Final

Bull Trout Redd Monitoring Report for the Wallowa Falls Hydroelectric Project

East Fork Wallowa River barrier to upstream fish migration, photo courtesy of Kendrick Moholt

(FERC No. P-308)

December 18, 2017

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1.0 INTRODUCTION

The United States Fish and Wildlife Service (USFWS) issued a new Biological Opinion (BiOp) for the Wallowa Falls Hydroelectric Project (Project) on October 14, 2016. Monitoring elements within the new BiOp specifically pertaining to Endangered Species Act (ESA) listed bull trout (*Salvelinus confluentus)* were triggered when the Federal Energy Regulatory Commission (FERC) issued a new operating license for the Project January 7, 2017.

The USFWS listed five reasonable and prudent measures (RPM) to be undertaken in order to minimize incidental take of bull trout by Project operations. Elements within this Plan pertain specifically to RPM 4 which seeks to "*minimize the risk of adverse effects to bull trout from emergency shut-down and ramping"*. Section 8.4 4(a) of the BiOp adds specific language and actions to be taken in order to achieve RPM 4.

Resident and migratory bull trout currently inhabit the East Fork Wallowa River (Study Area) at varying densities, depending on time of year. Past redd surveys of the Study Area have revealed bull trout actively constructing redds, while no bull trout redds have ever been observed within the neighboring West Fork.

This Report and the information contained therein fulfills reporting requirements per Section 8.4 4(a) of the USFWS issued BiOp as well as results pertinent to implementation of actions necessary to assess abundance and spatial distribution of bull trout redds within the East Fork Wallowa River.

2.0 STUDY AREA

The bypassed portion of the East Fork Wallowa River within and near the Project area is approximately 2,800 meters (m) long from the Project diversion dam to its confluence with the Wallowa River (Figure 1). Gradient in this reach is high, with the upper 1,600 m averaging 19 percent and the lower 1,200 m averaging 8.5 percent. Channel morphology within most of the upper reach is dominated mainly by steep bedrock, vertical waterfalls, and cascades over boulders; though the upper reaches are steep, the lower 800 m to the confluence with the Wallowa River has a shallower gradient, consisting of numerous riffles and pools. Over the course of its length, the bypassed East Fork Wallowa River drops approximately 365 m from the dam to the confluence with the Wallowa River. The upper and lower portions are divided by a 3.7 m vertical falls (Report cover photo), an impassible upstream migration fish barrier.

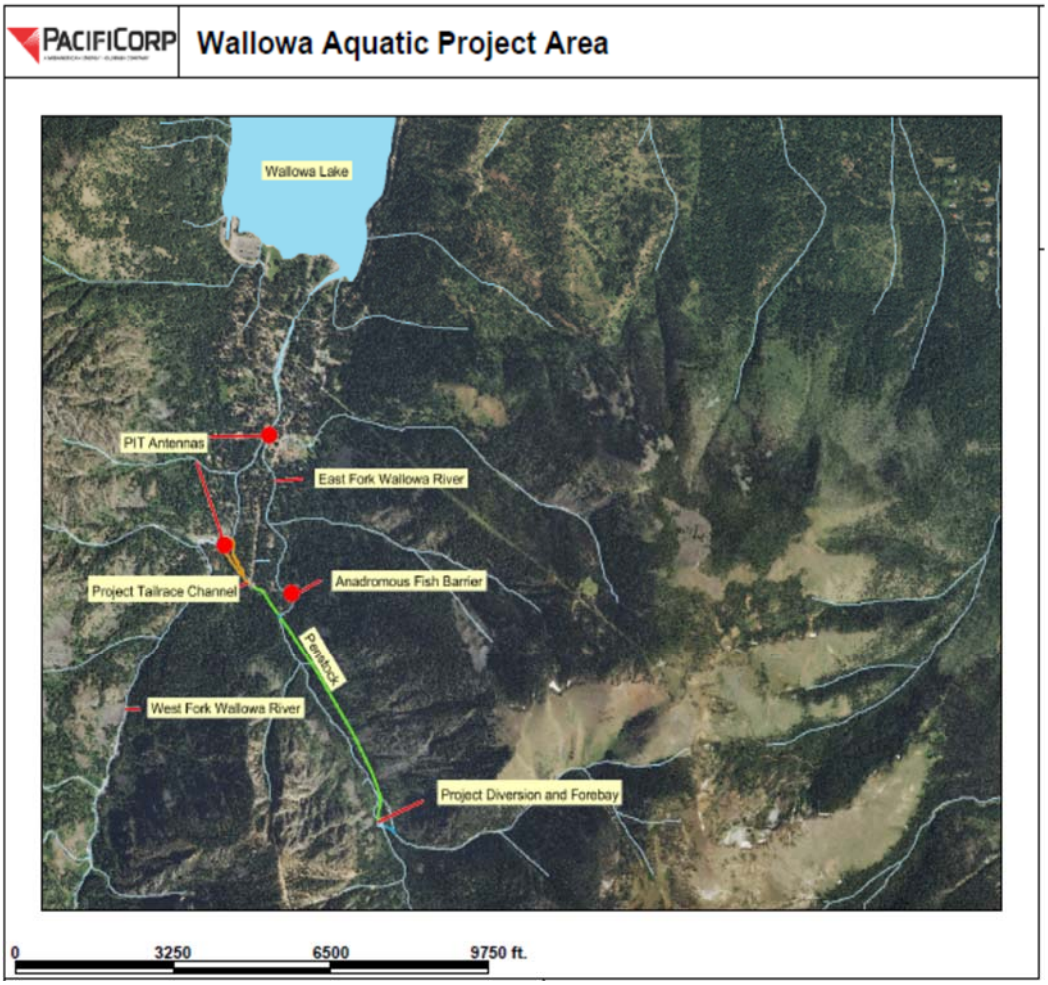

Figure 1. Wallowa Falls Hydroelectric Project.

3.0 METHODS

Section 8.4 4(a) of the BiOp states the following terms and conditions are necessary for the implementation of RPM 4, "*Conduct bull trout redd monitoring in the East Fork Wallowa River (from the upstream falls to the confluence with the Wallowa River) on an annual basis for 10 years to monitor take. FERC/PacifiCorp shall meet with the Service at the end of the 10 year period to determine whether additional years of redd monitoring are necessary GPS and map redds and photo document redds during survey. Measure the size of a redd and its location. Document bull trout observed (<6 inches in length, < 12 inches in length, <14 inches in length, and > 14 inches in length, while conducting redd count and document if bull trout occupy the redd). Note if brook trout are spawning with bull trout. Document flows during annual redd counts and during a shutdown and ramping. Conduct this redd monitoring in mid-September and October. If an emergency shutdown and ramping occurs during the spawning season, the East Fork Wallowa River spawning area will be field visited for any new redds built near the water's edge that could be dewatered due to shut down and ramping. Notify the Service of both positive and negative findings"*.

Bull trout redd surveys of the lower portion of the East Fork Wallowa River began September 12, 2017 and continued weekly through November 1, 2017 for a total of nine redd surveys. During each survey the entire lower portion of the East Fork Wallowa River was walked by an experienced qualified biologist, from the confluence with the West Fork Wallowa River upstream 800 m to the migratory fish barrier. In order to standardize inherent observer error, the same experienced surveyor was utilized for all nine surveys in 2017. All encountered bull trout redds were demarcated by handheld GPS, flagged for visual reference within the stream, and photographs were taken of each redd. During subsequent surveys, previously identified redds were revisited and assessed for visibility. Flagging was either marked Still Visible along with the survey date if redd could still be visually identified, or the flagging taken down if the redd was no longer visible. Time taken for redd to no longer remain visible within the stream was recorded in order to assess redd life. Though the Planning document called for only four redd surveys during the spawning period, this being the first year of study and redd life being unknown, nine surveys were performed in order to gain an accurate understanding of visual redd persistence within this watershed. 2017 observed redd life will be utilized to adjust frequency of surveys moving forward.

All fish observed in the vicinity of identified redds were recorded to species if possible, as well as estimated for fork length.

Per Section 1(c) of the Oregon Department of Environmental Quality issued 401 Water Quality Permit, no planned Project ramping events shall be initiated from September 1 – October 31. In the event an unplanned emergency shutdown does occur that causes the headgate to close during the bull trout spawn timeframe, a redd survey will be triggered and performed prior to the Project being brought back online in order to document any bull trout redds that may have been constructed high on the margin during the shutdown. Redds constructed on the margin during the Project shutdown could subsequently become dewatered when the Project is brought back online and minimum instream flows are once again restored. Redds identified high on the margin during this emergency shutdown triggered survey will be revisited after the Project is brought back online to verify if redd desiccation indeed occurred.

4.0 RESULTS

Three bull trout redds were identified and marked by GPS during the nine redd surveys performed of the East Fork Wallowa River in 2017 (Figure 2). All three bull trout redds were large and indicative of being constructed by large migratory-sized fish. Two of the three redds were identified during the very first survey on September 12. Both of these redds had a single bull trout in very near proximity. Four other bull trout lives were also observed during the September 12 survey, all six observed live bull trout were estimated to range in fork length between 350 millimeters - 600 millimeters (Figure 3 and Figure 4). The third redd was identified on September 25 and was found to also have a pair of bull trout actively over the top and in the process of constructing the redd, these fish were estimated to have been ~400 millimeters in fork length. An additional bull trout live was observed during a survey on October 2 and was estimated to have been ~350 millimeters in fork length. No other bull trout redds or lives were observed during the study period (Table 1).

Table 1. East Fork Wallowa River bull trout redd data.

Date	Survey Location	Redds Observed	Bull Trout Observed >300 mm	Bull Trout Observed <300mm
9/12/2017	EF Wallowa mouth to barrier	2	0	6
9/19/2017	EF Wallowa mouth to barrier	0	0	0
9/25/2017	EF Wallowa mouth to barrier	1	0	2
10/2/2017	EF Wallowa mouth to barrier	0	0	1
10/9/2017	EF Wallowa mouth to barrier	0	0	0
10/16/2017	EF Wallowa mouth to barrier	0	0	0
10/23/2017	EF Wallowa mouth to barrier	0	0	0
10/30/2017	EF Wallowa mouth to barrier	0	0	0
11/1/2017	EF Wallowa mouth to barrier	0	0	0

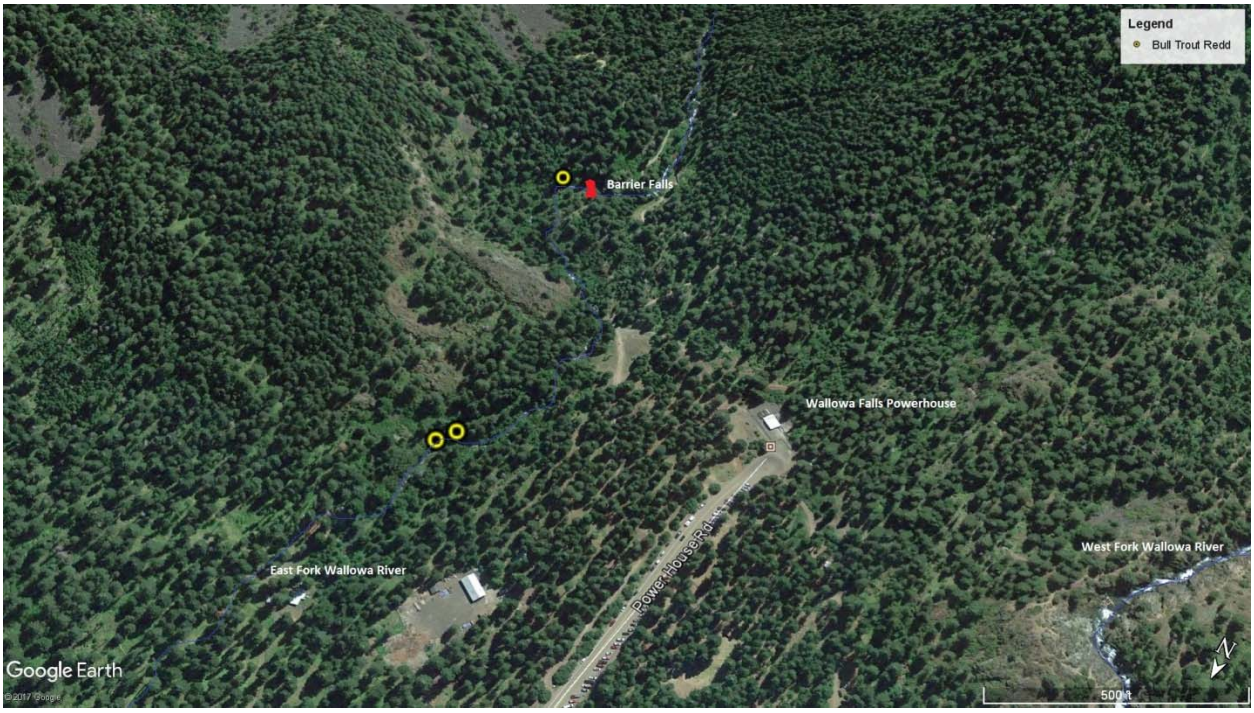

Figure 2. GPS marked locations (yellow dots, n=3) of bull trout redds within the East Fork Wallowa River

All three bull trout redds were in the upper portion of available habitat below the barrier, with the uppermost redd ~20 meters below the impassible falls. Redd 1 visually persisted for 20 days, while redd 2 and redd 3 both persisted for 13 and 10 days, respectively. The average time redds in 2017 were found to still be visually distinguishable within the stream was 14 days.

Figure 3

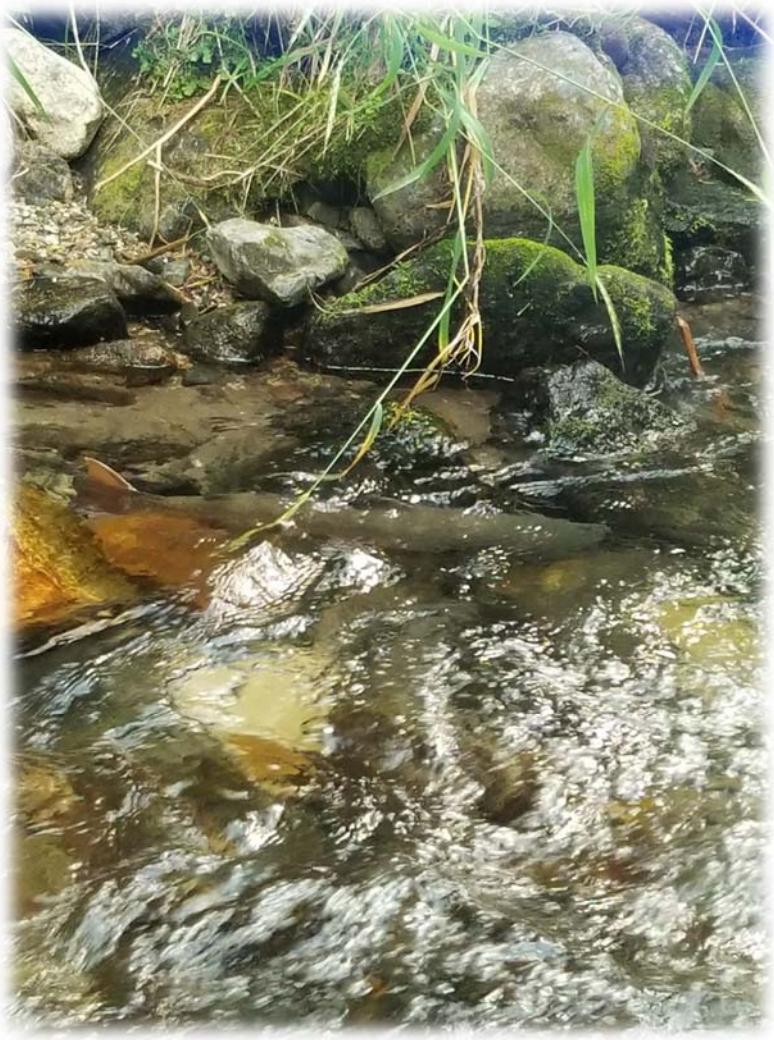

Figure 4

An emergency shutdown of the Project unit occurred September 15, 2017 due to a trip of the unit, the outage remained until November 1, 2017. Details concerning operational aspects of the outage can be found in the Outage Report located in Appendix A. This Outage Report was submitted to pertinent Agency representatives October 9, 2017. This unit trip did not cause the headgate to close so subsequently the tailrace channel was not dewatered but maintained a constant three cubic feet per second (cfs) of discharge. With the unit not in operation, higher than normal flow conditions persisted within the East Fork Wallowa River throughout the bull trout spawn timeframe.

On November 1, 2017, per Section 8.4 4(a) of the BiOp, a redd survey was performed before the unit was turned back on and water diverted from the East Fork Wallowa River. Previously identified redds were revisited and the redd assessed to be most readily impacted by receding flows was identified. On the same day, November 1, and after the redd survey to assess redds potentially impacted by Project turbine start up, a biologist was stationed at the one identified susceptible redd with a two-way radio so as to be in contact with an operator at the Wallowa Falls powerhouse as

the unit was slowly brought back online. The unit was stepped up in 400 kilowatt increments and time was allowed between step changes for the change in water flow to take effect in the East Fork Wallowa. The biologist on-site at the bull trout redd was in constant communication with the hydro operator during the entire unit ramp up procedure. Water level over the redd pocket as the unit was brought fully back online decreased, but at no time did the redd become dessicated.

5.0 CITATIONS

Oregon Department of Environmental Quality. 2016. 401 Water Quality Certification for the Wallowa Falls Hydroelectric Project.

United States Fish and Wildlife Service. 2016. Biological Opinion for the Wallowa Falls Hydroelectric Project.

APPENDIX A

UNIT OUTAGE REPORT

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

825 NE Multnomah St., Ste. 1500
Portland, OR. 97232

Event Notification – Wallowa Falls Hydroelectric Project (FERC NO. 308)

Reporting Date: October 9, 2017
Reported By : Russ Howison

Contacts:
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External Distribution List:

John Dadoly, ODEQ	Elizabeth Osier Moats, ODFW	Gretchen Sausen, USFWS
Mary Grainey, OWRD	Erich Gaedeke, FERC	Dan Gonzalez, USDA-FS

Summary of Events

Date	Location*	Type	Cause†	No. Events	Duration (hr)	License Requirement	Observation ** (ΔkW/hr *or* Minimum Flow (cfs))
9/15/17	Wallowa	Unplanned Outage	8	1	21 days	NA	

†The following codes represent the cause of an event:

1: Natural Flows, rapid flow changes upstream, or woody debris removal
2: Electrical fault causes unit outage or otherwise compromises generation/project control
3: Emergency shutdowns
4: System Test
5: Environmental noise (applies to minor, apparent exceedances attributed to the limits of stream gage resolution)
6: In-stream flow rating equation change and implementation
7: Loss of signal from compliance flow equipment
8: Equipment malfunction (applies to equipment malfunctions or computer system software/hardware malfunctions)

****Observation describes greatest magnitude of a single event, or the magnitude range of multiple events. Date, time, and magnitude of observations are based on provisional, real-time data and are subject to change in the final water year report following download of on-site data.**

Remarks

Event Description & Corrective Actions:
The Wallowa Falls (Project) generating unit tripped offline due to a line disturbance on September 15, 2017. The penstock intake headgate remained open and the tailrace was not dewatered during the event. For unknown reasons, the generating plant's Programmable Logic Controller (PLC) lost both primary and back-up power during the event, resulting in a memory wipe of the PLCs operating schema for the plant. The hydraulic system that actuates the generator needle valve and deflector plate also currently has an oil leak and is not fully functional. As a result, the unit cannot be restarted until the PLC is reprogrammed and the hydraulic flow control system is repaired. An Operations crew and Electrical Controls Engineer are scheduled to travel to the Project the week of October 9, 2017 to re-program the PLC. Repair of the hydraulic generation flow control system is tentatively scheduled to occur the week ending October 27, 2017 after which the generator can be re-started. Although the ramp rate restrictions prescribed under FERC License Appendix A, Condition 1c) are not in effect until July 5, 2018, PacifiCorp is providing this Event Notification as a courtesy.

Since the unit trip on September 15, 2017, water has continued to be discharged through the impulse nozzle, past the deflector plate, into the tailrace channel. The temporary fish barrier has also been in place in the tailrace channel for the duration of this event period. When bringing the generating unit back on-line PacifiCorp will step –up generation at no more than 400 killowatts (kW)/hour (the rate at which the onsite ramping study indicates bypass reach stage change is less than 0.1 foot/hour). In addition, to protect aquatic resources including bull trout redds, a biologist will monitor the

water level at the recorded redd locations to assure that flow is adequate to protect redds. As necessary, PacifiCorp will open the low level outlet gate at the dam to provide adequate flow to protect redds in the bypassed reach.

Environmental Impacts:

With the generating unit offline all natural inflow, with the exception of approximately 3 cfs that is being diverted down the penstock, is spilling over the Wallowa Falls diversion dam into the bypassed reach of the East Fork Wallowa River. This has resulted in increased flows in the bypassed reach during the bull trout spawning period.

The East Fork Wallowa River has been surveyed for bull trout redds weekly since September 12, 2017 for a total of four occurrences. During each survey a biologist walks from the confluence of the East Fork/West Fork Wallowa River upstream to the migratory fish barrier, a total of ~900 meters. To date, three bull trout redds and nine large migratory live bull trout have been observed over the course of the four surveys. All three redds have been observed to be located in tail-outs of step pools, in close proximity to the center of the thalweg, in the upper ~400 meters of the accessible reach. Three more surveys are scheduled to be completed before the end of the bull trout spawning season.

As discussed above, when brought back online, the unit will be ramped up using 400 kW/hr steps. A biologist will monitor water levels over the recorded redds to ensure that there is sufficient water over redds to protect eggs during each generation step up. As warranted, the low level sluice outlet gate will be raised to provide adequate water in the bypassed reach to protect redds until fry emergence in the spring.

Attachments:

APPENDIX B

AGENCY COMMENTS

AGENCY	COMMENT	UTILITY RESPONSE
ODFW	The figures 1 and 2 appear to be mis-numbered or numbered out of order. Please correct the numbering. To the map labeled Figure 1, please add a figure title, a legend, and a line indicating the path or course of the East Fork Bypassed Reach.	Thank you, correction to Figures made.
ODFW	The second paragraph on page 8 indicates that a redd survey was performed on November 1, 2017 before the turbine was re-started. It is unclear whether the unit was re-started the same day as the redd survey. Please revise to more clearly communicate the timing of events.	Comment noted, changes made to body of Report to reflect such.
ODFW	The second paragraph on page 8 describes procedures used during project start-up to ensure that bull trout redds were not desiccated. ODFW agrees with the method of having a biologist monitor the redd while flows are declining during re-start and that the biologist should maintain communication with the unit operator. In the future, if redds are present in the East Fork Bypassed Reach when flows will be operationally reduced, please provide a photo of the redd(s) after the project is restarted and measure and report the water depth over the highest part of any redds to verify that sufficient water is provided.	Comment noted.
USFWS	Data displayed in Figure 1, Recommend there are dates for the GIS map data and that the report includes a table summarizing the redd survey data. This would include survey location (EF Wallowa River, mouth to waterfall), distance of survey, dates, number of redds, number/sizes of bull trout (<6 inches <12 inches, <18 inches, and > 18 inches, redds occupied or unoccupied, redd size, and redd visibility. In future monitoring, recommend that for redds that are a concern that are located in the stream area that could potentially be dewatered, that the depth of water be measured at the redd (lowest point water depth over redd) and a photo of each redd taken to confirm no risk of dewatering from ramping.	Comment noted. Table of redd data collected added to body of Report.
USFWS	Future redd monitoring – To determine timing of earliest redds, since this year's data documents two redds reported on September 12, the first week of September may be warranted. Recommend you give an indication of approximate start and end dates and number of repeat surveys planned for next year.	Comment noted. Redd surveys in 2018 will start one week earlier than in 2017.