Priest Rapids Hydroelectric Project (P-2114)

Aquatic Invasive Species Control and Prevention Plan

License Article 401(a)(22)

Prepared By:

Public Utility District No.2 of Grant County
P.O. Box 878
Ephrata, WA 98823

January 2010

Executive Summary

The Public Utility District No. 2 of Grant County (Grant PUD) owns and operates two hydroelectric dams on the Columbia River; Wanapum and Priest Rapids, known collectively as the Priest Rapids Hydroelectric Project (Project), and operated under the terms and conditions of Federal Energy Regulatory Commission (FERC) Hydroelectric Project License No. 2114[1].

Grant PUD currently operates the Project through the coordinated operation of the seven-dam system and other Columbia Basin entities with current operational agreements with the fishery agencies and other operators to provide protection and enhancement for a range of fisheries within, and downstream of the Project. These agreements include the Hanford Reach Fall Chinook Protection Plan, the Hourly Coordination Agreement, and the Priest Rapids Project Salmon and Steelhead Settlement Agreement. The Project is also subject to the provisions of its FERC License and related laws and regulations, as well as to the requirements (incorporated by reference in the license) of the Biological Opinion for the Project issued by National Marine Fisheries Service for its effects on anadromous salmon, the Clean Water Act Section 401 Water Quality Certification issued by the Washington Department of Ecology (WDOE), and the Biological Opinion issued by the United States Fish and Wildlife Service regarding the effects of the Project on bull trout.

The WDOE issued a Final Water Quality Certification on April 3, 2007, with modifications filed on March 17, 2008, for the operation of the Project. Under Section 6.6(4) of the 401 Certification, Grant PUD is required, in consultation with the Priest Rapids Fish Forum (PRFF), to develop and implement an Aquatic Invasive Species Control and Prevention Plan (AISP) within one year of issuance of the New License. The plan is also required under License Article 401(a)(22) and must be approved both by WDOE and by FERC prior to implementation.

The following AISP contains education, monitoring, and response components intended to help reduce the potential for new AIS to be introduced into and become established in the Project. The educational components include placement of informational materials at Project boat launches and surrounding recreation stores, as well as voluntary boat inspections and surveys. These efforts will help inform the public about the risks of AIS transport and ways they can help reduce those risks. Additionally, boat inspections and surveys will provide Grant PUD with information related to the amount of risk of AIS transport into the Project, and may help to guide monitoring and response efforts. The monitoring component includes annual zebra/quagga mussel monitoring, annual plant surveys at Project boat launches, and Project-wide shoreline surveys biennially. These monitoring efforts are intended to help provide identification of new AIS introduced into the Project, and may also provide opportunity to respond to such an introduction prior to the species becoming established. Monitoring will also provide tracking information related to potential control/eradication efforts for a given AIS. The rapid response component includes coordination with upstream and downstream operators, state AIS agencies, and other regional AIS groups and will help Grant PUD in responding to newly introduced AIS, specifically the zebra or quagga mussel, in a way that may help to prohibit its establishment and infestation.

[1] 123FERC¶61,049

Table of Contents

List of Figures

List of Tables

List of Appendices

1.0 Introduction

The Public Utility District No. 2 of Grant County, Washington (Grant PUD) owns and operates the Priest Rapids Hydroelectric Project (Project), which includes the Wanapum and Priest Rapids developments, located on the Columbia River (Figure 1). The Project is licensed as Project No. 2114 by the Federal Energy Regulatory Commission (FERC). A 401 water quality certification (WQC) for the operation of the Project was issued by the Washington State Department of Ecology (WDOE) on April 3, 2007 and amended on March 6, 2008. The 401 WQC terms and conditions are incorporated in the new FERC license to operate the Project issued on April 17, 2008. Section 6.6(4) of the 401 WQC requires Grant PUD to develop, in consultation with the Priest Rapids Fish Forum (PRFF), and submit for approval an Aquatic Invasive Species Control and Prevention Plan (AISP); in addition, Article 401(a)(22) of the FERC license order required the AISP be submitted to FERC for approval prior to implementation.

Aquatic invasive species (AIS), defined by RCW 77.08.010, are described as any prohibited, regulated, unregulated, or unlisted aquatic animal or plant species, any aquatic weed on the state noxious weed control list adopted under RCW 17.10.080, and, as stated in RCW 77.60.130(1), any nonnative aquatic plant or animal species that threatens the diversity or abundance of native species, the ecological stability of infested waters, or commercial, agricultural, or recreational activities dependent on such waters.

The AISP for the Project has been developed in coordination with WDOE's Freshwater Aquatic Weed Control Program and the Washington Department of Fish and Wildlife's (WDFW) Aquatic Invasive Species Program. The AISP focuses on addressing ways to monitor and manage aquatic invasive flora and fauna in the Project. Key components of this AISP include education, monitoring, control, and response that are designed to help manage, control and potentially prevent introduction and spread of new AIS within the Project area. This AISP will be updated annually based on results from the previous year's education, monitoring, and control efforts and will be in effect for the term of the FERC operating license for the Project (currently set to expire in April 2052).

1.1 Priest Rapids Project Description

The downstream boundary of the Project begins at the Priest Rapids Dam tailrace (River Mile [RM] 397.1) and extends upriver to the Rock Island Dam tailrace at RM 453.5 (Figure 1). Priest Rapids Dam, which was completed in 1961, has a 7,725-acre reservoir and a 10,103-foot-long by 179.5-foot-high dam spanning the Columbia River. The dam consists of left and right embankment sections; left and right concrete gravity dam sections; a left and right fish passage structure, each with an upstream fish ladder; a gated spillway section; and a powerhouse containing 10 vertical shaft integrated Kaplan turbine/generator sets with a total authorized capacity of 855 MW (Figure 2). Wanapum Dam consists of a 14,680-acre reservoir and an 8,637-foot-long by 186.5-foot-high dam spanning the Columbia River. The dam consists of left and right embankment sections; left and right concrete gravity dam sections; a left and right fish passage structure, each with an upstream fish ladder; a gated spillway; an intake section for future generating units; a downstream fish passage structure in one of the unused intake sections (unit No. 11); and a powerhouse containing 10 vertical shaft integrated Kaplan turbine/generator sets with a total authorized capacity of 1,038 MW (Figure 3).

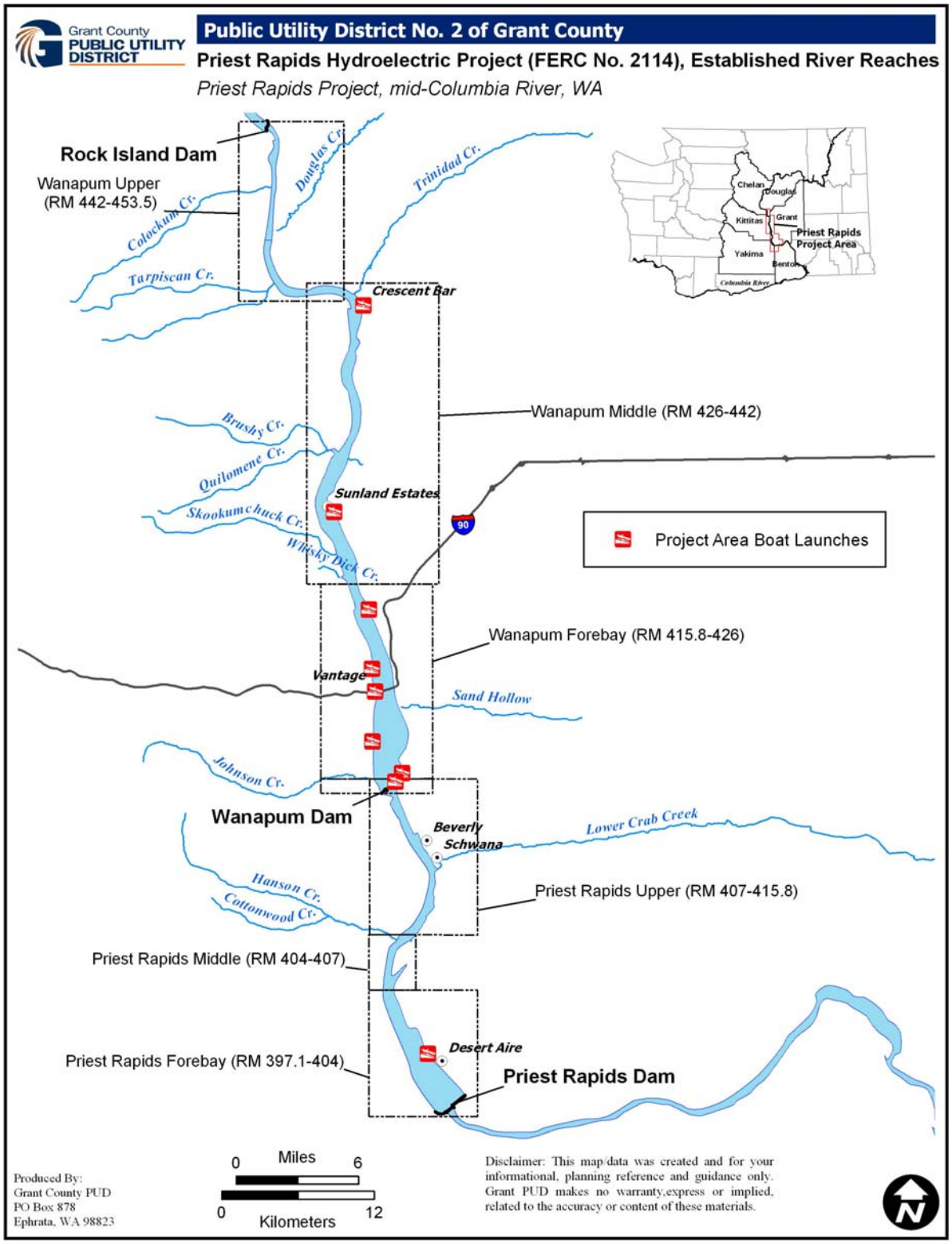


Figure 1 **Priest Rapids Project Area and established river reaches presented by river mile (RM), mid-Columbia River, WA.**

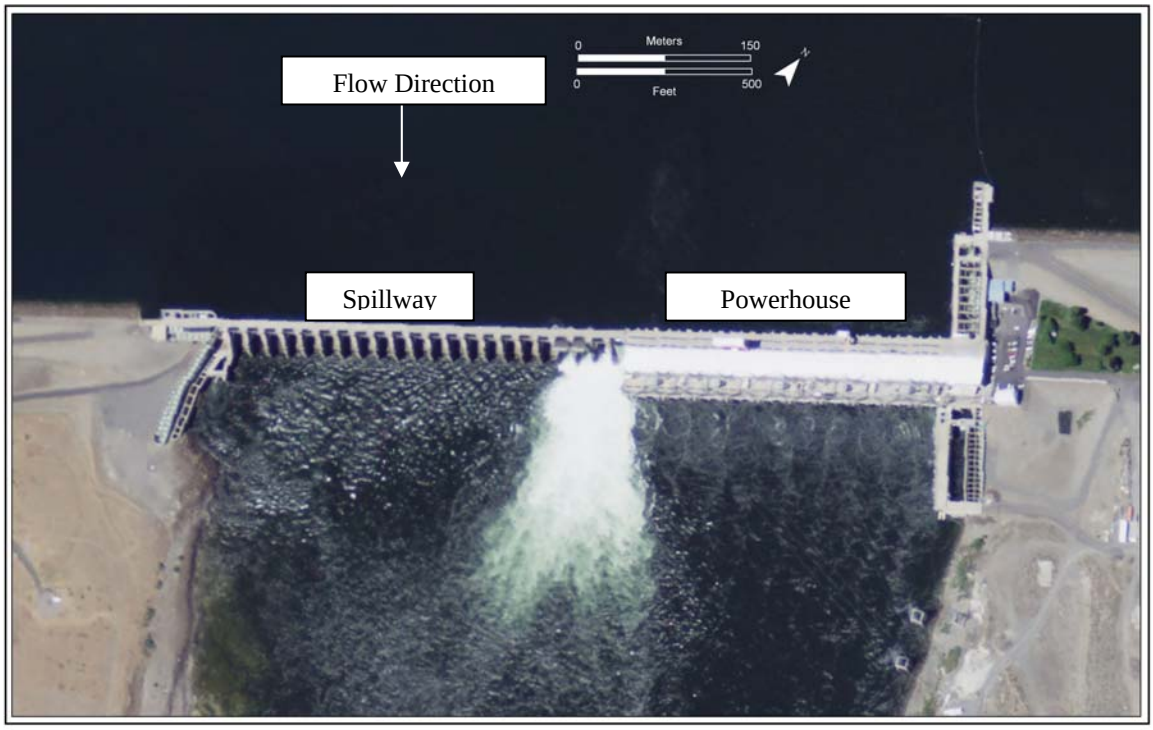


Figure 2 Aerial photograph of Priest Rapids Dam, mid-Columbia River, WA.

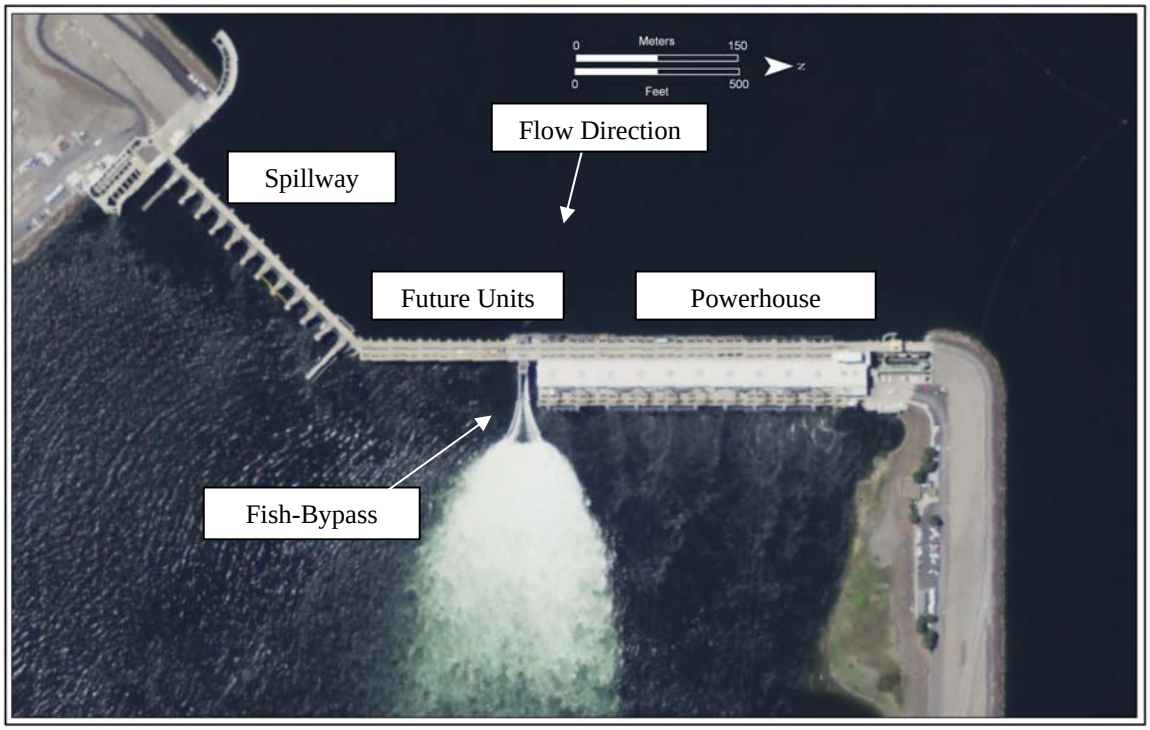


Figure 3 Aerial photograph of Wanapum Dam, mid-Columbia River, WA.

1.2 Pathways for AIS introduction

Infestation of AIS can come through several different pathways, which is dependent on the use characteristics of a given waterbody (including upstream and downstream uses), and potential risks associated with each of those uses. For the Priest Rapids Project area, the following pathways have been identified as being the most likely pathways for AIS introduction or spread.

1.2.1 Recreation

One of the primary methods of infestation for AIS is through transport on recreational boating vessels. AIS can become entangled or attached to the boat hull, motor, propeller, jet-intake, and/or trailer and will be unknowingly transported and introduced into a new water body. This kind of activity can result in a rapid spread and infestation of AIS. Recreational and commercial fishing activities can also increase the threat of AIS introductions. For example, the New Zealand mudsnail is commonly transported by fisherman on their waders, and other AIS species can be introduced when fisherman empty their bait buckets into the receiving waters. Because the primary method of infestation for several AIS is through transport from recreational boating or fishing activities, prevention of AIS infestation through public education is likely one of the most widely used proactive approaches to managing and/or preventing AIS infestations. Therefore, Grant PUD will use education, monitoring, and rapid response approaches as its primary methods for attempting to prevent AIS infestations within the Project by new AIS. Grant PUD will also monitor and manage AIS that already exist in the Project. See Sections 2, 3 and 5 for additional information on Grant PUD's AIS education, monitoring, and rapid response activities.

1.2.2 Upstream Flows

Because the Project is located within an open river system, AIS can flow into the Project area from upstream locations. Close coordination with Public Utility District No. 1 of Chelan County (Chelan PUD), which owns and operates the next two hydroelectric projects upstream of Grant PUD's, will be done as part of this AISP to help identify potential upstream introductions and coordinate response actions. Note that Chelan PUD has its own AIS program requirements and implementation of those efforts will be coordinated with Grant PUD (Waikele Hampton, Chelan PUD, pers. com.). See Section 5 for additional information on coordination and rapid response efforts.

1.2.3 Tributary/Irrigation Return Flows

Incoming flows from tributaries, irrigation return flows from Sand Hollow, Crab Creek and the Mattawa irrigation canal, are also possible pathways for AIS introductions. Some of the water sources that drain into these tributaries and irrigation return flows receive heavy recreation use and are therefore subject to AIS introduction and potential transport into the Project area. As described in Section 3 of this AISP, Grant PUD will conduct AIS monitoring and control activities intended to provide early detection of new AIS introductions and control existing AIS within the Project area. Monitoring locations will be located below tributary/irrigation return flow inlets into the Project area and educational materials will be placed near popular fishing areas within tributaries and irrigation return flow areas near the Project area (see Sections 2 and 3).

1.2.4 Fire Fighting, Equipment Transfers, etc

Other potential AIS introduction pathways that are less common include, but are not limited to, the following:

- Fire-fighting activities where water trucks which have previously pumped water from AIS-infested lakes or rivers pump water from an uninfected area. This risk can be reduced using educational materials that encourage fire-fighting crews, especially those that come from out of state, to clean their hoses and pumps prior to use on a fire.
- Installing previously used equipment that has been in an AIS-infested area that has not been properly cleaned. This risk is minimal because Grant PUD does not purchase used equipment for use at its dams.
- Crane certification weight testing using water bags has been identified by the US Bureau of Reclamation (BOR) as a potential pathway for the introduction of AIS. As applicable to Grant PUD operations, Grant PUD will follow BOR protocols or WDFW protocols as needed to decontaminate this type of equipment if/when used.
- Deliberate introductions, such as planting of non-native plants along shorelines near residences, discarding of unwanted pets or lab animals, etc. can also be a pathway of AIS introductions. Grant PUD has no enforcement capabilities related to deliberate introductions, but will attempt to reduce this pathway risk through its educational program.

Grant PUD will continue to monitor and research potential new pathways not identified in this AISP that may need to be addressed through the annual updates of this AISP. This will include participation in regional AIS forums (e.g. Columbia River Task Force) and annual meetings with WDFW and WDOE staff, which will include discussions of potential new AIS pathways potentially applicable to the Project area.

2.0 Education

One component of Grant PUD's AISP will be to provide educational opportunities for the public about the risks involved with AIS. This will include distribution of educational materials as well as administration of boat inspections and boater self-surveys. These educational tools are discussed in the following three sections.

2.1 Educational Materials

Grant PUD will distribute educational material each year during the peak of the boating season (May 1–October 30) at key recreational business locations within Grant County and within the Project at high use boat launches. Educational materials will consist of free pamphlets and identification cards at businesses that sell boating and water recreation equipment and materials (i.e. marinas, outdoor stores, and tackle shops). Potential retail sites for educational material distribution include the following: Tri-State Outfitters (Moses Lake), Pollywogs (Desert Aire), Cascade Marine (Moses Lake), Wal-Mart sporting goods department (Ephrata and Moses Lake), Trading Post (Trinidad), and any other appropriate consenting facility (Figure 4). In addition, educational signage and/or kiosks will be provided at boat launches within the Project to help increase public awareness of the dangers of spreading AIS. Potential boat launch sites for educational material distribution include the following: Crescent Bar, Sunland Estates, Vantage,

Wanapum State Park, Wanapum forebay left bank, Wanapum tailrace left bank, and Desert Aire (see Figure 1). Any new boat launches developed in the future will also be considered for placement of educational material.

The pamphlets, identification cards, and boat launch signs used to educate the public will be obtained from WDFW and the U.S. Fish and Wildlife Service (USFWS) to keep the signage used in the Project consistent with the other AIS signs used throughout Washington state. The educational material will clearly present ways to avoid the spread of AIS by removing and disposing of the weeds off the boats and trailers, and draining the live wells prior to moving to another water body. Pamphlets that help educate fisherman on proper gear cleaning and live bait handling methods will also be placed at the retail sites and boat launches identified above.

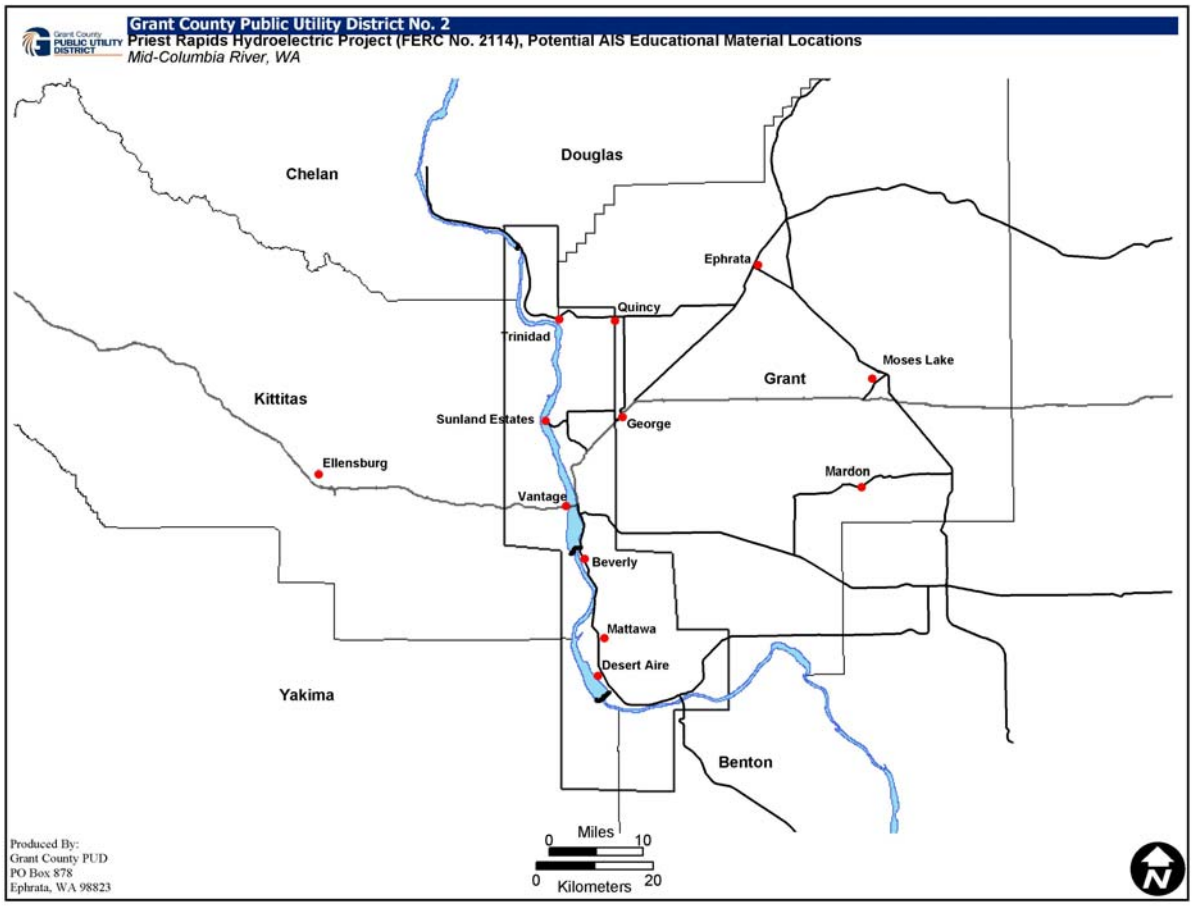


Figure 4 Potential locations (marked by red dots) for AIS educational materials.

2.2 Public Awareness and Voluntary Boat Inspections

In order to increase public awareness of AIS threats and to help prevent the potential introduction or transport of AIS into or from the Project area, Grant PUD will conduct voluntary boat inspections during the peak usage periods. The inspecting personnel will educate the public regarding the requirements of the AIS program and demonstrate how to identify and remove invasive species from boats and trailers. The inspecting personnel will also fill out a boater survey interview form while conducting the survey. The interview survey form used will be the one created by the 100th Meridian Initiative, a nationwide group supported by the U.S. Fish and

Wildlife Service, created to stop the spread of aquatic nuisance species (Appendix A). This interview form requests information from the boater including home residence, other lakes/rivers where that boat has recently been launched, the next anticipated launch location, and if the boater is aware of the threat of AIS. Information will also be gathered concerning items such as the home state of the boater, how many times the boater launches per year, how they store their vessel, etc. Inspecting personnel will conduct inspections during the Memorial Day, Fourth of July, and Labor Day holiday weekends as well as one additional weekend in August. Boat launches with the heaviest use will be used for inspections, including: Crescent Bar, Wanapum State Park, and Desert Aire boat launches (see Figure 1). Results of these surveys will be included in the annual AIS report (see Section 6).

2.3 Voluntary Self-Survey

In an effort to get boater information when boat inspections are not being performed, Grant PUD will place voluntary boater information forms (based on the 100th Meridian boater survey forms, Appendix B) at boat launches. The purpose of the survey will be explained to the boaters on the signage and the boaters will then have an opportunity to participate and fill out the form and place it in the return box located at the boat launch. This boater self-survey requests information from the boater including home residence, number of times the boat was launched last year, other lakes/rivers where the boat has been recently launched, the destination of the boat, if the boater cleans the boat between each launch, storage methods for the boat, and if the boater is aware of the threat of AIS. Results of these surveys will be included in the annual AIS report (see Section 6).

3.0 AIS Plant Monitoring

Monitoring of both present and new AIS is an important component to AIS management. As part of the AISP, Grant PUD proposes to monitor the entire Columbia River corridor portion of the Project to the ordinary high water mark (OHWM) on the shoreline every other year and all Project boat launches annually for AIS plants. The boat launch monitoring and the Project wide monitoring would begin the first year following WDOE and FERC approval of this AISP. Grant PUD will monitor for all aquatic invasive plants listed on the Washington State Noxious Weed List as outlined in RCW 17.26.020(5)(c) (see also Table 1). The goal of the AIS plant monitoring component will be to identify newly introduced AIS plants, as well as to map and track the movement of newly found and/or existing AIS plants. Monitoring will also allow for determination of success of control/eradication efforts.

Table 1 AIS plants that will be monitored for in the Columbia River as part of the Priest Rapids Project

Common Name	Genus/Species	Submergent	Emergent	Existing	Potential Control
Eurasian Watermilfoil	Myriophyllum spicatum	X		X	Bottom barrier
Curly-leaf Pondweed	Potamogeton crispus	X		X	Chemical; biological
Hydrilla	Hydrilla verticillata	X			Chemical; biological
Variable-leaf Milfoil	Myriophyllum heterophyllum	X	X		Bottom barrier
Brazilian Elodea	Egeria densa	X			Chemical; biological
Flowering Rush	Butomus umbellatus	X			Chemical; biological
Parrot Feather	Myriophyllum aquaticum		X		Chemical; biological
Floating Primrose-willow	Ludwigia peploides		X		Chemical; biological
Water Primrose	Ludwigia hexapetala		X		Chemical
Yellow Floating Heart	Nyphoides peltata		X		Chemical
Fanwort	Cabomba caroliniana	X			Chemical
Fragrant Water Lily	Nymphaea odorata		X		Chemical; biological

[1]Newly listed aquatic invasive plant species not listed here will be added to this table as needed during the annual updates to this plan

Although this AISP focuses on aquatic invasive plant species, as part of the plant monitoring effort Grant PUD will also monitor and map for existing and new terrestrial, wetland, and/or riparian zone plants that can be identified from the shoreline/boat launch monitoring efforts, as described below, and potential additional monitoring and/or control efforts will be coordinated through Grant PUD's existing Noxious Weed Management Plan as needed. For more information on Grant PUD's NWMP, see Mickle (2009).

3.1 Shoreline Monitoring

Shoreline monitoring efforts would consist of visually identifying plants and inspecting for AIS from a boat while traveling slowly along each shoreline. In areas where macrophytes cannot be seen, a sampling rake will be used to pull up macrophytes for visual identification. Macrophytes will also be examined for animals (e.g. the New Zeland Mudsnail) that may be attached. Digital photographs will be taken and sent to WDFW and/or WDOE AIS personnel for identification assistance, as necessary. A map showing locations of all areas sampled and plants identified will be created using GPS data collected from the locations where macrophytes were sampled. Once a baseline map and GPS database is established, the same sites will be re-visited every two years during the month of September when the annual macrophyte density is at its peak; this will also allow for determination of newly introduced AIS plant or animals that were not present during the previous sampling event and/or will allow for tracking the increase/decrease of existing plants.

3.2 Boat Launch Monitoring

Monitoring for AIS plant species will also be done via visual surveys at each boat launch. The surveys would be conducted by traveling three 50-meter transects out from the boat launch, or until visual contact with the macrophytes is lost. The first transect will be 30-m upstream of the launch, the second will be even with the middle of the launch, and the third transect will be 30-m

downstream of the launch. Macrophyte surveys will be done annually in September when the annual macrophyte density is at its peak. This visual survey will serve a two-fold purpose. The survey will be used to monitor for the presence and abundance of Eurasian watermilfoil to define a pattern for that species. In addition, through visual surveys, Grant PUD will be able to monitor for new AIS that might have entered the Project through recreational boater use.

3.3 Control/Management

Currently, the only AIS plants known to occur within the Project area are Eurasian watermilfoil and curly leaf pondweed. Potential control and management efforts for Eurasian watermilfoil are explained in more detail below, while potential control and management efforts for curly leaf pondweed are limited to biological or chemical, and additional discussion of the need or type of control will be determined after the first year of shoreline and boat surveys. Note that terrestrial, wetland, and/or riparian zone AIS plants are currently monitored, managed, and controlled as part of Grant PUD's NWMP (Mickle 2009). Any newly identified AIS plants found during the monitoring efforts will be discussed at the annual AIS meetings with WDOE and WDFW, and potential control, management, and/or eradication efforts for that given species will be determined as necessary (including for curly leaf pondweed). These activities will then be included in the annual report and added to this AISP during the annual update period (see Section 6). Coordination with any wildlife management plans/programs that may be impacted by future AIS plant control/management activities will be done through WDFW and WDOE, as needed. Prior to application of any herbicide controls, Grant PUD will consult with both WDFW and WDOE and will obtain any required permits. See also Section 6 for rapid response and notification details.

3.3.1 Eurasian watermilfoil

Eurasian watermilfoil is an invasive nonnative plant, and is considered to be one of the most undesirable AIS nuisance plants in North America because of its negative affects on such recreational activities as boating, swimming, and fishing (WDOE 2001). Like native aquatic milfoils, it has feather-like underwater leaves and emergent flower spikes. Eurasian watermilfoil is often identified by leaf shape; however, due to its variability, chemical and DNA analysis may be needed to distinguish it from native milfoil species (WDOE 2001).

There are currently several techniques used in the western United States to manage Eurasian watermilfoil, with some of the most feasible methods include mechanical harvesting, biological or herbicidal control, and physical control (e.g. bottom barriers). However, each of these methods has uncertainties related to their effectiveness, impacts to other aquatic species and habitat, and feasibility of use within the Project given the large scale of Eurasian watermilfoil infestations. Therefore, Grant PUD will focus its control/management of Eurasian watermilfoil through use of education/public awareness activities (see Section 2) as well as monitoring studies (see Section 3) in an attempt to manage and limit the spread of Eurasian watermilfoil throughout the Project. Adaptive management tools will also be used by Grant PUD to modify its Eurasian watermilfoil control/management methods, if needed, based on results of the voluntary boater inspections and self-surveys, monitoring efforts, and/or improvements in physical control methods.

The use of bottom barriers may be successful for limited use within specific locations in the Project area. The use of bottom barriers involves placing screen material over the desired bottom

area and anchoring the screen with sandbags. The barriers are typically deployed in the spring when the plants are in the early stages of growth and are removed after four to eight weeks. It is unknown if this method would be successful within the Project. Due to the size of the Project it may be unfeasible to use the bottom barriers for all of the areas that contain Eurasian watermilfoil. Through the educational and monitoring activities identified in this plan, Grant PUD will evaluate the potential need and feasibility of using bottom barriers at major boat launch areas within the Project that may help limit boater transport out of the Project area and potentially into areas not currently infested.

If monitoring indicates that more aggressive control of dense milfoil beds is needed at Project boat launches, through adaptive management Grant PUD will consider additional alternatives for control at the boat launches. These additional alternatives will be discussed within the annual report and at the annual AIS meetings prior to application of the control method. Current possible alternatives include harvesting or herbicides, but those (and any other new technologies), will need to be further evaluated based on monitoring results, potential impacts to other aquatic species, habitat, recreation, etc. Additional information on annual reporting and adaptive management can be found within Sections 6 and 7 of this AISP.

4.0 AIS Animal Monitoring

Monitoring for AIS animals is another component of this AISP. Aquatic Invasive Species fish will be monitored under a separate Native Resident Fish Monitoring Program (NRFMP) conducted as required by Article 401(a)(13) of the Project's operational license (FERC 2008). Under this AISP, Grant PUD will monitor for zebra mussels, quagga mussels, New Zealand mudsnails, and other AIS animals. The sections below summarize both AIS animal monitoring efforts.

4.1 Fish

The Project is currently residence to 14 introduced species of fish (Table 2). In accordance with Article 401(a)(13) of the Project's operating license (FERC 2008), Grant PUD will monitor the abundance and spread of these species through the NRFMP that will consist of a Project-wide evaluation of fish species every five years (Garner 2009). The NRFMP will use 12 metrics of biotic integrity to measure native and non-native fish health, abundance and distribution. For additional information see Garner (2009).

In an effort to provide WDFW with information regarding possible new AIS fish introductions within the Columbia River Basin, Grant PUD will coordinate its NRFMP, as well as its other fish management/monitoring programs, so that suspected identification of new AIS fish can be reported to WDFW AIS personal. For example, any bycatch of new AIS fish species during Grant PUD's northern Pikeminnow removal program, fish salvage efforts (e.g. during fish-ladder outages), etc. will be reported to WDFW as soon as Grant PUD's AIS coordinator is notified by Grant PUD biologists. WDFW will provide an updated list of AIS fish that have potential to be introduced into the Columbia River Basin, and Grant PUD will provide this list to its biologists working on the various Grant PUD fish programs. At a minimum, any new AIS fish identified within the Project will be reported to WDFW on a quarterly basis. If no new AIS fish species are identified, that will be included in the annual AISP report.

Table 2 Introduced fish species found in the Priest Rapids Project.

Family[1], Species	Relative tolerance of organic pollution, warm water, and sediment	Trophic group of adults	Origin
Centrachidae			
Black crappie *Pomoxis nigromaculatus*	Tolerant	Omnivore	Introduced
Bluegill *Lepomis macrochirus*	Tolerant	Insectivore	Introduced
Largemouth bass *Micropterus salmoides*	Tolerant	Piscivore	Introduced
Pumpkinseed *Lepomis gibbosus*	Tolerant	Insectivore	Introduced
Smallmouth bass *Micropterus dolomieu*	Intolerant	Piscivore	Introduced
White crappie *Pomoxis annularis*	Tolerant	Insectivore	Introduced
Clupeidae			
American shad *Alosa sapidissima*	Tolerant	Insectivore	Introduced
Cyprinidae			
Common carp *Cyprinus carpio*	Tolerant	Omnivore	Introduced
Tench *Tinca tinca*	Tolerant	Omnivore	Introduced
Ictaluridae			
Black bullhead *Ameiurus melas*	Tolerant	Insectivore	Introduced
Channel catfish *Ictalurus punctatus*	Tolerant	Insectivore	Introduced
Percidae			
Walleye *Sander vitreus*	Intermediate	Piscivore	Introduced
Yellow perch *Perca flavescens*	Intermediate	Insectivore	Introduced
Salmonidae			
Brown trout *Salmo trutta*	Intolerant	Omnivore	Introduced
[1]From Grant PUD's Native Resident Fish Monitoring Program (Garner, 2009)			

4.2 Zebra and Quagga Mussels

Zebra mussels and quagga mussels are prolific invaders that cost the United States hundreds of millions of dollars each year (Univ. of Minnesota Sea Grant Program 2004). These small mussels from Eurasia can clog water intakes and damage equipment by attaching to boat motors and hard surfaces. They have the ability to damage ecosystems by harming fisheries, smothering native mussels and crayfish, and littering beaches with their sharp shells (Univ. of Minnesota Sea Grant Program 2004).

Zebra mussels occur in many Eastern United States waters and spread primarily by attaching to boat hulls, aquatic plants, nets, fishing equipment, or through water contaminated with their larvae (Univ. of Minnesota Sea Grant Program 2004). Adult zebra mussels can survive out of water for up to 30 days under certain conditions.

4.2.1 Horizontal Zooplankton Tow Net Sampling

Since 2001, Grant PUD has been conducting horizontal zooplankton tow net sampling for zebra and quagga mussel veligers, in cooperation with WDFW in an early warning zebra/quagga mussel monitoring program within the Project. These efforts will continue under this AISP. The horizontal tow samples will be collected at nine locations throughout the Project (Figure 3). Samples are taken at the Rock Island tailrace (river mile (RM) 452.5), Crescent Bar (RM 440.5), Sunland Estates (RM 426.0), Wanapum forebay (RM 417.0), Wanapum tailrace (RM 414.8), Crab Creek (new location added in 2009; RM 412), Lake Geneva (RM 407.0), Priest Rapids forebay (RM 399.0), and Priest Rapids tailrace (RM 396.0). Samples are taken three to four

times annually at the time of year between June and September when conditions are suitable for mussel spawning and larval development. This occurs when water temperatures are between 14-22°C (Woodward and Clement 2008).

Sampling methods include use of a Wisconsin plankton net (363µ mesh net) that is drifted for a distance of 40-100 ft at a depth of approximately 20 ft for each location (Figure 5). The plankton net is thoroughly rinsed and all sample material transferred into a 250ml Teflon bottle and preserved immediately with 70 percent isopropyl alcohol. A label is affixed to the sample bottle and appropriately filled out. The sampling procedures follow protocols developed by WDFW (Pamala Meacham, WDFW, pers. com.). The samples are then cataloged and shipped to a certified laboratory for analysis and determination of veliger presence or absence. Grant PUD will follow rapid response actions as described in Section 5 if zebra or quagga mussels are detected or suspected.

Figure 5 Photograph of Grant PUD zebra/quagga mussel sampling efforts in Priest Rapids Project area, mid-Columbia River, WA.

4.2.2 Vertical Zooplankton Tow Net Sampling

In addition to the horizontal zooplankton tows, Grant PUD will also begin taking vertical tows that will sample the entire water column at each site. Methods for collecting vertical tow samples is almost identical to the horizontal tow sampling method as described above, except that samples will be taken from 1 meter above the bottom of the river up through the entire water column without drifting, in accordance with protocols established by the California Department of Fish and Game (CDFG; 2008a) and/or WDFW. Grant PUD will follow rapid response actions as described in Section 5 if zebra or quagga mussels are detected or suspected.

4.2.3 Artificial Substrate Monitoring

In an effort to monitor for zebra and quagga mussels near areas with high boat traffic, Grant PUD will deploy artificial substrates at Project boat launch docks. Boat launches proposed for monitoring would include Desert Aire, Wanapum Tailrace, Wanapum Forebay, Wanapum State Park, Vantage, Sunland Estates and Crescent Bar. Under the direction of WDFW, Grant PUD will follow the artificial substrate monitoring protocols as provided by WDFW. One substrate will be deployed at each site from a boat dock or buoy. The substrates will be kept at least one meter above the bottom and will be examined monthly from June through September. Grant PUD will follow rapid response actions as described in Section 5 if zebra or quagga mussels are detected or suspected.

4.2.4 Substrate Monitoring at Project Dams

As part of this AISP, Grant PUD will also begin monitoring for presence of adult zebra and quagga mussels that may have become attached on fishways, intake screens, cooling units, and other equipment at both Wanapum and Priest Rapids dams. Equipment that is regularly taken out of operation for maintenance will be inspected by Grant PUD staff. Grant PUD will follow rapid response actions as described in Section 5 if zebra or quagga mussels are detected or suspected. Results of this effort, including type of equipment inspected, frequency, and species found will be included in the annual AIS report (see Section 6).

4.3 New Zealand Mudsnail

The New Zealand mudsnail (*Potamopyrus antipodarum*) has become well established in many river drainages throughout the western United States and is quickly spreading to new locations (Richards et al. 2004). The New Zealand mudsnail is a parthenogenic live-bearing, prosobranch snail with high reproductive potential and is spread to new waters via contaminated fishing equipment (Winterbourn 1970, Richards et al. 2004). This mudsnail has spread in Montana through contaminated waders and wader boots of fly fishermen. Although fly-fishing activities are limited in the Columbia River, there are three popular fly-fishing lakes within the Crab Creek Wildlife Area: Nunnally, Merry, and Lenice Lakes, all of which drain into Crab Creek which then drains into the Columbia River below Wanapum Dam (see Figure 1). Therefore, Grant PUD will monitor for New Zealand mudsnails while conducting the annual boat lunch and two-year shoreline macrophyte monitoring studies (see Section 3). Grant PUD will also place educational material at Project boat launches as well as at the public fishing access points for Nunnally, Merry and Lenice Lakes inform fly fishermen of the threat of this snail and ways to prevent its spread.

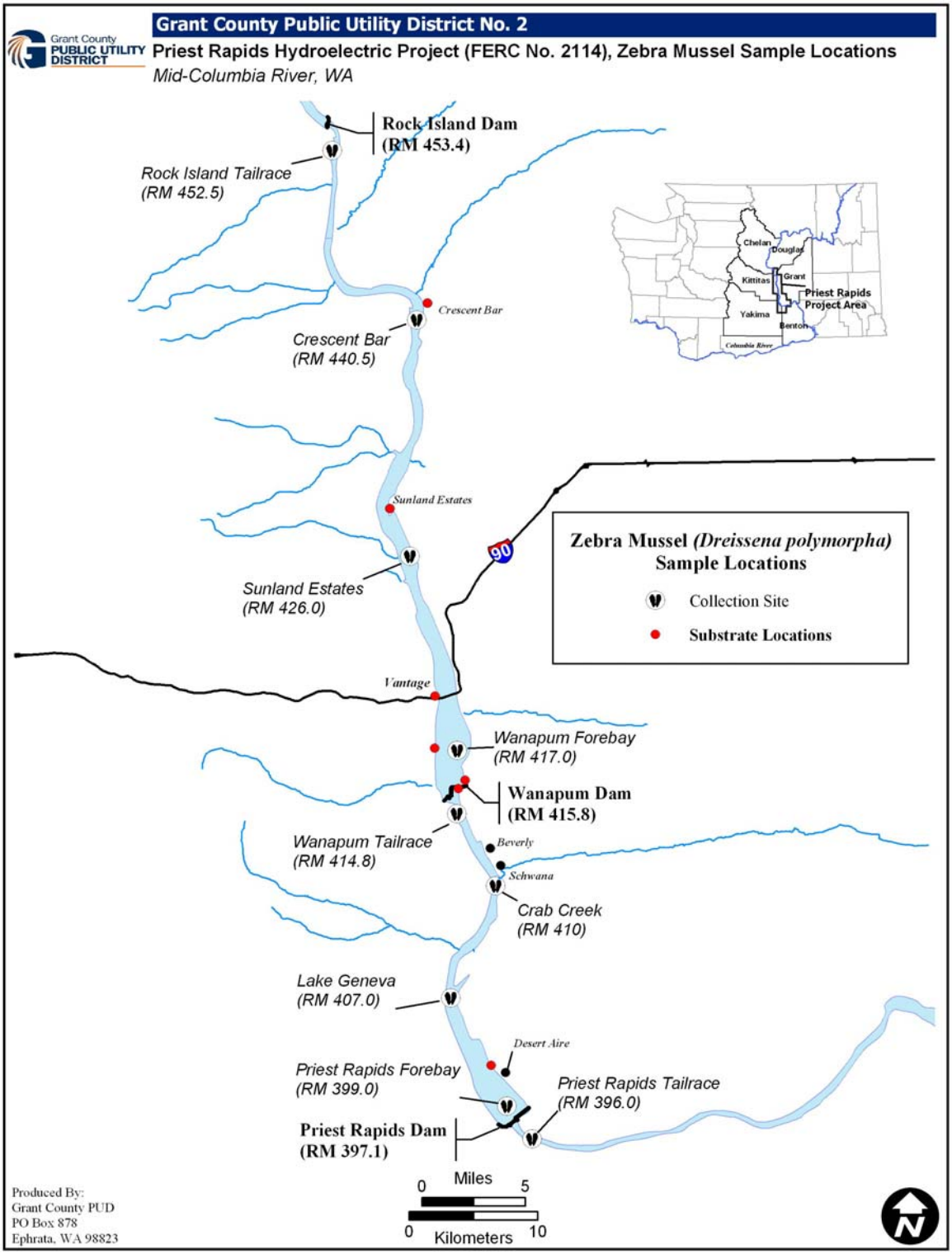


Figure 6 **Zebra and quagga mussel veliger and substrate sampling locations, Priest Rapids Project, mid-Columbia River, WA.**

5.0 Rapid Response and Coordination

Early detection and rapid response to an infestation of AIS is essential to control and potential containment of AIS. Through this AISP, Grant PUD will implement monitoring programs that will help detect new AIS infestations as soon as possible. In the event of positive identification of new AIS within the Project area, Grant PUD will conduct the following response activities:

- Immediate notification to WDOE (for plants) or WDFW (for animals) of positive or suspected AIS species identified during monitoring and/or boat inspections. Digital photographs will be taken and sent to WDOE or WDFW for assistance in identification. Table 3 provides contact information for AIS personal to be contracted in event of new AIS identification.
- If the AIS is a zebra or quagga mussel, Grant PUD will also notify upstream and downstream operators (Chelan PUD and Corps) and the Columbia River Basin Team. Grant PUD will help coordinate subsequent Columbia River Basin Team rapid response actions as applicable to the Project, such as implementing mandatory boat inspections, boat launch closures, quarantines, etc. Table 3 provides contact information for AIS personnel to be contacted in the event of new AIS identifications.
- Grant PUD will help coordinate agency site visits as necessary to assist in confirming the presence and extent of AIS infestation and determination of immediate or long-term control/eradication needs.
- Grant PUD will take the next steps needed to manage and contain the new AIS. These measures include providing assistance as needed for WDOE or WDFW site visits that may be needed to confirm presence, determine extent, and develop further response measures. Grant PUD will use the rapid response plan set forth by the Columbia River Basin Team as part of the 100th Meridian Initiative (Heimowitz and Phillips 2008) as guidance, where applicable, in implementing rapid response actions.
- Appropriate press releases will also be provided to the public about new AIS introductions (e.g. for zebra or quagga mussels), which will inform the public how they can aid in the prevention and proliferation of it. These press releases will be coordinated through WDFW and the Columbia River Basin Team Rapid Response Plan (Heimowitz and Phillips, 2008).
- After initial response efforts are conducted, Grant PUD will begin implementing control and/or eradication actions as appropriate based on the location, extent, and type of AIS identified. Where appropriate, Grant PUD will attempt to secure generalized control and/or eradication permits (e.g. for chemical eradication) for the Project area prior to zebra or quagga mussel identifications so that control/eradication efforts can begin immediately.

Figure 7 provides a response flow-chart in the event new AIS species are detected in the Project. Table 3 provides the contact information for AIS personnel to be notified in the event of a new AIS identification.

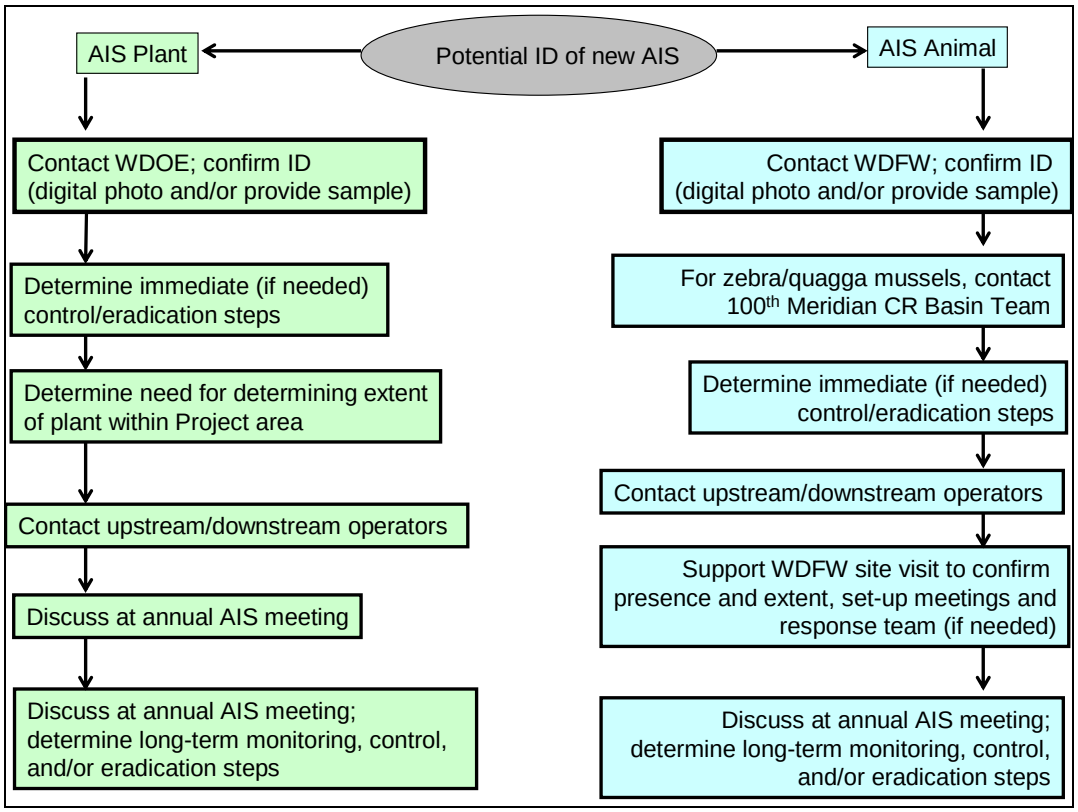


Figure 7 Response flow chart for new AIS identifications.

Table 3 Contact list for AIS response support.

Contact	Name	Phone Number	E-Mail Address
WDFW	Allen Pleus	360-902-2724	allen.pleus@dfw.wa.gov
	Pam Meacham	360-902-2741	pamala.meacham@dfw.wa.gov
	Sgt. Eric Anderson	360-640-0493	eric.anderson@dfw.wa.gov
WDOE	Kathy Hamel	360-407-6562	kham461@ecy.wa.gov
	Jenifer Parsons	509-457-7136	jenp461@ecy.wa.gov
	Marcie Mangold	509-329-3450	dman461@ecy.wa.gov
Chelan PUD	Waikele Hampton	509-661-4627	waikele.hampton@chelanpud.org
	Michelle Smith	509-661-4180	michelle.smith@chelanpud.org
Corps	Rustin Director	206-764-3636	Rustin.A.Director@usace.army.mil
	Deborah Johnston	206-764-3620	Deborah.J.Johnston@usace.army.mil

6.0 Reporting

By March 1 of each year, Grant PUD will submit an annual report to WDFW and WDOE which will include the number of boats inspected; the number of boats detected carrying nonnative aquatic invasive flora or fauna, a description of new infestations of AIS, a description of existing infestations, a summary of progress made in reducing or eliminating infestations, recommendations for modifying the plan as needed, and information regarding boat travel to and from other water bodies gained through the voluntary boater surveys. Information related to Grant PUD's zebra and quagga mussel monitoring results, annual boat launch and biennial visual shoreline surveys, and maps of monitoring locations will also be included in the annual report.

7.0 Adaptive Management

Adaptive management will be a key component to implementation of this AISP over the entire term of the Project's 44-year operating license. Section 6.1.21 of the Project's 401 WQC (WDOE 2008) provides the generalized meaning of adaptive management at it relates to meeting requirements within the 401 WQC. As part of this AISP, Grant PUD will conduct the following activities to assure adaptive management is incorporated into this AISP:

- By March 1 of each year, provide to WDFW and WDOE a report summarizing the previous year's AIS activities and any needed changes to the AISP that will be implemented during the up-coming year, as described in section 6.6.4(g) of the 401 WQC (WDOE 2008).
- Based on the results of the previous year's results or new AIS science, this AISP may be updated to reflect updated implementation schedules, monitoring methods, educational methods, new AIS threats, and/or new AIS that have been identified through previous year's monitoring efforts and potential control/eradication options.
- Prior to May 1 of each year, meet with WDFW and WDOE AIS personnel to discuss the contents of the annual report, any needed changes to AIS education, monitoring, and/or control methods or other changes to the AISP based on results from the previous year, new technologies, new AIS threats and/or introductions, new AIS pathways, etc. Members of the PRFF, upstream and downstream operators (e.g. Chelan PUD or Corps), and other interested parties will also be invited to these annual meetings.
- Additional meetings and/or conference calls may occur as needed throughout each year if new, more immediate, AIS threats or pathways are identified during the course of the year. The purpose of these meetings would be to determine if the new threat/pathway is applicable to the Project area and AISP, and if any immediate modifications to the AISP monitoring/education/response components are necessary.
- Grant PUD staff will participate in other regional AIS technical and policy groups and committees in order to stay current on AIS threats, pathways, monitoring, educational, and rapid response issues. Examples include the annual Columbia River Basin AIS Team meetings and participation in other regional water quality/invasive species committees. Information gained from these types of activities will be discussed at the annual AIS meeting as described above.

- Grant PUD staff will pursue training opportunities that focus on AIS identification, education, monitoring, and response as they become available. Information gained from these types of activities will be discussed at the annual AIS meeting as described above.

8.0 Implementation Schedule

Table 4 provides the proposed implementation schedule related to tasks to be completed under the monitoring and management of AIS in the Project. This table included tasks already being completed as well as new tasks proposed in this AISP.

Table 4 Task schedule of monitoring and control of aquatic invasive species in the Priest Rapids Hydroelectric Project.

Task	Monitoring Action	Managing Action	Task Schedule	Performance Measure
Place signage and/or erect kiosks at Project boat launches	Maintain signs and kiosks at Project boat launches, and update literature	Educate the public about the risks of AIS transport; help reduce potential introductions	Prior to May 1 of each year following WDOE and FERC approval of the AISP.	Signage to be placed at seven major Project boat launches (see Section 2)
Distribute educational pamphlets at key recreational use stores and boat launches	Maintain kiosks at Project boat launches, and update pamphlets as needed	Educate the public about the risks of AIS transport; help reduce potential introductions	Prior to May 1 of each year following WDOE and FERC approval of the AISP.	Signage to be placed at five local area recreational use stores (see Section 2)
Perform boat inspections at Project boat launches	Monitoring incoming/outgoing AIS	Control the introduction and/or spread of new/existing AIS	Major holidays and weekends during the boating season (May-Sept) following WDOE and FERC approval of the AISP	Perform inspections at least once per month; target 25% of boaters using launch during each inspection day
Continue monitoring for zebra and quagga mussels	Monitor for the presence of veligers from June-Sept	Stay informed on appropriate monitoring methods per protocols	Annually June-Sept.	Collect 36 total samples per year (nine samples per/month from June-Sept.)
Monitor for new/spreading aquatic invasive plants; also check for new AIS animals (e.g. mudsnail) that may be attached to plant samples	Monitor Project boat launches annually and monitoring entire shorelines biennially	Determine appropriate control and eradication options for newly identified AIS plants	Boat launches: annually in September. Shorelines: biennially in September starting first year after WDOE/FERC approvals	Monitor all seven boat launches once/yr, entire shoreline once/2 yrs
Stay current on rapid response methods and technology	Monitor developing response methods and technologies, staff informed on proper contact needs	Attend Columbia River Basin Team rapid response trainings or tabletop exercises	As available	Attend one training per year
Report to WDFW and WDOE on AIS program	Summarize monitoring efforts; allow WDFW/WDOE to progress	Implement adaptive management as needed based on results	Annually by March 1	One report per year

9.0 Conclusions

This AISP provides the education, monitoring, and response actions planed by Grant PUD within the Project area. The goal of this AISP is to help reduce potential new AIS introductions, while also attempting to respond to new AIS identifications through control, management, and eradications. The actions described in this AISP were also developed to meet the conditions of the 401 WQC for the Project. This AISP will be updated annually to reflect any changes in implementation schedules, new or improved technologies, or new AIS threats.

Literature Cited

CDFG (California Department of Fish and Game), 2008a. Zebra and Quagga Mussel Veliger Sampling Protocol - Vertical Tow. Adopted from the California Department of Water Resources Zebra and Quagga Mussel Veliger Sampling Protocol for the State Water Project, April 29, 2008.

CDFG (California Department of Fish and Game), 2008b. Zebra and Quagga Mussel Artificial Substrate Monitoring Protocol. Adopted from the California Department of Water Resources Monitoring Instructions for Zebra/Quagga Mussel Plate Samplers, April 2, 2008.

FERC (Federal Energy Regulatory Commission). 2008. Order Issuing New License for Public Utility District No. 2 of Grant County, Docket Number P-2114-116 (April 17, 2008).Hampton, W. 2009. Public Utility District No. 1 of Chelan County, WA. Personnel Communication

Garner, K. 2009. Native Resident Fish Management Plan. Grant County Public Utility District No. 2, Grant County, Washington.

Hampton, W. 2009. Public Utility District No. 1 of Chelan County, Washington. Personal Communication.

Heimowitz, P. and S. Phillips. 2008. Columbia River Basin Interagency Invasive Species Response Plan: Zebra Mussels and other Dreissenid Species. Prepared for the 100th Meridian Initiative Columbia River Basin Team. http://www.100thmeridian.org/ColumbiaRT.asp

Kolff, J. 2002. Limnology. Prentice-Hall, NJ, pp. 430–434.

Meacham, P. 2003. Aquatic Nuisance Species Management Program. Washington Department of Fish and Wildlife. Personnel Communication.

Mickle, J. 2009. 2009 Noxious Weed Management & Total Vegetation Control Program. Grant County Public Utility District No. 2, Grant County, Washington.

Normandeau Associates Inc., State of Washington Water Research Center (Washington State University), Department of Fish and Wildlife (University of Idaho). 2000. Water quality and aquatic ecology of Priest Rapids and Wanapum pools mid-Columbia River, Washington the Priest Rapids Project Grant County PUD. Public Utility District No. 2 of Grant County. Ephrata, Washington 98823.

Richards, D., Connel, P., and Cazier Shinn, D. 2004. Simple Control Method to Limit Spread of New Zealand mudsnail, *Potamopyrgus Antipodarum*. North American Journal of Fisheries Management

Schultz, J. 2009. Aquatic Nuisance Species Management Program. Washington Department of Fish and Wildlife. Personnel Communication.

University of Minnesota Sea Grant Program. 2004. Zebra Mussel Watch. http://www.seagrant.umn.edu/ais/index

WDOE (Washington State Department of Ecology). 2001. An Aquatic Plant Identification Manual for Washington's Freshwater Plant. Department of Printing, Olympia, WA.

WDOE (Washington State Department of Ecology). 2008. Section 401 Water Quality Certification Terms and Conditions for the Priest Rapids Hydroelectric Project, FERC Project No. 2114, Spokane, Washington.

WDOE (Washington State Department of Ecology). 2009. Aquatic Plants, Algae, and Lakes – Invasive Freshwater Plants. http://www.ecy.wa.gov/programs/wq/plants/weeds/index.html

Winterbourn, M. J. 1970. The New Zealand species of *Potamopyrgus* (Gastropoda: Hydrobiidae). Malacologia 10:283–321.

Woodward, M. and M.C. Clement. 2008. Results of Zebra Mussel Veliger Sampling in the Priest Rapids Project Area. Grant County Public Utility District No. 2, Grant County, Washington.

Appendix A
Interview Form for Trailered Boat Survey

Zebra Mussel

100TH MERIDIAN INITIATIVE TO PREVENT THE WESTWARD EXPANSION OF ZEBRA MUSSELS
Interview Form for Trailered Boat Survey

Interviewer: Last name	First name		
Date:	Time: AM / PM	Survey Type:	☐ Contact ☐ Observation
Water Body:	State:		
Launch Site:			

Where are you from?

Home State:	Zip Code:	Personal ☐ **Type of Transport**
How many times have you launched in the last year?		Commercial ☐ ¿
Do you always launch in the same water body? Yes ☐		Other ☐ explain
Type of Boat: ☐ Angling ☐ Pleasure ☐ Jet Ski ☐ Canoe ☐ Other		explain

Where else have you launched recently?

Water Body:	State:	County:	Date:
1.			
2.			
3.			

Where will you launch next?

Water Body:	State:	County:	Date:
1.			
2.			

Do you clean your boat and trailer between launchings?	☐ Yes	☐ No
Is you boat kept on land or in water when not in use?	☐ On Land	☐ In Water
If in water, where is it kept? Water body:		State:

Information Exchange: ☐ Viewed? ☐ Read? ☐ Both? ☐ Boater asked questions

Boater already aware of threats of… ☐ Zebra Mussels ☐ Any ANS

Boat Inspection Results: Inspection ☐ Rejected

Nothing Found: ☐ Undertaken by: ☐ Party ☐ Interviewer ☐ Both

	Zebra Mussels	Still Alive	Vege-tation	Other Exotics	Describe Other	Action Taken
Boat Deck	☐	☐	☐	☐		
Boat Hull	☐	☐	☐	☐		
Bilge & Bait Wells	☐	☐	☐	☐		
Motor	☐	☐	☐	☐		
Trailer	☐	☐	☐	☐		
Fishing Equipment	☐	☐	☐	☐		
Other	☐	☐	☐	☐		

Comments:

THE 100TH MERIDIAN INITIATIVE INSTRUCTIONS FOR:
TRAILERED BOAT SURVEY INTERVIEW FORM

General Instructions:

The large number of participants collecting data for the 100th Meridian Initiative means that it is very important for all respondents to report data that is complete, legible and standardized. **All** the information on the "Trailered Boat Survey Interview Form" will be used to answer questions concerning travelling boaters as potential carriers of harmful exotic organisms, so interviews should be directed towards **out-of-state boaters** visiting your state, or **resident boaters returning from out of state**.

If you have any questions concerning this or other forms please contact:

Dr. Robert McMahon, Ph.D.
University of Texas at Arlington
ph: 817-272-2412
fax: 817-272-2855
email: rmcmahon@uta.edu

David K. Britton, M.S.
University of Texas at Arlington
ph: 817-272-5577
fax: 817-272-2855
email:britton@uta.edu

Specific instructions for filling out the Trailered Boat Interview form follow on the next two pages…

THE 100TH MERIDIAN INITIATIVE INSTRUCTIONS FOR:
TRAILERED BOAT SURVEY INTERVIEW FORM

Specific Instructions:

Fill in all blank spaces on the form as follows:

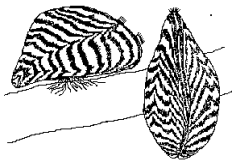
Interviewer:	Name of person conducting the interview, include last name & first name
Date:	Date the interview was conducted
Time:	Time the interview was conducted, including AM or PM
Water Body:	Give the full name of the water body where the interview was conducted. Example: "Lake Oahe" NOT: "Oahe".
Launch Site:	Where at the water body? Example: "John Doe Visitor Center, I-20" **DO NOT ABBREVIATE:** "John Doe Visitor Center" not "JDVC"
State:	Indicate the state or province where the interview was conducted
Survey Type:	Did you just observe the boater from a distance or did you actually contact the boater? Check the appropriate box as necessary.
Home State:	Home state of the person being interviewed
Zip Code:	Zip code of the person being interviewed
Purpose of Transport:	Commercial — Someone trailering/launching for business purposes (commercial boat transporters, commercial fishermen) Personal — Recreational boaters (most common) Other — An unusual situation not covered by personal or commercial (explain other)
How many times have you launched in the past year?	Past year = last 365 days (not just back to January 1st). Try to give a specific number. Example: "35", not "30 - 40". Estimates are expected and ok.
Do you always launch in the same water body?	Boaters who always launch in the same water are unlikely to distribute alien species to other lakes. Do NOT check this box if the boater only *usually* launches in the same water body.
Type of Boat:	Check the box that best describes the trailered vessel. Explain other if checked. (Other may be sailboat, submarine, jet boat, hover craft, etc.)
Where have you launched recently?	Include the full location and state of previous launchings. Example: "Lake Fork, TX " NOT: "Fork" or "Texas" or "around Tyler area". **Write down an exact date even if you are guessing**. Example: Sometime in July = (7-15-00) Space is provided for three launchings. Write in the margins or on the back if you want to include more.
Where are you going to launch next?	See instructions for "Where have you launched recently." Space is provided for two launchings. Write in the margins or on the back if you want to include more.
Do you clean your boat…?	Check yes or no. Add any comments to the comments section below, as necessary.
Is your boat kept on water or on land when not in use?	Boats kept in water are more likely to harbor zebra mussels and other organisms. Informing owners of these vessels is very important. Indicate where the boat is held when no in use.

THE 100TH MERIDIAN INITIATIVE INSTRUCTIONS FOR:
TRAILERED BOAT SURVEY INTERVIEW FORM

Information Exchange:	Viewed: Boater casually looked over, but did not accept literature. Read: Boater read over, but did not accept literature. Brochures Accepted: Boater took literature away with them.
Results of Boat Inspection:	Rejected: boater refused an inspection for some reason. Might have been non-receptive ([NR], see Comments) or simply in a hurry. Undertaken By: *Party* – the boater conducted the inspection with no help, or participation from, the interviewer. *Interview* – the interviewer conducted the inspection with no help from, or in the absence of, the boater. *Both* – the boater was present and involved in some aspect of the inspection.
Results:	*Nothing found* – check this box if an inspection was conducted and no organisms were discovered. Otherwise, check the appropriate box for the organism(s) and location(s) where a plant or animal was found. O*ther* - organisms other than zebra mussels or vegetation. (Examples: snails, clams, baitfish, etc.) *Action Taken* - indicate whether the organisms were removed, removed and collected, left alone, etc.
Comments:	In order to recall meaningful data from this section, we are using letter codes to designate common responses. Examples: [I] = Informed. Aware of zebra mussels and other exotics [U] = Uninformed. Generally ignorant of alien species [R] = Receptive. Receptive/helpful [NR] = Not receptive. Uncooperative/negative attitude [T] = Tournament Fisherman [D] = Dirty. Trailer/vessel exceptionally dirty. These are just some examples, feel free to create codes that cover other responses, just make sure to describe your code so that it can be standardized. As long as a code is included, written comments can be input as well.

Appendix B
Voluntary Boater Survey

LOCATION _____ STATE _____ DATE _____



The Zebra Mussel

100TH MERIDIAN INITIATIVE TO PREVENT THE WESTWARD EXPANSION OF ZEBRA MUSSELS
BOATER SELF-SURVEY

The 100th Meridian Initiative is a multi-agency partnership effort to prevent the westward spread of zebra mussels and other aquatic nuisance species to western North American waters. The U.S. Fish & Wildlife Service is sponsoring and coordinating education outreach and voluntary trailered boat surveys with other agencies in the states on the 100th meridian. Surveys similar to this are being conducted in Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota and the Canadian Province of Manitoba. This survey is now being extended to the Colorado River. You as a boater are being asked to voluntarily inspect your trailer, boat and related equipment for any transported aquatic species, such as the **zebra mussel**, which may be carried accidentally to new locations. Your assistance and participation is appreciated in completing this survey and returning it in the provided, stamped envelope to the agency that is conducting this survey for the U.S. Fish and Wildlife Service. Please review the enclosed information on introduced aquatic species and boat and trailer inspections. Be sure to clean your boat, trailer and equipment after hauling-out the boat and before leaving the ramp area. Thanks for your help!

The following instructions will help you complete the survey.

Part One – Where are you from? (Any information provided is voluntary and anonymous.)
Please state the purpose of your visit, and fill in the boxes relating to your boat and home state. Your most recent launches are very important information, so please be as complete as possible.

Part Two – Where are you going?
Please indicate where you will be launching next **after you leave this lake**. Do not list further launchings at this lake. Again, please be as complete as possible in filling out this section.

Part Three – Returning the survey.
That's all there is to it! All you need to do is place this page in the provided, stamped, return envelope, seal it, and drop it in the mail.

SURVEY INFORMATION (Please Print)

PART ONE: Where are you from?	Home State:	Zip Code:
Type of Boat: ☐ Angling ☐ Pleasure ☐ Jet Ski ☐ Canoe ☐ Other		explain

How many times have you launched in the last year?

Do you always launch in the same water body? ☐ Yes ☐ No
If no, please list below where else you have launched recently.

Water Body:	State:	County:	Date:
1.			
2.			
3.			

PART TWO: Where are you going? Please list below where you plan to launch next.

Water Body:	State:	County:	Date:
1.			
2.			

Are you already aware of threats of zebra mussels? ☐ Yes ☐ No
Or any other aquatic nuisance species? ☐ Yes ☐ No

Do you clean your boat and trailer between launchings? ☐ Yes ☐ No

Is you boat kept on land or in water when not in use? ☐ On Land ☐ In Water
If in water, where is it kept? Water body: State:

Any Comments:

THE 100TH MERIDIAN INITIATIVE INSTRUCTIONS FOR:

"BOATER SURVEY FOR NONNATIVE AQUATIC SPECIES"

Many of the participants in the 100th Meridian Initiative have indicated difficulty in obtaining useful numbers of boater interviews for the database. Leaving these postage-paid, return addressed self-interview forms on unattended out-of-state vehicles at launch ramps and other related facilities will add valuable survey information to the database, and help to increase public awareness. Please remember to record the complete location, state or province, and date when leaving the form. Also remember to leave the envelope **unsealed** so the boater can fill out, and then mail the form.

The correct return address for the form is:

Dr. Robert McMahon
University of Texas at Arlington
PO Box 19498
Arlington, TX 76019

Or you can have them mailed to your home institution for review and then forward them to R. F. McMahon at the above address for inclusion in the study database.

Please review the enclosed sample form, and if you have any questions concerning this or other forms please contact the following:

Dr. Robert McMahon, Ph.D.
University of Texas at Arlington
ph: 817-272-2412
fax: 817-272-2855
email: rmcmahon@uta.edu

David K. Britton, M.S.
University of Texas at Arlington
ph: 817-272-5577
fax: 817-272-2855
email:britton@uta.edu

Appendix C
Consultation Comment Letters – First Draft Aquatic Invasive Species Plan

State of Washington
DEPARTMENT OF FISH AND WILDLIFE

Mailing Address: 600 Capitol Way N • Olympia, WA 98501-1091 • (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building • 1111 Washington Street SE • Olympia, WA

March 2, 2009

Mr. Tom Dresser
Fish, Wildlife and Water Quality Manager
Public Utility District No. 2 of Grant County
Post Office Box 878
Ephrata, Washington 98823

RE: DRAFT AQUATIC INVASIVE SPECIES CONTROL AND PREVENTION PLAN FOR THE PRIEST RAPIDS PROJECT

Dear Mr. Dresser:

Thank you for the opportunity to review and comment on the Draft Aquatic Invasive Species (AIS) Control and Prevention Plan for the Priest Rapids Project. We understand that this plan is being developed in accordance with the requirements of the Priest Rapids Project License and the Clean Water Act 401 permit. We have conducted a preliminary review of the draft, and offer the following comments for your consideration.

Most of the information or coordination activities noted in this draft were taken from previous discussions more than two years ago and are no longer correct technically and substantively for either the control and prevention of zebra or quagga mussels or other AIS. In our review, we identified the following substantive deficiencies in treatment of AIS issues:

1. The application of this plan over the term of the license is unclear; an adaptive management approach is essential, but the version in this draft is inadequate.
2. The plan relies too heavily on an educational approach as its primary method for preventing AIS.
3. The plan must expand its focus beyond only zebra and quagga mussels.
4. As well, the singular focus on one AIS introduction pathway (recreational boating activity) is not adequate.
5. The plan contains un-quantified commitments to conduct voluntary boat inspections and surveys and implies that WDFW inspections and surveys would count toward those goals.
6. The monitoring strategy is outdated and insufficient.
7. The PUD should absorb the cost of the any AIS sampling and analysis.
8. The description of the planned rapid response process ("respond to and support efforts") and the commitments to actions and resources are inadequate.

The level of coordination with Washington Department of Fish and Wildlife in development of this plan has been minimal. We strongly urge you to work closely with our AIS coordinator Allen Pleus at (360) 902-2724 or Allen.Pleus@dfw.wa.gov for assistance in developing the second draft of this very important plan. We anticipate that development of the second draft will require a time extension, and suggest that it might be appropriate to request up to a year extension subject to guidance from the Priest Rapids Fish Forum.

Sincerely,

Bill Tweit
Columbia River Policy Lead

cc: Pleus
Verhey
Beich
Frymire
Marcie Mangold, Ecology
Kathy Hamel, Ecology

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

March 24, 2009

Mr. Tom Dresser, Manager
Fish, Wildlife, and Water Quality
Grant County Public Utility District
P.O. Box 878
Ephrata, WA 98823

Dear Mr. Dresser:

RE: Priest Rapids Hydroelectric Project No 2114 – Comments on Draft Aquatic Invasive Species Control and Prevention Plan

The Department of Ecology (Ecology) received the Draft Aquatic Invasive Species (AIS) Control and Prevention Plan on January 28, 2009. Ecology and WDFW met with Grant PUD on March 6, 2009, to discuss their comments regarding this plan. The following reflect Ecology's comments made during that meeting.

1. Other species of concern to consider would be curly leaf Pondweed, hydrilla, Brazilian elodea, flowering rush, parrot feather, phragmities, Japanese knotweed, yellow flag iris, hairy willow-herb and other state listed noxious weeds. It would be helpful to outline these species in your plan on how you will deal with them should they be detected. Similarly for New Zealand mud snails, zebra mussels and quagga mussels.

2. Invasive species including Milfoil: It is best to try and limit boaters from carrying invasive species into nearby uninfested lakes. Other useful strategies are to identify impacted boat launch sites and either install bottom barriers at those sites and/or harvest the milfoil around the launches.

3. Pathways: AIS can be transported on recreational craft, but may also come in through commercial craft, downstream water flow, fishing gear, deliberate introductions, and bait buckets. Grant PUD needs to explore these pathways also.

4. Management of Purple Loosestrife: More details are needed on this portion of the plan. Are there GIS mapped locations of the communities? What are the current control mechanisms that have been used and what results have been achieved? Are the bio control and herbicides effective? Has Grant PUD used bio control for large infestations and herbicide for outliers? Similarly for salt cedar.

5. Macrophyte Monitoring: There is a concern for the frequency of monitoring only every three years; we feel it should be every year. With annual monitoring, early detection of any new invasions of plants like hydrilla or Brazilian elodea would be identified. A quick visual survey would suffice, as well as a shoreline survey to detect any shoreline species of concern.

6. Mapping existing populations would be extremely helpful.

We appreciate the opportunity to comment on Grant PUD's draft plan. Please contact me at (509) 329-3450 or by email at dman461@ecy.wa.gov with further questions or comments.

Sincerely,

D. Marcie Mangold
Water Quality Program

DMM:dw
cc: Gerry O'Keefe, Grant PUD
Bill Tweit, WDFW
Alan Pleus, WDFS
Brian Faller, Ecology/ATG
Jenifer Parsons, Ecology/CRO
James M. Bellatty, Ecology/ERO

Appendix D
Summary Table of Agency Comments to Grant PUD's First Draft Aquatic Invasive Species Plan

SUMMARY TABLE OF AGENCY COMMENTS AND GRANT PUD RESPONSES FOR FIRST DRAFT OF THE AQUATIC INVASSIVE SPECIES PLAN [Article 401(a)(22].

Submitting Entity	Date Received	Paragraph #	Agency Comment	Grant PUD Response
WDFW	2-Mar-2009	1	Most of the information or coordination activities noted in this draft were taken from previous discussions more than two years ago and are no longer correct technically and substantively for either the control and prevention of zebra or quagga mussels or other AIS.	Grant PUD currently participates (and has since 2004) in a voluntary zebra mussel monitoring plan that was developed at the guidance of WDFW. See also Section 6.5 of the WDOE 401 Water Quality Certification (WQC) for the Priest Rapids Project. The draft AISP was written with the idea that additional coordination would occur during the comment period of the draft. Furthermore, additional coordination will occur throughout the life of Grant PUD's FERC License, which will include annual updates to the plan and implementation of adaptive management as described in Section 6.1.21 of 401 WQC. Through meetings with WDFW between March and October 2009 Grant PUD was given the most current zebra and quagga mussel control and prevention protocols, which were reflected in the second draft AISP. These protocols include the addition of vertical veliger sampling, artificial substrate sampling, and updated educational materials. WDFW AIS personal also participated in one of Grant PUD's monthly zebra/quagga mussel veliger sampling events (on 8/6/09), where additional discussion on the most up-to-date control and prevention methods were discussed.
		2	The application of this plan over the term of the license is unclear; an adaptive management approach is essential, but the version in this draft is inadequate.	Section 6.6.4(g) of the WDOE 401 WQC requires annual reports that must include recommendations for modifying the AISP. Section 7 of AISP also describes this reporting/plan modification requirement. Additional narrative was added in the Introduction and Adaptive Management sections to reflect the application of this plan over the term of the license and the adaptive management tools that will be used for this AISP.

		3	The plan relies too heavily on an educational approach as its primary method for preventing AIS.	Section 6.6.4 of WDOE 401 WQC states that the AISP shall "…focus on prevention by addressing pathways for invasion" and Section 6.6.4(a) of the WDOE 401 WQC outlines detailed requirements for educational components of AISP. The educational approach is also a major component of the other regional AIS requirements (e.g. Rocky Reach Dam 401 WQC). Grant PUD's planned education activities are similar to those conducted at the Box Canyon Hydroelectric project in 2007, which was approved by WDOE. Public awareness and education is described as "…most effective approach" to reducing the spread of zebra mussels by the U.S. Army Corps of Engineers Zebra Mussel Information System web-site (http://el.erdc.usace.army.mil/zebra/zmis/). Of the several pathways listed in WDFW's 2001 Aquatic Nuisance Species Management Plan (ANSMP; p. 11), recreational boating and fishing directly applies to the Priest Rapids Project. Since Grant PUD does not have enforcement capabilities, education is the one of the most feasible options available to help prevent AIS introductions. In WDFW's ANSMP, education is described as an important component of Objective 2 (preventing introduction of new AIS) and is listed as Objective 4 of WDFW's management actions. Specifically tasks 2A3e (recreational boating) and 4B1c (bait-shop owners) discuss educational programs similar to what Grant PUD proposes in Section 2 of the draft AISP. At the recommendation of WDFW through subsequent discussions, Grant PUD has added additional monitoring methods in the second draft AISP that are meant to provide early detection of possible AIS introductions (see also response to comment 2), and Grant PUD has determined both

				education AND monitoring are the most feasible methods for preventing introductions of new AIS.
		4	The plan must expand its focus beyond only zebra and quagga mussels.	The second draft AISP plan focuses on AIS plants and animals, including state listed aquatic invasive plant species, the New Zealand Mudsnail, and other AIS species that may threaten the Columbia River (through adaptive management section). Visual boat-launch surveys and boat launch/shoreline monitoring, as included in the AISP, will help identify new AIS within the project, and adaptive management will be employed should new AIS be identified. Non-native fish-species will be monitored under Grant PUD's Native Resident Fish Management Plan and Northern Pikeminnow control program.
		5	As well, the singular focus on one AIS introduction pathway (recreational boating activity) is not adequate.	Additional information related to different AIS introduction pathways, and ways Grant PUD is addressing those pathways, was added in Section 1.2.
		6	The plan contains un-quantified commitments to conduct voluntary boat inspections and surveys and implies that WDFW inspections and surveys would count toward those goals.	Section 2.2 and Table 4 now contain specific targets for conducting the voluntary inspections during the Memorial Day, Fourth of July, and Labor Day holiday weekends as well as one additional weekend in June and August. Grant PUD does not intend to use current or future WDFW AIS inspections as counting toward meeting Grant PUD's voluntary inspection program. However, Grant PUD does anticipate the need for coordination between WDFW inspections that occur within the Priest Rapids Project area.
		7	The monitoring strategy is outdated and insufficient.	Grant PUD's current zebra mussel sampling program is conducted in accordance with guidance provided by WDFW's AIS assistant coordinator. Since 2004 Grant PUD has submitted annual reports that document the sampling and monitoring methods, to which WDFW has yet to respond with suggested changes.

				Additional monitoring strategies provided in the draft plan were are similar to methods and strategies continued in the Box Canyon Project's 2007 annual report, which was approved by WDOE. Based on subsequent discussions with WDFW, and the 8/6/09 site visit by WDFW AIS staff, additional monitoring methods (vertical zooplankton tow net sampling, artificial substrate monitoring, substrate monitoring at each dam) were added to the AISP in Section 3.
		8	The PUD should absorb the cost of the any AIS sampling and analysis.	Since 2004, Grant PUD has provided staff, boat, and equipment needed to conduct the WDFW recommended zebra mussel sampling protocols. With the approval of this AISP, Grant PUD will continue providing the necessary staff, boat, and equipment needed to collect the samples and also develop necessary contracts with appropriate laboratories needed for zebra or quagga mussel identification.
		9	The description of the planned rapid response process ("respond to and support efforts") and the commitments to actions and resources are inadequate.	Additional narrative was added in the rapid response and adaptive management sections.
		10	The level of coordination with Washington Department of Fish and Wildlife in development of this plan has been minimal. We strongly urge you to work closely with our AIS coordinator Allen Pleus at (360) 902-2724 or Allen.Pleus@dfw.wa.gov for assistance in developing the second draft of this very important plan. We anticipate that development of the second draft will require a time extension, and suggest that it might be appropriate to request up to a year extension subject to guidance from the Priest Rapids Fish Forum.	The draft plan was developed in accordance with the specific requirements of the WDOE 401 WQC, WDFW's 2001 ANSMP, Grant PUD's current zebra mussel monitoring plan, and information obtained from the 100th Meridian. Coordination with WDFW in the development of this second draft AISP occurred between March and October 2009 through various meetings, conference calls, and e-mail correspondence. Specifically, meetings occurred on 3/6/09, 3/31/09, 8/6/09, 10/20/09, and 11/6/09.
WDOE	24-Mar-2009	1	Other species of concern to consider would be curly leaf Pondweed, hydrilla. Brazilian elodea, flowering rush, parrot feather, phragmities. Japanese knotweed, yellow flag iris, hairy willow-herb, and other state listed noxious weeds. It would be helpful to outline these species in your plan on how you will deal with them should they be detected. Similarly for New Zealand mud snails, zebra mussels and quagga mussels.	Many of the spices listed by WDOE are considered terrestrial/riparian/wetland in nature, and some are included in WDOE's web-site as wetland and riparian zone plants (http://www.ecy.wa.gov/programs/wq//plants/weeds/index.html). This AISP focuses on ***aquatic*** invasive plant

				species, and so Table 1 of the second draft AISP was updated to include only aquatic AIS plants, and Section 3.0 states that Grant PUD will monitor for all aquatic invasive plants listed on the Washington State Noxious Weed List as outlined in RCW 17.26.020(5)(c). Grant PUD's existing Noxious Weed Management Plan addresses terrestrial, riparian, and/or wetland plants within the Project area. Potential response, control, and/or eradication of the AIS plants, New Zealand mud snails, and/or zebra/quagga mussels are addressed in Sections 3.0, 4.2, 4.3, and 5.0, and 7.0
		2	Invasive species including Milfoil: It is best to try and limit boaters from carrying invasive species into nearby uninfested lakes. Other useful strategies are to identify impacted boat launch sites and either install bottom barriers at those sites and/or harvest the milfoil around the launches.	Additional language related to milfoil control near Priest Rapids Project boat launches, including the potential use of bottom barriers, is included 3.3 of the second draft AISP.
		3	Pathways: AIS can be transported on recreational craft, but may also come in through commercial craft, downstream water flow, fishing gear, deliberate introductions, and bait buckets. Grant PUD needs to explore these pathways also.	Additional information related to different AIS introduction pathways, and ways Grant PUD is addressing those pathways, was added in Section 1.2.
		4	Management of Purple Loosestrife: More details are needed on this portion of the plan. Are there GIS mapped locations of the communities? What are the current control mechanisms that have been used and what results have been achieved? Are the bio control and herbicides effective? Has Grant PUD used bio control for large infestations and herbicide for outliers? Similarly for salt cedar.	Purple loosestrife and salt cedar are considered wetland/riparian zone plants, and they are addressed in Grant PUD's existing Noxious Weed Management Plan (see also response to Paragraph 1).
		5	Macrophyte Monitoring: There is a concern for the frequency of monitoring only every three years: we feel it should be every year. With annual monitoring, early detection of any new invasions of plants like hydrilla or Brazilian elodea would be identified. A quick visual survey would suffice, as well as a shoreline survey to detect any shoreline species of concern.	Monitoring at Priest Rapids Project boat launches will occur every year, as this is where the initial establishment of new AIS plants is most likely to occur (if transported by boats), and the shoreline survey will be done every two years. Sections 3.1 and 3.2 reflect these changes.
		6	Mapping existing populations would be extremely helpful.	Maps of existing or newly identified AIS plant populations will be created using GPS and GIS data collected during the annual boat launch and every two-year shoreline surveys. These maps will be included in the annual report.

Appendix E
Consultation Comment Letters – Second Draft Aquatic Invasive Species Plan

STATE OF WASHINGTON
DEPARTMENT OF FISH AND WILDLIFE
1550 Alder St. N.W. • Ephrata, Washington 98823 • (509) 754-4624 FAX (509) 754-5257

January 5, 2010

Mr. Tom Dresser, Manager
Fish, Wildlife, and Water Quality
Public utility district No. 2 of Grant County
Post Office Box 878
Ephrata, Washington 98823

Subject: WDFW comments on Grant County PUD's Aquatic Invasive Species Control and Prevention Plan (AISP).

Dear Mr. Dresser:

Thank you for the opportunity to provide technical review and comment on the Second Draft of AISP consistent with the requirements of Section 6.6(4) of the 401 Water Quality Certification for the Priest Rapids Project and License Article 401(a)(22) of the Priest Rapids Hydroelectric Project License (P-2114).

WDFW's primary concern with the AISP is that Grant PUD should ensure that all biotic sampling data collected by Grant PUD and consultants working for Grant PUD are reviewed to identify observations of aquatic invasive species (AIS). Sampling staff should be familiar with the list of aquatic invasive species that threaten Washington State. The list of these species can be found in WAC 220-12-090 (http://apps.leg.wa.gov/wac/default.aspx?cite=220-12-090). Although WDFW is not currently requesting Grant PUD sample specifically for non-native crayfish and other prohibited or unlisted AIS, these species are of concern due to the increasing potential of them invading Washington State Waters (personal communication with Allen Pleus, WDFW October 2009). Grant PUD should be aware of emerging concerns of AIS and encourage biotic sampling staff to document any occurrence of AIS within the Priest Rapids Project in order to allow for state and federal agencies to investigate early detection responses.

We strongly support Grant PUD in the inclusion of public education efforts in the AISP that will be designed to raise the level of awareness of AIS species and their impacts. These efforts should not be limited to the highly invasive AIS species such as zebra and quagga mussels and Eurasian watermilfoil, but should also include at a minimum a reference to the above list of AIS. Impacts, both economically and biologically (including water quality), should be included in the information provided to the public. We support the action to specifically sample for zebra

mussels, quaqqa mussels, annual plant surveys at boat launches and annual Priest Rapids shoreline surveys for all AIS species. We suggest including walking transects on the shoreline during low pool events to investigate the presence of AIS. These monitoring efforts are intended to help provide identification of new AIS introduced into the Project, and may also provide opportunity to respond to an introduction prior to the species becoming established.

We support the rapid response component of the AISP which includes coordination with upstream and downstream operators, state AIS agencies, and other regional AIS groups. We concur with section 4.1 of the AISP, specifically, "Grant PUD will monitor the abundance and spread of these species through the NRFMP that will consist of a Project-wide evaluation of fish species every five years (Garner 2009). The NRFMP will use 12 metrics of biotic integrity to measure native and non-native fish health, abundance and distribution." Early response to identification of AIS will allow for investigating how to contain the current infestation and to initiate the determination of the full extent of infestation. We support annual AISP development in order to adaptively manage and improve upon the AISP with new scientific knowledge and the development of AIS occurrence databases.

WDFW is concerned with the use of herbicides to control aquatic weeds. Arguably the effects of chemical control agents on fish development have not been widely investigated. Therefore, a discussion should occur prior to the use of herbicides to weigh the benefits and costs of herbicide application. We suggest adding "*prior to application of the control method*" to the end of the sentence in the last paragraph of section 3.3.1 of the AISP that reads: "These additional alternatives will be discussed within the annual report and at the annual AIS meeting." WDFW is concerned with the use of herbicides in the Columbia River and the potential negative impact on fish life histories, including smoltification.

Please contact me if you have any questions or concerns. I can be reach via e-mail at Patrick.Verhey@dfw.wa.gov or by telephone at (509) 754-4624 ex. 13.

Sincerely,

Patrick Verhey
Hydroelectric Mitigation Biologist
Washington State Department of Fish and Wildlife

Comments on Draft Aquatic Invasive Species Control and Prevention Plan
1-8-10
Jenifer Parsons - WDOE

Pathways for introduction

Not mentioned is the small but important one of people intentionally putting stuff in lakes and rivers. Often people plant shorelines with non-native plants that can potentially become invasive (that is how yellow flag iris got its start), and people discard unwanted pets or lab animals into lakes (gold fish along with snails and plants, crayfish etc. This is another instance where more public education is needed.

Table 1 –

Add Butomus umbellatus (flowering rush) – as it has a submersed growth form though generally it is thought of as an emergent plant – It often grows at depths of 10 – 12 ft
Egeria is submersed
Parrotfeather is (sprawling) emergent
Add Ludwigia hexapetala – very similar to Ludwigia peploides which is on the list
Add Nymphoides peltata – a floating leaved plant
(None of these are currently known from the project area)

Section 3.1 – on the every two year shoreline sampling – it sounds like the whole shoreline will be inventoried the first year, then only selected places that were inventoried will get repeat visits. Is this right, or will the whole shoreline be inventoried every two years? If you don't have the resources to inventory the whole shoreline every two years, areas that are inventoried should be selected by habitat quality, proximity to human influences, and flow patterns (likely locations for propagule deposition).

Section 3.3 – curly leaf pondweed is also in the project area – though as a class C so control is up to the local weed coordinator.

Section 3.3.1 – Would help to explain what level of milfoil growth would trigger more aggressive control measures. Milfoil reaching the surface ? forming mats? Covering some percentage of the water?

WANAPUM

January 8, 2010

Public Utility District NO. 2 of Grant County
Attn: Tom Dresser, FWWQ Manager
P.O. Box 878
Ephrata, WA 98823

SUBJECT: Aquatic Invasive Species Control and Prevention Plan

Dear Mr. Dresser,

The Wanapum appreciate the opportunity to comment on the Aquatic Invasive Species Control and Prevention Plan for the Priest Rapids Project and have the following comments. The Wanapum acknowledge the District's efforts of compliance during license implementation. We would like to continue to be involved with maintaining the integrity of the Priest Rapids Project area on the Columbia River.

We recognize the efforts of Grant PUD as part of its license requirements under the 401 Water Quality Certificate and License Article 401 to manage control and prevent introduction and spread of new AIS in the Project by education, monitoring, control, and response. The Wanapum Reservoir Patrol is trained in interface with recreationist and is available to assist with establishing greater public awareness and education on aquatic invasive species.

Thank you for the opportunity to comment on this plan. Please do not hesitate to contact me at (509) 754-5088 ext. 3113 if you have any questions.

Sincerely,

Rex Buck Jr.
Wanapum Leader

Grant County
PUBLIC UTILITY DISTRICT
Excellence in Service and Leadership

Meeting Minutes

Priest Rapids Fish Forum

Wednesday, September 02, 2009
9:00 – 3:00
Grant PUD SeaTac Office

Technical Members

Stephen Lewis, USFWS
Marcie Mangold, WDOE
Tom Dresser, GCPUD
Ben Lenz, GCPUD
Patrick Verhey, WDFW
Bob Dach, BIA
Mike Clement, GCPUD

ATTENDEES:

Brad James, WDFW (on phone)
Molly Hallock, WDFW
Patrick Verhey, WDFW
Mike Clement, GCPUD
Ben Lenz, GCPUD (on phone)
Debbie Williams, GCPUD
Brian Nass, LGL
Marcie Mangold, WDOE (on phone)
Bob Rose, YN (on phone)
Keith Hatch (on phone)
Ross Hendrick, GCPUD
Kevin Malone, Facilitator

Meeting Minutes

I. **Welcome and Introductions** – Attendees introduced themselves around the table and on the conference line.

II. **Agenda Review** – No additions were made to the agenda.

III. **Action Item Review** - All action items were reviewed.

IV. **PRFF Protocol Discussion**

A Discussion and proposed Vote on Protocols – No discussion or vote took place because of the lack of a quorum.

V. **White Sturgeon Update** - FERC approval hasn't been received yet, so field work (Section C of Plan) will be moved to 2010. FERC approval was received for the Native Resident Fish Management Plan on Monday, August 31, 2009. In order of submission, Grant PUD anticipates that the White Sturgeon Management Plan should be next

up for approval. Via Web Ex Conferencing, Lenz and Clement shared video of their trip to the White Sturgeon facility in Cranbrook, B.C. Approximately one million eggs were taken during the 2009 spawning season in B.C. Grant PUD staff will be visiting the facility again during the various life cycles and invited PRFF members to attend. Juvenile releases happen in the spring, with spawning taking place mid June to the end of July. Disease issues, and how to handle them were discussed. Biosecurity precautions were followed diligently at the facility.

VI. **Aquatic Invasive Species (AISP) and Shallow Water Monitoring Plan (SWMP)** - Hendrick provided an update on the AIS and Shallow Water Monitoring Plans. The second preliminary draft of the AIS was sent to WDOE and WDFW on September 01, 2009. After consultation with Washington Department of Ecology (WDOE) and Washington Department of Fish and Wildlife (WDFW), PRFF members will be provided with a 30 day review period. The final report will be submitted to the Federal Energy Regulatory Commission (FERC) and WDOE prior to March 31, 2010.

AISP - The plan covers education (with focus on recreational use), monitoring designed to help catch new species before they establish themselves (36 samples collected throughout each reservoir monthly for presence/absence of zebra/quagga mussel veligers, substrate monitoring, and shoreline/boat launch AIS plant surveys), and rapid response (pro-active approach; coordination with WDFW/WDOE).

SWMP – Hendrick explained that main purpose today's presentation was to provide PRFF with an opportunity to discuss and provide input on selection of sampling locations, based on past studies. Hendrick explained that past (1999-2002) water quality monitoring efforts have provided a good picture of Dissolved Oxygen (DO), pH, and water temperatures in each reservoir. These locations were selected by the Limnological Solution Working Group during the re-licensing period, based on available information on habitat use. These locations are also well-mixed, which is in-line with WDOE's water quality standards (which state that samples taken for compliance purposes should be taken from well-mixed portions of the river). Hendrick suggests that in order to gather direct comparisons with historical data and to remain within well-mixed portions of the river, the same monitoring locations be used for the SWMP as in the 1999 - 2002 studies. Mangold stated that WDOE will be checking to make sure the SWMP sampling locations are in well-mixed portions of the river, in accordance with WDOE water quality standards.

Lewis asked clarifying question regarding the purpose of the SWMP in relation to the Bull Trout Management Plan (BTMP). Hendrick noted that the SWMP is not specifically intended to meet the BTMP water quality monitoring components, as the fixed-site monitoring stations

(which collect data year-round) will be used for that purpose as identified in the BTMP.

Hendrick will begin preparing the draft SWMP using the same locations used in the 1999 – 2002 studies, with the goal of sending it out for PRFF review by November 01, 2009. I f members have areas other than those discussed in today's presentation that they would like to have monitored, he asked that they be emailed to him prior to the next meeting on October 07, 2009 along with support of the rational (biological or other) behind the request.

VII. **Pacific Lamprey Study Plan**

A **Group Discussion of any items related to the 2010 Adult Lamprey Evaluation prior to drafting of Final Study Plan** - Nass explained that PRFF member's comments have been incorporated into the Pacific Lamprey Study Plan (PLSP).

Members discussed objectives of the study and tagging alternatives. Rose would like to understand the behavior of fish as they approach and enter the fish ladder, and questioned if flow reductions would make a difference.

The primary goal of the study is to tag 300 fish to evaluate fish ladder improvements and determine passage efficiency. If more fish are trapped, Nass explained that they would also be tagged. Half Duplex Pit-tags will be used for the study, with new detection arrays being placed in the fish ladders. Grant PUD will also be tagging lamprey with acoustic tags to evaluate the lower PRD fishway and to see if changes to the ladder operations have improved since the 2001 – 2002 studies.

Rose explained that because JSAT tags are being used to tag fish at Bonneville Dam, he would like to monitor those fish as well. The Yakama Nation has 95 radio tags that could possibly be used for lamprey tributary behavior studies. Rose would like to coordinate use of the radio tags if anyone has ideas of how to use them. Nass noted there is no intention to install radio tags in lamprey at Priest Rapids (PR), or to monitor fish that have been tagged with them other than monitoring HD PIT-tagged fish that were tagged by the COE downstream. Rose asked that all other fishways in the Priest Rapids Project (Project) also be monitored for lamprey passage. Clement noted that all 6 fish ladder entrances are identical and because the PRD left-bank entrance receives the highest amount of lamprey activity, that is the location which will be monitored. Previous studies provided information that suggests that fish readily approached and entered fishway entrances at both Wanapum and Priest Rapids dams.

Acoustic tags being used for the lamprey study are left over from the salmonid spring study. A tag battery life test has been conducted and will be approximately 21 to 25 days.

An acoustic telemetry study will be conducted at the PR left bank junction pool.

Members discussed the following contingency plans if there is a low run year. Structure passage efficiency - video, entrance to exit – HD PIT, junction pool use - Acoustic, and nighttime flow reductions. Nass questioned what the committee would want to achieve by implementing nighttime flow reductions. He explained that Grant PUD is addressing lamprey passage in the lower fishway by modifications to the fishway.

Fish ladder outages will start in mid - November. If so we need to know any requested changes before then. Plan to move ahead with testing things, we will continue to move ahead with this plan, and any adjustments would be made on the fly, stated Nass.

Rose suggested that acoustic tag receivers be placed at the exit of the fishway to determine if fish go into the turbines and back through the Project, or continue up stream.

The plan is to trap lamprey every night until the target sample size is collected, then traps will be pulled. In an effort to minimize recapture there is no plan to sample the run.

Rose suggested that an alternative strategy to fish collection be considered. Because lampreys travel through the Project from August to October, Rose questions if fish trapped at the beginning of the season might be different than fish trapped later in the season. Could changes in water temperature change a lamprey's performance, size, and metabolical capabilities? Clement cautioned that as soon as the water cools off, the fish stop moving and begin over wintering and could possibly not move through the fishway at all. Rose asked that different strategies be added to the study proposal. Clement suggested that Rose provide some alternate strategies for the group to discuss but that because this is a passage study, we should try and select fish earlier in the run that are more representative of actively moving and migratory fish. Fish later in the run, would be more likely to be representative of fish that are preparing to over winter, thus, we would potentially not be able to monitor or measure there passage.

Fish count discrepancies between PR and Rock Island Dam were discussed. Fish counting methodologies and differences between PUD's is a concern. Rose suggested that a mobile tracker be included in the Study Plan, so that when acoustic

tags leave the Project, the ability to track them upriver remains. Clement stated that can be included in the study, but reminded members that it's difficult to track fish in noisy area's. As soon as crowders are installed, lamprey will have no other way to get through the fishways but through the video count stations. That should make counts in the Project extremely accurate. The release of acoustic tagged fish in pulses of 3 might give a more efficient with mobile tracking, suggested Rose.

Because tracking fish after they leave the Project is outside the original scope of work, Nass and Clement will have to discuss this issue further. Clement thought that a boat survey of the reservoir could possibly be conducted to monitor the acoustically tagged lamprey. Rose noted that he would like to have the ability to extend the nature of the study. Clement suggested that Bob provide this in more detail for future discussions.

VIII. **Next Meeting**: October 07, 2009, Grant PUD Natural Resources Office, Ephrata, WA.

Grant County
PUBLIC UTILITY DISTRICT
Excellence in Service and Leadership

DRAFT Meeting Minutes

Priest Rapids Fish Forum

Wednesday, February 03, 2010
10:00 – 3:00 p.m.
Conference Call/WebEx

Technical Members

Stephen Lewis, USFWS
Bob Rose, Yakama Nation
Bob Heinith, CRITFC
Tom Dresser, GCPUD
Ben Lenz, GCPUD
Patrick Verhey, WDFW
Keith Hatch, BIA
Marcie Mangold, WDOE
Mike Clement, GCPUD

ATTENDEES: (*Denotes PRFF Technical member)

Patrick Verhey, WDFW*
Molly Hallock, WDFW
Steve Lewis, USFWS*
Bryan Nass, LGL
Alyssa Buck, Wanapum
Mike Clement, GCPUD*
Keith Garner, GCPUD
Kevin Malone, Facilitator
Chad Jackson, WDFW
Brad James, WDFW
Bob Rose, Yakama Nation*
Emily Anderson, Longview Assoc.
Ross Hendrick, GCPUD
Ben Lenz, GCPUD*
Debbie Williams, GCPUD

Action Items:

1. Pacific Lamprey Comprehensive Passage Evaluation Report **c**omments are due by February 28, 2010.
2. Williams will send the Pacific Lamprey Comprehensive Passage Evaluation Report in Word format to all PRFF members.
3. Malone will send an email to Heinith asking for his approval of the Aquatic Invasive Species Plan**.**
4. Verhey will develop a list of plans that required coordination by the PRFF and PRCC.
5. Williams will send Grant PUD Natural Resources Annual and Non-Annual Reports to PRCC members.

6. Lenz, Clement, and Garner will determine if aquaculture practices are covered by Grant PUD's Section 10 permit, bull trout BiOp, or file with the Corp and USFWS**.**

Decisions:

1. PRFF members in attendance approved the Aquatic Invasive Species Plan.

Draft Meeting Minutes

I. **Welcome and Introductions** – Attendees provided self introductions.

II. **Agenda Review** – No additions were made to the agenda.

III. **Action Item Review** - Action items were reviewed. A brief summary of each action follows:

#1 - Currently, the Priest Rapids Hatchery (PRH) is undergoing design modifications for future expansion. The existing National Pollution Discharge Elimination System (NPDES) for PRH is currently being reviewed by Grant PUD regulatory staff. It will be updated by June 2010. Because there will be a mutual point of discharge, the sturgeon hatchery that will be built at Priest Rapids hatchery will use the existing NPDES.

#2 - Lenz recommends use of sonic tags instead of JSAT tags because they have a 10 yr. tag life versus the JSAT's less than one year life.

IV. **Pacific Lamprey Comprehensive Passage Evaluation Report** - Emily Anderson, Longview Associates, and Bryan Nass, LGL presented a PowerPoint presentation on the Pacific Lamprey Comprehensive Passage Evaluation Report. They explained that the report was written to be easily updated, and that new information will be easily identified in the future. Because the report was written, using all available basin wide lamprey literature, and communication with leaders in the field, it is the most complete, comprehensive lamprey document for the Priest Rapids Project (PRP), explained Nass.

Malone noted that cost effectiveness hasn't been defined by PRFF members yet, but needs to be. For this report, cost effectiveness was defined as "If the objective is applicable and reasonable at the PRP, then it was given a yes." If current technology isn't available to complete a project, "It was considered not cost effective", but Grant PUD is open to reevaluating technology/processes in the future. Clement stated "Grant PUD will evaluate the objective or issue from a common sense approach. If an idea makes sense and will help lamprey survival and passage, is reasonable and feasible, and is cost-effective, we'll likely implement it. Cost effectiveness will address particular components of the Pacific Lamprey Management Plan

(PLMP). If it's inconsistent with the PLMP, isn't reasonable, feasible, or not cost effective, then Grant PUD will object to doing it." Malone reminded PRFF members that in order to take an issue to dispute resolution, why something is, or is not cost effective must be explained. The 401 Certification discusses "cost effectiveness" in plans written for Grant, Chelan and Douglas PUD's. Members reviewed examples of how cost effectiveness was evaluated in the plan. Nass explained that at no time was a dollar value assessed to a project in order to determine cost effectiveness. PRFF members noted their approval of the plan so far. **Comments are due by February 28, 2010.** Received comments will be responded to and placed in the document prior to being sent to FERC on, or before March 31, 2010. **Williams will send the report in Word format to all PRFF members.**

V. **Pacific Lamprey Modifications s Update Presentation** - Clement showed pictures of modifications completed to date. Traps, orifice closure devices and ramps have been installed. Crowders will be installed by February 08, 2010. Members participating in the ladder modification tour should meet at Grant PUD HED @ 9:30 on Monday, February 8th. Left bank ladders will be watered after the tours and right bank ladders will then be taken out of service.

VI. **Aquatic Invasive Species Plan (AIS) -**

A **Vote to Approve** - Hendrick joined the meeting at 1:17 p.m. Comments were received from WDFW and WDOE. WDFW was happy with changes made to the plan. Hendrick explained that additional educational and monitoring, and more adaptive management was added to the draft plan. A motion to approve was made by Verhey, and seconded by Lewis. **Malone will send an email to Heinith asking for his approval**. **PRFF members in attendance approved the Aquatic Invasive Species Plan**.

VII. **Shallow Water Monitoring Plan -** Rose approves the plan.

A **Vote to Approve** - Comments are due tomorrow. PRCC members want the PRFF to approve this plan prior to PRCC approval. If they have no issues, the PRCC will also approve it. Rose requested that FLIR flights be conducted to gather temperature data. Grant PUD agreed to draft a Statement of Agreement authorizing the contractor conducting the PRCC Predator Index Study to conduct FLIR fights, thus removing the request of FLIR flights from the SWMP. USFWS, WDFW, and Wanapum approve the plan as written

VIII. **Priest Rapids Fish Ladder Temperature Modeling Plan -**

A **Vote to Approve Plan** - Interpretations as to what is required in the 401 Certification 6.6.2 were discussed at the January PRCC meeting. It was explained that PRCC members questioned why Wanapum Dam fish ladder monitoring was not included in the

study plan. Grant PUD staff explained that baseline fish ladder temperature data was collected from 2002-2004 at Priest Rapids and Wanapum Dams. Because significant increases in water temperatures from upstream to downstream were not found in the ladders, and because modifications have not, and are not being made to fish ladders at Wanapum Dam, Grant PUD felt there was no need to include it in the study plan. Grant PUD's interpretation of the requirement was to verify that changes made to fish ladders at Priest Rapids Dam do not impact water temperatures as compared to the baseline data. Grant PUD's draft plan included no additional monitoring after the initial testing.

PRCC members interpretation of the study plan was that temperature monitoring should take place above, below and in the middle of the fish ladders at both dams. They also believe monitoring should occur on a periodic (5-10 year) basis. PRCC members anticipated a monitoring plan, not a study plan. Based on the discussion with the PRCC and comments received to date, Grant PUD intends on modifying the plan to include monitoring at both dams on a more periodic (e.g. every 5 years) basis.

Because the 401 Certification mandates that Grant PUD consult with both the PRCC and the PRFF, PRCC members requested that future plans that require coordination between the two committees have more review time allotted them. How future coordination takes place needs to be addressed. It was suggested that meeting minutes be shared between the two committees on issues that overlap.

Rose does not plan to send comments, as Bryan Nordlund, the NMFS PRCC representative will be sending comments that cover his concerns. **Verhey will develop a list of plans that required coordination by the PRFF and PRCC. Williams will send Grant PUD Natural Resources Annual and Non-Annual Reports to PRCC members.**

White Sturgeon Update:

B **Facility Construction Schedule** - Mike Nicholls will be the engineer in charge of construction. Because the intake siphon at Priest Rapids Hatchery feeds fall Chinook production and will need to be tied into for the sturgeon hatchery, the construction window of opportunity will be limited to late summer for the supply line to the sturgeon facility.

Nicholls hopes to have permitting level designs ready by the second quarter. The National Pollution Discharge Elimination System (NPDES) deadline for fall Chinook permitting at the Priest Rapids Hatchery is June 2010. The target completion date is for 2011, with operations starting in 2012. Verhey questioned who

will run the hatchery, and if plans for a residence are included. Lenz overheard that one of the three proposed residences at Priest Rapids Hatchery will be used for the sturgeon facility. The operator of the sturgeon facility could be determined by a Request for Proposal (RFP) based on sturgeon culture expertise. The contract will be awarded to the contractor who meets criteria outlined in the RFP.

Verhey questioned who will run the hatchery, and if plans for a residence are included. Lenz explained that one of the three proposed residences at Priest Rapids Hatchery will be used for the sturgeon facility. The operator of the sturgeon facility could be determined by a Request for Proposal (RFP) based on sturgeon culture expertise. The contract will be awarded to the contractor who meets criteria outlined in the RFP.

C **January 7th Marion Drain Tour Review** - PRFF members toured the Yakama Nation (YN) Marion Drain Sturgeon Facility (MDSF) on January 07, 2010. Clement explained that Tom Dresser, Grant PUD and Paul Ward, YN have agreed that the MDSF will meet Grant PUD's sturgeon production needs until the Priest Rapids Sturgeon Hatchery is complete. If for some reason the YN can't meet Grant PUD's production timeline at the MDSF Grant PUD's intends to obtain fish from Cranbrook, B.C. Clement expects that WDFW and the YN will support that plan, otherwise, it would be unlikely that Grant PUD could meet its' goal of releasing 6500 yearlings into the Project reservoirs. A lot of construction and tasks remain: placing tanks, covers, incubation stacks, and staffing.

Lenz explained that Grant PUD and the YN have talked about what it will take to make it this happen, and are developing a scope of work that will be shared with the PRFF when it's fully developed. The timeline to moving this forward is critical. Broodstock collection is a large piece of the puzzle. Questions that remain to be answered include: Priest Rapids broodstock collection by Golder & Associates, Outline McNary broodstock collection efforts by the YN. WDFW is concerned that because these populations are small, they could easily be over mined. They requested that agencies collecting broodstock work in coordination with each other.

Clement noted that Chelan PUD will be working with the YN to collect broodstock from McNary and/or Priest Rapids Project reservoirs. Grant PUD will be targeting 8 ripe females, and an equal number of males, and might possibly collect milt regionally. James asked to have each program recognize the other, and maybe share male or females. Not have two completely separate programs. Chelan PUD might take their fish off site to either the

Ringold or Chelan Falls facility, noted Clement. Late October is when a final decision is necessary about using surplus juveniles from the Kootenay (Cranbrook) facility in British Columbia. The Lake Roosevelt Trans Boundary (LRTB) team would have to authorize something like that first, if MDSF doesn't come through. Ideally, MDSF would be working as early as possible. Lenz has provided genetics information to the LRTB team. WDFW must be in full support of LRTB fish, stated Lenz.

Lewis questioned when Grant PUD will get a request of concurrence for ESA and permitting processes. Lewis explained that sturgeon weren't covered in the Biological Opinion, and because fish are being added to an eco system that bull trout exist, Grant PUD will have to consult with the USFWS. Grant PUD possibly needs to do a Biological Assessment and submit it to USFWS. Lewis thought they would most likely give a concurrence. The question was raised as to whether or not there is a provision in the Section 10 permit for aquaculture practices? That's frowned upon stated Lewis. Lenz, Clement, and Garner will determine if releasing juvenile sturgeon, the action of concern to bull trout, in the Priest Rapids Project is covered by Grant PUD's Section 10 permit, bull trout BiOp, and if it is necessary to file with USFWS. It could be as simple as responding to the Corps for the Section 10 permit, stated Lewis. USFWS have a series of public meetings regarding BT critical habitat, noted Lewis.

IX. **Next Meeting**: A place holder for the next meeting will be held for March 03, 2010. It will be determined at a later date if a conference call or meeting will be held**.**

From: Kevin Malone [kmmalone@wavecable.com]
Sent: Tuesday, February 09, 2010 11:39 AM
To: 'Bob Heinith'
Cc: Debra A Williams; Michael C. Clement; Ross R. Hendrick
Subject: Final AIS Vote- Approved

Thanks Bob...

Get your comments on the other plans to Grant as soon as you can...

Mike and Ross, based on my records the AIS Plan has now been approved.

Kevin

-----Original Message-----
From: Bob Heinith [mailto:heib@critfc.org]
Sent: Tuesday, February 09, 2010 11:35 AM
To: Kevin Malone
Cc: 'Carl Merkle'
Subject: Re: Vote

Kevin- I'm OK with the plan. I do have some comments coming on the fish ladder temp and shallow water studies.

Appendix F
Summary Table of Agency Comments to Grant PUD's Second Draft Aquatic Invasive Species Plan

SUMMARY TABLE OF AGENCY COMMENTS AND GRANT PUD RESPONSES FOR SECOND DRAFT OF THE AQUATIC INVASSIVE SPECIES PLAN [Article 401(a)(22].

Submitting Entity	Date Received	Paragraph #	Agency Comment	Grant PUD Response
WDFW	5-Jan-2010	1	WDFW's primary concern with the AISP is that Grant PUD should ensure that all biotic sampling data collected by Grant PUD and consultants working for Grant PUD are reviewed to identify observations of aquatic invasive species (AIS). Sampling staff should be familiar with the list of aquatic invasive species that threaten Washington State. The list of these species can be found in WAC 220-12-090 (http://apps.leg.wa.gov/wac/default.aspx?cite=220-12-090). Although WDFW is not currently requesting Grant PUD sample specifically for non-native crayfish and other prohibited or unlisted AIS, these species are of concern due to the increasing potential of them invading Washington State Waters (personal communication with Allen Pleus, WDFW October 2009). Grant PUD should be aware of emerging concerns of AIS and encourage biotic sampling staff to document any occurrence of AIS within the Priest Rapids Project in order to allow for state and federal agencies to investigate early detection responses.	Comment noted. Section 4.1 of the AISP addresses this concern by providing information related to Grant PUD's intent to coordinate its biological (or biotic) sampling/data collection efforts with the AISP. Grant PUD's AIS coordinator will review the AIS list provided by WDFW annually, and through discussions with WDFW, will provide Grant PUD biologists (and/or consultants as applicable) with a list of AIS threats and instructions on identifying and reporting the potential occurrence of new AIS.
		2	We strongly support Grant PUD in the inclusion of public education efforts in the AISP that will be designed to raise the level of awareness of AIS species and their impacts. These efforts should not be limited to the highly invasive AIS species such as zebra and quagga mussels and Eurasian watermilfoil, but should also include at a minimum a reference to the above list of AIS. Impacts, both economically and biologically (including water quality), should be included in the information provided to the public. We support the action to specifically sample for zebra mussels, quaqqa mussels, annual plant surveys at boat launches and annual Priest Rapids shoreline surveys for all AIS species. We suggest including walking transects on the shoreline during low pool events to investigate the presence of AIS. These monitoring efforts are intended to help provide identification of new AIS introduced into the Project, and may also provide opportunity to respond to an introduction prior to the species becoming established.	Comment noted. Grant PUD will use the most current educational materials related to AIS, and will include reference to WDFW's list of AIS threats. Grant PUD will also review its educational materials with WDFW on an annual basis and update as needed through adaptive management. Grant PUD will monitor the entire Columbia River corridor portion of the Project to the ordinary high water mark on the shoreline every other year and all Project boat launches annually for AIS plants, per Section 3 of the AISP. These efforts are intended to be done via boat during the fall (peak plant growing periods). If monitoring results (or other reason) indicate that walking the shoreline is needed, Grant PUD will discuss this method with WDFW during the annual AIS meeting.
		3	We support the rapid response component of the AISP which includes coordination with upstream and downstream operators, state AIS agencies, and other regional AIS groups. We concur with section 4.1 of the AISP, specifically, "Grant PUD will monitor the abundance and spread of these species through the NRFMP that will consist of a Project-wide evaluation of fish species every five	Comment noted.

			years (Gamer 2009). The NRFMP will use 12 metrics of biotic integrity to measure native and non-native fish health, abundance and distribution." Early response to identification of AIS will allow for investigating how to contain the current infestation and to initiate the determination of the full extent of infestation. We support annual AISP development in order to adaptively manage and improve upon the AISP with new scientific knowledge and the development of AIS occurrence databases.	
		4	WDFW is concerned with the use of herbicides to control aquatic weeds. Arguably the effects of chemical control agents on fish development have not been widely investigated. Therefore, a discussion should occur prior to the use of herbicides to weigh the benefits and costs of herbicide application. We suggest adding "prior to application of the control method" to the end of the sentence in the last paragraph of section 3.3.1 of the AISP that reads: "These additional alternatives will be discussed within the annual report and at the annual AIS meeting." WDFW is concerned with the use of herbicides in the Columbia River and the potential negative impact on fish life histories, including smoltification.	The intent of Sections 3.3 and 3.3.1 was to simply address/discuss possible control methods for AIS plants in the future. At this time, Grant PUD does not plan to use herbicides on AIS plants. Additional language was added in Section 3.3 and 3.3.1 to address WDFW's concern, which provides that Grant PUD consult with WDFW, as well as obtain any required permits from WDFW or WDOE, prior to the application of herbicides to control aquatic weeds. WDFW's suggested language was added to the end of the sentence in the last paragraph of Section 3.3.1.
WDOE	08-Jan-2010 (via e-mail)		Pathways for introduction: Not mentioned is the small but important one of people intentionally putting stuff in lakes and rivers. Often people plant shorelines with non-native plants that can potentially become invasive (that is how yellow flag iris got its start), and people discard unwanted pets or lab animals into lakes (gold fish along with snails and plants, crayfish etc. This is another instance where more public education is needed.	Comment noted: Although intentional or deliberate AIS introductions are possible, Grant PUD has no enforcement capabilities related to deliberate and intentional AIS introductions, and therefore this pathway is not addressed in this plan. However, an additional bullet point was included in Section 1.2.4 to acknowledge this pathway. Grant PUD will use the most current educational materials related to AIS, and will include reference to WDFW's list of AIS threats. Grant PUD will also review its educational materials with WDFW on an annual basis and update as needed through adaptive management.
			Table 1: Add Butomus umbellatus (flowering rush) – as it has a submersed growth form though generally it is thought of as an emergent plant – It often grows at depths of 10 – 12 ft. Egeria is submersed. Parrotfeather is (sprawling) emergent. Add Ludwigia hexapetala – very similar to Ludwigia peploides which is on the list. Add Nymphoides peltata – a floating leaved plant (None of these are currently known from the project area).	Table 1 has been updated to reflect these suggested changes/additions.

			Section 3.1 – on the every two year shoreline sampling – it sounds like the whole shoreline will be inventoried the first year, then only selected places that were inventoried will get repeat visits. Is this right, or will the whole shoreline be inventoried every two years? If you don't have the resources to inventory the whole shoreline every two years, areas that are inventoried should be selected by habitat quality, proximity to human influences, and flow patterns (likely locations for propagule deposition).	The entire shoreline will be inspected/inventoried during each survey (every two years); the GPS coordinates are intended to help find sites where AIS plants were previously identified to help determine if the plant dispersion has increased or decreased. However, special attention is likely to be given to areas with human influences, flow patterns, etc.
			Section 3.3 – curly leaf pondweed is also in the project area – though as a class C so control is up to the local weed coordinator.	Language has been added to this section to reflect this comment.
			Section 3.3.1 – Would help to explain what level of milfoil growth would trigger more aggressive control measures. Milfoil reaching the surface? Forming mats? Covering some percentage of the water?	As described in Section 3.2 and 3.3 of the AISP, Grant PUD will conduct annual boat-launch AIS plant surveys to help determine the extent and densities of existing AIS plants, as well as to help identify newly introduced AIS plants. After the first year of surveys, Grant PUD will consult with WDFW and WDOE on proper control measures, if needed. Section 7 of the AISP describes the adaptive management efforts that will take place during implementation of this plan, which will include annual meetings with WDFW and WDOE that will discuss results from the surveys, any necessary control measures, etc.
Wanapum	08-Jan-2010	1	The Wanapum appreciate the opportunity to comment on the Aquatic Invasive Species Control and Prevention Plan for the Priest Rapids Project and have the following comments. The Wanapum acknowledge the District's efforts of compliance during license implementation. We would like to continue to be involved with maintaining the integrity of the Priest Rapids Project area on the Columbia River.	Comment noted. Grant PUD will continue to coordinate with The Wanapum in relation to AIS control and prevention efforts associated with this plan.
		2	We recognize the efforts of Grant PUD as part of its license requirements under the 401 Water Quality Certificate and License Article 401 to manage control and prevent introduction and spread of new AIS in the Project by education, monitoring, control, and response. The Wanapum Reservoir Patrol is trained in interface with recreationist and is available to assist with establishing greater public awareness and education on aquatic invasive species.	Comment noted. Grant PUD will coordinate with the Wanapum Reservoir Patrol as it begins its public awareness and education programs associated with this plan.