. placement and maintenance of bottom barriers) during the drawdown period.

2.5 Monitoring

The following three types of monitoring will be included on the Program Task List:

1. Winter Drawdown: monitoring during the winter drawdown to determine a frequency and duration for drawdowns that achieves a moderate level of ongoing control
2. Bottom Barrier: monitoring to evaluate the condition of bottom barriers placed at primary recreation sites and to determine maintenance needs
3. Nine Mile Reservoir: biennial survey for aquatic noxious weeds in Nine Mile Reservoir

Each of these types of monitoring are discussed separately below. Additional monitoring may be developed, as needed, to address other site-specific aquatic weed control measures. Each unique control method implemented under this program will include monitoring to evaluate its effectiveness. In this way, adaptive management principals may be used to take advantage of knowledge gained and focus resources on control options that achieve program goals.

2.5.1 Drawdown Monitoring

The WQC states that Avista will seek to:

- Maintain the desired drawdown level for a sufficient period of time to achieve the desired adverse effects on the targeted weed species
- Conduct these types of drawdowns on a frequency sufficient to maintain at least a moderate level of ongoing aquatic weed control in the exposed areas as determined appropriate by follow-up monitoring of weed response and subsequent reestablishment

Prior to the implementation of drawdown monitoring, Avista, in consultation with Ecology and WDFW, will develop a detailed monitoring plan. This monitoring plan will include monitoring locations and dates, detailed data collection methods, data management procedures, and analysis methods.

Drawdown monitoring will consist of three components: pre-drawdown baseline characterization, monitoring of conditions during drawdown, and assessment of post-drawdown plant communities. In order to evaluate the efficacy of the winter drawdown, pre-drawdown monitoring will take place near the peak of the aquatic plant growth cycle (August to September). Post-drawdown monitoring will take place during the same period in the season following the winter drawdown.

The purpose of drawdown monitoring is to determine the length, frequency, and conditions during the drawdown that result in the most effective control of Eurasian watermilfoil. For this reason, the following data will be collected at the monitoring points:

- Biomass
- Plant height
- Relative abundance of each species present (stem density, cover, or mass)

During drawdown, the following variables will be recorded from monitoring sites:

- Soil temperature
- Water level
- Air temperature
- Snow cover

Data will be collected to determine the duration of effects. Analysis will focus on determining the effect of lakebed exposures of differing lengths and climate conditions on biomass and aquatic plant community composition. Monitoring methods, such as aerial surveys, may also be used to assess the effectiveness of weed control drawdowns. Monitoring will be conducted for the first five years in which drawdowns are implemented in Lake Spokane. Based on the results of the monitoring effort, Avista in consultation with Ecology and WDFW, will evaluate whether drawdowns are an effective weed control method and/or if any drawdown adjustments should be recommended.

2.5.2 Bottom Barrier Monitoring

Prior to implementation of bottom barrier monitoring, Avista will develop a detailed monitoring plan for approval by Ecology and WDFW. This monitoring plan will include monitoring locations and dates, detailed data collection methods, data management procedures, and analysis methods.

In general, bottom barriers eliminate all vegetation within the area covered (CDAT 2007). Monitoring will be conducted biennially and will focus on identifying maintenance needs. Maintenance and/or replacement will be indicated when ten percent of the barrier is no longer functioning to exclude aquatic weeds.

2.5.3 Nine Mile Reservoir Monitoring

Nine Mile Dam is located immediately upstream of Lake Spokane and forms an approximately 6 mile long, 4,600-acre-foot reservoir with a surface area of 440 acres at normal full pool elevation. Aquatic

invasive weeds, including Eurasian watermilfoil, are not known to exist in Nine Mile Reservoir. Significant seasonal water level fluctuations, combined with the lack of public motorized boat access, have prevented the establishment of noxious aquatic weeds in Nine Mile Reservoir.

During 2010, two tiers of flashboards on Nine Mile Dam will be replaced with a pneumatically-controlled spillway. This upgrade to the dam will stabilize water levels in the reservoir and potentially provide suitable conditions for colonization by invasive aquatic species. For this reason, littoral habitats within Nine Mile Reservoir will be monitored for the presence of aquatic noxious weeds during even-numbered years. Surveys will follow the "surface inventory" methods described in Ecology's Aquatic Plant Sampling Protocols (Ecology 2001). Other survey technologies, such as infrared aerial surveys, may be used as appropriate in consultation with Ecology and WDFW.

If Eurasian watermilfoil, or other aquatic noxious weeds, are found in Nine Mile Reservoir, Avista will develop a revised monitoring and control plan within one year of the detection of aquatic noxious weeds. If necessary, aquatic weed control activities will be implemented using the framework established in this Program (i.e. Program Task List).

TABLE 4

INITIAL PROGRAM TASK LIST[1]

Task	Notes
Install bottom barriers and/or implement other site-specific aquatic weed control at Nine Mile Recreation Area	The focus area for weed control is shown in Figure 3.
Install bottom barriers and/or implement other site-specific aquatic weed control at DNR Campground	The focus area for weed control is shown in Figure 3.
Develop and distribute brochures and educational materials	Brochures and educational materials will be developed and distributed as described within the I&E Plan.
Implement winter weed control drawdown	The initial weed control drawdown will take place during the winter of 2010/2011 or the winter of 2011/2012, depending on weather patterns and Project operating conditions.
Monitor the effects of winter weed control drawdowns	Temperature and soil conditions will be monitored during the drawdown, and aquatic weeds will be monitored during the subsequent growing season.
Monitor bottom barriers	Bottom barriers will be monitored biennially.
Monitor Nine Mile Reservoir for aquatic weeds	Nine Mile Reservoir will be monitored during even-numbered years.
Implement site-specific aquatic weed control at private community lake access sites	Aquatic weed control actions at private community boat access sites will require landowner approval and coordination.

1 – This initial list includes only those tasks that Avista has committed to implement during the first two to three years of aquatic weed control on Lake Spokane. We anticipate that coordination with the cooperating parties will result in an expanded list.

2.6 Reporting

Avista will prepare one report annually to summarize tasks implemented under this Program. Each report will be comprised of the following elements:

- A description of measures that have been implemented under the Program
- Planned weed management activities for the coming year
- Any proposed changes to the Program, including revised Program Task Lists
- For the period when drawdown monitoring takes place, the report will include
  - The status of monitoring activities
  - The location of monitoring sites and a brief description of monitoring methods
  - Monitoring results
  - A discussion of drawdown duration and conditions and associated effectiveness of aquatic weed control
- Relative to bottom barrier monitoring, the report will include
  - The status of monitoring activities
  - The location of monitoring sites and a brief description of monitoring methods
  - Monitoring results
- The status and results of any additional monitoring undertaken related to other aquatic weed control methods
- Results of monitoring on Nine Mile Reservoir for years that surveys take place

The annual report will be submitted to Ecology and WDFW. An electronic file of the report will be made available to the cooperating parties and to other public or private entities upon request.

2.7 Funding and Support

Avista will fund the implementation of aquatic weed control actions and monitoring identified on the Program Task List. In some cases, cooperating parties may use funds from Avista to leverage federal or state matching dollars, for collaborative projects or ones in which a cooperating party takes the lead. Avista will also provide support, in the form of staff time and equipment, to implement tasks identified on the Program Task List. Avista's administrative costs to implement this plan, including the reporting requirements and operational costs associated with weed-control drawdowns, will be part of Avista's internal costs for license implementation.

3.0 IMPLEMENTATION SCHEDULE

Implementation of this program will begin following FERC approval, and continue annually for the duration of the License, as outlined within Table 6. Changes to this schedule may be enacted on mutual agreement among Avista, Ecology, and WDFW.

TABLE 6

IMPLEMENTATION SCHEDULE

Task	Date
Revise initial Program Task List with cooperating parties	Within 90 days of FERC approval of program
Develop cost estimates and work or monitoring plans for each task	Within 180 days of FERC approval of program
Annual meeting with cooperating parties	February
Finalize Avista support for tasks to be implemented during the coming season	March[1]
Avista provides annual report	December 31

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TABLE 5

Table 5
Select Potential Site-Specific Aquatic Weed Control Methods

Control Method	Description	Regulatory Requirements	Efficacy[1]	Cost per Acre[2]	Limitations	Advantages
Herbicide Control	Herbicide control includes the application of fast-acting herbicides, such as diquat and triclopyr, to aquatic weed infestations.	The herbicide applicator must be state licensed. Herbicide control requires and Aquatic Plant and Algae Management Permit from Ecology. Herbicide application requires appropriate public notification.	40 - 100% (depending on conditions)	$600 - $800	Herbicide treatment is not appropriate for areas with significant current. Specialized equipment is required. Should avoid fish spawning and sensitive waterfowl nesting areas and dates. Large areas of decomposing vegetation may negatively affect dissolved oxygen and nutrient levels. Herbicide use may require restrictions on fish consumption and irrigation for a short period of time. Will affect native as well as noxious aquatic plants.	Herbicides can produce large-scale prolonged, effective control. Several herbicides produce little or no toxic impact on fish, invertebrates, or humans. Herbicides can be used in small and large areas. Herbicides are relatively low cost.
Diver Suction Removal	During diver suction removal, divers use a pump system to suction plants and roots from the sediment. Pumps are mounted on barges or pontoon boats and the diver uses a hose with a cutter head to remove the plants and vacuum them through the hose to a basket on the support vessel.	State permits for diver suction removal are covered by WDFW's Hydraulic Approval Pamphlet for Aquatic Plants and Fish. A federal permit from the U.S. Army Corps of Engineers may be required.	60 - 100%	$1,000 - $3,000	Activities should avoid fish spawning and sensitive waterfowl nesting areas and dates. Specialized equipment is required for diver suction removal. Suction removal has a limited potential to release plant fragments that may spread infestations. Suction removal disturbs bottom sediments.	Suction removal can provide long-term control. Suction removal can control weeds at any depth and weeds near docks and other obstructions.
Hand Pulling / Hand Cutting	During hand pulling, plants are pulled and removed from the water by hand, divers are needed in deep water. Hand cutting is accomplished by severing aquatic plants from their root mass using one of several cutting instruments.	Hand pulling or cutting may require a Hydraulic Project Approval permit from WDFW. In most cases, these activities will be covered by WDFW's Hydraulic Approval Pamphlet for Aquatic Plants and Fish.	50 - 80%	$80 - $2,400[4]	Activities should avoid fish spawning and sensitive waterfowl nesting areas and dates. Plant fragments released during hand pulling/cutting may lead to the spread of infestations. Hand pulling / cutting is only feasible for relatively small infestations.	Hand pulling can provide long-term control with removal of roots. Hand pulling and cutting are unspecialized methods that can be implemented by volunteers.

Table 5
Select Potential Site-Specific Aquatic Weed Control Methods

Control Method	Description	Regulatory Requirements	Efficacy[1]	Cost per Acre[2]	Limitations	Advantages
Bottom Barriers	Bottom barriers are composed of occlusive material placed on the lakebed over existing infestations or over areas where aquatic vegetation has been cut down.	Bottom barriers require a Hydraulic Project Approval permit from WDFW.This activity may be covered by WDFW's Hydraulic Approval Pamphlet for Aquatic Plants and Fish.	100%	$20,000 - $50,000[5]	Bottom barriers are only suitable for relatively small areas. Periodic maintenance of bottom barriers may be necessary to remove sediment. Activities should work around fish spawning and sensitive waterfowl nesting areas and dates. Bottom barriers may become suspended due to gas accumulation and/or currents.	Bottom barriers provide small-scale high-intensity control for up to 3 years. Bottom barriers are well suited for near complete exclusion of plants. Bottom barriers may be low cost for some materials (e.g., burlap).
Biocontrol[6]	Watermilfoil weevils (*Euhrychiopsis lecontei*) are native watermilfoil herbivores. Introductions of this weevil have varying results, but may reduce the abundance of Eurasian watermilfoil.	No permits are required for transplanting watermilfoil weevils.	Watermilfoil control with weevils is highly variable.	Costs include $1.00 per beetle and 3 to 7 beetles are required per stem for control. The final cost is determined by the density of stems per acre.	Control may require densities of 100-300 weevils per square meter. Control is largely unpredictable in natural systems and relies on a number of environmental variables.	Watermilfoil weevils are native to eastern Washington.
Mechanical Harvesting	During mechanical harvesting, a barge-mounted cutter cuts a 6 to 12 foot swath of aquatic vegetation 5 to 8 feet below the water surface. Conventional harvesting equipment cuts, collects, and stores harvested plant material.	Mechanical harvesting requires a Hydraulic Project Approval permit from WDFW.	A portion of aquatic plant biomass is removed for a period of time. Harvested plants will regrow.	Mechanical harvesting costs vary. Contract harvesting runs $500 to $800 per acre. The capital cost for a harvester ranges from $35,000 to $110,000. Operation of a harvester generally costs $100 to $200 per acre.[7]	Plant fragments released during harvesting may root and spread infestations. Mechanical harvesting is limited to a specific depth of control and does not remove plant roots for long-term control. Activities should work around fish spawning and sensitive waterfowl nesting areas and dates.	Removal of harvested plants may reduce internal nutrient loading related to plant decomposition.

1 - Efficacy estimates are from CDAT 2006 and CDAT 2007.
2 - Cost estimates are from IECWMA 2007 and IECWMA 2009.
3 - See Owens and Cornwell 2009.
4 - Costs depend on the density of infestation and height of plants, from Prather et al. 2003.
5 - From CDAT 2007 cost for bottom barrier trial.
6 - From Newman 2008.
7 - From Ecology 2010.

FIGURES

LEGEND

- HED
- Long Lake HED Boundary
- Nine Mile HED Boundary

N

0 1.5
Miles

Map Projection:
Washington State Plane
North Zone NAD 1983

Source:
ESRI, USGS (quadrangle 24k),
Golder Associates Inc.

This figure was originally produced in color. Reproduction in black and white may result in a loss of information.

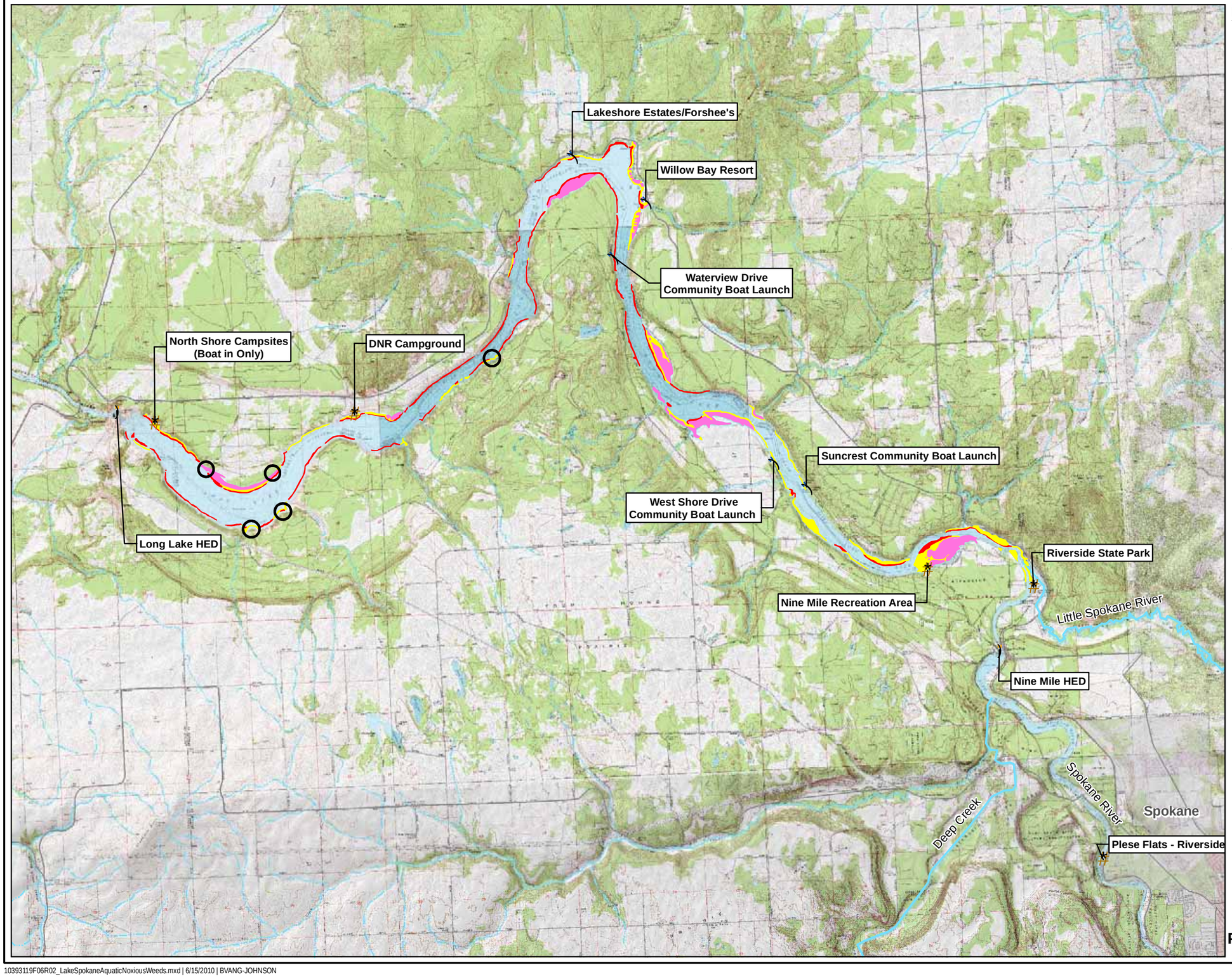
FIGURE **1**

LONG LAKE AND NINE MILE HED LOCATION MAP

AVISTA AQUATIC WEED PLANS

10393119F05R01_LakeSpokaneAquaticNoxiousWeeds.mxd | 6/15/2010 | BVANG-JOHNSON

Golder Associates



LEGEND

- Private Boat Access Site
- Public Boat Acess Site
- HED
- Long Lake Primary Tributary
- Proposed Boat In Only Campsite - Preliminary Location

Aquatic Noxious Weeds

- Eurasian Watermilfoil
- Yellow Floatingheart and White Lily
- Native and Introduced Pondweed

Golder Associates

N

0 1.5
Miles

Map Projection:
Washington State Plane
North Zone NAD 1983

Source:
Aquatechnex (2007), ESRI, USGS (quadrangle 24k), Golder Associates Inc.

This figure was originally produced in color. Reproduction in black and white may result in a loss of information.

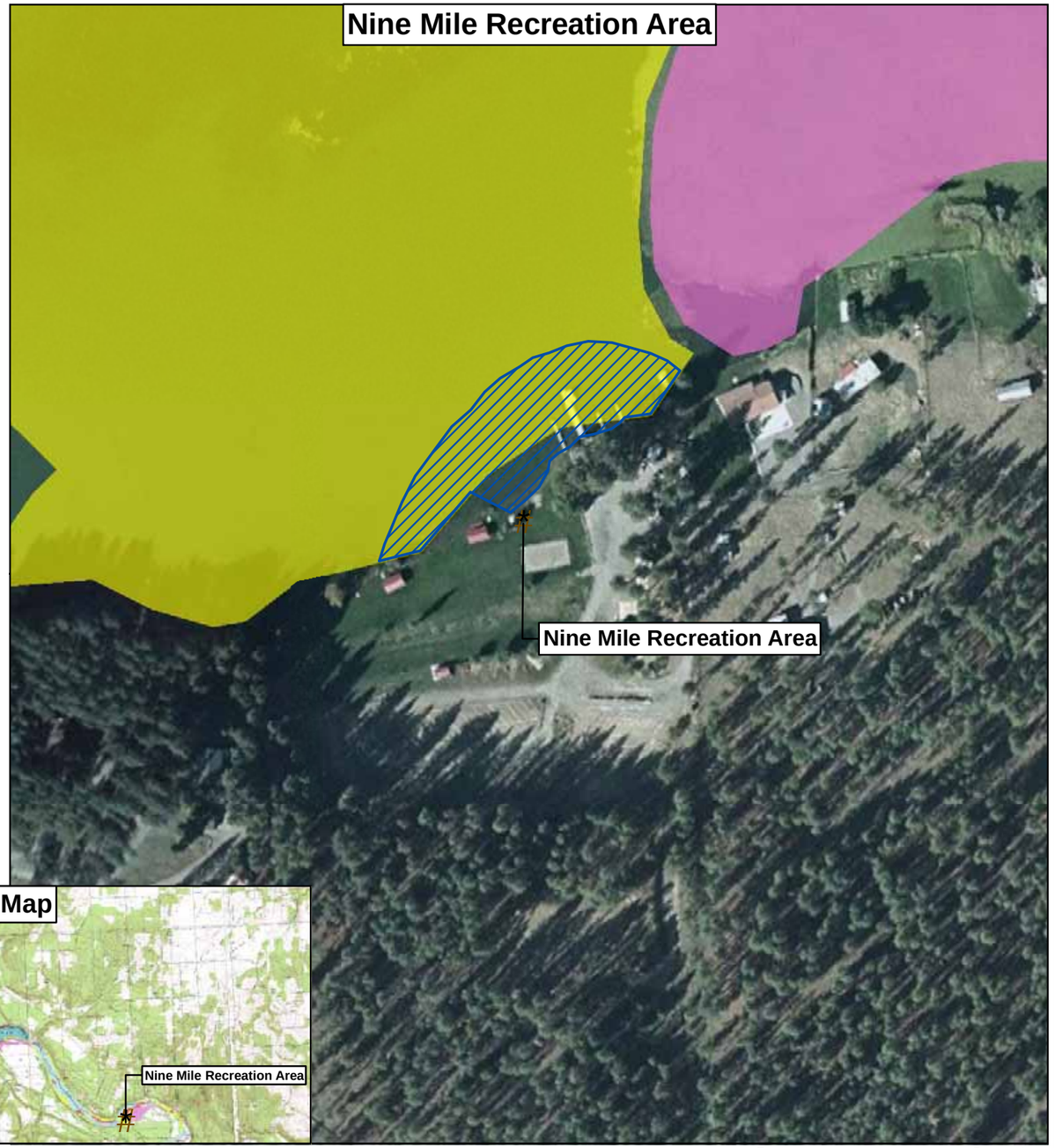
FIGURE **2**

LAKE SPOKANE AQUATIC NOXIOUS WEED INFESTATIONS AND PRIMARY PUBLIC LAKE ACCESS SITES

AVISTA AQUATIC WEED PLAN

10393119F06R02_LakeSpokaneAquaticNoxiousWeeds.mxd | 6/15/2010 | BVANG-JOHNSON

Golder Associates



LEGEND

- Public Boat Access Site
- Area of Site-Specific Weed Control

Aquatic Noxious Weeds

- Eurasian Watermilfoil
- Yellow Floatingheart and White Lily
- Native and Introduced Pondweed

0 200

Scale in Feet

Map Projection:
Washington State Plane
North Zone NAD 1983

Source:
Aquatechnix (aquatic noxious weeds, 2007),
Bing Maps (aerial photo), Avista (weed control areas),
Golder Associates Inc.

N

This figure was originally produced in color. Reproduction in black and white may result in a loss of information.

FIGURE **3**

LOCATION OF SITE-SPECIFIC AQUATIC WEED CONTROL

AVISTA AQUATIC WEED PLAN

10393119F15R02_WeedControlAreas.mxd | 6/15/2010 | BVANG-JOHNSON

Golder Associates

APPENDIX A

SECTION 5.3(E) OF THE WASHINGTON SECTION 401 WATER QUALITY CERTIFICATION

E. Non–Native Aquatic Invasive Plants

The Licensee shall develop a Lake Spokane Aquatic Weed Management Program in conjunction with FERC, WDFW and Ecology for review and approval within one year of issuance of the FERC license. The Program shall include but not be limited to:

1. Cooperation/Coordination

The development of monitoring plans to identify, design, and implement an agreed upon in-field action to control the spread and occurrence of Eurasian watermilfoil with a primary focus on access sites.

The Licensee will also work with the cooperating parties to monitor and control the other existing exotic aquatic weeds and any new exotic aquatic weeds that may become established. This may also include educating the public and area landowners about the threats posed by the spread of aquatic weeds and the appropriate means of limiting their spread or reducing their occurrence.

2. Site-specific Weed Control

Specific in-field weed control actions supported by or implemented under this Program may include but not be limited to any or all of the following: mechanical removal of plants, bottom barriers, chemical treatments, biological treatments, and Project operational measures. It is anticipated that, as new technologies for weed control are developed, they will be implemented when and where appropriate.

The Licensee will work with and coordinate Project operational measures related to this Program with the cooperating parties. This includes scheduled drawdowns of Lake Spokane on a multi-year (2 to 4 year) cycle of up to 10 to 14 feet (levels necessary) to accommodate the installation, maintenance and/or replacement of bottom or physical barriers with the cooperating parties. The Licensee shall target anticipated periods of below-freezing temperatures during the months of January or February for these scheduled drawdowns in order to accomplish more reservoir-wide aquatic weed control as outlined below.

3. Weed Control Lake Drawdowns

In addition to scheduled drawdowns associated with placement and maintenance of bottom barriers or other site-specific weed control efforts, the Licensee shall also implement lake drawdowns for the specific purpose of aquatic weed control. Ecology recognizes that winter drawdowns have varying rates of success due to the amount of the exposed lake bed, duration of exposure, presence of springs, and weather conditions at the time of drawndown. This type of operational measure will entail periodic winter drawdowns of Lake Spokane specifically intended to take advantage of freezing conditions that can kill or otherwise adversely affect the exposed aquatic weeds on a reservoir-wide basis.

In order to maximize the effectiveness of these drawdowns for reservoir-wide weed control purposes, the Licensee will seek to:

- Achieve a 13-14 foot drawdown in order to maximize the amount of exposed aquatic weeds;
- Achieve the desired drawdown level at a time when an extended period of below-freezing temperatures are anticipated;
- Maintain the desired drawdown level for a sufficient period of time to achieve the desired adverse effects on the targeted weed species (i.e. freezing and mortality of the plants); and
- Conduct these types of drawdowns on a frequency sufficient to maintain at least a moderate level of ongoing aquatic weed control in the exposed areas (i.e., between 0-14 foot depths) as determined appropriate by follow-up monitoring of weed response and subsequent reestablishment.

4. Monitoring

Monitoring plans specific to evaluating bottom barriers and drawdowns will be developed and implemented. The cooperating parties will select representative sites (reservoir-wide and at the public access sites) to assess the effectiveness of the weed control strategies (e.g. bottom barriers and winter drawdowns). An initial base-line assessment will be conducted at the sites to assess weed species occurrence, stem densities, plant heights, etc.

Water level, air temperature, subsurface temperature, and other relevant variables will be monitored and recorded during the lake drawdowns done for weed control.

One year after the weed control strategies are implemented, associated sites will be reassessed to evaluate weed species occurrence and density. Following this, periodic monitoring will be conducted as identified in the monitoring plans. The monitoring results will be included in the annual report and will be used in the decision-making process for future years.

5. Nine Mile Reservoir

The Licensee shall also discuss non-native invasive aquatic plant issues regarding Nine Mile reservoir in the Lake Spokane Aquatic Weed Management Program. Avista shall monitor Nine Mile reservoir for non-native aquatic plants during even-numbered years. If non-native plants are detected within the Nine Mile reservoir, Avista shall develop a revised monitoring and control plan within one year of detection.

6. Reporting

The Licensee will prepare an annual report that summarizes the activities conducted in the previous year and results that were achieved for submission to Ecology. The report will include discussions on the effectiveness of the weed control efforts that have been implemented and any proposed changes or adjustments and will be used to guide weed control efforts for the upcoming year.

APPENDIX B
AGENCY CONSULTATION RECORD

Appendix B: Agency Consultation Record

On May 26, 2010, Avista staff including Speed Fitzhugh and Meghan Lunney, Marilyn Nielson a representative from Golder Associates (on behalf of Avista), Marcie Mangold of the Washington Department of Ecology (Ecology), and Doug Robison of the Washington Department of Fish and Wildlife met at the Ecology Spokane Office to discuss the draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program (AWMP). The AWMP was modified to address this discussion and was resubmitted to Marcie Mangold and Doug Robison on June 7, 2010 for comments and approval, which are incorporated into Appendix C.

APPENDIX C

AGENCY COMMENTS AND AVISTA RESPONSES

April 29, 2010

Marcie Mangold, Water Quality Program
Washington Department of Ecology
Eastern Region Office
4601 N Monroe Street
Spokane, WA 99205-1295

Subject: Spokane River Hydroelectric Project, FERC Project No. 2545
Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program as Required by the Spokane River License, Appendix B, Section 5.3.E

Dear Ms. Mangold:

On June 18, 2009 the Federal Energy Regulatory Commission (FERC) issued a new license for the Spokane River Hydroelectric Project, FERC Project No. 2545 (License). Ordering Paragraph E of the License incorporated the *Washington Department of Ecology (Ecology) Certification Conditions under Section 401 of the Federal Clean Water Act (Issued on May 8, 2009 and filed on May 11, 2009)*. The conditions pertaining to the certification can be found in Appendix B of the License.

In accordance with Appendix B, Section 5.3.E of the License, Avista has developed a Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program (Program). The License requires that Avista develop the Program in conjunction with Ecology, the Washington Department of Fish and Wildlife, and the Washington Department of Natural Resources.

With this, we request your comments and recommendations on the Draft Program by **June 1, 2010**. Avista will incorporate your comments and recommendations as appropriate, and submit the final Program to FERC for approval. We will begin implementing the Program once we receive FERC's approval.

If you have any questions regarding this Program, feel free to call me at (509) 495-4998. In my absence please call Meghan Lunney at (509) 495-4643.

Sincerely,

Speed Fitzhugh

Elvin "Speed" Fitzhugh
Spokane River License Manager

Attachment

cc: Doug Robison, WDFW
Blain Reeves, DNR
Andrew Stenbeck, DNR
Meghan Lunney, Avista

From:	Lunney, Meghan
To:	dman461@ecy.wa.gov; robisdlr@DFW.WA.GOV;
cc:	Fitzhugh, Speed (Elvin); Hirschberger, Cherie; Nielson, Marilyn; blain.reeves@dnr.wa.gov; ANDREW.STENBECK@dnr.wa.gov; todd.palzer@dnr.wa.gov;
Subject:	Revised Lake Spokane & Nine Mile Reservoir Aquatic Weed Management Program
Date:	Monday, June 07, 2010 4:35:18 PM
Attachments:	Revised Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program_6-7-10.pdf

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<<Revised Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program_6-7-10.pdf>>

Marcie and Doug,

I have attached the revised Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program (AWMP), the revisions of which are based on our May 26th meeting. With this, we request your review and approval on the attached AWMP by **June 14, 2010**. This will allow us to meet our License requirement of submitting an Ecology and WDFW approved Plan to FERC for final approval by June 18, 2010.

If you have any questions regarding this revised AWMP please call me at 509-495-4643 or Speed Fitzhugh at 509-495-4998.

Thanks!

Meghan Lunney
Aquatic Resource Specialist
Avista Utilities
(509)495-4643

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N Monroe Street • Spokane, Washington 99205-1295 • (509)329-3400

June 14, 2010

Mr. Elvin Fitzhugh
Spokane River License Manager
Avista Corporation
1411 East Mission Ave., MSC-1
Spokane, WA 99220-3727

Dear Mr. Fitzhugh:

RE: Request for comment – Spokane River Hydroelectric Project No. 2545
Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program
Washington 401 Certification, Section 5.3(E)

The Department of Ecology (Ecology) has reviewed the Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program received by email on June 7, 2010, and would like to offer the following comment:

- Please change "may" to "will" on page 4, fourth paragraph, third sentence.

With this change, Ecology approves the Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program

Please contact me at (509) 329-3450 or by email at dman461@ecy.wa.gov if you have any further questions regarding this matter.

Sincerely,

D. Marcie Mangold

D. Marcie Mangold
Water Quality Program

DMM:eh

cc: Doug Robison, WDFW
Tom Young, Ecology/ATG
James M. Bellatty, Ecology/WQP

WASHINGTON STATE DEPARTMENT OF ECOLOGY COMMENTS ON DRAFT LAKE SPOKANE AND NINE MILE RESERVOIR AQUATIC WEED MANAGEMENT PROGRAM

Comment: Please change “may” to “will” on page 4, fourth paragraph, third sentence.

Response: *We have replaced the word “may” with “will” as requested.*

April 29, 2010

Doug Robison
Washington Department of Fish and Wildlife
2315 N Discovery Place
Spokane, WA 99206

Subject: Spokane River Hydroelectric Project, FERC Project No. 2545
Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program as Required by the Spokane River License, Appendix B, Section 5.3.E

Dear Mr. Robison:

On June 18, 2009 the Federal Energy Regulatory Commission (FERC) issued a new license for the Spokane River Hydroelectric Project, FERC Project No. 2545 (License). Ordering Paragraph E of the License incorporated the *Washington Department of Ecology (Ecology) Certification Conditions under Section 401 of the Federal Clean Water Act (Issued on May 8, 2009 and filed on May 11, 2009)*. The conditions pertaining to the certification can be found in Appendix B of the License.

In accordance with Appendix B, Section 5.3.E of the License, Avista has developed a Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program (Program). The License requires that Avista develop the Program in conjunction with Ecology, the Washington Department of Fish and Wildlife, and the Washington Department of Natural Resources.

With this, we request your comments and recommendations on the Draft Program by **June 1, 2010**. Avista will incorporate your comments and recommendations as appropriate, and submit the final Program to FERC for approval. We will begin implementing the Program once we receive FERC's approval.

If you have any questions regarding this Program, feel free to call me at (509) 495-4998. In my absence please call Meghan Lunney at (509) 495-4643.

Sincerely,

Elvin "Speed" Fitzhugh
Spokane River License Manager

Attachment

cc: Marcie Mangold, DOE
Blain Reeves, DNR
Andrew Stenbeck, DNR
Meghan Lunney, Avista

From:	Lunney, Meghan
To:	dman461@ecy.wa.gov; robisdlr@DFW.WA.GOV;
cc:	Fitzhugh, Speed (Elvin); Hirschberger, Cherie; Nielson, Marilyn; blain.reeves@dnr.wa.gov; ANDREW.STENBECK@dnr.wa.gov; todd.palzer@dnr.wa.gov;
Subject:	Revised Lake Spokane & Nine Mile Reservoir Aquatic Weed Management Program
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<<Revised Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program_6-7-10.pdf>>

Marcie and Doug,

I have attached the revised Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program (AWMP), the revisions of which are based on our May 26th meeting. With this, we request your review and approval on the attached AWMP by **June 14, 2010**. This will allow us to meet our License requirement of submitting an Ecology and WDFW approved Plan to FERC for final approval by June 18, 2010.

If you have any questions regarding this revised AWMP please call me at 509-495-4643 or Speed Fitzhugh at 509-495-4998.

Thanks!

Meghan Lunney
Aquatic Resource Specialist
Avista Utilities
(509)495-4643

From: Lunney, Meghan
To: Nielson, Marilyn;
Subject: FW: Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program - WDFW approval
Date: Friday, June 11, 2010 3:19:50 PM

WDFW's approval of the Lake Spokane AWMP, with the incorporation of a couple edits.
Thanks,
-Meghan.

From: Robison, Douglas L (DFW) [mailto:Douglas.Robison@dfw.wa.gov]
Sent: Friday, June 11, 2010 1:11 PM
To: Fitzhugh, Speed (Elvin)
Cc: Lunney, Meghan; Mangold, Marcie (ECY)
Subject: Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program - WDFW approval

Speed,
As we discussed today, I reviewed the revised Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program dated June 7, 2010 and only have a couple of comments. The document refers to a developed Program Task List but it is not included. Please include an initial Program Task List with proposed activities that Avista is directly responsible for, as well as other tasks that Avista may support, i.e. weed control at community lake access sites. The Program Task List should include implementation actions and monitoring activities that are addressed by Avista throughout the document. The initial Program Task List should be revised after meeting with the cooperating parties and other Tasks are incorporated into the Program. This also should be reflected in the implementation schedule, Table 5.

With these changes made in the document, WDFW approves the Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program.

Thank you for your cooperation on revising the Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program.

Doug Robison
WDFW

WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE COMMENTS ON DRAFT LAKE SPOKANE AND NINE MILE RESERVOIR AQUATIC WEED MANAGEMENT PROGRAM

Comment: The document refers to a developed Program Task List but it is not included. Please include an initial Program Task List with proposed activities that Avista is directly responsible for, as well as other tasks that Avista may support, i.e. weed control at community lake access sites. The Program Task List should include implementation actions and monitoring activities that are addressed by Avista throughout the document. The initial Program Task List should be revised after meeting with the cooperating parties and other Tasks are incorporated into the Program. This also should be reflected in the implementation schedule, Table 5.

Response: *We have included an initial Program Task List as Table 4 within the Program. This table includes monitoring and weed control actions that Avista is directly responsible for, and other weed control tasks that Avista will complete contingent upon collaboration and landowner permission. We have also updated the implementation schedule (Table 5 in the draft, now Table 6) to indicate that Avista will revise the initial Program Task List in coordination with the cooperating parties within 90 days of FERC approval of the Program. Updates and/or revisions to the Program Task List will be included in the subsequent annual reports and will not require amendments to this Program.*

April 29, 2010

Blain Reeves
Washington Department of Natural Resources
P.O. Box 47027
Olympia, WA 98504

Subject: Spokane River Hydroelectric Project, FERC Project No. 2545
Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program as Required by the Spokane River License, Appendix B, Section 5.3.E

Dear Mr. Reeves:

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With this, we request your comments and recommendations on the Draft Program by **June 1, 2010**. Avista will incorporate your comments and recommendations as appropriate, and submit the final Program to FERC for approval. We will begin implementing the Program once we receive FERC's approval.

If you have any questions regarding this Program, feel free to call me at (509) 495-4998. In my absence please call Meghan Lunney at (509) 495-4643.

Sincerely,

Elvin "Speed" Fitzhugh
Spokane River License Manager

Attachment

cc: Doug Robison, WDFW
Marcie Mangold, DOE
Andrew Stenbeck, DNR
Meghan Lunney, Avista

From:	Lunney, Meghan
To:	dman461@ecy.wa.gov; robisdlr@DFW.WA.GOV;
cc:	Fitzhugh, Speed (Elvin); Hirschberger, Cherie; Nielson, Marilyn; blain.reeves@dnr.wa.gov; ANDREW.STENBECK@dnr.wa.gov; todd.palzer@dnr.wa.gov;
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Thanks!

Meghan Lunney
Aquatic Resource Specialist
Avista Utilities
(509)495-4643

The Washington Department of Natural Resources did not provide comments on the Draft Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program.