RECLAMATION
Managing Water in the West

Instream Habitat Restoration in Bear Creek and Little Butte Creek Watersheds

FINDING OF NO SIGNIFICANT IMPACT AND ENVIRONMENTAL ASSESSMENT

Rogue River Basin Project, Oregon

Pacific Northwest Region

PN FONSI 15-05

PN EA 15-05

U.S. Department of the Interior
Bureau of Reclamation
Columbia-Cascades Area Office
Yakima, Washington

July 2015

MISSION STATEMENTS

U.S. Department of the Interior

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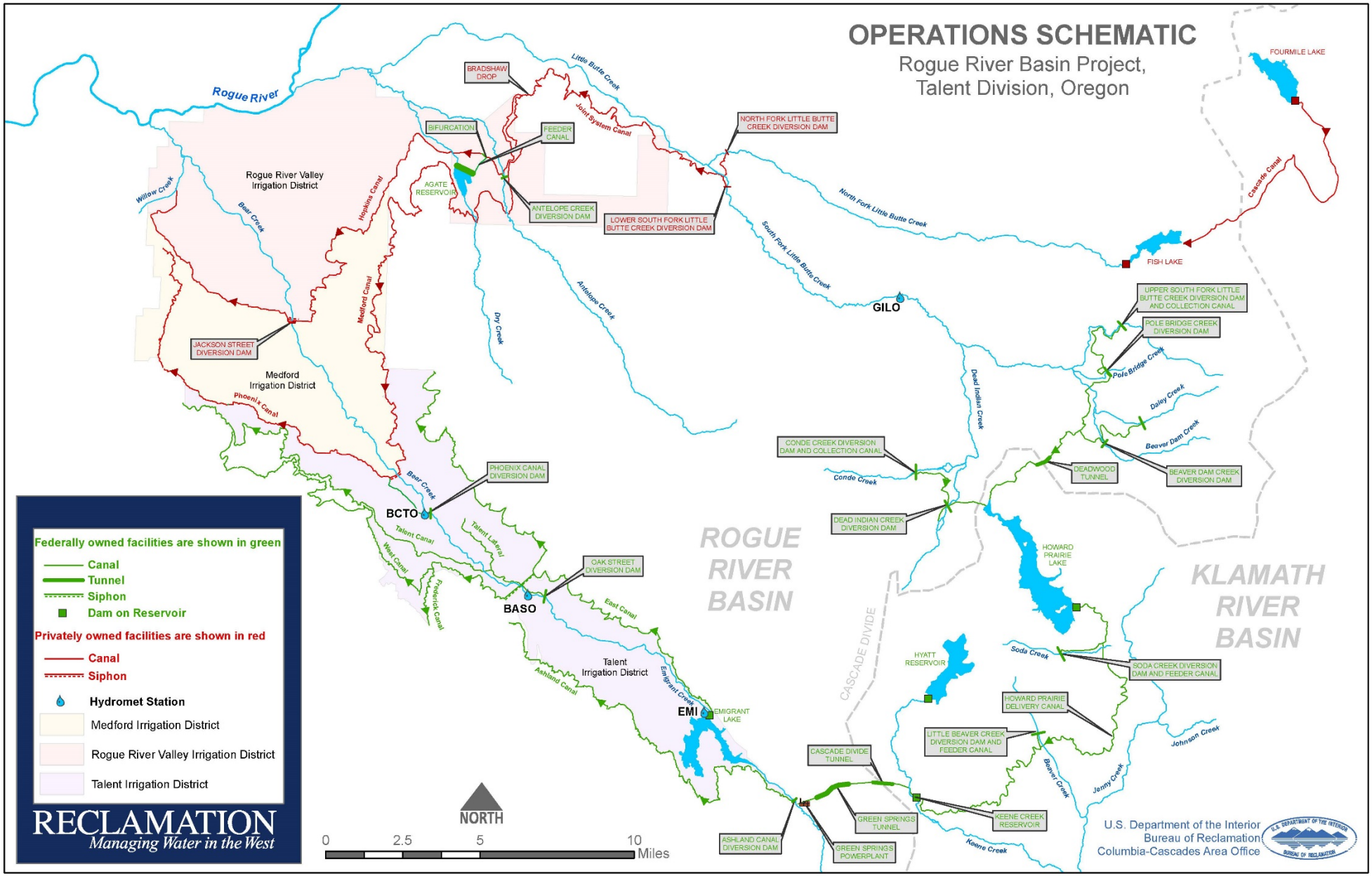
Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.


OPERATIONS SCHEMATIC
Rogue River Basin Project,
Talent Division, Oregon
Rogue River
Little Butte Creek
BRADSHAW DROP
Joint System Canal
BIFURCATION
FEEDER CANAL
NORTH FORK LITTLE BUTTE CREEK DIVERSION DAM
AGATE RESERVOIR
ANTELOPE CREEK DIVERSION DAM
LOWER SOUTH FORK LITTLE BUTTE CREEK DIVERSION DAM
Rogue River Valley Irrigation District
Willow Creek
Bear Creek
Hopkins Canal
Medford Canal
North Fork Little Butte Creek
South Fork Little Butte Creek
FOURMILE LAKE
Cascade Canal
FISH LAKE
GILO
Antelope Creek
Dry Creek
JACKSON STREET DIVERSION DAM
Medford Irrigation District
Phoenix Canal
UPPER SOUTH FORK LITTLE BUTTE CREEK DIVERSION DAM AND COLLECTION CANAL
POLE BRIDGE CREEK DIVERSION DAM
Pole Bridge Creek
Daley Creek
Beaver Dam Creek
Dead Indian Creek
CONDE CREEK DIVERSION DAM AND COLLECTION CANAL
Conde Creek
DEADWOOD TUNNEL
BEAVER DAM CREEK DIVERSION DAM
PHOENIX CANAL DIVERSION DAM
BCTO
Bear Creek
Talent Canal
Talent Lateral
West Canal
Fordyce Canal
DEAD INDIAN CREEK DIVERSION DAM
ROGUE RIVER BASIN
HOWARD PRAIRIE LAKE
KLAMATH RIVER BASIN
OAK STREET DIVERSION DAM
BASO
East Canal
Talent Irrigation District
Emigrant Creek
Ashland Canal
CASCADE DIVIDE
HYATT RESERVOIR
Soda Creek
SODA CREEK DIVERSION DAM AND FEEDER CANAL
HOWARD PRAIRIE DELIVERY CANAL
EMI
EMIGRANT LAKE
LITTLE BEAVER CREEK DIVERSION DAM AND FEEDER CANAL
Johnson Creek
CASCADE DIVIDE TUNNEL
Beaver Creek
Jenny Creek
GREEN SPRINGS TUNNEL
KEENE CREEK RESERVOIR
ASHLAND CANAL DIVERSION DAM
GREEN SPRINGS POWERPLANT
Keene Creek
Federally owned facilities are shown in green
Canal
Tunnel
Siphon
Dam on Reservoir
Privately owned facilities are shown in red
Canal
Siphon
Hydromet Station
Medford Irrigation District
Rogue River Valley Irrigation District
Talent Irrigation District
RECLAMATION
Managing Water in the West
NORTH
0
2.5
5
10
Miles
U.S. Department of the Interior
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Columbia-Cascades Area Office

Acronyms and Abbreviations

BA	Biological Assessment
BiOp	Biological Opinion
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CWA	Clean Water Act
Coho Salmon	Southern Oregon and Northern California Coast Coho Salmon
EA	Environmental Assessment
ESA	Endangered Species Act
ESU	Evolutionary significant unit
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
IDP	Inadvertent Discovery Plan
ITAs	Indian Trust Assets
LWM	large woody material
MSA	Magnuson-Stevens Fishery Conservation and Management Act
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA Fisheries	National Marine Fisheries Service
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
O&M	Operations and Maintenance
Reclamation	Bureau of Reclamation
Rogue River Project	Rogue River Basin Project
RPMs	reasonable and prudent measures
RVCOG	Rogue Valley Council of Governments
Secretary	Secretary of the Interior
SHPO	Oregon State Historic Preservation Office
SONCC	Southern Oregon and Northern California Coast
T&Cs	terms and conditions
TDMLs	total maximum daily loads
TID	Talent Irrigation District
MID	Medford Irrigation District
RRVID	Rogue River Valley Irrigation District
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
WUA	weighted usable area

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Instream Habitat Restoration in Bear Creek and Little Butte Creek Watersheds

FINDING OF NO SIGNIFICANT IMPACT

U.S. Department of the Interior
Bureau of Reclamation
Columbia-Cascades Area Office

PN FONSI 15-05

INTRODUCTION

The Bureau of Reclamation has prepared this finding of no significant impact (FONSI) to comply with the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA). The FONSI briefly describes the Proposed Action, the alternatives considered, Reclamation's consultation and coordination activities, and Reclamation's finding. The final *Instream Habitat Restoration in Bear Creek and Little Butte Creek Watersheds Environmental Assessment* (EA) fully documents the analysis.

BACKGROUND

Reclamation's Rogue River Basin Project (Rogue River Project) is located near the cities of Medford and Ashland in southwest Oregon. Hydrologically, the Rogue River Project is within the two tributary basins to the Rogue River, Bear Creek, and Little Butte Creek, and the tributaries of Jenny Creek in the Klamath Basin (see frontispiece). Originally the Rogue River Project was a network of privately owned facilities. In the Act of August 20, 1954 (68 Stat. 752, Public Law 83-606), Congress authorized the rehabilitation, reconstruction, and expansion of the Rogue River Project to serve multiple purposes including irrigation, flood control, fish and wildlife, recreation, and the generation and transmission of hydroelectric power.

Section 7(a)(2) of the Endangered Species Act (ESA) requires Federal agencies to consult with the National Marine Fisheries Service (NOAA Fisheries) to ensure their actions are not likely to jeopardize ESA-listed species or adversely modify designated critical habitat. On March 15, 2012, Reclamation issued a *Biological Assessment on the Future Operation and Maintenance of the Rogue River Basin Project and Effects on Essential Fish Habitat under the Magnuson-Stevens Act* (BA, Reclamation 2012a). The conservation activities described in the BA's proposed actions include several ecological conservation measures to reduce the potential for adverse effects on the Southern Oregon and Northern California Coast

(SONCC) Coho Salmon (*Oncorhynchus kisutch*). The conservation actions in Bear and South Fork Little Butte creeks include increasing minimum instream flows for the benefit of Coho Salmon habitat and increasing instream habitat through the addition of large wood.

On April 2, 2012, NOAA Fisheries issued to Reclamation the *Endangered Species Act Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Future Operation and Maintenance of the Rogue River Basin Project (2012-2022), Rogue and Klamath River Basins (HUCs: 18010206, 17100308, 17100307), Oregon and California* (BiOp, NOAA Fisheries 2012). After reviewing the status of ESA-listed species affected by the proposed action, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, NOAA Fisheries concluded that the action, as proposed, is not likely to jeopardize the continued existence of the SONCC evolutionary significant unit (ESU) of Coho Salmon.

Specifically, NOAA Fisheries concluded that despite some adverse effects, the proposed action also benefits to Coho Salmon habitat by allowing an increase in the abundance and productivity of the Upper Rogue River population of Coho Salmon, a core independent population in the Interior Rogue diversity strata. Further, NOAA Fisheries concluded that the proposed action would allow the Upper Rogue River population to fulfill its role in the recovery of the Coho Salmon ESU. NOAA Fisheries also concluded the proposed action is not likely to adversely modify designated critical habitat for Coho Salmon. NOAA Fisheries reached this conclusion because, "the proposed action's minimum flow requirements, combined with large wood additions, fish passage improvements, and ramping rate procedures offset the adverse effects on a watershed scale." (NOAA Fisheries 2012, p. 102)

The BiOp identifies the installation of large woody material (LWM) habitat structures as a reasonable and prudent measure (RPM) to minimize take of threatened Coho Salmon (NOAA Fisheries 2012). In the BiOp, Reclamation is committed to meeting the weighted usable area (WUA) uplift requirement for both median and dry flow years in Bear Creek, Emigrant Creek, South Fork Little Butte Creek, and Little Butte Creek within the Rogue River basin for winter and summer rearing habitat, as identified in Table 1.

Table 1. Proposed instream habitat uplift targets for Emigrant, Bear, South Fork Little Butte and Little Butte creeks.

	Increase in Habitat (ft^2 WUA)		
Reach Name	**Median Flow (50% exceedance)**	**Low Flow (80% exceedance)**	**Targeted Life Stage**
Emigrant Creek/Neil Creek	7,100	15,700	Winter rearing
Bear Creek/Ashland Creek	8,600	3,000	Winter rearing
Bear Creek below Oak Street	5,100	No uplift required	Summer rearing
South Fork Little Butte Creek	6,500	No uplift required	Winter rearing
Little Butte Creek	36,000	No uplift required	Summer rearing

ALTERNATIVES CONSIDERED

One action alternative was considered and evaluated in the EA. The No Action Alternative was also evaluated as required by NEPA. The following are brief descriptions of the alternatives considered in the EA.

Alternative 1 - No Action: Environmental conditions under the No Action Alternative would detract from species recovery efforts and would not achieve the basic goal to maintain or aid recovery of the basin's native Coho Salmon population at a genetically viable level. Under the No Action Alternative, instream habitat restoration projects would not be constructed within the Bear Creek and Little Butte Creek watersheds. Incidental take of juvenile Coho Salmon would continue as a result of Talent, Medford, and Rogue River Valley Irrigation districts operations and maintenance of the Rogue River Project. Avoiding the risk of incidental take for nonauthorized (covered) activities by the districts would result in additional operating constraints, limiting the availability and reliability of water supplies within the Rogue River Basin Project.

Alternative 2 – (Preferred Alternative) - Instream Habitat Restoration in Bear Creek and Little Butte Creek Watersheds (Instream Habitat Restoration): Instream habitat projects would be implemented in the Bear Creek and Little Butte Creek watersheds, consistent with the proposed WUA requirements for the reaches identified in Table 1 and the terms and conditions (T&Cs) of the BiOp.

Proposed Action

Reclamation has identified Alternative 2 (Proposed Action) as the Preferred Alternative. This alternative would implement Reclamation's conservation action by increasing quality instream habitat and habitat complexity through targeted LWM placement. LWM implementation actions may include the following:

- Blackberries and other invasive vegetation would be cleared from project sites by hand, mechanical, chemical, or a combination of methods (e.g., hand and herbicide). Post-project noxious weed monitoring and maintenance would be conducted to reduce or eliminate the reestablishment or establishment of noxious weed populations.
- Temporary access roads, staging areas, and stream crossings would be developed. The use of existing staging areas and access to creeks would be preferred, but brush, noxious weeds, and other understory vegetation may need to be removed for cultural resource surveys and to get vehicle and equipment to some target areas. Temporary access roads and other areas disturbed during construction would be restored to similar or better-than pre-work conditions. Restoration may include scarifying and reseeding with an erosion-control native seed mix.
- A temporary bridge or culvert system would be installed to facilitate stream crossings. Instream flow and fish passage would be maintained under the bridge.
- Riparian fencing would be installed to limit or eliminate access of cattle or other livestock to waterways; a replacement water source for livestock would be provided.

- Logs would be purchased from established forestry operations, including Federal forestry management agencies (e.g., U.S. Forest Service or the Bureau of Land Management). Cultural Resource surveys would be completed prior to the harvesting of trees; however, individual NEPA actions would not be completed for the trees, as they would be procured from established operations and considered a commodity.
- Log structures and boulders would be placed to create instream and off-channel habitat to benefit Coho Salmon and, subsequently, other aquatic species. Logs or boulders (or both) would be placed instream with heavy equipment. Slash from trees used for construction would be incorporated into log structures.
- Side channels or floodplain areas would be reconnected to increase the wetted area of habitat and potentially reduce bank and bed shear stress. This may include removing sediment plugs that block or impede water movement through side channels and alcoves and the placing log and boulder structures to provide cover.
- Step-pools or constructed riffles would be developed to reconnect floodplains hydraulically, establish hydraulic diversity, encourage hyporheic flow, and form slow-moving and deep-pool habitats for juvenile salmonids.
- Riparian plantings would be used to develop diverse riparian communities, habitat, and future wood supply in creeks; plantings would also remediate construction scars (e.g., excavation, temporary roads and staging areas), stabilize the banks, and increase structural and species diversity. Plant species endemic to Rogue River Basin riparian areas would be used and may be 1- to 2-year-old bareroot seedlings, cuttings, native grass, and forb seed. Plantings would be conducted by hand (e.g., hoedad) or mechanically (e.g., planting trailer) as appropriate for location. Riparian plantings provide root strength for stream bank stability; organic litter for nutrients and, eventually, stream shading and future large wood recruitment. A small water delivery system (e.g., drip line) may be installed until riparian plants reach the "free to grow" state. Monitoring would ensure successful riparian vegetation establishment, as it is critical to the long-term stability and success of the LWM structures.
- Project sites would be monitored and maintained. Initially, engineers would inspect LWM structures seasonally at discharges across the hydrograph. Post-project monitoring would occur following construction to establish as-built conditions. Monitoring would continue annually or as-needed, while the structure assimilates into the environment; the need for maintenance activities would continue to be evaluated.
- WUA habitat surveys would be used to determine effectiveness of achieving anticipated habitat response (e.g., creating rearing habitat for juvenile Coho Salmon). Monitoring techniques may include longitudinal profiles, snorkeling to conduct fish counts or presence/absence, cross-sections, and photographs.
- Fish salvage would be conducted before (and intermittently during) isolation of an inwater work area. Fish trapped in the area must be captured using a hand-net, seine, electrofishing, or other prudent methods to minimize risk of injury, then released at a safe site under the supervision of a qualified fishery biologist.
- Construction would involve use of heavy equipment such as, but not limited to, backhoes, excavators, front-end loaders, and dump trucks. Large wood may be keyed into the banks

and stabilized using soil and rock ballast, and secured through entanglement in existing riparian vegetation, fasteners, or a combination of methods.

- Necessary permits, authorizations, reviews, or exemptions would be obtained prior to implementation of LWM projects.

Prior to individual project implementation, a cultural resource survey would be completed and site-specific protection measures would be implemented to preserve the integrity of all recorded sites determined to be eligible to the National Register of Historic Places (National Register) or considered unevaluated. Such cultural resource sites would be buffered, avoided, or otherwise protected as determined in consultation with the Oregon State Historic Preservation Office (SHPO). This may include oversight by an archaeologist during project implementation.

Tribal consultations would be initiated at project concept inception and during pre-cultural resource survey, and Tribes would receive the cultural resource survey report. In addition, the Reclamation archaeologist from the Bend Field Office has developed an Inadvertent Discovery Plan (IDP). Copies of the IDP would be forwarded to contractors of each project, who must be follow its directions for inadvertent discoveries of cultural materials.

FINDINGS

The EA discusses the existing environment and the environmental consequences of the two alternatives on the following resources: climate change, water quality, riparian vegetation, fish and wildlife, threatened and endangered species, Indian Trust Assets (ITAs), and environmental justice.

Climate Change

The Preferred Alternative will not result in the local or regional alteration of air movement, moisture or temperature patterns; therefore, the Preferred Alternative would not have significant impacts on climate change. Installing LWM in Bear Creek and Little Butte Creek watersheds would insulate Coho Salmon from the effects of climate change, resulting in a long-term beneficial impact. The contractor will be required to comply with applicable Federal, State, and local air quality standards and emission limitations.

Water Quality

The Preferred Alternative will have occasional and short-term increases in turbidity downstream of the construction site during both phases of construction resulting in minor adverse impacts on water quality in the project area. Reclamation requires its contractors to comply with all Federal, State, and local regulations to reduce water pollution. Respective best management practices and regulatory requirements will be adhered to and appropriate permits will be obtained prior to construction activities. The contractor will be required to comply with all permit conditions.

LWM placement will result in long-term benefits of improved water quality. By trapping sediment, the LWM will reduce downstream sediment concentration, moderate river temperature, and create channel systems where incision of the river banks is limited.

Riparian Vegetation

The Preferred Alternative includes the removal of blackberries and other invasive vegetation from project sites by hand, mechanical, chemical, or a combination of methods. Project sites will be monitored post-construction for the development of noxious weeds and treated; new populations will be removed in the same methods as preconstruction. It is anticipated the Proposed Action would result in a long-term benefit of reduced populations of noxious weeds.

All disturbed areas resulting from the project will be re-contoured and rehabilitated to pre-project construction condition as near as practicable. After construction and restoration activities are completed, disturbed areas will be reseeded with appropriate native seed mixes when the area is ready for successful revegetation. Under the Preferred Alternative, riparian zones will experience long-term beneficial impacts by connecting the floodplain with the stream channel. It is expected that aggradation (the capturing of sediment) will aid floodplain development and improve floodwater retention. While native vegetation riparian plantings will initiate the riparian zone recovery, it is anticipated that native vegetation will thrive with the removal of invasive plants to quickly revegetate the floodplain.

No designated wetlands were identified within the project area.

Fish and Wildlife

The Preferred Alternative construction activities are expected to have a minor impact on fish and wildlife in the project vicinity. Construction activities are scheduled to occur mostly within the ODFW-approved inwater work window for Bear Creek and Little Butte Creek watersheds (June 15–September 15), when the LWM installation process would have the least impact on important fish, wildlife, and habitat resources. Temporary noise and limited disturbance to native vegetation is expected to have a minimal effect on wildlife habitat in the immediate location of the construction site.

Overall, the proposed project is expected to significantly improve salmon and steelhead presmolt, smolt, and adult survival by providing pools and adequate cover. This action could potentially help rebuild imperiled runs of salmon and steelhead returning to the Rogue River basin by providing juvenile rearing areas with habitat complexity, cover, and deep pools. It is likely that the number of juvenile fish outfmigrating from the Bear Creek and Little Butte Creek watersheds and reaching the ocean environment would increase over time.

Threatened and Endangered Species

The proposed project's effects on federally listed, threatened and endangered species were analyzed in in the BA and BiOp. The Coho Salmon is the only ESA-listed species that may be affected by implementation of the proposed project.

The BiOp identified T&Cs associated with this project to minimize incidental take of Coho Salmon caused by project implementation. Reclamation and its contractors must comply with the T&Cs to implement the reasonable and prudent measures included in the BiOp.

The Preferred Alternative will improve Coho Salmon habitat quantity and quality; benefits will begin to accrue in the short term and persist in the long term. Implementation of the proposed project will result in a significant increase of winter and summer instream rearing habitat as well as increased stream complexity conditions that are beneficial to juvenile Coho Salmon. It is anticipated that LWM installations will have long-term beneficial impacts on recovering the Coho Salmon population to a viable level.

Reclamation has determined that implementation of the proposed project will not affect ESA-listed species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS).

Environmental Justice

Implementation of the proposed instream habitat projects will have no adverse natural resource or socioeconomic impacts adversely affecting minority and low-income populations in Jackson County. No impacts will occur that would affect minority or low-income populations as projects will occur mostly on private property with willing landowners and possibly on lands owned by Jackson County or the City of Ashland; therefore, Reclamation has determined that there would be no disproportionate impacts on environmental justice.

Indian Trust Assets

Reclamation will consult with the Tribes as project specifics become known. Consultation will give the Tribes opportunity to identify any Indian Trust Assets (ITAs) associated with the projects. Reclamation will consult with the Confederated Tribes of Grand Ronde Community, Confederated Tribes of Siletz, Cow Creek Band of Umpqua Indians, Quartz Valley Indian Reservation, and the Klamath Tribes. Reclamation believes that our Proposed Action would not negatively impact ITAs related to fisheries, if any are present in the project area, since Bear Creek and Little Butte Creek watershed salmon runs would potentially be enhanced and restored.

Decision:

It is my decision to authorize the Preferred Alternative, the implementation of Instream Habitat Restoration in Bear Creek and Little Butte Creek watersheds.

Finding of No Significant Impact:

Based on the analysis of the environmental impacts presented in the final EA, and implementation of all environmental commitments, Reclamation has concluded the implementation of the Preferred Alternative will have no significant impacts on the quality of the human environment or natural and cultural resources of the area. Reclamation, therefore, concludes that preparation of an Environmental Impact Statement is not required, and that this EA and FONSI satisfy the requirements of NEPA.

Recommended:

7/8/15

Candace McKinley
Environmental Program Manager
Yakima, Washington

Date

Approved:

7/8/2015

ACTING FOR
Dawn Wiedmeier
Area Manager, Columbia-Cascades Area Office
Yakima, Washington

Date

RECLAMATION
Managing Water in the West

Instream Habitat Restoration in Bear Creek and Little Butte Creek Watersheds

ENVIRONMENTAL ASSESSMENT

Rogue River Basin Project, Oregon

Pacific Northwest Region

PN EA 15-05

U.S. Department of the Interior
Bureau of Reclamation
Columbia-Cascades Area Office
Yakima, Washington

July 2015

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ENVIRONMENTAL ASSESSMENT

U.S. Department of the Interior
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PN EA 15-05

INTRODUCTION

The Bureau of Reclamation's Rogue River Basin Project (Rogue River Project) is located near the cities of Medford and Ashland in southwest Oregon. Hydrologically, the Rogue River Project is within the two tributary basins to the Rogue River, Bear Creek and Little Butte Creek, and the tributaries of Jenny Creek in the Klamath Basin (see frontispiece). It was originally a network of privately owned facilities. In the Act of August 20, 1954 (68 Stat. 752, Public Law 83-606), Congress authorized rehabilitation, reconstruction, and expansion of the Rogue River Project to serve multiple purposes including irrigation, flood control, fish and wildlife, recreation, and generation and transmission of hydroelectric power.

The Rogue River Project collects water predominantly from the headwaters of South Fork Little Butte Creek for storage in Hyatt, Howard Prairie, and Emigrant reservoirs, where it awaits delivery into the Bear Creek watershed via canals on Ashland, Emigrant, and Bear creeks. The Rogue River Project covers approximately 35,000 acres of irrigated cropland in three irrigation districts: Talent Irrigation District (TID), Medford Irrigation District (MID), and Rogue River Valley Irrigation District (RRVID).

Section 7(a)(2) of the Endangered Species Act (ESA) requires Federal agencies to consult with the National Marine Fisheries Service (NOAA Fisheries) to ensure their actions are not likely to jeopardize ESA-listed species or adversely modify designated critical habitat. In 2003, Reclamation determined that the operation and maintenance of the Rogue River Project was likely to adversely affect the Southern Oregon and Northern California Coast (SONCC) evolutionarily significant unit (ESU) of Coho Salmon (*Oncorhynchus kisutch*) and initiated formal consultation with NOAA Fisheries. On March 15, 2012, Reclamation issued the updated *Biological Assessment on the Future Operation and Maintenance of the Rogue River Basin Project and Effects on Essential Fish Habitat under the Magnuson-Stevens Act* (BA) [Reclamation 2012a], which revised the proposed action to include several ecological conservation measures to reduce the potential for adverse effects to Coho Salmon. Conservation included the following measures: (1) provide minimum instream flows for the benefit of Coho Salmon habitat in Bear and South Fork Little Butte creeks, (2) improve fish

passage at Oak Street and Ashland diversions, (3) improve ramping rates for all facilities in the Bear Creek watershed, (4) install instream habitat (large wood additions), (5) restore the riparian zone, and (6) employ water conservation.

On April 2, 2012, NOAA Fisheries submitted to Reclamation the *Endangered Species Act Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Future Operation and Maintenance of the Rogue River Basin Project (2012-2022), Rogue and Klamath River Basins (HUCs: 18010206, 17100308, 17100307), Oregon and California* (BiOp) [NOAA Fisheries 2012]. After reviewing the status of the ESA-listed species affected by the BA's proposed action, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, NOAA Fisheries concluded that the proposed action is not likely to jeopardize the continued existence of the SONCC ESU of Coho Salmon. Specifically, NOAA Fisheries concluded that despite some adverse effects, the benefits to Coho Salmon habitat afforded by the proposed action would allow an increase in the abundance and productivity of the Upper Rogue River (URR) population, a core independent Coho Salmon population in the Interior Rogue diversity strata. Further, NOAA Fisheries concluded the proposed action would allow the URR population to fulfill its role in the recovery of the Coho Salmon ESU. NOAA Fisheries also concluded the proposed action is not likely to adversely modify designated critical habitat for Coho Salmon. NOAA Fisheries reached this conclusion because, "the proposed action's minimum flow requirements, combined with large wood additions, fish passage improvements, and ramping rate procedures offset the adverse effects on a watershed scale." (NOAA Fisheries 2012, p. 102)

The BiOp identifies the installation of large woody material (LWM) habitat structures as one of the reasonable and prudent measures (RPMs) to minimize take of threatened Coho Salmon (NOAA Fisheries 2012). In the BiOp, Reclamation committed to meeting the weighted usable area (WUA) uplift requirement for both median and dry flow years in Bear Creek, Emigrant Creek, South Fork Little Butte Creek, and Little Butte Creek within the Rogue River basin for winter and summer rearing habitat, as identified in Table 1.

Table 1. Proposed instream habitat uplift targets for Emigrant, Bear, South Fork Little Butte and Little Butte creeks.

	Increase in Habitat (ft^2 WUA)		
Reach Name	**Median Flow (50% exceedance)**	**Low Flow (80% exceedance)**	**Targeted Life Stage**
Emigrant Creek/Neil Creek	7,100	15,700	Winter rearing
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South Fork Little Butte Creek	6,500	No uplift required	Winter rearing
Little Butte Creek	36,000	No uplift required	Summer rearing

As part of the 2012 BiOp and as required by Section 7 of the ESA, NOAA Fisheries provided Reclamation an incidental take statement describing what they consider as RPMs necessary to minimize the impact of incidental take associated with Rogue River Project operations and maintenance (O&M). The incidental take statement in the BiOp sets forth nondiscretionary terms and conditions (T&Cs) that Reclamation must comply with to carry out the RPMs.

Actions that meet the T&Cs would be exempt from the ESA's prohibition against take of listed species.

Reclamation is committed to designing and installing LWM habitat structures to increase the area of high-quality juvenile Coho Salmon rearing habitat within the Bear Creek and Little Butte Creek watersheds. Pursuant to 50 Code of Federal Regulations (CFR) 402.15, Reclamation issued the *Decision Document Concerning NOAA Fisheries April 2012 Biological Opinion for the Future Operation and Maintenance of the Rogue River Basin Project, Talent Division* (Reclamation 2012b) to indicate how it will carry out the future O&M of the Rogue River Project in light of the BiOp. The decision document describes Reclamation's approach to addressing the RPMs and T&Cs included in the incidental take statement. It is Reclamation's intent to implement 70 percent of the WUA uplift requirement (listed in Table 1) by 2017 and 100 percent by 2020, contingent on available funds.

This *Instream Habitat Restoration Environmental Assessment* (EA) addresses the conservation actions of instream habitat improvement through the placement of LWM and also provides an analysis of the environmental consequences of typical projects. All proposed activities are consistent with actions identified by NOAA Fisheries in the BiOp. NOAA Fisheries and Reclamation identified these activities because they have predictable effects on species and habitat, regardless of the location of treatment. Restoration activities that did not have predictable effects (e.g., historical channel reconstruction projects) or which had uncertainty were not included.

This EA does not include or identify site-specific projects. Rather, the EA identifies a suite of actions that would benefit aquatic resources. Future site-specific projects would be evaluated for consistency with the effects disclosed in this EA. If future site-specific project effects are different than those addressed, they would require a separate National Environmental Policy Act (NEPA) analysis and documentation.

Large Woody Material and Fish Habitat

LWM is an important part of river and creek ecosystems and is critical to the survival of juvenile salmonids. In many watersheds, LWM is a primary factor controlling the shape of the stream channel (Opperman et al. 2006). The central role of LWM in creating and maintaining diverse and critical instream fish habitat is well established; therefore, NOAA Fisheries considers the installation of LWM an acceptable technique to create habitat uplift thereby making it a common conservation measure for mitigating impacts on freshwater environments.

High-quality salmonid habitat is largely a product of the hydraulics that develop around LWM during high-flow events. During high and fast flows, the LWM protruding into the flow causes local acceleration of the flow around the wood, which scours pools into the channel bed. The bed sediments are then deposited downstream leading to diverse patterns in bed topography and bed sediment sizes that together provide habitat options for various life stages of fish and a wide range of flows. At low flows, the scour pools created around the LWM structures are deep and slow moving and the LWM creates refugia (cover) that is ideal for juvenile Coho Salmon. The LWM also traps and stores

organic matter, forming the base of the food pyramid for aquatic insects, which are the main food sources of the fish.

Pools are especially important as rearing habitat for juvenile Coho Salmon. Juvenile Coho Salmon need to survive instream for one summer and one winter before they migrate to the ocean. In areas such as South Fork Little Butte Creek where dry, hot summers are the norm, deep pools may provide the only habitat for Coho Salmon, or any fish, as the streams begin to dry. LWM can increase the survival rate of fish by providing cover and shade for these pools; water temperatures too high are fatal to juvenile Coho Salmon, and fish without cover are very vulnerable to predation. While pools are critical to juvenile rearing during the summer, they are also critical during high-water events in winter. LWM interrupts high-velocity flows and creates a secure refuge for juvenile Coho Salmon during their first winter.

Restoring process and function to damaged or altered aquatic ecosystems is critical to aid recovery of the native Coho Salmon population. An ecosystem is considered restored when it contains sufficient resources to continue its development without further human assistance or intervention. A healthy ecosystem will sustain itself structurally and functionally, and demonstrate resilience to a normal range of environmental stress and disturbance.

PURPOSE AND NEED

Purpose

The purpose of the proposed instream habitat restoration projects is to aid the recovery of the Coho Salmon population to a viable level. This would be accomplished by increasing quality and complexity of instream habitat through targeted LWM placement. Increasing channel complexity would encourage the formation of pool habitat for juvenile rearing. Project activities intend to improve geomorphic forms and processes and create more hydraulic diversity. The LWM projects would be designed to increase WUA for winter or summer rearing habitat (as specified in Table 1) within the Bear Creek and Little Butte Creek watersheds.

Need

Water temperature, flow, sedimentation, lack of instream habitat (e.g., pools and cool water), and deficiencies in stream complexity limit aquatic life in the system (Bredikin et al. 2006). The proposed actions are needed to enhance the natural populations of anadromous fish in the degraded stream systems of Bear Creek and Little Butte Creek watersheds, and to meet the requirements for RPMs outlined in Table 1.

Project Location

The action area includes the Bear Creek and the Little Butte Creek watersheds (with the exception of North Fork Little Butte Creek). Specifically, the reaches identified in Table 1 would be targeted for LWM structure placements. The projects would occur on private land and some public land (most likely City of Ashland and Jackson County).

Authorities and Related Laws

The various laws, Executive orders, and Secretarial orders that apply to the proposed action are summarized in this section. Reclamation proposes to undertake this project under the authority cited below, including awards of financial assistance agreements, as needed, to accomplish instream habitat restoration projects.

Fish and Wildlife Coordination Act
FWCA, 16 United States Code (USC) 661-666c

The regional directors and the Director, Management Services Office, are delegated the authority pursuant to the Fish and Wildlife Coordination Act (16 USC 661-666c); Section 5 of the Endangered Species Act of 1973 (16 USC 1534); and Section 7(a) of the Fish and Wildlife Act of 1956 (16 USC 742f(a)) to take the following actions, either directly or by providing financial assistance to non-Federal parties (255 DM 1.1.B). Authority to award financial assistance agreements for projects associated with off-site locations (Paragraph 6.F.(2)(b) is limited to the regional directors and Director, Management Services Office. The authority of the regional directors and Director, Management Services Office to award financial assistance agreements for all other projects authorized by this delegation can only be re-delegated to designated grants officers.

(a) conduct activities for the improvement of fish and wildlife habitat associated with water systems or water supplies affected by Reclamation projects, including but not limited to fish passage and screening facilities at any non-Federal water diversion or storage project within the region;

(b) plan, design, construct, and monitor, including acquire lands or interest therein as needed, instream habitat improvements, including but not limited to fish passage screening facilities at off-site locations (as negotiated on privately owned lands and facilities not associated with a Reclamation project);

(c) acquire or lease water or water rights from willing sellers or lessors; and

(d) monitor and evaluate the effect of Reclamation actions on fish and wildlife resources including Endangered Species Act-listed species.

National Environmental Policy Act

Reclamation is responsible for determining if the proposed project might have significant effects to the environment under the NEPA. If Reclamation determines that effects are not significant, a finding of no significant impact (FONSI) would be prepared. A FONSI would allow Reclamation to proceed with the proposed action without preparation of an environmental impact statement (EIS).

Endangered Species Act

The Endangered Species Act (ESA) requires Federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Section 7 of the ESA (16 USC Section 1536(a)(2)) requires all Federal agencies to consult

with the NOAA Fisheries for marine and anadromous species or the U.S. Fish and Wildlife Service (USFWS) for freshwater and wildlife species, if an agency is proposing an action that may affect listed species or their designated habitat. If such species may be present, the Federal agency must conduct a BA for the purpose of analyzing the potential effects of the project on listed species and critical habitat in order to establish and justify an effect determination. Agencies must use their authorities to conserve listed species and make sure that their actions do not jeopardize the continued existence of listed species.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) is a Federal law that requires heightened consideration of fish habitat in resource management decisions. The MSA defines essential fish habitat and requires that Federal agencies consult with NOAA Fisheries if an agency action may adversely affect essential fish habitat.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966 (16 USC 470, Public Law 95-515), requires that Federal agencies complete inventories and site evaluations to identify historic resources that may be eligible for listing on the National Register of Historic Places (National Register), and then ensure those resources "are not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly." Regulations titled "Protection of Historic Properties" (36 CFR 800) define the processes for implementing requirements of the NHPA, including consultation with the appropriate State Historic Preservation Office and the Advisory Council on Historic Preservation.

Clean Water Act

The Clean Water Act (CWA) employs a variety of regulatory and nonregulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters that support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.

Executive Order 13007: Indian Sacred Sites

Executive Order 13007, dated May 24, 1996, instructs Federal agencies to accommodate access to Indian sacred sites and to protect the physical integrity of such sites. A sacred site is a specific, discrete, and narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as a sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the Tribe or authoritative representative has informed the agency of the existence of such a site.

Executive Order 12898: Environmental Justice

Executive Order 12898, dated February 11, 1994, instructs Federal agencies, to the greatest extent practicable and permitted by law, to make achieving environmental justice part of its mission by addressing, as appropriate, disproportionately high and adverse human health or

environmental effects on minority populations and low income populations. Environmental justice means the fair treatment of people of all races, income, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no person or group of people should shoulder a disproportionate share of negative environmental impacts resulting from the execution of environmental programs.

Secretarial Order 3175: Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States, with the Secretary of the Interior (Secretary) acting as trust for Indian Tribes or Indian individuals. Examples of ITAs are lands, minerals, hunting and fishing rights, and water rights. In many cases, ITAs are on-reservation; however, they may also be found off-reservation.

The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to Indian Tribes or Indian individuals by treaties, statutes, and executive orders. These rights are sometimes further interpreted through court decisions and regulations. This trust responsibility requires that officials from Federal agencies, including Reclamation, take all actions reasonable and necessary to protect ITAs when administering programs under their control.

ALTERNATIVES

This chapter describes basic features of the alternatives analyzed in this document.

Alternative 1 – No Action

The No Action Alternative represents a continuation of the existing conditions and provides a comparative baseline for evaluating changes and impacts of the Proposed Action Alternative. Under the No Action Alternative, Reclamation would take no action to improve Bear Creek and Little Butte Creek watershed resources for juvenile Coho Salmon. The natural process would proceed without intervention, including the following:

- Stream reaches would continue to lack the habitat complexity that provides juvenile Coho Salmon with refuge from high-velocity flows, predation, and high temperatures.
- Streams would continue to be disconnected from their floodplains, resulting in sediment fines remaining in channel.
- Invasive weeds would continue to proliferate, choking out native riparian vegetation.
- Direct solar radiation would continue to increase stream temperatures, which can be fatal to juvenile Coho Salmon.
- Riparian vegetation would continue to be degraded and would not be enhanced along the existing riparian corridor.

The No Action Alternative would continue to threaten incidental take of juvenile Coho Salmon as a result of irrigation district O&M of the Rogue River Basin Project. Environmental conditions under the No Action Alternative would detract from species recovery efforts and would not achieve the basic goal to maintain or aid recovery of the basin's native Coho Salmon population at a genetically viable level.

Alternative 2 – Instream Habitat Restoration

The preferred alternative is Alternative 2, Instream Habitat Restoration. Instream habitat projects would be implemented in the Bear Creek and Little Butte Creek watersheds, consistent with the proposed WUA requirements for the reaches identified in Table 1. The BiOp required an implementation and design schedule identifying the locations and amounts of large wood to be installed, the anticipated increase in WUA from those installations, a prioritized schedule of installation, and a description of the monitoring and reporting requirements. Reclamation submitted the *Large Woody Material Implementation Plan and Project Portfolio* (Reclamation 2013) in February 2014 to NOAA Fisheries. Reclamation intends to implement 70 percent of the actions identified in this plan by 2017 and 100 percent by 2020, assuming continuation of historical funding levels.

The instream habitat activities identified in this EA were selected for their predictable effects on species and habitat regardless of the location of implementation. Restoration activities that are uncertain or do not have predictable effects (e.g., historical channel reconstruction projects) are not included in the proposed action. All instream work would occur during the Oregon Department of Fish and Wildlife (ODFW) instream work-window (June 15 - September 15) to minimize impacts on spawning or rearing salmon. Work for installing the LWM structures would adhere to the T&Cs in the BiOp. The instream construction duration for each project would depend on the project extents, but is estimated at 2 to 6 weeks. LWM implementation actions may include the following:

- Blackberries and other invasive vegetation would be cleared from project sites by hand, mechanical, chemical, or a combination of methods (e.g., hand and herbicide). Post-project noxious weed monitoring and maintenance would be conducted to reduce or eliminate the reestablishment or establishment of noxious weed populations.
- Temporary access roads, staging areas, and stream crossings would be developed. The use of existing staging areas and access to creeks would be preferred, but brush, noxious weeds, and other understory vegetation may need to be removed for cultural resource surveys and to get vehicle and equipment to some targeted areas. Temporary access roads and other areas disturbed during construction would be restored to similar or better-than pre-work conditions. Restoration may include scarifying and reseeding disturbed areas with an erosion-control, native seed mix.
- A temporary bridge or culvert system would be installed to facilitate stream crossings. Instream flow and fish passage would be maintained under the bridge.
- Riparian fencing would be installed to limit or eliminate access to waterways by cattle or other livestock; a replacement livestock water source would be provided.

- Logs would be purchased from established forestry operations, including Federal forestry management agencies [e.g., U.S. Forest Service (USFS) or the Bureau of Land Management (BLM)]. Cultural Resource surveys would be completed prior to harvesting trees; however, individual NEPA actions would not be completed for trees, as they would be procured from established operations and considered a commodity.
- Log structures and boulders would be placed to create instream and off-channel habitat to benefit Coho Salmon and, subsequently, other aquatic species. Logs or boulders (or both) would be placed instream with heavy equipment. Slash from trees used for construction would be incorporated into log structures.
- Side channels or floodplain areas would be reconnected to increase the wetted area of habitat and potentially reduce bank and bed shear stress. This may include removing sediment plugs that block or impede water movement through side channels and alcoves and the placing log and boulder structures to provide cover.
- Step-pools or constructed riffles would be developed to reconnect floodplains hydraulically, establish hydraulic diversity, encourage hyporheic flow, and form slow-moving and deep-pool habitats for juvenile salmonids.
- Riparian plantings would be used to develop diverse riparian communities, habitat, and future wood supply in creeks; plantings would also remediate construction scars (e.g., excavation, temporary roads and staging areas), stabilize the banks, and increase structural and species diversity. Plant species endemic to Rogue River basin riparian areas would be used and may be 1- to 2-year-old bare root seedlings, cuttings, native grass, and forb seed. Plantings would be conducted by hand (e.g., hoedad) or mechanically (e.g., planting trailer) as appropriate for location. Riparian plantings provide root strength for stream bank stability; organic litter for nutrients and, eventually, stream shading and future large wood recruitment. A small water delivery system (e.g., drip line) may be installed until riparian plants reach the “free to grow” state. Monitoring would ensure successful riparian vegetation establishment, as it is critical to the long-term stability and success of the LWM structures.
- Project sites would be monitored and maintained. Initially, engineers would inspect LWM structures seasonally at discharges across the hydrograph. Post-project monitoring would occur following construction to establish as-built conditions. Monitoring would continue annually or as-needed, while the structure assimilates into the environment; the need for maintenance activities would continue to be evaluated.
- WUA habitat surveys would be used to determine effectiveness of achieving anticipated habitat response (e.g., creating rearing habitat for juvenile Coho Salmon). Monitoring techniques may include longitudinal profiles, snorkeling to conduct fish counts, or presence/absence, cross-sections, and photographs.
- Fish salvage would be conducted before (and intermittently during) isolation of an in-water work area. Fish trapped in the area must be captured using a hand-net, seine, electrofishing, or other prudent methods to minimize risk of injury, then released at a safe site under the supervision of a qualified fishery biologist.

- Construction would involve use of heavy equipment such as, but not limited to backhoes, excavators, front-end loaders, and dump trucks. Large wood may be keyed into the banks and stabilized using soil and rock ballast, and secured through entanglement in existing riparian vegetation, fasteners, or a combination of methods.
- Necessary permits, authorizations, reviews, or exemptions would be obtained prior to implementation of LWM projects.

ODFW's *Guide to Placing Large Wood in Streams* (1995) and *Habitat Restoration Guide* (1999) would guide project designs and construction where appropriate. Best management practices and project design features as identified in the T&Cs would be implemented to avoid or mitigate impacts, and all projects would be subject to pre-project implementation evaluation against Reclamation's *Pacific Northwest Region Resource & Technical Services Large Woody Material Risk Based Design Guidelines* (Reclamation 2014b); specifically, the Public Safety Risk Matrix and Property Damage Risk Matrix.

Instream habitat restoration projects would occur in the target stream reaches identified in Table 1 in order to provide habitat for Coho Salmon; however, other anadromous and resident fish species would also benefit. Instream habitat restoration projects would be selected after evaluation by a Reclamation River Systems Analysis Group team member.

Future identified site-specific projects would be assessed for consistency with the scope and effects addressed in this EA. To ensure consistency and to examine site-specific conditions and effects, Reclamation would determine NEPA adequacy prior to any project implementation. The determination would examine the project location, cultural resources, proposed activities, and the completed risk assessment on the project design. Projects found to be consistent with the scope and effects found in this alternative would be implemented. However, those that are not consistent with the scope and effects contained within this EA, would be modified to be consistent with this alternative or would require a separate NEPA analysis.

Alternatives Considered and Eliminated

Historical channel reconstruction was considered but eliminated from further consideration and analysis. The scope and extent of historical channel reconstruction can vary widely and is very site-specific, which would introduce uncertainty regarding environmental effects into the analysis. This EA addresses environmental effects considered to be consistent, regardless of location of implementation.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter describes the affected environment including existing conditions and future anticipated conditions if the No Action Alternative is selected. It also describes the anticipated effects and the cumulative impacts on the environment if the preferred alternative, Alternative 2, is implemented as the Proposed Action. Given the landscape variability and large geographic area of the Bear Creek and Little Butte Creek watersheds, the following discussions describe conditions across the watersheds with readily available data acknowledging that site-specific conditions vary.

Because specific actions in specific locations are not identified, the environmental effects determinations represent the typical effects associated with the implementation of LWM structures. As site-specific projects are planned, they will be evaluated individually to determine if the typical effects described in this EA adequately analyze site-specific project effects. In addressing cumulative effects of the proposed activities, the assessment assumes compliance with the BiOp regarding the WUA required within each identified reach, according to Table 1.

Resources likely to be affected by the Proposed Action—climate change, water quality, riparian vegetation, fish and wildlife, and threatened and endangered species—are analyzed in this EA. In addition, this document evaluates effects on ITAs and environmental justice, as required by current Reclamation and Department of the Interior policy. Where applicable, mitigation measures are recommended to reduce adverse environmental effects.

Issues Considered but Eliminated from Detailed Analysis

Cultural Resources

The NHPA requires Federal agencies to evaluate the impact of their actions on historic properties within the human environment. "Historic property" means any prehistoric or historic district, site, building, structure, traditional cultural property or object listed in, or eligible for, the National Register, and includes any material, artifacts, or records related to and located within such historic properties. They may include irrigation systems that are more than 50 years old and associated with events or processes important in the history of the area; associated with persons of national, regional, or local importance; or illustrate an unusual or rare design, engineering, or construction technique. "Cultural resources" covers a wider definition of resources than "historic properties," such as sacred sites, isolated artifacts, and archaeological collections.

Prior to project implementation, a cultural resource survey would be completed, and site-specific protection measures would be implemented to preserve the integrity of all recorded sites determined to be eligible, or unevaluated, for listing on the National Register. Such cultural resource sites would be buffered, avoided, or otherwise protected as determined in

consultation with the Oregon State Historic Preservation Office (SHPO). This may include oversight by an archaeologist during project implementation.

Tribal consultations would be initiated at project concept inception and during pre-cultural resource survey, and Tribes would receive the cultural resource survey report. In addition, the Reclamation archaeologist from the Bend Field Office has developed an Inadvertent Discovery Plan (IDP). Copies of the IDP would be forwarded to contractors working on each project, and must be followed for inadvertent discoveries of cultural materials.

Watershed Overview

Rogue River Watershed Overview

The Rogue River basin contains 3,300,000 acres in southwestern Oregon and northern California. It is located within the Oregon counties of Jackson, Josephine, Curry, Klamath, and Douglas, with portions located in the California counties of Siskiyou and Del Norte. The Rogue River watershed has five major sub-basins: Upper Rogue, Middle Rogue, Lower Rogue, Applegate, and Illinois.

There are 110 streams covering approximately 1,000 miles in the entire Rogue River basin, and considered to be Coho Salmon habitat. Only 18 stream-reaches totaling 170.9 miles were designated as Coho Salmon core areas in the *Southwest Oregon Salmon Restoration Initiative* (Prevost et al. 1997). About 17 percent of Rogue River basin Coho Salmon streams are considered high-value Coho Salmon core habitat.

Bear Creek Watershed

The Bear Creek watershed contains approximately 253,440 acres, or 396 square miles, in the Upper Rogue sub-basin. It is approximately 28 miles long and considered a large tributary of the Rogue River. The valley was formed by alluvial deposition from the surrounding areas. The headwaters of Bear Creek include such streams as Emigrant, Tyler, Soda, and Schoolhouse creeks, which occur above Emigrant Reservoir within the Emigrant Creek drainage. Approximately 950 linear stream miles create the Bear Creek watershed drainage; of that, 272 miles are within the agriculture zone of the watershed (RVCOG 2001).

The entire watershed lies within Jackson County, Oregon, which has a population of about 200,000 (PSU 2014). Most of the county's population resides in the communities of Ashland, Talent, Phoenix, Medford, and Central Point. These communities border the banks of Bear Creek and are the most densely populated and intensely cultivated areas in the Rogue River basin (ODEQ 2001).

Overall, Bear Creek provides relatively poor habitat for Coho Salmon (NOAA Fisheries 2007). Despite poor habitat conditions, some Coho Salmon spawning and rearing habitat occurs in approximately 30 miles of streams in the Bear Creek sub-basin, and accessible habitat has been designated as critical habitat for SONCC Coho Salmon (Vogt 2004).

Little Butte Creek Watershed

The Little Butte Creek watershed contains approximately 238,598 acres and is about 35 miles long. The BLM and the USFS manage approximately 114,600 acres of Federal land in this watershed. The majority (50 percent) of the land is privately owned. Little Butte Creek watershed is comprised of the mainstem Little Butte Creek and its tributaries: North Fork Little Butte Creek, South Fork Little Butte Creek, Antelope Creek, Dry Creek, Lost Creek, Lake Creek, and Dead Indian Creek.

South Fork Little Butte Creek is a designated "Coho Salmon core area" as identified in the *Southwest Oregon Salmon Restoration Initiative* (Prevost et al. 1997) and contains about 27 miles of high-value stream habitat used by native Coho Salmon. Coho salmon core areas are streams capable of sustaining year-round Coho Salmon spawning and rearing. While there may be existing habitat limitations, the resource management intent is to protect and improve these core habitats to help stabilize the basin's native Coho Salmon population at a genetically viable level.

Climate Change

Affected Environment

Human activities are contributing to climate change, primarily by releasing billions of tons of carbon dioxide (CO_2) and other heat-trapping gases, known as greenhouse gases, into the atmosphere every year (NRC 2010). These activities are primarily responsible for the observed 1.5˚ F increase in 20th century's annual-averaged temperatures in the Pacific Northwest (IWW 2012). Vehicles are a significant source of greenhouse gas emissions and contribute to global warming primarily through burning gasoline and diesel fuels. Generally, emissions have a relatively short life span in the atmosphere, and they lose potency to cause adverse health conditions as they disperse. However, unlike other pollutants, CO_2 has a lifespan in the atmosphere for hundreds of years; therefore, the effects build up rather than disperse overtime. National estimates show that the transportation sector, including construction activities, accounts for almost 30 percent of total domestic CO_2 emissions. In Oregon, construction-based emissions make up 5.4 percent of the State's consumption-based emissions (ODEQ 2013a).

Climate change poses a risk to western water management. In 2011, Reclamation released a report (Reclamation 2011) to Congress that shows several increased risks to water resources in the western United States during the 21st century. Specific projections include the following:

- A temperature increase of 5 to 7˚F
- A precipitation increase over the northwestern and north-central portions of the western United States and a decrease over the southwestern and south-central areas
- A decrease for almost all of the April 1 snowpack, a standard benchmark measurement used to project river basin runoff.

Climate variability involves fluctuation in weather and climatic conditions during the coming months, years, and decades. Climate change involves a shift in climatic variations, usually measured over a span of several decades.

The Oregon Department of Environmental Quality (ODEQ) has determined that the Medford area meets the national health standards for air pollution. The *2012 Oregon Air Quality Data Summaries* report (ODEQ 2013b) shows no "unhealthy" or "very unhealthy or higher" days for 2012. The Medford area only had 1 day in 2012 that was "unhealthy for sensitive groups," which occurred in mid-January and was related to wintertime emissions. In the last 10 years, Medford has recorded three "unhealthy" air quality days. Primary sources of air pollution are wood burning, including forest fires, and industrial emissions (ODEQ 2013b).

Environmental Consequences

No Action

There would be no impacts on climate change since construction activities would not occur.

Preferred Alternative

Construction activities would result in slight, local, and short-term impacts on air quality. Trucks and other equipment operating at the worksite could minimally and temporarily increase dust particulate and gaseous emission levels in the immediate area. Excavation would occur along the streambank and in the dewatered creek bed; soil conditions would be relatively moist thereby reducing the likelihood for dusty work conditions. Construction activities are not expected to have an impact on National or State Ambient Air Quality Standards annual averages for particulate of 15 micrograms per cubic meter ($\mu g/m^3$) or 35 $\mu g/m^3$ in a 24-hour period. See http://www.deq.state.or.us/aq/planning/ (ODEQ 2014). The Proposed Action, Preferred Alternative 2, would not involve permanent, stationary sources of emissions and would not be regulated by the Clean Air Act.

Air quality should not be adversely affected beyond minor exhaust emissions and dust associated with small-scale construction activities, which would be limited to the short period of actual construction. Construction activities would not result in the local or regional alteration of air movement, moisture or temperature patterns; therefore, the Proposed Action would not have significant impacts on climate change.

Cumulative Effect

Factoring in climate change, the cycles of floods and drought are becoming prolonged and intense, such that encouraging river channel complexity and reestablishing a connection to floodplains is essential. The installation of LWM encourages local scour that develops deep, slow-moving pockets of water that remain cool and contribute to juvenile salmon survival during extreme low-flow conditions caused by drought. The LWM provides refuge from increased stream temperatures and important cover for fish to hide and escape from non-native warm-water species. Increased floodplain connectivity helps to dissipate high-energy floods and retains water in the soil, which would eventually return to the creek during low-flow periods and increase aquifer recharge. Installation of LWM in Bear Creek and Little Butte Creek watersheds would insulate Coho Salmon from the effects of climate change, resulting in a long-term beneficial impact.

Mitigation

Contractors would comply with applicable Federal, State, and local air quality standards and emission limitations. Exhaust emissions would be limited to the short period of actual construction and would be substantially mitigated by the use of properly maintained equipment according to the T&Cs. Contractors would be required to use reasonable steps to control and minimize atmospheric emissions of air contaminants. For example, sprinkling may be used to control dust emissions.

Water Quality

Affected Environment

Water quality in the State of Oregon is managed by the ODEQ under the framework of the CWA. Oregon has established water quality standards for specific physical and chemical parameters to provide suitable conditions to support beneficial uses of the State's waters. Beneficial uses of the State's waters are assigned by basin in the Oregon Administrative Rules for water quality. Beneficial uses include domestic water supply, industrial water supply, fish and aquatic life, fishing, irrigation, aesthetic quality, boating, livestock watering, wildlife and hunting, water contact recreation, hydropower, and commercial navigation and transportation (ODEQb).

Section 303(d) of the CWA requires states and Tribes to identify waterbodies that do not meet water quality standards and publish a list of these impaired waters every 2 years. For lakes, rivers, and streams identified, states and Tribes must develop water quality improvement plans known as total maximum daily loads (TMDLs). TMDLs are designed to restore the health of the waterbody and establish the amount of pollutant a waterbody can carry and still meet water quality standards.

In 1992, Bear Creek was one of the first watersheds in the State of Oregon to have TMDLs developed for total phosphorus, ammonia, nitrogen, and biochemical oxygen demand. Bear Creek watershed also has several waterbody segments on the 303(d) list. Elevated water temperature and excess bacteria are the two primary pollutants of concern in the watershed.

In 2008, the State of Oregon completed TMDLs for temperature and bacteria. Sedimentation and dissolved oxygen are included on the 303(d) list.

A detailed description of baseline water quality can be found in the BA at http://www.usbr.gov/pn/programs/esa/oregon/rogue/rogueba.pdf. The water quality environmental baseline for the Bear Creek and Little Butte Creek watersheds can be found on pages 87 and 100, respectively.

Environmental Consequences

No Action

Under the No Action Alternative, current stream flows and temperature issues would persist. Summer flows would remain low, and conditions prompting the listing of streams on the 303(d) list as impaired for excess water temperature would remain.

Under the No Action Alternative, no modifications would be made to the stream channel or riparian areas; therefore, natural processes would continue. Bank erosion and the formation of headcuts (abrupt changes in bed surface elevation at the head of channels where intense, localized erosion takes place) would continue. Both of these processes contribute fine sediment inputs, which are more noticeable in lower water tables (summer) and in low gradient channels, year-round. The increased fine sediment during higher flows (winter) would likely reduce viable salmon eggs for the long term, as redds would be covered with a deeper sediment layer.

Cattle and other livestock would continue to have access to waterbodies without the implementation of riparian fencing. Fecal bacteria levels would continue to elevate throughout the watersheds, and the effects would be magnified during low, summer flows.

Part of the habitat loss is a result of operating Reclamation projects, which reduce the amount of water in the creeks during critical times (summer); therefore, reduce the amount of habitat available. This condition is exacerbated by the extreme drought conditions that are currently affecting the area. Without the installation of LWM and riparian plantings, the floodplains would not be reconnected and improve in functionality. High-energy floods would not have LWM, vegetation, or a connected floodplain to help dissipate the energy of the flood over a wider area. Floodwater would not be retained to increase aquifer recharge or eventually return to the creek during low flow periods (summer).

Proposed Action

Instream work would occur at low flows and during the ODFW approved inwater work window, June 15 through September 15 of each year. Project duration in most cases is estimated at 2 to 6 weeks. Constructing LWM structures would require dewatering of instream construction sites by placing cofferdams. When the cofferdams are constructed and dismantled, occasional and short-term increases in turbidity would occur downstream of the construction site, resulting in minor adverse impacts on water quality in the project area. However, the turbidity caused by introduced fine sediment would become entrained as the natural streamflow flushes the area, and would be reduced by the T&Cs; some residual fine sediment may not be flushed until the first high flow post-construction. The fine sediment would not affect downstream gravel or pool volume.

In areas where headcuts and unstable banks exist, installation of large wood structures and riparian plantings would greatly reduce the amount of coarse and fine sediment contributed to the stream, since the hydraulic forces would be directed away from the bank. While construction would disturb the soils and result in short-term effects of fine sediment released instream, the long-term benefits of improved channel complexity and bank stabilization would far outweigh potential short-term effects.

Operation of construction equipment in and near streams creates the potential for toxic materials (e.g., fuel, lubricants) to be released into the stream and riparian areas. The improper storage of petrochemicals and mechanical failure can introduced toxins that could injure or kill aquatic organisms. To reduced short-term impacts, operating equipment instream would be minimized to the extent practical. The T&Cs are designed to minimize and reduce risk of chemical spill or introduction of fluids into streams by restricting

equipment staging, fueling, and cleaning to more than150-feet from streams; therefore, the risk of spill and contamination is as low as possible, and it is anticipated that these scenarios would have minimal, short-term, or no impacts.

Installation of LWM would help reduce stream energy and velocity resulting in a reduction in turbidity caused by fine sediment. This would allow the channel to aggrade, reconnect to a larger floodplain, and provide habitat for fish and aquatic organisms. The channel would aggrade as a result of direct physical capture of bedload materials by LWM structures and by capturing sediment, including bedload, in the lower velocity areas created. The result is a connected, functioning floodplain would be created. Floodplains and their associated wetlands act as biological filters which improve water quality, and act as sponges, which increase water quantity. Through reconnecting streams to a floodplain in a natural, meandering channel, groundwater recharge would increase as flood flows are slowed and areas of off-channel water storage are increased. Sedimentation would also increase along the floodplain as water velocity slows thereby reducing the amount of sediment transported during normal flows. Creating a functioning floodplain is a long-term beneficial impact.

Installation of riparian fencing would limit or eliminate the access of cattle or other livestock to waterways. Through the installation of riparian fencing, a "buffer zone" would be created between their grazing areas and the stream, reducing the amount of fecal bacteria that would enter the waterbody. Reduction in fecal coliform counts is very beneficial to fish and wildlife habitat, riparian health, and water quality.

Temperature (a water quality indicator with a TMDL) is discussed further in the Riparian Vegetation section below, due to the connectivity with direct solar radiation as a result of degraded standing riparian vegetation. However, the installation of LWM encourages local scour, which develops deep, slow-moving pockets of water that remain cool and contribute to juvenile salmon survival during low and extreme low-flow conditions caused by drought. The LWM provides refuge from increased temperatures and important cover for fish to hide and escape from non-native warm-water species.

The Proposed Action would have occasional and short-term increases in turbidity downstream of the construction site during and after construction, resulting in minor adverse impacts on water quality in the project area. Reclamation would require its contractors to comply with all Federal, State, and local regulations to reduce water pollution. Respective best management practices and regulatory requirements would be adhered to, and appropriate permits would be obtained prior to construction activities. The contractor would be required to comply with all permit conditions.

Cumulative Effect

The cumulative effect of large-scale wood placement would improve water quality by trapping sediment, which reduces downstream sediment concentration, moderates river temperatures, and creates channel systems where incision of the river banks is limited.

Mitigation

The T&Cs in the BiOp and included in the Proposed Action would be adhered to throughout construction. In addition, Reclamation or any applicant would comply with Federal, State, and local regulations to reduce water pollution.

Riparian Vegetation

Affected Environment

Riparian areas are the vegetated areas immediately adjacent to waterbodies, including rivers, streams, lakes, ponds, reservoirs, marshes, and wet meadows. The vegetation and microclimate conditions in riparian areas depend on the presence and influence of the water source, local water tables, and soil moisture content. Riparian areas are variable in width, do not conform to a specific distance from the waterbody, and vary widely in shape. Plants adapt to natural river-flow patterns and habitat conditions. Winter rainstorms and spring snowmelt floods scour away dormant seedlings and saplings growing too close to the river's edge. Seeds released in the spring and early summer sprout higher on the bank when the water level is high. Seedlings on these higher surfaces will grow during the slowly receding spring snowmelt.

Riparian areas provide streambank stability and slow flow velocities. They would also reduce erosion, increase filtration of overland flows, store and release water over a long period of time, and insulate waterbodies from summer and winter extremes. Streambanks dominated by vegetation without extensive root masses are subject to undercutting during high-flow events, which can result in bank collapse and the introduction of high sediment loads into the stream. Standing vegetation (e.g., trees) provide shade to regulate water temperature during the spring and summer months and offer organic litter (e.g., leaves) to provide nutrients to aquatic species in autumn. Trees are also a sustainable source of coarse woody material; when trees fall into the stream, they can dissipate flood energy and create aquatic habitat. Riparian vegetation is also important to terrestrial species, as it provides nesting, roosting, cover, and food sources.

Overall, the Rogue River basin and its tributaries and riparian areas are in relatively poor condition with respect to fish habitat conditions (USFS and BLM 1997). In the Bear Creek watershed below Medford, direct solar radiation on unshaded stream-reaches and warm air temperatures can cause daytime water temperatures to exceed 26.7°C (80°F) during the summer (Reclamation 2001). Although releases of project water cools Emigrant Creek and portions of upper Bear Creek, Reclamation found that water flow does not relate to water temperature in the middle and lower reaches of Bear Creek, where the high temperatures result largely from solar loading (ODEQ 2007). In Little Butte Creek watershed, summer water temperatures generally correlate with elevation, with cooler temperatures found at higher elevations. The coolest summer temperature conditions are in stream segments above an elevation of 4,000 feet. These streams are primarily on Federal land in the Little Butte Creek watershed and account for 75 to 85 percent of the viable salmonid production during the summer months (USFS and BLM 1997). However, habitat available for salmon and steelhead rearing appears quite limited. Lower elevation stream sections influenced by cool water from spring discharge may provide some localized refugia and good summer rearing conditions. Little Butte Creek and its tributaries have been designated by ODEQ as having

core cold water habitat. Core cold water habitat waters are expected to maintain temperatures within the range generally considered optimal for salmon and steelhead rearing.

The Bear Creek and Little Butte Creek watershed riparian areas are generally laden with invasive vegetation that can prevent establishment of native species and can become an unwanted, permanent component of a plant community. Invasive plants are defined as those plants included on the Oregon State Noxious Weed list compiled by the Oregon Department of Agriculture. Invasive plants of particular concern include Himalayan blackberry (*Rubus armeniacus*), poison hemlock (*Conium maculatum*), yellow star thistle (*Centaurea solstitialis*), purple loosestrife (*Lythrum sailicaria*), puncture vine (*Tribulus terrestris*), and teasel (*Dipsacus sylvestris*) [RVCOG 2010]. Invasive plants respond to site disturbance; clearing a site often gives them a competitive advantage. According to the Rogue Valley Council of Governments (RVCOG 2010), when one species is removed (e.g., blackberries), new species take over (e.g., poison hemlock) if native plants are not established. Removal of invasive species requires incorporating long-term maintenance to prevent reestablishment of invasive plants, as well as maintaining native plants.

Riparian and stream habitat degradation have been linked to agricultural practices, road construction, timber harvest, urbanization, flood control, "stream cleaning" (removal of LWM from streams), and construction of dams (FEMAT 1993). Logging operations in the past typically cut right to the edge of the stream, depriving the stream of shade and wood input from the adjacent riparian area. Storm-triggered landslides (natural and human-caused) from older clear-cuts and numerous forest roads are a continuing source of sediment. Flood control projects straightened stream channels, eliminating sinuosity and floodplain connectivity that dissipates floodwater energy. Major rain-on-snow storm floods in 1955, 1964, 1974, 1997, and 2005 caused both road and logging-related landslides, which transported large amounts of sediment into streams, especially in the Little Butte Creek watershed. These storm events caused major stream-channel erosion. As a result, an elevated amount of fine sediment evident in the watershed's lower gradient stream reaches is embedding spawning gravels and filling pools important for juvenile fish rearing. "Stream cleaning" removed LWM and boulders, and instream and riparian habitat, elements of floodplain connectivity used dissipate flood energies, while increasing width-to-depth ratios.

Environmental Consequences

No Action

Under the No Action Alternative, LWM structures and riparian plantings would not occur. Stream courses would continue to erode the streambank and reduce riparian habitat. Inferior and reduced riparian vegetation causes streambanks to be less stable, increasing susceptibility to erosion. Other negative effects stemming from poor riparian conditions include reducing the amount of LWM and organic material available to the stream. The lack of LWM instream would continue to inhibit juvenile salmon rearing habitat, suitable spawning sites, and habitat diversity. Under this alternative, LWM contributions from existing immature stands would be limited for several years or decades; therefore, LWM accumulations would not likely reach historical levels, which would impede the recovery of Coho Salmon runs and continue to limit their reproduction within the project area for the long term.

Noxious weeds can out-compete native plants and reduce habitat for native insects and animals, thereby, threatening biological diversity. They can alter soil fertility, dry up water supplies, poison animals, decrease agricultural production, and infest rivers. While there would be no soil disturbance to provide additional habitat for noxious weeds, their spread would continue through natural forces. Additionally, noxious weeds would not be removed to reduce the existing population or inhibit future populations.

Proposed Action

Operation of construction equipment in and near streams creates the potential for introduction of toxic material (e.g., fuel, lubricants) into the stream and riparian areas from improper storage of petrochemical and mechanical failure, which can injure or kill aquatic organisms. Due to the adherence to the T&Cs, it is anticipated that these scenarios would have minimal, short-term, or no impacts.

Construction equipment can also introduce or spread noxious weeds, such as Himalayan blackberry. While construction equipment is essential for installation of LWM structures, the Proposed Action includes the removal of blackberries and other invasive vegetation from project sites by hand, mechanical, chemical, or a combination of methods (e.g., hand and herbicide) and adherence to the T&Cs for vehicle washing. Project sites would be monitored post-construction for the development of noxious weeds and treated, and new populations would be removed in the same methods as preconstruction. It is anticipated the Proposed Action would result in a long-term benefit of reduced populations of noxious weeds.

Construction equipment can compact soils and vegetation in staging areas and ingress and egress routes. However, the T&Cs provide for scarifying and reseeding these compacted areas. It is anticipated that the Proposed Action would have long-term beneficial effects because the reseeding would be with native grasses.

Overtime, sediment deposition and storage would aggrade the streambed, allowing reconnection of the stream to its historical floodplain during high-flow events. This would aid in the creation of off-channel rearing habitat, recruitment of LWM from the floodplain, and addition of organic nutrients to the stream and riparian areas.

Riparian zones would experience beneficial impacts by connecting the floodplain with the stream channel. It is expected that aggradation, the capturing of sediment, will aid floodplain development and improve floodwater retention. As a floodplain recovers, it is often most evident in the increase in riparian vegetation. Planting native vegetation would initiate the riparian-zone recovery, and the removal of invasive plants would likely revegetate the floodplain quickly. Post-project monitoring would ensure that any invasive vegetation would not out-compete the plantings and native vegetation.

The following is a list of the native plant species commonly found in the riparian areas in the Rogue Valley, which includes the Bear Creek and Little Butte Creek watersheds. The majority, if not all, of the species on this list would be planted in the riparian zones. The specific suite of species at any particular site would be tied to the documented occurrences at the closest reference site, and the relative numbers of each species planted would be representative of densities observed at reference sites.

Big Leaf Maple (*Acer macrophyllum*)

Vine Maple (*Acer circinatum*)

Red Alder (*Alnus rubra*)

White Alder (*Alnus rhombifolia*)

Western Dogwood (*Cornus nuttallii*)

Black Hawthorne (*Crataegus douglasii*)

Oregon Ash (*Fraxinus latifolia*)

Black Cottonwood (*Populus balsamifera v. trichocarpa*)

Common Chokecherry (*Prunus virginiana*)

Western Crabapple (*Pyrus fusca*)

Pacific Willow (*Salix lasiandra*)

Scoulers Willow (*Salix scouleriana*)

Dusky Willow (*Salix exigua ssp. melanopsis)*

Incense Cedar (*Calocedrus decurrens*)

Serviceberry (*Amelanchier alnifolia*)

Red Osier Dogwood (*Cornus stolonifera*)

Ocean Spray (*Holodiscus discolor*)

Indian Plum (*Oemleria cerasiformis*)

Pacific Ninebark (*Physocarpus capitatus*)

Nootka Rose (*Rosa nutkana*)

Thimbleberry (*Rubus parviflorus*)

Golden Currant (*Ribes aureum*)

Blue Elderberry (*Sambucus cerulea*)

Red Huckleberry (*Vaccinium parvifolium*)

Oregon Grape (*Mahonia aquifolium*)

Sword Fern (*Polystichum munitum*)

Common Snowberry (*Symphoricarpos albus*)

Wild Mock Orange (*Philadelphus lewistii*)

Solar radiation of streams will eventually decrease as canopy cover increases, resulting in improved water quality. The effect of tree plantings would not have an immediate effect on water temperatures; however, it would be a long-term beneficial effect.

Cumulative Effect

The cumulative effect of riparian plantings can improve water quality by trapping sediment, which reduces downstream sediment concentration, moderates river temperatures, and creates channel systems where incision of the river banks is limited.

Mitigation

No mitigation is necessary. The Proposed Action includes T&Cs that reduce impacts on existing vegetation and actions to increase riparian vegetation, including rehabilitating all disturbed areas.

Fish and Wildlife

Affected Environment

Fish

Many natural and human-induced factors have cumulatively led to the decline in the population status of anadromous salmonids in the Rogue River basin as well as throughout the Pacific Northwest coastal rivers. Many factors have contributed to these declines, including forestry, grazing, agriculture, mining, dams and water withdrawals, hydropower, urbanization, and over-harvesting.

Anadromous and resident salmonids use Bear Creek and Little Butte Creek for spawning and rearing. The Bear Creek and Little Butte Creek watersheds currently support anadromous runs of Coho Salmon, fall Chinook Salmon, and summer and winter steelhead trout.

Steelhead (*Oncorhynchus mykiss*). Summer steelhead enter the Rogue River from May through November then enter Bear Creek and Little Butte Creek and their tributaries December through March to spawn. The run is composed of mature spawning adults, half-pounders, or immature fish that return to freshwater 3 months after entering the ocean as smolts. Spawned eggs are incubated in gravel beds from March through May. Young summer-steelhead fry generally move into the mainstem of Bear Creek and Little Butte Creek and into the Rogue River as water levels drop and temperatures increase in late spring. When river-flows, access, and water temperatures are suitable, juveniles remain in the upper reaches of perennial streams. Juveniles remain in the mainstem and tributaries for 1 to 4 years (most commonly 2 years) to rear before migrating downstream to the ocean during the spring freshet season. During each year of freshwater residence, juvenile steelhead reenter tributaries with fall rain and rear through winter and spring months, returning to the mainstem for summer rearing.

Winter steelhead populations migrate into Bear Creek and Little Butte Creek watersheds from December through May. Spawning occurs from late winter through spring in the mainstem streams and tributaries. Egg incubation lasts from March through June; fry emergence occurs from April to July; and juveniles either move downstream to the Rogue River or remain in the headwaters of tributary streams. The young fish stay in freshwater from 1 to 4 years (most commonly 2 years) before the smolt lifestage migrates to the ocean.

Chinook Salmon *(Oncorhynchus tshawytscha).* Both watersheds support a fall run of Chinook Salmon. If flows are adequate, runs begin in early October, and spawning continues through December. After emerging from gravel redds in March and April, young fry move down to the mainstem Rogue River when water temperatures become suitable. Fry seek out mainstem river-edge habitat in the early spring and remain there for several months before outmigration to the ocean by late June.

Pacific Lamprey (*Entosphenus tridentatus).* Pacific Lamprey are eel-like, non-salmonid anadromous species found in both watersheds. Pacific lamprey tend to spawn in larger tributaries and mainstem sections of streams. After hatching, the blind, filter feeding ammocoetes (juvenile lamprey) embed themselves in sandy river bottoms for up to 7 years. After they develop eyes and gills, they begin to use their circular, suction-cup-like mouth to

attach to, and parasitize, other fish. In this manner, they "hitchhike" to the ocean. After 1 to 3 years in the ocean, mature lamprey swim back to fresh water to spawn. Very little information is known about Pacific lamprey population abundance in the watersheds.

Resident Fish. Resident fish in both watersheds include warm-water and cold-water species. Resident rainbow and cutthroat trout inhabit Bear Creek and Little Butte Creek and their tributaries. Native trout and cutthroat trout reside in the upper reaches, where the water temperatures are cooler and good water quality conditions persist. Several nonnative warm-water fish species are found in both watersheds—sculpins, carp, shiner, largemouth bass, and bullheads thrive in aquatic conditions that exceed salmon and trout preferences.

Wildlife

The Bear Creek and Little Butte Creek watersheds provide a wide array of habitats conducive to an abundant and diverse population of wildlife species that may be found in the project area. These mammals may include blacktail deer, Beechey ground squirrel, raccoon, coyote, opossum, porcupine, and rodents. Raptors known to inhabit the watershed include northern spotted owls, ospreys, bald eagles, golden eagles, red-tailed hawks, American kestrel, northern harriers, and turkey vultures.

High populations of waterfowl, shorebirds, songbirds, and game birds, particularly California quail, ring-necked pheasant, and mourning dove occur in the watershed riparian zones. Waterfowl feed in the fields during fall and winter migration periods. Waterfowl and shorebirds frequent irrigation ditches, canals, fields, and wetted areas. Other insect and seed-eating birds use weedy areas, open gravel areas, ditch banks, and grain fields.

Environmental Consequences

No Action

Fish. Fish would continue to be subject to warm temperatures and predation as a result of shallow water and scattered riparian shade. Lack of pools within the project area limits resting and rearing habitat for juvenile and adult salmonids. Poor pool quality would continue to have direct and indirect negative effects on the production of adult and juvenile salmon, trout, and other species.

Wildlife. No impacts on wildlife would occur since there would be no construction.

Proposed Action

Fish. The noise and human activities associated with the proposed action are not expected to significantly displace or impact anadromous and resident fish found in the project vicinity. By virtue of multiple species and life stages of anadromous and resident fish present in the project area, in-river construction activities are not likely to impact fish resources, as annual juvenile outmigration would have occurred and construction would be completed before adult migration begins. The construction period, June 15 through September 15, is during summer low flows and not expected to directly conflict with the anadromous and resident fish in the watersheds. This construction period is within the ODFW approved in-water work window for streams in both watersheds and coincides with the time that stream temperatures are higher

and fish—resident and anadromous—will have sought cooler waters. The inwater work period would have the least impact on important fish, wildlife, and habitat resources.

Overall, the proposed project is expected to significantly improve salmon and steelhead pre-smolt, smolt, and adult survival by providing pools and adequate cover. This action could potentially help rebuild imperiled runs of salmon and steelhead returning to the Rogue River basin by providing juvenile rearing areas with habitat complexity, cover, and deep pools. It is likely that the number of juvenile fish out-migrating from the Bear Creek and Little Butte Creek watersheds and reaching the ocean environment would increase over time.

Wildlife. Construction activities would have temporary effects on wildlife species located in the immediate vicinity of the proposed project area. Human activity and noise emitted from equipment would disturb some wildlife species sensitive to this activity, causing animals to disperse to other unaffected areas. A limited amount of vegetative groundcover would be disturbed that could reduce cover or foraging for wildlife during construction. However, the construction work would be temporary, and would cause only a small reduction in available wildlife habitat around the immediate location of the construction site. It is expected that any disturbed or displaced animals would return to the construction area after work is completed; consequently, there would be no net long-term loss of individuals to local populations.

Cumulative Effect

The installation of LWM encourages local scour that develops deep, slow-moving pockets of water that remain cool and contribute to juvenile salmon survival and other fish species during low and extreme low flow conditions caused by drought. The LWM provides refuge from increased stream temperatures and important cover for fish to hide and escape from non-native warm water species. The increased floodplain connectivity helps to dissipate high energy floods and retain water in the soil, which would eventually return to the creek during low flow periods and increase aquifer recharge.

Mitigation

No mitigation is necessary due to the benefits of the project. In addition, the project would be constructed during the ODFW authorized work window, and the terms and conditions provide for fish salvage operations and protection before and during construction. A Scientific Taking Permit–Fish would be secured from ODFW as appropriate. A Scientific Taking Permit–Fish would not be necessary if ODFW conducts or leads fish salvage operations.

Threatened and Endangered Species

Affected Environment

The Coho Salmon is the only ESA-listed species that may be affected by implementation of the proposed project. Please see the Rogue River Project evaluation of the overarching effects on Coho Salmon online at http://www.usbr.gov/pn/programs/esa/oregon/rogue/rogueba.pdf.

Other ESA-listed species in the Jackson County area under the jurisdiction of NOAA Fisheries include the North American green sturgeon and Pacific eulachon.

The following are ESA-listed species under USFWS jurisdiction for Jackson County (USFWS 2015):

- Birds: Northern Spotted owl (*Strix occidentalis caurina*)
- Crustaceans: Vernal Pool fairy shrimp (*Branchinecta lynchi*)
- Mammals: Gray wolf (*Canis lupus*)
- Amphibians: Oregon spotted frog (*Rana pretiosa)*
- Flowering Plants: Cook's lomatium (*Lomatium cookie*), Gentner's Fritillary (*Fritillaria gentneri*), and large-flowered woolly Meadowfoam (*Limnanthes floccosa ssp. grandiflora*)

Environmental Consequences

No Action

If the Proposed Action is not implemented, Reclamation would not satisfy the required conservation actions of the BiOp, which would trigger reconsultation with NOAA Fisheries.

The lack of pools within the project area limits resting and rearing habitat for juvenile and adult salmonids. Poor pool quality would continue to have direct and indirect negative effects on the production of adult and juvenile salmon, trout, and other species.

Coho Salmon would continue to be subject to warm temperatures and predation as a result of shallow water and scattered riparian shade.

Proposed Action

Reclamation's evaluation of the Rogue River Project effects on Coho Salmon can be found in the BA; NOAA Fisheries' determination of effects on can be found in the BiOp. Both documents are available at http://www.usbr.gov/pn/programs/esa/oregon/rogue/index.html. The BiOp concluded that projects associated with the continued operation of the Rogue River Project would not adversely affect the North American green sturgeon and Pacific eulachon or their critical habitat.

The Alternative 2, the Preferred Alternative, was analyzed as part of the BA's proposed action. The BiOp identified T&Cs associated with this project to minimize incidental take caused by project implementation. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct." "Harm" is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. "Incidental take" is defined as "take that is

incidental to, and for the purpose of, carrying out of an otherwise lawful activity." NOAA Fisheries, for the purpose of consultation on the BA, interpreted "harass" to mean "an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point where such behaviors are abandoned or significantly altered" (NOAA Fisheries 2012). Section 7(b)(4) and Section 7(o)(2) of the ESA provide that take that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of the incidental take statement included in the BiOp.

The proposed action would improve Coho Salmon habitat quantity and quality; benefits would begin to accrue in the short term and persist in the long term. Implementation of the proposed project would result in a significant increase of winter and summer instream rearing habitat and stream complexity conditions that are beneficial to juvenile Coho Salmon. It is anticipated that the long-term beneficial impacts of LWM installations would aid in the recovery of the Coho Salmon population to a viable level.

While the exact locations of proposed LWM installations are unknown, Reclamation has assessed target reaches of the lower South Fork Little Butte, Neil, Emigrant, Ashland, and Bear creeks and have determined that no terrestrial threatened and endangered species listed by the USFWS in Jackson County, Oregon, occur in the vicinity of the proposed projects. USFWS ESA-listed species and habitat occur within the Bear Creek and Little Butte Creek watersheds, but LWM installations would be not be placed in locations where these species are found; therefore, implementation of the project would not have an impact on ESA-listed species under the jurisdiction of USFWS.

Cumulative Effect

Reclamation has assessed past, present, and reasonably foreseeable future projects in the Bear Creek and Little Butte Creek watersheds for cumulative impacts. There are several reasonably foreseeable actions in the proposed project vicinity that have beneficial effects to Coho Salmon. Both the BA and the BiOp address Reclamation's conservation actions within both watersheds, which include instream flows, ramping rates, fish passage modifications, riparian-zone restoration (without LWM placement), and water conservation.

Mitigation

No mitigation is needed. The effects of the proposed project on federally listed, threatened and endangered species were analyzed in the BA and the BiOp. The resulting proposed action of the BiOp provides T&Cs that are non-discretionary; and Reclamation must comply with the T&Cs to implement the RPMs. (See Appendix A for the RPMs and T&Cs associated with construction of the proposed project.)

Reclamation has determined that implementation of the proposed project would not affect ESA-listed species under the jurisdiction of USFWS.

Indian Trust Assets

Reclamation has established a policy (dated October 3, 1993) to protect Indian Trust Assets (ITAs) from adverse impacts on its programs and activities to enable the Secretary to fulfill responsibilities to the Indian Tribes. ITAs are legal interests in property held in trust by the

United States for Indian Tribes or individuals. ITAs may include lands, minerals, hunting and fishing rights, and water rights. The United States, with the Secretary as the trustee, holds many assets in trust for Indian Tribes or Indian individuals.

Affected Environment

In many cases, ITAs are on-reservation; however, they may also be found off-reservation. While ITAs have not been specifically identified, they may be potentially associated with anadromous fisheries. Without adequate over-wintering habitat for juvenile Coho Salmon, the loss of anadromous fish would likely remain the same.

Environmental Consequences

No Action and Proposed Action

Under both the No Action and Proposed Action alternatives, Reclamation would consult with the Tribes as project specifics become known. Consultation would give the Tribes opportunity to identify any ITAs associated with the projects. Reclamation would consult with the Confederated Tribes of Grand Ronde Community, Confederated Tribes of Siletz, Cow Creek Band of Umpqua Indians, Quartz Valley Indian Reservation, and the Klamath Tribes. Reclamation believes that the proposed action would not negatively impact ITAs related to fisheries, if any are present in the project area, since Bear Creek and Little Butte Creek watershed salmon runs would potentially be enhanced and restored.

Mitigation

No mitigation is anticipated, because the project would likely enhance fisheries that may be considered ITAs.

Environmental Justice

In August 1994, the Secretary established an environmental justice policy based on Executive Order 12898, dated February 11, 1994. This policy requires departmental agencies to identify and address any disproportionate environmental impacts resulting from their proposed actions on minority and low-income populations and communities, as well as the equity of the distribution of benefits and risks of those decisions. Environmental justice addresses the fair treatment of people of all races and incomes with respect to actions affecting the environment. Fair treatment implies that no group should bear a disproportionate share of negative impacts.

Affected Environment

The projects are located in rural Jackson County, which was also selected as the local study area. Table 2 provides the numbers and percentages of population for seven racial categories: White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian, and Other Pacific Islander, Two or More Races, and Hispanic or Latino (U.S. Census Bureau 2013).

Table 2. Race and ethnicity for Jackson County and the State of Oregon (2012)

Racial Category	Percent in Jackson County	Percent in State of Oregon
White	92.9	88.3
Black or African American	0.8	2.0
American Indian and Alaska Native	1.5	1.8
Asian	1.3	4.0
Native Hawaiian and Other Pacific Islander	0.3	0.4
Two or More Races	3.1	3.5
Hispanic or Latino	11.4	12.2

Table 3 provides income, poverty, unemployment, and housing information for Jackson County and the State (U.S. Census Bureau 2013)

Low-income populations are identified by several socioeconomic characteristics. As categorized by the 2012 Census, specific characteristics include income (median family and per capita), percentage of the population below poverty (families and individuals), unemployment rates, and substandard housing.

Table 3. Industry, employment, and labor income comparison (2008-2012)

Socioeconomic Characteristic	Jackson County	State of Oregon
Median family income	$43,664	$50,036
Per capita income	$24,449	$26,702
Families below poverty level	12.2%	10.8%
Individuals below poverty level	16.6%	14.9%
Percent unemployed	12.3%	10.8%

Median family and per capita income for Jackson County is $43,664, less than the State's average of $50,036. When compared to the State of Oregon, the study area has a greater percentage of families and individuals below the poverty level.

The unemployment rate also characterizes demographic data in relation to environmental justice. In November 2013, the seasonally adjusted unemployment rate for Jackson County was 9.3 percent, greater than the State's 7.3 percent unemployment rate (OED 2013).

Environmental Consequences

No Action

There would be no impacts on environmental justice if the projects are not implemented.

Proposed Action

Implementation of the proposed instream habitat projects would have no adverse natural resources or socioeconomic impacts on minority and low-income populations in Jackson

County. No impacts would occur that would affect minority or low-income populations, as projects would occur mostly on private land with willing landowners and, possibly, on lands owned by Jackson County or the City of Ashland; therefore, Reclamation has determined that there would be no disproportionate impacts on environmental justice.

Mitigation

No mitigation is needed.

Cumulative Impacts

A cumulative impact is identified by the Council on Environmental Quality as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

CONSULTATION AND COORDINATION

Reclamation consulted Federal agencies, Tribes, and State agencies during the preparation of this EA.

ESA Section 7 Consultation

The effects of activities related to this action are addressed in the BA issued by Reclamation and the BiOp issued by NOAA Fisheries. The increase in WUA in Bear Creek and Little Butte Creek watersheds is a RPM in the BiOp and is addressed with T&Cs. Both documents are available online at http://www.usbr.gov/pn/programs/esa/oregon/rogue.

Coordination

Reclamation prepared this EA with an interdisciplinary approach to comply with the mandate of the NEPA to "…utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment" (40 CFR 1501.2(a)). The following resource specialists and principal disciplines were involved with preparation of this EA:

- Elizabeth Heether, Environmental Protection Specialist; Reclamation
- Christine Horting-Jones, Archaeologist; Reclamation
- Scott Willey, Fisheries Biologist; Reclamation
- Richard Rieber, Fisheries Biologist; Reclamation
- Christopher Cuhaciyan, Hydraulic Engineer; Reclamation

Reclamation worked with the following agencies during the development of this EA:

- National Marine Fisheries Service
- Oregon State Historic Preservation Office

- Oregon Department of Fish and Wildlife
- Confederated Tribes of Grand Ronde Community
- Confederated Tribes of Siletz
- Cow Creek Band of Umpqua Indians
- Quartz Valley Indian Reservation
- Klamath Tribes

Reclamation staff have met with, or presented information to, the following agencies and interest groups in an effort to accomplish the LWM objectives in both the Bear Creek and Little Butte Creek watersheds. Generally, meetings with these groups have involved informal discussions or formal presentations with question and answer periods. Reclamation has also attended several field tours with most of these agencies, stakeholder groups, and prospective restoration contractors as follows:

- Bear Creek Watershed Council
- Little Butte Creek Watershed Council
- Oregon Department of Fish and Wildlife (ODFW)
- Rogue Valley Council of Governments (RVCOG)
- City of Medford, OR
- City of Ashland, OR
- Rogue Valley Irrigation Districts (TID, RRVID, MID)
- Water for Irrigation, Stream and Economy (WISE) Project Partners
- Individual Local Landowners
- The Freshwater Trust

Reclamation also had an informational booth at the 2014 Bear Creek Salmon Festival.

Permits and Authorizations Needed

Reclamation or its contractor would obtain all necessary Federal, State, and local exemptions prior to implementation of the Proposed Action. These permits, authorizations, reviews, or exemptions may include items displayed in Table 4.

Table 4. Permits and authorization needed for LWM projects

Authority	Permit/Authorization Needed	Responsible Agency
Endangered Species Act of 1973	Scientific Taking Permit - Fish	Oregon Department of Fish and Wildlife
Clean Water Act	Section 404-Permit to Discharge Dredged or Fill Material into the Waters of the United States	U.S. Army Corps of Engineers
ORS. 196.800-990	Removal-Fill Permit	State of Oregon Division of State Lands
44 CFR	Floodplain Development Permit	Jackson County

LITERATURE CITED

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APPENDIX A

2.8.2 Reasonable and Prudent Measures

The terms and conditions described below are non-discretionary, and Reclamation or any applicant must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). Reclamation or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the following terms and conditions are not complied with, the protective coverage of section 7(o)(2) will likely lapse.

Reclamation shall:

1. Minimize incidental take from fish passage construction and large wood additions by using conservation measures to avoid or minimize disturbance to aquatic habitats.
2. Minimize incidental take from fish screen and fish passage structures at Oak Street Diversion and Ashland Creek diversion by coordinating with NMFS fish passage engineers.
3. Minimize incidental take in the LBCO reach during median flow conditions in the month of June by providing 90% of the without Reclamation WUA.
4. Minimize incidental take in Emigrant Creek from loss of flow over redds by implementing a survey and manage process.
5. Minimize incidental take in South Fork Little Butte Creek and Antelope Creek by operating the facilities to minimize flow ramping and entrapment and stranding of SONCC coho salmon. [10]
6. Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this ITS are effective in minimizing incidental take.

2.8.3 Terms and Conditions

1. To implement reasonable and prudent measure #1 (construction), Reclamation shall ensure:

    a. Contractor Notice. Before beginning work, all contractors working on site shall be provided with a complete list of NMFS' reasonable and prudent measures, and terms and conditions intended to minimize the amount and extent of take resulting from general construction activities and in-water work.
    b. Minimize Impact Area. Confine construction impacts to the minimum area necessary to complete the construction.
    c. Fish salvage. Before, and intermittently during, isolation of an in-water work area, fish trapped in the area must be captured using a hand-net, seine, electrofishing, or other methods as are prudent to minimize risk of injury, then released at a safe release site under the supervision of a qualified fishery biologist.

[10] At times, operations outside the bounds of this reasonable and prudent measure may be required to meet Reclamation's flood control obligations. In the event that flood control obligations require Reclamation to operate the facilities outside of the limits established by this RPM, Reclamation must conform operations to this RPM as soon as practical.

i. Do not use electrofishing if water temperatures exceed 18°C, or are expected to rise above 18°C, unless no other method of capture is available.

ii. If electrofishing equipment is used to capture fish, comply with NMFS' guidelines found at: http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf

iii. Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

iv. Ensure water quality conditions are adequate in buckets or tanks used to transport fish by providing circulation of clean, cold water, using aerators to provide dissolved oxygen, and minimizing holding times.

v. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

vi. Do not transfer ESA-listed fish to anyone except NMFS personnel, unless otherwise approved in writing by NMFS.

vii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

viii. Salvage Notice. Include the following notice as a permit condition:

NOTICE: If a sick, injured, or dead specimen of a threatened or endangered species is found in the project area, the finder must notify NMFS through the contact person identified in the transmittal letter for this opinion, or through the NMFS Office of Law Enforcement at 1-800-853-1964, and follow any instructions. If the proposed action may worsen the fish's condition before NMFS can be contacted, the finder should attempt to move the fish to a suitable location near the capture site while keeping the fish in the water and reducing its stress as much as possible. Do not disturb the fish after it has been moved. If the fish is dead, or dies while being captured or moved, report the following information: (a) NMFS consultation number; (b) the date, time, and location of discovery; (c) a brief description of circumstances and any information that may show the cause of death; and (d) photographs of the fish and where it was found. The NMFS also suggests that the finder coordinate with local biologists to recover any tags or other relevant research information. If the specimen is not needed by local biologists for tag recovery or by NMFS for analysis, the specimen should be returned to the water in which it was found, or otherwise discarded.

d. Fish screen. A screen meeting NMFS' fish screen criteria must be used on any pump used to dewater the work isolation area.

e. Flow reintroduction. After construction is complete, slowly reintroduce streamflow, allowing the streambed to reabsorb water and preventing sudden surface flow to unduly increase suspended sediments downstream.

f. Control pollution and erosion. Prepare and carry out a pollution and erosion control plan to avoid or minimize the adverse effects of pollution and erosion by

limiting soil disturbance, scheduling work when the fewest number of fish are likely to be present, and limiting the harm that may be caused by accidental discharges of pollutants and sediment. The plan will contain the elements listed below, meet requirements of all applicable laws and regulations, and be available for inspection on request by NMFS.

i. Responsible party. The name, address, and telephone number of the person responsible for accomplishment of the pollution and erosion control plan.

ii. Hazardous materials. A description of any regulated or hazardous products or materials that will be used for the construction, including procedures for inventory, storage, handling, and monitoring.

iii. Spill containment. Spill containment and control measures, including notification procedures, specific cleanup and disposal instructions for different products, maintenance of quick response containment and cleanup supplies that will be available on the site, including a supply of sediment control materials (*e.g.*, a silt fence, straw bales),[11] procedures for disposal of spilled materials, and description of employee training for spill containment.

iv. Accidental spills. All spills or accidental discharges of pollutants and sediment within the work isolation area must be cleaned and removed prior to reintroducing flow.

g. Heavy Equipment. Restrict use of heavy equipment as follows:

i. Select equipment that will have the least adverse effects on the environment (*e.g.*, minimally-sized, low ground pressure equipment).

ii. Ensure that only enough supplies and equipment to complete a specific job will be stored on site.

iii. Complete vehicle cleaning, maintenance, refueling, and fuel storage in the vehicle staging area placed 150 feet or more from any stream, waterbody, or wetland.

iv. Inspect all vehicles operated within 150 feet of any stream or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by NMFS.

v. Before operations begin, and as often as necessary during operation, steam clean all equipment that will be used below ordinary high water until all visible external oil, grease, mud, and other visible contaminants are removed. Complete all cleaning in the vehicle staging area.

[11] When available, certified weed-free straw or hay bales must be used to prevent introduction of noxious weeds.

2. To implement reasonable and prudent measure #2 (fish screen and passage design), Reclamation shall:

    a. Ensure the fish screen at the Ashland Creek Diversion meets NMFS fish passage criteria by coordinating with NMFS fish passage engineers at the 50% and 90% design phase, at least.
    b. Ensure the fish passage facilities at Oak Street Diversion and Ashland Creek Diversion meet NMFS fish passage criteria by coordinating with NMFS fish passage engineers at the 50% and 90% design phase, at least.

3. To implement reasonable and prudent measure #3 (LBCO June median flow WUA), Reclamation shall:

    a. Use in-stream flow and/or large wood to provide WUA equal to at least 90% of the without Reclamation scenario.

4. To implement reasonable and prudent measure #4 (loss of flow over redds), Reclamation shall:

    a. Prepare and submit a redd protection plan to NMFS prior to September 30, 2012.
    b. Survey. Survey spawning coho salmon in Emigrant Creek during November and December following the most recent version of ODFW's salmon spawning survey procedures[12], including:
        i. Survey intervals cannot exceed 10 days.
        ii. Walk all channels including side channels and backwater pools.
    c. Mark. Locate and mark all coho salmon redds.
        i. Note location of redd.
        ii. Record adequate hydraulic information for the manage portion of this plan.
    d. Manage. Maintain adequate flow over at least 90% of redds until March 1.[13]
        i. Use hydraulic information from each redd to determine the minimum flow necessary to maintain survival of at least 90% of the redds.
        ii. Release adequate flow from Emigrant Dam to achieve the minimum flow.

5. To implement reasonable and prudent measure #5 (flow ramping), Reclamation shall:

    a. Ensure that operation of facilities on SF Little Butte Creek and Antelope Creek do not cause flows (as measured at the closest downstream Hydromet station) to increase by more than 100% in any 24-hour period.
    b. Ensure that operation of facilities on SF Little Butte Creek and Antelope Creek do not cause flows (as measured at the closest downstream Hydromet station) to decrease by more than 50% in any 24-hour period.

[12] Oregon Department of Fish and Wildlife's 2010 Salmon Spawning Survey Procedures can be found at: http://oregonstate.edu/dept/ODFW/spawn/pdf%20files/reports/2010_SSManual.pdf

[13] Coho salmon eggs incubate for 35 to 50 days (Shapovalov and Taft 1954). Fry emerge from the gravel 2 to 3 weeks later (Shapovalov and Berrian 1940)

c. Ensure that operation of facilities on SF Little Butte Creek and Antelope Creek between May 1 and February 28-29 do not cause the water surface elevation of the creeks (as measured at the closest downstream Hydromet station) to decrease by more than two inches per hour.

d. Ensure that operation of facilities on SF Little Butte Creek and Antelope Creek between March 1 and April 30 do not cause the water surface elevation of the creeks (as measured at the closest downstream Hydromet station) to decrease by more than 1 inch per hour.

6. To implement reasonable and prudent measure #6 (monitoring and reporting program), Reclamation shall ensure that NMFS receives an annual report by February 15 of each year according to the following:

a. Submit monitoring reports to:

Director, Oregon State Habitat Office
Habitat Conservation Division
National Marine Fisheries Service
Attn: 2003/01098
1201 NE Lloyd Blvd Suite 1100
Portland, Oregon 97232-1274

b. For any completed construction component, provide the following in the report:

i. Implementation success. The monitoring report will describe Reclamation's success meeting the construction term and conditions (term and condition #1).

ii. Implementation Monitoring Report Contents. The monitoring report will include the following information for each construction activity that occurred in the prior year:

(1) Project identification.

(a) Permittee name, permit number, and project name.

(b) Project location by 6th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.

(c) Reclamation contact person.

(d) Starting and ending dates for work completed.

(2) Habitat conditions. Photos of habitat conditions at the construction site before, during, and after project completion from consistent photo points.

(a) Include general views and close-ups showing details of the project and project area.

(b) Label each photo with date, time, project name, photographer's name and a comment about the subject.

(3) Project data. Include the following specific project data in the annual monitoring report:

(a) Work dates. Dates of any in-water work.

(b) Pollution and erosion control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release and correction effort, including cleanup activities.

(c) Action monitoring. All construction activities shall be monitored and NMFS notified immediately if circumstances warranting reinitiation of consultation become apparent.

(d) Chemical contaminant monitoring. In the event of a spill, measure chemical contamination within 75 feet of the construction area.

(e) Riparian plantings. Number, type and source of plants and seed mixes used, including width and length planted.

(f) Work area isolation and fish capture and release:

(i) Supervisory fish biologist name and address.
(ii) Size of isolation area.
(iii) Methods of work area isolation and take minimization.
(iv) Stream conditions before, during, and one week after completion of work area isolation
(v) Means of fish capture (if any).
(vi) Number of fish captured by species.
(vii) Release site and condition of all fish released.
(viii) Any incidence of observed injury or mortality of listed species.

c. For flow management related components, provide the following in the report:

i. Record of the system state for each day of the year.
ii. Record of daily flow values for each of the nine Hydromet stations.
iii. Record of monthly values for each of the nine Hydromet stations.
iv. Summary of any reporting required due to exceeding minimum flows during the previous year.
v. Summary of Reclamation's success meeting the proposed Emigrant Creek and Bear Creek ramping rate procedures.
vi. Summary of Reclamation's success meeting the LBCO term and condition (term and condition #3).
vii. Summary of Reclamation's success meeting the Emigrant Creek redd term and condition (term and condition #4).
viii. Summary of Reclamation's success meeting the South Fork Little Butte Creek, Dry Creek, and Antelope Creek ramping rate term and condition (term and condition #5).

d. To ensure NMFS analytic assumption that the effects in Dry Creek and Antelope Creek is similar to those in SF Little Butte Creek and Emigrant Creek, provide the following:

i. Prior to September 30, 2012, complete an analysis of without Reclamation WUA in Antelope Creek and Dry Creek.

ii. In the annual report include an analysis of whether or not the Project provided 90% of without Reclamation habitat during median and wet system states and 80% during dry states.

2.9 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The following recommendations are discretionary measures that are consistent with this obligation and therefore should be carried out by Reclamation:

1. NMFS recommends Reclamation, in partnership with the Districts, the Environmental Protection Agency, Oregon Department of Environmental Quality and the Oregon Water Resources Department develop a coordinated effort to identify common water quality and quantity goals and objectives to monitor. This effort would facilitate collecting information regarding water quality and quantity from Project-related waterways (rivers, streams, canals and return flow). This effort should use an existing monitoring and reporting system, identify additional sampling and monitoring sites to enhance our current knowledge base, and identify methods for more effective use of information collected by the existing monitoring and reporting system.
2. NMFS recommends Reclamation analyzes and quantifies the potential benefits to the Klamath Project reliability through storage and delivery of Jenny Creek flows via Iron Gate Dam. Study parameters should not focus solely on in-stream flow volumes and associated habitat values, but also consider water quality. NMFS suggests that Reclamation convene a working group consisting of Federal, state, tribal, and irrigation district representatives to assist in study design and implementation. NMFS recommends Reclamation fund the installation of stream gages within Jenny Creek watershed to accurately portray streamflow and runoff patterns.
3. NMFS recommends Reclamation assist the Districts in development of a Habitat Conservation Plan regarding the non-Federal Districts operations, maintenance and facility improvements, if the Districts seek to obtain a Habitat Conservation Plan from the NMFS and U.S. Fish and Wildlife Service.
4. To the extend practical, during the storage season Reclamation should attempt to meet a two-inch per hour downramping rate at Emigrant Dam after drafting Emigrant Reservoir to achieve the flood control rule curve elevation following a surcharge event. Reclamation should coordinate with the Corps in real-time to gradually ramp down discharges at Emigrant in light of existing and forecasted weather events. NMFS recognizes that achieving the rule curve elevation is necessary to meet flood control obligations and that metered ramping would delay meeting that objective and would not always be advisable. However, when flows are abruptly reduced following achievement of the flood control volume, severe risk of entrapment and stranding can occur. This is of particular concern during March and April when fry are emerging and are highly susceptible.