Lewis River Hydroelectric Projects

FERC Project Nos. 935, 2071, 2111, 2213

Photo courtesy of Kathy Solheim, PacifiCorp – September 2019

2019 Annual Report

Annual Summary of License Implementation and Compliance: Aquatic and Terrestrial Resources

April, 2020

Lewis River Hydroelectric Projects

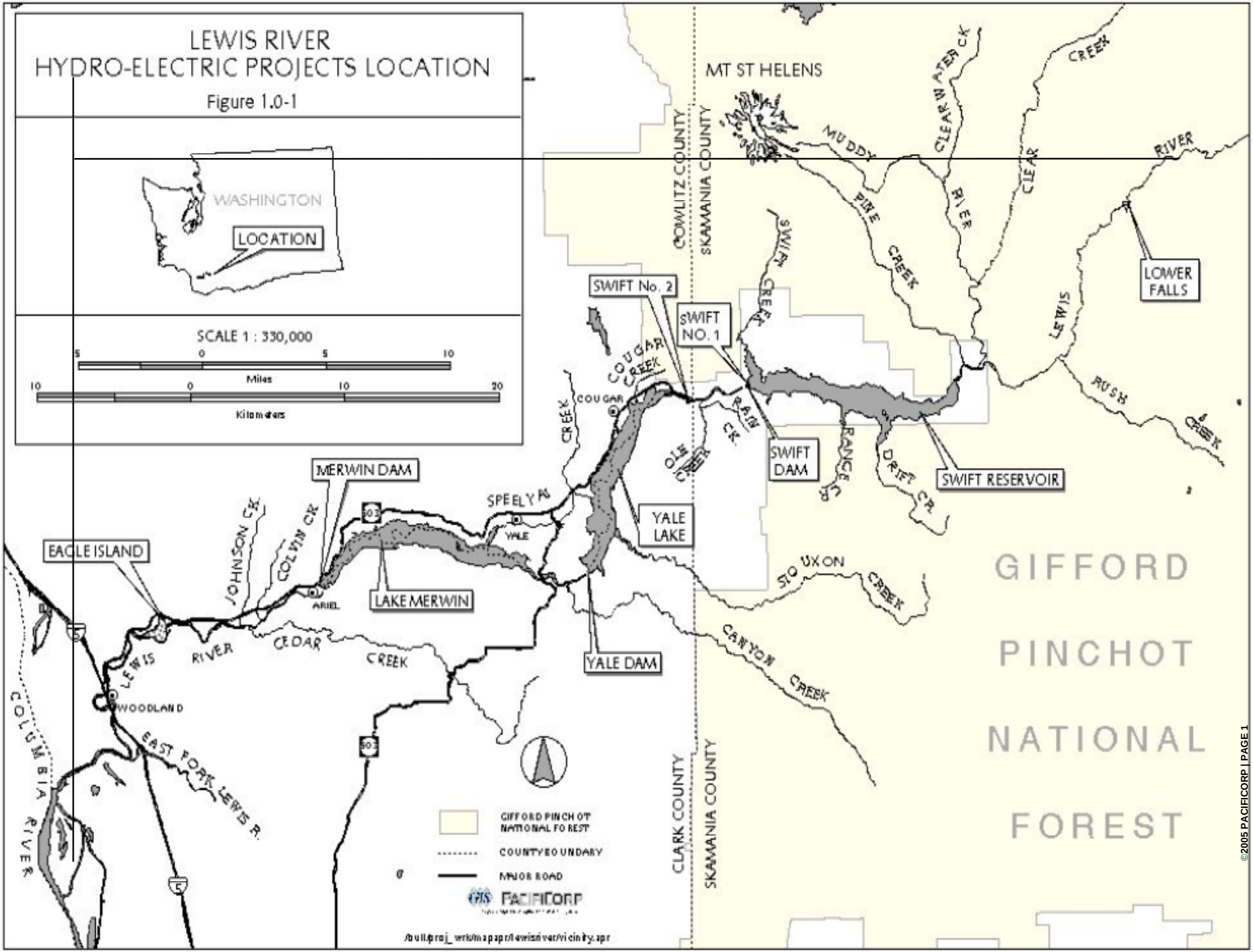
FERC Nos. 935, 2071, 2111, 2213

Annual Summary of License Implementation and Compliance:
Aquatic and Terrestrial Resources

2019 Annual Report

PUBLIC UTILITY DISTRICT NO. 1 COWLITZ CO. WASH.

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY



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1.0 INTRODUCTION

This 2019 annual report prepared by PacifiCorp and the Public Utility District No. 1 of Cowlitz County, Washington ("Cowlitz PUD") is provided to the Federal Energy Regulatory Commission (FERC) and the Lewis River Settlement Agreement (SA) Parties to fulfill the reporting requirements of project licenses, articles 402 and 404, and article 14.2.6 of the agreement. It has been prepared in consultation with Terrestrial Coordination Committee (TCC) and Aquatic Coordination Committee (ACC) members. Period of record for this report is from January 1, 2019 to December 31, 2019.

To reflect the settlement Parties' interest in continuing coordination and communication of the implementation of SA and new FERC licenses, Article 14.2.6 of the SA requires PacifiCorp and Cowlitz PUD to prepare annual reports describing the activities of the TCC and the ACC. This SA Article stipulates that the Committee Coordinators for the TCC and ACC shall prepare and file with the FERC detailed annual reports on the fish and wildlife Protection, Mitigation, and Enhancement (PM&E) measures occurring during the prior year as well as plans for the coming year. This annual report fulfills the requirements of Article 14.2.6.

Per the Article language, any comments that were not incorporated into this final report are presented in **Attachment A** of this report.

This 2019 report is available to the Public on PacifiCorp's website at:
https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - Reports

Copies of this report are available from PacifiCorp upon request.

Spencer Creek – Lewis River

1.1 BACKGROUND

Located on the North Fork of the Lewis River in southwestern Washington, the Lewis River Hydroelectric System consists of four operationally coordinated projects. PacifiCorp owns Swift No. 1 (FERC No. 2111), Yale (FERC No. 2071), and Merwin (FERC No. 935) projects which together generate 536 MW of electricity at full capacity. Cowlitz PUD owns the 77 MW Swift No. 2 Project (FERC No. 2213) which lies between Swift No. 1 and Yale. Currently, PacifiCorp operates Swift No. 2 for Cowlitz PUD under contract.

The Lewis Hydroelectric System was developed over a period of approximately 30 years. The first development, the Merwin project, was completed in 1931. The Yale project was completed next in 1953. The Swift No. 1 and Swift No. 2 projects were both completed in 1958.

1.1.1 Lewis River Settlement Agreement

In response to the FERC relicensing of the hydroelectric projects, interested parties collaborated on establishing a settlement agreement concerning future operations and responsive protection, enhancement and mitigation measures. On November 30, 2004, (Effective Date) 26 Parties (including two Licensees, five federal agencies, two state agencies, eight local/county agencies, two tribes, two citizens-at-large, and five non-governmental organizations) signed the Lewis River Settlement Agreement (PacifiCorp and Cowlitz PUD 2004). In December 2004, the Licensees filed with the FERC the SA along with a Joint Explanatory Statement and Supplemental Preliminary Draft Environmental Assessment (PacifiCorp and Cowlitz PUD 2004). The SA reflects the interests of all Parties; provides significant investments in fish and aquatic resources, wildlife and recreation; includes monitoring and evaluation and adaptive management; and includes ongoing coordination with the Parties through the Aquatics and Terrestrial Coordination Committees. The SA included support for 50-year licenses to allow the projects to continue to provide benefits to the Utilities customers. The Lewis River system allows PacifiCorp to maximize the value of its generation assets and power purchases to provide customer benefits. Cowlitz PUD uses its Swift No. 2 power in a similar fashion to provide benefits to its customers.

1.1.2 Environmental Impact Statement

In September 2005, the FERC released the Draft Environmental Impact Statement for the Lewis River Hydroelectric Projects (DEIS) (FERC 2005) for public comment. The DEIS was generally consistent with the SA in that it included most of the SA terms. In November 2005, the Parties filed comments on the DEIS. The FERC released the Final Environmental Impact Statement for the Lewis River Hydroelectric Projects March 24, 2006.

1.1.3 Agency Terms and Conditions

The USFS submitted modified Terms and Conditions in November 2005 (USDA FS 2005). The US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) filed fishway prescriptions February 22, 2006 and February 14, 2006, respectively.

1.1.4 Endangered Species Act Consultations

In January 2005, Cowlitz PUD and PacifiCorp filed with the FERC Biological Evaluations (BEs) covering federally listed fish and wildlife in the Lewis River basin (PacifiCorp and Cowlitz PUD 2005a, PacifiCorp and Cowlitz PUD 2005b). The FERC modified the BEs, included them in the Final EIS and submitted the documents to the Services. The Proposed Action in the BEs is the SA. On September 15, 2006, the USFWS issued a Biological Opinion covering bull trout, northern spotted owls and bald eagles. The National Marine Fisheries Service issued its Biological Opinion covering their respective listed species August 27, 2007.

1.1.5 Water Quality Certifications

Both Licensees applied to the Washington State Department of Ecology (Ecology) for Clean Water Act Section 401 Water Quality Certifications for their respective projects in February 2005. At Ecology's request, both Licensees withdrew and resubmitted those applications in December 2005. Ecology issued a Draft Certification Order for each of the Lewis River projects February 10, 2006. Section 401Water Quality Certifications were issued to the Licensees and filed with the FERC October 9, 2006.

Subsequently, Ecology issued an Order Amendment for the Swift No. 2 project November 3, 2006 followed by a second Order Amendment (No. 4998) December 21, 2007, addressing Conditions 4.6.3.e, 4.6.4.a, and 4.6.5.a. in Administrative Order 3676. Order Amendment No. 3 (No. 5531), issued by DOE January 17, 2008 replaces Condition 3 of Amended Order 4998 (Condition 4.6.5.a of Order 3676). On November 7, 2011, Ecology issued Order Amendment 8832 which replaced conditions of Order No. 3676 relating to water quality standards as provided by RCW 90.48 and WAC 173-210A.

PacifiCorp filed with the FERC an Objection to Inconsistent 401 Certificates Pursuant to Section 15.2 of the Lewis River Settlement Agreement November 16, 2006 and conducted two Alternative Dispute Resolution meetings with SA parties December 11, 2006 and December 15, 2006. Parties reached a resolution at the December 15, 2006 meeting.

On December 21, 2007 the Washington Department of Ecology (Ecology) issued Amended Orders 5000, 4999 and 5001 for the Merwin (Order No. 3678), Yale (Order No. 3677) and Swift No. 1 (Order No. 3679) Certifications respectively. These amendments replaced conditions 4.6.3e, 4.6.4a and 4.6.5a of the Merwin, Yale and Swift No. 1 Certifications, as well as condition 4.6.4e of the Swift No. 1 Certification.

On January 17, 2008, Ecology issued Amended Orders 5329, 5328 and 5330 which replaces condition 4.6.5a as provided in Amended Order 5000 for the Merwin Certification, Amended Order 5328 replacing condition 4.6.5a as provided in Amended Order 4999 for the Yale Certification and Amended Order 5330 replacing condition 4.6.5a as provided in Amended Order 5001 for the Swift No. 1 Certification.

On October 3, 2008, Ecology issued Amended Orders 5743, 5972 and 5974 which replaces condition 4.2(1) and portions of 4.8(3) Table 2 as provided for in Amended order 5329 for the Merwin Certification, Amended Order 5972 replaces portions of 4.8(3) Table 2 as provided in

Amended Order 5328 for the Yale Certification and Amended Order 5974 replaces portions of 4.8(3) Table 2 as provided in Amended Order 5330 for the Swift No. 1 Certification.

On June 22, 2009, Ecology issued Amended Order 6811 which modified the mixing zone for turbidity as it relates to construction of the Upper Release and Constructed Channel implementation.

On February 1, 2010, Ecology issued Amended Order 7325 which modifies Order 3679. Specifically, this amendment extends the expiration dated listed in section D. Duration of Order of amendment 6811 from December 31, 2009, to March 31, 2010.

On November 7, 2011, Ecology issued Amended Orders 8833, 8834 and 8831 which replaced conditions of Administrative Orders 3677,3678,and 3679, respectively, to comply with new water quality standard language modified by Washington Administrative Code (WAC 173-201A-600(1)(a)(ii)).

The Water Quality Certifications and associated amendments for the Swift No. 1, Swift No. 2, Yale and Merwin projects are available for viewing on PacifiCorp's website at https://www.pacificorp.com/energy/hydro/lewis-river/relicensing-documents.html
- (Lewis River relicensing documents).

1.1.6 New FERC Licenses

On June 26, 2008, the FERC provided the Utilities with new operating licenses for the Lewis River hydroelectric projects (Merwin Project No. 935, Yale Project No. 2071, Swift No. 1 Project No. 2111, and Swift No. 2 Project No. 2213). The license periods are each 50 years starting June 1, 2008. Each license includes the respective conditions of the services biological opinions and respective conditions of the Washington Department of Ecology 401 certificates. In general the licenses include terms of the Lewis River Settlement Agreement with few exceptions. Parties to the SA continue to abide by the SA terms including those terms outside the FERC requirements. As such this report may contain information not required by the FERC licenses.

1.1.7 2019 Annual Report and Consultation

PacifiCorp and Cowlitz PUD prepared this 2019 Lewis River Hydroelectric Projects Annual Report (Annual Report) in consultation with the ACC and TCC. A draft report was provided to the ACC and TCC March 3, 2020, the Licensees reviewed the ACC and TCC comments and prepared this final Annual Report. This report was provided to the FERC and the Settlement Agreement Parties April 3, 2020 to fulfill the requirements of Section 14.2.6 of the Settlement Agreement.

The period of record for the 2019 Annual Report is January 1, 2019 through December 31, 2019.

The following Plans and Reports were completed in 2019:

- Aquatics Fund Projects Annual Report – April 2020
- Wildlife Habitat Management Plan (WHMP Annual Plan for Operation Phase 2020)
- WHMP Annual Progress Report Operations Phase 2019
- Aquatic Coordination Committee/Terrestrial Coordination Committee 2019 Annual Report
- Lewis River Hatchery & Supplementation Program Annual Operations Report 2019
- Hatchery and Supplementation Program 2019 Annual Operating Plan
- Lewis River Monitoring and Evaluation Program 2019 Annual Report
  - Lewis River 2019 Fish Passage Program Annual Report
  - Lewis River Bull Trout 2019 Annual Operations Report
  - Lewis River Bull Trout 2020 Annual Operations Plan
  - Yale Reservoir Kokanee 2019 Escapement Report

The water quality monitoring (Section 4) and terrestrial resources (Section 5) sections of this Annual Report have been prepared in cooperation with Cowlitz PUD.

1.2 Annual Report Organization

The 2019 Lewis River Annual Report provides the following information as required under Section 14.2.6 of the SA and the 401 Water Quality Certifications:

Section 2.0 Aquatics and Terrestrial Coordination Committees (ACC, TCC)

Section 2.1 ACC and TCC Membership

Section 3.0 Aquatic Resources

Section 3.1 ACC Meetings
Section 3.2 Aquatic Measures Implemented in 2019
Section 3.3 Aquatics 2019 Annual Plans

Section 4.0 Water Quality

Section 4.1 PacifiCorp Water Quality Measures Implemented in 2019
Section 4.2 PacifiCorp Water Quality 2020 Annual Plan
Section 4.3 Cowlitz PUD Water Quality Measures Implemented in 2019
Section 4.4 Cowlitz PUD Water Quality 2020 Annual Plan

Section 5.0 Terrestrial Resources

Section 5.1 TCC Meetings
Section 5.2 PacifiCorp Terrestrial Measures Implemented in 2019
Section 5.3 PacifiCorp Terrestrial 2020 Annual Plan

Lewis River Bull Trout
Photo courtesy of Jeremiah Doyle - PacifiCorp

2.0 AQUATICS AND TERRESTRIAL COORDINATION COMMITTEES

Section 14 of the Lewis River Settlement Agreement includes several measures that define the Parties' roles and obligations. The full text of Section 14 of the Settlement Agreement is provided in **Attachment B**. The structure and process of the ACC and TCC is intended to provide a forum to address time-sensitive matters, early warning of problems, and coordination of member organization actions, schedule, and decisions to save time and expense. The ACC and TCC make decisions based on consensus, while implementing the Settlement Agreement.

More specifically, Section 14:

- Establishes the Aquatics Coordination Committee (ACC) and Terrestrial Coordination Committee (TCC).
- Establishes the Licensees' ACC and TCC Coordinators (Coordinators).
- Describes the coordination and decision making roles of the ACC and TCC.
- Requires the ACC and TCC to coordinate and Consult on development of plans by the Licensees.
- Requires the ACC and TCC to review information and oversee, guide, and make comments and recommendations on implementation and monitoring of the terrestrial and aquatic Protection, Mitigation and Enhancement (PM&E) Measures, including plans.
- Requires the ACC and TCC to establish, among other things:
    i. Procedures and protocols for conducting committee meetings and deliberations to ensure efficient participation and decision making;
    ii. Rules for quorum and decision making in the absence of any member;
    iii. Alternative meeting formats as desired, including phone or teleconference; and
    iv. The methods and procedures for updating committee members on interim progress of development and implementation of the terrestrial and aquatic PM&E Measures.
- Requires the ACC and TCC to establish subcommittees to carry out specified committee functions and responsibilities and establish the size of, membership of, and procedures for, any such subcommittees.
- Requires the Licensees' Coordinators to prepare and file with the FERC detailed annual reports on the TCC and ACC activities; monitoring and evaluations under the Monitoring and Evaluation Plan (M&E Plan) described in SA Section 9; implementation of the terrestrial and aquatics PM&E Measures occurring during the prior year; and plans for the coming year, and water quality monitoring information.
- Requires the Licensees to consult with the ACC and TCC when preparing the Annual Report.

2.1 ACC and TCC Membership

In December 2004 the Licensees appointed their respective ACC and TCC Coordinators. At the same time, the Licensees established the ACC and TCC, and invited the Parties to designate representatives (and alternates) for membership on these committees. Current Party representation for each committee is shown in Table 1 and Table 2. Fourteen Parties have designated representatives to the ACC and twelve Parties designated representatives to the TCC.

Committee meetings were conducted in every month in 2019. During the year, the ACC met 12 times and the TCC met 10 times.

The purposes of the Coordination Committee meetings were to:

- Develop study and monitoring plans.
- Discuss implementation strategies for PM&E measures.
- Oversee implementation of the PM&E measures.

Sections 3.1, 3.2, and 5.1 of this report summarize major items discussed at the ACC and TCC meetings during the reporting period. Detailed meeting summaries are provided on the PacifiCorp Web site at: https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - ACC or TCC - 2019

Lewis River Elk Calf, Spring 2019
Photo courtesy of Ray Croswell

Table 1. Representatives and Alternates for Membership on the ACC

ACC Representatives	Organization	Alternate
Jonathan Stumpf	American Rivers	Wendy McDermott
Public Works Director	City of Woodland	To be named
No representative at this time	Clark County	To be named
No representative at this time	Cowlitz County	To be named
Eli Asher	Cowlitz Indian Tribe	Pete Barber
No representative at this time	Cowlitz-Skamania Fire District No. 7	To be named
Jim Malinowski	Fish First	To be named
No representative at this time	Lewis River Citizens at-large	To be named
Mariah Stoll-Smith Reese	Lewis River Community Council	To be named
Steve Manlow	Lower Columbia River Fish Recovery Board	Steve West[1]
Josh Ashline	National Marine Fisheries Service	To be named
No representative at this time	National Park Service	To be named
No representative at this time	North County Emergency Medical	To be named
Erik Lesko	PacifiCorp (PacifiCorp Co-Chair)	To be named
Amanda Froberg	PUD of Cowlitz County (PUD Co-Chair)	To be named
No representative at this time	Rocky Mountain Elk Foundation	To be named
No representative at this time	Skamania County	To be named
Bill Bakke	The Native Fish Society	To be named
Jim Byrne	Trout Unlimited	Brice Crayne
No representative at this time	US Bureau of Land Management	To be named
Tim Romanski	US Fish & Wildlife	Lindsy Wright
Ruth Tracy	USDA Forest Service	To be named
Peggy Miller	Washington Dept. of Fish & Wildlife	[2]Tom Wadsworth
[3]Katie Pruit	Washington State Recreation and Conservation Office, formerly known as *Washington Interagency Committee for Outdoor Recreation*	Kaleen Cottingham
No representative at this time	Woodland Chamber of Commerce	To be named
[4]Bill Sharp	Yakama Nation	No be named

[1] As of April 1, 2018 Steve West was appointed as alternate ACC representative.
[2] As of September 12, 2019 Bryce Glaser has been named ACC representative in place of Tom Wadsworth who has accepted another opportunity outside of WDFW.
[3] As of March 8, 2019 Katie Pruit has been named ACC representative in place of Adam Cole who has been reassigned.
[4] As of August 30, 2019 Steve Parker named Bill Sharp as ACC representative in place of Bob Rose who retired.

Table 2. Representatives and Alternates for Membership on the TCC

TCC Member	Organization	Alternate
No representative at this time	American Rivers	To be named
Public Works Director	City of Woodland	To be named
No representative at this time	Clark County	To be named
No representative at this time	Cowlitz County	To be named
Nathan Reynolds	Cowlitz Indian Tribe	Erik White
No representative at this time	Cowlitz-Skamania Fire District No. 7	To be named
No representative at this time	Fish First	To be named
No representative at this time	Lewis River Citizens at-large	To be named
Mariah Stoll-Smith Reese	Lewis River Community Council	To be named
Steve Manlow	Lower Columbia River Fish Recovery Board	Steve West[5]
Michelle Day	National Marine Fisheries Service	To be named
No representative at this time	National Park Service	To be named
No representative at this time	North County Emergency Medical	To be named
Kendel Emmerson	PacifiCorp (PacifiCorp Co-Chair)	Summer Peterman
Amanda Froberg	PUD of Cowlitz County (PUD Co-Chair)	To be named
Bill Richardson	Rocky Mountain Elk Foundation	Ray Croswell
No representative at this time	Skamania County	To be named
No representative at this time	The Native Fish Society	To be named
No representative at this time	Trout Unlimited	To be named
No representative at this time	US Bureau of Land Management	To be named
Tim Romanski	US Fish & Wildlife	To be named
Neil Chartier	USDA Forest Service	Ruth Tracy
Peggy Miller	Washington Dept. of Fish & Wildlife	Eric Holman
[6]Katie Pruit	Washington State Recreation and Conservation Office, formerly known as *Washington Interagency Committee for Outdoor Recreation*	Kaleen Cottingham
No representative at this time	Woodland Chamber of Commerce	To be named
[7]Bill Sharp	Yakama Nation	To be named

[5] As of April 1, 2018 Steve West was appointed as alternate ACC representative.
[6] As of March 8, 2019 Katie Pruit has been named TCC representative in place of Adam Cole who has been reassigned.
[7] As of August 30, 2019 Steve Parker has named Bill Sharp TCC representative in place of Bob Rose who retired

3.0 AQUATICS RESOURCES

3.1 ACC Meetings

The purpose and role of the Aquatic Coordination Committee (ACC), as defined in Section 14.1 of the SA is to facilitate coordination and implementation of the aquatic PM&E measures.

The structure and process of the ACC is intended to provide a forum to address time-sensitive matters, early warning of problems, and coordination of member organization actions, schedule, and decisions to save time and expense. The ACC makes decisions based on consensus, while implementing the Settlement Agreement and the FERC license requirements.

3.1.1 ACC Meetings and Conference Calls: Overview

This section summarizes major items discussed at ACC meetings during the 12-month reporting period. Detailed meeting summaries are provided on the PacifiCorp website at: https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - ACC - 2019

- On January 2, 2019 the ACC agreed to the rearing strategy as outlined in Attachment A of the meeting notes.
- The 2018 Draft ACC/TCC Annual Report was distributed to the ACC for its 30-day review and comment period March 4, 2019.
- On April 11, 2019 the USFWS provided an overview of the Lewis River Bull Trout: Synthesis of Known Information
- On April 11, 2019 the ACC agreed it was beneficial to distribute the 2019/2020 aquatic fund announcement in May 2019 in order to provide additional time for interested parties to submit their project proposals.
- On May 9, 2019 the USFWS and NOAA presented the preliminary In Lieu determinations of the Services contained in their April 12, 2019 letters to the Utilities.
- The 2018 ACC/TCC Annual Report was submitted to the FERC April 12, 2019.
- On July 11, 2019 he ACC accepted the recommendation of the Aquatic Technical Subgroup (ATS) that the Adult Trap Efficiency (ATE) Study scheduled in fall 2019 for adult coho salmon be postponed until fall of 2020.
- Also, on July 11, 2019 a thorough update of the In-Lieu Strategic & Monitoring Plans was provided in addition to a presentation of the Draft Lewis River Bull Trout Fish Passage Plan and conceptual drawings.

- On July 11, 2019 the ACC accepted the recommendation of the Aquatic Technical Subgroup (ATS) that the Adult Trap Efficiency (ATE) Study scheduled in fall 2019 for adult coho salmon be postponed until fall of 2020.

- On August 8, 2019 the ACC agreed that PacifiCorp should send a scope of work to both DJ Warren and HDR to solicit informal bids from both firms for the external Comprehensive Review study.
  The ACC further requested to have the opportunity to assess their qualifications of each but would like input on the final selection. PacifiCorp will provide bids received to the ACC prior to the September meeting.

- On September 12, 2019 PacifiCorp informed the ACC attendees that the on August 5, 2019 the Forest Service informed PacifiCorp that they will not be implementing the Lewis River 21 Phase II project. The Forest Service does not want to relocate the trail, nor has funds to invest in the trail crossing structures that would be necessary once the Lewis River side channels accessed the area. The aquatic funds in the amount of $177,000 was refunded to PacifiCorp and placed back in the aquatic fund account. After an additional 7-day review period the ACC selected D.J. Warren & Associations to perform the comprehensive periodic review of the Hatchery and Supplementation Program.

  Also on September 12, 2019 it was agreed that PacifiCorp has the option to increase the upstream transport number of live fish up to 9,000 from the original 7,500, so the ACC agreed to use an adaptive management approach as long as the Annual Operating Procedure requirements are followed.

- PacifiCorp distributed the 2019/2020 Lewis River Aquatic Fund Pre-Proposals to the ACC September 30, 2019.

- The ACC began its review of the Aquatic Fund 2019/2020 Pre-Proposals with comments and evaluations due by October 11, 2019. An additional 7-day review period was provided to accommodate absentee ACC Representatives with comments due by October 18, 2019. In addition, the ACC agreed to meet the second Thursday of every month in 2020 beginning at 9:30am, and adjust as needed.

- On December 12, 2019 each aquatic fund applicant provided a PowerPoint presentation for ACC review, comments and questions.

- The ACC agreed to postpone the 2020 ATE Evaluations and requested PacifiCorp develop a draft memorandum outlining the proposed steps for moving forward with the Merwin Trap for the ACC to review and approve in 2020.

- On December 12, 2019 the ACC approved PacifiCorp requesting a December 31, 2020 extension from the FERC for the Hatchery & Supplementation Comprehensive Periodic Review.

3.1.2 ACC Meeting Notes

The Licensees prepared draft notes for ACC meetings and conference calls. These notes were distributed to ACC members for review and comment approximately one week after the subject meeting. After review, revision and approval by the ACC, the final notes were entered in the public record and posted on the PacifiCorp web site at:
https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - ACC – 2019

3.2 Aquatic Measures Implemented as of the End of 2019

This section presents the actions taken by the Utilities during January 2019 through December 2019 toward Aquatic requirements of the Lewis River Settlement Agreement and the FERC licenses. It also includes previously completed Settlement Agreement actions. The actions are identified by agreement Article number as the agreement is more specific in detailing the requirements than the license orders which in essence, incorporate agreement terms via agency regulatory authority. In some instances previous actions are noted to provide a more comprehensive record.

A description of funding amounts deposited and disbursed during 2019 is provided in Section 7.0 – Funding.

3.2.1 SA Section 4.1 Common Provisions Regarding Fish Collection and Transport Facilities

Studies to Inform Design Decisions (SA 4.1.1)
PacifiCorp has completed the Merwin Tailrace Fish Behavior study to provide information that could assist the planning and design of the Merwin Upstream Collection and Transport Facility. The study plan was developed in coordination with the ACC and was finalized as a revised document June 30, 2005. In 2005 through 2006, the study was conducted and a final report was issued in February 2007.

Adult Trap Efficiency for Salmonids (SA 4.1.4c)
The Adult Trap Efficiency (ATE) standard was first discussed by the ACC at the February 14, 2009 meeting. Bryan Nordlund of NMFS subsequently developed a proposal for the ATE standard along with a matrix for a phased fish trap implementation. This proposal was the topic of nearly every ACC and Engineering subgroup meeting for most of the year accompanied by several offline conversations. An ATE determination methodology and standard was finally accepted by the ACC at their December 11, 2009 meeting with the efficiency set at 98%. Detailed methodology and definitions were delegated to the Draft Monitoring and Evaluation Plan which was submitted to the FERC in June 2009 and approved in December 2010, and later revised and resubmitted to FERC in April 2017 and approved on May 15, 2017 (see Section 3.2.36 below). The Merwin Upstream Collection and Transport facility was not substantially completed until April 2014. Based on this, PacifiCorp proposed and the ACC agreed to suspend the start date of the two year ATE evaluation until spring 2015.

ATE evaluation continued in 2019 with the monitoring of late-run winter steelhead only (no spring Chinook or coho salmon in 2019). The annual report for the 2019 Merwin ATE Study with late-run adult winter steelhead can be found in the Lewis River Fish Passage Program 2019 Annual Report, which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

3.2.2 SA Section 4.2 Original Merwin Trap

Original Merwin Trap suspended operation in June 2013.

Merwin Trap Flow Restrictions (SA 4.2b)

To provide a margin of safety for personnel, PacifiCorp limited the 2012 river discharge at Merwin dam/powerhouse to 5,500 cfs or less as river flow conditions warranted when personnel were in the trap. Flow limitations were coordinated with WDFW hatchery staff. With completion of the Merwin Upstream Collection and Transport facility, flow restrictions are no longer needed.

Merwin Trap Upgrades (SA 4.2c)

On November 29, 2005 PacifiCorp provided the Services (USFWS and NOAA Fisheries) and WDFW a letter requesting a meeting to discuss potential upgrades and operational procedures to improve operating conditions for personnel working in the Merwin Trap by providing a greater margin of safety. Attached to the letter was a memo that identified company proposed measures and a supporting Engineering Study (Report No. RES 3000028924).

Final designs were submitted to the FERC February 2, 2007 and acceptance received from the FERC February 12, 2007. Final designs and the FERC correspondence are available upon request.

Interim Merwin Trap Operations (SA 4.2d)

For 2012, the Merwin Trap was operated in coordination with WDFW or PacifiCorp's new Fish Passage crew to collect hatchery fish returning from the ocean and to transport any bull trout collected to Yale reservoir. Per the SA, WDFW increased frequency of trap cleanout to daily during the work week (Monday - Friday) unless flows or inadequate staff prevented such effort. PacifiCorp coordinated with WDFW and made reasonable efforts to operate the Merwin powerhouse to allow fish trapping operations at the trap. Fish other than hatchery fish or wild winter steelhead were returned to the river downstream of Merwin Dam.

3.2.3 SA Section 4.3 Merwin Upstream Collection and Transport Facility

On March 2, 2009, PacifiCorp submitted to the subgroup and the ACC the 60 percent design report. Following comments on the 60 percent design report, the subgroup worked on developing the design to a 100 percent level. On June 26, 2009, the subgroup was provided the 90 percent design report. Following the review period, PacifiCorp worked with the subgroup to finalize the report. A 100 percent design report was submitted to the FERC December 23, 2009. Periodic project updates were provided at monthly ACC meetings until the upstream collection facility was completed.

On September 4, 2012, PacifiCorp assumed operations of the existing adult trap located at Merwin Dam. This included daily (Mon. – Fri.) removal of fish from the trap, vertical adjustment of weir orifice, transportation of target species upstream, and data management. WDFW remained responsible for transporting all non-target species (i.e., species not identified in PacifiCorp's upstream transport plan) to the hatcheries or to the lower Lewis River.

On June 30, 2013, the existing Merwin Trap was decommissioned to allow for construction of the new facility and associated infrastructure. The new upstream collection and transport facility began operation in late December 2013 and was considered substantially complete in April 2014. The following information is a summary of the Merwin trap operations in 2014. Detailed results of the 2019 operations and associated M&E evaluations are included in the Lewis River Fish Passage Program 2019 Annual Report, which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

In compliance with WDFW standards, all adult salmonids collected were identified to species and sorted based on the following characteristics: missing adipose fin with no coded wire tag detection *(AD CLIP ONLY),* adipose fin absent and present with a coded wire tag detection *(CWT),* adipose fin intact with no coded wire tag detection *(WILD),* and adipose fin intact with blank wire tag present *(WILD + BWT).* All fish were also identified as male *(M),* female *(F),* or jacks *(J).*

A total 8,495 fish were captured at the Merwin Trap in 2019 (**Table 3**). Among the species collected, early coho accounted for the largest proportion of fish captured (n=2,612) followed by winter steelhead (n=1,896), summer steelhead (n=1,865), spring Chinook (n=998), late coho (n=762), fall Chinook (n=309), cutthroat (n=45), sockeye salmon (n=11), and resident rainbow trout (n=6). Of the fish captured, several were recaptured fish that had already passed through the trap once. Recaptured fish counts include 468 hatchery summer steelhead, 90 blank wire tag winter steelhead, and three wild sockeye salmon. No bull trout were captured at the Merwin Trap in 2019, or in any previous years.

Lower Lewis River Screw Trap – October 2018

Photo courtesy of Christopher M. Karchesky

Table 3. 2019 Merwin Trap Capture Data.

Specie	AD Clip			CWT			Wild			Wild Recap			Wild-BWT		Recap		Not sexed	Total
	M	F	J	M	F	J	M	F	J	M	F	J	M	F	M	F		
Spring Chinook	337	213	100	116	74	125	12	12	9									998
Fall Chinook	68	43	33	25	5	4	70	51	10									309
Early Coho	567	589	142	119	133	44	389	430	199									2,612
Late Coho	173	189	31	26	28	2	152	128	33									762
Summer Steelhead	467	922					5	3							124	344		1,865
Winter Steelhead	317	422					51	25					513	478	50	40		1,896
Sockeye Salmon							2	6								3		11
Chum Salmon																		
Pink Salmon																		
Cutthroat (>13 inches)																	45	45
Cutthroat (< 13 inches)																		
Rainbow (< 20 inches)																	6	6
Bull Trout (> 13 inches)																		
Bull Trout (< 13 inches)																		
															Total			8,495

A total 6.756 adult salmonids (115 spring Chinook, 5,587 coho salmon, 1,009 winter steelhead, and 45 cutthroat) were transported upstream throughout the migration period in 2019 as part of the PacifiCorp's reintroduction program (**Table 4**).

Table 4. Summary of 2019 Upstream Transport to Swift Reservoir.

Species	Male	Female	Jack	Not sexed	Female:Male Ratio	Jack:Adult Ratio	Total
Spring Chinook	14	13	88		0.13	3.26	115
Early Coho	1,319	1,535	232		0.99	0.08	3,086
Late Coho	1,627	838	36		0.50	0.01	2,501

Winter Steelhead	527	482			0.91		1,009
Cutthroat >13"				45			45
Bull Trout >13"							0
							6,756

3.2.4 SA Section 4.4 Downstream Transport at Swift No. 1 Dam

Modular Surface Collector (SA 4.4.1)
The Modular Surface Collector, referred to as the Swift Floating Surface Collector (FSC), operated for most of 2019 with a planned shutdown from approximately mid-July through mid-October 2019 for scheduled maintenance. Detailed results of the 2019 operations and M&E evaluations are included in the attached Lewis River Fish Passage Program 2019 Annual Report, which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**). A total 118,612 salmonids were captured by the FSC in 2019. Of these fish, 111,702 were transported and released downstream of Merwin Dam. Juvenile coho accounted for the highest proportion of the overall estimated catch (83.5%), followed by Chinook (9.2%), steelhead (2.5%), and coastal cutthroat trout (0.8%). A total 1,413 hatchery rainbow trout and 5 bull trout were also collected in 2019 and returned to Swift Reservoir. A full accounting of the required standards, such as injury rate, capture efficiency, Overall Downstream Survival (ODS), and others, is included in the Lewis River Fish Passage Program 2018 Annual Report, which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

Release Ponds (SA 4.4.3)
In 2006, PacifiCorp notified the ACC representatives that the company was working to secure a site for the Release Ponds. PacifiCorp initially worked with WDFW to secure acquisition of a site just downstream of Woodland, Washington. The site met the criteria established in the SA and the land was available for trade with WDFW.

In 2009, PacifiCorp discovered that the identified WDFW parcel was much smaller than originally recorded with the county and was not of suitable size. PacifiCorp then initiated talks with the adjacent landowner to pursue either purchase or lease. Discussions with continued through to October 2010, at which point the adjacent landowner withdrew from negotiations.

In November 2010, PacifiCorp initiated an effort to find an alternate site upriver from the previously considered location. A site was selected and purchased and final designs updated. The site is on approximately 5 acres near River Mile 9 and the town of Woodland, Washington. PacifiCorp has prepared documentation for formal consultation between NMFS and the FERC on Eulachon smelt (*Thaleichthys pacificus*) and associated critical habitat.

A Biological Opinion from NOAA Fisheries was submitted to the FERC February 3, 2015. With the Biological Opinion complete, progress towards the US Army Corp of Engineers' (USACOE) dredge and fill permit, and the Washington Department of Natural Resources (WDNR) lease for the in-water structure could continue.

In 2015, PacifiCorp received notification from the City of Woodland that the Company would need to resubmit permit applications for construction of the Release Ponds since the previous permits had expired. PacifiCorp staff resubmitted permit applications. Land Use permit approvals were issued by the City of Woodland, USACOE, WDNR and WDFW, with the final approval granted April 16, 2017. Following completion of all the regulatory requirements, PacifiCorp initiated and completed construction of the Release Ponds in December 2017. Operations testing occurred in early-January 2018 with final acceptance later that month. The Woodland Release Pond began daily operation in March 2018. The facility's purpose is to allow for stress reduction and determination of transport survival for out-migrants transported downstream from the Swift Reservoir FSC before volitional release into the lower Lewis River.

3.2.5 SA Section 4.5 Downstream Passage at Yale Dam

Implementation scheduled prior to 13th anniversary of Yale Project License.

3.2.6 SA Section 4.6 Downstream Passage at Merwin Dam

Implementation scheduled prior to 17th anniversary of Merwin Project License.

3.2.7 SA Section 4.7 Upstream Passage at Yale Dam

Implementation scheduled prior to 17th anniversary of Yale Project License.

3.2.8 SA Section 4.8 Upstream Passage at Swift Projects

Implementation scheduled prior to 17th anniversary of Swift No.1 Project License.

3.2.9 SA Section 4.9.1 Interim Bull Trout Collection and Transport Programs

Per Article 402(a) in the FERC licenses and the Lewis River SA section 4.9.1, PacifiCorp annually captures and transports bull trout from the Yale powerhouse tailrace (upper Merwin Reservoir) to the mouth of Cougar Creek, a Yale Reservoir tributary. A total of 162 bull trout have been captured from the Yale tailrace since the program began in 1995.

For Methods, Materials, and Results concerning number of bull trout captured and transported during 2019 Yale Tailrace activities as well as pertinent biological information of individual bull trout captures, please see the *Bull Trout 2019 Annual Operations Report,* which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

Investigation of Alternative Collection Methods (SA 4.9.2)

PacifiCorp continues to consider more effective and less intrusive methods to collect bull trout from the Yale tailrace until capital improvements and future fish passage is implemented prior to 2023. Past alternative methods investigated include; beach seines, purse seines, drifting tangle nets when the powerhouse is online, and angling.

In 2019, tangle nets and angling were the only methods used and, to date, remain the most effective. Annual Consultation concerning 2019 bull trout monitoring activities occurred between the Utilities and the USFWS in January 2019 at which time it was agreed that tangle nets would again be utilized in the upcoming field season to attempt to capture bull trout from within the Yale tailrace waters.

Yale and Merwin Bull Trout Entrainment Reduction (SA 4.9.3)
PacifiCorp completed and distributed a revised *Yale Project Entrainment Reduction Plan* to the ACC and the Services May 16, 2008. The plan is available on PacifiCorp's website:https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/lewis-river/license-implementation/acc/Yale_Hydro_Project_Bull_Trout_Entrainment_Final_Report_and_Bull_Trout_Reduction_Plan_January_2008.pdf

3.2.10 SA Section 4.10 Bull Trout Passage in the Absence of Anadromous Fish Facilities

If Yale Downstream Facility is not constructed, implement prior to 13th anniversary of Yale Project License.

3.2.11 SA Section 5.1 Yale Spillway Modifications

PacifiCorp has nearly completed installation of a spillway barrier net. This net is similar in design and made of material similar to the Entrainment Reduction net in Yale Reservoir. The net is designed to exclude bull trout from the spillway at any spill flow less than 6,000 cfs (the average spill volume for Yale Spillway) meeting the intent of SA 5.1. When spill flows exceed 6,000 cfs, the net floating line is designed to sink to allow large debris to float over the net and exit Yale reservoir via spill. This procedure avoids damaging the net. It is anticipated that the occurrence of spills greater than 6,000 cfs will be rare so bull trout spillway entrainment is consequently expected to be low. As of the end of 2012, some of the floating system parts failed during installation so PacifiCorp solicited approvals from ACC members and the FERC to extend the final installation to March 31, 2013. ACC members, including the Services, approved the extension but the FERC had not responded prior to the end of 2012. The FERC approved the extension in spring 2013 and the spillway entrainment net was completed October 15, 2013.

3.2.12 SA Section 5.2 Bull Trout Habitat Enhancement Measures

PacifiCorp continued to manage the Cougar Creek Conservation Covenant to the benefit of bull trout. Noxious weeds (scotch broom and Himalayan blackberry) were identified and treated along the transmission Right Of Way (ROW) and in previously tree harvested lands along Panamaker Creek.

A habitat improvement project on Panamaker Creek was submitted by PacifiCorp through the 2007/2008 Aquatic Habitat Fund process. This project was completed in August 2008 and had the following benefits:

- Reduced sediment input through the decommissioning of one mile of road;
- Removal of nine culverts and installation of ten cross ditches for runoff control; and
- Re-vegetation of all disturbed soils.

Per the SA, Cowlitz PUD managed the Devil's Backbone Conservation Covenant to benefit bull trout.

3.2.13 SA Section 5.3 Reserved

3.2.14 SA Section 5.4 Reserved

3.2.15 SA Section 5.5 Bull Trout Limiting Factors Analysis

Contract was awarded to Meridian Environmental, Inc. (the Consultant). The Consultant completed the field work and provided a final report in May 2007. The report describes three potential streams that could support bull trout if improvements were made to the habitat. The improvements include shading to reduce stream temperatures and riparian habitat stabilization. An overriding limiting factor in two of the three streams was lack of water during the critical spawning period.

3.2.16 SA Section 5.6 Public Information Program to Protect Listed Anadromous Species

PacifiCorp maintains signage at the Eagle Cliff area to inform the public of specific angling regulations that are designed to protect both bull trout and reintroduced anadromous species (**Figure 1**). Additionally, WDFW has approved new regulations on Swift Reservoir that prohibit the harvest of unclipped adipose fin salmonids or salmon over 15 inches in length. The area upstream of Eagle Cliff Bridge remains catch and release for all species. This effort will help protect transported adults and their progeny migrating through Swift Reservoir.

3.2.17 SA Section 5.7 Public Information Program to Protect Bull Trout

PacifiCorp maintains signage at most reservoir and river access sites that are owned by the company. The company also provides informational flyers to the public at all camping and day use areas the company owns. As of July 2018 Figure 1 content was updated.

Figure 1. Signs posted for public information.

3.2.18 SA Section 6.1 Flow Releases in the Bypass Reach: Upper Release and Constructed Channel

Upper Release Point (SA 6.1.2)

Upper Release Point water flowed continuously throughout 2019. With the exception of the noted excursions, stream flow as measured at the upper release point was in excess of the required minimum flow for the duration of the year. There were no uplanned spill events at the Swift project in 2019[8].

The following discussion provides explanations for the recorded minimum flow excursions on March 16, 2019, April 8, 2019, April 23, 2019 and October 6, 2019 through October 11, 2019. On March 15, 2019, a full plant outage was taken at Swift No. 1 for planned annual maintenance. A Swift spill gate was cracked at 12:00 PM on March 15, 2019 to maintain minimum flow in the bypassed reach. Although flow measured at the upper release point on March 16 was reduced, the open spill gate maintained flows, in excess of the minimum flow, in the bypass reach. On April 7, 2019, the penstock for the Swift No. 12 generating unit was dewatered in preparation for a planned maintenance outage. A Swift spill gate was cracked at 7:00 AM on April 7, 2019 to maintain minimum flow into the Swift bypass reach. Again,

[8] A Swift spill gate was opened on March 16, 2019, April 8, 2019, April 23, 2019 and October 6 through 11, 2019 to maintain minimum flows in the Swift bypass reach.

although flow measured at the upper release point on April 8, 2019 was reduced, the open spill gate maintained flows, in excess of the minimum flow, in the bypass reach. On April 22, 2019 the penstock for Swift No. 13 was dewatered in preparation for a planned maintenance outage. A spill gate was cracked at 7:00 AM on April 22, 2019 to maintain minimum flow into the Swift bypass reach. As in the previous unit dewatering events discussed, the cracked spill gate provided flows greater that the minimum flow into the bypass reach. A Swift No. 1 total plant outage was taken from October 6, 2019 through October 11, 2019 to allow for the installation of new flow meters. A Swift spill gate was cracked at 6:55 AM on October 6, 2019 to maintain minimum flow to the bypass reach for the duration of the plant outage. Average daily flows, as measured at the upper release point, are provided in **Figure 2**.

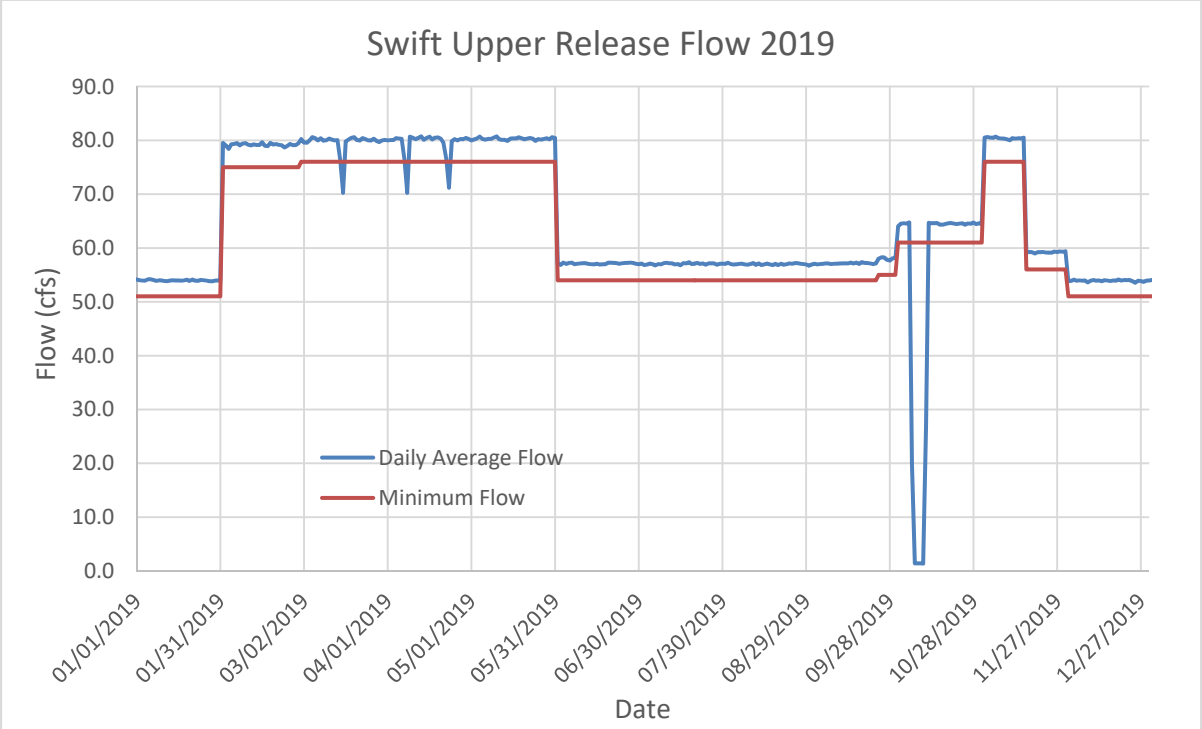

Figure 2. Daily Minimum Release flows from January 1, 2019 to December 28, 2019.

Constructed Channel (SA 6.1.3b)

Beginning in fall 2011, a flow monitoring gage was installed at the canal drain outlet to provide a minimum flow alarm system and enhanced flow measurement. Minimum flow from the canal drain is set at 14 cfs year round. The system is performing well and with the exception of one excursion on January 18, 2019, flows were in excess of the minimum flow for the duration of 2019. On January 18, 2019 the daily average flow, as measured at the canal drain outlet, was 13.8 cfs, 0.2 cfs below the minimum flow of 14 cfs. There was no generation outage or operational explanation for the reduction in flow, so it was likely the result of a temporary debris blockage at the drain outlet that washed out on its own.

There were several other variances in 2019 that were not true excursions, for which the following explanations are provided. The low flow readings recorded on April 9 and 10, 2019 were due to a low nitrogen tank at the gage and visual observation confirmed that there was no

actual drop in flow on those dates. The significant increase in flow recorded from August 13 through August 16, 2019 was due to a downstream log jam causing an elevated stream stage at the gage. Average daily flows for 2019 are provided in **Figure 3**.

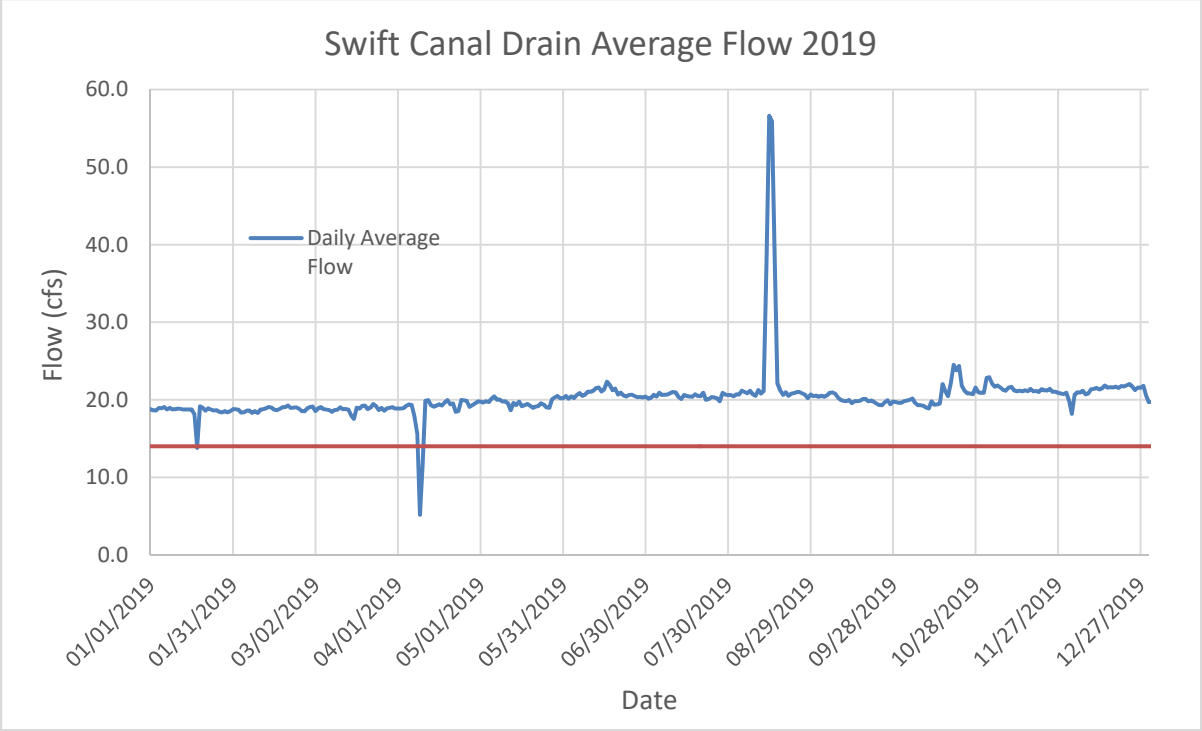

Figure 3. Minimum daily water flow (cfs) measured from the Swift canal drain - 2019.

Maintenance of the Constructed Channel (SA 6.1.3e)
As of December 31, 2019 all structures are in place and functioning.

3.2.19 SA Section 6.2 Flow Fluctuations and Ramp Rates below Merwin Dam

Minimum Flows
During calendar year 2019, flows for the Merwin Project were met or exceeded as stipulated in the June 26, 2008 FERC license with the following exceptions.

In accordance with Article 415 of the Federal Energy Regulatory Commission (Commission) license for the Merwin Hydroelectric Project, all planned flow modifications during the 2019 calendar year were agreed to by the Lewis River Flow Coordination Committee (FCC).

On July 24, 2019, PacifiCorp began releasing the modified minimum flow of 1,200 cubic feet per second (cfs) and transitioned to 1,000 cfs on July 31, 2019 as shown below (**Figure 4**). These modified stream flow releases was approved by the FCC on July 24, 2019.

Date	FERC Minimum Flow	Modified Minimum Flow
7/24/19 – 7/30/19	1,500 cfs	1,200 cfs
7/31/19- 8/31/19	1,200 cfs	1,000 cfs

The decision to reduce flows was based on the early loss of snowpack, low natural inflows and dry summer conditions. The conditions we were experiencing were not unlike those in 2015 and 2016 and PacifiCorp and the FCC took a proactive approach to water management in an effort to preserve water for fall salmonid spawning flows as well as maintain water in the reservoirs for recreational use during the summer months (**Figures 5 and 6**).

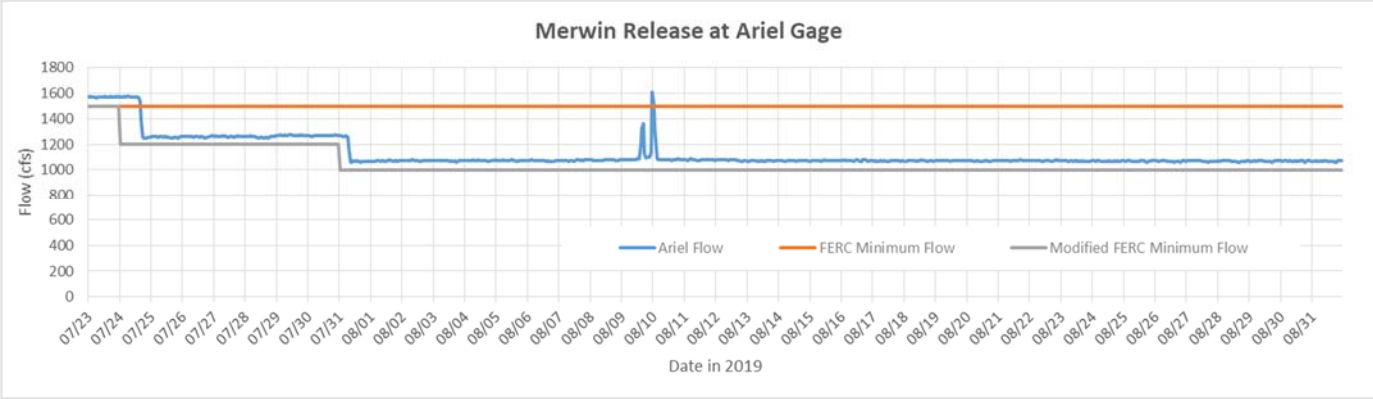

Figure 4. Daily water flow (cfs) at USGS Ariel Gage No. 14220500 vs. FERC Minimum Flow: July 23, 2019 through August 31, 2019

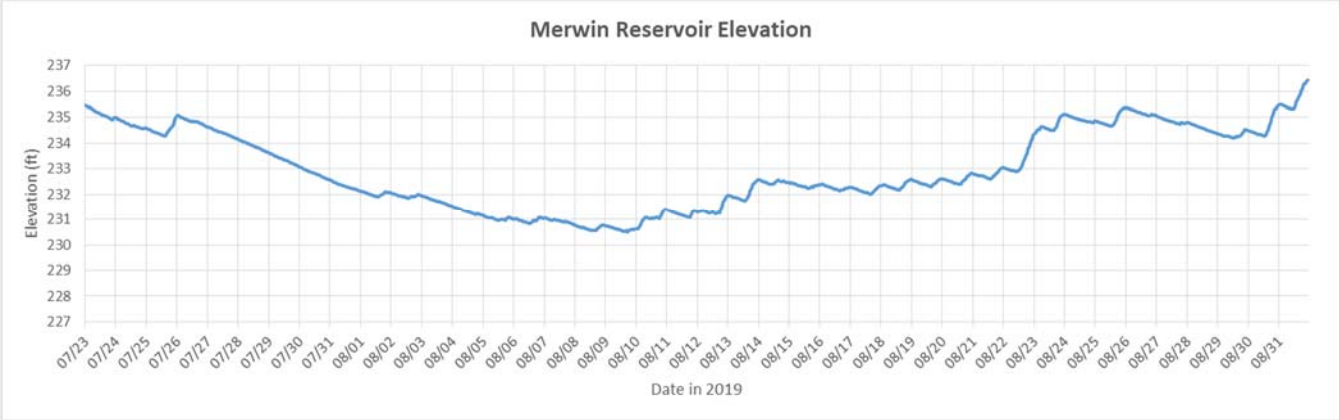

Figure 5. Merwin Reservoir Elevation: July 23, 2019 through August 31, 2019

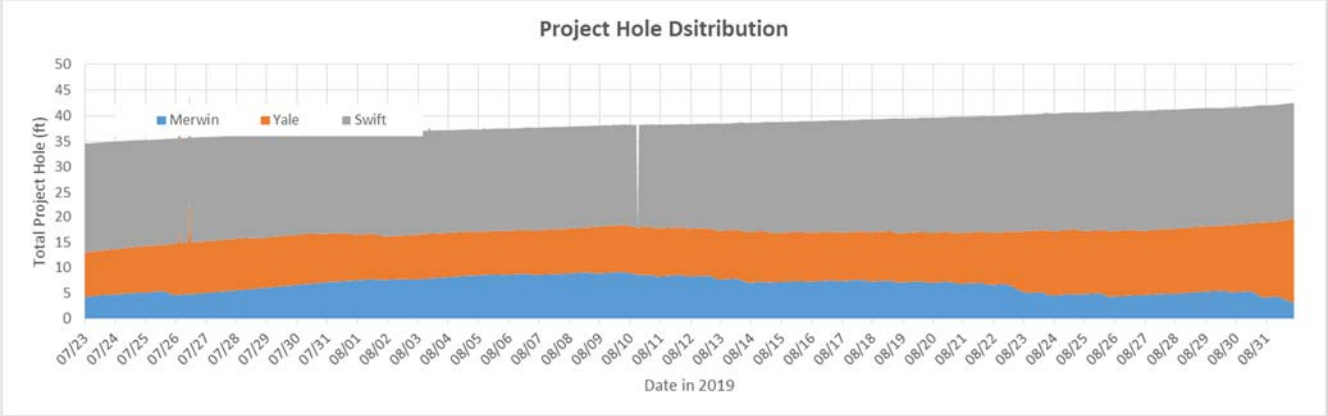

Figure 6. Lewis River Total Reservoir Hole (Draft): July 23, 2019 through August 31, 2019

As in years past, Washington Department of Fish And Wildlife requested several days of Merwin Project flow reductions to facilitate fall Chinook fish and redd counts in the lower Lewis River. PacifiCorp and the FCC agreed to the following flow reductions.

Date	FERC Minimum Flow	Modified Minimum Flow (0930 – 1430 hrs)
11/6/2019	4,200 cfs	1,200 cfs
11/13/2019	4,200 cfs	1,200 cfs
11/20/2019	4,200 cfs	1,200 cfs
11/27/2019	4,200 cfs	1,200 cfs
12/14/2019	4,200 cfs	1,200 cfs

On November 20, 2019 PacifiCorp began releasing the modified minimum flow of 2,000 cfs. This flow was released until December 16, 2019, when the FERC minimum flow transitioned to 2,000 cfs (**Figure 7**). The decision to reduce flows was made by PacifiCorp and the FCC to facilitate the completion of dam safety work on the Merwin spillway gates. The dry weather pattern through fall 2019 resulted in significant drafting of the Lewis River reservoirs, such that on November 18, 2019 there was over 70 feet of hole in the reservoirs (**Figure 9**). PacifiCorp's ongoing dam safety work on the Merwin spillway gates, required that Merwin reservoir be maintained at an elevation of 230 feet or higher to keep a bulkhead in place on the upstream side of the gate that is being worked on (**Figure 8**). Due to the low inflows and ongoing drafting of reservoirs, by November 20, 2019 PacifiCorp would have had to remove the bulkhead in Merwin Reservoir and stop the spill gate work unless flows out of Merwin were decreased.

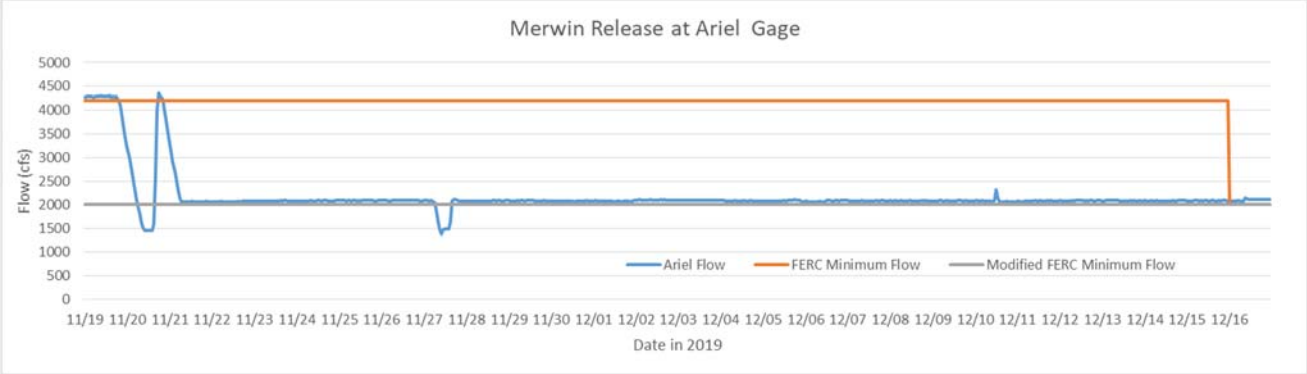

Figure 7. Daily water flow (cfs) at USGS Ariel Gage No. 14220500 vs. FERC Minimum Flow: July 23, 2019 through August 31, 2019

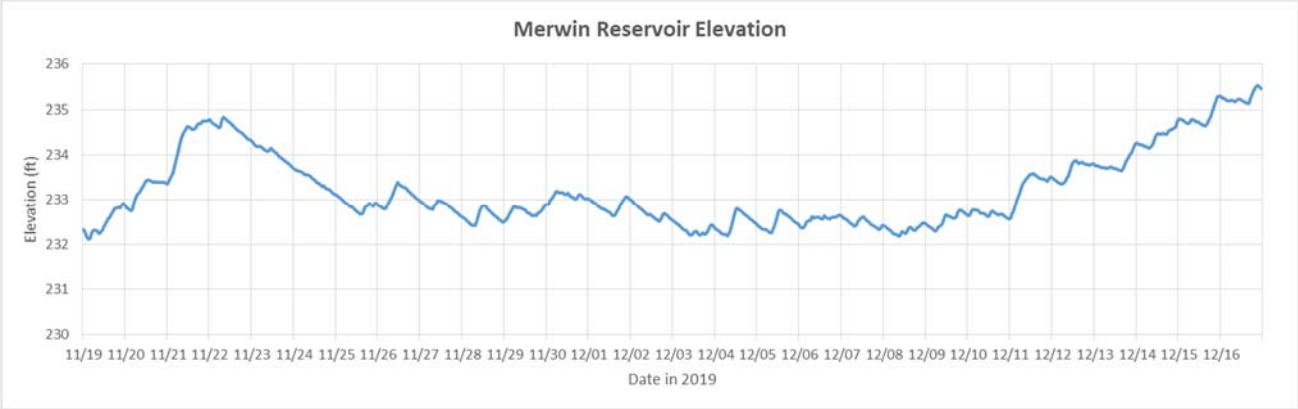

Figure 8. Merwin Reservoir Elevation: November 19, 2019 through December 16, 2019 18, 2019

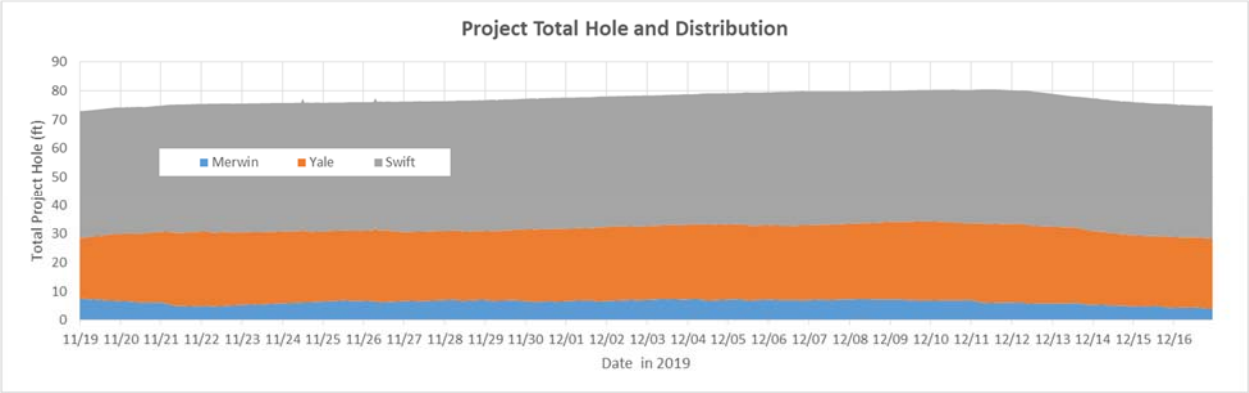

Figure 9. Lewis River Total Reservoir Hole (Draft): November 19, 2019 through December 16, 2019

Ramp Rates
There were no ramp rate excursions downstream of Merwin Dam, as measured at the USGS Ariel Gage No. 14220500, in calendar year 2019.

3.2.20 SA Section 7.1 Large Woody Debris Program

Swift Reservoir did not require large wood debris removal in 2019, therefore no logs were stored or donated for habitat enhancement projects in 2019. The remaining Large Woody Debris Fund balance as of December 31, 2019 is $4,013.42.

3.2.21 SA Section 7.2 Spawning Gravel Study and Gravel Monitoring and Augmentation Plan

In 2006, PacifiCorp completed a Spawning Gravel Report for downstream of Merwin dam and proposed to monitor gravel movement for two years before making recommendations and developing a final gravel augmentation plan. A summary report was provided to the ACC December 20, 2007, regarding completion of two tasks for the Lewis River Spawning Gravel Evaluation. In 2008, the third year of mapping the spawning gravel areas and analyzing the accumulated data was completed. Some of the key findings were that spawning habitat is likely limiting to the local Chinook salmon population. Available spawning gravel does not appear to be diminished in the upper reach and the gravel appears to be stable. Adding more spawning gravel would not necessarily increase the spawning area due to the effect of the confined canyon geomorphology.

PacifiCorp provided an annual report to the ACC and monitored the gravel sites in the fall of 2008 in order to provide more refinement to the model for gravel movement and an applicable trigger or gravel augmentation. A final report update and recommendations was submitted in January 2009. Per the assessment plan a recommended monitoring-trigger occurs when flows below Merwin exceed 42,000 cfs as measured at the Ariel gage. Since completion of the assessment report, flows of that magnitude have not occurred. The highest flow since the completion of this study occurred in January 2010 at just over 37,000 cfs.

3.2.22 SA Section 7.3 Predator Study

A predator analysis was initiated as part of the New Information process and was reported in the document titled, *New Information Regarding Fish Transport into Lake Merwin and Yale Lake* which was provided by the USGS and University of Washington June 24, 2016 (PacifiCorp 2016).

3.2.23 SA Section 7.4 Habitat Preparation Plan

PacifiCorp's obligation under the Habitat Preparation Program for Swift Reservoir ended in 2012. Formal reintroduction of fish collected at Merwin Trap replaced the Habitat Preparation Program for all reintroduction species into Swift. The Habitat Preparation Program may be initiated at Merwin and Yale reservoirs pending the decision to reintroduce salmon and steelhead into those reservoirs.

3.2.24 SA Section 7.5 Aquatics Fund

PacifiCorp continues to annually make funds available for Aquatic resource projects in accordance with the *Aquatics Fund – Strategic Plan and Administrative Procedures*.

On May 3, 2019 the Licensees notified Settlement Agreement Parties, ACC, TCC and interested parties of the availability of Funds for the 2019/2020 funding cycle. The total amount available as of December 31, 2019 was $3,620,669.57 (see Section 7.0). The Licensees will continue to provide additional money to the Aquatic Fund on an annual basis as stipulated in the SA.

3.2.25 SA Section 7.6 In Lieu Fund

On April 12, 2019, the National Marine Fisheries Service and US Fish & Wildlife Service (USFWS) (collectively the "Services") issued preliminary decisions regarding construction of anadromous fish passage facilities at the Merwin and Yale hydroelectric projects located on the Lewis River. Current anadromous fish passage is provided between Merwin dam and upstream of Swift dam. The Services preliminary decision is to forego construction of anadromous fish passage into Merwin reservoir and establish a Merwin In-Lieu Fund of approximately $20,000,000, and postpone a decision until 2031 in regards to downstream fish passage measures in Yale reservoir and until 2035 regarding Yale upstream fish passage measures. For the USFWS, the preliminary decision also requires the construction of smaller magnitude bull trout fish passage measures for connectivity between Merwin, Yale and Swift reservoirs.

In response to the Services announcements, PacifiCorp and the Cowlitz Public Utility District (collectively the "Utilities") filed the Services preliminary decision with the Federal Energy Regulatory Commission the same day (April 12, 2019), and committed to provide a schedule of actions that the Utilities will implement to advance the process from the preliminary decision to a license amendment application. On April 22, 2019, PacifiCorp submitted to the Commission a letter identifying such actions and accompanying schedule.

On May 9, 2019, the Utilities and representatives of the Services met with the Lewis River Aquatic Coordination Committee (ACC) to explain the Services' preliminary decision and outline the steps the Utilities will take through the remainder of 2019 to prepare a license amendment application to the Commission. The application will be consistent with the Services' preliminary decision. Approved ACC meetings notes from this portion of the May ACC meeting along with the meeting attendance list are available on PacifiCorp's Lewis River webpage.

On May 13, 2019, the Commission notified the Utilities that the Utilities proposed April 22, 2019 actions were accepted and stipulated that the Utilities submit to the Commission quarterly progress reports on this matter, the first of which is due to the Commission no later than July 1, 2019. The letter also encouraged the Utilities to file as early as possible a request to be the Commission's non-federal representative for purposes of informal consultation under Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act. PacifiCorp filed this request with the Commission on May 14, 2019. On June 6, 2019, the Commission issued a letter to the Utilities granting the requested non-federal represent position to the Utilities.

On June 6, 2019, the Cowlitz Indian Tribe, joined by The Native Fish society, Trout Unlimited, and American Rivers, sent the Utilities, the Federal Energy Regulatory Commission and the

Services a Notice of Dispute Concerning Fish Passage Determinations and Implementation. Pursuant to the Lewis River Settlement Agreement, the parties are initiating the Alternative Dispute Resolution (ADR) procedures contained in the settlement agreement. The action is an attempt to resolve disputes arising from, or associated with, the actions and inactions of the Services preliminary determinations (April 12, 2019 letters) and the Utilities' subsequent letter filed on April 22, 2019, to the Commission outlining the specific steps the company will take to implement the Services' determinations.

On June 10, 2019, the Lower Columbia Fish Recovery Board also sent the settlement parties a Notice of Dispute to initiate the ADR process. The Lower Columbia Fish Recovery Board's concern relates to the delay of Yale fish passage or an in-lieu decision for over ten years.

On June 13, 2019, PacifiCorp provided the ACC with a project and ADR status update. Approved ACC meetings notes from this portion of the June ACC meeting along with the meeting attendance list are available on PacifiCorp's Lewis River webpage.

On July 8, 2019, the Washington Department of Fish and Wildlife (WDFW) sent the Utilities, the Federal Energy Regulatory Commission and the Services a Notice of Dispute and Notice of Participation in ADR Disputes Noticed by Cowlitz Indian Tribe, et al., and Lower Columbia Fish Recovery Board Concerning Fish Passage Determinations and Implementation; Lewis River Hydroelectric Project Nos. P-935, P-2071, P-2111, and P-2213. The letter notes the agency adopts and makes as its own the underlying nature of the issues raised by the notice of dispute filed on June 7, 2019, by the Cowlitz Indian Tribe on behalf of itself, The Native Fish Society, Trout Unlimited, and American Rivers, and the notice of dispute filed on June 10, 2019, by the Lower Columbia Fish Recovery Board. WDFW also stated its intent to participate as a settlement party in any alternative dispute resolution proceeding scheduled under the terms of the Lewis River Settlement Agreement.

On August 1, 2019, the Utilities submitted to the Lewis River Aquatic Coordination Committee (ACC) the following documents for review and comment:

- Draft Merwin In-Lieu Strategic Plan
- Draft Lewis River Basin Implementation Monitoring Plan
- Draft Bull Trout Passage Plan

The Utilities requested that the ACC provide any comments on the draft documents to PacifiCorp by September 3, 2019.

On August 8, 2019, the Utilities met with the ACC and provided presentations on the Draft Merwin In-Lieu Strategic Plan, Draft Lewis River Basin Implementation Monitoring Plan and Draft Bull Trout Passage Plan. Approved ACC meetings notes from this portion of the August 8, 2019 ACC meeting are available on PacifiCorp's Lewis River webpage.

On August 13, 2019, the Utilities submitted to parties of the Lewis River Settlement Agreement an invitation to a dispute resolution meeting to be held on September 19, 2019.

On August 26, 2019 the U.S. Forest Service submitted a letter to PacifiCorp noting the agency determined it would be inappropriate to review or provide input to any documents pertaining to the In-Lieu implementation until the dispute resolution procedures are completed. The agency recommended that all ACC parties allow time for the dispute resolution procedures to be completed before starting collaborative development and review of plans and designs to implement the Services' preliminary decisions.

On August 29, 2019 the WDFW provided the Utilities with a response to the requested 30-day review of the draft plans. The agency stated that given the uncertain outcome of the dispute resolution process, it is premature for WDFW (or the ACC) to approve any of the aforementioned plans until the dispute resolution process is completed. WDFW also provided a few general comments on the draft plans which the Utilities will address.

On August 30, 2019, the Lower Columbia Fish Recovery Board sent PacifiCorp an email noting that the dispute resolution process is ongoing and will not be concluded prior to the draft plan 30-day review period. The Board recommended that the review period for these documents be postponed until after completion of the dispute resolution process. This same day the Cowlitz Indian Tribe sent PacifiCorp an email stating that the Tribe will not provide detailed review comments on the draft plans at this time because the plans have been drafted prematurely, and may be rendered unnecessary by ongoing disputes among settlement agreement parties. This same day Trout Unlimited also sent an email to PacifiCorp noting concerns related to timing of plan review during the dispute resolution process, and recommend the review period for the draft plans be postponed.

On September 12, 2019, PacifiCorp provided the ACC with a project and dispute resolution status update. Approved ACC meetings notes from this portion of the September ACC meeting along with the meeting attendance list are available on PacifiCorp's Lewis River webpage.

On September 19, 2019, an informal dispute resolution meeting was conducted in Kelso, Washington, among the disputing parties, the Utilities, and the Services.

On October 10, 2019, PacifiCorp provided the ACC with a project and dispute resolution status update. Approved ACC meetings notes from this portion of the October ACC meeting along with the meeting attendance list are available on PacifiCorp's Lewis River webpage.

On November 14, 2019, PacifiCorp provided the ACC with a project update. Approved ACC meetings notes from this portion of the November ACC meeting along with the meeting attendance list are available on PacifiCorp's Lewis River webpage.

Also on November 14, 2019, with concurrence of NMFS, PacifiCorp distributed the agency's comments on the Utilities Draft Merwin In-Lieu Strategic Plan and Draft Lewis River Basin Implementation Monitoring Plan to the ACC. The Utilities will respond to NMFS' comments and include those responses in the next version of the draft plans to be circulated to the ACC.

On December 12, 2019, the NMFS representative noted the agency was preparing a response to parties regarding the ADR process. Approved ACC meetings notes from this portion of the

December ACC meeting along with the meeting attendance list are available on PacifiCorp's Lewis River webpage.

On December 13, 2019, PacifiCorp met with representatives from the Washington Department of Fish and Wildlife (WDFW) to review specific questions raised by WDFW during their review of the Draft Lewis River Basin Implementation Monitoring Plan.

On December 18, 2019, PacifiCorp participated in a Bull Trout Working Group meeting. The group is comprised of stakeholders interested in the recovery of bull trout in southwestern Washington. PacifiCorp provided a high level overview of the proposed Draft Bull Trout Passage Plan including location of proposed new bull trout fish passage facilities. PacifiCorp will provide more detailed information on the proposed facilities at the January 2020 Working Group meeting.

As of the end of December, 2019, the Utilities were consulting with the Commission regarding the scope and nature of the approvals necessary to implement the Services' preliminary determinations. Once the nature and scope of the approval are confirmed, the Utilities will complete the necessary application documents. Consistent with Commission regulations and the requirements of the Settlement Agreement, the Utilities will provide draft copies of the application documents to the Services, the ACC, and the Settlement Agreement parties for review and comment. The Utilities anticipate providing draft copies of the application for review in the first quarter of 2020.

3.2.26 SA Section 7.7 Management of Aquatics Fund and In Lieu Fund

At the end of 2019, PacifiCorp's total available fund amount was $2,814,405.02 for Resource Projects and $806,264.55 for Bull Trout Projects.

Fund account information is provided in Section 7.0.

3.2.27 SA Section 7.8 Execution of Projects and Mitigation Measures

The ACC approved to proceed to full proposal for the four (4) projects referenced below by consensus at the October 9, 2019 ACC meeting.

USDA Forest Service	Lewis River 21 Phase III
USDA Forest Service	Rush Creek Side Channel Reactivation
WDFW	Eagle Island chum spawning channel construction
Cowlitz Conservation District	Anderson NF Lewis River Restoration

3.2.28 SA Section 8.1 Hatchery and Supplementation Program

On December 20, 2010, the FERC issued an order approving the *Hatchery and Supplementation Plan,* which was originally submitted December 23, 2009. On

January 22, 2015, the FERC issued an order approving the updated Lewis River Hatchery and Supplementation Plan that was submitted December 16, 2014. On December 23, 2019, the Licensees filed an extension of time request to the FERC for submittal of an updated Hatchery and Supplementation Plan on or before December 31, 2020.. This request was filed to allow results from the Comprehensive Period Review to be incorporated into the revised plan. A response from the FERC is expected in 2020.

3.2.29 SA Section 8.2 Hatchery and Supplementation Plan and Report

The Licensees have completed the H&S Annual Report for 2019 (see **Attachment C)**. The Hatchery and Supplementation Subgroup is currently working on finalizing the 2020 Annual Operations Plan with a target completion date of July 2020. During the interim, implementation of the H&S monitoring activities will be guided by the 2019 Annual Operating Plan which was finalized in August 2019 and approved by the Services on March 26, 2020 (**Attachment C-1**). The Licensees will continue to schedule planning meetings to ensure the 2020 AOP is finalized as soon as possible.

3.2.30 SA Section 8.3 Anadromous Fish Hatchery Adult Ocean Recruit Target by Species

The development of a precise and acceptable methodology for calculation of ocean recruits is an ongoing process. PacifiCorp and their contractors began evaluating methods and identifying data acquisition concerns and needs. This work continued in 2015 and was presented as part of the Monitoring and Evaluation Plan dated April 3, 2017. NOTE: As part of the Hatchery and Supplementation Plan update, development of methods to calculate ocean recruits was moved to the Monitoring and Evaluation Plan (as Objective 12) to reduce redundancy between the two plans and because many of the objectives in the Monitoring and Evaluation rely on this estimate.

3.2.31 SA Section 8.4 Anadromous Fish Hatchery Juvenile Production

Juvenile production targets as provided in the H&S Plan have been met for 2019.

3.2.32 SA Section 8.5 Supplementation Program

The Supplementation Program is included in the *Hatchery and Supplementation Plan* submitted to the FERC in December 2014. The Utilities have followed and met the provisions of this plan during 2019 as adaptively managed by the Hatchery and Supplementation Subgroup. The annual report of operations under this program is provided as **Attachment C**.

3.2.33 SA Section 8.6 Resident Fish Production

PacifiCorp and Cowlitz PUD funded the operation of the Lewis River Hatchery Complex to meet current FERC license obligations for resident fish production.

3.2.34 SA Section 8.7 Hatchery and Supplementation Facilities, Upgrades, and Maintenance

The Licensees have fulfilled their obligation with respect to SA Section 8.7 hatchery upgrades. The Licensees will continue to implement hatchery facility upgrades in collaboration with the hatchery managers, hatchery engineers and in Consultation with the ACC. The completion schedule for SA 8.7 upgrades was provided in **Attachment E** of the 2015 ACC/TCC Annual Report.

3.2.35 SA Section 8.8 Juvenile Acclimation Sites

On June 14, 2018, The ACC agreed to suspend the spring Chinook acclimation program upstream of Swift (up to 100,000 juveniles) for a period of at least 5 years. This decision modified the release location of 100,000 juveniles from acclimation sites upstream of Swift Dam to in-river release sites downstream of Merwin Dam in an effort to improve future adult returns to traps at Merwin Dam or the Lewis River hatchery. Review of this modification will occur annually between the ACC and the ATS.

On December 5, 2017, PacifiCorp filed with the Federal Energy Regulatory Commission (FERC) a request for Commission approval to decommission the juvenile fish acclimation pond facilities located along the Muddy River, Clear Creek and upper Lewis River near Crab Creek within the Gifford Pinchot National Forest Service. On January 4, 2018, the Commission responded with an order approving the December 5, 2017 request. The acclimation site located on the Muddy River was decommissioned from August through October of 2018. The acclimation sites located along Clear Creek and in the upper Lewis River near Crab Creek were both decommissioned from August through November 2019. All sites were restored to pre-construction condition. The final decommissioning report was filed with FERC on December 13, 2019.

3.2.36 SA Section 9.1 Monitoring and Evaluation Plan

On March 31, 2010, PacifiCorp provided a draft Monitoring and Evaluation (M&E) Plan to the ACC for review. After receiving comments, the M&E Plan was finalized and submitted to the FERC June 16, 2010. The FERC approved the final plan November 3, 2010. A 5-year update of the M&E Plan occurred during 2015-2016, and a final draft version was submitted to the ACC for a 90-day review period September 2, 2016. Based on discussions with NMFS and with concurrence from WDFW, PacifiCorp requested an Extension of Time request from the FERC and provided stakeholders an additional 45 day period to review the completed final draft of the M&E Plan by February 2017. The document was updated and submitted to the Commission in April 2017. The final Plan was approved by the FERC May 15, 2017. Implementation of the M&E Plan requirements continued through 2019.

3.2.37 SA Section 9.2 Monitoring and Evaluation Related to Fish Passage

Implementation of the M&E Plan as it relates to anadromous reintroduction continued in 2019 and included monitoring of upstream and downstream migrants. Coho salmon, spring Chinook salmon, and wild winter steelhead adults were available for transportation upstream so spawning surveys took place for these species. In terms of fish passage, the 2019 Annual fish Passage report (Lewis River Fish Passage Program 2019 Annual Report), which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**). This report specifically addresses Settlement Agreement sections 4.1.4 and 9.2.1 through 9.2.2.

3.2.38 SA Section 9.3 Wild Fall Chinook and Chum

Implementation of the fall Chinook and chum salmon monitoring continued in 2019 per the revised H&S Plan approved by the FERC in 2015, and related 2019 H&S Annual Operating Plan. NOTE: Fall Chinook and chum salmon monitoring activities and objectives in the lower

Lewis River were part of the M&E Plan but are now part of the Hatchery and Supplementation Plan as part of the updated plan approved by the FERC in January 2015.

3.2.39 SA Section 9.4 Water Quality Monitoring

See section 4.1.2 under Water Quality

3.2.40 SA Section 9.5 Monitoring of Hatchery and Supplementation Program

The FERC approval of the updated *Hatchery and Supplementation Plan* was provided January 22, 2015. Monitoring of the H&S program is the responsibility of the H&S subgroup created by the ACC. Each year, the H&S subgroup develops annual operating plans (AOP) to adaptively manage and implement components of the H&S Plan.

3.2.41 SA Section 9.6 Bull Trout Monitoring

PacifiCorp, on behalf of the Utilities, completed actions according to the *2019 Bull Trout Annual Operations Plan*. Results from activities performed and data obtained under SA Section 4.9.2 and 9.6 are provided in the *Bull Trout 2019 Annual Operations Report,* which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

3.2.42 SA Section 9.7 Resident Fish Assessment

Given the spatial and temporal overlap of preferred spawning habitat and periodicity between coho and bull trout, there is concern that later spawning coho may superimpose redds over redds newly constructed by bull trout. To evaluate any superimposition, bull trout redd surveys were completed in Pine Creek and Pine Creek tributary P8 in September and October. All identified bull trout redds were labeled by Global Positioning Satellite, as well as physically marked within the stream for ease of identification at a later date. Coho redd surveys were subsequently performed of the same stream in October and November to evaluate any redd superimposition by the two species. No coho redds were observed to be superimposed over bull trout redds in 2019. We will continue to watch for any encroachment of coho into critical spawning streams for bull trout.

This evaluation was not conducted within Cougar Creek in 2019 as no reintroduced anadromous species were released into Yale Reservoir this year. Habitat Preparation Plan species were scheduled to be released into Yale Reservoir in 2016 but that has been delayed pending decision on passage into Yale Lake.

Kokanee spawner abundance was evaluated within Yale Reservoir and estimates are included within the Yale Reservoir Kokanee 2019 Escapement Report, which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

3.2.43 SA Section 9.8 Monitoring of Flows

Monitoring of Merwin flows and the Upper Release and the Constructed Channel flows has occurred on a continuous basis and will continue per the M&E Plan.

3.3 Aquatic 2020 Annual Plan

3.3.1 SA Section 4.2 Merwin Trap

Since the new trap was installed in December 2013 this section no longer applies.

3.3.2 SA Section 4.3 Merwin Upstream Collection and Transport Facility

The new upstream collection and transport facility was considered substantially complete in April 2014. And will continue to operate with some minor modifications anticipated that will improve operations. Major modifications are potential but, pending results of the Adult Trap Efficiency studies for each of the three transport species, will not be put in place until a determination of need occurs. The intent of the modifications made to the existing collection facility at Merwin Dam were to provide safe, timely, and effective passage of adult salmonids being transported upstream.

The new facility is designed to be modified in phases, offering the ability to incrementally improve fish passage performance (if needed) in the future to meet biological performance goals. Depending on the biological monitoring of the facility's performance (which began spring 2015), there are up to four additional phases that will increase flow into the fishway attraction pools, and add a second fishway with additional attraction flow, if necessary.

3.3.3 SA Section 4.4 Downstream Transport at Swift No. 1 Dam

PacifiCorp completed and submitted the final design for the Swift Downstream Facility in December 2009 and the facility was put into service December 26, 2012. PacifiCorp purchased the land needed for the downstream Release Pond and the pond facility was constructed in December 2017. The Release Pond facility began full operation in March 2018.

3.3.4 SA Section 4.9 Interim Bull Trout Collection and Transport

PacifiCorp and Cowlitz PUD are to investigate alternative Bull Trout collection methods in consultation with the ACC. The *2020 Bull Trout Annual Operations Plan* has been incorporated into this Annual Report and submitted to the ACC including USFWS and NMFS in March 2020. This document can be found within the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

3.3.5 SA Section 5.2 Bull Trout Habitat Enhancement Measures

PacifiCorp will continue to manage the Cougar Creek Conservation Covenant and Cowlitz PUD will continue to manage the Devil's Backbone Conservation Covenant to benefit bull trout.

3.3.6 SA Section 5.7 Public Information Program to Protect Bull Trout

PacifiCorp will continue to provide flyers with the same information at recreation park entrance booths. The Utilities will also provide such flyers to enforcement personnel for distribution.

3.3.7 SA Section 6.1 Flow Releases in the Bypass Reach; Constructed Channel

PacifiCorp and Cowlitz PUD will continue to adhere to the Swift bypass reach and constructed channel flow release schedule specified in the 401 Water Quality certifications.

3.3.8 SA Section 6.2 Flow Fluctuations below Merwin Dam

PacifiCorp will continue to implement the operational flow regimes as identified in the SA and the Merwin FERC License.

3.3.9 SA Section 7.1 Large Woody Debris Project

PacifiCorp will continue to maintain the available funds in a Tracking Account per the SA to help defray the costs of LWD transport.

3.3.10 SA Section 7.2 Spawning Gravel Study and Gravel Monitoring and Augmentation Plan

Periodic monitoring will continue pursuant to determining the need for gravel supplementation if flows exceed 42,000 cfs.

3.3.11 SA Section 7.4 Habitat Preparation Plan

PacifiCorp's obligation under the Habitat Preparation Program for Swift Reservoir ended in 2012. Formal reintroduction of fish collected at Merwin Trap replaced the Habitat Preparation Program for all reintroduction species. The Habitat Preparation Program will again be initiated for Yale Reservoir (5 years prior to proposed implementation of downstream collection facilities at Yale Dam) pending a decision on passage into Yale Lake (now referred to as the In-Lieu Decision).

3.3.12 SA Section 7.5 Aquatics Fund

On August 5, 2019 PacifiCorp received an email from the USDA Forest Service stating that they will not be implementing the Lewis River 21 Phase II project (2018/2019 Funding cycle). PacifiCorp informed the ACC attendees on September 12, 2019 that the trail runs immediately adjacent to the Lewis River in the areas of Reach 21. If the floodable area was accessed then the trail would need to either be relocated along the valley wall at the far side of the 30 acre floodplain areas, or have trail crossing structures (at least two) that could accommodate flood flows of the Lewis River. The Forest Service does not want to relocate the trail, nor has funds to invest in the trail crossing structures that would be necessary once the Lewis River side channels accessed the area. Funds awarded to the Forest service in the amount of $177,000 was returned to PacifiCorp on September 9, 2019, which will be returned to the aquatic fund accounting for distribution to approved projects in the future.

Attachment H provides a copy of recent Lewis River Aquatic Fund Projects (SA 7.5.3.2) Project Closeout Reports, if any, which provides a summary of those aquatic fund projects completed as of December 31, 2019.

3.3.13 SA Section 8.2 Hatchery and Supplementation Plan

On January 22, 2015, the FERC issued an order approving the updated Lewis River Hatchery and Supplementation Plan that was submitted December 16, 2014. The utilities continue to develop annual operating plans with the H&S Subgroup to guide implementation and adaptively manage the H&S program based on the objectives contained in the updated H&S Plan.

3.3.14 SA Section 8.3 Anadromous Fish Hatchery Adult Ocean Recruit Target by Species

The development of a precise and acceptable methodology for calculation of ocean recruits is an ongoing process. PacifiCorp and their contractors developed methods to estimate Ocean Recruits, worked with WDFW and others in the M&E Plan subgroup, and included these revised methods in the Monitoring and Evaluation Plan issued in May 2017. The methods for determining Ocean Recruits is complicated and will continually require adjustments to find the right mix of inputs to come up with a reliable measure. In addition, there are still not enough returning adults to evaluate Ocean Recruits for either the Hatchery or the Natural component. An alternative exists that is much simpler and faster and that could be easily applied to coho and steelhead. It has been suggested by Lars Mobrand that, if adult returns to the Merwin trap and the Lewis River hatchery ladder reach or exceed the by-species recruit number, then the goal is reached for that year. For example in 2014, the combined adult return numbers for hatchery coho reached 66,304 (the goal is 60,000) so, if that were to continue and be consistently over the goal then the hatchery Ocean Recruit number for coho would be considered achieved. More importantly, the natural returns need to reach the collective target of 20,000 adult returns (2,977 spring Chinook, 13,953 coho, and 3,070 late winter wild steelhead) which has not been achieved as of 2019. NOTE: As part of the Hatchery and Supplementation Plan update, development of methods to calculate Ocean Recruits was moved to the Monitoring and Evaluation Plan to reduce redundancy between the two plans and because many of the objectives in the Monitoring and Evaluation rely on this estimate. Evaluation of Ocean Recruit performance will continue in 2020. Detailed information on Ocean Recruit metric can be found in the Lewis River Fish Passage Program 2019 Annual Report, which is an appendix to the Lewis River Monitoring and Evaluation Program 2019 Annual Report (**Attachment D**).

3.3.15 SA Section 8.4 Anadromous Fish Hatchery Juvenile Production

Per the SA and the *Hatchery and Supplementation Plan* and depending on the adult returns of spring Chinook, the Licensees will provide for the production of spring Chinook salmon smolts, steelhead smolts, and coho salmon smolts at levels specified ("Juvenile Production").

3.3.16 SA Section 8.6 Resident Fish Production

Subject to Section 8.6.3, the Licensees will continue to provide for the production of 20,000 pounds of resident rainbow trout (to Swift reservoir) and 12,500 pounds of kokanee (to Merwin reservoir) each year following per the FERC licenses.

3.3.17 SA Section 8.7 Hatchery and Supplementation Facilities, Upgrades, and Maintenance

The Licensees have fulfilled their obligation with respect to SA Section 8.7 hatchery upgrades.

3.3.18 SA Section 8.8 Juvenile Acclimation Sites

With damages that occurred to the acclimation facilities caused by flood flows in December 2015, the ACC agreed that acclimation releases would be suspended until further notice. On December 5, 2017, PacifiCorp filed with the Federal Energy Regulatory Commission (FERC) a request for Commission approval to decommission the juvenile fish acclimation pond facilities located along the Muddy River, Clear Creek and upper Lewis River near Crab Creek within the Gifford Pinchot National Forest Service. On January 4, 2018, the Commission

responded with an order approving the December 5, 2017 request. The acclimation site located on the Muddy River was decommissioned from August through October of 2018. The acclimation sites located along Clear Creek and in the upper Lewis River near Crab Creek were both decommissioned from August through November 2019. All sites were restored to pre-construction condition. The final decommissioning report was filed with FERC on December 12, 2019. Spring Chinook targeted for acclimation sites in 2019 were released downstream of Merwin Dam as part of rearing and release strategies being evaluated as part of the Hatchery and Supplementation program. It is expected that spring Chinook releases will continue to be released as part of the hatchery program downstream of Merwin Dam until the ACC recommends reinitiating the upstream acclimation program.

3.3.19 SA Section 9.6 Bull Trout Monitoring

The Licensees will continue to monitor and evaluate bull trout populations in the Lewis River basin following approval of the Bull Trout Annual Operating Plan (AOP). Overarching long-term bull trout monitoring objectives were included within the FERC approved M&E Plan. Specific monitoring tasks, including methods and locations, will continue to be developed and included within the bull trout AOP and submitted to the USFWS and ACC annually.

3.3.20 Monitoring and Evaluation Post-Season Incidental Take

Each year PacifiCorp handles and processes numerous ESA-listed fish species. As part of the NOAA Fisheries Biological Opinion, PacifiCorp is to use an Incidental Take Form provided by NOAA Fisheries to report on species taken during the previous year of scientific activity. The Incidental Take Form reporting the 2019 sampling year is provided in **Table 5**.

Table 5. Aquatic Species Incidental Take form used for reporting in 2019.

ESU Species and population group if specified in your permit	Life Stage	Origin	Take Activity	Number of Fish Authorized For Take	Actual Number of Listed Fish Taken	Authorized Unintentional Mortality	Actual Unintentional Mortality	Evaluation Location	Evaluation Period
Lower Columbia River (LCR) Chinook	Juv.	NOR	Screwtrap, Mark, Release	N/A	673	0	0	NF Lewis River, WA	Mar 5 – July 19
LCR Steelhead	Adult	NOR	Tangle Net, Mark, Release	N/A	31	0	0	NF Lewis River, WA	Feb 25 – April 23
LCR Steelhead	Adult	HOR	Tangle Net, Mark, Release	N/A	28	0	0	NF Lewis River, WA	Feb 25 – Apr 23
Oregon Coast Coho	Juv.	NOR	Screwtrap, Mark, Release	N/A	7064	0	0	NF Lewis River, WA	Mar 5 – July 19
Lower Columbia River (LCR) Chinook	Adult	HOR	Merwin Adult Fish Trap	N/A	740	0	6	NF Lewis River, WA	Jan 1 – Dec 31
Lower Columbia River (LCR) Chinook	Adult	NOR	Merwin Adult Fish Trap	N/A	24	0	0	NF Lewis River, WA	Jan 1 – Dec 31

ESU Species and population group if specified in your permit	Life Stage	Origin	Take Activity	Number of Fish Authorized For Take	Actual Number of Listed Fish Taken	Authorized Unintentional Mortality	Actual Unintentional Mortality	Evaluation Location	Evaluation Period
LCR Steelhead	**Adult**	**HOR**	**Merwin Adult Fish Trap**	**N/A**	**3,119**	**0**	**0**	**NF Lewis River, WA**	**Jan 1 – Dec 31**
LCR Steelhead	**Adult**	**NOR**	**Merwin Adult Fish Trap**	**N/A**	**84**	**0**	**0**	**NF Lewis River, WA**	**Jan 1 – Dec 31**
Oregon Coast Coho	**Adult**	**HOR**	**Merwin Adult Fish Trap**	**N/A**	**1,850**	**0**	**0**	**NF Lewis River, WA**	**Jan 1 – Dec 31**
Oregon Coast Coho	**Adult**	**NOR**	**Merwin Adult Fish Trap**	**N/A**	**1,099**	**0**	**0**	**NF Lewis River, WA**	**Jan 1 – Dec 31**
Lower Columbia River (LCR) Chinook	**Juv.**	**NOR**	**Swift Floating Surface Collector**	**N/A**	**10,951**	**0**	***NA*[9]**	**NF Lewis River, WA**	**Jan 1 – Dec 31**
LCR Steelhead	**Juv.**	**NOR**	**Swift Floating Surface Collector**	**N/A**	**3,021**	**0**	***NA***	**NF Lewis River, WA**	**Jan 1 – Dec 31**
Oregon Coast Coho	**Juv.**	**NOR**	**Swift Floating Surface Collector**	**N/A**	**99,057**	**0**	***NA***	**NF Lewis River, WA**	**Jan 1 – Dec 31**

[9] Estimates of Collection Survival (CS) provided in the Lewis River Fish Passage Program 2019 Annual Report.

4.0 WATER QUALITY

4.1 PacifiCorp Water Quality Measures Implemented in 2019

4.1.1 PacifiCorp Application for 401 Water Quality Certificate for Yale, Swift No. 1 and Merwin Hydroelectric Projects

On October 9, 2006, Ecology provided 401 Water Quality certificates for the Merwin, Yale, and Swift No. 1 hydroelectric projects. These 401 Certifications have subsequently been amended several times. Until the FERC issued licenses for the Lewis River Hydroelectric Project June 26, 2008, PacifiCorp implemented those measures contained in the 401 Certifications that were not FERC license-specific, and has implemented all the 401 requirements since June 26, 2008.

4.1.2 SA Section 9.4 Water Quality Monitoring

The following section covers water quality monitoring activities performed in accordance with Ecology's Lewis River 401 water quality certifications. More specifically this sections covers the monitoring of Total Dissolved Gas (TDG), water temperature, and dissolved oxygen as prescribed in the Water Quality Management Plan submitted in July 2013 (WQMP) and approved by Ecology on September 20, 2013. Some monitoring parameters are ongoing from previous years, such as TDG monitoring in Swift No. 1 and Yale tailraces; while other activities such as Merwin, Yale, and Swift forebay temperature profiles were implemented for the first time in 2007 and continued in 2019. Water quality data collected in 2019 is summarized in this report; 2019 data tables are available per request.

Per the 401 water quality certificates, monitoring of projects' spillway TDG levels continued through 2019. Tailrace TDG monitoring has been ongoing since 1995 and will continue per the direction of the 401 requirement. Until it is shown that a water temperature issue does not exist, PacifiCorp will also continue to monitor water temperature in the forebays and tailraces of each project and, in cooperation with Cowlitz PUD, monitor water temperature in the Swift Bypass Reach. A summary of the water quality parameters associated with this section (TDG, Water Temperature and Dissolved Oxygen) to be monitored and the schedule of that monitoring as taken from the WQMP is summarized below in Table 4.1-1.

Table 4.1-1: Water quality parameters to be monitored and the schedule of that monitoring according to the July 2013 WQMP.

Parameter	Total Dissolved Gas	Dissolved Oxygen	Temperature
Merwin	Monitor turbine outlets to assure compliance with 110%. During spill, monitor just downstream of aeration zone. TDG must be <110% unless 32,884cfs inflows are exceeded. If TDG is exceeded with spill when inflow is <32,884cfs, then provide TDGWQAP with data.	Monitor in forebay and tailrace, in September and October hourly.	Monitor in forebay at depths of 1, 5, 10, 20, 40, 60, 100, and 200 feet. May 1st through Oct. 31st hourly. Monitor tailrace hourly all year, not to exceed 16ºC (13ºC Sept.1-June 15).
Frequency/Duration	Ongoing if exceedences occur until 3 months after such exceedences are corrected.	Ongoing until DO is found to not go below 8 mg/l for a period of 5 consecutive years.	Ongoing until tailrace temperature does not exceed 16ºC (13ºC Sept. 1- June 15) for five consecutive years.
Yale	Monitor turbine outlets to assure compliance with 110%. During spill, monitor just downstream of aeration zone. TDG must be <110% unless 27,088cfs inflows are exceeded. If TDG is exceeded with spill when inflow is <27,088cfs, then provide TDGWQAP wit	N/A	Monitor in Forebay at depths of 1, 5, 10, 20, 40, 60, and 100 feet. May 1st through Oct. 31st hourly. Monitor tailrace, 15ft deep, hourly all year. Also profile of tailrace depth temp. Provide TWQ Attainment Plan for the canyon on Lake Merwin just dow
Frequency/Duration	Ongoing if exceedences occur until 3 months after such exceedences are corrected.		Ongoing until temp is shown to not increase the 7-DADMax temperature more than 0.3ºC (0.54ºF) above natural conditions. Occurs for five consecutive years. Tailrace temp./depth profile monitoring done until temp. fluctuations in tailrace/upper Lake Merwin
Swift 1	Monitor in Swift No. 1 forebay. Monitor turbine outlets to assure compliance with 110%. During spill, monitor just downstream of aeration zone. TDG must be <110% unless 21,322cfs	N/A	Monitor Swift 1 forebay at 1, 5, 10, 20, 40, 60, 80, 120, and 145 ft. depths May 1st - Oct. 31st. Swift 1

	inflows are exceeded. If TDG is exceeded with spill when inflow is <21,322 cfs.		tailrace canal at depth of 1 ft. hourly all year. Place 1 meter just upstream from Ole Creek mouth and 1 meter just downstream from Ole Creek mouth
Frequency/Duration	Ongoing if exceedences occur until 3 months after such exceedences are corrected. Spill monitoring ongoing unless TDG during spill is found to not exceed 110% during river flows <21,322cfs.		Swift forebay monitoring is ongoing until temp. behavior in the forebay of Swift 2, the upper and lower release points, and the bypass reach are understood. Monitoring in the Swift 1 tailrace and just below Ole Creek mouth are ongoing.

2019 Total Dissolved Gas Analysis for Yale, Swift No. 1 and Merwin Hydroelectric Project Spills

Upon issuance of the 401 water quality certificates, PacifiCorp began monitoring of spillway TDG in the fall of 2006. Previous TDG monitoring sites near the Swift No. 1, Yale and Merwin spillways were reactivated at the beginning of the 2018/2019 high run-off period.

During 2019 no spill occurred at Swift 1, Yale, or Merwin. As a result no TDG exceedances as related to spill events were observed at Swift 1, Yale, or Merwin in 2019. TDG monitoring of Swift No. 1, Yale and Merwin spillways is ongoing and will continue as prescribed in the WQMP.

Yale Tailrace TDG:

Total dissolved gas data in the Yale tailrace (**Attachment E**) were gathered hourly in 2019 using a HydroLab Series 5 miniSonde (MS5). A stainless steel tube is permanently attached to the Yale powerhouse wall and submerged to a depth of 15 feet. The HydroLab is deployed within this tube to protect the probe and maintain consistent depth at 15 feet. In 2019, 8,153 hourly data points were recorded in the Yale tailrace, of which one hourly data point exceeded the state standard of 110% (**Attachment E**). During 2019 Yale reservoir had extremely low water conditions, as a result, during the fall period, there were occasions when the meter was not submerged in the water. Total dissolved gas levels greater than 110% have been observed in the past and can be produced during times of motoring operations and at low generation levels. Motoring Operations involves spinning a turbine using grid power in order to have the unit ready to engage at a moment's notice in case of a power plant outage in another area of the Western Grid or in the case of a surge in power demand. During times of normal generation, elevated levels of tailrace TDG are not typically observed.

During 2019 PacifiCorp continued measures at the Yale tailrace to control TDG during motoring operations. These measures include automated "flushing" of the tailrace periodically. Flushing is defined as ramping one unit to 5 MW for ten minutes. The frequency of this event depends on real-time dissolved gas measured in the tailrace with the MS5 and is fully automated through the Programmable Logic Control (PLC). This measure was first implemented October 20, 2007 and continues to be an effective procedure in reducing TDG levels in the Yale tailwaters as demonstrated in the 2019 data.

In addition to flushing flows, automated air valves have been in place since 2009 to limit the volume of air entering the turbine throughout the operating range of each unit. This investment provides control of excessive TDG in the Yale tailwaters during normal operations of the units.

Swift No. 1 Tailrace TDG
TDG data (**Attachment F**) were gathered hourly in the Swift No. 1 tailrace using two HydroLab Series 5 minisondes (MS5). The second meter is used for comparison and quality control as well as determining if differences in TDG exist based on individual unit operation. Similar to the Yale tailrace, meters are deployed within steel tubes permanently attached to the powerhouse wall. Meter No. 1 is located between the draft tubes of Units 11 and 12 while Meter No. 2 is located between the draft tubes of Units 12 and 13. The meters gather data hourly from a water depth of 15 feet. Data between the two meters are averaged and provided in graphic form (**Attachment F**). Of the 8,693 data points collected in 2019, no data points exceeded the 110% state standard. Similar to Yale tailrace, data points greater than 110% can be produced during times of project motoring operation or prolonged periods of inefficient operation between 20 and 40 MW per unit. During times of normal generation, elevated levels of TDG are not typically observed.

To reduce TDG within Swift No. 1 tailrace during periods of normal generation and load following operations, air intake modifications and automation were made in 2005 that limit the volume of air entering the units over their generation range based on a predefined air volume curve. This measure, while effective at normal generation levels, is not effective during periods of motoring. Flushing procedures used at Yale have been demonstrated to be effective, and the same procedure has been implemented at Swift No. 1. Modifications were made in late October 2012, to ensure that air entrainment would not be possible during periods of motoring operation.

TDG monitoring of Swift No. 1 and Yale Tailraces are ongoing and will be continuously monitored as prescribed in the WQMP.

Swift No. 1 Forebay TDG
TDG data was gathered hourly in the Swift No. 1 forebay from February 7, 2008 to May 31, 2008 using a HydroLab Series 5 datasonde (DS5). The meter was deployed to a water depth of 15 feet from the dam intake deck via steel cable. During the period, 2,747 data points were recorded. Of those data points none were found to exceed 110% TDG saturation. Based on Table 2 in section 4.8 of the 401 water quality certification for the Swift No. 1 hydroelectric facility, TDG monitoring in the project forebay is “Ongoing if exceedances occur until three months after such exceedances are corrected”. No exceedances were recorded in the four

month monitoring period for the Swift No. 1 forebay, therefore monitoring activities were suspended as of May 31, 2008.

2019 Temperature Profiles for Merwin, Yale, and Swift No. 1 Forebays and Corresponding Temperature Comparison between Forebay Intake Depth and Tailrace For Each Project

Graphs representing forebay temperature profiles from the surface to reservoir bottom and graphs comparing forebay intake depth temperatures to the tailrace temperatures for Merwin, Yale, and Swift No. 1 during 2019 are included in **Attachment E, Attachment F** and **Attachment G**. Data points for forebay temperature profiles are two-week averages of hourly temperature readings taken at each specified depth.

Data points for intake depth/tailrace comparison were taken hourly from a depth of 15 feet in project tailraces, and at specified intake depth in project forebays. This hourly data was then converted to seven-day averages of the daily maximum temperature (7DADmax). Temperature data were gathered using Onset HOBO prov2 Temp Loggers®. Prior to deployment, each temperature thermograph was verified and calibrated using a National Institute of Standards and Technology (NIST) certified reference thermometer.

Yale

Temperature stratification was observed in the Yale forebay during the entire period monitored (**Attachment G**). The coldest recorded two-week temperature was 5.6°C in early May at 100 feet below the surface. The warmest two-week average temperature was 22.2°C in early August near the reservoir surface.

The Yale tailrace 7DADmax temperature graph is presented in **Attachment G**. The tailrace temperatures are comparable to what has historically been observed.

Swift No. 1

Temperature stratification was observed in Swift No. 1 forebay for the entire period of analysis May through October 2019 (**Attachment F**). The warmest two-week average temperature, 20.6°C, was observed in early August three feet below the surface. The coldest observed temperature was 5.3°C and was recorded at a depth of 122 feet in early May. In 2019 the Swift thermograph string was attached to a vertically fixed position, as a result, temperature loggers were at constant elevation rather than constant water depths. To address this, fluctuating reservoir levels were correlated to each temperature loggers fixed elevation. Bi-weekly average logger depths were calculated and assigned to corresponding bi-weekly average temperatures.

Hourly temperature readings were taken from the Swift No. 1 tailrace from a depth of 15 feet using HydroLab Series 5 miniSonde. Hourly temperatures were then converted to 7DADmax readings in order to get an intake depth temperature to tailrace temperature comparison per the direction of the 401 certification (**Attachment F**). Many different environmental factors influenced the intake depth to tailrace water temperature comparison, namely; reservoir elevations, powerhouse operations, configuration of the water withdrawal system, and placement of the forebay thermistors.

The bathymetry of Swift Reservoir in the vicinity of the penstock intakes is unusual. Instead of the entrance of the intakes lying on the reservoir bottom, drawing water from all angles, they are at the downstream end of a deep and narrow trench notched into the hillside during construction of the dam. The intakes influence the mixing of stratified water columns as they draw water through the trench. It is difficult to deploy thermographs that spatially align and represent the temperature regime occurring near the intake (**Attachment F**) as it relates to the Swift No. 1 tailrace temperature.

Merwin

As in prior years, temperature stratification was observed in Merwin Reservoir from May through October 2019, with the reservoir getting progressively warmer until turn-over in the latter half of October (**Attachment G**). The coldest two-week temperature average, 6.5°C, was recorded in May at intake depth of 178 feet. The warmest two-week average temperature was 21.7°C at the reservoir surface in August. Since PacifiCorp considers the reservoir conditions as baseline, there were no observed temperature exceedances for Merwin Reservoir in 2019.

An Onset HOBO Pro v2 Temp Logger® temperature recorder was positioned within the Merwin tailrace at a depth of approximately 15 feet and hourly temperature recordings were taken for the duration of 2019 (**Attachment G)**. Hourly readings were converted to seven-day averages of the daily maximum temperature (7DADmax). During the June 15 through September 15 time period, fourteen 7DADmax data points were recorded and zero were observed to be greater than the state standard of 16° C. During the Jan 1 through June 14 and September 15 to December 31 time frames; thirty-two 7DADmax data points were recorded. Of these, eleven were observed to be greater than the state standard of 13° C (**Attachment G**). 7DADmax temperatures over 13° C were first observed in the project tailrace during the second week of September and persisted through the third week of November. PacifiCorp will continue to monitor this condition as per the WQMP approved by Ecology in September 2013.

Temperature monitoring of Swift No. 1, Yale and Merwin forebay's are ongoing and will continue as prescribed in the WQMP.

2019 Dissolved Oxygen Comparison between Merwin Forebay Intake Depth and Merwin Tailrace in September and October

Hourly dissolved oxygen levels in milligrams per liter (mg/l) were measured in the Merwin forebay at an approximate depth of 160 feet and in Merwin tailrace at an approximate depth of 15 feet from September through October 2019 (**Attachment G**). Measurements in the forebay were recorded with a HydroLab Series 5 datasonde (DS5) and with a HydroLab Series 5 miniSonde (MS5) in the project tailrace.

The Merwin forebay DO meter experienced a malfunction during the entire monitoring period, consequently, no forebay DO data for 2019 is available. The tailrace DO meter also experienced malfunctions resulting in 559 dissolved oxygen hourly data points collected from September, 27 2019 through October 20, 2019 (**Attachment I**). Of these 700 data points collected in the tailrace 523 of them were observed to be lower than the minimum state standard of 9.5 mg/L. The minimum dissolved oxygen level observed in Merwin forebay was 8.0 mg/l.

Merwin dissolved oxygen monitoring is ongoing and monitoring will continue as prescribed in the WQMP.

Lewis River Temperature and Dissolved Oxygen Water Quality Attainment Plan
As discussed above, PacifiCorp has continued to monitor temperature and dissolved oxygen in the Merwin forebay and tailrace, as required by the certification conditions as well as the WQMP. In response to Ecology's 2011 amendment of the certification conditions, PacifiCorp in June 2013 submitted to Ecology a revised WQMP that included the Lewis River Temperature and Dissolved Oxygen Water Quality Attainment Plan (TDOWQAP). The revised WQMP and TDOWQAP were approved by Ecology on September 20, 2013. Per the TDOWQAP, PacifiCorp developed a water quality model to determine natural temperatures and dissolved oxygen concentrations immediately downstream of the Merwin Dam from September through November, as well as any project contributions to deviations from natural conditions. The results of this modelling were submitted to Ecology in a Water Quality Model Report in March 2015.

2019 Temperature Comparison in the Swift Bypass Reach between Waters Upstream and Downstream of the mouth of Ole Creek
In 2019, 8,760 hourly temperature readings were taken from the Swift Bypass Reach 50 feet upstream of the Ole Creek confluence. The temperature logger downstream of Ole Creek was damaged and as a result no corresponding temperature readings were taken. These hourly data points were converted to 7DADmax values (**Attachment G**). Temperatures were recorded using Onset HOBO pro v2 Temp Loggers®. As with previous years, Ole Creek seems to have a slight cooling effect on the Swift Bypass Reach.

Temperature monitoring of Swift Bypass temperature upstream and downstream of the Ole Creek confluence is ongoing and will continue as prescribed in the WQMP.

2019 Redd and Biological Surveys of the Lewis River Bypass Reach, Upper Release Point and Canal Drain Constructed Channels
In compliance with section 4.2(10)(a) and 4.2(11) of the Washington Department of Ecology issued 401 Water Quality Certificate for Swift 1 Hydroelectric Project, PacifiCorp will conduct quarterly biological surveys and bi-weekly redd surveys (during Sept. 15th- Nov. 15th) of the Lewis River Bypass Reach, Upper Release Point and Canal Drain Constructed Channels on a set schedule as stipulated within Section 4.2(10)(a-e) of the 401 Water Quality Certificate.

According to the schedule defined within section 4.2(10)(a-e) of the 401 Water Quality Certificate, PacifiCorp was not required to perform any biological or redd surveys of the Lewis River Bypass Reach, Upper Release Point or Canal Drain Constructed Channels in 2019.

4.2 PacifiCorp Water Quality 2020 Annual Plan

PacifiCorp will implement the following water quality measures in 2020.

4.2.1 Water Quality Management Plan

PacifiCorp will continue to implement the Ecology-approved Water Quality Management Plan (WQMP) (Approved by Ecology on September 20, 2013).

4.2.2 Flow Monitoring

PacifiCorp will continue to monitor flows in the Swift bypass reach (Upper Release flow and Constructed Channel flow) and flow/ramp rates downstream of Merwin dam.

4.2.3 Bypass Reach Gravel Replacement

PacifiCorp and Ecology met onsite at the Swift project Bypass reach to view gravel conditions following a December 2015 high flow event. That event resulted in spill exceeding 10,000 cfs that completely scoured the replaced spawning gravel out of the channel. Based on this occurrence and other spill events in the past, Ecology provided PacifiCorp a determination dated December 14, 2016 to cease gravel augmentation at the Bypass Reach until further notice.

4.2.4 Lake Merwin Canyon Water Quality Attainment Plan

Implement the Lake Merwin Canyon (Yale Tailrace) Water Quality Attainment Plan per the final WQMP approved by Ecology in September 2013.

4.2.5 Swift and Merwin Spill TDG Attainment Plan

Implement Merwin Spill TDG Attainment Plan per the final WQMP approved by Ecology in September 2013. Implement the Swift Spill TDG Attainment Plan as approved by Ecology in February 2014.

4.2.6 Lewis River Project Temperature Model

The model was completed and a report was submitted to Ecology in 2015.

4.2.7 Yale-Swift Turbine TDG Corrective Action Plan

Continue implementation of corrective actions and monitoring for turbine TDG for the Yale and Swift projects. A copy of the corrective action plan is included in the final WQMP. However, since PacifiCorp has been able to demonstrate compliance with TDG standards related to turbine operation at the Yale and Swift plants, Ecology has removed these sites from the 303(d) list of sites requiring a Total Maximum Daily Load (TMDL) procedure. PacifiCorp continues to monitor Swift No. 1 and Yale turbine TDG and implement actions to maintain TDG in the tailraces to less than the state standard of 110%.

4.3 Cowlitz PUD Water Quality Measures Implemented as of the End of 2019

On October 9, 2006, Ecology issued a Clean Water Act Section 401 Certification (Order No. 3676) to Cowlitz PUD for the continued operation of the Swift No. 2 Hydroelectric Project under a new FERC license (Ecology 2006). The Section 401 Certification, as

amended[10,11,12,13,10], includes a number of conditions and general requirements directing Cowlitz PUD to comply with applicable water quality standards codified in 173-201A WAC. As of December 31, 2019, Cowlitz PUD has completed all of the requirements in the 401 Certification.

This section of the 2019 Annual Report lists the completed measures. Additional Settlement Agreement and amended Section 401 Certification requirements relating to instream flows, the constructed channel, gravel augmentation, salmonid monitoring, and water temperature monitoring in the Lewis River bypass reach are implemented together with PacifiCorp.

4.3.1 Swift No. 2 Project Water Temperature Monitoring

The water temperature monitoring program in the Swift No. 2 canal and forebay was completed in 2012 and fully satisfied the requirement of the amended Section 401 Certification to monitor a total of 10 qualifying periods. Final results were included in the 2012 Annual Report (PacifiCorp and Cowlitz PUD 2013).

As illustrated in Table 4.3.1-1, during the 2007, 2008, 2009, 2010, 2011, and 2012 forebay and log boom water temperature monitoring periods, there were a total of ten qualifying periods when the Swift No. 1 and Swift No. 2 projects were off-line for more than 48 consecutive hours. As a result, the completion of the 2012 sampling season fully satisfies the requirement of the amended Section 401 Certification to monitor a total of 10 qualifying periods. There were no documented exceedences of the 16.0˚C 7-DADMax water temperature criteria at any depth interval at the log boom or forebay sites during the six summer monitoring periods between 2007 and 2012. Results of monitoring over the past six years have clearly shown that regular operating procedures at Swift No. 1 and No. 2 maintain water temperatures that protect Core Summer Salmonid Habitat (i.e., will not cause any violation of the state water temperature standards).

Based on these findings, and consistent with its amended Section 401 Certification, Cowlitz PUD discontinued the water temperature monitoring program at both the log boom and forebay sites in September 2012.

[10] https://www.ezview.wa.gov/Portals/_1962/images/FERC%20401s/swiftno2cert3676.pdf
[11] https://www.ezview.wa.gov/Portals/_1962/images/FERC%20401s/swift2amend1.pdf
[12] https://www.ezview.wa.gov/Portals/_1962/images/FERC%20401s/swift2amend2.pdf
[13] https://www.ezview.wa.gov/Portals/_1962/images/FERC%20401s/swift2amend3.pdf
[10] https://www.ezview.wa.gov/Portals/_1962/images/FERC%20401s/swift2amend4.pdf

Table 4.3.1-1 Total number of qualifying periods when the Swift No. 1 and Swift No. 2 projects were off-line for more than 48 consecutive hours during the 2007, 2008, 2009, 2010, 2011, and 2012 monitoring periods.

Year	Qualifying Off-line Periods
2007	3
2008	0
2009	3
2010	3
2011	0
2012	1
Total	**10**

4.3.2 Swift No. 2 Project Tailrace Water Quality Monitoring

On August 15, 2013, with Ecology's written approval, Cowlitz PUD discontinued water quality monitoring in the Swift No. 2 tailrace. Final results of this monitoring were included in the 2013 Annual Report (PacifiCorp and Cowlitz PUD 2014).

After four years of detailed water quality monitoring, it is clear that the Swift No. 2 Project has no negative effect on water quality in the Swift No. 2 Project's tailrace or in the upper end of Yale Lake, and may actually improve water quality conditions in the project area during the summer months. During the summer, discharges from the Swift No. 2 Project function to cool the water in the upper end of Yale Lake, improving aquatic habitat conditions for salmonids and other native cold water fish species. However, during periods when the project is off-line, water temperatures in the tailrace can increase as warmer surface water in Yale Lake begins to enter the tailrace area. Based on these findings and on the conditions included in the amended Section 401 Certification, which do not require a long-term water quality monitoring program in the tailrace, Cowlitz PUD believes there is a reasonable assurance that Project operations do not violate applicable water quality standards.

If project operations change in any way that could adversely affect water quality, Cowlitz PUD will consult with Ecology staff to determine an appropriate level of monitoring needed to document any changes to existing conditions.

4.3.3 Swift No. 2 Tailrace Total Dissolved Gas (TDG) Monitoring (401) Certification Section 4.8.3

The initial Water Quality Certification Section 4.8.3 study was completed in 2008 and included in the 2008 Annual Report.

As stipulated in Ecology's amended Water Quality Certification, Cowlitz PUD was required to monitor TDG in the project tailrace to capture a minimum of one month of TDG data during normal Project operations (at tailrace elevations above 485 ft msl and with the air injection system operating automatically to reduce turbine cavitation). TDG concentrations did not exceed the 110 percent criteria at any time during the 2008 or 2006 monitoring periods and in general, TDG concentration associated with Project operations are protective of designated beneficial uses, including salmonid, spawning, rearing, and migration. Based on these finding,

Cowlitz PUD requested to discontinue TDG monitoring at the Swift No. 2 Project. However, should Cowlitz PUD implement any operational or structural adjustments that could change the amount of air entrained at the powerhouse, it would implement additional TDG monitoring to fully meet the requirements of its Section 401 Certification.

In September 2014, Cowlitz PUD replaced the original (1956) air intake valves for both turbines (Unit 21 and Unit 22) with new automated air intake valves. This modification triggered additional monitoring in 2014. Consistent with 401 Water Quality Certification Sections 4.3.4 and 4.8.3, Cowlitz PUD monitored TDG in the Swift No. 2 forebay and tailrace from June 24 to November 20, 2014. Final results of this monitoring were included in the 2014 Annual Report (PacifiCorp and Cowlitz PUD 2015).

As expected and as previously documented (PacifiCorp Energy and Cowlitz PUD 2013), the results of sampling during this period indicated that the overall water quality in the Swift No. 2 Project tailrace remains good. During 2014, TDG in the Swift No 2. Project tailrace ranged from 92.6 percent saturation to 109.5 percent saturation. The highest TDG values were observed just prior to installation of the air intake valve when the project was not generating. These values were most likely due to warm Yale Lake surface water entering the tailrace sampling area, but decreased to about 100 percent after the project returned to standard operations. Overall, the valve replacement at the Project did not have a significant effect on water quality in the tailrace or in the upper end of Yale Lake and TDG remained below 110 percent saturation during the entire 2014 monitoring period.

4.3.4 Swift No. 2 Surge Arresting Structure Total Dissolved Gas (TDG) Monitoring (401) Certification Section 4.3.5 as amended

The TDG study required in Certification Section 4.3.5, as amended, was completed in 2007 and included in the 2007 Annual Report.

Cowlitz PUD monitored TDG at two fixed stations in the Project area during a scheduled one hour-long SAS test on March 11, 2007. One station was located in the Swift No. 2 Project forebay at the SAS intake in an area approximately eight feet from the intakes' trash rack. The other was located approximately 100 feet downstream of the existing tailrace buoy line (just outside of the turbulent SAS release path bubble curtain).

Prior to opening the SAS valves, TDG levels in the release path were fairly constant, ranging from 100.2 to 100.8 percent. During the SAS test, TDG levels increased as the visible surge of water moved past the release path monitoring site, reaching a peak at 105.0 percent saturation, after which, TDG levels gradually decreased to pre-test levels (as the SAS valves were closed). TDG levels at the SAS intake were fairly constant throughout the entire SAS test ranging from 97.8 to 98.3 percent. Water temperatures at the release path site ranged from 4.2 to 5.9 °C and water temperatures at the intake ranged from 4.1 to 4.2 °C.

In conclusion, TDG levels remained well below the state standard of 110 percent saturation during the entire test.

4.3.5 SA Section 9.4 Water Quality Monitoring

Cowlitz PUD developed a Water Quality Management Plan, dated January 23, 2013, to address the water quality requirements of the Lewis River Settlement Agreement and Ecology's Section 401 Certification. This document described Cowlitz PUD's completed, ongoing, and future plans for water quality monitoring and management, including the results of water quality monitoring discussed above in Sections 4.3.1, 4.3.2, 4.3.3, and 4.3.4. The Water Quality Management Plan described Cowlitz PUD's plan to discontinue all water quality monitoring unless any operational or structural adjustments are implemented that could adversely affect water quality, in which case Cowlitz PUD will consult with Ecology staff to determine an appropriate level of monitoring needed to document any changes to existing conditions.

Ecology approved the Swift No. 2 Water Quality Management Plan on September 20, 2013.

4.4 Cowlitz PUD Water Quality 2020 Annual Plan

Cowlitz PUD will implement the following water quality measures in 2020.

4.4.1 Water Quality Management Plan

Cowlitz PUD has completed all monitoring required under the Water Quality Management Plan. No future monitoring is anticipated unless an operational change triggers additional monitoring as required in the 401 Certification Order as amended.

5.0 TERRESTRIAL RESOURCES

5.1 TCC Meetings

The purpose and role of the TCC, as defined in Section 14.1 of the Settlement Agreement, is to facilitate coordination and implementation of the Terrestrial PM&E measures.

The structure and process of the TCC is intended to provide a forum to address time-sensitive matters, early warning of problems, and coordination of member organization actions, schedule, and decisions to save time and expense. The TCC makes decisions based on consensus, while implementing the Settlement Agreement.

5.1.1 Meetings and Conference Calls: Overview

This section summarizes major items discussed at TCC meetings during the 12-month reporting period. Detailed meeting summaries are provided on the PacifiCorp website at: https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - TCC - 2019

- On January 9, 2019 the TCC agreed that the Cowlitz PUD would go out for a logging bid package after the RMEF grant determination ($10,500), which is approximately

March 31, 2019, to see if it is possible to complete the Devil's Backbone forest management plan this year, as the current budget is approximately $16,000 shy of the goal.

- On January 9, 2019 the TCC agreed that they will review the final draft of the Forestry Plan Memorandum and be prepared to approve the memorandum at the February 13, 2019 TCC meeting.

- A field tour was also conducted on January 8, 2019 to view Management Unit 27 and 38.

- On February 13, 2019 the TCC reviewed proposed budgets and project overviews for PacifiCorp's 2018 Wildlife Habitat Management Plan (WHMP) Annual Report, PacifiCorp 2019 WHMP Annual Plan and the Cowlitz PUD WHMP 2019 Annual Plan for its 30-day review period.

- On February 13, 2019 PacifiCorp provided the Terrestrial Fund 2018 year end accounting to the TCC and conducted a field tour to Unit 11 Orchard and Oak Site 5.2

- On February 13, 2019 the TCC approved the memorandum titled, Lewis River Wildlife Habitat Management Plan (WHMP) Lands Timber, January 4, 2019, and the TCC approved payment of matching funds for $13,735.00 in accordance with Lewis River SA 10.3.3 - Contribution of Additional Matching Funds.

- The 2018 Draft ACC/TCC Annual Report was distributed to the TCC for its 30-day review and comment period March 4, 2019.

- On March 13, 2019 the TCC attendees agreed that Cowlitz Tribe should continue **its** research on PacifiCorp lands to determine beaver habitat suitability. The TCC support the beaver reintroduction program. The Cowlitz Tribe will report scorecard data back to the TCC. The TCC further agreed that the ACC should also be engaged.

- On April 10, 2019 the TCC conducted a field tour to visit Unit 14 – 2017 harvest area, Unit 15 2018 completed harvest.

- On March 21, 2019 the Cowlitz PUD filed its WHMP 2019 Annual Plan with the FERC.

- The 2018 ACC/TCC Annual Report was submitted to the FERC April 12, 2019.

- After discussion and thorough review of calling stations 924 and 951, the TCC agreed on June 12, 2019 that given the elevation of the survey points, 924 is likely calling the east side of the ridge while 951 is likely calling the west side and top of the ridge. This coverage is acceptable to the TCC. The TCC agrees with the goshawk survey as detailed in the maps provided.

- The TCC participated in a field tour on June 12, 2019 to Unit 34 to evaluation a 2018 timber harvest, a 2019 timber harvest, Unit 39 to review the seed plots and Unit 36 to look at new meadows and shrub exclosures.

- The TCC agreed to cancel the July 2019 meeting and reconvene August 14, 2019.

- The TCC participated in a field tour on August 14, 2019 to view the TNC property near Management Unit 25 (details of the tour are considered confidential and not for public viewing).

- On October 9, 2019 the Cowlitz PUD conducted a field tour to Devils Backbone management area, Upper Hanley Curry meadow and pollinator plots in Management Units 3 & 6. In addition, the TCC agreed to meeting the second Wednesday of every month in 2020 beginning at 9:00am and adjust as needed.

- On November 13, 2019 the TCC agreed to move forward with purchasing certain property in the Lewis River basin. Details of which will be provided upon closing in 2020.

5.1.2 Meeting Notes

The Licensees prepared draft notes for TCC meetings and conference calls. These notes were distributed to TCC members for review and comment approximately one week after the subject meeting. After review, revision and approval by the TCC, the final notes were entered in the public record and posted on the PacifiCorp web site at:
https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - TCC - 2019

5.2 PacifiCorp Terrestrial Measures Implemented as of the End of 2019

This section presents the actions taken during January 2019 through December 2019 toward PacifiCorp terrestrial requirements in the Lewis River Settlement Agreement. It also includes previously completed Settlement Agreement actions. **Attachment J** provides a copy of the *Lewis River Wildlife Habitat Management Plan Annual Report*, which provides a summary of the terrestrial protection, mitigation, and enhancement measures that were implemented in this area during 2019.

A discussion of the activities associated with each of the measures is presented by SA Article for the report period. A description of funding amounts deposited and disbursed during 2019 is provided in Section 7.0 – Funding.

5.2.1 SA Section 10.1 Yale Land Acquisition and Habitat Protection Fund

PacifiCorp completed its settlement agreement and the FERC license commitment under the Yale Land Acquisition Fund for acquiring land in 2010 with the purchase of 490 acres (198.3 ha) of land near Saddle Dam.

5.2.2 SA Section 10.2 Swift No. 1 and Swift No. 2 Land Acquisition and Habitat Protection Fund

PacifiCorp did not acquire any additional Swift No. 1 and Swift No. 2 lands in 2019.

PacifiCorp contributed $655,182.00 to the fund per the Settlement Agreement schedule, this is the 9th and final contribution to this fund. As of December 31, 2019 the fund is $2,042,295.

Because of confidentialities in acquiring other lands, specific discussion is not included in this annual report other than to indicate that opportunities continue to be discussed.

5.2.3 SA Section 10.3 Lewis River Land Acquisition and Habitat Protection Fund

a) In April 2017 the 10.3 funds were used in their entirety, which was $1,170,009.20, and there are no further contributions.

b) In addition to contributions made under 10.3.1 PacifiCorp provided additional matching funds of $15,000 for the Swift Creek Forage Enhancements project in 2013, $16,500 to WDFW for the Eagle Island project in 2017 and $20,093.00 for the Marble Mountain Forage Enrichment and Effectiveness Monitoring project in 2018. All matching funds provided by PacifiCorp are not to exceed $100,000 per year, and not to exceed $500,000 in any ten consecutive years. Fund account information is provided in Section 7.0.

5.2.4 SA Section 10.4 Transaction Costs

PacifiCorp expended $18,110.65 in transaction costs for the completion of property and timber appraisal and Phase I environmental survey on a property of interest 2019.

5.2.5 SA Section 10.5 Management of Funds

PacifiCorp made interest contributions to Swift No. 1 and Swift No. 2 Land Acquisition and Habitat Protection Funds in 2019. The Funds continue to be tracked in an account and is inclusive of accrued interest pending any transactions (see Section 7.0).

5.2.6 SA Section 10.6 Completed Implementation Advanced Purchases

As identified in the Settlement Agreement article 10.6.2, PacifiCorp acquired 770 acres (in 2000) of wildlife habitat near Cougar and Panamaker Creeks and established a 213 acre conservation covenant on those lands for the protection of bull trout. Routine maintenance of culverts, existing road closures, forestry management assessments, and invasive plant species control continued in 2019.

5.2.7 SA Section 10.7 Conservation Easements

PacifiCorp continued management of the 16 acres of land managed under a conservation easement with the Cowlitz Indian Tribe. In the past PacifiCorp has treated (herbicide spraying) for invasive scotch broom control in a meadow area and the Cowlitz Tribe also hand-pulled scotch broom in the 2011 timber harvest area. The scotch broom continues to be monitored.

PacifiCorp continued inspections of a vegetation exclosure established on this easement for purposes of monitoring forage establishment and use by wildlife. Ocular assessments of vegetation within the exclosures and the surrounding area will be conducted for another 5 years

(2023) by PacifiCorp biologists to assist in determining success of program treatments. Forage establishment as a result of the 2011 forest management actions and subsequent seeding has been successful especially in terms of releasing understory shrubs from excessive shade. Wildlife use in the conservation easement area is evidenced from browsing, grazing and deer or elk pellet groups throughout the easement.

5.2.8 SA Section 10.8 Wildlife Habitat Management Plan

PacifiCorp completed the WHMP and submitted it to the FERC December 23, 2008. The Utilities each received a FERC approval for their respective WHMP's May 29, 2009.

Article 403 of the Merwin, Yale, and Swift No. 1 licenses and Section 14.2.6 of the Settlement Agreement directs PacifiCorp to prepare and file with the FERC a detailed Annual Report (Federal Energy Regulatory Commission 2008a, 2008b, and 2008c, PacifiCorp et al. 2004). **Attachment J** provides a copy of the *Lewis River Wildlife Habitat Management Plan 2019 Annual Report*.

5.3 PacifiCorp Terrestrial 2020 Annual Plan

This section presents PacifiCorp's Terrestrial Resources Annual plan which identifies planned 2019 activities as organized by the Settlement Agreement measures.

5.3.1 SA Section 10.2 Swift No. 1 and Swift No. 2 Land Acquisition and Habitat Protection Fund

PacifiCorp will continue work that was initiated in 2018 and continued in 2019 in coordination with the TCC regarding the acquisition of interests in land in the vicinity of Swift Reservoir. Fund account information is provided in Section 7.0.

5.3.2 SA Section 10.3 Lewis River Land Acquisition and Habitat Protection Fund

All funds were expended in 2017 for the 2nd and final phase of land acquisition. There are no additional contributions, so this fund and action is completed.

5.3.3 SA Section 10.4 Transaction Costs

Transaction costs incurred in 2020 will be managed in accordance with SA language and reported in the 2020 Annual Report.

5.3.4 SA Section 10.5 Management of Funds

Funds provided by PacifiCorp in 2019 will be managed in a tracking account and in accordance with SA language. Contribution amounts and interest gained will be identified in the 2019 Annual Report. See Fund account information provided in Section 7.0 for end of 2019 amounts.

5.3.5 SA Section 10.6 Completed Implementation Advanced Purchases

PacifiCorp will continue to manage the Cougar Creek Conservation Covenant lands and the company lands on the Swift Creek Arm for the long-term benefit of fish, wildlife, and native plants. These lands are managed under the WHMP as described in SA 10.8.

5.3.6 SA Section 10.7 Conservation Easements

Guidelines for the selection and acquisition of conservation easements will be considered in the acquisition of Interests in Lands to be purchased with Funds described in SA 10.1 through 10.3.

5.3.7 SA Section 10.8 Wildlife Habitat Management Plans

The 2020 Annual Plan fulfills PacifiCorp's obligations for the license's Article 403 and Settlement Agreement 10.8.3 and is provided in **Attachment I**. The plan details the terrestrial protection, mitigation, and enhancement measures to be implemented on PacifiCorp WHMP lands in the following year (i.e., January 1 to December 31, 2020).

5.3.8 SA Section 10.8.5.5 Mitigation for Impacts on Wildlife Habitat

Following consultation with the TCC, PacifiCorp received $5,931.23 for mitigation funding dollars for proposed adverse impacts to WHMP lands from PacifiCorp Transmission & Distribution (T&D) operations due to the Cowlitz PUD Interconnect Project. This fund also received $1,238.51 and $603.58 from the Washington Department of Natural Resources for impacts from constructing temporary access roads across PacifiCorp lands in management units 11 and 16. Finally this fund received $1,190.57 for a judgment payoff from a property trespass. This fund does not accrue interest, which PacifiCorp will account for in a separate funding account, See Section 7.0, Funding. These funds were used in their entirety to create pollinator seed test plots along the transmission line ROW. This is discussed in more detail in **Attachment J** provides a copy of the *Lewis River Wildlife Habitat Management Plan 2019 Annual Report*.

5.4 Cowlitz PUD Terrestrial Measures Implemented in 2019

5.4.1 SA Section 10.6 Completed Implementation: Advance Purchases [Devil's Backbone Conservation Covenant]

Cowlitz PUD managed the Devil's Backbone Conservation Covenant to benefit bull trout.

5.4.2 SA Section 10.8.1 Development of the Wildlife Habitat Management Plan (WHMP)

Cowlitz PUD filed the Swift No. 2 WHMP with the FERC December 23, 2008. The FERC issued an Order Modifying and Approving the Habitat Management Plan March 31, 2009. The FERC's Order approved the WHMP and added the following requirements:

- file an Annual Habitat Management Report by April 30 of each year; and
- In the event changes are made to the WHMP, file these changes with the Commission and the TCC.

This Section 5.4 fulfills Cowlitz PUD's obligation to file the WHMP Annual Report.

5.4.3 SA Section 10.8.2 WHMP Fund

On December 26, 2018, Cowlitz PUD made $19,158 available for Year 11 2019 WHMP activities, $41,775 in carry forward, and $1,984 in interest earned from 2018 for a total of $62,917. Table 2.1-1 in the March 21, 2019, Year 11 2019 WHMP Annual Plan included a list of proposed actions and estimated costs based on the 2019 budget. **Table 5a** below illustrates the 2019 Budget, including estimated costs, year-end costs and the difference between the two. At year-end, ($23,473) remained in the budget, as itemized in **Table 5b**. **Table 6** provides the WHMP Tracking Account summarizing the WHMP budget and expenditures for each year.

Table 5a. Cowlitz PUD WHMP Year 11 2019 Budget.

WHMP Activity	2019 Budget	2019 Actual	Difference
Administration	$ 5,000	$ 2,451	$ 2,549
Annual inspection to monitor and manage public access	$ 0	$ 0	$ 0
Invasive plant surveys at high priority sites	$ 0	$ 0	$ 0
Invasive Species Control	$ 0	$ 0	$ 0
Northern Goshawk Survey	$ 3,500	$ 3,523	($ 23)
Meridian Forester Oversite	$ 3,000	$ 936	$ 2,064
5.8-acre Devil's Backbone Patch Cut	$ 89,000	$ 93,215*	($ 4,215)
Estimated cost of management activities	**$ 100,500**	**$ 100,125**	**$ 375**
Estimated amount remaining in 2019 Budget at year-end	($ 37,583)	($ 37,208)	$ 375

*This is not the total cost due to contract retention. Cowlitz PUD retains five percent (5%) of the total Contract price until satisfactory completion of the project.

Table 5b. Cowlitz PUD WHMP Year 11 2019 Carry Forward

Carry Forward		Running Total
2019 Carry Forward	($ 37,208)	($ 23,473)

Table 6. Cowlitz PUD WHMP Tracking Account.

Year	Year Beginning Date	WHMP Beginning Balance	WHMP Annual Payment at Year Beginning	WHMP Beginning Balance + Annual Payment	Grants Received During Year	WHMP Funds Dispersed at Year-End	Year-End WHMP Funds Remaining	Interest Accrued Year-End WHMP Funds	WHMP Ending Balance	Year-End Date	WSJ Prime Rate Apr 1
1	26-Dec-2008	$ -	$ 16,321	$ 16,321		$ 18,855	$ (2,535)	$ -	$ (2,535)	26-Dec-2009	0.0325
2	26-Dec-2009	$ -	$ 16,659	$ 16,659		$ 18,230	$ (1,571)	$ -	$ (1,571)	26-Dec-2010	0.0325
3	26-Dec-2010	$ -	$ 16,773	$ 16,773		$ 12,822	$ 3,951	$ 128	$ 4,080	26-Dec-2011	0.0325
4	26-Dec-2011	$ 4,080	$ 16,959	$ 21,039		$ 7,949	$ 13,091	$ 425	$ 13,516	26-Dec-2012	0.0325
5	26-Dec-2012	$ 13,516	$ 17,408	$ 30,924		$ 31,094	($ 170)	$-	($ 170)	26 Dec-2013	0.0325
6	26 Dec-2013	$-	$ 17, 715	$ 17,715		$14,530	$3,185	$103	$3,288	26 Dec-2014	0.0325
7	26 Dec-2014	$ 3,288	$ 17,971	$ 21, 259		$ 7,078	$ 14,181	$ 461	$ 14,642	26 Dec-2015	0.0325
8	26 Dec-2015	$ 14,462	$ 18,214	$ 32, 856		$4,762	$28,094	$983	$29,077	26 Dec-2016	0.0350
9	26 Dec-2016	$ 29,077	$18,488	$47,565		$8,033	$39,532	$1,581	$41,114	26 Dec-2017	0.04
10	26 Dec-2017	$41,144	$18,814	$59,928		$18,153	$41,775	$1,984	$43,759	26 Dec-2018	0.0475
11	26 Dec-2018	$43,759	$19,158	$62,917	$13,735	$100,125	$ (23,473)	$ -	$ (23,473)	26 Dec-2019	0.055
12	26 Dec-2019	$ (23,473)	$19,574	$ (3,899)							

In 2019, Cowlitz PUD completed the 2019 WHMP Annual Report without charge as an in-kind service. On December 26, 2019, the WHMP fund included a deficit of $23,473 in funds, which generated $0 interest. On December 26, 2019, Cowlitz PUD made $19,574 available for the Year 12 2020 WHMP activities. Therefore, the total available for the Year 12 2020 WHMP is ($3,899).

5.4.4 SA Section 10.8.3 Management of the Plan [Implementation of the Annual Plan]

After consultation with the TCC, Cowlitz PUD filed the Swift No. 2 Year 11 2019 WHMP Annual Plan with the FERC March 21, 2019. Specific wildlife management activities implemented under the Year 11 2019 Annual Plan are described in the following sections.

5.4.4.1 Invasive Plant Surveys

The invasive plant surveys are designed to focus on areas identified in the WHMP as high priority due to 1) known concentrations of invasive plants; 2) presence of ecologically sensitive resources, such as wetlands; or 3) soil disturbance or traffic that could pose a risk of introduction or spread of invasive plants. Surveys do not cover the transmission line right of way (ROW) or revegetated habitat south of the maintenance road, because these areas are treated under on-going operation and maintenance programs separate from the WHMP.

The surveys are conducted according to standard operating procedures (SOPs) outlined in the WHMP (Section 5.8, Invasive Plant Management SOPs). Survey routes are documented using a hand-held GPS unit, and the boundaries of new survey areas are flagged. GPS data points are transferred into the project GIS and used to prepare maps of areas surveyed or selected for weed treatment. **Figures 10 and 11** illustrate weed survey areas that have been delineated in the Devil's Backbone and Project Works management units (MUs) to date.

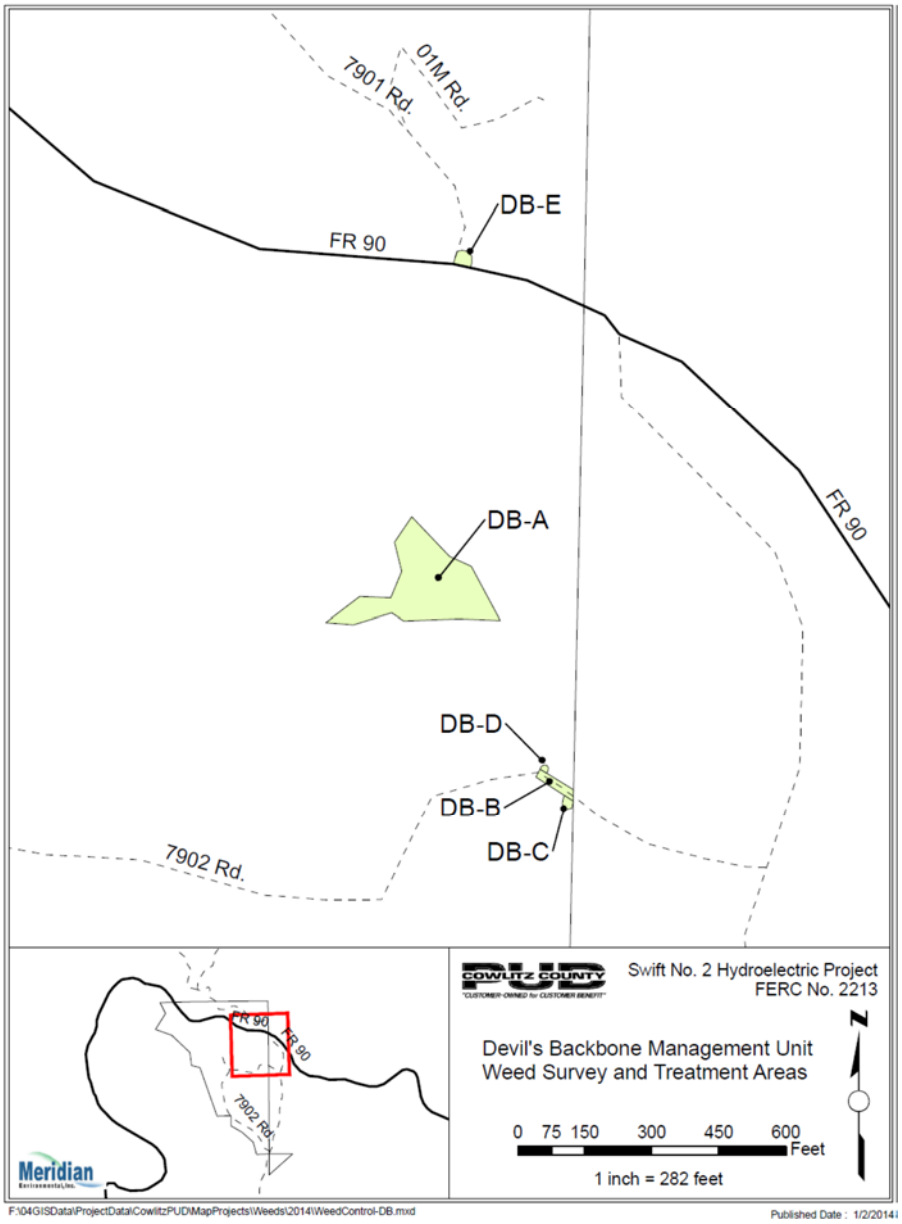

Figure 10. Devil's Backbone Management Unit Weed Survey and Treatment Areas

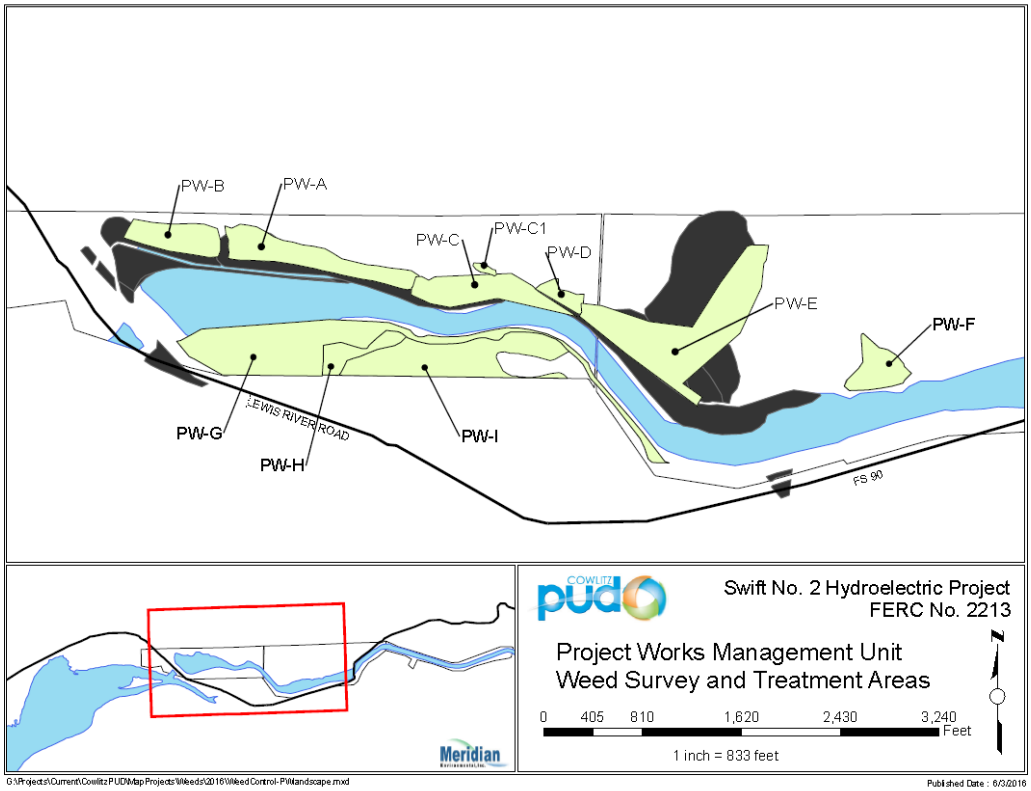

Figure 11. Project Works Management Unit Weed Survey and Treatment Areas

Updated noxious weed lists are obtained annually from the Cowlitz County and Washington State noxious weed control boards (Skamania County follows the state listings). The current classifications of target weed species observed in the Swift No. 2 Wildlife Management Area (WMA) as of 2018 are shown in **Table 7** below. Weeds shown in bold are species Cowlitz County has selected as high priorities for control.

Class B Weeds: Non-native species presently limited to portions of the State. Species are designated for control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.

Class C Weeds: These are noxious weeds typically widespread in WA State or are of special interest to the state's agricultural industry. The Class C status allows counties to require control if locally desired.

Table 7. Non-native invasive plants classified as noxious weeds in Cowlitz or Skamania County that have been observed in the Swift No. 2 WMA as of 2019.

Common Name (*Scientific Name*)	Cowlitz County	Skamania County (Washington State)
Bull thistle (*Cirsium vulgare*)	C	C
Canada thistle (*Cirsium arvense*)	**C**	**C**
Common catsear (*Hypochaeris radicata*)	---	C
Common groundsel *(Senecio vulgaris)*	C	C
Common St. Johnswort (*Hypericum perforatum*)	C	C
Evergreen blackberry (*Rubus laciniatus*)	C	C
Himalayan blackberry (*Rubus armeniacus*)	C	C
Oxeye daisy (*Leucanthemum vulgare*)	C	C
Perennial sowthistle (*Sonchus arvensis ssp. arvensis*)	---	C
Robert's geranium (*Geranium robertianum*)	**B**	**B**
Scentless mayweed (*Matricaria perforata*)	C	C
Scotch broom (*Cytisus scoparius*)	**B**	**B**
Tansy ragwort (*Senecio jacobaea*)	**B**	**B**

Other non-native invasive species that are not classified in either county as noxious weeds are also recorded when observed. These include foxglove (*Digitalis purpurea*), self-heal (*Prunella vulgaris*), brackenfern (*Pteridium aquilinum*), and common dandelion (*Taraxacum officinale*).

5.4.4.1.1 Initial Invasive Plant Surveys

Meridian Environmental, Inc. (Meridian) completed initial invasive plant surveys in all high priority areas of the Devil's Backbone MU in 2009. These areas are shown in **Figure 10,** above.

Meridian completed initial invasive plant surveys of high priority areas in the Project Works MU in 2013. These areas are shown in **Figure 11**.

5.4.4.1.2 Invasive Plant Species Follow-up Surveys

Meridian did not conduct follow-up surveys in 2019, as the TCC collectively decided to spend 2019 funds on the 5.8-acre Devil's Backbone Patch Cut.

5.4.4.2 Invasive Plant Species Control

In January 2017, Cowlitz PUD signed a 1-year interlocal agreement (with an option for 3 additional years) with Skamania County to perform weed control in the WMA.

No weed control treatments were completed in 2019.

5.4.4.3 PWMU-PUB Wetland Restoration

During a heavy rain event in January 2009, a landslide buried the PWMU-PUB wetland in mud and large woody debris. The following summer, Cowlitz PUD re-contoured the wetland, reseeded the area, and planted willow (*Salix spp.*) stakes. Crews planted additional willow and red osier dogwood (*Cornus sericia*) stakes and rooted stock of several species in 2010 to further

increase the species and structural diversity of wildlife habitat around the wetland. No survey was completed in 2019.

5.4.4.4 Devil's Backbone Forest Management

The Timber Management Fund was expended in 2019.

5.4.4.4.1 Devil's Backbone Elk Forage Plot

In 2019, Cowlitz PUD completed the bidding process, goshawk survey and harvesting of the agreed upon 5.8-acre patch cut in Devil's Backbone MU (DBMU-2). Stump grubbing and soil scarification was completed after harvesting. The patch cut was implemented in accordance with Forestland Management SOPs outlined in Section 5.7 of the WHMP, and in accordance with Invasive Plant Management SOPs (Section 5.8) and Raptor Management SOPs (Section 5.9). In 2020, Cowlitz PUD will complete the last steps of the project, which includes burning of stumps and slash, seeding and roadwork.

On January 28, 2019, Cowlitz PUD received approval from Rocky Mountain Elk Foundation for funding at the $13,735 level to fund stump-pulling, scarification, forage seeding and burning stumps/slash. No cost reimbursements were received in 2019, but the majority should be received in 2020. In 2019, PacifiCorp provided $13,735 in matching funds.

On July 1, 2019, an intensive search survey was conducted for the northern goshawk. The survey was performed at the patch cut and all suitable goshawk habitat within 1,570 feet. No goshawks were detected. Following the Woodbridge and Hargis protocol and the Pacific Power 2015 memo protocol amendments, goshawk surveys were completed to protocol with no goshawks or nesting activity detected. The northern goshawk survey technical memorandum is attached as **Attachment K**.

The 5.8 acre patch cut is illustrated in **Figure 12, 13 and 14.**

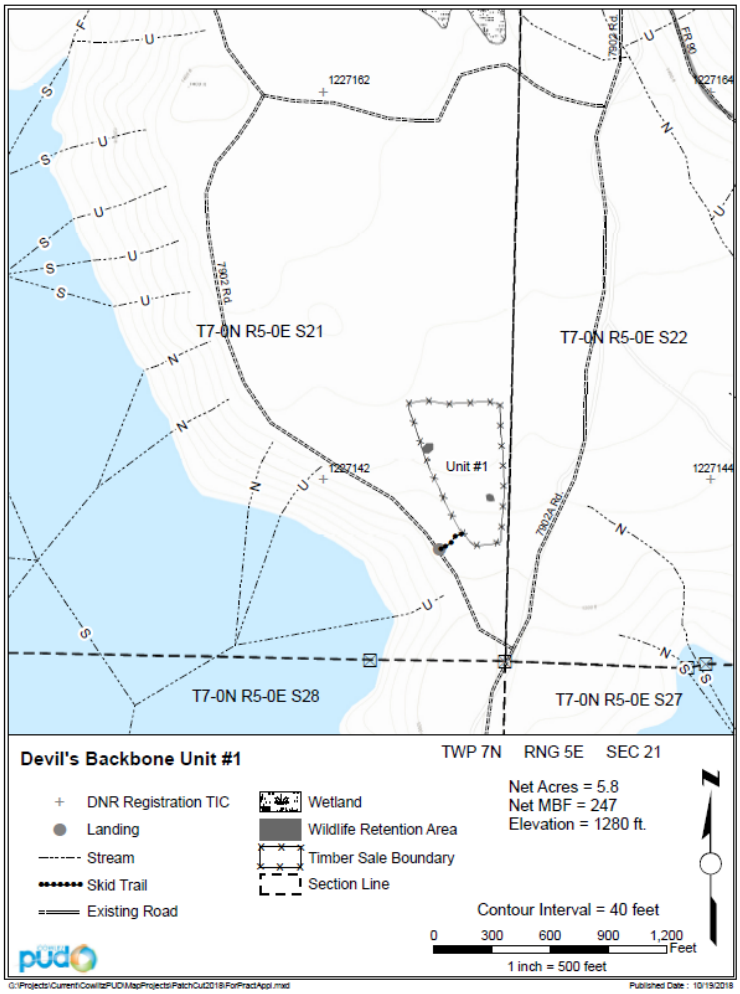

Figure 12. Devil's Backbone Elk Forage Plot

Figure 13. Elk Forage Plot after harvest looking east.

Figure 14. Elk Forage Plot after harvest looking south.

5.4.4.5 Public Access Monitoring

Public access surveys are conducted concurrently with invasive plant species surveys, but were not completed in 2019. The purpose of the surveys is to document the condition of roads, gates, and signs; evidence of authorized (i.e., non-motorized) or unauthorized (i.e., motorized) public access; and screening between the roads and adjacent habitat. The surveys included roads that lead into the Devil's Backbone MU and the Project Works MU maintenance road, shown in **Figures 10 and 11**, respectively.

Devil's Backbone MU

The Devil's Backbone MU public access surveys are conducted concurrently with invasive plant species surveys, but were not completed in 2019.

Project Works MU

The Project Works MU maintenance road was not inspected in 2019, but weekly dam safety inspection are completed and any issues are reported to management.

5.4.4.6 Fisher Candidate Conservation Agreement with Assurances

On May 6, 2016 Cowlitz PUD received confirmation from the Washington Department of Fish and Wildlife of enrollment of the Devil's Backbone and Project Works MU lands in the Candidate Conservation Agreement with Assurances (CCAA) for the Fisher in the State of Washington. This agreement is designed to promote fisher conservation while also addressing concerns about future regulatory restrictions if fishers were to ever become a listed species under the federal Endangered Species Act (ESA). As an enrolled landowner, Cowlitz PUD is entitled to regulatory assurances against future land-use restrictions on its enrolled lands.

5.4.5 SA Section 10.8.4 Habitat Evaluation Procedures

Implementation scheduled for 2025 (Year 17) of the Swift No. 2 License.

5.4.6 SA Section 10.8.4.2 Review of Effectiveness of WHMP

Implementation scheduled for 2025 (Year 17) of the Swift No. 2 License.

5.4.7 SA Section 10.8.3 Cowlitz PUD 2020 Annual Plan

Cowlitz PUD will begin preparation of the 2020 WHMP Annual Plan in January 2020.

5.5 Cowlitz PUD Terrestrial 2020 Annual Plan

5.5.1 SA Section 10.6 Cowlitz PUD Completed Implementation: Advance Purchases [Devil's Backbone Conservation Covenant]

These lands will be managed under the WHMP.

5.5.2 SA Section 10.8.1 Cowlitz PUD Development of the Wildlife Habitat Management Plan (WHMP)

The WHMP will be implemented via the 2020 Annual Plan upon the FERC approval.

5.5.3 SA Section 10.8.2 Cowlitz PUD WHMP Fund

The carry forward, interest, and the Year 12 2019 annual funding amount will be available in 2020. Cowlitz PUD will make approximately $20,161 available for WHMP activities December 26, 2020.

5.5.4 SA Section 10.8.3 Management of the Plan [Annual Plan]

Following consultation with the TCC, Cowlitz PUD will file the 2020 Annual Plan with the FERC. Upon the FERC approval, Cowlitz PUD will implement the 2020 Annual Plan.

6.0 Law Enforcement

6.1 SA Section 13.2.1 Law Enforcement

Throughout the year the Lewis River Basin was patrolled by a full time Washington Department of Fish and Wildlife officer, a part time Skamania County Deputy (May through October) and a full time Cowlitz County Deputy. During some periods, additional patrols were provided by other officers. For these officers the focus is protection of fish and wildlife, cultural resources, and public safety and security.

The following table presents the WDFW Fish and Wildlife Police actions taken during January through December 2019 toward fish and wildlife law enforcement requirements in the Lewis River Settlement Agreement:

Table 8. WDFW Actions taken 2019 (All fishing)

IncidentType	Total
BOATING SAFETY INSP./VIOLATION	5
COL. RIVER SALMON/STEELHEAD STAMP	1
ESA - COL. RIVER SALMON/STEELHEAD STAMP	23
ESA/PROTECTED SPECIES VIOLATION	13
FRESHWATER FISH VIOLATION	16
Grand Total	**58**

Table 9. WDFW Actions taken 2019 (Non-fishing related)

IncidentType	Total
BIG GAME VIOLATION	3
COLLISION MV - INJURY	1
DANGEROUS WILDLIFE REPORT	2
DRIVING UNDER THE INFLUENCE	1
GENERAL AUTHORITY INVESTIGATION	3
OFF ROAD VEHICLE INCIDENT/VIOLATION	2
PROBLEM WILDLIFE REPORT	2
REC. LICENSE FRAUD INVESTIGATION	1
SMALL GAME VIOLATION	1
SNOWMOBILE VIOLATION/INVESTIGATION	17
TRAFFIC INCIDENT/VIOLATION	5
TRESPASSING	2
Grand Total	**40**

The following table presents the WDFW Fish and Wildlife Police charges/citations during January through December 2019 toward fish and wildlife law enforcement requirements in the Lewis River Settlement Agreement:

Table 10. WDFW Charges/Citations 2019 (fishing related)

IncidentType	Criminal Nontraffic	Criminal Traffic	Infraction Nontraffic	Grand Total
BOATING SAFETY INSP./VIOLATION			5	5
COL. RIVER SALMON/STEELHEAD STAMP			1	1
ESA - COL. RIVER SALMON/STEELHEAD STAMP	47	1	14	62
ESA/PROTECTED SPECIES VIOLATION			18	18
FRESHWATER FISH VIOLATION	3		14	17
Grand Total	**50**	**1**	**52**	**103**

Table 11. WDFW Charges/Citations 2019 (Non-fishing related)

IncidentType	Criminal Nontraffic	Criminal Traffic	Infraction Nontraffic	Infraction Traffic	Grand Total
BIG GAME VIOLATION	4		1	1	6
GENERAL AUTHORITY INVESTIGATION			1		1
OFF ROAD VEHICLE INCIDENT/VIOLATION	2		3		5
REC. LICENSE FRAUD INVESTIGATION	2		1		3
SNOWMOBILE VIOLATION/INVESTIGATION			17		17
TRAFFIC INCIDENT/VIOLATION		1		5	6
Grand Total	**8**	**1**	**23**	**6**	**38**

The following table represents WDFW Fish and Wildlife Police arrests/bookings during January through December 2019 toward Fish and Wildlife law enforcement requirements in the Lewis River Settlement Agreement:

Table 12. WDFW Arrests/Bookings 2019

IncidentType	Total
ESA - COL. RIVER SALMON/STEELHEAD STAMP	2
Grand Total	**2**

7.0 FUNDING

This section presents an accounting to date of the funding obligations for the Lewis River Settlement Agreement section 7.5.

Lewis River License Implementation
Lewis River Aquatics Fund - Resource Projects
Sections 7.5.1, 7.5.3, 7.5.3.1 & 7.7

Release Date	Funds Received	Expense	Interest	Balance	Notes
12/31/2018				**$ 2,183,431.50**	
4/30/2019	$ 301,640.03	$ -	$ -	$ 2,485,071.53	0
12/31/2019	$ -	$ -	$ 112,538.44	$ 2,814,405.02	0
			Total Spent to Date:	$ (2,229,281.00)	
			Balance Remaining:	$ 2,814,405.02	

Lewis River License Implementation
Lewis River Aquatics Fund - Bull Trout
Sections 7.5, 7.5.1, 7.5.3, 7.5.3.1, & 7.7

Release Date	Funds Received	Expense	Interest	Balance	Notes
12/31/2018				**$ 765,287.72**	
12/31/2019	$ -	$ -	$ 27,044.68	$ **806,264.55**	0
			Total Spent to Date:	$ (234,547.92)	
			Balance Remaining:	$ 806,264.55	

Lewis River License Implementation
Lewis River WHMP Fund (Conservation Easement Lands)
Section 10.8.2

Release Date	Funds Received	Funds Expended	Balance	Notes
1/1/2019			**$ 288.20**	
12/31/2019	$ -	$ (288.20)	$ -	Expenditure for 2019
		Total Spent to Date:	$ (2,698.14)	
		Balance Remaining:	$ -	

Lewis River License Implementation
Lewis River WHMP Fund (Fee Simple Lands)
Section 10.8.2

Release Date	Funds Received	Expense	Interest	Balance	Notes
1/1/2019				**479,630.06**	
12/31/2019	-	(570,095.25)	28,254.47	(62,210.72)	As of 12/31/19, current WHMP acreage is: total 15,158 acres
12/31/2019	-	(570,095.25)	28,254.47	**(62,210.72)**	As of 12/31/19, current WHMP acreage is: total 15,158 acres
			Total Spent to Date:	$ (4,929,838.60)	
			Balance Remaining:	$ (62,210.72)	

Lewis River License Implementation
Lewis River LWD Fund - Haul
Section 7.1.1

Release Date	Funds Received	Funds Dispersed	Balance	Notes
4/30/2018			$ 2,013.42	
4/30/2019	$ 2,000.00	$ -	$ 4,013.42	7.1.1 Large Woody Debris Program, ILR-LWD
	Total Spent to Date:		$ (21,986.58)	
	Balance Remaining:		$ 4,013.42	

Lewis River License Implementation
Lewis River LWD Fund - Resource
Section 7.1.1

Release Date	Funds Received	Funds Dispersed	Balance	Notes
12/26/2019			$ 101,500.00	7.1.1 Large Woody Debris Program, ILR-LWD
	Total Spent to Date:		$ (18,500.00)	
	Balance Remaining:		$ 101,500.00	

Lewis River License Implementation
Swift No. 1 & Swift No. 2 Land and Habitat Protection Fund
Section 10.2, 10.2.1

Release Date	Funds Received	Expense	Interest	Balance	Notes
12/31/2018			$ 61,211.71	$ 1,941,598.36	
12/31/2019	$ -	$ -	$ 100,697.14	$ 2,042,295.50	
		Total Spent to Date:		$ (7,929,974.69)	
		Balance Remaining:		$ 2,042,295.50	

Lewis River License Implementation
Mitigation for Impacts on Wildlife
Section 10.8.5.5

Release Date	Funds Received	Expense	Interest	Balance	Notes
10/17/2018				$ 19,135.89	
12/31/2019	$ -	$ (19,135.89)	$ -	$ -	0
		Total Spent to Date:		$ (19,135.89)	
		Running Total:		$ -	

Lewis River License Implementation
Additional Matching Funds
Section 10.3.3

Release Date	Funds Received	Expense	Interest	Balance	Notes
11/1/2018				$ 2,105.75	
12/31/2019	$ -	$ -	$ -	$ 2,105.75	No contributions or expenditures in 2019
		Total Spent to Date:		$ (84,578.25)	
		Running Total:		$ 2,105.75	

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Attachment A
ACC / TCC Comments

Commenter	Comment Number	Location	Comment	Response
Peggy Miller and Eric Holman Washington Department of Fish and Wildlife	1	2020 WHMP Plan - Page 5	Page 5 of the plan provides that "A budget shortage from 2018 was discovered in 2020 that was not accounted in 2019 budget. This shortage was the result of reporting a greater budget then actual in 2018, unaware of charges that were included in the WHMP budget, and reporting the total 2018 cost before all charges had posted. As a result the 2020 budget will be reduced to make up this budget deficit." Due to the $62,210 reduction in the 2020 budget, WDFW reviewed the plan with the consideration of identifying activities that could be delayed and still provide habitat benefits so that funds would be allocated to the priority activities that provide the greatest wildlife and habitat benefits.	No response required
Peggy Miller and Eric Holman Washington Department of Fish and Wildlife	2	2020 WHMP Plan - 13.0 Forestland Habitat Management Invasive Plant Control Page 24-25 Table 8: 2020 Timber Harvest Area vegetation control treatments –13.0 Forestland Habitat Management	Section 13.2.8 references using either spraying or mechanical removal to remove and control invasive plant species and competing vegetation in previously harvested areas. Table 8 shows seven Units in which approximately 186 acres of alder will be removed. In addition, four of the seven Units (approximately 98 acres) are listed as Priority 1, the highest priority action for vegetation control. WDFW suggests deferring the treatment of alder to future years. Alder is a native nitrogen fixing tree which improves soil conditions which leads to improved wildlife habitat. In addition, the Terrestrial Coordinating Committee has recommended planting alder in some areas to increase the plant species diversity in the stands. Leaving the alder in place for another year will not be a detriment to wildlife habitat. In addition, Section 2.0 Wildlife Habitat Management Plan Funding refers to the budget reduction for 2020 and the Invasive Plant Control section provides that the budget may be a limiting factor to accomplish the large amount of proposed vegetation control treatments (approximately 1000 acres) hence the establishment of the priority rating. Given the reduction in the 2020 budget WDFW suggests deferring the treatment of alder to future years to ensure priority activities in management areas such as pre-commercial thinning and pruning can be completed. Since the Terrestrial Coordinating Committee has recommended planting alder in some areas, recognizing alder as an important component of stand diversity, WDFW suggests addressing alder stands in the Pre-commercial Thinning and Pruning section. By including alder in the Invasive Plant Control section, it diminishes the perceived valve of alder. Including alder in the Pre-commercial Thinning and Pruning section could be accomplished by adding a new column to Table 9: 2020 Pre-commercial Thinning and pruning treatments called Alder Treatment.	The acres identified in Table 8 are the timber harvest acres. The acres that will be treated may vary from entire THA, to small patch, to just the road side. The "Acres" column has been changed to "Timber Harvest Acres". The Priority 2 (P2) alder treatment will be road side treatment only and one alder treatment was removed. The Priority 1 (P1) will be roadside treatment and any treatments within a timber harvest area will retain alder that are not competing with planted trees. Typically red alder is treated within the first 5 years following timber harvest. Waiting to remove alder during the first pre-commercial thinning treatment may not be effective in some areas. To promote diversity the following language was provided in the Pre-Commercially thinning and Pruning section: "Red alder thickets within timber harvest area may be thinned to allow individual alders to be released. Red alders that are not directly competing with planted trees can be retained to promote diversity within the timber harvest area."
Peggy Miller and Eric Holman Washington Department of Fish and Wildlife	3	WHMP 2019 Report - 11.0 Forestland Habitat Management Unit 27 Page 31-32 Table 13: Unit 27 pre- and post- timber harvest cover:forage ratio	Please check pre- and post-harvest acres for this unit. Cover decrease by 34.9 acres, forage increased by 28.1 acres, and there was no change for the Neither category. There doesn't appear to be an adjustment in the total acreage for the unit.	The post harvest acreages have been corrected and match the values in Appendix D. The Mid-Successional Conifer, Upland Mix, Upland Deciduous, and Seedling/Sapling (new) categories have been corrected.
Carol Serdar WA Department of Ecology	4	ACC TCC 2019 Annual Report	Page 29: Figure 2 has no text in the body of the report? Please explain the dips below the red line of the minimum flows;	Narrative explanations have been added to the report.
Carol Serdar WA Department of Ecology	5	ACC TCC 2019 Annual Report, Constructed Channel (SA 6.1.3b) - Figure 3	Page 29: Text explains, "The system is performing well and there were no minimum flow excursions recorded for 2019 (Figure 3)." – the figure shows a dip below the minimum 14 cfs flow. No explanation of this?	Narrative explanations have been added to the report.
Carol Serdar WA Department of Ecology	6	ACC TCC 2019 Annual Report, Section 6.2	Page 30 – 31: Section on SA Section 6.2 Flow Fluctuations… describes change to minimum flow to preserve water for fall spawning. It would be great to show a hydrograph for Merwin releases with Merwin Lake level elevations for the time period in which minimum flows were reduced (it would be great to also have an understanding of the distribution of the 70 foot hold in all three reservoirs). Ecology appreciates the manner in which PacifiCorp keeps the Flow Coordination Committee up to date with refill probabilities during the time of changes to low flow, thank you.	Figures 4 through 8 have been added to the report.
Carol Serdar WA Department of Ecology	7	ACC TCC 2019 Annual Report, Section 3.2.19	Page 31: Thank you for providing the agencies with an understanding of the required maintenance of the Merwin spillway gates and low flow conditions, at the time of maintenance.	Comment noted.
Carol Serdar WA Department of Ecology	8	ACC TCC 2019 Annual Report, Section 3.3.20	Page 31: Large Woody Debris Program; There is no mention of the need for a WQ Protection Plan (WQPP, as cited in 2006 WQCs Section 4.5 Construction Projects, Miscellaneous Discharges, and Habitat Modifications – 4.5.2 – WQPPs are required for in- and near-water work to be performed. A WQPP may be written for the length of the HPA required, for ongoing activities such as LWD. This WQPP should include a map of the location the LWD is taken to, as well as BMPs that will be employed to prevent turbid water from entering waters of the state, as well as how the LWD would be removed (and location of removals from all reservoirs) to prevent turbid discharges, using visual monitoring at the correct distance, depending on the site removal waters. Please provide the HPA with the WQPP.	In 2019 there was no large wood debris removed from Swift Reservoir and as a result no large wood debris was donated to other entities for habitat projects in the Lewis Basin. Therefore no permits (e.g WQPP or HPA) were required. Please note PacifiCorp's obligation of the program is to make habitat logs available for off-site projects not related to the FERC licenses. As such, reciepant of logs is responsible to acquire any necessary permits for their log placement.
Carol Serdar WA Department of Ecology	9	ACC TCC 2019 Annual Report, SA 3.3.18	Page 42: "…final decommissioning report that was filed with FERC on December 12, 2019" should be December 13.	Text has been corrected in the report.
Carol Serdar WA Department of Ecology	10	ACC TCC 2019 Annual Report, Section 4.0 Water Quality	Page 46: Section 4.0 Water Quality; this section is missing critical data that should be available to review with the statements made in this section. The water quality graphs in the attachments are insufficient, and raw data should be provided in this report to compare with the graphs. The text of this section should include data related to the WQ attainment plans (TDG, temperature, and DO) and the status of each component of the attainment plans per FERC Project	For each annual report, water quality data is summarized given the extensive data record collected. PacifiCorp can make the raw water quality data available upon request to ACC representative or agency. Given Ms. Serder's request, PacifiCorp will provide her the 2019 data set under separate cover. Table 4.1-1 which describes the water quality parameters that will continue to be monitored and the schedule of the monitoring was added to the body of the section.
Carol Serdar WA Department of Ecology	11	ACC TCC 2019 Annual Report, Section 4.2.1	Page 50: "PacifiCorp has been implementing the monitoring portions of the WQMP since the license was issued in 2008." Cite the data, add data tables to the Attachments. What components will continue to be monitored and when…	Previous Annual Reports provide a summary of annual data; these reports are available on PacifiCorp's website. Table 4.1-1 which describes the water quality parameters that will continue to be monitored and the schedule of the monitoring was added to the body of the section.
Carol Serdar WA Department of Ecology	13	ACC TCC 2019 Annual Report, Section 4.2.7	Page 51: Provide dates Ecology approved the attainment plans and the WQMP. Also, Section 4.2.7 – add to the end of the section that "PacifiCorp continues to monitor for TDG."	Approval dates and text have been added to the document.
Carol Serdar WA Department of Ecology	14	ACC TCC 2019 Annual Report, Section 4.3 Cowlitz PUD Water Quality	Page 51-52: Section - Cowlitz PUD WQ Measures Implemented as of the End of 2019; each of these sections should include the "findings" or final results (as stated in each report) with any data that is cited in said reports; this will suffice for a summary of all water quality sampled and a request for cessation of the monitoring requirements. Once this information is provided, Ecology will send Cowlitz PUD a letter stating the fulfillment of monitoring requirements has been met, and Cowlitz PUD may cease monitoring based on the WQCs. Ecology will remind Cowlitz PUD there are additional requirements in the WQCs, including turbid discharges. If Swift No. 2 experiences a landslide that delivers turbid water to the canal or other waters of the state, this should be reported as an Environmental Report Tracking System (ERTS). When an ERTS is filed, state Carol Serdar is the Water Quality Compliance Manager that regulates the WQCs that is being implemented. Additional requirements also include WQPPs for construction and activities in- or near-water.	The findings have been summarized and added to the report.
Carol Serdar WA Department of Ecology	15		Additionally, Ecology requests that the Water Quality Compliance Manager, Carol Serdar, is notified when habitat activities are selected to be funded by PacifiCorp. She will assist in determining which activities will require a WQPP and possibly a Construction Stormwater General Permit (NPDES). This is an obligation under all FERC projects on the Lewis River.	Prior to April 15 of each year, PacifiCorp prepares and submits an Annual Report specific to the Lewis River Aquatic Fund projects to the FERC. This report identifies projects that were proposed to the ACC, the ACC review process and the projects selected by the ACC for funding. PacifiCorp's role is to only provide funding as identified by the ACC. Project owners are responsible for all other aspects of the project including permitting, construction and reporting. In the future PacifiCorp will notify Ms. Serdar of the projects selected by the ACC for funding.

Commenter	Comment Number	Location	Comment	Response
Carol Serdar WA Department of Ecology	16		Finally, there are deadlines related to dam compliance schedules that should be discussed with Ecology as soon as possible, due to the date of compliance (November 7, 2021). It would be beneficial to schedule a meeting to discuss status of the dam compliance schedules and attainment plans.	Comment noted. PacifiCorp will be following up with Ecology on this item.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	17		Please check throughout the report that the year 2018 should in fact be 2018 and not 2019. Specifically see pages 20, 23, 25, 31, 36, 37, 38, however there may be other instances within the report.	PacifiCorp reviewed and edited dates where appropriate.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	18	ACC TCC 2019 Annual Report, Section 3.1.1	ACC Meetings and Conference Calls: Overview (Page 19) The ACC agreed to meet the second Thursday of every month in 2020 beginning at 9:30am and adjust as needed rather than the TCC.	Corrected
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	19	ACC TCC 2019 Annual Report, Section 3.2.18	SA Section 6.1 Flow Releases in the Bypass Reach: Upper Release and Constructed Channel Upper Release Point (SA 6.1.2) (Pages 28 and 29) The report provides that the upper release flow was in excess of the required minimum flow for the duration of the year. Yet Figure 2. Daily Minimum Release flows from January 1, 2019 to December 28, 2019 shows a significant drop below minimum flow the first part of October and smaller drops in March and April. In addition, figure 2 is not reference in the text. Please explain the difference between the text and figure.	Narrative explanations have been added to the report.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	20	ACC TCC 2019 Annual Report, Section 3.2.18	Constructed Channel (SA 6.1.3b) (Pages 29 and 30) The report provides that there were no minimum flow excursions recorded for 2019. Figure 3. Minimum daily water flow (cfs) measured from the Swift canal drain – 2019 shows one drop below the 14 cfs minimum flow mid-April. Please explain why this is not an excursion.	Narrative explanations have been added to the report.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	21	ACC TCC 2019 Annual Report, Section 3.2.29	SA Section SA Section 8.2 Hatchery and Supplementation Plan and Report (Page 36) The report provides that the Subgroup is working on finalizing the 2019 Annual Operations Plan with a target completion date of December 2019, and later, once the 2018 plan is approved, the Subgroup will begin work on 2019 planning efforts and documents. Please confirm is the subgroup is working on the 2018 or 2019 plan and if they will be moving on to the 2019 or 2020 plan.8.2 Hatchery and Supplementation Plan and Report (Page 36)	Updates incorporated to this section to clarify current status of the 2019 and 2020 AOP
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	22	ACC TCC 2019 Annual Report, Section 3.2.35	SA Section 8.8 Juvenile Acclimation Sites (Page 37) This section begins with "However". Is there missing information that should be before this paragraph?	Section revised to clarify current program
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	23	ACC TCC 2019 Annual Report, Section 3.3.2	SA Section 4.3 Merwin Upstream Collection and Transport Facility (Page 39) The report provides that the upstream collection and transport facility will continue to operate with some minor modifications anticipated that will improve operations. Major modifications are potential but, pending results of the Adult Trap Efficiency studies for each of the three transport species, will not be put in place until a determination of need occurs. Page 19 provides that the ACC agreed to postpone the 2020 ATE Evaluations and requested PacifiCorp develop a draft memorandum outlining the proposed steps for moving forward with the Merwin Trap for the ACC to review and approve in 2020. These statements are in conflict. Please revise section 3.3.2 on page 39 to reflect the ATE studies have been deferred and improvements to the facility will be evaluated. Also identify if improvements would be considered major or minor.	Update was made to text to clarify and provide more background.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	24	ACC TCC 2019 Annual Report, Section 3.3.12	SA Section 7.5 Aquatics Fund (Page 41) The information provided in this section is similar to the information on page 19. It seems like this information should be in 3.2 Aquatic Measures Implemented as of the End of 2019 section not 3.3 Aquatic 2020 Annual Plan.	PacifiCorp did not move the information in Section 3.3.12 as the activity specifically relates to Aqatic Fund activity and not Aquaic Measures.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	25	ACC TCC 2019 Annual Report, Section 3.3.14	SA Section 8.3 Anadromous Fish Hatchery Adult Ocean Recruit Target by Species (Page 41) It is unclear why the suggested method proposed by Lars Mobrand to determine if the goals for Adult Ocean Recruit targets have been met is in the plan section and if this is a method that is supported by the ACC. Please explain further when the ACC approved the method and if it will be used in 2020 to determine if Ocean Recruit target goals have been met.	Update was made to text to provide more clarify.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	26	ACC TCC 2019 Annual Report, Section 3.3.20	Monitoring and Evaluation Post-Season Incidental Take (Page 47) The information provided in this section under 3.3 Aquatic 2020 Annual Plan is 2019 Incidental Take data. This section should likely reflect that incidental take will continue to be collected in 2020 and the 2019 information moved to 3.2 Aquatic Measures Implemented as of the End of 2019.	Update was made to text. Good catch!
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	27	ACC TCC 2019 Annual Report, Section 7.0	Some of the budget tables are missing information necessary to track from beginning to ending balance. For instance, 10.3.3 has a beginning balance of $2,105.75 in 2018, with expenditures of $38,078.25 also in 2018 with an ending balance for 2019 of $2,105.75 (in green). It's unclear if the years should be 2018 or 2019. In addition, if 2019 expenses were $38,078.25 then the 2019 beginning balance should have been $40,184.00 and then the ending balance for 2019 would be $2,105.75.	No contributions or expenditues in 2019.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	28	Attachment C - H&S 2019 Annual Report, Section 3.0	Monitoring and Evaluation Objective 16: Evaluate Fall Chinook and Chum Populations Downstream of Merwin Dam (Page 27) The report notes that PacifiCorp is waiting for the 2018 and 2019 Fall Chinook and Chum salmon survey data from WDFW and it is expected that these results will be available for the 2020 Annual Report. WDFW has just completed this estimate and is in the process of final review. Please contact WDFW staff prior to the submittal of this document to FERC and we will strive to provide a Fall Chinook Estimate and Summary.	Results will be incorporated into the 2019 Annual Report if received by WDFW. If not provided, these results will be provided in the 2020 Annual Report.
Peggy Miller, Bryce Glaser and Josua Holowatz - WDFW	29	Attachment D - Aquatics M&E Program 2019 Annual Report, Section 2.0	Monitoring and Evaluation Objectives Objective 19 Document Project compliance with flow, ramping rate and flow plateau requirements (Page 21) Objective 19 summarizes information from the 2019 Annual Report, as such please see our comments for section 3.2.18 SA Section 6.1 Flow Releases in the Bypass Reach: Upper Release and Constructed Channel above and make similar changes to Objective 19. In addition, 3.2.19 SA Section 6.2 Flow Fluctuations and Ramp Rates below Merwin Dam describes the reductions in minimum flow approved by the FCC for the 2019 drought conditions. Please add a summary of those reductions in the table for Objective 19.	Update was made to table for Objective 19

Attachment B
Section 14 of the Lewis River Settlement Agreement

SECTION 14: COORDINATION AND DECISION MAKING

14.1 Coordination and Decision Making. The provisions of this Section 14 describe the processes for coordination and decision making among the Parties for the implementation of the terrestrial and aquatic PM&E Measures provided for in this Agreement. As provided for in Section 14.2 below, the Licensees shall convene a Terrestrial Coordination Committee ("TCC") to coordinate implementation of the terrestrial PM&E Measures described in Section 10 (including any exhibits, schedules, and appendices related to Section 10), and shall accomplish the purposes set forth in Section 14.1.1 below. The Licensees shall convene an Aquatics Coordination Committee ("ACC") to coordinate implementation of the aquatics PM&E Measures described in Sections 3 through 9 (including any exhibits, schedules, and appendices related to those Sections), referred to below as terrestrial and aquatic PM&E Measures.

14.1.1 Purposes of the TCC. The TCC is intended to accomplish the purposes set forth below:

a. Provide a forum for coordination between the Licensees and the other Parties on terrestrial resources PM&E Measure implementation.

b. Oversee the development by the Licensees of an objective-oriented WHMP prior to the Issuance of the New Licenses.

c. Monitor implementation of that WHMP.

d. Oversee the HEP study in the 17th year after Issuance of the New Licenses, and modify the WHMP if necessary based on the HEP's results.

e. Oversee and make decisions regarding the: (1) Yale Fund; (2) the Swift Fund; and (3) the Lewis River Fund.

f. Oversee the annual budget for the WHMP.

14.2 Coordination Committees. Within 60 days after the Effective Date, PacifiCorp and Cowlitz PUD shall convene the TCC and the ACC.

14.2.1 Committee Coordinators. Within 30 days after the Effective Date, PacifiCorp Energy and Cowlitz PUD each shall designate one Committee Coordinator for the TCC and one Committee Coordinator for the ACC. PacifiCorp Energy and Cowlitz PUD shall make their designations by notice to the Parties in accordance with the notice provisions in Section 16.6. The PacifiCorp Energy Committee Coordinator(s) shall be employed or retained by PacifiCorp Energy and may represent PacifiCorp Energy on the TCC and the ACC. The Cowlitz Committee Coordinator(s) shall be employed or retained by Cowlitz PUD and may represent Cowlitz PUD on the TCC and the ACC. The PacifiCorp Energy Committee Coordinator(s) shall, as their primary responsibilities, oversee the coordination and implementation of the terrestrial and aquatics PM&E Measures that are the responsibility of PacifiCorp

Energy as provided in this Agreement. The Cowlitz PUD Committee Coordinator(s) shall oversee the coordination and implementation of the terrestrial and aquatics PM&E Measures that are the responsibility of Cowlitz PUD as provided in this Agreement. PacifiCorp Energy and Cowlitz PUD Committee Coordinators together shall oversee the coordination and implementation of terrestrial and aquatics PM&E Measures for which PacifiCorp Energy and Cowlitz PUD have joint responsibility as provided in this Agreement.

14.2.2 TCC and ACC Membership. Within 30 days after the Effective Date, or at any time thereafter with 30 days' notice to the Licensees, each Party, at its own discretion and cost, may designate one representative for membership on the TCC and may designate one representative for membership on the ACC and may designate one or more alternates. The Party shall make its designation(s) by notice to the Parties in accordance with Section 16.6. A Party not participating on the TCC, the ACC, or both may request, by notice to the Parties in accordance with Section 16.6, to be placed on a contact list to receive notices of committee meetings and releases of information, including annual reports and other interim reports that the TCC or the ACC may issue.

14.2.3 TCC and ACC Functions. The TCC and the ACC will:

a. Coordinate and Consult on development of plans by the Licensees as provided in this Agreement;

b. Review information and oversee, guide, and make comments and recommendations on implementation and monitoring of the terrestrial and aquatic PM&E Measures, including plans;

c. Consult with the Licensees on their respective reports prepared under this Agreement regarding implementation of the terrestrial and aquatic PM&E Measures as referred to in Section 14.2.6 below;

d. Make decisions, grant approvals, and undertake any additional duties and responsibilities expressly given to the TCC or the ACC with respect to the terrestrial and aquatic PM&E Measures;

e. Establish, among other things, (i) procedures and protocols for conducting committee meetings and deliberations to ensure efficient participation and decision making; (ii) rules for quorum and decision making in the absence of any member; (iii) alternative meeting formats as desired, including phone or teleconference; and (iv) the methods and procedures for updating committee members on interim progress of development and implementation of the terrestrial and aquatic PM&E Measures;

f. As deemed necessary and appropriate by the TCC or the ACC, establish subcommittees to carry out specified committee functions and responsibilities described in this Section 14.2.3, and establish the size of,

membership of, and procedures for any such subcommittees; and

g. Discuss the protocols and the content of public information releases; provided that each Party retains the right to release information to the public at any time without such discussion.

14.2.4 TCC and ACC Decision-Making Process and Limitations. The TCC and the ACC shall make comments, recommendations, and decisions in a timely manner as provided below:

a. Each Party represented on the TCC and the ACC will have the authority to participate in all committee discussions relating to, and to provide input and advice on, decisions regarding implementation of the terrestrial or aquatics PM&E Measures;

b. The TCC and the ACC shall strive to operate by Consensus. Whether or not the TCC or the ACC has final authority over decisions on terrestrial and aquatic PM&E Measures, the Licensees and other Parties may proceed with actions necessary to implement the New Licenses or this Agreement, even though Consensus is not achieved; provided that in such cases the responsible Licensee or Licensees shall notify the Commission of the comments of the ACC or TCC members and the areas of disagreement. If the TCC or ACC does not reach Consensus, then any member of the TCC or ACC, respectively, may initiate the ADR Procedures as provided in Section 15 below.

c. Where one or more Parties have approval authority under this Agreement, Licensees shall notify the Commission of any approvals that were not obtained, include the relevant comments of the Parties with approval authority, describe the impact of the lack of approval on the schedule for implementation of PM&E Measures, and describe proposed steps to be taken to gain the approval, including dispute resolution.

d. In no event shall the TCC or the ACC increase or decrease the monetary, resource, or other commitments made by PacifiCorp Energy and Cowlitz PUD in this Agreement; override any other limitations set forth in this Agreement; or otherwise require PacifiCorp Energy to modify its three Projects' facilities without PacifiCorp Energy's prior written consent or require Cowlitz PUD to modify its Project's facilities without Cowlitz PUD's prior written consent, which consent may be withheld in the applicable Licensee's discretion.

e. At any juncture where discussion or other contact with the ACC or TCC is required by this Agreement, when requested by the Services or as required by the Agreement, the ACC or TCC Committee Coordinator, respectively, shall schedule an opportunity to discuss the relevant issue with the ACC or TCC. This event shall consist of a conference call, in-person meeting, or other appropriate forum to enable full consideration of the issue.

14.2.5 TCC and ACC Meetings. Commencing in the first year after the Effective Date and each year thereafter for the terms of the New Licenses, the TCC and ACC Committee Coordinators shall arrange and provide an agenda for an annual meeting of their respective committees. The TCC and ACC Committee Coordinators also shall arrange and provide an agenda for any additional meetings deemed necessary by either coordinator for a committee or at the request of any two Parties on that committee, which request shall be sent simultaneously to all members of that committee. Members of the TCC and the ACC shall be given a minimum of 30 days' notice prior to any meeting, unless otherwise agreed to by the members of the applicable committee.

14.2.6 TCC and ACC Reports

The Committee Coordinators for the TCC and the Committee Coordinators for the ACC shall prepare and file with the Commission detailed annual reports on the TCC and ACC activities, monitoring and evaluations under the M&E Plan, and implementation of the terrestrial and aquatics PM&E Measures occurring during the prior year, as well as plans for the coming year as required in this Agreement. The annual reports may also include plans and reports required pursuant to Sections 4.9.1, 7.7.1, 8.2.3, 8.2.4, 10.5, and 10.8.3. Copies of such reports will be made available to each Party. The annual reports shall be prepared in Consultation with the TCC and ACC committee members and shall be submitted to the committees for review each year, commencing after the Effective Date. Committee members shall have a minimum of 30 days to review and provide comment on a draft report before a final report is prepared and filed with the Commission. The Licensees shall submit the final report to the Commission not later than 30 days after the close of the ACC and TCC comment periods. To the extent that comments are not incorporated into the final report, an explanation will be provided in writing, and such explanation shall be included in the report.

Attachment C is saved as a separate file.

Attachment C
Hatchery and Supplementation Plan
2019 Annual Operations Report

Attachment C-1 is saved as a separate file.

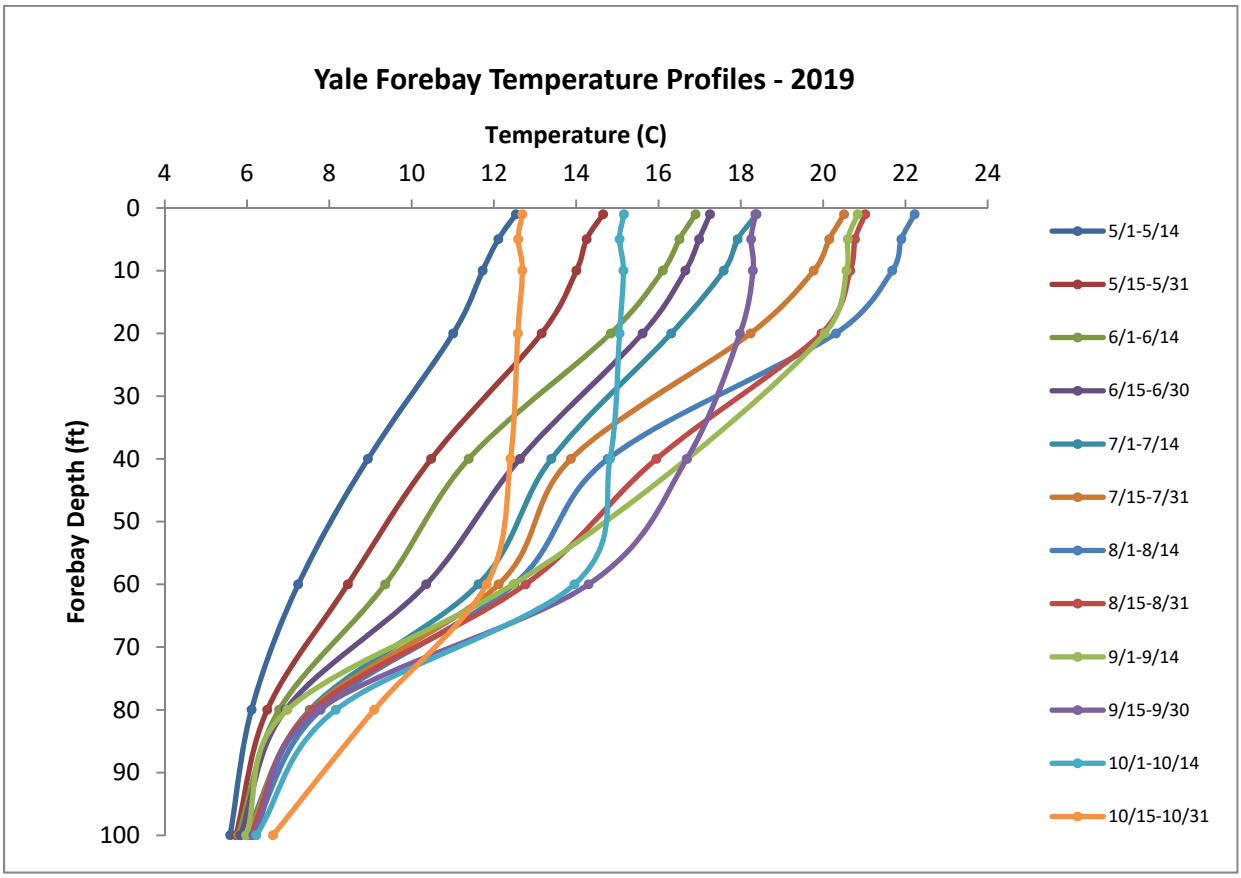
Attachment C-1
Hatchery and Supplementation Program 2019 Annual Operating Plan

Attachment D includes the following and is saved as a separate file.

- Lewis River 2019 Fish Passage Program Annual Report
- Lewis River Bull Trout 2019 Annual Operations Report
- Lewis River Bull Trout 2020 Annual Operations Plan
- Yale Reservoir Kokanee 2019 Escapement Report

Attachment D
Lewis River Monitoring and Evaluation Program 2019 Annual Report

Attachment E
Yale Water Quality Graphs


Yale Forebay Temperature Profiles - 2019
Temperature (C)
4
6
8
10
12
14
16
18
20
22
24
Forebay Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
5/1-5/14
5/15-5/31
6/1-6/14
6/15-6/30
7/1-7/14
7/15-7/31
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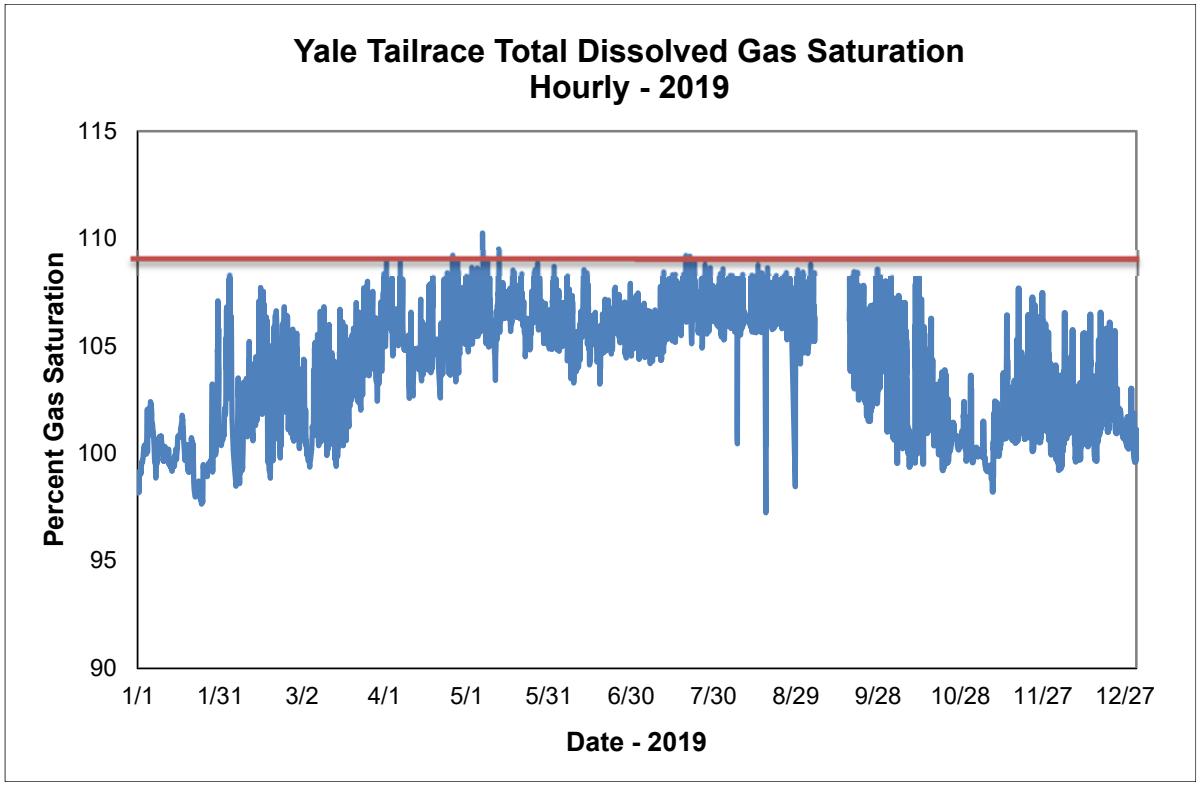
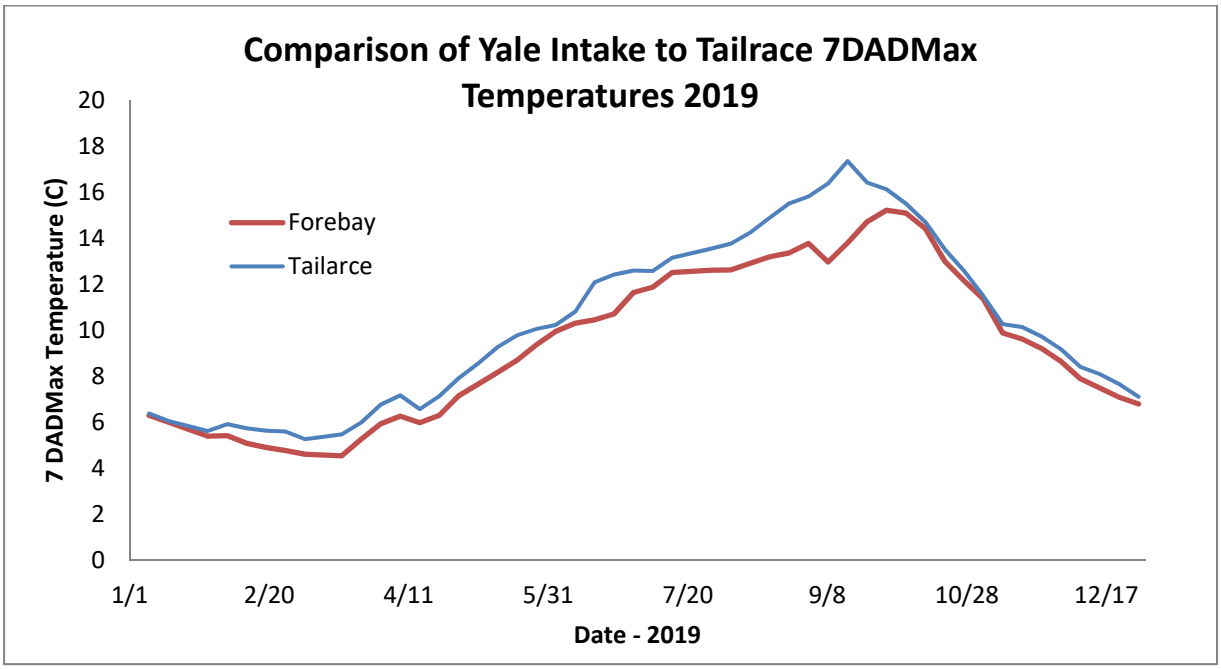
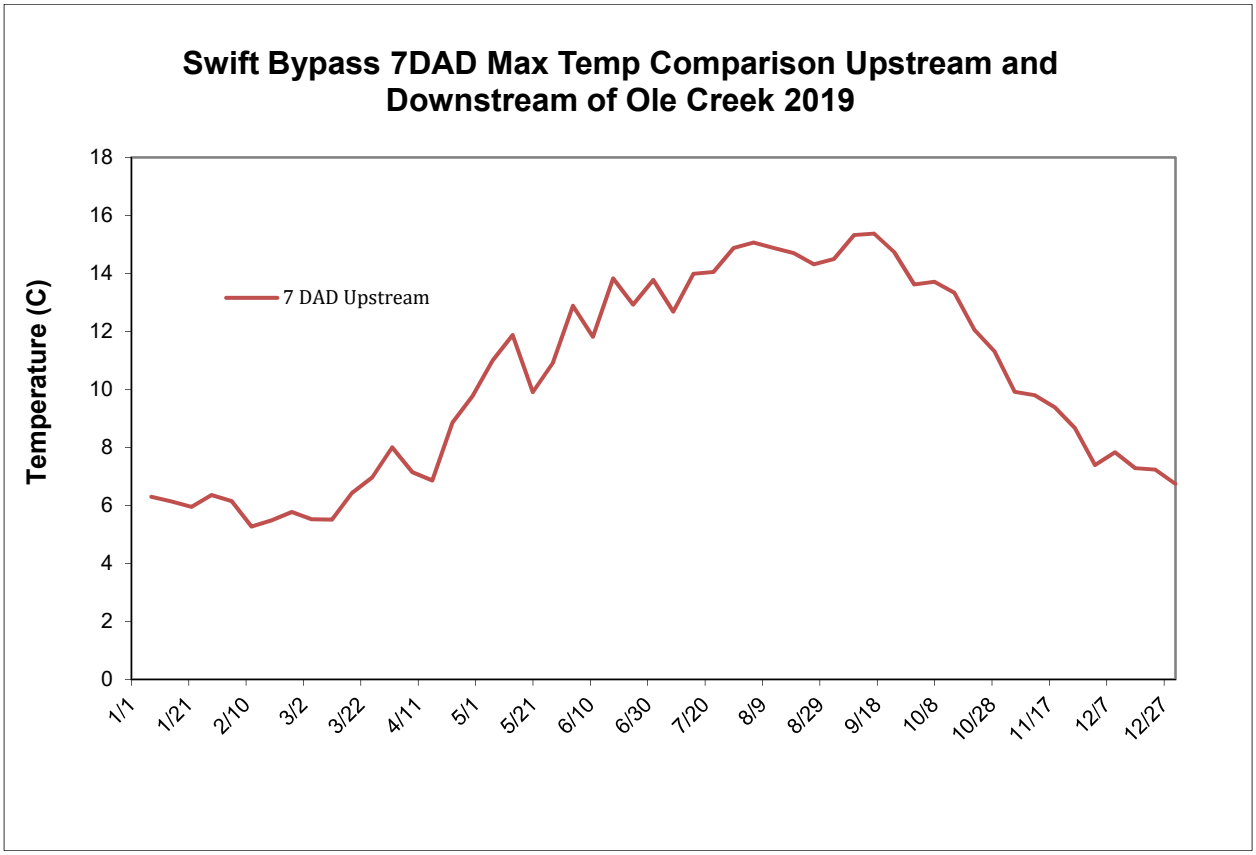
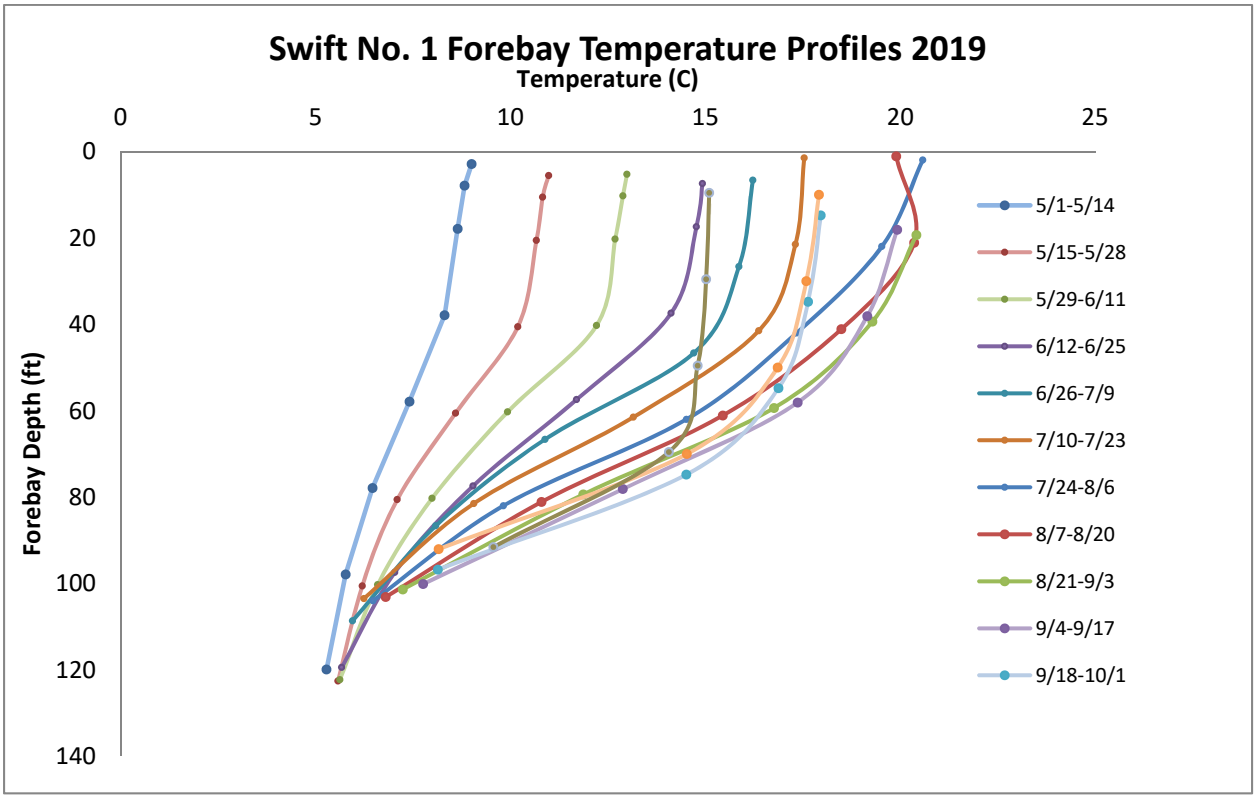
9/1-9/14
9/15-9/30
10/1-10/14
10/15-10/31

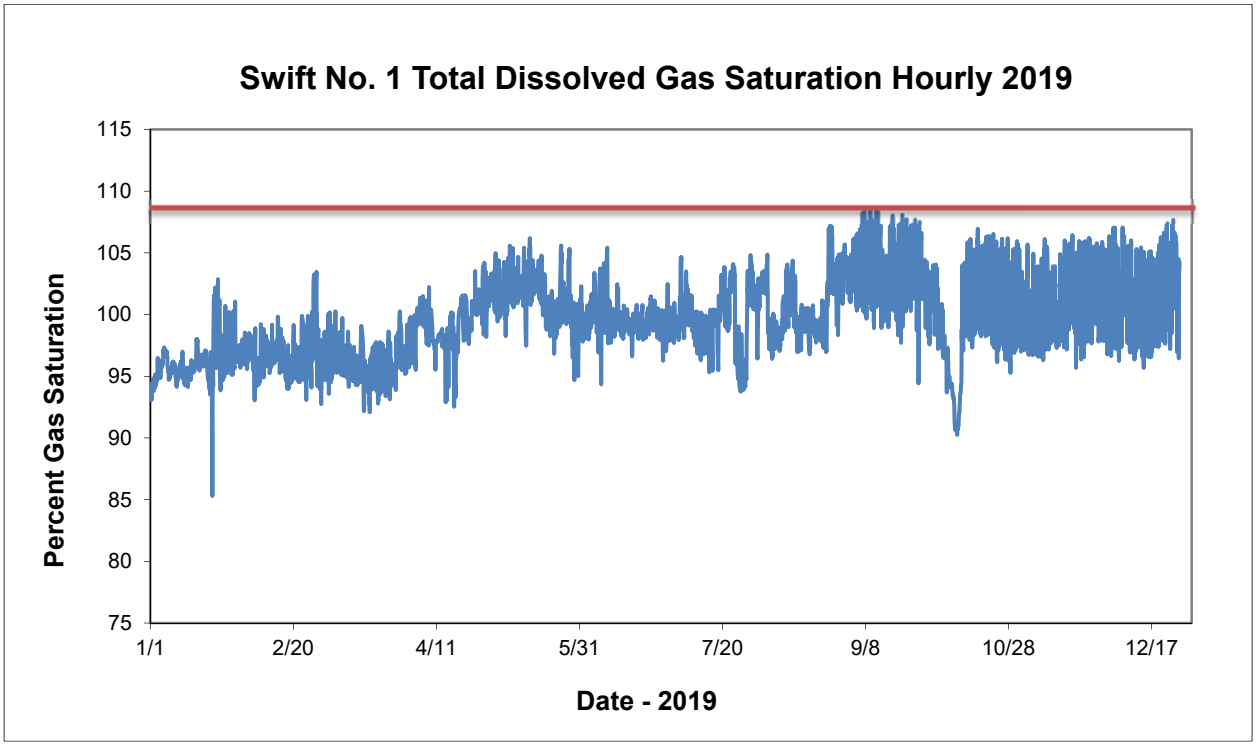

Yale Tailrace Total Dissolved Gas Saturation
Hourly - 2019
Percent Gas Saturation
115
110
105
100
95
90
1/1
1/31
3/2
4/1
5/1
5/31
6/30
7/30
8/29
9/28
10/28
11/27
12/27
Date - 2019

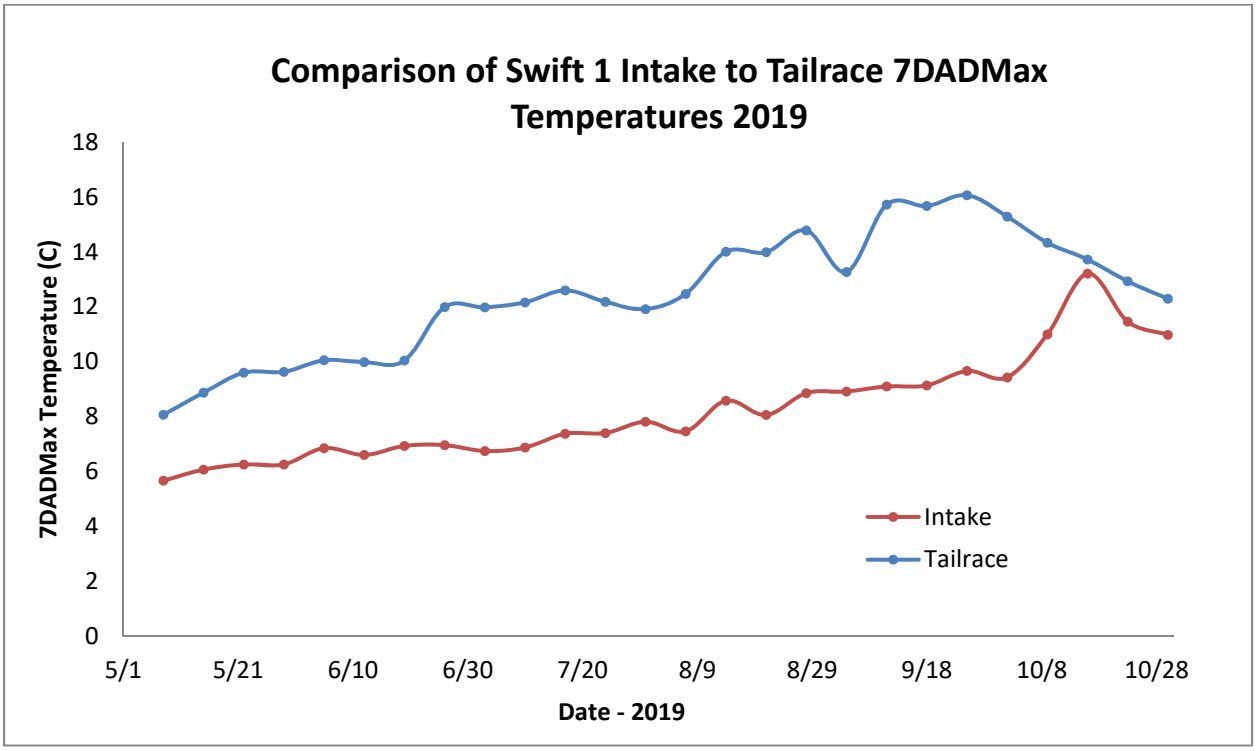

Comparison of Yale Intake to Tailrace 7DADMax
Temperatures 2019
7 DADMax Temperature (C)
20
18
16
14
12
10
8
6
4
2
0
Forebay
Tailarce
1/1
2/20
4/11
5/31
7/20
9/8
10/28
12/17
Date - 2019


Swift Bypass 7DAD Max Temp Comparison Upstream and Downstream of Ole Creek 2019
Temperature (C)
18
16
14
12
10
8
6
4
2
0
7 DAD Upstream
1/1
1/21
2/10
3/2
3/22
4/11
5/1
5/21
6/10
6/30
7/20
8/9
8/29
9/18
10/8
10/28
11/17
12/7
12/27

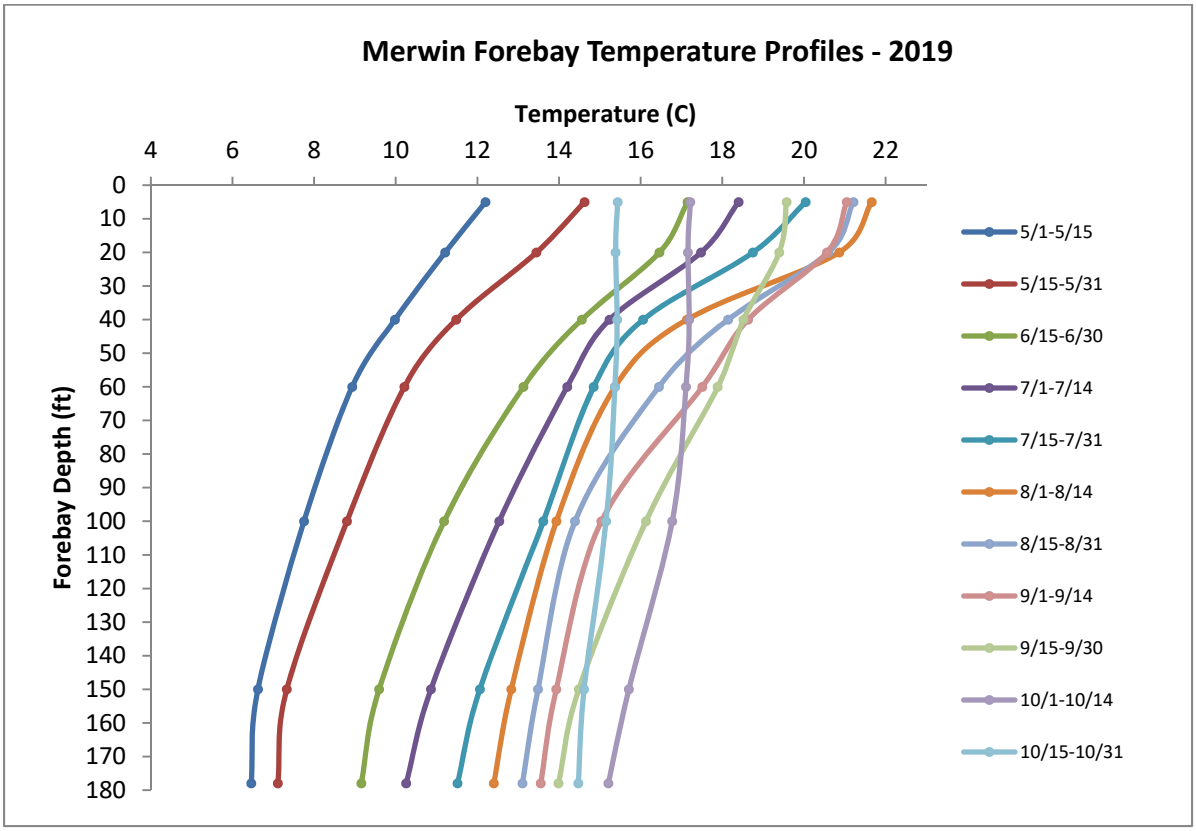
Attachment F
Swift No. 1 Water Quality Graphs

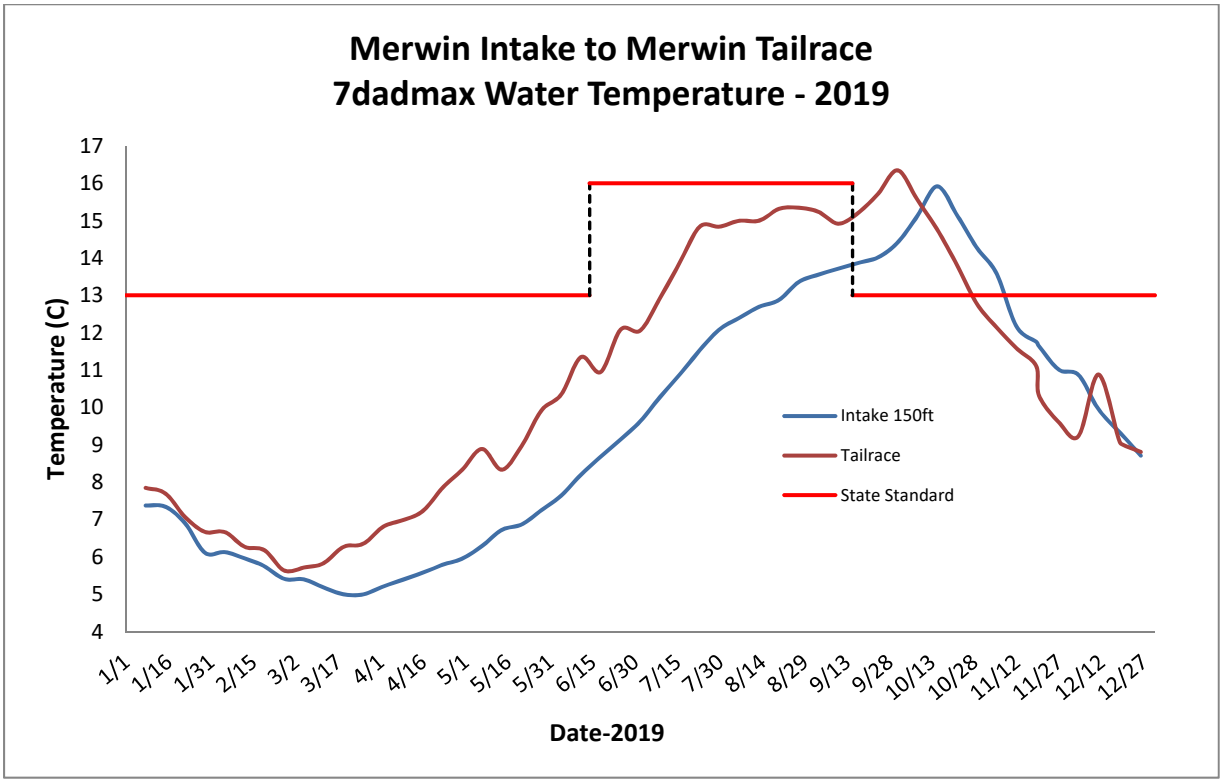

Swift No. 1 Forebay Temperature Profiles 2019
Temperature (C)
0
5
10
15
20
25
Forebay Depth (ft)
0
20
40
60
80
100
120
140
5/1-5/14
5/15-5/28
5/29-6/11
6/12-6/25
6/26-7/9
7/10-7/23
7/24-8/6
8/7-8/20
8/21-9/3
9/4-9/17
9/18-10/1

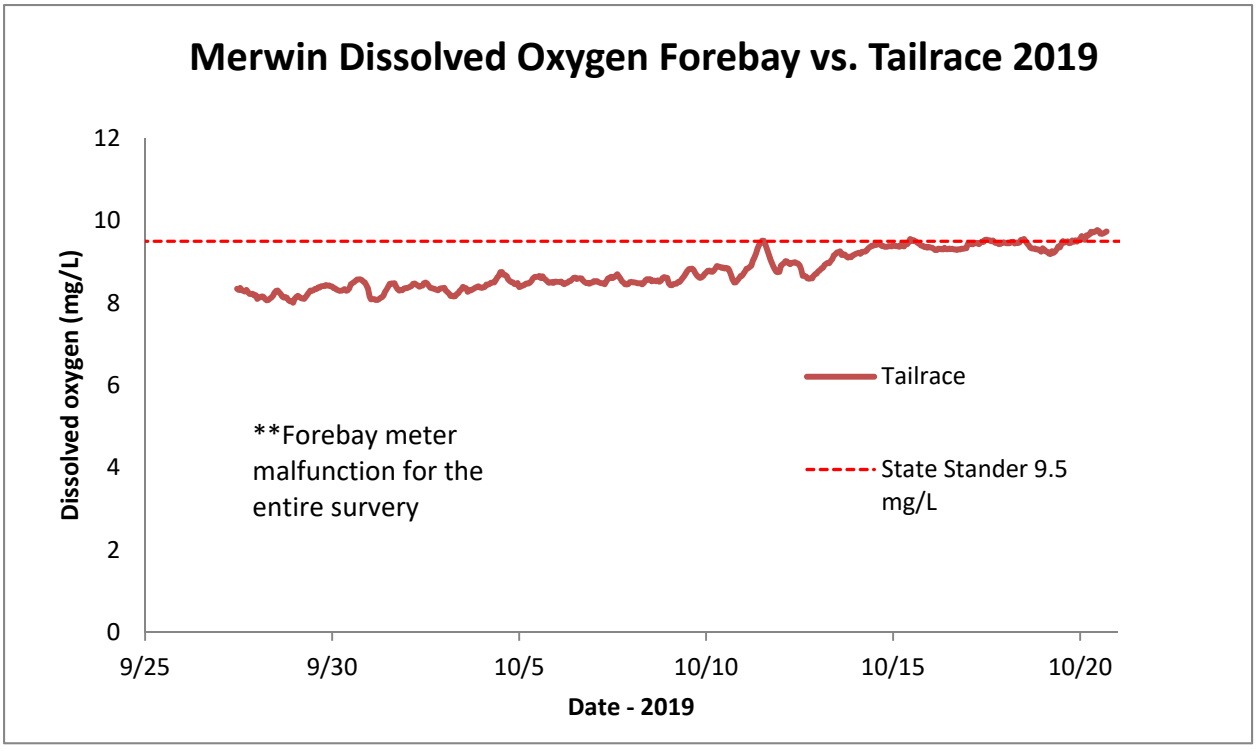

Swift No. 1 Total Dissolved Gas Saturation Hourly 2019
Percent Gas Saturation
115
110
105
100
95
90
85
80
75
1/1
2/20
4/11
5/31
7/20
9/8
10/28
12/17
Date - 2019


Comparison of Swift 1 Intake to Tailrace 7DADMax Temperatures 2019
7DADMax Temperature (C)
18
16
14
12
10
8
6
4
2
0
5/1
5/21
6/10
6/30
7/20
8/9
8/29
9/18
10/8
10/28
Date - 2019
Intake
Tailrace

Attachment G
Merwin Water Quality Graphs


Merwin Forebay Temperature Profiles - 2019
Temperature (C)
4
6
8
10
12
14
16
18
20
22
Forebay Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
5/1-5/15
5/15-5/31
6/15-6/30
7/1-7/14
7/15-7/31
8/1-8/14
8/15-8/31
9/1-9/14
9/15-9/30
10/1-10/14
10/15-10/31


Merwin Intake to Merwin Tailrace
7dadmax Water Temperature - 2019
Temperature (C)
17
16
15
14
13
12
11
10
9
8
7
6
5
4
1/1
1/16
1/31
2/15
3/2
3/17
4/1
4/16
5/1
5/16
5/31
6/15
6/30
7/15
7/30
8/14
8/29
9/13
9/28
10/13
10/28
11/12
11/27
12/12
12/27
Date-2019
Intake 150ft
Tailrace
State Standard


Merwin Dissolved Oxygen Forebay vs. Tailrace 2019
Dissolved oxygen (mg/L)
12
10
8
6
4
2
0
9/25
9/30
10/5
10/10
10/15
10/20
Date - 2019
**Forebay meter malfunction for the entire survery
Tailrace
State Stander 9.5 mg/L

Attachment H
Aquatic Fund Project Close-Out Reports

Lewis River Aquatic Fund Projects (SA 7.5.3.2)
Project Closeout Report

Project Title:	**Lewis River Hydroelectric Project**
Project Approved By:	Aquatic Coordination Committee March 24, 2014
Original Project Sponsor:	Lower Columbia Fish Enhancement Group
Project Funding	$292,460: $40,000 ACC and $252,460 SRFB
Project Description (work completed):	• Main channel margin wood placement: 1,100' of margin habitat created along the NF Lewis River including 11 structures comprised of 55 piling and 41 pieces of LWD. • Floodplain roughness: 4.0 acres of floodplain roughness structures installed using 31 structures comprised of 73 piling and 59 pieces of LWD. • Riparian enhancement: 9.5 acres were treated including scotch broom removal, spraying knotweed, spraying and manually removing blackberry, and revegetating with native plants.
Workforce: o **Personnel (by craft)** o **Contractors:**	• Project Manager: Brice Crayne • Project Coordinator: Maurice Frank • Engineering Firm: Inter-Fluve, Inc. • Contractor for LWD Install: Kysar-Koistinen • Contractor for knotweed treatment: RK Reforestation • Manual Labor provided by Larch Correctional Facility CWC Crews
Schedule Summary:	Planned Completion Date: 3/15/2018 Actual Completion Date: 3/15/2019
Problems Encountered:	• Access permitting on WDFW land set back construction one year. • Plant desiccation in two planting zones increased mortality and required us to bring in equipment to assist with planting to increase hole depth and import compost to increase organic matter in the soil. • Crew access in the winter was sometimes difficult because of the high flow channel that flows through our access route. • LCFEGs stacked up construction schedule made watering the plants regularly nearly impossible.

Things that went well:

- Lots of wood was donated by PacifiCorps to the project from Swift Reservoir wood collections.
- Wood installation went smooth with no equipment issues.
- Plant survival under the established cottonwood canopy is high (>80%) with good growth already on the western red cedar.

Work Not Completed:

- None. All objectives were met.

Lessons Learned:

- Areas dominated by scotch broom likely have underlying soil content issues. At this project, we discovered that areas that were originally dominated by scotch broom had a substrate composition of about 60% cobble, 20% gravel, and 20% sand. To try and get plants established in these areas we dug holes with a 12" diameter x 48" long bit mounted on a skidsteer on about 6-8' centers. These holes had to be manually excavated by hand before they could be planted. Each hole received 5 gallons of compost as it was backfilled during plant installation. This was completed in spring 2019 and results will not be available for a few years.
- Slash should be a primary component of any LWD structure being installed, not a secondary thought. Slash increases the roughness associated with the structure, increases places for fish to hide, and mimics natural woody structures. This is especially important in systems like the NF Lewis which has three major reservoirs and therefore has limited woody debris supply.

*** Attachments (Photo Documentation):**

- See attached document: "Haapa Phase 1 Photo Documentation"

*(Per National Marine Fisheries Service's Biological Opinion for Relicensing of the Lewis River Hydroelectric Projects):

Identify process or methodology the project will include and provide photo documentation of habitat conditions at the project site **before, during, and after** project completion.

a. Include general views and close-ups showing details of the project and project area, including pre- and post-construction.
b. Label each photo with date, time, project name, photographer's name, and documentation of the subject activity.

Lower Columbia RFEG

Inter-Fluve, Inc.

Kysar-Koistinen

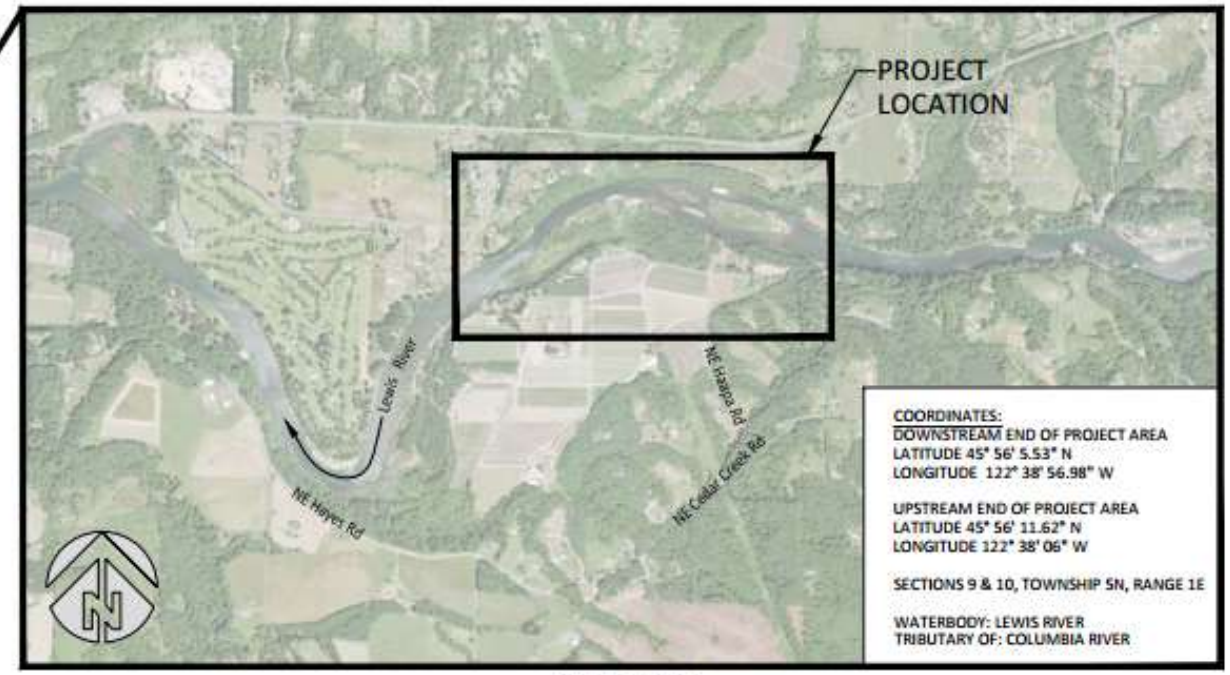
NF Lewis River Restoration

Haapa Phase I Project

SRFB# 14-1339

NORTH FORK LEWIS RIVER - HAAPA FISH HABITAT RESTORATION PROJECT
CLARK COUNTY, WASHINGTON
FINAL DESIGN - JUNE 17, 2014

VICINITY MAP
NOT TO SCALE



SITE MAP
NOT TO SCALE

SHEET LIST

NO.	BY	DATE	REVISION DESCRIPTION

DF	MM,JE	GJ
DRAWN	DESIGNED	CHECKED
MM	6/17/14	13-02-01
APPROVED	DATE	PROJECT

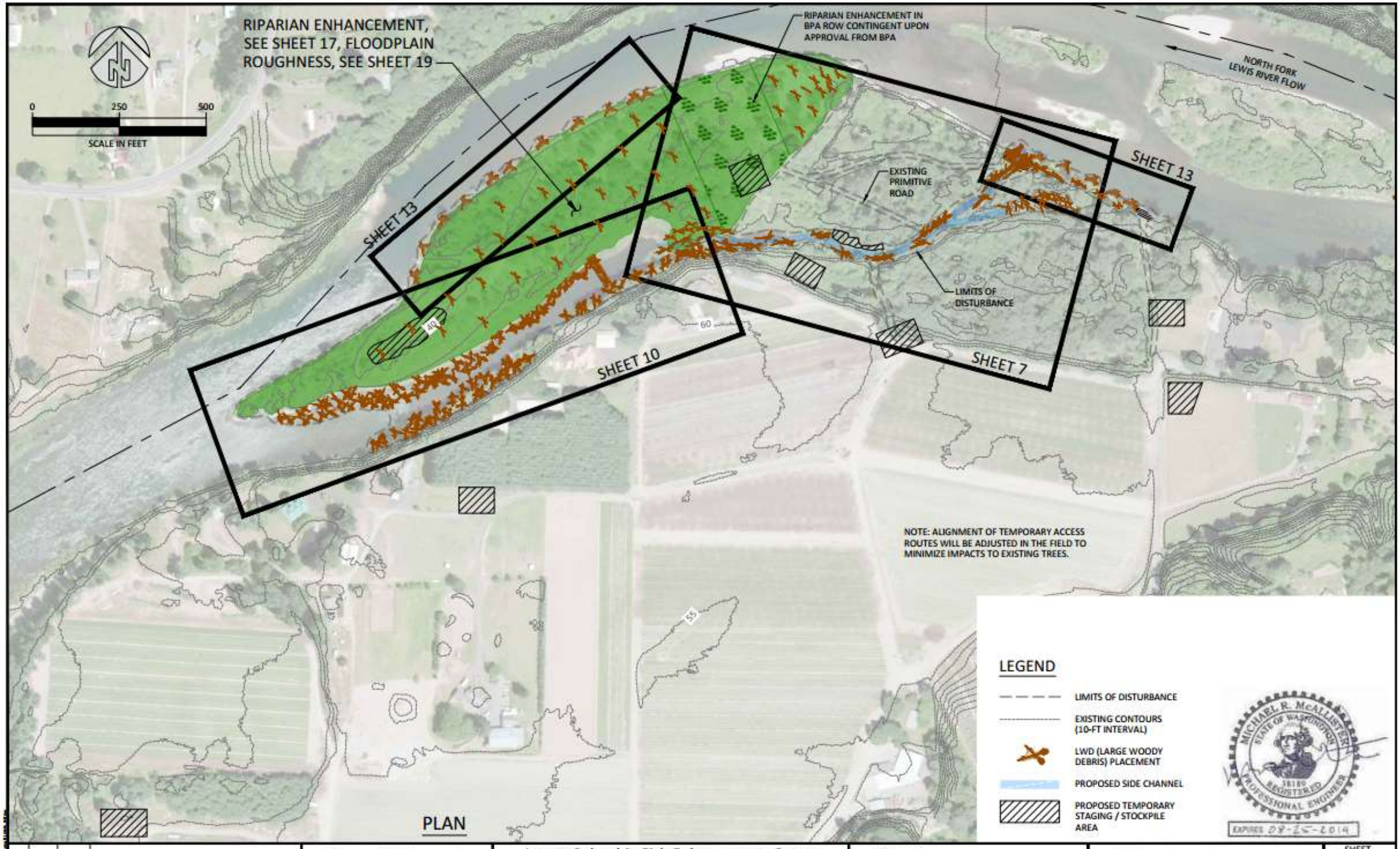
Lower Columbia Fish Enhancement Group
North Fork Lewis River - Haapa
Fish Habitat Restoration Project

Interfluve
501 Portway Ave, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

COVER SHEET, INDEX AND VICINITY MAP

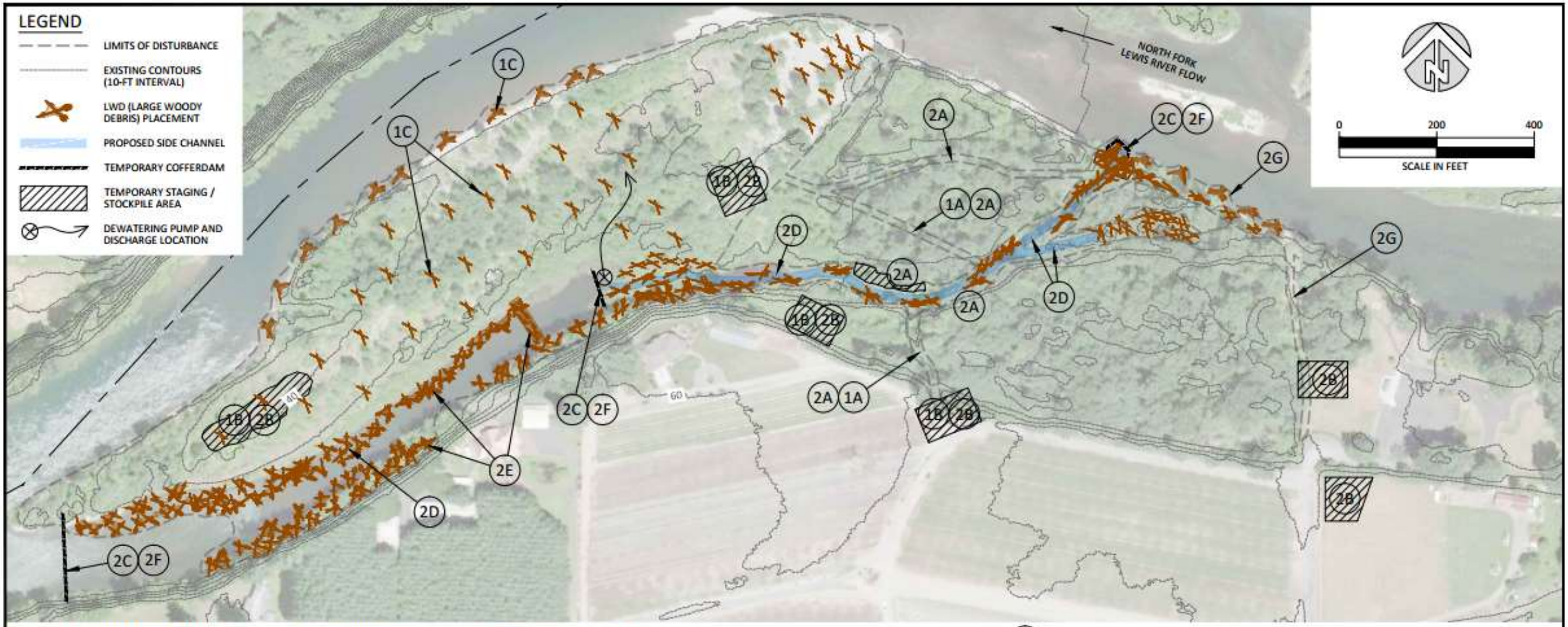
SHEET 1 OF 19

SRFB-FUNDED DESIGN SRFB#12-1165



SRFB-Funded Design SRFB#12-1165

Phase I included riparian enhancement and floodplain roughness (Sheet 17 and 19)



PHASE 1 CONSTRUCTION SEQUENCE

PRIOR TO ANY EARTHWORK, CONSTRUCTION LIMITS SHALL BE DELINEATED BY PAINTED LATH AND FLAGGING.

EQUIPMENT TRAFFIC SHALL OCCUR WITHIN THE NEW CONSTRUCTION LIMITS FOR NEW CHANNELS, AND ALONG EXISTING GRAVEL ROADS.

FINISHED AREAS SHALL BE STABILIZED WITH SEED AND MULCH.

1A ESTABLISH ACCESS AND CLEAR AND GRUB VEGETATION.

1B STAGE WOOD ALONG THE PHASE 1 WORK SITES AT DESIGNATED AREAS.

1C CONSTRUCT LOWER BANK ENHANCMENT, FLOODPLAIN ROUGHNESS

PHASE 2 CONSTRUCTION SEQUENCE

PRIOR TO ANY EARTHWORK, CONSTRUCTION LIMITS SHALL BE DELINEATED BY PAINTED LATH AND FLAGGING.

EQUIPMENT TRAFFIC SHALL OCCUR WITHIN THE NEW CONSTRUCTION LIMITS FOR NEW CHANNELS, AND ALONG EXISTING GRAVEL ROADS.

AS CHANNEL IS CONSTRUCTED, FINISHED AREAS SHALL BE STABILIZED WITH SEED AND MULCH.

UPSTREAM END OF SIDE CHANNEL CONSTRUCTION SHALL OCCUR DURING THE IN-WATER WORK WINDOW AND DURING A PERIOD OF EXPECTED ZERO PRECIPITATION AND LOW FLOW IN THE RIVER.

2A ESTABLISH ACCESS AND CLEAR AND GRUB VEGETATION. CLEAR AND GRUB EQUIPMENT ACCESS AND SIDE CHANNEL ALIGNMENT. REMOVE (AND DISPOSE OF OFF-SITE) SOILS CONTAMINATED BY INVASIVE, NON-NATIVE VEGETATION IN THE SIDE CHANNEL ALIGNMENT TO AVOID SPREADING SEEDS AND OTHER MATERIALS ON CONSTRUCTION EQUIPMENT (REMOVAL AREAS WILL BE FLAGGED). NATIVE VEGETATION IN SIDE CHANNEL ALIGNMENT TO BE SALVAGED AND TRANSPLANTED IN WETLAND ENHANCEMENT ZONES.

2B STAGE WOOD ALONG THE PHASE 2 WORK SITES AT DESIGNATED AREAS.

2C COFFER DAMS AND FISH RESCUE
INSTALL COFFER DAMS AT THE INLET AND MOUTH OF THE SIDE CHANNEL, AND THE DOWNSTREAM END OF THE BACKWATER CHANNEL IN COORDINATION WITH FISH RESCUE.

2D SIDE CHANNEL EXCAVATION
EXCAVATE SIDE CHANNEL AND GROUNDWATER CHANNEL FROM DOWNSTREAM TO UPSTREAM. TRANSPLANT NATIVE VEGETATION MATS TO WETLAND ENHANCEMENT ZONES ALONG THE SIDE CHANNEL. TRANSPORT EXCAVATED MATERIAL TO BACKWATER FILL LOCATIONS. DEWATER CONSTRUCTION AREA AS NEEDED BY PUMPING TO ADJACENT UPLAND VEGETATED INFILTRATION AREAS. INSTALL STRAWBALES, SILT FENCE, AND/OR SANDBAG DAMS AS NEEDED TO REMOVE TURBIDITY BEFORE DISCHARGED WATER ENTERS BACKWATERED AREAS OF THE RIVER.

2E CONSTRUCT BACKWATER & BEAVER DAM
PLACE FILL AND CONSTRUCT BACKWATER ENHANCEMENT LWD, CONSTRUCT SIMULATED BEAVER DAM.

2F FLOW RAMPING
AFTER SIDE CHANNEL CONSTRUCTION IS COMPLETE AND ALL SURFACES HAVE BEEN SEEDED AND MULCHED, GRADUALLY INCREASE FLOW TO SIDE CHANNEL BY PARTIALLY REMOVING THE UPSTREAM COFFERDAM. CONTINUE PUMPING UNTIL SIDE CHANNEL FLOW BECOMES CLEAR. NEXT, REMOVE DOWNSTREAM COFFERDAM AND THEN REMOVE REMAINDER OF UPSTREAM COFFERDAM.ALLOW TIME FOR TURBIDITY TO SETTLE IN BACKWATER, AND REMOVE COFFER DAM FROM THE DOWNSTREAM END OF THE BACKWATER.

2G UPPER BANK ENHANCEMENT AND EGRESS
CONSTRUCT UPPER MAINSTEM BANK ENHANCEMENT, BANK REGRADING AND EGRESS THROUGH WDFW/CLARK COUNTY LAND.

MICHAEL R. McALLISTER — STATE OF WASHINGTON — 38189 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 09-25-2014

NO.	BY	DATE	REVISION DESCRIPTION

DF	MM,JE	GJ
DRAWN	DESIGNED	CHECKED
MM	6/17/14	13-02-01
APPROVED	DATE	PROJECT

Lower Columbia Fish Enhancement Group
North Fork Lewis River - Haapa
Fish Habitat Restoration Project

Interfluve
501 Portway Ave, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

SIDE CHANNEL AND BACKWATER SEQUENCING AND EROSION CONTROL

SHEET 6 OF 19

SRFB-Funded Design SRFB#12-1165

Phase I included 1A-C: Access, Staging, and Lower Bank Enhancement and Floodplain Roughness

GOOGLE EARTH IMAGERY
PRE-CONSTRUCTION
APRIL 2015

March 2016

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: MAURICE FRANK

PRE-TREATMENT OF SCOTCH BROOM

March 2016

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: MAURICE FRANK

POST TREATMENT OF SCOTCH BROOM

December 2016

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

FLOODPLAIN ROUGHNESS INSTALLATION ON PRIVATE LAND

February 2017

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

SPRING 2017 PLANTING

February 2017

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

GREEN MOUNTAIN SCHOOL VOLUNTEER PLANTING DAY

April 2017

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

SPRING SURVIVAL ASSESSMENT

GOOGLE EARTH IMAGERY
MID-CONSTRUCTION
MAY 2017

April 2016

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

WOOD DONATED BY PACIFICORPS

April 2017

Haapa Habitat Restoration Phase I

Photographer: Brice Crayne

Before - Image of Instream LWD Construction Site (looking downstream)

September 2017

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

DURING - CONSTRUCTION IMAGE OF INSTREAM LWD CONSTRUCTION SITE (LOOKING UPSTREAM)

September 2017

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

AFTER - CONSTRUCTION IMAGE OF INSTREAM LWD CONSTRUCTION SITE (LOOKING SLIGHTLY UPSTREAM)

October 2017
HAAPA HABITAT RESTORATION PHASE I
PHOTOGRAPHER: BRICE CRAYNE
AFTER - CONSTRUCTION IMAGE OF INSTREAM LWD CONSTRUCTION SITE AT HIGH FLOWS (LOOKING UPSTREAM)

March 2018

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

AFTER - CONSTRUCTION IMAGE OF INSTREAM LWD CONSTRUCTION SITE (PANORAMIC)

March 2018

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

AFTER - CONSTRUCTION IMAGE OF INSTREAM LWD CONSTRUCTION SITE (UPSTREAM STRUCTURES)

GOOGLE EARTH IMAGERY
POST-CONSTRUCTION (2018/19 RIPARIAN REVEGETATION STILL REMAINING)
JULY 2018

January 2019

HAAPA HABITAT RESTORATION PHASE I

VIDEOGRAPHER: BRICE CRAYNE

PHOTO SERIES FROM VIDEO OF SKIDSTEER-AUGER HOLE DIGGING; EACH HOLE TOOK 30-60 SECONDS TO DIG.

January 2019

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

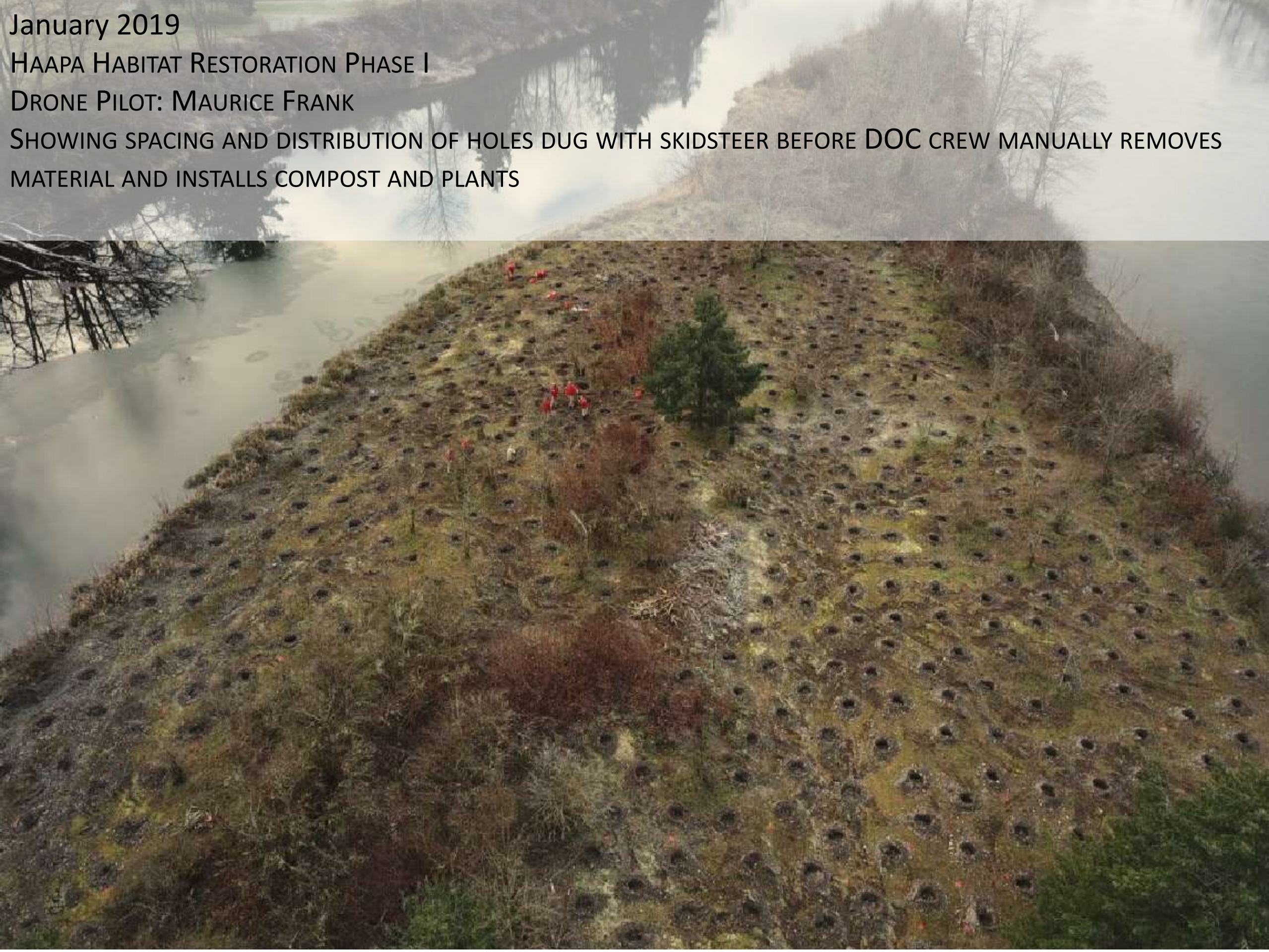
SHOWING HOLE COMPOSITION, DEPTH AND SUBSTRATE SIZE AFTER SKIDSTEER AUGER FINISHES

January 2019

HAAPA HABITAT RESTORATION PHASE I

DRONE PILOT: MAURICE FRANK

SHOWING SPACING AND DISTRIBUTION OF HOLES DUG WITH SKIDSTEER BEFORE DOC CREW MANUALLY REMOVES MATERIAL AND INSTALLS COMPOST AND PLANTS



January 2019

HAAPA HABITAT RESTORATION PHASE I

DRONE PILOT: MAURICE FRANK

HOLES WERE DUG OUT MANUALLY BY DOC CREWS

January 2019

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: MAURICE FRANK

EACH HOLE WAS DUG OUT DEEP AND WIDE ENOUGH TO FIT A 5-GALLON BUCKET. 5 GALLONS OF COMPOST WAS ADDED TO EACH HOLE.

January 2019

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

50 YARDS OF COMPOST IMPORTED TO AMEND SOIL AND MULCH PLANTS

March 2019

HAAPA HABITAT RESTORATION

PHASE I

PHOTOGRAPHER: BRICE CRAYNE

WESTERN RED CEDAR WERE SHADED AND PROTECTED FROM DEER BROWSE

March 2019

HAAPA HABITAT RESTORATION PHASE I

PHOTOGRAPHER: BRICE CRAYNE

FINAL PRODUCT OF RIPARIAN ENHANCEMENT

Attachment I is saved as a separate file.

Attachment I
Lewis River Wildlife Habitat Management Plan 2020 Annual Plan

Attachment J is saved as a separate file.

Attachment J
Wildlife Habitat Management Plan Annual Progress Report for Operation Phase 2019

Attachment K
Goshawk Survey Completion at Patch Cut on Devil's Backbone Area 2019

Technical Memorandum

To: Amanda Froberg, Cowlitz PUD

From: Emily Drew, Quill Consulting and Jeff Boyce, Meridian Environmental.

Date: September 6, 2019

Subject: Goshawk Survey Completion at Patch Cut on Devil's Backbone Area

Introduction

This memorandum summarizes the northern goshawk survey performed at the Devil's Backbone area on July 1, 2019.

Cowlitz PUD is intending to make a patch cut in the Devil's Backbone area of the Swift No. 2 Hydroelectric Project. The cut is proposed to be 5.8 acres and would provide foraging habitat for elk in the area. The cut is proposed in secondary forest that is approximately 78% Douglas fir, 23% western hemlock. It has an open understory (with some Oregon grape, sword fern, hemlock saplings, and a few vine maples). It is surrounded on all sides primarily by similar secondary forest, though a small patch of mature forest is present to the west, within about 800 feet of the patch cut (see Figure 1 in Attachment A).

This mature forest patch contains Douglas fir, a few western hemlock and bigleaf maple trees, and snags and logs. Understory includes Oregon grape, sword fern, lady fern, and areas of bare soil. The patch is on a steep slope directly adjacent to the reservoir.

Survey Protocol Selection

The Lewis River Wildlife Habitat Management Plan, which applies to the Devil's Backbone area, describes protocol surveys that should be performed prior to disturbing potential habitat for raptors, including the northern goshawk. The Terrestrial Resource Committee determined specific protocols to use for northern goshawk, which follow Woodbridge and Hargis 2006. However, some of these protocols were not a good fit for the small scale of vegetation-altering projects within the Swift #2 Hydroelectric Project area, and had the potential to create excessive disturbance should goshawks be present. Therefore, in 2015, Pacific Power presented a decision matrix and protocol details that would specifically apply to the area's smaller projects (Pacific Power 2015).

Following the 2015 decision-matrix (Pacific Power 2015), pertinent details of the Devil's Backbone patch cut are as follows:

- Patch cut is less than 9.88 acres.
- Patch cut is not in old growth or mature forest type, and will not modify this forest type.
- Patch cut is within 1,570 feet (as well as within 1,148 feet) of a mature forest cover type (a small patch along the reservoir edge 800 feet away), which is potential goshawk habitat for a nest cluster or post-fledging (Pacific Power 2015).
- The patch cut will remove at least one tree >21 inches dbh. (individual trees in the patch cut stand range from 5 to 21 inches, with 86% being 15 inches dbh or less (pers. comm., Jeff Boyce, Meridian Environmental).

In the decision matrix, these factors lead to an Intensive Search Survey.

Methods

According to the Pacific Power memo, intensive search surveys require the following protocol:

> *Intensive Search Survey: A combination of visual searches for signs of goshawk presence (nest, white wash, prey remains, and molted feathers) along closely spaced transects with broadcast acoustical surveys. This method is best applied to smaller area (9.88 to 98.80 acres). The advantages are this method can detect inactive nests stands, survey may be conducted in a single survey in one season and provide high confidence that area searched does not contain a goshawk breeding site. Conclusions drawn from search conducted within a limited area during a single season, however, may not be applicable to surrounding habitat and can only detect nests within 200 m of a calling point.*
>
> *Timing: Following hatch date. June 1 to August 31.*
> *Number of Seasons and Surveys: 1 survey with a minimum of 3 surveyors*
> *Number of Seasons: Single season prior to conducting activity*
> *Survey Area: Project Area*
> *Survey Transects: Transect width 20-30 m*

The 2019 survey followed the above guidance as well as Woodbridge and Hargis (2006), who provide further instructions on intensive surveys.

Meridian Environmental and Cowlitz PUD determined that the intensive survey would cover the project area (the patch cut) and suitable habitat within 1,184 feet (the mature forest patch 800 feet to the west.) Within each patch, the 3 surveyors walked parallel lines within 60 feet of each other and placed no more than 60 feet between transects. Both patches took 2 surveys each to complete.

The protocols referenced above require broadcast calls to be played every 200 meters (656 ft). Both patches are small enough that only one broadcast station would fit in each; we added additional broadcast calls at the start and end of each transect for thoroughness of coverage. At each broadcast station, the center surveyor recorded calls in 3 directions, with 10 seconds of broadcast and 30 seconds of listening for responses in each direction.

Survey

The survey took place on July 1, 2019 as follows:

- Surveyors: Emily Drew (Quill Consulting), Amanda Froberg (Cowlitz PUD) and Jeff Boyce (Meridian Environmental),
- Weather: clear, about 65 to 70 degrees Fahrenheit, with winds varying from 0 to 5 mph with occasional gusts.
- Survey time: 1105am-1230pm, 110pm-2pm.
- Number of transects: 2 transects at each patch.
- Transect headings:
    - Mature forest: Transect 1: 135 degrees, Transect 2: 315 degrees.
    - Patch cut: Transect 1: 0 degrees, Transect 2: 180 degrees.

The surveyors covered the ground thoroughly at both patches, due to the open understory. No whitewash or feathers of any kind, from any species of bird, were found during the survey. No raptors responded to the projected calls. Species heard incidentally were as follows: common raven, osprey (calling from the reservoir), Townsend's warbler, dark-eyed junco, chestnut-backed chickadee, hairy woodpecker, winter wren, pacific slope flycatcher, and Hutton's vireo.

See Figure 2 (Attachment A) for a map of the broadcast call stations in the patch cut unit and the mature forest patch.

Conclusion

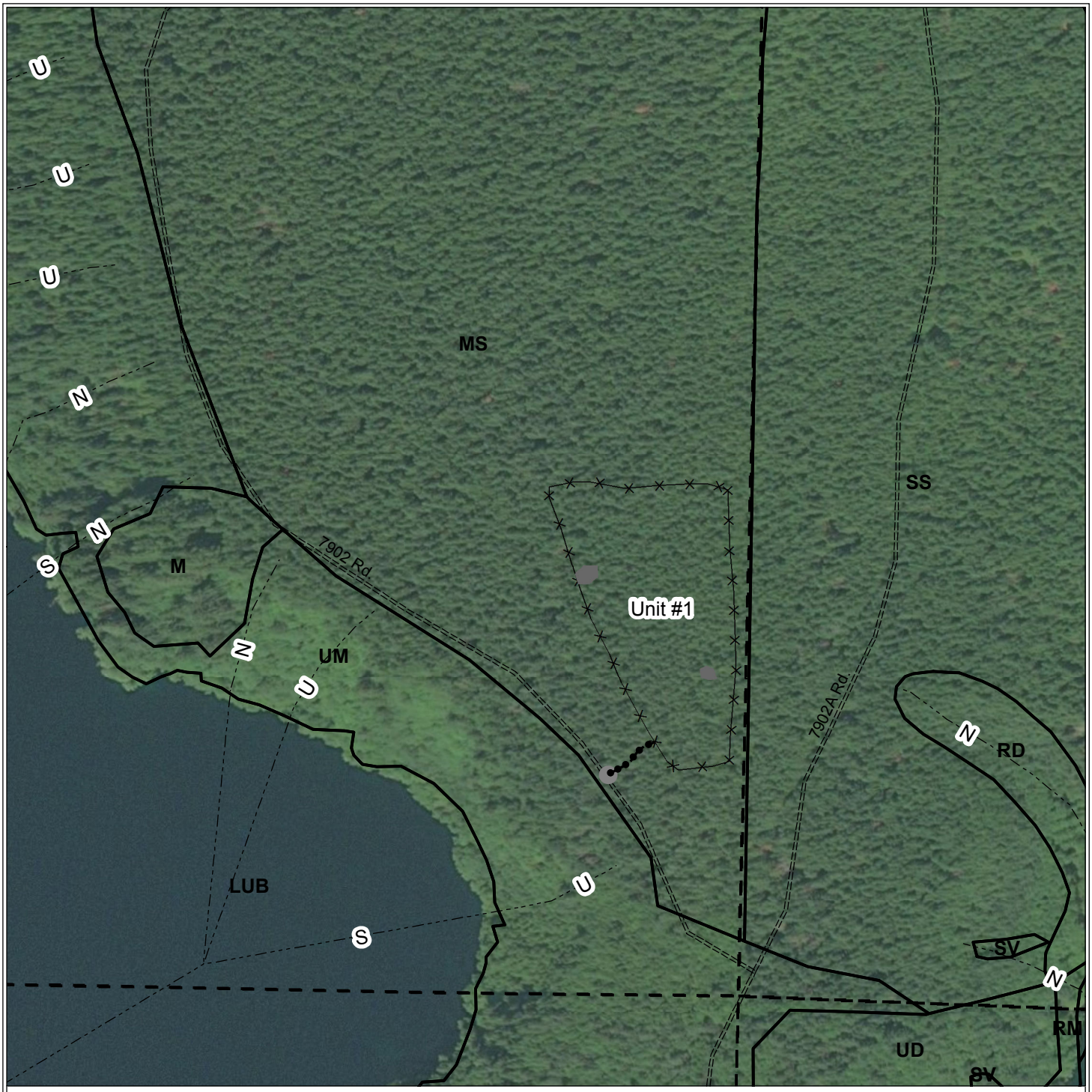
An intensive survey was performed at the patch cut and all suitable goshawk habitat within 1,570 feet. No goshawks were detected. Following the Woodbridge and Hargis protocol and the Pacific Power 2015 memo protocol amendments, goshawk surveys were completed to protocol with no goshawks or nesting activity detected.

References

Woodbridge, B. and C.D Hargis. 2006. Northern Goshawk Inventory and Monitoring Technical Guide. Gen Tech. Reg. WO-71. Washington, DC: U.S. Department of Agriculture, Forest Service. 80pp.

Pacific Power. 2015. Northern Goshawk Management on Lewis River Wildlife Habitat Management Lands. Technical Memo from Kendel Emmerson, PacifiCorp Wildlife Biologist to the Teresstrial Coordination Committee on December 9, 2015.

Attachment A - Figures



Devil's Backbone Unit #1

TWP 7N RNG 5E SEC 21

Net Acres = 5.8
Net MBF = 247
Elevation = 1280 ft.

- Landing
- Stream
- Skid Trail
- Existing Road
- Wildlife Retention Area
- Timber Sale Boundary
- Section Line

N

Contour Interval = 40 feet

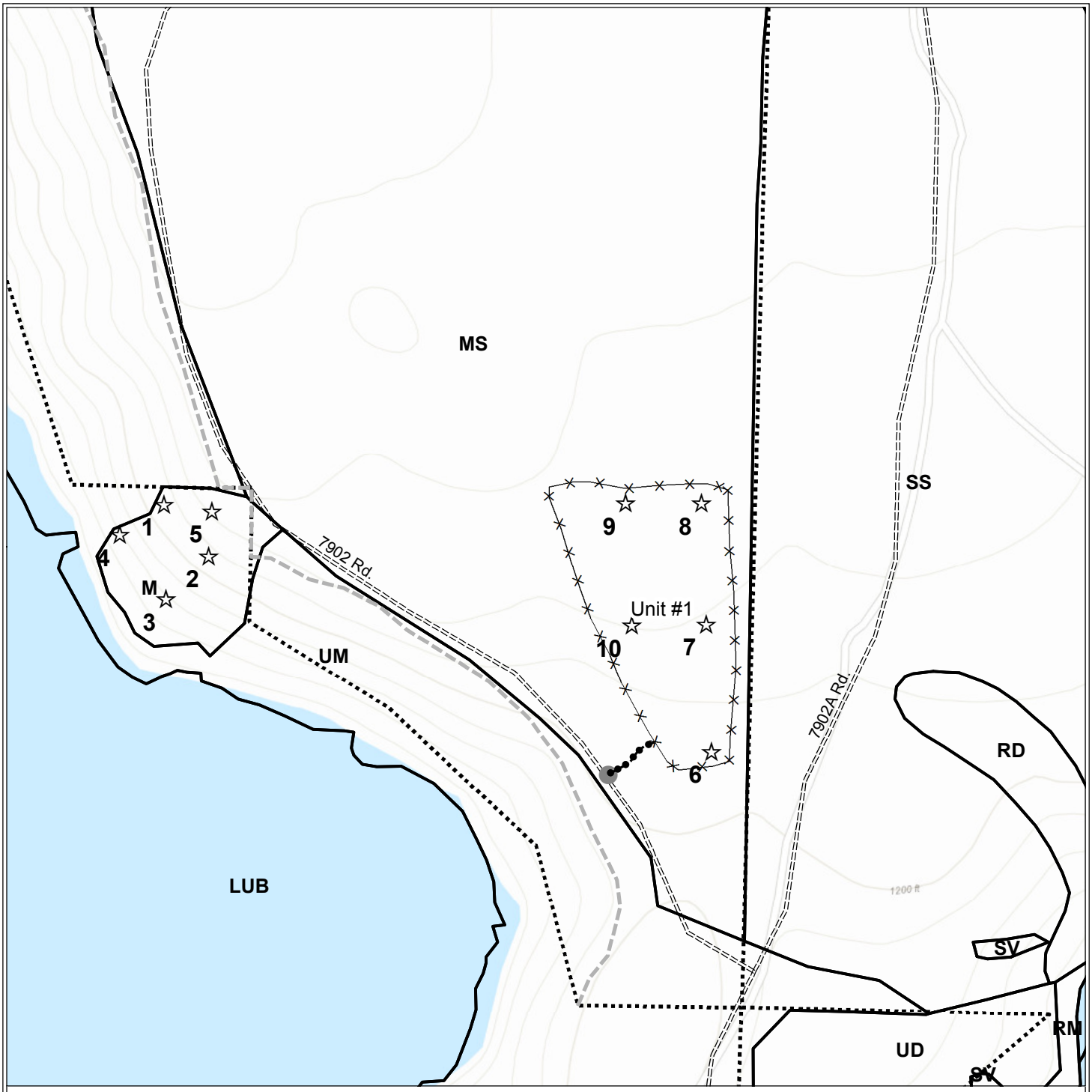
0 225 450 675 900 Feet

1 inch = 375 feet

Figure 1 - Aerial Photo

G:\Projects\Current\CowlitzPUD\MapProjects\PatchCut2018\GoshawkFieldMap.mxd

Published Date : 6/24/2019



Devil's Backbone Unit #1

TWP 7N RNG 5E SEC 21

☆ Goshawk Calling Station

====== Existing Road

- - - - Conservation Easement Boundary

Cover Type Boundary

Timber Sale Boundary

Property Boundary

N

Contour Interval = 40 feet

0 225 450 675 900 Feet

1 inch = 375 feet

Figure 2 - Broadcast Stations

G:\Projects\Current\CowlitzPUD\MapProjects\PatchCut2018\GoshawkSurveyStations.mxd

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Attachment B - Pacific Power 2015 Memo

PACIFIC POWER

MEMORANDUM

DATE: December 9, 2015

TO: Terrestrial Coordination Committee

FROM: Kendel Emmerson, PacifiCorp Wildlife Biologist

SUBJECT: Northern Goshawk Management on Lewis River Wildlife Habitat Management Lands

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Section 1: Purpose and Need

The Lewis River Wildlife Habitat Management Plan (WHMP) has the following goal and objective to manage northern goshawk (*Accipiter gentilis*) on WHMP lands (PacifiCorp 2008):

> **Goal:** Provide and protect habitat for, and minimize or avoid disturbance to, raptors, including bald eagles (*Haliaeetus leucocephalus*), buteos, ospreys (*Pandion haliaetus*), accipiters, and owls.
>
> **Objective a**: Use protocol surveys in areas scheduled for road construction, heavy maintenance, or forestland management activities to identify specific raptors and their active and inactive nest sites and roost sites (including bald eagle winter roosts in suitable habitat), if possible, and implement appropriate measures to protect these sites.

To achieve this goal and objective the WHMP states (PacifiCorp 2008 section 14.4.1):

> *"Protocol surveys will be conducted prior to implementing activities that would remove or modify nesting habitat, have the potential to disturb breeding raptors (e.g., road construction, heavy maintenance activities, and forestland management), and will be conducted during the breeding season. Currently, the northern spotted owl, northern goshawk, and peregrine falcons are the only breeding raptors that have protocol survey methods."*

While finalizing the WHMP, the Terrestrial Coordination Committee (TCC) had considerable discussion on the appropriate northern goshawk survey method for WHMP lands. To better understand the survey methods and how it applies to WHMP lands, several TCC members participated in northern goshawk survey training with Steve Desimone (Washington Department of Fish and Wildlife) and Tracy Fleming (National Council for Air and Stream Improvement) on the proposed 2008 Unit 26 timber harvest area. During the training the following survey information was decided (PacifiCorp 2007):

"Survey methods should be conducted according to Woodbridge and Hargis 2006 using the following methods:

Dawn Acoustical Surveys should be done at known sites to determine occupancy with two surveys per season to determine an unoccupied status. "If only one year of survey is used, this method may not identify nest stands that are unoccupied during the year of survey." (Woodbridge and Hargis 2006 Page 3-8). According to Woodbridge and Hargis (2006 Page 3-6), the listening stations should be limited to about 150 m radius of all habitats to be surveys.

Intensive Search Surveys may be conducted within 1 nesting season during late June, July, and August with experienced observers. "A single Intensive Search Survey may be sufficient to determine goshawk presence within a habitat patch" (Woodbridge and Hargis 2006 Page 3-9).

Broadcast Acoustical Surveys should be conducted within 2 consecutive nesting seasons with two surveys per survey season.

The surveys should include habitat surrounding the area of impact for up to 400 m (1,312 ft.) for light activities and 800 m (2,624 ft.) for heavy activities (Woodbridge and Hargis 2006 page 3-13).

For projects involving significant modification of forest structure (e.g., commercial thinning), the survey should extend 800 m beyond the project boundary. This distance corresponds to the mean radius of the post fledging area (about 200 ha) and will allow for detection of territories that overlap the project area. For projects that involve minor modification of forest structure (under burning, light under thinning, and light salvage) surveys need extend only 400 m beyond the project boundary."

The smaller size harvest area's (less than 10.2 acres) and timber harvest begin after August 31 fall in between minor and significant modifications. Steve recommended that the proposed timber harvest areas surveys extend more than the minor modification extent and extend up to 2 survey stations distances, which is equal to 500 m. Kirk explained that in most cases PacifiCorp doesn't own the lands beyond or up to 500 m (1641 ft.) of a timber harvest area and PacifiCorp can only survey up to their property line."

Although the purpose of this training was to determine a survey method to meet WHMP goal and objectives, it was specific to timber harvest activities and used the 2008 proposed timber harvest as a training example, which included 3 harvest areas within ¼ mile of each other totaling 29.2 acres (8.2 acres, 9.1 acres, and 11.9 acres in size). The training did not consider survey methods for non-timber harvest activities or projects that require vegetation removal in small areas. As a result since the implementation of the WHMP in 2008, PacifiCorp has had several projects requiring small areas of vegetation removal that as stated above would require 2 years of Broadcast Acoustical Surveys to the extent of 500-m beyond the project area boundaries. Due to

the presumably low number of nesting goshawks in western Washington and, in particular, the Lewis River Basin, this survey effort for small areas exceeds the potential to adversely affect northern goshawks. The purpose of this memo is to provide a decision matrix that assesses a project's potential affects to northern goshawks to the appropriate survey method.

In addition since 2008, the WHMP lands have expanded extensively to lands north of Swift Reservoir. Most of this area is currently clearcut and most remaining timber does not meet suitable goshawk habitat. This memo categorized existing WHMP cover types into suitable goshawk, unsuitable, and non-habitat categories. A table summarizing northern goshawk home range habitat characteristics has been included for conducting field verification for areas that may have marginal suitable habitat. Lastly, the memo also provides a method to complete a habitat analysis for a project and surrounding area to determine the extent of effect a project may have on suitable goshawk habitat.

Section 2: Presence of Northern Goshawk and WHMP Surveys in Lewis River

Less than 1% of the recorded goshawk nests in Washington have been in the southwest portion of the state (Desimone and Hays 2004). The only recorded observations of goshawks in the Lewis River basin are from 1989 and 1995. Both observations were on United State Forest Service lands in the Drift Creek basin and are greater than 2 miles from WHMP lands.

PacifiCorp has been conducting goshawk surveys on PacifiCorp-owned lands since 1999. Between 1999 and 2007, the goshawks surveys were conducted using methods described in Joy et al. 1994, two surveys in a single nesting season, and include the timber harvest area and all suitable PacifiCorp-owned habitats within 1500 feet of the harvest area. In 2007, the Woodbridge and Hargis (2006) methods were adopted for planned harvest areas using the Broadcast Acoustical Survey method for two seasons and to include all PacifiCorp-owned lands within 500-meters of the planned harvest. To date, none of these survey efforts have detected a northern goshawk and PacifiCorp is not aware of any other goshawk monitoring efforts in the Lewis River basin.

Section 3: WHMP Cover Types and Northern Goshawk Habitat

There are numerous sources from the southwest United States and western Washington that describe goshawks as typically associated with mature or old-growth forests (Desimone and Hays 2004, Finn et al. 2002, Reynolds 1992, and Bloxton 2002). A 2002 study of 30 northern goshawk nests in the Olympic Peninsula found that they consistently nested in conifer trees greater than 40 years old and the nest areas were predominately late-seral forest habitat [i.e., trees with average dbh (diameter at breast height) $\geq$ 21 inches] (Finn et al. 2002). An additional study on nesting goshawks on private industrial lands in western Washington documented nests in conifer trees that average 21.97 in. dbh (Bosakowski et al. 1999). Nest in deciduous trees are uncommon and not well understood, they are usually in a tree that is sub-canopy and isolated in coniferous stands or in a pure deciduous stand that is in proximity to mature conifer stands (PacifiCorp 2007 and Desimone and Hays 2004).

This variability in suitable goshawk habitat has made delineating WHMP cover types into suitable goshawk habitat challenging; however it is necessary to assess potential habitat impacts from a proposed project. Based on the cover type classifications and habitat features described in the attached table each cover type has been categorized into suitable, unsuitable, and non-habitat:

Suitable habitat: all forest cover types that have trees that average greater than 16 in. dbh. This includes the following cover types (PacifiCorp and Cowlitz PUD 2004):

Cover Types that may meet Suitable Northern Goshawk Habitat Criteria

Cover type	Associated Cover Type Codes
Lodgepole Pine[2]	LP
Mature conifer[1]	M or M-t
Mid-Successional Conifer	MS or MS-t
Oak Woodland[2]	OW
Old-growth Conifer[1]	OG or OG-t
Palustrine Forested Wetland[2]	PFO
Riparian Deciduous[3]	RD or RD-t
Riparian mixed[3]	RM or RM-t
Upland Deciduous[3]	UD or UD-t
Upland Mixed[3]	UM or UM-t

[1]OG and M cover groups include stands that have an average stand diameter that is $\geq$ 21 inches and are preferred habitat for northern goshawks.
[2]The LP, OW, and PFO cover types are not classified by an average stand diameter and therefore habitat suitability may be discretionary.
[3]The RD, RM, UD and UM cover groups have a minimum average stand diameter class of 10 inches therefore may require ground-truthing to confirm suitability.

Unsuitable habitat: all forest cover types with trees that average less than or equal to 16 in. dbh. This included the following cover types (PacifiCorp and Cowlitz PUD 2004):

Cover Types that are Unsuitable Northern Goshawk Habitat

Cover type	Associated cover type codes
New clearcut	SS1
Pole conifer	P
Seedling/sapling conifer forest	SS
Young riparian mixed	YRM
Young upland deciduous	YUD
Young upland mixed	YUM

Non-habitat: all other cover types that do not currently provide or have future potential to provide northern goshawk habitat (PacifiCorp and Cowlitz PUD 2004). This would include developed areas, meadows, agriculture, shrublands, wetlands etc. A habitat analysis table for McKee Meadows Timber Harvest Area (Attachment B) has all cover type categorized in to Suitable Habitat, Unsuitable Habitat, and Non-Habitat

Section 4: Decision Matrix

The following table provides a decision matrix for each project to systematically determine the appropriate survey method. The questions were developed using a variety of resources and some assumptions based on WHMP lands

Question 1:	The 9.88 acres is the minimum size for small area surveys described in Woodbridge and Hargis 2006.
Question 2:	There are numerous sources from the southwest United States and western Washington that describe goshawks as typically associated with mature or old-growth forests (Desimone and Hays 2004, Finn et al. 2002, Reynolds 1992, and Bloxton 2002).
Question 3:	A nest area cluster is 177.8 acres which is a radius of 1570.6 ft. Therefore it is assumed that any project greater than 1570.6 ft. from a nest or preferred nesting habitat (i.e., OG or M) has a low probability of being within a nest area cluster.
Question 4a:	Adverse modification would be any action that would require the cover type to be changed to another cover type. M to M-t would not be an adverse modification, but changing from M to MS would be an adverse modification.
Question 4b:	Finn et al. 2002 recommends no timber harvest within 350 m of historical nest sites.
Question 4c, 5b, and 5f:	Average nest tree diameter is 21 in. dbh (Desimone and Hays 2004 and Finn et al. 2002)
Question 5a:	Reynolds et al. 1992 recommends patch cuts $\leq$ 2 acres within the PFA to create openings, therefore it assumed any project less than this size would have negligible effect on habitat.
Question 5d:	Finn et al. 2002 found that if more than 10% of the combined NAC and PFA were in conifer stands less than 7 years of age then occupancy rates declined. On WHMP lands this would be equivalent to 10% unsuitable habitat within the combined NAC and PFA
Question 5e:	It is assumed that if project does not reduce the percent of suitable habitat on WHMP lands within the combined NAC and PFA more than 1% then it is negligible effect on northern goshawk habitat.

Northern Goshawk Survey Decision Matrix			
1. Is the project ≥ 9.88 acres in size and includes suitable goshawk habitat cover types?		Yes	Broadcast Acoustical Survey
		No	Go to question 2
2. Does area include any portion of a M or OG cover type?		Yes	Go to 4
		No	Go to 3
3. Is the project within 1570.6 ft., and not separated by the reservoir, of a known goshawk nest tree **or** M or OG cover type?		Yes	Go to 4
		No	Go to 5
4. For projects that are potentially within a nest area cluster (NAC)			
a.	Does the project require the removal or adverse modification of habitat in a M or OG cover type?	Yes	Broadcast Acoustical Survey
		No	Go to 4b.
b.	Is the project ≥ than 350 m (1148.3 ft.) from a known goshawk nest tree or M or OG cover type?	Yes	Go to 4c.
		No	Broadcast Acoustical Survey
c.	Does project require the removal of any conifer tree ≥ 21 in dbh?	Yes	Intensive Search Survey
		No	Go to 4d.
d.	Will the activity be occurring between March 1 and August 31	Yes	Intensive Search Survey
		No	No survey required
5. For projects that are potentially within post-fledgling family area (PFA)			
a.	Is habitat modification area < 2 acres in size and 200 feet in width?	Yes	Go to 5b.
		No	Go to 5d.
b.	Does project require the removal of any conifer tree greater than 21 in dbh?	Yes	Intensive Search Survey
		No	Go to 5c.
c.	Will the activity be occurring between March 1 and August 31?	Yes	Intensive Search Survey
		No	No survey required
d.	Complete habitat analysis as described below in Section 5. Will the WHMP lands within the combined NAC and PFA be >10% unsuitable habitat after the project is completed?	Yes	Go to 5e.
		No	Intensive Search Survey
e.	After the project is complete will the percent of suitable habitat on WHMP lands within the combined NAC and PFA be decreased by more than 1%?	Yes	Go to 5f.
		No	Intensive Search Survey
f.	Does project require the removal of any conifer trees greater than 21 in dbh?	Yes	Broadcast Acoustical Survey
		No	Intensive Search Survey

Section 5: Habitat Analysis Methods

Determining the amount and quality of suitable northern goshawk habitat in proximity of a project is based on components of goshawks nesting home range nest area cluster (NAC), post-fledgling family area (PFA), and foraging area (FA) (Reynolds et al. 1996 and Desimone and Hays 2004). Because the purpose is to analyze habitat surrounding the project, the center of the project area will be used as center for the habitat analysis. From this center point a circle with a radius of 1570.6 ft. will represent the NAC's and be 177.8 acres. A second concentric circle will be 2879.3-ft from the center and will represent the PFA and be additional 420 acres. The cover typing for WHMP lands does not extend to the full extent of goshawk home range; therefore it is assumed that all WHMP lands have the potential of being within the NAC and/or PFA of a nesting goshawk. Attachment A is a map of the McKee Meadow Timber Harvest area NAC and PFA circle and Attachment B is the associated habitat analysis to be used as example. The green numbers in the bottom right corner represent the answer to 4 d and the red numbers represent the answer to 4e.

Section 6: Survey Methods (Woodbridge and Hargis 2006)

Dawn Acoustical Survey:
This survey method is based on detection of courtship vocalizations and flight displays of goshawks at their nest sites. It consists of establishing "listening stations" in close proximity to known nest stands or patches of suitable habitat and conducting 1½-hour listening periods at dawn during the early breeding season. The advantages can determine occupancy early in the nesting season and single survey for the year. Best suited for surveying historical nest and has high level of detection rate for occupied sites. The disadvantages are it will confirm occupancy/non-occupancy for that season, but does not confirm the presence of an inactive nest. This method is to be used to survey known goshawk nest sites, since there are no known nest sites on WHMP land this survey method is not currently used.

Timing: During the month preceding egg laying. March 15 to April 30
Number of Surveys: 2 surveys, unless determined occupied in a single survey
Number of Seasons: Single season prior to conducting activity.
Survey Area: Project Area
Survey Stations: Placed every 150 meters

Intensive Search Survey:
A combination of visual searches for signs of goshawk presence (nest, white wash, prey remains, and molted feathers) along closely spaced transects with broadcast acoustical surveys. This method is best applied to smaller area (9.88 to 98.80 acres). The advantages are this method can detect inactive nests stands, survey may be conducted in a single survey in one season and provide high confidence that area searched does not contain a goshawk breeding site. Conclusions drawn from search conducted within a limited area during a single season, however, may not be applicable to surrounding habitat and can only detect nest within 200 m of a calling point.

Timing: Following hatch date. June 1 to August 31.
Number of Seasons and Surveys: 1 survey with a minimum of 3 surveyors
Number of Seasons: Single season prior to conducting activity
Survey Area: Project Area
Survey Transects: Transect width 20-30 m

Broadcast Acoustical Survey:
Method is based on broadcast of taped goshawk calls at points along transect routes to elicit response from defensive territorial adult goshawks and their young. Primary advantages are efficient, standardized, and applicable to large areas. The disadvantage is its labor intensive and requires two seasons.

Timing: During the nestling and fledgling stages. June 1 to August 15.
Number of Seasons and Surveys: 1 survey with a minimum of 3 surveyors
Number of Seasons: 2 surveys for 2 consecutive seasons
Survey Area: Project Area plus all suitable habitat and PacifiCorp-owned lands within 500 meters.
Survey Transects: 250 m with a calling station every 200 m

Section 7: Documentation

The Raptor Section of the Lewis River WHMP Annual Report will provide a discussion on proposed areas for vegetation removal. Each proposed area will use the Northern Goshawk Survey Decision Matrix to determine the appropriate goshawk survey method. If a proposed area will require a different survey method than determined by the matrix, then a rationale will be provided in the Annual Plan for TCC approval. Removing vegetation from an area may be proposed following the completion and approval of the Annual Plan, in this case the proposed area and decision matrix results will be presented to the TCC at the next scheduled meeting or if approval is needed sooner by email.

Section 8: References

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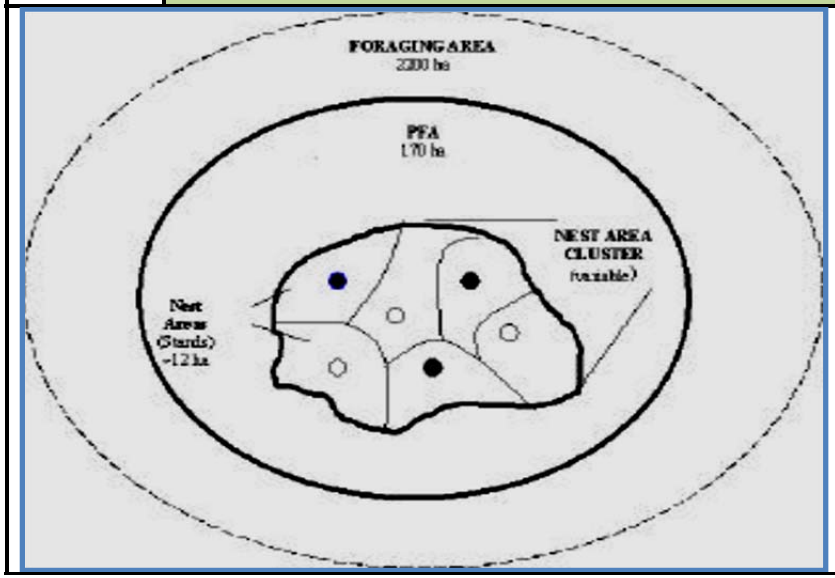
Northern Goshawk Home Range Habitat Characteristics in the Western Washington					
Habitat Features	**Breeding Home Range**				**Proposed Project**
	Nest Area	**Nest Area Cluster (NAC)**	**Post-Fledgling Family Area (PFA)**	**Foraging Area**	
Description	Boundaries are defined by movement and behavior of the adults and newly fledged young and the locations of prey plucking posts surrounding the nest tree.[1]	Includes all stands that contain active, inactive, and alternate nest sites[1]	Contains the NAC and is an area of concentrated use by adult females and developing juveniles after fledgling and prior to natal dispersal.	Home range during the breeding season	
Area Size	12 ha (29.64 acres) in size [1,3]	Estimated 72 ha (177.8 acres) include at least 3 active nest sites and 3 replacement nest areas per home range. All nest areas are within 0.5 miles of active nest site [1,3]	420 ac in addition to and centered on active and alternate nest areas and include as much mature and old forests as possible.	Foraging area= 5998 acres= 5,400 ac+ 420 (PFA) ac+ 178 (NAC) ac= 6,032ac	
Tree Species	Often in Douglas-fir, with western hemlock used to a lesser extent. Nests in deciduous trees are uncommon. Deciduous trees used for nesting were generally found in the sub-canopy and isolated in coniferous forest stands comprised of less than 2% deciduous species.[1,4]		Varies	Varies	
Average dbh*	Average nest tree size in the Pacific Northwest is >53 cm (21 in) dbh (range: 25-172 cm [10-68 in]) [1.]	Average dominant and co dominate trees are 17-19 in. dbh and >89 ft. in height[1]	70% of the trees are >21 in dbh	Minimum 10-14 in QMD	
Density (TPA)	195 trees/acres[1]		Dense Forests	25 trees/acre= 20 in dbh.	
Average Stand Age*	Mature to old forest habitat. Stand characteristics begin at year 50 in western Washington. Prefer to manage areas to greater than 70 years.[1]		PFA should include as much mature and old forests as possible and should be <10% seedling or sapling[1]	> 30 years of age and mix of 20% mid-successional, 20% mature, and 20% old-growth with a preferred of 60% in mature to old-growth	
Structure*	Typically live trees, large (2-3 ft. diameter) bulky stick nest built close to bole of the tree and in the lower third of the canopy.[1]	More snags and down wood then surrounding areas.	Abundant number of snags and down logs	>3 snags > 18 in dbh/acre , > 5 logs >12 in. diameter >7 ft. in length/acre[1]	
Canopy closure	>50%[1]	60-65%[1]	>70%[1]	>60%[1]	

Northern Goshawk Home Range Habitat Characteristics in the Western Washington					
	Breeding Home Range				Proposed Project
Habitat Features	**Nest Area (Site)**	**Nest Area Cluster (NAC)**	**Post-Fledgling Family Area (PFA)**	**Foraging Area**	
Canopy structure	2 or more canopy layers, gaps with abundance of large diameter crown, and shade tolerant trees[1]	1-3 layers with poor developed understory vegetation[1]	No Information	Adequate space for flying 31 snags/acre=5 in. dbh[1]	
Nest tree spacing	Average 1759 ft. and pluck post typically within 100 ft. of nest tree[1]	No Information	No Information	No Information	
Minimum opening size	• East of the Cascades an increase of 1% (0r 0.28 acres) in early successional habitat can decrease occupancy by 10%[1]. • No more than 2.94 acres within 300m (984 feet) of nest[2] • No M or OG habitat harvested		Recommends regeneration cuts up to 2 acres in mixed forest stands. Less than 200 feet in width and retain 3-5 mature trees with interlocking crowns[3]	Recommends regeneration cuts up to 4 acres in mixed forest stands. Less than 200 feet in width and retain 6 mature trees with interlocking crowns[3]	
Habitat threshold	Comprised of 67% (or 19.85 acres) of late seral (M or OG)[2]		• No more than 10% (or 42 acres) in Unsuitable HaSS1 • 72% (or 302 acres) in Mature coniferous forests and (10 % of the trees >21 in dbh)[1]	Retain at least 60% (or 3,240 acres) of foraging habitat in mid-aged (20% or 1080 acres), mature (20% or 1080 acres), and old (20% or 1080 acres) forest successional classes[1]	



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[3] Reynolds, Richard T.; Graham, Russell T.; Reiser, M. Hildegard; and others. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217, Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 90 p.

[4] PacifiCorp. 2007. Northern Goshawk Survey Training and Proposed Timber Harvest Areas Habitat Assessment. June 25 and 26, 2007 North Fork Lewis River Washington. Unpublished Document.

*These Habitat Features are priority indicators for northern goshawk habitat on WHMP lands.