DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

Received
Electronically
February 8 2016

REPLY TO
ATTENTION OF

Environmental and Cultural Resources Branch

FEB 05 2016

Ms. Loree Randall
Coastal Zone Management Program – Federal Consistency
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Dear Ms. Randall:

The U.S. Army Corps of Engineers, Seattle District (USACE) is proposing to replace the White River barrier structure (barrier structure) and the fish trap-and-haul facility (fish facility) over a four year period (2015 – 2020). The barrier structure and fish facility are located near Buckley, King and Pierce counties, Washington. The purpose of the proposed work is to meet the requirements of the 2014 National Marine Fisheries Service (NMFS) Biological Opinion's (BiOp) Reasonable and Prudent Alternative number 3 (RPA 3), in order to reduce the potential for injuries and fatalities to upstream migrating fish, including species listed under the Endangered Species Act (ESA).

Damage to the existing barrier structure presents a hazard to migrating fish when they attempt to pass over the barrier. The previous timber and rebar apron was replaced in 2015 with concrete and steel plates as specified by the NMFS 2014 BiOp, which lowered hazards to fish caused by the apron. However, missing and damaged flashboards can provide attraction flows which keep fish from entering the fish facility or allows fish to bypass the facility entirely. In addition, replacing the flashboards following damage or loss requires in-water work with flows reduced to very low levels, leading to fish stranding and mortality. Additionally, significant erosion near the flashboard anchor points can occur, which weakens the overall barrier flash board support structure. If a failure of the barrier structure were to happen, attraction to the fish facility would be severely limited and a catastrophic loss of salmonids would occur. Several species of fish are present in the White River, including ESA listed fall and spring Chinook salmon, steelhead, and bull trout. Recent returns of migrating salmonids, including record numbers of pink salmon in odd numbered years, have exceeded the current fish facility's capabilities causing fish to stack up at the barrier and leading to significant delays in migration and spawning and pre-spawning mortality. The USACE is required under Section 7 of the ESA to provide safe, timely, and effective fish passage. To pass

upstream, migrating fish enter the Fish Facility, which is located adjacent to the barrier structure on the left bank. Trapped fish are hauled by truck and released above MMD. This is the only method for fish to access spawning habitat above the dam.

The proposed project would construct a new barrier structure on the same axis of the existing barrier structure and approximately a third narrower, and a new fish facility capable of handling a projected 60,000 fish per day would be built on the right bank. The proposed new barrier structure will be able to manage the river flows and debris that occur at the site to the extent that frequent repairs to the structure will not be necessary. The proposed project would also improve the existing Muckleshoot Indian Tribe (MIT) hatchery levee on the right bank and improve the access road system in the project area. The fish release site will also be repaired and improved in order to facilitate higher numbers of fish being transported and released at the site.

Due to the extensive nature of the proposed construction and the requirement to meet the NMFS RPA 3 requirement of project completion by December 2020, construction is proposed to take place outside of the established work window (July 15 – August 31). The USACE is coordinating with Federal, State and Tribal representatives on revised work windows to accommodate the proposed construction.

The USACE is requesting Individual 401 Water Quality Certification (WQC) review and Coastal Zone Management (CZM) Consistency concurrence from the Washington Department of Ecology for the Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement. Please note that due to presence of Muckleshoot Indian Tribe (MIT) Tribal Trust Lands within the project footprint, the Environmental Protection Agency will also be requested to issue an individual 401 WQC for the project activities that occur on MIT lands.

Documentation enclosed to support our request includes a JARPA form and attachments, a CZM consistency determination, and a water quality monitoring plan (WQMP). The Corps did not include JARPA Attachment E (Aquatic Use Authorization on Department of Natural Resources (DNR) – managed aquatic lands) as a part of this submittal because there are no DNR lands in the project area.

If you have any questions or need additional information, please contact Mr. Michael Scuderi at michael.r.scuderi@usace.army.mil or at 206-764-7205 or Mr. Fred Goetz at fred.goetz@usace.army.mil or at 206-764-3515.

Sincerely,

Evan R. Lewis
Chief, Environmental and Cultural
Resources Branch

Enclosures

Copy furnished with enclosures:

Ms. Rebekah Padgett
401/CZM Federal Permit Manager
Shorelands & Environmental Assistance Program
Washington Department of Ecology
3190 – 160th Avenue SE
Bellevue, Washington 98008

Copy furnished without enclosures:

Ms. Linda Storm
Office of Ecosystems Tribal and Public Affairs
Environmental Protection Agency
Region 10
1200 6th Ave., Suite 900.
Seattle, Washington. 98101

WASHINGTON STATE
Joint Aquatic Resources (JAR) Form[1,2]

USE BLACK OR BLUE INK TO ENTER ANSWERS IN THE WHITE SPACES BELOW.

AGENCY USE ONLY

Date received:

Agency reference #: _____

Tax Parcel #(s): _____

_____

Submitted for Information Purposes Only

Part 1–Project Identification

1. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [help]
Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement

Part 2–Applicant

The person and/or organization responsible for the project. [help]

2a. Name (Last, First, Middle)			
2b. Organization (If applicable)			
United States Army Corps of Engineers			
2c. Mailing Address (Street or PO Box)			
P.O. Box 3755			
2d. City, State, Zip			
Seattle, WA 98124-3755			
2e. Phone (1)	**2f.** Phone (2)	**2g.** Fax	**2h.** E-mail
(206) 764-7205	( )	( )	

Part 3–Authorized Agent or Contact

[1]Additional forms may be required for the following permits:

- If your project may qualify for Department of the Army authorization through a Regional General Permit (RGP), contact the U.S. Army Corps of Engineers for application information (206) 764-3495.
- If your project might affect species listed under the Endangered Species Act, you will need to fill out a Specific Project Information Form (SPIF) or prepare a Biological Evaluation. Forms can be found at http://www.nws.usace.army.mil/Missions/CivilWorks/Regulatory/PermitGuidebook/EndangeredSpecies.aspx.
- Not all cities and counties accept the JARPA for their local Shoreline permits. If you need a Shoreline permit, contact the appropriate city or county government to make sure they accept the JARPA.

[2]To access an online JARPA form with [help] screens, go to http://www.epermitting.wa.gov/site/alias__resourcecenter/jarpa_jarpa_form/9984/jarpa_form.aspx.

For other help, contact the Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@ora.wa.gov.

Person authorized to represent the applicant about the project. (Note: Authorized agent(s) must sign 11b of this application.) [help]

3a. Name (Last, First, Middle)			
Scuderi, Michael Robert			
3b. Organization (If applicable)			
United States Army Corps of Engineers			
3c. Mailing Address (Street or PO Box)			
P.O. Box 3755			
3d. City, State, Zip			
Seattle, WA 98124-3755			
3e. Phone (1)	**3f.** Phone (2)	**3g.** Fax	**3h.** E-mail
(206) 764-7205	( )	( )	Michael.R.Scuderi@usace.army.mil

Part 4–Property Owner(s)

Contact information for people or organizations owning the property(ies) where the project will occur. Consider both **upland and aquatic** ownership because the upland owners may not own the adjacent aquatic land. [help]

☒ Same as applicant. (Skip to Part 5.)

☐ Repair or maintenance activities on existing rights-of-way or easements. (Skip to Part 5.)

☐ There are multiple upland property owners. Complete the section below and fill out JARPA Attachment A for each additional property owner.

☐ Your project is on Department of Natural Resources (DNR)-managed aquatic lands. If you don't know, contact the DNR at (360) 902-1100 to determine aquatic land ownership. If yes, complete JARPA Attachment E to apply for the Aquatic Use Authorization.

4a. Name (Last, First, Middle)			
4b. Organization (If applicable)			
4c. Mailing Address (Street or PO Box)			
4d. City, State, Zip			
4e. Phone (1)	**4f.** Phone (2)	**4g.** Fax	**4h.** E-mail
	( )		

Part 5–Project Location(s)

Identifying information about the property or properties where the project will occur. [help]

☒ There are multiple project locations (e.g. linear projects). Complete the section below and use JARPA Attachment B for each additional project location.

5a. Indicate the type of ownership of the property. (Check all that apply.) [help]

Private
☒ Federal
X Publicly owned (state, county, city, special districts like schools, ports, etc.)
☒ Tribal
☐ Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)

5b. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 5p.) [help]

5c. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]

Buckley, Washington, 98321

5d. County [help]

King

5e. Provide the section, township, and range for the project location. [help]

¼ Section	Section	Township	Range
NE	02	19N	6E

5f. Provide the latitude and longitude of the project location. [help]

- Example: 47.03922 N lat. / -122.89142 W long. (Use decimal degrees - NAD 83)

47.170045 N Latitude, -122.00444 W Longitude

5g. List the tax parcel number(s) for the project location. [help]

- The local county assessor's office can provide this information.

0619021006, 3520069025, 0219069002

5h. Contact information for all adjoining property owners. (If you need more space, use JARPA Attachment C.) [help]

Name	Mailing Address	Tax Parcel # (if known)
White River Fish Hatchery	25305 SE Mud Mountain Rd. Enumclaw, WA 98022	3520069024
Puget Sound Energy/Electric	P.O. Box 97034 Bellevue, WA 98009-9734	7535000010, 7535000020 0620353001
Washington State Department of Social and Health Services	2120 Ryan Road Buckley, WA 98321-9115	0619021000
Cascade Water Alliance	520 112th Avenue NE Suite 400 Bellevue, WA 98004-5503	0619021006, 3520069025

5i. List all wetlands on or adjacent to the project location. [help]

A wetland delineation conducted by United States Army Corps of Engineers (USACE) biologists in 2015 identified a large slough wetland system that occurs in the project area. The entire boundary of this system was not delineated, only the intersection with the proposed project features. Wetland conditions begin to appear along the landward alignment of the levee upstream of the White River Fish Hatchery. Downstream of the White River Barrier Structure (barrier structure) no wetlands were identified in the riparian complex present in a survey done by Tetra Tech in 2012. Corps biologists did identify wetlands adjacent to the right bank access road in one spot and several swales between the river and the access road. Wetland impacts were identified for 0.08 acres of wetland. The wetlands are located on Muckleshoot Indian Tribe (MIT) Tribal Trust Lands. Please see attached wetland map and rating form for more information.

5j. List all waterbodies (other than wetlands) on or adjacent to the project location. [help]

White River

5k. Is any part of the project area within a 100-year floodplain? [help]

☒ Yes ☐ No ☐ Don't know

5l. Briefly describe the vegetation and habitat conditions on the property. [help]

The barrier structure is located on the White River. The vegetation adjacent to the barrier structure is predominantly second growth mixed riparian, which includes conifer forests and hardwood or mixed stands. Species such as Sitka spruce, hemlock, red cedar, willow, red alder, and cottonwood are also abundant, with the understory primarily including blackberry and other species typically found in disturbed upland areas. The White River Fish Hatchery on the right bank also has a maintained grass lawn around the rearing ponds.

5m. Describe how the property is currently used. [help]

The property is currently used for the barrier structure, which was built between 1910 and 1912 by Puget Sound Power and Light (now PSE) to divert water to Lake Tapps for hydropower use, and is currently owned and operated by Cascade Water Alliance for the purposes of municipal and industrial water supply. The barrier structure also serves to attract salmon that are unable to migrate past Mud Mountain Dam (MMD) and are instead diverted into the USACE trap-and-haul fish facility on the left bank to be transported above MMD. The access road to the proposed facility is contained on property owned by the Muckleshoot Indian Tribe (MIT), and is used for access to the MIT White River hatchery. In addition, approximately 5 miles upstream of Mud Mountain Dam on the right bank of the White River is the release site for the collected adult fish. This site is serviced by a gravel road which is accessed from Highway 410.

5n. Describe how the adjacent properties are currently used. [help]

On the left bank there are residences, access roads, a fish trap-and-haul facility built in 1941 owned and operated by the USACE, and a flume that conveys water to Lake Tapps Reservoir. On the right bank is the White River Fish Hatchery, which began operation in 1989 and is currently operated by the Muckleshoot Indian Tribe (MIT). The remaining adjacent properties are undeveloped.

The release site and road is surrounded by land owned by the Corps of Engineers for flood storage for Mud Mountain Dam, and privately owned timber land.

5o. Describe the structures (above and below ground) on the property, including their purpose(s) and current condition. [help]

The barrier structure on the White River consists of a timber crib with concrete and gravel inserts and 4-foot high flashboards installed on top of the crib structure to achieve an 11-foot overall height. The flashboards collapse under high flows and were most recently repaired in August, 2015. The barrier structure serves as a barrier to fish migration and provides adequate head differential necessary to generate attraction flows needed for the fish trap. The current fish trap-and-haul facility is located on the left bank where fish are attracted into a holding pool through a tunnel trap, loaded into a loading hopper, and transported by truck to a release site five miles upstream of MMD. Concrete abutments are present at each end to integrate the trap-and-haul facility. An apron

of concrete and steel is at the downstream foundation of the barrier structure. The flashboards are designed to collapse under high flow conditions and under pressure from debris. Periodic high flows can damage the apron and some erosion can occur of concrete components and/or near the flashboard anchor points. The access road on the right bank leads to the MIT hatchery and consists of packed gravel with an approximate 9% grade at its steepest point. The existing fish release site is approximately 5 miles upstream of MMD and consists of a single fish chute sized for 1200-gallon trucks, and a single graveled back-in area with a wooden crib wall. There is also a primitive spare chute at the site which has not been used. The fish release site access road consists of packed gravel and ranges in width from 12 feet to a maximum of 18 feet in some locations and runs a total length of 6,900 feet with an approximate 9% grade at its steepest point. The existing roadway does not include guardrails or turnouts.

5p. Provide driving directions from the closest highway to the project location, and attach a map. [help]

Head northeast on WA-410 E toward Cemetery Road then turn right onto SE Mud Mountain Road. Follow SE Mud Mountain Road to the White River Fish Hatchery. The barrier structure is on the White River past the lower rearing pond. Please see attached map.

Part 6–Project Description

6a. Briefly summarize the overall project. You can provide more detail in 6b. [help]

The purpose of the project is to replace the existing barrier structure with a new operable structure, construct a new fish trap-and-haul and support facility on the right bank, and improve the roads and levees adjacent to the new facility as well as upgrade the road leading to the release site and the release facilities.

6b. Describe the purpose of the project and why you want or need to perform it. [help]

The purpose of the proposed work is to meet the requirements of the 2014 National Marine Fisheries Service (NMFS) Biological Opinion's (BiOp) Reasonable and Prudent Alternative (RPA), in order to reduce the potential for injuries and fatalities to upstream migrating fish, including species listed under the Endangered Species Act (ESA). Damage to the existing barrier structure presents a hazard to migrating fish when they attempt to pass over the barrier. The previous timber and rebar apron was replaced in 2015 with concrete and steel plates as specified by the NMFS 2014 BiOp, which lowered hazards to fish caused by the apron. However, missing and damaged flashboards can provide attraction flows which keep fish from entering the trap-and-haul facility. In addition, replacing the flashboards following damage or loss requires in-water work with flows reduced to very low levels, leading to fish stranding and possible mortality. Additionally, significant erosion near the flashboard anchor points can occur, which weakens the overall barrier flash board support structure. If a failure of the barrier structure were to happen, attraction to the fish trap would be severely limited and a catastrophic loss of salmonids would occur. Several species of fish are present in the White River, including ESA listed fall and spring Chinook salmon, steelhead, and bull trout. Recent returns of migrating salmonids, including record numbers of pink salmon in odd numbered years, have exceeded the current fish trap-and-haul facility's capabilities causing fish to stack up at the barrier and leading to significant delays in migration and spawning. The USACE is required under Section 7 of the ESA to provide safe, timely, and effective fish passage. Instead of passing upstream, migrating fish enter the USACE Fish Trap, which is located adjacent to the barrier structure on the left bank. Trapped fish are hauled by truck and released above MMD. This is the only method for fish to access spawning habitat above the dam. The proposed project would construct a new barrier structure on the same axis of the existing barrier structure and a new fish trap-and-haul facility capable of handling a projected 60,000 fish per day would be built on the right bank. In addition, replacement of the barrier with an operable structure will reduce the need to lower river flows to repair the existing barrier and significantly reduce the loss of juvenile salmonids due to stranding. The ability to operate the barrier to manage sediment and debris will greatly reduce or potentially eliminate the need to perform emergency repairs outside in-water work windows. The proposed project would also improve the existing Muckleshoot Indian Tribe (MIT) hatchery levee on the right bank and improve the access road system in the project area. The fish release site will also be repaired and improved in order to facilitate higher numbers of fish being transported and released at the site.

6c. Indicate the project category. (Check all that apply) [help]

☐ Commercial ☐ Residential ☐ Institutional ☒ Transportation ☐ Recreational
☐ Maintenance ☒ Environmental Enhancement

6d. Indicate the major elements of your project. (Check all that apply) [help]

☐ Aquaculture	☐ Culvert	☐ Float	ss Retaining Wall (upland)
☐ Bank Stabilization	☒ Dam / Weir	☐ Floating Home	☒ Road
☐ Boat House	☒ Dike / Levee / Jetty	☐ Geotechnical Survey	☐ Scientific Measurement Device
☐ Boat Launch	☐ Ditch	☒ Land Clearing	☐ Stairs
☐ Boat Lift	☐ Dock / Pier	☐ Marina / Moorage	☒ Stormwater facility
☐ Bridge	☒ Dredging	☐ Mining	☐ Swimming Pool
☐ Bulkhead	☐ Fence	☐ Outfall Structure	☐ Utility Line
☐ Buoy	☐ Ferry Terminal	☐ Piling/Dolphin	
☐ Channel Modification	☒ Fishway	☐ Raft	

☒ Other:

Fish Barrier and trap-and-haul facility for an upstream fish passage project for the Corps Mud Mountain Dam and Muckleshoot Tribe of Indians White River Hatchery

6e. Describe how you plan to construct each project element checked in 6d. Include specific construction methods and equipment to be used. [help]

- Identify where each element will occur in relation to the nearest waterbody.
- Indicate which activities are within the 100-year floodplain.

The work effort will consist of three main elements: roads and levees construction, barrier structure/support facility construction, and fish release site improvements and repair. The construction phase for the roads and levees element is proposed to begin in August, 2016 and be completed in August, 2017. The barrier structure/support facility element is proposed to begin construction in June 2017 and be completed in December 2020. The proposed date for the fish release site construction start has yet to be determined, but will be completed by December 2020.

Roads and Levees

The roads and levees work effort will include improving existing roadways into the MIT hatchery site and improvement of the access road into the proposed support facility location. The project will entail storm and drainage features and improvements at the wetland crossing adjacent to the site. The proposed road section will consist of two 11-foot drive lanes, gravel shoulders, and a dedicated pedestrian walkway with a guardrail separating it from the roadway to address additional traffic generated by the project and tribal safety concerns. Paving will be required to limit noise, dust, and rapid road degradation. A new 400 foot long road will be constructed off the existing road to the new fish collection facility work site. An 1800 foot long levee system on the right bank will be constructed/upgraded to avoid induced flooding of the new facilities and the MIT hatchery resulting from the proposed barrier replacement. In-water work will be required during levee improvement efforts, but will be minimized to the fullest extent possible in part by constructing during low flows when the secondary river channel adjacent to the river is dry. Approximately 0.95 acres of fill will be placed below ordinary high water for construction of the new levee. Permanent inwater impacts will be minimized through the use of a buried toe.

Approximately 6 acres of forested land will be cleared for this phase. Of that removal approximately 2.5 acres of clearing will be within the primary riparian buffer (50 foot width) adjacent to the White River.

The release site road will be upgraded with turnouts and retaining walls, as well as paved during this construction phase. All disturbed sites will be restored according to the conditions described in the 2014 BiOp from NMFS

Barrier Structure and Fish Support Facility

The new barrier structure/support facility will consist of a narrower 200-foot wide hinged crest gate concept with five, 40-foot wide, hinged crest gates, with piers between gates and an access bridge across the top to facilitate maintenance and mechanical debris removal. A concrete scour-protection apron will be constructed downstream of the gates and riprap scour protection will be added downstream of the apron. The barrier and support facility will be replaced in two phases with each phase portioned into three sub-phases: construct, build, and remove. Care and diversion of water will be required in each phase (a monitoring plan for water quality, and BMPs to be utilized are found the JAR form attachments.

Construct Phase 1 (Assumes works starts in November 2017 thru July 2019)

1. BarrierConstruction -

Remove 2 feet of flash boards from the existing barrier structure.

Phase 1 will be access from the right bank of the river.

Start placement of cofferdam on the right bank, starting from upstream end. Use super sacks or large rock to deflect flow from each cofferdam cell as it is being placed. The footprint of the cofferdam will need to be excavated an estimated 5' deep due to sediment that gets built up in front of the flashboards. Cofferdam cells will be backfilled with river material from within the coffered area. (Due to time of the year, flood season, it is possible this will be done directly in the river, if flows remain lower it would be possible to do this behind a temp cofferdam of gravel berms and super sacks.)

River flow will be passed over 130' of the existing barrier along the left bank. The existing left bank fish trap will continue to be used for trap and haul activities. For flows over 3,600 cfs the flash boards will be knocked out to provide flow capacity for the high flows. Flash boards will then be replaced during the next available lower flow period using methods similar to what is currently used. No channel modifications are necessary during phase 1.

Where the cofferdam crosses the existing barrier it will be sealed with grout or another sealer to prevent water seepage.
In the section of cofferdam over the existing barrier (extending approx. 50' upstream and downstream) a structural wall will be drilled through the cofferdam and existing barrier, secant piles or H-pile possibly. The cofferdam landward of that wall will be removed to make space for the excavation.
Within the cofferdam a cutoff wall will be installed around the perimeter, possibly a grout curtain, bentonite trench, or sheet pile to reduce groundwater flow into the coffered area.
H-piles will be drilled into place around the excavation footprint and ground water wells will be installed throughout the coffered area.
Ground water will be pumped out of the site to maintain the groundwater level 2' below the bottom of the excavation. This will be a combination of deep wells and sumps, so the water will be treated accordingly before being returned to the river.
The excavation for the barrier and fish facility will then be excavated to depth, installing timber lagging between the H-piles as it goes down to maintain vertical sides.
Install concrete working floor in the bottom of the excavation.
Construct 2 bays of new barrier and fish facility.
Remove lagging, H-piles and backfill excavation to final grades around new barrier and fish facility.
Install Phase 2 cofferdam to maximum extent possible within the Phase 1 cofferdam. Specifically the connections to the Pier.
During summer low flow periods using gravel berms and super sacks to isolate these activities from the river flow.
Remove Phase 1 cofferdam
Open excavation to install scour protection downstream of the new barrier
Channel excavation upstream and downstream of the 2 new barrier bays down to the elevation of the new invert (6 ft lower on the upstream side and 8ft lower on the downstream side). This work will involve dredging approximately 5 acres of river channel to readjust the river morphology to align with the new barrier structure. Approximately 27,500 cubic yards of material would be removed, and approximately 5700 cubic yards of class 5 riprap being places for scour protection. Some of this work will occur outside of the cofferdam boundaries.
Complete construction of the new levee upstream of the fish facility.
The 2 bays of the new barrier and the new fish facility must be fully operational before phase 2 can start.

2. Fish Trap-and-Haul Facility Construction: (November 2017 thru July 2019)

The fish facility will consist of an intake structure for water supply, a fish ladder, and fish trap designed to collect 95% of all fish, with a survival requirement of 98% and maximum daily passage of 60,000 fish. The support facility will consist of a combination of fish augers and hoppers to lift fish from the entrance pool to an overhead facility that contains sorting areas, holding pools, and loading mechanisms into the transport trucks. The sorting area will be conceptually designed to facilitate coarse sorting by species and delivery of hatchery fish, specific sorting mechanisms have not been identified at this time. The loading mechanisms will consist of a hopper that lifts fish over the truck drive-under pad and establishes a hydraulic connection with the truck tank. New 4500-gallon trucks are proposed for this action. The trucks transport fish to a released site above MMD at approximately RM 32.

3. Fish Release Site and Access Road Improvements/Repair

The fish release site and access road improvements will entail widening of the road and creating additional areas for turnouts and truck turnaround at the river in order to accommodate more than one truck. The release site improvements will consist of repairs to the existing chute and construction of a second chute for the new 4500-gallon trucks. In water work requirements are expected to be minimal.

Construct Phase 2 (Assumes works starts in July 2019 thru Dec 2020)
Use the 2 new bays of the barrier to draw the flow of the river to the right bank. These will be used to pass flow during the duration of phase 2. The new fish facility will be used to trap and haul fish during phase 2 of construction.
Access will be from the left bank just downstream of the existing fish trap but upstream of the contaminated area.

During low water, using gravel berms and super sacks to isolate the construction, excavate the phase 2 cofferdam alignment to depth and install the phase 2 cofferdam (should be minimal work given the new barrier invert is 6' lower). Cofferdam cells will be backfilled with river material from within the coffered area. Within the cofferdam a cutoff wall will be install around the perimeter, possibly a grout curtain, bentonite trench, or sheet pile to reduce groundwater flow into the coffered area.
H-piles will be drilled into place around the excavation footprint and ground water wells will be installed throughout the coffered area.
Ground water will be pumped out of the site to maintain the groundwater level 2' below the bottom of the excavation. This will be a combination of deep wells and sumps, so the water will be treated accordingly before being returned to the river.
The excavation for the barrier will then be excavated to depth, installing timber lagging between the H-piles as it goes down to maintain vertical sides.
Install concrete working floor in the bottom of the excavation.
Construct 3 bays of new barrier.
Remove lagging, H-piles and backfill excavation to final grades around new barrier and fish facility.
During summer low flow periods using gravel berms and super sacks to isolate these activities from the river flow.
Remove Phase 2 cofferdam
Open excavation to install scour protection downstream of the 3 new barrier bays
Channel excavation upstream and downstream of the 3 new barrier bays down to the elevation of the new invert (6 ft lower on the upstream side and 8ft lower on the downstream side).
Demo/fill-in existing fish trap on left bank.
Full barrier and fish facility are operational.
After demobilization of the upstream staging area, approximately 2 acres of riparian forest will be reestablished behind the new levee alignment

The current conceptual schedule is not developed to the degree necessary to identify all periods of in-water work. The normal in-water work window of July 15- August 31 is considered insufficient to conduct a year-round construction schedule in the river. The phasing of the project will result in periods of work outside the normal window most likely during fall and winter. The need for work outside the window was part of the ESA consultation with NMFS and USFWS and has been coordinated with WDFW, the Puyallup and Muckleshoot Tribes as part of their ongoing participation as partners in the design of the facility. Input from these groups will continue during the detailed design phase. The current design plan is still ongoing and elements included in the work efforts may change as design progresses.

6f. What are the anticipated start and end dates for project construction? (Month/Year) [help]

- If the project will be constructed in phases or stages, use JARPA Attachment D to list the start and end dates of each phase or stage.

Start date: June/2016 End date: December/2020 ☒ See JARPA Attachment D

6g. Fair market value of the project, including materials, labor, machine rentals, etc. [help]

$100,646,000-$106,775,000

6h. Will any portion of the project receive federal funding? [help]

- **If yes**, list each agency providing funds.

☒ Yes: United States Army Corps of Engineers ☐ No ☐ Don't know

Part 7–Wetlands: Impacts and Mitigation

☒ Check here if there are wetlands or wetland buffers on or adjacent to the project area.
(If there are none, skip to Part 8.) [help]

7a. Describe how the project has been designed to avoid and minimize adverse impacts to wetlands. [help]

☐ Not applicable

0.08 acres of wetlands will be affected by the improvement and paving of the access road to the new fish facility on the right bank. Any work conducted in wetlands will be entirely on MIT Tribal Trust lands. The impacted area is currently a crushed gravel road with limited vehicular traffic and a forested area leading to the fish trap site. The presence of the new fish facility will greatly increase traffic, and widening and paving of the road is required. The road improvement will require expanding the road footprint into a wetland area, requiring a fill of approximately 0.03 acres. The wetland fill impact was reduced through the addition of retaining wall at the edge of the roadway. In addition, to avoid vibration impacts to the MIT Hatchery Facility, a new 400 foot long road will have to be built off the existing access road to the new fish trap facility. This road will cross two wetland areas of approximately 0.05 acres. Road improvement design will be limited to the best extent possible to the existing road footprint, though some deviation is required in order to gain direct access to the support facility. The impact to total wetland area is minimal and BMPs will be followed during construction to minimize leaks, run-off, and destruction of wetland areas to the maximum extent possible. All wetland impacts are on MIT Tribal Trust Lands

The release site road improvements were designed to avoid impacts to existing wetlands along the road alignment through the shifting of proposed turnouts away from wetland areas.

7b. Will the project impact wetlands? [help]

☒ Yes ☐ No ☐ Don't know

7c. Will the project impact wetland buffers? [help]

☒ Yes ☐ No ☐ Don't know

7d. Has a wetland delineation report been prepared? [help]

- **If Yes**, submit the report, including data sheets, with the JARPA package.

☒ Yes ☐ No

7e. Have the wetlands been rated using the Western Washington or Eastern Washington Wetland Rating System? [help]

- **If Yes**, submit the wetland rating forms and figures with the JARPA package.

☒ Yes ☐ No ☐ Don't know

7f. Have you prepared a mitigation plan to compensate for any adverse impacts to wetlands? [help]

- **If Yes**, submit the plan with the JARPA package and answer 7g.
- **If No, or Not applicable**, explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Not applicable

The proposed fill in wetlands is necessary to respond to a Biological Opinion from NMFS to rectify the current situation where adult ESA listed Chinook, steelhead and bull trout are experiencing mortality due to inadequate upstream passage and impacts to juvenile listed salmonids due to dewatering of the river for maintenance operations on the current barrier structure. The access road needs to upgraded to assure safe passage for listed fish and the new segment has to be located away from the existing Muckleshoot White River Hatchery to avoid vibration impacts at the hatchery which is a component of the Chinook Recovery plan for the listed stock. The minimal fill in wetlands proposed will be compensated by the gain in fisheries stocks, increased nutrient input to the upper watershed, increased passage of sediment and large woody debris

downstream, as well as a significant reduction in juvenile salmonid mortality due to the cessation of flow alterations to repair the existing barrier structure.

7g. Summarize what the mitigation plan is meant to accomplish, and describe how a watershed approach was used to design the plan. [help]

The proposed fill of 0.08 acres is considered to be minor. This fill will enable road improvements which will allow safe transport of salmonids upstream of Mud Mountain Dam, enhancing nutrient flow in the watershed and allowing more salmonids to spawn thereby increasing salmonid populations. Overall health of the watershed will be improved due to the addition of more nutrients to the upper watershed, and improved passage of sediment and large woody debris.

7h. Use the table below to list the type and rating of each wetland impacted, the extent and duration of the impact, and the type and amount of mitigation proposed. Or if you are submitting a mitigation plan with a similar table, you can state (below) where we can find this information in the plan. [help]

Activity (fill, drain, excavate, flood, etc.)	Wetland Name[1]	Wetland type and rating category[2]	Impact area (sq. ft. or Acres)	Duration of impact[3]	Proposed mitigation type[4]	Wetland mitigation area (sq. ft. or acres)
Excavate/Grade, Pavement	MIT Hatchery	Category II	0.08 acres	permanen t	NA	NA

[1] If no official name for the wetland exists, create a unique name (such as "Wetland 1"). The name should be consistent with other project documents, such as a wetland delineation report.
[2] Ecology wetland category based on current Western Washington or Eastern Washington Wetland Rating System. Provide the wetland rating forms with the JARPA package.
[3] Indicate the days, months or years the wetland will be measurably impacted by the activity. Enter "permanent" if applicable.
[4] Creation (C), Re-establishment/Rehabilitation (R), Enhancement (E), Preservation (P), Mitigation Bank/In-lieu fee (B)

Page number(s) for similar information in the mitigation plan, if available: _____

7i. For all filling activities identified in 7h, describe the source and nature of the fill material, the amount in cubic yards that will be used, and how and where it will be placed into the wetland. [help]

The fish facility access road will be paved with asphalt pavement, placed on the prepared road surface.

Concrete will also be used to fill guardrail post holes during post installation.

7j. For all excavating activities identified in 7h, describe the excavation method, type and amount of material in cubic yards you will remove, and where the material will be disposed. [help]

Prior to paving, the access road area will be prepared with proper earthwork, starting with the building of embankments with cuts and fills. A grader or bulldozer will be used to level the soil at the site and compact it to maximum density. Following compaction, approximately XX cubic yards of gravel will be placed in a 12-inch layer on the road surface. No significant amount of soil will be removed from the area permanently, but will be manipulated at the site.

Guardrail installation will require ground digging for post support at a depth of approximately 22 inches and a spacing of approximately 6 feet between posts. Displaced soil will be retained on site or utilized for cofferdam construction.

Part 8–Waterbodies (other than wetlands): Impacts and Mitigation

In Part 8, "waterbodies" refers to non-wetland waterbodies. (See Part 7 for information related to wetlands.) [help]

☒ Check here if there are waterbodies on or adjacent to the project area. (If there are none, skip to Part 9.)

8a. Describe how the project is designed to avoid and minimize adverse impacts to the aquatic environment. [help]

☐ Not applicable

Overall, the project is expected to result in a net gain in aquatic habitat function and values; however, the following impact minimization measures will be employed during construction:

- The following best management practices (BMPs) will be used to prevent discharge of pollutants and promote the maintenance of water quality:
  - Oil will be changed in equipment to an environmentally friendly substance prior to start of work.
  - Equipment will be inspected for leaks each work day prior to start of work.
  - No fueling, oil changing, repairs or maintenance of equipment will occur within 50 feet of waters of the U.S.
  - Spill cleanup supplies and equipment will be maintained on site throughout the period of work, and construction personnel will be instructed in their proper use.
  - Equipment tracks would remain outside of the flowing water to the extent practical.

Additional BMPs are listed in attachment 3.

- The Corps will visually monitor turbidity downstream of the Barrier Structure, in the mixing zone as required by State and Federal agencies. If a visible plume is observed, turbidity readings will be made. If excursions outside of applicable criteria are observed, the USACE will notify Cascade and work will stop until the cause is determined, and if necessary corrected. Cascade will resume work when notified by the Corps. See attached monitoring plan for detailed information.

8b. Will your project impact a waterbody or the area around a waterbody? [help]

☒ Yes ☐ No

8c. Have you prepared a mitigation plan to compensate for the project's adverse impacts to non-wetland waterbodies? [help]

- **If Yes**, submit the plan with the JARPA package and answer 8d.
- **If No, or Not applicable,** explain below why a mitigation plan should not be required.

☐ Yes ☐ No ☒ Not applicable

This is an action required by the 2014 NMFS Biological Opinion that is critical to upstream migration of fish in the White River as well as improvement to aquatic habitat downstream of the project. There may be temporary adverse impacts to downstream areas during construction activities which will be minimized through the implementation of BMPs. The long-term impacts are expected to be highly beneficial to the White River and its associated biota.

8d. Summarize what the mitigation plan is meant to accomplish. Describe how a watershed approach was used to design the plan.

- If you already completed 7g you do not need to restate your answer here. [help]

The proposed dredge and fill in other waters of the U.S. is necessary to respond to a Biological Opinion from NMFS to rectify the current situation where adult ESA listed Chinook, steelhead and bull trout are experiencing mortality due to inadequate upstream passage and impacts to juvenile listed salmonids due to dewatering of the river for maintenance operations on the current barrier structure. The 1.8 acre fill in other waters of the U.S. proposed will be compensated by the gain in fisheries stocks, increased nutrient input to the upper watershed, increased passage of sediment and large woody debris downstream, as well as a significant reduction in juvenile salmonid mortality due to the cessation of flow alterations to repair the existing barrier structure.

8e. Summarize impact(s) to each waterbody in the table below. [help]

Activity (clear, dredge, fill, pile drive, etc.)	Waterbody name[1]	Impact location[2]	Duration of impact[3]	Amount of material (cubic yards) to be placed in or removed from waterbody	Area (sq. ft. or linear ft.) of waterbody directly affected
Placement of riprap for new levee	White River	Upstream of barrier structure towards right bank	Approximately 12 months	300 cy riprap	Approximately 0.95 acres
Construction of new fish collection facility	White River	downstream of barrier structure; right bank	Approximately 21 months	Construction of concrete structure isolating site using cofferdam made of steel bins filled	Approximately 0.83 acres

				with river material and bracingl	
Construction of new barrier	White River	Footprint of existing barrier	Approximately 35 months	New concrete structure isolating site using cofferdam made of steel bins filled with river material and bracingl	In existing barrier footprint
Dredging of approach and tailrace of new barrier with placement of new scour protection	White River	upstream and downstream of barrier structure	Approximately 35 months	Approximately 16500 cy and 11000 cy of river material will be removed upstream and downstream of existing barrier. Approximately 5700 cy of class 5 riprap will be placed downstream of the new barrier	Approximately 3 acres upstream and 2 acres downstream
Add retaining wall to release site	White River	Release site	Approximately 12 months	Approximately 150 cy of concrete	0.009 acres

[1] If no official name for the waterbody exists, create a unique name (such as "Stream 1") The name should be consistent with other documents provided.
[2] Indicate whether the impact will occur in or adjacent to the waterbody. If adjacent, provide the distance between the impact and the waterbody and indicate whether the impact will occur within the 100-year flood plain.
[3] Indicate the days, months or years the waterbody will be measurably impacted by the work. Enter "permanent" if applicable.

8f. For all activities identified in 8e, describe the source and nature of the fill material, amount (in cubic yards) you will use, and how and where it will be placed into the waterbody. [help]

The majority of the materials for the cofferdam steel bins will come from re-worked rock and accumulated sediment on site. Cubic yards of fill are identified in table 8e.

8g. For all excavating or dredging activities identified in 8e, describe the method for excavating or dredging, type and amount of material you will remove, and where the material will be disposed. [help]

Any required excavation of the upstream and downstream gravel bar will remove material from the river and dispose in an approved disposal site. This will be achieved with the use of a track hoe or backhoe and bulldozer or bobcat to manipulate the material. Equipment tracks will remain outside of the flowing water to the extent practical but some river crossing may be required. When construction is complete, the area upstream and downstream of the barrier structure will have been re-graded to match the reduced width of the new barrier and closer align with the existing natural White River channel width upstream and downstream of the existing barrier. Please see the attached work plans, work phases, and drawings for more information.

Part 9–Additional Information

Any additional information you can provide helps the reviewer(s) understand your project. Complete as much of this section as you can. It is ok if you cannot answer a question.

9a. If you have already worked with any government agencies on this project, list them below. [help]

Agency Name	Contact Name	Phone	Most Recent Date of Contact
Washington Department of Ecology	Rebekah Padget	(425) 649-7129	January 14, 2016
Environmental Protection Agency	Linda Storm	(206) 553-6384	January 14, 2016
National Oceanic and Atmospheric Administration	Steve Fransen	(360) 753-6038	November 20, 2015
Cascade Water Alliance	Michael Gagliardo	(425) 453-1503	November 20, 2015
US Fish and Wildlife Service	Martha Jensen	(360) 753-9000	December 2015
Puyallup Tribe	Russ Ladley	(253) 680-5568	November 20, 2015
Muckleshoot Tribe	Holly Cocolli	(253) 876-3360	November 20, 2015
Washington Department of Fish and Wildlife	Doug Wiedemeier	(360) 902-2516	November 20, 2015

9b. Are any of the wetlands or waterbodies identified in Part 7 or Part 8 of this JARPA on the Washington Department of Ecology's 303(d) List? [help]

- **If Yes,** list the parameter(s) below.
- If you don't know, use Washington Department of Ecology's Water Quality Assessment tools at: http://www.ecy.wa.gov/programs/wq/303d/.

☒ Yes ☐ No

Impairments of water quality have been documented as follows (from the Washington Department of Ecology's interactive mapping tool, https://fortress.wa.gov/ecy/wqamapviewer.

As of 2012, immediately downstream of the barrier structure there is a Category 4C (impaired by a nonpollutant) rating for instream flow levels.

Listing ID	Name	Parameter	Medium	Category	Waterbody ID	Lower Address	Upper Address
6193	WHITE RIVER	Instream Flow	Habitat	4C	1222573471997	36.634	37.984

In addition, as of 2012 there is a Category 4a (has a total maximum daily load (TMDL): water bodies that have an approved TMDL in place and are actively being implemented) rating for fecal coliform levels not far downstream, below, and influenced by, the confluence with Boise Creek.

Listing ID	Name	Parameter	Medium	Category	Waterbody ID	Lower Address	Upper Address
16708	WHITE RIVER	Bacteria	Water	4A	1222573471997	34.937	36.634

The proposed work will not contribute to excursions from standards. The short term nature of the work and minor turbidity releases are unlikely to elevate temperatures above thresholds for core summer salmonid habitat (60.8 F), reduce dissolved oxygen below thresholds (9.5 mg/l) or affect pH. No aspect of the project will contribute to fecal coliform levels.

9c. What U.S. Geological Survey Hydrological Unit Code (HUC) is the project in? [help]

- Go to http://cfpub.epa.gov/surf/locate/index.cfm to help identify the HUC.

17110014

9d. What Water Resource Inventory Area Number (WRIA #) is the project in? [help]

- Go to http://www.ecy.wa.gov/services/gis/maps/wria/wria.htm to find the WRIA #.

WRIA 10

9e. Will the in-water construction work comply with the State of Washington water quality standards for turbidity? [help]

- Go to http://www.ecy.wa.gov/programs/wq/swqs/criteria.html for the standards.

☐ Yes ☒ No ☐ Not applicable

9f. If the project is within the jurisdiction of the Shoreline Management Act, what is the local shoreline environment designation? [help]

- If you don't know, contact the local planning department.
- For more information, go to: http://www.ecy.wa.gov/programs/sea/sma/laws_rules/173-26/211_designations.html.

☐ Rural ☐ Urban ☐ Natural ☒ Aquatic ☐ Conservancy ☐ Other

_____

9g. What is the Washington Department of Natural Resources Water Type? [help]

- Go to http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesApplications/Pages/fp_watertyping.aspx for the Forest Practices Water Typing System.

☐ Shoreline ☒ Fish ☐ Non-Fish Perennial ☐ Non-Fish Seasonal

9h. Will this project be designed to meet the Washington Department of Ecology's most current stormwater manual? [help]

- **If No**, provide the name of the manual your project is designed to meet.

☒ Yes ☐ No

Name of manual:

9i. Does the project site have known contaminated sediment? [help]

- **If Yes**, please describe below.

☐ Yes ☒ No

Northeast of Buckley, Washington near the barrier structure there is a cleanup site (https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=4054) with the Site ID PSE BUCKLEY DEBRIS PILE FILL TERRACE BUR. The contaminants are listed as "confirmed above cleanup level" and include arsenic (groundwater and soil), petroleum products-unspecified (soil), and polynuclear aromatic hydrocarbons (soil). The unit status is listed as awaiting cleanup.

The construction and repair site has been heavily modified for years previously and the barrier structure apron repairs will not disturb any new areas. Please see attached cleanup site details for more information.

9j. If you know what the property was used for in the past, describe below. [help]

The property was originally used for water diversion for hydropower (Puget Sound Energy) and to provide upstream passage for adult salmon.

9k. Has a cultural resource (archaeological) survey been performed on the project area? [help]

- **If Yes**, attach it to your JARPA package.

☒ Yes ☐ No

The barrier dam, which is a component of the White River Diversion Dam/Headworks, a contributing historic district in the larger White River Hydroelectric Project, was previously documented pursuant to standards of the Historic American Engineering Record (HAER). In 2008, the Corps prepared a detailed historic context and evaluation of the Headworks resources in order to augment the minimal recordation provided in the original HAER document. From 2007 to 2014, the Corps conducted archaeological survey and investigation of access and staging areas necessary to conduct the Project and has not identified resources eligible for listing in the National Register.

9l. Name each species listed under the federal Endangered Species Act that occurs in the vicinity of the project area or might be affected by the proposed work. [help]
Chinook salmon, Steelhead trout, Bull trout,
9m. Name each species or habitat on the Washington Department of Fish and Wildlife's Priority Habitats and Species List that might be affected by the proposed work. [help]
Instream habitat would be affected. All anadromous fishes in the White River are affected including coho, sockeye, chum, Chinook, and pink salmon, bull trout, and steelhead trout. Other animals include bald eagle and elk. (http://apps.wdfw.wa.gov/phsontheweb/)

Part 10–SEPA Compliance and Permits

Use the resources and checklist below to identify the permits you are applying for.

- Online Project Questionnaire at http://apps.ecy.wa.gov/opas/.
- Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@ora.wa.gov.
- For a list of addresses to send your JARPA to, click on agency addresses for completed JARPA.

10a. Compliance with the State Environmental Policy Act (SEPA). (Check all that apply.) [help] • For more information about SEPA, go to www.ecy.wa.gov/programs/sea/sepa/e-review.html.
☐ A copy of the SEPA determination or letter of exemption is included with this application.
☐ A SEPA determination is pending with _____ (lead agency). The expected decision date is _____.
☐ I am applying for a Fish Habitat Enhancement Exemption. (Check the box below in 10b.) [help]
☐ This project is exempt (choose type of exemption below). ☐ Categorical Exemption. Under what section of the SEPA administrative code (WAC) is it exempt? _____ ☐ Other: _____
☒ SEPA is pre-empted by federal law.

10b. Indicate the permits you are applying for. (Check all that apply.) [help]

LOCAL GOVERNMENT

Local Government Shoreline permits:

☒ Substantial Development ☐ Conditional Use ☐ Variance

☐ Shoreline Exemption Type (explain): _____

Other City/County permits:

☐ Floodplain Development Permit ☐ Critical Areas Ordinance

STATE GOVERNMENT

Washington Department of Fish and Wildlife:

☐ Hydraulic Project Approval (HPA) ☐ Fish Habitat Enhancement Exemption – Attach Exemption Form

Effective July 10, 2012, you must submit a check for $150 to Washington Department of Fish and Wildlife, unless your project qualifies for an exemption or alternative payment method below. **Do not send cash.**

Check the appropriate boxes:

☐ $150 check enclosed. Check #_____
Attach check made payable to Washington Department of Fish and Wildlife.

☐ My project is exempt from the application fee. (Check appropriate exemption)_____
- ☐ HPA processing is conducted by applicant-funded WDFW staff.
  Agreement #_____
- ☐ Mineral prospecting and mining.
- ☐ Project occurs on farm and agricultural land.
  (Attach a copy of current land use classification recorded with the county auditor, or other proof of current land use.)
- ☐ Project is a modification of an existing HPA originally applied for, prior to July 10, 2012.
  HPA #_____

Washington Department of Natural Resources:

☐ Aquatic Use Authorization

Complete JARPA Attachment E and submit a check for $25 payable to the Washington Department of Natural Resources. **Do not send cash.**

Washington Department of Ecology:

☒ Section 401 Water Quality Certification

FEDERAL GOVERNMENT

United States Department of the Army permits (U.S. Army Corps of Engineers):

☐ Section 404 (discharges into waters of the U.S.) ☐ Section 10 (work in navigable waters)

United States Coast Guard permits:

☐ Private Aids to Navigation (for non-bridge projects)

Environmental Protection Agency:

☒ Section 401 Water Quality Certification

Part 11–Authorizing Signatures

Signatures are required before submitting the JARPA package. The JARPA package includes the JARPA form, project plans, photos, etc. [help]

11a. Applicant Signature (required) [help]

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities, and I agree to start work only after I have received all necessary permits.

I hereby authorize the agent named in Part 3 of this application to act on my behalf in matters related to this application. _____ (initial)

By initialing here, I state that I have the authority to grant access to the property. I also give my consent to the permitting agencies entering the property where the project is located to inspect the project site or any work related to the project. _____ (initial)

Applicant Printed Name	Applicant Signature	Date

11b. Authorized Agent Signature [help]

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities and I agree to start work only after all necessary permits have been issued.

Authorized Agent Printed Name	Authorized Agent Signature	Date

11c. Property Owner Signature (if not applicant) [help]
Not required if project is on existing rights-of-way or easements.

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.

Property Owner Printed Name	Property Owner Signature	Date

18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ENV-019-09 rev. 08/2013

AGENCY USE ONLY

Date received:

WASHINGTON STATE
Joint Aquatic Resources (JAR) Form

Attachment B:
For additional project location(s) [Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement Release Site

Use this attachment only if you have more than one project location.

Use a separate form for **each** additional location.

Use black or blue ink to enter answers in white spaces below.

1. Indicate the type of ownership of the property. (Check all that apply.) [help]

- ☐ Private
- ☒ Federal
- ☐ Publicly owned (state, county, city, special districts like schools, ports, etc.)
- ☐ Tribal
- ☐ Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)

2. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 16) [help]

47 degree 08'47.64" North; 121 degree 51' 35.70" West

3. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]

4. County [help]

King

5. Provide the section, township, and range for the project location. [help]

¼ Section	Section	Township	Range

6. Provide the latitude and longitude of the project location. [help]

- Example: 47.03922 N lat. / -122.89142 W long (Use decimal degrees - NAD 83)

47 degree 08'47.64" North; 121 degree 51' 35.70" West

7. List the tax parcel number(s) for the project location. [help]

- The local county assessor's office can provide this information.

121907UNKN

8. Contact information for all adjoining property owners. (If you need more space, use JARPA Attachment C.) [help]

Name	Mailing Address	Tax Parcel # (if known)
Corps of Engineers owns surrounding land.		

9. List all wetlands on or adjacent to the project location. [help]

none

10. List all waterbodies (other than wetlands) on or adjacent to the project location. [help]

White River

11. Is any part of the project area within a 100-year flood plain? [help]

☒ Yes ☐ No ☐ Don't know

12. Briefly describe the vegetation and habitat conditions on the property. [help]

Second growth riparian forest. Release site is gravel pad with chute to release adult salmonids into the White River for upstream migration.

13. Describe how the property is currently used. [help]

Site is used to release adult salmonids into the White River for upstream migration.

14. Describe how the adjacent properties are currently used. [help]
Adjacent properties are used for temporary flood storage for Mud Mountain Dam and forestry
15. Describe the structures (above and below ground) on the property, including their purpose(s). [help]
Fish release chute and maintenance shed.
16. Provide driving directions from the closest highway to the project location, and attach a map. [help]
The entrance to the release site road is located 1.29 miles east of the intersection of Highway 410 and SE Mud Mountain Road. Access is only available with escort from the Mud Mountain Dam Project Office. Contact JAR Form POC for access.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number ENV 021-09 rev. 09/2015

AGENCY USE ONLY

Date received:

WASHINGTON STATE
Joint Aquatic Resources Permit Application (JARPA) [help]

Attachment C:
Contact information for adjoining Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement property owners. [help]

Use this attachment only if you have more than four adjoining property owners.

Use black or blue ink to enter answers in white spaces below.

1. Contact information for all adjoining property owners. [help]

Name	Mailing Address	Tax Parcel # (if known)
EQUTY GROUP NWEST LLC	18306 DRIFTWOOD DR E LAKE TAPPS, WA 98391	352006-9021

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ENV-022-09 rev. 0/2015

AGENCY USE ONLY

Date received:

WASHINGTON STATE
Joint Aquatic Resources (JAR) Form

Attachment D:
Construction sequence Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement

Use this attachment only if your project will be constructed in phases or stages. Complete the outline showing the construction sequence and timing of activities, including the start and end dates of each phase or stage.

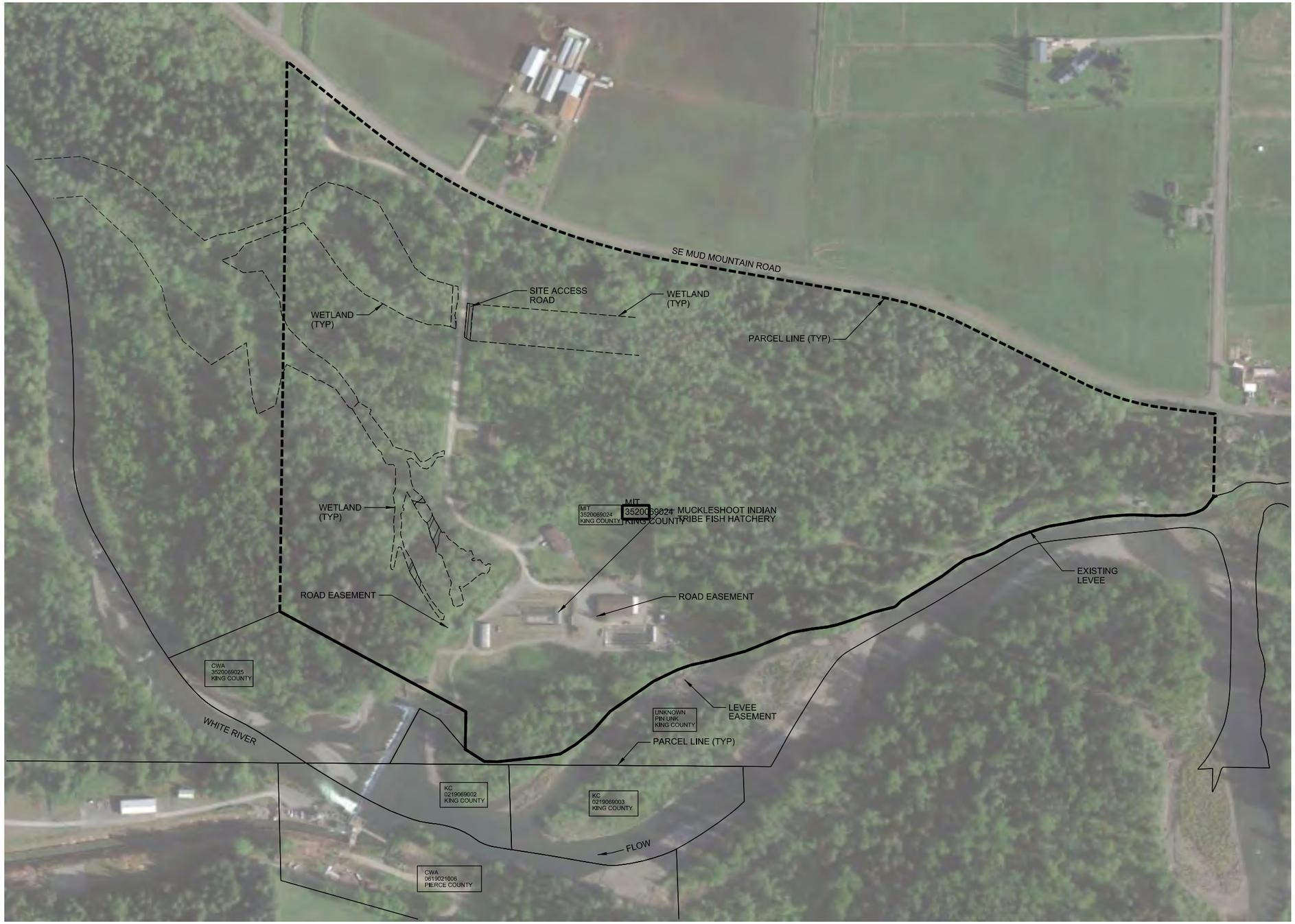
Use black or blue ink to enter answers in white spaces below.

Please refer to attached plan sheets for identification of work areas for each phase.

Phase or Stage	Start Date	End Date	Activity Description
Roads and Levees	August 2016	August 2017	Provide improvements to existing access road; clear area for new access road; construct new road off existing access road to new right bank fish collection site; construct new right bank levee to maintain protection to MIT hatchery; provide improvements to existing release site road; clear area for fish collection facility construction; clear area upstream and downstream of existing barrier for future flow shaping and construction staging
Barrier Construction Phase I	November 2017 –	July 2019	Install cofferdam; construct new fish collection facility; construct part of new barrier including 2 bays with gates; dredge upstream and downstream areas for flow shaping; place scour protection for new barrier; Improve turnaround at release site and up new retaining wall at dropoff point to accommodate two trucks.
Barrier Construction Phase 2	July 2019	December 2020	Install cofferdam and construct remainder of new barrier and 3 bays with gates. Replant upstream staging area behind new levee.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ENV-023-09 rev. 09/2015

Attachment 1. FIGURES



N

1 - MIT 401 EXISTING SITE

1" = 150'

0 150' 300'

FIGURE 1 EXISITING CONDITIONS

US Army Corps of Engineers®
SEATTLE DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON

DESIGNED BY: | DATE: 29 JAN 2016
DWN BY: | CKD BY:
SUBMITTED BY: COOK
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SIZE: ANSI D | FILE NAME: FY16-MMDFPF_RDL-C-401.dgn

FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUD MOUNTAIN DAM
ENUMCLAW, WASHINGTON

MIT 401 EXISTING SITE

SHEET IDENTIFICATION

SHEET 1 OF 1

DESIGN FILE: pw:\\COE-NWSPW001SEA.nws.ds.usace.army.mil:cenws01\Documents\Civil Works\Mud Mountain Dam, WA\FY16 447520 MMD FPF\6. Engineering & Design\6.1 Design\Roads & Levee\Con_Docs\CAD_Sheets\Civil\FY16-MMDFPF_RDL-C-401.dgn

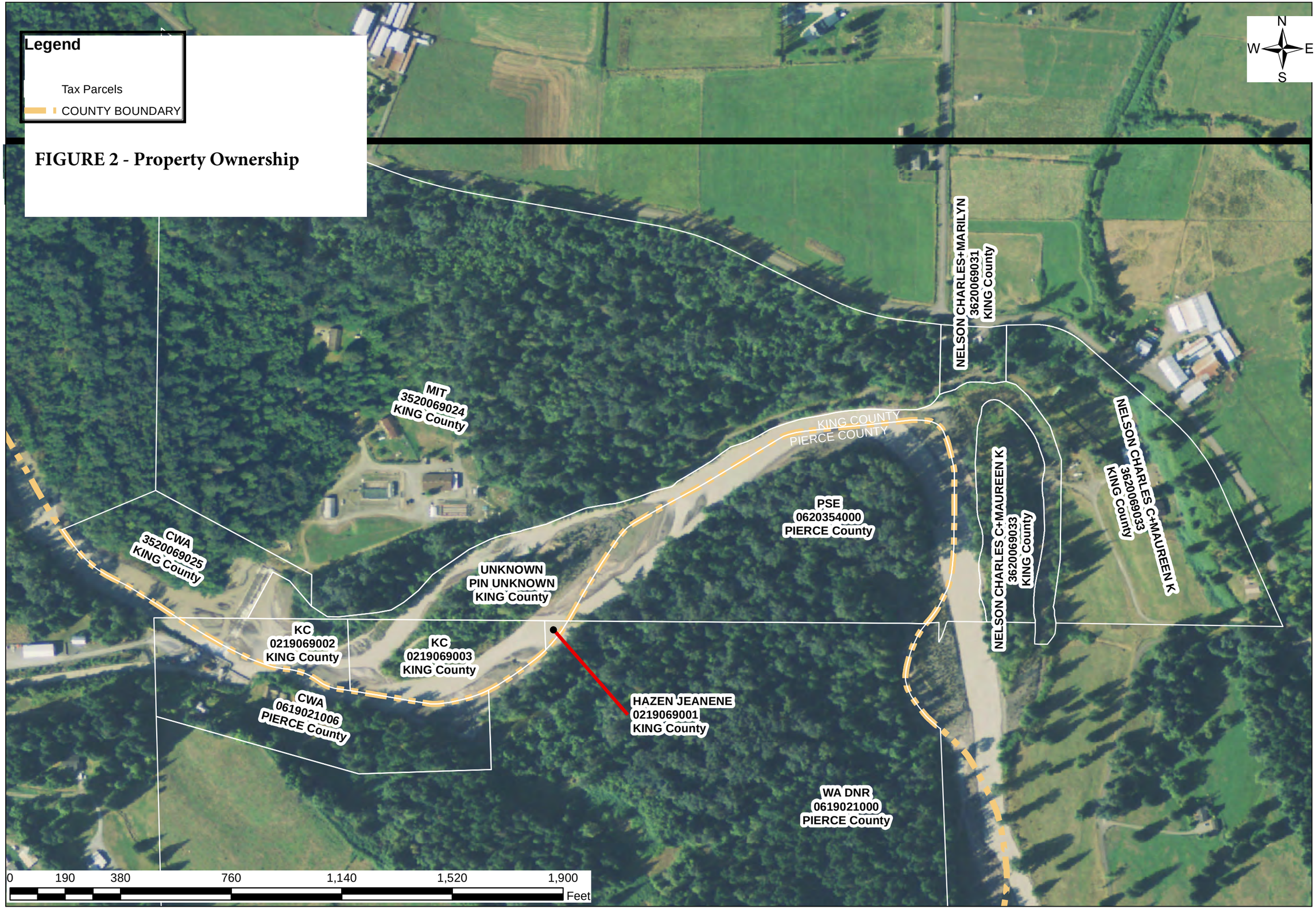

FIGURE 2 - Property Ownership

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SEATTLE, WASHINGTON

Notes:

Date: 28 Sep 2015 9:59:51 AM
File Name: MMD_FP.mxd
Datum:

Created by: OJV
Section: CENWS-RE-TR
Coordinate System:
Path: O:\TR\cadastral\OrgProjects\Civil\Mud Mountain Dam\Tasks\MMD UPSTREAM FISH PASSAGE 2014 Concepts\Right Bank-2015-title.mxd

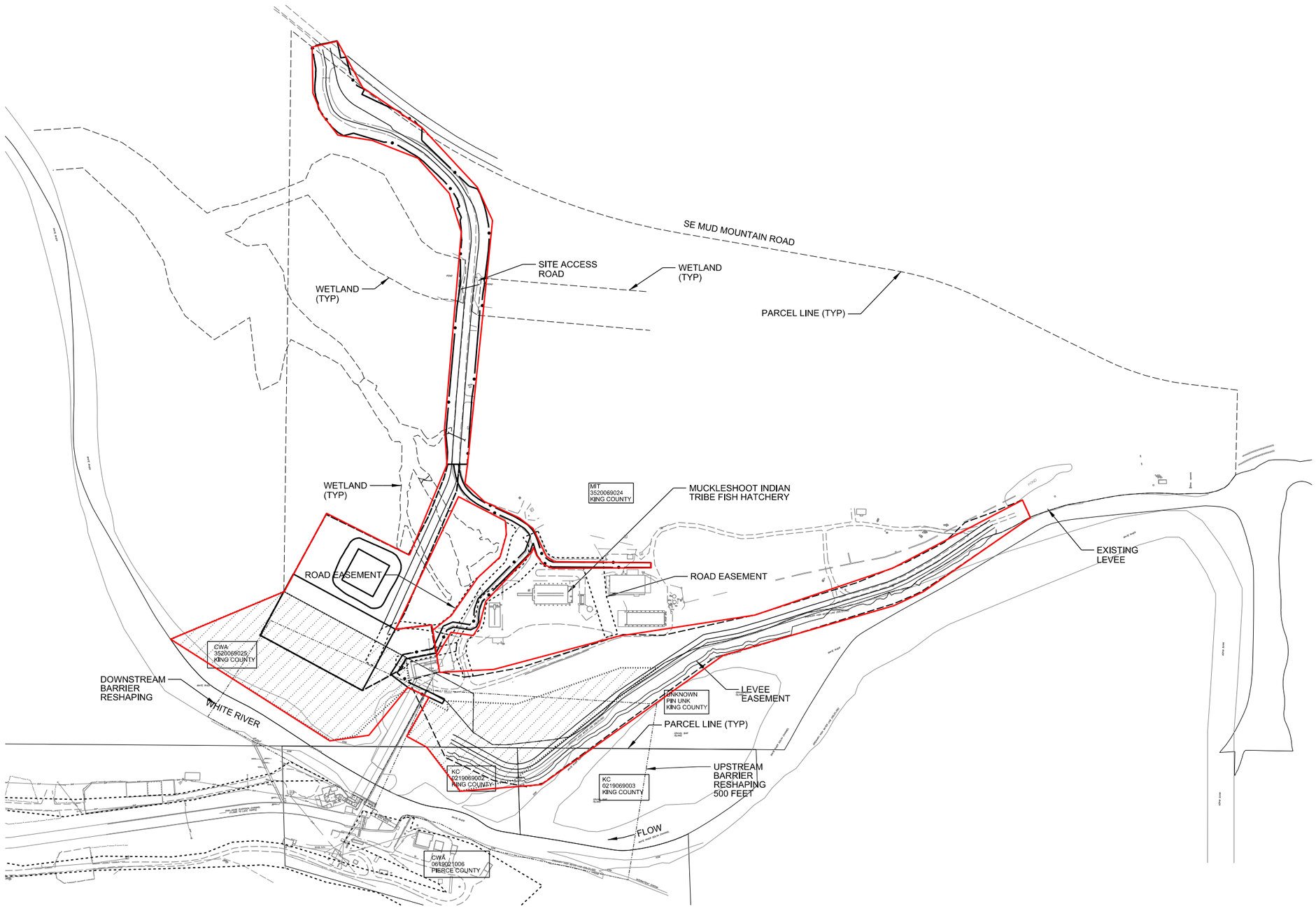
MUD MOUNTAIN DAM
RIGHT BANK CONCEPT

REAL ESTATE TITLE MAP

WASHINGTON STATE

COUNTY OF KING & PIERCE

Sheet Number:
1



N

1 MIT 401 ROADS AND LEVEE SITE PLAN
1" = 150'

0 150' 300'

FIGURE 3 - Roads and Levees Footprint

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FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUD MOUNTAIN DAM
ENUMCLAW, WASHINGTON

MIT 401 ROADS AND LEVEE SITE PLAN

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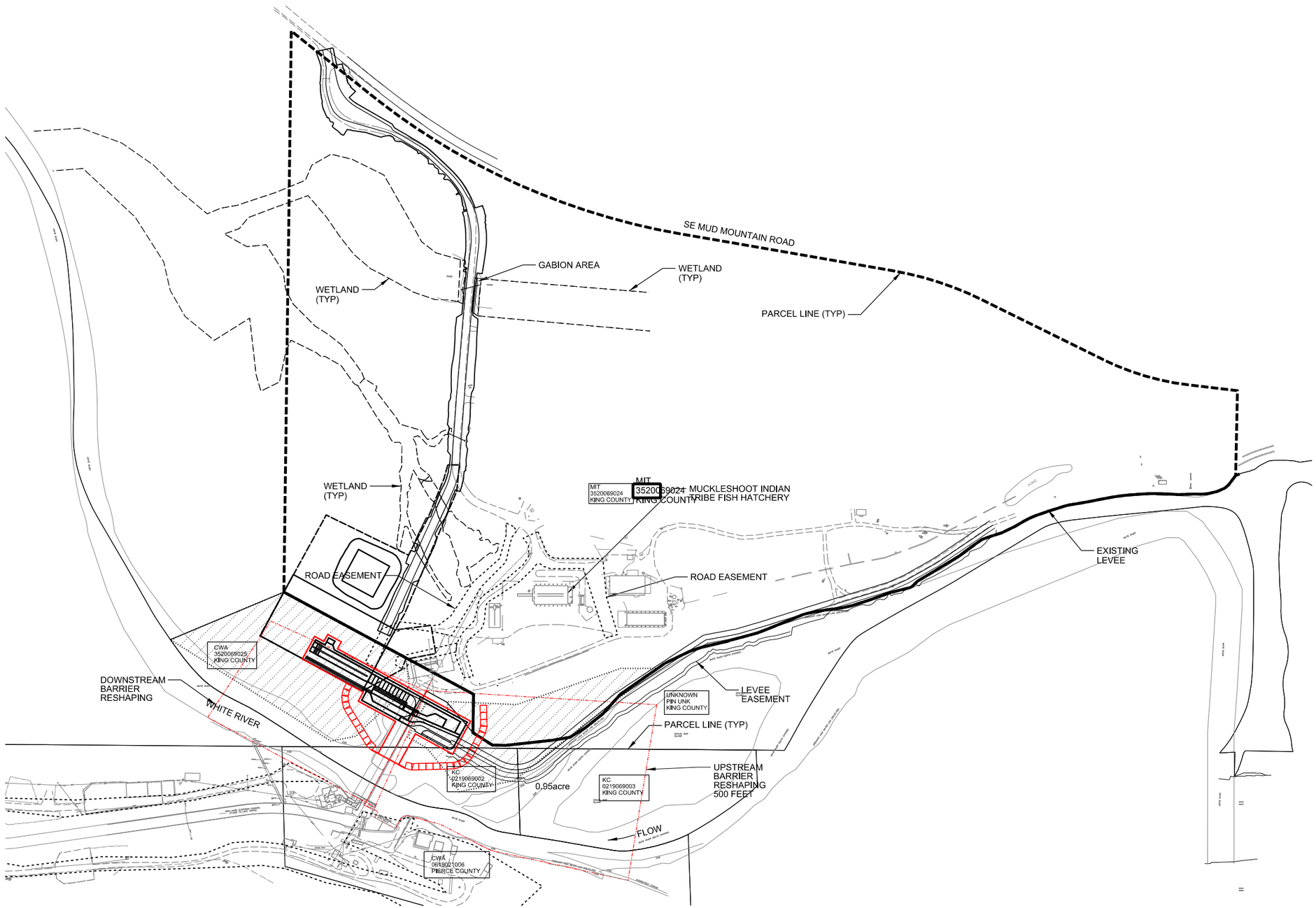

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1 MIT 401 PHASE 1 BARRIER SITE PLAN

1" = 150'

0 150' 300'

FIGURE 4 - Phase 1 Barrier Construction Footprint

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FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUD MOUNTAIN DAM
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MIT 401 PAHSE 1 BARRIER SITE PLAN

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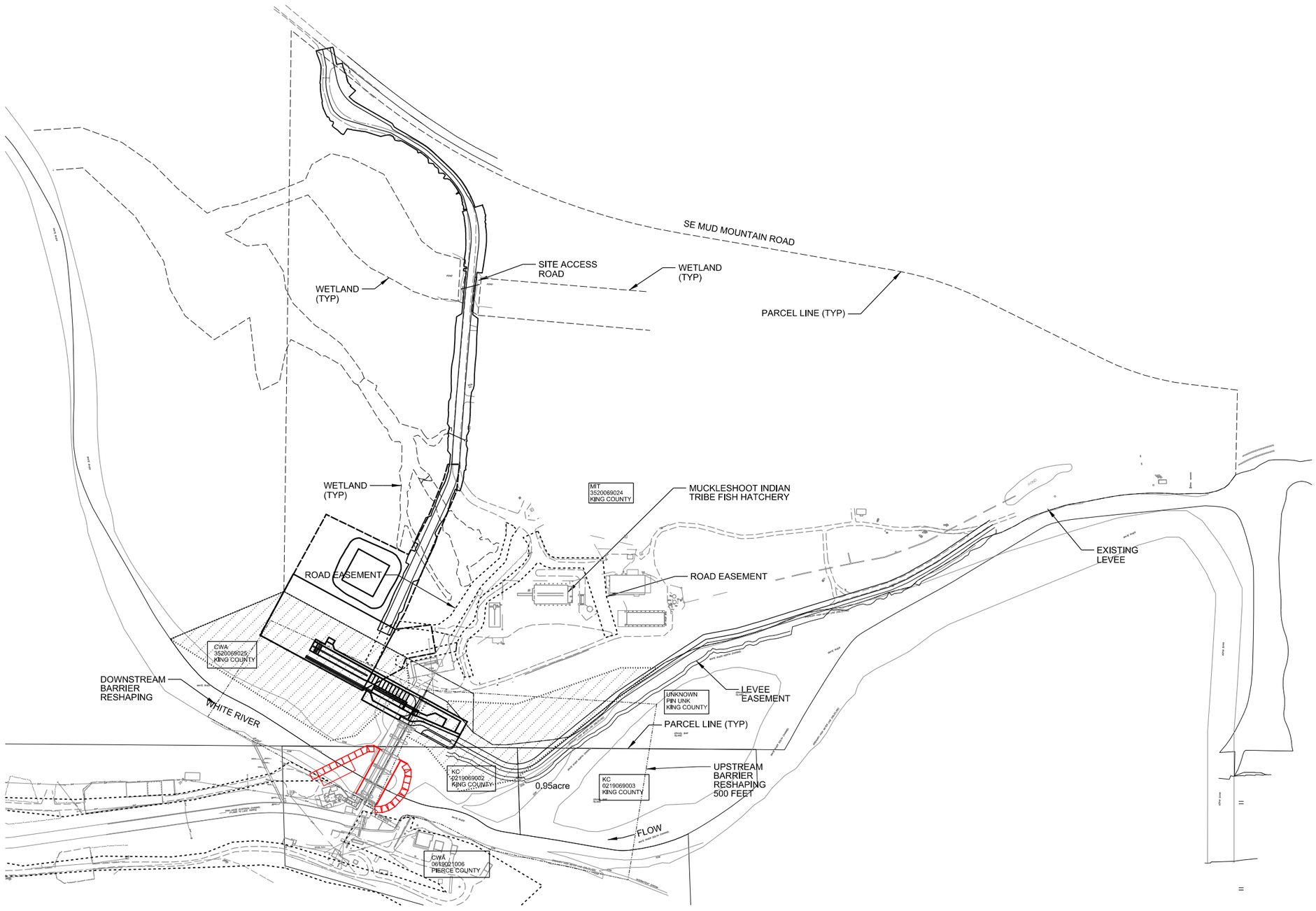

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1 MIT 401 PHASE 2 BARRIER SITE PLAN

1" = 150'

0 150' 300'

FIGURE 5 - Phase 2 Barrier Construction Footprint

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FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUD MOUNTAIN DAM
ENUMCLAW, WASHINGTON

MIT 401 PHASE 2 BARRIER SITE PLAN

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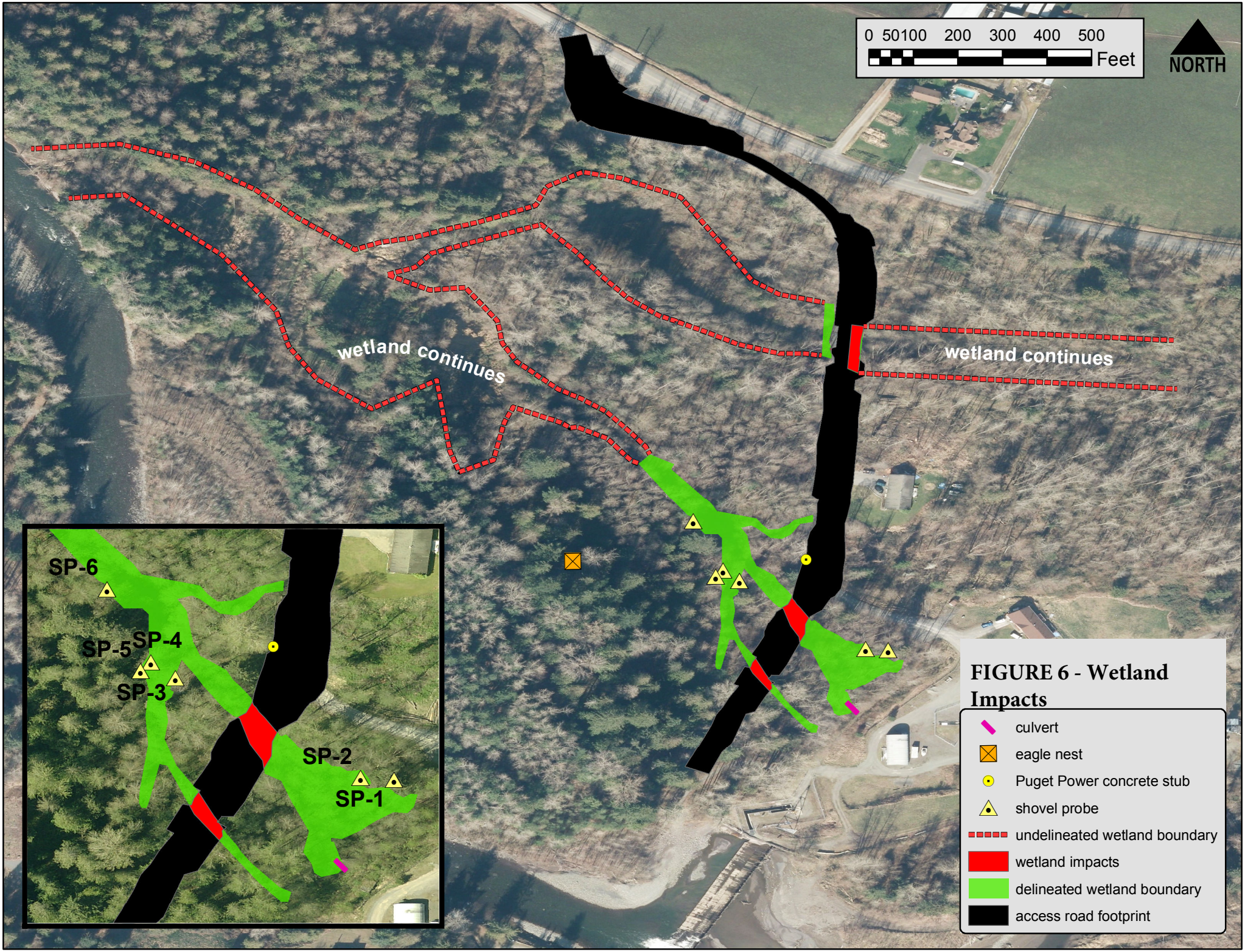
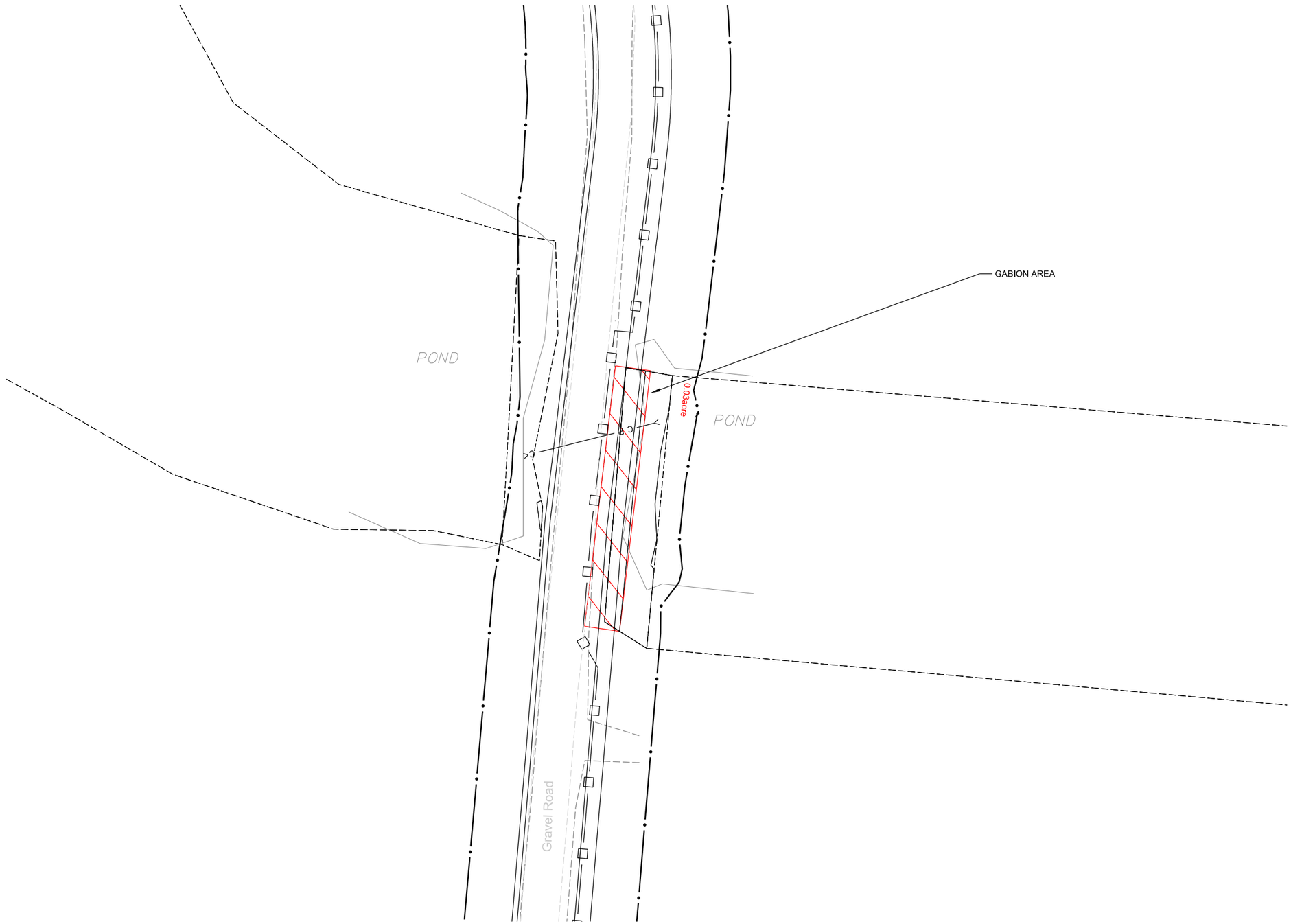


FIGURE 6 - Wetland Impacts



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1 - MIT 401 ROADS AND LEVEE WETLAND AREA PLAN

1" = 20'

0 20' 40'

FIGURE 7 - Detail Wetland Impacts Existing Road

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FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUDDY MOUNTAIN DAM
ENUMCLAW, WASHINGTON

MIT 401 ROADS AND LEVEE
WETLAND AREA PLAN

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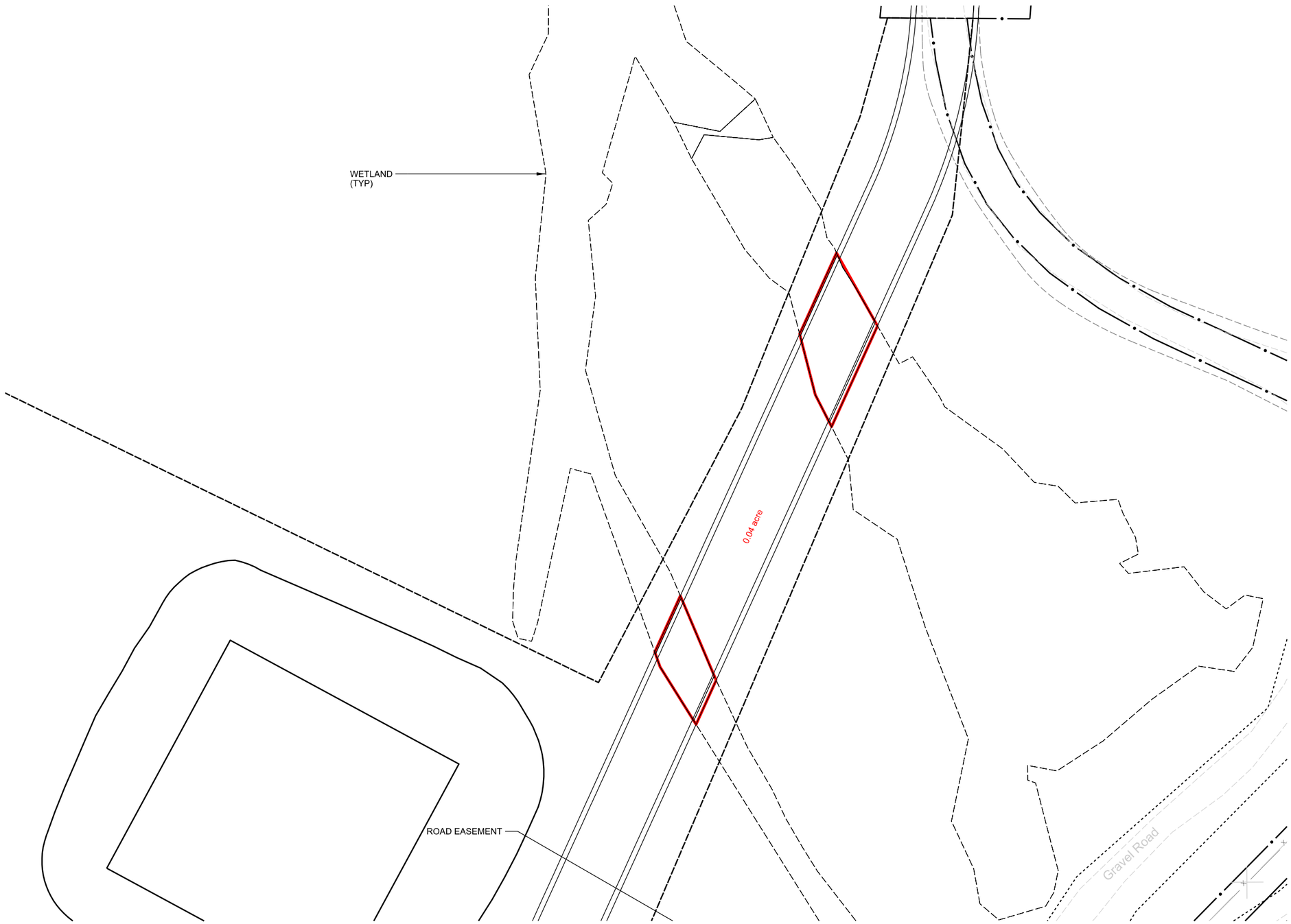

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1
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MIT 401 FISH LOADING WETLAND AREA PLAN

1" = 20'

0 20' 40'

FIGURE 8 - Detail Wetland Impacts New Road

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FILE NAME: FY16-MMDFPF_RDL-C-401.dgn

FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUDDY MOUNTAIN DAM
ENUMCLAW, WASHINGTON

MIT 401 FISH LOADING
WETLAND AREA PLAN

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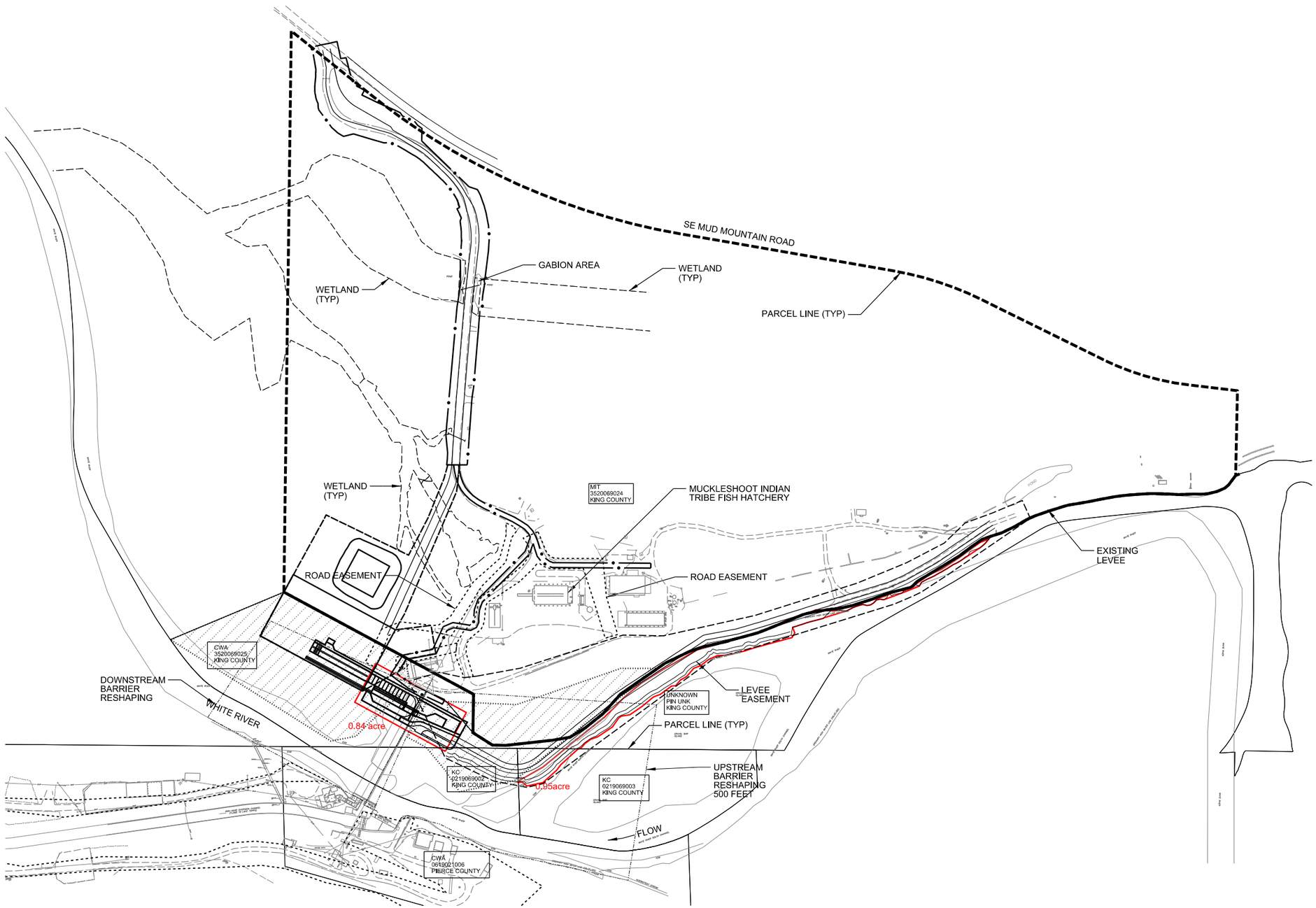

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1 - MIT 401 ROADS AND LEVEE OTHER WATERS OF THE US

1" = 150'

0 150' 300'

FIGURE 9 - Impacts to Other Waters of the U.S.

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SIZE: ANSI D FILE NAME: FY16-MMDFPF_RDL-C-401.dgn

FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUD MOUNTAIN DAM
ENUMCLAW, WASHINGTON

MIT 401 ROADS AND LEVEE
OTHER WATERS OF THE US

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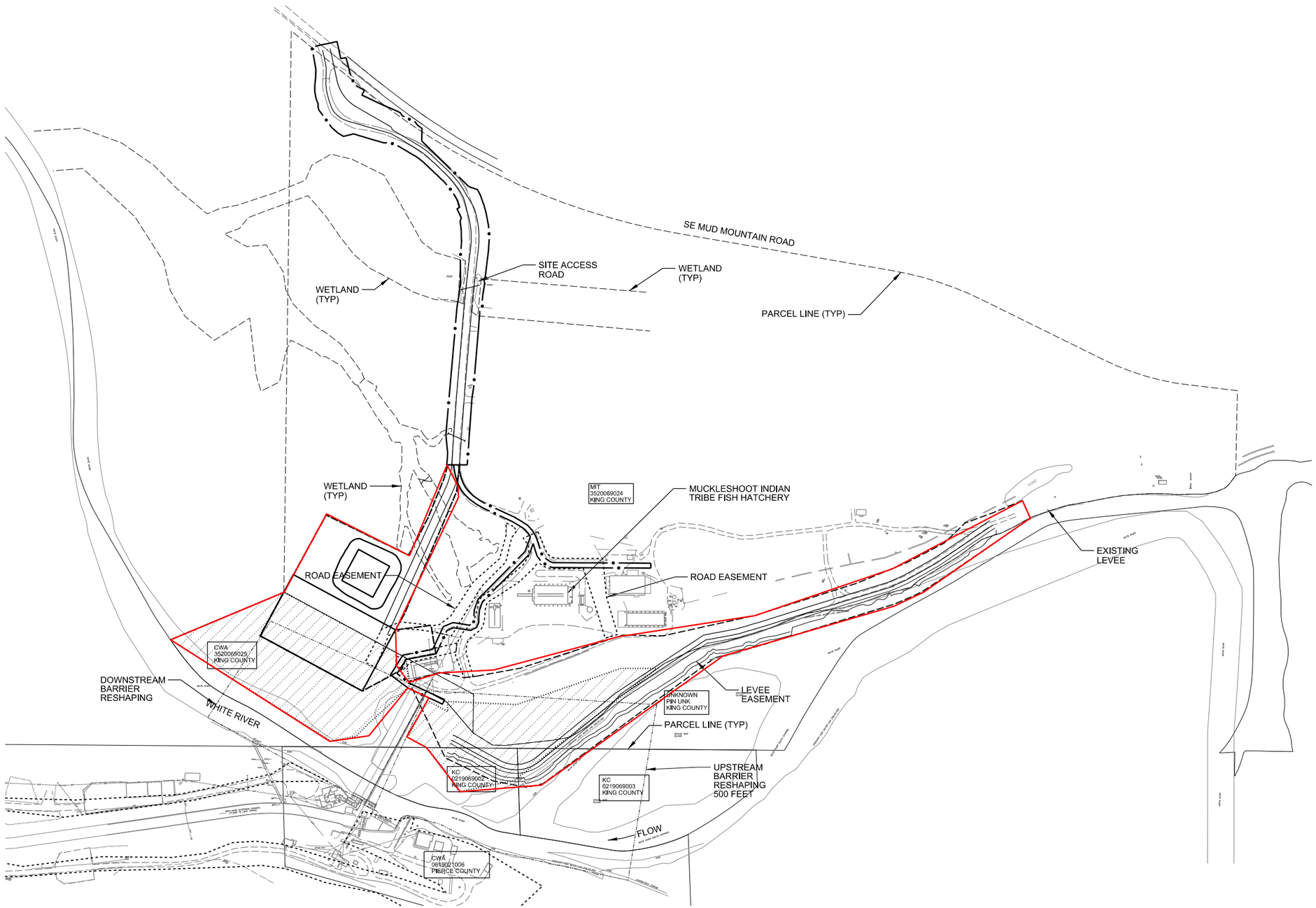

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1 - MIT 401 ROADS AND LEVEE CLEARING AREAS

1" = 150'

0 150' 300'

FIGURE 10 - Forested Areas to be Cleared

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SIZE: ANSI D | FILE NAME: FY16-MMDFPF_RDL-C-401.dgn

FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
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MIT 401 ROADS AND LEVEE CLEARING AREAS

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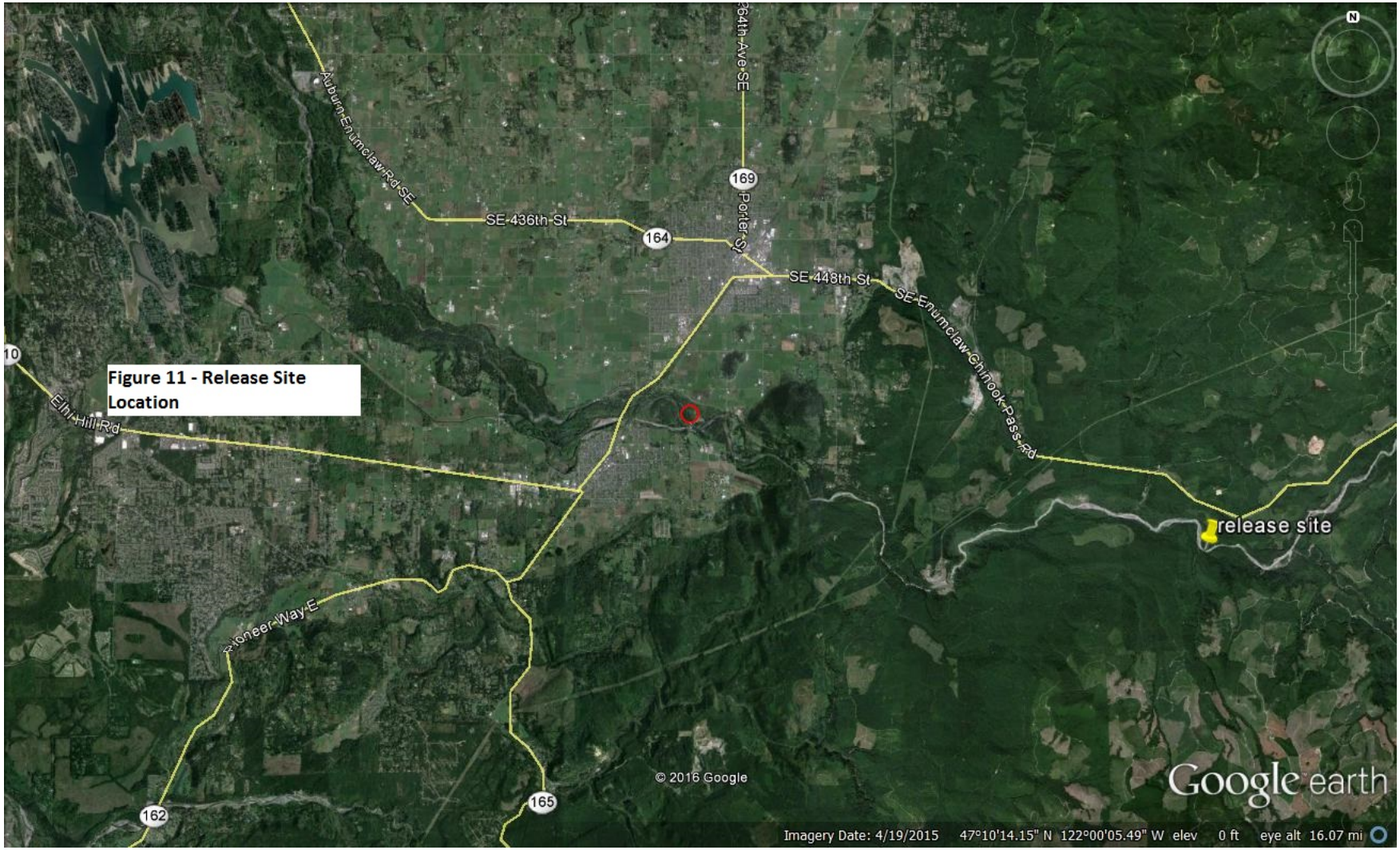


Figure 11 - Release Site Location

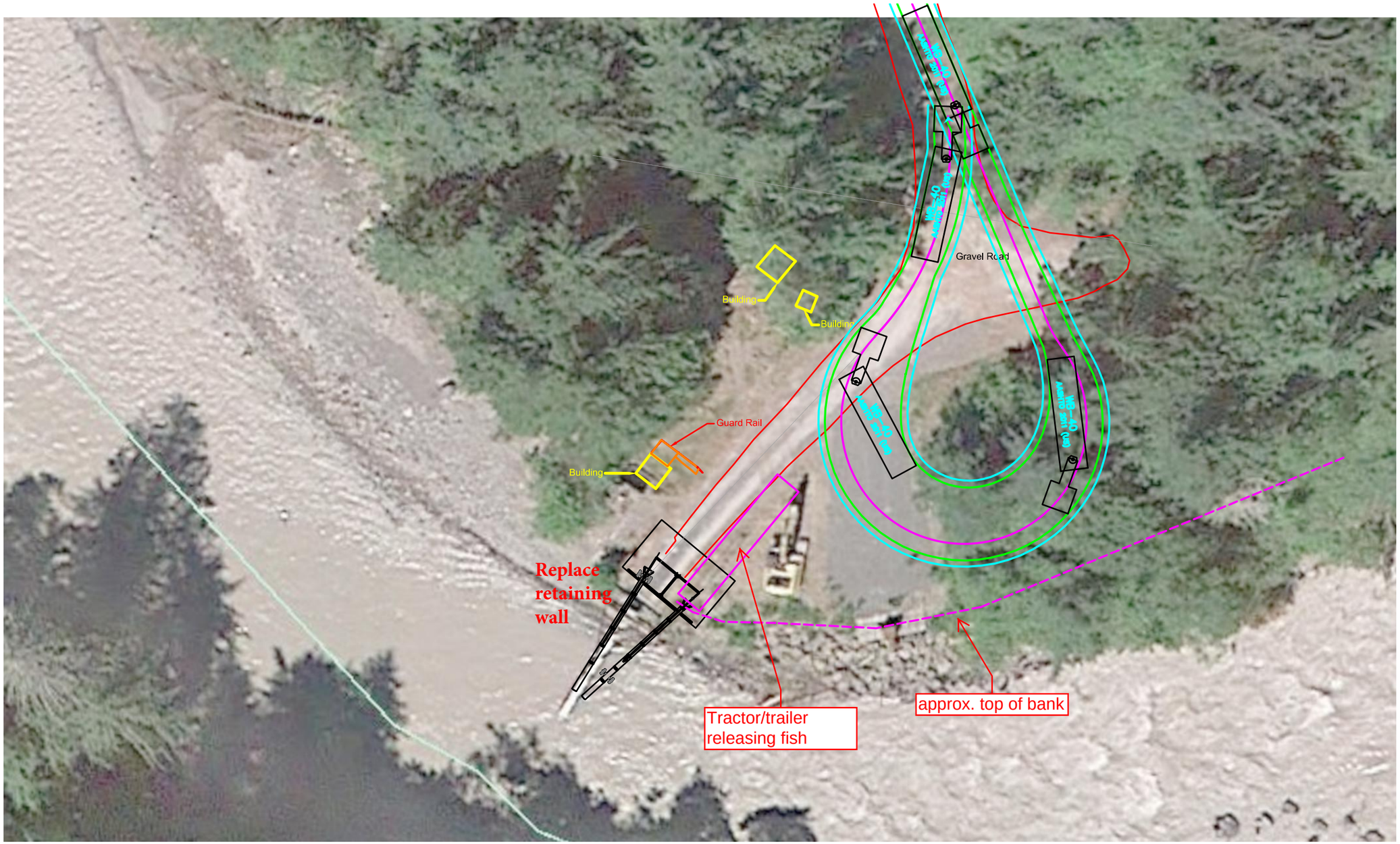


Figure 12 - Release Site Construction Area

30 scale
Tractor/trailer turning movement to get into position to back into release flume

DRAFT

Water Quality Monitoring Plan

Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement
Buckley, Washington
2016-2020

Water Quality Certification #

Prepared by:

M. Scuderi, J. Gardiner, F. Goetz, L. Wallace
U.S. Army Corps of Engineers, Seattle District
February 2016

WATER QUALITY MONITORING PLAN

Multi-Year Repair and Maintenance of the White River Barrier Structure
Buckley, Washington
2015-2020

BACKGROUND

The U.S. Army Corps of Engineers, Seattle District (Corps) is proposing replace the Mud Mountain Dam White River Barrier Structure (barrier structure) and fish passage facility, in response to Reasonable and Prudent Alternative (RPA) Action Item 3 in the 2014 National Marine Fisheries Service (NMFS) Biological Opinion (BiOp) for Mud Mountain Dam operation and maintenance and White River barrier replacement. Work will occur over a 3 year period from May 2016 to December 2020. The barrier structure is in the White River, at Buckley Washington. The King/Pierce County line runs down the center of the river in this location (Figure 1; Attachment 1).

The following methods for water quality monitoring have been approved by the Washington Department of Ecology (Ecology) in the past, as well as by the U.S. Fish and Wildlife Service (USFWS) and NMFS (the Services), to ensure the protection of salmonids (Puget Sound Chinook salmon, Puget Sound steelhead, and Coastal/Puget Sound bull trout) listed as threatened under the Endangered Species Act (ESA). The water quality monitoring requirements of the Services regarding the proposed in-water work below the ordinary high water mark (OHWM) are outlined in the Biological Opinions (Attachment 2). Based on site-specific monitoring data collected during previous repairs (Attachment 3), and in an effort to align monitoring requirements by the Services with Washington State water quality standards for surface water, the Corps is proposing to extend the mixing zone point of compliance to 1,000 feet for specific sediment generating project activities.

PURPOSE

The purpose of the Water Quality Monitoring Plan (WQMP) is to track the performance of Best Management Practices (BMPs) used during in-water work, as described in this document. This WQMP identifies the appropriate parameters to be monitored, includes a monitoring schedule, monitoring locations, monitoring and sampling procedures, and contingency sampling procedures.

OBJECTIVES

- Document the performance of BMPs used within waters of the proposed work will occur in by monitoring water quality.
- Determine if State water quality standards are being met at the edge of the point-of-compliance.

Any changes in the proposed monitoring will be submitted to Ecology for approval prior to making the changes. Before work commences the Corps Contractor will prepare revised Water Quality Monitoring Plan following the parameters outlined in this document. The revised Contractor Water Quality Monitoring Plan will be subject to review and approval by Washington State Department of Ecology as part of the project 401 Water Quality Certification.

IN-WATER/OVER-WATER ACTIVITY DESCRIPTION

Figures defining the construction limits for each phase of the project are included in the project JAR along with construction sequencing of the five construction components, roads construction, levee construction, release site improvements, phase 1 construction of the barrier and fish collection facility, and phase 2 construction of the remainder of the new barrier structure.

White River Flow Control

Some modification of Mud Mountain Dam releases will be required to facilitate some of the inwater work including placement of cofferdams. Releases will be targeted to at least meet minimum instream flow requirements.

Construction of Access Road

The existing access road to the MIT Hatchery will be upgraded and expanded to provide access to the new fish collection facility and barrier structure. Road fill and gabions will be placed at the existing slough crossing to widen the road. The new road prism will cross two wetland areas necessitating placement of road fill and culverts in the wetland area.

Levee Construction

An 1800-foot long levee would be constructed upstream of the new barrier structure to maintain flood protection to the MIT Hatchery facility. The construction area would be cleared and grubbed and then graded for placement of the levee. Levee fill material will be imported to the site and placed along the new levee alignment. Riprap armor will be installed on the levee face. Depending upon the timing of levee construction the secondary channel adjacent to the levee might not contain flow reducing the amount of inwater work. A buried toe will be constructed necessitating excavation of a trench in the river channel and placement of riprap in that trench.

Release Site Retaining Wall

The existing timber crib retaining wall at the release site will be demolished and removed to allow for a larger retaining wall to accommodate two trucks. The new retaining wall will be constructed using concrete and will be in the same alignment as the existing wall adjacent to the White River channel. Depending upon the timing of the retaining wall construction the White River channel might be reduced in size decreasing the amount of inwater work.

Installation and demobilization of cofferdam

Cofferdams will be installed and removed during two phases of the project for construction of the fish collection facility and the new barrier structure. In phase one a cofferdam would be constructed starting at the upstream end of the barrier on the right bank. Approximately half of the river width would be isolated by the cofferdam and work would proceed inside the cofferdam on construction of two bays of the new barrier structure and the fish passage facility. After completion of the first part of the barrier and the fish collection facility, the cofferdam will be removed, and a second cofferdam will be constructed from upstream of the barrier on the left bank and encircle the remainder of the old barrier. The remaining three bays of the new barrier would be constructed inside of the cofferdam. After completion the cofferdam would be removed and the new barrier structure and fish passage facility would be complete.

Channel Shaping upstream and downstream of the barrier structure

Approximately 27,500 cubic yards of river material would be removed from the channel in the area 500 feet upstream and downstream of the barrier structure. This work would be done at low flow using excavators and dump trucks to remove the river material to align the river morphology with the new narrower barrier structure. Approximately 5700 cubic yards of class 5 riprap would be placed immediately downstream of the new barrier for scour protection. Part of this placement would done within the cofferdam and part outside of the cofferdam.

WATER QUALITY STANDARDS FOR SURFACE WATERS

The project is located in WRIA (Water Resources Inventory Area) 10 (Puyallup/White), in the White River. The White River is designated as Core Salmonid Summer Habitat use below the barrier structure, which requires monitoring the following parameters.

- **Turbidity:** Shall not exceed 5 NTU over background when the background is 50 NTU or less; or 10 percent increase in turbidity when the background turbidity is more than 50 NTU: as outlined in Washington Administrative Code (WAC) 173-201A-200(1)(e) for Core Salmonid Summer Habitat.
- **pH:** pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units per WAC 173-201A-200(1)(g). Will be monitored using pH indicator paper. Measurements of pH will be obtained within the containment area behind the cofferdam where concrete will be poured. Best Management Practices will be employed to ensure all water leaving the containment area meets State water quality requirements prior to discharge.
- **Oil and Grease:** No visible sheen

MONITORING PLAN

Monitoring Contacts

M. Scuderi, J. Gardiner and F. Goetz will be responsible for providing Ecology with the necessary notifications and results of the water quality monitoring per the frequency specified in the Section 401 Water Quality Certification (WQC).

The Corps contractor will be conducting the WQC monitoring. The primary contacts for water quality monitoring will be M. Scuderi J. Gardiner and F. Goetz, available at 206-764-7205, 206-764-6878 and 206-764-3515, respectively. Dan Johnson is the MMD Operating Project Manager, available at 206-764-3717.

Additional Contacts: Matt Harrington, Section Chief (206-764-6169) and Evan Lewis, Branch Chief (206-764-6922).

Monitoring Schedule

The monitoring parameters and schedule for all work below the OHWM is outlined in Table 1.

Monitoring Duration

Water samples and visual observations will be collected and recorded for as long as work activities below the OHWM continues.

Visual monitoring will be conducted continuously for all work below the OHWM, but not within the wetted perimeter, and for all over-water work activities.

pH monitoring will occur when cementitious activities are occurring. All cementitous activities will occur within the confines of the cofferdam, and treated waste water will be tested for pH before release.

Contingency Sampling

If sample results confirm that water quality is out of compliance with State standards, the project will modify or stop the activity causing the problem and commence contingency sampling as outlined in Table 2, until standards are met for two consecutive sample periods.

Once compliance with water quality standards is achieved, the project shall return to its standard sampling schedule.

Non-Compliance

If either visual or physical monitoring indicates that water quality standards have been exceeded, the required reporting will be initiated.

SAMPLING PROTOCOL

Sampling Locations

Monitoring sites are identified on the Figure 3 for activities below the OHWM (Attachment 3).

Sampling Procedures

A background sample will be collected outside the area of influence and as close as possible to the start of in-water work.

Water quality samples will be collected and analyzed for the parameters outlined in the Monitoring Schedule (Table 1), and the equipment and sampling guidelines below.

1. Turbidity will be monitored using a turbidimeter.

Calibration of the turbidimeters will be conducted per the manufacturer’s instructions.

The first compliance sample for turbidity will be taken approximately 1 hour after the in-water activity starts, unless there is a visual plume at the point of compliance prior to 1 hour.

A turbidimeter will be used to collect a representative sample that accurately reflects the actual condition of the White River at the sampling station. The following protocol will be used to ensure a standardized sample is collected and analyzed.

- A clean container will be used to obtain the water sample.
- The sample will be collected with care to avoid disturbance of sediments and collecting surface contaminants.
- The sample will be gently and thoroughly mixed before pouring it into the vial used in the turbidimeter.
- The sample will not be allowed to settle prior to the turbidity reading and will be analyzed per the manufacturer's instructions.

2. Oil and grease will be monitored continuously for a visible sheen on the water's surface throughout the monitoring time period.
3. Should water enter the cofferdam during cementitious activities, the contractor will monitor pH using a paper test kit. No water will be discharged from the area until pH is below State criteria.

If no exceedances are detected, the results of the monitoring will be provided to WDOE on a monthly basis, per WQC Condition B9.

Turbidity samples and visual observations will be collected for as long as the construction activity is occurring.

When work is occurring behind the cofferdam, the Corps will conduct visual monitoring. If turbidity is observed escaping the cofferdam, BMPs will be adjusted and physical monitoring would commence as described in Table 1.

If turbidity measurements show that turbidity is approaching State criteria threshold limits (Table 1), the monitoring team will notify the contracting officer or their representative (COR) to ensure that all BMPs are in place; BMPs may need adjusting. Physical monitoring will continue as described in Tables 1 and 2 during the monitoring period.

If BMPs are in place and monitoring indicates turbidity is at or exceeds State criteria, the Corps will notify the Corps' barrier monitor and Contingency Sampling as described in Table 2 will begin.

Monitoring sites are shown in Figure 3. If turbidity measurements exceed State standards, sequential monitoring will begin as described in Table 1.

If WQC turbidity thresholds are exceeded, the Corps will notify Ecology within 24 hours as outlined in the Reporting Section of this plan.

If no exceedances are detected, the results of the monitoring will be provided to Ecology on a monthly basis.

Monitoring Methods

Turbidity measurements will be taken above and below the barrier structure before construction begins and during construction activities below the OHWM; Monitoring Form is Attachment 4. Measurements for background turbidity will be collected upstream of the barrier structure (site A; Figure 2). Alternative sampling methods may be deployed for background levels, which could also include data from the USGS gage located on the left bank immediately upstream of the barrier, or a Corps logger (if installed).

Monitoring will consist of one observer at or above the barrier structure who will conduct background monitoring and a team of two people who will monitor the downstream sites. The construction observer will radio information on construction activity, especially the start and stop of in-water work, to the turbidity monitoring team. This information will be recorded on the field data forms.

Turbidimeters will be calibrated per the manufacturer's instructions and a baseline turbidity sample will be collected at the 1,000 feet site before work below the OHWM begins (right bank). The turbidimeters will be the same make as those used in field work for repairs in July 2014, February 2015 and June – August 2015. Downstream monitoring will occur on the same bank where work is occurring if possible; site D in on the right bank (no access on left bank) and site E is on the right bank due to ease of access there.

A temporary in-stream data logger may be installed at the barrier structure for periodic monitoring. The Corps will let Ecology know if this device is deployed.

A permanent turbidity monitoring station is at MMD approximately 3 miles upriver and will provide an additional upstream point for tracking ambient turbidity conditions.

During activities below the OHWM, the Corps will provide visual observations of turbidity at 300 feet (site B), as well as documenting any visible sheen throughout the project area during all construction activities. This information will be included in the monitoring reports submitted to Ecology.

Should water enter the cofferdam during cementitious activities, the contractor will monitor pH using a paper test kit. No water will be discharged from the area until pH is below State criteria

REPORTING

All water quality monitoring results, visual and physical, will be recorded on the monitoring form (Attachment 4).

All sample results will be submitted to the Ecology Federal Permit Manager/Coordinator within 24 hours of collection (Attachment 5). If sample results or visual monitoring indicate an exceedance of State standards, notification will be made within 24 hours to Ecology's Federal Permit Manager/Coordinator.

Attachments

Attachment 1 – Biological Opinions USFWS and NMFS
Attachment 2 – Turbidity Report June-August 2015 with Appendices
Attachment 3 – Figures
Attachment 4 – Water Quality Monitoring Form
Attachment 5 – Exceedance Summary Form
Attachment 6 – Tables 1 and 2
Attachment 7 – Request for Extension of Mixing Zone for Turbidity

Attachment 1. Biological Opinions from USFWS and NMFS.

Available for download at: https://safe.amrdec.army.mil/SAFE/ Details about how to download these documents is available upon request.

Attachment 2. Turbidity Report June-August 2015 with Appendices

Available for download at: https://safe.amrdec.army.mil/SAFE/ Details about how to download these documents is available upon request.

Report on Turbidity Monitoring Effort along the White River as the Result of the Barrier Dam Apron Replacement in the Lower White River below Buckley, Washington

U.S. Army Corps of Engineers
Seattle District

Mud Mountain Dam

June-August 2015

Introduction and Background

This report is a summary of the turbidity data collected by the U.S. Army Corps of Engineers (Corps) Seattle District biologists and other technical staff during the June-August 2015 Cascade Water Alliance (CWA) barrier dam apron replacement repairs at Buckley, in Pierce County, Washington, five miles downstream of Mud Mountain Dam (MMD) on the White River. The Corps funds Cascade to maintain the barrier because it is needed for provision of flows to operate the adjacent Corps fish trap, and to attract migrating adult salmonids to the trap.

Several species of fish are present in the White River, including fall and spring Chinook salmon, steelhead, and bull trout, all listed as threatened under the Endangered Species Act (ESA). Also present are coho, pink, and chum salmon. Designated critical habitat for the three listed species includes the project area, and the Primary Constituent Elements of critical habitat for all three species include unimpeded migration. In addition, endangered Southern Resident killer whales (SRKW) depend on Chinook salmon as prey, and designated critical habitat for SRKW includes food resources. The Corps is required under Section 7 of the ESA to provide upstream fish passage past MMD, and the barrier functions as a necessary component of the Corps' fish trap, which is part of the project authorization. The fish trap provides a means for fish to be placed in tank trucks for transport to a release point about five miles upstream of MMD. Thus, sound condition and operation of the barrier are critical to recovery of listed species.

The apron replacement project is a National Marine Fisheries Service (NMFS) 2014 Biological Opinion (BiOp) requirement (Reasonable and Prudent Alternative [RPA] Action Item 2). Per NMFS BiOp RPA Action Item 3, the barrier is to be completely replaced by December 2020. However, in the meantime, the severely deteriorated apron on the existing barrier posed a hazard that was shown to cause injury and mortality of adult salmonids, due to gaps in the wood structure, and sharp exposed rebar ends (those were hammered down in summer 2014). An interim fix of the apron was needed to remove the exposed rebar, and replace deteriorated timbers on the apron with a combination of steel sheets and concrete. Additionally, significant erosion near the flashboard anchor points weakened the overall barrier flash board support structure. If a failure of the barrier structure were to happen, attraction to the fish trap would be severely limited and a catastrophic loss of salmonids would occur.

Repair Construction Sequence

Phase I

Flow rampdown began at Mud Mountain Dam on May 29, when flows as measured above Boise Creek on the White River near Buckley (USGS gage station 12099200) were about 900 cubic feet per second (cfs) (Appendix A, Figure 1). On June 1, the first rampdown of flows at Mud Mountain Dam to approximately an outflow of 365 cfs (target was 350 cfs) was achieved. Minimum discharge continued until June 09. A cofferdam was built and a channel was excavated upstream of the barrier to direct river flow towards the right bank. The first repairs to the apron were made on the left side of the barrier in front of bays 1-6, closest to the Corps fish trap. This

was to ensure the fish trap would remain operational for the repairs to the remainder of the barrier.

Flows were then ramped up to restore flow and outflow reached approximately 750 cfs on June 11. CWA diverted flows during the following two weeks to fill Lake Tapps while maintaining minimum instream flows of 800 cfs.

Phase II
The barrier apron repairs continued through June. At this time the river flow was directed towards the left bank by closing off the previously excavated right bank channel. Additionally, access roads and cofferdams were built above and below the barrier so the remainder of the barrier could be replaced in the dry behind the cofferdam. Another river flow reduction was necessary June 22 for Phase II of the apron replacement.

Prior to rampdown, outflow was measured above Boise Creek at about 725 cfs (Appendix A, Figure 2). Rampdown began June 18. Target outflow was 350 cfs. Minimum discharge occurred June 22 when outflow was approximately 356 cfs, and continued until June 29. At this time the river flow was directed towards the left bank by closing off the previously excavated right bank channel. Additionally, access roads and cofferdams were built above and below the barrier so the remainder of the barrier could be replaced in the dry. Flows were then ramped up to restore flow, and outflow reached approximately 800 cfs on June 3.

Phase III
The barrier apron repairs continued through August, and another river flow reduction was necessary July 29 for the final 10 days of the apron repair and removal of all materials from the river. At that time the river flow was still directed towards the left bank to allow collection of fish at the Corps trap. Any remaining work on the apron or for removal of materials and sediments was performed behind the cofferdam and downstream of the barrier. The last week of work from August 03-06 was concentrated on removal of all remaining materials and restoration and regarding of the river above and below the barrier.

Prior to the Phase 3 rampdown, outflow was measured above Boise Creek on the White River near Buckley, Washington (USGS gage station 12099200) at about 800 cfs (Appendix A, Figure 3). Rampdown began approximately July 27 with a series of gate changes from the 9-ft to 23-ft tunnel with river flow reduction beginning July 26. Target outflow was 350 cfs. Minimum discharge occurred at 0800 July 29 when outflow was approximately 331 cfs and continued until August 06.

After work was complete August 06 flows were ramped up and outflow reached approximately 550 cfs at mid-day August 07. Flows were to remain above inflow volume through August 13 as stored water behind the dam was released. Once the pool was evacuated, the outflow matched inflow.

Turbidity Monitoring Methods and Materials

The monitoring protocol developed by the Corps called for:

- Real estate access for each site if necessary.
- 1 turbidimeter and backup turbidimeter.
- 2 people with PFDs for each downstream site. Two people were needed for safety, and one measured while the other recorded data.
- Safe access to sample at 2 depths in three locations in a transect 90 degrees from shore.
- 2-way radios or cell phones—one for each site/team, for safety and coordination.
- Ideally 1 GPS for each of the downstream sites.

The protocol (Term and Condition 3) in the USFWS BiOp (USFWS 2015) called for monitoring at five sites A-E (locations shown in Appendix B). The Water Quality Certification from the Washington Department of Ecology (Ecology) called for monitoring at the same five downstream sites. The NMFS BiOp (NMFS 2014) Term and Condition 3, called for monitoring downstream. The sites are as follows:

Site A: ≥ 100 feet upstream (background)
Site B: 300 feet downstream
Site C: 600 feet downstream
Site D: 1/2 mile downstream (Accessible from the left bank only due to access and safety)
Site E: 1 mile downstream
1,000 ft: Sampling point for NMFS compliance.

Prior to the sampling event, all personnel were oriented to the use of the turbidimeter and the protocol. The meter was calibrated prior to sampling each day.

A background sample was collected from Site A (≥ 100 feet upstream; Appendix B) prior to the start of construction and at least every three hours during construction to determine background turbidity levels before and during sediment-generating activities. Personnel sampling downstream referenced the background turbidity data to determine whether a turbidity exceedance occurred according to the USFWS BiOp, NMFS BiOp, or Washington Department of Ecology (Ecology) permit requirements.

Criteria used for turbidity exceedances and take came from the Ecology permit requirements (Appendices C and D) and USFWS BiOp (Appendix C), as well as the NMFS BiOp, which determined the extent of take would be exceeded if turbidity exceeded background levels by more than 50% at the 1,000 ft site (NMFS 2014).

Measurements for the USFWS BiOp (USFWS 2015) point of compliance (1 mile) began approximately 300 feet downstream of the in-water construction activity (Site B; Appendix B) and were taken about every 15 minutes. If an exceedance occurred, monitoring would occur at sequential points downstream to sites C, D and E (Appendix B). Monitoring would move downstream if turbidity exceeded USFWS BiOp-specified adverse levels at a given point, then the next point downstream would be evaluated in similar fashion, and so on to the one mile point of compliance. The USFWS BiOp called for notification of the USFWS if an exceedance of take allowance occurred, with a requirement to halt in-water work until a solution could be determined.

Measurements for Ecology permit compliance were taken approximately 300 feet downstream of the in-water construction activity about every 15 minutes after in-water construction began (Appendix B, Site B). Complete Ecology sampling requirements and methods are not replicated here but are outlined in the Water Quality Monitoring Plan and Water Quality Certification (Appendix C and D).

After each day of in-water work, a summary of the repair work and turbidity monitoring was conveyed to the Ecology representative, Rebekah Padgett.

Results and Discussion

Exceedances were noted as a result of a variety of construction activities, weather events, and likely water management flow manipulations. Although the nature of certain activities (e.g., reopening a river channel, heavy rainfall, river stage changes) and concern for the safety of the contractors did not always allow the activity to be stopped, turbid conditions due to repair work were generally temporary in nature and Best Management Practices (BMPs) were investigated and implemented to reduce or prevent turbidity whenever possible.

Specific events where turbidity exceeded Ecology permit requirements during each stage of the barrier apron repair and replacement are outlined and discussed below. Exceedances have also been summarized by hourly occurrence for each day (Appendix E) and all data collected has been appended to this report (Appendix F).

Phase I (June 2-11)
During Phase I, it was necessary to build a cofferdam and excavate a channel upstream of the barrier to direct river flow towards the right bank so that the fish trap would remain operational throughout the barrier apron repairs.

On June 02, a brief (15-30 minutes) exceedance was noted during deepening of channel on the right bank along the barrier. Later in the day an exceedance of longer duration was recorded when water was then released into the new right bank channel and excavation to stabilize the channel and divert river flow, but the water and full closure of the left bank, which were likely increasing turbidity, could not be halted. Inundating a previously dry area was a common source of exceedances during the barrier apron repairs and other previous barrier repairs. Color change of river was noted at the ½ mile and 1 mile sites downstream. A heavy downpour also occurred periodically during this work, and may have contributed to the turbidity farther downstream.

On June 03, an exceedance due to work on the downstream gravel bar was observed at Site C. The rock chute (upstream of Site C on the left bank) outflow turbidity was measured to determine its role in the exceedance at Site C (600 ft) since Site B (300 ft) was near background level. Occasionally during previous barrier repairs the rock chute appeared to influence downstream turbidity. Although the rock chute outflow turbidity on June 03 was recorded as higher than background, after work was paused for approximately 15 minutes the turbidity returned to background levels and no plume or exceedance was noted at Site D.

On June 04, excavation of a small section of the left bank channel near the Corps fish trap created a visible plume. Work was paused frequently and residual turbidity was noted for approximately 30 minutes after the left bank channel excavation was completed. Later that day, excavation of the diversion channel north bank resulted in an exceedance with a visible plume, so work was paused. Approximately 5 minutes later the plume had dissipated.

On June 05, modifications to the operation of the fish trap, rock chute, and the reintroduction of water through the job site contributed to periodic exceedances. Work was paused at this time and resumed upstream to enlarge the forebay pool edges, and concluded after 20-30 minutes.

On June 08, an excavator removed gravel from the left bank bulkhead to place on the upstream gravel bar. Work stopped shortly (< 30 minutes) after first exceedance was noted and investigated. After in-water work stopped and work in the dry began, some exceedances and water discoloration were observed up to 90 minutes later. This is a longer duration than turbidity is normally observed, which would typically be 15-30 minutes, and may be due to the upstream location of the work and proximity to the flume, which was manipulated to try and reduce the turbid water entering the river.

On June 09, one exceedance was noted at Site B but not Site C following excavator manipulation of a bank above the flume. There was no visible plume and most of the visibly turbid water entered the flume. No further exceedances were noted.

On June 10, excavation of the upstream right bank gravel bar "toe" occurred mostly in the dry, but some in-water. An exceedance was noted and turbidity dropped after other work (moving ecology blocks, and shoring up supersacks and gravel bar edges) was begun. After excavation was resumed, however, more exceedances were noted and work was paused. Measurements at Site A indicated that water management actions to increase the flow of the river may have also been increasing turbidity due to natural erosion processes. This was noted later in the day and at other points of the barrier apron repair as well.

On June 11, the only exceedances occurred during a period of no in-water work and were attributed to water management actions to increase the flow of the river. When background measurements were taken, the turbidity had increased at different points during the day (e.g., from 29.8 NTU to 37.8 NTU). Changes to turbidity when there was little or no in-water work were noted at several points during the barrier apron repair, and may have been a result of water management manipulation of river flows. More frequent background turbidity measurements (Site A) may be necessary to determine what could be causing increases to turbidity, especially if no in-water work is being conducted at that time.

Phase II (June 19-July 01)

During Phase II, the river flow was directed towards the left bank by closing off the previously excavated right bank channel. Additionally, access roads and cofferdams were built above and below the barrier so the remainder of the barrier could be replaced in the dry.

On June 19, the only exceedances occurred almost an hour after in-water work was conducted. A repeat background measurement was taken to determine if water management actions to

manipulate the flow of the river were responsible for the exceedance, but no change in background had occurred. Subsequent samples did not exceed the background turbidity.

On June 23, an exceedance occurred for ≤ 15 minutes after an excavator removed boards from the apron. In general, work done directly to the apron did not cause exceedances because the work would typically be done in the dry (e.g., behind a cofferdam), if possible.

A channel was opened by removing supersacks and ecology blocks later in the day on June 23 and caused exceedances for approximately one hour. No work was stopped because the action of the water entering the channel was the cause of the turbidity. When excavators returned to manipulate channel material and place supersacks for stability, exceedances were noted. Due to this, the work was paused and limited to only moving supersacks and ecology blocks. Additionally, BMPs were investigated and modified by opening a panel on the left bank to increase flow and the fish trap was opened to take additional water. The right bank channel was closed off to create a cofferdam.

On June 25, exceedances occurred while a culvert for fish passage upstream and road for barrier apron access were installed. Steps were taken to better control the seepage through the upstream cofferdam with additional supersacks. An exceedance during construction of a cofferdam was noted, but work stopped soon after (20 minutes) and turbidity returned to background levels within 30 minutes.

On June 20, 22, 24 and July 01, most work was in the dry and there were no exceedances noted.

Phase III (August 03-05)
During Phase III any remaining work on the apron or for removal of materials and sediments was performed behind the cofferdam and downstream of the barrier. The last construction effort was concentrated on removal of all remaining materials and restoration and regrading of the river above and below the barrier.

On August 03, exceedances occurred at Site B over one 50 minute period. During the subject time period, a site restoration of existing gravel bar below barrier was performed: a channel downstream in front of the apron was created, ecology blocks placed downstream on the left bank were removed, a gravel bar was regraded, and logs were placed in the left bank to provide slower water for salmon to access fish trap. Over this same time period a marked rise in flow and turbidity was noted and an additional Site A sample revealed that the background turbidity had risen 122 NTU in 2 hours. The background turbidity had likely influenced downstream readings and may have caused higher turbidity levels than could have been attributed to in-water work. This phenomenon was also observed during previous phases and barrier repair events.

On August 05, one exceedance occurred during removal of super sacks near the guide wall. Removal of the super sacks allowed water to erode a portion of the gravel bar but the resulting exceedance was temporary in duration (≤ 9 minutes) and scope (no exceedance was noted further downstream at Site C).

Conclusion

Project activities did exceed State criteria at times in each phase of construction during the June-August barrier dam apron repair and replacement near Buckley, WA. These exceedances were most often a result of in-water construction activities (e.g., excavation of gravel), restoring flow to a dewatered area, or water management flow manipulations (i.e., outflow changes due to MMD gates opening or closing). When possible, construction activities were halted and altered to reduce or prevent turbidity. Generating turbidity may not have been preventable because in-water work and variations in water flow were required for the barrier dam apron repairs.

When an exceedance did occur and steps were taken to stop or reduce turbidity, river conditions returned to or near background concentrations afterwards, confirming that the exceedances were typically of short duration and temporary in nature rather than continual. In most instances of an exceedance, the appropriate Contract Inspector or CWA representative was notified to implement the appropriate action to the stop the violation and correct the problem. In most situations the action was to stop the sediment generating activity and wait for the water to clear, which often occurred in 15-30 minutes. After assessing the BMPs already in place, some other actions included preventing seepage through cofferdams, changing the flow allocation (i.e., through the flume or into the fish trap), and using different techniques to stabilize channel banks, (e.g., clean ecology blocks instead of excavated gravel). Clear and frequent communication among the Corps, CWA, and contractor was vital for identifying ways to reduce and prevent turbidity while construction was ongoing.

The effects of water management (increasing or decreasing flow) on turbidity due to natural erosion processes as water levels changed were more apparent during the barrier apron repairs and replacement. There were several instances of the background turbidity changing more quickly than was anticipated, which made differentiating between turbidity generated by construction and background turbidity more difficult. Therefore, the frequency of upstream background turbidity measurements was increased whenever possible to capture potential changes.

An important trend to note is the wide variation in background turbidity throughout the barrier apron repairs (Appendices A and F). By July 01, the background turbidity upstream of the barrier dam was 761-943 NTU, as compared to approximately 20-30 NTU in early June and 50-60 NTU in late June. By August the background turbidity was about 300-475 NTU. As demonstrated during previous barrier repairs and USGS stream gages, the turbidity of the White River appears to be naturally variable, particularly after precipitation and depending on the time of year (i.e., summer high temperatures and glacial melt). Development of exceedance limits for future monitoring efforts should take into account natural turbidity fluctuations, local weather conditions, and time of year to reflect the range of normal turbidity limits within a system and modify monitoring plans as appropriate to best fit each unique system.

References

U.S. Fish and Wildlife Service (USFWS). 2015. Endangered Species Act - Section 7 Consultation Biological Opinion, Mud Mountain Dam and Cascade Water Alliance Diversion Dam Maintenance and Operations and Replacement of the Cascade Water Alliance Diversion Dam and Existing Fish Trap Facility on the White River with a New Barrier Dam and Fish Trap. March 18, 2015. Lacey, Washington.

National Marine Fisheries Service (NMFS). 2014. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion, Conference Opinion And Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation, Mud Mountain Dam, Operations, and Maintenance, White River, HUC 17110014 Pierce and King Counties, Washington.. October 3, 2014. Seattle, Washington.

APPENDIX A. White River flows before, during, and after barrier apron repairs in June, July, and August 2015

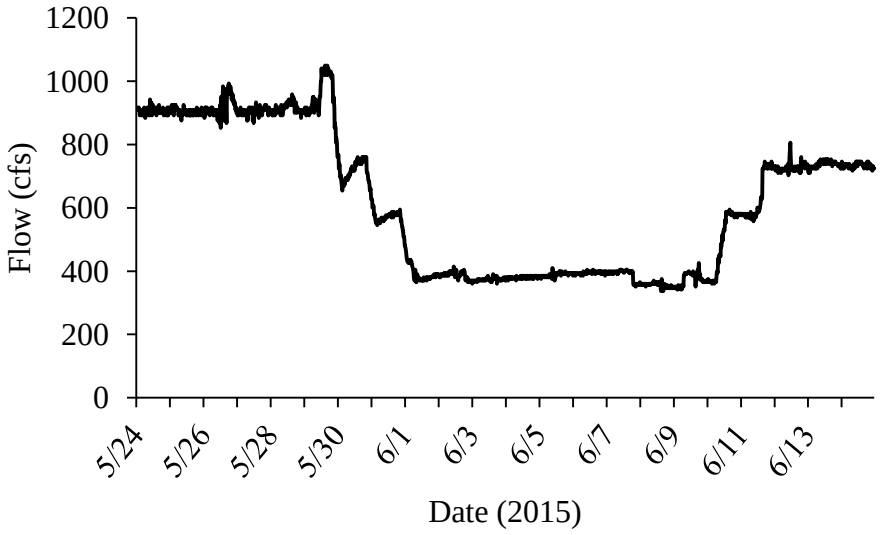


Figure 1. White River flow as recorded by the USGS gage above Boise Creek (12099200) during the drawdown for barrier apron repairs approximately June 01-10. Gage location is downstream of the barrier apron replacement project.

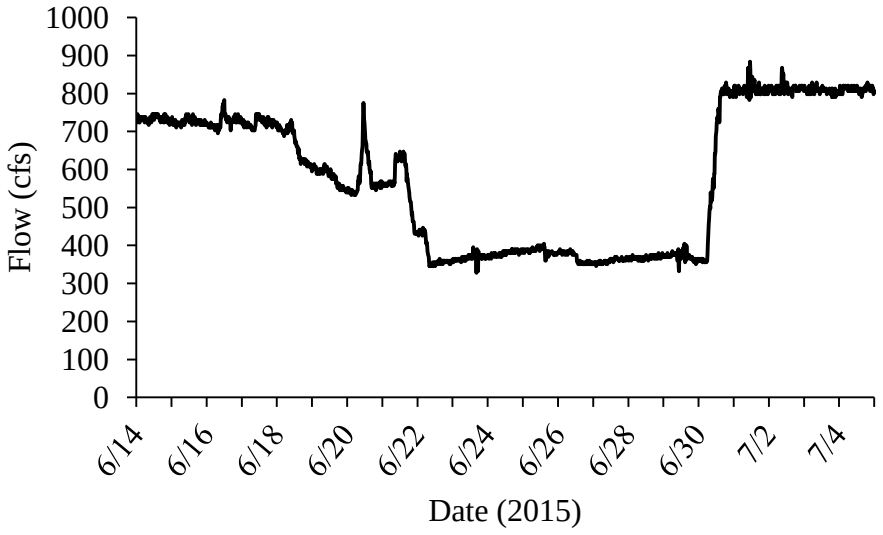


Figure 2. White River flow as recorded by the USGS gage above Boise Creek (12099200) during the drawdown for barrier apron repairs approximately June 22-30. Gage location is downstream of the barrier apron replacement project.

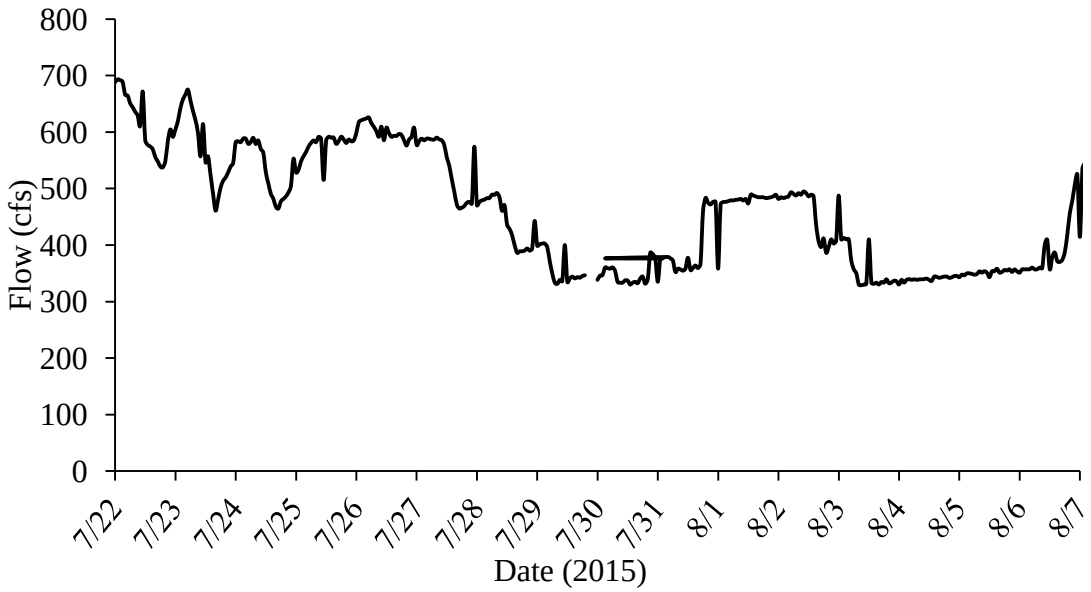


Figure 3. White River flow as recorded by the USGS gage above Boise Creek (12099200) during the drawdown for barrier apron repairs approximately July 22-Aug 06, 2015. Gage location is downstream of the barrier apron replacement project.

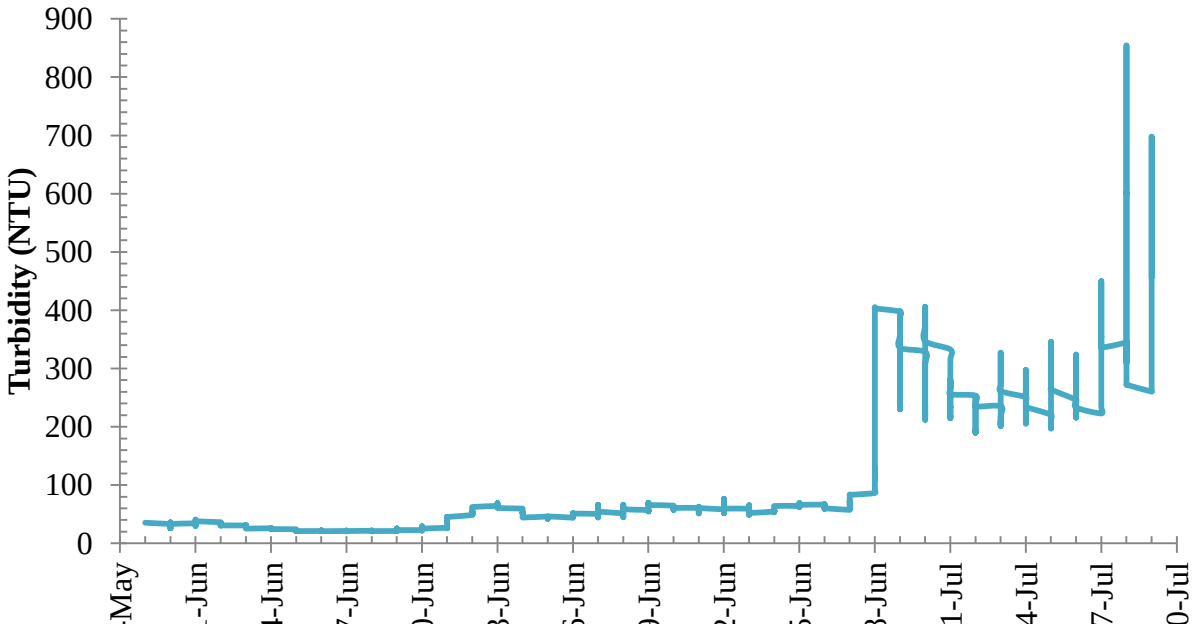


Figure 4. Ambient turbidity in the White River downriver of Mud Mountain Dam as measured at the USACE gage near river mile (RM) 26.5 approximately 2 miles upriver of the barrier apron replacement project at RM 24.3.

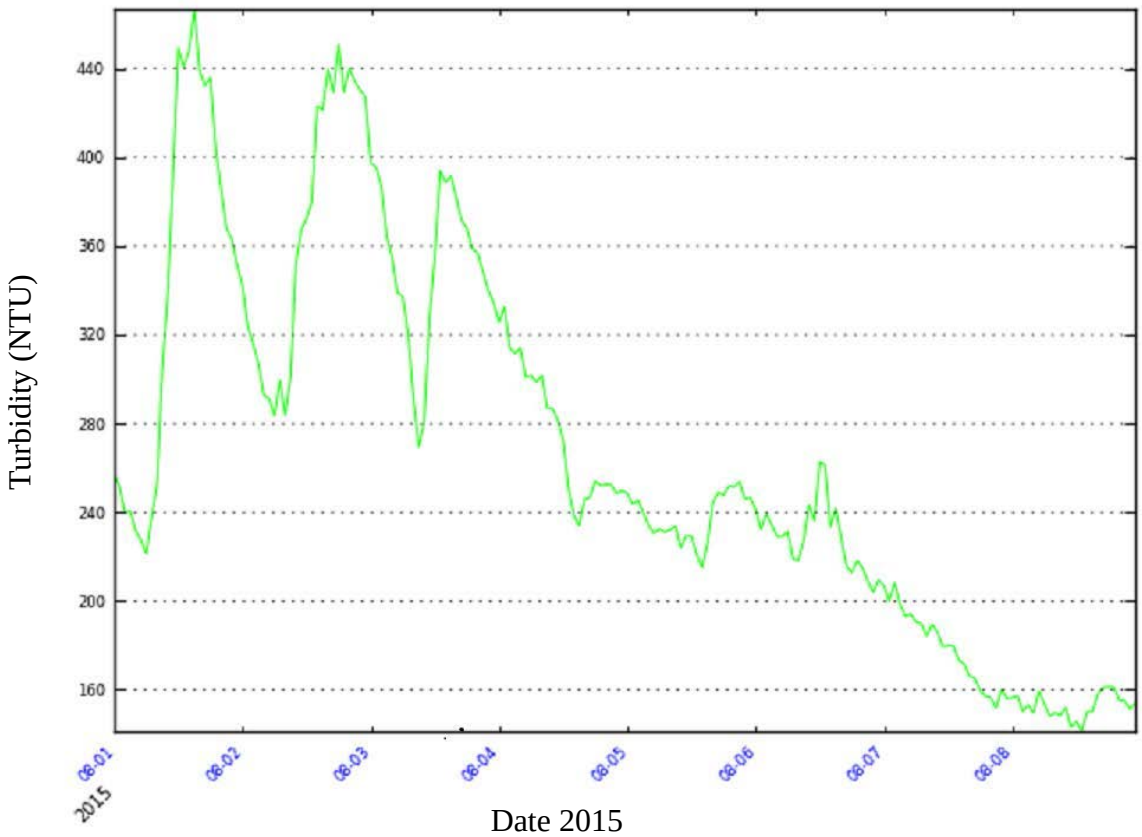
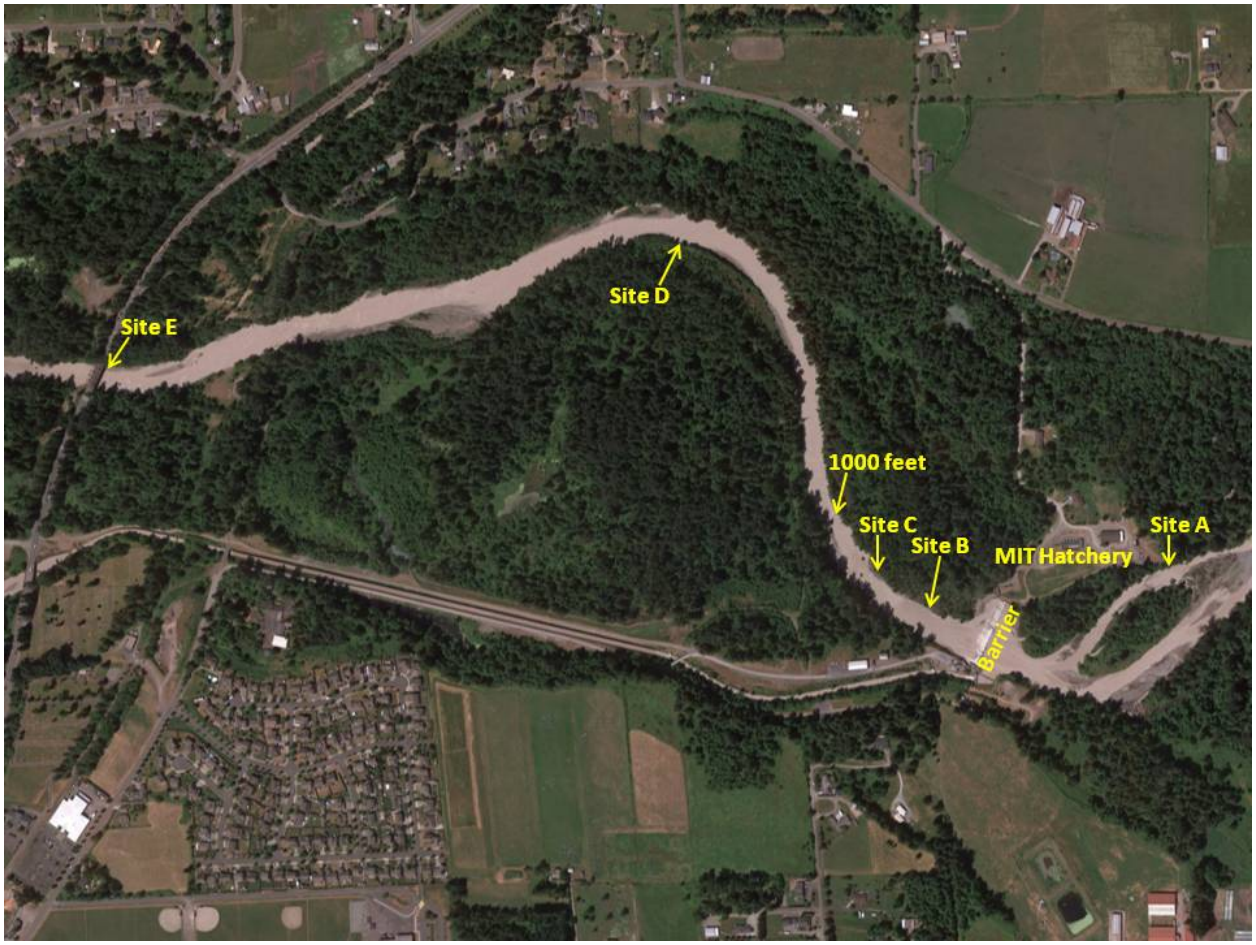


Figure 5. Ambient turbidity in the White River from Mud Mountain Dam as measured at the USACE gage near river mile (RM) 26.5 approximately 2 miles upriver of the barrier apron replacement project at RM 24.3.

APPENDIX B. Sampling locations



All turbidity monitoring locations on White River near Buckley, Washington (part of town is at lower left, with Highway 410 cutting across upper left). Site A (background) is several hundred feet upstream from the barrier dam. Site B is 300 ft downstream and Site C is 600 ft downstream of the barrier dam. The 1000 ft site was used for turbidity monitoring requirements from NMFS. Site D is ½ mile downstream and Site E is 1 mile downstream of the barrier dam.

Turbidity monitoring locations around the barrier dam. Site A is several hundred feet upstream while Site B and Site C are 300 ft and 600 ft downstream of the barrier dam, respectively.

Turbidity monitoring locations Site D (1/2 mile downstream) and Site E (1 mile downstream).

APPENDIX C. Ecology and USFWS BiOp exceedance criteria

Table 1. Washington Department of Ecology Table 200 (1)(e) Aquatic Life Turbidity Criteria in Fresh Water for Core Summer Salmonid Habitat.

Use Category	**Percent Saturation**
Char Spawning and Rearing	Turbidity shall not exceed: •5 NTU over background when the background is 50 NTU or less; or •A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Core Summer Salmonid Habitat	Same as above.
Salmonid Spawning, Rearing, and Migration	Same as above.
Salmonid Rearing and Migration Only	Turbidity shall not exceed: •10 NTU over background when the background is 50 NTU or less; or •A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.
Non-anadromous Interior Redband Trout	Turbidity shall not exceed: •5 NTU over background when the background is 50 NTU or less; or •A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Indigenous Warm Water Species	Turbidity shall not exceed: •10 NTU over background when the background is 50 NTU or less; or •A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.

Table 2. USFWS BiOp requirements for adverse effects to adult, subadult, and juvenile bull trout based on NTU levels above background, time of year, and duration within the White River (USFWS 2015).

From November through May	**From June I through October 31**
1) When background NTU levels are exceeded by 42 NTUs, but less than 2,294 NTUs at any time.	I) When background NTU levels are exceeded by 133 NTUs to 7,366 NTUs at any time.
2) When background NTU levels are exceeded by 28 NTUs to 1,630 NTUs for more than 1 hour continuously.	2) When background NTU levels are exceeded by 89 NTUs to 5,236 NTUs for more than 1 hour continuously.
3) When background NTU levels are exceeded by 1I NTUs to 661 NTUs for more than 3 hours cumulatively.	3) When background NTU levels are exceeded by 36 NTUs to 2,123 NTUs for more than 3 hours cumulatively.
4) When background NTU levels are exceeded by 6 NTUs to 329 NTUs for more than 7 hours cumulatively.	4) When background NTU levels are exceeded by 18 NTUs to 1,058 NTUs for more than 7 hours cumulatively.

Endangered Species Act - Section 7 Consultation
Biological Opinion

Mud Mountain Dam and Cascade Water Alliance Diversion Dam
Maintenance and Operations
and
Replacement of the Cascade Water Alliance Diversion Dam and Existing Fish Trap Facility on the White River with a New Barrier Dam and Fish Trap

U.S. Fish and Wildlife Reference:
01EWFW00-2013-F-0273

Agency:
U.S. Army Corps of Engineers
Seattle Disctrict

Consultation Conducted By:
U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office

Eric V. Rickerson, State Supervisor
Washington Fish and Wildlife Office

March 18, 2015
Date

available. Should the Corps demonstrate that major rehabilitation of the 9-foot diameter tunnel will occur by 2018, submittal of the study design may be extended until 2018.

B. Implement a monitoring study to test assumptions regarding the injury of bull trout captured in the fish trap upstream. The study will be developed in collaboration with the USFWS and must be approved by the USFWS. The Corps will propose a study design to the USFWS within 1 year of this signed Opinion and implement the study within 3 years of this signed Opinion or as funding becomes available.

C. Implement surveys for stranding of fish sooner and employ enough personnel to adequately survey all areas were stranding may occur and improve successful rescue of fish.

3. To implement RPM 3, the Corps shall:

A. Monitor downstream turbidity levels in the White River during sediment-generating activities (e.g., repair of 23-foot diameter tunnel bridge pier; installation and removal of cofferdams associated with construction of the new fish passage barrier and fish trap, maintenance and repairs to the Cascade Diversion Dam. The Corps will develop a monitoring plan[28] and provide it to the USFWS for review and approval at least 90 days prior to the proposed in-water work. No in-water construction may occur until approval of the plan has been provided by USFWS. The USFWS recommends that the following be included in the plan. Deviations from these recommendations will be specifically identified by the Corps and explained why they will not be implemented.

i. No in-water work may commence until upstream and downstream baseline water quality has been determined and staff and sampling devices are ready and available for measuring during construction and maintenance activities. The Corps will ensure that there are sufficient trained staff and sampling devices (calibrated daily at a minimum) necessary to fully implement turbidity monitoring.

ii. Monitoring for turbidity shall occur at the following distances. Locations will be noted on a map or with GPS locators:

a. For all sediment-generating activities, background turbidity levels will be determined upstream of the project site. Turbidity levels should be measured approximately 100 to 150 ft upstream of the project area. If a permanent turbidity monitoring station is available that is near the project site, it can be used to determine background levels with USFWS concurrence. Information on its location relative to the sediment-generating activity should be provided.

[28] The monitoring plan may be used to address more than on action, if appropriate. Site specific details may be required to address the different activities monitored within the over-arching monitoring plan.

b. Re-opening of 9-foot diameter tunnel following maintenance and compliance with NMFS RPA 1 (open after June 30).

   (i) 300 ft downstream of sediment-generating activity.

c. 23-foot diameter tunnel-bridge pier repair.

   (i) 300 ft downstream of sediment-generating activity.

d. Fish passage barrier and fish trap project sites during the placement and removal of each cofferdam.

   (i) 300 and 600 ft downstream of sediment-generating activity.

e. Maintenance and repair of the Cascade Diversion Dam.

   (i) 600 ft, 0.5 mile, and 1 mile downstream of the sediment-generating activity.

The most downstream monitoring location is based off of Take estimates. If turbidity measurements identified above under Sediment Related Impacts and **Error! Reference source not found.** are exceeded, then Take identified in this Opinion has been exceeded, and the Corps will discontinue in-water activities immediately. In-water work may not continue until 1) the USFWS has been notified of the exceedance and concurred on work proceeding[29], 2) the Corps has determined the extent and duration of the exceedance; and 3) the Corps has determined why the exceedance occurred and implement measures to prevent future exceedances.

iii. Monitoring for turbidity shall occur by the following methods:

a. Background levels can be measured by either a water quality data logger or by manual measurements.

b. Turbidity measures taken at intermediate distances between the construction activities and the downstream point of Take compliance can be taken by either a water quality data logger or by manual measurements.

c. Downstream monitoring location to determine exceedances of Take must be manual measurements.

[29] Reinitiation of consultation may be necessary.

d. Sampling methodology:

(i) Water quality data loggers – loggers will be set to measure turbidity once every 15 minutes. Loggers should be placed in the stream at locations that are safe to access and in locations where they will measure any turbidity plume resulting from sediment-generating activities and obtain accurate measurements of turbidity in the stream. A run or pool may be the most appropriate location as turbidity may be uniformly spread across the river. However, depending on the site location, placing the data logger near the thalweg may be appropriate. Safety, theft, and vandalism must also be considered. If possible, data loggers giving real time values should be used. If not, data loggers should be downloaded and turbidity levels checked twice a day. This will allow changes in construction to occur if turbidity levels indicate excessive amount of turbidity and sediment being generated.

(ii) Manual measurements – personnel shall take measurements perpendicular to stream flow to obtain an accurate representation of turbidity across the stream. Turbidity samples will be taken every 15 minutes. At a minimum turbidity samples will be taken at two locations across the stream at a mid-column water depth to monitor the sediment plume.

iv. Deviations, changes, or alterations to turbidity sampling.

a. 23-foot diameter tunnel-bridge pier repair, 9-foot diameter tunnel maintenance and its reopening after June 30th.

(i) Monitoring at the point of Take compliance should occur every 15 minutes for the first 2 hours of sediment-generating activities each day. If turbidity measurements at the point of Take compliance do not exceed the NTUs where adverse effects occur, then additional monitoring will be conducted for the remainder of the workday at a frequency of once every 3 hours. Turbidity monitoring will revert to 15-minute intervals for at least 2 hours when the sediment generating activity is modified such that an increase in sediment over previous conditions is likely to occur. Once sediment-generating activities have stopped and turbidity levels have reached background levels, monitoring may cease.

A. The purpose of the change in monitoring is based on a determination that construction activities and BMPs are being implemented in a manner that

sediment generation is minimized and demonstrates that sediment levels that will result in adverse effects to bull trout will not exceed the Take authorized.

b. Maintenance and operation of Cascade Diversion Structure (current structure).

(i) As the point of compliance for this activity is 1 mile downstream, the Corps may begin monitoring at 600 ft at the time sediment generating activities begin. If sediment levels exceed the values where adverse effects occur, monitoring will shift to the 0.5 mile site. If sediment levels exceed the values at 0.5 mile, then monitoring will shift to the 1 mile site. Monitoring at any given site shall begin every 15 minutes for a period of 2 hours during sediment-generating activities each day. If turbidity measurements do not exceed the NTUs where adverse effects occur, then additional monitoring will be conducted for the remainder of the duration of the sediment-generating activity at a frequency of once every 3 hours. Turbidity monitoring will revert back to 15-minute intervals for at least 2 hours when the sediment generating activity is modified such that an increase in sediment over previous conditions is likely to occur. Once sediment-generating activities have stopped and turbidity levels have reached background levels, monitoring may cease.

A. The purpose of the change in monitoring is based on a determination that construction activities and BMPs are being implemented in a manner that sediment generation is minimized and demonstrates that sediment levels that will result in adverse effects to bull trout will not exceed the Take authorized.

v. If turbidity levels begin to approach the Take limits (75 percent of the measurements exceed the background NTU level within the time period of concern (**Error! Reference source not found.**) the Corps will contact the USFWS's consultation biologist to discuss means of assuring that the authorized amount of incidental take is not exceeded.

vi. If sediment levels exceed background levels at and/or beyond the downstream monitoring site as described above for the amount of take authorized by the Take Statement, then take will have been exceeded and the Corps must

reinitiate consultation. The Corps shall take corrective action to reduce sedimentation and contact the Washington Fish and Wildlife Office in Lacey, Washington (360-753-9440).

vii. Provide a report to the USFWS on an annual basis describing the monitoring protocols used and results of the surveys, including any exceedances, by March 31st of each reporting year[30]. The report will include at a minimum:

a. Dates and times of activities that generated turbidity.

b. Background NTUs, date, time, and location of samples.

c. Identification of the construction activities and downstream NTUs (actual and average) associated with the activities. Also, provide the date, time, and location of sample.

d. Any corrective actions taken.

e. Any reporting requirements of the 401 State Water Quality Permit issued for this project.

f. If no sediment is generated during the construction season, then no report is necessary. An email to the consulting biologist is sufficient noting that no sediment-generating activities occurred during that year.

4. To implement RPM 4, the Corps shall:

A. Ensure all small woody debris and LW entrained on or collected upstream of the existing Cascade Diversion Dam and future fish passage barrier during maintenance and operation is placed or released whole downstream of the Cascade Diversion Dam and future fish passage barrier. If a single piece of LW is too large or heavy to be passed over the dam with heavy equipment operated from the land or maintenance deck, a minimum number of cuts necessary to enable transport is allowable.

B. Minimize effects of loss of LW associated with levee construction and maintenance.

i. Prepare a draft plan to include the design, location, and performance monitoring of proposed riparian restoration. The plan will be coordinated with the Muckleshoot Indian Tribe, Puyallup Tribe of Indians, NMFS, and WDFW in addition to the USFWS. The draft plan will be due to the USFWS at least 180 days prior to proposed levee construction.

ii. Implement final plan following review and approval by the USFWS and NMFS, in coordination with the Muckleshoot Indian Tribe, Puyallup Tribe of Indians, and WDFW. Implementation must prior to or concurrent with levee construction.

[30] The Reporting year is based on the calendar year.

APPENDIX D. Water Quality Certification and Water Quality Management Plan

APPENDIX D. Water Quality Certification and Water Quality Management Plan

IN THE MATTER OF GRANTING A WATER QUALITY CERTIFICATION TO U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT in accordance with 33 U.S.C. 1341 (FWPCA § 401), RCW 90.48.120, RCW 90.48.260 and Chapter 173-201A WAC	)	**ORDER #11422** Interim Repair and Replacement of Mud Mountain Dam White River Barrier Structure Apron Project; White River, King and Pierce Counties, Washington.

TO: U.S. Army Corps of Engineers, Seattle District
Attn: Evan Lewis
PO Box 3755
Seattle, WA 98124

On March 30, 2015, U.S. Army Corps of Engineers, Seattle District (Corps) submitted a request to the Department of Ecology (Ecology) for a Section 401 Water Quality Certification. A public notice regarding the request was distributed by Ecology for the above-referenced project pursuant to the provisions of Chapter 173-225 WAC on April 9, 2015.

The proposed barrier apron repair and replacement includes:

- Barrier apron repair: Repair failed flashboards; install new posts, support tie rods, and knee braces; replace timber and steel flashboards; install boards in the barrier structure; evacuate equipment from the channel; and install metal panels at each end of the structure.
- Excavate and place exposed bedload: Exposed bedload would be excavated and placed within the river bed in order to redirect water flow and construct earthen cofferdams and plugs. This work would include excavation of a temporary diversion channel through the upstream gravel bar behind the barrier dam and construction of two temporary cofferdams consisting of alluvium and supersacks.
- Barrier apron demolition and repair: Steel plates would be installed over the existing horizontal and sloped timbers, with a bed of leveling grout applied over the horizontal timbers as necessary. Some timbers would be removed and the sloped section replaced with concrete supported by a fabric filter with an internal drain system.
- Construction of temporary earthen access roads: A temporary access road would be constructed across the right bank diversion channel, upstream of the barrier structure, to provide access during upstream cofferdam construction. A temporary access road would be constructed from downstream right bank out to the lower horizontal apron timbers.
- Installation of culvert: A 36-inch diameter corrugated metal pipe with sealed joints would be installed from the entrance of the Muckleshoot Tribe hatchery fishway through downstream cofferdam.

The project is located at the Mud Mountain Dam White River Barrier Structure, near Buckley, King and Pierce Counties, Washington, White River, Section 2, T. 19 N., R. 6E., WRIA 10.

AUTHORITIES:

In exercising authority under 33 U.S.C. § 1341, RCW 90.48.120, and RCW 90.48.260, Ecology has examined this application pursuant to the following:

1. Conformance with applicable water quality-based, technology-based, and toxic or pretreatment effluent limitations as provided under 33 U.S.C. §§ 1311, 1312, 1313, 1316, and 1317 (FWPCA §§ 301, 302, 303, 306 and 307);

2. Conformance with the state water quality standards contained in Chapter 173-201A WAC and authorized by 33 U.S.C. § 1313 and by Chapter 90.48 RCW, and with other applicable state laws; and

3. Conformance with the provision of using all known, available and reasonable methods to prevent and control pollution of state waters as required by RCW 90.48.010.

WATER QUALITY CERTIFICATION CONDITIONS:

Through issuance of this Order, Ecology certifies that it has reasonable assurance that the activity as proposed and conditioned will be conducted in a manner that will meet the applicable water quality standards and other appropriate requirements of state law. In view of the foregoing and in accordance with 33 U.S.C. § 1341, RCW 90.48.120, RCW 90.48.260 Chapter 173-200 WAC and Chapter 173-201A WAC, water quality certification is granted to the Applicant subject to the conditions within this Order.

Certification of this proposal does not authorize the Applicant to exceed applicable state water quality standards (Chapter 173-201A WAC), ground water standards (Chapter 173-200 WAC), or sediment quality standards (Chapter 173-204 WAC). Furthermore, nothing in this certification shall absolve the Applicant from liability for contamination and any subsequent cleanup of surface waters, ground waters, or sediments occurring as a result of project construction or operations.

A. General Conditions:

A1. For purposes of this Order, the term "Applicant" shall mean U.S. Army Corps of Engineers, Seattle District, and its agents, assignees and contractors.

A2. For purposes of this Order, all submittals required by its conditions shall be sent to Ecology's Northwest Regional Office, Attn: 401/CZM Federal Project Manager, 3190 160th Avenue SE, Bellevue, WA 98008-5452. Any submittals shall reference Order #11422.

A3. Work authorized by this Order is limited to the work described in the application received by Ecology on March 30, 2015; Memorandum from Jo Gardiner, Corps, Seattle District, to Rebekah Padgett, Ecology, RE: Revised Project Description for Mud Mountain Dam Interim Barrier Apron Repair and Replacement, dated May 12, 2015; and Sheets 1 of 24 to 24 of 24, dated April 7, 2015. The Applicant will be out of compliance with this Order and must reapply with an updated application if the information contained in the application is voided by subsequent changes to the project not authorized by this Order.

A4. Within 30 days of receipt of an updated application, Ecology will determine if the revised project requires a new water quality certification and public notice or if a modification to this Order is required.

A5. Copies of this Order shall be kept on the job site and readily available for reference by Ecology personnel, the construction superintendent, construction managers and lead workers, and state and local government inspectors.

A6. The Applicant shall provide access to the project site upon request by Ecology personnel for site inspections, monitoring, necessary data collection, and/or to ensure that conditions of this Order are being met.

A7. Nothing in this Order waives Ecology's authority to issue additional orders if Ecology determines that further actions are necessary to implement the water quality laws of the state. Further, Ecology retains continuing jurisdiction to make modifications hereto through supplemental order, if additional impacts due to project construction or operation are identified (*e.g.*, violations of water quality standards, downstream erosion, etc.), or if additional conditions are necessary to further protect water quality.

A8. The Applicant shall ensure that all appropriate project engineers and contractors at the project site have read and understand relevant conditions of this Order and all permits, approvals, and documents referenced in this Order. The Applicant shall provide Ecology a signed statement (see Attachment A for an example) from each project engineer and contractor that they have read and understand the conditions of this Order and the above-referenced permits, plans, documents and approvals. These statements shall be provided to Ecology before construction begins at the project or mitigation sites.

A9. This Order does not authorize direct, indirect, permanent, or temporary impacts to waters of the state (including wetlands) or related aquatic resources, except as specifically provided for in conditions of this Order.

A10. Failure of any person or entity to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.

B. Water Quality Conditions:

B1. This Order does not authorize exceedances of water quality standards beyond the limits established in WAC 173-201A, except as specifically modified by this Order in Condition B2 below.

B2. In-water construction activities may cause water quality effects that will exceed the turbidity criteria specified in Chapter 173-201A-200 WAC. Per WAC 173-201A-410, Ecology may grant a temporary mixing zone on a short-term basis for the disturbance of in-place sediments during and immediately after essential activities. For the specific activities below, Ecology is authorizing a temporary turbidity mixing zone of 600 feet from the edge of the in-water activities:

a. Installation and removal of temporary diversion channels,
b. Installation and removal of temporary earthen cofferdams and plugs,
c. Installation and removal of temporary earthen access roads, and
d. Installation of the downstream end of the culvert.

B3. Ecology has reviewed the *Water Quality Monitoring Plan, White River Barrier Structure Interim Apron Repair and Replacement June 2015* (hereafter called the "Water Quality Monitoring Plan") prepared by U.S. Army Corps of Engineers, Seattle District, and dated May 12, 2015, and the Applicant shall submit a revised Water Quality Monitoring Plan that includes all changes and additions to the current Plan, as modified by this Order. The revised plan shall be submitted per Condition A2 on or before May 22, 2015. No work below the OHWM may begin until Ecology approves the revised Plan.

B4. If further changes to the Water Quality Monitoring Plan are proposed through the duration of this Order, the Applicant shall submit them to Ecology for review and approval (see A2) prior to implementation. Following Ecology's approval, the Applicant shall comply with the approved, revised Plan.

B5. If monitoring results demonstrate that the applicable water quality standards or project performance standards are not being met, Ecology may require additional monitoring and/or mitigation.

B6. Visual monitoring for turbidity shall be conducted during all work below the OHWM.

B7. Location of turbidity samples: Turbidity shall be sampled for this project at 300 feet downstream from the activity causing the turbidity for all work below the OHWM.

a. Additionally, for activities outlined in Condition B2:
   i. If there is turbidity at 600 feet downstream from the activity, then turbidity shall also be sampled at 0.5 mile downstream from the activity causing turbidity.
   ii. If there is turbidity at 0.5 mile downstream from the activity, then turbidity shall also be sampled at 1.0 mile downstream from the activity causing turbidity.

Sampling for turbidity is to be accomplished using a turbidometer properly calibrated according to the operator's manual.

B8. Detection of exceedances: If exceedances at the point of compliance are detected through water quality sampling and monitoring, the Applicant shall immediately take action to stop, contain, and prevent unauthorized discharges or otherwise stop the violation and correct the problem. After such an event, the Applicant shall assess the efficacy of the site BMPs and update or improve the BMPs used at the work site in an effort to reduce or prevent recurrence of the turbidity exceedance.

B9. Reporting: If no exceedances are detected, results of water quality sampling, as determined by the Plan, shall be forwarded to Ecology on a monthly basis in accordance to Condition A2.

B10. Notification of exceedances: Notification of exceedances (including visual) that are detected through water quality sampling shall be made to Ecology within 24 hours of occurrence. Notification shall be made with reference to Order #11422, Attn: 401/CZM Federal Project Manager, by telephone at (425) 649-7129 or (425) 649-7000, or by fax to (425) 649-7098. The Applicant shall, at a minimum, provide Ecology with the following information:

   i. A description of the nature and cause of exceedance.
   ii. The period of non-compliance, including exact dates, duration, and times and/or the anticipated time when the Applicant will return to compliance.
   iii. The steps taken, or to be taken, to reduce, eliminate, and prevent recurrence of the non-compliance.
   iv. In addition, within five (5) days after notification of an exceedance, the Applicant shall submit a written report to Ecology that describes the nature of the exceedance, sampling results and location, photographs, and any other pertinent information. The report shall also identify what additional BMPs were or will be implemented to prevent further exceedances.

C. Dewatering Conditions:

C1. Dewatering water from the cofferdams and any in-water activities may not be discharged to the White River or conveyed to surface waters unless it meets Surface Water Quality Standards (Chapter 173-201A WAC) for pollutants of concern (e.g., turbidity and pH).

C2. The method of discharge shall be designed and operated so as not to cause erosion or scour in state waters, banks, or vegetation.

C3. The Applicant shall identify treatment and disposal contingencies that will be used if the dewatering water does not meet standards for discharge to surface waters.

C4. All equipment associated with dewatering activities shall be properly operated and maintained.

D. Conditions for Construction Activities:

Upland Conditions

D1. Machinery and equipment used during construction shall be serviced, fueled, and maintained upland, at least 100 feet from state waters, unless otherwise approved by Ecology, in order to prevent contamination to any surface water.

D2. Wash water containing oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall be contained for proper disposal, and shall not be discharged into state waters or storm drains.

D3. Equipment used for this project shall be free of external petroleum-based products while working in or around state waters.

D4. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its working in or adjacent to state waters.

D5. Equipment such as track hoes, backhoes, bulldozers, and bobcats shall remain outside of flowing water, to the extent practicable.

D6. Work shall be completed in the dry whenever possible.

In-Water Conditions

D7. The Applicant shall use biodegradable hydraulic fluids for all equipment working within the watercourse.

D8. When constructing the upstream and downstream cofferdams, the Applicant shall, to the extent practicable, place supersacks prior to performing in-river bedload movement for cofferdam construction in order to minimize turbidity.

D9. All cofferdams shall be removed at the end of the project and the riverbed restored.

D10. Work in or near the water that may affect fish migration, spawning, or rearing shall cease immediately upon a determination by Ecology that fisheries resources may be adversely affected.

D11. All construction debris shall be properly disposed of on land so that it cannot enter a waterway or cause water quality degradation to state waters.

D12. The Applicant shall use tarps or other containment method when cutting or drilling over water to prevent debris, sawdust, and other materials from entering the water.

D13. All manmade debris that has been deposited below the OHWL within the construction work area shall be removed and disposed of upland such that it does not enter waters of the state. Concrete rubble, metal debris, and other debris in the construction work corridor that have washed into marine areas shall be removed from the project area.

D14. If cast in place, wet concrete/grout shall be prevented from entering waters of the state. Forms for any concrete/grout structure shall be constructed to prevent leaching of wet concrete/grout. Impervious materials shall be placed over any exposed concrete/grout not lined with the forms that will come in contact with state waters. Forms and impervious materials shall remain in place until the concrete/grout is cured.

D15. Project activities shall be conducted to minimize siltation of the river bed, to the extent practicable.

D16. Clean Fill Criteria: Applicant shall ensure that fill (soil, sand, or other material) placed for the proposed project does not contain toxic materials in toxic amounts.

E. Emergency/Contingency Measures:

E1. The Applicant shall develop and implement a Spill Prevention and Containment Plan for all aspects of this project.

E2. The Applicant shall have adequate and appropriate spill response materials on hand to respond to emergency release of petroleum products or any other material into waters of the state.

E3. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., shall be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters.

E4. Any work that is out of compliance with the provisions of this Order, or conditions causing distressed or dying fish, or any discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, is prohibited. If these occur, the Applicant shall immediately take the following actions:

a. Cease operations at the location of the violation or spill.

b. Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.

c. Notify Ecology of the failure to comply. All oil spills shall be reported immediately to Ecology's 24-Hour Spill Response Team at 1-800-258-5990, **and** within 24 hours of spills or other events to Ecology's 401/CZM Federal Project Manager at (425) 649-7129 or (425) 649-7000.

d. Submit a detailed written report to Ecology within five (5) days that describes the nature of the event, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.

Compliance with this condition does not relieve the Applicant from responsibility to maintain continuous compliance with the terms and conditions of this Order or the resulting liability from failure to comply.

F. Timing Conditions

F1. This Order expires one (1) year from the date of issuance of this Order.

F2. Work below the Ordinary High Water Line (OHWL) shall not occur from August 16 through May 31 of any year for the protection of fish.

G. Reporting and Notification Requirement Conditions

G1. Applicant shall provide notice to Ecology's 401/CZM Federal Project Manager:

- At least three (3) days prior to the start of construction and
- Within 14 days after completion of construction at the project site.

Notification, referencing Order #11422 can take place by telephone to (425) 649-7129 or (425) 649-7000, fax to (425) 649-7098, or in writing.

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do both of the following within 30 days of the date of receipt of this Order:

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel Road SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

CONTACT INFORMATION

Please direct all questions about this Order to:

Rebekah Padgett
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008
(425) 649-7129
rebekah.padgett@ecy.wa.gov

MORE INFORMATION

Pollution Control Hearings Board Website
www.eho.wa.gov/Boards_PCHB.aspx

Chapter 43.21B RCW - Environmental and Land Use Hearings Office – Pollution Control Hearings Board
http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21B

Chapter 371-08 WAC – Practice And Procedure
http://apps.leg.wa.gov/WAC/default.aspx?cite=371-08

Chapter 90.48 RCW – Water Pollution Control
http://apps.leg.wa.gov/RCW/default.aspx?cite=90.48

Chapter 173-204 WAC – Sediment Management Standards
www.ecy.wa.gov/biblio/wac173204.html

Chapter 173-200 WAC – Water Quality Standards for Ground Waters of the State of Washington
www.ecy.wa.gov/biblio/wac173200.html

Chapter 173-201A WAC – Water Quality Standards for Surface Waters of the State of Washington
www.ecy.wa.gov/biblio/wac173201A.html

SIGNATURE

Paul Anderson

Paul Anderson, Unit Supervisor
Shorelands and Environmental Assistance Program
Northwest Regional Office

May 15, 2015
Date

ATTACHMENT A

U.S. ARMY CORPS OF EINGINEERS, SEATTLE DISTRICT
INTERIM REPAIR AND REPLACEMENT OF MUD MOUNTAIN DAM
WHITE RIVER BARRIER STRUCTURE APRON
Water Quality Certification Order #11422

Statement of Understanding of
Water Quality Certification Conditions

I have read and understand the conditions of Order #11422 Section 401 Water Quality Certification for the U.S. Army Corps of Engineers, Seattle District, Interim Repair and Replacement of Mud Mountain Dam White River Barrier Structure Apron Project. I have also read and understand all permits, plans, documents, and approvals associated with the project referenced in this Order.

_____ _____
Signature Date

_____
Title

_____
Company

Water Quality Monitoring Plan (WQMP)

Interim Repair and Replacement of White River Barrier Structure Apron
Buckley, Washington

Water Quality Certification # 11422

Prepared by:

J. Gardiner, F. Goetz and J. Laufle
U.S. Army Corps of Engineers, Seattle District
May 29 2015

US Army Corps of Engineers, Seattle District
Water Quality Monitoring Plan
Interim Repair and Replacement of White River Barrier Structure Apron
Buckley, Washington

Introduction

The U.S. Army Corps of Engineers, Seattle District (Corps) is proposing to conduct interim repair and replacement of the barrier apron (apron replacement) of the White River Barrier Structure (barrier structure) in the White River, near Buckley, Washington (Attachment 1). The barrier structure apron replacement is Reasonable and Prudent Alternative (RPA) Action Item 2 in the 2014 National Marine Fisheries Service (NMFS) Biological Opinion (BiOp) for Mud Mountain Dam operation and maintenance and White River barrier replacement. The barrier structure was most recently repaired in February 2015 to replace flashboards that had been damaged or were missing due to multiple storms and high-river flow events.

Construction activities to repair the barrier structure apron will commence June 2015 and continue for approximately three months. Water quality will be monitored for turbidity during in-water work, which is expected to occur in three 4-day periods with the first period on June 1, the second in later June (estimated June 21), and last in mid-August. Further details are provided in Sampling Protocol and Methods sections. Short-term pulses of turbidity are expected to occur due to the nature of the repairs. The following methods for water quality monitoring have been approved by the U.S. Fish and Wildlife Service (USFWS) and NMFS (the Services); to ensure the protection of salmonids (Puget Sound Chinook salmon, Puget Sound steelhead, and Coastal/Puget Sound bull trout) listed as threatened under the Endangered Species Act (ESA). The requirements of the Services for the apron replacement are outlined in the BiOps. Requirements for the Washington Department of Ecology (WDOE) are described below. This would correspond to work in the water, which is below the ordinary high water mark (OHWM).

Water quality monitoring will be conducted and is intended to ensure that applicable State and BiOp-mandated water quality standards are met. Water quality will be visually and physically monitored throughout the duration of the project. Visual monitoring for turbidity will occur during all work below the OHWM for the duration of the project. Water quality will be physically monitored for turbidity during the phases of in-water work as described above, which includes all work below the OHWM, but also includes specific activities that are described in Condition B2 of the Water Quality Certification, Order #11422, issued for the project. Physical monitoring will occur for all work below the OHWM as described in Table 1.

Location: See Attachment 1, WRIA 10, Latitude 47.169963 N Longitude 122.004956 W

Purpose: The Water Quality Monitoring Plan (WQMP) will be used to track the performance of Best Management Practices (BMPs) used during in-water work within the project limits of the

Project Name: Repair of White River Barrier Apron Structure

Objectives

- Document the performance of BMPs used within waters of the state. *No work will occur in wetlands for this project.*

- Determine if Water Quality Standards are being met at the point of compliance.

Any changes to monitoring must be approved by Ecology prior to making the changes.

In-water/Over-water Activity Description: The construction sequence is provided in the 3-Phase Diversion and Care of Water Sequence (Attachment 3). The proposed work consists of the following five project elements and as described in Attachment 4.

1. <u>Barrier Apron Repair</u>

Cascade will repair any failed flashboards across width of barrier. Repair work may include installation of new posts, support tie rods and knee braces; replacement of timber and steel flashboards; install the boards in the barrier structure; evacuate equipment from the channel; and install metal panels from land at each end of the barrier structure. If necessary, a steel wedge may be temporarily placed in the river via an overhead crane, immediately in front of the upstream side of a post, to temporarily isolate the work area.

2. <u>Excavate and place exposed bedload to redirect water flow and construct earthen cofferdams and plugs</u>

The contractor will excavate a temporary diversion channel through the upstream gravel bar that has built up behind the barrier dam, to direct flow to the steel gates on the left and right banks, the Corps fish trap and flume headgates (Sheets G05 and G07). Project details are provided in Sheet G06. This work will be conducted by track or back hoe, bulldozer or bobcat. This work will be conducted in the dry due to managed streamflow rates and tracks will remain out of flowing water to the extent practicable, although some river crossings will be required.

Construct two temporary cofferdams, one upstream and one downstream of the barrier structure (Sheets G07, G08, G09). The cofferdams would consist of supersacks filled with White River alluvium. Approximately 400 supersacks measuring 4 feet-by 4 feet-by 4 feet, would be placed

as necessary along the channel side of the cofferdam to prevent material from scouring away at natural flow rates up to 2,000 cfs. All temporary cofferdams will be removed at the end of the project.

3. Barrier apron demolition and repair

Water will be diverted away from the work area during demolition and repairs to apron, to ensure all apron demolition and repair work will be conducted in-the-dry and prevent material from contacting the water.

Demolition will be accomplished both manually and with the use of excavators and cranes. Demolition activities will use the same method for all apron repairs and is described in Specifications, Section 0211 Demolition (provided for download at file sharing site). Equipment will remain on shore and along temporary access roads as much as practicable during demolition.

Steel plates will be installed over the existing horizontal and sloped timbers, with a bed of leveling grout applied over the horizontal timbers as necessary. Some timbers will be removed and the sloped section will be replaced with concrete supported by a fabric filter with an internal drain system. The horizontal portion will be a steel plate supported by leveling grout as necessary.

Phase I: Contractor will perform demolition and install prefabricated steel brackets and stop logs 4-feet in height on downstream end of lower horizontal apron (Bays 1-6; Sheet Sheet G07). Contractor would install prefabricated steel brackets and a steel plate spillway guide wall 4-feet in height along Bay 6-7 contact line. Contractor installs plywood seepage cutoff panels along both sides of crib timbers underneath upper horizontal apron along Bay 6-7 contact line. All Phase I apron repairs be conducted in the dry (Bays 1-6).

Phase II: Install dewatering pumps as needed behind the downstream cofferdam. All Phase II apron repairs will be conducted in the dry. Should water enter behind the cofferdam, water will be treated and discharged back into the river as described on Sheet G03.

Phase III: Cascade will reinstall 3 flashboard sets (Bays 4-6) and left bank steel panels and steel frame (Bays 1-3). Contractor would cut off and remove supporting steel brackets and steel plate spillway guide wall, and grind smooth the cut steel brackets (Sheet G09). All Phase II apron repairs will be conducted in the dry.

All construction debris will be disposed of at an appropriate upland facility.

4. Construction of temporary earthen access roads

Construct a temporary access road across right bank diversion channel, upstream of barrier structure, to provide access during upstream cofferdam construction (Sheets G08 and G09).

Construct a temporary access road from downstream right bank out to the lower horizontal apron timbers to provide access for equipment and personnel onto apron (Sheets G08 and G09).

All temporary access roads will be removed as part of the project.

Water Quality Standards for Surface Waters

The water quality standard for the White River is designated as Core Salmonid Summer Habitat use of below the barrier structure and includes the following parameters.

Turbidity: Shall not exceed 5 NTU over background when the background is 50 NTU or less; or 10 percent increase in turbidity when the background turbidity is more than 50 NTU: as outlined in Washington Administrative Code (WAC) 173-201A-200(1)(e) for Core Salmonid Summer Habitat.

pH: pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units per WAC 173-201A-200(1)(g). Will be monitored using pH indicator paper. Measurements of pH will be obtained within the containment area behind the cofferdam where concrete will be poured. Best Management Practices will be employed to ensure all water leaving the containment area meets State water quality requirements prior to discharge.

Oil and Grease: No visible sheen

Monitoring Plan

Monitoring Contacts

J. Gardiner and F. Goetz will be responsible for providing Ecology with the necessary notifications and results of the water quality monitoring per the frequency specified in the Section 401 Water Quality Certification (401).

A number of Corps employees will be conducting the 401 water quality monitoring. The primary contacts for water quality monitoring will be J. Gardiner and F. Goetz, available at 206-

764-6878 and 206-764-3515, respectively. The primary project support contact is Dan Johnson, Operating Project Manager, available at 206-764-3717.

Additional Contacts: Matt Harrington, Section Chief (206-764-6169) and Evan Lewis, Branch Chief (206-764-6922).

Monitoring Schedule

The following table outlines the monitoring and schedule for all in-water work activities (Table 1).

Sampling Locations

Monitoring locations are provided on the attached maps for activities below the OHWM (Figure 1). Sampling locations have been given unique numbers as marked on the figure.

Table 1. Monitoring schedule for barrier apron replacement.

Activity	Waterbody	Physical and Visual Monitoring Point Location	Frequency	Parameter	WQ Standard
All in-water work below OHWM. Project Phases: Phase 1 estimated June 1-4; Phase 2 – estimated June 21-24; Phase 3 – estimated August 7-14	White River, RM 24.3, Buckley Barrier Apron In-water flow during turbidity general of 350 cfs	300 ft downstream; exceedances for B2 exceptions shown below **Ambient** monitoring will occur at 300-ft upstream of the barrier	**Physical** monitoring every 15 minutes for two hours for all work below the OHWM. **Physical Ambient** Monitoring will occur every 3 hours.	Turbidity and Visible Sheen	Turbidity shall not exceed: •5 NTU over background when the background is 50 NTU or less; or •A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Visual Monitoring Coordination for Phase 1, 2 and 3	Same	Worker will be on the barrier providing **Visual** monitoring at Barrier for all work below OHWM, and all over water work activities	Hourly	Turbidity and Visible Sheen	Visual turbidity above background
Sediment Generating Activities (as identified in WQC Condition B2)	Same	600 ft downstream of turbidity causing activity. Monitoring will occur every 15 minutes for two hours for all work below the		Turbidity and Visual Sheen	Turbidity shall not exceed: •5 NTU over background when the background is 50 NTU or less; or

		OHWM. Should a different in-water work activity commence, monitoring will occur every 15 minutes for two hours of the activity.			•A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
WQC Condition B2 Exceedance at 600 ft	Same	If State criteria is exceeded at 600 ft, monitoring will move immediately to Site D; if State criteria is exceeded at Site D then monitoring will move immediately to Site E. If State criteria is exceeded at Site E the Corps will contact Ecology as outlined in WQC condition B10 and the Reporting section of this document. .		Turbidity and Visible Sheen	If monitoring at these locations, an exceedance has occurred at 600 feet
Work behind Cofferdam: All periods outside of Phases of WQC Condition B2 activities	Same	Visual Monitoring at Barrier for all Work below OHWM, and all over water work activities	At least Hourly	Visual Sheen and pH Contractor or Corps observer will notify USACE COR if plume is observed exiting cofferdam,	Visual turbidity above background

				BMPs will be adjusted.	

Sampling Protocol

Turbidity samples and visual observations will be collected for as long as the construction activity that has triggered monitoring is taking place.

When work is occurring behind the cofferdam, the Corps will conduct visual monitoring. If turbidity is observed escaping the cofferdam, BMPs will be adjusted and physical monitoring would commence.

If turbidity measurements show that turbidity is approaching State criteria threshold limits (Table 1), the monitoring team will notify the contracting officer or their representative (COR) to ensure that all BMPs are in place; BMPs may need adjusting. Physical monitoring will continue during this period. The BMPs are shown in the contractor drawings and in the Contract Specifications as noted in Water Quality Certification Order A3. If BMPs are in place and monitoring indicates turbidity is at or exceeds State criteria, the Corps will notify the COR that work must stop. Work below the OHWM will resume once turbidity is at or below State criteria.

Sampling stations for the monitoring schedule are shown in Figure 1. If turbidity measurements for WQC Condition B2 activities exceed State criteria monitoring at 600 ft, turbidity monitoring (Site C Figure 1) will follow sequentially at sites identified in the WQC and described in Table 1.

If Water Quality Certification turbidity limits are exceeded, the Corps will notify WDOE within 24 hours as noted in WQC Condition B10. and as outlined in the Reporting Section of this document.

Sampling Locations

Monitoring locations are provided on the attached maps for activities below the OHWM. (Attachment B)

Sampling locations are provided on the following maps for activities below the OHWM and/or in wetlands or activities that may affect water quality, such as soil improvement activities. Sampling locations have been given unique names or numbers, and clearly marked on the plan sheets.

Sampling Procedures

A background sample must be taken outside the area of influence and immediately prior to the downstream or radius samples.

Water samples will be collected and analyzed for the appropriate parameters, per the Monitoring Schedule above, following the equipment and sampling guidelines below:

The first compliance sample for turbidity will be taken approximately 1 hr after the in-water activity starts, unless there is a visual plume at the point of compliance prior to 1 hour.

A portable turbidity meter will be used in the field. Turbidity will be monitored using a Hanna turbidimeter. A representative sample should accurately reflect the true condition of the water source from which the sample was taken. The following protocol will be used to ensure a representative sample is analyzed:

- Use a clean container to obtain a grab sample from the source;
- Collect sample with care to avoid disturbance of sediments and collecting surface contaminants;
- Gently but thoroughly mix the sample before pouring it into the small vial used to read the sample in the turbidimeter; and
- Without allowing the sample to settle, take turbidity reading according to turbidimeter manufacturer's instructions.

The turbidimeters will be calibrated daily. The instrument will be recalibrated using primary standards at least once every 3 months, or more when a calibration check indicates there is a problem. The manufacturer's calibration procedures will be followed.

1. Oil and Grease is a continuous visual for a visible sheen on the water's surface.

2. pH will be monitored using (enter meter, test kit or pH indicator paper) Measurements of pH will be obtained using the same grab sample as used for turbidity, if being measured at the same time.(Delete if not monitoring pH)

If no exceedances are detected, the results of the monitoring will be provided to WDOE on a monthly basis, per WQC Condition B9.

Monitoring Methods

Turbidity measurements will be taken above and below the work location before construction begins and during construction activities (Monitoring Form is Attachment 2). Manual measurements for background turbidity will be collected upstream of the barrier repair site (Site A; Figure 1). Alternative sampling methods may be deployed for background levels, which

could also include data from the USGS gage located on the left bank immediately upstream of the barrier, or a Corps logger (see below).

Field monitoring will consist of one observer at or above the barrier structure who will conduct background monitoring and a team of two people who will monitor the downstream sites. The construction observer will be stationed at or above the barrier structure and will radio information on construction activity, especially the start and stop of in-water work, to the turbidity monitoring team. This information will be noted on the field data forms.

Turbidimeters will be calibrated each day prior to sampling and a baseline turbidity sample will be collected at Sites B and C before work begins. Turbidimeters for manual sampling will be the same make as those used in field work for repairs in July 2014 and February 2015. Downstream monitoring will occur on the same bank where work is occurring if possible; there is no access to the shoreline at Site D on the right bank.

A temporary instream data logger may be installed at the barrier structure for periodic monitoring. Prior to construction start, deployment locations will be evaluated for site security and appropriate in-water deployment conditions, avoiding erosive and depositional areas that can scour or bury the logger or areas that may be dewatered by changing river flows. Locations that are along river banks without existing man-made structures on the shoreline or in-water deployment cables will likely have problems with the above conditions. Locations that may meet necessary criteria include the USGS gage at 1 mile downriver and the Cascade Water Alliance intake above the barrier.

A permanent turbidity monitoring station is at MMD approximately 3 miles upriver and will provide an additional upstream point for tracking ambient turbidity conditions.

During non-sediment generating activities the Corps will provide periodic visual observations of turbidity at 300 ft as well as documenting any visible sheen throughout the project area during all construction activities. Should work enter the cofferdam during cementitious activities, the contractor will monitor pH using a paper test kit. No water will be discharged from the area until pH is below State criteria and as outlined in the construction specifications document (Attachment 5). The Construction Manager will be requested to contact the Corps if a visible plume is observed by the construction crew at the site. The Corps observer will record their observations at the project, as part of the routine reporting of work activities, and this information will be included in the monitoring reports submitted to Ecology.

Reporting

Reporting will follow WQC Conditions B9 and B10 as previously described.

All water quality monitoring results, visual and physical, will be recorded on the monitoring form (Attachment 2).

All sample results will be submitted to the Ecology Federal Permit Manager/Coordinator per the frequency specified in this plan. If sample results or visual monitoring indicate an exceedance of water quality standards, notification shall be made within 24 hours to Ecology's Federal Permit Manager/Coordinator.

Attachments

Attachment 1 – Vicinity Map for White River Barrier Structure
Attachment 2 – Sample Monitor Results Reporting Form
Attachment 3 – Diversion & Care of Water Sequence
Attachment 4 – Construction Drawing Set
Attachment 5 – Specifications

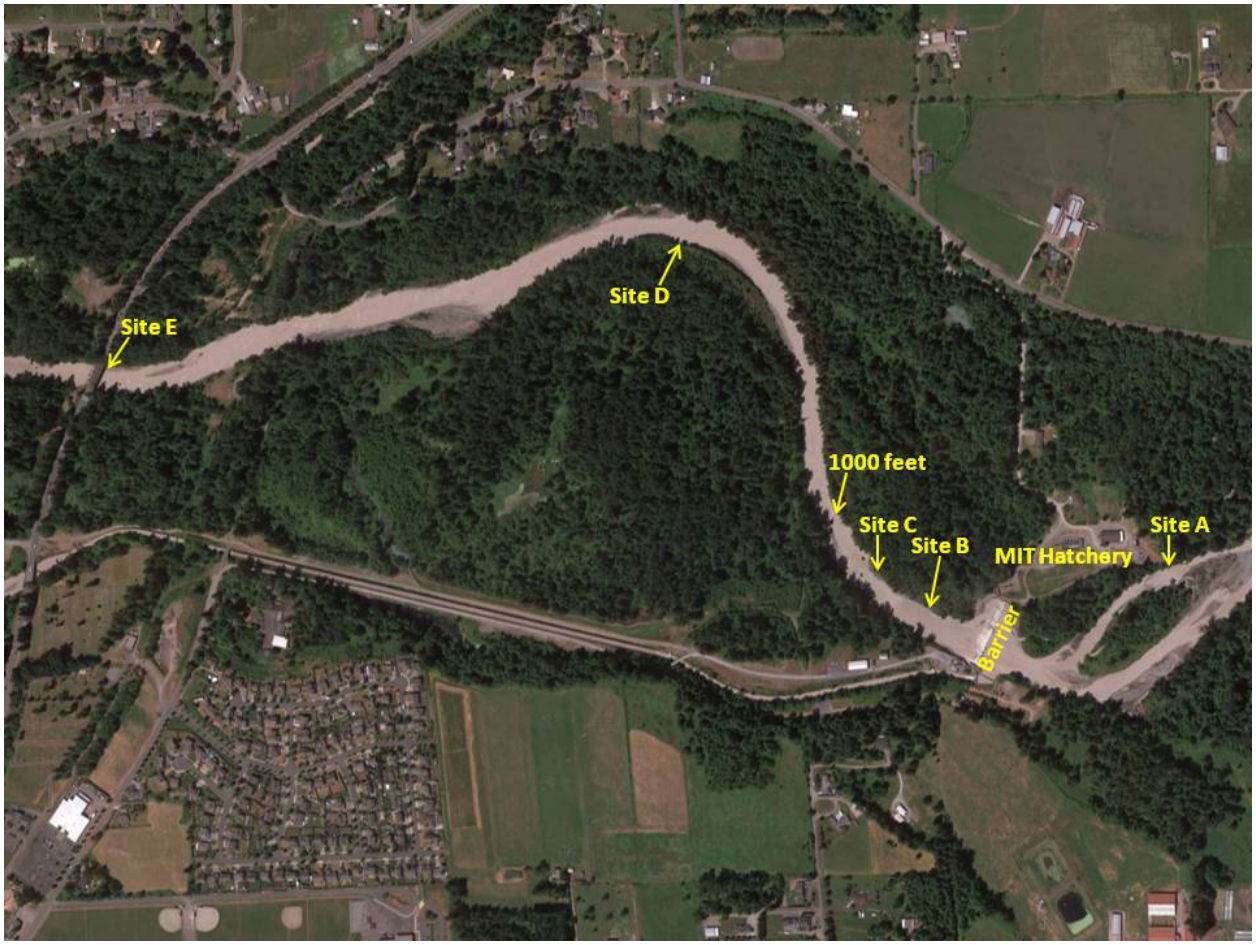
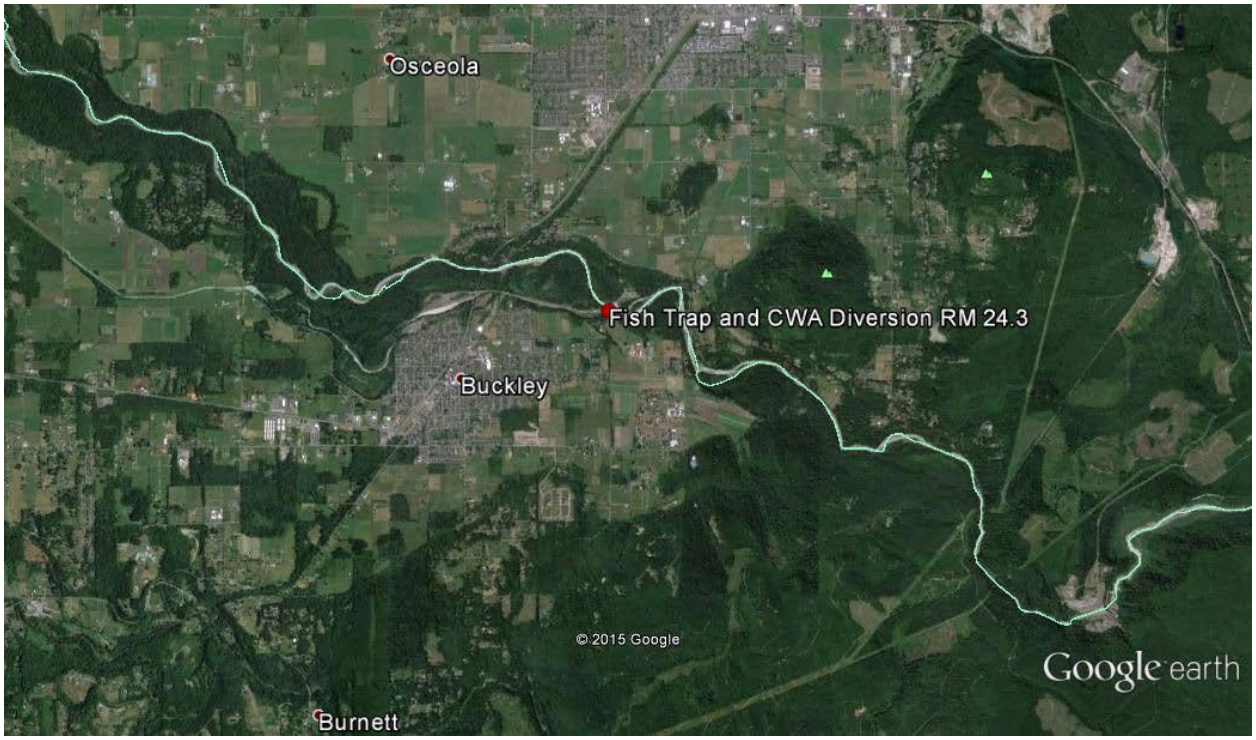


Figure 1. All monitoring sites above and below the barrier structure.

Attachment 1. Vicinity Map for the White River Barrier Structure at Buckley.



Attachment 2. Monitoring form for visual and physical measurement of turbidity.

Turbidity monitoring data form

TEAM MEMBERS:

Example ONLY	B: 300' d/s	7/21/2014	0930	2	65	-	49	=	16	excavator crossing river	water somewhat turbid with glacial flour	n/a
	Site (Identifying letter, intended distance from barrier)	**Date**	**Time (24-hr)**	**Distance from shore (ft)**	**NTUs**	-	**Most recent Site A value (NTUs)**	=	**NTUs this site minus most recent Site A value (NTUs)**	**Sediment-generating (repair) activity at time of measurement (reported by observer)**	**Remarks/observations**	**If criteria exceeded, corrective actions taken at construction site**
This row MUST have data->						-		=				
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APPENDIX E. Hourly exceedance summaries during barrier apron repairs. Shading and the number 1 indicate an exceedance occurred in the hour

Table 1. Daily summary of Phase I exceedances.

Date	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
6/2/2015		1		1	1	1	1	1			
6/3/2015				1	1						
6/4/2015					1						
6/5/2015		1	1	1	1	1					
6/8/2015							1	1			
6/9/2015											1
6/10/2015	1	1		1							
6/11/2015			1								

Table 2. Daily summaries of Phase II exceedances

Date	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
6/19/2015						1					
6/20/2015											
6/22/2015											
6/23/2015				1		1		1	1		
6/24/2015											
6/25/2015	1			1	1						
7/1/2015											

Table 3. Daily summaries of Phase III exceedances.

Date	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
8/3/2015						1	1				
8/4/2015	1										
8/5/2015											

APPENDIX F. Data collected during 2015 barrier apron repairs

APPENDIX F. Data collected during 2015 barrier apron repairs

Date	Site	Distance (ft)	Direction from barrier	Time (24-hr)	Time (rounded to Hr)	Distance from shore (ft)	NTUs	Most recent Site A value (NTUs)	NTUs this site minus most recent Site A value (NTUs)	Exceedance?	Remarks/Observations. Note any turbidity generating activities at time of observation. Include any corrective actions taken, if any.
2-Jun-15	A	300	Upstream	0843	800	3	36.6	36.6	0.0	NO	No sediment generating activity, Background. Placing supersacks in dry to prep for moving river to RB.
2-Jun-15	B	300	Downstream	0855	800	6	34.3	36.6	-2.3	NO	Work in dry. Right bank. On gravel bar to reach channel.
2-Jun-15	C	600	Downstream	0900	900	6	35.3	36.6	-1.3	NO	Same. Fairly uniformly turbid. No plume yet visible.
2-Jun-15	B	300	Downstream	0930	900	6	34.3	36.6	-2.3	NO	Work to deepen channel on RB along barrier to just beginning.
2-Jun-15	C	600	Downstream	0937	900	4	35.2	36.6	-1.4	NO	Same. (Work to deepen channel on RB along barrier). No plume visible.
2-Jun-15	C	600	Downstream	0938	900	10	38.0	36.6	1.4	NO	Same. (Work to deepen channel on RB along barrier).
2-Jun-15	B	300	Downstream	0945	900	6	66.0	36.6	29.4	YES	Water appears more turbid, no distinct plume but definite turb. ↑ Work to deepen channel on RB along barrier.
2-Jun-15	C	600	Downstream	0950	900	4	52.8	36.6	16.2	YES	Same as 0945. Work (excavator crossing channel to gravel bar to work on middle below barrier) just upstream.
2-Jun-15	C	600	Downstream	0951	900	10	53.0	36.6	16.4	YES	Work to deepen channel on RB along barrier. Went to take sample at Site D, was notified they were going to move flow to RB in newly dug channel, decided to return to B to record turb during event.
2-Jun-15	B	300	Downstream	1032	1000	6	36.3	36.6	-0.3	NO	Turb returned to background by the time we returned. Channel is complete, took sample before moving flow over to RB. Now moving to upstream side of barrier on river right. Will be removing sand & gravel placed to prevent flow towards the right bank in bypass channel.
2-Jun-15	C	600	Downstream	1041	1000	4	34.8	36.6	-1.8	NO	Same work as above. Preparing to release flow into new channel. Still uniformly turbid. Seems a little deeper.
2-Jun-15	C	600	Downstream	1042	1000	10	35.9	36.6	-0.7	NO	Same work as above.
2-Jun-15	B	300	Downstream	1055	1000	6	36.9	36.6	0.3	NO	Moving supersacks and ecology blocks in preparation for release of flow into new RB channel.
2-Jun-15	C	600	Downstream	1113	1100	4	36.3	36.6	-0.3	NO	No color change, channel still not open fully yet.
2-Jun-15	C	600	Downstream	1114	1100	10	34.0	36.6	-2.6	NO	Same as above.
2-Jun-15	B	300	Downstream	1120	1100	6	35.5	36.6	-1.1	NO	Took just before channel opened at 1121.
2-Jun-15	B	300	Downstream	1122	1100	2	920.0	36.6	883.4	YES	Channel opening. Water rose, had to move away from edge for safety (of gravel bar). Dark plume at 1121 hrs, channel not completely open yet. First reading over range, diluted 50% = 460 NTU = 920 NTU value. Debris in water. Water action causing turbidity--no work to stop/modify.
2-Jun-15	C	600	Downstream	1135	1100	4	449.0	36.6	412.4	YES	Channel opening. Very turbid water. Debris floating. Fairly uniformly turbid.
2-Jun-15	C	600	Downstream	1136	1100	10	377.0	36.6	340.4	YES	Still opening channel and moving flow to RB. Placing ecology blocks for channel direction.
2-Jun-15	A	300	Upstream	1150	1100	2	34.7	34.7	0.0	NO	Background. Same work.
2-Jun-15	D	1/2 mi	Downstream	1217	1200	5	65.8	34.7	31.1	YES	Rained heavily just before taking measurements at D site 1/2 mile. At barrier, ecology blocks being placed in newly opened channel, excavators are working in the right bypass channel to deepen.
2-Jun-15	D	1/2 mi	Downstream	1218	1200	10	66.4	34.7	31.7	YES	Same.

2-Jun-15	E	1 mi	Downstream	1244	1200	2	57.9	34.7	23.2	YES	Taken close to shore for safety concerns. At barrier, excavators on right bank excavating to allow more water flow and build point of gravel bar upstream of barrier.
2-Jun-15	E	1 mi	Downstream	1245	1200	2	49.0	34.7	14.3	YES	Water is uniformly turbid, no visible plume. Lighter color than at barrier. No rain. Same work as above.
2-Jun-15	B	300	Downstream	1305	1300	6	96.4	34.7	61.7	YES	Moved to left bank (all LB now unless otherwise noted) uniform color.
2-Jun-15	B	300	Downstream	1306	1300	12	94.8	34.7	60.1	YES	Channel fully open and most flow on RB but excavator on LB moving gravel. Stopped raining.
2-Jun-15	C	600	Downstream	1315	1300	12	81.0	34.7	46.3	YES	Only one sample for safety. Close to barrier @ RB is slightly > turbid color. Uniform color @ 600' across river. Excavators working on left and right banks.
2-Jun-15	B	300	Downstream	1350	1300	12	46.8	34.7	12.1	YES	Still trying to push flow more on RB and stabilize channel w/ less flow to LB, involves some digging of RB to widen channel.
2-Jun-15	C	600	Downstream	1400	1400	4	42.9	34.7	8.2	YES	RB sample same as 1315, also moving some supersacks to contain channel flow.
2-Jun-15	C	600	Downstream	1401	1400	10	42.3	34.7	7.6	YES	RB same as above, no visible plume.
2-Jun-15	NMFS	1000	Downstream	1414	1400	4	181.0	34.7	146.3	NA	Uniformly turbid, still widening channel on RB and stabilizing. Placed supersacks in LB channel to divert to RB.
2-Jun-15	NMFS	1000	Downstream	1415	1400	10	172.0	34.7	137.3	NA	Placing supersacks in left channel. Pulling back right bank.
2-Jun-15	D	1/2 mi	Downstream	1445	1400	4	72.0	34.7	37.3	YES	No rain, uniform turb., no debris noted. Most of the river flow has been cut off from the left bank.
2-Jun-15	D	1/2 mi	Downstream	1446	1400	10	77.6	34.7	42.9	YES	Brownish color ("chocolate milk").
2-Jun-15	E	1 mi	Downstream	1514	1500	4	62.9	34.7	28.2	YES	Light brown color, no debris, no rain. Supersack positioning, US point is being built, most flow diverted to RB.
2-Jun-15	E	1 mi	Downstream	1515	1500	10	58.9	34.7	24.2	YES	Sample point was also near rapids.
2-Jun-15	B	300	Downstream	1534	1500	4	36.7	34.7	2.0	NO	End of day, work is done for the day.
2-Jun-15	B	300	Downstream	1535	1500	10	37.7	34.7	3.0	NO	Work is done for day. No visible plume. Uniform color, lighter than previously.
2-Jun-15	Boise Creek		Downstream	1558	1500	6	33.9	34.7	-0.8	NO	At Boise Creek, no plumes visible.
3-Jun-15	A	300	Upstream	0800	800	2	30.3	30.3	0.0	NO	Background. No rain, overcast, cool.
3-Jun-15	B	300	Downstream	0825	800	10	29.7	30.3	-0.6	NO	Background. Before in-water work starts.
3-Jun-15	C	600	Downstream	0830	800	5	30.1	30.3	-0.2	NO	Background. Before in-water work starts.
3-Jun-15	C	600	Downstream	0831	800	10	28.9	30.3	-1.4	NO	Background. Before in-water work starts.
3-Jun-15	B	300	Downstream	1120	1100	10	28.1	30.3	-2.2	NO	Work on gravel bar downstream of barrier has started to dewater LB.
3-Jun-15	C	600	Downstream	1125	1100	10	28.8	30.3	-1.5	NO	Turbidity mainly in middle of channel. Pushing rock/gravel in river below barrier to arrange gravel bar.
3-Jun-15	Rock Chute	325	Downstream	1130	1100	3	29.6	30.3	-0.7	NO	Lots of water from rock chute outlet. Pushing rock/gravel in river below barrier.
3-Jun-15	B	300	Downstream	1140	1100	15	29.7	30.3	-0.6	NO	Pushing rock/gravel in river below barrier to arrange gravel bar.
3-Jun-15	C	600	Downstream	1144	1100	10	48.6	30.3	18.3	YES	Water is milky white/light brown. Pushing rock/gravel in river below barrier to arrange gravel bar.
3-Jun-15	B	300	Downstream	1146	1100	15	32.0	30.3	1.7	NO	Pushing rock/gravel in river below barrier to arrange gravel bar.
3-Jun-15	C	600	Downstream	1155	1100	10	40.1	30.3	9.8	YES	Fairly uniform color by site C. Still rearranging middle gravel bar.
3-Jun-15	Rock Chute	325	Downstream	1200	1200	3	37.1	30.3	6.8	YES	Taken to see if rock chute has turbid water and could be contributing to turbidity at Site C (probably not).
3-Jun-15	B	300	Downstream	1205	1200	30	29.2	30.3	-1.1	NO	Still rearranging middle gravel bar. Gravel bar on LB became more exposed, channel was sample area ~ 30' from shore.

3-Jun-15	C	600	Downstream	1215	1200	10	54.9	30.3	24.6	YES	Water turbidity from middle gravel bar work (some) is going into RB channel, so might be missing site B somewhat sample taken from plume. Work stopped.
3-Jun-15	B	300	Downstream	1220	1200	30	29.1	30.3	-1.2	NO	Work paused after sample was taken for 15 min then site C returned to background.
3-Jun-15	C	600	Downstream	1230	1200	10	30.1	30.3	-0.2	NO	Turb back to background after 10-15 min work stoppage.
3-Jun-15	D	1/2 mi	Downstream	1300	1300	5	31.7	30.3	1.4	NO	Following brief exceedance at site C, no plume at site D.
3-Jun-15	D	1/2 mi	Downstream	1301	1300	10	31.8	30.3	1.5	NO	DS gravel bar being extended towards barrier. Demolition of LB barrier wood.
3-Jun-15	A	300	Upstream	1330	1300	2	29.1	29.1	0.0	NO	Background. Excavator was just on top of gravel bar, rearranging top rocks.
3-Jun-15	B	300	Downstream	1345	1300	35	28.2	29.1	-0.9	NO	Excavator on middle gravel bar. Right bank. No visible plume at site B/fairly uniform.
3-Jun-15	C	600	Downstream	1351	1300	10	29.3	29.1	0.2	NO	Same and some work on right channel mostly. RB
3-Jun-15	C	600	Downstream	1352	1300	5	28.7	29.1	-0.4	NO	Same. RB.
3-Jun-15	B	300	Downstream	1420	1400	35	30.2	29.1	1.1	NO	Work on middle gravel bar, no plume at site B. LB.
3-Jun-15	C	600	Downstream	1423	1400	10	29.8	29.1	0.7	NO	Cofferdam near Corps fish trap being built, some muddy water being released. LB.
3-Jun-15	B	300	Downstream	1438	1400	35	29.3	29.1	0.2	NO	Sample taken from RB channel from middle gravel bar to see if turbidity was on the channel w/ high flow ~ 35' from RB. Supersacks being placed btwn DS gravel bar and apron to build cofferdam.
3-Jun-15	B	300	Downstream	1440	1400	25	32.9	29.1	3.8	NO	Sample taken from lower flow channel next to LB. No visible plume on either side, lots of exposed gravel/cobbles. Supersacks being placed btwn DS gravel bar and apron to build cofferdam.
3-Jun-15	C	600	Downstream	1448	1400	10	33.5	29.1	4.4	NO	No in-water work currently. River currently milky color typically seen, no brown. LB.
3-Jun-15	A	300	Upstream	1612	1600	4	28.2	28.2	0.0	NO	Final background.
3-Jun-15	Boise Creek		Downstream	1625	1600	10	23.0	28.2	-5.2	NO	Work done for day.
4-Jun-15	A	300	Upstream	0718	700	2	24.5	24.5	0.0	NO	Background. Cool, overcast, no rain, hazy. No in-water work yet.
4-Jun-15	A	300	Upstream	0720	700	2	24.2	24.5	-0.3	NO	Background. Same.
4-Jun-15	B	300	Downstream	0755	700	50	25.3	24.5	0.8	NO	LB. No work yet, ambient turbidity, some barrier being removed in the dry.
4-Jun-15	C	600	Downstream	0800	800	5	25.9	24.5	1.4	NO	Demolishing LB section of barrier in dry, no visible plume. No in-water work.
4-Jun-15	C	600	Downstream	0802	800	10	23.8	24.5	-0.7	NO	Some trickle of water out of LB, most on RB. No in-water work.
4-Jun-15	B	300	Downstream	0819	800	50	24.3	24.5	-0.2	NO	Demo, tracks out of water, only water in channel is rivulets. Only 1 sample collected due to narrow shallow channel.
4-Jun-15	C	600	Downstream	0821	800	5	23.8	24.5	-0.7	NO	~ 1' - 1.5' depth. No plume uniform ambient turbidity (White River is WHITE!!!)
4-Jun-15	C	600	Downstream	0824	800	10	23.8	24.5	-0.7	NO	Note: used view finder to figure out how far B sampling station is from shore confirmed 50'. Note all work and sampling on LB for this page.
4-Jun-15	B	300	Downstream	0848	800	50	24.6	24.5	0.1	NO	Demolition work, no in-water.
4-Jun-15	B	300	Downstream	0931	900	50	25.4	24.5	0.9	NO	Demolition work, no in-water.
4-Jun-15	C	600	Downstream	0938	900	5	23.9	24.5	-0.6	NO	Demolition work, no in-water.
4-Jun-15	C	600	Downstream	0940	900	10	24.3	24.5	-0.2	NO	Demolition work, no in-water.
4-Jun-15	B	300	Downstream	1029	1000	50	24.3	24.5	-0.2	NO	Demolition work, no in-water.
4-Jun-15	C	600	Downstream	1039	1000	5	27.2	24.5	2.7	NO	Demolition work, no in-water.
4-Jun-15	B	300	Downstream	1040	1000	50	24.8	24.5	0.3	NO	Demolition work, no in-water.
4-Jun-15	C	600	Downstream	1041	1000	10	24.0	24.5	-0.5	NO	Demolition work, no in-water.
4-Jun-15	C	600	Downstream	1148	1100	5	24.9	24.5	0.4	NO	Demolition work, no in-water.
4-Jun-15	C	600	Downstream	1151	1100	10	24.1	24.5	-0.4	NO	Demolition work, no in-water.

4-Jun-15	Rock Chute	325	Downstream	1157	1100	3	24.9	24.5	0.4	NO	Demolition work, no in-water.
4-Jun-15	C	527	Downstream	1223	1200	5	36.4	24.5	11.9	YES	Excavator excavating small section of channel L bank by trap. Visible plume along LB. Note work occurring on gravel bar no tracks in water excavating selectively. C-GB = sampling team moved DS to allow appropriate distance from work.
4-Jun-15	C	527	Downstream	1225	1200	10	29.6	24.5	5.1	YES	Washing apron deck. Visible plume along LB. W/in channel in front of trap, no further than West edge of gravel bar. 1215 this work began.
4-Jun-15	C	527	Downstream	1238	1200	5	75.3	24.5	50.8	YES	Washing apron deck. Visible plume along LB. W/in channel in front of trap, no further than West edge of gravel bar.
4-Jun-15	C	527	Downstream	1239	1200	10	54.4	24.5	29.9	YES	Washing apron deck. Visible plume along LB. W/in channel in front of trap, no further than West edge of gravel bar.
4-Jun-15	C	527	Downstream	1253	1200	5	33.9	24.5	9.4	YES	Excavator entering RB channel to get on bank and work on dry land.
4-Jun-15	C	527	Downstream	1255	1200	10	27.5	24.5	3.0	NO	Excavator pulled some sand/gravel on far RB.
4-Jun-15	NMFS	1000	Downstream	1325	1300	5	25.7	24.2	1.5	NA	NMFS station no in-water work.
4-Jun-15	A	300	Upstream	1326	1300	2	24.2	24.2	0.0	NO	In-water work on gravel bar concluded, work behind cofferdam. Hosing off.
4-Jun-15	A	300	Upstream	1328	1300	2	24.3	24.2	0.1	NO	Hosing apron. Excavator digging channel deeper.
4-Jun-15	B	300	Downstream	1417	1400	50	28.2	24.2	4.0	NO	Hosing apron.
4-Jun-15	C	600	Downstream	1422	1400	5	27.9	24.2	3.7	NO	Crane moving supersacks to US side of left diversion cofferdam.
4-Jun-15	C	600	Downstream	1424	1400	10	25.7	24.2	1.5	NO	Confirmation of visual monitoring.
5-Jun-15	A	300	Upstream	0721	700	3	24.1	24.1	0.0	NO	Background RB. Sunny, clear, warm.
5-Jun-15	B	300	Downstream	0816	800	50	21.5	24.1	-2.6	NO	Ambient LB. Demo started work behind cofferdam.
5-Jun-15	C	527	Downstream	0822	800	5	24.2	24.1	0.1	NO	Ambient LB. Demo started work behind cofferdam.
5-Jun-15	C	527	Downstream	0824	800	10	21.8	24.1	-2.3	NO	Ambient LB. Demo started work behind cofferdam.
5-Jun-15	Rock Chute	325	Downstream	0903	900	3	25.6	24.1	1.5	NO	Work later in day may send water into rock chute, this sample is for ambient rock chute conditions.
5-Jun-15	C	527	Downstream	0907	900	5	37.0	24.1	12.9	YES	In-water work-contractor peeling back N bank of diversion channel. Contractor told to stop in-water work-contractor stopped.
5-Jun-15	C	527	Downstream	0909	900	10	72.3	24.1	48.2	YES	Excavator told to stop. Will be placing ecology blocks on toe.
5-Jun-15	D	1/2 mi	Downstream	0942	900	6	38.0	24.1	13.9	YES	Fish trap gate reopened.
5-Jun-15	D	1/2 mi	Downstream	0944	900	12	34.9	24.1	10.8	YES	Brown cast to white milky color.
5-Jun-15	E	1 mi	Downstream	1014	1000	6	21.4	24.1	-2.7	NO	Some sediment in flume, in-water work has stopped.
5-Jun-15	E	1 mi	Downstream	1016	1000	15	20.8	24.1	-3.3	NO	Same.
5-Jun-15	A	300	Upstream	1034	1000	3	25.8	25.8	0.0	NO	Excavator on upstream gravel bar. Water to fish trap off again. Plume visible.
5-Jun-15	C	527	Downstream	1040	1000	5	85.5	25.8	59.7	YES	From middle of plume. Excavator on US gravel bar. Fish trap water off.
5-Jun-15	C	527	Downstream	1042	1000	10	50.0	25.8	24.2	YES	Edge of plume (outer edge toward thalwage). Some sediment out of rock chute.
5-Jun-15	Rock Chute	325	Downstream	1059	1000	3	71.0	25.8	45.2	YES	Contractor said they just shut down the rock chute.
5-Jun-15	B	300	Downstream	1148	1100	50	34.7	25.8	8.9	YES	Cascade allowing head pressure to build up and water is flowing through job site.
5-Jun-15	B	300	Downstream	1150	1100	50	40.5	25.8	14.7	YES	Fish trap open again.
5-Jun-15	C	527	Downstream	1158	1100	5	28.5	25.8	2.7	NO	Fish trap open again.
5-Jun-15	C	527	Downstream	1200	1200	10	27.5	25.8	1.7	NO	Lunch break.
5-Jun-15	B	300	Downstream	1243	1200	50	38.9	25.8	13.1	YES	Excavator working upstream edges.
5-Jun-15	C	527	Downstream	1315	1300	5	37.9	25.8	12.1	YES	Excavator finished enlarging forebay pool. No more inwater work today.
5-Jun-15	C	527	Downstream	1317	1300	10	32.2	25.8	6.4	YES	No more inwater work today.
5-Jun-15	NMFS	1000	Downstream	1403	1400	10	26.5	25.8	0.7	NA	For NMFS.
8-Jun-15	A	300	Upstream	1013	1000	3	31.3	31.3	0.0	NO	Background. White River is white. LB.

8-Jun-15	B	300	Downstream	1053	1000	50	26.8	31.3	-4.5	NO	Ambient reading. White River is white. LB
8-Jun-15	C	527	Downstream	1059	1000	5	22.2	31.3	-9.1	NO	LB. Apron work ongoing, no in-water.
8-Jun-15	C	527	Downstream	1101	1100	10	20.8	31.3	-10.5	NO	Apron stop wall completed.
8-Jun-15	B	300	Downstream	1157	1100	50	23.5	31.3	-7.8	NO	RB. Ambient. No work has started.
8-Jun-15	C	600	Downstream	1203	1200	6	23.1	31.3	-8.2	NO	RB. Ambient. No work has started.
8-Jun-15	C	600	Downstream	1205	1200	12	23.5	31.3	-7.8	NO	RB. Ambient. No work has started.
8-Jun-15	NMFS	1000	Downstream	1212	1200	12	22.3	31.3	-9.0	NA	RB. Ambient. No work has started.
8-Jun-15	B	300	Downstream	1256	1200	12	24.3	31.3	-7.0	NO	Hourly sampling work above OHWM; but no in-water work (placing supersacks from staging area to bank stagin area (above OHWM)
8-Jun-15	A	300	Upstream	1335	1300	3	24.4	24.4	0.0	NO	Background.
8-Jun-15	B	300	Downstream	1409	1400	50	24.7	24.4	0.3	NO	Excavator removes sand/cobble from in front of cofferdam near fish trap.
8-Jun-15	B	300	Downstream	1415	1400	50	41.2	24.4	16.8	YES	In-water work commenced, visible plume.
8-Jun-15	Rock Chute	325	Downstream	1419	1400	3	24.2	24.4	-0.2	NO	Checked rock chute for turbidity.
8-Jun-15	C	527	Downstream	1426	1400	5	53.7	24.4	29.3	YES	Excavator still removing gravel from LB bulkhead and placing it on US gravel bar.
8-Jun-15	C	527	Downstream	1428	1400	10	42.1	24.4	17.7	YES	Same.
8-Jun-15	D	1/2 mi	Downstream	1458	1400	8	32	24.4	7.6	YES	No visible plume, work had stopped when we got back to site B.
8-Jun-15	D	1/2 mi	Downstream	1459	1400	15	24.1	24.4	-0.3	NO	No visible plume, work had stopped when we got back to site B.
8-Jun-15	B	300	Downstream	1552	1500	12	49.1	24.4	24.7	YES	No in-water work but plume visible on LB, more water in flume and rock chute. Turbidity likely from work before. Went to take sample at site C, rock chute too fast flow to cross safely. Will try later if necessary. 1609-plume is decreasing, work still in dry and behind cofferdam.
9-Jun-15	A	300	Upstream	0700	700	5	23.9	23.9	0.0	NO	Background before in-water work begins.
9-Jun-15	B	300	Downstream	0727	700	10	20.3	23.9	-3.6	NO	Ambient before in-water work begins. LB.
9-Jun-15	C	600	Downstream	0738	700	12	19.3	23.9	-4.6	NO	No in-water work but still working on concrete portion of apron-high flow through rock chute. LB.
9-Jun-15	B	300	Downstream	0828	800	10	24.2	23.9	0.3	NO	No inwater work at the moment.
9-Jun-15	C	600	Downstream	0835	800	10	23.9	23.9	0.0	NO	No inwater work at the moment.
9-Jun-15	B	300	Downstream	0920	900	12	21.9	23.9	-2.0	NO	No inwater work yet. Taken from point near 300' (point of land). RB. Ambient.
9-Jun-15	C	600	Downstream	0930	900	12	24.7	23.9	0.8	NO	Same as 0920. Milky blue color. RB. Material being placed along supersacks.
9-Jun-15	NMFS	1000	Downstream	0940	900	12	26	23.9	2.1	NA	For NMFS. 2 channels left and right. Milky color, sample the right bank.
9-Jun-15	A	300	Upstream	1105	1100	5	28.9	28.9	0.0	NO	Background. No in-water work, no color change.
9-Jun-15	B	300	Downstream	1301	1300	10	30.6	28.9	1.7	NO	RB. No inwater work, no color change.
9-Jun-15	C	600	Downstream	1307	1300	10	20.4	28.9	-8.5	NO	RB Ambient.
9-Jun-15	B	300	Downstream	1437	1400	8	22.8	28.9	-6.1	NO	RB No inwater work, no plumes.
9-Jun-15	C	600	Downstream	1504	1500	10	25.7	28.9	-3.2	NO	RB No inwater work, no plumes.
9-Jun-15	A	300	Upstream	1517	1500	10	24.7	24.7	0.0	NO	US excavator near fish trap/headgate removing cobble/sand to regulate flow.
9-Jun-15	B	300	Downstream	1615	1600	10	27.6	24.7	2.9	NO	LB. Some inwater work on upper gravel bar but work stopped ~ 30 min prior to sample no plume.
9-Jun-15	C	600	Downstream	1625	1600	10	22.3	24.7	-2.4	NO	LB. No plume, moved track ho around but stopped work for now.
9-Jun-15	B	300	Downstream	1715	1700	10	24.3	24.7	-0.4	NO	Left bank. No inwater work.
9-Jun-15	C	600	Downstream	1719	1700	12	22	24.7	-2.7	NO	Left bank. No inwater work.
9-Jun-15	B	300	Downstream	1810	1800	10	28.9	24.7	4.2	NO	Left bank. No inwater work.
9-Jun-15	C	600	Downstream	1814	1800	10	25.1	24.7	0.4	NO	Left bank. No inwater work.
9-Jun-15	B	300	Downstream	1835	1800	10	28.9	24.7	4.2	NO	Excavator peeling back some bank above flume. LB. No visible plume, most water entering flume at excavator location.

9-Jun-15	B	300	Downstream	1850	1800	10	35.8	24.7	11.1	YES	LB. Same as above. No plume. Not much water from rock chute.
9-Jun-15	C	600	Downstream	1855	1800	10	27.8	24.7	3.1	NO	LB. No plume or discoloration/debris. Excavator left water soon after. Water higher (+2 gate changes). River stage still rising (+1 more gate change to make (~1950 hrs) will show up.
10-Jun-15	A	300	Upstream	0645	600	3	21.7	21.7	0.0	NO	Background. ~~No work yet in water.~~ Some work. Gate change ~0700 should reach us around 0830.
10-Jun-15	B	300	Downstream	0707	700	5	20.6	21.7	-1.1	NO	Ambient. Excavator working DS and river L on US gravel bar, bucket wet, some in water. LB.
10-Jun-15	C	600	Downstream	0711	700	15	20.8	21.7	-0.9	NO	Ambient. Work prior to us arriving on US gravel bar near flume. Pulled back point of gravel bar, most turb went down LB flume.
10-Jun-15	B	300	Downstream	0725	700	5	24.8	21.7	3.1	NO	Excavator still adjusting gravel bar US, some in dry and some in water with many pauses.
10-Jun-15	B	300	Downstream	0745	700	5	24.7	21.7	3.0	NO	Excavator has been paused for ~10 min, expecting gate change results to arrive soon.
10-Jun-15	B	300	Downstream	0810	800	5	24.9	21.7	3.2	NO	Excavator moving material US to shore up RB toe - mostly dry, maybe some in-water, unclear as to how long this will happen.
10-Jun-15	C	600	Downstream	0815	800	15	27.6	21.7	5.9	YES	Excavator stopped shoring up toe, now manipulating US "finger" of gravel bar near flume on LB, sediment going into flume (if any).
10-Jun-15	B	300	Downstream	0825	800	5	28.1	21.7	6.4	YES	Excavator on finger US, no longer on RB gravel bar.
10-Jun-15	C	600	Downstream	0830	800	10	26.7	21.7	5.0	NO	Moving ecology blocks, shoring up supersacks and gravel bar edges.
10-Jun-15	C	600	Downstream	0831	800	15	26	21.7	4.3	NO	No plume or color change, gate change has risen the river. Excavator modifying US "finger."
10-Jun-15	B	300	Downstream	0840	800	5	28.9	21.7	7.2	YES	No plume, no work occurring w/ excavator, flows are ↑. Excavator paused.
10-Jun-15	C	600	Downstream	0845	800	10	28.5	21.7	6.8	YES	Beginning to angle "finger" to allow more water to go in flume. No plume or color change.
10-Jun-15	C	600	Downstream	0846	800	15	26.1	21.7	4.4	NO	Repeated 10' sample (27.2 NTU) since the 15' wasn't > 5 NTU over background. Work has paused.
10-Jun-15	D	1/2 mi	Downstream	0925	900	10	26.5	21.7	4.8	NO	No plume or discoloration, river is higher. Excavator moving cobble off US point.
10-Jun-15	D	1/2 mi	Downstream	0926	900	15	27	21.7	5.3	YES	Same.
10-Jun-15	E	1 mi	Downstream	0953	900	15	24.2	21.7	2.5	NO	No plume or debris, river continues to rise. Excavator paused.
10-Jun-15	E	1 mi	Downstream	0954	900	10	24.4	21.7	2.7	NO	Same.
10-Jun-15	A	300	Upstream	1009	1000	3	26.8	26.8	0.0	NO	Background sample. Repeat @ 1010 = 26.5 NTU.
10-Jun-15	B	300	Downstream	1032	1000	10	29.8	26.8	3.0	NO	No excavator work, only w/in cofferdam on concrete/grout.
10-Jun-15	C	600	Downstream	1040	1000	10	29.5	26.8	2.7	NO	Same as ↑. Also, no plume or debris and river is rising.
10-Jun-15	C	600	Downstream	1041	1000	15	31.3	26.8	4.5	NO	Same.
10-Jun-15	B	300	Downstream	1110	1100	10	28.1	26.8	1.3	NO	Visible plume on R. bank started before excavator was working probably from erosion of DS gravel bar on RB.
10-Jun-15	C	600	Downstream	1112	1100	10	29.8	26.8	3.0	NO	Stabilizing actions.
10-Jun-15	C	600	Downstream	1115	1100	15	31.3	26.8	4.5	NO	Banks of RB channel eroding as water rises excavator shoring up "finger" and banks of LB channel.
10-Jun-15	B	300	Downstream	1128	1100	10	33.8	26.8	7.0	YES	Excavator working near entrance to flume.
10-Jun-15	C	600	Downstream	1132	1100	10	33.3	26.8	6.5	YES	Same as 1128. Turbidity only coming from RB channel due to erosion.
10-Jun-15	C	600	Downstream	1133	1100	15	31.7	26.8	4.9	NO	Excavator stabilizing channel banks on LB near flume entrance (where most water is going).
10-Jun-15	A	300	Upstream	1207	1200	3	29.5	29.5	0.0	NO	Went to check background again to see if it rose again since site B reading was higher w/ no visible plume.

10-Jun-15	B	300	Downstream	1238	1200	10	30.5	29.5	1.0	NO	Told excavator to stop but already stopped - Rafael gave official stop request.
10-Jun-15	C	600	Downstream	1242	1200	10	34.4	29.5	4.9	NO	No work being done in or out of water.
10-Jun-15	C	600	Downstream	1244	1200	15	30.2	29.5	0.7	NO	No visible plume/debris. No work occurring.
10-Jun-15	B	300	Downstream	1318	1300	10	30.4	29.5	0.9	NO	No inwater work.
10-Jun-15	B	300	Downstream	1345	1300	10	28.7	29.5	-0.8	NO	Excavator has just begun working again (a little).
10-Jun-15	C	600	Downstream	1348	1300	10	29.4	29.5	-0.1	NO	Same, no visible plume.
10-Jun-15	C	600	Downstream	1349	1300	15	28	29.5	-1.5	NO	Same, not much excavator work.
10-Jun-15	B	300	Downstream	1400	1400	10	30.5	29.5	1.0	NO	Placing ecology blocks, shoring up banks.
10-Jun-15	C	600	Downstream	1405	1400	10	29.4	29.5	-0.1	NO	Water faster moving + still rising. Observer sighted brief plume US of barrier - no visible plume at sample location. Some ecology blocks placed.
10-Jun-15	C	600	Downstream	1410	1400	15	28.8	29.5	-0.7	NO	Tree moving through (Xmas from near site A) and excavator has paused for the moment.
10-Jun-15	B	300	Downstream	1425	1400	10	31.2	29.5	1.7	NO	Work paused due to blown breaker.
10-Jun-15	C	600	Downstream	1429	1400	10	29	29.5	-0.5	NO	Same, no visible plume.
10-Jun-15	C	600	Downstream	1430	1400	15	29.5	29.5	0.0	NO	Same, no work or plume.
10-Jun-15	A	300	Upstream	1630	1600	3	28.4	28.4	0.0	NO	final background of day.
10-Jun-15	NMFS	1000	Downstream	NA		NA	NA	28.4	NA	NA	Conditions unsafe to access sample point.
11-Jun-15	A	300	Upstream	0745	700	5	29.8	29.8	0.0	NO	Background. River is up. Prior to inwater work.
11-Jun-15	B	300	Downstream	0800	800	10	28.4	29.8	-1.4	NO	Ambient. No inwater work yet.
11-Jun-15	C	600	Downstream	0804	800	50	28.3	29.8	-1.5	NO	Wide gravel bar on left bank, sample collected in main stream deeper water. No inwater work yet.
11-Jun-15	NMFS	1000	Downstream	0811	800	15	27.9	29.8	-1.9	NA	Sample collected ~50' upstream of flagged point due to safe access issues.
11-Jun-15	B	300	Downstream	0910	900	10	29.2	29.8	-0.6	NO	No inwater work yet.
11-Jun-15	C	600	Downstream	0915	900	50	29	29.8	-0.8	NO	Inwater work began about now-placing ecology blocks and buckets of cobble gravel on channel banks.
11-Jun-15	B	300	Downstream	0925	900	10	32.9	29.8	3.1	NO	No visible plume at site, plume at ~0929 noted by observer on barrier but not at site. Ecology blocks being placed and gaps filled w/ sand/cobble. Tracks on land.
11-Jun-15	B	300	Downstream	0940	900	10	31.1	29.8	1.3	NO	Filling in gaps btwn ecology blocks w/ cobble + placing rock.
11-Jun-15	B	300	Downstream	0955	900	10	31	29.8	1.2	NO	paused work for a moment and preparing cobble to place on banks. Frequent breaks.
11-Jun-15	B	300	Downstream	1010	1000	10	33.1	29.8	3.3	NO	Mostly dry work, moving demolished barrier pieces. No plume or debris.
11-Jun-15	B	300	Downstream	1025	1000	10	35	29.8	5.2	YES	Temp is increasing (air). Same as above and moving demolished barrier logs.
11-Jun-15	C	600	Downstream	1031	1000	50	35.4	29.8	5.6	YES	No inwater work, so perhaps erosion from increasing water flows.
11-Jun-15	A	300	Upstream	1048	1000	3	37.8	37.8	0.0	NO	3 hr later background-changed a lot from this morning so repeated @ 1050 hrs = 34.5
11-Jun-15	D	1/2 mi	Downstream	1118	1100	10	35.1	37.8	-2.7	NO	River higher and faster than before, no plume or debris. No inwater work yet.
11-Jun-15	D	1/2 mi	Downstream	1120	1100	20	33	37.8	-4.8	NO	Same.
11-Jun-15	B	300	Downstream	1153	1100	10	39.1	37.8	1.3	NO	Some movement of a supersack diggin out by excavator earlier, no work at the moment.
11-Jun-15	B	300	Downstream	1208	1200	10	38.8	37.8	1.0	NO	No inwater work. Work is behind cofferdam on new concrete/grout area.
11-Jun-15	B	300	Downstream	1223	1200	10	37.2	37.8	-0.6	NO	Excavator moved a supersack on RB then took lunch. No plume at B.
11-Jun-15	B	300	Downstream	1305	1300	10	41	37.8	3.2	NO	No inwater work, only working on access road.
11-Jun-15	C	600	Downstream	1314	1300	50	35.2	37.8	-2.6	NO	No in-water work.
11-Jun-15	B	300	Downstream	1338	1300	10	37.1	37.8	-0.7	NO	Excavator moved a supersack on RB @ 1335.
11-Jun-15	B	300	Downstream	1350	1300	10	35.3	37.8	-2.5	NO	Excavator has just removed 2 S.S. from RB.
11-Jun-15	B	300	Downstream	1405	1400	10	36.1	37.8	-1.7	NO	Excavator has driven back to park.

11-Jun-15	A	300	Upstream	1428	1400	5	37.2	37.2	0.0	NO	Excavator RB can't tell if in dry or wet.
11-Jun-15	B	300	Downstream	1449	1400	50	38.2	37.2	1.0	NO	Asked to come to LB. may have inwater work.
11-Jun-15	B	300	Downstream	1507	1500	50	39.1	37.2	1.9	NO	Some movement of gravel upstream-many pauses in and out of water, mostly into flume.
19-Jun-15	A	300	Upstream	0820	800	2	61.1	61.1	0.0	NO	Background before work; river appears milky, light brown color
19-Jun-15	B	300	Downstream	0848	800	50	54.0	61.1	-7.1	NO	Ambient turbidity on left bank
19-Jun-15	C	600	Downstream	0851	800	15	53.6	61.1	-7.5	NO	Ambient turbidity on left bank
19-Jun-15	B	300	Downstream	0925	900	50	53.7	61.1	-7.4	NO	Excavator has started placing ecology blocks US; no visible plume or debris
19-Jun-15	B	300	Downstream	0940	900	50	53.8	61.1	-7.3	NO	Still placing ecology blocks - no plume - work on apron behind cofferdam in dry
19-Jun-15	B	300	Downstream	0955	900	50	54.7	61.1	-6.4	NO	Same as above; no material being moved yet, no plume
19-Jun-15	B	300	Downstream	1010	1000	50	56.4	61.1	-4.7	NO	Excavator has stopped for ~ 10 min. will be for ~ 1 hr, no plume or work in water
19-Jun-15	A	300	Upstream	1040	1000	2	62.3	62.3	0.0	NO	Meter placed on uneven rock surface therefore took 3 readings
19-Jun-15	A	300	Upstream	1041	1000	2	55.9	55.9	0.0	NO	Used same sample to take second reading; note different value
19-Jun-15	A	300	Upstream	1043	1000	2	53.9	53.9	0.0	NO	New background sample - taken on flat surface
19-Jun-15	B	300	Downstream	1112	1100	50	57.2	53.9	3.3	NO	No in-water work for ~ 1 hr; will start soon, no plumes
19-Jun-15	B	300	Downstream	1140	1100	50	53.8	53.9	-0.1	NO	Placing a few ecology blocks, scooped material a couple of times (assuming to shore up areas)
19-Jun-15	B	300	Downstream	1155	1100	50	56.8	53.9	2.9	NO	Same as above; no plume/debris. Still making minor adjustments US to gravel bar "finger"
19-Jun-15	B	300	Downstream	1212	1200	50	58.5	53.9	4.6	NO	Work has ended for now, will resume later - no plume
19-Jun-15	B	300	Downstream	1315	1300	50	59.8	53.9	5.9	YES	No in-water work for ~ 1 hr to cause exceedance
19-Jun-15	C	600	Downstream	1323	1300	15	62.1	53.9	8.2	YES	No in-water work, river flow is dropping and likely influencing turbidity therefore no trip to Site D but will repeat backgroung though
19-Jun-15	A	300	Upstream	1345	1300	2	65.1	65.1	0.0	NO	Background
19-Jun-15	B	300	Downstream	1405	1400	50	66.3	65.1	1.2	NO	Excavator moving some ecology blocks US
19-Jun-15	B	300	Downstream	1425	1400	50	67.6	65.1	2.5	NO	Same as above, no plume
19-Jun-15	B	300	Downstream	1530	1500	50	70.8	65.1	5.7	NO	No in-water work since 1410. River flow continues to drop and may have made more turbidity, no plume or debis
20-Jun-15	A	300	Upstream	0732	700	2	56.3	56.3	0.0	NO	Background before any work began; river is milky white
20-Jun-15	B	300	Downstream	0805	800	50	56.2	56.3	-0.1	NO	Ambient Site B on Left Bank before work
20-Jun-15	C	600	Downstream	0812	800	15	56.6	56.3	0.3	NO	Ambient Site C on Left Bank before work
20-Jun-15	B	300	Downstream	0905	900	50	54.2	56.3	-2.1	NO	Excavator moving material in the dry upstream of barrier; no plume.
20-Jun-15	B	300	Downstream	0920	900	50	55.6	56.3	-0.7	NO	Excavator building up gravel bar upstream - some in-water work, water mostly going into flume; no visible plume.
20-Jun-15	Rock Chute	325	Downstream	0926	900	2	56.7	56.3	0.4	NO	Took rock chute sample to see if turbidity below (> 300 ft downstream) could be influenced by rock chute since most water from upstream work is going into flume on left bank and leaking through flume into rock chute.
20-Jun-15	B	300	Downstream	0935	900	50	54.1	56.3	-2.2	NO	Same as above; no plume.
20-Jun-15	B	300	Downstream	0950	900	50	54.3	56.3	-2.0	NO	Work has paused for now ~ 15 min. since last movement; no plume
20-Jun-15	A	300	Upstream	1007	1000	2	56.7	56.7	0.0	NO	Background
20-Jun-15	B	300	Downstream	1049	1000	50	60.7	56.7	4.0	NO	No in-water work occurring and no plume
20-Jun-15	B	300	Downstream	1133	1100	50	55.0	56.7	-1.7	NO	Excavator moved some ecology blocks and is now done
20-Jun-15	NMFS	1000	Downstream	1205	1200	10	55.6	56.7	-1.1	NA	For NMFS
20-Jun-15	A	300	Upstream	1220	1200	2	57.9	57.9	0.0	NO	Background
22-Jun-15	A	300	Upstream	0650	600	5	28.8	28.8	0.0	NO	Background before any work began.

22-Jun-15	B	300	Downstream	0710	700	15	25.6	28.8	-3.2	NO	Ambient Site B on Left Bank before work; water has dropped exposing left bank gravel bar
22-Jun-15	C	600	Downstream	0715	700	10	25.8	28.8	-3.0	NO	Ambient Site C on Left Bank before work
22-Jun-15	B	300	Downstream	0818	800	10	24.7	28.8	-4.1	NO	No in-water work at moment
22-Jun-15	B	300	Downstream	0916	900	10	24.6	28.8	-4.2	NO	No in-water work
22-Jun-15	C	600	Downstream	0922	900	10	23.0	28.8	-5.8	NO	No in-water work
22-Jun-15	A	300	Upstream	1011	1000	10	24.8	24.8	0.0	NO	Background
22-Jun-15	B	300	Downstream	1032	1000	10	23.9	24.8	-0.9	NO	No in-water work at moment
22-Jun-15	B	300	Downstream	1130	1100	10	22.9	24.8	-1.9	NO	No in-water work still
23-Jun-15	A	300	Upstream	0639	600	2	55.3	55.3	0	NO	Background before inwater work.
23-Jun-15	B	300	Downstream	0655	600	50	53.4	55.3	-1.9	NO	Ambient B station LB
23-Jun-15	C	600	Downstream	0700	700	15	52.1	55.3	-3.2	NO	Ambient C station LB
23-Jun-15	B	300	Downstream	0750	700	15	54.8	55.3	-0.5	NO	No inwater work yet
23-Jun-15	C	600	Downstream	0755	700	15	53.1	55.3	-2.2	NO	No inwater work yet
23-Jun-15	B	300	Downstream	0850	800	50	53.7	55.3	-1.6	NO	same
23-Jun-15	C	600	Downstream	0853	800	15	52.3	55.3	-3	NO	same
23-Jun-15	A	300	Upstream	0920	900	2	54	54	0	NO	Background, no work
23-Jun-15	B	300	Downstream	0935	900	50	53	54	-1	NO	Excavator crossed river ~0942, not much in water work otherwise no plume. Started placing supersacks to block flow to LB shortly after.
23-Jun-15	B	300	Downstream	0950	900	50	55.2	54	1.2	NO	Site B @ 0935 moved ~50' DS to accommodate work on DS of barrier to be 300' DS from work- cont'd until otherwise noted. Removal of US cofferdam supersacks.
23-Jun-15	B	300	Downstream	1005	1000	50	54.1	54	0.1	NO	Still placing supersacks to block cross flow parallel to barrier
23-Jun-15	B	300	Downstream	1020	1000	50	57.2	54	3.2	NO	same, also no plume noted since work began
23-Jun-15	B	300	Downstream	1035	1000	50	57.7	54	3.7	NO	same, building pile on gravel bar DS of supersacks transferred from US
23-Jun-15	B	300	Downstream	1050	1000	50	59.4	54	5.4	NO	Still transferring supersacks, no plume visible.
23-Jun-15	B	300	Downstream	1105	1100	50	58.7	54	4.7	NO	Excavator paused, then rolled into LB channel + paused again, now trying to lift part of apron up
23-Jun-15	B	300	Downstream	1120	1100	50	60	54	6	YES	Excavator pulled up some boards ~ 10 min and one small spot of turbidity appeared at apron but no plume in channel- then crossed RB channel to leave.
23-Jun-15	C	600	Downstream	1124	1100	15	53.6	54	-0.4	NO	Excavator has stopped for fuel line problem + lunch break
23-Jun-15	A	300	Upstream	1144	1100	2	54.5	54.5	0	NO	Background during lunch- no work
23-Jun-15	B	300	Downstream	1220	1200	50	54.4	54.5	-0.1	NO	Sill on lunch, no work.
23-Jun-15	C	600	Downstream	1230	1200	15	52.3	54.5	-2.2	NO	Still lunch break, no work
23-Jun-15	C	600	Downstream	1255	1200	15	54.4	54.5	-0.1	NO	Excavator crossed RB channel to middle gravel bar
23-Jun-15	B	300	Downstream	1310	1300	50	52.1	54.5	-2.4	NO	moving supersacks to gravel bar, very little to no contact w/ the water
23-Jun-15	B	300	Downstream	1325	1300	50	65.7	54.5	11.2	YES	Supersacks moved from US opened channel to DS, slight plume noted in LB channel from water entering newly opened channel and eroding sediment naturally
23-Jun-15	C	600	Downstream	1329	1300	15	60.9	54.5	6.4	YES	Same as above, no visible plume from sample site
23-Jun-15	B	300	Downstream	1340	1300	50	56.4	54.5	1.9	NO	Arranging top of channel (in the dry) that was newly opened. No visible plume from sample site.
23-Jun-15	B	300	Downstream	1355	1300	50	128	54.5	73.5	YES	Removed ecology blocks from channel, water rose considerably and created large medium brown plume in LB channel.
23-Jun-15	C	600	Downstream	1357	1300	15	91.5	54.5	37	YES	no more channel work but water entering from newly opened channel is very turbid due to natural erosion.
23-Jun-15	B	300	Downstream	1410	1400	50	58.7	54.5	4.2	NO	Excavator started near rock chute for different project, we moved to RB after this sample.

23-Jun-15	B	300	Downstream	1430	1400	10	54.9	54.5	0.4	NO	RB, excavator moving ecology blocks to RB channel to begin to cut off RB channel.
23-Jun-15	A	300	Upstream	1442	1400	2	50.3	50.3	0	NO	Background
23-Jun-15	B	300	Downstream	1450	1400	10	54.9	50.3	4.6	NO	RB excavator crossing RB US channel to RB to begin closing of RB channel. No plume
23-Jun-15	B	300	Downstream	1505	1500	10	48.8	50.3	-1.5	NO	RB Excavator crossed RB DS channel, no work at the moment
23-Jun-15	B	300	Downstream	1520	1500	10	50.1	50.3	-0.2	NO	No work at the moment.
23-Jun-15	B	300	Downstream	1535	1500	10	51.6	50.3	1.3	NO	2 excavators + 1 bulldozer US. 1 excavator moving gravel on US gravel bar. Bulldozer smoothing RB road. No plume.
23-Jun-15	B	300	Downstream	1550	1500	10	66.9	50.3	16.6	YES	Excavators placing supersacks + digging along channel (LB?)
23-Jun-15	C	600	Downstream	1555	1500	20	60.9	50.3	10.6	YES	same. No more excavating material, only placing supersacks + ecology blocks for channel stability. Any turbidity is well mixed in channel + very light brown + diluted.
23-Jun-15	B	300	Downstream	1605	1600	10	64.4	50.3	14.1	YES	Same. Slightly darker water but no distinct plume.
23-Jun-15	C	600	Downstream	1610	1600	20	68.9	50.3	18.6	YES	Only supersacks + ecology blocks, paused work + opened LB panel to lower turbidity.
23-Jun-15	B	300	Downstream	1615	1600	10	74	50.3	23.7	YES	Work stopped, panel on LB opened for > flow on LB channel, opened fish trap to take > water. BMPs investigated and modified
23-Jun-15	C	600	Downstream	1620	1600	20	63.8	50.3	13.5	YES	Fish trap gate reopened.
23-Jun-15	B	300	Downstream	1630	1600	10	47.8	50.3	-2.5	NO	Placing supersacks + ecology blocks began again to try and close off RB channel Light brown evenly through RB channel, > flow on RB
23-Jun-15	B	300	Downstream	1640	1600	10	70.4	50.3	20.1	YES	RB channel more closed off, most flow on LB still closing/ strengthening channel.
23-Jun-15	C	600	Downstream	1645	1600	20	66.3	50.3	16	YES	Same. River is uniform milky/light brown color. Moved to site c b/c B is only seepage, extra concentrated from blocking RB channel. PTI fish rescue.
23-Jun-15	C	600	Downstream	1653	1600	20	65.3	50.3	15	YES	RB channel mostly closed = coffer dam.
23-Jun-15	NMFS	1000	Downstream	1657	1600	10	58.3	50.3	8	NA	For NMFS
24-Jun-15	A	300	Upstream	0639	600	2	56.8	56.8	0	NO	Background
24-Jun-15	B	300	Downstream	0740	700	10	54.3	56.8	-2.5	NO	Ambient Site B LB before work
24-Jun-15	C	600	Downstream	0745	700	15	49.9	56.8	-6.9	NO	Ambient Site C LB before work
24-Jun-15	B	300	Downstream	0805	800	10	51.1	56.8	-5.7	NO	Excavator on US side moving ecology blocks to DS apron- little to no inwater contact
24-Jun-15	B	300	Downstream	0820	800	10	50.5	56.8	-6.3	NO	Excavator cutting off flow DS from RB to LB - some digging in dry on gravel bar, mostly placing ecology blocks + supersacks to build cofferdam
24-Jun-15	B	300	Downstream	0835	800	10	52.8	56.8	-4	NO	Excavator cutting off flow DS from RB to BL- some digging in dry on gravel bar, mostly placing ecology blocks + supersacks to build cofferdam
24-Jun-15	B	300	Downstream	0850	800	10	55.5	56.8	-1.3	NO	Placing supersacks pool behind cofferdam may strand fish, called Rafael to organize rescue
24-Jun-15	B	300	Downstream	0905	900	10	56.1	56.8	-0.7	NO	More supersacks, some have some dirt on them that might add some turbidity to channel.
24-Jun-15	B	300	Downstream	0920	900	10	57.6	56.8	0.8	NO	Stopped placing supersacks for now
24-Jun-15	A	300	Upstream	0935	900	2	54.3	54.3	0	NO	Background
24-Jun-15	B	300	Downstream	0955	900	10	57.7	54.3	3.4	NO	Still placing cofferdam ecology blocks + supersacks
24-Jun-15	B	300	Downstream	1010	1000	10	55.3	54.3	1	NO	Paused the super sack/ block placement for a while, starting up again now.
24-Jun-15	B	300	Downstream	1025	1000	10	53.5	54.3	-0.8	NO	Most of cofferdam constructed, some seepage, no work on it for now.
24-Jun-15	B	300	Downstream	1040	1000	10	50.1	54.3	-4.2	NO	Just work US in the dry
24-Jun-15	B	300	Downstream	1130	1100	10	54	54.3	-0.3	NO	US building road across former RRB channel, some manipulation of LB channel bank during building + dirt/ rubble will be going in RB channel for road\

24-Jun-15	C	600	Downstream	1132	1100	15	57.5	54.3	3.2	NO	Same, sample here to see if RB seepage is noticeable as it flows/ trickles into mixed channel.
24-Jun-15	B	300	Downstream	1145	1100	10	51.4	54.3	-2.9	NO	Building up US road across former RB channel
24-Jun-15	C	600	Downstream	1148	1100	15	48.5	54.3	-5.8	NO	Same, plus bulldozer out in middle US now
24-Jun-15	B	300	Downstream	1200	1200	10	50.7	54.3	-3.6	NO	same as above.
24-Jun-15	C	600	Downstream	1205	1200	15	49.6	54.3	-4.7	NO	same
24-Jun-15	B	300	Downstream	1215	1200	10	51.3	54.3	-3	NO	same
24-Jun-15	C	600	Downstream	1220	1200	15	50.5	54.3	-3.8	NO	same
24-Jun-15	B	300	Downstream	1230	1200	10	51.7	54.3	-2.6	NO	same
24-Jun-15	C	600	Downstream	1233	1200	15	48.9	54.3	-5.4	NO	same
24-Jun-15	B	300	Downstream	1245	1200	10	51	54.3	-3.3	NO	same, and some ecology blocks were placed along LB channel bank.
24-Jun-15	C	600	Downstream	1250	1200	15	47.9	54.3	-6.4	NO	same
24-Jun-15	B	300	Downstream	1300	1300	10	50.4	54.3	-3.9	NO	Paused, then started up again ~10 min
24-Jun-15	C	600	Downstream	1305	1300	15	48.8	54.3	-5.5	NO	same
24-Jun-15	A	300	Upstream	1325	1300	2	50.7	50.7	0	NO	Background prior to inwater work.
24-Jun-15	B	300	Downstream	1400	1400	10	52.8	50.7	2.1	NO	Mostly work in the dry, a little soil/cobble being placed/ falling onto the DS side of RB channel cofferdam
24-Jun-15	C	600	Downstream	1405	1400	15	52	50.7	1.3	NO	Same-Any turbidity from above mostly contained in former RB channel and along RB- no flow to disperse < 300 DS but it isn't going into the river main channel @ 600' DS, it seems, according to the site C measurements.
24-Jun-15	B	300	Downstream	1415	1400	10	51	50.7	0.3	NO	Same
24-Jun-15	C	600	Downstream	1418	1400	15	50.5	50.7	-0.2	NO	Same
24-Jun-15	B	300	Downstream	1430	1400	10	49.4	50.7	-1.3	NO	Same
24-Jun-15	C	600	Downstream	1433	1400	15	48.8	50.7	-1.9	NO	Same
24-Jun-15	B	300	Downstream	1445	1400	10	50.5	50.7	-0.2	NO	Same
24-Jun-15	C	600	Downstream	1447	1400	15	50.4	50.7	-0.3	NO	End of road building
24-Jun-15	NMFS	1000	Downstream	1515	1500	10	51.3	50.7	0.6	NA	For NMFS
24-Jun-15	B	300	Downstream	1520	1500	10	43.9	50.7	-6.8	NO	RB, just to see what the pool of turbid water was.
25-Jun-15	B	350	Downstream	122	1200	10	63.4	59.3	4.1	NO	Same
25-Jun-15	A	300	Upstream	0635	600	2	58.7	58.7	0	NO	Background. 10%= 5.87. 65.57= exceedance limit
25-Jun-15	B	300	Downstream	0655	600	10	56.6	58.7	-2.1	NO	Ambient before work began
25-Jun-15	C	600	Downstream	0658	600	15	55.4	58.7	-3.3	NO	Ambient before work began
25-Jun-15	B	~350	Downstream	0800	800	10	94.6	58.7	35.9	YES	Culvert being installed, at point where stagnant RB channel combines w/ LB flow ~ 300' from in water work.
25-Jun-15	C	600	Downstream	0810	800	20	73.3	58.7	14.6	YES	RB, road US being built and culvert pieces brought down. Shallow sample, may have been to close to bottom.
25-Jun-15	NMFS	1000	Downstream	0815	800	10	58	58.7	-0.7	NA	For NMFS. Fred told contractor to close off US cofferdam w/ supersacks to better control seepage
25-Jun-15	C	600	Downstream	0817	800	20	57.8	58.7	-0.9	NO	Mid water column at deeper spot. Likely didn't collect sediment from bottom, same work ongoing.
25-Jun-15	B	~350	Downstream	0830	800	10	61	58.7	2.3	NO	Burying culvert near RB w/ cobble + sediment
25-Jun-15	C	600	Downstream	0835	800	20	55.3	58.7	-3.4	NO	Same, crossed RB channel to go on middle DS gravel bar to grab supersacks + place across RB DS channel temporarily until inwater is done US.
25-Jun-15	B	350	Downstream	0845	800	10	61.2	58.7	2.5	NO	Excavator on middle bar, US excavator modifying LB channel bank, appears in dry mostly.
25-Jun-15	B	350	Downstream	0900	900	10	57.9	58.7	-0.8	NO	Still placing supersacks, US work on road w/ excavator.

25-Jun-15	C	600	Downstream	0904	900	20	58.6	58.7	-0.1	NO	~ 1/3 to 1/2 way across w/ super sacks.
25-Jun-15	B	350	Downstream	0915	900	10	55.1	58.7	-3.6	NO	Supersacks almost across RB channel, no movement US
25-Jun-15	B	350	Downstream	0930	900	10	54.1	58.7	-4.6	NO	Same, and excavator/ bulldozer burying cofferdam and arranging RB gravel bar
25-Jun-15	C	600	Downstream	0934	900	20	54.7	58.7	-4	NO	Same
25-Jun-15	A	300	Upstream	0950	900	2	58	58	0	NO	Background, 10% = 5.8, 63.8 = exceedance limit
25-Jun-15	B	350	Downstream	1000	1000	10	60	58	2	NO	Built road over culvert, paused for a minute across RB DS channel.
25-Jun-15	B	350	Downstream	1015	1000	10	56.5	58	-1.5	NO	No work right now.
25-Jun-15	C	600	Downstream	1018	1000	20	55.3	58	-2.7	NO	Excavator moved to middle channel then stopped lifting wood from apron.
25-Jun-15	B	350	Downstream	1030	1000	10	54.8	58	-3.2	NO	Pulling up wood from apron, moving ecology blocks w/ in cofferdam near LB
25-Jun-15	B	350	Downstream	1045	1000	10	53.3	58	-4.7	NO	Same, not much movement
25-Jun-15	C	600	Downstream	1049	1000	20	53.2	58	-4.8	NO	Same, not much movement
25-Jun-15	A	300	Upstream	1100	1100	2	59.3	59.3	0	NO	Background 10%= 5.93 NTU
25-Jun-15	C	600	Downstream	1125	1100	20	56.7	59.3	-2.6	NO	Removing wood from apron
25-Jun-15	B	350	Downstream	1141	1100	10	58.3	59.3	-1	NO	Excavator crossed channel RB plume noted by observer. Still removing boards.
25-Jun-15	B	350	Downstream	1154	1100	10	66.9	59.3	7.6	YES	Still ripping up wood but dumped some dirt in front of coffer dam near LB channel
25-Jun-15	C	600	Downstream	1158	1100	20	60.7	59.3	1.4	NO	Same, plume out of RB channel, excavator starting to bury cofferdam near LB channel.
25-Jun-15	B	350	Downstream	1211	1200	10	92.4	59.3	33.1	YES	same, excavator crossed RB channel
25-Jun-15	C	600	Downstream	1215	1200	20	72.2	59.3	12.9	YES	Activity has paused, exceedance likely from moving around supersacks + dirt around cofferdam near LB, excavator stopped that and is now placing supersacks on RB channel
25-Jun-15	A	300	Upstream	1230	1200	2	65.5	65.5	0	NO	Background
25-Jun-15	D	1/2 mi	Downstream	1315	1300	10	62.8	65.5	-2.7	NO	No visible plume. Work done for day.
1-Jul-15	A	300	Upstream	0630	600	3	943	943	0	NO	Background before work. Milky brown, turbid.
1-Jul-15	B	300	Downstream	0656	600	10	958	943	15	NO	Ambient before work.
1-Jul-15	C	600	Downstream	0701	700	10	949	943	6	NO	Ambient before work.
1-Jul-15	B	300	Downstream	0715	700	10	921	943	-22	NO	Excavator working on cofferdam R bank.
1-Jul-15	Bottled	NA	NA	0719	700	NA	1.31	943	NA	NA	In case of dilution needed.
1-Jul-15	B	300	Downstream	0730	700	10	928	943	-15	NO	Excavator working on cofferdam R bank.
1-Jul-15	B	300	Downstream	0745	700	10	889	943	-54	NO	Same.
1-Jul-15	B	300	Downstream	0800	800	10	859	943	-84	NO	Excavator deepening channel (LB) Moved site ~300' DS of work.
1-Jul-15	C	600	Downstream	0805	800	15	860	943	-83	NO	Same but at normal 600' site.
1-Jul-15	B	300	Downstream	0820	800	15	843	943	-100	NO	Same.
1-Jul-15	B	300	Downstream	0835	800	15	849	943	-94	NO	Same.
1-Jul-15	B	300	Downstream	0850	800	15	862	943	-81	NO	Same.
1-Jul-15	B	300	Downstream	0905	900	15	876	943	-67	NO	Same.
1-Jul-15	C	600	Downstream	0905	900	10	810	943	-133	NO	Same.
1-Jul-15	Rock Chute	325	Downstream	0911	900	5	837	943	-106	NO	Same.
1-Jul-15	B	300	Downstream	0920	900	10	807	943	-136	NO	Same.
1-Jul-15	B	300	Downstream	0935	900	15	830	943	-113	NO	Same.
1-Jul-15	B	300	Downstream	0950	900	15	819	943	-124	NO	Excavator on gravel bar moving super sacks.
1-Jul-15	B	300	Downstream	1005	1000	15	809	943	-134	NO	Same + pouring gravel on R. bank access road.
1-Jul-15	A	300	Upstream	1026	1000	10	777	777	0	NO	Background. 787 NTU on second sample for comparison.
1-Jul-15	B	300	Downstream	1100	1100	10	770	777	-7	NO	Both excavators working R bank behind cofferdam.
1-Jul-15	C	600	Downstream	1103	1100	10	817	777	40	NO	Same.

1-Jul-15	B	300	Downstream	1115	1100	10	820	777	43	NO	Work stopped.
1-Jul-15	B	300	Downstream	1205	1200	10	743	777	-34	NO	Both excavators working R bank behind cofferdam.
1-Jul-15	B	300	Downstream	1220	1200	10	758	777	-19	NO	Same as before plus laying gravel for access road.
1-Jul-15	B	300	Downstream	1235	1200	10	756	777	-21	NO	Work stopped.
1-Jul-15	B	300	Downstream	1310	1300	10	734	777	-43	NO	Excavator deepening channel on R bank of gravel bar. Adjusted to 300' from work.
1-Jul-15	B	300	Downstream	1325	1300	10	762	777	-15	NO	Same.
1-Jul-15	B	300	Downstream	1345	1300	10	757	777	-20	NO	Same.
1-Jul-15	B	300	Downstream	1400	1400	10	745	777	-32	NO	Work stopped.
1-Jul-15	A	300	Upstream	1420	1400	3	761	761	0	NO	Background. 787 NTU on second sample for comparison.
1-Jul-15	NMFS	1000	Downstream	1442	1400	10	676	761	-85	NA	Could not reach 1000' marker due to washout [~50' US of point].

Table 1. A summary of individual turbidity measurements taken at monitoring sites above and below the barrier August 3 - 5, 2015.

Date	Site	Distance (ft)	Direction from barrier	Time (24 -hr)	Distance from shore (ft)	NTUs	Most recent Site A value (NTUs)	NTUS at this site minus most recent Site A value (NTUs)	State Water Quality Threshold Limit (NTUs)	Exceedance	Remarks/Observations. Note any turbidity generating activities at time of observation. Include any corrective actions taken, if any.
3-Aug-15	A	300	Upstream	0720	5	n/a	476.0	n/a	n/a	NA	Background; > 50 NTUs --> limit is 10% = 48 NTU --> 524 NTU limit
3-Aug-15	B	300	Downstream	0747	10	484.0	476.0	8.0	524	NO	Ambient before work
3-Aug-15	A	300	Upstream	0934	5	n/a	430.0	n/a	n/a	NA	Background; > 50 NTUs --> limit is 10% = 43 NTU --> 473 NTU limit
3-Aug-15	B	300	Downstream	0956	10	419.0	430.0	-11.0	473	NO	**Moved ~100 ft DS of site B while in-water work ongoing on LB channel ~100 ft from barrier dam.**
3-Aug-15	B	300	Downstream	1011	10	435.0	430.0	5.0	473	NO	**Moved ~100 ft DS of Site B - see above. Work slightly farther up than 15 min ago. Closing Right bank channel.**
3-Aug-15	C	600	Downstream	1016	10	408.0	430.0	-22.0	473	NO	
3-Aug-15	B	300	Downstream	1030	10	399.0	430.0	-31.0	473	NO	Moved ~100 ft DS of site B.
3-Aug-15	B	300	Downstream	1045	10	387.0	430.0	-43.0	473	NO	Same as before.
3-Aug-15	B	300	Downstream	1100	10	380.0	430.0	-50.0	473	NO	Same as before.
3-Aug-15	B	300	Downstream	1115	10	365.0	430.0	-65.0	473	NO	**Same as before. Still closing off R channel; both excavators on R bank.**
3-Aug-15	C	600	Downstream	1120	10	370.0	430.0	-60.0	473	NO	Excavator moved back to L side.
3-Aug-15	B	300	Downstream	1131	10	366.0	430.0	-64.0	473	NO	Still ~100 ft down from B b/c of position of work.
3-Aug-15	B	300	Downstream	1145	10	348.0	430.0	-82.0	473	NO	Same. Work stopped for lunch at 11:50.
3-Aug-15	A	300	Upstream	1230	5	n/a	354.0	n/a	n/a	NA	Background; > 50 NTUs --> limit is 10% = 35 NTU -->389 NTU limit
3-Aug-15	B	300	Downstream	1250	10	339.0	354.0	-15.0	389	NO	**In-water work resumed at ~12:40. Sampling moved to R. bank.**
3-Aug-15	C	600	Downstream	1255	10	330.0	354.0	-24.0	389	NO	
3-Aug-15	B	300	Downstream	1305	10	346.0	354.0	-8.0	389	NO	(Still sampling on R bank)
3-Aug-15	B	300	Downstream	1320	10	358.0	354.0	4.0	389	NO	**In-water work at R side of spillway.**
3-Aug-15	B	300	Downstream	1335	10	397.0	354.0	43.0	389	YES	Site-restoration of existing gravel bar below barrier: creating the channel downstream in front of the apron per request of Muckleshoot Tribe, removing ecology blocks placed downstream (L. bank), grading gravel bar, and placing logs in left bank to provide slower water for salmon to access fish trap.
3-Aug-15	C	600	Downstream	1340	10	375.0	354.0	21.0	389	NO	Same as above
3-Aug-15	B	300	Downstream	1352	10	393.0	354.0	39.0	389	YES	Same as above
3-Aug-15	C	600	Downstream	1356	10	378.0	354.0	24.0	389	NO	Same as above
3-Aug-15	B	300	Downstream	1405	10	404.0	354.0	50.0	389	YES	Same as above
3-Aug-15	C	600	Downstream	1410	10	387.0	354.0	33.0	389	NO	Same as above
3-Aug-15	B	300	Downstream	1420	10	446.0	354.0	92.0	389	YES	Same as above
3-Aug-15	C	600	Downstream	1425	10	419.0	354.0	65.0	389	YES	Going to go take a background next…
3-Aug-15	A	300	Upstream	1435	10	n/a	476.0	n/a	n/a	NA	Background was taken an hour early due to marked rise in flow and turbidity. Background >50 NTU --> limit is 10% = 48 NTU --> 524 NTU limit

3-Aug-15	B	300	Downstream	1450	10	497.0	476.0	21.0	524	NO	
3-Aug-15	B	300	Downstream	1505	10	494.0	476.0	18.0	524	NO	
3-Aug-15	B	300	Downstream	1520	10	505.0	476.0	29.0	524	NO	**In-water work done for the day at 1520.**
3-Aug-15	NMFS*	1000	Downstream	1530	10	523.0	n/a	n/a	n/a	NA	
4-Aug-15	A	300	Upstream	0657	6	419.0	n/a	n/a	n/a	NA	> 50 NTU --> limit is 10% = 42 NTU --> 461 NTU limit
4-Aug-15	B	300	Downstream	0737	10	423.0	419.0	4.0	461	NO	**Pushing soil into river to shape bank. Working slow moving small amounts of dirt.**
4-Aug-15	B	300	Downstream	0750	10	415.0	419.0	-4.0	461	NO	**Pulling bags from behind soil wall. Bginning work above barrier on left bank too.**
4-Aug-15	B	300	Downstream	0808	10	408.0	419.0	-11.0	461	NO	No in-water work.
4-Aug-15	B	300	Downstream	0818	10	482.0	419.0	63.0	461	YES	**Downstream cofferdam in vicinity of guide wall removed.**
4-Aug-15	C	600	Downstream	0827	8	457.0	419.0	38.0	461	NO	Sampled further in river --> more representative.
4-Aug-15	B	300	Downstream	0833	15	432.0	419.0	13.0	461	NO	**In-water work US and DS of barrier.**
4-Aug-15	B	300	Downstream	0846	15	416.0	419.0	-3.0	461	NO	
4-Aug-15	B	300	Downstream	0901	15	413.0	419.0	-6.0	461	NO	US barrier work stopped. DS moving sediment in water.
4-Aug-15	B	300	Downstream	0921	15	400.0	419.0	-19.0	461	NO	In-water work has stopped.
4-Aug-15	B	300	Downstream	0950	15	397.0	419.0	-22.0	461	NO	**Shaping channel along barrier on left bank.**
4-Aug-15	A	300	Upstream	1006	6	n/a	395.0	n/a	n/a	NA	Pause in in-water work. Background >50 NTU --> limit is 10% = 40 NTU --> 435 NTU limit
4-Aug-15	B	300	Downstream	1032	15	388.0	395.0	-7.0	435	NO	**In-water work along channel along barrier.**
4-Aug-15	B	300	Downstream	1102	10	359.0	395.0	-36.0	435	NO	**Moved to right bank. Began opening channel.**
4-Aug-15	B	300	Downstream	1120	10	338.0	395.0	-57.0	435	NO	Water cooler on R bank.
4-Aug-15	B	300	Downstream	1240	10	334.0	395.0	-61.0	435	NO	Lunch 12:30--no turbidity generating work. 12:40 started in-water.
4-Aug-15	B	300	Downstream	1255	10	313.0	395.0	-82.0	435	NO	
4-Aug-15	B	300	Downstream	1311	10	293.0	395.0	-102.0	435	NO	Added board C barrier to L bank.
4-Aug-15	A	300	Upstream	1321	6	n/a	367.0	n/a	435	NA	Background >50 NTU --> limit is 10% = 37 NTU --> 404 NTU limit
4-Aug-15	B	300	Downstream	1330	10	342.0	367.0	-25.0	435	NO	
4-Aug-15	B	300	Downstream	1346	10	388.0	367.0	21.0	435	NO	
4-Aug-15	B	300	Downstream	1400	10	326.0	367.0	-41.0	435	NO	
4-Aug-15	B	300	Downstream	1415	10	323.0	367.0	-44.0	435	NO	**Stopped in-water work.**
4-Aug-15	B	300	Downstream	1456	15	354.0	367.0	-13.0	435	NO	**Removing ecology blocks.**
4-Aug-15	B	300	Downstream	1523	10	299.0	367.0	-68.0	435	NO	Stopped in-water work to refuel. In-water not started yet.
4-Aug-15	B	300	Downstream	1543	10	290.0	367.0	-77.0	435	NO	1400 --> end of day.
5-Aug-15	A	300	Upstream	0710	5	n/a	295.0	n/a	n/a	NA	Background >50 NTU --> limit is 10% = 30 NTU --> 325 NTU limit
5-Aug-15	B	300	Downstream	0720	10	288.0	295.0	-7.0	325	NO	
5-Aug-15	B	300	Downstream	0735	10	290.0	295.0	-5.0	325	NO	**Culvert removed.**
5-Aug-15	B	300	Downstream	0750	10	289.0	295.0	-6.0	325	NO	
5-Aug-15	B	300	Downstream	0805	10	286.0	295.0	-9.0	325	NO	
5-Aug-15	B	300	Downstream	0820	10	288.0	295.0	-7.0	325	NO	**Opened R side channel.**
5-Aug-15	B	300	Downstream	0835	10	290.0	295.0	-5.0	325	NO	
5-Aug-15	B	300	Downstream	0850	10	295.0	295.0	0.0	325	NO	**Excavator in R channel.**

5-Aug-15	NMFS*	1000	Downstream	0855	10	292.0	295.0	-3.0	325	NA	
5-Aug-15	B	300	Downstream	0905	10	291.0	295.0	-4.0	325	NO	
5-Aug-15	A	300	Upstream	1005	5	n/a	292.0	n/a	n/a	NA	No in-water work. Background >50 NTU --> limit is 10% = 29 NTU --> 321 NTU limit
5-Aug-15	A	300	Upstream	1230	5	n/a	282.0	n/a	n/a	NA	No in-water work. Background >50 NTU --> limit is 10% = 28 NTU --> 310 NTU limit
5-Aug-15	B	300	Downstream	1322	10	282.0	292.0	-10.0	310	NO	**Plug being removed. Water starting to come through.**
5-Aug-15	B	300	Downstream	1335	10	280.0	292.0	-12.0	310	NO	
5-Aug-15	B	300	Downstream	1350	10	279.0	292.0	-13.0	310	NO	Starting to see possible turbidity plume from R bank - but it gets diluted before it gets to 300 feet.
5-Aug-15	B	300	Downstream	1405	10	283.0	292.0	-9.0	310	NO	
5-Aug-15	B	300	Downstream	1420	10	278.0	292.0	-14.0	310	NO	**In-water work finished.**

*Sampling station for the National Marine Fisheries Service (NMFS) located 1,000 ft downstream of the barrier on the right bank.

Attachment 3. Figures

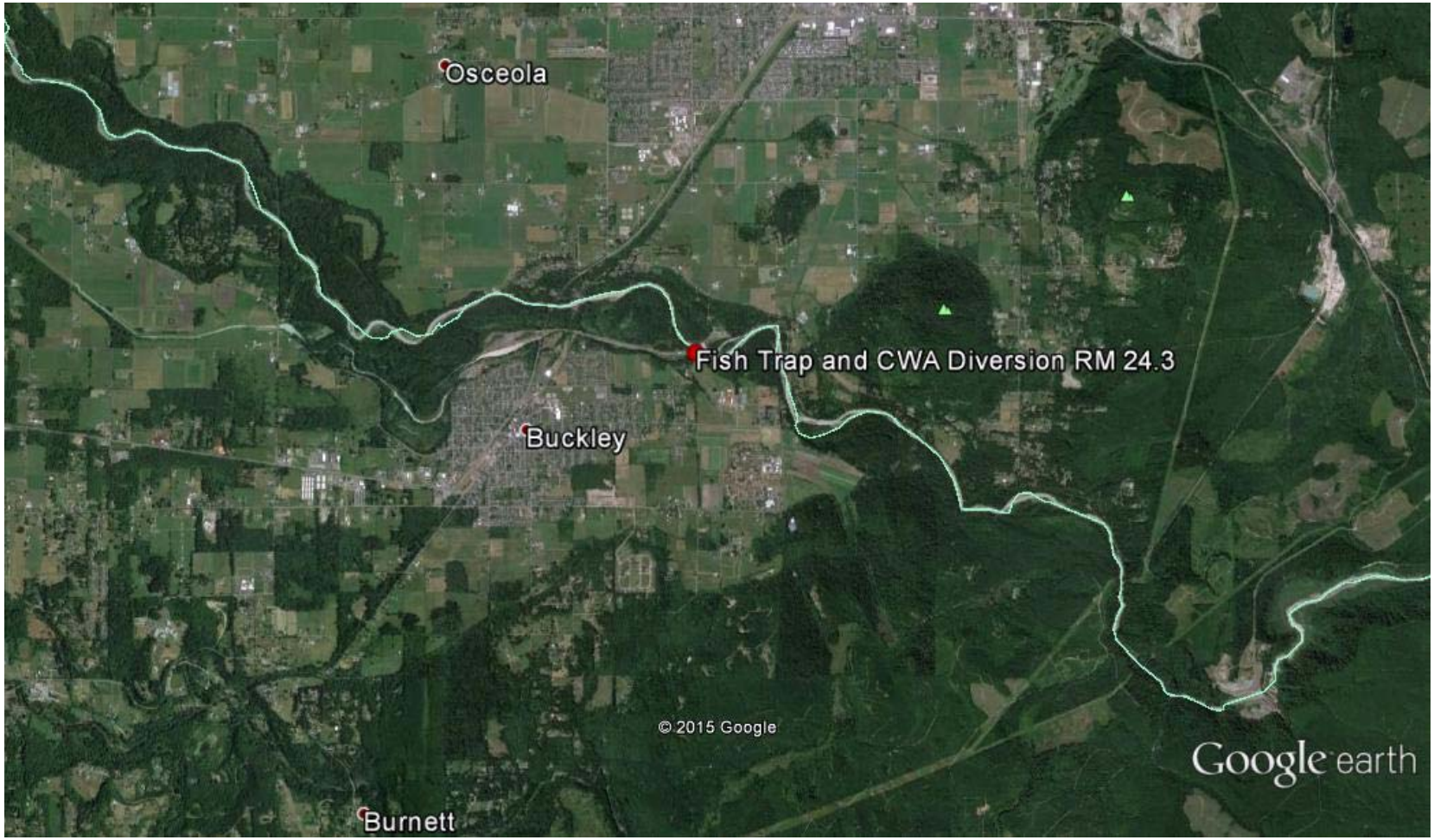
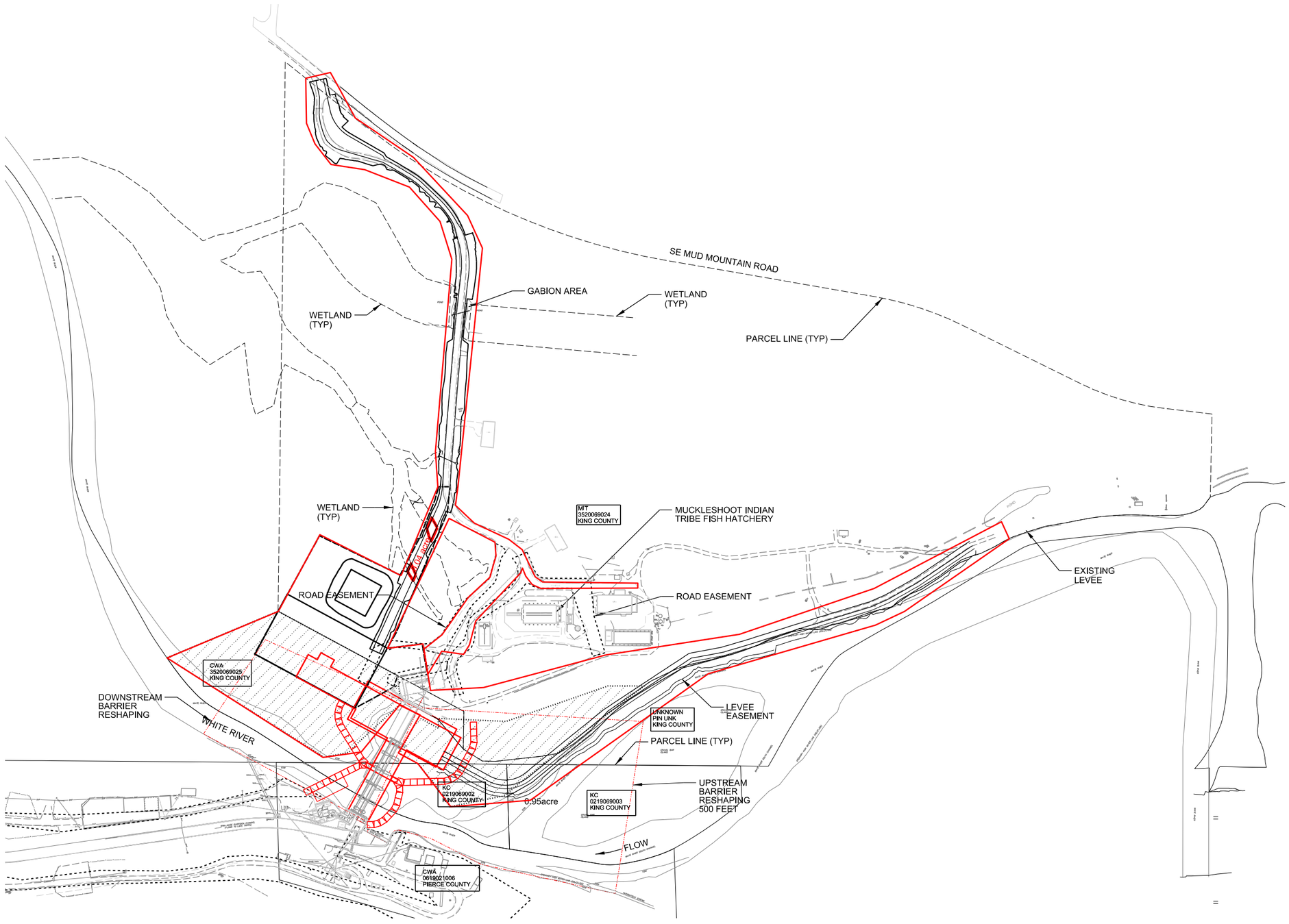


Figure 1. Vicinity Map for the White River Barrier Structure at Buckley, Washington.



N

1 MIT 401 OVERALL SITE PLAN

1" = 150'

0 150' 300'

FIGURE 2 - OVERALL WORK AREA SHOWING PROJECT FEATURES IN RED

US Army Corps of Engineers®
SEATTLE DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON

DESIGNED BY: | DATE: 12 FEB 2016
DWN BY: | CKD BY:
SUBMITTED BY: COOK
PLOT DATE: 2/12/2016 | PLOT TIME: 11:57:00 AM
SIZE: ANSI D | FILE NUMBER: E3-2-0842
FILE NAME: FY16-MMDFPF_RDL-C-401.dgn

FY16 FISH PASSAGE FACILITY
ROADS AND LEVEE
MUD MOUNTAIN DAM
ENUMCLAW, WASHINGTON

MIT 401 ROADS AND LEVEE SITE PLAN
MIT 401 OVERALL SITE PLAN

SHEET IDENTIFICATION

SHEET 1 OF 1

DESIGN FILE: pw:\\COE-NWSPW001SEA.nws.ds.usace.army.mil:cenws01\Documents\Civil Works\Mud Mountain Dam, WA\FY16 447520 MMD FPF\6. Engineering & Design\6.1 Design\Roads & Levee\Con_Docs\CAD_Sheets\Civil\FY16-MMDFPF_RDL-C-401.dgn

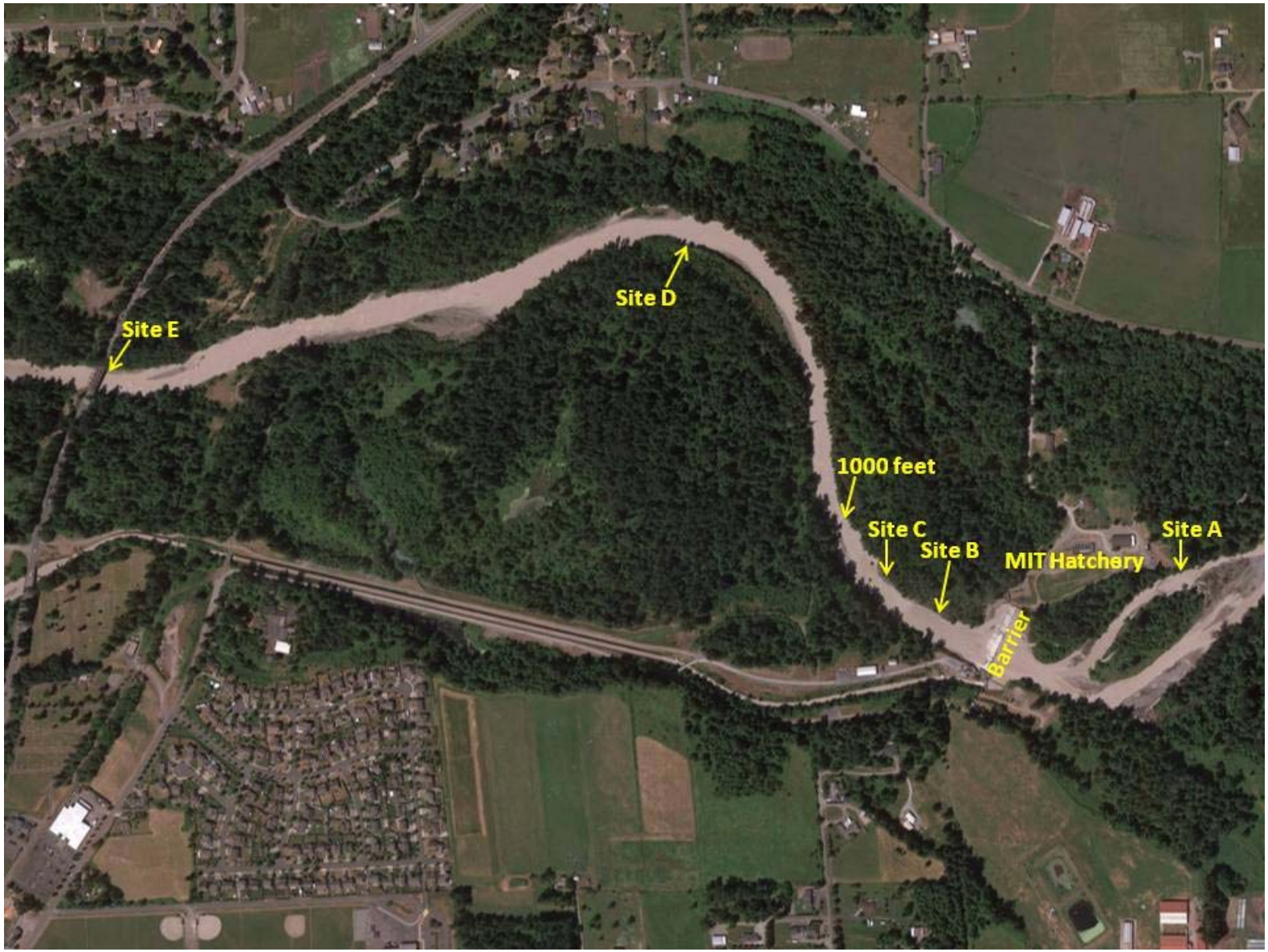


Figure 3. All monitoring sites above and below the barrier structure.

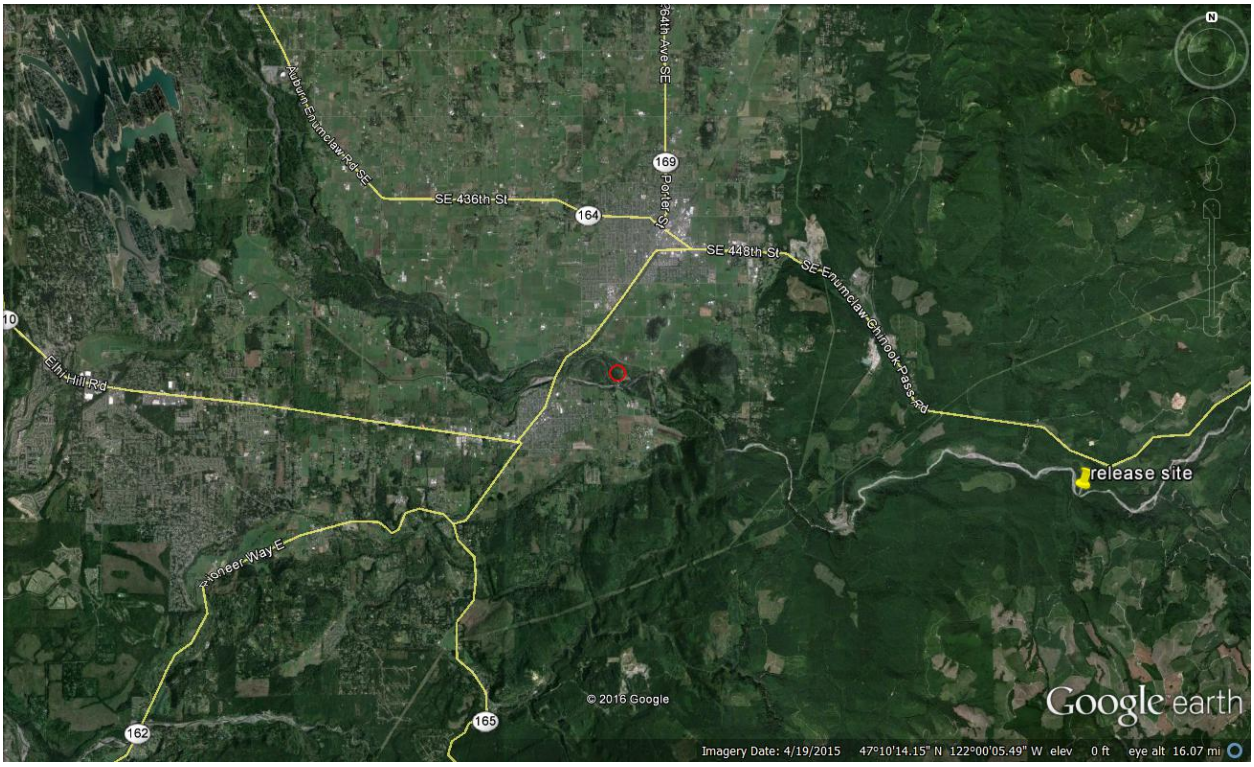


Figure 4 – Release Site Location

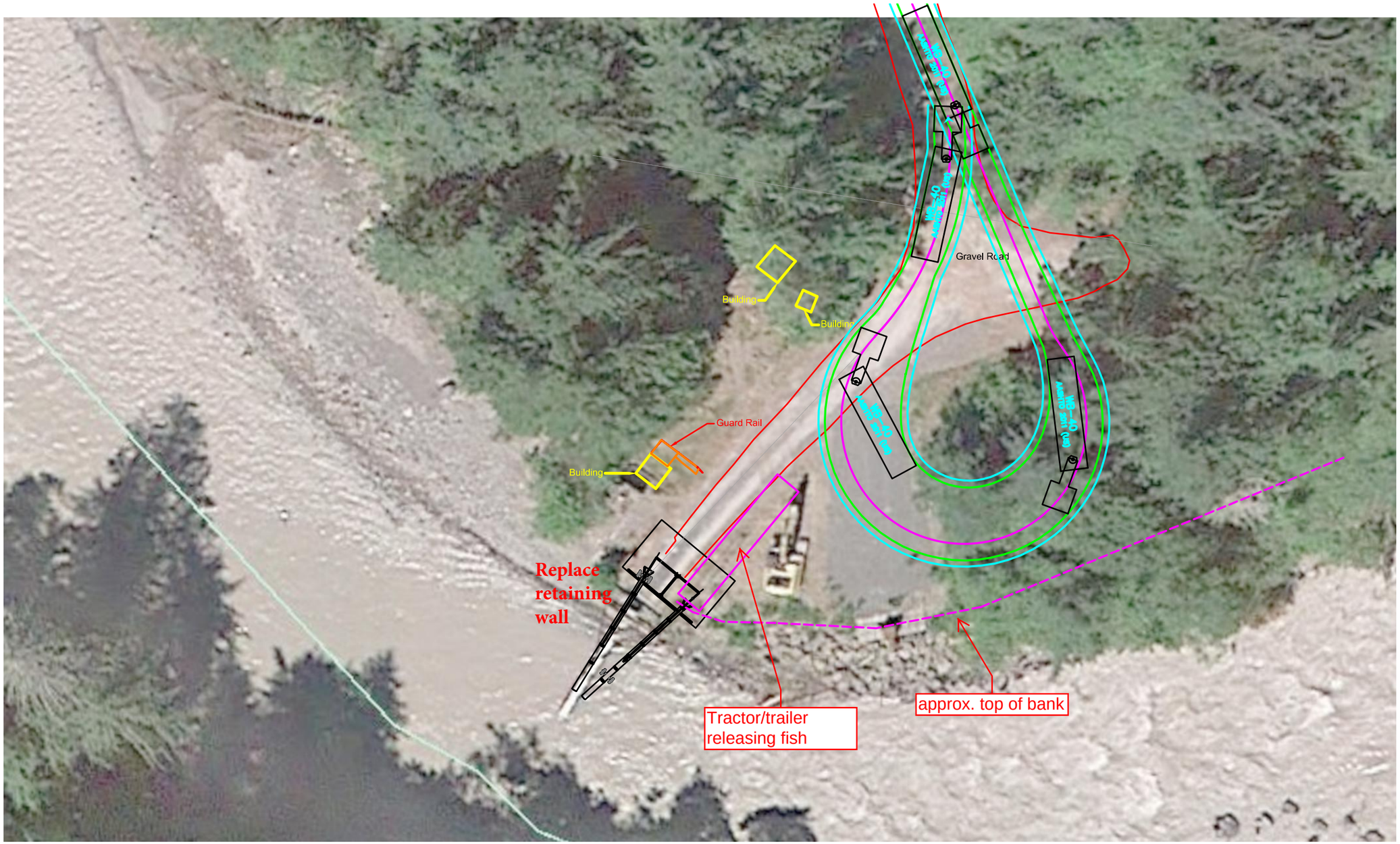


Figure 5 - Release Site Construction Area

30 scale
Tractor/trailer turning movement to get into position to back into release flume

Attachment 4. Water Quality Monitoring Form

Turbidity monitoring data form

TEAM MEMBERS:

Example ONLY	B: 300' d/s	7/21/2014	0930	2	65	-	49	=	16	excavator crossing river	water somewhat turbid with glacial flour
	Site (Identifying letter, intended distance from barrier)	**Date**	**Time (24-hr)**	**Distance from shore (ft)**	**NTUs**	**-**	**Most recent Site A value (NTUs)**	**=**	**NTUs this site minus most recent Site A value (NTUs)**	**Sediment-generating (repair) activity at time of measurement (reported by observer)**	**Remarks and observations. If State standards are exceeded, list corrective actions taken.**
This row MUST have data->						-		=			
						-		=			
						-		=			
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Page ____ of ____						-		=			

Attachment 5. Exceedance Summary Form

Exceedance Event Summary

Name: _____

Date: _____

									Major Earthwork Activity (Check Appropriate Box)						
Date	Site (B-D)	Time (24-hr)	Measured NTUs	Most recent Site A value (NTUs)	NTUs this site minus most recent Site A value	Duration of Exceedance	Photo (Y or N)	Photo Number	Temporary Diversion Channels	Barrier Repair	Temporary Cofferdams and Earthen Plugs	Temporary Earthen Acccess Roads	Other	BMPs Employed (Insert BMP Number(s))	Additional Notes

Barrier Repair: Repair failed flashboards; install new posts, support tie rods, and knee braces; replace timber and steel flashboards; install bomds in the banier structure; evacuate equipment from the channel; and install metal panels at each end of the structure; removal of materials.
Installation and Removal of Temporary Diversion Channels
Installation and Removal of Temporary Cofferdams and Earthen Plugs
Installation and Removal of Temporary Earthen Acccess Roads

Best Management Practices

1: Work conducted below OHWM is limited to the amount necessary to perform the authorized work.
2: To avoid generating unnecessary turbidity the bucket will be placed in the water and will pause to allow any turbidity to settle. The bucket will be lifted slowly through the water column and will pause at the water surface to allow water to drain.
3: Upstream and/or downstream coffedams are in place are inplace to isolate and protect the work areas from river flows.
4: Pumping systems within the cofferdams are sufficient to isolate the work areas, keep the work areas in-the-dry, and complies with all water quality requirements.

Attachment 6. Tables

Monitoring Schedule

Table 1. The monitoring paramaters required and the schedule for all work activities below the OHWM.

Activity below OHWM	Waterbody	Monitoring Point Location	Frequency	Parameter	WQ Standard
All work below the OHWM	White River RM 24.3 Barrier Structure	A	Every 3 hours	Turbidity	Turbidity shall not exceed: • 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
All work below the OHWM	Same	300 ft (B)	Continuous - Visual	Turbidity	Same
Installation and demobilization of cofferdams including excavate and place exposed bedload	Same	1,000 ft	Every 15 minutes for 2 hours, and every 3 hours thereafter if no exceedances	Turbidity	Same
Channel shaping	Same	1,000 ft	Same	Turbidity	Same
New Levee construction	Same	300 ft	Same	Turbidity	Same
road construction	Wetlands adjacent to White River at RM 24.3	300 ft	Same	Turbidity	Same
Release site Retaiing Wall Construction	White River at RM	300 ft	Same	Turbidity	Same
Cementitious Work inside Cofferdam	Same	at point of treatment	Every 3 hours	pH	pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units per WAC 173-201A-200(1)(g).
All work below the OHWM	Same	300 ft (B)	Continuous - Visual	Oil/Grease	No Sheen

Contingency Sampling

Table 2. The contingency monitoring paramaters and protocol to follow if an exceedance of State water quality standards is recorded.

Parameter	Contingency Sampling Location	Contingency Frequency	WQ Standard
Turbidity	1,000 ft	After exceedance recorded, take 2nd sample to confirm; confirm BMPs are in place; if BMPs in place move to station D	Turbidity shall not exceed: • 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Turbidity	D	If exceedance recorded, take 2nd sample to confirm; move to station E	Same
Turbidity	E	If exceedance recorded, take 2nd sample to confirm; contact COR to have contractor stop work until standards are met for two consecutive samples.	Same
Turbidty (for roads, levees and retaining wall construction)	300 feet	If exceedance recorded, take 2nd sample to confirm; contact COR to have contractor stop work until standards are met for two consecutive samples.	Same
pH	at point of treatment	If exceedance recorded, take 2nd sample to confirm; contact COR to have contractor stop work until standards are met for two consecutive samples.	pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units per WAC 173-201A-200(1)(g).
Oil/Grease	1,000 ft	Continuous - Visual	No sheen
Oil/Grease	D	Same	Same
Oil/Grease	E	Same	Same

Attachment 7. Request for Extension of Mixing Zone

Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement

Mixing Zone Request

February 5, 2016

Seattle District Corps of Engineers

PROJECT DESCRIPTION

The U.S. Army Corps of Engineers, Seattle District (USACE), proposes to conduct a complete replacement of the barrier structure and apron, as well as replace the fish trap-and-haul facility currently located on the left bank with a new support facility on the right bank, and improve levee protection and roads in the project area, as well as improve and repair the fish release site above MMD, in and adjacent to the White River, King County, Washington. The purpose of the proposed work is to meet the requirements of the 2014 National Marine Fisheries Service (NMFS) Biological Opinion's (BiOp) Reasonable and Prudent Alternative (RPA), in order to reduce the potential for injuries and fatalities to upstream migrating fish, including species listed under the Endangered Species Act (ESA). The proposed project would construct a new barrier structure on the same axis as the existing barrier structure and a new fish trap-and-haul support facility capable of handling a projected 60,000 fish per day would be built on the right bank. The proposed project would also improve the existing Muckleshoot Indian Tribe (MIT) hatchery levee on the right bank and improve the access road system into the support facility, as well as repair and improve the fish release site and access road.

The existing barrier structure is a concrete and rock-filled timber crib structure. Steel vertical members and wooden flashboards are attached to the top of the crib creating a pool behind the structure (providing for diversion into Lake Tapps and to the USACE fish trap intake) and providing a "jump barrier" for upstream migrating fish. The downstream section of the crib structure is capped with an apron comprised of concrete and steel plates to protect the underlying crib structure. The apron is made up of an angled and horizontal section extending 350 ft from the right bank to the left bank. Periodic High flows can damage the apron. Damage to the apron has the potential to cause harm to upstream migrating fish and repairs to the barrier structure are required on a nearly annual basis in order to maintain its functionality and reduce hazards to migrating fish.

Damage to the existing barrier structure presents a hazard to migrating fish when they attempt to pass over the barrier. The previous timber and rebar apron was replaced in 2015 with concrete and steel plates as specified by the NMFS 2014 BiOp, which lowered hazards to fish caused by the apron. However, missing and damaged flashboards can provide attraction flows which keep fish from entering the trap-and-haul facility. Additionally, significant erosion near the flashboard anchor points can occur, which weakens the overall barrier flash board support structure. If a failure of the barrier structure were to happen, attraction to the fish trap would be severely limited and a catastrophic loss of salmonids would occur. In addition, replacing the flashboards following damage or loss requires in-water work with flows reduced to very low levels, leading to fish stranding and possible mortality.

Several species of fish are present in the White River, including ESA listed fall and spring Chinook salmon, steelhead, and bull trout. Recent returns of migrating salmonids, including record numbers of pink salmon in odd numbered years, have exceeded the current fish trap-and-haul facility's capabilities causing fish to stack up at the barrier and leading to significant delays in migration and spawning. The USACE is required under Section 7 of the ESA to provide safe, timely, and effective fish passage. Instead of passing upstream, migrating fish enter the USACE Fish Trap, which is located adjacent to the barrier structure on the left bank. Trapped fish are hauled by truck and released above MMD. This is the only method for fish to access spawning habitat above the dam. The existing fish release site is approximately 5 miles upstream of MMD and is also obsolete and incapable of handling the increased numbers of

migrating fish. The access road to the release site ranges in width from 12 feet to a maximum of 18 feet in some locations and runs a total length of 6,900 feet. The existing roadway does not include guardrails or turnouts. The narrow and steep access road limits the number of truck trips during peak pink salmon season. The existing fish chute is currently sized for 1200-gallon trucks and in need of repairs.

Due to the existing barrier structure and support facility's functional limitations and risk potential to migrating fish, the Corps is proposing the complete replacement of the barrier structure and the fish trap-and-haul facility, as well as the improvement of roads and levees to protect the facility and facilitate the transport of fish above Mud Mountain Dam, and the improvement and repair of the fish release site access road and fish chute.

The work effort will consist of three main elements: Roads and Levees construction, Barrier Structure/Support Facility construction, and Fish Release Site and Access Road Improvement. The construction phase for the Roads and Levees element is proposed to begin in August, 2016 and be completed in August, 2017. The Barrier Structure/Support Facility element is proposed to begin construction in June 2017 and be completed in December 2020. Fish Release Site construction will be completed by December 2020.

The Roads and Levees work effort will include improving existing roadways into the MIT hatchery site and improvement of the access road into the proposed support facility location. The project will entail storm and drainage features and improvements at the wetland crossing adjacent to the site. The proposed road section will consist of two 11-foot drive lanes, gravel shoulders, and a dedicated pedestrian walkway with a guardrail separating it from the roadway to address additional traffic generated by the project and tribal safety concerns. Paving will be required to limit noise, dust, and rapid road degradation. The levee system on the right bank will be improved to avoid induced flooding of the new facilities and the MIT hatchery site resulting from the new barrier structure.

The new Barrier Structure/Support Facility will consist of a narrower 200-foot wide hinged crest gate concept with four, 50-foot wide, hinged crest gates, with piers between gates and an access bridge across the top to facilitate maintenance and mechanical debris removal. The gates are designed to be lowered down in order to pass sediment and debris without damage. A concrete scour-protection apron will be constructed downstream of the gates and riprap scour-protection will be added downstream of the apron. Construction will be conducted in three phases, with care and diversion of water required in each phase. Phase one will have a left bank temporary cofferdam constructed to facilitate demolition of the existing structure and construction of the left three bays of the barrier structure. Phase two will require a right bank temporary cofferdam to facilitate demolition of the existing structure and construction of the right side of the barrier structure and the training wall protecting the support facility. Phase three will be the final construction of the right side of the barrier and construction of the new fish support facility on the right bank. The fish support facility will consist of hoppers to lift fish from the entrance pool to an overhead facility that contains sorting areas, holding pools, and loading mechanisms into the transport trucks. The sorting area will be conceptually designed to facilitate coarse sorting by species and delivery of hatchery fish, specific sorting mechanisms have not been identified at this time. The loading mechanisms will consist of a hopper that lifts fish over the truck drive-under pad and establishes a hydraulic connection with the truck tank. New 4500-gallon trucks are proposed for this action. All temporary cofferdams used during construction will be designed by the construction

contractor. Current specifications call for the use of fillable steel bin structures as the primary cofferdam.

The Fish Release Site and Access Road Improvements will entail widening of the road and creating additional area for truck turnaround at the river in order to accommodate more than one truck. The release site improvements will consist of repairs to the existing chute and construction of a second chute for the new 4500-gallon trucks and construction of a replacement 40 foot long concrete retaining wall. In water work requirements are expected to be minimal.

The current conceptual schedule is not developed to the degree necessary to identify all periods of in-water work. The normal in-water work window of July 15- August 31 is considered insufficient to conduct a year-round construction schedule in the river. The phasing of the project will result in periods of work outside the normal window most likely during fall and winter. The need for work outside the window has been coordinated with agencies and was part of the ESA consultation with NMFS and USFWS. Input from these groups will continue during the detailed design phase.

PROPOSED IN-WATER CONSTRUCTION ACTIVITIES

The following construction elements will involve inwater work potentially generating suspended sediment and leading to elevated turbidity levels downstream, necessitating a request for request for a turbidity mixing zone for exceedance of the state water standard for turbidity:

1. Installation and demobilization of cofferdams for construction of the new barrier structure and fish facility.
2. Channel shaping upstream and downstream of the new barrier structure to better align the channel morphology and direct flow to the new barrier structure.

An extended mixing zone is not requested for inwater construction activities related to road construction, levee construction, and improvements to the release site though some inwater activities might occur for each of these elements.

TEMPORARY BMPs TO CONTROL SEDIMENT

Modification of diversion structures to divert water form work areas and shutdown of construction activities are the two main BMPs which will be utilized to control sediment. A complete list of BMPs is included in exhibit 1. Included in that list are the NMFS 2014 BiOp requirements.

STREAM CHARACTERISTICS

Chapter 173-201A Washington Administrative Code (WAC), Water Quality Standards for Surface Waters of the State of Washington, classifies the "White River from the mouth upstream to latitude 47.2348 longitude -122.2422 (approximately RM 4.5) as a Salmonid Spawning, Rearing and Migration Aquatic Life Use. The White River from latitude 47.2348 longitude -122.2422 (approximately river mile 4.5) to MMD (river mile 27.1) is classified as a Core Summer Salmonid Habitat Aquatic Life Use. From MMD upstream to the West Fork White River at latitude 47.3699 longitude -121.6197, the White River is classified as a Core Summer Salmonid Habitat Aquatic Life Use. Upstream of the confluence with the West Fork, the White River is classified as a Char Spawning and Rearing Aquatic Life Use. Water quality

standards for the various use designations applicable to salmonids potentially affected by the proposed action on the White River are presented in Table 1. Although Washington State designated the char spawning and rearing use and associated temperature standard of 12 °C, there currently are no waters designated for this use in the White River watershed.

Chapter 173-201A Washington Administrative Code (WAC), Water Quality Standards for Surface Waters of the State of Washington, also classifies the "White River from the mouth upstream to latitude 47.2348 longitude -122.2422 (approximately RM 4.5) as having Primary Contact Recreation uses, Domestic, Industrial, Agricultural and Stock water uses, Wildlife Habitat, Harvesting, Commerce/Navigation and Aesthetics uses.

WDOE listed several segments of the lower White River, downstream of MMD, as water quality impaired for temperature and pH, and placed these segments on the 2012 Section 303(d) list of Category 5 impaired waters that require a total maximum daily load (TMDL) analysis. Temperature and pH impairments were identified at several locations between the mouth of the White River and river mile 9. Currently, a TMDL study for pH is ongoing for the lower White River. A TMDL study for temperature has not yet been approved by WDOE. Approved TMDLs for the lower White River include a bacteria TMDL, approved in 2011 (WDOE 2011), and a 5-day BOD and ammonia TMDL approved in 1993 and 1994 (WDOE 1994).

WDOE has not listed any segment of the upper White River upstream of MMD as Category 5 water-quality-impaired waters requiring a TMDL analysis. However, several drainages in the upper White River watershed were determined to be impaired for sediments and temperature resulting in an Upper White River Watershed Sediment and Temperature TMDL approved in 2006 (WDOE 2006). Other water quality issues in the White River watershed upstream of MMD include natural turbidity associated with the glacial nature of the system, increased peak flows, debris flows, and loss of riparian habitat associated with forest management in the basin (WDOE 1998), as well as the above mentioned increased sediment loading and temperature loading from several drainages in the basin (WDOE 2011). In the White River basin upstream of MMD, the USFS, Weyerhaeuser, and Washington Department of Natural Resources own or manage 109,000 acres, 68,000 acres, and 7,000 acres, respectively (WDOE 1998). This equates to approximately 83 percent of the basin under forest management.

Table 1. Freshwater Designated Uses and Critical Applicable to Salmonids in Western Washington (WAC 173-201A-200)*. White River specific uses including core summer habitat, and salmonid spawning and rearing.**

Category	Temperature Highest 7-DAD Max	Dissolved Oxygen Lowest 1-day minimum	pH Units	Turbidity NTUs
Char Spawning and Rearing*	12°C (53.6°F)	9.5 mg/L	pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units.	5 NTU over background when the background is 50 NTU or less; or A 10 percent % in turbidity when the background turbidity is more than 50 NTU.
Core Summer Salmonid Habitat* and **	16°C (60.8°F)	9.5 mg/L	Same as above.	Same as above.
Salmonid Spawning, Rearing, and Migration*	17.5°C (63.5°F)	8.0 mg/L	pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units.	Same as above.
Salmonid Rearing and Migration Only	17.5°C (63.5°F)	6.5 mg/L	Same as above.	10 NTU over background when the background is 50 NTU or less; or A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.

* http://apps.leg.wa.gov/WAC/default.aspx?cite=173-201A-200

** WDOE (2006) established a lower temperature criterion of 13 °C from September 15 to July 1 for the White River between the Lake Tapps tailrace and diversion structure (excluding the portions within the MIT Reservation) to provide additional protection for salmonid spawning and incubation.

In general, the temperature of the White River does not exceed 16° C in the project area. Because MMD holds a pool mainly during fall-winter flood events and is operated as run-of-river for most other times, it has little impact on the water temperature in the White River during the critical summer time period. However, water temperatures increase downstream in the lower White River and temperature is listed on the 2012 303(d) list as impaired from about the mouth to RM 9.0 (WDOE 2012). White River temperature monitoring was conducted by WDOE at RM 1.8, about 1.5 miles downstream of the Lake Tapps tailrace canal, in 2001, 2004, and 2006, and at RM 8 within MIT lands in 2002, 2003, and 2008 (Ebbert 2002, Zentner 2005, Bell-McKinnon 2006, Ward 2008). Prior to cessation of hydropower operations in 2004, the White River temperature ranged as high as about 21o C in July and August (WDOE 2005). In July and August of 2001, the water temperature ranged up to about 20o C at RM 1.8 and up to about 21o C at RM 8.0, and exceeded the state water quality criterion of 17.5° C 7-day average daily maximum (7-DADMax). After 2004, diversions from the White River into Lake Tapps Reservoir and releases from Lake Tapps Reservoir through the tailrace canal were significantly reduced (from 2000 cfs to less than 1000 cfs) under the Interim Agency Operating Agreement. Reducing diversions from the White River to Lake Tapps Reservoir provided additional water in the river for both the MIT Reservation Reach and the Lower White River. Although PTI personnel indicate this has allowed for lower summertime temperatures, there isn't any data that clearly supports this.. However, riparian development places this indicator "at risk."

Upstream of MMD, watershed activities such as forestry, roads, recreation and riparian vegetation disturbances can impact landscape characteristics and may cumulatively act to increase water temperatures. These watershed activities were noted by the Temperature TMDL as probable sources of temperature impairment in the upper White River watershed (WDOE 2003). For the mainstem White River above the dam, there are unvegetated banks in the inundation zone, so shading may be affected. However, the reach above and below the dam also contains steep walls and slopes that shade the river even on midsummer days. Consequently, water temperatures in the mainstem White River immediately above and below the dam are cool and generally do not exceed 16° C. The indicator above MMD is "properly functioning".

Temperatures recorded from 1994 to 1998 at the USGS station near Buckley, downstream of MMD, are slightly higher than temperatures recorded at a station a short distance below the mouth of the Clearwater River, at the head end of MMD project lands. Given that the downstream location is approximately 10 river miles below the upstream location, that the river between these points is wide and not well shaded, and that the lower station is at a lower elevation, the mean temperature increase observed between the two stations (1.6°F for data from 1994 to 1998) is not surprising. The lower station has not recorded any temperatures in excess of the Class A water quality criterion of 64°F.

Large amounts of glacial flour are conveyed from Mt. Rainier from glacial melting in warmer months, causing considerable accumulation of fines in the mainstem White River. This is likely to increase during the next few decades as climate change causes continued or accelerated retreat of glaciers. Any impoundment has at least temporarily caused sediment to accumulate in the reservoir that forms; this gradually erodes over time as flows drop and channel cutting combined with rain transports it out. Some scour and removal of accumulated sediment would occur in the winter, when glacial melting is not taking place, and water is clearer.

There is also some accumulation of coarser sediments behind the fish passage barrier at Buckley and below the barrier near the MIT fish trap entrance; they are washed through from time to time, particularly when the flashboards are blown out by debris in high flows.

Turbidity concentrations in the White River are elevated compared to other Puget Sound rivers due to the glacial origins of the river. Additionally, in the upper White River watershed, activities such as forestry, road building, recreation and riparian vegetation removal have resulted in increased sediment loading from the watershed to the White River (WDOE 2003). Turbidity concentrations in the White River are measured upstream and downstream of MMD. Data show that baseline turbidity concentrations are greatest in the White River during the summer months, likely because the river naturally carries glacial meltwater sediments. WDOE has not listed the White River above or below MMD as water quality impaired for sediments. Despite its natural origins, the high amount of fine sediment in the White River means that this indicator is "not properly functioning," and it impacts the usability of the mainstem White for spawning and egg incubation.

The White River has a significant sand/gravel/cobble bedload and a large suspended sediment load (WDOE 1999). The suspended sediment from glacial meltwater during the spring, summer and fall reduces the light penetration in the water column and limits biological productivity and algal growth (Ebbert 2002). Further, the river also has an exceeding low buffering capacity which limits its ability to assimilate pollutants.

Several areas of the lower White River from the mouth to RM 9.0 are on the 2012 WDOE Section 303(d) Category 5 list for pH and require a TMDL (WDOE 2012). Past monitoring conducted by WDOE between 1996 and 2003 documented pH exceedances of the 8.5 maximum at many locations in the lower White River (Ebbert 2002, 2003; Stuart and Brett 2001). The primary cause of elevated pH levels in the lower White River was attributed to the increased growth of periphyton caused by excessive nutrient inputs. Increased algal growth can result in diurnal cycling of pH because during daylight hours algae consume carbon dioxide (CO_2) in the water resulting in an increase in pH levels. WDOE measured pH in the lower White River between August and October 2012 at several locations, including RM 28 (at the USGS gage house downstream of MMD) and RM 3.7 (just upstream of the Lake Tapps tailrace) (WDOE 2012b). Preliminary data analysis shows that pH levels at RM 28 (downstream of MMD) were good and ranged from 6.99 to 7.7, while pH levels measured downstream at RM 3.7 (upstream of Lake Tapps tailrace) were higher and ranged up to 8.71. Nutrient inputs to the lower White River from point sources such as waste water treatment plants and industrial discharges, and non-point sources such as agricultural runoff and stormwater runoff, likely result in the increased algal growth and higher pH levels measured in the Lower White River.

MIXING ZONE REQUEST

Reference Site for Mixing Zone Length

To determine the desired length of the turbidity mixing zone within the state water quality standards can be met during the proposed inwater construction activities, turbidity measurements from the most recent repair project at the Buckley fish passage barrier were examined. Please refer for exhibit 2, "Report on Turbidity Monitoring Effort along the White River as the result of the barrier Dam Replacement in the Lower White River below Buckley, Washington for background data. Turbidity was measured for inwater activities similar to being proposed for the barrier and fish facility replacement (placement and removal of cofferdams, and channel shaping. Turbidity measurements were taken for sites, 300 feet, 600 feet, 1000 feet, ½ mile and 1 mile downstream. Exceedances were observed for inwater activities. However, while some of the exceedances were related to the inwater construction, some were generated by rapid changes in the background turbidity due local weather conditions and temperature changes and glacial melt.

Mixing Zone Derivation

Based on monitoring data from the apron repair project, the 1000 foot compliance point is a logical monitoring point. Based on previous construction experience in this reach, exceedances of the state water quality turbidity standards can be observed at 600 feet and application of BMPs (mainly further diversion of flows and work stoppages) can be applied to allow for compliance at the 1000 foot monitoring point. The 1000 foot point of compliance matches the NMFS BiOp requirements for monitoring. NMFS interprets exceedances of Washington State Water Quality Standards at the 1000 foot monitoring point to be a condition where harm would start to occur to ESA listed species.

Recreation use in this reach of the river is limited by access and will not be impacted by the proposed inwater activities. Instream flows and withdrawals to the Cascade Water Alliance flume will not be impacted by the proposed activities so water supply will not be impaired. The inwater activities might generate a turbidity plume, however, implementation of BMPs will reduce the visual aspects past the 1000 foot point of compliance, and will not be observable to downstream users.

In summary, the following mixing zone is requested for cofferdam installation and demobilization, and channel shaping activities – 1000 feet downstream.

REFERENCES

U.S. Army Corps of Engineers, Seattle District. 2015. Report on Turbidity Monitoring Effort along the White River as the Result of the Barrier Dam Apron Replacement in the Lower White River below Buckley, Washington.

EXHIBITS

Exhibit 1 (BMPs) is already included in attachment 3 of the Joint Aquatic Resources form.

Exhibit 2 (Turbidity Report June-August 2015 with Appendices) is already included in attachment 2 of the Draft Water Quality Plan of which this Request of Extension of Mixing Zone is Attachment 7.

Attachment 3. BEST MANAGEMENT PRACTICES

List of potential Best Management Practices for the proposed Mud Mountain Dam Upstream Fish Passage Facility and Barrier Replacement

The following list of BMPs are being considered for use in the replacement of the Mud Mountain Dam barrier structure and Fish Passage Facility. The BMPs are taken from the Washington State Department of Ecology 2012 Stormwater Management Manual for Western Washington, the 2014 National Marine Fisheries Service Final Biological Opinion for Mud Mountain Dam, Operation and Maintenance

BMPs from:
2012 Stormwater Management Manual for Western Washington
Washington Department of Ecology
Amended December 2014
Volume II: Construction Stormwater Pollution Prevention, Chapter 4

C101: Preserving Natural Vegetation

C102: Buffer Zones

C103: High Visibility Fence

C105: Stabilized Construction Entrance/Exit

C120: Temporary and Permanent Seeding

C121: Mulching

C122: Nets and Blankets

C123: Plastic Covering

C125: Topsoiling/Composting

C140: Dust Control

C151: Concrete Handling

C152: Sawcutting and Surfacing Pollution Prevention

C153: Material Delivery, Storage and Containment

C154: Concrete Washout Area

C160: Certified Erosion and Sediment Control Lead

C232: Gravel Filter Berm

C233: Silt Fence

C235: Wattles

C240 Sediment Trap

C241: Temporary Sediment Pond

C251: Construction Stormwater Filtration

C252: High pH Neutralization Using CO_2

C253: pH Control for High pH Water

T6.10: Presettling Basin

BMPs from:
NMFS Final Biological Opinion for Mud Mountain Dam, Operation and Maintenance
NWR-2013-10095
October 2014
Appendix B: Best Management Practices for In-Water Work

1. Pollution and erosion control. Any action that will require earthwork and may increase soil erosion and cause runoff with visible sediment into surface water, or that will require the use of materials that are hazardous or toxic to aquatic life (such as motor fuel, oil, or drilling fluid), must have a pollution and erosion control plan that is developed and carried out by the applicant, and commensurate with the scale of the action.

a. The plan must include practices to minimize erosion and sedimentation associated with all aspects of the project (*e.g.*, staging areas, stockpiles, grading); to prevent construction debris from dropping or otherwise entering any stream or waterbody; and to prevent and control hazardous material spills.

b. During construction, erosion controls and streams must be monitored and maintained daily during the rainy season and weekly during the dry season as necessary to ensure controls are properly functioning.

c. If monitoring shows that the erosion controls are ineffective at preventing visible sediment discharge, the project must stop to evaluate erosion control measures. Repairs, replacements or the installation of additional erosion control measures must be completed before the project resumes.

d. Proper maintenance includes removal of sediment and debris from erosion controls like silt fences or hay bales once it has reached on-third of the exposed height of the control.

2. Stormwater management. Any action that will expand, recondition, reconstruct, or replace pavement, replace a stream crossing, otherwise increase the contributing impervious surface within the project area, or create a new stormwater conveyance or discharge facility, must have a stormwater management plan that is developed and carried out by the applicant, commensurate with the scale of the action.

3. Site restoration. Any action that results in significant disturbance of riparian vegetation, soils, streambanks, or stream channel must have a site restoration plan that is developed and carried out by the permittee (or Corps), that is commensurate with the scale of the action. The goal of the plan is to ensure that riparian vegetation, soils, streambanks, and stream channel are cleaned up and restored after the action is complete. No single criterion is sufficient to measure restoration success, but the intent is that the following features should be present in the upland parts of the project area, within reasonable limits of natural and management variation:

a. Human and livestock disturbance, if any, are confined to small areas necessary for access or other special management situations.

b. Areas with signs of significant past erosion are completely stabilized and healed, bare soil spaces are small and well-dispersed.

c. Soil movement, such as active rills and soil deposition around plants or in small basins, is absent or slight and local.

d. Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.
e. Plants are native species and have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.
f. Vegetation structure is resulting in rooting throughout the available soil profile.
g. Plant litter is well distributed and effective in protecting the soil with little or no litter accumulated against vegetation as a result of active sheet erosion ("litter dams").
h. A continuous corridor of shrubs and trees appropriate to the site are present to provide shade and other habitat functions for the entire streambank.
i. Streambanks are stable, well vegetated, and protected at margins by roots that extend below baseflow elevation, or by coarse-grained alluvial debris.

4. Compensatory mitigation. Any action that will permanently displace riparian or aquatic habitats or otherwise prevent development of properly functioning condition of natural habitat processes will require compensatory mitigation to fully offset those impacts.

a. Examples of actions requiring compensatory mitigation include construction of a new or enlarged boat ramp or float, the addition of scour protection to a boat ramp, or construction of new impervious surfaces without adequate stormwater treatment.
b. For displaced riparian and aquatic habitat, the primary habitat functions of concern are related to the physical and biological features essential to the longterm conservation of listed species. Those are water quality, water quantity, channel substrate, floodplain connectivity, forage, natural cover, space, and free passage. Examples of acceptable mitigation for riparian losses includes planting trees or other woody vegetation in the riparian area, removal of existing overwater structures or restoration of shallow-water, off-channel, or beach habitat by adding features such as submerged or overhanging large wood, aquatic vegetation, large rocks and boulders, side channels and undercut banks.
c. For new impervious surfaces with inadequate stormwater treatment, the primary habitat functions of concern are water quality and water quantity. Examples of acceptable mitigation for inadequate stormwater management includes providing adequate stormwater treatment at an alternate site where it did not exist before or retrofitting an existing but substandard stormwater facility to provide capacity necessary to infiltrate and retain the proper volume of stormwater.
d. As part of NMFS's review under clause 3 above, NMFS will determine if the proposed compensatory mitigation fully offsets permanent displacement of riparian or aquatic habitats and/or impacts that prevent development of properly functioning processes.

5. Preconstruction activity. Before alteration of the action area, flag the boundaries of clearing limits associated with site access and construction to minimize soil and vegetation disturbance, and ensure that all temporary erosion controls are in place and functional.

6. Site preparation. During site preparation, conserve native materials for restoration, including large wood, vegetation, topsoil and channel materials (gravel, cobble and boulders) displaced by construction. Whenever practical, leave native materials where they are found and in areas to be cleared, clip vegetation at ground level to retain root mass and encourage reestablishment of native vegetation. Building and related structures may not be constructed inside the riparian management area.

7. Heavy equipment. Heavy equipment will be selected and operated as necessary to minimize adverse effects on the environment (*e.g.*, minimally-sized, low pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils); and all vehicles and other heavy equipment will be used as follows:

a. Stored, fueled and maintained in a vehicle staging area placed 150 feet or more from any waterbody, or in an isolated hard zone such as a paved parking lot.

b. Inspected daily for fluid leaks before leaving the vehicle staging area for operation within 50 feet of any waterbody.

c. Steam-cleaned before operation below ordinary high water, and as often as necessary during operation to remain free of all external oil, grease, mud, seeds, organisms and other visible contaminants.

d. Generators, cranes and any other stationary equipment operated within 150 feet of any waterbody will be maintained and protected as necessary to prevent leaks and spills from entering the water.

8. In-water work period. All work within the active channel will be completed in accordance with the WDFW- and NMFS-approved in-water work windows.

a. Hydraulic and topographic measurements and encased geotechnical drilling may be completed at any time, if a fish biologist determines that no adult fish are congregating for spawning and no redds are occupied by eggs or pre-emergent alevins within 300 feet of the work site.

9. Actions that require work area isolation. Any action that involves excavation (other than access management), backfilling, embankment construction, or similar work below ordinary high water where adult or juvenile fish are reasonably certain to be present, or 300 feet or less upstream from spawning habitats, must be effectively isolated from the active stream.

10. Fish capture and removal. Whenever work isolation is required and ESA-listed fish are likely to be present, the applicant must attempt to capture and remove the fish as follows:

a. A fishery biologist experienced with work area isolation and competent to ensure the safe capture, handling and release of all fish will supervise this part of the action, and complete the fish salvage form from Appendix C that will be submitted with the action completion report.

b. Any fish trapped within the isolated work area must be captured and released using a trap, seine, electrofishing, or other methods as prudent to minimize the risk of injury, then released at a safe release site.

c. If electrofishing is used to capture fish, that work must consistent with NMFS' electrofishing guidelines (NMFS 2000).

11. Piling installation. Pilings may be concrete, steel round pile 24 inches in diameter or smaller, steel H-pile designated as HP24 or smaller, or wood that has not been treated with preservatives or pesticides. Any proposal to use wood pilings treated with preservatives or pesticides is not covered by this consultation and will require individual consultation.

a. When practical, use a vibratory hammer for piling installation. For pile driving in the Columbia River in the month of October, only a vibratory hammer may be used.

b. Jetting may be used for piling installation in areas with coarse, uncontaminated sediments.

12. Pile driving with an impact hammer. When using an impact hammer to drive or proof steel piles, one of the following sound attenuation methods must be used:

a. Completely isolate the pile from flowing water by dewatering the area around the pile.

b. If water velocity is 1.6 feet per second or less, surround the piling being driven by a confined or unconfined bubble curtain (*see*, Wursig *et al*. 2000, and Longmuir and Lively 2001) that will distribute small air bubbles around 100% of the piling perimeter for the full depth of the water column.

c. If water velocity is greater than 1.6 feet per second, surround the piling being driven by a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or non-metallic sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

Attachment 4. COASTAL CONSISTENCY DETERMINATION

COASTAL ZONE MANAGEMENT ACT
CONSISTENCY DETERMINATION

Coastal Zone Management Act Consistency Determination
Mud Mountain Dam Upstream Fish Passage Facility YEAR XX
XX December 2015

The Coastal Zone Management Act of 1972, as amended, requires federal agencies to carry out their activities in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved state Coastal Zone Management (CZM) Programs. The Shoreline Management Act (SMA) of 1972 (RCW 90.58) is the core of authority of Washington's CZM Program. Primary responsibility for the implementation of the SMA is assigned to local governments.

The construction actions discussed herein are activities undertaken by a Federal agency; the following constitutes a Federal consistency determination with the enforceable provisions of the Washington Coastal Zone Management Program.

This document concerns the proposed action of the ***Mud Mountain Dam Upstream Fish Passage Facility Replacement near Buckley, Washington in waters of King and Pierce counties*.**

1. INTRODUCTION

The proposed Federal action applicable to this consistency determination is the replacement actions at the *Mud Mountain Dam (MMD) Upstream Fish Passage Barrier Structure (barrier structure) and Fish Trap and Haul Support Facilities (support facility)* in the White River. The barrier structure is located in an area where the river itself is on the county line between both King and Pierce Counties. The barrier structure spans the width of the river; therefore, this determination of consistency with the Washington CZMA is based on review of applicable sections of the State of Washington Shoreline Management Program and policies and standards of the Shoreline Master Plans for King and Pierce counties, Washington.

The U.S. Army Corps of Engineers, Seattle District (USACE), proposes to conduct a complete replacement of the barrier structure and apron, as well as replace the fish trap-and-haul facility currently located on the left bank with a new support facility on the right bank, and improve levee protection and roads in the project area, as well as improve and repair the fish release site above MMD, in and adjacent to the White River, King County, Washington. The purpose of the proposed work is to meet the requirements of the 2014 National Marine Fisheries Service (NMFS) Biological Opinion's (BiOp) Reasonable and Prudent Alternative (RPA), in order to reduce the potential for injuries and fatalities to upstream migrating fish, including species listed under the Endangered Species Act (ESA). The proposed project would construct a new barrier structure on the same axis as the existing barrier structure and a new fish trap-and-haul support facility capable of handling a projected 60,000 fish per day would be built on the right bank. The proposed project would also improve the existing Muckleshoot Indian Tribe (MIT) hatchery levee on the right bank and improve the access road system into the support facility, as well as repair and improve the fish release site and access road.

The existing barrier structure is a concrete and rock-filled timber crib structure. Steel vertical members and wooden flashboards are attached to the top of the crib creating a pool behind the structure (providing for diversion into Lake Tapps and to the USACE fish trap intake) and providing a "jump barrier" for upstream migrating fish. The downstream section of the crib structure is capped with an apron comprised of concrete and steel plates to protect the underlying crib structure. The apron is made up of an angled and horizontal section extending 350 ft from the right bank to the left bank. Periodic High flows can damage the apron. Damage to the apron has the potential to cause harm to upstream migrating fish and repairs to the barrier structure are required on a nearly annual basis in order to maintain its functionality and reduce hazards to migrating fish.

Damage to the existing barrier structure presents a hazard to migrating fish when they attempt to pass over the barrier. The previous timber and rebar apron was replaced in 2015 with concrete and steel plates as specified by the NMFS 2014 BiOp, which lowered hazards to fish caused by the apron. However, missing and damaged flashboards can provide attraction flows which keep fish from entering the trap-and-haul facility. Additionally, significant erosion near the flashboard anchor points can occur, which weakens the overall barrier flash board support structure. If a failure of the barrier structure were to happen, attraction to the fish trap would be severely limited and a catastrophic loss of salmonids would occur. In addition, replacing the flashboards following damage or loss requires in-water work with flows reduced to very low levels, leading to fish stranding and possible mortality.

Several species of fish are present in the White River, including ESA listed fall and spring Chinook salmon, steelhead, and bull trout. Recent returns of migrating salmonids, including record numbers of pink salmon in odd numbered years, have exceeded the current fish trap-and-haul facility's capabilities causing fish to stack up at the barrier and leading to significant delays in migration and spawning. The USACE is required under Section 7 of the ESA to provide safe, timely, and effective fish passage. Instead of passing upstream, migrating fish enter the USACE Fish Trap, which is located adjacent to the barrier structure on the left bank. Trapped fish are hauled by truck and released above MMD. This is the only method for fish to access spawning habitat above the dam. The existing fish release site is approximately 5 miles upstream of MMD and is also obsolete and incapable of handling the increased numbers of migrating fish. The access road to the release site ranges in width from 12 feet to a maximum of 18 feet in some locations and runs a total length of 6,900 feet. The existing roadway does not include guardrails or turnouts. The narrow and steep access road limits the number of truck trips during peak pink salmon season. The existing fish chute is currently sized for 1200-gallon trucks and in need of repairs.

Due to the existing barrier structure and support facility's functional limitations and risk potential to migrating fish, the Corps is proposing the complete replacement of the barrier structure and the fish trap-and-haul facility, as well as the improvement of roads and levees to protect the facility and facilitate the transport of fish above Mud Mountain Dam, and the improvement and repair of the fish release site access road and fish chute.

The work effort will consist of three main elements: Roads and Levees construction, Barrier Structure/Support Facility construction, and Fish Release Site and Access Road Improvement. The construction phase for the Roads and Levees element is proposed to begin in August, 2016 and be completed in August, 2017. The Barrier Structure/Support Facility element is proposed to begin

construction in June 2017 and be completed in December 2020. Fish Release Site construction will be completed by December 2020.

The Roads and Levees work effort will include improving existing roadways into the MIT hatchery site and improvement of the access road into the proposed support facility location. The project will entail storm and drainage features and improvements at the wetland crossing adjacent to the site. The proposed road section will consist of two 11-foot drive lanes, gravel shoulders, and a dedicated pedestrian walkway with a guardrail separating it from the roadway to address additional traffic generated by the project and tribal safety concerns. Paving will be required to limit noise, dust, and rapid road degradation. The levee system on the right bank will be improved to avoid induced flooding of the new facilities and the MIT hatchery site resulting from the new barrier structure.

The new Barrier Structure/Support Facility will consist of a narrower 200-foot wide hinged crest gate concept with four, 50-foot wide, hinged crest gates, with piers between gates and an access bridge across the top to facilitate maintenance and mechanical debris removal. The gates are designed to be lowered down in order to pass sediment and debris without damage. A concrete scour-protection apron will be constructed downstream of the gates and riprap scour-protection will be added downstream of the apron. Construction will be conducted in three phases, with care and diversion of water required in each phase. Phase one will have a left bank temporary cofferdam constructed to facilitate demolition of the existing structure and construction of the left three bays of the barrier structure. Phase two will require a right bank temporary cofferdam to facilitate demolition of the existing structure and construction of the right side of the barrier structure and the training wall protecting the support facility. Phase three will be the final construction of the right side of the barrier and construction of the new fish support facility on the right bank. The fish support facility will consist of hoppers to lift fish from the entrance pool to an overhead facility that contains sorting areas, holding pools, and loading mechanisms into the transport trucks. The sorting area will be conceptually designed to facilitate coarse sorting by species and delivery of hatchery fish, specific sorting mechanisms have not been identified at this time. The loading mechanisms will consist of a hopper that lifts fish over the truck drive-under pad and establishes a hydraulic connection with the truck tank. New 4500-gallon trucks are proposed for this action. All temporary cofferdams used during construction will be designed by the construction contractor. Current specifications call for the use of fillable steel bin structures as the primary cofferdam.

The Fish Release Site and Access Road Improvements will entail widening of the road and creating additional area for truck turnaround at the river in order to accommodate more than one truck. The release site improvements will consist of repairs to the existing chute and construction of a second chute for the new 4500-gallon trucks and construction of a replacement 40 foot long concrete retaining wall. In water work requirements are expected to be minimal.

The current conceptual schedule is not developed to the degree necessary to identify all periods of in-water work. The normal in-water work window of July 15- August 31 is considered insufficient to conduct a year-round construction schedule in the river. The phasing of the project will result in periods of work outside the normal window most likely during fall and winter. The need for work outside the window has been coordinated with agencies and was part of the ESA consultation with NMFS and USFWS. Input from these groups will continue during the detailed design phase. The current design plan

is still ongoing and elements included in the work efforts may change as design progresses. The 10% design plan and a detailed work effort description is attached to the Joint Aquatic Resources (JAR) form.

The USACE has determined that the proposed actions are consistent with applicable coastal zone and shoreline management regulations as shown below. Applicable goals and policies of the State of Washington, King County, and Pierce County SMPs are presented below with the Corps consistency evaluation indicated in ***bold italics.***

2. STATE OF WASHINGTON SHORELINE MANAGEMENT PROGRAM

The SMA is the core of authority of Washington's CZM Program. Primary responsibility for the implementation of the SMA is assigned to local government. King and Pierce Counties, in which the proposed project is located, fulfilled this requirement with the Shoreline Management Program for King County, which was revised on January 28, 2013 and Pierce County, which was revised on March 10, 2015.

Washington Shoreline Management Act

Chapter 173-27-60 of the Washington Administrative Code outlines guidance for SMA compliance when involving federal projects and federal lands. The proposed action complies to the SMA to the fullest extent possible.

The Corps has the authority for construction at completed projects when the purpose of the work is the continued operation of the project. The Corps may make "reasonable changes and additions to project facilities within project boundaries as may be needed to properly operate the project or minimize maintenance" (ER 1165-2-119 § 8). The Corps has authority to construct the proposed fish passage facility as necessary for proper operation of MMD.

Chapter 173-26 outlines the guidelines for the Washington State Shoreline Master Program Guidelines. Section 176-26-176 describes general policy goals for shorelines of the state. RCW 90.58.020 identifies protection, restoration and preservation of the ecological functions of shoreline natural resources to be policy goal of the state. The proposed project will restore ecological functions to the White River system by improving upstream fish passage, thereby increasing nutrient flow in the upper watershed and access to spawning habitat; improve downstream sediment and wood flow below the Buckley Barrier Structure; and improve downstream aquatic habitat by eliminating the need for flow reduction events for maintenance of the current barrier structure which in the past has resulted in fish stranding.

KING COUNTY SHORELINE MANAGEMENT PROGRAM

Chapter 5 (Shorelines) of the King County SMP identified the MMD Reservoir and the White River from river mile 15.5 to river mile 46 (excluding the Muckleshoot Indian Tribe Reservation between RM 8.9 to RM 15.5) as a water body that qualifies as a "Shoreline of Statewide Significance" a category in which specific priority uses are preferred (pg 5-13 in King Co. SMP dated December 2012). The location of the repair is at RM 24.3 at the barrier structure and associated fish trap, which is used to collect upstream migrating salmon and trout and transport those fish above MMD.

Elements of the King County SMP

S-203: The King County SMP describes shoreline preferred uses which include areas reserved for water-related uses that are compatible for ecological protection and restoration.

The MMD Fish Passage Facility project provides the ecological function of improving upstream fish passage to the upper White River for salmon and trout. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-515: Includes conservancy shoreline environment designation criteria where elements of the shoreline include an area where important ecological processes have not been substantially degraded or where the shoreline is in public ownership. Areas included in the Conservancy include shorelines in public ownership and managed for public access or recreation.

The proposed project includes areas in public ownership and provides ecological process of sustaining upstream migration of salmon and trout. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-516: Includes shoreline environment management policies that sustain the shoreline area's physical and biological resources. The Conservancy Shoreline allows uses for water-dependent facilities if significant adverse impacts to the shoreline are mitigated.

The proposed project sustains biological resources by improving upstream fish passage. In addition, downstream aquatic habitat will be improved because of the elimination of flow reduction events to repair the current barrier. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-603: King County shall require shoreline uses and modifications to be designed and managed to prevent degradation of water quality and alteration of natural hydrographic conditions to the maximum extent practical.

The proposed project will provide better sediment discharge and require less alteration of natural flow than the existing barrier. Therefore, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-617: King County wetland regulations shall address the following uses to achieve, at a minimum, no net loss of wetland area and functions:

1. Removal, excavation, grading, or dredging of soil, sand, gravel, minerals, organic matter, or material of any kind;
2. Dumping, discharging, or filling with any material, including discharges of stormwater and domestic, commercial, or industrial wastewater;
3. Draining, flooding, or disturbing of the open water level, duration of inundation, or groundwater table;

4. Driving of pilings;
5. Placing of obstructions;
6. Construction, reconstruction, demolition, or expansion of any structure;
7. Significant vegetation removal, except for non-conversion forest practices regulated under RCW chapter 76.09;
8. Other uses or development that results in a significant ecological impact to the physical, chemical or biological characteristics of wetlands; and
9. Activities reducing the functions of buffers.

The proposed project will follow strict Best Management Practices (BMPs) to avoid any unnecessary impacts to wetlands. The project will require alteration and impacts to .08 acres of wetlands in order to improve and build the fish support facility access road; USACE considers this impact to be minor and will mitigate this impact by improving overall watershed functions enhancing the functioning of wetlands and other aquatic habitats in the overall system. Therefore, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-619: King County should allow alterations to wetlands only if there is no net loss of wetland functions and values.

The proposed project will improve overall wetland and aquatic habitat functions in the overall watershed by improving nutrient flow, sediment supply, downstream rearing areas, and maintaining instream flows. These improved functions will compensate for .08 acres of wetlands impacted by the project, resulting in no net loss of wetlands functions. Therefore, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-633: King County shall provide a high level of protection to critical freshwater habitats due to the important ecological functions they provide.

The proposed project will improve and protect the ecological function of the river by improving upstream salmon passage in the upper White River as well as providing adequate flows to maintain downstream rearing habitats for aquatic species. Therefore, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-636: King County shall protect ecological functions associated with critical freshwater habitat as necessary to assure no net loss from shoreline activities and associated changes.

The MMD Fish Passage Facility project provides the ecological function of improving upstream fish passage to the upper White River for salmon and trout, and maintaining downstream rearing areas there will be no net loss from shoreline activities as a result of the project. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-640: Vegetation conservation provisions apply to all shoreline uses and developments, whether or not the use or development requires a shoreline substantial development permit.

The proposed project will require the clearing of approximately 8 acres of vegetation; Replacement trees and vegetation will be planted at the site where possible. Areas disturbed by construction will be replanted at completion. The proposed project will also allow for the passage of Large Woody Debris (LWD) through the barrier structure, improving downstream shoreline habitat. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-646: Shoreline Master Program water quality, stormwater, and non-point pollution policies apply to all development and uses in the shoreline jurisdiction that affect water quality.

The MMD upstream fish passage project will utilize BMPs designed to limit impacts to stormwater run-off and water quality degradation. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-650: Habitat protection and restoration projects in the shoreline jurisdiction shall consider implications of sea-level rise and other climate change impacts to promote resiliency of habitats and species.
Flows in the White River within the project area are controlled by the upstream releases at MMD and constrained by flood risk management triggers downstream. While the hydrology of the river is expected to be affected by climate change, given the constraints of the flood risk management operations, design criteria formulated to the current conditions and operating plan for MMD are assumed to be adequate to provide for long-term stability of the structure and fish trap operations at the site. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-740: "In-water structures shall provide for protection and preservation of shoreline ecological processes and functions, and cultural resources, including, but not limited to, fish and fish passage, wildlife and water resources, shoreline critical areas, hydro-geological processes, and natural scenic vistas."

The proposed project improves upstream fish passage and allows for maintenance of instream flows to protect downstream aquatic habitats. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

S-741: "The location and planning of in-water structures shall give due consideration to the full range of public interests and shoreline ecological processes and functions, with special emphasis on protecting and restoring habitat for threatened and endangered species."

The proposed project improves survival of all fish, including ESA listed species, requiring upstream fish passage. Thus, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

The MMD Fish Passage Facility project is considered by the USACE to be an allowable activity consistent to the maximum extent practicable with the local shoreline plan. The replacement of the barrier and trap and haul facility will improve ecological function and restore biological resources by reducing the harm to upstream and downstream migrating salmon and trout.

PIERCE COUNTY SHORELINE MANAGEMENT PROGRAM

Elements of the Pierce County SMP

Chapter 20.14: The Conservancy Environment is designed to protect, conserve and manage existing natural resources and valuable historic and cultural areas in order to ensure a continuous flow of recreational benefits to the public and to achieve sustained resource utilization. The Pierce County SMP describes shoreline preferred uses that include areas for outdoor recreation activities.

The proposed project improves upstream fish passage to the upper White River for salmon and trout and improves downstream habitat for migrating juvenile salmonids. Therefore, USACE considers the proposed work to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program as it would not have any adverse effects to outdoor recreation activities.

Chapter 20.24: Aquaculture is described as the commercial culture and farming of food fish, shellfish, and other aquatic plants and animals in lakes, streams, inlets, estuaries, and other natural or artificial water bodies. Aquacultural Practices include the hatching, cultivating, planting, feeding, raising, harvesting, and processing of aquatic plants and animals, and the maintenance and construction of necessary equipment, buildings, and growing areas. Methods of aquaculture include but are not limited to fish pens, shellfish rafts, racks and longlines, seaweed floats and the culture of clams and oysters in tidal and other shoreline areas.

The Muckleshoot Indian Tribe Fish Hatchery is dependent upon a functioning barrier structure. The barrier structure replacement provides an improved barrier structure with better functional stability. Therefore, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

Chapter 20.34: Educational and Archeological Areas and Historic Sites includes significant archeological sites or excavations, ghost towns, military forts, old settlers homes, historic trails, kitchen middens, interpretive centers, or any other site, facility, or structure that is educationally significant. Regulations that apply to Educational and Archeological sites and Historical areas in all Shoreline environments include the protection, rehabilitation, restoration and reconstruction of districts, sites, buildings, structures and objects significant in American and Washington history, architecture, archeology or culture.

The barrier structure is eligible for listing under the National Historic Preservation Act of 1966 and Chapter 43.51 RCW to provide for the protection, rehabilitation, restoration and reconstruction of districts, sites, buildings, structures and objects significant in American and Washington history, architecture, archeology or culture. The barrier structure is part of the White River Hydroelectric Project (WRHP) Historic District. The USACE is currently working with the Washington State

Historic Preservation Officer to prepare a Memorandum Of Agreement to evaluate the buildings, structures or places of historic significance that comprise the barrier structure and to determine appropriate actions that will mitigate any adverse effects from the proposed action. Therefore, the USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

Chapter 20.66.030: Shoreline Protection Actions includes the Conservancy Environment, which in turn includes dams and holding basins. These are permitted subject to the general regulatory standards and Conditional Use requirements.

The proposed project improves the functional stability of the barrier structure and improves the capabilities of the fish trap-and-haul facility. Therefore, USACE considers this to be consistent to the maximum extent possible with the State of Washington Shoreline Management Program.

4. OTHER STATUTES

The State Environmental Policy Act

SEPA is not applicable to this action as this is a federal project; the proposed action has been reviewed under the National Environmental Policy Act and a Finding of No Significant Impact and Environmental Assessment was released in May 2015 with all applicable laws and regulations reviewed under its provisions.

Ocean Resources Management Act

As per Section 43.143.010 of the Washington Ocean Resources Management Act, the proposed project area is not defined as a coastal county or coastal water, thus this Act is not applicable.

Clean Water Act

The USACE is analyzing the project under Section 404 and has submitted a request to the Department of Ecology for Section 401 Water Quality Certification. The project design conducted an alternatives analysis which reviewed alternate means and sites to provide upstream fish passage and meet the NMFS BiOp requirements. The alternatives analysis determine that the Buckley site was the best alternative to meet the BiOp goals. Project designs were chosen to minimize impact to wetlands, other waters of the US and riparian areas. The proposed action will improve overall watershed functions for wetlands and aquatic habitats by increasing nutrient flow in the upper watershed, improve sediment and wood movement below the barrier structure, and reduce disruption to aquatic habitat downstream of the barrier structure by eliminating the need for flow reducing events to repair the current structure. These actions compensate for impacts to wetland and other waters of the U.S..

Construction stormwater management will be covered via a request for a Section 402 NPDES permit to cover construction activities. The project will have a stormwater detention pond which will be covered by an NPDES permit for project operations.

Clean Air Act

The proposed project was analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. The proposed activities will have temporary impacts to local air quality due to the emissions of construction vehicles, however the lack of any exceed de minimis levels of direct emissions of a criteria pollutant or its precursors long-term recurring emissions from the work is unlikely to exceed de minimis levels of direct emissions of a criteria pollutant or its precursors.

Washington State Energy Facility Site Evaluation Council

The proposed action is a single-purpose project designed to improve upstream passage for fish species in the White River and does not qualify as an energy project or energy facility, therefore this section is not applicable.

Attachment 5. WETLAND DELINEATIONS AND RATING FORM

Available for download at: https://safe.amrdec.army.mil/SAFE/ Details about how to download these documents is available upon request.