Lewis River Hydroelectric Projects Settlement Agreement
Aquatic Coordination Committee (ACC)
Meeting Agenda

Date & Time: **December 12, 2019**
9:00 a.m. – 2:00 p.m.

Place: **Merwin Hydro Control Center**
105 Merwin Village Court
Ariel, WA 98603

Contacts: **Erik Lesko: (503) 412-8401**

Time	Discussion Item
9:00 a.m.	Welcome ➢ Review Agenda and ACC 11/14/19 Meeting Notes ➢ Comment & Accept Agenda and 11/14/19 Meeting Notes
9:10 a.m.	Public Comment Opportunity
9:15 a.m.	2019/2010 Aquatic Fund Project Presentations (30 minutes each presentation to include Q&A) ➢ USFS - Lewis River 21 Phase III & Rush Creek Side Channel Reactivation ➢ WDFW - Eagle Island chum spawning channel construction ➢ Cowlitz Conservation District - Anderson NF Lewis River Restoration
11:15 a.m.	Salmon Port Review, Peggy Miller and Steve West
12:00 p.m.	**Lunch**
12:30 p.m.	ATE Report/Merwin Trap Discussion
1:00 p.m.	Study/Work Product Updates o In Lieu/ADR Update o Flows/Reservoir Conditions Update o ATS update; Extension of time o Nutrient Enhancement Update o Fish Passage update o Hatchery Broodstock/adult return update
1:45 p.m.	➢ Next Meeting's Agenda ➢ Public Comment Opportunity Note: all meeting notes and the meeting schedule can be located at: https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html
2:00 p.m.	**Adjourn**

Join by Phone
+1 (503) 813-5252 [Portland, Ore.]
+1 (855) 499-5252 [Toll Free]
Conference ID: 6325627

FINAL Meeting Notes
Lewis River License Implementation
Aquatic Coordination Committee (ACC) Meeting
December 12, 2019
Merwin Hydro Control Center

ACC Representatives Present (15)
Kim McCune, PacifiCorp
Chris Karchesky, PacifiCorp
Erik Lesko, PacifiCorp
Mark Ferraiolo, PacifiCorp
Jeremiah Doyle, PacifiCorp
Levi Pienovi, PacifiCorp
Jim Byrne, Trout Unlimited
Bryce Glaser, WDFW
Peggy Miller, WDFW
Josh Holowatz, WDFW
Steve West, LCFRB
Joshua Ashline, NMFS
Ruth Tracy, USFS
Greg Robertson, USFS
Eli Asher, Cowlitz Indian Tribe

Guests (3)
Todd Hilson, WDFW
Darin Houpt, Cowlitz Conservation District
Brad Garner, WDFW

Calendar:

January 9, 2020	ACC Meeting	Merwin HCC

Assignments from December 12, 2019	**Status**
McCune: Distribute November 14, 2019 meeting notes to the ACC that were edited by WDFW.	**Complete 12/13/19**
Olson: The ACC attendees requested an email update regarding the In Lieu process to date.	
McCune: Email ACC and provide additional 7-day review period for H&S and comprehensive review extension of time to December 31, 2020.	**Complete 12/13/19**

Assignments from November 14, 2019	**Status**
Miller and West: Assist with Salmon Port review at December ACC meeting.	**Rescheduled to January 2020 meeting**

Parking Lot Items	Status
Tracy: Stage 0 webinar PowerPoint presentation to ACC. As of 11/14/19 Tracy is asking for an update from USFS staff regarding timeline for presentation in early winter 2020 or spring 2020.	**Tentative**
All: What are things to focus on; Salmon Port for review of aquatic fund projects.	

Opening, Review of Agenda and Meeting Notes
Erik Lesko (PacifiCorp) called the meeting to order at 9:05am and reviewed the agenda. Josua Holowatz (WDFW) requested the addition of a Lewis River Flow Reduction Assessment update.

Lesko also reviewed the November 14, 2019 meeting notes. Peggy Miller (WDFW) indicated that she submitted WDFW's edits via email to PacifiCorp on December 11, 2019. The ACC would like an opportunity to review the edits so the ACC agreed to add the approval of the November 13, 2019 meeting notes to the January 2020 ACC meeting agenda.

Public Comment
None

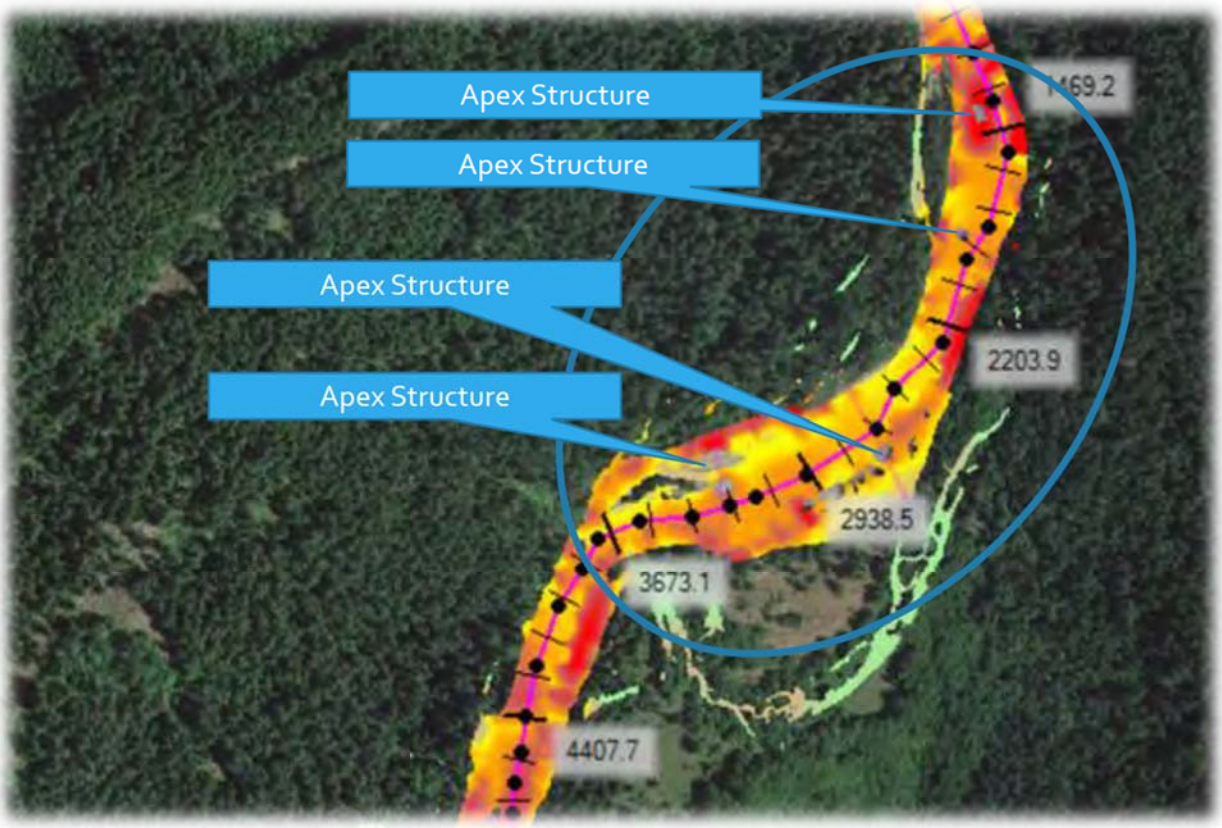
Lewis River 21 Phase III Presentation – Greg Robertson (USFS)
Robertson, Restoration Biologist for the U.S. Forest Service provided a big picture overview of the Lewis River Reach 21 aquatic fund project. See attached presentation for further detail or via the following link: https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - ACC - 2019 – December 12, 2019 Meeting Notes.

- 0.55 miles between Little Creek Confluence and Rush Creek Alluvial Fan
- 0.7 miles between LR 21 phase I and III
- Lewis River Reach 21 Phase 1 apex log jam is located at the upper 1/3rd extent of the Rush Creek Alluvial Fan
- Only four access routes to the Lewis River exist off Forest Road 90, one Forest Service System Road FR9000480 and three legacy roads
- The FS does not have a requirement to remove all culverts restricting flow paths
- The FS does identify and remove culverts considered a priority for removal
- FR9000480 is closed to the public
- The other three access roads are not Forest Service System Roads and are not currently proposed for complete obliteration because of expected future access needs to Lewis River restoration projects
- All of these routes can be used for project access and returned to a closed to public use status after project completion

Robertson noted that if engineering drawings are requested the project budget will increase by approximately another $77k. The USFS is requesting $227k from the aquatic fund but the request could increase to $294k.

- NEPA field review completed, Final Decision Memo expected January 2020
- Lewis River Trail 31 will not be affected by this project
- Wood will be staged in 2020 and instream work completed in 2021.

- 4 mainstem apex type Jams will be constructed. 1 margin type structure at access point into river to mitigate access point disturbance.
- The existing functioning habitat (rearing and spawning) will be improved as 1) side channels are maintained as perennial features and 2) spawning gravels are deposited in front of and behind the apex structures
- Stranding of fish during low flows should not occur as boundary shear stress will be increased on side channels to maintain perennial flow



Eli Asher (Cowlitz Indian Tribe) would like the USFS to consider larger scale multi-phase engineered projects now and into the future. In addition, Asher expressed that this project already includes some rework occur the Little Creek project that was completed 2014-2016.

Rush Creek Side Channel Reactivation – Greg Robertson (USFS)
This project will require tipping approximately 800 trees; existing wood will be used. The area in blue polygon will be thinned by ½ and 800 trees will be laid into the channels. Redline is the pushup berm blocking the channel. A representative from the bull trout subgroup also reviewed the site. See attached presentation for further detail.

Robertson noted that $65k will be provided as in-kind and the USFS is requesting $130k from the aquatic fund (this includes the road decommission).


39
31
326
151
326
151
39
Miles

- User created ford at RM 6.5
- Spawning can occur from Rm 0-1.7
- Two disconnected side channels
- Need 3' elevation to reactivate disconnected channel.
- ~5 miles between the ford and spawning reach
- Vehicle crossings risk oil and grease from entering Rush Creek during spawning time.
- Stewardship funds can be used to address ford if preferred
- Currently Rush Creek Alluvial Fan is multi-threaded
- Multiple channels allow flow to be distributed
- Coho are also using Rush Creek to spawn
- One project side channel flow was disconnected by legacy timber harvest activities and one was disconnected by a legacy timber harvest landing and bridge abutment
- Two Side Channels will be enhanced, one connected to the Rush Creek mainstem by removing legacy landing and the other reconnected to upper drainage feature currently disconnected by legacy timber harvest activities
- Contract will be obligated by May 1, 2020, an internal Forest Service deadline
- Allowing 20% of the mainstem flow to enter the side channels will have little effect on the flow depths in the steep riffle that the bull trout negotiate during their upward migration. It is expected to decrease depths less than 1.5 inches at each side channel/ mainstem entrance, lessen velocities and decrease sediment sizes, which is a favorable condition
- The current Coho mainstem Rush Creek spawning overlap may lessen if the Coho prefer the gentler gradient and lower velocities of the project side channels
- Noise limitation for Spotted Owl limit work start date to after July 15th
- The In water work window July 15th-August 15th
- These two restrictions necessitate bringing this project forward as a single project, and not combine with other projects in the area
- **The Forest Service presumed that the project, if funded, would be considered a Bull Trout restoration project, even though benefits to Coho will also occur**
- This Rush Creek Project will not affect the shade of mainstem Rush Creek and it is not expected that the reduction in flow to the lowest 0.4 miles of the mainstem would not affect the temperature of Rush Creek
- Rush Creek Temperatures were monitored and remain cool

<Break 10:20am>
<Reconvene 10:40am>

Eagle Island Chum Salmon Spawning Channel Construction Presentation – Todd Hilson (WDFW)
Hilson provided a historical overview of chum salmon return from the decline in the 1940's through the listing as threatened under the Endangered Act in 1999 and the currently return to the lower Columbia River (LCR). See attached presentation for further detail or via the following link: https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - ACC - 2019 – December 12, 2019 Meeting Notes.

Hilson addressed limiting factors to include harvest, hydro, hatcheries and habitat:

- Annual Columbia River commercial landings of adults ranged from 100-500K adults
- Appropriate harvest rate for a healthy population of chum salmon is 48%
- Fisheries Managers reduced harvest in 1950s due to declines in abundance

Current Harvest
- Harvest prohibited on LCR
- chum salmon
- Incidental impacts in Chinook and/or coho salmon targeted commercial fisheries limited to <5%.

Hydro
- Bonneville Dam flooded chum spawning areas upstream to The Dalles (Celilo Falls)
- Cowlitz and Lewis River Hydro limiting upstream distribution and natural watershed processes
- Bonneville tailwater fluctuations are minimized to protect Columbia River mainstem spawning (e.g. dewatering redds)

Hatchery
- Little/no current or historical impact from LCR chum salmon hatchery programs
- Potential predation impact on fry outmigrants from releases of hatchery yearling age juveniles

Habitat

- Key chum salmon spawning and incubation habitat historically occurred in off-channel or braided portions of rivers
- This habitat produces high egg-to-fry survival which is needed to sustain populations when ocean survival is low
- Typically this type of habitat occurred in the lowest portions of rivers and has been negatively impacted by agriculture, dikes, levees, and population growth

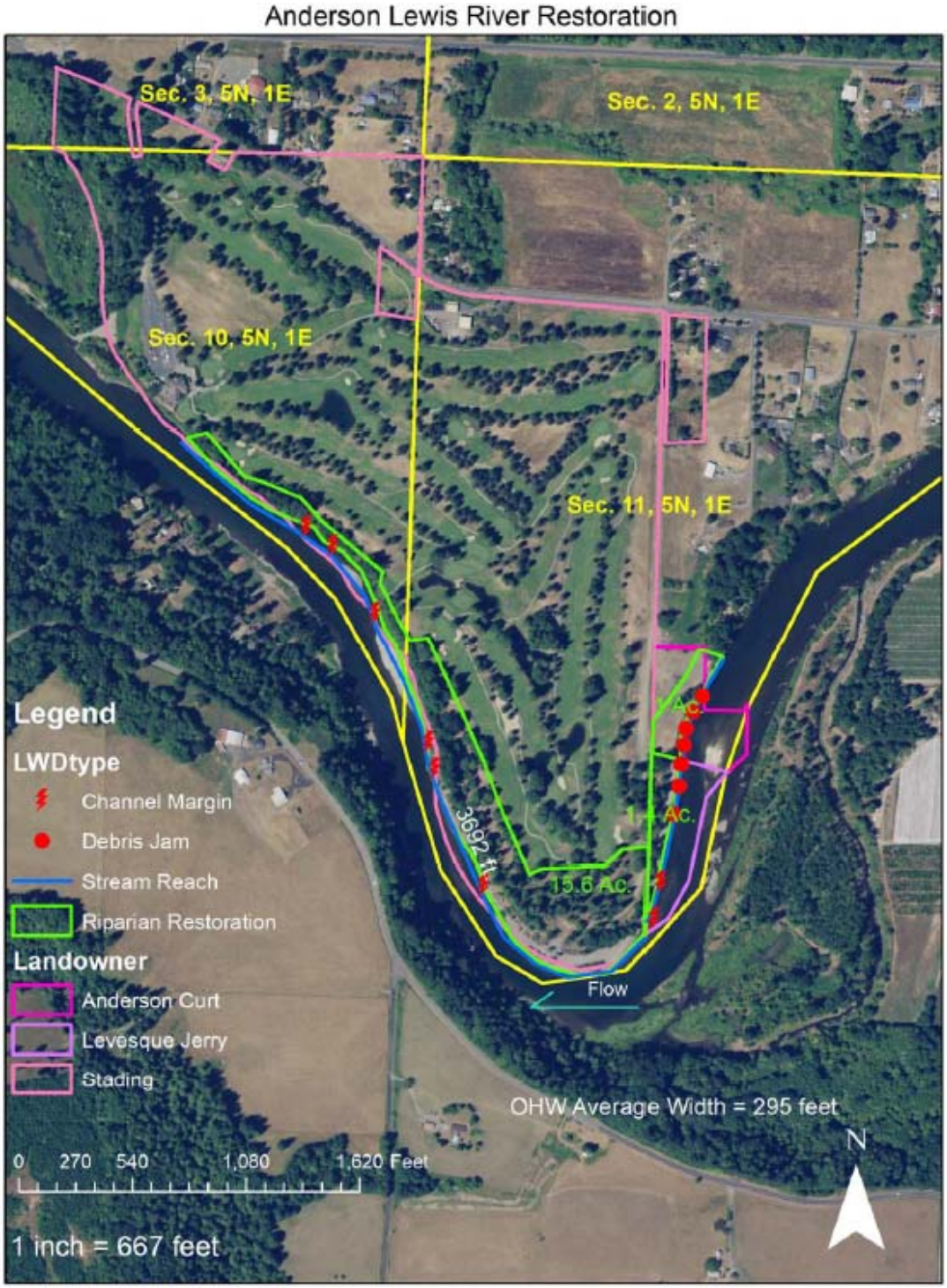
Hilson provided a number of examples of completed spawning channels constructed and/or upgraded in years 2001, 2008, 2011 and 2017. Hilson noted that the project has been delayed considerably due to landowner easement disputes and no funding path with BPA so the project has been pushed out until 2021. The maintenance expected is unknown at this time. Protected channels have a better life span and less maintenance. The objective is to design to specifically benefit chum salmon spawning and juvenile rearing.

WDFW will roll the monitoring of this project into other WDFW programs. All other focal species will be documented, not just chum.

Anderson NF Lewis River Restoration Presentation – Darin Houpt (Cowlitz Conservation District, CCD)
Houpt provided detailed drawings and topographic view illustrating the volume of sand entering the river, the areas identified for riparian restoration and needed bank shaping. CCD is proposing installation of three (3) deflector structures and the riparian restoration to give it a change to take hold and recover. See attached presentation for further detail or via the following link:

https://www.pacificorp.com/energy/hydro/lewis-river/acc-tcc.html - ACC - 2019 – December 12, 2019 Meeting Notes.

The proposed project is located along 3670 feet of the right bank in EDT Reach 5 of the Lewis River and currently encompasses three landowners including the Lewis River Golf Course (Stadings), Jerry Levesque, and Curt Anderson.



Anderson noted total project cost is $310k and the CCD is requesting $254k from the aquatic fund.

<Break 12:05pm>
<Reconvene 12:20pm>

Working Lunch

Adult Trap Efficiency (ATE) Report/Merwin Trap Discussion
Chris Karchesky (PacifiCorp) reminded the ACC attendees that the 30-day review period for the 2019 ATE report was completed on November 14, 2019. This latest report summarized the fifth year of study using adult winter steelhead. Karchesky mentioned that PacifiCorp had received comments back from NMFS and WDFW. The final report will be inserted as an appendix to the *2019 Lewis River Fish Passage Program Annual Report,* and a comment matrix will be included.

Karchesky then reviewed the original intent of the ATE Evaluation, which was to assess how well adult salmon and steelhead recruited to the new Merwin Trap configuration, and make needed adjustments/modifications if deficiencies were found. He reminded members that the adult trap was built as a phased approach with the possibility of increasing attraction flow and/or providing a second entrance in the future if the ATE Evaluation demonstrated that those additional features were needed. Karchesky also mentioned that the original study design called for adults that were collected at the trap to be tagged and then released back downstream below Merwin Dam to assess ATE.

Karchesky explained that based on the past five years of evaluation that assessed mostly Blank-Wire-Tag (BTW) winter steelhead and adult coho, the reliability of the fish lift and conveyance system has appeared to be largest contributor to the success of fish being captured. There also appeared to be a strong correlation between location where test fish were captured and success of passage. Adults that have already passed through the facility (non-naïve) generally have a lower probability of capture than adults collected and tagged downstream and prior to arriving at the dam.

Given this information, Karchesky suggested that the ATE Evaluations scheduled for 2020 be postponed until modifications could be made to the fish lift and conveyance system to improve reliability. Karchesky did not provide a definitive schedule, although mentioned that time would be needed for design, and that construction activities would need to be coordinated with the ACC; it is possible that the trap maybe down for several weeks while the modifications are being made, and that fish passage and abundance would need to be considered. He also mentioned that the current study design will need to be reviewed and this could occur during the next update of the Lewis River Monitoring and Evaluation Plan, which is scheduled to begin next year (2020). Bryce Glaser (WDFW) mentioned that the suggested plan sounded appropriate and requested that a memo be developed to outline the process moving forward. Joshua Ashline (NMFS) also agreed that the plan was appropriate and offered to help develop the memo.

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

Study/Work Product Updates

In Lieu Update
Josh Ashline (NMFS) communicated to the ACC that their response to parties is going through legal review now and will be distributed to the ACC upon final approval from NMFS.

The ACC attendees requested that Todd Olson (PacifiCorp) send an email update to the ACC. (this email was to clarify what is going to be submitted for review by the ACC. Specifically, are the Licensee's submitting a draft license amendment for official review, or resubmitting the strategic and M&E plans for additional comment and review?)

Flows/Reservoir Conditions Update
Lesko informed the ACC attendees that Merwin is currently down 5.75', Swift down 47' and Yale is down 27.2 for a total draft of about 80 feet between the three reservoirs.

The Flow Coordination Committee requested an update on the lower Lewis redd dewatering survey. Josua Holowatz (WDFW) conducted the survey after the flow regime change from 4200 cfs to 2000 cfs. The Lewis River Flow Reduction Assessment of November 24, 2019 is provided as **Attachment A**.

H&S/ATS Update
Lesko informed the ACC attendees that the Aquatic Technical Subgroup (ATS) and the Licensees are working collaboratively to prepare the draft H&S plan for review by DJ Warren and Associates - an independent consultant selected by the ACC. The ATS anticipates providing a review draft to DJ Warren by the end of January 2020. The Comprehensive Periodic Review is expected to take between 60 and 90 days to complete. The Licensees will then incorporate recommendations from this review prior to distributing the plan for a 60-day ACC review period. The Licensee's will then address any ACC comments and finalize the H&S plan for approval by the Services prior to submittal to the FERC.

The current FERC approved deadline is December 31, 2019, however, in order to provide adequate ACC review time for the H&S plan after recommendations from the Comprehensive Periodic Review are incorporated, PacifiCorp is requesting ACC approval for an extension of time from the FERC to December 31, 2020. While the goal for completion of the final plan is expected by June, 2020, final HGMP's have not been submitted to NOAA Fisheries and additional time may be needed to incorporate any H&S Plan changes resulting from these submittals.

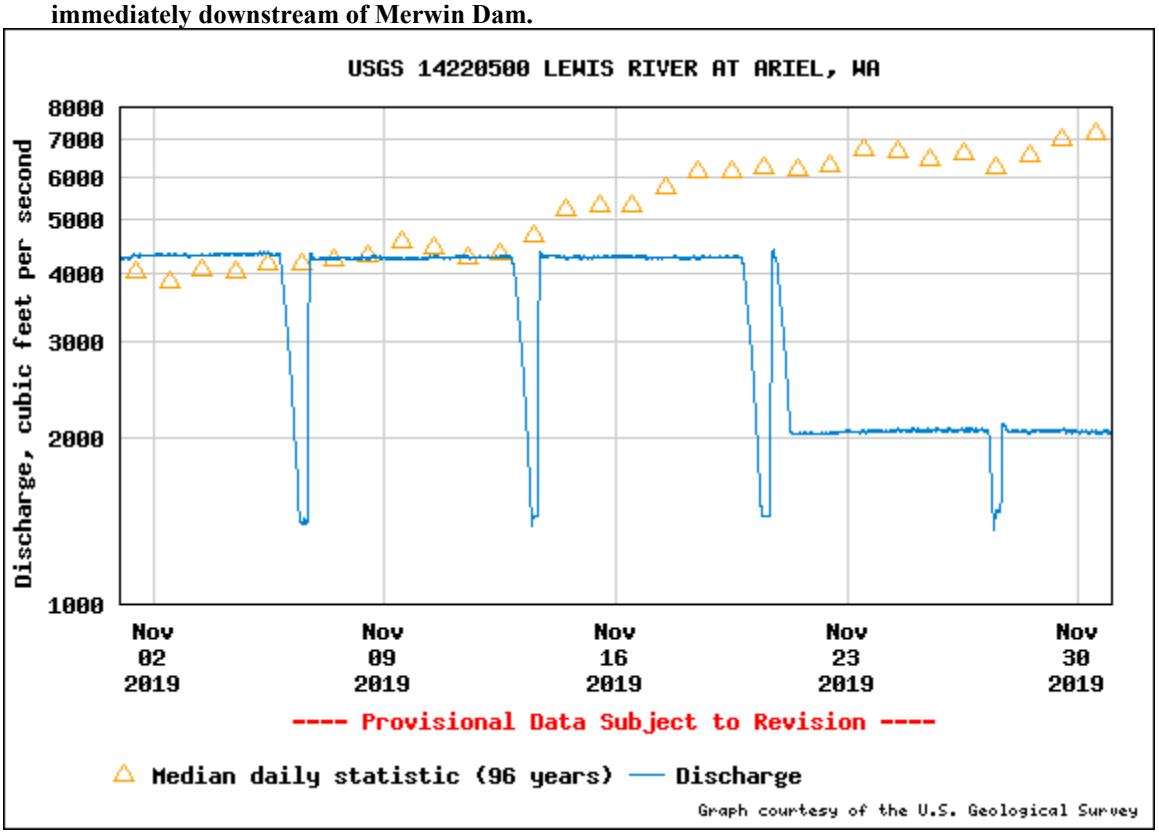
The ACC approved the extension request to December 31, 2020, however, several ACC representatives were absent so the ACC attendees agreed that an additional 7-day review period is appropriate for those ACC representatives not in attendance. McCune will send the request via email.

Extension of time will not affect the in-season monitoring work.

Merwin Fish Collection Facility and General Operations (Attachment B)
During the month of November, a total of 941 fish were captured at the Merwin Dam Adult Fish Collection Facility (MFCF). The majority of these fish were early-run Coho (71.4 %).

As a reminder, the Merwin Dam Fish Collection Facility was shutdown unexpectedly on October 12, 2019 due to extensive damage to the automatic fish crowding system. Repairs were administered, and the trap was put back in service on November 4, 2019. The MFCF ran continuously for the remainder of the month. Flow below Merwin Dam was maintained at approximately 4,250 cfs until November 19th, and then decreased to approximately 2,050 cfs. River flow remained near this level for the reminder of the month. Similar to previous years, weekly scheduled drawdowns occurred every Wednesday in order to accommodate fall spawning surveys for adult fall Chinook in the Lewis River below Merwin Dam. (Table 1).

Table 1. Discharge in cubic feet per second recorded at the USGS Ariel, WA gauge (14220500) located immediately downstream of Merwin Dam.



Upstream Transport (Attachment B)

Eight (8) Blank Wire Tag (BWT) winter steelhead were captured by the end of December 2018 and were transported upstream as part of the 2019 run year. An additional 38 adults were taken upstream in January 2019 and another 30 in February, 106 in March, 705 in April, 110 in May, and 4 in June for a total of 1,001 BWT winter steelhead transported as part of the 2019 run year. Twelve (12) additional winter steelhead of natural origin (NOR) containing PIT tags from the upper basin were also transported upstream as part of the 2019 run year. A combined total of 1,013 adult winter steelhead have been transported upstream of Swift Dam as part of the 2019 run year (Table 2). No winter steelhead had been taken upstream as part of the 2020 run year by December 1, 2019.

Table 2. Total number of adult winter steelhead transported upstream of Swift Dam in 2019.

Run Year	Male	Female	Total adult winter steelhead taken upstream of Swift Dam
2012	141	48	**189**
2013	440	301	**741**
2014	452	581	**1,033**
2015	746	477	**1,223**
2016	378	376	**754**
2017	331	261	**592**
2018	682	535	**1,227**
2019	527	486	**1,013**

Thirty three (33) NOR (12 female/12 male/9 jack) and an additional 76 hatchery origin jack (HOR) spring Chinook adults had been taken upstream as part of the 2019 run year.

By the end of November, 2,856 adult Coho (1,410 male/1,446 female) had been transported upstream along with 241 jacks (< 20 inches). During the month of November, seven (7) NOR Coho that were PIT tagged in the upper basin had been detected as returning adults at the MFCF. All of these fish were tagged at the Swift FSC in the spring of 2018 and returned as adults.

Swift Floating Surface Collector (Attachment B)

The Swift Reservoir Floating Surface Collector (FSC) was returned to service on October 14, 2019, following the summer maintenance outage and suspected lightning damage. The Swift FSC ran continuously throughout the month of November with a total of 1,069 out-migrants collected. The majority of the fish collected were juvenile Chinook (56.6%) and juvenile Coho (38.5%).

Karchesky (PacifiCorp) provided a brief update on the Swift FSC, and informed the ACC that PacifiCorp had to accelerate the timing on when the FSC would be turned off. This was due to lower than usual reservoir conditions and the need to repair the access stairs on the mooring tower. While the exact timing was not yet known, he expected that the FSC would be turned off by December 20, 2019. The FSC would remain off through the end of the year. Karchesky also reminded ACC members that there were a number of construction projects scheduled at the FSC in January and February 2020, which would influence operation. These projects include:

- Installation of additional surge suppression (December 2019)
- Smolt sample bar upgrades (January 2020)

- Starboard smolt flume and diverter system rebuild (February 2020)
- Set-up for Collection Efficiency Evaluation (February 2020)

Karchesky mentioned that PacifiCorp would continue to keep the ACC informed as these projects move forward. All construction actives are planned to be complete by March, 1, 2020.

Karchesky (PacifiCorp) also reminded ACC members that the draft report summarizing the 2019 Collection Efficiency Evaluation was sent out for 30-day review on December 6, 2019. Responses are requested by January 10, 2019.

Hatchery Broodstock Update
Bryce Glaser (WDFW) informed the ACC that hatchery brood stock numbers for late-Coho integrated program were still behind target, and that the run as a whole had not come in as predicted. He also indicated that in 2018 the late-Coho arrived later than usual, so the 2019 run could be similar.

Glaser also mentioned that the forecast for the 2020 spring Chinook run had been released and at this time the numbers were lower than hoped for the Lewis River.

Nutrient Enhancement Effort in the Upper Lewis River (Attachment C)
Karchesky (PacifiCorp) provided a final report to the ACC summarizing the 2019 Nutrient Enhancement effort that occurred in the upper Lewis River basin during the month October. The final report is provided as **Attachment C**.

Agenda items for January 9, 2019

- November 14, 2019 Meeting Notes
- December 12, 2019 Meeting Notes
- Salmon Port Review, Peggy Miller and Steve West
- Swift FSC Collection Efficiency Evaluation Report Discussion; Consultant Presentation
- Merwin Dam ATE Memorandum Review
- In Lieu /ADR Update
- Flows/Reservoir Conditions Update
- Study/Work Product Update

Adjourn 2:00pm

Next Scheduled Meeting:

January 9, 2020
Merwin Hydro Control Center
9:00 a.m. – 12:00 p.m.

Meeting Handouts & Attachments:
- Meeting Notes from 11/14/19
- Agenda from 12/12/19
- Lewis River 21 Phase III Presentation – Greg Robertson (USFS)
- Rush Creek Side Channel Reactivation – Greg Robertson (USFS)

- Eagle Island Chum Salmon Spawning Channel Construction Presentation – Todd Hilson (WDFW)
- Anderson NF Lewis River Restoration Presentation – Darin Houpt (CCD)
- **Attachment A** – Lewis River Flow Reduction Assessment, November 24, 2019
- **Attachment B** – Lewis River Fish Passage Report (November 2019)
- **Attachment C** – Upper Lewis River Nutrient Enhancement – 2019 Final Report

2020 Upper Lewis River Reach 21 Phase III and Rush Creek Project Proposals

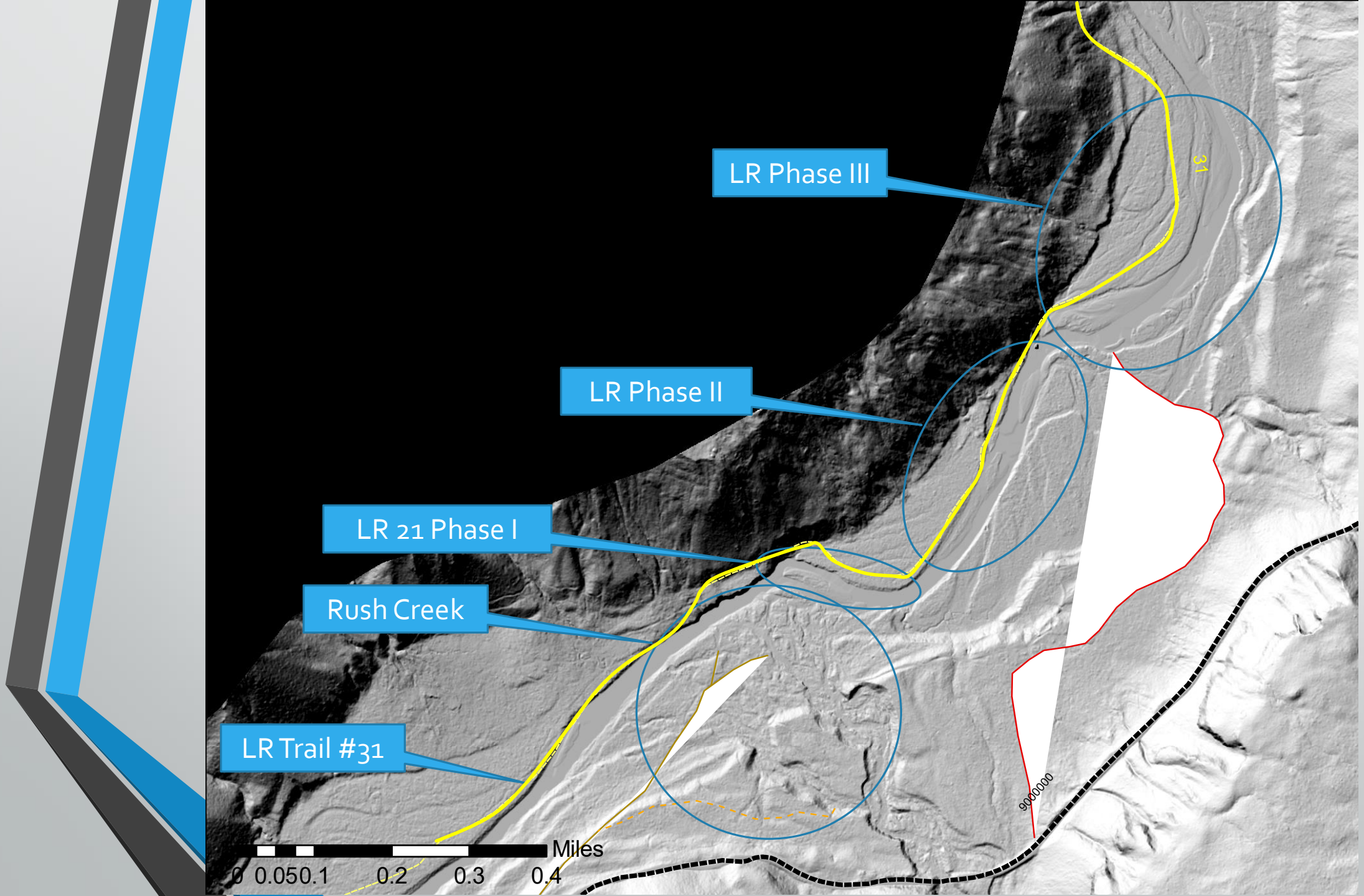
Greg Robertson

Restoration Biologist

U.S. Forest Service

Big Picture Lewis River Reach 21

- 0.55 miles between Little Creek Confluence and Rush Creek Alluvial Fan
- 0.7 miles between LR 21 phase I and III
- Lewis River Reach 21 Phase 1 apex log jam is located at the upper 1/3rd extent of the Rush Creek Alluvial Fan.


LR Phase III
LR Phase II
LR 21 Phase I
Rush Creek
LR Trail #31
31
9000000
Miles
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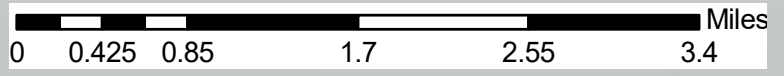
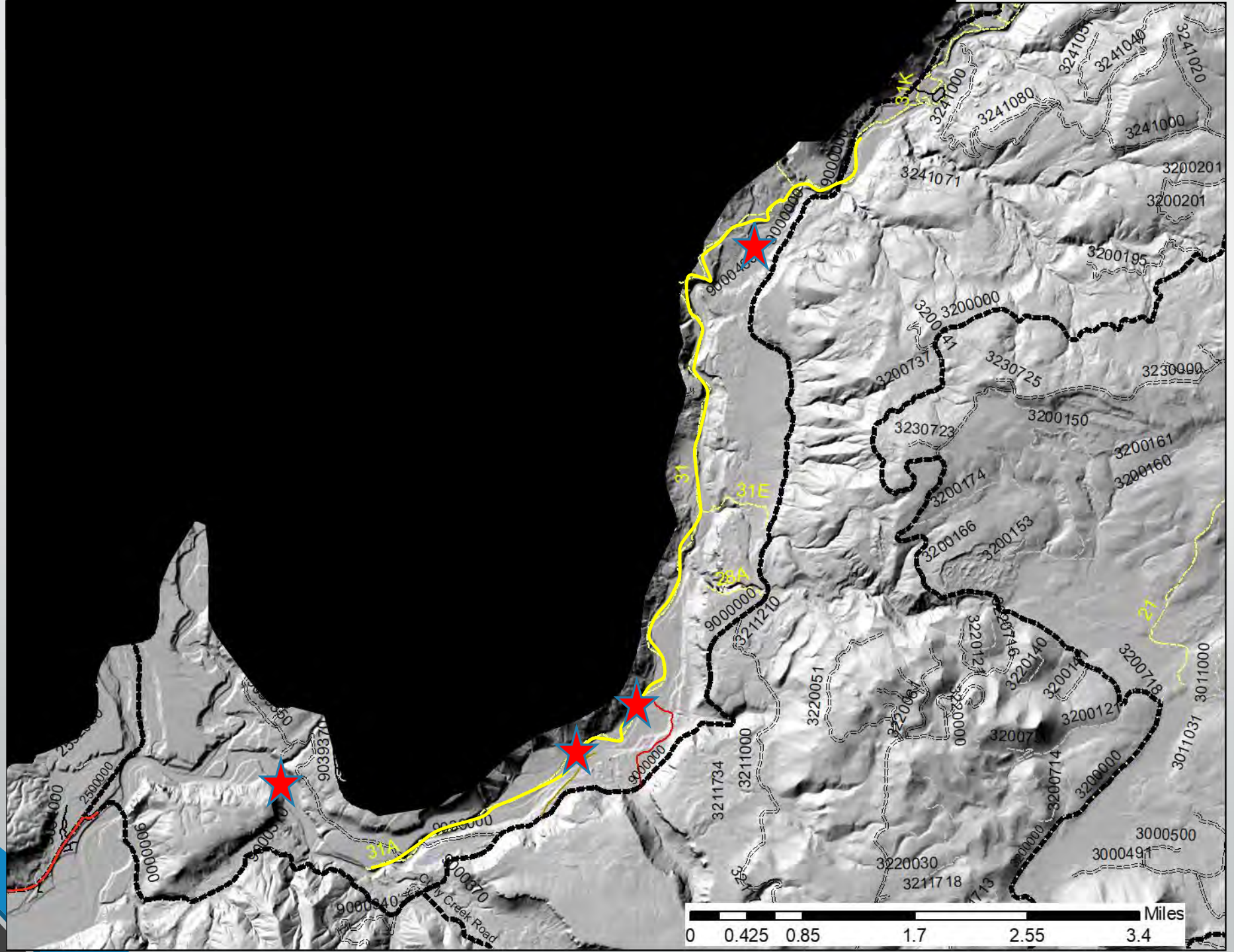
Big Picture Access to Lewis River

- Only four access routes to the Lewis River exist off Forest Road 90, one Forest Service System Road FR9000480 and three legacy roads.
- The FS does not have a requirement to remove all culverts restricting flow paths.
- The FS does identify and remove culverts considered a priority for removal.
- FR9000480 is closed to the public.
- The other three access roads are not Forest Service System Roads and are not currently proposed for complete obliteration because of expected future access needs to Lewis River restoration projects.
- All of these routes can be used for project access and returned to a closed to public use status after project completion.




31K
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28A
21
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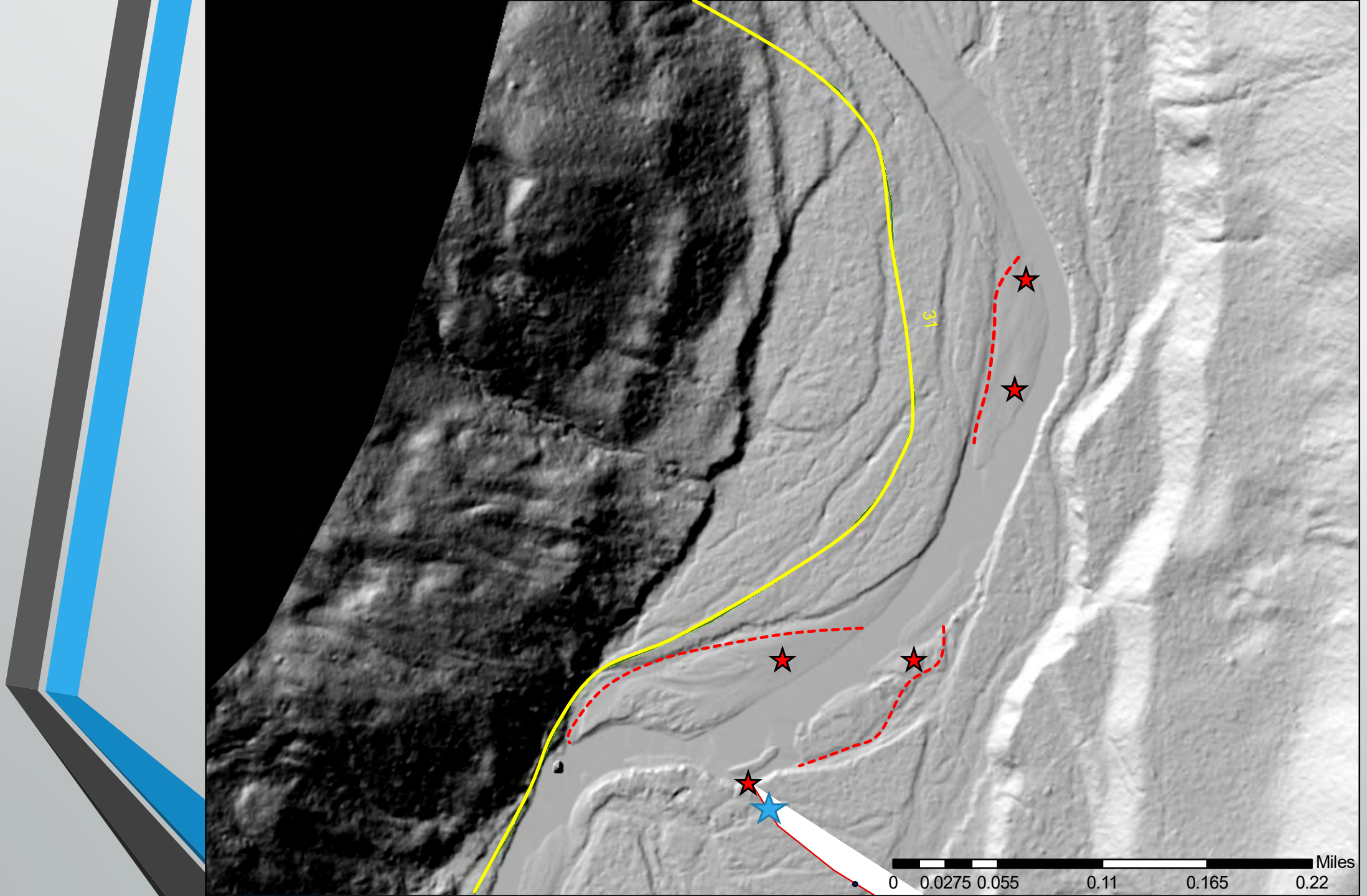
0.85
1.7
2.55
3.4

GPNF ‘Permit Requirements’

- If a project on the GPNF meets criteria within the Memorandum of Understanding with WDFW and the Aquatic Restoration Biological Opinion (ARBO II), then no other permits are required.
- ARBO II requirements specify what size and how many trees can be removed from Spotted Owl habitat and tree selection is determined by a wildlife biologist.

Lewis River Reach 21 Phase III

- NEPA field review completed, Final Decision Memo expected January 2020.
- Lewis River Trail 31 will not be affected by this project.
- Wood will be staged in 2020 and instream work completed in 2021.
- 4 mainstem apex type Jams will be constructed. 1 margin type structure at access point into river to mititgate access point disturbance.


31
Miles
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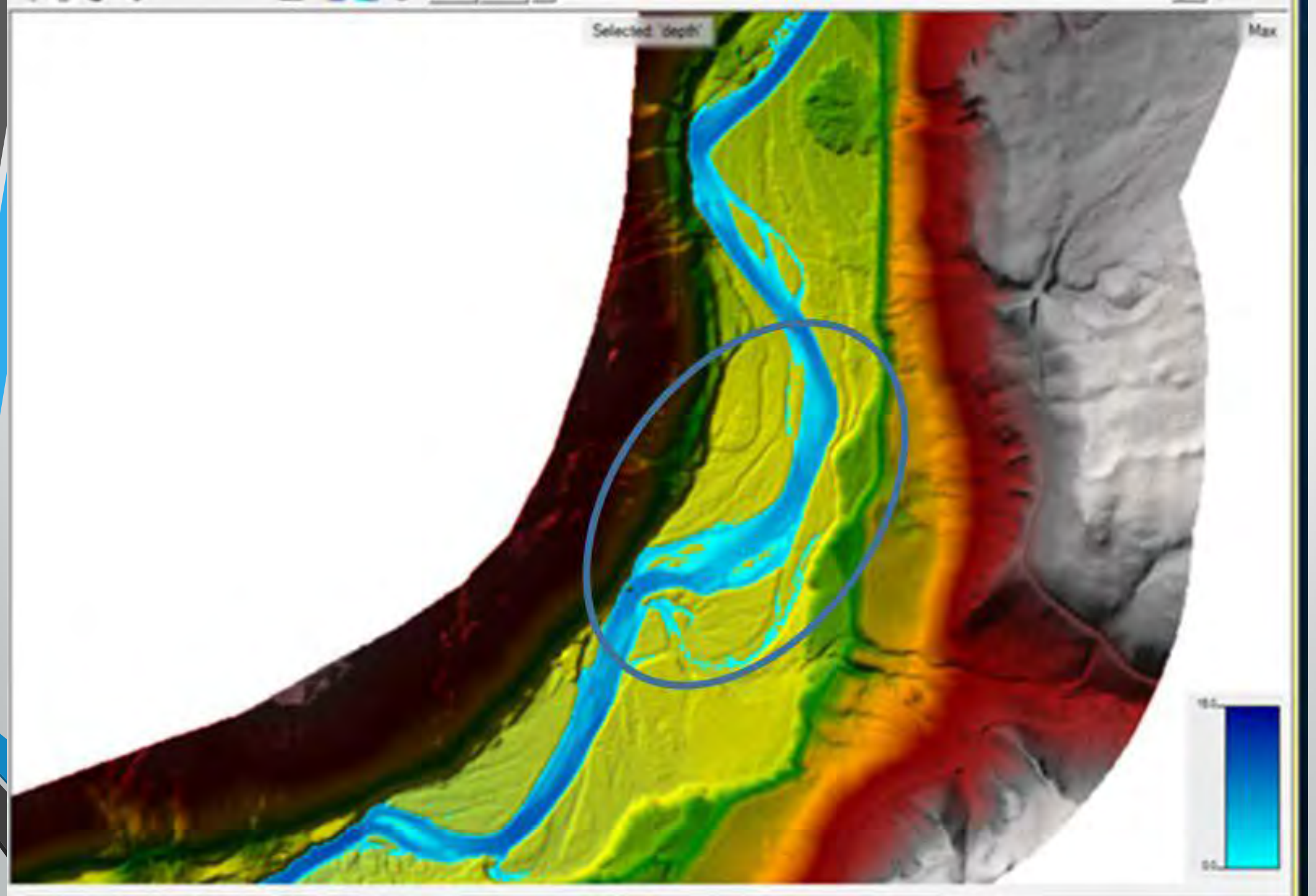
0.22


Selected: 'depth'
Max

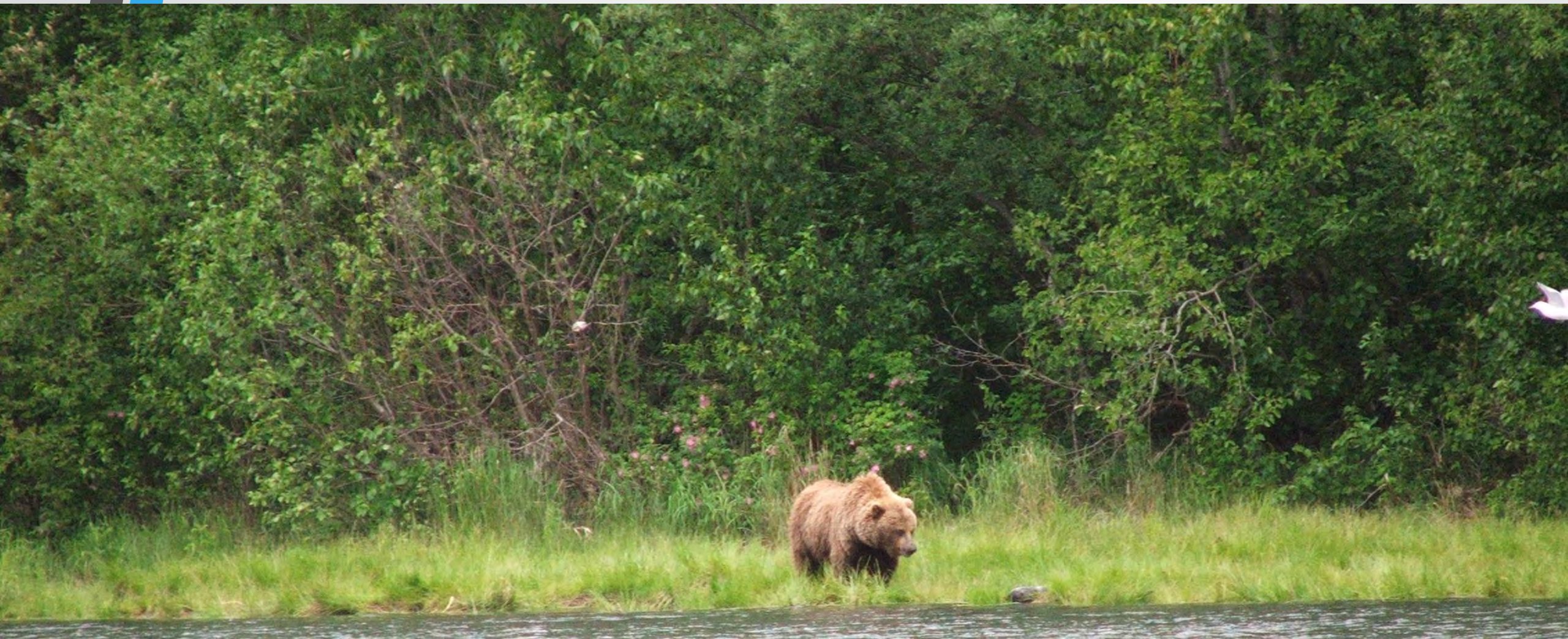
Lewis River Reach 21 Phase III

- The existing functioning habitat (rearing and spawning) will be improved as 1) side channels are maintained as perennial features and 2) spawning gravels are deposited in front of and behind the apex structures.
- Stranding of fish during low flows should not occur as boundry shear stress will be increased on side channels to maintain perennial flow.


Apex Structure
Apex Structure
Apex Structure
Apex Structure
1469.2
2203.9
2938.5
3673.1
4407.7

Requested ACC Funds				**USFS IK Funds**		
Lewis River 21 Phase III				**Lewis River 21 Phase III**		
Engineering Design; Quantities, Durability, Ballast, and Risk Assessment		$39,000				
Engineering Construction Oversite (Including transportation Perdiem and Lodging)		$38,000				
Mobilization	LS	$12,500		NEPA Anlaysis @400/day		
Harvest and Haul	LS	$90,000			Heritage	$2,000
Skidder (150 for initial and 50 hrs for tipped trees and misc.)	200 hrs @ 135	$27,000			Hydrology	$2,000
Excavator #1	200 hrs @ 165	$33,000			Botany	$2,000
Excavator #2	200 hrs @ 165	$33,000			Fisheries	$2,000
					Wildlife	$2,000
Erosion Control/Revegation/ Pre-treat Weeds (Ska Co.)	Road fabric, plants, and weed treatment	$8,500			Silviculture	$2,800
Laborer/Sawyer		$2,500		Contracting	Contracting Officer	$2,000
COR Construction Oversite/ Implementation	30 days @ $400	$12,000		Trees @ $50/tree	500	$25,000
Monitoring/ Reporting	Fish / Hydro Technician (2)	$8,500		Project Management	30 days	$12,000
	ACC SUB-TOTAL	**$294,000**			**USFS In-Kind SUB-TOTAL**	**$51,800**
					Project Total	**$345,800**

Questions?



2020 Upper Lewis River Reach 21 Phase III and Rush Creek Project Proposals

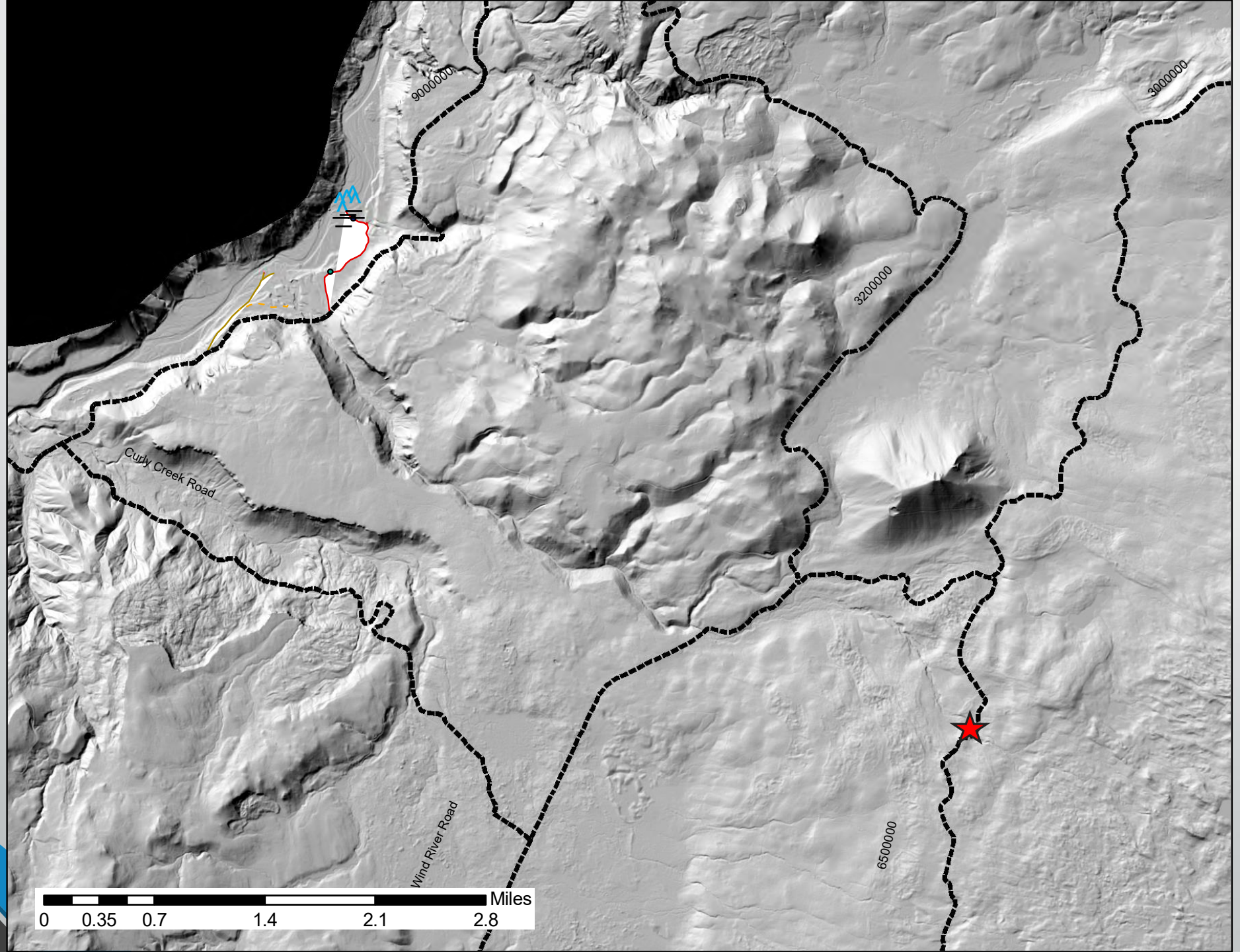
Greg Robertson

Restoration Biologist

U.S. Forest Service

Rush Creek Side Channel Reactivation

- User created ford at RM 6.5
- Spawning can occur from Rm 0-1.7
- Two disconnected side channels


9000000
3000000
3200000
Curly Creek Road
Wind River Road
6500000
Miles
0
0.35
0.7
1.4
2.1
2.8

Rush Creek Side Channel Reactivation

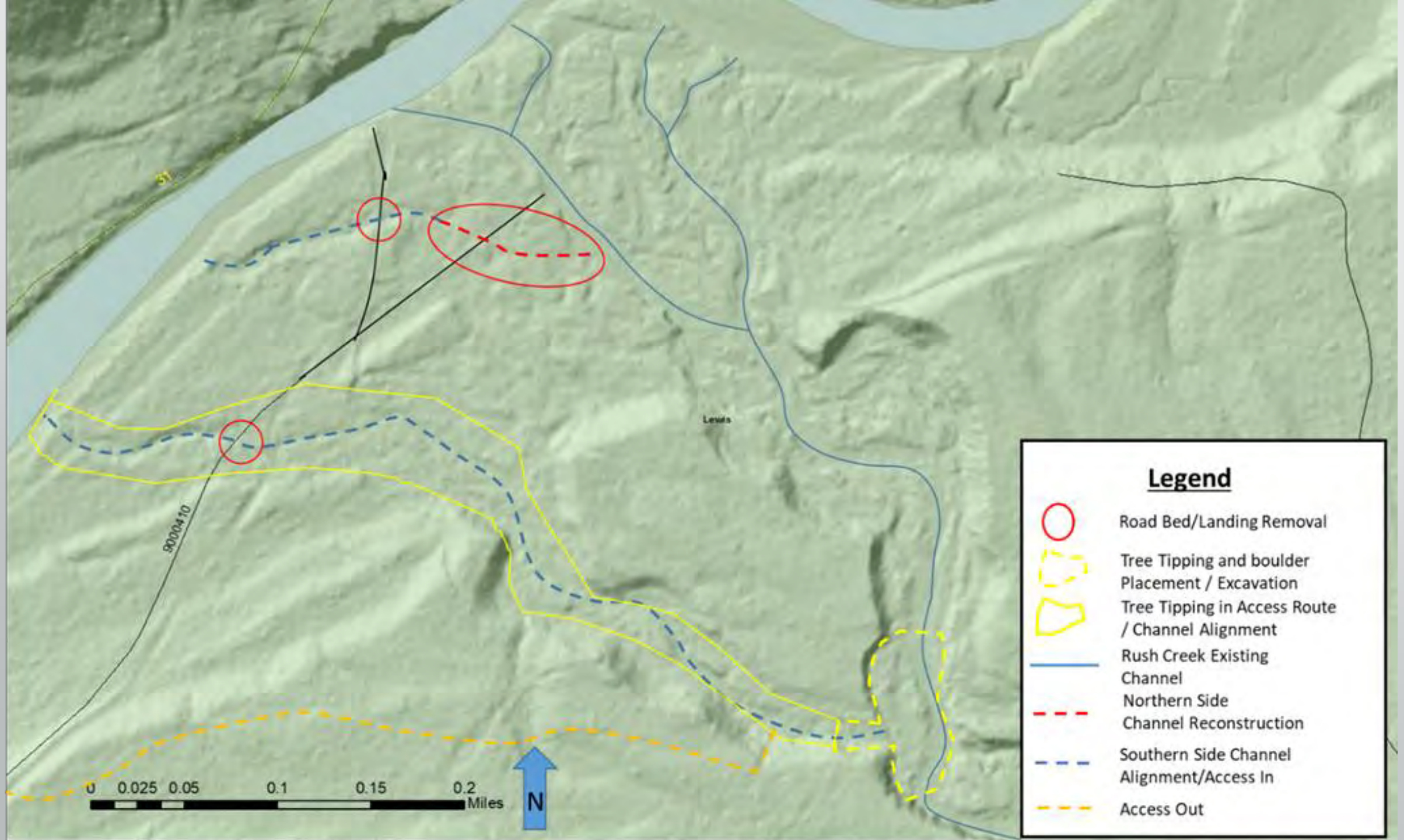
- ~5 miles between the ford and spawning reach
- Vehicle crossings risk oil and grease from entering Rush Creek during spawning time.
- Stewardship funds can be used to address ford if preferred.

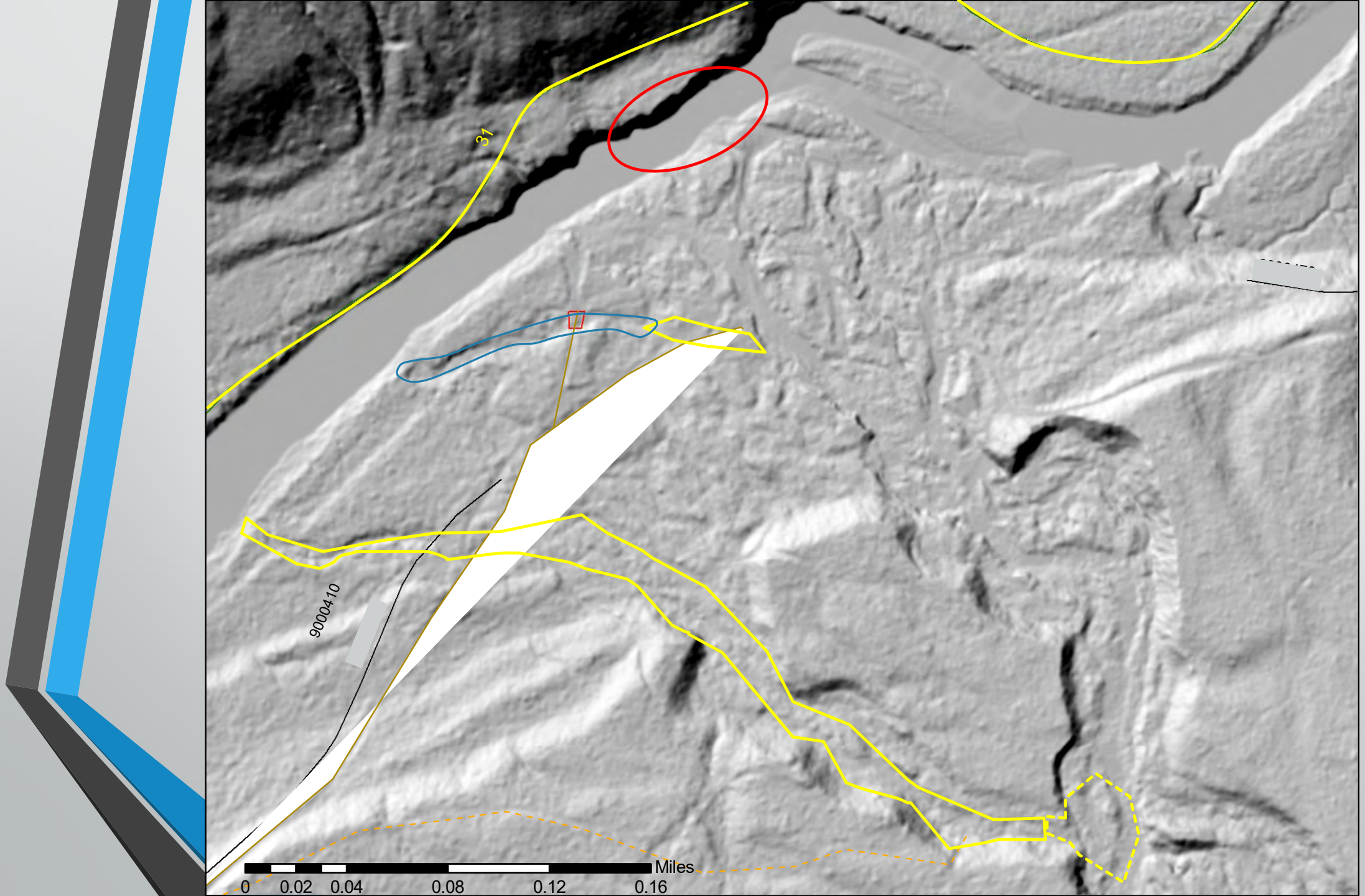
Rush Creek Side Channel Reactivation

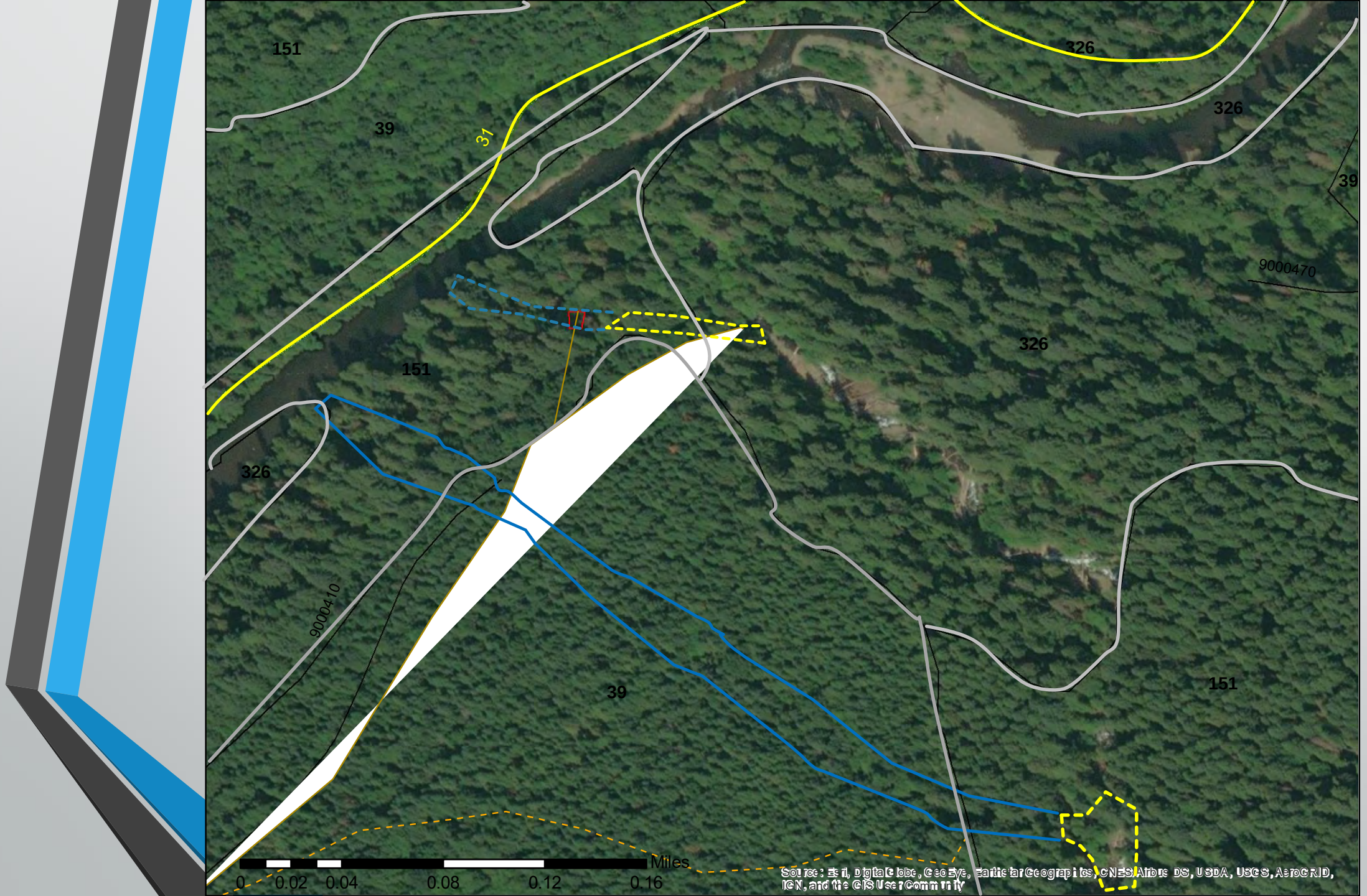
- Currently Rush Creek Alluvial Fan is multi-threaded.
- Multiple channels allow flow to be distributed.
- Coho are also using Rush Creek to spawn.
- One project side channel flow was disconnected by legacy timber harvest activities and one was disconnected by a legacy timber harvest landing and bridge abutment.

Rush Creek Side Channel Reactivation

- Two Side Channels will be enhanced, one connected to the Rush Creek mainstem by removing legacy landing and the other reconnected to upper drainage feature currently disconnected by legacy timber harvest activities.
- Contract will be obligated by May 1, 2020, an internal Forest Service deadline.


Legend
Road Bed/Landing Removal
Tree Tipping and boulder Placement / Excavation
Tree Tipping in Access Route / Channel Alignment
Rush Creek Existing Channel
Northern Side Channel Reconstruction
Southern Side Channel Alignment/Access In
Access Out
0 0.025 0.05 0.1 0.15 0.2 Miles
N
9000410
Lewis


31
9000410
Miles
0
0.02
0.04
0.08
0.12
0.16


151
326
39
31
326
39
9000470
326
151
326
9000410
39
151
Miles
0 0.02 0.04 0.08 0.12 0.16
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Rush Creek Side Channel Reactivation

- Allowing 20% of the mainstem flow to enter the side channels will have little affect on the flow depths in the steep riffle that the bull trout negotiate during their upward migration. It is expected to decrease depths less than 1.5 inches at each side channel/ mainstem entrance, lessen velocities and decrease sediment sizes, which is a favorable condition.
- The current Coho mainstem Rush Creek spawning overlap may lessen if the Coho prefer the gentler gradient and lower velocities of the project side channels.

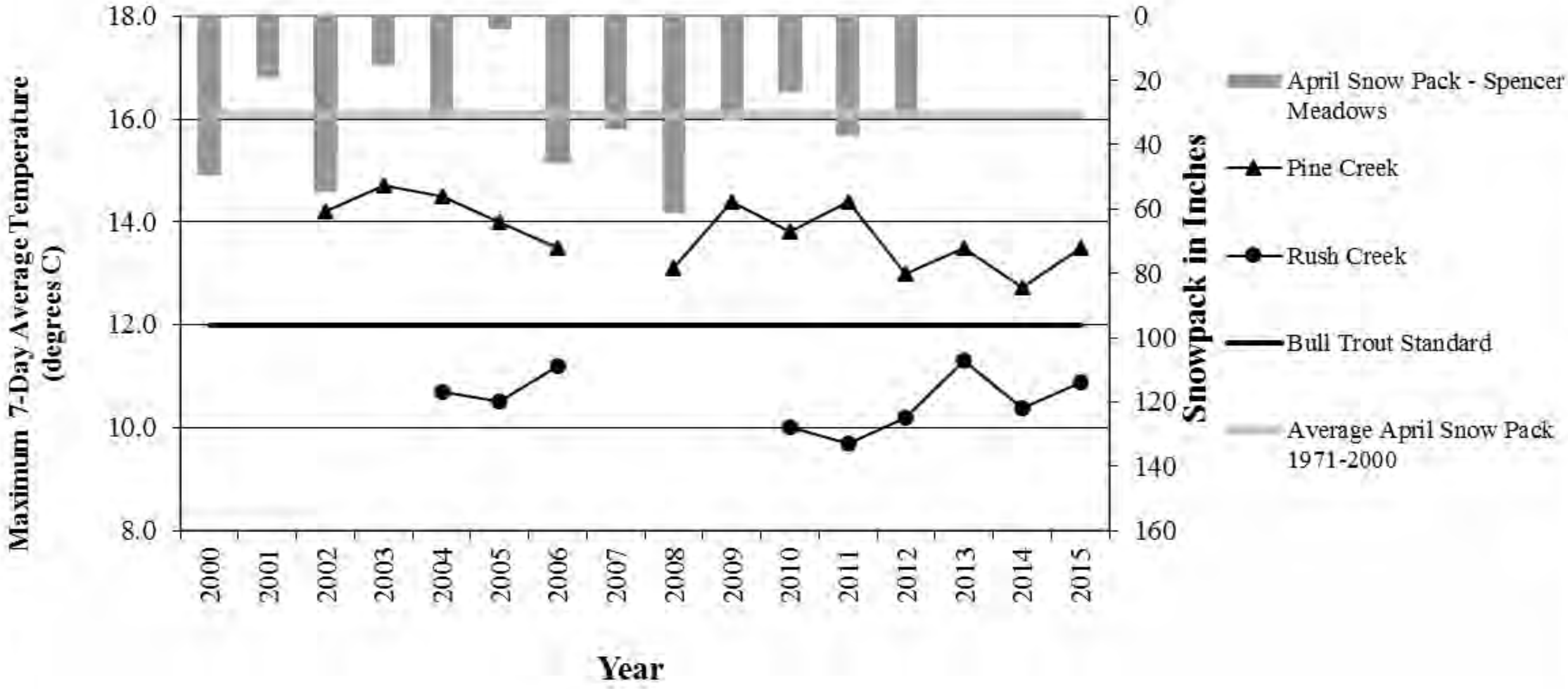
Rush Creek Side Channel Reactivation

- Noise limitation for Spotted Owl limit work start date to after July 15.
- The In water work window July 15th- August 15th.
- These two restrictions necessitate bringing this project forward as a single project, and not combine with other projects in the area.
- The Forest Service presumed that the project, if funded, would be considered a Bull Trout restoration project, even though benefits to Coho will also occur.

Rush Creek Temperature

- This Rush Creek Project will not affect the shade of mainstem Rush Creek and it is not expected that the reduction in flow to the lowest 0.4 miles of the mainstem would not affect the temperature of Rush Creek.
- Rush Creek Temperatures were monitored and remain cool.

Rush Creek Temperature



Rush Creek Side Channel Reactivation Budget

Requested ACC Funds				**USFS IK Funds**		
Rush Creek Side Channel				**Rush Creek Side Channnel**		
Mobilization	LS	$15,500		NEPA Anlaysis @400/day		
Directional Tree Cable	100 @ $200	$20,000			Heritage	$2,000
Skidder	100 @ $135	$13,500			Hydrology	$2,000
					Botany	$2,000
					Fisheries	$2,000
					Wildlife	$2,000
Off Road Haul Truck 20 Ton minimum	100 hrs @ $250	$22,500			Silviculture	$2,800
Excavator #1 (w/Harvester Cage)	200 hrs @ $200	$40,000		Contracting	Contracting Officer	$2,000
Excavator #2 (Large)	200 hrs @ $225	$45,000				
				Trees	825 @ $50	$41,250
Erosion Control/Revegation/ Pre-treat Weeds (Ska Co.)	Road fabric, plants, and weed treatment	$8,500				
Laborer/Sawyer		$2,500				
Dewatering/Sediment Control		$7,000				
COR Construction Oversite/ Implementation	30 days @ $400	$12,000				
Monitoring/ Reporting	Fish / Hydro Technicia	$8,500				
	ACC SUB-TOTAL	**$195,000**			**USFS In-Kind SUB-TOTAL**	**$56,050**
					Total Project Total	**$251,050**

Questions?

Eagle Island Chum Salmon Spawning Channel Project

Todd Hillson, Washington Department of Fish and Wildlife

Washington Department of FISH and WILDLIFE

Outline

- Brief historical overview of Lower Columbia River (LCR) chum salmon
- LCR chum salmon limiting factors
- Why is this project important for recovery of LCR chum salmon
- A time-line and funding history of the Eagle Island spawning channel project
- Overview of the design
- Pre-proposal comments & questions

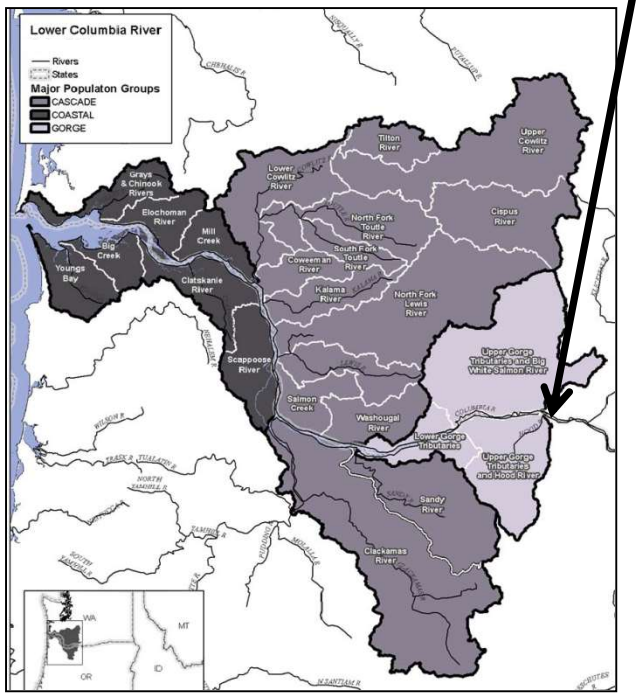
Historic Overview

Based on commercial landings & habitat, 0.5 - 1 million chum salmon returned to Columbia River basin (ISAB 2015-1)

- Upper Distribution Celilo Falls

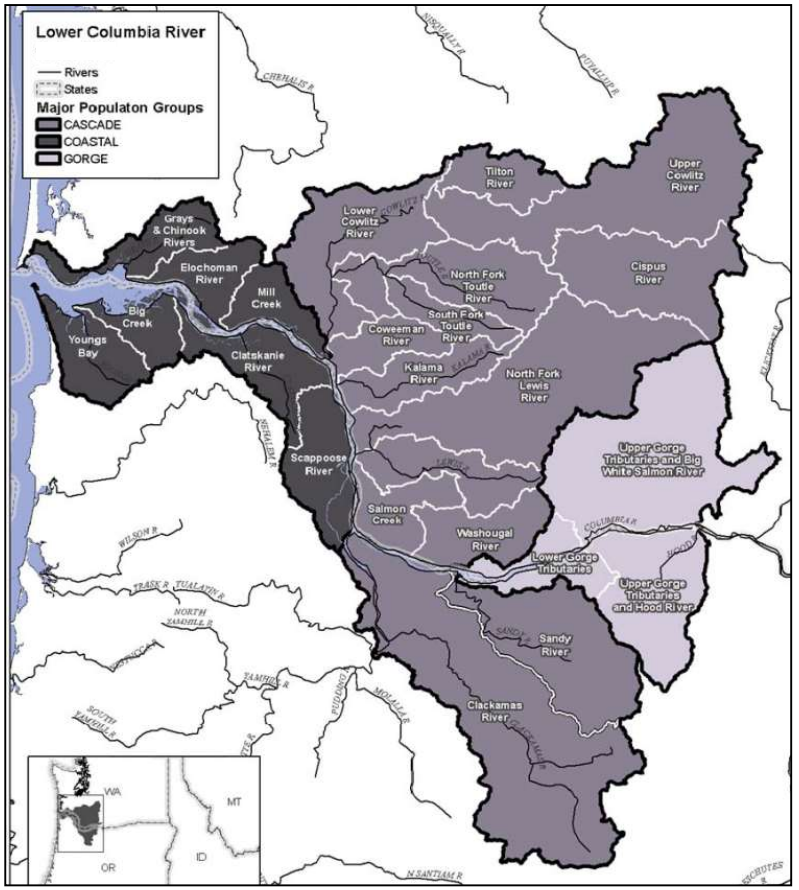
Decline in the 1940's

- Loss, degradation, and impeded access to spawning habitat
- Changes to estuary ecology and habitat
- Altered mainstem & tributary hydrology
- Harvest

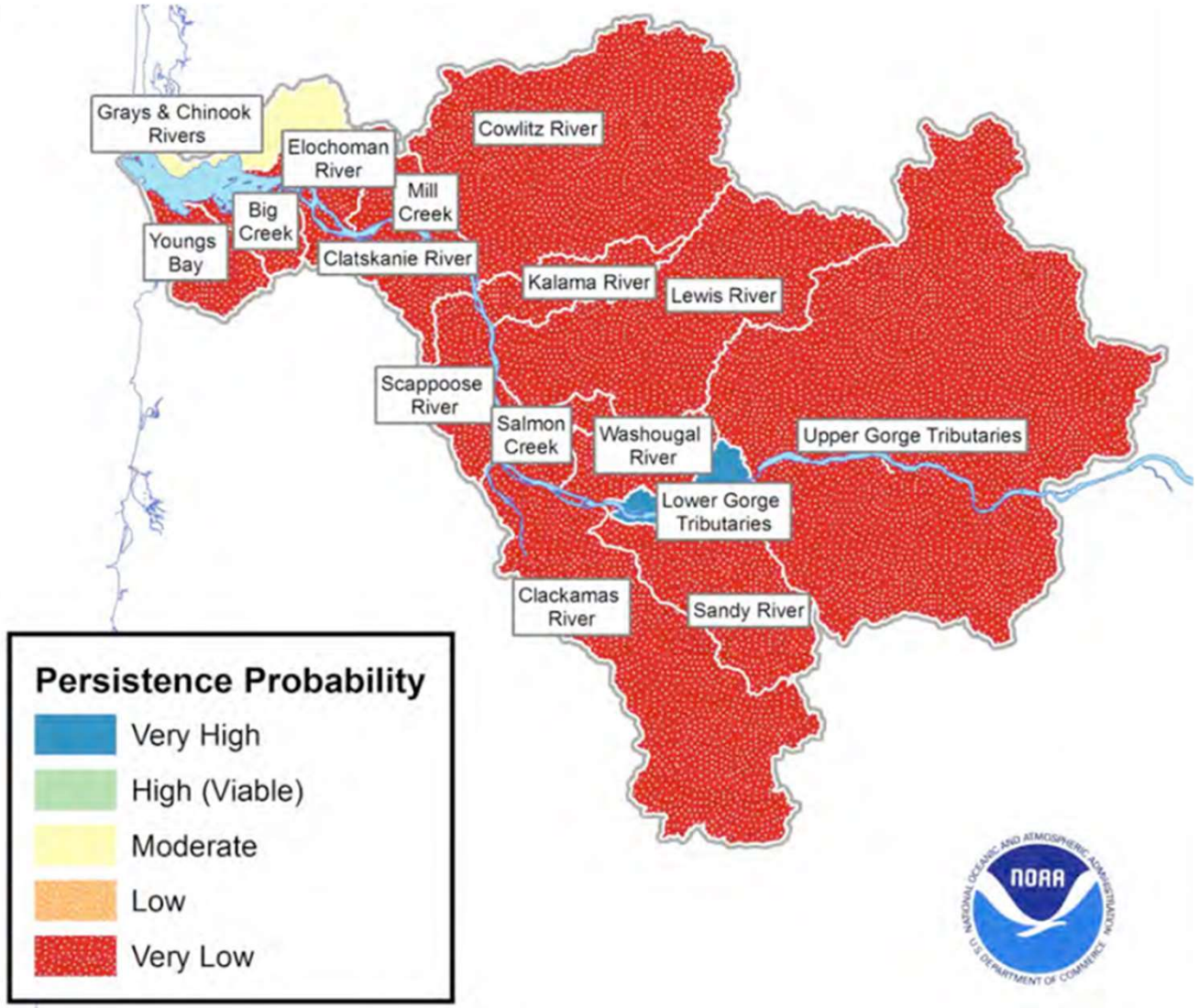


Endangered Species Act (ESA)

- Currently, between 1,000s & 10,000s of chum salmon return to the LCR
  - 17 historic populations in the Columbia River (90% of which are extirpated)
  - Limited current distribution (Mostly in Washington)
- Listed as Threatened under Endangered Species Act in 1999
  - 1 ESU for Lower Columbia River
  - Divided into 3 geographic stratum (Coast, Cascade & Gorge)



Lower Columbia River Salmon and Steelhead ESA Recovery Plan, NOAA - 2013



LCR Chum Salmon Limiting Factors

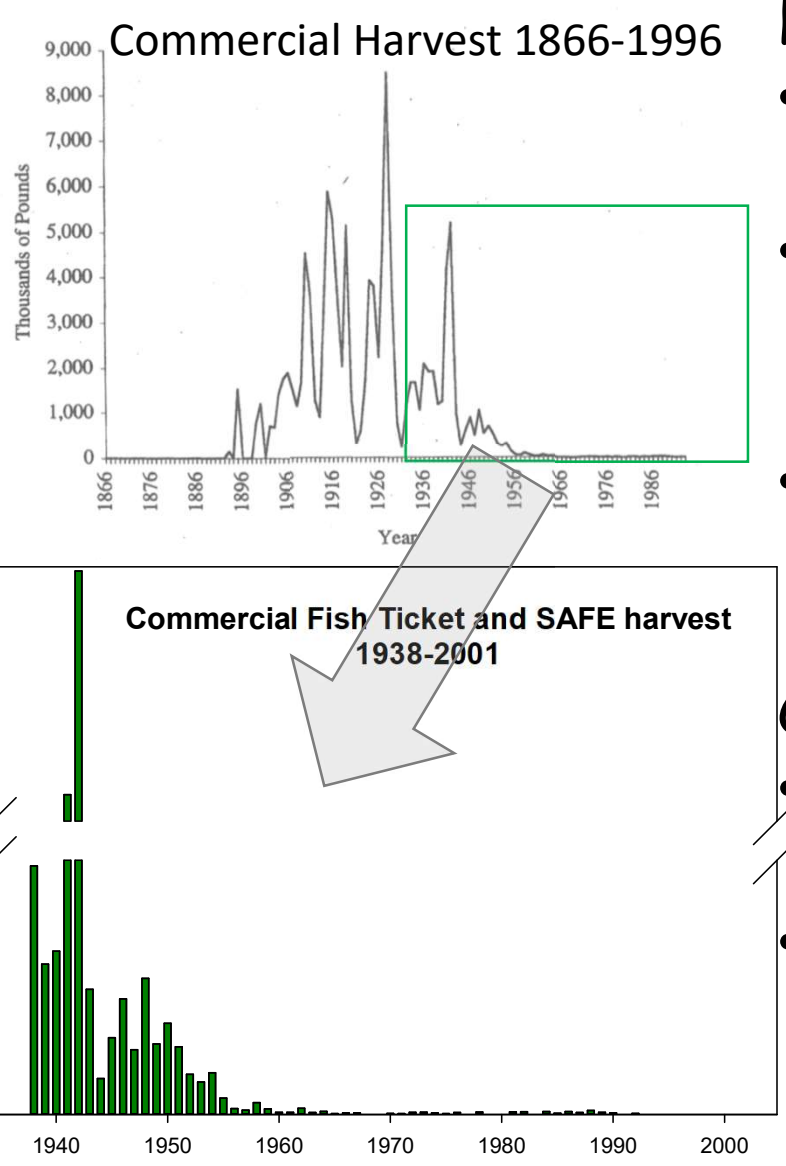
Harvest

Hydro

Hatcheries

Habitat

Limiting Factor - Harvest



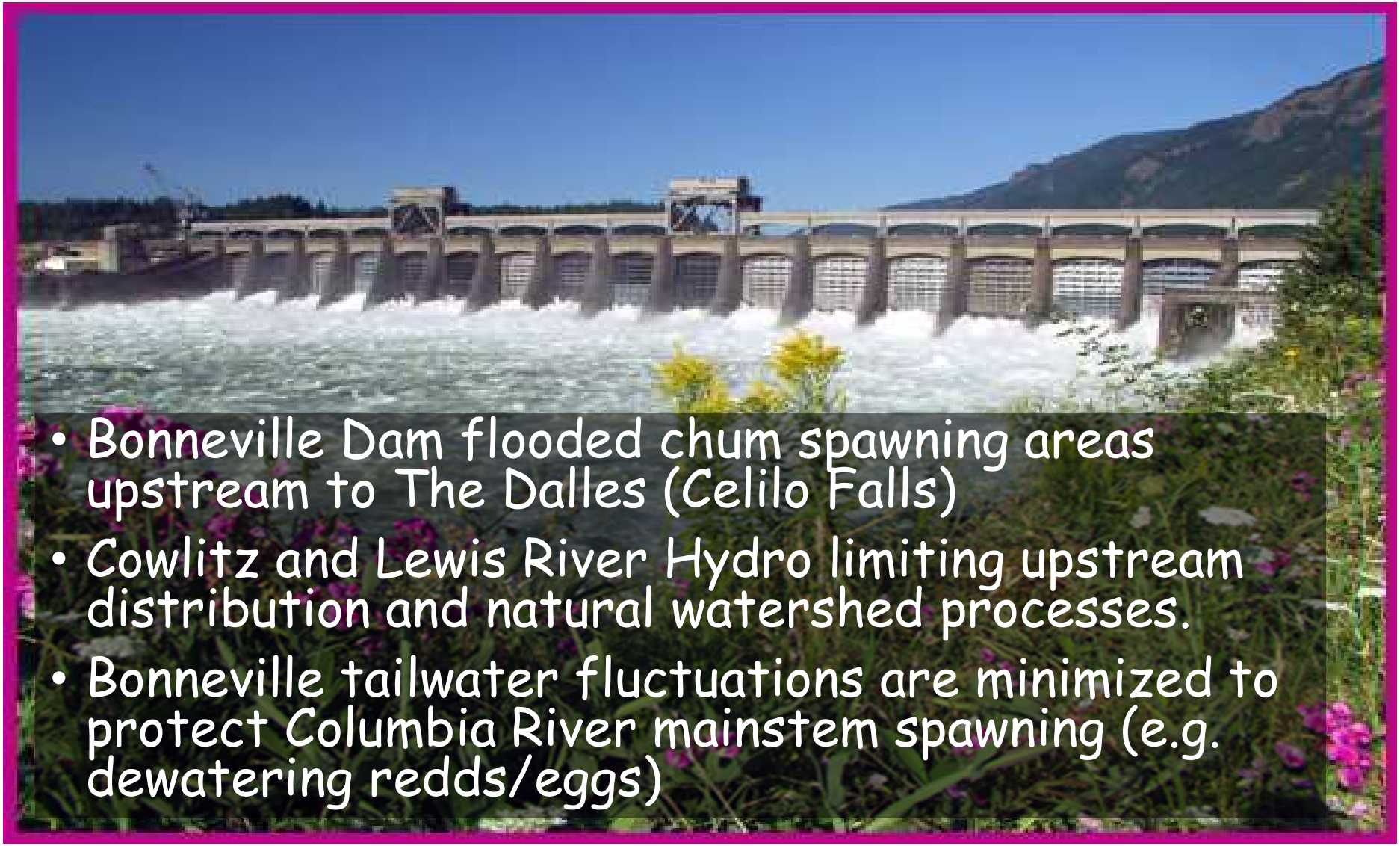
Historic Catch

- Annual Landings of adults ranged from 100-500K adults
- Appropriate harvest rate for a healthy population of chum salmon is 48% (Chapman 1986)
- Fisheries Managers reduced harvest in 1950s due to declines in abundance

Current Harvest

- Harvest prohibited on LCR chum salmon
- Incidental impacts in Chinook and/or coho salmon targeted commercial fisheries limited to <5%.

Limiting Factor - Hydro

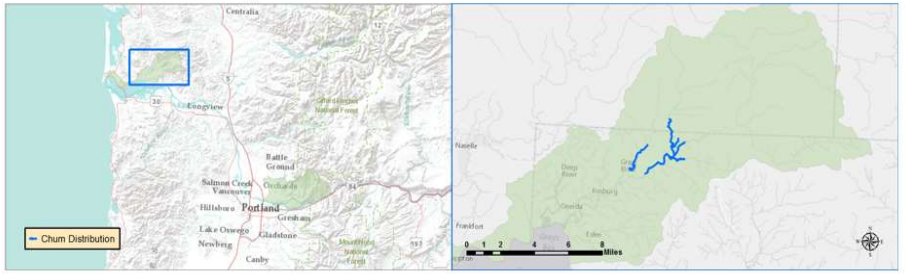


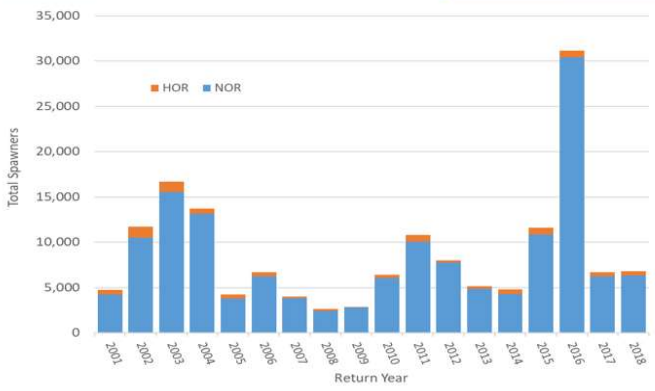
- Bonneville Dam flooded chum spawning areas upstream to The Dalles (Celilo Falls)
- Cowlitz and Lewis River Hydro limiting upstream distribution and natural watershed processes.
- Bonneville tailwater fluctuations are minimized to protect Columbia River mainstem spawning (e.g. dewatering redds/eggs)

Limiting Factor - Hatcheries

- Little/no current or historical impact from LCR chum salmon hatchery programs
  - Currently four hatchery chum programs in the LCR – Grays, Big Creek (ODFW), Lewis, and Duncan
  - All WDFW Programs are integrated with annual values of recent pNOB >90-95% and pHOS ranging from 0-10%
- Potential predation impact on fry outmigrants from releases of hatchery yearling age juveniles

Grays Status & Trend





Grays	
2002-06	10,819
2003-07	9,237
2004-08	6,381
2005-09	4,174
2006-10	4,640
2007-11	5,517
2008-12	6,336
2009-13	6,873
2010-14	7,284
2011-15	8,293
2012-16	12,325
2013-17	11,862
2014-18	12,370

Delisting goal = 1,600 spawners

Limiting Factor - Habitat

- Key chum salmon spawning and incubation habitat occurred in off-channel or braided portions of rivers.

- Because this habitat produces high egg-to-fry survival which is needed to sustain populations when ocean survival is low.

- Typically this type of habitat occurred in the lowest portions of rivers and has been negatively impacted by agriculture, dikes, levees, and population growth.

EF Lewis Historic Channels

Completed Habitat Restoration

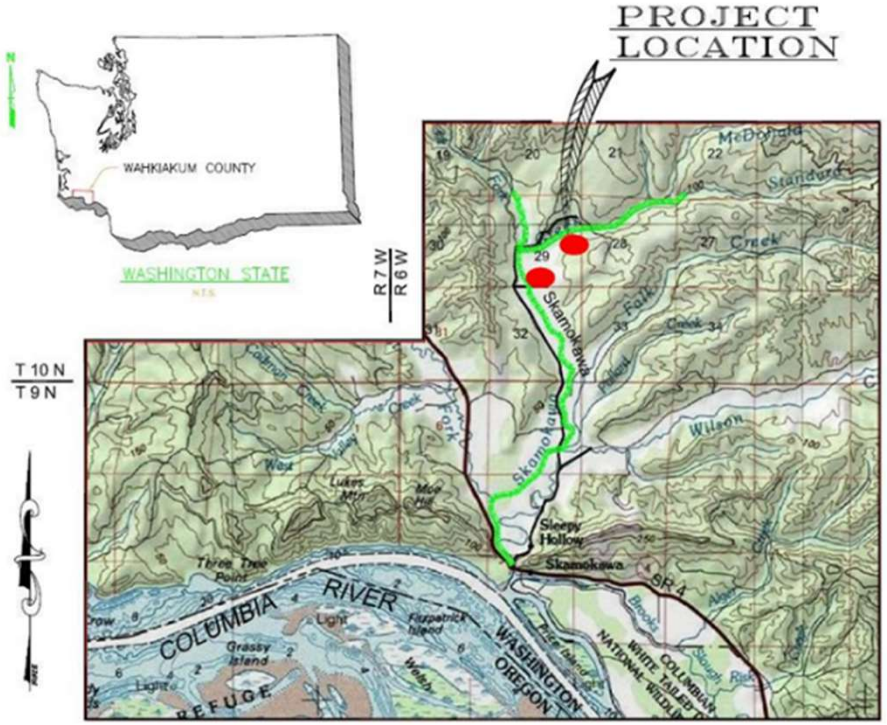
Duncan Creek spawning channels constructed in 2001 & upgraded in 2008, extended in 2011

Hamilton Springs constructed in 1980s, upgraded and extended in 2011

LCFEG implementation of multi-species restoration

Skamokawa Spawning Channels

- Completed in summer of 2017
- ELJ and small berms installed to protect two spawning channels (Emlen & McNally)



Crazy Johnson Spawning Channels

- Completed in fall of 2017 by the LCFEG

Habitat Effectiveness Monitoring

- Spawning channel egg-to-fry survival
  - Duncan Creek Channels - mean=54%, range 35-86%
  - Hamilton Springs - mean=48%, range 38-60%
- Natural off-channel egg-to-fry survival
  - Crazy Johnson Creek Spawning area – mean 28%, range 18-38%
- River channel egg-to-fry survival
  - Grays River mean=17%, range 2-33%

- Natural and artificial off-channel sites have higher, and less variable, egg-to-fry survival compared to river channel survival

Why is high egg-to-fry/ freshwater survival critical to recovering LCR chum salmon?

1) Necessary to overcome the low Smolt-to-Adult Survival Rates (SARs) experienced by LCR chum salmon as fry migrants

2) Critical for populations to persist during prolonged periods of poor ocean conditions

Ocean Indicators & Forecasting

- There has been a lot of research on how ocean conditions affect the growth and survival of juvenile salmon in the northern California Current
- Standardized physical and biological metrics have been developed to describe ocean conditions – known as "ecosystem indicators"
- These ecosystem indicators have been used to forecast adult returns for Chinook and coho salmon
- WDFW uses these same ecosystem indicators to predict SARs and forecast adult chum salmon returns to the Columbia River

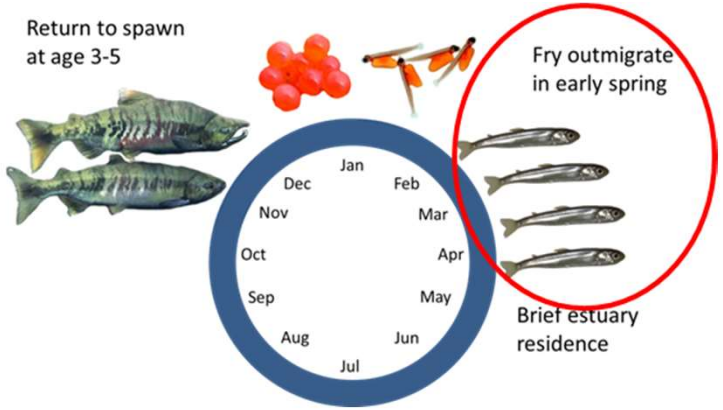
	Year																	
Ecosystem Indicators	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
PDO (Sum Dec-March)	5.07	-1.75	-4.17	1.86	-1.73	7.45	1.85	2.44	1.94	-0.17	-3.06	-5.41	2.17	-3.65	-5.07	-1.67	1.24	9.26	6.69
PDO (Sum May-Sept)	-0.37	-5.13	-3.58	-4.22	-0.26	3.42	2.96	3.48	0.28	0.91	-7.63	-1.11	-3.53	-6.45	-7.79	-3.47	5.07	8.08	6.6
ONI (Average Jan-June)	1.12	-1.07	-1.07	-0.40	0.18	0.27	0.20	0.47	-0.30	0.08	-0.98	-0.23	0.55	-0.72	-0.43	-0.30	-0.28	0.67	1.48
46050 SST (°C, May-Sept)	13.66	13.00	12.54	12.56	12.30	12.92	14.59	13.56	12.77	13.87	12.39	13.02	12.92	13.06	13.26	13.37	13.43	14.05	13.88
Upper 20 m T (°C, Nov-Mar)	12.27	10.31	10.12	10.22	10.08	10.70	10.85	10.60	10.61	10.04	9.33	10.19	11.01	10.02	9.62	10.09	9.47	12.75	12.02
Upper 20 m T (°C, May-Sept)	10.38	10.13	10.19	9.77	8.98	9.62	11.39	10.73	9.97	9.99	9.30	9.90	10.14	10.05	9.95	10.63	10.97	10.04	10.20
Deep temperature (°C, May-Sept)	8.59	7.63	7.74	7.56	7.46	7.81	7.89	7.97	7.83	7.58	7.48	7.73	7.89	7.81	7.56	7.94	8.38	8.08	7.89
Deep salinity (May-Sept)	33.54	33.86	33.78	33.86	33.85	33.68	33.66	33.77	33.85	33.88	33.87	33.72	33.61	33.74	33.75	33.76	33.53	33.71	33.83
Copepod richness anom. (no. species, May-Sept)	4.54	-2.58	-3.41	-1.03	-1.12	1.99	1.42	4.39	2.68	-0.63	-0.76	-0.64	3.12	-2.13	-1.31	-2.51	-0.11	7.76	8.32
N. copepod biomass anom. (mg C m^{-3}, May-Sept)	-0.76	0.04	0.15	0.15	0.29	-0.13	0.06	-0.84	-0.01	0.14	0.26	0.15	0.16	0.44	0.39	0.28	0.26	-0.33	-0.90
S. copepod biomass anom. (mg C m^{-3}, May-Sept)	0.60	-0.23	-0.21	-0.21	-0.23	0.09	0.20	0.55	0.07	-0.07	-0.23	-0.19	0.21	-0.14	-0.19	-0.20	-0.02	0.43	0.52
Biological transition (day of year)	263	134	97	101	108	156	132	230	180	81	64	65	169	82	125	91	162	Never	Never
Ichthyoplankton biomass (log (mg C 1000 m^{-3}) Jan-Mar)	0.12	0.90	1.80	1.25	1.05	0.46	0.58	0.83	0.59	0.60	1.84	0.89	1.65	0.61	0.99	1.16	0.43	1.63	1.47
Ichthyoplankton community index (PCO axis 1 scores; Jan-Mar)	-2.13	10.40	-42.67	-31.69	-36.80	1.39	49.41	47.23	-38.11	8.26	-40.10	15.31	26.19	7.60	-35.45	-27.36	-15.69	48.49	55.72
Chinook salmon juvenile catches (no. km^{-1} June)	0.26	1.27	1.04	0.44	0.85	0.63	0.42	0.13	0.69	0.86	2.56	0.97	0.89	0.46	1.32	1.35	0.86	0.57	0.82
Coho salmon juvenile catches (no. km^{-1} June)	0.35	2.29	1.50	2.87	2.51	3.58	1.13	0.23	1.13	3.49	3.37	1.87	1.84	1.26	1.12	4.91	1.63	1.95	1.38
Principal Component scores (PC1)	4.92	-2.16	-2.82	-2.09	-2.53	0.87	2.41	3.58	-0.08	-0.95	-4.71	-1.49	0.88	-1.79	-2.65	-2.10	0.74	4.94	5.04
Principal Component scores (PC2)	1.53	-0.04	0.05	-0.85	-1.49	-0.53	2.31	0.25	-0.24	-0.09	-2.14	0.65	-0.44	1.60	0.63	0.58	3.09	-2.14	-2.74
Ecosystem Indicators not included in the mean of ranks or statistical analyses																			
Physical Spring Trans. UI based (day of year)	83	88	134	120	84	109	113	142	109	70	87	82	95	105	123	97	129	103	86
Physical Spring Trans. Hydrographic (day of year)	187	119	142	129	120	141	157	209	123	136	102	136	169	119	140	106	162	124	164
Upwelling Anomaly (April-May)	-14	19	-36	2	-12	-34	-27	-55	-14	9	0	-5	-35	-36	-35	-21	-37	50	28
Length of Upwelling Season UI based (days)	191	205	151	173	218	168	177	129	195	201	179	201	161	153	161	163	133	175	186
SST NH-5 (°C, May-Sept)	11.30	11.08	11.04	10.98	10.15	10.85	12.85	11.73	11.36	11.80	10.66	11.99	11.41	11.08	11.66	11.66	11.71	11.57	11.76
Copepod Community Index (MDS axis 1 scores)	0.65	-0.89	-0.90	-0.83	-1.02	-0.27	-0.23	0.46	-0.06	-0.72	-0.96	-0.86	-0.29	-0.77	-0.83	-0.91	-0.39	0.52	0.85
Coho Juv Catches (no. fish km^{-1} Sept)	0.11	1.12	1.27	0.47	0.98	0.29	0.07	0.03	0.16	0.15	0.27	0.01	0.03	0.30	0.13	NA	NA	NA	NA

NOTE: The SST at 46050 for 2011 is an estimated value due to a lack of buoy data from January to July.

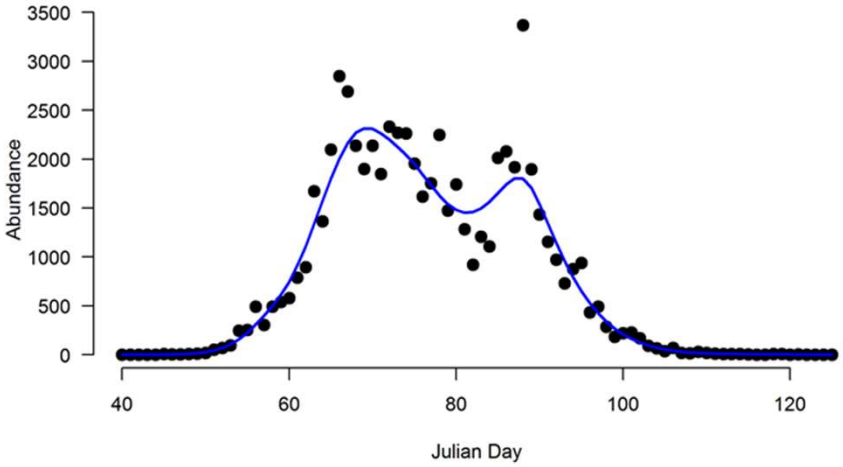
	Year																	
Ecosystem Indicators	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
PDO (Sum Dec-March)	16	6	3	12	7	18	11	15	13	9	5	1	14	4	2	8	10	19	17
PDO (Sum May-Sept)	10	4	6	5	11	15	14	16	12	13	2	9	7	3	1	8	17	19	18
ONI (Average Jan-June)	18	1	1	6	12	14	13	15	8	11	3	10	16	4	5	7	9	17	19
46050 SST (°C, May-Sept)	15	8	3	4	1	7	19	14	5	16	2	9	6	10	11	12	13	18	17
Upper 20 m T (°C, Nov-Mar)	18	11	8	10	6	14	15	12	13	5	1	9	16	4	3	7	2	19	17
Upper 20 m T (°C, May-Sept)	15	11	13	4	1	3	19	17	7	8	2	5	12	10	6	16	18	9	14
Deep temperature (°C, May-Sept)	19	6	8	4	1	10	12	16	11	5	2	7	14	9	3	15	18	17	13
Deep salinity (May-Sept)	18	3	8	4	5	15	16	9	6	1	2	13	17	12	11	10	19	14	7
Copepod richness anom. (no. species, May-Sept)	17	2	1	7	6	13	12	16	14	10	8	9	15	4	5	3	11	18	19
N. copepod biomass anom. (mg C m^{-3}, May-Sept)	12	13	9	10	3	15	12	18	14	11	6	8	7	1	2	4	5	16	19
S. copepod biomass anom. (mg C m^{-3}, May-Sept)	19	2	5	4	3	13	18	19	12	10	1	7	15	9	8	6	11	16	17
Biological transition (day of year)	17	11	6	7	8	12	10	16	15	3	1	2	18	4	9	5	13	19	19
Ichthyoplankton biomass (log (mg C 1000 m^{-3}) Jan-Mar)	19	10	2	6	8	17	16	12	15	14	1	11	5	13	9	7	18	4	5
Ichthyoplankton community index (PCO axis 1 scores; Jan-Mar)	9	13	1	6	4	10	18	16	3	12	2	14	15	11	5	7	8	17	19
Chinook salmon juvenile catches (no. km^{-1} June)	16	4	5	18	10	13	17	19	12	8	1	6	7	15	3	2	9	14	11
Coho salmon juvenile catches (no. km^{-1} June)	18	7	12	5	6	2	15	19	16	3	4	9	10	14	17	1	11	8	13
Mean of ranks	16.4	7.0	5.7	6.9	5.8	11.9	14.6	15.5	11.0	8.7	2.7	8.1	11.8	7.9	6.3	7.4	12.0	15.3	15.3
Rank of the mean rank	19	6	2	5	3	13	15	18	11	10	1	9	12	8	4	7	14	16	16
Ecosystem Indicators not included in the mean of ranks or statistical analyses																			
Physical Spring Trans. UI based (day of year)	3	7	18	15	4	12	14	19	12	1	6	2	8	11	16	9	17	10	5
Physical Spring Trans. Hydrographic (day of year)	18	3	13	8	5	12	14	19	6	9	1	4	17	3	11	2	15	7	16
Upwelling Anomaly (April-May)	9	3	18	5	8	13	12	19	9	4	6	7	14	16	15	11	18	1	2
Length of Upwelling Season UI based (days)	6	2	17	11	1	12	9	19	5	3	8	3	14	16	15	13	18	10	7
SST NH-5 (°C, May-Sept)	8	6	5	4	1	3	19	15	9	17	2	18	10	7	13	12	14	11	16
Copepod Community Index (MDS axis 1 scores)	18	5	4	8	1	13	14	16	15	10	2	6	12	9	7	3	11	17	19
Coho Juv Catches (no. fish km^{-1} Sept)	17	2	1	4	3	6	12	14	8	9	7	15	13	5	10	NA	NA	NA	NA

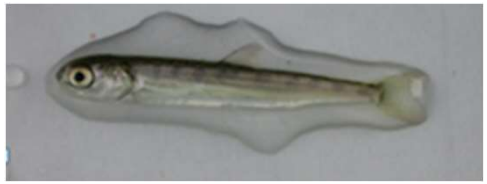
Early Life History for Chum Salmon

- Juveniles emigrate from February to early May
- Size 38-42mm (~1.6 inches)
- Working Hypothesis: Early marine (first year) survival explains most of the variability in ocean survival
- Data Analysis
  - Grays Hatchery releases & Duncan spawning channel production paired with broodyear adult returns are used to estimate smolt-to-adult return rates (SARs)
  - NOAA Ocean Indicators (PC1 scores)
  - Logit(SARs) = a + b(Principle Component 1)

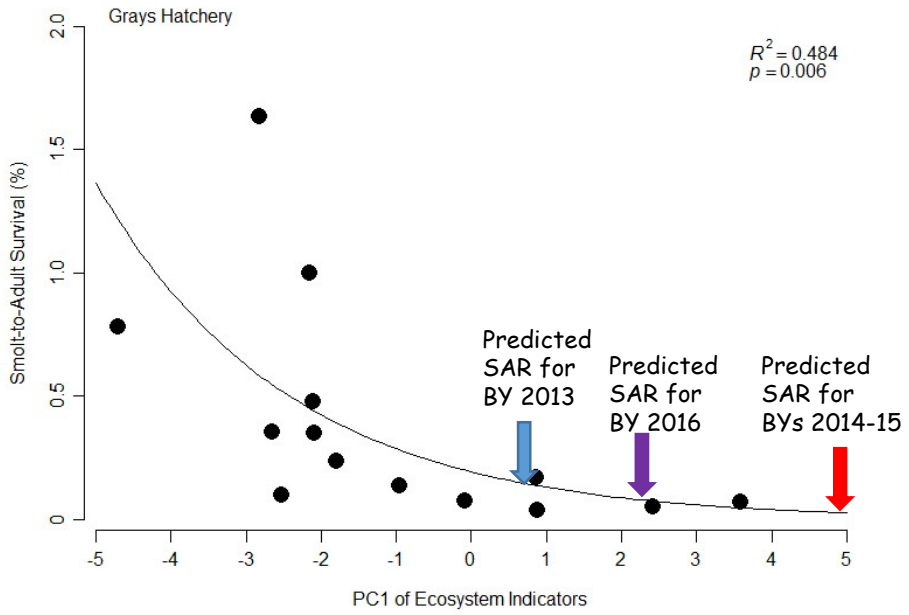


2016 Duncan Creek outmigration counts

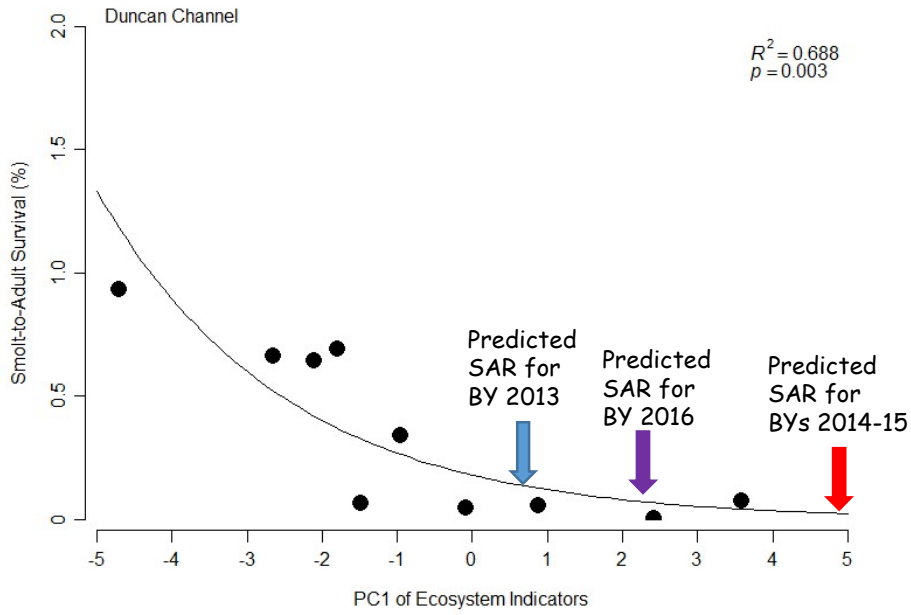




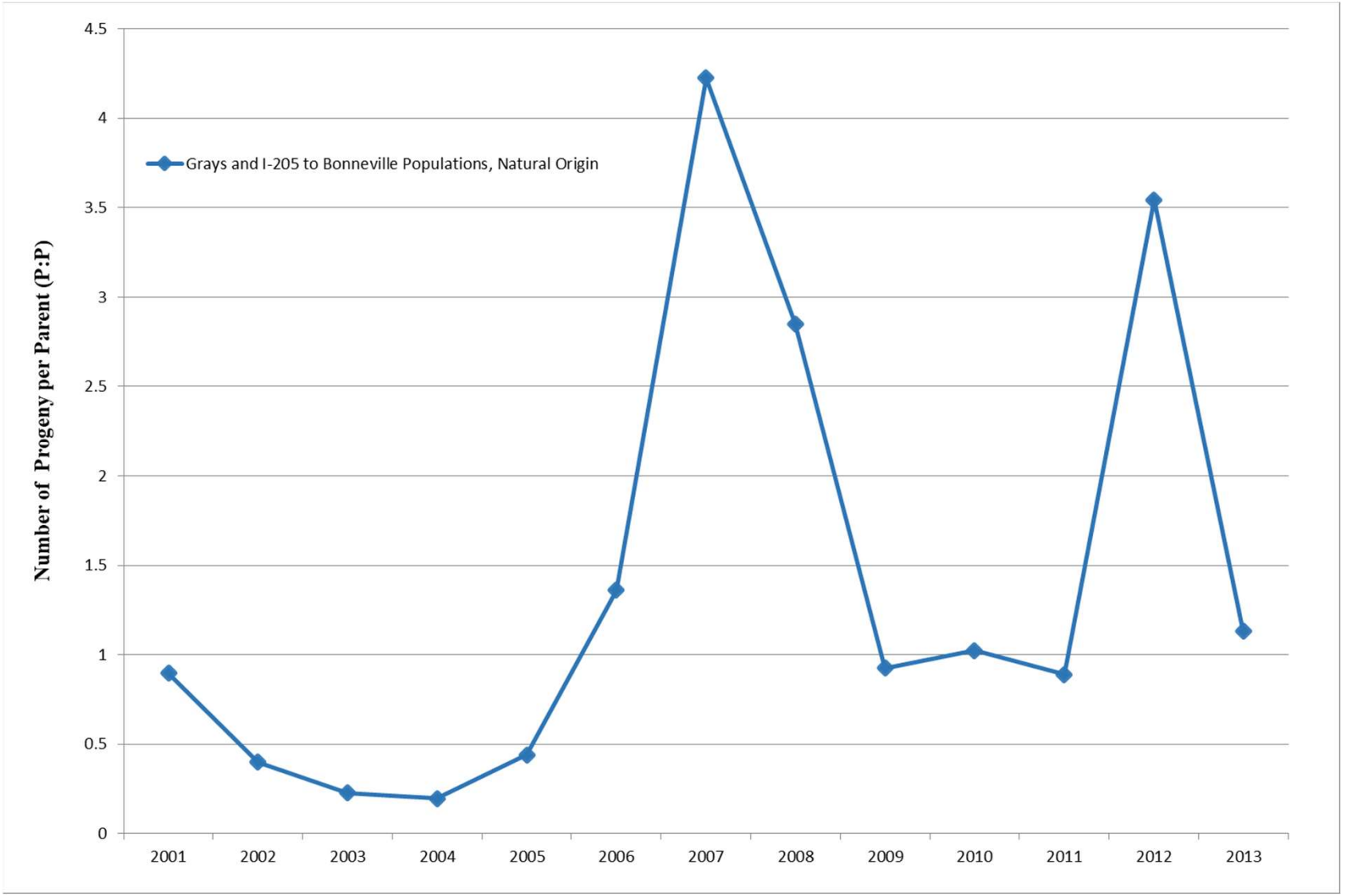
Logistic Regression Results



Grays River Hatchery-origin,
Broodyears 1998-2007, 2009-2012



Duncan Spawning Channel-origin,
Broodyears 2003-2012

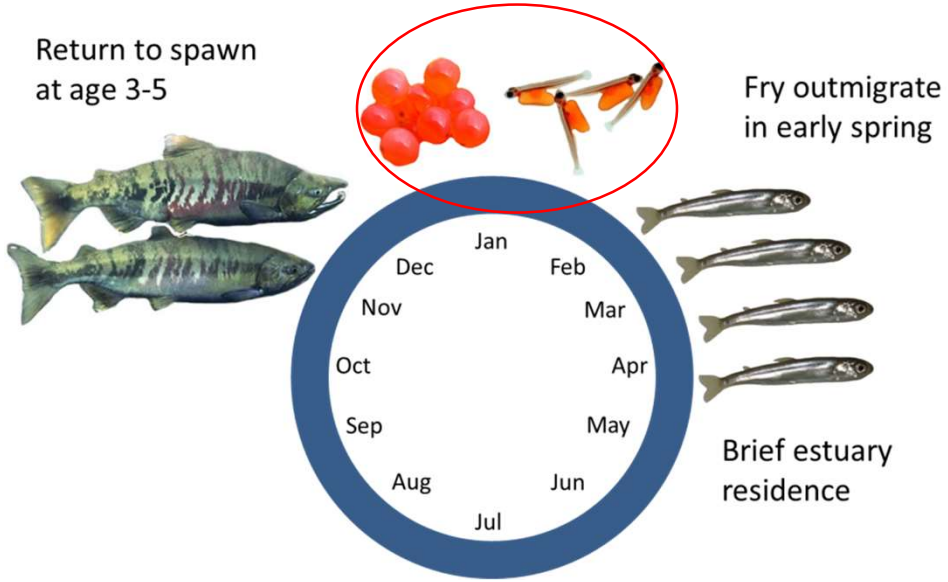


Progeny-Per-Parent, values greater than 1.0 equals population growth, in only 46% of recent NOR cohort/ broodyear returns.

Limiting Factors Summary

- Ocean survival explains much of the variation in life cycle survival but, except for estuary restoration, not much can be done to improve ocean survival.
- The only remaining healthy chum salmon populations have protected spawning and incubation areas.
- High freshwater survival only exists in protected off-channel sites, below hydro-regulated dams, artificial spawning channels, hatcheries, and remote-site incubators.

- **Working Hypothesis:** The quality and quantity of spawning and incubation habitat is limiting recovery of this species.



Timeline of Overall Project

- 2010 to 2012 - Scoping project initiated under BPA Project 2008-710-00 (LCR chum BiOp project) to identify sites within the Lewis River basin with the potential to support a large chum salmon spawning channel
  - Ten sites were initially identified, six in the EF Lewis River basin and four in the Lewis River basin
  - Reduced to four sites (two each in the EF Lewis and Lewis)
  - In the summer of 2011, sites were surveyed, test pits and pump tests were conducted at all sites; piezometers were installed to monitor groundwater over a chum salmon spawning and incubation season.
  - After considering all evaluation results and criteria, the Eagle Island Site was determined to have the most potential
  - In 2012, additional surveys and groundwater monitoring were conducted along with an analysis of the hydrology and hydraulic conditions at the Eagle Island Site.
  - A 30% design plan and design report were generated

Timeline - Continued

- 2013 – Goal was to move project into construction phase
  - However, BPA budget issues prevented substantial progress towards construction
  - Funds from BPA LCR chum BiOp project were used to conduct another year of groundwater monitoring and generate a comprehensive report and final design plans

- 2014 – Funding was secured through the Odessa Water Withdrawal Project Mitigation Fund to secure construction permits and cost share construction cost.
  - Design was reviewed by LCFRB SRFB TAC in 2014 for fatal flaws – none found
  - Additional funds to complete construction would be requested from BPA through their LCR chum BiOp project.

Timeline - Continued

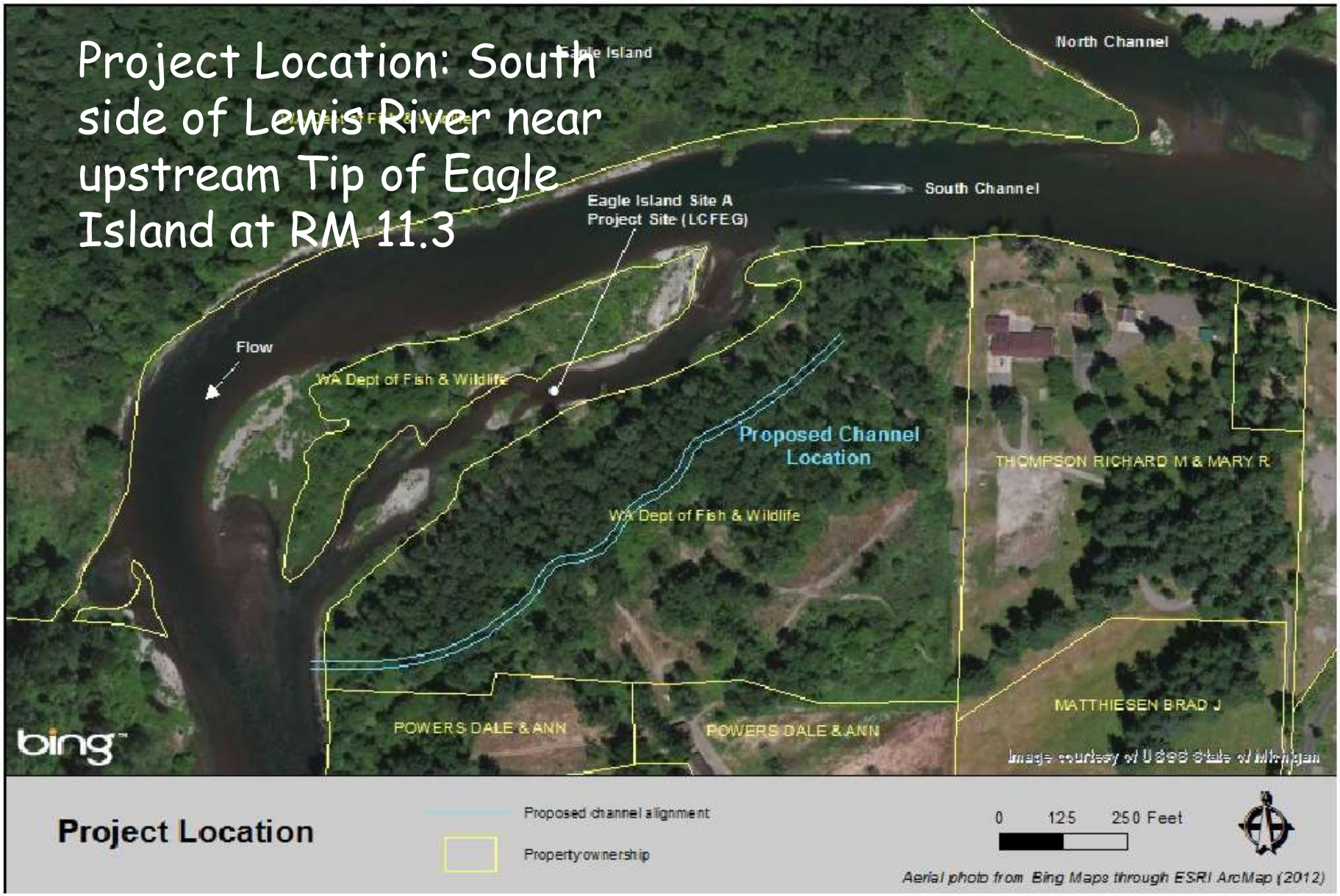
- Construction was planned to start at first opportunity after construction permits were secured (late Spring – Summer of 2015 or 2016)
  - All Construction permits were secured by Spring of 2016
  - Construction was planned to start in late Spring of 2016
  - Late Spring of 2016, funds from the BPA LCR chum BiOp project were used to purchase the majority of the construction materials needed (rock, spawning gravel, toe and pile logs, root wads, etc…)
  - Construction was delayed due to a landowner issue concerning the easement road to property. Purchased materials stored off-site.
  - Negotiated an agreement with landowner concerning easement in the fall of 2016.
  - They backed out at the last minute due to perceived impacts to their property from another project.
- Odessa Mitigation funding was repurposed in the fall of 2016 to construct one of the two Skamokawa basin chum salmon spawning channels in 2017

Timeline - Continued

- Re-engaged landowner with easement issue. Work to improve the easement road and move construction materials onto project site was scheduled for fall of 2017
  - Landowner changed position again and locked gate on easement road.
- January of 2018, the Title Company that insured the easement tried to negotiate with the landowner to resolve issues. Unfortunately, the landowner stated the easement issue could only be resolved through the court system.
  - The Title Company initiated a lawsuit against the landowner over the easement on May 2, 2018.
  - Summer of 2018 – Lawsuit was settled out of court.

History of Project Funding

- The BPA, through their LCR Chum BiOp project, have invested approximately $575K in this project to date
  - Scoping and evaluation, design reports and construction plans, and purchase of construction materials
- Approximately $215K of the Odessa Water Withdrawal Mitigation Fund was used for advancing this project towards construction
- Estimated final cost of project: $1.65 to $1.75 million
  - ~$890K has already been expended
  - Between $750-$850K needed to complete
    - $600-$800K from BPA and/or other sources
    - $100K SFRB grant



Source: Inter-Fluve Inc. Eagle Island Chum Spawning Channel FINAL DESIGN REPORT.

Figure 3. (A) looking upstream in the trench during the pump test. (B) The transition from soil, to sand, and finally alluvium can be seen in the wall of the trench.

Source: Inter-Fluve Inc. Eagle Island Chum Spawning Channel FINAL DESIGN REPORT.

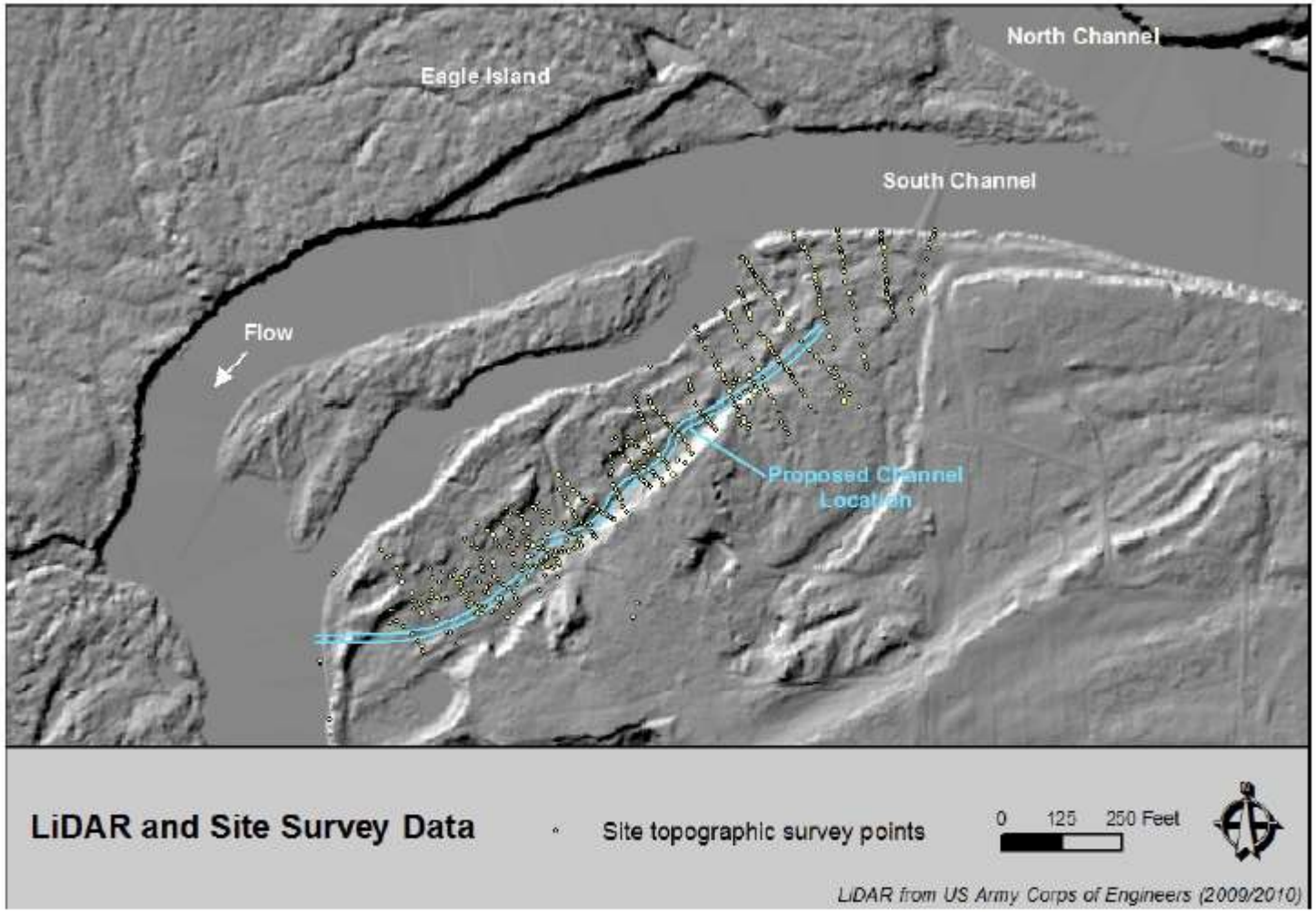
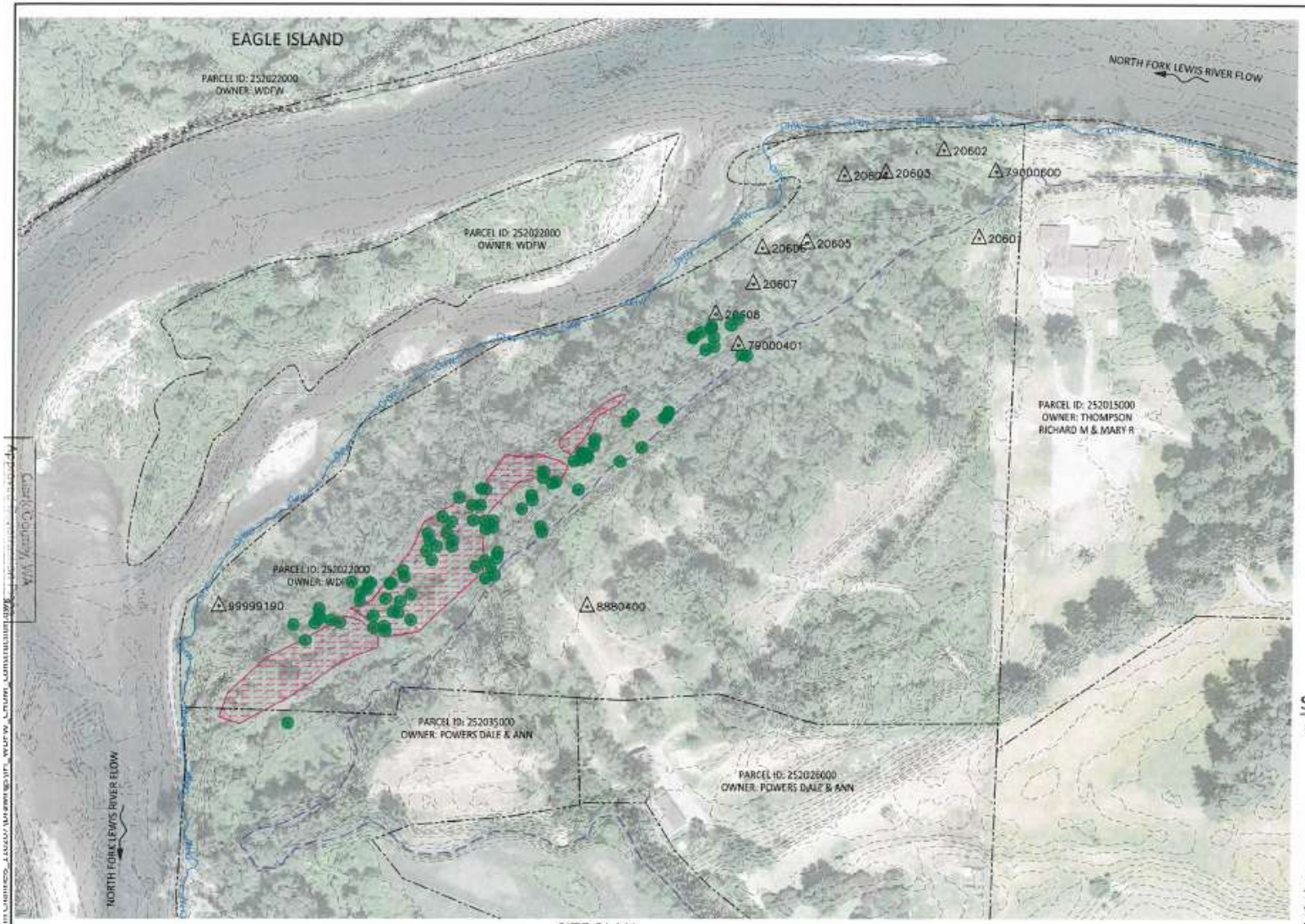


Figure 2. LiDAR hillshade map and site topographic survey points. Additional survey data of the North and South channels were also available and used for this project.

Source: Inter-Fluve Inc. Eagle Island Chum Spawning Channel FINAL DESIGN REPORT.



SITE PLAN

0 150 300
SCALE IN FEET

LEGEND

- CP600 △ SURVEY CONTROL POINT
- ORDINARY HIGH WATER
- EDGE OF EXISTING FLOODPLAIN
- EXISTING CONTOURS (1FT INTERVALS)
- PROPERTY LINES
- WETLAND - PALUSTRINE FORESTED (43,356 SQUARE FEET)
- EXISTING TREES

MICHAEL R. MCHALE — STATE OF OREGON — 78189 REGISTERED PROFESSIONAL ENGINEER

EXPIRES 8/25/2016

SURVEY CONTROL

POINT #	NORTHING	EASTING	ELEV.	DESC.
20601	227958.97	1084979	35.3348	cp601
20602	228093.074	1084924	31.9128	cp602
20603	228058.741	1084836	31.7898	cp603
20604	228054.871	1084772	31.0508	cp604
20605	227951.448	1084717	31.7058	cp605
20606	227943.802	1084650	28.1588	cp606
20607	227889.161	1084636	29.4308	cp607
20608	227842.826	1084580	33.5998	cp608
8880400	227397.62	1084388	37.5886	cp400
79000401	227795.747	1084615	29.0248	cp401
79000600	228060.609	1085003	31.3948	CP600
79000601	227958.951	1084979	35.2958	cp601
99999190	227397.76	1083826	28.9528	cp90

NO.	BY	DATE	REVISION DESCRIPTION

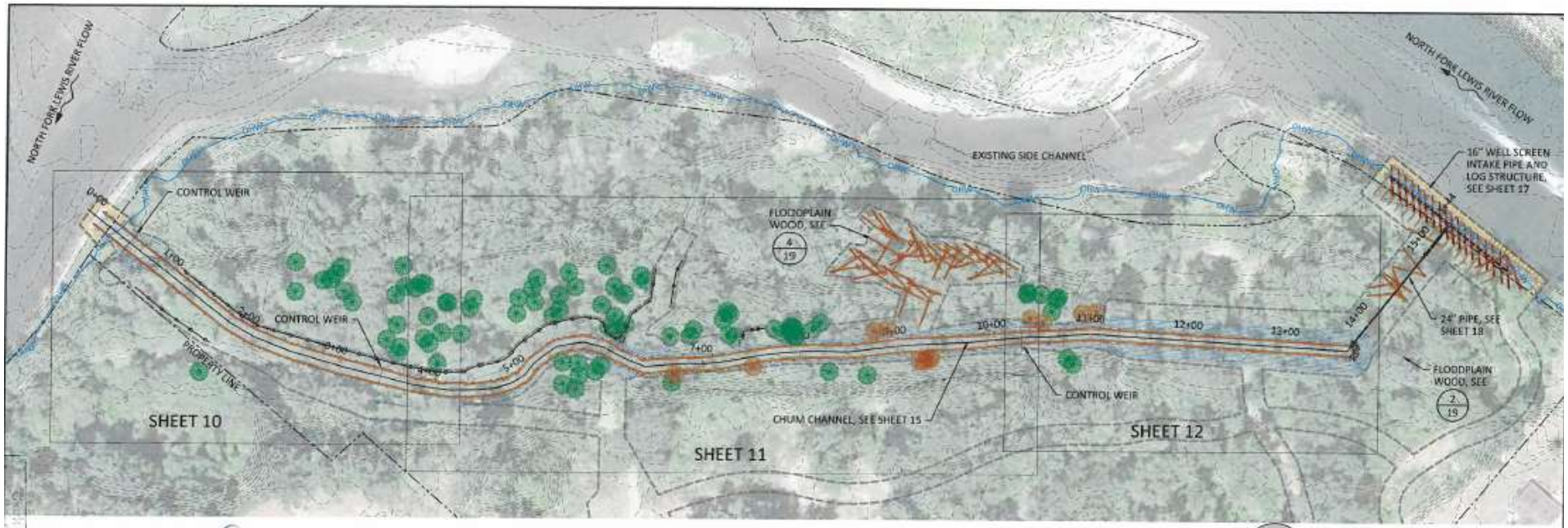
MJ,DF	MM,GJ	GJ
DRAWN	DESIGNED	CHECKED
MM	7/07/16	11-02-07
APPROVED	DATE	PROJECT

LEWIS RIVER - EAGLE ISLAND
CHUM SPAWNING CHANNEL
WOODLAND, WASHINGTON

inter-fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

EXISTING CONDITIONS, OWNERSHIP, AND SURVEY CONTROL

SHEET 6 OF 20



PLAN

LEGEND

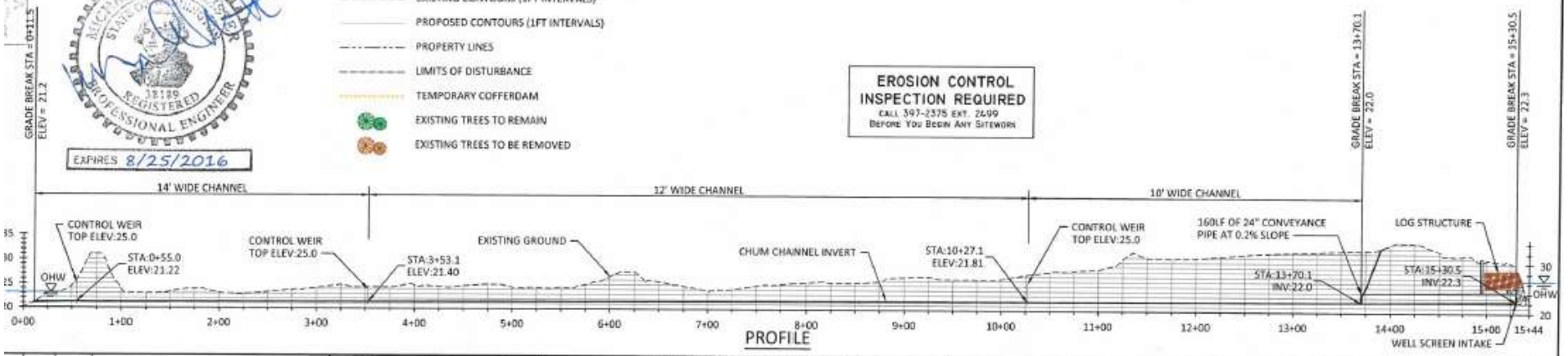
- ORDINARY HIGH WATER
- EXISTING CONTOURS (1FT INTERVALS)
- PROPOSED CONTOURS (1FT INTERVALS)
- PROPERTY LINES
- LIMITS OF DISTURBANCE
- TEMPORARY COFFERDAM
- EXISTING TREES TO REMAIN
- EXISTING TREES TO BE REMOVED

TEN EXISTING TREES TO BE REMOVED AND SALVAGED. REMOVED TREES SHALL BE USED IN LOG STRUCTURE OR FLOODPLAIN WOOD AT LOCATIONS SPECIFIED BY OWNER.

0 100 200
SCALE IN FEET

EROSION CONTROL INSPECTION REQUIRED
CALL 397-2375 EXT. 2409
BEFORE YOU BEGIN ANY SITEWORK

MICHAEL R. SCALISE
38189
REGISTERED PROFESSIONAL ENGINEER
EXPIRES 8/25/2016



PROFILE

NO.	BY	DATE	REVISION DESCRIPTION

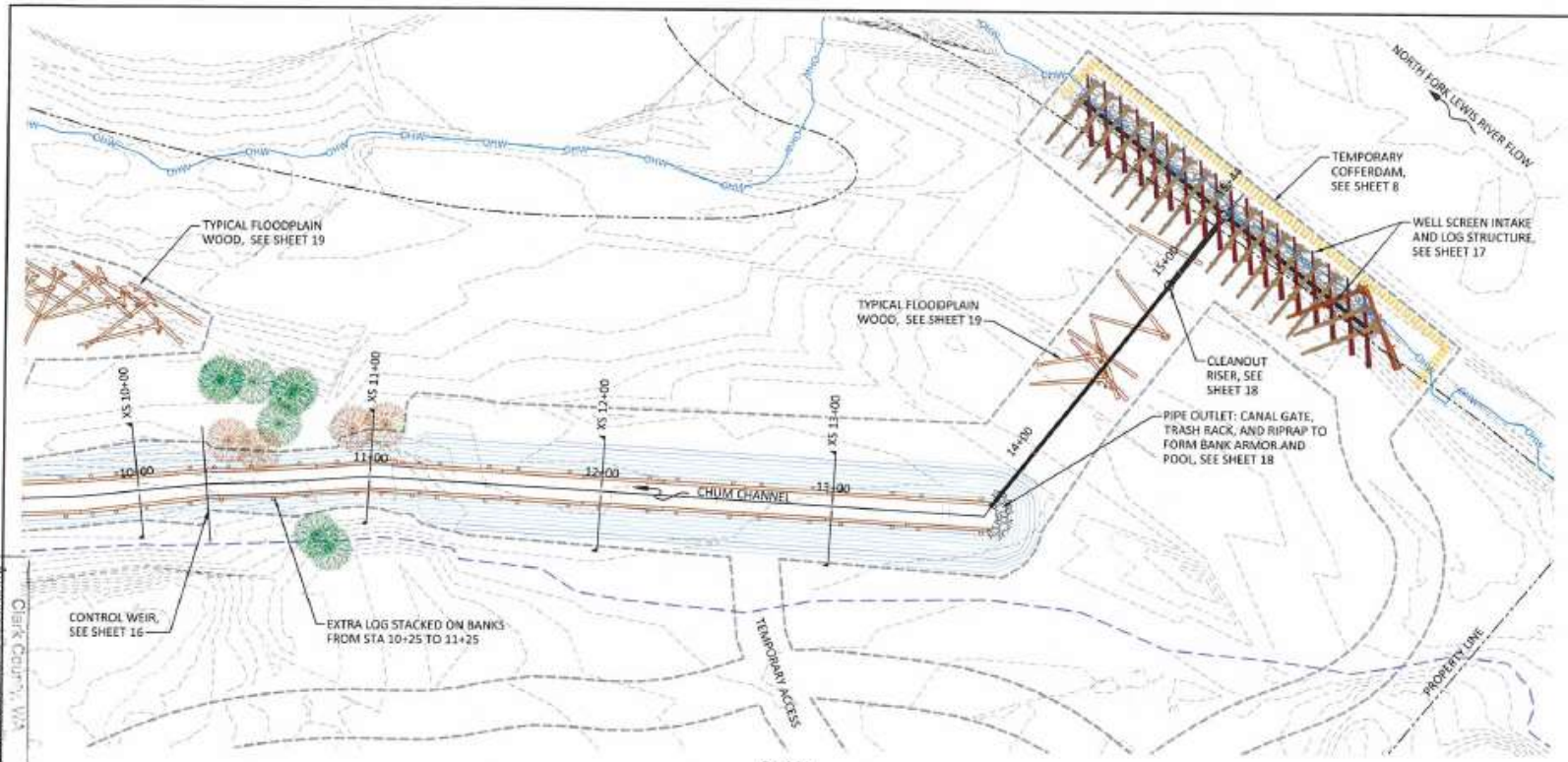
MJ.DF	MM.GJ	GJ
DRAWN	DESIGNED	CHECKED
MM	7/07/16	11-02-07
APPROVED	DATE	PROJECT

LEWIS RIVER - EAGLE ISLAND CHUM SPAWNING CHANNEL WOODLAND, WASHINGTON

inter·fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

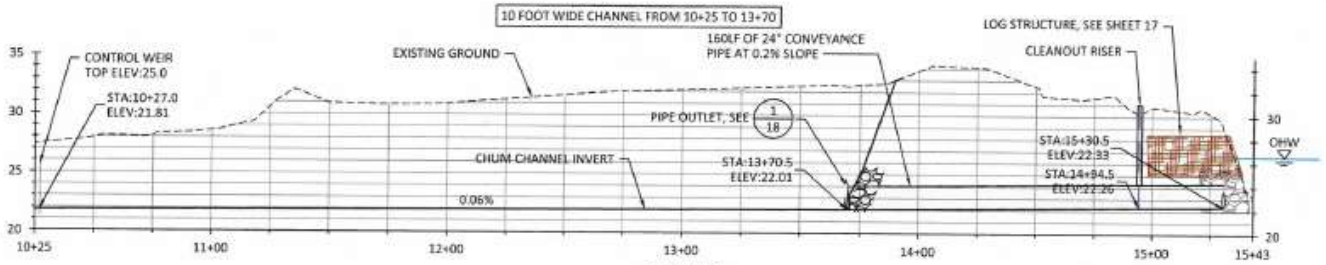
SHEET INDEX AND PROPOSED CONDITIONS PLAN & PROFILE

SHEET 9 OF 20



PLAN

SEE SHEET 13 FOR GRADING CROSS SECTIONS.



PROFILE

LEGEND

- ORDINARY HIGH WATER
- EDGE OF EXISTING FLOODPLAIN
- EXISTING CONTOURS (1FT INTERVALS)
- PROPOSED CONTOURS (1FT INTERVALS)
- PROPERTY LINES
- LIMITS OF DISTURBANCE
- TEMPORARY COFFERDAM
- XS 3+00 GRADING CROSS SECTIONS, SEE SHEET 13
- EXISTING TREES TO REMAIN
- EXISTING TREES TO BE REMOVED

0 50 100
SCALE IN FEET

EROSION CONTROL INSPECTION REQUIRED
CALL 397-2375 EXT. 2499
BEFORE YOU BEGIN ANY SITEWORK

MICHAEL R. McALLISTER
STATE OF WASHINGTON
38189
REGISTERED PROFESSIONAL ENGINEER

EXPIRES 8/25/2016

NO.	BY	DATE	REVISION DESCRIPTION

MJ,DF	MM,GJ	GJ
DRAWN	DESIGNED	CHECKED
MM	7/07/16	11-02-07
APPROVED	DATE	PROJECT

LEWIS RIVER - EAGLE ISLAND
CHUM SPAWNING CHANNEL
WOODLAND, WASHINGTON

inter-fluve
501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

PROPOSED CONDITIONS
STA 10+25 TO 13+70

SHEET 12 OF 20

Approved
Clerk of the Board

G:\U-Z\WDFW Chum Channels_110207\Drawings\VFI_WDFW_CHUM_Construction.dwg

Pre-Proposal
Comments & Questions

Lower Columbia Fish Recovery Board

- Why is this so expensive?
- Do you anticipate this being delayed further?
- What maintenance is expected?
- Consider adding other projects in the immediate vicinity.

Utilities

- Reference channel adjacent to this proposed channel. How has the other channel performed?
- How does this channel differ in objective?
- How will benefits be determined (very few chum salmon available).
- What are the plans to bring Chum to use the channel (hatchery?).
- Other grants have been secured, and permitting and logs secured. Funds are for construction only (20% of total construction costs). Where do monitoring funds come from?

National Marine Fisheries Service

- Expand on benefits to focal reintroduction species.
- Monitoring should include juvenile use by other focal species.
- More detailed budget.

Cowlitz Tribe

- The regional value of chum population enhancement is well supported within the proposal. While constructed channels should be a second-to-last measure behind hatchery production, the constrained and controlled nature of the Lewis mainstem leaves few viable options for enhancing chum habitat and populations.

- This project entered into agreement with SRFB in July 2019. The budget provided to SRFB indicated that the total construction cost was $900,000 (total project cost, including A&E, was not supplied), of which SRFB provided $100,000. At that time, WDFW did not indicate that they would seek additional funds from the ACC or elsewhere to complete the project, other than a negotiated amount from BPA.

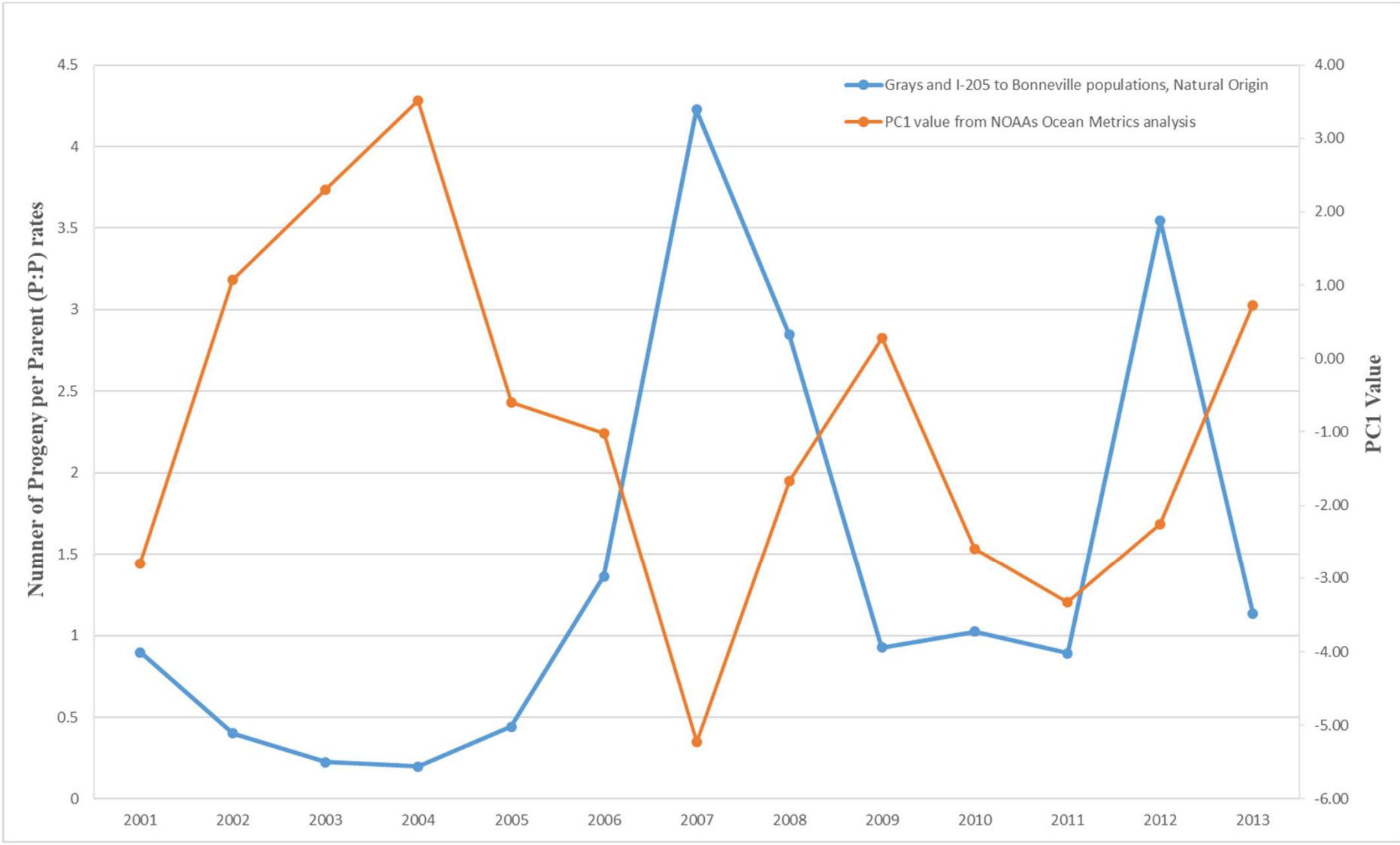
- The Aquatic Fund preproposal indicates that the $175,000 requested from the ACC is only 10% of the total project cost (i.e., total project $1.75 million). The Engineer's Estimate for construction provided by the applicant is roughly $700,000.

Cowlitz Tribe - continued

- The applicant states that WDFW has already expended $890K on the project without turning dirt (but an undefined portion of this money has been used to purchase construction materials). Please explain why this is a wise use of ACC funds, given the apparent free spending of other funds previously committed to the project without measurable progress on the project.

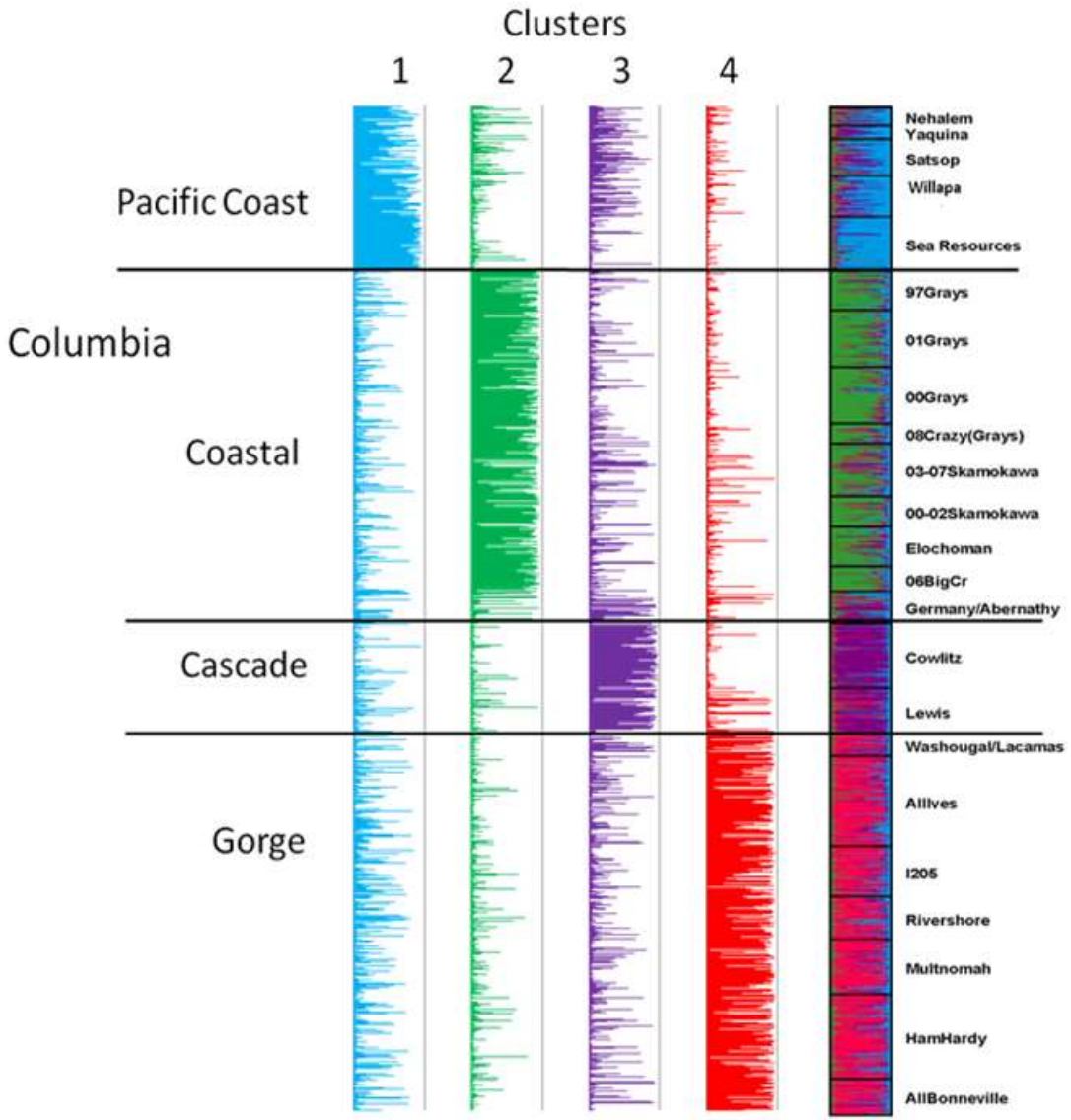
- The SRFB proposal listed Washington DNR State Owned Aquatic Lands (SOAL) as a landowner. The only landowner acknowledgement form attached is from WDFW. Has landownership changed on the project footprint?

- Groundwater chum channels constructed elsewhere in the Columbia Basin have required periodic maintenance to maintain their productivity. The addition of an infiltration gallery introduces an additional layer of long-term operational uncertainty. How would WDFW address the long-term operation and maintenance of this artificially constructed habitat?



Progeny Per Parent Values by BroodYear and corresponding PC1 values (negative is better) for outmigration year from NOAAs Ocean Metrics Analysis.

Project Location: South Side of Lewis River Near Upstream Tip of Eagle Island at RM 11.3



Individual ancestry values for combined contemporary and archived Lower Columbia River and Pacific Coast chum salmon collections from STRUCTURE analysis at K = 4.

Anderson NF Lewis River Restoration Design

Lower Coumbia Fish Recovery Board (Small Grants Program #2019-02)

Goal: To design a river restoration project within the project reach that addresses local resource concerns.

Objectives:
To obtain financial assistance to assist landowners with implementation of a project designed to address local resource concerns and state and federal natural resource mandates.

Address limiting factors influencing critical life stages for all species of fish within the project area according to the Lower Columbia Fish Recovery Board Salmon and Steelhead and Fish and Wildlife Plan.

Address water quality concerns within the project reach which will add to the cumulative benefit of the North Fork Lewis River.

Address community resource concerns and address river geomorphic factors resulting in the observed symptoms in the project reach.

RESOURCE CONCERNS
The salmon recovery plan identifies key limiting factors as habitat quantity, habitat diversity, flow, and predation. Priority life stages are primarily rearing, some spawning, and adult migration. Species of concern include Chinook, Steelhead, Coho, and Chum.

There are no listings on the 303(d) list for this reach of the Lewis River. Locally there are concerns for river temperatures and increased fine sediment delivery from the river bank within the project reach.

Project Location
The project site encompasses seven tax parcels owned by three owners within the Lewis River in Cowlitz County, Washington including:
Stadings (Lewis River Golf Course), 3209 Old Lewis River Rd; Woodland, WA 98674; Parcels 6044804, 6279902, 62795, 62799, and 6044801
Anderson, Curt; 3447 Old Lewis River Rd; Woodland, WA 98674; parcel 6045201
Lewisaque, Gerald; 1823 N 2nd Avenue; Upland, CA 91784; parcel 6045202

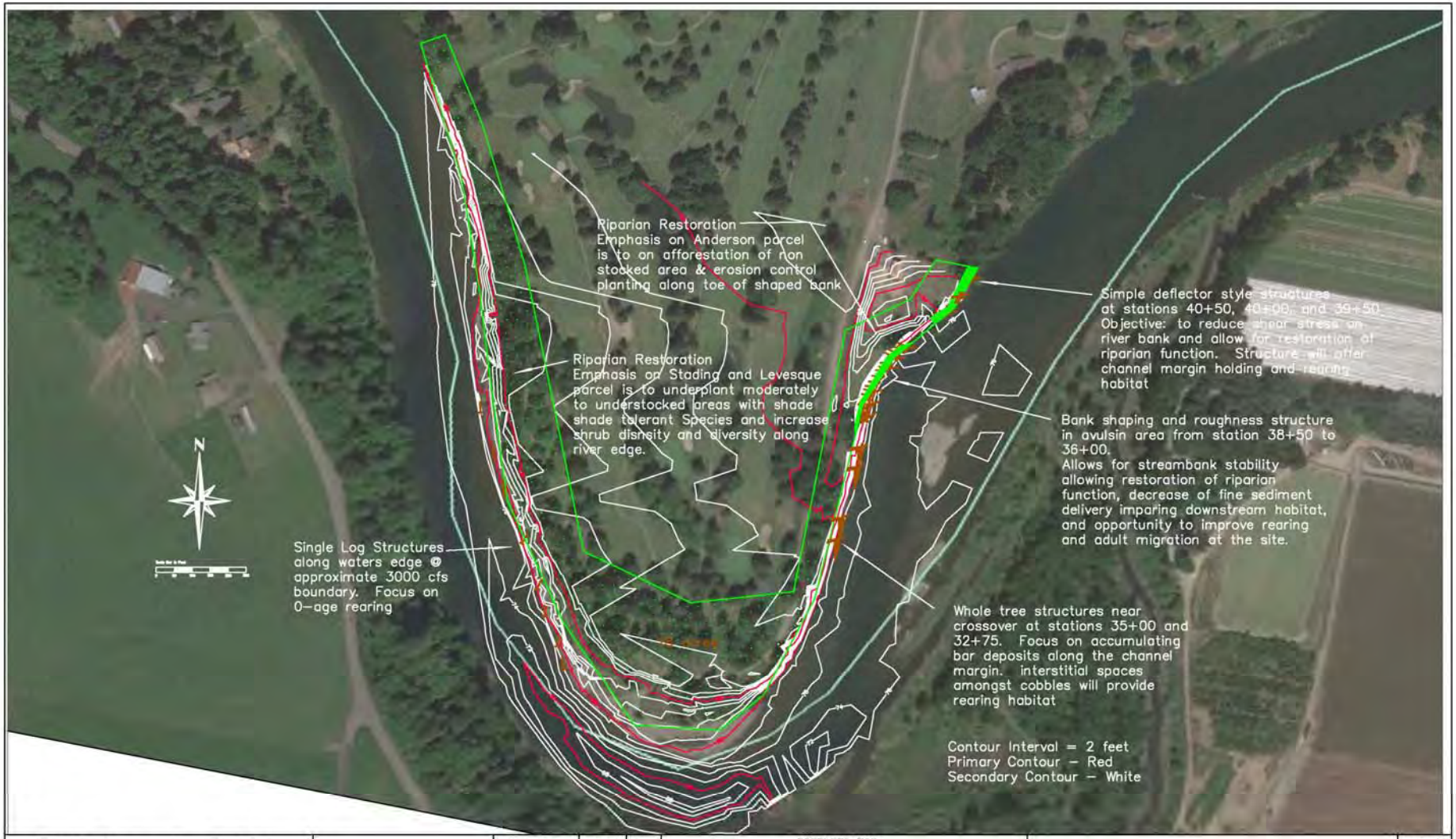
The project is located in EDT reach 3 (tier 1) at approximate river mile 13.5 in the North Fork Lewis River in the Watershed Resource Inventory Area 27 in Cowlitz County Washington.

Legal Description
NE¼ Section 10, Township 5 North, Range 1 East
NW¼ Section 11, Township 5 North, Range 1 East

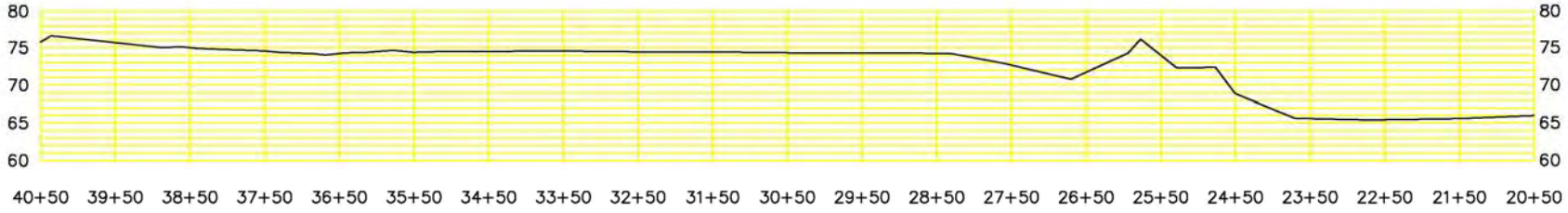
Latitude / Longitude
45.930598 / -122.654662

Driving Directions
I-5 to Woodland Washington, travel East on Lewis River Rd (503) about 6 miles; turn right onto Old Lewis River Rd; turn right onto gated gravel driveway bounding the golf course on the east.

Cowlitz Conservation District 2125 8th Avenue Longview, WA 98632 360-425-1880	DATE: _____ SCALE: _____ CHECKED BY: _____ DRAFTED BY: _____	REVISIONS	DATE	BY	PREPARED FOR: Anderson NF Lewis River Restoration Project	Detail Shhet Existing Plan View	SHEET 1 OF 8



Cowlitz Conservation District 2125 8th Avenue Longview, WA 98632 360-425-1880	DATE : SCALE : CHECKED BY: DRAFTED BY:	REVISIONS	DATE	BY	PREPARED FOR: Anderson NF Lewis River Restoration Project	Detail Sheet Proposed Plan View	SHEET 2 OF 8

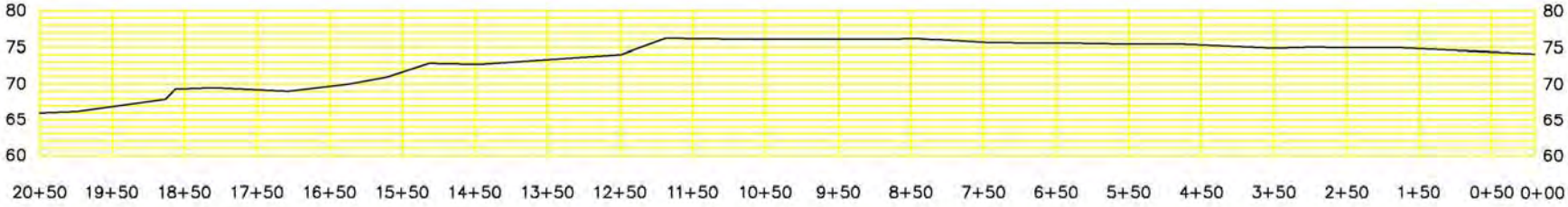


Small deflectors
40+50, 40+00, & 39+50

Bank Shaping & Roughness Structure
38+50 to 36+00

Whole Tree Structure
35+00 and 32+75

Meander Scour Pool

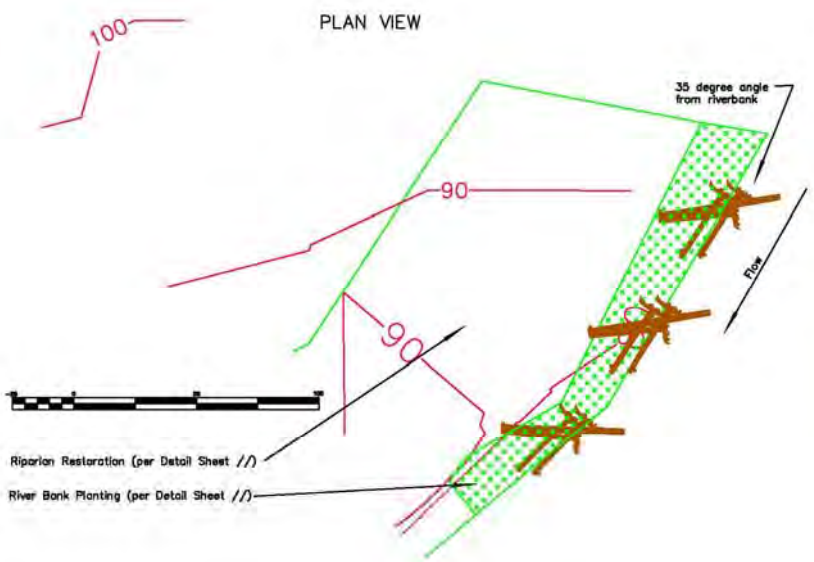


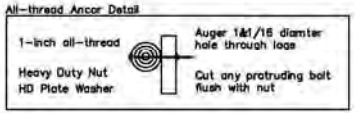
Single Log or Log with Rootwad Structure along channel margin at 3000cfs stage
From Approximate station 17+00 to 8+00

Cowlitz Conservation District 2125 8th Avenue Longview, WA 98632 360-425-1880	DATE : SCALE : CHECKED BY: DRAFTED BY:	REVISIONS	DATE	BY	PREPARED FOR: Anderson NF Lewis River Restoration Project	Detail Sheet Longitudinal Profile	SHEET 3 OF 8

SMALL DEFLECTOR STRUCTURE

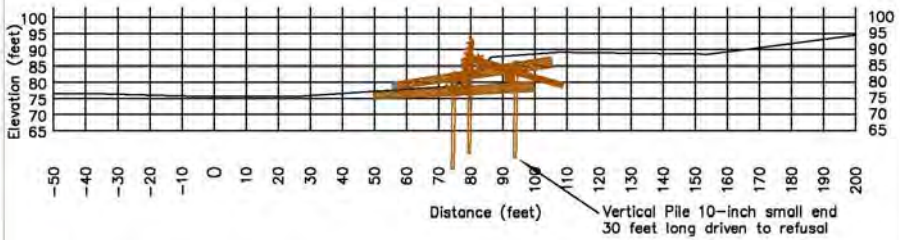
PLAN VIEW





CROSS SECTION VIEW

Small Deflector (stations 40+50, 40+00, & 39+50)



CONSTRUCTION NOTES

Structure Objective:
- Retain substrate upstream of structure to provide rearing habitat matrix in interstitial spaces.
- Reduce shear stress on river bank allowing establishment of root strength function of riparian buffer
- Shift energy slot 20-30 feet off of toe of river bank

Construction oversight provided by Cowlitz Conservation District to ensure:
- Intent of design is met and structure stability is achieved
- Adherence to all applicable Federal, State, and Local permit requirements
- Structure construction documented to allow for as-built stability analysis
- Structure is field fit to ensure protection of highly erodible layers

As-built structure may vary slightly based on size and form of wood delivered to the site and the site conditions encountered during installation.

Structure stability based upon
Direct burial of logs and logs with rootwads
Use of vertical pile
Use of 1-inch diamter all-thread and heavy duty plate washers and nuts to secure key pieces of lwd to vertical pile as guided by Cowlitz Consewrvation District staff.

All bare soil will be seeded with a suitable erosion control seed mix with major components including annual ryegrass, perennial ryegrass, creeping red fescue, white clover, and red clover at a rate of 30 lbs / acre. All seeded areas will be mulched with weed-free hay or straw at a rate of 1-ton / acre.

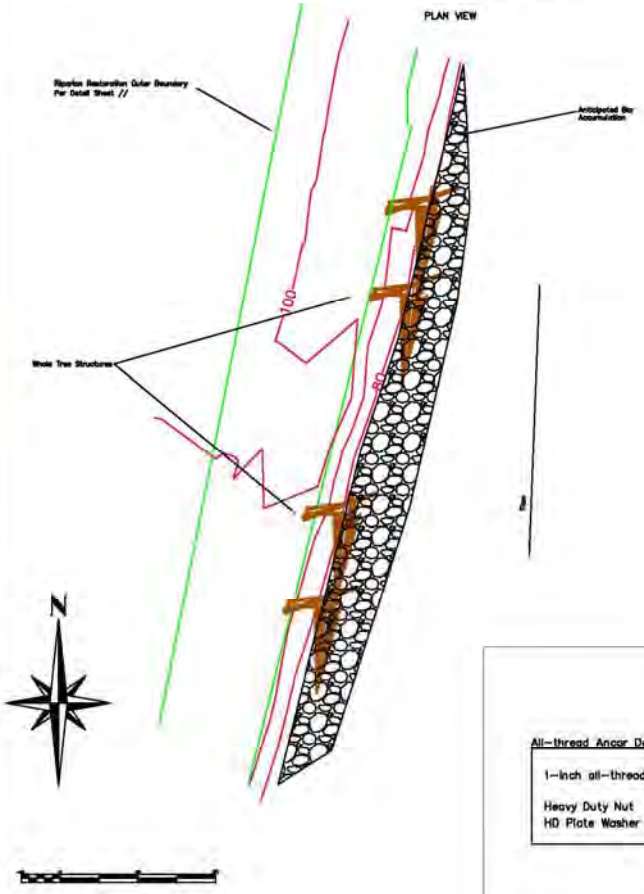
Riparian restoration per design sheet ?? and installed by others

Cowlitz Conservation District 2125 8th Avenue Longview, WA 98632 360-425-1880	DATE : SCALE : CHECKED BY: DRAFTED BY:	REVISIONS	DATE	BY	PREPARED FOR: Anderson NF Lewis River Restoration Project	Detail Sheet Small Deflector Structure	SHEET 4 OF 8

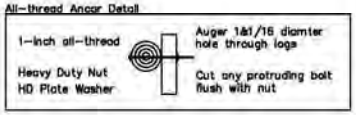
Whole Tree Roughness Structures

Station 35+00 – 34+50 and
Station 33+00 – 32+50

PLAN VIEW

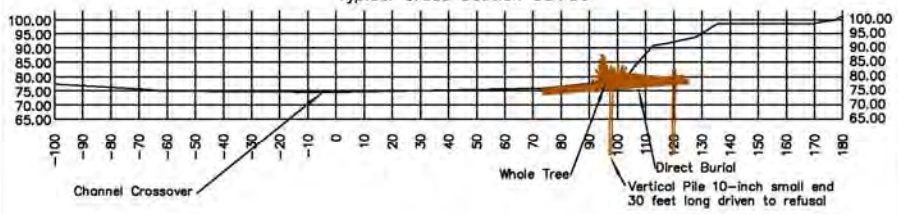


All–thread Anchor Detail



CROSS SECTION VIEW

Typical Cross Section 35+00



CONSTRUCTION NOTES

Structure Objective:

- Acculuate bar deposits along toe of river bank and provide rearing habitat matrix in interstitial spaces.
- Reduce shear stress on river bank allowing establishment of root strength function of riparian buffer
- Acculuated substrate along river margin will constrict cross section resulting in slight scour of river crossover.

Construction oversight provided by Cowlitz Conservation District to ensure:

- Intent of design is met and structure stability is achieved
- Adherence to all applicable Federal, State, and Local permit requirements
- Structure construction documented to allow for as–built stability analysis
- Structure is field fit to ensure protection of highly erodible layers

As–built structure may vary slightly based on size and form of wood delivered to the site and the site conditions encountered during installation. Whole tree component consists of Sitka Spruce, Noble Fir, or Wesster Red Cedar depending on local available and or ability to transport material.

Structure stability based upon
Direct burial of logs and logs with rootwads
Use of vertical pile
Use of 1–inch diamter all–thread and heavy duty plate washers and nuts to secure key pieces of lwd to vertical pile as guided by Cowlitz Consewrvation District staff.

All bare soil will be seeded with a suitable erosion control seed mix with major components including annual ryegrass, perennial ryegrass, creeping red fescue, white clover, and red clover at a rate of 30 lbs / acre. All seeded areas will be mulched with weed–free hay or straw at a rate of 1–ton / acre.

Riparian restoration per design sheet ?? and installed by others

Cowlitz Conservation District
2125 8th Avenue
Longview, WA 98632
360–425–1880

DATE :
SCALE :
CHECKED BY:
DRAFTED BY:

REVISIONS	DATE	BY

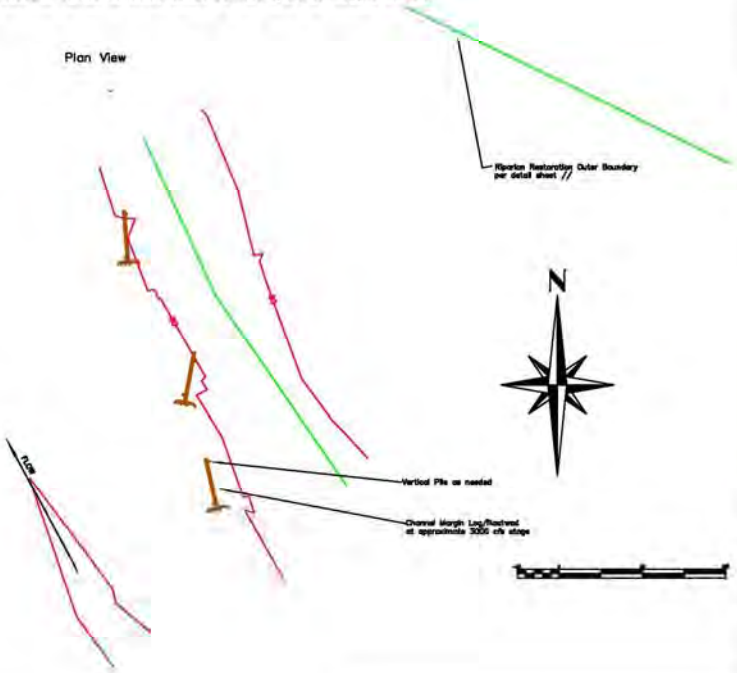
PREPARED FOR:
Anderson NF Lewis River Restoration Project

Detail Sheet
Whole Tree Structure

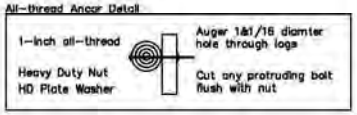
CHANNEL MARGIN LOGS/ROOTWADS

From Stations 18+00 to 9+00 about 70 feet apart as flagged in field

Plan View

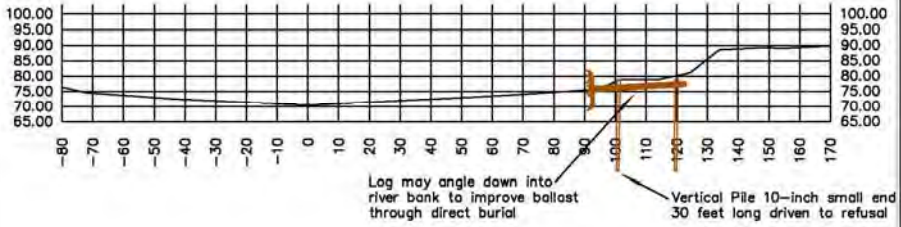


All-thread Anchor Detail



CROSS SECTION VIEW

Typical Cross Section (16+00)



CONSTRUCTION NOTES

Structure Objective:

- Acculuate bar deposits along toe of river bank and provide rearing habitat matrix in interstitial spaces.
- Reduce shear stress on river bank allowing establishment of root strength function of riparian buffer
- Acculuated substrate along river margin will constrict cross section resulting in slight scour of river crossover.

Construction oversight provided by Cowlitz Conservation District to ensure:

- Intent of design is met and structure stability is achieved
- Adherence to all applicable Federal, State, and Local permit requirements
- Structure construction documented to allow for as-built stability analysis
- Structure is field fit to ensure protection of highly erodible layers

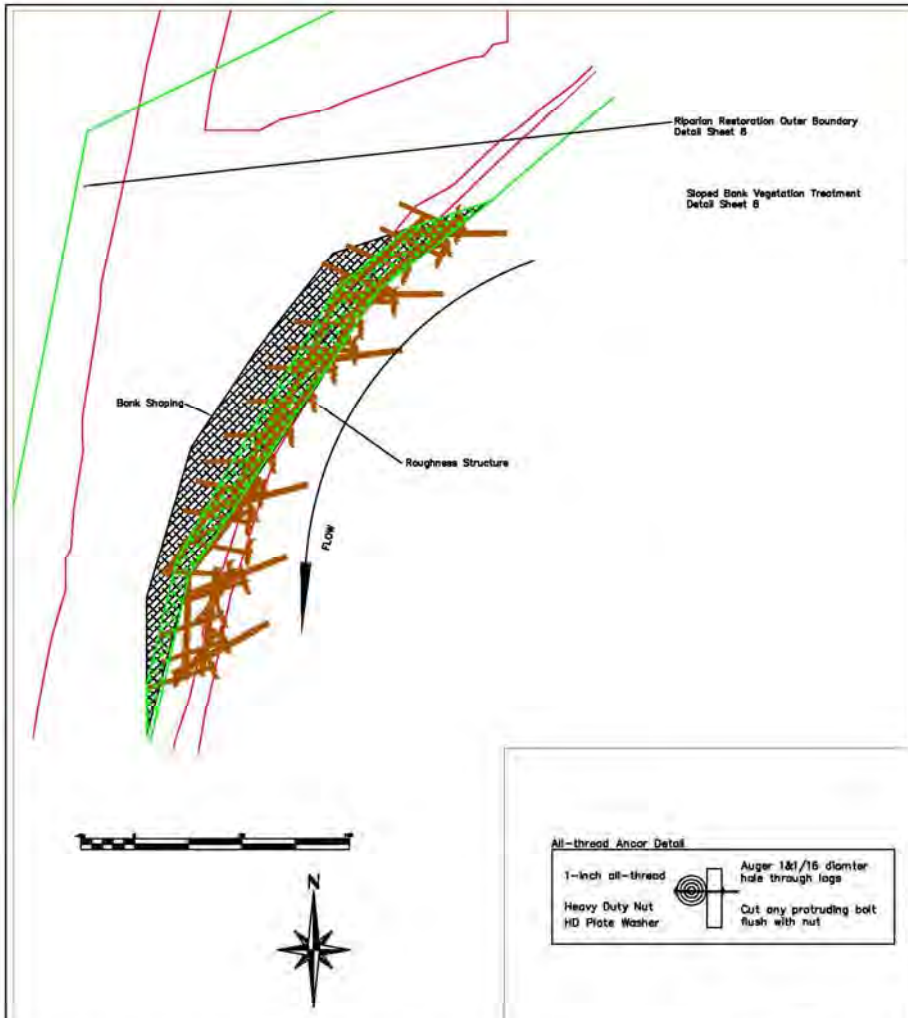
As-built structure may vary slightly based on size and form of wood delivered to the site and the site conditions encountered during installation. Whole tree component consists of Sitka Spruce, Noble Fir, or Wesster Red Cedar depending on local available and or ability to transport material.

Structure stability based upon
Direct burial of logs and logs with rootwads
Use of vertical pile
Use of 1-inch diamter all-thread and heavy duty plate washers and nuts to secure key pieces of lwd to vertical pile as guided by Cowlitz Consewrvation District staff.

All bare soil will be seeded with a suitable erosion control seed mix with major components including annual ryegrass, perennial ryegrass, creeping red fescue, white clover, and red clover at a rate of 30 lbs / acre. All seeded areas will be mulched with weed-free hay or straw at a rate of 1-ton / acre.

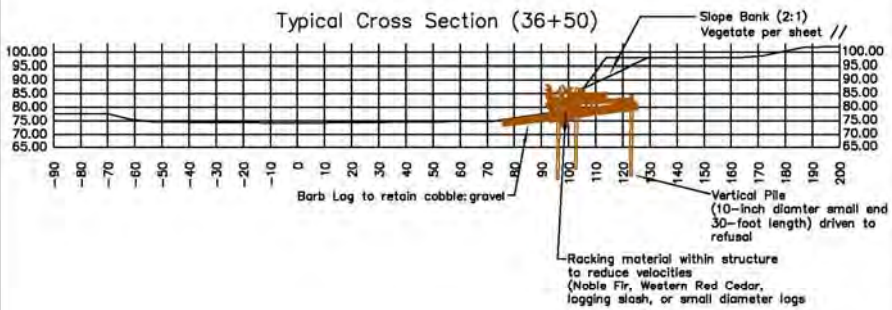
Riparian restoration per design sheet ?? and installed by others

Cowlitz Conservation District 2125 8th Avenue Longview, WA 98632 360-425-1880	DATE : SCALE : CHECKED BY: DRAFTED BY:	REVISIONS	DATE	BY	PREPARED FOR: Anderson NF Lewis River Restoration Project	Detail Sheet Channel Margin Logs / Rootwads	SHEET 6 OF 8



All-thread Anchor Detail

CROSS SECTION VIEW



CONSTRUCTION NOTES

Install wood roughness structure consisting of logs, logs with rootwads, and racking material (whole tree and logging slash) along the right river bank from approximate station 38+50 through 36+00. River bank above roughness structure will be laid back to an approximate 2:1 slope, protected by installation of erosion control fabric, and planted with both herbaceous and woody vegetation.

Structure Objective:

- Reduce accelerated erosion of river bank by protecting erosive layers, minimizing velocity and shear stress acting on bank, and restoring root strength in the soil.
- Retain substrate through use of barb logs oriented upstream and slope to maintain existing substrate to provide rearing habitat matrix in interstitial spaces.
- Provide both rearing and adult migration habitat amongst structure element interacting with river flows.
- Reduce shear stress on river bank allowing establishment of root strength function of riparian buffer
- Shift energy slot 20-30 feet off of toe of river bank

Construction oversight provided by Cowlitz Conservation District to ensure:

- Intent of design is met and structure stability is achieved
- Adherence to all applicable Federal, State, and Local permit requirements
- Structure construction documented to allow for as-built stability analysis
- Structure is field fit to ensure protection of highly erodible layers

As-built structure may vary slightly based on size and form of wood delivered to the site and the site conditions encountered during installation.

Structure stability based upon
Direct burial of logs and logs with rootwads
Use of vertical pile
Use of 1-inch diamter all-thread and heavy duty plate washers and nuts to secure key pieces of lwd to vertical pile as guided by Cowlitz Conservation District staff.
Use of erosion control fabric to resist anticipated velocities during flood flows.

All bare soil will be seeded with a suitable erosion control seed mix with major components including annual ryegrass, perennial ryegrass, creeping red fescue, white clover, and red clover at a rate of 30 lbs / acre. All seeded areas will be mulched with weed-free hay or straw at a rate of 1-ton / acre.

Riparian restoration per design sheet ?? and installed by others

Cowlitz Conservation District
2125 8th Avenue
Longview, WA 98632
360-425-1880

DATE : 12/4/2019
SCALE : per drawing
CHECKED BY:
DRAFTED BY: dbh

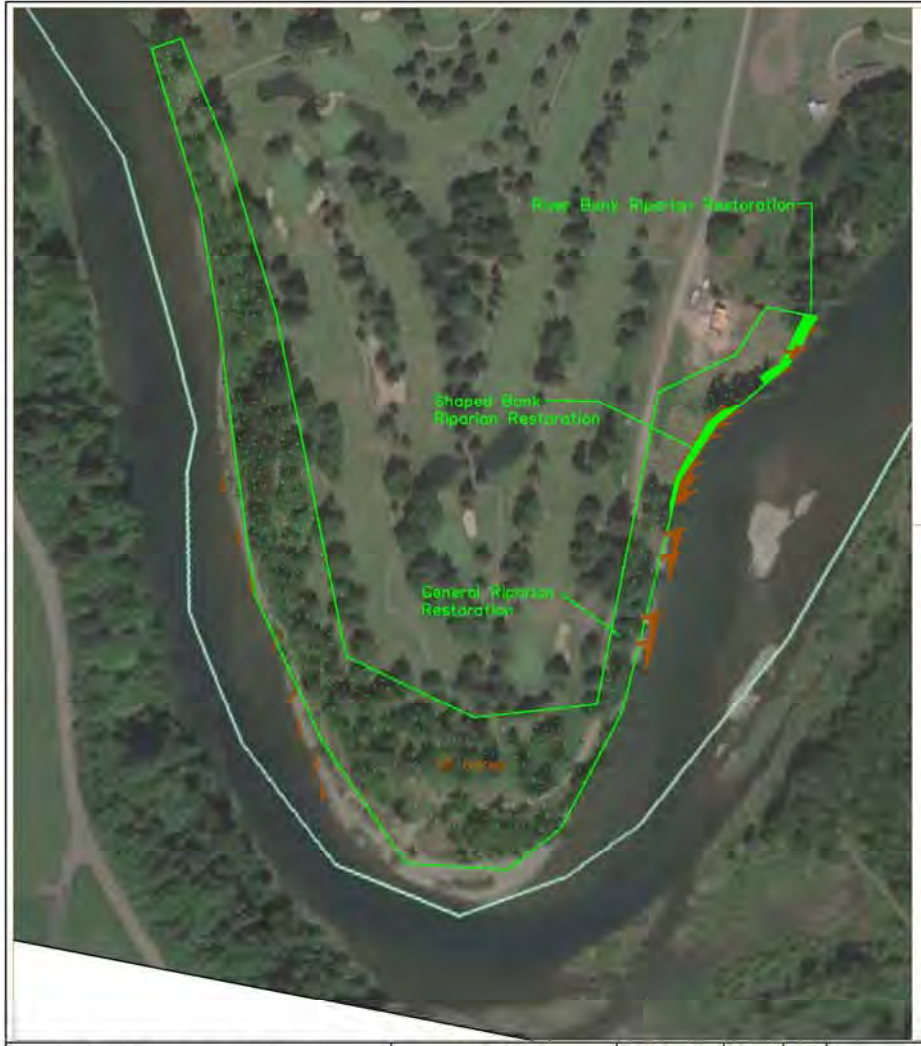
REVISIONS	DATE	BY

PREPARED FOR:

Anderson NF Lewis River Restoration Project

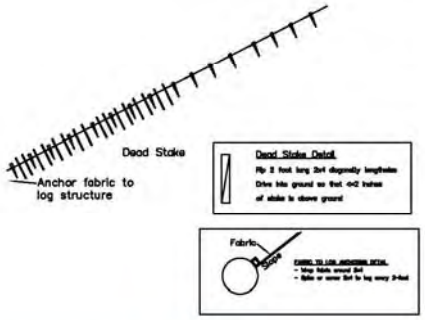
Detail Sheet 7
Bank Erosion Treatment

SHEET 7 OF 8



EROSION CONTROL BANKS

1. Seed slope (30#/acre erosion control mix)
2. Mulch slope either 1 ton/acre weed free straw or mulch fabric (cotton thread mesh - no plastic)
3. Install jute erosion control grid (Dekowe 700 or equivalent); shingle downstream to upstream; Secure toe & top of erosion control fabric in cup trench ~12inch deep; secure fabric with dead stake every 3 feet. (Stake = 2' long 2x4 cut diagonally)
4. Summer plant willow livestakes on lower 1/2 of project slope. Plant on approximate 1-foot spacing. Stakes will be >=36 inch long 1/2 - 1 inch in diameter and planted 30 inches deep.
5. Livestakes will angle slightly upstream to facilitate anchoring the fabric. Angle with the slope will maximize root soil moisture interaction.



RIPARIAN RESTORATION

Two treatment areas are defined on the plan view. The first is the river bank treatment area, the second the general riparian restoration area. Both treatment areas will be installed through a reforestation contractor under separate contract.

River Bank Treatment

Objectives:
Establish root strength as quickly as possible to protect river bank soils from continued erosion
Utilize plant materials as livestakes to aid in anchoring erosion control fabric(s).

Treatment consists of summer planting cuttings and winter planting bare root stock into the erosion control fabric installed over the sloped river bank. Planting density, species, and material specifications will vary with elevation above the toe of slope. Planting amongst the large woody material will be opportunistic. Cuttings will consist of local willow species. Cuttings will be approximately 3/4-inch diameter and 3 feet in length. Cutting will be directly pushed into the river bank or installed using a cutting planting bar. Cutting will be installed nearly horizontal at the bottom of the slope and with an increasing angle with increased elevation. The intent is to ensure that root establishment is not unduly influenced by local water table. Target spacing will be about 1.5 feet between cuttings (19,360 stems per acre).

Cuttings will be planted on a 1-foot spacing for four planting rows immediately above the wood structure or in the first three feet of the erosion control fabric. Cuttings will be staggered between planting rows. Cuttings will be installed on a slight downstream angle to facilitate effectiveness of the cutting to serve as a livestake to help anchor erosion control fabric. Cuttings will consist of local willow species. Cuttings will be planted on a 1-foot spacing between cuttings and between planted rows (43,560 stems per acre). Cutting will be less than 1-inch diameter and will consist of both 3 and 4 foot cutting length.

The remainder of the slope will be summer planted with cuttings consisting of red cedar dogwood, blue elderberry, and local willow species on an approximate 3-foot spacing (4,840 stems per acre). Cuttings will be planted in groups to mimic how communities of a single species tend to establish in nature.

Survival will be assessed in the fall so that plans can be made to restock the site. Additional cuttings will be installed amongst the large woody material and within the four rows of willow on the lower portion of the erosion control fabric. On the upper portion of the slope any mortality will be replaced with bare root species which will allow for incorporation of additional plant diversity.

General Riparian Restoration
Treatment varies between afforestation and interplanting amongst existing woody vegetation.

Site preparation:
The site will be reviewed by Cowlitz County Noxious Weed Program. Invasive species will be documented and an integrated pest management plan (IPM) will be prepared. The IPM will be implemented prior to construction to avoid spreading invasive species at the site.

Areas target for afforestation will have planting sites prepared by construction activity and spot spraying grass on an approximate 10-foot spacing (436 stems per acre). A tank mix of glyphosate and sulfometuron will used to treat grass.

In areas targeted for interplanting amongst existing trees planting spots will be prepared either through mechanical scalping/slashing at the time of planting or through the use of a chemical spot spray to manage competing vegetation. The herbicide of choice is triclopyr.

Planting
The site will be planted with bare root seedling consisting of 1-1 stock or better during winter months following construction.
In afforestation areas species shall include:
Red Alder (Alnus Rubra) 100
Cascara (Rhamnus Purshiana) 50
Douglas Fir (Pseudotsuga Menziesii) 100
Western Red Cedar (Thuja Plicata) 100
Shrubs
Elderberry (Sambucus), Current (Ribes), Indian Plum (Oemleria Cerasiformis), Snowberry (Symphoricarpus Alba)

In areas to be interplanted the focus will be on local shade tolerant species including:
Western Red Cedar (Thuja Plicata)
Grand Fir (Abies Grandis)
Willow spp (Salix) - understocked areas along rivers edge

Maintenance
Site will be inspected in the spring and fall each year to assess establishment. Factors impacting establishing will be assessed and maintenance prescriptions applied. Anticipated concerns including vegetative competition and wildlife damage.

Cowlitz Conservation District 2125 8th Avenue Longview, WA 98632 360-425-1880	DATE: 12/4/2019 SCALE: per drawing CHECKED BY: DRAFTED BY: dbh	REVISIONS	DATE	BY	PREPARED FOR: Anderson NF Lewis River Restoration Project	Detail Sheet 8 Riparian Restoration Treatment	SHEET 8 OF 8

Anderson NF Lewis River Restoration
Response to ACC questions

Lower Columbia Fish Recovery Board

Better explain riparian plan and strategy

The riparian strategy includes three elements; high density establishment of shrubs along treated riverbank, afforestation within open ground, and underplanting with shade tolerant species in currently stocked areas. Wood structures and bank shaping are proposed along the riverbank. A component of this treatment is to lay the bank back, install erosion control fabrics, and plant the slope with cuttings on a 1-foot spacing for the first five feet of elevation and 3-foot spacing to the hinge at the top of bank. Cuttings will average 1-inch in diameter and range from three to five feet in length. Cuttings will be planted on 1 foot spacing in alternating rows as lives stakes to help secure erosion control fabric and to establish root strength. This treatment will be installed in the first five feet of elevation from the top of wood up. From the five-foot elevation up to the hinge at the top of bank cuttings will be planted on a 3-foot spacing in alternative rows. Cuttings will consist of both willow (*Salix spp*) and red osier dogwood (*Cornus Sericea*).

Areas of afforestation will have planting sites prepared by clipping the grass and preparing planting sites through chemical spot spray. Planting spots will be treated on an approximate 10-foot spacing (436 trees per acre). Spots will be a minimum of 3-foot diameter. Planting will include species typical of riparian corridors including red alder (alnus rubra), Douglas fir (pseudotsuga menziessi), wester red cedar (thuja placate) and a compliment of shrub species including blue elderberry (sambucus cerulea), service berry (Amelanchier alniflora), Snowberry (Symphoricarpos alnus), Cascara (Rhamas purshiana), and wild rose (Rosa nutkana). Trees will be planted in groups befitting their ecological niche in the buffer. Shrubs will be planted in small clusters 5 shrubs per planting spot scattered throughout the tree matrix. Cascara will be planted along the road side of the buffer along the road created edge.

The remainder of the buffer is currently stocked. Stocking density ranges from poor to medium. The plan is to underplant the stands with shade tolerant species to promote natural succession including Western Red Cedar (Thuja plicata) and Grand fir (Abies grandis), . Along the river edge, hardwood trees will be interplanted amongst existing willow. These species will include Red Alder (Alnus rubra) and Black Cottonwood (Populus trichocarpa). Planting sites will be prepared during planting by shovel scalping planting site.

Plantings will be inspected at minimum twice a year, once in the spring and once in the fall. Monitoring will key in on survival, identify agents of mortality, and generate prescriptions to ensure successful establishment.

What is the certainty of obtaining a WDNR Aquatics lease?

WDNR SOAL staff have visited the site and have issued the landowner acknowledgement. This does not guarantee an aquatic lease to construct the project. The DNR SOAL manager indicated that she liked the project and the project approach. We believe we will be able to obtain the aquatics lease.

Access appears to be pretty clear and relatively non-invasive. Is this true? Please show access points.

Yes, this is true. Access is via a rocked access road that provides access to the entire project site. The access road is illustrated within the design sheets.

Based on the acreage, and lineal feet, the budget seems appropriate; however, a more detailed budget would be helpful

A more detailed budget is provided as part of the full project proposal. The preliminary design provides more detailed quantity estimates.

Reference to other projects is helpful, but Skamokawa and Monahan (I believe) don't seem to be good proxies. Design details would be helpful

Preliminary design sheets are attached to the full project proposal. Reference to Skamokawa and Monahan (photos) were intended to illustrate the project approach wood structures with erosion control fabrics and more important expected influence on flows.

Provide a more detailed explanation on how this project fits in with other projects in the area.

The proposed project is an additional project with respect to cumulative treatment in the lower river. The proposed project benefits for the reaches downstream. For each foot of erosion from the river bank three hundred cubic yards of sand is delivered to the river. This sand is working its way downstream and settling out along the channel margins and in off-channel slack water. WDFW staff has expressed their concern with the negative impact the sand is having on rearing habitat. There is a proposed project that includes an infiltration gallery that can infuse water into a constructed chum channel. The sand load from this proposed river bank could influence the function of this gallery.

May be helpful to see if there are other release sites (other than the DS Woodland site) US of this project site.

We are unaware of any other release sites for Spring Chinook other than the PacifiCorp site downstream.

Utilities

Limited benefits for fish recovery (benefit/cost), potential hazard for boating, landowner benefit

As part of the first Salmon Recovery Funding Board proposal the state review panel member assigned to this region met with WDFW biologist working the Lewis River. They met to review the Eagle Island project. Following that review, the Review Panel member asked the biologist what their highest priority project was for the lower river. They took her to what we call the Anderson NF Lewis River project site. The sand delivery is impairing rearing habitat for miles downstream. Allowed to continue the erosion is going to continue to get worse. We are going to lose riparian buffer along the river. Once migration reaches access roads and the golf course a more extreme approach to dealing with the issues will occur under the emergency permit process. The well head in the middle of the channel does present of potential boating hazard. Boaters travel through the reach in the thalweg slot about 40 feet off the bank. The structures are highly visible at boating flows and should not present a hazard to boating. We trust that when flows are high enough to obscure the structures that boaters are smart enough not to be on the river and they will already be aware of the structures. We do intend to leave a pile high on the downstream and upstream end of the bank structure. Signage will be attached to these piles to identify the potential hazard. We will work with the landowners to attempt to remove the well head from the middle of the channel by cutting it off and capping it at bed elevation.

Landowners obviously have concerns for continued accelerated channel migration at the site. The first is the Anderson property. They purchased the parcel after the prior owner cleared the trees from the riverbank and eventually lost the home to the river. Yes, they are in the process of building a home on the parcel much like the other remainder of Woodland and surrounding areas. They did select the best possible location for their home on the property and are relatively removed from recruitment given the path the river has embarked on. The entire family are avid fisherman and they are concerned with the impact the sand recruitment is having on the lower river. They boat and fish the river and have observed firsthand the effect. They will attempt to contribute as much of their resources as possible to resolving the concern.

The second is a parcel owned by an absentee landowner. Over half of the parcel has been recruited by the river. He is willing to allow a project to address resource concerns even though he does not have plans for occupying the parcel. Everyone would not like to see their property vanish.

The third is the Lewis River Golf Course. They are concerned over the eventual loss of the access road that provides for maintenance and then the eventual impact to the course. Now that the preliminary design has been drafted, CCD will review it with all of the

landowners to identify what the local contribution can be.

More clarity and definition of “margin structures” and how these are designed and function

The preliminary design provides detail sheets for the proposed wood structures to address concerns at the site. Channel margin simply refers to the fact that the structures are held tight to the riverbank. The lower river is not a wood driven system. Most wood routed through the lower river either racks up at obstructions or bends in the river or is simply routed through the system. The proposed project mimics the natural accumulation along the rivers edge but encourages stability of the wood. The proposed wood structure provides roughness along the exposed riverbank. Roughness reduces velocity along the bank and therefor shear. Stability of the wood is encouraged by utilizing direct burial and vertical pile to counter both velocity and buoyancy forces acting on individual pieces and the structure as a whole. Key “barb” log components will extend about 25 feet into the channel below existing bed elevation. Logs and logs with rootwads racked in successive layers extend no more than about 15 feet into the channel. Encroachment of wood on the channel decreases with increase in structure elevation. Racked material typical increases in size with increased elevation. This assists with stability of the structure by increasing the mass of the structure during the smaller flow events. Again, direct burial and use of vertical pile anchor the structure. Key pieces are anchored to vertical pile through the use of 1-inch diameter all thread bolts and heavy-duty hardware. Vertical pile typically consists of 30-foot long douglas-fir poles about 10-inch diameter on the small end. Pile is driven to refusal. We fully anticipate an embedded depth of 25 feet. Within the racked layers of wood we incorporate whole tree tops (usually sitka spruce or noble fir) or slash to further decrease velocity working within the structure. The net result, or function of the structure is to reduce velocity along the riverbank. We typically observe sediment accumulating within the structure and velocity dropped to nothing or a back eddy resulting in velocity occurring in an upstream direction. Where opening occur will are planted within the structure to further bind soils through root strength.

National Marine Fisheries Service

Further explanation of limiting factors.

Restoration needs and limiting factors are provided within the salmon recovery plan and habitat strategy as prepared by the Lower Columbia Fish Recovery Board. Restoration needs in the Lewis 5 EDT reach include;

"Floodplan function and channel migration processes" with multi-species priority of High. The proposed project simply proposes to restore a more natural rate of erosion and therefore channel migration to the small length of riverbank. If left unchecked, riparian functions influence on the geomorphology of the site will be lost and the relationship between hydrology and sediment will be out of balance.

"Riparian conditions and functions" with a multi-species priority of High. The proposed project re-establishes riparian function through afforestation of the riverbank (700 feet) and by bring the remainder of the project reach (3600 feet) to fully stock condition through interplanting with shade tolerant species.

"Stream channel habitat structure and bank stability" with multi-species priority of High. The project proposes four different treatment along the project reach which will provide habitat benefits to fisheries including adult migration and rearing. The bank stabilization aspect of the project will provide a form of stream channel habitat but is most influential with regard to riparian function and water quality. The proposed wood structure will allow for establishment of riparian function and will reduce fine sediment delivery improving water quality within the reach.

"Water Quality" with multi-species priority of High. The proposed treatment will reduce fine sediment delivery from a rapidly migrating 400 feet of riverbank and an additional 500 feet downstream at risk of continued loss of riparian function and increase riverbank instability.

Limiting factors are presented within the recovery plan and habitat strategy are for the top 5-ranked life stages which are predominantly rearing life stages. The limiting factors include habitat diversity and key habitat quantity. The proposed structures provide for habitat diversity and quantity along the edge of river channel which will provide rearing habitat. Benefits will include retaining gravel and slowing velocity along the eroding riverbank which will provide rearing habitat along the river's edge. Whole tree structures and simple log structures will result in localized scour that will help remove fine sand from accumulating within cobbles. This will improve interstitial spaces in river cobbles used by young rearing life stages.

More detailed budget.

The preliminary design provides improved quantities for preparing a detailed budget that will be attached with the full project proposal.

More detailed monitoring plan.

The District intends to monitor the constructed project as we do all of our projects. First, the project is monitored during construction to ensure consistency with the design sheets and to provide as-built conditions. As-built conditions are re-routed through the stability calculation procedures to ensure that stability expectations are realized. Second, structures will be monitored on a regular (daily) basis by the landowner whom will notify the District if anything appears out of place. The District will establish photo-points and will photo document the structures at least once annually and after any significant flow event to ensure that structure expectations are realized. The riparian restoration component will be monitored at minimum twice a year. Once in the spring and once in the fall. Management prescriptions will be prepared and implemented to ensure successful establishment of riparian function. This monitoring typically includes a series of transects or use of fixed radius plots to assess plant survival. We plan to collaborate with WDFW to determine whether they will assist by including the project reach in their typical monitoring activities.

Cowlitz Tribe

A substantially similar project proposed by the Cowlitz Conservation District in 2018 was declined SRFB funding and designated a "Project of Concern" through multiple technical reviews by the SRFB's statewide Review Panel. Their concerns were based on WDFW's interest in preventing bar scour throughout the downstream portion of the project footprint, and the clear focus on stabilizing an eroding bank with little apparent resource value. The Tribe generally agrees that this project has little resource benefit; its primary benefit is to the riparian landowners who wish to enjoy their riverfront property without enduring the vagaries of the river itself.

A similar project was proposed through the Lower Columbia Fish Recovery Board process in 2018. The project was designated a Project of Concern by the SRFB Statewide Review Panel through their review process. However, their concern was not based on WDFW interest but on their own form which asks if bank stabilization is a component of the project. The WDFW Lewis River biologists have actually been very supportive of the proposed project. The local review by the LCFRB TAC raised several questions about bank stabilization and the big concern was the desire for a preliminary design. The project made the funding list and was not awarded due to bank stabilization questions by the State RP.

The project received some funding from the LCFRB for design purposes. The project was re-submitted through the LCFRB process in 2019 with the intent to provide a preliminary design by final proposal. The DNR SOAL process would not submit a landowner acknowledgement so the project was deemed incomplete and the TAC never reviewed the draft preliminary design. Vagaries of the river have been modified by prior owners and to a lesser extent by prior fish recovery processes. We are working with a landowner that would like to restore suited natural process to the riverbank. Should the ACC choose to decide that the proposed project does not fit the program, we will continue to seek river restoration funding through other venues.

The applicant states that this project intends to remedy fine sediment inputs from the eroding bank but ignores the fact that the hydropower projects immediately upstream already cleanse the river of nearly all suspended sediment and bedload; this system is essentially sediment starved. The application states that sediment begins to drop out near Eagle Island, which is at the bottom end of potential spawning, and the head end of tidal influence; fine sediment deposition should be expected in this environment.

Yes, the hydropower projects tend to arrest sediment load moving through the system which elevates the concern for the loss riparian buffer and exposure of the sand riverbank to river flow. The "clean" flows compound erosion at the site. All we are proposing is to get the root strength back into the riverbank to restore balance of discharge and sediment in the system. Sediment begins dropping out in the river cross over immediately downstream of the eroding bank which does present a concern for spawning, egg incubation, and fry colonization life stages. What was meant to be conveyed is that according to WDFW, they are observing filling of the side channel at Eagle Island by sand and that the effects of the eroding bank are being observed down river.

This project may be subject to DNR Aquatic Lands review and lease, right of entry, or other mechanism. If this is not the case, the proponent must attach documentation to a final proposal (if submitted). This is not a permit—the applicant should demonstrate that the riparian landowners also own the entire project footprint.

According to DNR, this project is subject to DNR SOAL conservation license. We are not sure what beyond county tax parcel data the Cowlitz Tribe is seeking to demonstrate ownership of the riparian footprint. +

The Tribe understands that a third-party design report was developed for the eroding bank at this site by Inter-Fluve, with a conceptual-level design cost that was several times the total requested by the applicant. This report should be shared with the ACC if the applicant chooses to submit a final application.

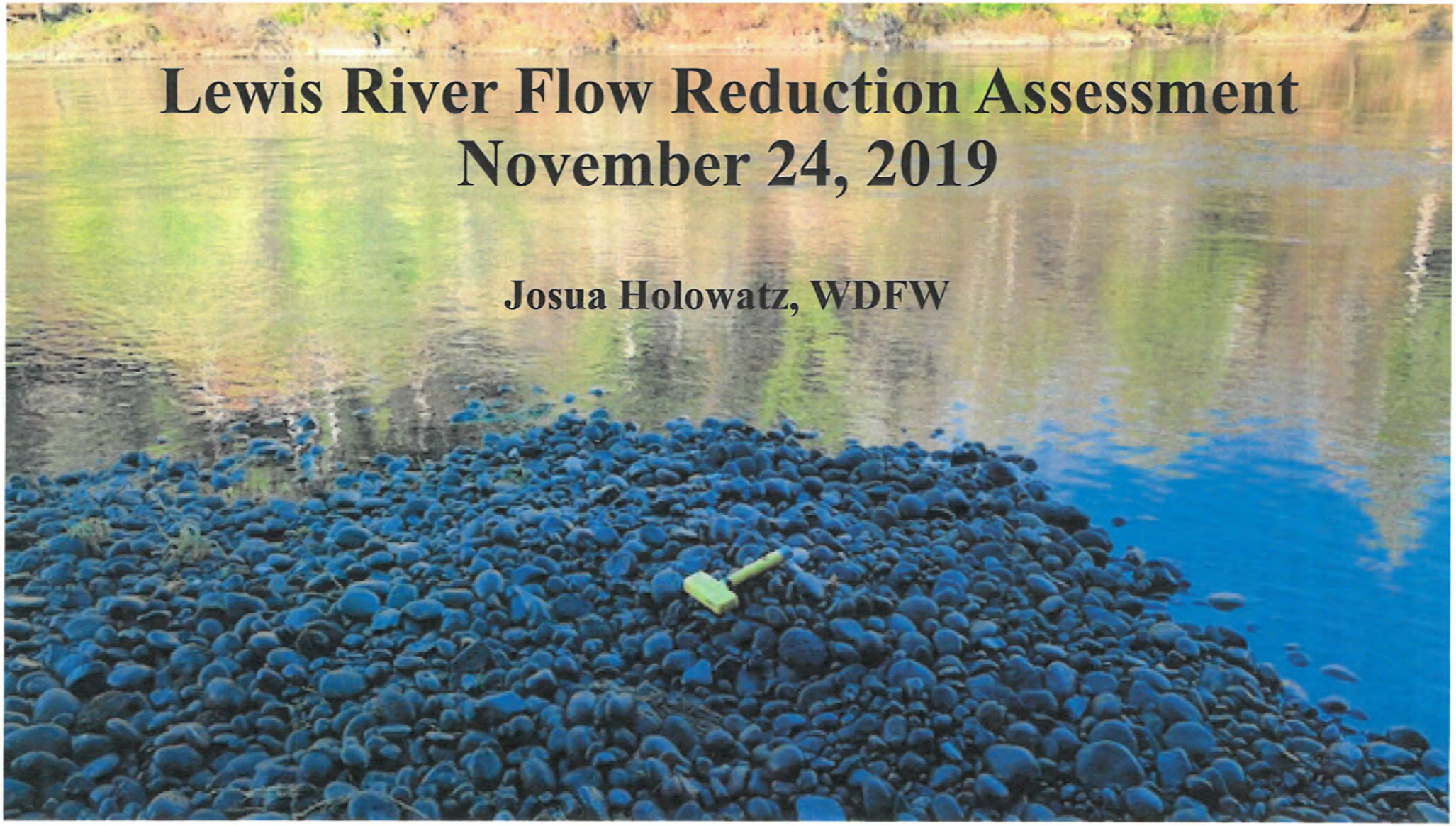
Our understanding is that yes, a conceptual level cost was thrown at a project by Interfluve at the request of the Lower Columbia Fish Enhancement Group. It appears that this was the basis from which the LCFEG moved wood away from the site and did not implement their proposed project to address the resource concern. We do not have a copy of that report. If we can locate it we will share it with the ACC. It does not influence the preliminary design we have prepared and based a budget on. Cowlitz CD has demonstrated our ability to implement projects of this nature well within the budgeted figures. The preliminary design quantities will be used to prepare the final budget. We fully believe that we will be able to implement the designed project within budget.

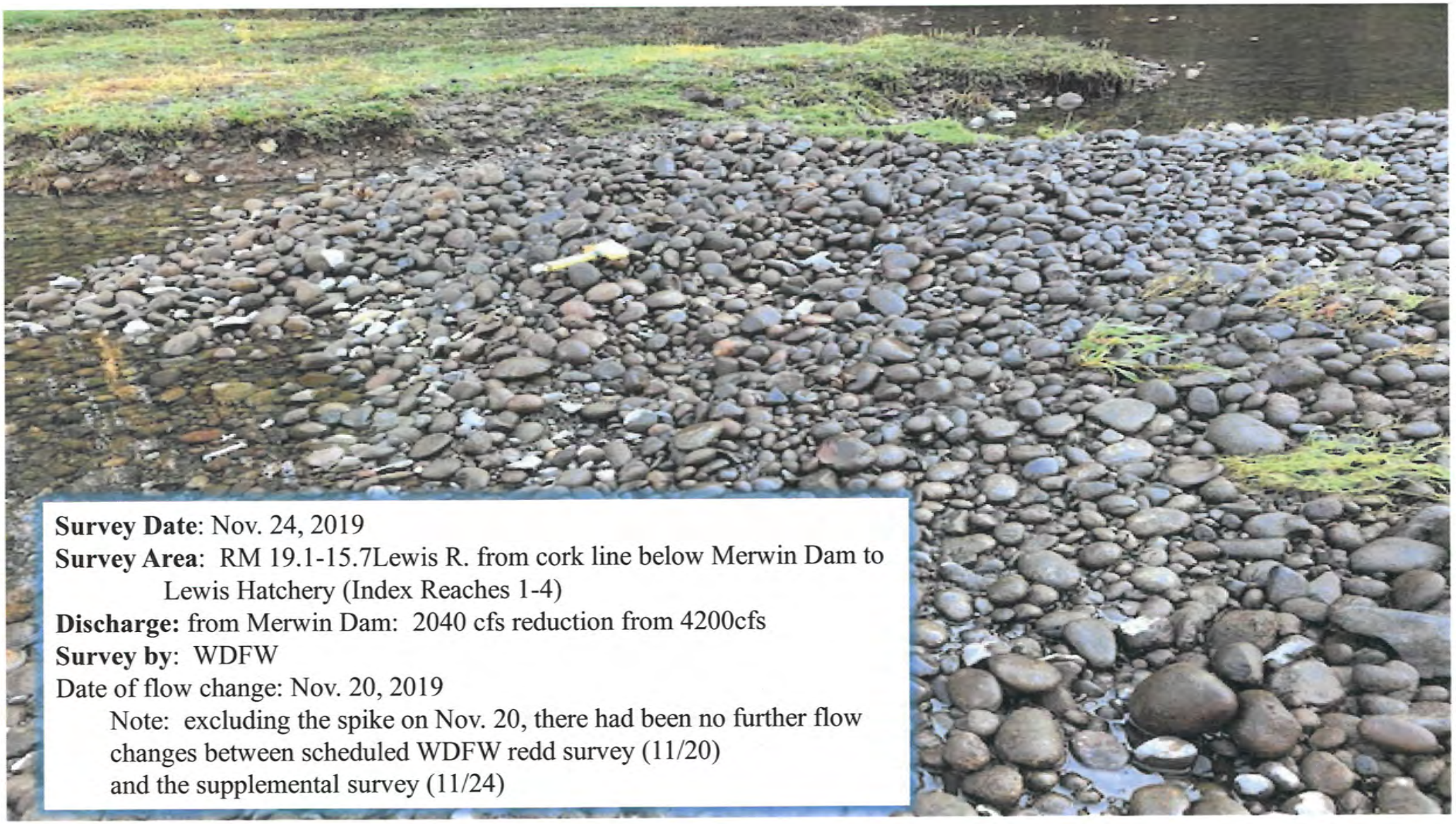
The potential risk to implementing this project is relatively high; if bank erosion is not arrested, and structures remain, they will become boating hazards. If bank erosion is not arrested and structures wash out, the Aquatic Fund dollars will have been squandered.

If wood structures persist and bank erosion is arrested, then another successful project will reduce sediment load to the river that according to many is a concern for fisheries habitat in the lower river. Squandering funds could be applied to any project funded that do not successfully serve to meet design objectives.

Lewis River Flow Reduction Assessment
November 24, 2019

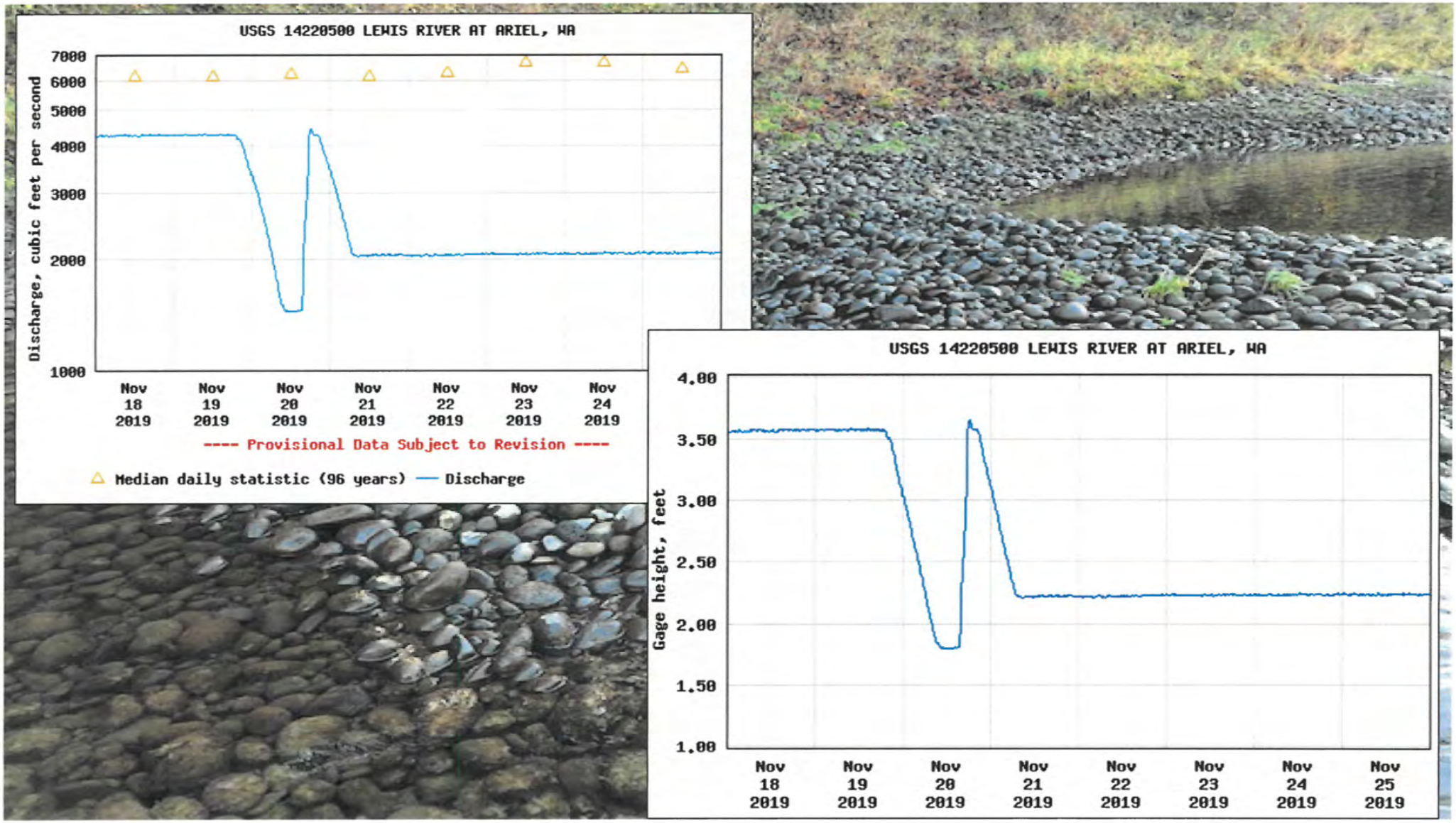
Josua Holowatz, WDFW



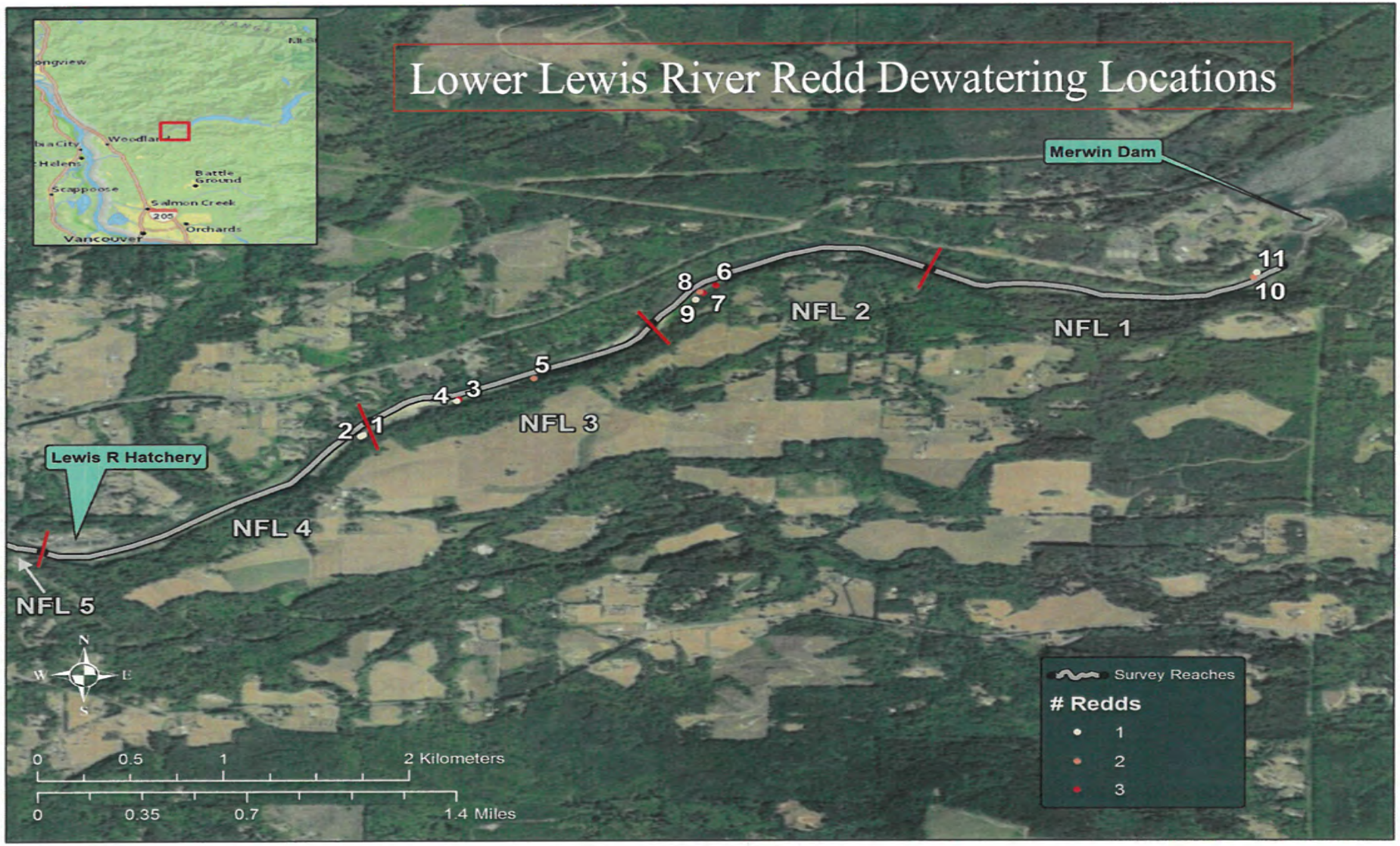


Survey Date: Nov. 24, 2019
Survey Area: RM 19.1-15.7Lewis R. from cork line below Merwin Dam to Lewis Hatchery (Index Reaches 1-4)
Discharge: from Merwin Dam: 2040 cfs reduction from 4200cfs
Survey by: WDFW
Date of flow change: Nov. 20, 2019

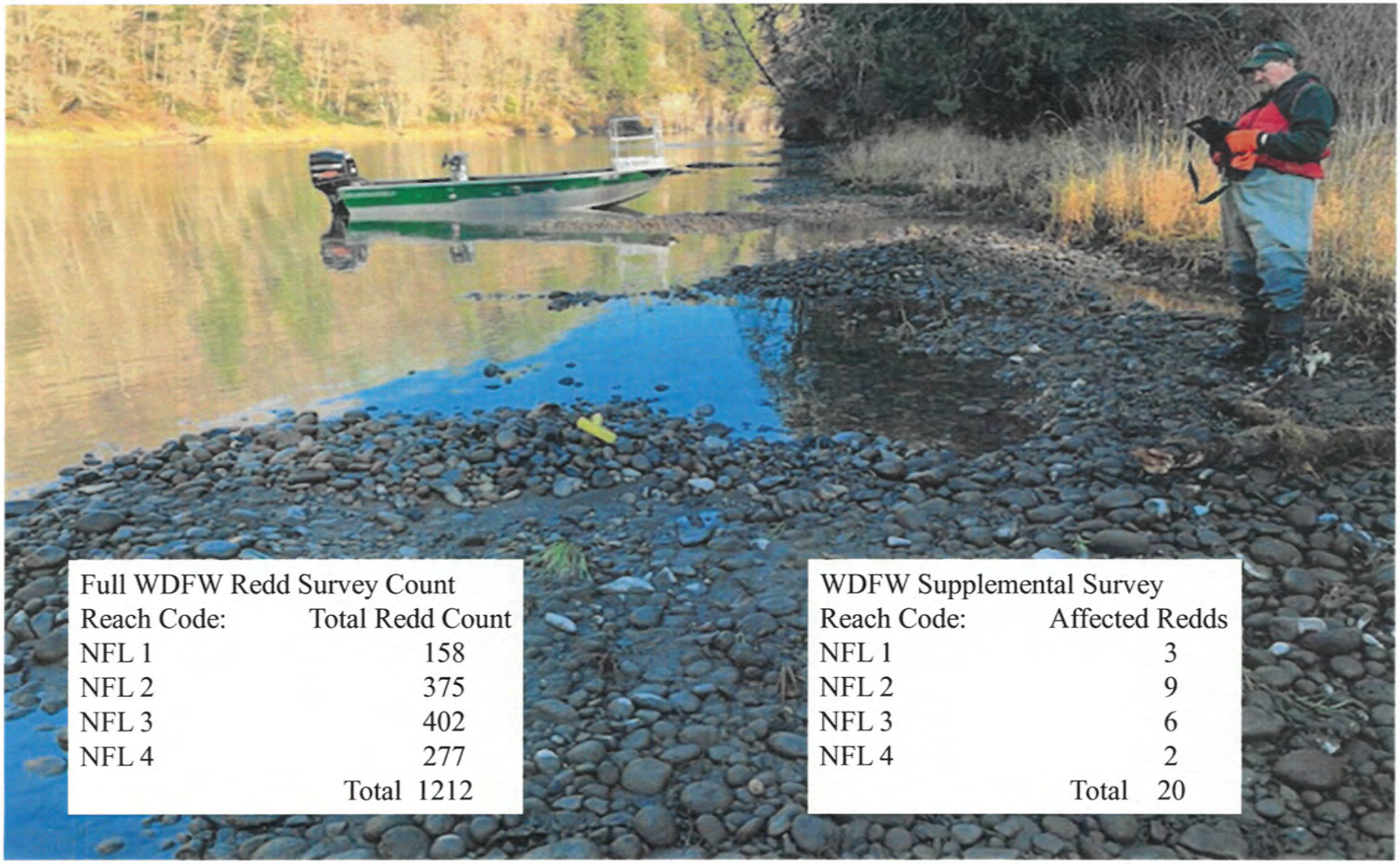
Note: excluding the spike on Nov. 20, there had been no further flow changes between scheduled WDFW redd survey (11/20) and the supplemental survey (11/24)


USGS 14220500 LEWIS RIVER AT ARIEL, WA
Discharge, cubic feet per second
7000
6000
5000
4000
3000
2000
1000
Nov 18 2019
Nov 19 2019
Nov 20 2019
Nov 21 2019
Nov 22 2019
Nov 23 2019
Nov 24 2019
---- Provisional Data Subject to Revision ----
Median daily statistic (96 years)
Discharge
USGS 14220500 LEWIS RIVER AT ARIEL, WA
Gage height, feet
4.00
3.50
3.00
2.50
2.00
1.50
1.00
Nov 18 2019
Nov 19 2019
Nov 20 2019
Nov 21 2019
Nov 22 2019
Nov 23 2019
Nov 24 2019
Nov 25 2019


Assessed Chinook Redds
By: Substrate size
Size of pillow mound


Lower Lewis River Redd Dewatering Locations
Merwin Dam
Lewis R Hatchery
NFL 1
NFL 2
NFL 3
NFL 4
NFL 5
1
2
3
4
5
6
7
8
9
10
11
Survey Reaches
Redds
1
2
3
0
0.5
1
2 Kilometers
0
0.35
0.7
1.4 Miles
N
W
E
S
Vancouver
Salmon Creek
Battle Ground
Orchards
Scappoose
Woodland

Dewatered: Although the egg pocket may have been below the waterline, the effect was recorded as dewatered if the spill mound was isolated from the water flow



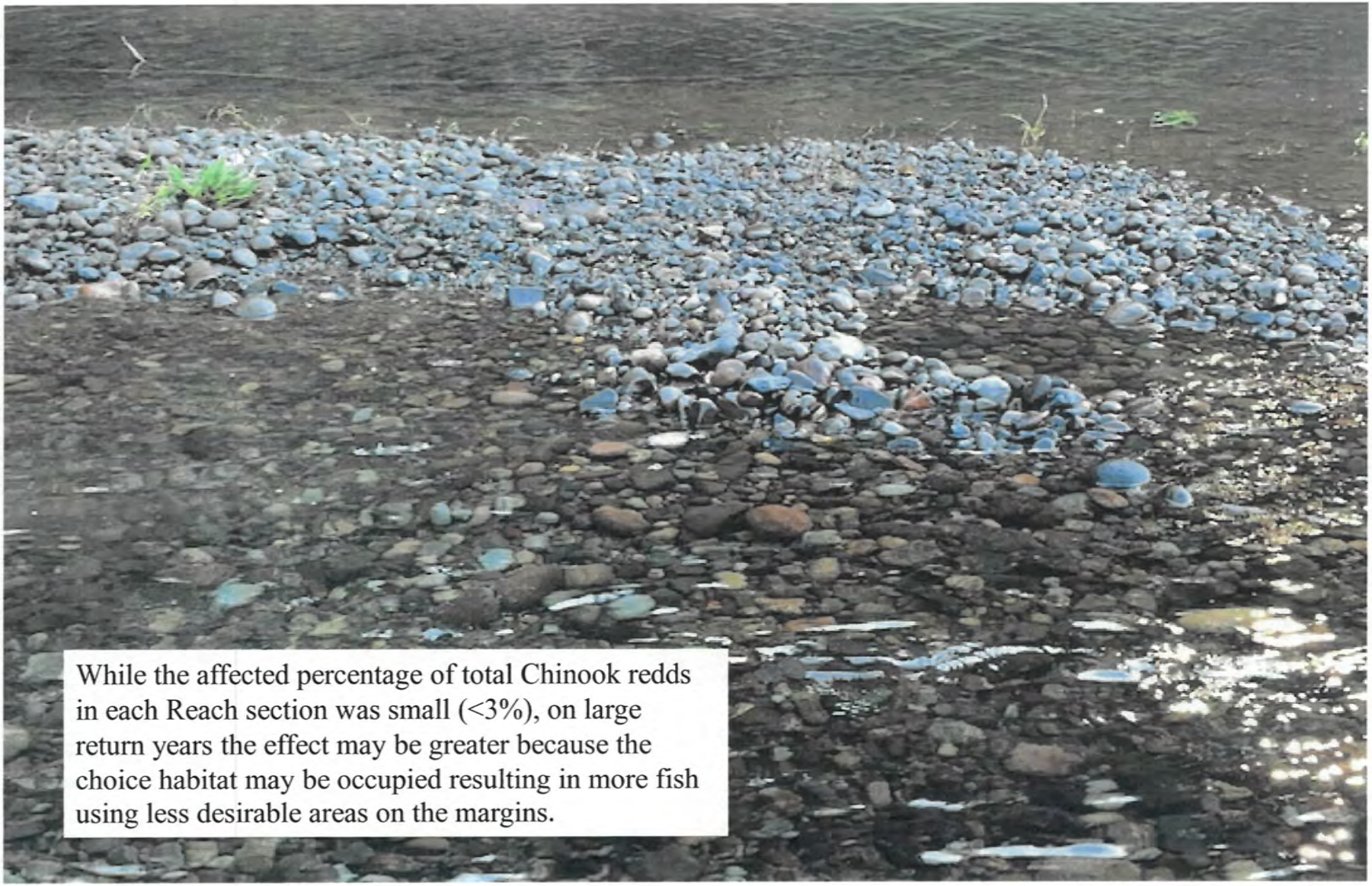
Full WDFW Redd Survey Count

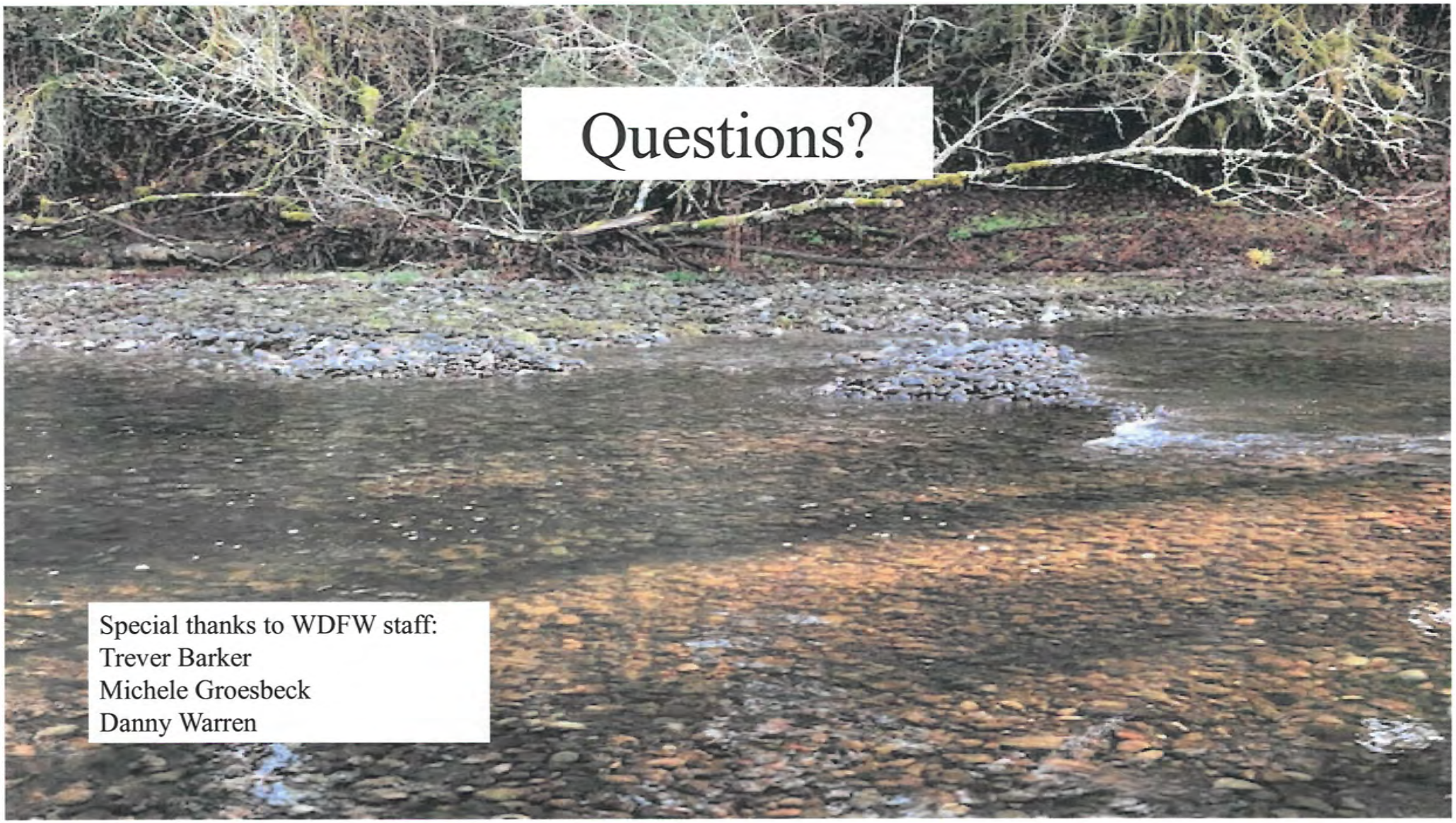
Reach Code:	Total Redd Count
NFL 1	158
NFL 2	375
NFL 3	402
NFL 4	277
Total	1212

WDFW Supplemental Survey

Reach Code:	Affected Redds
NFL 1	3
NFL 2	9
NFL 3	6
NFL 4	2
Total	20


Change in Elevation: 1.3 feet


While the affected percentage of total Chinook redds in each Reach section was small (<3%), on large return years the effect may be greater because the choice habitat may be occupied resulting in more fish using less desirable areas on the margins.


Questions?
Special thanks to WDFW staff:
Trever Barker
Michele Groesbeck
Danny Warren

Lewis River Fish Passage Report

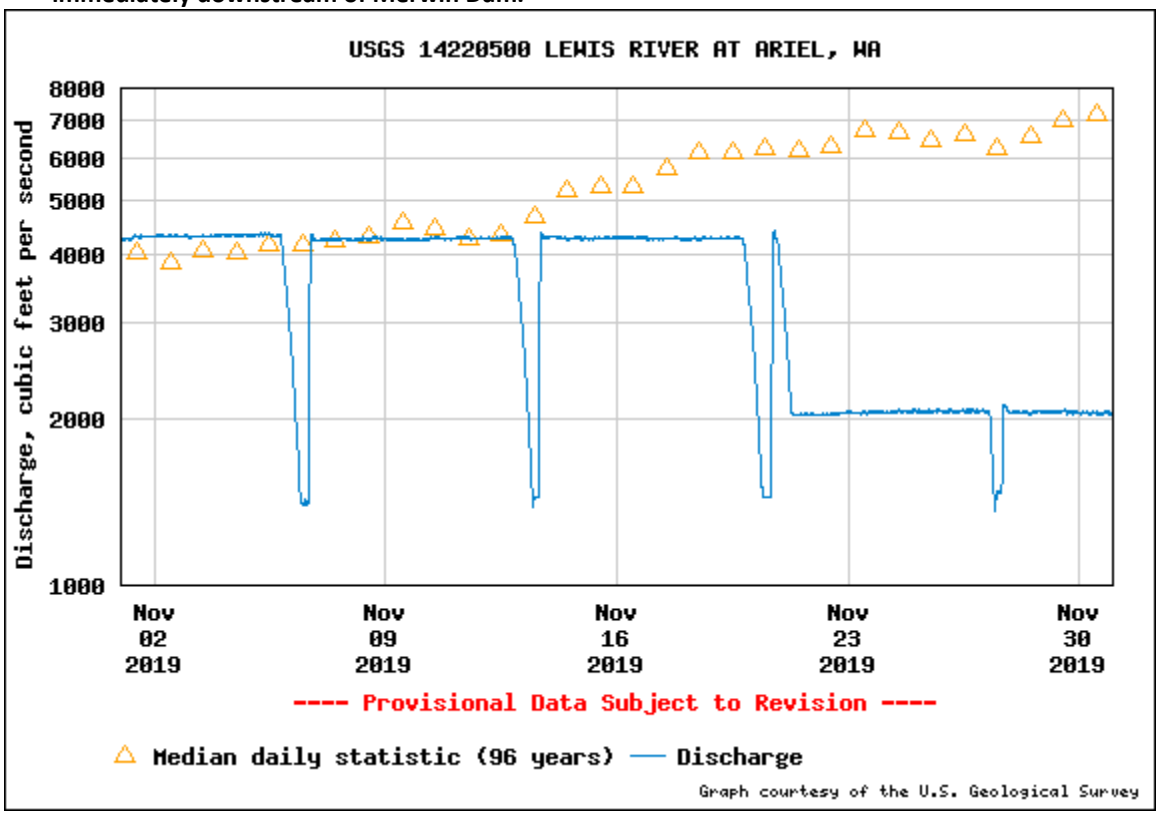
November 2019

Merwin Fish Collection Facility and General Operations

During the month of November, a total of 941 fish were captured at the Merwin Dam Adult Fish Collection Facility (MFCF). The majority of these fish were early-run Coho (71.4 %).

The Merwin Dam Fish Collection Facility was shutdown unexpectedly on October 12, 2019 due to extensive damage to the automatic fish crowding system. Repairs were administered, and the trap was put back in service on November 4, 2019. The MFCF ran continuously for the remainder of the month. Flow below Merwin Dam was maintained at approximately 4,250 cfs until November 19th, and then decreased to approximately 2,050 cfs. River flow remained near this level for the reminder of the month. As in previous years, weekly scheduled drawdowns occurred every Wednesday in order to accommodate spawning survey efforts in the Lewis River below Merwin Dam. (Table 1).

Table 1. Discharge in cubic feet per second recorded at the USGS Ariel, WA gauge (14220500) located immediately downstream of Merwin Dam.



Upstream Transport

Eight (8) Blank Wire Tag (BWT) winter steelhead were captured by the end of December 2018 and were transported upstream as part of the 2019 run year. An additional 38 adults were taken upstream in January 2019 and another 30 in February, 106 in March, 705 in April, 110 in May, and 4 in June for a total of 1,001 BWT winter steelhead transported as part of the 2019 run year. Twelve (12) additional winter steelhead of natural origin (NOR) containing PIT tags from the upper basin were also transported upstream as part of the 2019 run year. A combined total of 1,013 adult winter steelhead have been transported upstream of Swift Dam as part of the 2019 run year (Table 2).

Table 2. Total number of adult winter steelhead transported upstream of Swift Dam in 2019.

Run Year	Male	Female	Total adult winter steelhead taken upstream of Swift Dam
2012	141	48	**189**
2013	440	301	**741**
2014	452	581	**1,033**
2015	746	477	**1,223**
2016	378	376	**754**
2017	331	261	**592**
2018	682	535	**1,227**
2019	527	486	**1,013**

Thirty three (33) NOR (12 female/12 male/9 jack) and an additional 76 hatchery origin jack (HOR) spring Chinook have been taken upstream through November 2019.

By the end of November, 2,856 adult Coho (1,410 male/1,446 female) had been transported upstream along with 241 jacks (< 20 inches). During the month of November, seven (7) NOR Coho that were PIT tagged in the upper basin had been detected as returning adults at the MFCF. All of these fish were tagged at the Swift FSC in the spring of 2018 and returned as adults.

Floating Surface Collector (FSC)

The Swift Reservoir Floating Surface Collector was returned to service on October 14, 2019, following the summer maintenance outage. The Swift Floating Surface Collector (FSC) ran continuously throughout the month of November. A total of 1,069 fish were collected at the Swift FSC during the month of November. The majority of the fish collected were juvenile Chinook (56.6%) and juvenile Coho (38.5%).

Fish Facility Report
Merwin Adult Trap
November 2019

Reporting Date	Spring Chinook (1) AD-Clip M	F	JK	Spring Chinook Wild M	F	JK	Spring Chinook Recap M	F	JK	Early Coho AD-Clip M	F	JK	Early Coho CWT M	F	JK	Early Coho Wild M	F	JK	Early Coho Recap M	F	JK
1-Nov																					
2-Nov																					
3-Nov																					
4-Nov										16	10	6	4	3	1	11	6	8			
5-Nov											2										
6-Nov																					
7-Nov											1					1					
8-Nov										1	2	1	1		1						
9-Nov										7	4	1	3	2		1	1	1			
10-Nov												1				1					
11-Nov																					
12-Nov										1		1			1						
13-Nov										4			1	2		2	1				
14-Nov										10	8	1		3		3	2	1			
15-Nov										24	23	9	1	2	1	1	4	1			
16-Nov										4	3	1				2					
17-Nov										6	5	2		1	1	1	1	1			
18-Nov										1	2	1	3	2		1					
19-Nov										29	21	5	3	8	2	3	6				
20-Nov										28	27	4	12	11	3	5	2				
21-Nov										22	22	2	2	5	2	7	2	3			
22-Nov										10	7	3	3	1		5	8	1			
23-Nov										3	8			2							
24-Nov										3	3					2	1				
25-Nov											4	1		1			1	1			
26-Nov										6	8		1			2	4				
27-Nov										11	7		4	1	1	1	1				
28-Nov										5	11		3			3	9				
29-Nov										18	16	2	2			4	1				
30-Nov											2			3							
Monthly	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**209**	**196**	**41**	**43**	**47**	**13**	**56**	**50**	**17**	**0**	**0**	**0**
Annual	**453**	**287**	**225**	**12**	**12**	**9**	**0**	**0**	**0**	**538**	**538**	**142**	**119**	**133**	**44**	**377**	**411**	**196**	**1**	**0**	**0**

Reporting Date	Late Coho AD-Clip M	F	JK	Late Coho CWT M	F	JK	Late Coho Wild M	F	JK	Late Coho Recap M	F	JK	S. Steelhead Fresh M	F	S. Steelhead Recap M	F	S. Steelhead Wild M	F
1-Nov																		
2-Nov																		
3-Nov																		
4-Nov	22	37	3	4	3		35	41	8				1	5				
5-Nov	1	4	1	1	1			1										
6-Nov	3	2																
7-Nov																		
8-Nov																		
9-Nov		4			1			1						2				
10-Nov																		
11-Nov							1	1										
12-Nov		1																
13-Nov	2	1																
14-Nov		6					1						1					
15-Nov		4		1				1					1	2				
16-Nov																		
17-Nov		1																
18-Nov	7	1					2											
19-Nov		1											2					
20-Nov		3						1						1				
21-Nov							1											
22-Nov	2	1						1										
23-Nov	1							1					1	2				
24-Nov	2	1																
25-Nov																		
26-Nov																		
27-Nov	1	1																
28-Nov		1																
29-Nov			1															
30-Nov	1	1					2	2										
Monthly	**42**	**70**	**5**	**6**	**5**	**0**	**42**	**50**	**8**	**0**	**0**	**0**	**6**	**12**	**0**	**0**	**0**	**0**
Annual	**43**	**70**	**8**	**6**	**5**	**0**	**44**	**52**	**10**	**0**	**0**	**0**	**463**	**918**	**124**	**344**	**6**	**4**

Reporting Date	W. Steelhead AD-Clip M	F	W. Steelhead BWT M	F	W. Steelhead Recap M	F	W. Steelhead Wild M	F	Fall Chinook AD-Clip M	F	JK	Fall Chinook Wild M	F	JK	Fall Chinook Recap M	F	JK	Sockeye M	F	Chum M	F	Pink M	F	Cutthroat	Rainbow (< 20 inches)	Bull Trout	Daily Total
1-Nov																											
2-Nov																											
3-Nov																											
4-Nov												3	1														**228**
5-Nov																								1			**12**
6-Nov																											**5**
7-Nov																											**2**
8-Nov																											**6**
9-Nov																								1			**29**
10-Nov																											**2**
11-Nov																											**2**
12-Nov																											**4**
13-Nov																											**13**
14-Nov	1																	1						1			**39**
15-Nov													2											2			**79**
16-Nov												1															**11**
17-Nov		1																									**20**
18-Nov												1															**21**
19-Nov																											**80**
20-Nov																											**97**
21-Nov																											**68**
22-Nov												1															**43**
23-Nov																											**18**
24-Nov																											**12**
25-Nov																											**8**
26-Nov																											**21**
27-Nov		1											1														**30**
28-Nov		2																									**34**
29-Nov																											**44**
30-Nov		2																									**13**
Monthly	**1**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**4**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**941**
Annual	**201**	**363**	**511**	**477**	**54**	**40**	**55**	**28**	**93**	**48**	**37**	**64**	**40**	**10**	**0**	**0**	**0**	**2**	**8**	**1**	**0**	**0**	**0**	**32**	**6**	**0**	**7664**

1 Only hatchery verses wild distinctions are currently being made. All hatchery fish are labeled as "AD-Clip".

2 Total counts do not include recaptured salmon.

Fish Facility Report

Swift Floating Surface Collector

November 2019

	Coho			Chinook			Steelhead				Cutthroat			Bull	Planted	
Day	**fry**	**parr**	**smolt**	**fry**	**parr**	**smolt**	**fry**	**parr**	**smolt**	**kelt**	**fry**	**<13 in**	**> 13 in**	**Trout**	**Rainbow**	**Total**
1		38	32		7	51								0	0	**128**
2		24	3		3	33								0	0	**63**
3		17	12		33	54								0	0	**116**
4		25	60		3	40						11		1	0	**140**
5		14	33		5	12			2			2		1	0	**69**
6	1	8	28		4	16				1	1	2		0	0	**61**
7	1	26	24			9			1			1		0	0	**62**
8	3	28	11			20						3		0	0	**65**
9		18	9		3	4						1		0	0	**35**
10		7	3		1	4			1					0	0	**16**
11		11			9	7			1			2		0	0	**30**
12		6			1	7		1		1		1		0	0	**17**
13	1	8			3	4		1				2		0	0	**19**
14	1	12				2								0	0	**15**
15		6	1			1						1		0	0	**9**
16	4	7	1		1	2								0	0	**15**
17		9				2								0	0	**11**
18		3	1			4								0	0	**8**
19	1	4	1			10								0	0	**16**
20		3	1			5						1		0	0	**10**
21		7				9		1					1	0	0	**18**
22		7	4			5			3					0	0	**19**
23		10				1	1							0	0	**12**
24		5			1	2		1						0	0	**9**
25		4	1			4			1			1		0	0	**11**
26		2	1											0	0	**3**
27		36	1			17			3			1		0	0	**58**
28		9				3								0	0	**12**
29	4	4				9								0	0	**17**
30		3	1			1								0	0	**5**
Monthly	16	361	228	0	74	338	1	4	12	2	1	29	1	2	0	**1069**
Total	2790	4490	91735	64	2834	7979	8	63	2947	62	1	899	44	5	4405	**118326**

Lewis River Aquatic Coordination Committee Meeting

Date: Thursday, December 12, 2019

Time: 9:00 am – 12:00 pm

Location: Merwin Hydro Control Center
105 Merwin Village Court
Ariel, WA 98603

Meeting Topic: Upper Lewis River Nutrient Enhancement – Final Report

At the September 12, 2019 Lewis River Aquatic Coordination Committee (ACC) meeting, members agreed to the Project Proposal requesting the use of surplus hatchery adult coho carcasses for nutrient enhancement upstream of Swift Dam in fall 2019.

The carcasses were prepared and distributed through the support of the Lower Columbia Fish Enhancement Group (LCFEG) volunteers and Washington Department of Fish and Wildlife Hatchery Staff. Three locations were selected to receive carcasses. These locations were: 1) Clear Creek Bridge Site; 2) Lower Lewis River Falls - Crab Creek Bridge Site; and 3) Muddy River Bridge Site. All fish were marked by having their tails removed prior to seeding so that deposited carcasses would not impact spawning surveys.

Nutrient Enhancement efforts occurred on four (4) separate days in October 2019 (Table 1). A total of 1,850 adult coho carcasses were evenly distributed between all three locations. Nutrient Enhancement efforts were not completed in November due to lower than expected returning adult coho numbers and inclement weather conditions. Additional details regarding the 2019 effort are provided in Table 1.

Figure 1. Volunteers with the LCFEB distributing carcasses off the Muddy River Bridge (photo left) and near Lower Falls, North Fork, Lewis River (photo right).

Nutrient Enhancement - Final Report 2019
Lower Columbia Fish Enhancement Group
Volunteer Data Sheet
WATERSHED: Upper NF Lewis River

Date	Site Location	Species	No. Fish	Tails Cut	Whole/ Clipped	No. Volunteers	No. Hours Worked	Total Volunteer Hours
10-Oct	MRBS	Coho	94	Y	W	5	3	15
10-Oct	CCBS	Coho	94	Y	W	5	2	10
10-Oct	LLRF	Coho	94	Y	W	5	3	15
17-Oct	MRBS	Coho	234	Y	W	5	3	15
17-Oct	CCBS	Coho	233	Y	W	5	3	15
17-Oct	LLRF	Coho	234	Y	W	5	3	15
24-Oct	MRBS	Coho	214	Y	W	5	3	15
24-Oct	CCBS	Coho	214	Y	W	5	3	15
24-Oct	LLRF	Coho	214	Y	W	5	3	15
25-Oct	MRBS	Coho	76	Y	W	2	3	6
25-Oct	CCBS	Coho	75	Y	W	2	3	6
25-Oct	LLRF	Coho	76	Y	W	2	3	6

Site Location	Total
Clear Creek Bridge Site (CCBS)	**616**
Lower Lewis River Falls (Crab Cr. Bridge Site)(LLRF)	**616**
Muddy River Bridge Site (MRBS)	**618**
TOTAL	**1,850**