Spokane River License Implementation

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Spokane River Forum
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Avista’s Hydroelectric Projects

Map showing hydroelectric projects in the Pacific Northwest, including locations along the Pend Oreille River and other major waterways.
2010 & 2011 Recap

- Approx. 50 regulatory filings with FERC, Interior, WDOE, and IDEQ
- Began implementation activities of Fisheries, Water Quality, Weeds, Recreation, Erosion, Wetlands, and Cultural Resources
Spokane River Project License

• Hank Nelson
  ➢ TDG and DO implementation activities at Long Lake Dam

• Dave Armes
  ➢ Noxious, invasive aquatic weed control program for Lake Spokane and Nine Mile Reservoir

• Tim Vore
  ➢ Wild rainbow trout spawning habitat in the lower Spokane River

• Avista License Website
  http://www.avistaeutilities.com/resources/relicensing/spokane/default.asp
Water Quality Conditions,
Nine Mile HED

Spokane River
Washington Water Quality Conditions

Nine Mile HED

- Total Dissolved Gas (TDG)
  - Monitoring
  - Potential WQAP
Water Quality Conditions, Long Lake HED
Washington Water Quality Conditions

Long Lake HED

- TDG
  - WQAP
  - Evaluating Mitigation Measures
  - Monitoring
Washington Water Quality Conditions

Long Lake HED (continued)

• Dissolved Oxygen
  – Tailrace WQAP
  – Tailrace Monitoring
  – Reservoir WQAP
  – Reservoir Monitoring
Potential Reasonable & Feasible Mitigation Measures

• Wetland restoration/enhancement
• Vegetative shoreline buffer on Avista-owned property
• Reduction of size and conversion of lakeshore lawns to native vegetation
• Lower Hangman Creek shoreline stabilization and agricultural practices
Potential Reasonable & Feasible Mitigation Measures (continued)

- Conversion of grazing lands to open space
- Septic system education and improvements
- Aquatic Weed Control
Lake Spokane Data Collection

• Assisting Ecology with nutrient monitoring
• Purchased satellite imagery for 2001, 2009, and 2010 with lake-wide monitoring of chlorophyll-a and cyanobacteria
• Working with the Lake Spokane Association and Ecology to collect algae samples for the freshwater algae program
• Assess dominant aquatic habitat in Lake Spokane
• Bathymetry
Washington Water Quality Conditions

Long Lake HED (continued)

• Temperature
  – WQAP
  – Exploring Mitigation Measures
  – Monitoring
QUESTIONS?
Long Lake Dam Update
Total Dissolved Gas  Dissolved Oxygen
Long Lake Hydroelectric Development

Total Dissolved Gas Abatement

Phase II Feasibility Study

Final Report

December 9, 2010

Prepared by
Northwest Hydraulic Consultants

Prepared for
Avista Utilities, Inc.
Current Project Status:

• Build a physical model, test
  1. Spill way deflectors on 7/8
  2. Stepped weir
Improving Dissolved Oxygen (DO) in Discharges from Long Lake Dam
Daily average DO (mg/L) in Long Lake HED tailrace for releases during generation for 1999-2001 and 2007
Penstock, scroll cases (housing turbines), and draft chest

Upper portion of penstock entering powerhouse
Spokane River channel downstream of tailrace

Long Lake HED tailrace pool
Long Lake HED

Plant Discharge Dissolved Oxygen (DO) Evaluation

Phase II Assessment

Summer 2010 Field Study Plan

(Draft Tube Aeration)
Current Project Status:

Try draft tube aeration for the 2011 low flow season, monitor results.
Spokane River Project
Aquatic Weed Management Program

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Aquatic Weeds, Why Should You Care?

Invasive Aquatic Weeds degrade lake beneficial uses including:

• Recreation
• Fisheries, Waterfowl & Wildlife Habitat
• Water Quality
• Aesthetics
The Spokane River Project License required the development of three Aquatic Weed Management Plans:

• Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program;

• Coeur d’Alene Lake Aquatic Weed Management Plan for Non-Tribal Waters; and

• Coeur d’Alene Reservation Aquatic Weed Management Plan.
The Primary Elements of All Three Aquatic Weed Management Programs

- **Education** – Establish or expand educational programs to keep the public informed of the hazards of invasive aquatic weeds.

- **Monitoring** – Monitor and/or map the distribution of invasive aquatic weeds within the Project area.

- **Management** – Develop strategies to help control invasive aquatic weeds within the Project area.
The Goals for the Lake Spokane Aquatic Weed Management Program are to:

• Reduce cover of invasive aquatic weeds at public and community boat access points;

• Maintain a moderate level of ongoing control of aquatic weeds in areas of 10-14 feet using winter reservoir draw downs; and

• Support weed control and facilitate coordination among the entities involved in aquatic weed control.
Approximate area of invasive aquatic weeds on Lake Spokane range from 634 acres (Tetra Tech, 2001) to 715 acres (AquaTechnex, 2007) survey.
Eurasian water milfoil
(Myriophyllum spicatum)
Curly-leaf pondweed (*Potamogeton crispus*)
White Lilly (*Nymphaea odorata*)
Yellow Floating Heart (*Nymphoides peltata*)
Flowering Rush (*Butomus umbellatus*)

Photos not of Lake Spokane.  
Photograph of Flathead Lake, MT below;
Flowering Rush Distribution
2011 Program Task List

Avista is working with cooperating parties to develop a 2011 Program Task List. The proposed task list includes the following:

• Contacting community lake access site owners to discuss future herbicide treatments at five community boat launches (Contingent upon landowner approval and coordination)
• Treatment (herbicide) at Nine Mile Recreation Area
• Treatment (herbicide or bottom barrier) at the DNR Campground
• Plan for winter 2012 drawdown to the degree possible. The goal with this is to control weeds on a reservoir wide basis.
2011 Program Task List (continued)

- Development and distribution of brochures, educational materials and signage
- Begin flowering Rush treatments in Lake Spokane
- Monitoring efficacy of site-specific weed control actions implemented
- Develop monitoring plan for Nine-Mile Reservoir to occur during even numbered years
Thank you!

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Federal Energy Regulatory Commission
Hydroelectric Operations

Spokane River

Long Lake Nine Mile Upper Falls Post Falls Monroe Street Lake Coeur d'Alene

AVISTA
FERC License

- Hydro Operations for 50 Years
- Measures for Wetlands, Fisheries, Recreation, Cultural Resources, and Wildlife
- Water Quality Certifications from Idaho and Washington Incorporated into New License
Fisheries Measures in Washington

- Spokane River Redband Population Assessment
- Upper Falls Fish Population Assessment
- Increased Stocking of Fin Clipped Sterile Hatchery Rainbow Trout in Upper Falls and Nine Mile Reservoirs
- Lower Spokane River Redband Spawning Habitat
Redband Spawning and Population Study Elements

- Hydrology Review
- Spawning Patch Inventory of the Study Area
- Physical Characterization of Spawning Patches
- Hydrodynamic Characterization of Spawning Patches
- Biological Spawning Characterization
- Effective Spawning/Incubation Habitat Relationships
- Redband Trout Abundance Estimates (ten years)
Wild Rainbow (Redband) Trout Have an Adipose Fin
Study Reach and Patch Inventory (2009)
Substrate Characterization
Survey Patch Area and Elevation
Spawning Survey (2010)
Redband Trout Spawning Period 2010

![Graph showing the number of Redds observed and average daily discharge from April 1 to May 12, 2010.](image-url)
Spawning Areas Mapped
Observed Redband Trout Depth and Velocity Frequency
Artificial Redds
Sample Oxygen and Temperature
Trout Fry Survival
Cumulative Spawning Plot Area

![Graph showing cumulative spawning plot area vs discharge (cfs)]
Mark-Recapture Redband Population Estimate
When, Where, and Fish Number (tag #10,186)
Results 2010

- 58 Gravel Patches
- Deeper Spawning: Ave. 3.5’, Max. Over 5 Feet
- 148 Redds Counted in 2010 (130 in 2003)
- Appears There is Good Intra-Gravel Survival
- Habitat Over a Range of Flows
- Effective Spawning and Incubation Habitat Tables
- Tagged Over 800 Redbands in the Spokane River
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Credits: Forest & Channel Metrics, Cardno Entrix, WDFW
Avista License Website:

http://www.avistaultilities.com/resources/relicensing/spokane/default.asp