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Via Electronic Filing

Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 1st Street N.E.
Washington, D.C. 20426

April 28, 2015

Subject: 2014 Water Temperature Annual Report

Dear Secretary Bose:

Public Utility District No. 1 of Douglas County, Washington (Douglas PUD), licensee for the Wells Hydroelectric Project (Wells Project), respectfully submits the final 2014 Water Temperature Annual Report for the Wells Project (Water Temperature Report; Appendix A). The Water Temperature Report summarizes water temperature activities and milestones for calendar year 2014.

Submission of this report is due to the FERC by April 30, 2014. The filing of this Water Temperature Report is also consistent with requirements contained within Douglas PUD's 401 Water Quality Certification 6.7(3)(b) and license Article 401(b) for the Wells Project.

Consistent with license requirements, Douglas PUD provided a draft Water Temperature Report to the parties to the Aquatic Settlement Agreement for review and comment. Douglas PUD's responses to the received comments and recommendations are provided in Appendix B of this filing and serve as a consultation record pertinent to the Water Temperature Report development, review and approval. Revisions to the draft Water Temperature Report were approved by the applicable agencies and tribes during the April 8, 2015 Aquatic Settlement Work Group conference call.

If you have any questions or require further information regarding the enclosed report, please feel free to contact Andrew Gingerich at (509) 881-2323 or andrewg@dcpud.org.

Sincerely,

Shane Bickford
Natural Resources Supervisor

Enclosures:
(1) Appendix A – 2014 Water Temperature Annual Report
(2) Appendix B – Pre-filing Consultation Record Supporting the Approval of the 2014 Water Temperature Annual Report

Cc: Aquatic Settlement Work Group
Charlie McKinney – Ecology
Chris Coffin – Ecology
Chas Kyger – Douglas PUD
Andrew Gingerich – Douglas PUD

APPENDIX A

2014 WATER TEMPERATURE ANNUAL REPORT

2014 WATER TEMPERATURE ANNUAL REPORT

WELLS HYDROELECTRIC PROJECT

FERC NO. 2149

March 11, 2015

Prepared by:

Public Utility District No. 1 of Douglas County
East Wenatchee, WA

Prepared for:
Washington Department of Ecology
Yakima, WA

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1.0 INTRODUCTION

The Wells Hydroelectric Project (Wells Project or Project) is owned and operated by the Public Utility District No. 1 of Douglas County (Douglas PUD). On November 9, 2012, Douglas PUD received a new 40-year license for the Wells Project from the Federal Energy Regulatory Commission (FERC). During the FERC licensing process, Douglas PUD submitted to the Washington Department of Ecology (Ecology), an application for a 401 Water Quality Certification (401 Certification) on September 30, 2010, pursuant to the provisions of 33 USC §1341 (§401 of the Clean Water Act [CWA]). On September 12, 2011, Douglas PUD withdrew its request and reapplied. On February 27, 2012, Ecology concluded that the Wells Project, as conditioned by its 401 Certification/Order No. 8981, complied with all applicable provisions of 33 USC 1311, 1312, 1313, 1316, 1317 and appropriate requirements of Washington State law (Ecology 2012).

Pursuant to the Wells Project License Order and the 401 Certification, Douglas PUD is required to maintain compliance with the state Water Quality Standard (WQS) for water temperature through continued implementation of a monitoring program and to prepare an annual report of the monitoring results and analyses for submittal by April 30 of the following year (Ecology 2012).

This annual report summarizes water temperature activities implemented at the Wells Project in 2014. Background activities including the Project description, regulatory framework, past Wells Project temperature activities, and 401 Certification temperature requirements are presented in Section 2.0. Implementation results for 2014 are presented in Section 3.0 and include the implementation of an Ecology-approved Quality Assurance Project Plan (QAPP) for water temperature, and the results of water temperature monitoring activities within the Wells Project.

2.0 BACKGROUND

2.1 Project Description

The Wells Project is located at river mile (RM) 515.6 on the Columbia River in the State of Washington. Wells Dam is located approximately 30 river miles downstream from the Chief Joseph Dam, owned and operated by the U.S. Army Corps of Engineers (USACE), and 42 miles upstream from the Rocky Reach Dam, owned and operated by Public Utility District No. 1 of Chelan County. The nearest town is Pateros, Washington, which is located approximately 8 miles upstream from the Wells Dam.

The Wells Project is the chief generating resource for Douglas PUD. It includes ten generating units with a nameplate rating of 774.3 MW and a peaking capacity of approximately 840 MW. The design of the Wells Project is unique in that the generating units, spillways, switchyard, and fish passage facilities were combined into a single structure referred to as the hydrocombine. Fish passage facilities reside on both sides of Well Dam, which is 1,130 feet long, 168 feet wide, with a crest elevation of 795 feet in height. The juvenile fish bypass (JBS) system was developed by Douglas PUD and uses a barrier system to modify the intake velocities on all even numbered spillways (2, 4, 6, 8 and 10).

The Wells Reservoir is approximately 30 miles long. The Methow and Okanogan rivers are tributaries of the Columbia River within the Wells Reservoir. The Wells Project boundary extends approximately 1.5 miles up the Methow River and approximately 15.5 miles up the Okanogan River. The normal maximum surface area of the reservoir is 9,740 acres with a gross storage capacity of 331,200 acre-feet and usable storage of 97,985 acre-feet at elevation of 781 feet above mean sea level (msl). The normal maximum water surface elevation of the reservoir is 781 feet (Figure 1).

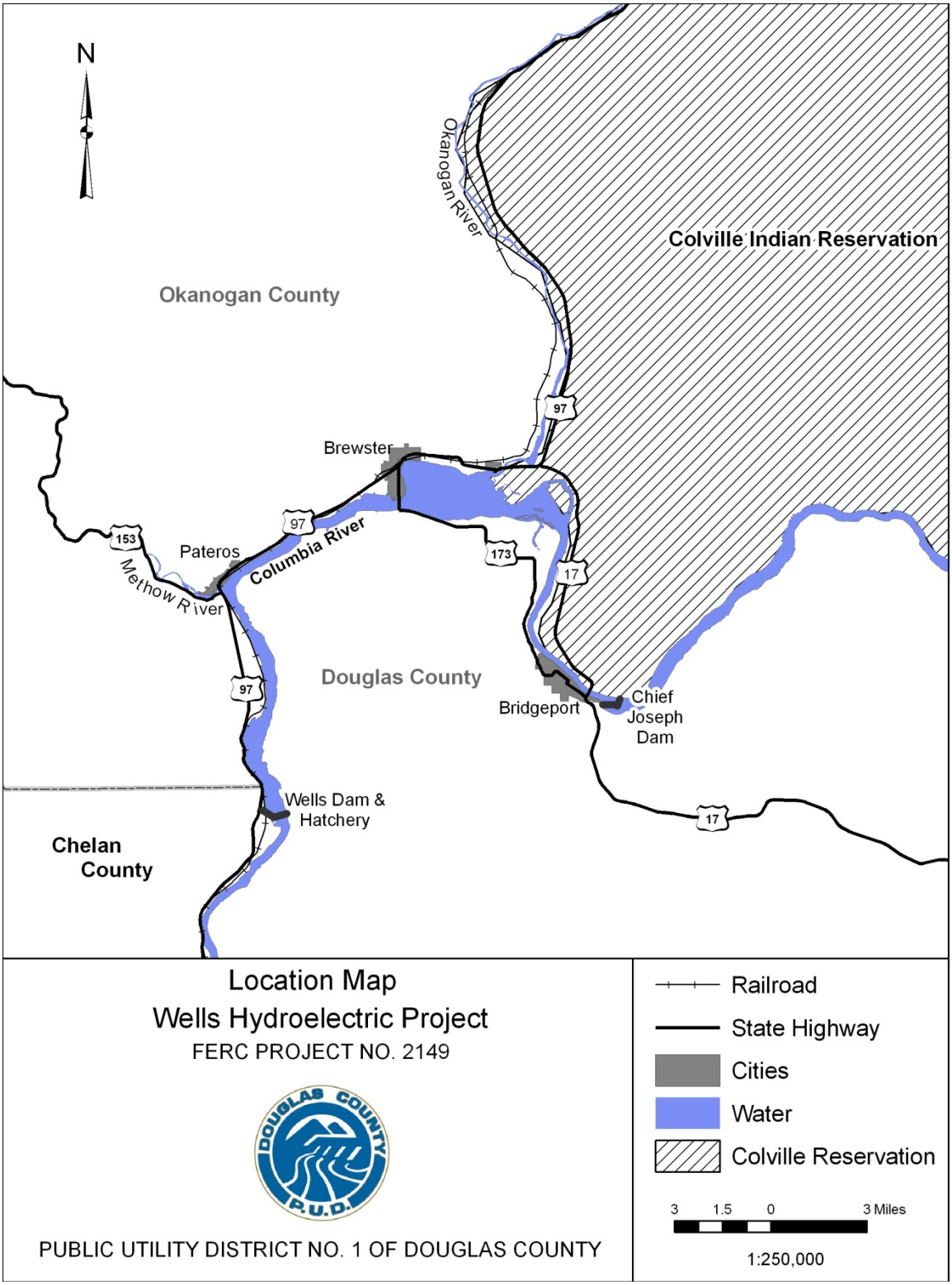

Figure 1. Location Map of the Wells Project.

2.2 Regulatory Framework

2.2.1 Temperature Water Quality Standard

Temperature is measured by the 7-day average of the daily maximum temperatures (7-DADMax). The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date (WAC 173-201A-020).

Under the Washington State WQS, the 7-DADMax temperature within the Columbia, Methow, and Okanogan river portions of the Wells Project shall not exceed 17.5°C (63.5°F) (WAC 173-201A-602 and 173-201A-200(1)(c)). When a water body's temperature is warmer than 17.5°C (or within 0.3°C (0.54°F) of the criteria) and that condition is due to natural conditions, then human actions considered cumulatively may not cause the 7-DADMax temperature of that water body to increase more than 0.3°C (0.54°F).

In addition to the numeric criteria above, the WQS contains additional supplemental temperature requirements for the Project portion of the Methow River (i.e., Methow River Supplemental Requirements). Ecology has identified water bodies, or portions thereof, which require special protection for spawning and incubation in accordance with Ecology publication 06-10-038. This publication indicates where and when the following criteria are to be applied to protect the reproduction of native char, salmon, and trout. Water temperatures are not to exceed 13°C from October 1 to June 15 in the lower Methow River including the portion within the Project boundary (up to RM 1.5).

2.2.2 305(b) Report, 303(d) List and Total Maximum Daily Loads

Every two years, the Environmental Protection Agency (EPA), as specified in section 305(b) of the CWA, requires Ecology to compile an assessment of the State's water bodies. Data collected from the water quality assessment are used to develop a 305(b) report. The report evaluates and assigns each water body into five categories based upon the Ecology's evaluation of the water quality parameters collected from within each water body.

(1) Category 1 states that a water body is in compliance with the State WQS for the parameter of interest.
(2) Category 2 states a water body of concern.
(3) Category 3 signifies that insufficient data are available to make an assessment.
(4) Categories 4a-4c indicates an impaired water body that does not require a Total Maximum Daily Load (TMDL) for one of three reasons:

- Category 4a indicates a water body with a finalized TMDL.
- Category 4b indicates a water body with a Pollution Control Program.
- Category 4c indicates a water body impaired by a non-pollutant (e.g., low water flow, stream channelization, and dams).

(5) Category 5 represents all water bodies within the State that are considered impaired and require a Water Quality Implementation Plan (WQIP) (formerly TMDL). The 303(d) list consists of only water bodies with Category 5 listings.

For temperature, the reach of the Columbia River within the Project is on the State's 2012 303(d) list for temperature impairment. The EPA has developed a draft temperature TMDL for the mainstem Columbia River, including that portion of the Columbia River contained within the Project. It is anticipated that the EPA will issue the final temperature TMDL for the Columbia River at some future date. The TMDL will address the water temperature effects of dams and other human actions, including model analyses and load allocations for mainstem hydroelectric projects including Wells Dam.

The reach of the Methow River within the Project (RM 1.5) is not on the 2012 303(d) list for temperature.

The reach of the Okanogan River within the Project (RM 15.5) is not on the 2012 303(d) list for temperature. However, reaches of the Okanogan River upstream of the Wells Project boundary are listed on the 2012 303(d) list for temperature.

2.3 Wells Project Water Temperature Activities

2.3.1 Wells Reservoir and tributaries

Beginning in 2001, an extensive water temperature monitoring effort was initiated by Douglas PUD in order to better understand the temperature dynamics throughout the Wells Reservoir. Temperature data was collected by Douglas PUD at four locations in the Columbia River (RM 544.5, RM 535.3, RM 530.0, and RM 515.6) and at one site each on the Okanogan (RM 10.5) and Methow (RM 1.4) rivers. Data collected by Douglas PUD were collected hourly using Onset© Tidbit temperature loggers. Monitoring start and end dates varied from year to year but generally began in the early spring and ended in late fall. Quality assurance and control measures were implemented prior to deploying and upon retrieving temperature loggers to ensure that data collected were accurate. Due to sensor loss or sensor malfunction in some years, the availability of data at some of these monitoring locations is sporadic (WEST Consultants 2008).

The 7-DADMax temperature data recorded since 2001 indicate that the portion of the Columbia River upstream of and within the Project generally warms to above 17.5^{o}C (WQS numeric criteria) in mid-July and drops below the numeric criterion by early October. Temperatures in the Methow River upstream of the Project warm to above 17.5^{o}C in mid-July and drop below the numeric criterion by September, while trends in the Okanogan River upstream of the Project indicate warming above 17.5^{o}C from early June with cooling by late September.

To assess compliance with the state WQS for temperature (during the Wells Project FERC relicensing process), two 2-dimensional laterally-averaged temperature models (using CE-QUAL-W2) were developed that represented existing (or "with Project") conditions and "without Project" conditions of the Wells Project area, including the Columbia River from the Chief Joseph Dam tailrace to Wells Dam, the lowest 15.5 miles of the Okanogan River, and the

lowest 1.5 miles of the Methow River. The results were processed to develop daily values of the 7-DADMax, and then compared for the two conditions.

The model analyses demonstrated that "with Project" temperatures in the Columbia, Okanogan and Methow rivers do not increase more than 0.3°C compared to ambient ("without Project") conditions anywhere in the reservoir, and that the Project complies with the state WQS for temperature (West Consultants Inc. 2008). However, as identified in the Wells Project 401 Certification, a full evaluation of potential temperature impacts of hydroelectric power generation on the Columbia River will most likely require analysis of hydraulic and temperature conditions on a system-wide basis. Hydraulic and temperature influences from upstream dams complicate the evaluation of Project-related impacts. The only way to properly understand these impacts is to examine the river water temperatures more comprehensively through a system-wide TMDL study such as that which is under consideration for development by EPA. Douglas PUD is participating in the Sovereign Technical Team Water Quality Workgroup and is collaborating with the USACE and other agencies that are developing a temperature model that will inform Columbia River Treaty negotiations with the Canadian Government.

2.3.2 Wells Dam Fish Ladders

According to the terms and conditions found in the Biological Opinion (BO) supporting the implementation of the Wells Anadromous Fish Agreement and Habitat Conservation Plan (HCP) all entities that use the fish ladder trapping facilities at Wells Dam are required to monitor the water temperatures within the ladders every two hours from May 1 to November 15 and to discontinue trapping operations when fish ladder water temperatures exceed 68.0º F (20.0°C). In 2001, Douglas PUD added supplemental temperature recording equipment at Pool 39 near the broodstock collection facilities in the east fishway at Wells Dam to ensure compliance with requirements in the National Marine Fisheries Service (NMFS) HCP BO. In 2001, hourly data indicated that water temperatures at this location in the east fish ladder did not exceed 68.0ºF (20.0°C) at any time during the monitoring period, which ran from late July to early December. In 2003, data were recorded every two hours and exceedances of greater than 68.0ºF (20.0°C) were observed on only three hourly occasions.

2.4 401 Certification Temperature Requirements

The Wells Project 401 Certification requires that Douglas PUD maintain compliance with the state WQS for water temperature (via citation of the Wells Project Water Quality Management Plan [Douglas PUD 2008]) by monitoring water temperature at various Wells Project locations at certain times of the year and transmitting these data on a daily basis to a web-accessible database. Specific requirements include:

1. Prepare a QAPP for each water quality parameter to be monitored. QAPPs shall follow the Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (July 2004 Ecology Publication Number 04-03-030).

2. Monitor water temperatures at three boundary locations of the Wells Project (Methow River RM 1.5, Okanogan River RM 10.5, and Columbia River RM 544.5) and in the Well Dam Forebay and Tailrace on an hourly basis, from April 1st to October 31st.

3. Continue to collect hourly fish ladder temperatures 24 hours a day during the upstream fish passage season (currently May 1 to November 15) at the Wells Dam East Fishway Pool No. 39[1].

4. Monitor water temperatures hourly in the auxiliary water supply system and near the east shore of the Wells Dam Forebay (bottom, middle, and surface depths) during the upstream fish passage season (May 1 to November 15).

5. Transmit hourly temperature data on a daily basis to a web-accessible database maintained by Douglas PUD and available to Ecology, regional fish management agencies, and the public.

6. Develop an annual report of the monitoring results and analyses, in a format approved by Ecology, and submit it by April 30 of the following year.

3.0 IMPLEMENTATION RESULTS

3.1 Quality Assurance Project Plan

As required by the 401 Certification section 6.7(7)(a)(i), Douglas PUD developed a Wells Project QAPP for water temperature and total dissolved gas (TDG) (Douglas PUD 2013). The QAPP describes a systematic approach for collecting high quality and reliable data that may be used to determine compliance of these parameters with the State of Washington's WQS for the Wells Project. With regard to temperature, the QAPP contains a map of sampling locations, descriptions of the purpose of the monitoring, sampling frequency, sampling procedures and equipment, analytical methods, quality control procedures, data handling and data assessment procedures and reporting protocols (Douglas PUD 2013). The QAPP was provided to Ecology for review on March 4, 2013 and subsequently approved. Douglas PUD submitted the QAPP to the FERC on June 21, 2013, which issued an order approving it on August 8, 2013.

3.2 Regulatory and Permitting

3.2.1 Joint Aquatic Resource Permit Application

The installation of temperature monitoring stations required work below the ordinary high water mark (OHWM) of waters of the U.S. and Washington State, and within designated shorelines of the state. Work in these areas requires authorization from a number of federal, state, and local resource agencies. In compliance with these authorization requirements, Douglas PUD prepared a Joint Aquatic Resource Permit Application (JARPA), which serves as the application for a number of state, federal and local authorizations. Douglas PUD submitted a JARPA to the following entities:

[1] Both the WDFW staff and Douglas PUD monitor water temperatures in the Wells Dam fishways during trapping periods in order to remain in compliance with hatchery permitting.

- The USACE, which authorizes discharges of dredged or fill material into waters of the U.S. pursuant to Section 404 of the CWA, and authorizes activities in navigable waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act, submitted in March 2013;
- The Washington Department of Fish and Wildlife (WDFW), which processes and issues Hydraulic Project Approvals (HPA) pursuant to the State Hydraulic Code, submitted in March 2013; and
- The Okanogan County Planning Department, which issues Shoreline Substantial Development Permits pursuant to the County's Shoreline Master Program, submitted in April 2013.

After review and processing of the JARPA, the following authorizations (or exemptions) were issued to Douglas PUD for instream and shoreline-related activities associated with installation of the temperature monitoring stations:

- An exemption for Shoreline Substantial Development, issued by Okanogan County (Natural Resource Senior Planner, Charlene Schumacher) on May 13, 2013. The County determined that the proposed installation of remote temperature sensors was Exempt from the County shoreline permit requirements because the activity was considered a Fish Habitat Enhancement Project as defined by RCW 77.55.181.
- An HPA, issued by WDFW (Graham Simon, Area Habitat Biologist), on May 2, 2013.
- A Nationwide Permit verification letter, issued by the USACE (Jess Jordan, Project Manager) on June 17, 2013. The verification letter confirmed that the project was compliant with state, general and regional conditions under NWP No. 5 (Scientific Measurement Devices). This verification applies to both Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. In addition, the USACE conferred with Ecology, which administers water quality certifications under Section 401 of the CWA. This conference verified that the installation of the temperature monitoring stations is certified for compliance with state water quality standards.

3.2.2 State Environmental Policy Act

Douglas PUD's State Environmental Policy Act (SEPA) coordinator determined that the project was categorically exempt from SEPA threshold determinations and the environmental review process pursuant to WAC 197-11-800, which exempts some types of minor new construction from the SEPA process:

> *(2)* ***Other minor new construction…*** *(i) the installation of hydrological measuring devices, regardless of whether or not on lands covered by water.*

3.3 Temperature Monitoring Equipment

3.3.1 Equipment Acquisition

Prior to the issuance of a new Wells Project FERC License, Douglas PUD collected temperature data using Onset© Tidbit temperature loggers (see Section 2.3.1 above), which were programmed to collect hourly data year-round and required retrieval in order to download and report data. Douglas PUD retrieved and downloaded loggers two to four times a year depending upon river conditions and access.

Per the Wells Project 401 Certification section 6.7(3)(a)(iii), hourly temperature data was required to be transmitted to a web-accessible database maintained by Douglas PUD and available to Ecology, regional fish management agencies, and the public. To meet the daily data transmission requirement, Douglas PUD applied for and received permits, before acquiring and subsequently installing new temperature monitoring equipment. At each temperature monitoring location, equipment consists of a Design Analysis H-377 temperature sensor, Sutron GOES radio/logger, GOES satellite antenna and cable, 20 watt solar panel, and voltage regulator. On shore housing includes a National Electrical Manufacturers Association enclosure, 12 volt sealed lead-acid battery, galvanized pipe, flex conduit, fittings, and other hardware (Figure 2). The system consists of a sensor connected to a communications box with wireless modem access. Data is collected hourly and sent wirelessly and uploaded to Douglas PUD's publically available webpage in real time. The system is powered by battery and charged using the solar panel (Douglas PUD 2013).

Figure 2. **Remote water temperature station that sends data in real time using GOES satellite link.**

3.3.2 Equipment Installation

Consistent with 401 Certification section 6.7(3)(a)(i-iii), remote water temperature sensors were installed at eight locations in the Wells Project during 2013. Locations and required durations of monitoring include:

April 1st to October 31st:

1. Methow River, RM 1.5 - Project Boundary
2. Columbia River, RM 544.5 - Chief Joseph Dam Tailrace
3. Okanogan River, RM 10.5 - Project Boundary
4. Wells Dam Forebay (data from TDG sensor)
5. Wells Dam Tailrace (data from TDG sensor)

May 1st to November 15th:

6. Wells Dam East Fishway, Pool No. 39
7. Wells Dam Auxiliary Water Supply
8. Wells Dam Forebay (three depths)

Temperature monitoring locations are illustrated in Figures 3 through 6.

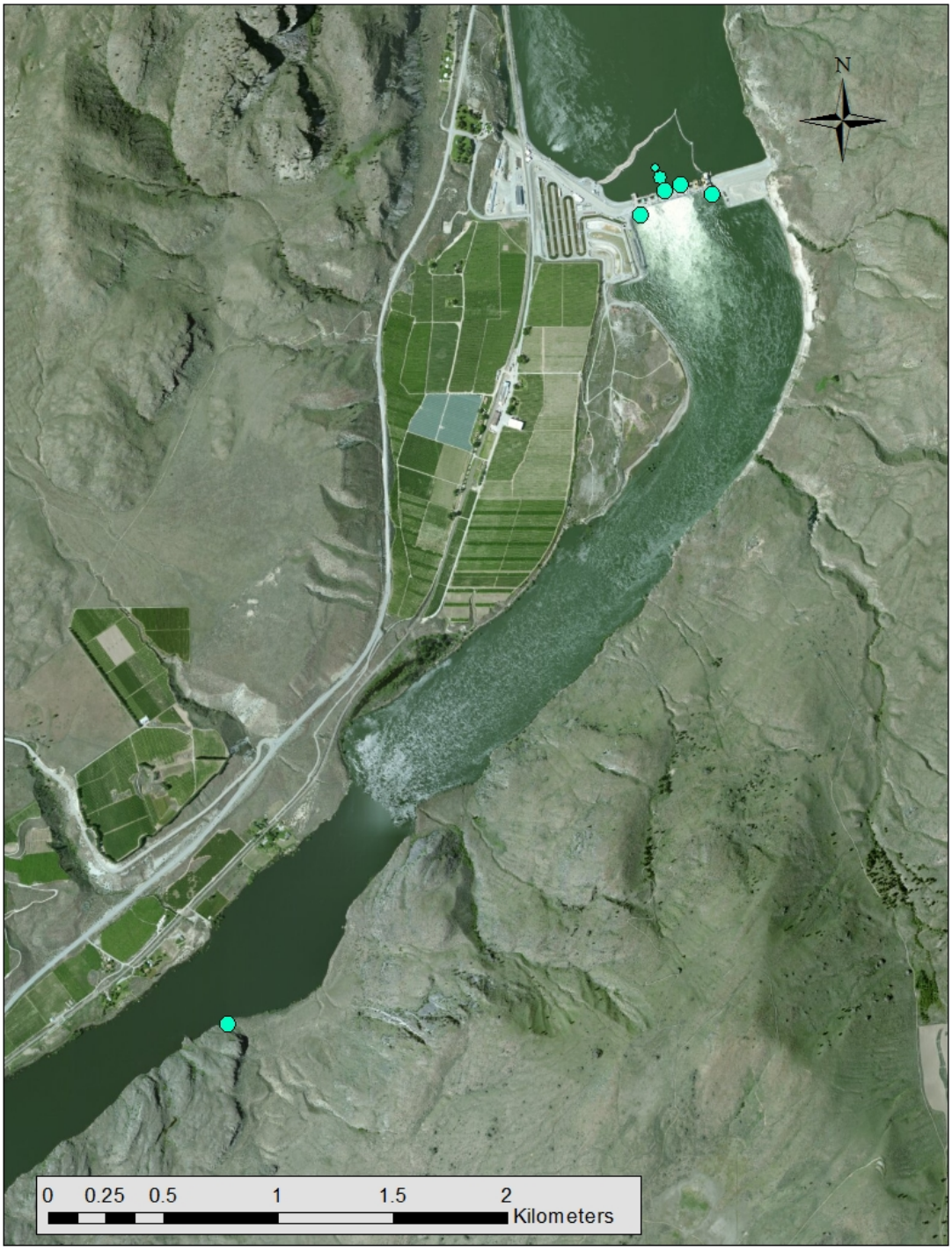

Figure 3. **Temperature monitoring at and around Wells Dam (graduated green circles are intended to show surface middle and deep depths).**

Figure 4. **Methow River temperature monitoring location (RM 1.5). The location of the sensor is approximated by the green circle.**

Figure 5. **Okanogan River temperature monitoring location (RM 10.5). The location of the sensor is approximated by the green circle.**

Figure 6. **Chief Joseph Tailrace (Columbia River RM 544.5) temperature monitoring. The location of the sensor is approximated by the green circle.**

In May of 2013, Douglas PUD entered into a Joint Funding Agreement with the United States Geological Survey (USGS) to install and maintain remote water temperature equipment at four of the eight monitoring locations including the Wells Dam Forebay (three depths), the Methow River, the Okanogan River, and the Chief Joseph Dam Tailrace. The Wells Dam Forebay and Tailrace sensors are maintained by Columbia Basin Environmental (these sensors collect both temperature and TDG data year round) but data is managed by Douglas PUD. The remaining two locations (Wells Dam East Fishway and Wells Dam Auxiliary Water Supply) were installed and are maintained by Douglas PUD.

Following approval of the QAPP, securing required permits, and equipment acquisition, the USGS began installation of temperature sensors at four locations. The Chief Joseph Dam Tailrace and Okanogan River sensors were installed in July 2013 and the Methow River and Wells Forebay locations were completed in October 2013. The Wells Dam Forebay and Tailrace sensors began collecting data on April 1st 2013 after being calibrated and installed by Columbia Basin Environmental. Douglas PUD installed sensors at two locations; the Wells Dam East Fishway and Auxiliary Water Supply, these stations were upgraded and installed respectively during the month of October 2013.

In October 2013 Douglas PUD launched a new website where hourly temperature data is transmitted daily and is publically accessible. This webpage provides a link to all real-time temperature data at http://www.dcpud.org/wells-project/total-dissolved-gas-and-temperature-monitoring.

3.4 Temperature Data Results

Temperature data from new equipment was available towards the end of the compliance year 2013. As such, water temperature monitoring using Tidbit sensors from Onset© was discontinued by the end of 2013. The 2014 annual report consists exclusively of data from the new temperature equipment.

In all subsequent figures, horizontal lines at 17.5 or 13 C^{O} illustrate 7-DADMax thresholds, aside from figure 14 where the 21^{o}C trapping threshold is denoted (see section 3.4.8).

3.4.1 Chief Joseph Dam Tailrace

The Chief Joseph Dam Tailrace temperature sensor location is at RM 544.5 on the left bank (looking downstream) of the Columbia River near the town of Bridgeport, WA. Water temperature data is collected from April 1 to October 31 and is indicative of incoming water temperature conditions to the Wells Project at this location.

Data ranged from 3.5 to 20.1°C during the monitoring period. 7-DADMax temperature values at this location were above the WQS numeric criteria (17.5°C) from July 25 - October 19 2014 (Figure 7; Table 1).

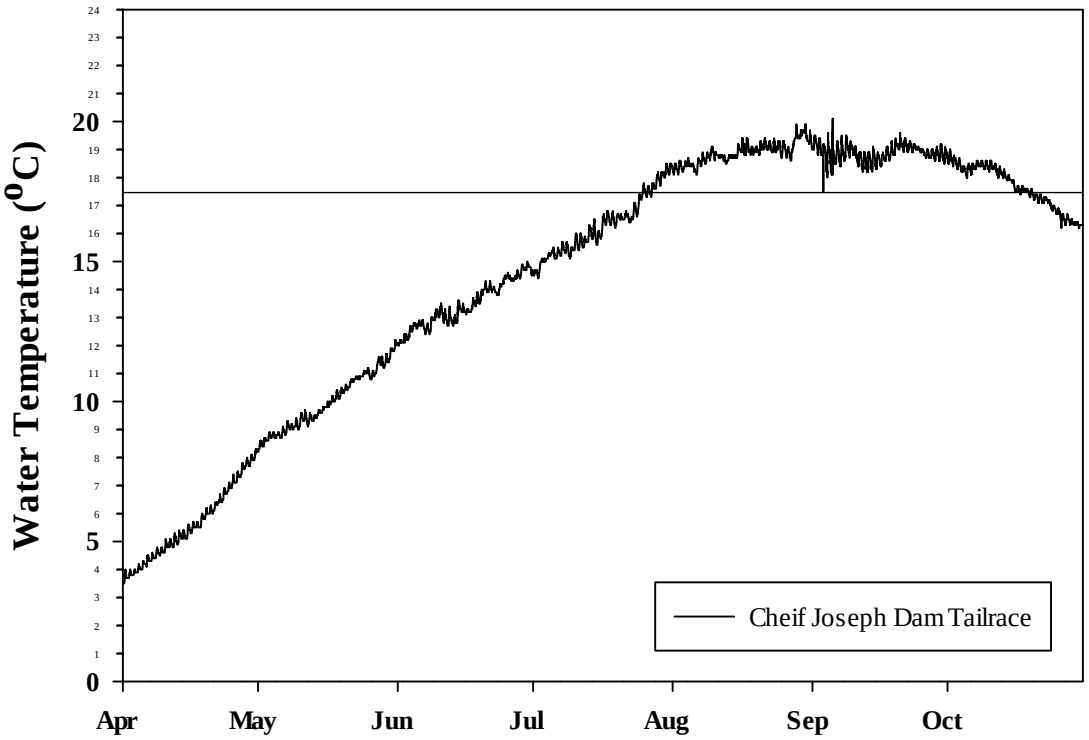

Figure 7. Water temperature data collected in the Chief Joseph Tailrace.

3.4.2 Okanogan River Boundary

The Okanogan River Boundary monitoring location is at RM 10.5. Per requirements, water temperature is gathered at this location from April 1 to October 31 of each year and is generally indicative of incoming water temperature conditions to the Wells Project at this location. The USGS maintains operations of this sensor. 7-DADMax temperature values at this location were above the WQS numeric criteria (17.5°C) from June 28, 2014 to September 27, 2014 (Figure 8).

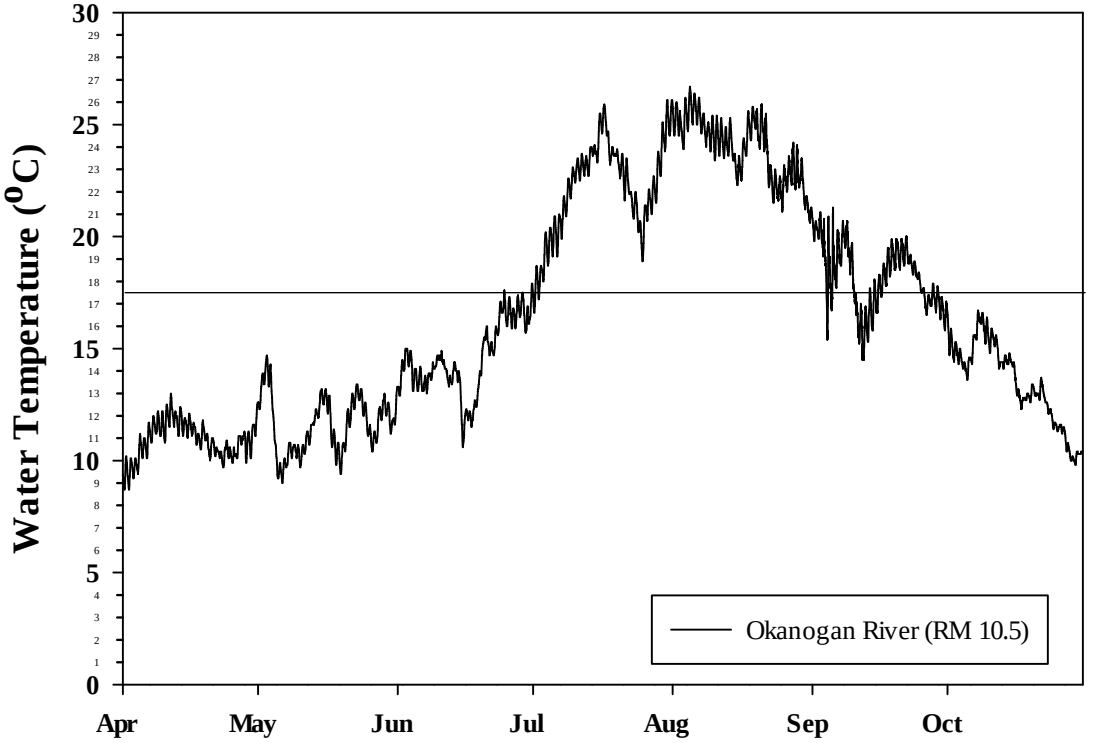

Figure 8. Water temperature data collected in the Okanogan River at river mile 10.5.

3.4.3 Methow River Boundary

The Methow River Boundary monitoring location is at RM 1.5 on the left bank near Pateros, WA. Water temperature data is required to be collected from April 1 to October 31 and is generally indicative of incoming water temperature conditions to the Wells Project at this location. In addition to the WQS numeric criteria of 17.5°C, Ecology has identified this portion of the Methow River as requiring special protection for spawning and incubation in accordance with Ecology publication 06-10-038. This publication indicates where and when the following criteria are to be applied to protect the reproduction of native char, salmon, and trout. In the lower Methow River including the reach within the Wells Project boundary, water temperatures are not to exceed 13°C from October 1 to June 15. During 2014, daily averages were at or above 13°C from October 6, 2014 to October, 9, 2014.

On July 17, 2014 the Carlton Complex fire destroyed the water temperature station. On July 31 the system was replaced and real time data function was restored (see missing data during this time in Figure 9). 7-DADMax temperature values at this location were above the WQS numeric criteria (17.5°C) from July 6, 2014 to September 10, 2014, with 13 days being assumed as a result of fire destruction. The assumption was made since 7-DADMax values were above 17.5°C on the days immediately leading up to the fire destruction and immediately after.

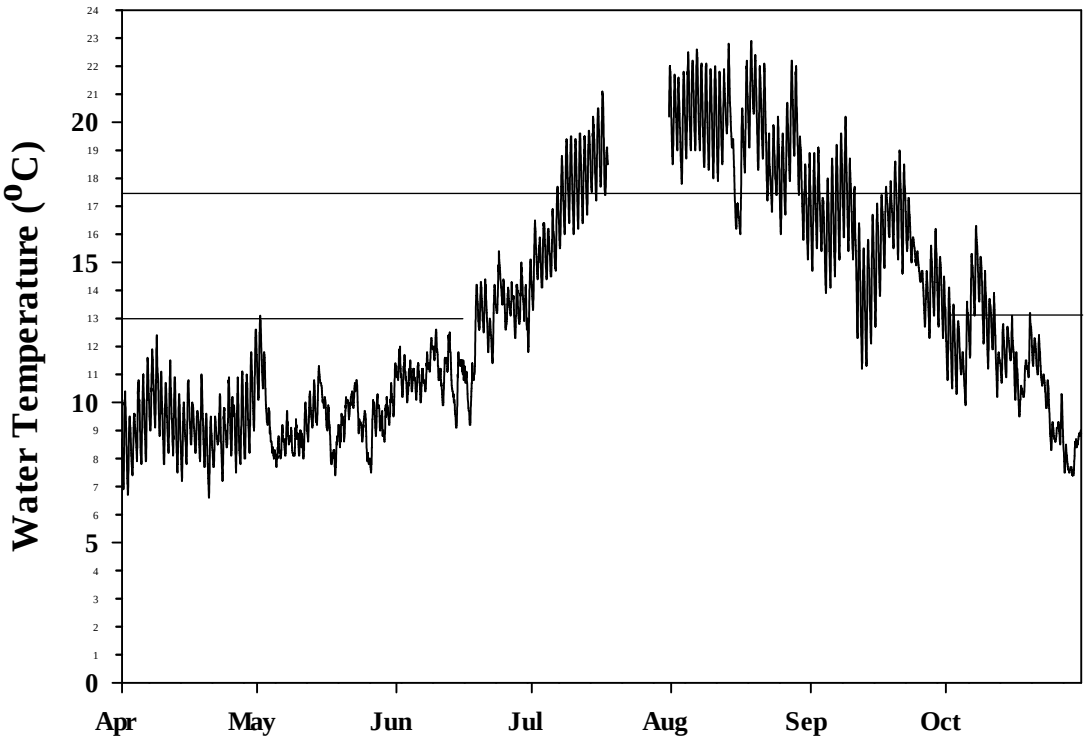

Figure 9. Water temperature data from the Methow River at river mile 1.5. Criterion of 13°C applies only from October 1-31 (bottom horizontal line).

3.4.4 Wells Dam Forebay

The Wells Dam Forebay location, where temperatures are required to be collected hourly from April 1 to October 31 of each year, is located on the face of pier nose 6 at Wells Dam. Columbia Basin Environmental maintains operations of this sensor (collects both temperature and TDG) and Douglas PUD manages the data. 7-DADMax temperature values at this location were above the WQS numeric criteria (17.5°C) from July 25, 2014 to October 16, 2014 (Figure 10), which is generally consistent with historic Wells Project temperature monitoring data (see section 2.3.1).

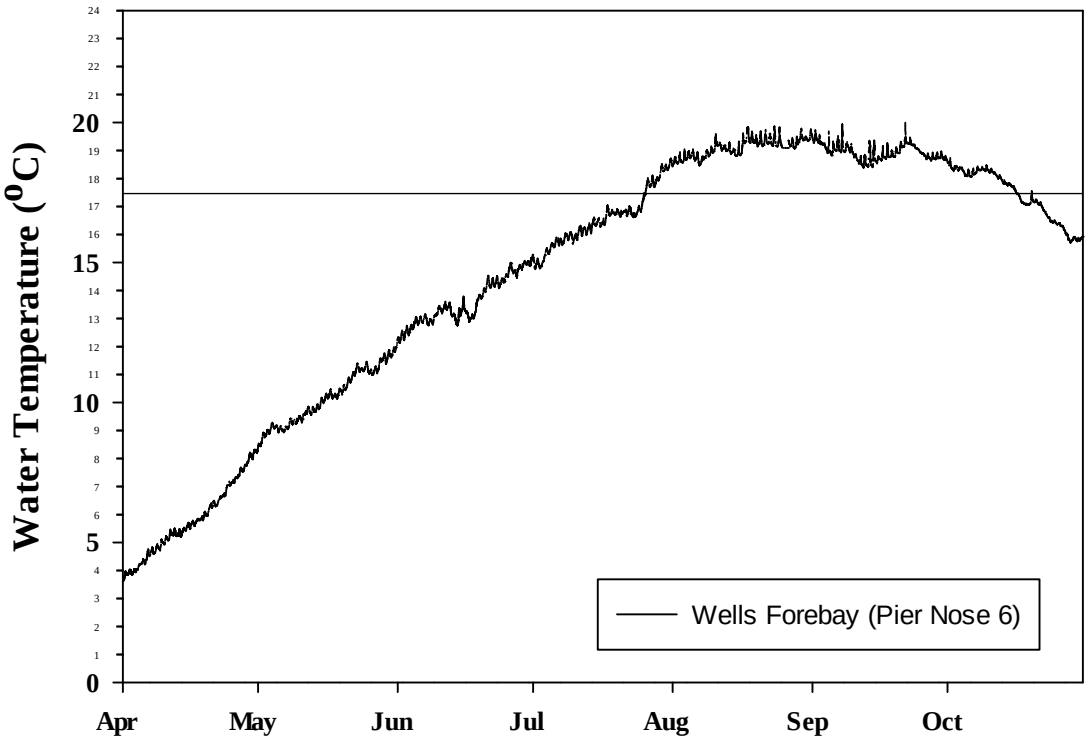

Figure 10. Water temperature data collected in the Wells Dam Forebay at pier nose 6.

3.4.5 Wells Dam Tailrace

The Wells Dam Tailrace location, where temperatures are required to be collected hourly from April 1 to October 31 of each year, is located approximately 2 miles downstream of Wells Dam on the left bank of the river. Columbia Basin Environmental maintains operations of this sensor (collects both temperature and TDG) and Douglas PUD manages the data. 7-DADMax temperature values at this location were above the WQS numeric criteria (17.5°C) from July 25, 2014 to October 16, 2014 (Figure 11), which is generally consistent with historic Wells Project temperature monitoring data (see section 2.3.1).

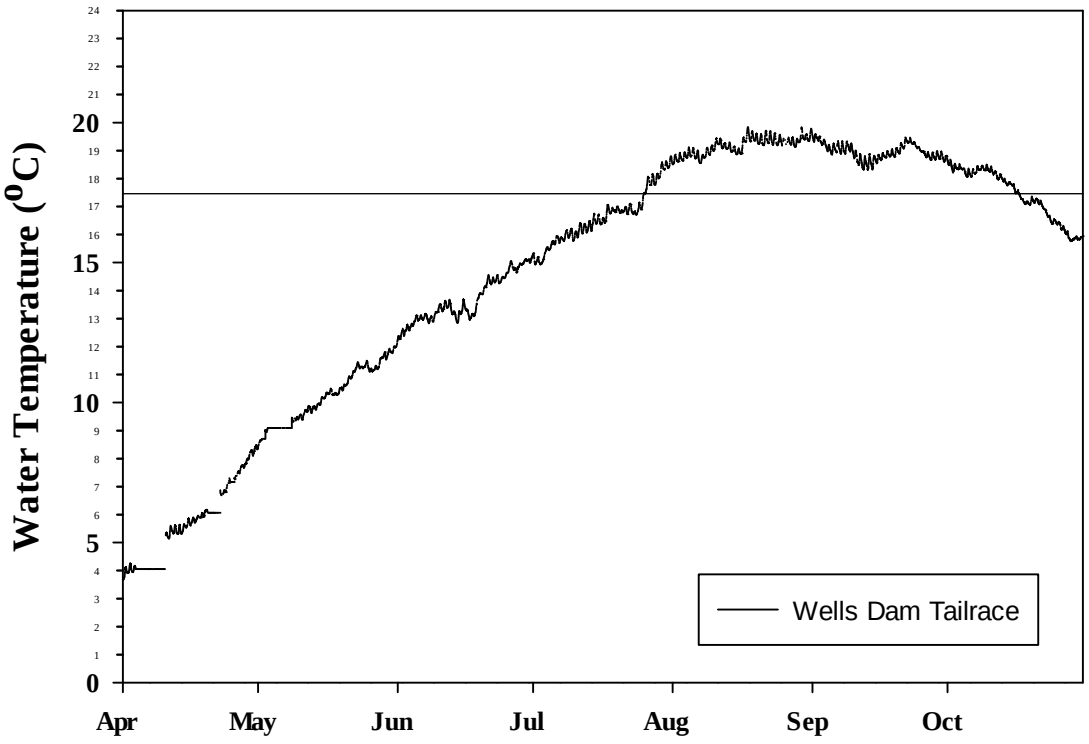

Figure 11. Water temperature data collected in the Wells Dam Tailrace.

3.4.6 Wells Dam Forebay Multiple Depth Requirement

The Wells Dam Forebay temperature monitoring location is at RM 515.8. Monitoring at this location is required between May 1 and November 15. Temperature data is collected at three depths to provide temperature profiles throughout the water column at this location. Sensors are located near the surface (<2m depth), mid-water column (approximately 10m), and near bottom (>30m). 7-DADMax temperature values at this location were above the WQS numeric criteria (17.5°C) from July 27, 2014 to October 12, 2014 (Figure 12). Comparison of data at the three depths indicates that thermal stratification does not occur at this location (Figure 12). Measurements between three depths were similar throughout the season and never differed by more than 0.8°C (occurred on September 7, 2014) between depths at anytime during the monitoring period. The lack of thermo-stratification in the Wells Forebay is supported by relicensing efforts conducted by Douglas PUD and West Consultants (WEST Consultants Inc., 2008). Given the run-of-river nature of the Well Project, retention time is insufficient for thermostratification to occur.

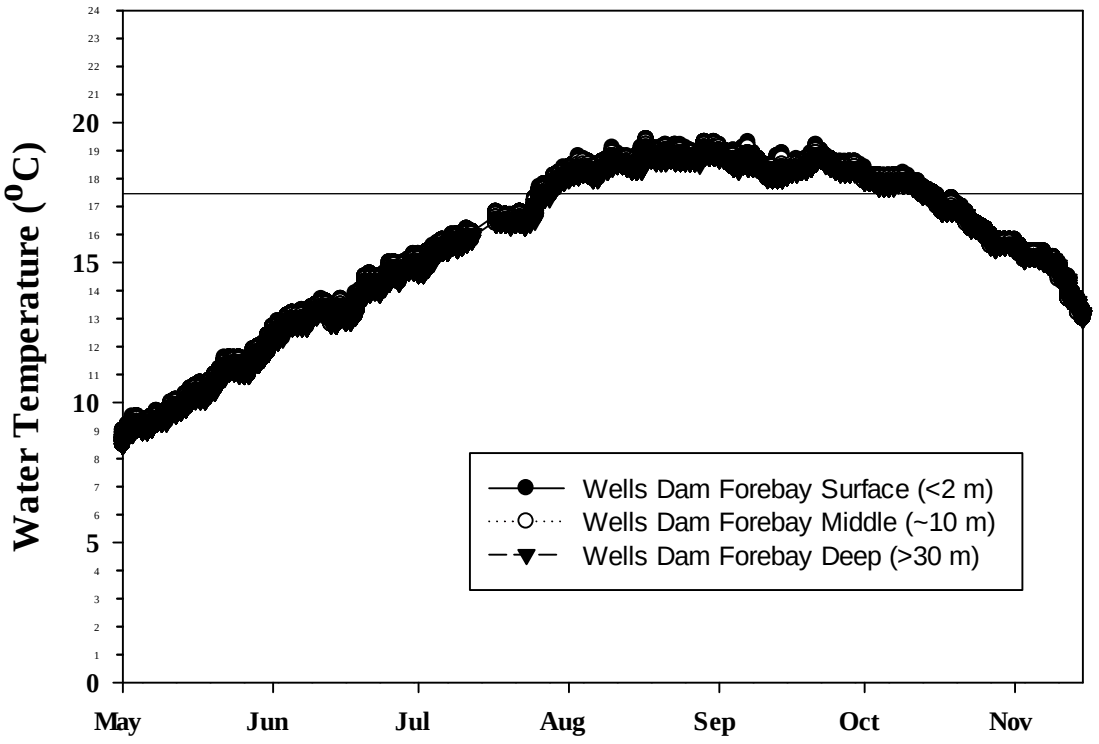

Figure 12. Water temperature data collected in the Wells Dam Forebay at three depths. Temperature profiles show the lack of stratification in this location during the time period.

3.4.7 Wells Dam Auxiliary Water Supply

The Wells Dam Auxiliary Water Supply location is within the lower west fishway adjacent to the collection gallery. Water from this location originates from the tailrace and is used to provide additional water for the lower 22 pools of the fishway including the fish collection gallery (Douglas PUD 2001). Monitoring at this location is required between May 1 and November 15. Results indicate that temperatures were above the 7-DADMax (17.5 ^{o}C) from July 21, 2014 to October 19, 2014 (Figure 13).

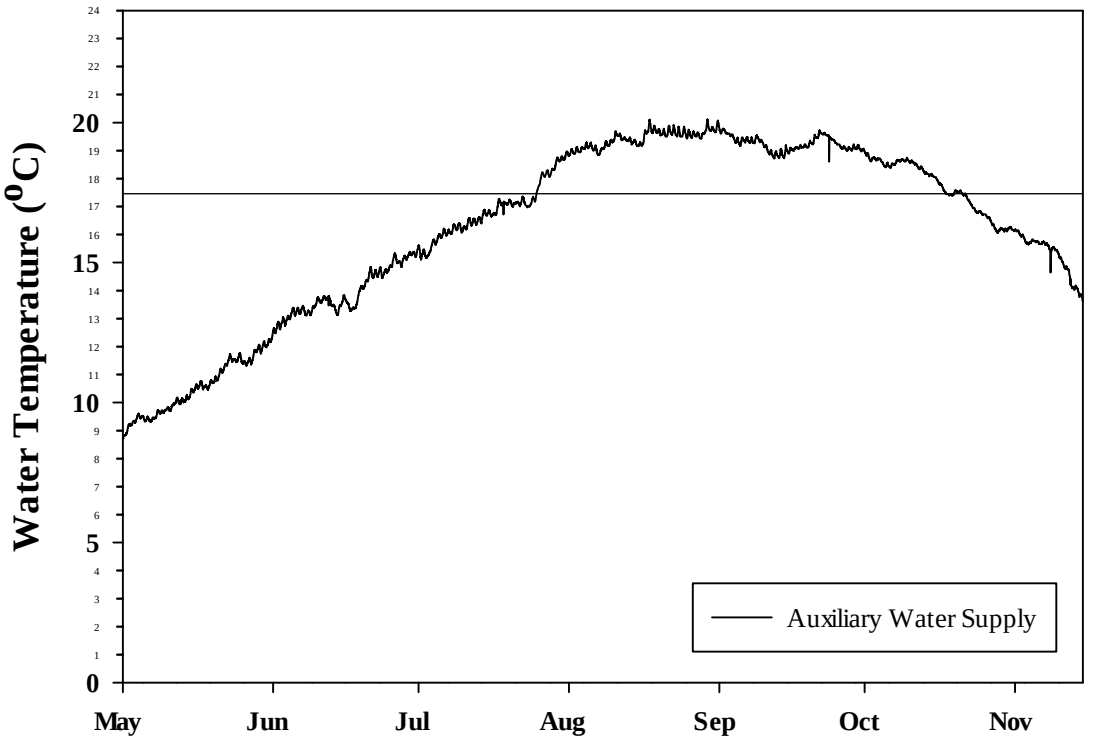

Figure 13. Water temperature data collected in the auxiliary water supply system at Wells Dam.

3.4.8 Wells Dam East Fishway Pool No. 39

According to the HCP hatchery permits, all entities that use the fish trapping facilities at Wells Dam are required to monitor the ladders every two hours May 1 to November 15 and discontinue trapping operations when fish ladder water temperatures exceed 69.8º F (21.0°C). The Wells Project 401 Certification also adopted this requirement with the addition of hourly monitoring. Wells Fish ladders did not reach this threshold in 2014 with the highest water temperature being recorded as 20.3°C on August 17, 2014. In addition, results indicate that temperatures were above the 7-DADMax (17.5 ^{o}C) from July 22, 2014 to October 17, 2014 (Figure 14).

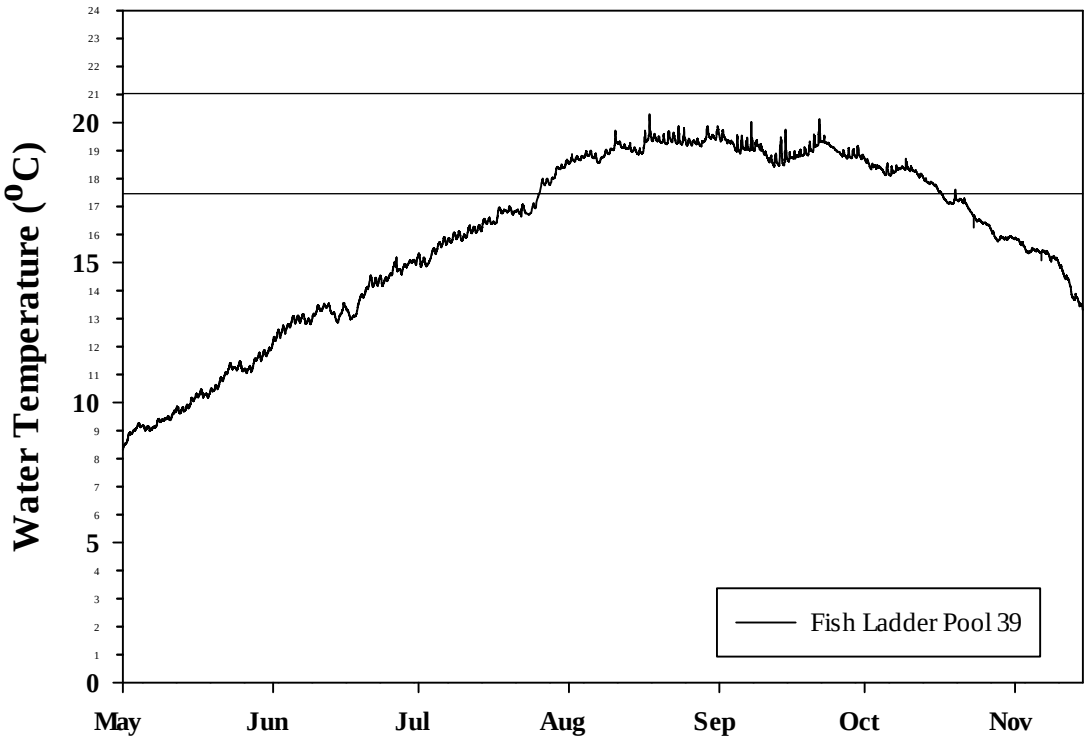

Figure 14. Water temperature data collected in Pool 39 of the east fish ladder at Wells Dam. The horizontal line at 21°C (top line) denotes the threshold whereby adult broodstock trapping at Wells Dam discontinues and the horizontal line at 17.5 (bottom line) denote the 17.5 °C 7-DADMax.

Water temperature data from the 2014 monitoring season for all locations and sources are summarized in Table 1 and indicate that during the late summer to early fall of the monitoring period, water temperatures (i.e., 7-DADMax values) at multiple locations within the Wells Project were above the state WQS of 17.5°C. However, as discussed in more detail in the conclusions, the thermal regime observed was consistent with historic temperature data collected and evaluated using the CE-QUAL-W2 model which found that the Wells Project remains in compliance with the state WQS.

Table 1. 7-DADMax by location as determined by remote real time temperature sensor.

Location	*Number of Required Monitoring Days*	*Actual Number of Days Monitoring*	*Number of days exceeding 7-DADMax*	*Days exceeding 7-DADMax (17.5°C)*
Chief Joseph Tailrace	April 1 - October 31 (n = 214)	214	86	July 25 - October 19
Okanogan RM 10.5	April 1 - October 31 (n = 214)	214	91	June 28 - September 27
Methow RM 1.5	April 1 - October 31 (n = 214)	201	66*	July 6 - September 10
Wells Forebay Pier Nose 6	April 1 - October 31 (n = 214)	214	83	July 25 - October 16
Wells Tailrace	April 1 - October 31 (n = 214)	214	83	July 25 - October 16
Wells Forebay Surface	May 1 - November 15 (n = 199)	199	77	July 27 - October 12
Wells Forebay Mid	May 1 - November 15 (n = 199)	199	77	July 27 - October 12
Wells Forebay Deep	May 1 - November 15 (n = 199)	199	77	July 27 - October 12
Auxiliary Water Supply	May 1 - November 15 (n = 199)	199	90	July 21 - October 19
Pool 39 East Fish Ladder	May 1 - November 15 (n = 199)	199	87	July 22 - October 17

*The Carleton water temperature station was inoperable for 13 days following a large wildfire that destroyed the station on July 17th, 2014. Service was restored on July 31, 2014. Given water temperatures before and after the outage, Douglas PUD assumes that during this period 7-DADmax temperatures were above 17.5 C

4.0 CONCLUSIONS

During the 2014 monitoring period, all stations recorded data in accordance with Douglas PUD's Wells Project 401 Certification requirements. Data was made available in real time at Douglaspud.org. The Carlton Complex fire destroyed the Methow River monitoring station on the evening of July 17, 2014. This station was restored by July 31, 2014. Aside from the Carlton Complex fire all stations functioned properly and collected accurate data during the monitoring period.

In general, data indicates that the thermal regime observed during the Wells Project relicensing process is still reflective of current observations. Temperatures warmed to above the WQS criteria of 17.5°C in late July through early- to mid-October but remain below the numeric criteria during all other times of the year. In addition, exceedances of the WQS appear to be associated with incoming water temperature rather than thermal loading associated with the reservoir area (see Table 1). Monitoring will continue, consistent with 401 Certification requirements during the 2015 monitoring period.

5.0 REFERENCES

Douglas PUD (Public Utility District No. 1 of Douglas County). 2001. Wells Dam Fish Passage System Overview – Preliminary. Public Utility District No. 1 of Douglas County, Washington.

Douglas PUD (Public Utility District No. 1 of Douglas County). 2008. Water Quality Management Plan *in* the Aquatic Settlement Agreement. Public Utility District No. 1 of Douglas County, Washington.

Douglas PUD 2013. (Public Utility District No. 1 of Douglas County). Quality Assurance Project Plan for Water Temperature and Total Dissolved Gas. Wells Hydroelectric Project. FERC No. 2149. February 2013. Prepared for Washington Department of Ecology, Yakima, WA.

Ecology. 2012. 401 Certification Wells Hydroelectric Project. Order No. 8981 February 27, 2012.

WEST Consultants Inc. 2008. Development of a Water Temperature Model Relating Project Operations to Compliance with the Washington State and EPA Water Quality Standards (Water Temperature Study). Prepared for Public Utility District No. 1 of Douglas County. East Wenatchee, WA

APPENDIX B

PRE-FILING CONSULTATION RECORD SUPPORTING THE APPROVAL OF THE 2014 WATER TEMPERATURE ANNUAL REPORT

EMAIL TO AQUATIC SETTLEMENT WORK GROUP AND WASHINGTON STATE DEPARTMENT OF ECOLOGY REQUESTING REVIEW OF THE 2014 WATER TEMPERATURE ANNUAL REPORT

From: Kristi Geris <kgeris@anchorqea.com>
Sent: Wednesday, March 11, 2015 7:26 PM
To: Andrew Gingerich; Bao Le; Bill Towey (bill.towey@colvilletribes.com); Bob Rose; 'Brad James'; 'Bret Nine'; 'Chad Jackson'; Charlie McKinney (cmck461@ecy.wa.gov); Chas Kyger; Chris Coffin (ccof461@ecy.wa.gov); Chris Sheridan; Donella Miller (mild@yakamafish-nsn.gov); Jason McLellan; Jeff Korth; 'Jessi Gonzales'; John Ferguson; Keith Kirkendall (Keith.Kirkendall@noaa.gov); Kirk Truscott; Kristi Geris; Mary Mayo; Mike Schiewe; Pat Irle (pirl461@ecy.wa.gov); Patrick Verhey (Patrick.Verhey@dfw.wa.gov); Paul Ward (ward@yakama.com); Shane Bickford; 'Steve Lewis'; 'Steve Parker (parker@yakama.com)'
Subject: FW: Draft 2014 Wells Project Temperature Report
Attachments: 2015_03_11 Douglas - 2014 DCPUD Water Temp Report Draft.docx

Hi Aquatic SWG: please see the email below from Andrew and the attached draft 2014 Wells Project Temperature Report. As noted below, the attached draft report is available for review, with edits and comments due to Douglas PUD by **Friday, April 3, 2015**.

The attached draft report is also available for download from the Aquatic SWG Extranet site under: Documents > Reports (instructions below). Thanks! –kristi ☺

Instructions:

To gain access to the Aquatic SWG Extranet Homepage, please use the following procedure:

* Visit: https://extranet.dcpud.net/sites/nr/aswg/
* Login using "Forms Authentication" (for non-Douglas PUD employees)

You should now be at the Aquatic SWG homepage.

If you encounter problems, or need a login username and password to access the site:
Please feel free to contact me, Andrew Gingerich, or Julene McGregor [jmcgregor@dcpud.org; (509) 881-2236] and we will gladly assist you with questions or issues.

Kristi Geris

ANCHOR QEA, LLC
kgeris@anchorqea.com
T 509.491.3151 x104
C 360.220.3988

From: Andrew Gingerich [mailto:andrewg@dcpud.org]
Sent: Wednesday, March 11, 2015 5:18 PM
To: Kristi Geris; Chris Coffin (ccof461@ecy.wa.gov) (ccof461@ecy.wa.gov); McKinney, Charlie (ECY)
Subject: Draft 2014 Wells Project Temperature Report

Kristi, please distribute the attached along with this email to the Aquatic Settlement Work Group. I have included Charlie and Chris from Ecology on this email since this requirement is related to the implementation of Douglas PUD's 401 Certification.

Attached is Douglas PUD's Draft 2014 Annual Water Temperature Report. The final report with comments incorporated and addressed is due to the FERC by April 30th. Douglas PUD is seeking review and comment from Ecology and the rest of the Aquatic SWG by April 3rd, 2015 to allow for revision to be made prior to voting its approval at the April 8th 2015 Aquatic SWG conference call. This schedule is a little more ambitions than our standard 30 day review period. Please let me know if you have concerns with the 3.5 week review window. An April 8th approval will allow Douglas PUD to develop the consultation record and file the document with FERC before the end of April deadline.

The report is relatively straightforward and captures temperature monitoring that occurred in required locations for the calendar year 2014.

I would encourage anyone with questions to send me an email or give me a ring.

Thanks!

Andrew Gingerich
Senior Aquatic Resource Biologist
Public Utility No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, WA 98802
Office: (509) 881-2323

EMAIL FROM THE COLVILLE CONFEDERATED TRIBES APPROVING THE 2014 WATER TEMPERATURE ANNUAL REPORT

From: Jason McLellan <Jason.McLellan@colvilletribes.com>
Sent: Tuesday, April 07, 2015 11:29 AM
To: Kristi Geris; Andrew Gingerich
Cc: Mike Schiewe (mschiewe@anchorqea.com)
Subject: RE: Aquatic SWG Agenda item V. Water Forecast 2015

Hi Andrew,

I will not be able to make the call tomorrow. However, we have reviewed both the temperature and bull trout reports and do not have any suggested edits. We vote to approve both of them barring any major revisions.

Mike - Best of luck to you. It has been a pleasure working with you. I have appreciated how you handled some of the difficult issues that we faced in the ASWG.

Cheers,
Jason

From: Kristi Geris [mailto:kgeris@anchorqea.com]
Sent: Tuesday, April 07, 2015 9:30 AM
To: Andrew Gingerich (andrewg@dcpud.org); Bob Rose; Jason McLellan; John Ferguson; Kristi Geris; Mike Schiewe; Pat Irle (pirl461@ecy.wa.gov); Patrick Verhey (Patrick.Verhey@dfw.wa.gov); 'Steve Lewis'
Cc: Chas Kyger; Chris Coffin (ccof461@ecy.wa.gov)
Subject: FW: Aquatic SWG Agenda item V. Water Forecast 2015

Hi Aquatic SWG: please see the email below from Andrew regarding a discussion item for tomorrow's ASWG 4/8 conference call. Thanks! –kristi ☺

Kristi Geris

ANCHOR QEA, LLC
kgeris@anchorqea.com
T 509.491.3151 x104
C 360.220.3988

From: Andrew Gingerich [mailto:andrewg@dcpud.org]
Sent: Tuesday, April 07, 2015 8:25 AM
To: Kristi Geris
Subject: Aquatic SWG Agenda item V. Water Forecast 2015

Kristi, please distribute the below to Aquatic SWG technical leads. This will serve as a discussion kickoff for Agenda item V on Wednesday.
Thanks
Andrew

- Wet spring with most precipitation falling as rain: Well above average flows from Oct-April 5th (rainfall and above average temperatures combined with Grand Coulee drum gate maintenance).
- Wells freshet flows looking close to average or slightly below.

- Upper Columbia is 91% of average because of BC snowpack. <30% of the Columbia River drainage is in Canada but approximately 60% of river flows come from Canadian portion of drainage (high elevation snowpack).
- West of the Cascades, Oregon and lower Snake below average snowpack.

Figure 1. NWRFC Columbia River snow pack to date as % of historical average.

EMAIL FROM THE WASHINGTON STATE DEPARTMENT OF ECOLOGY WITH SUGGESTED EDITS TO THE 2014 WATER TEMPERATURE ANNUAL REPORT

From: McKinney, Charlie (ECY) <cmck461@ECY.WA.GOV>
Sent: Wednesday, April 08, 2015 8:55 AM
To: Andrew Gingerich
Subject: RE: 2014 Temperature Report

That sounds good. Talk to you on the call at 10:00.
Charlie

From: Andrew Gingerich [mailto:andrewg@dcpud.org]
Sent: Wednesday, April 08, 2015 8:47 AM
To: McKinney, Charlie (ECY)
Subject: RE: 2014 Temperature Report

Charlie,

Yes, this should be clarified. Good point. How about something like, "Temperatures warmed to above the WQS criteria of 17.5°C in late July **through early to mid-October**, but remain below the numeric criteria during all other times of the year.

Andrew

From: McKinney, Charlie (ECY) [mailto:cmck461@ECY.WA.GOV]
Sent: Tuesday, April 07, 2015 8:36 AM
To: Andrew Gingerich
Subject: 2014 Temperature Report

Andrew,

Just one question on the report: in the final paragraph there is the following statement:

" Temperatures warmed to above the WQS criteria of 17.5°C in late July but remain below the numeric criteria during all other times of the year."

Since it appears that temperatures often exceed 17.5 C into September for example, could you clarify?

That is my only question, everything else looks good.

Charlie McKinney
Water Quality Section Manager
Central Region Office, Yakima
Washington Dept. of Ecology
509-457-7107

AQUATIC SETTLEMENT WORK GROUP APPROVAL OF THE 2014 WATER TEMPERATURE ANNUAL REPORT

Final Conference Call Action Items

Aquatic Settlement Work Group

To: Aquatic SWG Parties **Date**: April 8, 2015

From: Michael Schiewe, Chair (Anchor QEA, LLC)

Re: Final Action Items of the April 8, 2015 Aquatic SWG Conference Call

Below is a summary of Action Items from the Aquatic SWG meeting that was held by conference call on Wednesday, April 8, 2015, from 10:00 a.m. to 11:30 a.m. These action items include the following:

I. Summary of Action Items

1. The Colville Confederated Tribes (CCT), Douglas PUD, and John Ferguson (new Aquatic SWG Chair, effective May 2015) will discuss developing guidelines for hatchery rearing juvenile sturgeon; the path forward will be considered during an Aquatic SWG meeting in summer 2015 (Item VI-1).
2. Douglas PUD will update the Aquatic SWG when more is known regarding the feasibility of tagging white sturgeon on a work boat equipped with a sling opposed to on the shore, during white sturgeon monitoring and evaluation efforts in 2015 (Item VI-1).
3. The U.S. Fish and Wildlife Service (USFWS) will provide comments on the draft 2014 Bull Trout Management Plan and Incidental Take Annual Report to Douglas PUD after today's conference call; once USFWS comments are resolved, Douglas PUD will provide the approved revised final draft report to Kristi Geris for distribution to the Aquatic SWG (Item VI-2).
4. Douglas PUD will provide the final 2014 Water Temperature Annual Report, including the revisions made per the Washington State Department of Ecology's (Ecology's) comments, to Kristi Geris for distribution to the Aquatic SWG (Item VI-3). *(Note: Andrew Gingerich provided the final report, along with the email exchange between Ecology and Douglas PUD, to Geris after the Aquatic SWG meeting on April 8, 2015, which Geris distributed to the Aquatic SWG that same day.)*
5. Douglas PUD will provide the four remaining draft 2014 Aquatic Settlement Agreement (ASA) Management Plan Annual Reports (i.e., Water Quality, Pacific Lamprey, Resident

Fish, and White Sturgeon) for review to Kristi Geris by the end of today for distribution to the Aquatic SWG (Item VI-4). *(Note: Andrew Gingerich provided the draft reports for review after the Aquatic SWG meeting on April 8, 2015, as discussed, which Geris distributed to the Aquatic SWG that same day.)*

6. Douglas PUD will continue discussing the feasibility of combining all ASA Annual Reports and deadlines into one submittal (Item VI-4).
7. Douglas PUD will provide the draft 2015 Juvenile Lamprey Habitat Study Plan for review to Kristi Geris by Friday, April 17, 2015, for distribution to the Aquatic SWG (Item VI-8).
8. Douglas PUD will provide photographs of the Wells Dam fishways and lamprey box, when available, to Kristi Geris for distribution to the Aquatic SWG (Item VI-9). *(Note: Chas Kyger provided photographs of the Wells Dam fishways after the Aquatic SWG meeting on April 8, 2015, which Geris distributed to the Aquatic SWG that same day.)*

II. Summary of Decisions

1. The Aquatic SWG members present approved the 2014 Bull Trout Management Plan and Incidental Take Annual Report, contingent upon modifications and agreement reached by Douglas PUD and USFWS (Item VI-2). *(Note: Jason McLellan provided the CCT's approval of the draft report via email on April 7, 2015.)*
2. The Aquatic SWG members present approved the 2014 Wells Project Water Temperature Annual Report, as revised (Item VI-3). *(Note: Jason McLellan provided the CCT's approval of the draft report via email on April 7, 2015.)*

III. Agreements

1. There were no agreements discussed during today's conference call.

IV. Review Items

1. Kristi Geris sent an email to the Aquatic SWG on April 8, 2015, notifying them that the four remaining draft 2014 ASA Management Plan Annual Reports (i.e., Water Quality, Pacific Lamprey, Resident Fish, and White Sturgeon) are available for a 30-day review period, with edits and comments due to Andrew Gingerich by Friday, May 8, 2015. Douglas PUD will request approval of these draft reports during the Aquatic SWG meeting on May 13, 2015 (Item VI-4).

V. Documents Finalized

1. The final 2014 Water Temperature Annual Report was distributed to the Aquatic SWG by Kristi Geris on April 8, 2015 (Item VI-3).

Attachment A
List of Attendees

Name	Role	Organization
Mike Schiewe	Aquatic SWG Chair	Anchor QEA, LLC
John Ferguson	Aquatic SWG Chair (May 2015)	Anchor QEA, LLC
Kristi Geris	Administration/Technical Support	Anchor QEA, LLC
Andrew Gingerich	Aquatic SWG Technical Representative	Douglas PUD
Chas Kyger	Technical Support	Douglas PUD
Bob Rose	Aquatic SWG Technical Representative	Yakama Nation
Chris Coffin	Observer	Washington State Department of Ecology
Charlie McKinney	Aquatic SWG Policy Representative	Washington State Department of Ecology
Steve Lewis	Aquatic SWG Technical Representative	U.S. Fish and Wildlife Service
Patrick Verhey	Aquatic SWG Technical Representative	Washington Department of Fish and Wildlife