AVISTA CORPORATION

LAKE SPOKANE DISSOLVED OXYGEN WATER QUALITY ATTAINMENT PLAN 2015 ANNUAL SUMMARY REPORT

WASHINGTON 401 CERTIFICATION
FERC LICENSE APPENDIX B, SECTION 5.6

SPOKANE RIVER HYDROELECTRIC PROJECT
FERC PROJECT NO. 2545

Prepared By:

AVISTA

March 21, 2016

[Page intentionally left blank]

TABLE OF CONTENTS

FIGURES

APPENDICES

[Page intentionally left blank]

1.0 INTRODUCTION

The Washington Department of Ecology (Ecology) has determined that the dissolved oxygen (DO) levels in certain portions of the Spokane River and Lake Spokane do not meet Washington's water quality standards. Consequently, those portions of the river and lake are listed as impaired water bodies under Section 303d of the Clean Water Act. To address this, Ecology developed the Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load Water Quality Improvement Report (issued February 12, 2010).

Reduced DO levels are largely due to the discharge of nutrients into the Spokane River and Lake Spokane. Nutrients are discharged into the Spokane River and Lake Spokane by point sources, such as waste water treatment facilities and industrial facilities, and from non-point sources, such as tributaries, groundwater, and stormwater runoff, relating largely to land-use practices.

Avista Corporation (Avista) owns and operates the Spokane River Hydroelectric Project (Project), which consists of five dams on the Spokane River, including Long Lake Hydroelectric Development (HED) which creates Lake Spokane. Avista does not discharge nutrients into either the Spokane River or Lake Spokane. However, the impoundment creating Lake Spokane increases the residence time for water flowing down the Spokane River, and thereby influences the ability of nutrients contained in those waters to reduce DO levels.

Avista received a new, 50-year license for the Project from the Federal Energy Regulatory Commission (FERC) on June 18, 2009 (FERC 2009). The license incorporates a water quality certification (Certification) issued by Ecology under Section 401 of the Clean Water Act (Ecology 2009). As required by Section 5.6.C of the Certification, Avista submitted an Ecology-approved Lake Spokane Dissolved Oxygen Water Quality Attainment Plan (DO WQAP) to FERC on October 8, 2012. Avista began implementing the DO WQAP upon receiving FERC's December 19, 2012 approval.

DO WQAP

The DO WQAP addresses Avista's proportional level of responsibility as determined in the Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load (DO TMDL). It identified nine potentially reasonable and feasible measures to improve DO conditions in Lake Spokane, by reducing non-point source phosphorus loading into Lake Spokane. It also incorporated an implementation schedule to analyze, evaluate and implement such measures. In addition, it contains benchmarks and reporting sufficient for Ecology to track Avista's progress toward implementing the plan within the ten-year compliance period.

The DO WQAP included a prioritization of the nine reasonable and feasible mitigation measures based upon several criteria including, but not limited to, quantification of the phosphorus load reduction, DO response time, likelihood of success, practicality of implementation, longevity of load reduction, and assurance of obtaining credit. From highest to lowest priority, the following summarizes the results of the measure prioritization: reducing carp populations; managing aquatic weeds; acquiring, restoring, and enhancing wetlands; reducing phosphorus from Hangman Creek sediment loads; educating the public on

improved septic system operations; reducing lawn area and providing native vegetation buffers; and converting grazing land to conservation or recreation use. One measure, which involved modifying the intake of an agricultural irrigation system, was removed from the list, as it was determined infeasible given it would likely create an adverse effect on crop production.

Based on preliminary evaluations, Avista proposed to focus its initial efforts on two measures: reducing carp populations and aquatic weed management, which were expected to have the greatest potential for phosphorus reduction.

In its 2014 Annual Summary Report, Avista included a recommendation to implement a pilot study utilizing a combination of mechanical methods (including spring electrofishing, passive netting, and winter seining), to identify which is the most effective method to remove carp from Lake Spokane. Ecology approved the 2014Annual Report and the recommendation to move forward with the carp removal pilot study. Avista has been working with Ecology and WDFW to plan the carp removal efforts, a summary of which is provided in Section 3.2 (2015 Implementation Measures) and Section 5.0 (Proposed Activities for 2016).

In its 2013 Annual Summary Report, Avista concluded that harvesting macrophytes in Lake Spokane at senescence, would not be a reasonable and feasible mitigation measure to reduce total phosphorus in Lake Spokane. However, Avista will continue to implement winter drawdowns, herbicide applications at public and community lake access sites, and bottom barrier placement to control invasive/noxious aquatic weeds within Lake Spokane. Avista may also, through adaptive management, reassess opportunities to harvest macrophytes to control phosphorus in the future.

As required by the DO WQAP, this report provides a summary of the 2015 baseline monitoring, implementation activities, effectiveness of the implementation activities, and proposed actions for 2016.

2.0 BASELINE MONITORING

Longitudinally, the lake can be classified as having three distinct zones which consist of a riverine, transition and lacustrine zone. Six monitoring stations, LL5 through LL0, exist within these three zones (**Figure 1**). Station LL5 is the most upstream station and is located within a riverine zone, Stations LL3 and LL4 are located in the transition zone, and Stations LL0 through LL2 are located in the lacustrine zone. The vertical structure of Lake Spokane is set up by thermal stratification, largely determined by its inflow rates and temperature, climate, and location of the powerhouse intake. Within Lake Spokane's lacustrine zone, thermal stratification creates three layers (the epilimnion, metalimnion, and hypolimnion) that are generally present between late spring and early fall. The epilimnion is the uppermost layer, and the warmest due to solar radiation. The metalimnion contains the thermocline and is the transition layer between the epilimnion and the hypolimnion that is influenced by both surface and interflow inflows. The hypolimnion is the deepest layer and is present throughout the lacustrine zone. Avista contracted with Tetra Tech to complete the baseline monitoring activities during 2015. Sample events were completed at all six stations during May through October.

Results of the monitoring are summarized in the Lake Spokane Annual Summary Report 2015 Baseline Water Quality Monitoring Results (Tetra Tech 2016), and include the water quality conditions in Lake

Spokane as well as for its inflows and outflows, tables of water quality data collected for the DO WQAP, and a description of the general hydrologic and climatic conditions. Additionally, the report includes an analysis of the phytoplankton and zooplankton populations present during the 2015 sampling events. Highlights taken from the Tetra Tech Report are provided as follows.

- During 2015, the Spokane River Watershed experienced record low flows, drought (an eight consecutive month period with below normal precipitation), and one of the worst fire seasons on record. Flows in the Spokane River were well below the historical median from the middle of April through the middle of October. As a result of the low flow and drought conditions, Spokane River flows out of Post Falls Dam were reduced to 500 cubic feet per second (cfs) in July. For reference, the Spokane River median flow for July is 2,000 cfs. That said, weather conditions during 2015 differed greatly from the 30-year norms reported at the Spokane International Airport, with cooler than normal temperatures at the start of the year and in September and warmer than normal temperatures in February, March, May through August, and October. Precipitation was below normal for most of the year. June was the driest month of the year and also the warmest June on record, with an average temperature of 71.4°F and a record high temperature of 105°F reached on June 28th.
- Peak flows in 2015 (22,500 cfs) were significantly smaller than peak flows observed in 2011 and 2012, slightly greater than peak flows in 2013 and 2010, and similar in magnitude to peak flow in 2014 (**Figure 2**). Peak flow in 2015 occurred in February, which is approximately two months earlier than normal. The annual mean daily flow during 2015 was 5,427 cfs.
- Whole lake water residence time during 2015 (June through October) in Lake Spokane was higher than previous years at 70.1 days. Comparatively, average whole lake water residence time (June through October) during 2010 through 2014 was 25 days. Using the DO TMDL seasonal timeframe of July through September, the whole lake residence time was calculated at 84.8 days.
- Thermal stratification was evident the first sampling event in May at the four downstream stations, LL3, LL2, LL1, and LL0. Stratification was present at all stations, including LL4 and LL5 by early June. The water column at LL4 remained stratified through the remainder of the monitoring period and at LL5stratification remained present through early September. This is unusual for these two stations, typically, LL4 and LL5 have brief and sporadic stratification, if any.
- While the extent and depth of the hypolimnion varied throughout the summer, for most of the sampling dates the hypolimnion depth occurred at about 10 meters (m) from the surface, being shallow in June and deepening later in the summer.
- The maximum temperature reached at the surface was 26°C in the upper reservoir and 25°C in the lacustrine zone during early July. Similar maximums (25°C) also occurred in August 2014. Temperature was usually at or below 20°C at depths greater than 10 m in the lacustrine zone during 2015, as was the case in 2013 and 2014.
- Conductivity varied from about 106 to 290 micro Siemens/cm (µS/cm). This range is higher when compared with conductivity measured in 2014. This is likely due to a stronger signature from groundwater which typically has higher conductivity compared with inflows from the river. During 2015, water with increased conductivity (150 to 280 µS/cm), comprised the interflow zone that extended from about 5 to 18 m at stations LL3 through LL0 in June, and extended to 36 m at LL0 in

October as higher conductivity water plunged and moved through the reservoir at those depths intervals. Below 30 m, conductivity was less than 150 µS/cm. Much of the metalimnion in the lower reservoir was composed of interflow.

- The water column profiles for pH showed a range of 6.8 to 9.3 at the six stations during 2015 with the highest pH values occurred during July, August, and September. Water column averages were much narrower, ranging from 7.6 to 8.6.
- Maximum epilimnetic DO concentrations ranged from 11.4 to 14.5 milligrams per liter (mg/L) at the six stations, with higher values occurring in the lacustrine zone. Average water column DO ranged from 7.1 to 10.9 mg/L. Minimum DO concentrations of 0.0 mg/L occurred near the bottom at the three deepest stations, LLO (~154 ft), LL1 (~108 ft), and LL2 (~82 ft). Minimum DO concentrations in 2013 through 2015 were the lowest observed of the six years sampled (2010-2015), and June to October hydraulic residence times were also the highest (31 to 70 days) during 2013 through 2015.
- Total phosphorus (TP) concentrations ranged from 3.1 to 59 micrograms per liter (µg/L) during 2015. Soluble reactive phosphorus (SRP) concentrations ranged from non-detect (1.0 µg/L) to 53 µg/L. TP and SRP were usually highest at stations LL0, LL1, and LL2 in the hypolimnion (15 m and deeper) with higher levels usually starting in July. The highest TP concentration (59 µg/L) was at station LL1 at one meter off the bottom in late August. Similar to 2014, epilimnetic TP concentrations in the lacustrine zone (LL0, LL1, LL2) varied some in 2015, but were usually less than or equal to about 10 µg/L. The highest TP concentrations at the up-reservoir sites were measured at the surface (0.5 m) in July at a maximum of 44 µg/L at LL4, and in July and early September at LL5 at a maximum concentration of 42 µg/L and 52 µg/L, respectively. Volume-weighted water column TP concentrations for all stations was below 40 µg/L and for most of the period was below 30 µg/L.
- Total nitrogen (TN) concentrations at all six stations ranged from 470 to 2,300 µg/L over the monitoring period, with most of the TN consisting of nitrate+nitrite. The average lacustrine epilimnetic TN and nitrate+nitrite concentrations during June through September were 871 and 686 µg/L, respectively. It should be noted, the TN and nitrate+nitrite concentrations measured at Ecology's Nine Mile and Little Spokane Stations (54A090 and 55B070) were high (1,040 to 2,470 µg/L), with most being nitrate+nitrate, roughly matched the levels in the metalimnion and hypolimnion of the lacustrine zone. This suggests that plunging river inflows were the source of the high summer N concentrations in the reservoir, with groundwater being an important contributor.
- Chlorophyll concentrations at the six stations ranged from 0.2 to 18.2 µg/L in 2015. Chlorophyll maximums at the lacustrine sites were slightly higher in 2015 than in 2014 while maximums at the transition and riverine zone sites were lower. Maximums in 2014 at most sites were also higher than in 2012 or 2013. Chlorophyll was often highest at the 5 m depth (or 4 m depth at LL4) in 2015, which was the case in 2012, 2013, and 2014. However, chlorophyll differed more seasonally than with depth at the three up-reservoir sites, where sizable blooms occurred in July, August, and September, similar to conditions during both 2013 and 2014. The maximum chlorophyll concentration observed (18.2 µg/L) in 2015 was at 4 m at LL4 during early September.
- Transparency ranged from 1.2 to 9.9 m throughout the reservoir during 2015, and appears to be affected largely by phytoplankton (except during May).

- Phytoplankton density and biovolume were much greater at all stations in 2015 than the other years. The composition of the phytoplankton taxa showed diatoms (*Chrysophyta*) to be dominant at all the stations during spring, based on both cell counts and biovolume. Cyanobacteria (blue-green algae) increased numerically (cells/ml) at all sites in July and August, but were represented by significant biovolume at LL5 only in late July and late August. The 2015 pattern is similar to 2012 and 2014 when diatoms dominated during the spring at all sites, but cyanobacteria dominated cell counts at all sites in the summer. Diatoms and green algae represented the greatest biovolume at all sites in 2015.
- Algal scums were observed just downstream of LL5 and in between LL4 and LL5 starting in early August. This contrasts with 2014 when no scums were observed even though there was a large bloom. Conditions in 2015 are similar to those in previous years (2010 and 2012), in which a thick scum of accumulated algae (primarily cyanobacteria) occurred up-reservoir of LL4, just down-reservoir from the Nine Mile Resort boat launch, as well as at LL5. In 2015, samples collected by a representative of the Lake Spokane Association near LL4 (Suncrest Park) were positive for the cyanobacteria toxin microcystin at levels above the state guidelines. These samples were collected on three dates; July 27, August 4, and August 31.

Measures of Improvement

Tetra Tech used several standard limnological approaches to measure the lake's DO improvement since 1977. These approaches included comparing the minimum volume-weighted hypolimnetic DO over time, determining the lake's current trophic state index, and completing a cursory habitat evaluation for rainbow trout. Results of these analyses are discussed in the Lake Spokane Annual Summary Report 2015 Baseline Water Quality Monitoring Results (Tetra Tech 2016), which is available upon request, and are summarized below. The approaches used by TetraTech provide valuable information. Avista anticipates these or other approaches, along with the goals of the DO TMDL, will be used to determine compliance with the surface water quality standards at the end of the 10-year compliance schedule.

- The minimum volume-weighted hypolimnetic DO has substantially increased since 1977. In 1978, the City of Spokane's wastewater treatment plant implemented an 85% reduction in point-source TP in their discharge water. Prior to the TP reduction, minimum volume-weighted hypolimnetic DO ranged from 0.2 to 3.4 mg/L (1972 – 1977). Following the TP reduction, minimum volume-weighted hypolimnetic DO ranged from 2.5 to 4.5 mg/L (1978 – 1985). The current (2010 – 2015) minimum volume-weighted hypolimnetic DO ranged from 5.1 to nearly 8 mg/L, and averaged 6.3 mg/L with inflow TPs averaging 15.2 µg/L. While DO conditions have improved in Lake Spokane since 85% of point-source effluent phosphorus was removed in 1977, it is important to note data collected in 2015 indicate DO levels do not meet the surface water quality standard in the hypolimnion during portions of the summer critical season.

- The lake's tropic state, a general measure of biological production (utilizing concentrations of TP, chlorophyll, water clarity, etc.) is near borderline oligotrophic-mesotrophic, with the exception of the TP concentrations in the transition and riverine zones. The average TP in the transition and riverine zones was slightly greater than the oligotrophic-mesotrophic boundary (10 µg/L). The trophic state of the lake is an important index to measure, especially when evaluating the lake's habitat. A

eutrophic state indicates high biological production within the lake, an oligotrophic state indicates low biological production, and mesotrophic is between those two states.

- A cursory review of Lake Spokane's aquatic habitat specific to Washington's designated aquatic life use, core summer salmonid habitat was completed by Tetra Tech using the baseline nutrient monitoring data collected in 2015. Tetra Tech used a critical maximum temperature (18°C) and a minimum DO (6 mg/L) to compute the percent volume acceptable for growth for rainbow trout at the six stations for 2015 (Tetra Tech 2016, Figures 97-102). For the majority of the summer, between 10 and 20 m, DO was usually near or above 6 mg/L at the four deepest stations (LL0, LL1, LL2, and LL3). In August and September at LL0, DO dropped below the often cited required minimum of 5 mg/L between 10 and 20 m and was even lower at deeper depths. However, at the other deep stations DO remained above 5 mg/L. These data suggest that rainbow trout are most likely inhabiting cooler water in the metalimnion and upper portions of the hypolimnion. Additionally, the habitat volumes for temperature and DO together, as well as separately, were shown to indicate which factor appears most limiting. While DO was restrictive at LL0 later in the summer, there was little restriction from DO at the other sites. Further, Tetra Tech (2016) figures 97-102 show that habitat appears to be more restricted by temperature for rainbow trout. This evaluation provides a cursory review of rainbow trout habitat in Lake Spokane and how it might be affected by DO and temperature conditions, based upon select literature sources, as well as the data collected at the six lake stations. The above temperature and DO results suggest that trout likely avoid the epilimnion during most of the summer due to temperatures that reached 25°C and likely seek cooler water deeper than 10 m. However, to obtain site specific water quality limitations on fish habitat in Lake Spokane, a more thorough analysis would need to be completed.

Monitoring Recommendations

Avista will continue conducting nutrient monitoring in Lake Spokane during 2016 in accordance with the Ecology approved Quality Assurance Project Plan for Lake Spokane Nutrient Monitoring (Tetra Tech 2014). Following the completion of the 2016 nutrient monitoring season, Avista and Ecology will re-evaluate the results and success of monitoring baseline nutrient conditions in Lake Spokane and define future monitoring goals for the lake. This may include assessing whether the monitoring parameters, locations, duration, and frequency should be modified.

3.0 IMPLEMENTATION ACTIVITIES

3.1 Studies

In accordance with the DO WQAP, Avista focused its initial efforts on analyzing two measures: reducing carp populations and aquatic weed management, which were identified as having high potential for phosphorus reduction.

3.1.1 Carp Population Reduction Program

In order to investigate whether removing carp would improve water quality in Lake Spokane, a Lake Spokane Carp Population Abundance and Distribution Study consisting of a Phase I and

Phase II component, was initiated during 2013 and 2014. The purpose of this study was to better understand carp population abundance, distribution, and seasonal habitat use, as well as to help define a carp population reduction program, that may benefit Lake Spokane water quality.

Three contractors were utilized to complete different components of the Phase I and II Analyses, including Golder Associates (Golder), Ned Horner LLC (Avista contract Fishery Biologist), and Tetra Tech. The results of the Phase I and II Analyses were summarized in the Lake Spokane DO WQAP 2014 Annual Summary Report (Avista 2015).

Results of the Phase I and Phase II Analyses indicate that carp removal from Lake Spokane may provide meaningful reductions in TP directly through removal of TP in carp biomass (5g of TP/kg of carp) and indirectly through the reduction of re-suspended TP from sediments that carp disturb (bioturbation). The telemetry study, conducted in 2014, defined two time periods when carp were concentrated and vulnerable to harvest; during the winter and during the spring spawning period (May/June). The Phase II Analysis indicated that several different mechanical methods, including but not limited to, spring electrofishing, passive netting, and winter seining would be the most biologically effective and cost efficient means to reduce carp in Lake Spokane. With this, Avista plans to implement a pilot study utilizing a combination of these methods to identify which is the most effective way to remove carp from Lake Spokane.

Based upon the findings of the Phase I and II Analyses, Avista estimates the combination of these efforts could capture from 10,000 to 20,000 carp. The data obtained in 2014 indicated that the average carp weighs 4 kg/fish with about 5 g of TP/kg carp (wet weight), removing 10,000 to 20,000 carp would equate to removing approximately 200 to 400 kg (440 to 882 lbs) of TP from Lake Spokane. Removal of carp would likely also reduce bioturbation and resuspension of TP in sediments.

3.1.2 Aquatic Weed Management

There are approximately 940 acres of aquatic plants present in Lake Spokane, of which 315 acres consist of the non-native yellow floating heart and fragrant water lily (AquaTechnex 2012). In order to evaluate harvesting aquatic plants as a viable method of reducing phosphorus in the lake, Avista contracted Tetra Tech to complete a Phase I Analysis, which: 1) assessed whether harvesting would be a reasonable and feasible activity to perform in Lake Spokane; 2) refined TP concentrations of relevant weed species in Lake Spokane; and 3) quantified TP load reductions associated with selected control methods.

The results of the Phase I Analysis and Nutrient Reduction Evaluation were summarized in the Lake Spokane Dissolved Oxygen Water Quality Attainment Plan 2013 Annual Summary Report. Based upon the results, Avista concluded that harvesting aquatic plants in Lake Spokane at senescence, would not be effective in reducing TP in Lake Spokane. However, Avista will continue to implement winter drawdowns, herbicide applications at public and community lake access sites, and bottom barrier placement to control invasive/noxious aquatic weeds within the

lake. Avista may also, through adaptive management, reassess opportunities to harvest aquatic plants to control phosphorus in the future.

3.2 2015 Implementation Measures

The following section highlights measures which Avista implemented, or assisted in the implementation in order to reduce phosphorus loading and improve DO concentrations in Lake Spokane.

3.2.1 Carp

The Phase I and II Analyses indicated that carp removal from Lake Spokane may provide meaningful reductions in TP directly through removal of TP in carp biomass (5g of TP/kg of carp) and indirectly through the reduction of re-suspended TP from sediments that carp disturb (bioturbation). The telemetry study in 2014 defined two time periods when carp were concentrated and vulnerable to harvest; during the winter and during the spring spawning period in June. Based on these findings, Avista plans to implement a pilot study utilizing a combination of mechanical methods (including spring electrofishing, passive netting and winter seining), to identify an effective way to remove carp from Lake Spokane.

Ecology agreed with Avista's plan in an approval letter dated May 28, 2015. Following Ecology's approval, Avista worked with WDFW and Ecology in planning a carp reduction effort for 2016, which included the following activities.

Winter Seining

The Phase I and II Analyses indicated that carp aggregated in the winter near the Sportsman's Paradise area of Lake Spokane when temperatures were below 8°C and lake levels were stable. Large seines are used by commercial carp fishermen in Midwestern waters to surround and remove winter aggregations of carp. However, the bottom must be free of tree stumps, snags, large rocks, etc. to effectively seine. Preliminary sonar surveys conducted on July 23, 2015 and August 26, 2015 of the Sportsman's Paradise winter aggregation area indicated old stumps and other snags may prevent effective seining. Snags can be removed by dragging heavy cables, however in preliminary discussions with WDFW, dragging a cable along the river bottom to remove snags would require obtaining a Hydraulic Project Approval permit. Additionally, preliminary conversations with commercial carp fisherman indicated more telemetry data would be required prior to implementing this type pf effort. Given the timing, additional telemetry efforts and permit complexities involved with this method, Avista determined to focus initial efforts on the spring spawning reductions and following those activities will revisit winter seining opportunities with WDFW in the future.

Spring Spawning

Avista met with WDFW and Ecology during 2015 to discuss this method of removal, address any agency concerns and define contact people for developing a study design and proposal. Avista has been working directly with WDFW and the Idaho Cooperative Fishery Research Unit (Coop Unit) to better define the study methods and design, which include assessing the effectiveness of

boat electrofishing and the use of gill nets alone and in combination with electrofishing during carp spawning during the Spring over a two week timeframe. Avista will evaluate the effectiveness of carp removal during the spring spawning period in 2016. Additionally, Avista will analyze carp for phosphorus in order to confirm the amount of phosphorus removed. This will provide a more accurate understanding of how much phosphorus is removed from the lake through this program.

3.2.2 Wetlands

Avista acquired the 109 acre Sacheen Springs property, located on the west branch of the Little Spokane River. This property contains a highly valuable wetland complex with approximately 59 acres of emergent, scrub-shrub and forested wetlands and approximately 50 acres of adjacent upland forested buffer. Several seeps, springs, perennial and annual creeks are also found on the property. The property was purchased "in fee" and Avista will pursue a conservation easement in order to protect it in perpetuity. Avista completed a detailed site-specific wetland management plan and began implementing it upon Ecology and FERC's approval in 2014. Herbicide application to control terrestrial invasive weeds was completed in 2014 and 2015, and should help improve the overall biodiversity and function of the wetland property.

Avista and the Coeur d'Alene Tribe have acquired approximately 656 acres on upper Hangman Creek, within the southern portion of the Coeur d'Alene Tribe Reservation in Benewah County, Idaho approximately 10 miles east of the Washington-Idaho Stateline. Site-specific wetland management plans are updated annually for approximately 500-acres of these properties and include establishing long-term, self sustaining native emergent, scrub-shrub and/or forested wetlands, riparian habitat and associated uplands, through preservation, restoration and enhancement activities. These properties were all in agricultural use, including straightened creek beds prior to the acquisition. Given Hangman Creek is a significant contributor of sediment and associated phosphorus loading to the Spokane River, Avista anticipates a TP load reduction from the wetland mitigation work. Since 2013, approximately 8,000 native tree and shrub species have been planted on this wetland complex.

As part of the Nine Mile Hydroelectric Development's Rehabilitation Program, Avista partnered with the Washington State Parks and Recreation Commission Parks to complete a wetland and shoreline restoration project on four acres within the Little Spokane Natural Area Preserve. The Natural Area Preserve is a popular location for recreation, however two invasive weed species, yellow flag iris and purple loosestrife, have severely constricted large sections of the river and adjacent shoreline. The mitigation project included herbicide treatments on four acres of yellow flag iris and purple loosestrife invasive weed species during 2014 and 2015. Additionally, in 2014 four trees were removed from the Nine Mile barge landing site and relocated to the Little Spokane River Mitigation Site for large woody debris habitat. After two consecutive years of herbicide applications the stands of invasive weeds have been greatly reduced by an estimated 90%-100%. Also during 2015, Avista partnered with the Washington Department of Natural Resources to implement re-vegetation of the site which included planting 400 trees and shrubs (black cottonwoods, quaking aspens, chock cherry and red osier dogwood). Individual plants

were enclosed with four foot welded wire fencing for protection from browsing and the base was wrapped with a protective sleeve for protection from small mammals. Avista anticipates completing additional herbicide spot treatments in 2016.

Additionally, Avista worked with the Stevens County Conservation District (SCCD) to plan the placement of a floating treatment wetland in Lake Spokane. The purpose of the floating treatment wetland would be for wave attenuation outside a community swim area as well as potential TP removal.

3.2.3 Native Tree Planting

Due to the drought conditions experience in 2015, Avista and the SCCD decided to postpone planting additional native trees along Lake Spokane's shoreline on Avista-owned property. This project is part of the Long Lake Dam Reservoir and Tailrace Temperature Water Quality Attainment Plan. Avista and the SCCD hope to complete the tree planting during spring of 2016, pending weather conditions. Once mature, the trees will help reduce water temperature and improve habitat along the lake's shoreline.

3.2.4 Land Protection

Avista has identified approximately 215 acres of land that is currently used for grazing under lease from Washington State Department of Natural Resources (DNR). This land is located within the south half of Section 16 in Township 27 North, Rand 40 E.W. M. in Stevens County. Avista will continue pursuing a lease for the 215 acres of land from DNR with the intent of placing the land in conservation use.

In addition, Avista owns over 1,000 acres of land, of which approximately 350 acres are located within 200 feet of the Lake Spokane shoreline in Spokane, Stevens, and Lincoln counties at the downstream end of the reservoir. This includes approximately 14-miles of Avista-owned shoreline that is managed in accordance with Avista's, FERC approved, Spokane River Project Land Use Management Plan (Avista 2016). For the most part this land is contiguous along the north and south shorelines and is managed primarily for conservation purposes. Specific details related to Avista's land use management activities are included in the Land Use Management Plan, a copy of which is available upon request. During 2014 Avista continued to protect this area and will pursue identifying the potential TP load that could be avoided by maintaining a 200-foot buffer along the Avista-owned lake shoreline. Avista will pursue the quantification of this activity along the wetland/restoration enhancements as the 200-foot buffer should create similar sediment-filtering effects.

3.2.5 Rainbow Trout Stocking

Avista stocked 155,000 triploid rainbow trout (approximately six inches in length) in Lake Spokane during May 2015 as part of a FERC License requirement. As in 2014, Avista continues to hear positive feedback from fisherman indicating the stocked fish were healthy and on average 14 inches long with some as long as 16 inches. Anecdotal information demonstrates the lake is

becoming a more popular trout fishery as reported by local residents, news media, and agency staff.

3.2.6 Bulkhead Removal

During 2015, Avista continued to work with the Stevens County Conservation District (SCCD) to plan and permit a design for an additional bulkhead removal project on an Avista-owned shoreline parcel located in TumTum. The project would consist of replacing a 90 foot bulkhead with native rocks and vegetation to provide a more natural shoreline. We anticipate this project taking place during winter 2016/2017, after all permits have been obtained and when the lake is drawn down.

3.2.7 Education

Avista participated with others to support passage of a Washington law[1], effective January 2013, limiting the use of phosphorus (except for certain circumstances) in residential lawn fertilizers, which includes those adjacent to Lake Spokane in Spokane, Stevens, and Lincoln counties. Although the new law legally restricts use of fertilizer containing phosphorus, homeowner education will be important in actually reducing phosphorus loads to the lake.

During 2015, Avista participated in the SCCD's Best Management Implementation Project. This project is funded through an Ecology grant and one component includes educating Lake Spokane high school students about the water quality in the watershed. This includes discussing best management practices around the lake, such as, the benefits of natural shorelines with native vegetation buffers, proper disposal of lawn clippings and pet waste, use of phosphorus-free fertilizers, and regularly maintaining septic systems.

In addition, during 2015 Avista managed a booth at the Northern Idaho/Eastern Washington Annual Lakes Conference to provide education materials for lakeshore owners and community members.

Avista actively participates with the Lake Spokane Association and features articles regarding best management practices for shoreline homeowners in its annual Spokane River Newsletter which is distributed electronically to the Lake Spokane shoreline homeowners.

4.0 EFFECTIVENESS OF IMPLEMENTATION ACTIVITIES

Quantification of the implementation activities including wetlands, land protection, and carp removal are in progress as described for each of these activities below.

- **Wetlands**

[1] Engrossed Substitute House Bill 1489, Water Quality – Fertilizer Restrictions, Approved by Governor Christine Gregoire April 14, 2011 with the exception of Section 4 which is vetoed. Effective Date January 1, 2013.

Given Avista is in the initial stages of implementing site-specific wetland management plans for the Sacheen Springs and Hangman Creek properties, along with the lack of trading ratios associated with the DO TMDL, Avista is currently unable to quantify a TP load reduction for these properties. Avista will more thoroughly evaluate TP reduction once the site-specific wetland management plans have had a few years of implementation.

- **Land Protection**

  Avista will continue pursuing the 215 acre lease from DNR with the intent of placing the land in conservation use. Once this has been completed, Avista will provide a quantification of the estimated TP loading removed from eliminating, or limiting, grazing activities.

  In addition, Avista owns over 1,000 acres of land, of which approximately 350 acres are located within 200 feet of Lake Spokane's shoreline in Spokane, Stevens, and Lincoln counties at the downstream end of the reservoir. During 2015 Avista continued to protect this area and will pursue identifying the potential TP load that could be avoided by maintaining a 200-foot buffer along the Avista-owned lake shoreline.

  Avista will pursue quantifying TP load reduction for the 200-foot buffer and from the wetland/restoration enhancements, as these two activities should create similar sediment-filtering effects.

5.0 PROPOSED ACTIVITIES FOR 2016

The following activities are proposed for implementation in 2016.

- **Carp**

  Avista will assess the effectiveness of electrofishing and using gill nets during spring spawning when carp are concentrated in shallow areas. Avista may also explore the effectiveness of carp removal through archery. Avista is coordinating these efforts with WDFW and will obtain a scientific collection permit prior to implementing the activities.

  An education outreach effort will be completed during the spring spawning carp reduction efforts in order inform shoreline homeowners of the programs main objective, to reduce TP from the lake and improve dissolved oxygen concentrations.

  The TP reduction associated with the carp removal efforts will be quantified based upon the results of the Phase I Analysis as well as any new information pertaining to loading estimates for Lake Spokane. Avista will analyze carp for phosphorus in order to either confirm the 5 g of TP/kg identified during the Phase I Analysis, or allow for adjustment based upon the analysis results.

  With regard to carp disposal in 2016, the carp will be transported to one of Waste Management's municipal landfills upon approval at either its Wenatchee or Arlington Facilities. Avista is also pursuing carp disposal in the future at facilities, including, but not limited to:
  - Spokane Waste to Energy Plant
  - Barr-Tech (composting)

- Commercial use as crayfish, crab bait, etc.

- **Habitat Evaluation**

  Avista will continue to stock 155,000 triploid rainbow trout (approximately six inches in length) in Lake Spokane on an annual basis. Initial responses to the program indicate it is successful and the stocked trout are doing well. This program will assist Avista, Ecology and WDFW in the ongoing effort to evaluate suitable salmonid habitat in Lake Spokane. Additionally, Avista and WDFW will evaluate the success of the stocking program after ten years of implementation.

- **Wetlands**

  Avista will continue to implement site-specific wetland management plans for the Sacheen Springs and Hangman Creek properties.

  Additionally, Avista will continue to work with the SCCD to plan the placement of a floating treatment wetland in Lake Spokane. The purpose of the floating treatment wetland would be for wave attenuation outside a community swim area as well as for potential TP removal. Implementation is dependent upon SCCD receiving an Ecology grant for the work, as well as the participation from a homeowners association. Should the SCCD receive the grant, Avista would assist in the planning and implementation efforts, and with the nutrient monitoring component of the project.

- **Native Tree Planting**

  Pending weather conditions, Avista and the SCCD anticipate planting native tree species along Lake Spokane's shoreline on Avista-owned property in 2016. The tree planting will be completed as part of the Long Lake Dam Reservoir and Tailrace Temperature Water Quality Attainment Plan. Once mature, the trees will help reduce water temperature and improve habitat along the lake shoreline.

- **Land Protection**

  Avista will continue to pursue the 215 acre lease of land from DNR with the intent of placing the land in conservation use. Avista will also continue to protect the 200-foot buffer of Avista-owned shoreline located in the lower portion of the reservoir.

- **Bulkhead Removal**

  During the 2016/2017 winter, once all permits have been obtained, Avista will work with the SCCD to replace approximately 90 feet bulkhead with a more natural shoreline on the Avista-owned shoreline parcel in TumTum.

- **Education**

  Avista will continue to participate with Ecology, the Lake Spokane Association, the SCCD, and others to inform shoreline homeowners of best management practices they can implement to help protect the lake.

6.0 SCHEDULE

Avista's implementation schedule incorporates several benchmarks and decision points important in implementing the DO WQAP. Based on Ecology's recommendation, Avista has revised its DO WQAP Implementation Schedule (Figure 3, Revised DO WQAP Implementation Schedule) to better sync with the compliance schedule of the Spokane River and Lake Spokane Total Maximum Daily Load, including point- and non-point source wasteload and load reductions. The revision consists of removing the initial implementation dates that Avista would run the CE-QUAL model (2016/2017, 2019/2020, and 2021/2022). Avista will work with Ecology to develop a model plan by June 30, 2017 that includes criteria to decide when Avista will run the CE-QUAL model.

Benchmarks and important milestones completed to date, and extending into 2018 include the following.

2012

- Prepared the DO WQAP, which identified nine potentially reasonable and feasible measures to improve DO conditions in Lake Spokane. Approval of the DO WQAP was obtained from Ecology on September 27, 2012 and from FERC on December 19, 2012.

2013 (Year 1)

- Conducted the baseline nutrient monitoring in Lake Spokane (May through October).
- Conducted the Aquatic Weed Management Phase I Analysis and Nutrient Reduction Evaluation.
- Initiated the Lake Spokane Carp Population Abundance and Distribution Study.
- Planted 300 trees on Lake Spokane.
- Assisted with a bulkhead removal on the Staggs parcel and began designing the bulkhead removal for the second property on Lake Spokane.
- Protected approximately 14-miles of Avista-owned shoreline from future development.
- Acquired 109-acres of wetland property in the Little Spokane Watershed and 656-acres in the upper Hangman Creek Watershed.
- Continued education activities targeted at Lake Spokane shoreline homeowners.

2014 (Year 2)

- Completed and submitted the 2013 DO WQAP Annual Summary Report to Ecology and FERC.
- Conducted baseline nutrient monitoring in Lake Spokane (May through October).
- Completed the Lake Spokane Carp Population Abundance and Distribution Study.
- Planned and began permitting a bulkhead removal on an Avista Lake Spokane parcel.
- Protected approximately 14-miles of Avista-owned shoreline from future development.
- Implemented site-specific wetland plans on the Sacheen Springs and Hangman Creek properties.
- Stocked 155,000 triploid rainbow trout in Lake Spokane.
- Continued education activities targeted at Lake Spokane shoreline homeowners.

2015 (Year 3)

- Completed and submitted the 2014 DO WQAP Annual Summary Report to Ecology and FERC.
- Conducted baseline nutrient monitoring in Lake Spokane (May through October).
- Worked with WDFW and Ecology in planning a carp reduction effort for 2016.

- Continued planning and permitting the bulkhead removal on an Avista Lake Spokane parcel.
- Protected approximately 14-miles of Avista-owned shoreline from future development.
- Implemented site specific wetland plans on the Sacheen Springs and Hangman Creek properties.
- Stocked 155,000 triploid rainbow trout in Lake Spokane.
- Continued education activities targeted at Lake Spokane shoreline homeowners.

2016 (Year 4)

- Will submit the 2015 DO WQAP Annual Summary Report to Ecology and FERC by February 1 and April 1, respectively.
- Will conduct the baseline nutrient monitoring in Lake Spokane (May through October). Following monitoring, will evaluate the results and success of monitoring baseline nutrient conditions in Lake Spokane and work with Ecology to define future monitoring goals for the lake.
- Plan to initiate carp removal activities.
- Plan to complete the TumTum bulkhead replacement project.
- Will stock 155,000 triploid rainbow trout in Lake Spokane.
- Will continue to implement site specific wetland plans on the Sacheen Springs and Hangman Creek properties.
- Will protect approximately 14-miles of Avista-owned shoreline from future development.
- Plan to plant trees along Lake Spokane shoreline.

2017 (Year 5)

- Will submit the 2016 DO WQAP Five-Year Report to Ecology and FERC by February 1 and April 1, respectively.
- May conduct the baseline nutrient monitoring in Lake Spokane (May through October), dependent upon the 2016 monitoring program evaluation.
- Will complete other mitigation measures as proposed in previous years' Annual Summary Report.
- Will work with Ecology to develop a model plan by June 30, 2017 that includes criteria to decide when Avista will run the CE-QUAL Model. This may also include timing, objectives, and data input for potential future model runs.

2018 (Year 6)

- Will submit the 2017 DO WQAP Annual Summary Report to Ecology and FERC by February 1 and April 1, respectively.
- May conduct the baseline nutrient monitoring in Lake Spokane (May through October), dependent upon the 2016 monitoring program evaluation.
- Will complete other mitigation measures as proposed in previous years Annual Summary Report.
- Will discuss timing, objectives, and data input of potential future CE-QUAL Model runs with Ecology.

7.0 REFERENCES

Avista. 2016. Land Use Management Plan, Article 419, Spokane River Hydroelectric Project, FERC Project No. 2545. March 9.

Avista. 2015. Lake Spokane Dissolved Oxygen Water Quality Attainment Plan, 2014 Annual Summary Report, Washington 401 Certification, FERC License Appendix B, Section 5.6, Spokane River Hydroelectric Project, FERC Project No. 2545. May19.

Avista and Golder Associates, 2012. Lake Spokane Dissolved Oxygen Water Quality Attainment Plan, Spokane River Hydroelectric Project, FERC Project No. 2545, Washington 401 Certification, Section 5.6. Prepared by Avista and Golder Associates. October 5.

Ecology (Washington State Department of Ecology). 2009. 401 Certification-Order Spokane River Hydroelectric Project Certification-Order No. 5492 FERC License No. 2545, As amended May 8, 2009 by Order 6702.

Ecology (Washington State Department of Ecology). 2010a. Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load Water Quality Improvement Report. Publication No. 07-10-073. Revised February 2010.

Federal Energy Regulatory Commission (FERC). 2009. Order Issuing New License and Approving Annual Charges For Use Of Reservation Lands. Issued June 18.

Golder Associates. 2015. Lake Spokane Carp Population Abundance and Distribution Study 2014 Annual Report Phase I. January 29.

Horner LLC. Phase II Analysis Carp Harvest Potential in Lake Spokane. January 2015.

Tetra Tech. 2016. Lake Spokane Annual Summary Report, 2015 Baseline Water Quality Monitoring Results. January 2016.

Tetra Tech. 2016. Technical Memorandum, Literature Review of Phosphorus Loading from Carp Excretion and Bioturbation & Phosphorus Loading Estimates for Lake Spokane Carp. January.

Tetra Tech. 2014. Quality Assurance Project Plan for Lake Spokane Baseline Nutrient Monitoring. January 2014.

FIGURES

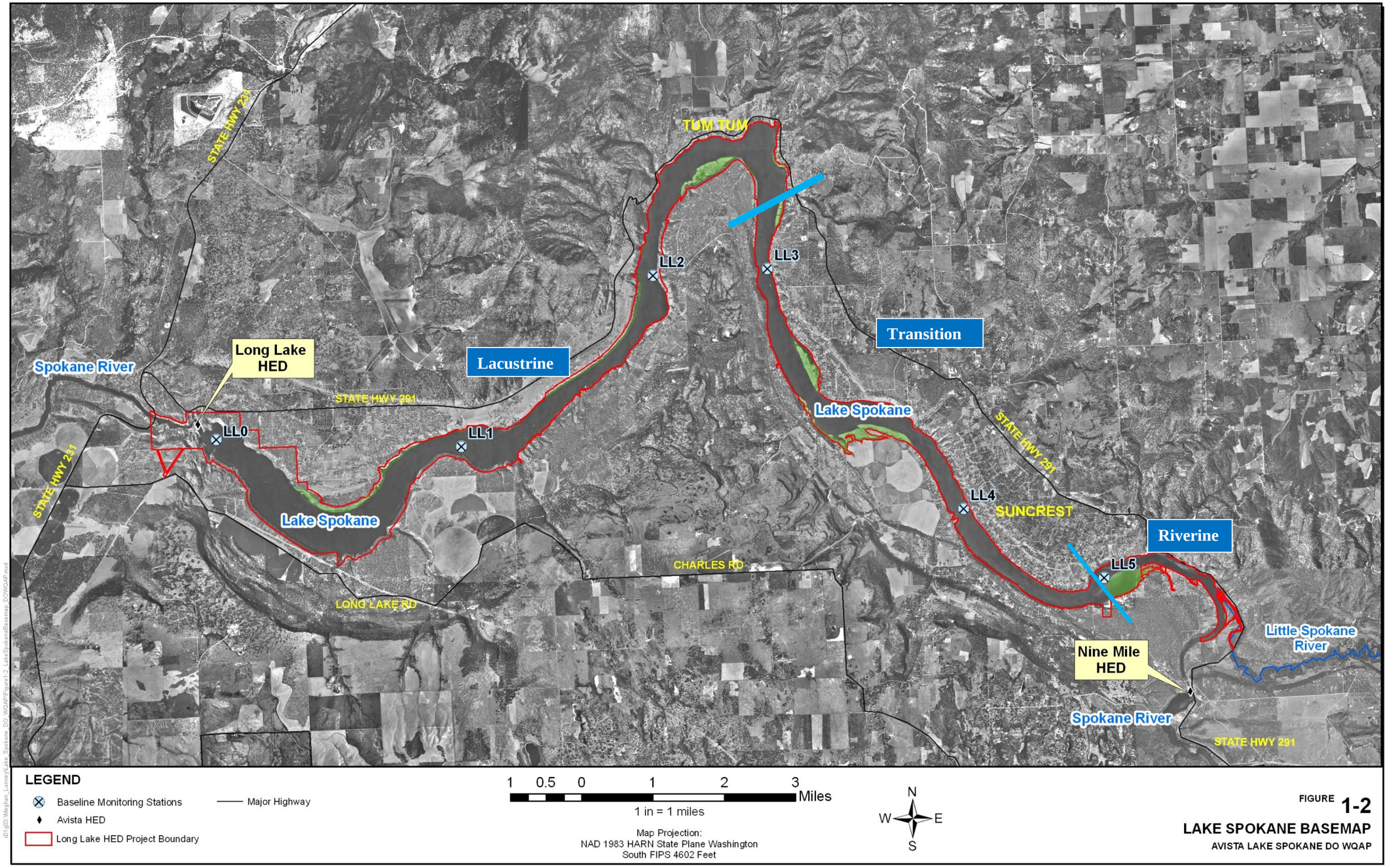

Figure 1. Lake Spokane Baseline Monitoring Stations

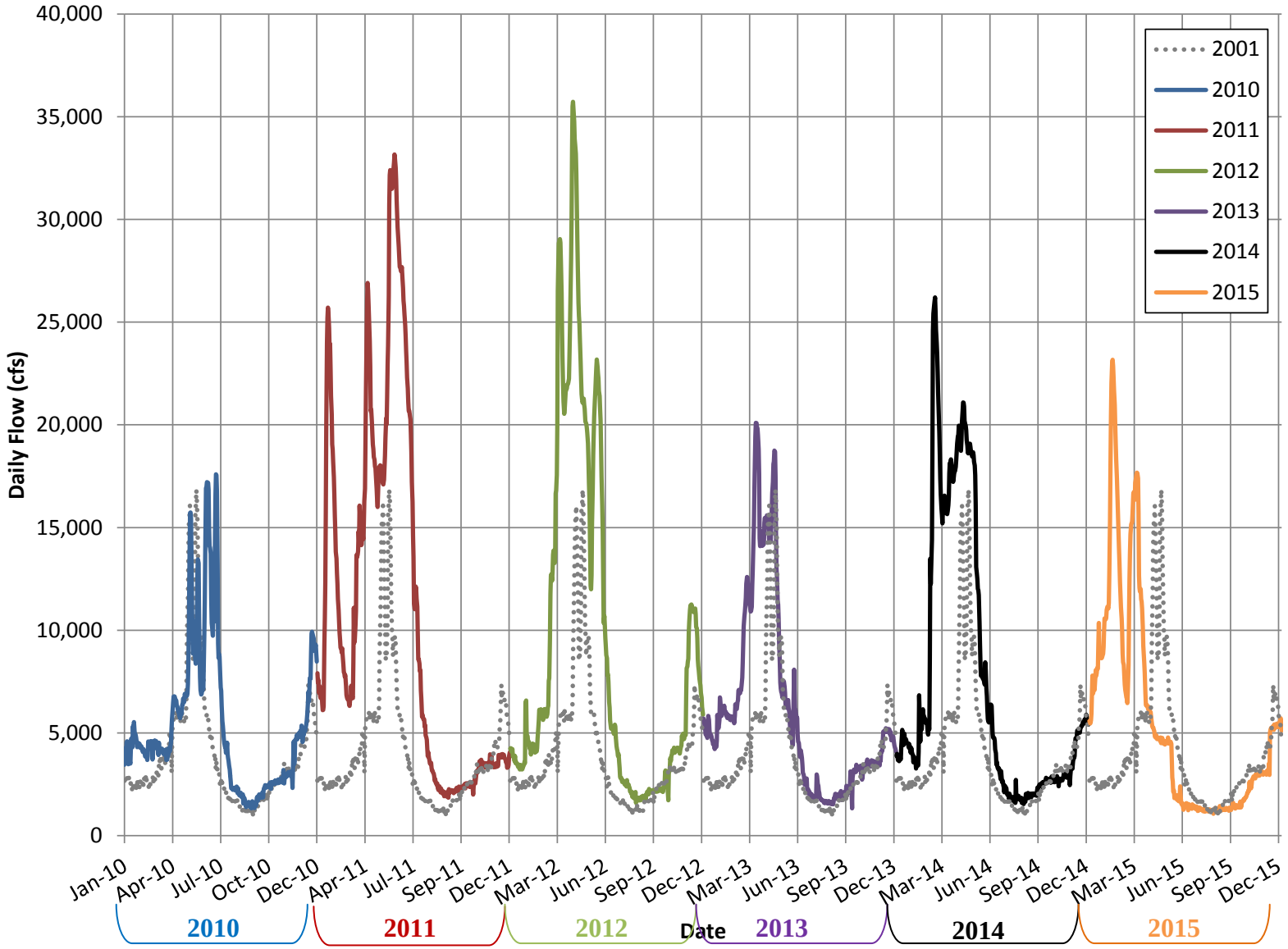

Figure 2. Total Inflows[1] between 2010 and 2015 into Lake Spokane contrasted with 2001 inflows (Source: TetraTech, 2016).

[1] Inflows calculated based on midnight to midnight lake elevation and day average outflow at midnight as recorded at Long Lake Dam.

Activity		Implementation Year[1]									
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
		Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall	Winter Spring Summer Fall
DO WQAP Submittal	Submit DO WQAP to Ecology	x										
	Receive approval from Ecology*	x										
	Submit DO WQAP to FERC*	x										
	Receive approval from FERC*	x										
Carp	Phase I Analysis: Identify location and population of carp		x x	x x x								
	Summarize Phase I findings [2]*			x	x							
	Phase II Analysis: Evaluate harvest technology			x x x x								
	Select carp removal method(s)			x								
	Summarize Phase II findings[2] , consult and discuss with Ecology				x							
	Determine with Ecology whether carp population reduction is reasonable and feasible to implement in Lake Spokane*				x							
	If determined reasonable and feasible, implement measure; if not, revise implementation strategy, monitoring, and schedule*				x x	x x x x						
	If implemented, monitor for nutrient reductions				x x	x x	x x	x x	x x	x x	x x	
Aquatic Weed Management	Phase I Analysis: Evaluate feasibility of mechanical harvesting		x x x									
	Nutrient reduction evaluation		x x									
	Summarize findings[2] , consult and discuss with Ecology*			x								
	Determine with Ecology whether aquatic weed harvesting is reasonable and feasible to implement in Lake Spokane*			x								
	If determined reasonable and feasible, implement measure; if not, revise implementation strategy, monitoring, and schedule*			x x	x x	x x	x x	x x	x x	x x	x x	
	If implemented, monitor for nutrient reductions			x x	x x	x x	x x	x x	x x	x x	x x	
	Implement yearly aquatic weed controls through separate program[3]			x x	x x	x x	x x	x x	x x	x x	x x	
Other Measures	Evaluate & implement additional measures, as appropriate						x x x x	x x x x	x x x x	x x x x	x x x x	
Monitoring & Modeling	Baseline Monitoring[4]	x x x	x x x	x x x	x x x	x x x						
	Ongoing Habitat Analysis[5]			x x	x x	x x	x x	x x	x x	x x	x x	
	Site Specific Nutrient Reduction Analysis[6]											
	CE-QUAL Modeling[7]											
Compliance Reporting	DO WQAP Annual Summary Report*			x	x	x		x	x		x	
	Five, Eight, and Ten-Year Reports*						x			x		x

Notes:

(1) = Implementation Year dependent upon date of FERC approval.

(2) = Findings would be summarized in the DO WQAP Annual Summary/Report, which will be submitted to Ecology for review and approval.

(3) = Annual aquatic weed control activities implemented under the Lake Spokane and Nine Mile Reservoir Aquatic Weed Management Program.

(4) = Avista and Ecology will re-evaluate baseline nutrient monitoring program following the completeing of the 2016 season.

(5) = Ongoing in nature with periodic reporting to Ecology.

(6) = Dependent upon outcome of carp population reduction and aquatic weed management phased analyses.

(7) = Avista will continue to work with Ecology to determine the timing for future CE-QUAL model runs.

<u>Revised</u> Figure 3. DO WQAP Implementation Schedule (Source: Figure 3-3, DO WQAP)

Revised: March 2016

APPENDICES

APPENDIX A

Agency Consultation

1411 East Mission Avenue
PO Box 3727
Spokane, WA 99220-3727

January 29, 2016

Patrick McGuire, Water Quality Program
Washington Department of Ecology
Eastern Regional Office
4601 N Monroe Street
Spokane, WA 99205-1295

Subject: Lake Spokane Dissolved Oxygen Water Quality Attainment Plan, 2015 Annual Summary Report

Dear Pat:

I have enclosed the Lake Spokane Dissolved Oxygen Water Quality Attainment Plan 2015 Annual Summary Report (Annual Report) for your review and approval. The Annual Report was completed in accordance with the Lake Spokane Dissolved Oxygen Water Quality Attainment Plan (DO WQAP), required by the Spokane River Hydroelectric Project License (License) Appendix B, Section 5.6.C of the Washington Department of Ecology (Ecology) Section 401 Water Quality Certification.

The Annual Report provides a summary of the 2015 baseline monitoring, implementation activities, effectiveness of the implementation activities, and proposed actions for the upcoming year. As you're aware, Avista has been working with WDFW in planning to implement a carp removal effort in Lake Spokane this spring, when carp are congregated and in shallow areas. Avista will continue to keep Ecology updated as we implement this project, and will continue to work with WDFW in planning the effort as well as obtaining all the required permits prior to implementation.

Additionally, based upon Ecology's recommendation, Avista revised its DO WQAP Implementation Schedule (Figure 3) to better sync with the compliance schedule for the Spokane River and Lake Spokane Total Maximum Daily Load, including point- and non-point source wasteload and load reductions. The revision consists of removing the initial implementation dates that Avista would run the CE-QUAL Model (2016/2017, 2019/2020, and 2021/2022). Avista will continue to work with Ecology to determine the timing for future CE-QUAL model runs.

Avista also looks forward to visiting with Ecology, following the 2016 monitoring season to discuss the results and success of monitoring baseline nutrient conditions and to define future monitoring goals for the lake.

We would appreciate your review of the Annual Report by **March 7, 2016**. This will allow us time to incorporate your comments and recommendations, if you have any, and submit it to the Federal Energy Regulatory Commission by **April 1, 2016**.

Please feel free to call me at (509) 495-4643 if you have any questions about the Annual Report.

Sincerely,

Meghan Lunney
Aquatic Resource Specialist

Enclosure

cc: Dave Knight, Ecology
Chad Brown, Ecology
Speed Fitzhugh, Avista

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

March 7, 2016

Ms. Meghan Lunney
Aquatic Resource Specialist
Avista Corporation
1411 East Mission Avenue, MSC-1
Spokane, WA 99220-3727

RE: Ecology Review and Comments –*Lake Spokane Dissolved Oxygen Water Quality Attainment Plan, 2015 Annual Summary Report.* Spokane River Hydroelectric Project, No. P-2545

Dear Ms. Lunney:

The Department of Ecology (Ecology) has reviewed the Lake Spokane Dissolved Oxygen Water Quality Attainment Plan, 2015 Annual Summary Report sent to us on January 29, 2016. The Annual Summary Report is a requirement of Section 5.6.C, Appendix B of the 401 Certification.

Ecology offers the following comments:

1. Report Section 3.2.1: Do *Carp Implementation Measures*, include verification testing carp for phosphorous content to assess how much phosphorous is being removed? This testing would confirm the 5g of TP/kg stated or allow for adjustment to the calculations.
2. Ecology is concerned how and where the carp will be disposed. It would be beneficial to mention options to be explored to keep PCBs out of the environment.
3. In section 6.0 the Report notes that Avista protected about 14 miles of Avista-owned shoreline. It would be helpful to add some more details such as:
    a. What stretch or stretches? Is the area protected in one section or contiguous, or is it in a number of sections?
    b. What was done to protect the shoreline area(s) – fencing, plantings, easements or agreements?
4. In section 6.0 Avista notes the revision of the original 3 proposed CE-QUAL-W2 model implementation dates and that Avista will work with Ecology to establish future model runs. Ecology asks that Avista develop a model plan by June 30, 2017 that includes criteria to decide when Avista would run the model.

Please contact me at (509) 329-3567 or pmcg461@ecy.wa.gov if you have any questions.

Sincerely,

Pat McGuire

Patrick McGuire
Eastern Region FERC License Coordinator
Water Quality Program

PDM:jab
cc: Elvin "Speed" Fitzhugh, Avista

ECOLOGY COMMENTS AND AVISTA RESPONSES

On March 7, 2016, Ecology provided comments on the Lake Spokane Dissolved Oxygen Water Quality Attainment Plan 2015 Annual Summary Report (Annual Summary Report), dated January 29, 2016. Avista subsequently modified the Annual Summary Report to incorporate these comments, and resubmitted it to Ecology on March 21st. Avista's responses to Ecology's comments are provided as follows.

Ecology Comment 1:
Report Section 3.2.1: *Do Carp Implementation Measures*, include verification testing carp for phosphorus content to assess how much phosphorous is being removed? This testing would confirm the 5g of TP/kg stated or allow for adjustment to the calculations.

Avista Response
Section 3.2.1 was revised to incorporate the confirmation phosphorus testing.

Ecology Comment 2:
Ecology is concerned how and where the carp will be disposed. It would be beneficial to mention options to be explored to keep PCBs out of the environment.

Avista Response
Section 5.0 was revised to incorporate the 2016 carp disposal location.

Ecology Comment 3:
In Section 6.0 the Report notes that Avista protected about 14 miles of Avista-owned shoreline. It would be helpful to add some more details such as:

a. What stretch or stretches? Is the area protected in one section or contiguous, or is it in a number of sections?
b. What was done to protect the shoreline area(s) – fencing, plantings, easements or agreements?

Avista Response
Section 3.2.4 was revised to provide clarification that the 14-miles of Avista-owned shoreline, referenced in Section 6.0, is managed primarily for conservation purposes as part of Avista's Land Use Management Plan.

Ecology Comment 4:
In section 6.0 Avista notes the revision of the original 3 proposal CE-QUAL-W2 model implementation dates and that Avista will work with Ecology to establish future model runs. Ecology asks that Avista develop a model plan by June 30, 2017 that includes criteria to decide when Avista would run the model.

Avista Response:
Section 6.0 was revised to reference the model plan, to be developed by June 30, 2017.

Lunney, Meghan

From: McGuire, Patrick D. (ECY) <PMCG461@ECY.WA.GOV>
Sent: Monday, March 28, 2016 1:20 PM
To: Lunney, Meghan; Fitzhugh, Speed (Elvin)
Cc: Knight, David T. (ECY)
Subject: [External] RE: Lake Spokane DO WQAP, 2015 Annual Summary Report _ REVISIONS

Hi Meghan and Speed – Ecology (Karin and I) has reviewed the Lake Spokane DO WQAP 2015 Annual Report that includes the modifications Ecology requested. Ecology approves the 2015 DO WQAP Annual Report as modified. If you have any questions please call or e-mail me. Thanks!

Patrick McGuire
Hydropower Compliance Specialist
Water Quality Program
Eastern Regional Office
(509) 329-3567
e-mail: pmcg461@ecy.wa.gov

From: Lunney, Meghan [mailto:Meghan.Lunney@avistacorp.com]
Sent: Monday, March 21, 2016 2:37 PM
To: McGuire, Patrick D. (ECY) <PMCG461@ECY.WA.GOV>
Cc: Fitzhugh, Speed (Elvin) <SpeedElvin.Fitzhugh@avistacorp.com>; Knight, David T. (ECY) <dkni461@ECY.WA.GOV>
Subject: Lake Spokane DO WQAP, 2015 Annual Summary Report _ REVISIONS
Importance: High

We have revised the Lake Spokane Dissolved Oxygen Water Quality Attainment Plan 2015 Annual Summary Report (2015 Annual Summary Report) to **address the comments you provided on March 7, 2016**. The revisions include modifications to the main body of the report as summarized below. To help expedite your review, I have included a version showing the red-lined revisions as well as a clean version.

Comment 1
Section 3.2.1 was modified to incorporate the confirmation phosphorus testing.
Comment 2
Section 5.0 was modified to incorporate the 2016 carp disposal location.
Comment 3
Section 3.2.4 was modified to provide clarification that the 14-miles of Avista-owned shoreline, referenced in Section 6.0, is the same as the 1,000-acres of Avista owned land located within 200-feet of the shoreline located in the downstream end of the reservoir and is held in conservation land as part of Avista's Land Use Management Plan.
Comment 4
Section 6.0 was modified to reference the model plan, to be developed by June 30, 2017.

We would greatly appreciate your expedited review of the 2015 Annual Summary Report by **March 29th** in order to meet the FERC submittal date of April 1st. Upon your approval, we will submit the report to FERC and continue pursuing the carp removal pilot study as well as the other implementation activities outlined in the report.

Please feel free to give me a call at 509-495-4643 if you have any questions.

Thanks!!
-Meghan.

Meghan Lunney
Aquatic Resource Specialist

1411 E Mission MSC-1
Spokane, WA 99202
P 509.495.4643
C 509.842.6133
meghan.lunney@avistacorp.com
http://www.avistautilities.com/environment/spokaneriver/resources/Pages/default.aspx

---

From: McGuire, Patrick D. (ECY) [mailto:PMCG461@ECY.WA.GOV]
Sent: Monday, March 07, 2016 1:21 PM
To: Lunney, Meghan; Fitzhugh, Speed (Elvin)
Subject: [External] Ecology comment letter on Lake Spokane DO WQAP, 2015 Annual Report

Hi Meghan – here's our comments. Please give me a call if you have any questions. Thanks!

Patrick McGuire
Hydropower Compliance Specialist
Water Quality Program
Eastern Regional Office
(509) 329-3567
e-mail: pmcg461@ecy.wa.gov
