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United States Department of Agriculture
Forest Service

Upper Stillwaters and Stormy A Restoration Project on the Entiat River

Final Environmental Assessment

Entiat Ranger District, Okanogan-Wenatchee National Forest, Chelan County, Washington

February 2017

Photo of the Entiat River by Emily Johnson, Fisheries Biologist, USDA Forest Service

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Introduction

The Okanogan-Wenatchee National Forest, Entiat Ranger District, has partnered with the Yakama Nation and Bonneville Power Administration to conduct stream restoration work on U.S. Forest Service lands along the Entiat River from river mile (RM) 25.5 to 27.5 (Upper Stillwaters Reach) and RM 20.5 to 20.7 (USFS portion of the Stormy A Reach). The Entiat River provides critical habitat for populations of Upper Columbia River Steelhead, Upper Columbia River Spring Chinook salmon and Columbia River bull trout, which are listed under the Endangered Species Act (ESA). The Entiat River also provides Essential Fish Habitat (EFH) for coho and chinook salmon, which are covered under the Magnuson-Stevens Fisheries Conservation and Management Act (MSA). The Upper Stillwaters and Stormy A restoration projects are designed to enhance and improve in-stream habitat for fish species, especially ESA-listed salmon, steelhead and bulltrout, in the Entiat River by:

- Increasing the amount of large wood in the Entiat River
- Increasing the quality of pool habitat by placing large wood structures along streambanks and riprap banks at key locations where the Entiat River Road and the Entiat River interact
- Restoring side-channel habitat

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the no action and proposed action alternative.

This EA was prepared to determine the effects of constructing and placing large wood and boulder structures along riprap sections of the Entiat River Road, constructing large wood jams and re-establishing a side-channel in the 2.0 mile Upper Stillwaters Reach and the 0.2 mile Stormy A Reach of the Entiat River. This EA would also determine whether the Upper Stillwaters and Stormy A projects significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement.

Background

The Entiat River flows into the Columbia River upstream of Rocky Reach Dam, near RM 484, within the Upper Columbia River Basin. The Entiat River historically produced large numbers of upper Columbia River spring chinook salmon, steehead and bull trout, however past activities (such as dams, fishing, roads, timber harvest, grazing, etc.) have impacted stream habitat and fish populations to the extent that these species have been listed under the ESA. Past timber harvest within the riparian areas has reduced the recruitment potential, size and number of key pieces of large wood to the Entiat River. The Entiat River Road and associated rip rap which abuts the channel in key locations and confines the river, has reduced riparian vegetation within these locations as well. Impacts from the Entiat River Road are localized to areas where the road and the river interact and include reduced riparian vegetation and large tree overstory, accelerated scour processes, reduced hydraulic roughness and reduced potential for large wood recruitment due to riparian clearing and bank armoring.

Large wood and pools in rivers provide important habitat to many aquatic species both in the main river channel and in side channels. Large wood provides shelter, hydraulic refuge, and creates pools with slow water that are important for rearing salmon and trout. Large wood increases food production by increasing invertebrate production. Wood also contributes to the creation of vegetated islands that are important nutrient inputs for many aquatic species. Side-channel habitat is important for juvenile rearing as refugia from high stream temperatures, predators and high flows during spring runoff.

Recent stream surveys of the Entiat River; the Upper Stillwaters Reach Assessment (Interfluve Inc. 2013) and the Stormy Reach Assessment (USBR, 2009), provided an evaluation of existing aquatic habitat conditions and compared them to "target" or desired conditions based on reference data and regional habitat thresholds (USFWS and NOAA Matrix of pathways and indicators). The Upper Stillwaters Reach Assessment identified potential projects that would be intended to improve existing stream habitat within the Entiat River and move towards these desired/target conditions. The Stormy Reach Assessment was produced by the Bureau of Reclamation (BOR) to assist in meeting tributary habitat commitments contained in the 2008 Federal Columbia River Power System Biological Opinion and also identified potential projects that would be intended to improve existing stream habitat within the Entiat River and move towards desired/target conditions.

These projects are supportive of moving endangered fish species toward recovery while benefiting aquatic and wildlife resources. On NFS lands within the Upper Stillwaters area, the lack of large woody material (LWM) due to past timber harvest, the location of the Entiat River Road and the location of several NFS campgrounds within the floodplain are the primary impacts to floodplain and channel function from management actions identified in the reach assessment. On NFS lands within the Stormy area, the lack of LWM due to past timber harvest, private development along the river and channel incision/disconnected floodplain were identified as the primary impacts to floodplain and channel function from management actions.

The impacts of past actions on stream habitat diversity in the Entiat River has limited fish productivity as well as limiting Essential Fish Habitat, which is defined as all suitable habitat for salmon that currently is, or historically was, necessary to fish for spawning, breeding, feeding, or growth to maturity (USDA-FS 1994), (UCSRB 2007), (USDA-FS 2010). The Upper Columbia Salmon Recovery Plan (developed by the Upper Columbia Salmon Recovery Board in 2007) and the associated Biological Strategy ((UCRTT 2013) recommends restoration actions for aquatic habitat complexity including; strategic implementation of instream structures and LWM complexes, and reconnection of side-channel habitats and the floodplain where feasible.

Therefore, in-stream habitat recommendations for USFS lands provided by the Upper Stillwaters and Stormy Reach assessments focused on improving off-channel habitat by reconnecting a side channel, improving in-stream structural complexity by installing LWM along riprap banks, and constructing Log Jams to improve stream habitat for listed fish species. The Yakama Nation, BPA and USFS Entiat Ranger District have agreed to develop and analyze the proposed projects identified in this EA. These projects are intended to add habitat complexity and juvenile cover by placement of large wood and large wood jams along the stream banks of the Entiat River at key locations and to develop a side channel to promote continued improvement in aquatic and riparian conditions in the long-term along the Entiat River.

Purpose and Need

The **purpose** of the project is to promote continued improvement in aquatic and riparian conditions in the Entiat River and improve fish habitat for ESA-listed Upper Columbia Spring Chinook, Upper Columbia Steelhead and Columbia River bull trout.

The Entiat River has been slow to recover from a legacy of instream large wood removal, riparian timber harvest and impacts of the Entiat River road, which abuts the stream bank at key locations along the Entiat River. Legacy stream channel straightening and construction of levees for flood control and to protect the Entiat River Road have affected side-channel habitat as well. Recent surveys (Upper Stillwaters Reach Assessment, Stormy A Reach Assessment) have shown that large wood, pool habitat and side-channel habitat are either adequate or below desired conditions. Therefore, there is a **need** to increase the number of pieces of large wood, improve side-channel habitat, and alleviate impacts from the Entiat River Road at key locations where the road is constricting the river in order to improve fish habitat for ESA-listed species.

Proposed Project Location

The Entiat River Basin is located on the east slope of the Cascade Mountains in north-central Washington. The Entiat River is a tributary to the Columbia River upstream of Rocky Reach Dam, near RM 484. The Entiat River Upper Stillwaters and a portion of the Stormy A Project are located on Forest Service land in T28N, R19E, Sections 19, 29 and 33 and T27N R19E, Sections 10, 11, 14 and 15 (see Figure 1, below). The project includes construction of features at five sites on National Forest Land along the Entiat River. The proposed project is not within an inventoried roadless area, wilderness or other congressionally designated area, nor is it within potential wilderness.

The Stormy Reach reach assessment analyzed and proposed projects in the Entiat River from approximately river mile (RM) 18.0 to RM 20.8. The Stormy Reach begins on National Forest lands (RM 20.5-20.7), with the remainder of the reach located on Chelan-Douglas Land Trust, Washington State Department of Fish and Wildlife (WDFW) managed lands and Private Property. Downstream from the Stormy Reach, the BOR also analyzed and proposed instream projects for the Grey Reach Assessment which extends from Entiat RM 16.2 to RM 17.9, and is located off USFS lands. All of the Grey Reach and the majority of the Stormy Reach is located off USFS land, however, when combined with the effects from the USFS portion of the Stormy A and Stillwaters project may result in cumulative effects. The cumulative effects of these projects are analyzed in Chapter 3 in each resource section. The U.S. Forest Service would only make a decision on the portion within Agency jurisdiction. Implementation of the non-USFS Stormy and Grey Reach Projects is dependent upon a decision from another agency (BPA).

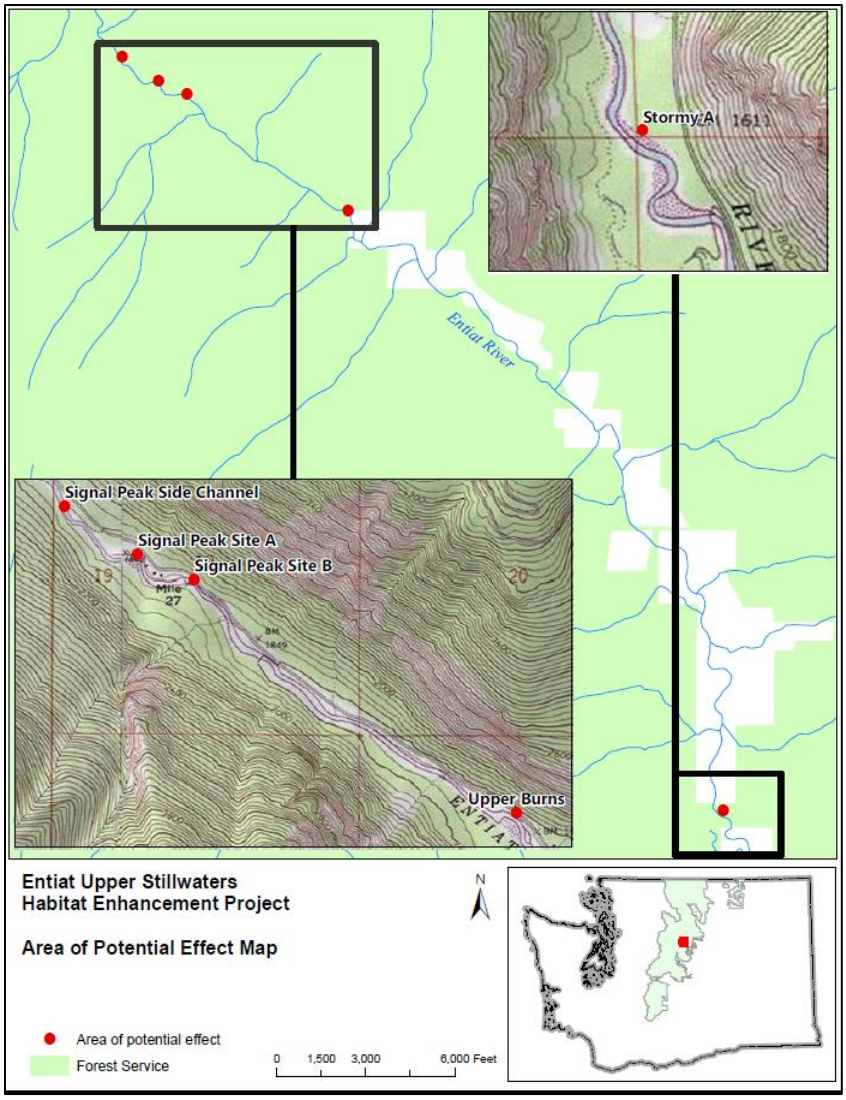


Figure 1. Stormy A and Upper Stillwaters Vicinity Map

Regulatory Framework

This project tiers to the Final Environmental Impact Statement for the 1990 Wenatchee National Forest Land and Resource Management Plan (LRMP), as amended by the Record of Decision for the Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (Northwest Forest Plan- NWFP, 1994, 2001), the Record of Decision for Survey and Manage (2001) and the R6 PNW Invasive Plant Record of Decision (USDA Forest Service 2005) which provide broad management direction for the Upper Stillwaters/Stormy A Restoration Project.

Wenatchee Land and Resource Management Plan (1990)

The Wenatchee Forest Plan delineates Management Areas (MA's) across the Okanogan-Wenatchee National Forest that emphasize a particular management approach. The following management areas are included in the project area:

- **EW-2 Riparian-Aquatic Habitat Protection Zone** are designated along all Class I, II and fish bearing Class III streams, lakes and wetlands. Specific Standards and Guidelines apply to this management area and are intended to maintain and enhance habitat conditions for fish species and maintain water quality. This land allocation overlays all other land allocations, but is not mapped.
- **WS-1 Scenic River** (Upper Stillwaters) preserve the scenic river characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.
- **ST-1 Scenic Travel Retention** (USFS-Stormy A) is designated to retain or enhance the viewing and recreation experiences along scenic travel routes.

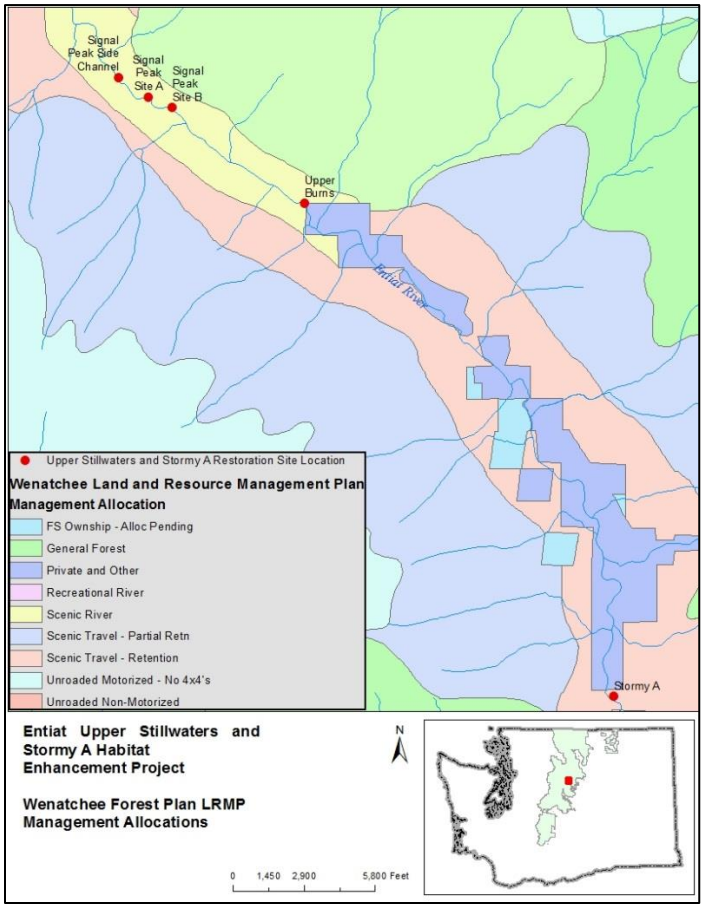


Figure 2. Wenatchee Forest Plan Management Allocations

Northwest Forest Plan (1994)

The NWFP delineated Management Areas, that amend and overlay all other Management Areas (MAs) designated in the WNF plan. As stated in the ROD for the NWFP, standards and guidelines from the WNF plan continue to apply where they are more restrictive or provide greater benefits to late successional forest related species as well as S&G from the NWFP. Standards and Guidelines for Riparian Reserves (RR) and Key watersheds apply across the forest and are added to and implemented along with the standards and guidelines for overlapping designated management areas (i.e. where RR overlap Matrix MA, standards and guidelines for RR and Matrix MA apply to management actions). The following management areas are included in the project area:

- **Riparian Reserves** include portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply. These MA's are adjacent to streams, rivers, lakes, ponds, wetlands and other areas required for maintaining hydrologic, geomorphic and ecologic processes. Unstable and potentially unstable slopes are also included.
- **Key Watersheds** overlay all other management allocations. Key Watersheds were designated under the NWFP based on their ability to provide high quality habitat or refugia for aquatic and riparian dependent species with an emphasis on watersheds that

would "directly contribute to conservation of at-risk stocks of anadromous salmonids, bull trout and resident fish species".

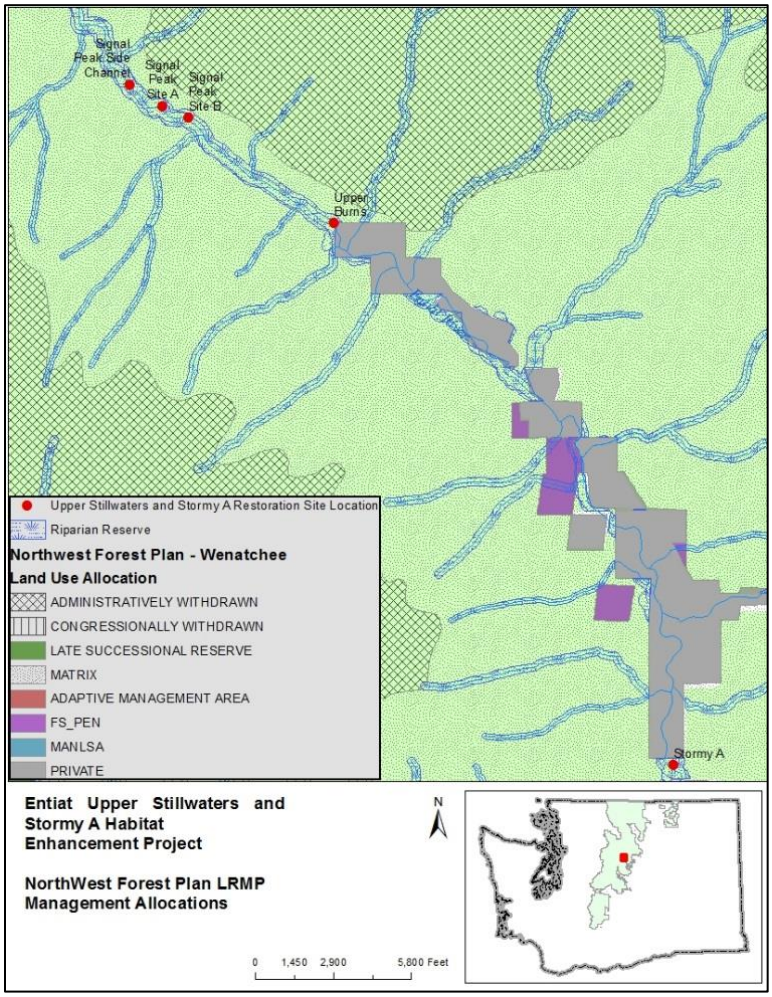


Figure 3. NWFP Land Management Allocations

Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer and other Mitigation Measures (2001)

The Survey and Manage ROD contains direction for mitigating effects to certain species of wildlife, vascular plants, bryophytes, lichens, and fungi within the Northwest Forest Plan lands. This project uses the January 2001 ROD standards and guidelines and the associated January 2001 species list.

R6 PNW Invasive Plant Record of Decision (2005)

The Regional Forester's October 11, 2005 amendment to forest plans in Region 6, *Preventing and Managing Invasive Plants*, (USDA Forest Service 2005a) gave management direction to include invasive plant prevention and treatment and restoration standards to achieve desired future conditions, goals, and objectives.

Bonneville Power Administration

BPA is proposing to provide funds to the Yakama Nation for the restoration project following the USFS Entiat Ranger District's decision.

The project would meet BPA's objectives mandated under several federal laws. BPA is a federal power-marketing agency that is part of the U.S. Department of Energy. BPA's operations are governed by several statutes, such as the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act) (16 U.S.C. 839 et seq.). Among other things, the Northwest Power Act directs BPA to protect, mitigate, and enhance fish and wildlife affected by the development and operation of the Federal Columbia River Power System (FCRPS). To assist in accomplishing this, the Act requires BPA to fund fish and wildlife protection, mitigation, and enhancement actions consistent with the Northwest Power and Conservation Council's (NPCC) Fish and Wildlife Program. Under this program, the NPCC makes recommendations to BPA concerning which fish and wildlife projects to fund. The NPCC determined that this project was consistent with the Fish and Wildlife Program, and BPA would use the analysis in this EA to decide whether to fund the project.

The project would also assist in carrying out commitments related to the 2008 Columbia Basin Fish Accords Memorandum of Agreement with the Yakama Nation. The Columbia River Accords, allow the Yakama Nation to contract with BPA for annual funding that can be used for salmonid habitat restoration projects.

Additionally, this project would help BPA meet its obligations under the Endangered Species Act (16 U.S.C. 1531 et seq.) by fulfilling commitments to implement Reasonable and Prudent Alternative 35, which calls for identifying tributary habitat restoration projects in the 2008 FCRPS Biological Opinion, as amended by a Supplemental Biological Opinion in 2010 and 2014 (National Oceanic and Atmospheric Administration Fisheries 2008, 2010, 2014).

Public Involvement and Tribal Consultation

On August 27, 2015, government-to-government consultation letters were sent to the Yakama Nation and Confederated Tribes of the Colville Indian Reservation per Executive Order 13175. No concerns regarding the project were expressed by either Tribal government.

Public Scoping began on September 11, 2015 with the mailing of 25 letters and 52 emails to interested parties. A public scoping notice was published in *The Wenatachee World* on September 17, 2015. The scoping letter was posted to the Okanogan-Wenatchee Schedule of Proposed Actions (SOPA) website on September 22, 2015. The project was presented to the Entiat Watershed Planning unit during the quarterly meeting in October 2015. These scoping efforts generated three comments, which were considered during the development of the proposed action. The Draft EA was posted to the SOPA website and the legal notice for the 30-day public comment period was published in the *Wenatchee World* on July 28th, 2016. The comment period for this project began on July 29th, 2016 and closed on August 29th, 2016. Six timely written comments were received from individuals during this period.

The project was discussed, reviewed, and modified internally by an interdisciplinary team of resource specialists working with the Yakama Nation, BPA and their design consultants. Consultation with NOAA-Fisheries and the US Fish & Wildlife Service for Endangered Species Act (ESA) compliance will be completed at the time the Decision Notice is signed using the Programmatic Biological Assessment for Fish Habitat Restoration Activities Affecting ESA-

Listed Animal and Plant Species and their designated or proposed Critical Habitat and Designated Essential Fish Habitat under MSA found Oregon, Washington and portions of California, Idaho and Nevada (USFS/USDI/BIA 2013).

Issues and Concerns

Issues are based on unresolved conflicts concerning alternative uses of available resources that are generally raised during scoping and can be used as the basis for formulating and comparing alternatives to the Proposed Action, for prescribing mitigating and monitoring measures, or for identifying environmental analysis needs (40 CFR 1502.14). Public scoping did not identify any unresolved issues that would require the development of an additional alternative.

Scoping

A concern was raised during public scoping regarding the downstream impacts of large wood structures within the Entiat River. The concern stated that "Placing this large volume of foreign material in the Entiat River will cause substantial environmental impact in the affected area as well as potential **downstream environmental impacts** and **property damage impacts.**" The No Action Alternative was fully analyzed to address this concern. Mitigation measures and design criteria were incorporated into the Proposed Action to address this concern as well. This EA addresses two alternatives, the No Action Alternative and one action alternative, the Proposed Action, including design criteria and required mitigations to prevent unacceptable resource damage and ensure Forest Plan compliance.

Summary of Scoping Comment: Constructed features, such as logjams, could break loose and move downstream, impacting private property. Large wood that is cabled together and ballasted with rocks and boulders act differently than natural debris and could cause more property damage, especially to bridges with a center pier.

Response: The LWM structures in the Stormy A and Upper Stillwaters reaches were designed to remain stable at a 100-year flow event. LW structure design also followed the guidelines provided in the US Bureau of Reclamations Large Woody Material Risk Based Design Guidelines (USBR 2014), therefore the occurrence of the logjams breaking apart is considered unlikely *within the life span of the structure which has been determined to be approximately 25 to 50 years*. As the large wood structures slowly decompose with time, they will break apart and move through the river system in a typical manner to a natural piece of large wood. Many factors determine longevity of large wood in streams including; tree species and size, site conditions, stream channel stability, morphology, etc. In general, large conifer trees, decompose slowly (decay, fragmentation, fluvial transport) and can remain in streams and rivers from 70 to 100 years (Scherer 2004). All logs for structures would be Douglas fir and/or western red cedar and would be between 12 and 24 inches diameter at breast height (DBH). LW structures in the Upper Stillwaters project area were also modified through project design to use threaded rod, plate washer and nuts to attach and ballast the boulders to the LW structures in response to this comment. No cable will be used in the project.

Comments

During the 30-day comment period for the draft EA, 6 comment letters were received. Several comments were raised regarding structural integrity, justification and benefit, NEPA process, Wild and Scenic Rivers and Burned Area Emergency Response related to the Stormy A and

Upper Stillwaters Restoration Project. The complete Response to Comments table can be found in *Appendix A*.

One of the main themes of the comments, was regarding the impacts of the 2014 Duncan and 2015 Wolverine fires on the structural integrity of the proposed large wood structures. Commenters were concerned that potential post-fire flash flooding and debris flows could interact with the large wood structures and have an impact on downstream private property.

Summary of Comments: The Entiat River has a history of mud flows and catastrophic flooding following wildfires. There is an increased risk of mud flows, river impounding due to slides and flash flooding that could result due to the recent fires in the Entiat River Watershed.

Response: The LWM structures in the Stormy A and Upper Stillwaters reaches were designed and stamped by licensed engineers to remain stable at a 100-year flow event with an appropriate factor of safety. LW structure design followed the guidelines provided in the US Bureau of Reclamations Large Woody Material Risk Based Design Guidelines (USBR 2014). Due to concerns raised by the public regarding post-fire debris flows associated with a 100-yr flood event and potential interactions with the proposed LW structures, the Forest Service requested additional analysis be completed by the engineering consultants to address these concerns. The Technical Memorandums developed by Natural System Design and Interfluve, Inc. in response to the Forest Service request are attached in *Appendices C and D*. In summary, the post fire condition did not change the design standards for the large wood structures. There is a long period of gauged streamflow discharge on record at the USFS Ardenvoir gage that includes a number of peak flows following wide spread moderate to severe fire damage (e.g. 1972). These peak flows were already factored into the estimation of the 100-year return period flow. However, the additional analysis considered the differences in structure stability between design flow and an 8% increase in peak flow and suggests that no modifications are required for the proposed structures given the slight increase in post-fire peak flow and low likelihood of channel blocking debris jams. Design calculations were repeated for a project condition assuming debris racking and still indicated that an acceptable factor of safety was used.

Chapter 2: No Action and Proposed Action

No Action Alternative

The "No Action" alternative would not propose instream habitat restoration within the Upper Stillwaters and Stormy A reaches of the Entiat River that are located on USFS lands. No large wood structures would be constructed, no riparian planting would occur and riprap banks and side channels would remain in their current state. The wood needed for increasing large wood complexity and pools would have to be recruited through natural processes. Recovery of pool habitat and restoring the quantity and quality of side-channel rearing habitat in the river would also be left to natural processes. Natural restoration of the underlying processes would take many decades or centuries (e.g. growth of large trees and more natural wood recruitment rates), and in some cases, such as with riprapped bank armoring associated with a roadway and levees which prevent side channel function, may never be fully recovered.

Recent wildfires in the upper Entiat watershed; the 2014 Duncan Fire which burned approximately 12,700 acres and resulted in 54% of the total burn acres falling into high and moderate burn severity and the 2015 Wolverine Fire which burned approximately 29,600 acres and resulted in 50% of the burn acres falling into the high and moderate burn severity, have created a potential source of in-stream wood recruitment. Natural wood recruitment from upstream fires, would be transported to downstream reaches of the Entiat River, however in some cases, such as with bank armoring along the roadway, would not have the ability to retain large wood that becomes available.

Proposed Action

Overview

The Proposed Action alternative includes placement of LWM along the riprap banks of the Entiat River, re-connection of a side channel and construction of large wood structures. These projects are intended to add habitat complexity by creating back water and deep pool habitat and improve juvenile cover by placement of large wood and large wood jams along the stream banks of the Entiat River. Re-connection of the abandoned side channel would provide habitat for rearing juvenile salmon and steelhead by inundating the channel at lower summer stream flows.

Implemention of the Stormy A and Upper Stillwaters project would occur from July 16-July 31, 2017 (the in-water work window designated by WDFW) to avoid impacts to spawning fish species. Any excavation would be backfilled with imported gravel/cobble material and approximately 30% salvaged fines and topsoil and disturbed areas would be re-seeded and planted using native plant species. Invasive plants would be treated prior to construction to prevent seed bearing plants from being present during project activities. Existing vegetation, especially large trees and aspen stands, would be protected to the greatest extent possible during project implementation and slash that is produced would be incorporated into LWM structures to the greatest extent possible. All logs used to construct the structures would be 12-24 inch Douglas fir and/or western red cedar and would be procured and brought in from off site by the Yakama Nation. The boulder-log structures would be constructed off site and placed at the toe of the riprap banks with a crane working from the Entiat River Road.

Table 1. Stormy A and Upper Stillwaters Project Overview

Entiat River – Proposed USFS Restoration Reaches	River Mile	Project Area	Approximate Acres	Primary Implementation Year
Stormy A	20.5-20.7	USFS-Stormy A	7.0	2018
Upper Stillwaters	25.5-25.8	Upper Burns Riprap Enhancement	1.0	2017
	27.0-27.5	Signal Peak RipRap Enhancement Site B	2.0	2017
		Signal Peak RipRap Enhancement Site A	1.0	2017
		Signal Peak Side Channel Reconnection	3.0	2017
TOTAL	~2.2 miles		~14.0 acres	2017-2018

Stormy A Reach – USFS lands

At this site, seven large wood structures are proposed on the left bank to provide instream habitat complexity and deflect stream flow towards the opposite streambank. One structure is located on

right bank and is designed to provide habitat and deflect flow across to the structures located upstream of Dill Creek. The upland field near the Entiat River road that is currently occupied primarily by bracken ferns, grass, and downed slash, would be used as an equipment staging area for use during the construction of structures on NFS land. This area would be used temporarily during construction of the project only and would be replanted immediately post construction. All other areas of disturbance from the project would also be revegetated. In order to minimize the number of times heavy equipment would need to cross the river to access the LWM structure on the right bank, large wood would be flown to the site via helicopter. All other structures would be constructed using heavy equipment.

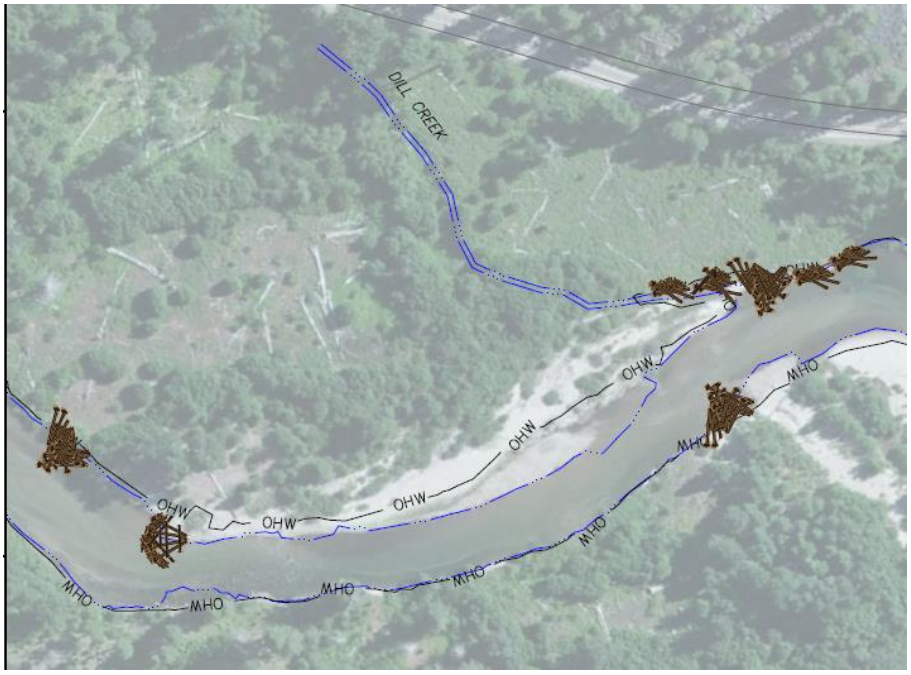


Figure 4. USFS Stormy A LW Structures

Upper Stillwaters Reach

**Complete final design drawings can be found in Appendix B*

- **Upper Burns Riprap Enhancement**: In stream habitat complexity and riparian vegetation is limited at this site, due to the Entiat River roadway and associated riprap armoring along the left bank (~200 ft.). The project proposes to place LW structures along the toe of the riprap bank and proposes one LW jam structure downstream of the riprap bank that would improve aquatic habitat in existing deep pools at this location.

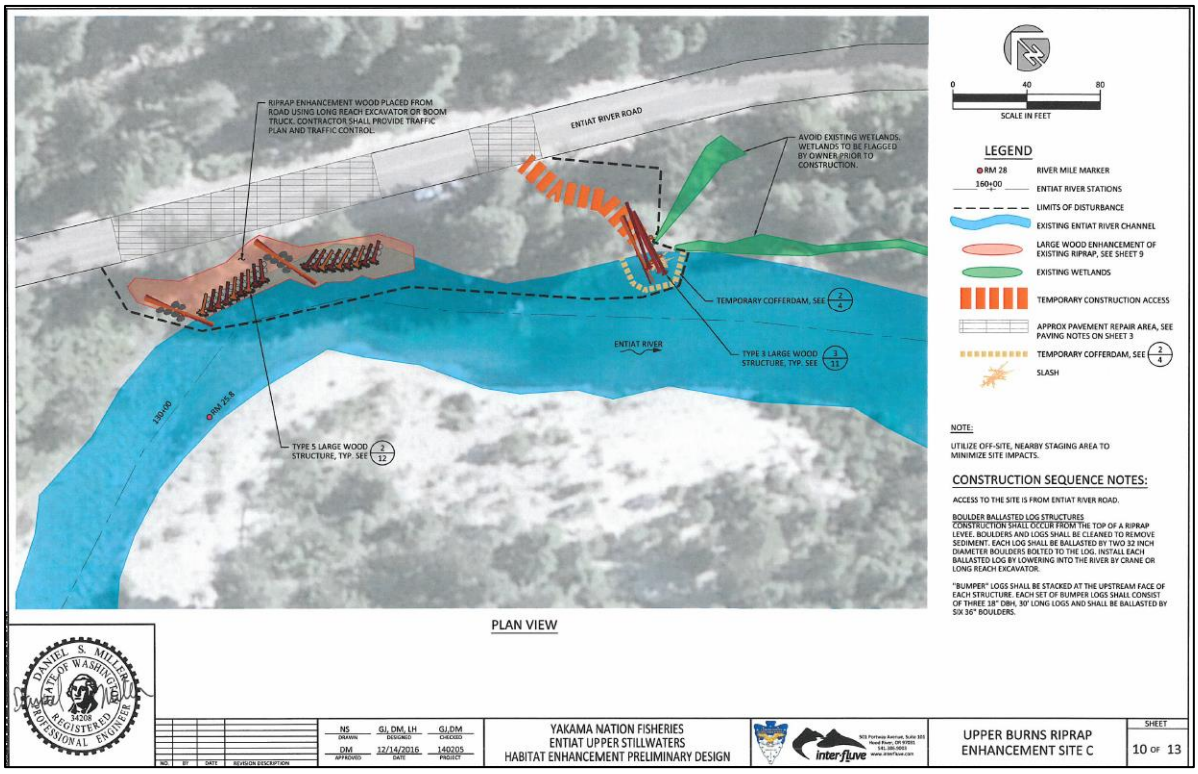


Figure 5. Upper Burns RipRap Enhancement Design

- **Signal Peak Riprap Enhancement Site B**: In stream habitat complexity and riparian vegetation is limited at this site, due to the Entiat River roadway and associated riprap armoring along the left bank (~300 ft.). The project proposes to place LW structures along the toe of the riprap bank. Bumper logs would also be placed at an angle along the riprap structures to divert floating objects downstream so as not to get entrained in the LW structures. Access to the site would be from the Entiat River Road, although there is potential need for temporary access on the upstream end of the project.

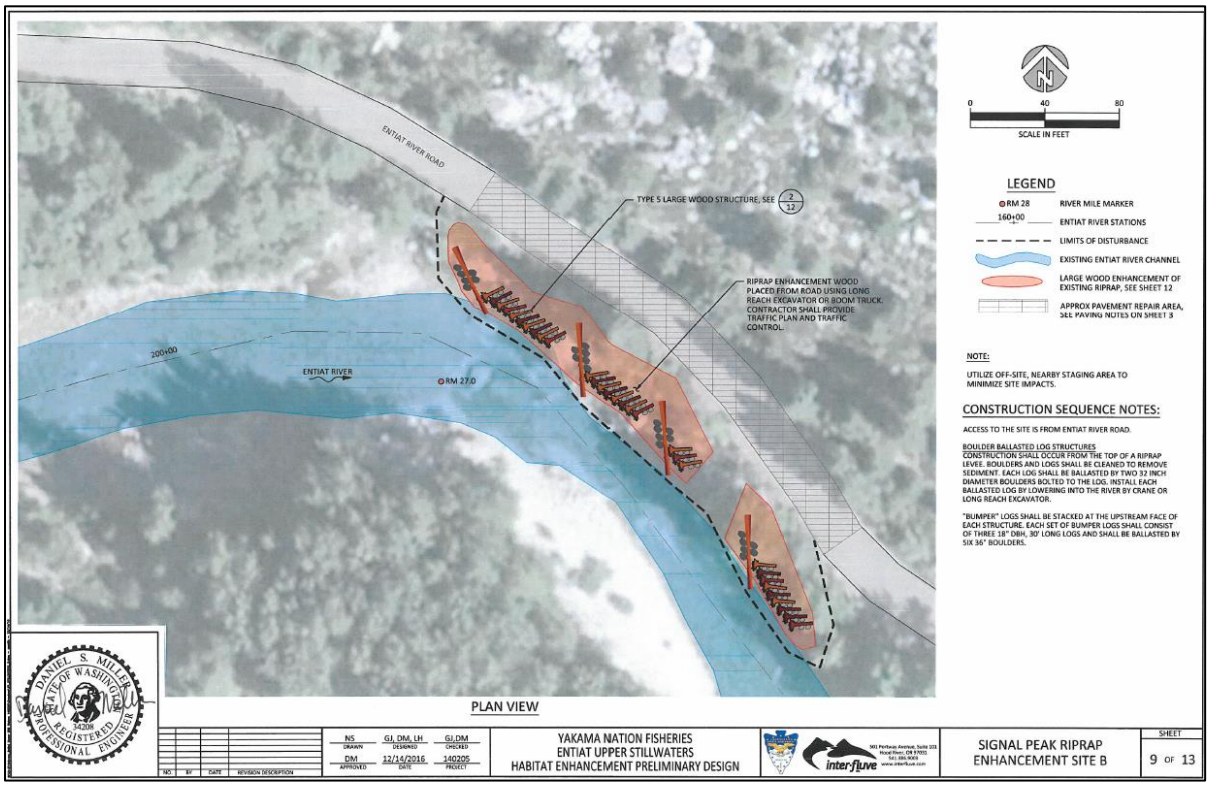


Figure 6. Signal Peak RipRap Enhancement Site B Design

- **Signal Peak Riprap Enhancement Site A**: In-stream habitat complexity and riparian vegetation is limited at this location, due to the location of the Entiat River roadway and associated riprap armoring along the left stream bank (~ 400 ft.). The project proposes to place LWM structures along the toe of the riprap bank to enhance cover and stream complexity for fish species while shifting the stream energy away from the roadway. The project also proposes a LW structure located upstream of the riprap bank which would provide aquatic habitat. An additional structure would also be placed on the Entiat River side of a small island to provide habitat complexity within the main channel of the Entiat River.

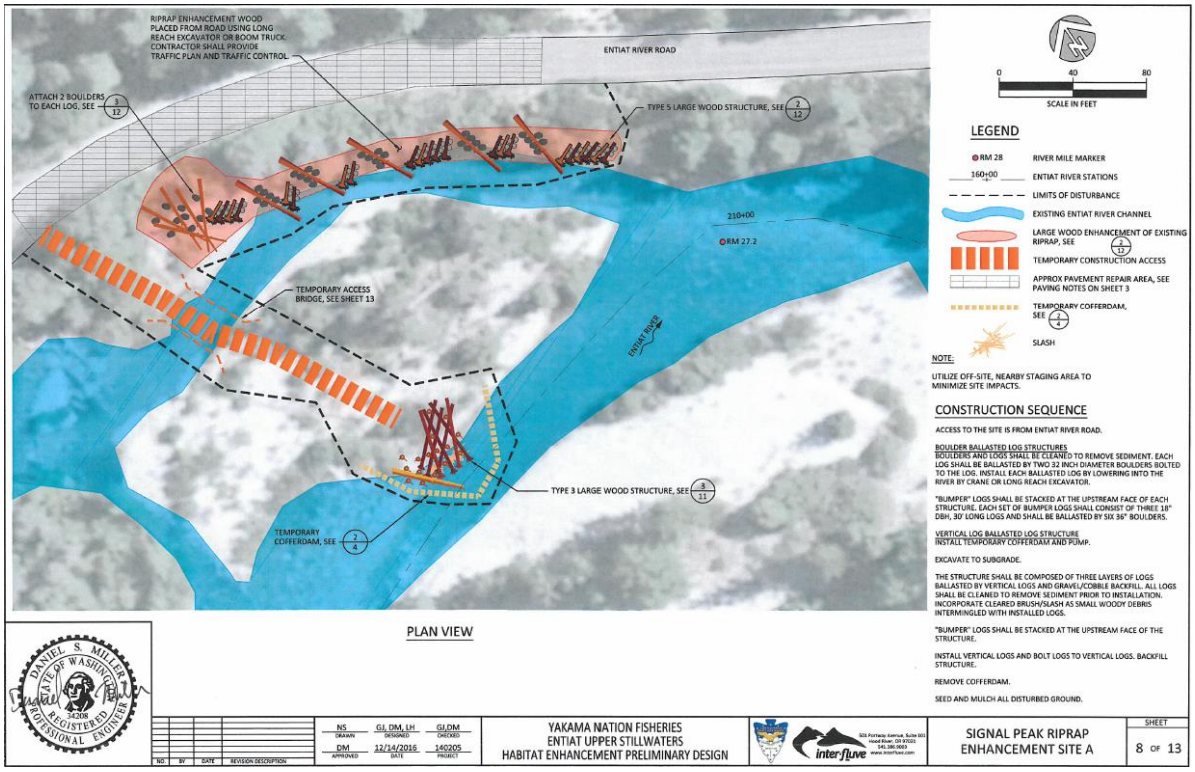


Figure 7. Signal Peak RipRap Enhancement Site A

- **Signal Peak Side Channel Reconnection**: At this location, the project proposes to remove the existing levee that is currently located at the inlet of an old side channel. The levee was presumably constructed to prevent flow in this side channel in an attempt to protect the road. The side channel is currently inundated at stream flows of 2300-2500 cubic feet per second (cfs) which typically occur during spring runoff. By removing the levee, the side channel would be inundated during lower summer stream flows of 700-800 cfs which would provide habitat for rearing juvenile salmon and steelhead. The project includes excavation of the side channel between the inlet and outlet and placement of large wood within the channel. The project would also involve decommissioning the adjacent road pull out to increase the available floodplain and planting riparian vegetation within the pull out to increase the riparian area between the side channel and Entiat River Road. An additional two LWM structures flanking the inlet of the channel would be constructed to help moderate flow as well as prevent the inlet from deforming.

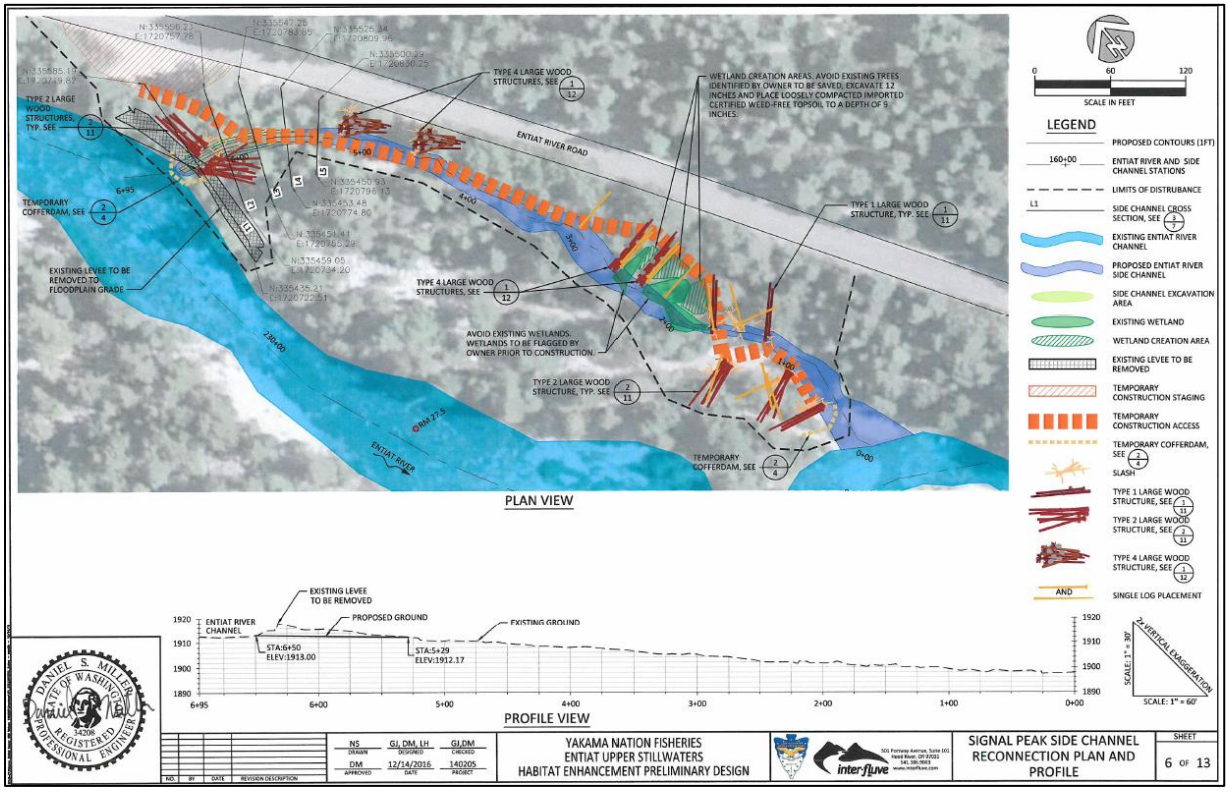


Figure 8. Signal Peak Side Channel Reconstruction Design

Large Wood Structure Description:

Stormy A Reach

Table 2. Stormy A Reach (USFS property); Type of Large Wood Structures

LW Structure Type	Number of Structures	Piece of LW per Structure	Total LW
Deflector	3	29	87
Apex	1	22	22
Bank Enhancement Type 1	1	9	9
Bank Enhancement Type 2	3	7	21
Total	**8**		**139**

- ***Deflector LWM Structure***: LW structure consists of 29 logs ranging from 12-24 inches diameter at breast height (DBH) and 25-50 ft. in length. Horizontal logs with root wads attached would be embedded to match the elevation of the river channel (root wads may extend 2 ft. above the bank) and vertical snags would be embedded 18 ft. into the riverbed. Logs would be connected through the use of pins or bolts in the stream channel. Thirty pieces of "racking material" would be placed within the structure and would consist of small trees with branches (6-12 inches DBH and 20-40 ft. in length) and slash. Vertical snags would have tops broken at varying heights. The dimensions of the structure after construction would be approximately 70 feet in length and extend 48 feet in width from the top of the stream bank to the middle of the Entiat River channel and would extend over 22 ft. into the Entiat River.

DEFLECTOR

- ***Apex LWM Structure***: LW structure consists of 22 logs ranging from 12-24 inches DBH and 25-40 ft. in length. This structure is not embedded into the streambank. Logs would be connected through the use of pins or bolts in the stream channel. Thirty pieces of "racking material" would be placed within the structure and would consist of small trees with branches (6-12 inches DBH and 20-40 ft. in length) and slash. Vertical snags would have tops broken at varying heights. The dimensions of the structure after construction would be approximately 35 feet in length and extend 30 feet in width to the middle of the Entiat River channel.

APEX

- ***Bank Enhancement Type 1 Structure***: LW structure consists of nine logs ranging from 12-24 inches diameter at breast height (DBH) and 25-50 ft. in length. Horizontal logs with root wads attached would be embedded to match the elevation of the river channel (root wads may extend 2 ft. above the bank) and vertical snags would be embedded 15 ft. into the riverbed. Logs would be connected through the use of pins or bolts in the stream channel. Ten pieces of "racking material" would be placed within the structure and would consist of small trees with branches (6-12 inches DBH and 20-40 ft. in length) and slash. Vertical snags would have tops broken at varying heights. The dimensions of the structure after construction would be approximately 17 feet in length and extend 20 feet in width from the top of the stream bank to the margins of the Entiat River channel and would extend less than 5 ft. into the Entiat River.

BANK ENHANCEMENT 1

- ***Bank Enhancement Type 2 Structure***: LW structure consists of seven logs ranging from 12-24 inches diameter at breast height (DBH) and 25-50 ft. in length. Horizontal logs with root wads attached would be embedded to match the elevation of the river channel (root wads may extend 2 ft. above the bank) and vertical snags would be embedded 15 ft. into the riverbed. Logs would be connected through the use of pins or bolts in the stream channel. Ten pieces of "racking material" would be placed within the structure and would consist of small trees with branches (6-12 inches DBH and 20-40 ft. in length) and slash. Vertical snags would have tops broken at varying heights. The dimensions of the structure after construction would be approximately 24 feet in length and extend 13 feet in width from the top of the stream bank to the margins of the Entiat River channel and would extend less than 5 ft. into the Entiat River.

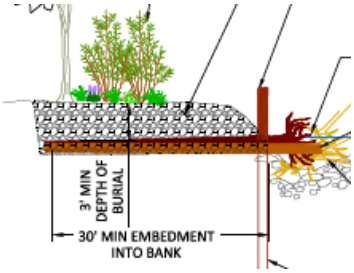
BANK ENHANCEMENT 2

Upper Stillwaters Reach

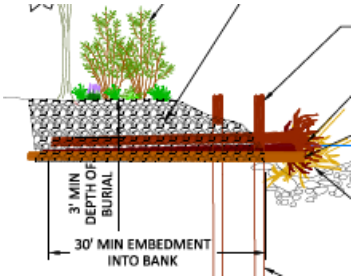
Table 3. Upper Stillwaters Reach; Type of LW Structure by Restoration Site Location

LW Structure Type	Number of Structures	Piece of LW per Structure	Estimated Total LW
Small Buried Jam	2	2	4
Large Buried Jam	5	10	50
Buried Jam with Bumper Logs	2	12-28	35
Road Embankment Deflector Jam	4	6	24
RipRap Enhancement Structures with Deflector Bumper Logs	70	1-2	108
Single Log Placement	--	24	24
Total			**221**

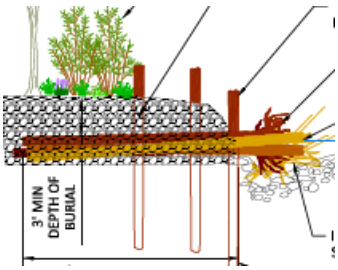
- ***Small Buried Jam***: 2 Horizontal logs (1 bumper and 1 with rootwad attached) embedded 30+ ft. into bank and 1 vertical snag embedded 20+ ft. into river bed would be installed in excavated trench (3 ft. min depth).



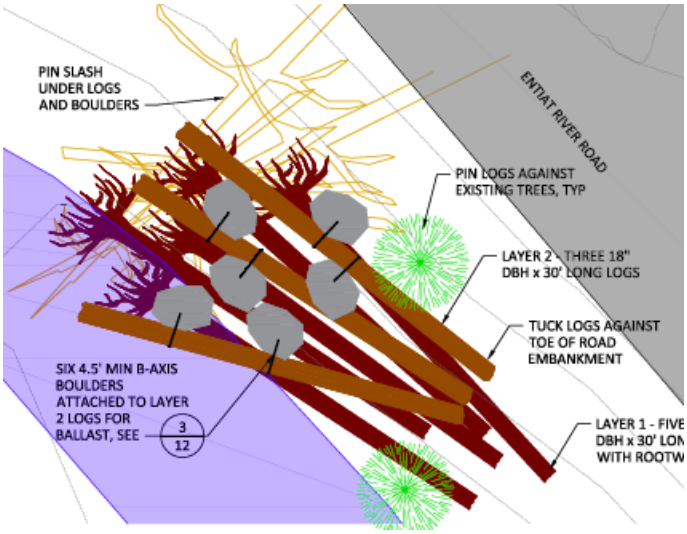
- ***Large Buried Jam***: 4-7 Horizontal logs (1 bumper and 2-7 with rootwad attached) embedded 30+ ft. into bank and 3-7 vertical snags embedded 20+ ft. into river bed would be installed in excavated trench (3 ft. min depth).



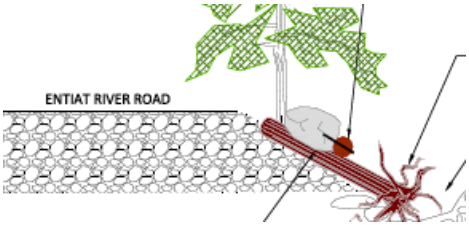
- ***Buried Jam with Bumper Logs***: 3-7 Horizontal logs (2 bumper and 3-7 with rootwad attached) embedded 30+ ft. into bank and 3-7 vertical snags embedded 20+ ft. into river bed would be installed in an excavated trench (3 ft. min depth).



- ***Road Embankment Deflector Jam***: Two boulders would be anchored to the same side of 30+ ft. long log (with and without rootwads) via a 1.25 inch threaded rod that is kept in place with epoxy. Steel plates and heavy hex nuts would be used to further secure the rod. These log and rock structures would be "layered" (2 layers with 5 and 3 log/boulder structures) along the road embankment.



- ***Boulder Ballasted RipRap Enhancement with Bumper Logs***: Two boulders would be anchored to the same side of a short log (~12 ft. long) with rootwads attached via a 1.25 inch threaded rod that held in place with epoxy. Steel plates and heavy hex nuts would be used to further secure the rod. These log and rock structures would be constructed off site and placed along rip rap sections of the Entiat River Road. Deflector bumper log structures (bumper logs will be stacked 3 high and will be ballasted by six 36 inch diameter boulders) would be stacked at the upstream face of each structure.



Project Design Features and Mitigation Measures

Design criteria for large wood placement and side channel design from the Programmatic Biological Assessment for Fish Habitat Restoration Activities Affecting ESA-Listed Animal and Plant Species and their designated or proposed Critical Habitat and Designated Essential Fish Habitat under MSA found in Oregon, Washington and portions of California, Idaho and Nevada (ARBA II; USFS/USDI/BIA 2013) would be implemented during this project.

1. All conditions and requirements within the most recent U.S. Forest Service Aquatic Restoration Program Regional General Permit (RGP-8) would be met.

2. All design criteria and conservation measures in the 2013-2017 Programmatic Biological and Conference Opinions (BiOps) for Aquatic Restoration Activities in Oregon, Washington and portions of California, Idaho and Nevada would be met (ARBO II; NMFS 2013 and USFWS 2013 – *see Appendices E and F*).

3. The Yakama Nation would obtain the proper Hydraulic Permits with Washington Department of Fish and Wildlife (WDFW).

In addition to design criteria in ARBO II and the RGP-8, the following design features for vegetation management, botany, invasives and engineering/road/fire concerns would also be incorporated into the project.

- This project is proposed to be implemented during the in-water work window (July 16-July 31) designated by the WDFW.
- All excavation (trenches, soil test pits, etc.) would be backfilled with imported gravel/cobble material and approximately 30% salvaged fines and topsoil.
- In order to meet Scenic objectives, any vertical snags that are incorporated into the LW structures would have top broken at varying heights.
- Existing vegetation, especially large trees and aspen stands, would be protected to the greatest extent possible during project implementation and any slash that is produced would be incorporated into LWM structures. Riparian vegetation planting would be completed after completion of LWM installation.
- All logs for structures would be Douglas fir and/or western red cedar.
- Piles would be driven into the riverbed with an excavator-mounted piece of vibratory equipment.
- Freshly cut or uprooted Douglas-fir logs that are transported to the worksite or staging area shall be assessed for insect infestation. Actions such as deploying Bark Beetle traps or pheromones may be required near infested logs or staged logs during the spring and summer months.
- Revegetation of disturbed sites shall utilize native tree seedlings and shrubs (locally collected from the Entiat valley) from Forest Service approved seed zones and sources. The district botanist and/or silviculturist shall approve the revegetation plan prior to the implementation of ground disturbing activities.
- Use only weed free gravel and rock – source piles should be inspected.

- Hog fuel should be from native sources (native trees and shrubs found in the Entiat valley). Inspect source piles for invasive plants.
- Any straw or mulch must be weed-free.
- All equipment, both terrestrial and aquatic, must be cleaned and free of dirt and seeds before use on Forest Service land. If equipment is being moved from site to site, it should be cleaned before entering the new site.
- Treat invasive plants in the season prior to construction to prevent seed bearing plants from being present during project activities.
- All disturbed ground must be monitored for invasive plants for 3 years. Any found should be treated as covered in the Forest-wide Invasive plant EIS.
- Any Regional Forester Interagency Special Status/Sensitive Species (ISSSSP) or survey and manage plants found during implementation would be protected from project activities.
- For the riprap enhancement, access to the site would be from the Entiat River Road using a crane to place the structures at the toe of the riprap bank. Any road surface damage that might occur as a result of the project will be repaired per WSDOT asphalt resurfacing standards.
- Design constructed structures to mimic naturally occurring log jams in terms of overall size and shape.
- Use a variety of sizes of logs in each structure to avoid a uniform look.
- The pattern of logs in the constructed structures should be as varied as possible, avoiding a parallel pattern or angular shape.
- Avoid blunt-cutting ends of logs in constructed structures.
- Vertical members needed for structural stability should be varied in size and height. If vertical height is needed for structural stability, place the members in a random-looking pattern, vary the height as much as possible, and avoid blunt-cut ends/tops. Tops should be masticated or roughed somehow so they blend into the surroundings.
- Ensure that none of the structures would interfere with the free-flowing nature of the river (i.e. catching logs and eventually spanning the river at any point).
- Protect dispersed campsites and user-created trails during construction, and restore them after the project is complete. Restoration would include the following, as necessary: remove, chip, or burn all slash, re-grade the camping area, reconstruct fences, reconstruct fire rings, re-vegetate site by seeding or transplanting, reconstructing trails.
- Avoid road closures longer than 30 minutes on the Entiat River Road to allow recreation and other traffic to proceed farther up the valley. In fire or other life safety situations that may be further up valley, open road closures as soon as possible.
- Follow Washington State Industrial Fire Precaution Level (IFPL) restrictions for forest equipment that emits a spark. IFPL restrictions range from Level 1 (1-hour fire watch required) to Level 4 (All operations prohibited).

- Ensure that all food and garbage is “attended” during the day and hauled off the site at the end of each day.
- Communication with the Fire Management Officer and/or Division Duty Officer is required when road closures will be in effect that will impede an emergency response past the location of this project

Chapter 3: Environmental Impacts of the Proposed Action and Alternatives

This section summarizes the potential impacts of the No Action and Proposed Action for each impacted resource. Additional in depth analysis for each resource area is contained in the Specialist Reports in the Project Record. Resources that were not impacted and therefore not further analyzed include fire, fuels and range.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects

Past, present and future actions, expected to overlap in time and space with the proposed action include:

- Past riparian timber harvest, road building and campground development within the floodplain, sheep grazing, stocking of non-native fish species, levee construction for flood control and removal of large trees from the Entiat River
- Private land development and agricultural development.
- Large Wood placement project proposals located downstream of the Stormy and Grey Reaches on non-FS lands are being planned for implementation in 2018 and 2019 by the BPA and BOR. Information about site locations and designs can be found in the Stormy and Grey Reach Assessments.
- USFS small tree thinning and burning projects within the Entiat Watershed.

Hydrology and Soils

Affected Environment

The Entiat River in the vicinity of the Stormy A project is classified as a U-shaped trough with a valley bottom gradient of less than 3 percent and an unconstrained, moderately sinuous channel. The stream type is predominantly a C-type channel (Rosgen 1996) showing evidence of slight to moderate incision with predominantly riffle and run bedform and gravel/cobble as the dominant substrate. Landforms typically include alluvial and glacial deposits comprising terraces and alluvial fans. Alluvial fan deposits provide lateral and vertical channel controls (USBR 2009).

In the vicinity of the Upper Stillwaters project, the Entiat valley again shows the evidence of late Pleistocene glaciation but fluvial and colluvial processes that occurred during and after glacial retreat are the primary drivers of reach geomorphology. Glacial terracing and alluvial/colluvial fan deposits exert constraints on lateral and vertical channel stability by supplying oversized coarse material that acts as vertical bed control (Inter-Fluve 2013).

The Entiat River has a snowmelt dominated hydrograph with highest peaks usually occurring in June. At river mile 19 bankfull flows (1.5 to 2 yr. recurrence) are around 2,630 cfs, while the 100-year flow event is 6210 cfs.

Regulatory Framework

Wenatchee National Forest Plan

The Stormy A and Upper Stillwaters Restoration Project on the Entiat River, falls under the Wenatchee National Forest LRMP (USDA Forest Service, 1990). The Wenatchee NF LRMP goal for water resource management is to maintain favorable conditions of stream flow in regards to quality and quantity, and timing. The dominant objective is to ensure meeting or exceeding federal and state water quality standards during the life of the plan (Wenatchee LRMP p. IV-57). For soil, the primary goal is to maintain or enhance the productive properties of the soil resource (Wenatchee LRMP p. IV-58).

Wenatchee LRMP standards and guidelines that apply to this project include, in particular:

- Protection of water quality would be achieved by complying with state requirements for protection of waters of the State of Washington through planning, application, and monitoring of Best Management Practices (BMPs) in conformance with the Clean Water Act, regulations, and federal guidance.
- Surface water would be controlled on all roads, landings, rockpits, parking areas, and other road related facilities.
- Follow the specified measurable standards for fine sediment in spawning gravels, water temperature, channel morphology (large wood and pools), floodplain/riparian vegetation and fish passage (Wenatchee LRMP: IV-80 to IV-88).

Northwest Forest Plan

Regional and multi-Regional amendments subsequent to the Wenatchee Forest Plan were made under the Northwest Forest Plan. The Northwest Forest Plan for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl was published (NWFP) (USDA and USDI, 1994) contains an Aquatic Conservation Strategy and standards and guidelines that are incorporated into existing LRMPs when existing LRMP standards and guidelines are less restrictive than the NWFP. The NWFP developed standards and guidelines, which amended National Forest Plans in the analysis area. Specifically, the NWFP amended some of the standards and guidelines of approved National Forest Land and Resource Management Plans, including all of the Wenatchee National Forest Land and Resource Management Plan, and portions of the Okanogan National Forest LRMP.

The NWFP includes The Aquatic Conservation Strategy (ACS) that was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on National Forestlands. The ACS includes nine objectives to guide management for healthy watershed and aquatic resources. Management actions that do not maintain the existing condition or do not lead to improved conditions in the long term would not “meet” the intent of the ACS and thus, should not be implemented. The Aquatic Conservation strategy consists of four components: Riparian Reserves (RR), Key Watersheds, Watershed Analysis, and Watershed Restoration. Standards and guidelines for management with RR and Key Watersheds provide further management direction.

See Fisheries section below for an analysis of Standards and Guidelines for Riparian Reserves and Key Watersheds.

Federal Law

Clean Water Act as amended in 1977, 1982 and 1987

The primary objective of the Clean Water Act is to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental national goals: To eliminate the discharge of pollutants into the nation's waters, and to achieve water quality levels that are favorable for fishing and swimming in all water bodies.

The State of Washington, as directed by the Clean Water Act and the Environmental Protection Agency, is responsible for the protection of rivers and other water in the public interest. Water quality standards for surface waters in the State of Washington are found in Chapter 170-201A-WAC of the Washington Administrative Code.

The Forest Service responsibilities under the Clean Water Act are defined in a November 2000 Memorandum of Understanding (MOU) between Washington State Department of Ecology and the Forest Service. The MOU designates the Forest Service as the management agency for the State on National Forest System lands. This means that the Forest Service is responsible for defining and implementing appropriate Best Management Practices (BMPs) for National Forest System lands.

Water bodies that do not meet established water quality standards are identified on a list called the 303(d) list which is prepared periodically (most recently in 2008). Each state also prepares a non-degradation policy for all waters that exceed standards. This policy protects these waters from any further degradation. The Washington Department of Ecology has established Total Maximum Daily Loads (TMDL) for Wenatchee National Forest to address stream temperature (WDOE 2003). The primary objectives of the TMDL are to examine pollutant sources and determine the pollutant reductions (allocations) necessary to achieve the water quality standard. The water quality standards most commonly exceeded on the Okanogan-Wenatchee National Forest (Forest or OWNF) are temperature. Neither of the current project sites have associated listings for non-attainment of water quality standards (303 (d) category 5, however, there is a category 2 (water of concern) listing for temperature just upstream of the Stormy A site.

Environmental Consequences

Alternative 1 - No Action

No action would take place and conditions would continue as described earlier.

There are currently no actions that would occur in the project area that would be likely to require the Entiat River be listed on the 303(d) list for chemical contaminants within the project areas. However, the Entiat River road is adjacent to the river in many places carries with it the potential for a spill of chemical contaminants near the Entiat River and within riparian areas and the floodplain.

There would be no appreciable change in sediment production in the project area nor in the capacity of the Entiat river to transport or store sediment.

There would be no project related impacts to soil conditions with the riparian area as a result of heavy equipment operations.

The Stormy reach would continue to be considered adequate but at risk relative to LWM and the benefits it confers. The lower portions of the Stillwaters project would continue to have a relative

lack of LWM and not meet its apparent potential relative to LWM. There would be no increase in side channel habitat.

Since no structures would be built in the no action alternative, there would be no potential of fire related flow effects to structures.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Use of heavy equipment would take place along access routes used for construction of the LWM structures in the Stormy A reach project and the LWM structures and side channel reconnection in the Stillwaters reach, while pumps would be used during construction for de-watering. Much of the access and equipment use would be in sensitive areas such as riparian areas and the floodplain adjacent to the Entiat River. There would be an increase in the hazard of a chemical spill from project activities due to the increase in equipment use and equipment proximity to sensitive areas. Design criteria would reduce the risk of introduction of pollutants or contaminants to waterways and sensitive areas and are consistent with programmatic guidelines in ARBO II. In particular, location of equipment fueling and servicing sites 150 feet or more from waterbodies or wetlands or on a hardened site would be designated within the staging areas adjacent to the Entiat River road or on the northeast side of the road, as well as the requirement for inspections, cleanings, and the implementation of a fuel and chemical management plan would avoid or minimize adverse effects to soil, water quality, riparian resources, surface water and ground water during project implementation.

Project implementation would not likely result in construction related increases in surface water temperatures, but would likely result in long-term attenuation or decreases in surface water temperature.

Project elements that have the potential for construction related vegetation removal may increase solar insolation on surface water, and may lead to a localized, increase in surface water temperatures. However, these effects are expected to be unlikely, minimal and short-term until vegetation becomes re-established through planting and natural regeneration.

The majority of the structures are on the north side of the channel where this vegetation provides relatively little shade to the Entiat River and its removal would not result in large increases in solar insolation.

The side channel reconnection would result in vegetation removal resulting from levee removal and would result in local insolation increase to surface water, particularly since the vegetation removed from the levee currently provides shading to the area the re-aligned channel would occupy. Again, any increases in stream temperature from this source are expected to be minor and short-term. Effects would be limited by the potential to increase delivery of near surface cold water as a result of channel reconnection, and longer-term by establishment and growth of both planted and natural re-vegetation.

Project elements that have the potential to increase hyporheic and groundwater exchange with the Entiat River may result in localized decreases in surface water temperatures.

Project implementation would expose mineral soil and has the potential to delivery fine sediment to surface waters and the Entiat River. However, design criteria in the form of erosion control plans, temporary road/path access requirements, and road/path obliteration requirements is expected to be effective in minimizing or eliminating delivery of fines to the Entiat River in the short-term, while re-vegetation through planting and natural re-vegetation is expected to minimize delivery of fine sediment long-term.

An Erosion/Sediment Control Plan (ESC) would be required of the contractor prior to project implementation. Further, inspection and maintenance of elements in the ESC by the contractor would occur daily or as need to assure continued performance of their function. Elements included in design criteria which are expected to provide erosion and sediment control include requirements to protect exposed soils with mulching, or other approved measures to prevent sediment generation and delivery. Stockpiles would be required to be stabilized and protected, and permanent stabilization would occur through seeding and planting as described in the project description.

Further, sediment-laden water from in channel work would be localized and discharged in such a manner as to avoid the release of turbid or sediment-laden water in order to prevent contamination or increase turbidity of surface waters. Isolation would be accomplished through the use of plastic sheeting lined bulk bag coffer dams. Turbid water would be discharged to an upland location, floodplain area, non-stream connecting ditch or channel, etc. in a manner that would prevent additional erosion delivery of sediment to surface waters as described in the Stormy A, and Stillwaters design plans.

Project implementation is expected to result in short-term soil disturbance during project implementation and a long-term improvement in soil conditions within the project area. Project implementation is expected to detrimentally disturb soil on 1300 feet of temporary access routes used for structure construction in the Stormy A reach and approximately 1 acre used for temporary staging. In the Stillwater reach, approximately 1100 feet of temporary access routes for levee removal, side channel reconnection and LWM structure construction would be disturbed.

Design criteria from ARBO II contain provisions to minimize soil disturbance within the new clearing limits temporary routes, such as designation of and flagging of construction limits, mulching, and slope requirements, and would also require active soil restoration of rutting and compaction that occurs.

Design criteria from ARBO II requires disturbed areas to be restored to pre-project grade and that all areas would have a loose friable seedbed prior to seeding. Planting of riparian and upland vegetation would occur on ground disturbed by channel relocation and levee removal operations. Coupled with improved riparian function, restoration would result in a long-term improvement of soil conditions within the project area.

In the Stormy A reach, LWM structure placement would increase the abundance of large wood within the project reach by adding approximate 130 pieces of large wood within 9 structures in and adjacent to the Entiat River. The structures would provide cover habitat, deflect flow providing armoring to banks, create scour pools at their apexes, and for large structures provide for racking of LWM delivered from upstream. Deflection structures and racking structures are likely to result in dynamic channel adjustments on opposite banks.

In the Stillwaters reach, side channel reconnection has the potential to expose existing subsurface fines to erosion and sediment delivery through lateral and vertical channel scour. However, incorporation of LWM design elements should minimize the likelihood of excessive scour that would result in impacts to the Entiat River road and would serve to stabilize the reconnected side channel. Additionally, wetland benches will be created and planted with native vegetation in order to further reduce the potential for erosion and to add more surface area for wetland type plants to be established.

Location and placement of large wood elements would increase the abundance of large wood within the Stillwater by approximately 221 pieces. Increases in large wood frequency would increase channel stability in the reconnected side channel, provide complexity, cover, pool creation, riparian complexity, and beneficial sediment capture. Side channel reconnection would create areas of off channel habitat accessible at low flows that would also serve as habitat refugia and function as energy attenuation at high flows.

Location and design of the reconnected channel should also increase the acres of floodplain inundation at all flow levels.

Both Inter-Fluve and Natural System Design (NSD), project design consultants for the Yakama Nation and BPA, re-valuated stability and robustness of project element designs based on the potential for increased flow events resulting from the 2015 Wolverine Fire.

NSD estimated post fire peak increases at the Stormy A site of 8%, while making the assumption that major bulking of flows would be attenuated due to the distance and channel conditions between the fire and the project location (approximately 12 river miles between Wolverine Fire and Stormy A and approximately 6 river miles between the Wolverine Fire and Upper Stillwaters). Their analysis considered the differences in structure stability between design flow and an 8% increase in peak flow and suggests that no modifications are required for the proposed structures given the slight increase in post-fire peak flow and low likelihood of channel blocking debris jams. Similarly, Inter-Fluve found that the large wood structure stability factors of safety are above the lowest suggested values for the extreme post-fire scenario.

Cumulative Effects

Cumulative effects analysis is bounded in time and space. The temporal boundary of cumulative effects to hydrology and soils within the Stormy A-Upper Stillwaters reaches spans from the early 1900's, when past activities including; commercial timber harvest, road building, sheep grazing, and other management actions began to have an impact on hydrology and soils on a large scale, and continues approximately up to 5 years following the completion of the proposed action when benefits from restoration projects would become apparent from riparian planting, side channel re-connection and large wood placement. The spatial boundary includes the Entiat River Watershed. Past, present, and reasonably foreseeable activities relevant to cumulative effects are listed and discussed at the beginning of Chapter 3.

Timber harvest on nearby lands, private land development, and road construction and maintenance are likely to continue on private and Federal land adjacent to and upstream of the project area. These activities carry with them the potential to increase sediment production and delivery to drainage pathways and eventually to the project reach. There is the possibility for short-term (less than 5 years) impacts from project generated sediment being introduced to the Entiat River, however design criteria are expected to minimize any potential impacts. Long-term

(greater than 5 years) there would be beneficial cumulative effects from the projects as LWM structures and side channel reconnection would providing functions of both storing and transporting sediment in a manner beneficial to watershed health. The project would have beneficial hydrologic effects to other infrastructure such as the Entiat River Road by providing armoring and protection along the Rip-Rap enhancement sites. Increases in pool depth and frequency within the project, as well as revegetation through planting and natural re-generation would meet ACS objectives and the Wenatchee National Forest Water Temperature TMDL implementation strategy by providing for a long-term improvement in stream temperatures.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Wenatchee National Forest Land and Resource Management Plan

Project implementation would improve conditions related to specific measureable standards of the WNF LMRP. In particular, LWM would be increased in reaches where the project elements are constructed, and pool frequency would be increased. Riparian planting, natural re-generation, and the construction of pool habitat would make conditions favorable to maintain or decrease surface water temperature. Channel morphology would be improved from a straight, transport reach to a meandering response reach more in line with reference condition pattern, form, and function. Large wood supplementation would occur and frequency would increase.

Northwest Forest Plan

Aquatic Conservation Strategy Objectives

Objective 1: Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

The project is designed to increase the amount of large wood within the Entiat River and thereby increase complexity of stream habitat. By restoring natural flow paths for water, sediment and large woody material channel components that contribute to channel complexity; pool quantity/quality and substrate, flows would be enhanced. All elements of the project are specifically designed to restore distribution, diversity, and complexity of watershed and landscape scale features. The project would enhance habitat where infrastructure and related impacts occur, would restore and make accessible side channel, and would provide refugia access and habitat for riparian dependent species.

Objective 2: Maintain and restore spatial and temporal connectivity in and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

Large wood structures are designed to provide habitat along the stream banks of the Entiat River. Structures would extend into the Entiat no more than 25% of the stream channel width and would allow passage at all flows. Removal of a legacy levee and re-connection of the Signal Peak Side Channel would allow the side channel to be inundated during lower summer stream flows of 700-800 cfs which would provide habitat for rearing juvenile salmon and steelhead.

Objective 3: Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

The physical integrity of the riprap banks along the Entiat River Road would be improved by placing large wood structures and re-planting native vegetation in these areas that are currently devoid of vegetation. Removing the levee, reconnecting the side channel, and constructing LWM and deflector structures along the Entiat River, restores the physical integrity of the aquatic system within the project area.

Objective 4: Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

There may be short-term impacts to water quality (increased sedimentation) when the projects are implemented (during large wood placement and side-channel re-connection). However, project design criteria were developed to minimize these impacts and keep them to an acceptable level and in the long term, water quality would be maintained. Water quality would be restored by allowing the Entiat River to access the reconnected side channel and floodplain and provide all of the associated biological, physical and chemical functions of a functioning stream/floodplain system.

Objective 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Project elements, by design, would maintain sediment regime by enhancing simplified habitat elements (rip-rap) and providing for dynamic responses to LWM structures. The sediment regime within the Entiat River would be maintained in the long term. There may be short-term increases in sedimentation due to construction activities; however, project design criteria would minimize these impacts.

Objective 6: Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

The project is not likely to have an effect on in-stream flows, and would maintain the current hydrologic regime. Changing the project reach to a response reach would restore patterns of sediment, nutrient, and wood routing. The project would improve wetland and floodplain habitat by providing for side channel reconnection and inundation of the floodplain.

Objective 7: Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

The project would largely maintain the timing, variability, and duration of floodplain inundation and improve inundation with respect to the channel reconnection and levee removal.

Objective 8: Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion,

and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Areas impacted by the implementation of this project would be planted, seeded, and/or mulched. Re-vegetation will include native plants only. These plants would provide ground cover, thereby reducing erosion. All plantings will be monitored yearly for survivability and/or replaced on an as needed basis. Concurrently non-native weeding will take place to ensure survivability of native species as well.

Objective 9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

The project is designed specifically to restore and increase in-stream habitat, riparian plant species and side channel connection, which would enhance terrestrial and aquatic plant and animal populations by providing improved habitat for all life stages.

Fisheries

Affected Environment

The Entiat River flows into the mainstem Columbia River upstream of Rocky Reach Dam, near RM 484. The Entiat River originates in a glaciated basin east of the Cascade crest and flows in a southeasterly direction to its confluence with the Columbia River. The Entiat River has two major tributaries: the North Fork Entiat, which joins the mainstem at river mile 34.5; and the Mad River, which flows into the lower Entiat River near RM 10.5.

The Entiat River provides habitat for many fish species including spring and summer chinook, steelhead, bull trout, brook trout, rainbow trout, cutthroat trout, mountain whitefish, and several species of sculpin, dace, suckers and lampreys. The Entiat River provides critical habitat for populations of Upper Columbia River Steelhead, Upper Columbia River Spring Chinook salmon and Columbia River bull trout, which are listed under the Endangered Species Act (ESA) and Essential Fish Habitat (EFH) for coho and chinook salmon, which are covered under the Magnuson-Stevens Fisheries Conservation and Management Act (MSA). Spring Chinook salmon, spawn within the Entiat River from RM 16 to RM 28 during August and September. Steelhead, typically spawn within the Entiat River from the mouth (RM 0.5) to the Fox Creek spawning channel (RM 28), from mid-March through May. Box Canyon (RM 29), is typically a barrier to upstream migration of spring Chinook and steelhead, however during certain high flow years spring Chinook and steelhead redds have been documented upstream of Box Canyon near the USFS/WA DOE gaging station below Entiat Falls (RM 34). Bull trout spawn in the Entiat River from Box Canyon (RM 29) to Entiat Falls (RM 34), from September through October. Entiat Falls at RM 34 is a complete natural barrier to all anadromous fish.

Primary impacts to the floodplain and stream channel function of the Entiat River on USFS lands within the upper Entiat River Watershed involve past timber harvest and wildfire, the location of the Entiat River Road, and the location of several Forest Service Campgrounds and Recreation Residences within the floodplain. Past timber harvest has reduced the recruitment potential, size and number of key pieces of LWM to the Entiat River. The Entiat River Road and associated rip rap which abuts the channel in key locations and confines the river, has reduced riparian vegetation, accelerated scour processes, reduced hydraulic roughness and reduced potential for LWM recruitment from riparian clearing and bank armoring. These impacts have reduced stream

habitat complexity (pools, LWM, spawning gravels) which effects fish species ability to spawn and rear within the Entiat River.

Regulatory Framework

The Entiat Ranger District is managed under the Wenatchee Forest Plan (WNF 1990), as amended by the Northwest Forest Plan (NWFP 1994).

Wenatchee National Forest Plan

The Wenatchee Forest Plan delineates Management Areas (MA's) across the Okanogan-Wenatchee National Forest that emphasize a particular management approach. For riparian and aquatic habitat's, **EW-2 Riparian-Aquatic Habitat Protection Zone** are designated along all Class I, II and fish bearing Class III streams, lakes and wetlands. Specific Standards and Guidelines apply to this management area and are intended to maintain and enhance habitat conditions for fish species and maintain water quality.

For fisheries, the primary fish habitat objectives are to maintain and improve fish habitat capability, integrate fish and riparian habitat management into other multiple use objectives, have an aggressive habitat management program, and develop management partnerships with local, state, federal, and tribal governments, and private groups (Wenatchee LRMP p. IV-41).

Management Indicator Species

Management indicator species (MIS) were designated in the Wenatchee National Forest Plan (1989). Species are selected as MIS because their population changes may indicate the effects of land management activities (36 CFR 219.19 (a) (1)). 36 CFR 219.19 (1982 planning rule) directs forests to establish objectives for maintenance and improvement of habitat for MIS. Potential habitat exists in the project area for all listed MIS fish species.

Current MIS under Wenatchee Forest Plan:

- Cutthroat trout
- Bull trout
- Steelhead
- Sockeye
- Spring Chinook
- Summer Chinook

Northwest Forest Plan

The Wenatchee Forest Plan incorporates amendments made to it by the *Record of Decision for Amendments to Forest Service and BLM Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (USDA/USDI 1994, as amended 2001) (Northwest Forest Plan). The NWFP delineated Management Areas, that amend and overlay all other Management Areas (MAs) designated in the WNF plan. The Aquatic Conservation Strategy includes Objectives for aquatic and riparian habitat as well as Riparian Reserve and Key Watershed MA's which are designated within the NWFP area and overlay all other MA's (i.e. Matrix, LSR, etc.). As stated in the ROD for the NWFP, standards and guidelines from the WNF plan continue to apply where they are more restrictive or provide greater benefits to late successional forest related species as well as S&G from the NWFP. Standards and

Guidelines for RR and Key watersheds apply across the forest and are added to and implemented along with the standards and guidelines for overlapping designated management areas (i.e. where RR overlap Matrix MA, standards and guidelines for RR and Matrix MA apply to management actions).

Aquatic Conservation Strategy Objectives

The NWFP contains the Aquatic Conservation Strategy (ACS), which provides watershed direction that is intended to restore and maintain the ecological health of watersheds, aquatic ecosystems and water quality on National Forest lands. Direction within the ACS is based on nine Objectives that are focused on maintaining and restoring natural processes, water quality and healthy fish populations.

Key Watersheds

Key Watersheds are defined as systems of large refugia comprising watersheds that are crucial to at-risk fish species and stocks and provide high quality water and are the highest priority for watershed restoration. The Entiat River HUC5, including the Stormy A and Upper Stillwaters Reaches, was designated as a Key Watershed.

Riparian Reserves

Riparian Reserves were designated under the NWFP-ACS and are a key element in achieving the nine ACS Objectives. Riparian Reserve MA's include portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply. These MA's are adjacent to streams, rivers, lakes, ponds, wetlands and other areas required for maintaining hydrologic, geomorphic and ecologic processes. Unstable and potentially unstable slopes are also included.

Region 6 Regional Foresters Sensitive Species

Within the National Forest System, a sensitive species is a plant or animal whose population viability is identified as a concern by a Regional Forester because of a significant current or predicted downward trend in abundance or habitat quality that would reduce its distribution. The primary objective of the Sensitive species program is to ensure that federal actions do not contribute to a loss of viability, or cause a significant trend toward listing under the ESA. The following are Region 6 aquatic sensitive species that are suspected and/or known to occur on the OWNF (ISSSSP List 2015), species that occur within the Stormy A-Stillwaters project area are listed in bold;

- **Pacific Lamprey**
- Pygmy Whitefish
- Lake Chub
- **Inland Columbia Basin Redband Trout**
- **Westslope Cutthroat Trout**

Federal Law

Endangered Species Act (1973) and Critical Habitat:

Through federal action and by encouraging the establishment of state programs, the 1973 Endangered Species Act provided for the conservation of ecosystems upon which threatened and

endangered species of fish, wildlife, and plants depend. Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 (as amended) requires all federal agencies to review actions authorized, funded or carried out by them to ensure such actions do not jeopardize the continued existence of any listed species. The following fish species are listed under the ESA within the Entiat River within the Stormy A- Stillwaters Project area:

Columbia River Bull Trout (Salvelinus confluentus)

Listed as Threatened on June 12, 1998, Critical Habitat designated on October 18, 2010 notice (50 CFR Part 17), Bull Trout Recovery Plan completed in April 2002.

Upper Columbia Spring Chinook (Oncorhynchus tshawytscha)

Listed as Endangered in March 1999; endangered status was reaffirmed on June 28, 2005 (70 FR 37160); Critical Habitat designated on September 2, 2005 (70 CFR 52630); Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan completed in August 2007.

Upper Columbia River Steelhead (Oncorhynchus mykiss)

Listed as Endangered on October 17, 1997, reinstated as endangered on June 13, 2007, reclassified as threatened on August, 2009; Critical Habitat designated on September 2, 2005 (70 CFR 52630); Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan completed in August, 2007.

Magnuson-Stevens Fishery Conservation and Management Act:

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1996 (as amended) requires the identification of Essential Fish Habitats (EFH) for Federally managed fishery species and the implementation of measures to conserve and enhance this habitat as described in Federal Fishery Management Plans (FMP's). Federal agencies are required to review actions authorized, funded or carried out by them to ensure that such actions do not negatively affect any EFH (those waters and substrate necessary to fish for spawning, breeding or growth to maturity). Federal fisheries within the middle and upper Columbia basin which are covered under the MSA (Pacific Coast Salmon FMP) include; chinook and coho (*O. kisutch*), which are known to occur in the Entiat River within the Stormy A-Upper Stillwaters Project Area.

Environmental Consequences

Alternative 1 - No Action

Poor stream habitat including lack of pools and large wood, eroding banks, embedded stream substrate and lack of mature riparian vegetation would remain and would continue to impact the abundance and distribution of fish species, especially those listed under the Endangered Species Act.

The No Action Alternative would not propose an active program to restore wood or side channels in the Entiat River nor any other river restoration activities on Forest Service lands. The wood needed for increasing large wood complexity would have to be recruited through natural processes.

Recovery of pool habitat and restoring the quantity and quality of off-channel rearing habitat in the river would also be left to natural processes. Without wood recruitment and retention, those processes are hindered.

Although recent wildfires in the upper Entiat watershed have created a potential source of in-stream wood, the processes affecting large wood recruitment and retention have all been altered over time and are unlikely to fully recover on their own. For example, an ample supply of large wood exists upstream from past fires, however riparian roads, channel cleaning, riparian harvest, bank armoring etc. have altered the stream banks and channelized the flow reducing the ability of the stream to retain large wood that becomes available. Furthermore, natural restoration of the underlying processes would take many decades or centuries (e.g. growth of large trees and more natural wood recruitment rates), and in some cases, such as with bank armoring associated with a roadway, may never be fully recovered. In-stream habitat complexity would continue to limit rearing habitat for fish species, in particular ESA listed spring chinook, steelhead and bull trout. Potential pulses of sediment from debris flows and runoff of ash and surface erosion from post-fire effects can have positive and negative impacts on late summer and fall adult spawners such as Chinook salmon and bull trout. Impacts to the aquatic habitat would be short term increases in turbidity and fine sediment (3-5 years), while potential inputs of large wood and gravel could beneficially increase habitat complexity in areas of the river (i.e. create new spawning areas).

Alternative 2 - Proposed Action

Direct and Indirect Effects

The Proposed Action could directly impact fish through the placement of LWM and construction of the side channel. These projects involve work in an active stream channel where fish reside and therefore could have direct effects. The potential exists to create localized turbidity, which can harm fish as well as direct mortality to fish if they become entrained during de-watering. Any sediment that is disturbed would likely be mobilized during the first winter and be redistributed downstream temporarily. The use of heavy equipment could disturb the stream channel and cause impacts to fish. Direct impacts could range from short-term reduction in feeding efficiency to incidental mortality. Design criteria (e.g. timing, ARBO II PDC) would reduce or minimize this risk. Past management activities have had many indirect long-term effects on fish and fish habitat. Under the proposed action, these effects would be lessened due to placement of LWM along the riprap banks of the Entiat River, re-connection of a side channel and construction of large wood structures that would create back water and deep pool habitat as well as provide cover for fish species. Large wood is important for reducing river energy, forming pools, and adding overall habitat complexity. Pool habitat is important for salmon and trout as rearing habitat for juveniles and deep pools are important for cool water holding areas for adults. Off-channel areas provide important rearing habitats for juvenile salmonids during spring runoff periods and throughout the year. Long-term beneficial effects in stream habitat function are expected to lead to improved growth and survival of individual fish through enhanced spawning, incubation, rearing, and migration for fish species and their critical habitat.

Table 4. Resource indicators and measures for the existing condition and Proposed Action

Resource Element	Resource Indicator	Measure (Quantify if possible)	Existing Condition (No Action)	Proposed Action (Alternative 1)
Aquatic and Fish Habitat	Large Wood	pieces of Large Wood per Mile	~28 pieces per mile	~163 pieces per mile
	Off-channel Habitat	% side channel of stream reach	~10%	~20%
Riparian Function	Streamside vegetation	Miles of Rip-Rap enhanced	0	0.2

Cumulative Effects

Cumulative effects analysis is bounded in time and space. The temporal boundary of cumulative effects to aquatic habitat and fisheries within the Stormy A-Upper Stillwaters reaches spans from the early 1900's, when past activities including; commercial timber harvest, road building, sheep grazing, stocking of non-native fish species and other management actions began to have an impact on aquatic habitat and fisheries on a large scale, and continues approximately up to 5 years following the completion of the proposed action when benefits from restoration projects would become apparent from riparian planting, side channel re-connection and large wood placement. The spatial boundary includes the Entiat River Watershed.

The overall effect of past activities on the Entiat watershed baseline has been toward the loss and degradation of instream habitat and reduction in fish populations, water quality and hydrologic function. Stormy A-Upper Stillwaters Restoration Project would continue to improve and recover stream habitat function and increase in distribution and abundance of fish species. Climate-related factors such as temperature and streamflow could affect habitat in different ways and at different scales, therefore a diversity of conditions is needed for fish species population stability. Existing well connected, habitats on public lands would be important to supporting salmon survival and recovery as the climate continues to warm. Maintaining and restoring these areas is a fundamental objective of the Stormy A-Upper Stillwaters Watershed Restoration project. Implementation of the Upper Stillwater-Stormy A project in addition to Large Wood placement project proposals by the BPA and BOR on non-FS lands downstream of the Stormy A and Grey Reach (with possible implementation in 2018, depending on environmental review) would have a cumulative beneficial effect on in-stream habitat elements (increase in LWM and channel complexity) and fisheries within the Entiat River.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Wenatchee Forest Plan

Management Indicator Species (MIS)

Large wood placement, side channel re-connection and riprap enhancement within the Stormy A and Upper Stillwaters project areas would have long-term beneficial effects to stream habitat function and are expected to lead to improved growth and survival of MIS fish species through enhanced spawning, incubation, rearing, and migration habitat.

Northwest Forest Plan

Region 6 Regional Foresters Sensitive Species

Large wood placement, side channel re-connection and riprap enhancement within the Stormy A and Upper Stillwaters project areas would have long-term beneficial effects to stream habitat function are expected to lead to improved growth and survival of R6 sensitive fish species through enhanced spawning, incubation, rearing, and migration. This project would contribute to improved viability for Sensitive Species and would not cause a trend toward listing under the ESA.

Key Watersheds

The following Standard and Guidelines apply to all Key Watersheds and would be met during the proposed project since no road construction is proposed and there would be no net increase in the amount of roads within the Entiat Watershed due to this project:

- Outside Roadless Areas - Reduce existing system and non-system road mileage. If funding is insufficient to implement reductions, there would be no net increase in the amount of roads in Key Watersheds.

Riparian Reserves

The Northwest Forest Plan contains standards and guidelines for Riparian Reserves that prohibit or regulate activities that retard or prevent attainment of the ACS objectives. Standards and Guidelines that apply to this project include the following:

Watershed and Habitat Restoration

- **WR-1**. Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains Aquatic Conservation Strategy objectives.
    - This standard and guideline would be met by project design. The project is specifically designed to promote the long-term integrity of the aquatic habitat within the project area.

Fish and Wildlife Management

- **FW-1**. Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of Aquatic Conservation Strategy objectives.

    - This Standard and Guideline would be met through project implementation and attainment of ACS objectives (see Hydrology Secion).

Federal Law

Endangered Species Act (1973) and Critical Habitat:

This project would meet the requirements of the Endangered Species Act by following the design criteria and conservation measures from the Programmatic Biological and Conference Opinions (BiOps) for Aquatic Restoration Activities in Oregon, Washington and portions of California, Idaho and Nevada would be met (NMFS 2013 and USFWS 2013).

ESA effects determination to listed fish and their critical habitat are determined by integrating project effects during construction (discussed above) with anticipated beneficial effects to the biological needs of the ESA fish species present. The short-term effects of project activities determinations from the Programmatic Regional Biological Opinions (ARBO II) from the National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (FWS) indicate that the project "**May Affect and is Likely to Adversely Affect**" spring chinook, steelhead and bull trout and their critical habitat in the short term due. Effects are dut to heavy equipment being used in the floodplain and within the river during project implementation that would disturb stream channels and create short term turbidity and fine sediment plumes in the river. Soil disturbance resulting from heavy equipment working along the streambank would result in exposure of soils and potential erosion, however design criteria and conservation measures would

minimize these impacts. ESA listed fish species may be directly harmed and/or harassed during de-watering, capture and release prior to and during in-stream work. In the long-term this project will have a beneficial effect on all three species and their critical habitat due to increased LWM and side channel habitat, which provides stream complexity, cover and off-channel rearing areas for fish.

Magnuson-Stevens Fishery Conservation and Management Act (MSA) and Essential Fish Habitat (EFH):

This project would place large wood structures and improve side channel habitat within the Entiat River where chinook are known to spawn and rear. Due to heavy equipment being used in the floodplain and within the river during project implementation, stream channels would be disturbed and create short term turbidity and fine sediment plumes in the river. Soil disturbance resulting from heavy equipment working along the streambank would result in exposure of soils and potential erosion, however design criteria and conservation measures would minimize these impacts. This project "**May Adversely Affect**" EFH within the Entiat River in the short term, however the the project would improve EFH habitat in the long-term by improving "those waters and substrate necessary to fish for spawning, breeding or growth to maturity".

Botany

Affected Environment

The project is entirely within Riparian habitat (defined as within 300 feet of a perennial stream or wetland and 150 feet of an intermittent (seasonally wet stream). The project area includes rip-rapped banks that support little or no vegetation, riparian areas dominated by hardwood shrubs, conifers, and black cottonwood, rocky and sandy gravel bars, and old, dry stream channels. This portion of the Entiat River is natural in appearance, with meanders, pools and gravel bars. However, there are fewer pieces of large wood in and along the river than would be expected. Past logging reduced the number large trees that would have otherwise fallen in to the river or on the banks. Logs in rivers and on riverbanks are habitat for the mosses and lichens that grow on moist wood substrates.

The Forest Service Natural Resource Information System (NRIS) database and the Washington State Natural Heritage databases were reviewed, and there are no Regional Forester Sensitive and Special Status Species (RFSSSP), no federally listed threatened or endangered species and no Northwest Forest Plan survey and manage plants known to occur in the project area. The project area was surveyed in 2015 and no RFSSSP, no federally listed threatened and endangered or survey and manage plants were found.

Regulatory Framework

The National Forest Management Act (NFMA) and regulations, and Forest Service policy require the agency to maintain viable populations of all native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.

Wenatchee National Forest Land and Resource Management Plan

The Wenatchee Forest Plan Standards and Guidelines (IV-104) give direction "to maintain or enhance biological diversity by providing or developing an ecologically sound distribution and

abundance of plant and animal communities and species at the forest stand, subdrainage, and Forest level. This distribution must contribute to the goal of "maintaining or enhancing all native and desirable introduced species and communities". The most critical components of diversity are identified as old growth, and wildlife and plant habitat for rare species. The Wenatchee Forest Plan has several Forest-wide Standards and Guidelines that apply to plants (pages IV-78, IV-89, IV-92):

- Threatened, endangered and sensitive species would be identified and managed in cooperation with the [USFWS, WDFW, DNR] and Washington Natural Heritage Program (plants) for all projects.
- All proposed projects that may involve significant habitat disturbances or changes, or have the potential to alter habitat of [TES] plant…species, shall be inventoried to determine if any of these species are present.
- Habitat for existing Federally classified threatened and endangered species shall be managed to achieve objectives of recovery plans.
- When sensitive species are present in a project area, follow the objectives in the Species Management Guide.
- Sensitive species would receive special management consideration under Forest Service policy. All necessary actions would be taken to assure that management activities do not jeopardize the continued existence of a sensitive species through adverse modifications of their essential habitat until their status is determined.

Northwest Forest Plan (1994) and ROD for Survey and Manage (2001)

The Wenatchee National Forest Plan was amended by the Northwest Forest Plan and the R6 Invasive Plant EIS (2005). All of the project area lies within the range of the northern spotted owl and is managed under the Northwest Forest Plan. The Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA 2001) contains direction for mitigating effects to certain species of vascular plants, bryophytes, lichens, and fungi within the Northwest Forest Plan lands. This project uses the January 2001 ROD standards and guidelines and the associated January 2001 species list.

Also applicable within the entire NWFP area is one of the main intents of the Northwest Forest Plan: to maintain a healthy forest ecosystem with habitat that would support populations of native species (R6 PNW ROD, p. A-1). The Northwest Forest Plan includes an Aquatic Conservation Strategy; the relevant objectives for botany in this project are to "8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands…" and "9. Maintain and restore habitat to support well-distributed populations of native plant…species." Consistency with ASC objectives can be found in the Hydrology Section on page 31.

In addition to the intents of the NWFP, Survey and Mange requirements and ACS requirements that apply throughout the NWFP area, two land allocations have allocation specific management direction for plants:

- In the LSR land allocation, non-native species (plant and animal) should generally not be introduced into LSRs. If proposed, an assessment of the impacts must be completed and introduction must avoid retarding or preventing achievement of LSR objectives.

- Riparian Reserves are used to …enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas and improve travel and dispersal corridors for many terrestrial plants and animals.

The NWFP gives Standards for coarse woody debris (which are critical for maintaining populations of fungi, mosses, lichens and some vascular plants) in matrix stands (C-40).

- Coarse wood (large down logs) that are already on the ground need to be retained and protected from disturbance to the greatest extent possible.

- Manage to provide a renewable supply of large down logs well distributed across the matrix landscape.

Federal Law

Endangered Species Act

The Endangered Species Act (ESA) requires that the Forest Service conserve endangered and threatened species. The sensitive species program was developed to ensure that species do not become threatened or endangered because of Forest Service actions. As part of the NEPA process the Forest Service is required to review programs and activities through biological evaluation, to determine their potential effect on sensitive species. Management "…must not result in the loss of species viability or create significant trends toward Federal listing" (FSM 2670.5). A viable population "…has the estimated numbers and distribution of reproductive individuals to ensure the continued existences of the species throughout its existing range within the planning area" (FSM 2670.5) The Region 6 Sensitive Species list was last updated in 2015.

Environmental Consequences

Alternative 1 – No Action

Under this alternative no re-establishment, enhancement or improvement of aquatic habitat would occur. Without any treatments, there would be no effects from the activities to riparian plant communities.

The old stream channel currently blocked by a man-made levee would remain dry most of the year and would not support those riparian plants which require wetter conditions. There would be no large wood added to the river or riverbanks. However, eventually, large wood would be added to the system from wildfire-burned areas upstream. Without treatment, the rip-rapped banks would likely remain as they are, minimal native plant cover.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Heavy machine access and construction could disturb or kill individual native plants through physical damage or changes in microsite conditions (such as shading). This would result in a short term (1-5 years) weakening of the native plant community until replacement plants could become established. Long term adverse effects to the plant community would be prevented by requirements to minimize the amount of travel back and forth along access routes, careful selection and identification of access routes, and Project Design Features (PDFs) requiring

replanting of disturbed areas with local native species, and monitoring for invasive plant colonization.

The project would benefit the native plant community in the riparian area by increasing the amount of moist/wet riparian habitat available, increasing the cover of native plants along the rip rapped banks, and providing more large wood substrates for mosses and lichens. This beneficial effect would be long term and would offset the short-term damage from construction activities.

Cumulative Effects

The spatial boundary for analyzing the cumulative effects to riparian native plant communities is the project area, because this would be where the effects of this and other projects would overlap.

The temporal boundaries are the lifespan of the document plus an additional 5 years to estimate the length of time for native vegetation recovery after machine work (15 years total).

Short-term effects to plants are within a single growing season (1 year). Long-term effects are over more than one growing season up to 15 years.

The present and reasonably foreseeable activities that may affect riparian native plant communities in the project area are road maintenance and wildfire suppression.

This project is expected to offset some of the adverse effects to the river from past road construction and logging. The side channel that was blocked in order to protect the road would be re-opened and the unnatural riprapped banks would softened with native plant planting and large wood placement. Present and future road maintenance and wildfire suppression is expected to be conducted in a way that prevents damage to riparian vegetation given existing laws, directions, and standards and guidelines. Therefore, no adverse cumulative effects to riparian vegetation is expected when the proposed action is combined with present and future activities in the project area.

Table 5. Summary comparison of environmental effects to Botany resources

Resource Element	Indicator/Measure	No Action	Proposed Action
Riparian plant communities	Riprap bank planted with native species	0 feet	370 feet of riprapped bank planted.
	Increase of Wet/moist riparian habitat along the dry side channel	0 feet	2,000 feet
	Large wood structures added	0	5-6 large wood structures added to the riparian area, large wood added to 370 feet of rip rapped bank.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Wenatchee Forest Plan and Northwest Forest Plan

The Proposed Action meets the direction for Sensitive plant management in the Wenatchee Forest plan. If discovered during project implementation Sensitive plant populations would be protected from disturbance through design features.

The Proposed Action is consistent with Northwest Forest Plan guidance to enhance and improve habitat in riparian reserves –wet/moist habitat would be restored along the current dry side channel, large wood would be added to the river and banks, and native species would be planted in riprapped banks.

Endangered Species Act

There are no threatened or endangered plants known in the project area. If any are found during implementation, they would be protected.

Invasives

Affected Environment

Invasive plants found in the project area during field survey include diffuse and spotted knapweed (Washington state Class B noxious weeds), woolly mullein, orchard grass, common brome, cheatgrass, yellow salsify, and dandelion.

Regulatory Framework

The National Forest Management Act (NFMA) and regulations, and Forest Service policy require the agency to maintain viable populations of all native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.

Wenatchee National Forest Land and Resource Management Plan

The Wenatchee Forest Plan Standards and Guidelines (IV-104) give direction "to maintain or enhance biological diversity by providing or developing an ecologically sound distribution and abundance of plant and animal communities and species at the forest stand, subdrainage, and Forest level. This distribution must contribute to the goal of "maintaining or enhancing all native and desirable introduced species and communities". The Wenatchee Forest Plan has several Forest-wide Standards and Guidelines that apply to invasive plants (pages IV-78, IV-89, IV-92):

- Contain, control or eradicate existing [weed] populations as budget allows. Give priority as follows: 1. Projects that are next to…threatened Federally listed threatened, endangered and sensitive species.
- The Wenatchee Forest Plan Standards and Guidelines (IV-89) require that a noxious weed assessment be completed for all significant ground disturbing project activities to determine the risk of introducing noxious weeds and to develop and plan to prevent introduction on moderate and high-risk sites.

R6 PNW Invasive Plant Management ROD (2005)

Both Forest Plans were amended in 2005 by the Region 6 Invasive Plant Management ROD (2005), which has several standards that apply to this project (Complete Invasive Plant Assessment can be found in the project record):

1. Prevention Standard 1 - requires that prevention of invasive plant introduction, establishment, and spread would be addressed in all plans (with existing condition, mechanisms for spread, prevention measures, and remaining risk addressed).
2. Prevention Standard 2 – requires cleaning of all heavy equipment prior to entering NFS lands.
3. Prevention Standard 3 - requires weed free straw and mulch for rehab.
4. Prevention Standard 8 – conduct road blading and ditch clearing in consultation with local weed specialist (time activity to reduce spread of seeds, etc.).
5. Treatment Restoration Standard 13 – use native plant materials in revegetation unless conditions warrant other choices.
6. Develop a long-term site strategy for restoring/revegetating invasive plant sites.

State and Local Law

Noxious Weed

Washington State Noxious Weed law (RCW 17.10.140) requires landowners to control the spread of noxious weeds as required by weed class.

Executive Orders

Invasive Species, EO 13112 of February 3, 1999

Section 2 of this EO 13112 established duties for Federal Agencies whose actions may affect the status of an invasive species (to the extent practicable and permitted by law): to identify such actions, use relevant programs and authorities to prevent the spread of invasive species, detect, respond rapidly to and control populations of such species, monitor invasive species populations, provide for restoration of native species and habitat in ecosystems that have been invaded, and promote public education on invasive species.

In addition, Federal agencies may not authorize, fund or carry out actions that it believes are likely to cause of promote the introduction or spread of invasive species unless the agency had determined and made public its determination that the benefits of such actions clearly outweigh the potential harm cause by invasive species and that all prudent and feasible measure to minimize the risk of harm would be taken in conjunction with the actions.

Federal agencies are directed to pursue the above duties in consultation with the Invasives Species Council and in cooperation with stakeholders, as appropriate.

Environmental Consequences

Alternative 1 – No Action

Under this alternative no re-establishment, enhancement or improvement of aquatic habitat would occur. Without any treatments, there would be no effects from the activities to invasive plant infestations. Existing invasive plant populations would likely persist on the site, unless treated as part of a different project. The Entiat River Road is included on the annual District weed control program, but treatment is typically confined to areas immediately adjacent to the road.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Project activities could contribute to the spread of invasive plants already found in the project area, and could introduce new invaders. However, PDFs requiring that all equipment be cleaned prior to entering the project area, pre and post treatment of invasive plants already in the project area, and monitoring of disturbed areas for new invaders should prevent establishment and spread of invasive plants due to the proposed action. Project Design Features requiring rock and mulch materials from weed free sources should further prevent new invaders.

Cumulative Effects

Spatial and Temporal Context for Effects Analysis

The spatial boundary for analyzing the cumulative effects to riparian native plant communities from invasive plants is the project area, because this would be where the effects of this and other projects would overlap.

The temporal boundaries are the lifespan of the document plus an additional 5 years to estimate the length of time for native vegetation recovery after machine work (15 years total).

Short-term effects to plants are within a single growing season (1 year). Long-term effects are over more than one growing season up to 15 years.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

The present and reasonably foreseeable activities that may favor establishment of invasive plants and therefore affect riparian native plant communities in the project area are road maintenance and wildfire suppression.

Past actions likely resulted in the establishment of invasive plants in the project area. Roads are common vectors for invasive plant spread, and logging creates the early successional conditions favored by weeds. The proposed action would offset the effects of past actions by increasing the cover of native riparian plants in the long term. Project Design Features would prevent establishment and spread of invasive plants from project activities. The Proposed Action is not expected to contribute to an adverse cumulative effect from invasive plant spread or establishment. Because the project includes some new ground disturbance it is not expected to contribute to a beneficial cumulative effect.

Table 6. Summary comparison of environmental effects to Invasive Plant resources

Resource Element	Indicator/Measure	No Action	Proposed Action
Risk of spread of Invasive plants	Treatment of existing populations	None	Yes, pre and post activity treatment
	Risk from project activities	None	Low, PDFs minimize risk.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Wenatchee National Forest Land and Resource Management Plan (Forest Plan)

A noxious weed assessment was completed for this project and it was found to have a moderate risk. A plan was developed to prevent the introduction of weeds onto moderate and high-risk sites. This was achieved through design features requiring invasive plants to be treated before and after project activities, for all equipment and materials to be from weed free sources, and for disturbed areas to be replanted and monitored for new invaders.

The applicable prevention and treatment restoration standards provided in the R6 PNW Invasive Plant Management ROD would be met. Prevention of invasive plant introduction, establishment and spread is addressed through PDFs requiring the cleaning of heaving equipment and use of weed free materials, pre and post construction treatment of invasive plants, planting of native species, and monitoring for new invaders.

Executive Order Invasive Species, EO 13112 of February 3, 1999

The proposed action is consistent with guidance in EO 13112. An invasive plant prevention strategy was developed for the project and incorporated into the Design Features. It includes all prudent and feasible measures to prevent the introduction and spread of invasive plants (pre and post treatment, clean equipment and materials, planting of native species in disturbed areas, and monitoring for new invaders).

Recreation / Wild and Scenic River Eligibility

Affected Environment

The Entiat River is approximately 57 miles long. The first 12 miles (from the headwaters to the Glacier Peak Wilderness Boundary) is in wilderness and off the trail, in pristine, natural condition. The next section of river, 4 miles, from the Glacier Peak Wilderness Boundary to Cottonwood Trailhead has a trail that parallels it (although most of the time the trail is far off the river), so is quite pristine. The next section, 15 miles, from Cottonwood Campground to the Wenatchee Forest boundary has roads, campgrounds, trails and dispersed recreation sites scattered along it.

Regulatory Framework

The Wild and Scenic Rivers Act

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 USC 1271 et seq.) to preserve certain rivers with outstanding natural, cultural and recreational values in a free-flowing condition for the enjoyment of present and future generations. Under the Act, rivers are classified as wild, scenic, or recreational. Specific rivers across the country have been designated as part of the Wild and Scenic Rivers System. Once a river is designated, the values for which it was designated cannot be degraded. In partial fulfillment of the Section 5(d) requirements, the National Park Service has compiled and maintains a Nationwide Rivers Inventory (NRI), a register of river segments that potentially qualify as national wild, scenic or recreational river areas. The NRI qualifies as a comprehensive plan under Section 10(a)(2)(A) of the Federal Power Act.

The National Rivers Inventory determined the Entiat River, from the Cottonwood Trailhead to the Forest Boundary, has the qualities for preliminary classification in the scenic category. Scenic rivers are;

> *[t]hose rivers or sections of rivers that are free of impoundments, with shorelines or watershed still largely primitive and shorelines largely undeveloped, but accessible in places by roads. (Wild and Scenic Rivers Act, 1968)*

Section 5 (d) (1) of the National Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) requires that "In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas."

The Forest Plan includes standards and guidelines (listed below) to ensure that management actions do not affect the river segments that potentially qualify as national wild, scenic or recreational river areas.

Wenatchee Forest Plan

The following forest-wide standards and guidelines apply to the section of the Entiat River passing through the project area.

WS-1 The potential scenic classification attributes within a one-fourth mile wild corridor on each side of the {Entiat River} shall be protected pending congressional action on river designation.

WS-1 and ST-1 New recreation sites and facilities shall be widely spaced and screened from the river.

Motorized recreation vehicle use off roads should be restricted to designated routes and areas.
Common variety mineral material sources should not be developed.
New above ground utility lines should not be permitted.
New impoundments and diversions should not be authorized.

The project area falls with Management Area WS-1 and ST-1, as designated by the Forest Plan. The goal of management area WS-1 is to preserve the scenic river characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System. The goal of ST-1 is to provide a near natural appearing foreground and middleground along scenic travel corridors. The following standards and guidelines that apply to the proposed action:

WS-1 The visual quality objective is retention (the proposed action would occur within the foreground of the Entiat River)

- Provide a diversity of tree species and age classes, with goal to grow large mature trees
- Activities creating form, line or texture changes should not be evident for more than one season

ST-1 The visual quality objective is partial retention (the proposed action would occur within the foreground of the Entiat River)

- Provide a diversity of tree species and age classes, with goal to grow large mature trees
- Activities creating form, line or texture changes should not be evident for more than two season

Environmental Consequences

Alternative 1 - No Action

Wild and Scenic River Eligibility

In the No Action Alternative, the Outstanding Remarkable Values identified for the Entiat River in determining its eligibility for Wild and Scenic River designation would not change from current conditions. There would be no direct and adverse effect on the river.

Recreation and Scenery

The No Action Alternative would maintain the current recreation opportunities, since no roads would be temporarily closed. Boater safety would not be altered from natural conditions. Free-floating logs and naturally occurring log jams would still pose a potential hazard to boaters, but the risk of injury would be lower than with implementation of the proposed action.

Alternative 2 – Proposed Action

Direct Effects

Wild and Scenic River Eligibility

The effects analysis used for the Stormy A-Upper Stillwaters project follows the process described in Appendix C of "Wild and Scenic Rivers Act: Section 5 (d) (1), October 2004" (USFS, 2004) which was used to determine if the proposed activity would have a direct and adverse impact on the free-flowing nature of the river and its identified Outstandingly Remarkable Values

Based on this analysis, the free-flowing river conditions and water quality would not be changed. The Outstandingly Remarkable Values would be, for the most part, protected or improved. Changes in the scenic quality would be minor, and likely not noticeable to most people. Access to and availability of recreation would be affected in the short term only at the one involved dispersed recreation site near the Signal Peak Side Channel site during construction. River-users could see longer-term impacts if channel-spanning logs become lodged in the structures. Given the low number of river-users, and the design of the structures to minimize the potential of floating log capture, impacts to recreation would be slight.

Recreation and Scenery

Any impacts to recreation from the proposed activity would be to the dispersed recreation site that would be used as a staging and construction area, users of the Entiat Road and to river-users. As stated previously, the dispersed recreation site that would be used for a staging and construction area would be closed during construction. The site would be restored after the project is completed, however it would likely take approximately 1 to 2 years for the site to fully recover to its pre-construction condition. The proximity of the constructed structure to the site could lead to people climbing on the structure, posing a safety hazard. Road users could be delayed up to 30 minutes during the construction.

The safety of river-users and the quality of their recreation experience could be compromised if the structures capture free-floating logs, increasing the size of the structures, and potentially spanning the river. The structures in the Upper Stillwaters reach would be designed to shed floating logs by placement of "bumper logs" at the upstream end of the structures. These bumper logs are designed to deflect floating logs away from the structure, back into the fast moving water in the center of the river. In the unlikely event that channel-spanning logs were collected on the structures, it would directly alter the navigation of the river by people in canoes, kayaks, or rafts. People would need to exit the river, walk along the riverbank around the channel-spanning logs, and re-enter the river on the down-river side of the blockage.

Cumulative Effects of the Proposed Action

Present, Ongoing, and Reasonably Foreseeable Future Actions

The following reasonably foreseeable future actions would have a cumulative effect with the proposed action on eligible Wild and Scenic River management and recreation use. The spatial boundary of the cumulative effects analysis is the length of the Entiat River from the wilderness boundary to the forest boundary due to this section being eligible under the scenic category. Since the structures in the proposed action are designed to last for many years, recreation use is anticipated to continue to increase on the river and adjacent to the river. The Forest Service would

continue to maintain the developed recreation facilities and roads, the spatial boundary of the analysis is approximately 30 years into the future, and possibly beyond. Effects of past and present actions on Wild and Scenic River eligibility and recreation use were included in the affected environment (current condition) section.

Recreation Use and Scenery

The amount of area used for dispersed camping is increasing slowly over time as the number of people coming to the project area increases. The number of people recreating in the state has increased over the past decade with 42 percent of Washington residents participating in camping, (SCORP, 2013-18). Most people have their "favorite spots", and camp there year after year. If their spot is taken when they arrive, they generally move to another spot, or make a new one.

The Entiat Ranger District manages some of the most popular sites in the Entiat River riparian area, balancing use with impacts to the rivers and streams.

Recreation Facility and Road Maintenance

It is reasonably foreseeable that the Forest Service would continue to maintain the developed campgrounds, trails, and roads along the river, or providing access to the river. These would maintain and improve the recreation opportunities, enhancing the Outstandingly Remarkable Value of recreation along the Entiat River.

Summary of Cumulative Effects

The cumulative effect of the Proposed Action and the reasonably foreseeable future actions of increasing recreation use, and campground, trail, and road maintenance would be a maintenance or improvement of the Entiat's Outstandingly Remarkable Values of scenery, sites will blend better over time. Recreation opportunites would be impacted in short duration during construction, no long term impacts are anticipated as project does not change where or how people access the river or use the adjacent area. The river would most likely remain in a condition that would make it eligible for designation as a Wild and Scenic River in the future.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act does not provide protection of non-designated rivers, however, this project would maintain the free-flowing nature of the river, and maintain or improve the condition of its Outstandingly Remarkable Values at the time the eligibility determination was made by the Forest Plan. There would be no direct and adverse effect to this section of the Entiat River and it's potential for listing as a Wild and Scenic River.

The proposed action would be consistent with the management guidance from the Wenatchee National Forest Plan, pertaining to the condition of the Entiat River at the time eligibility was determined.

1. **River area shall be free of impoundments.**
   The project would not create impoundments.

2. **River area shorelines and immediate environment should not show substantial evidence of human activity.**

The river area shorelines and immediate environment would not show substantial evidence of human activity. The design criteria would minimize potential impacts to scenery, and the structures would appear natural.

3. **Structures or concentration of structures must be limited to relatively short reaches of the total river area.**
   The structures would not be concentrated, with a total of five spread along approximately 3 ½ miles (River Mile 20.5 to 20.7 and 25 to 27.5).

4. **Road may reach the river area and occasionally bridge the river.**
   Access routes constructed to reach construction sites would revegetate within 1 to 2 years, and would not become permanent roads.

Wenatchee Forest Plan Standards and Guidelines

The proposed action is also consistent with all applicable Forest Plan standards and guidelines.

WS-1 The potential scenic classification attributes within a one-fourth mile wild corridor on each side of the {Entiat River} shall be protected pending congressional action on river designation.

The design criteria would protect the scenic quality of the area within the one-fourth mile wide corridor. The constructed structures would appear natural.

WS-1 The visual quality objective is retention (the proposed action would occur within the foreground of the Entiat River)

The design criteria would ensure the structures appear natural, meeting the retention objective. The design critera and project goals meet the standards and guides for recreation class (ROS – roaded natural)

ST-1 The visual quality objective is partial retention (the proposed action would occur within the foreground of the Entiat River)

The design criteria would ensure the structures appear natural, meeting the retention objective. The design criteria and project goals meet the standards and guides for recreation class (ROS – roaded natural)

Vegetation

Affected Environment

Vegetation in the project area consists of deciduous and conifer trees along with grasses, sedges, forbs and shrubs at varying densities and composition depending on location, extent of the saturated soils, elevation of the site, and proximity to Forest System Road 5100. This section will focus exclusively on the tree component while the other vegetation components will be covered in the botany section. Trees throughout the project area include aspen, cottonwood, Douglas maple, ponderosa pine, Douglas-fir, grand fir, subalpine fir, lodgepole pine, western white pine and western redcedar. The trees within the affected area range from pole sized, less than 7 inches diameter at breast height, to seedlings and saplings. The Entiat River has a history of logging with an estimated 3.5 MMBF of timber harvested, within the Entiat River riparian area, from the time period 1893-1902. These logs were floated/driven down the Entiat River during high water months (Plummer 1902).

Regulatory Framework

Project design features address the management of potential insect issues along with the requirement for an approved site specific re-vegetation plan.

Wenatchee National Forest Plan

The following forest-wide standards and guidelines apply to the project.

IV-92 The Silviculture system selected must promote stand structure and species composition which avoids serious risk of damage from mammals, insects, disease, or wildlife and will allow treatment of existing insect, disease, or fuel conditions.

IV- 93 Natural regeneration opportunities will be utilized as appropriate to supplement planting of tree improvement stock

IV-237 Use compatible reforestation methods. Plant all nonstocked areas following regeneration harvest, unless natural regeneration is expected within 3 years.

Northwest Forest Plan

The following standard and guideline applies to this project within Riparian Reserve designated areas.

C-32 c. Apply silviculture practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives

Environmental Consequences

Alternative 1 - No Action

The No Action would allow the existing vegetation to remain undisturbed. The existing vegetation would continue to provide shade and future large woody material (LWM) input to the riparian area.

Alternative 2 - Proposed Action

Direct and Indirect Effects

A portion of the trees would be removed, as necessary, to facilitate levee removal (RM 27.5) along with accessing the log structure sites within the reconstructed side channel. Many of the trees removed during the implementation of the project would be incorporated into the constructed log features. Excess material would either be chipped, or burned in small hand piles. Burning of a small amount of material would be conducted in coordination with Washington State Smoke Management protocol and would not affect the Entiat airshed. Removal methods include cutting trees with a chainsaw, mechanically pulling the entire tree from the ground with root wad intact, or by mechanically pushing over trees. The logs needed for habitat structures would come from off site and is a connected action. The logs would be removed from other land ownerships or from Forest System Lands that have previously been analyzed for that action. Mitigation measures would address potential insect issues associated with this material.

Site preparation of impacted areas may include smoothing and leveling of depressions left by stump removal. Re-vegetation of disturbed sites would include the planting of native trees, grass, forbs and shrubs propagated from locally collected seed. The direct effects of this project would include the removal of both deciduous and conifer tree species. The indirect effects include loss of shade, and loss of future wood input to the stream.

The Proposed Action Alternative impacts to the deciduous and conifer tree components is negligible due to the small project area footprint (less than 1/2 acre disturbance of forested area). The post treatment revegetation efforts would establish deciduous and conifer trees along with grasses, forbs and shrubs. These revegetation efforts would establish a vegetative cover that is currently lacking in some areas, specifically at RM 25.8, 27.0 and 27.2. The temporary disturbance within the riparian area, RM 27.5 and the Stormy A site, would likely recover quickly due to the amount of available moisture and the post construction revegetation efforts.

Cumulative Effects

Past, present, and reasonably foreseeable actions have affected riparian and floodplain vegetation across the project area including; historic logging, the construction and maintenance of Forest System road 5100, construction of rock riprap armored banks, and the construction of the levee (RM 27.5).

The area considered for cumulative effects include the project area for 30 years into the future. The project area would be where the effects of this and other projects would overlap; 30 years is a timeframe with predictable vegetation dynamics for this site Past actions have reduced the number of large trees within the project area. The site is expected to recover from the implementation of the Proposed Action Alternative within 10 years of project completion. Recover would include newly established shrubs and conifer seedlings; additionally, tree canopies along the edge of the disturbed side channel would become more developed as a result of increased sunlight. This would provide additional shade to these areas.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

The Proposed Action is not a regeneration harvest but does remove < ½ acre of small diameter conifers. This area would be partially revegetated post disturbance and natural revegetation is expected. The Proposed Action complies with the Okanogan-Wenatchee Land Management Plan and the Northwest Forest Plan, and all relevant laws, regulations, policies.

Wildlife

Affected Environment

The project is entirely within riparian habitat along the Entiat River at elevations of approximately1600 -1900 ft. The project area includes riparian areas dominated by hardwood shrubs, conifers, and black cottonwood, rocky and sandy gravel bars, old, dry stream channels, and rip-rapped banks. Trees throughout the project area include aspen, cottonwood, Douglas maple, ponderosa pine, Douglas-fir, grand fir, subalpine fir, lodgepole pine, western white pine and western redcedar. The majority of the trees within the affected are less than 12 inches diameter at breast height, with a few scattered individuals and clumps of larger diameter conifers that survived the last wildfire. This portion of the Entiat River has fewer pieces of large wood in

and along the river than would be expected. Past logging reduced the number large trees that would have otherwise fallen in to the river or on the banks.

Regulatory Framework

The Entiat Ranger District is managed under the Wenatchee Forest Plan (WNF 1990), as amended by the Northwest Forest Plan (NWFP 1994).

Wenatchee National Forest Plan

The Wenatchee Forest Plan delineates Management Areas (MA's) across the Wenatchee National Forest that emphasize a particular management approach. For riparian and aquatic habitat's, **EW-2 Riparian-Aquatic Habitat Protection Zone** are designated along all Class I, II and fish bearing Class III streams, lakes and wetlands. Specific Standards and Guidelines apply to this management area and are intended to maintain and enhance habitat conditions for fish species, maintain water quality, and provide diverse wildlife habitat.

The primary objective for riparian areas will be to maintain and enhance long-term productivity to provide for riparian dependent resources including water quality, fish, wildlife, and plant habitat. (Wenatchee LRMP p. IV-41).

The proposed project also falls within management areas WS-1 Scenic River and ST-1 Scenic Travel Retention. Neither of these have standards or guidelines regarding wildlife habitat that would be applicable to this project.

Region 6 Regional Forester Sensitive Species

Within the National Forest System, a sensitive species is a plant or animal whose population viability is identified as a concern by a Regional Forester because of a significant current or predicted downward trend in abundance or habitat quality that would reduce its distribution. The primary objective of the Sensitive species program is to ensure that federal actions do not contribute to a loss of viability, or cause a significant trend toward listing under the ESA.

The harlequin duck is a R6 Sensitive species that is known to nest along the Entiat River. Harlequin ducks were observed on the Entiat River within the project area during surveys in 2013.

The following are Region 6 terrestrial sensitive species that are suspected and/or known to occur on the OWNF (ISSSSP List 2015);

Vertebrate Species	Invertebrate Species
Northern goshawk	Giant palouse earthworm
Gray flycatcher	Puget oregonian
American peregrine falcon	Grand coulee mountainsnail
Common loon	Shiny tightcoil
Sandhill crane	Blue-gray tail-dropper
Bald eagle	Western bumblebee
Harlequin duck	Astarte fritillary
Lewis's woodpecker	Meadow fritillary
White-headed woodpecker	Freija fritillary

Sharp-tailed grouse
Townsend's big-eared bat
Wolverine
Little Brown myotis
Mountain goat
Rocky Mtn. bighorn sheep
Western gray squirrel
Cascade red fox
Larch mountain salamander
Western pond turtle
Striped whipsnake

Labrador sulphur
Lustrous copper
Melissa arctic
Mardon skipper
Peck's skipper
Tawny-edged skipper
Great basin fritillary
Zigzag darner
Subarctic darner
Subarctic bluet
Subarctic darner
Subarctic bluet
Subarctic bluet

Federal Law

Endangered Species Act (1973) and Critical Habitat:

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 (as amended) requires all federal agencies to review actions authorized, funded or carried out by them to ensure such actions do not jeopardize the continued existence of any listed species. A Biological Assessment is required to facilitate consultation with the U.S Fish and Wildlife Service on any federally threatened, endangered, or proposed species determined to be affected by the proposed project.

The following terrestrial species are listed under the ESA and are known or suspected to occur within the Entiat River watershed.

Gray Wolf (Canis lupus)

Gray wolves were classified as an endangered species under provisions of the Endangered Species Act in 1973. In 2011, wolves in the eastern third of Washington were removed from federal protections under the ESA. Wolves in the western two thirds of Washington continue to be protected under the ESA and are classified as an endangered species. The Entiat Ranger District is within the area where wolves are still classified as endangered. There are no known wolf packs in the Entiat River watershed. However, gray wolves are likely to be using the Upper Stillwaters/Stormy A project area. The Teanaway Pack primarily inhabits areas south of the Entiat River watershed and the Lookout Pack primarily inhabits areas to the north of Lake Chelan, but individual wolf movement between the two pack areas has been documented.

Northern Spotted Owl (Strix occidentalis)

The northern spotted owl was classified as a threatened species under provisions of the Endangered Species Act in 1990. A revised final recovery plan (FWS 2011) and conservation strategy (USDA and USDI 1994) has been developed for the northern spotted owl. Critical Habitat was designated in 1992 and updated in 2012 (FWS 1992, FWS 2012). The Upper Stillwaters/Stormy A project area is within the distribution of the northern spotted owl, but is not within designated critical habitat. Standardized surveys were completed for northern spotted owls in the Upper Stillwaters/Stormy A project area and adjacent areas and resulted in detections of great horned owls and barred owls, but no northern spotted owls.

Canada Lynx (Felis canadensis)

The Canada lynx was classified as a threatened species under provisions of the Endangered Species Act in 2000. A Recovery Outline for the Contiguous United States DPS of Canada Lynx was prepared by the USFWS in 2005. Critical Habitat was designated for Canada lynx in 2006 and updated in 2014 (FWS 2006, FWS 2014). The Canada Lynx Conservation Assessment and Strategy (LCAS) was updated in 2013; it is used to provide a consistent approach to lynx conservation and assist with section 7 consultation of Federal lands. The Upper Stillwaters/Stormy A project area is not within lynx habitat.

Grizzly Bear (Ursus horribilis)

The grizzly bear was classified as a threatened species under provisions of the Endangered Species Act in 1975. A Grizzly Bear Recovery Plan was prepared in 1982 and revised in 1993. The North Cascades were designated as a Grizzly Bear Recovery Zone in 1991 and the recovery plan was updated with a chapter for the North Cascades in 1997. The Upper Stillwaters Restoration project area is located within the Lower Entiat Bear Management Unit of the North Cascades Grizzly Bear Recovery Zone. The Stormy A portion of the project area is located with the Lower Entiat BMU.

National Forest Management Act 1976

The National Forest Management Act mandates the use of management indicator species (MIS) (Forest Service Manual 2621.1).

Management Indicator Species (MIS)

Management indicator species were designated in the Wenatchee National Forest Plan (1989). Species are selected as MIS because their population changes may indicate the effects of land management activities (36 CFR 219.19 (a) (1)).

Current Terrestrial MIS under Wenatchee Forest Plan:

- Rocky Mountain Elk
- Mule Deer
- Primary Cavity Excavators
- Pileated Woodpecker
- Marten/Northern Three-toed Woodpecker
- Mountain Goat
- Beaver and Ruffed Grouse

Within the proposed project area, the Entiat River and its associated riparian vegetation provides excellent habitat for beavers and ruffed grouse. The project area is also likely used by mule deer, primary cavity excavators and pileated woodpecker. There is no habitat within the project area for marten, northern three-toed woodpecker or mountain goat.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 2001 makes it unlawful to pursue, hunt, take, capture, or kill migratory birds. Executive Order 13186, 66 Fed. Reg. 3853 (2001) Responsibilities of Federal Agencies to Protect Migratory Birds, along with the Memorandum of Understanding between the USDA Forest Service and the US Fish & Wildlife Service to Promote the Conservation of

Migratory Birds (2008) require proposed federal actions to be evaluated for effects on migratory birds.

Environmental Consequences

Alternative 1 - No Action

Under this alternative re-establishment, enhancement and improvement of aquatic and riparian habitat would not occur. Without any treatments there would be no disturbance effects from the activities to wildlife species or habitats. However, the current, altered stream habitat including lack of pools and large wood, eroding banks, embedded stream substrate and lack of mature riparian vegetation would remain. The old stream channel currently blocked by a man-made levee would remain dry most of the year and would not be modified to increase and enhance riparian habitat. There would be no large wood added to the river or riverbanks.

Alternative 1 would have no impact on any of the Region 6 Sensitive Species. It would have no effect on any terrestrial species Federally listed as threatened, endangered or proposed. It would have no effect on any of the terrestrial management indicator species for the Wenatchee National Forest, and it would have no effect on any migratory birds.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Potential effects of the proposed river restoration projects to terrestrial wildlife species would include disturbance to nesting birds and wide ranging carnivores during project implementation. However, with an implementation work window of July 16-July 31 the potential for disturbance to nesting birds is reduced since most, if not all species in the project area would be finished nesting by July 15. Project disturbance to carnivores would be very limited both spatially and temporally and would be insignificant and discountable.

Project implementation activities would modify some existing vegetation in the short term. However, there would be no reduction of unique or important habitats for any MIS, Sensitive, or Federally listed species. In addition, all disturbed areas would be revegetated with native plants.

This alternative would enhance the riparian area by increasing the amount of moist/wet riparian habitat available, increasing the cover of native plants along the rip rapped banks, and providing more large wood along the river banks.

Cumulative Effects

Cumulative effects analysis is bounded in time and space. The temporal boundary of cumulative effects to riparian habitat and wildlife species within the portion of the Entiat River within the project area begins in the early 1900's with predator control associated with sheep and cattle grazing to commercial timber harvest, road building, campground development, levee construction and private land development to large scale wildfires in the recent past, and continues approximately up to 5 years following the completion of the proposed action when anticipated benefits from restoration projects would be realized. The spatial boundary is the Entiat River Watershed.

The present and reasonably foreseeable activities that may affect wildlife species and habitats in the project area are road maintenance, wildfire suppression, small tree thinning and burning on National Forest and additional river restoration projects on state and private lands.

The overall cumulative effect of past activities on wildlife habitat and species in the Entiat River watershed has been a reduction in large carnivore populations, large diameter trees, old growth conifer habitat, and riparian floodplain habitats. Alternative 2 of the Stormy A-Upper Stillwaters Restoration Project would have an minor disturbance effect on large carnivore populations that would be temporary in nature, would have no effect on large diameter trees or old growth conifer habitat and would enhance and increase riparian habitats. Additional large wood placement project proposals located downstream of the Stormy A Reach on non-FS lands that are being planned for implementation in 2017 and 2018 by the BPA and BOR would also improve riparian habitat within the Entiat River.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Wenatchee Forest Plan

Region 6 Regional Foresters Sensitive Species

Large wood placement, side channel re-connection and riprap enhancement within the Stormy A and Upper Stillwaters project areas would have long-term beneficial effects to riparian habitat. This project would contribute to improved viability for many Sensitive Species and would not cause a trend toward listing under the ESA.

The Stormy A and Upper Stillwaters project area is not within or adjacent to habitat for common loon, sandhill crane, sharp-tailed grouse, mountain goat, bighorn sheep, Cascade red fox, Larch mountain salamander, western pond turtle, striped whipsnake, Astarte fritillary, meadow fritillary, Freija fritillary, Labrador Sulphur, lustrous copper, Melissa arctic, zigzag darner, subarctic darner, or subarctic bluet. Alternative 2 of the proposed project would have "no impact" on any of these sensitive species.

The Stormy A and Upper Stillwaters project area will not negatively modify habitats important for northern goshawk, gray flycatcher, peregrine falcon, bald eagle, harlequin duck, Lewis's woodpecker, white-headed woodpecker, Townsend's big-eared bat, wolverine, little brown bat, western gray squirrel, or any of the invertebrate species. Alternative 2 of the proposed project would have "no impact" on any of these sensitive species.

The harlequin duck is a R6 Sensitive species that is known to nest along the Entiat River. The female is extremely sensitive and can be very intolerant to disturbance while incubating (ISSSP 2009). Incubation of eggs usually begins in mid to late May and eggs hatch in 28-30 days (ISSSP 2009). The newborn ducklings are precocial and can leave the nest soon after hatching to join their mother on the water (ISSSP 2009). The mother and brood can be on the breeding areas in to September (ISSSP 2009). Harlequin ducks were observed on the Entiat River within the project area during surveys in 2013. Potential impacts of the proposed project to harlequin ducks would be disturbance or destruction of active nest sites during project implementation. The proposed project would be implemented July 16-31, which is after harlequin duck eggs have hatched and ducklings are on the water. With this timing of implementation, the proposed project would have

"no impact" on harlequin ducks. In the long term, the improvement and expansion of riparian habitat resulting from the project would be beneficial for the species.

Federal Law

Endangered Species Act (1973) and Critical Habitat:

The Upper Stillwaters/Stormy A project would meet the requirements of the Endangered Species Act by following the design criteria and conservation measures from the Programmatic Biological and Conference Opinions (BiOps) for Aquatic Restoration Activities in Oregon, Washington and portions of California, Idaho and Nevada (NMFS 2013 and USFWS 2013).

The project area may be inhabited by wolves. Temporary human disturbance to the site is the only potential effect that this project would have on gray wolf. The proposed construction activity would occur between July 16 and July 31. The construction activity would likely disturb ungulates and other wildlife that were utilizing the area. If wolves were hunting in the area, this activity would likely disturb them. Wolves and deer would be able to use the area without human disturbance at night. Wildlife disturbed by construction activity would be able to move to adjacent areas. This temporary human disturbance of a forested riparian site would not result in any reductions to the mule deer or other wildlife populations. It would not reduce prey availability for gray wolf. The Upper Stillwaters/Stormy A project would have a slight disturbance effect and "may effect, but would not likely adversely affect" the gray wolf.

There is no suitable nesting/roosting/foraging habitat for northern spotted owls within 1/4 mile of the Upper Stillwaters/Stormy A project area. Project implementation (July 16- July 31) would occur after the critical breeding period for the northern spotted owl. The proposed project would have no effect on mature or old growth habitats. It would have "no effect" on the northern spotted owl.

The Upper Stillwaters/Stormy A project area is at 1600-1900 ft elevation in ponderosa pine and Douglas fir forest. It is not within suitable lynx habitat. This alternative would have "no effect" on the lynx.

The proposed construction activity would likely disturb bears and other wildlife that were utilizing the area. Grizzly bears would be able to use the area without human disturbance at night. Wildlife disturbed by construction activity would be able to move to adjacent areas. This temporary human disturbance of a forested riparian site would not result in any reductions to grizzly bears or any of their forage items. Human activity in the project area would provide potential for a bear/human interaction. To minimize this potential, human foods, garbage, and other bear attractants would not be stored or left at the site. The construction work contract would specify that all food and garbage be "attended" during the day and hauled off the site at the end of each day. The project would meet interim direction for the North Cascades Grizzly Bear Recovery Zone; there would be no decrease in core habitat. The temporary human disturbance to the site and the sanitation issue are the only potential effects that the proposed project would have on grizzly bear. Alternative 2 would have a slight disturbance effect on grizzly bear. With the proposed measure to minimize the potential for a sanitation issue, the proposed project "may effect, but would not likely adversely affect" the grizzly bear.

National Forest Management Act 1976

Management Indicator Species (MIS)

The Stormy A and Upper Stillwaters project area is not within or adjacent to habitat for Rocky Mountain elk, marten, northern three-toed woodpecker, or mountain goat. Alternative 2 of the proposed project would have "no effect" on these five species.

Alternative 2 of the Stormy A and Upper Stillwaters project would not negatively modify habitats important for mule deer. It would not result in the loss of snags or large downed logs and thus would not impact habitat for primary cavity excavators, or pileated woodpecker. Alternative 2 of the proposed project would have "no effect" on these MIS species. It will have a beneficial effect on habitats important for beaver and ruffed grouse.

Migratory Bird Treaty Act 2001

Landbird habitats in the Upper Stillwaters/Stormy A project area include dead and defective tree habitat and forested riparian habitats. Alternative 2 of the Stormy A and Upper Stillwaters project would not negatively modify either of these habitats. It would have "no effect" on migratory bird species.

Heritage Resources

The National Historic Preservation Act (NHPA) of 1966 (36 CFR 800) established the Federal government's policy and programs on historic preservation. Section 106 of the Act requires Federal agencies having direct or indirect jurisdiction over a proposed federal, federally- assisted, or permitted undertaking to take into account the effect an undertaking may have on heritage resources determined significant enough to be listed on or eligible for the National Register of Historic Places (NRHP). The Washington State Historic Preservation Officer (SHPO) at the Department of Archaeology and Historic Preservation (DAHP) and the Advisory Council on Historic Preservation (ACHP) are the state and federal agencies respectively responsible for overseeing the management and protection of historic properties in compliance with the NHPA.

On the Okanogan-Wenatchee National Forest heritage resources include district buildings, pre-contact archaeological sites, historic sites, buildings, structures and objects that contain evidence of past human activities. They are fragile and non-renewable. Heritage resources that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places are given consideration in planning for federally licensed, approved or funded projects (E.O. 11593).

A review of Okanogan-Wenatchee National Forest heritage resource reports and site records indicates that five previous archaeological surveys have been conducted within approximately one mile of the Upper Stillwaters project area and seven previous archaeological surveys have been conducted within approximately one mile of the Stormy A project area. Cultural resources surveys were conducted by Yakama Nation Cultural Resources Staff utilizing 20 meter east/west transects over each of the project area locations. Surface visibility varied from 90 percent in areas devoid of vegetation to less than 5 percent in portions covered by dense vegetation and deciduous leaf litter. No cultural resources were identified during surface pedestrian surveys. Subsurface testing was conducted at 5 sites within the Upper Stillwaters Project area and 6 sites within the Stormy A Project Area with all material recovered from test excavations screened in 0.25 inch geologic grade screening material. No cultural material was found within excavation sites.

If undocumented heritage resources are discovered during project implementation, all work would cease pending review by a cultural resource specialist and as needed, in consultation with the State Historic Preservation Officer (SHPO) and the Tribal Historic Preservation Officers (THPO) for the Confederated Tribes and Bands of the Yakama Nation and the Confederated Tribes of the Colville Reservation.

Specifically Required Disclosures

This is not a major Federal action. It would have limited context and intensity (40 CFR 1508.27), individually or cumulatively, to the biological, physical, social or economic components of the human environment. In addition, the following conditions would be met.

Clean Air Act

This action is consistent with the U.S. Clean Air Act under permit 42 U.S.C 7401 et seq. (1972). These actions would meet air quality standards set by the Clean Air Act (as amended 1990) and as regulated through the Washington State Smoke Management Plan (as revised 1998).

Social Groups, Civil Rights and Environmental Justice

Executive Order No. 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, directs Federal agencies to address effects accruing in a disproportionate way to minority and low income populations. No disproportionate impacts to consumers, civil rights, minority groups, and women are expected from the action alternatives. The work would be implemented by the Yakama Nation. Project contracting for the project's activities would use approved management direction to protect the rights of these private companies. There would be no effect from the proposed activities on the rights of the Confederated Tribes of the Colville Indian Reservation and the Yakama Indian Nation.

Effects on Wetlands and Floodplains

Positive, long-term benefits to designated floodplains or wetlands are projected as described in the Hydrology and Fisheries sections above. Floodplains and wetlands would be protected by mitigation measures which conform to Executive Orders 11988 and 11990.

Effects on Prime Farmland, Rangeland, and Forest Land

The project area does not contain any prime rangeland or prime farmland. The forest land within the analysis area does not qualify as "prime forest" because growth rates do not exceed 85 cubic feet/year at culmination of mean annual increment. Therefore, the proposed action complies with the Secretary of Agriculture's Memorandum 1827.

Energy Requirements of Alternatives

Fossil fuels used during project implementation would result in an irreversible resource commitment of fossil fuel resources. Energy consumption associated with this project would be insignificant at the local, regional, or national level.

American Indian Treaty Rights

The Upper Stillwaters and Stormy A Restoration Project area lies within the traditional use areas of some members of the Confederated Tribes of the Colville Indian Reservation and is within the lands ceded to the U.S. Government by the 1855 Treaty with the Confederated Tribes and Bands of the Yakama Nation. The proposed alternative would not conflict with Executive Order provisions. This project would not affect subsistence rights under the Executive Order for traditional hunting or gathering rights. The project would benefit natural resources and would likely enhance the ability to exercise these rights.

Inventoried Roadless Area and Unroaded/Undeveloped Areas

The Upper Stillwaters and Stormy A Restoration Project area contains no inventoried roadless areas or large areas with unroaded or undeveloped character.

Irreversible and Irretrievable Effects

There are no known substantial, irreversible, or irretrievable commitments of resources connected with the proposed action. The irreversible commitment of resources refers to a loss of non-renewable resources, such as mineral extraction, heritage (cultural) resources, or to those factors which are renewable only over long time spans, such as soil productivity.

Chapter 4 – Consultation and Coordination

Interdisciplinary Team

The following people are members of the Interdisciplinary Team (IDT) that participated in the preparation or review of all or part of the environmental assessment:

Pete Wier	Silviculturist/Environmental Coordinator
John Rohr	Wildlife Biologist
Brigitte Ranne	Botanist
Emily Johnson	Fishery Biologist/IDT Lead
Jon Meier	Recreation Specialist
Matt Karrer	Hydrologist
Christy Merrit	Environmental Coordinator- Reviewed EA/DN/FONSI and R6 NEPA checklist

In addition, the following people assisted in developing the proposal or in the editing and review of this document:

Richard Vacirca	Forest Fisheries Biologist

Deciding Official

James Simino	Entiat District Ranger

Public Involvement

Public Scoping began on September 11, 2015 with the mailing of 25 letters and 52 emails to interested parties. A public scoping notice was published in *The Wenatachee World* on September

17, 2015. The scoping letter was posted to the Okanogan-Wenatchee Schedule of Proposed Actions (SOPA) website on September 22, 2015. The project was presented to the Entiat Watershed Planning unit during the quarterly meeting in October 2015. These scoping efforts generated three comments, which were considered during the development of the proposed action. The Draft EA was posted to the SOPA website and the legal notice for the 30-day public comment period was published in the *Wenatchee World* on July 28th, 2016. The comment period for this project began on July 29th, 2016 and closed on August 29th, 2016. Six timely written comments were received from individuals during this period.

Agency and Other Government Consultation

On August 27, 2015, government-to-government consultation letters were sent to the Yakama Nation and Confederated Tribes of the Colville Indian Reservation per Executive Order 13175. No concerns regarding the project were expressed by either Tribal government.

Consultation with NOAA-Fisheries and the US Fish & Wildlife Service will be completed at the time of signing the Decision Notice using the 2013-2017 Programmatic Biological and Conference Opinions (BiOps) for Aquatic Restoration Activities in Oregon, Washington and portions of California, Idaho and Nevada would be met (ARBO II; NMFS 2013 and USFWS 2013). It addresses ESA-Listed Animal and Plant Species and their designated or proposed Critical Habitat and Designated Essential Fish Habitat under MSA found Oregon, Washington and portions of California, Idaho and Nevada (USFS/USDI/BIA 2013).

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