Environmental Assessment
for the Coquille Working Landscapes Project

(also known as the Winter Lake Restoration and China Camp Creek Projects)

Prepared by:

U.S. Fish and Wildlife Service

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Prepared pursuant to:
42 U.S.C. 4332(2)(c) and 49 U.S.C. 303

Acronyms and Abbreviations

BA	Biological Assessment
BMP	Best Management Practice
BSDD	Beaver Slough Drainage District
CCGC	China Creek Gun Club
cfs	Cubic feet per second
CMP	Corrugated Metal Pipe
Corps	U.S. Army Corps of Engineers
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DLCD	Oregon Department of Land Conservation and Development
DPS	Distinct Population Segment
DWMP	District Water Management Plan
DSL	Oregon Department of State Lands
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
HDPE	High Density Polyethlene
IPac	Information for Planning and Conservation
LWD	Large Woody Debris
MHW	Mean High Water
MHHW	Mean Higher High Water
MSA	Magnuson-Stevens Fisheries Conservation and Management Reauthorization Act
MTR	Muted Tidal Regulator
NAVD	North American Vertical Datum
NCWCG	National Coastal Wetland Conservation Grant
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OC	Oregon Coast
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ONHP	Oregon Natural Heritage Program
OWEB	Oregon Watershed Enhancement Board
PCE	Primary Constituent Element
Project	Winter Lake Restoration Project
ROW	Right-of-Way
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Office
SLOPES	Standard Local Operating Procedures for Endangered Species
TNC	The Nature Conservancy
USC	United States Code
WSFR	Wildlife and Sport Fish Restoration

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CHAPTER 1: INTRODUCTION

In accordance with the National Environmental Policy Act (NEPA), this environmental assessment (EA) discloses the effects on the human environment of adopting either of two alternatives proposed in the development of two related restoration actions: the Winter Lake Restoration Project and the China Camp Creek Project, both in Coquille, Oregon, and together called the Coquille Working Landscapes Project (Project). As envisioned, the Preferred Alternative involves a large-scale freshwater tidal floodplain restoration on 400 acres of low elevation lands, in an area known as "Winter Lake," and the re-establishment of more consistent tidal exchange on 1,300 acres of floodplain, known as China Camp Creek area. Together these two actions would enhance habitat of 1,700 acres in the Coquille Valley on the southern Oregon Coast.

The Project consists of activities funded by the U.S. Fish and Wildlife Service (Service) through two National Coastal Wetlands Conservation Grant (NCWCG) Projects: Coquille Wetland Conservation and Restoration (also called Winter Lake) (grant # F11AP00488) and China Camp Creek Project (grant # F15AP00142). The Service is the lead federal agency for this Project. In addition, the U.S. Army Corps of Engineers (Corps) may issue a Nationwide Permit #27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities).The National Oceanic Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) may issue an Endangered Species Act (ESA) Section 7 Biological Opinion. Other Project partners include the Oregon Watershed Enhancement Board (OWEB), The Nature Conservancy (TNC), Oregon Department of Fish and Wildlife (ODFW), China Camp Gun Club (CCGC), and the Beaver Slough Drainage District (BSDD).

1.1 Background

Outside of the Columbia River, the Coquille River Valley (Figure 1) encompasses the longest estuary in Oregon (~40 miles). Prior to development, extensive freshwater tidal wetlands, tidal channels, and non-tidal wetland habitats in the valley floor comprised over 12,000+ acres of varying width multi-tiered wetland forest (Benner 1992; Figure 2), with estimates as high as 17,000 acres. This ecosystem consisted of willow (*Salix sp*), Oregon ash (*Fraxinus latifolia*), red alder (*Alnus rubra*), red osier (*Cornus sericea occidentalis*), Oregon crab apple (*Malus fusca*), and other shrubby species with black cottonwood (*Populus tricharpa*) and Sitka spruce (*Picea sitchensis*) overstory on the river levee (Figure 2). This was a highly dynamic and productive and ecosystem for fish and wildlife; the historical Coho salmon peak has been estimated at 412,000 returning adults (Lawson et al. 2007). The valley was also an important resting and feeding area for migrating waterfowl.

Beginning in the late 19th and early 20th centuries, land in the Coquille River Valley floor was cleared, bermed, and drained for agriculture. Land was substantially altered from its historical state as a freshwater tidal marsh into a drained pasture used seasonally for grazing. Due to the low elevation topography of the Coquille Valley (Figure 3) and high fluctuations in water surface levels of the Coquille River, valley floor streams were channelized into straight drainage networks and substantial infrastructure (drainage canals, berms, and tide gates) was installed throughout the valley to make sites usable (i.e. dry enough) for agricultural purposes

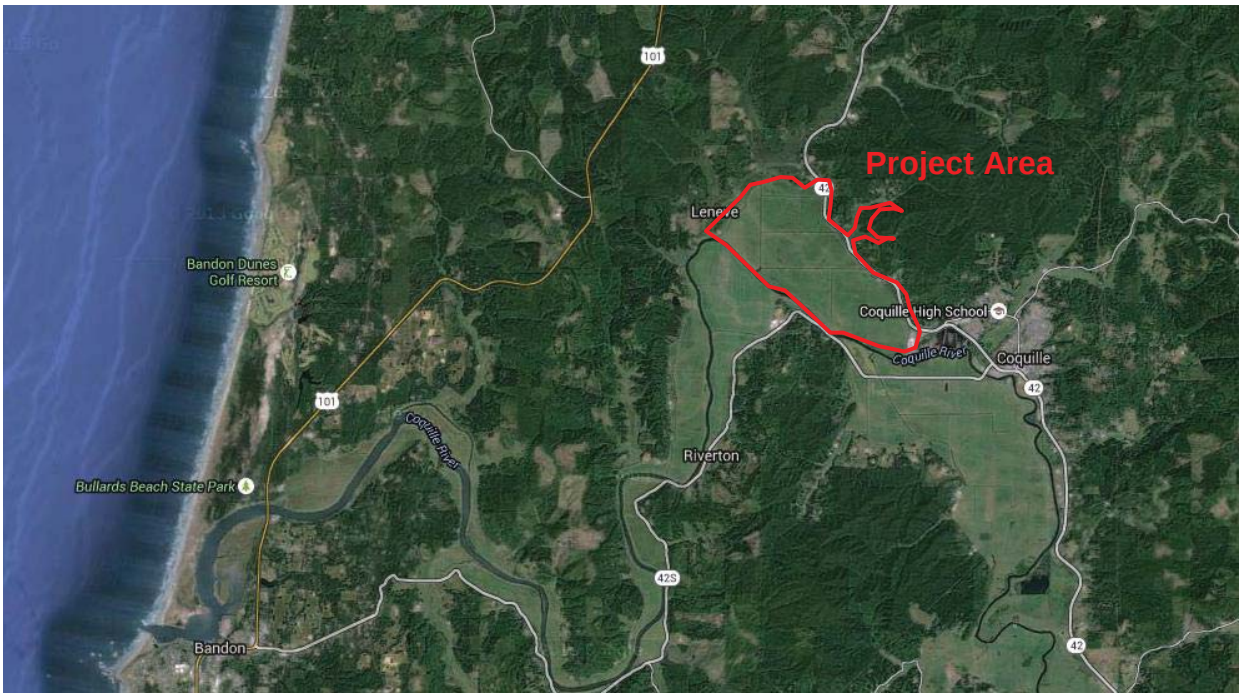

Figure 1. Project Vicinity Map.

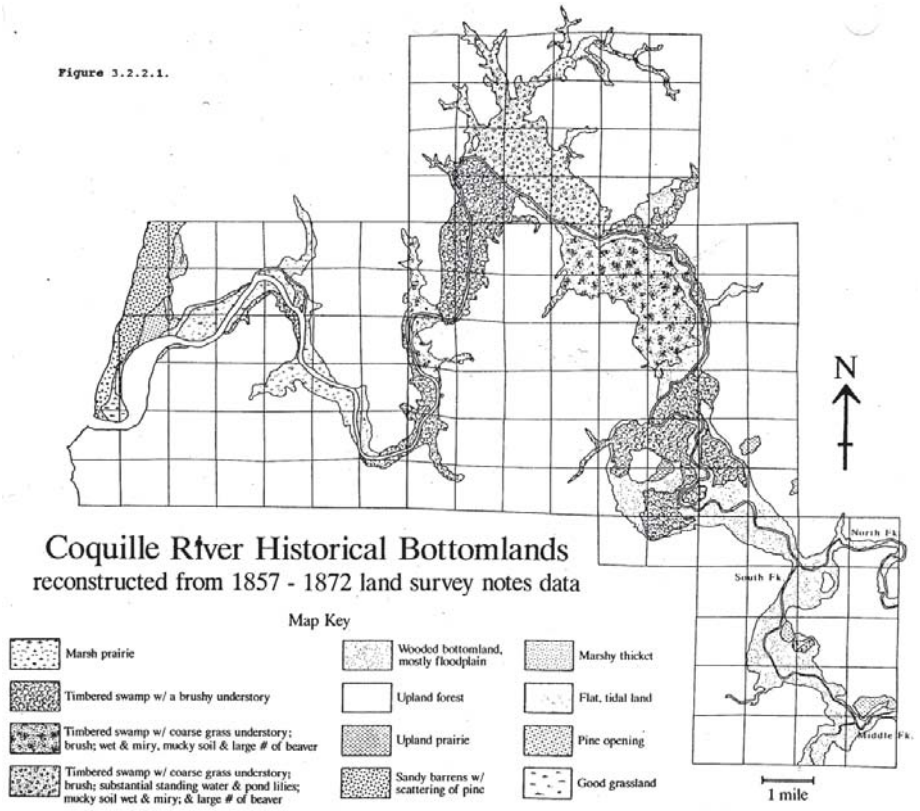

Figure 2. Coquille River Valley habitats as mapped in the late 1800's.

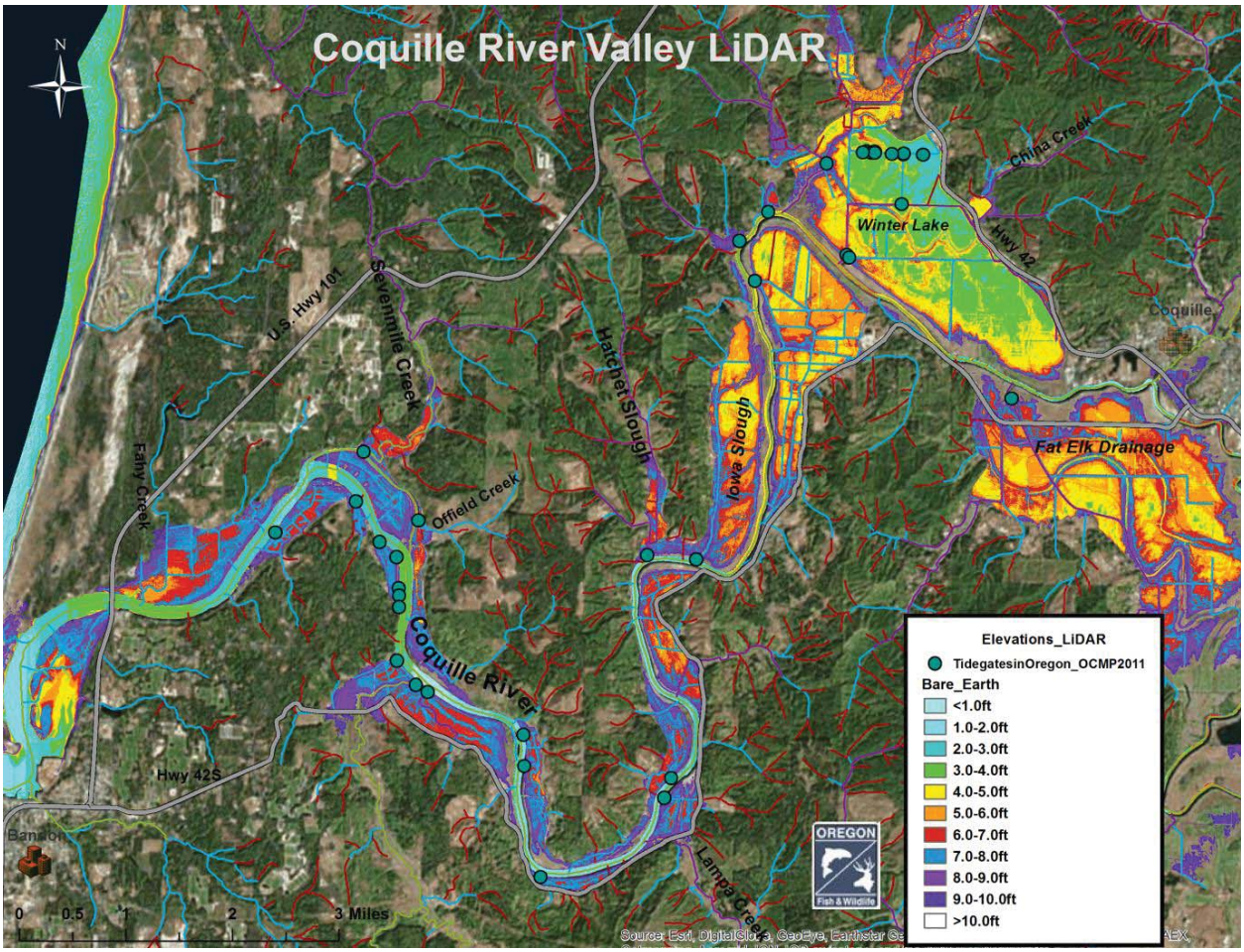

Figure 3. Elevation depiction of the Coquille River Valley from LiDAR imagery.

This agricultural development in the Coquille River Valley adversely altered fish and wildlife habitat. Filling stream and tidal channel networks and straightening streams reduced available habitat to Coho and other fish species. The landscape changed from a multi-tiered forested canopy and beaver pond network to pasture, which consists of a substantial mixture of non-native plant species. This resulted in a reduction of total habitat availability for Coho and decreased their production capacity in remaining habitat due to the loss of micro-habitats for feeding and avoiding predation. Seasonal grazing effectively eliminated the regeneration of hardwood vegetation on stream and channel networks. Water management has reduced tidal inflow/outflow, which has led to decreased water quality and the ability of juvenile Coho to use the Project area. Feces and urine deposited by grazing cattle have introduced high nutrient and bacterial loads into the channels, which has increased plant growth and reduced water quality, limiting the use of the canals and channels by juvenile Coho.

The Project area is now low-lying pasture, but was a large, productive wetland, historically (Figure 4). The current tide gate network prevents flooding of the former wetlands in all months when river levels are low due to limited precipitation. The current gate design consists of standard, top-hinged flaps that open when the water pressure is higher on the upstream side and

Figure 4. Existing conditions at the Project site.

then close as the river levels rise and water pressure becomes greater on the river side. The angle of the gates when open is generally less than 20% when upstream flow is low; this results in a severe restriction to immigrating juvenile fish from the mainstem Coquille River into locations that would have historically provided very high quality fall and winter rearing habitat. Damage to, and elimination of, fall and winter rearing habitat, including restricted accessibility is considered a substantial factor inhibiting Coho salmon recovery in the basin (Coquille Tribe 2007).

The Project area is managed by BSDD. It is broken into four management Units (Figure 4). Units 1, 3, and Garden Valley (1,300 acres) are in private ownership and Unit 2 is owned by ODFW and CCGC (Figure 4). The Project will restore tidally influenced palustrine emergent and scrub-shrub wetlands in Unit 2, re-establish more consistent tidal exchange on the floodplain in Units 1-3, improve access, and benefit several fish and wildlife species. The primary land use in the Project area is cattle grazing. Industrial development is present along Highway 42 and rural residential development is present upstream in Garden Valley (see Figure 1.). A lumber mill is located east of the action area at the edge of BSDD.

The Project would allow fish access into and throughout Unit 2 via excavation of a continuous channel and tributary channels from an upstream connection near China Camp Creek to the downstream tide gate structure at the Coquille River. Remnant tidal channels (identified via LIDAR) would be excavated and reconnected to the main channel and new channels would be constructed to facilitate fish access to the landscape and prevent stranding. Channels and

tributary channels throughout this EA refer to sinuous channels developed for more productive fish and wildlife habitat.

A new primary drainage canal would be excavated along the eastern perimeter of the CCGC property with an associated berm and this canal would replace the western portion of the existing east-west canal for drainage and outflow for China Camp Creek (Figure 5). Both the new canal and associated berms would be constructed by BSDD. Large ditches within the ODFW property would be filled, and a portion of the east-west canal would be filled to divert China Camp Creek and drainage to the new canal. This structure would also be installed and maintained by BSDD. Perimeter berms would be repaired/filled and graded to bring them up to the existing average elevation and improved to allow maintenance access to all lands they protect. According to the District Water Management Plan (Appendix A), the repairs will serve to isolate water on adjacent properties. The north perimeter berm on Unit 2 would be raised and used for pedestrian access. Excavated material would be placed as mounds throughout the site to increase habitat diversity.

This Project would use a muted tide gate, designed to maximize both quantity and quality of fish passage, improve interior water quality, and restore the range of juvenile fish habitat. The muted tide gate structure is intended to significantly improve fish passage; while recognizing that agricultural land uses will continue in the floodplain, providing benefits to both fish and to people.

Traditional tide gates featured heavy wooden or metal top hinge doors that, when open, pose a formidable barrier to fish passage and do not allow for tidal exchange. By design, they are "default-closed." They remain firmly closed until substantial differential levels force them open. This means for example, during dry seasons, there may be long periods with no fish passage. The proposed alternative uses a system that is "default-open." This means the system will normally be in an open condition, providing tidal exchange and fish passage any time the interior water level permits. Much of the improvement is obtained by providing an auxiliary source of energy to open the gate even during times of very small or absence flows. This energy is derived from a weighted float tank (modulator) falling. In many cases, the muted tide gate will actually force the door open against a small head creating an additional tidal exchange.

All attempts at tide gate controllers up to this time were dependent on the level outside of the gate. Exterior levels are highly dynamic and using them to control tide gates normally ends in restoration levels being compromised. Precise control of interior levels with the muted tide gate enables the highest level of restoration that is compatible with the current interior land use; the muted tide gate represents the highest level of fish passage and restoration short of un-gated reconnection with the mainstem of the Coquille River.

Historically, the water controlling infrastructure in this area has required major renovation about every 20 to 25 years. The primary tide gate structures servicing BSDD were built in 1996 and are approaching the end of their useful life. Since 1996, new rules require that any replacement structure design must meet the criteria for compliance in the Oregon Fish Passage Statutes and Administrative Rules (ORS 509.580-590, 509.600-645,509.910; OAR Division 412) and NOAA-Fisheries.

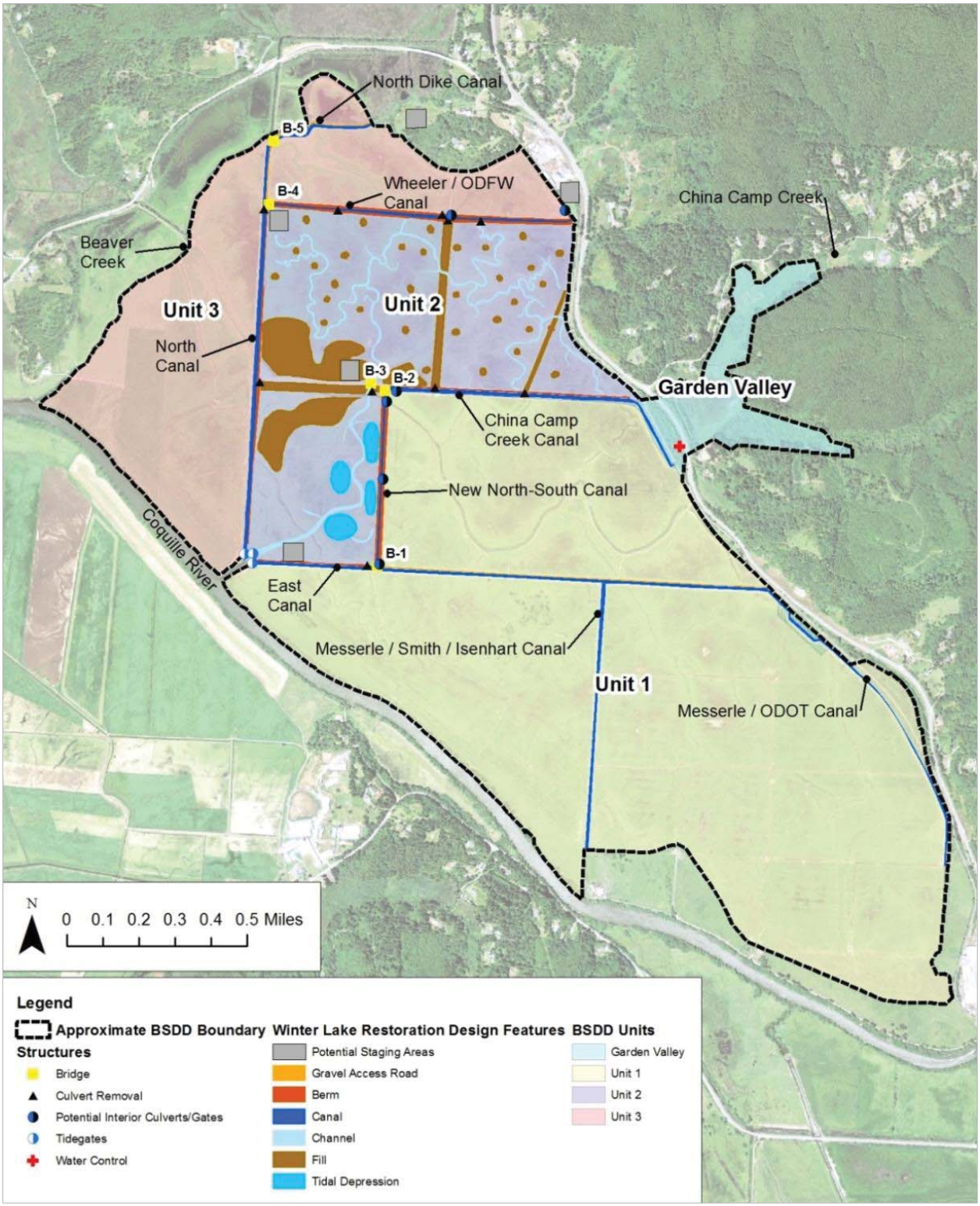

Figure 5. Project actions.

Project partners and the community recognize the need to improve fish and wildlife conditions, but also want to maintain current land use practices and private ownership. To achieve both of those objectives, this Project uses a 'Working Landscape' model. This approach provides for greater wildlife values on landscapes while retaining on-going needs of their agricultural uses, thus providing improved conditions for all resources. The proposed Project would fully restore the 400-acre Winter Lake area owned by ODFW and the CCDC (Unit 2), and improve the river floodplain connectivity in the 1,300 acres of privately owned pastures in Units 1 and 3. While differing management objectives exist within the Project, the overarching goal is to reestablish tidal processes to all three management Units, and gain the ability to manage water flows independently.

Water would be managed according to the BSDD approved DWMP (Appendix A), which provides a framework and process to allow every landowner in the District the opportunity to maximize their management objectives, within their ownership, without affecting other District members. BSDD by statute and policy has an obligation to serve the best interests of all members of the District. BSDD worked with landowners within its jurisdiction, the community, and local, state, and federal government partners during the DWMP process. The outcome led to a management plan that allows independent unit management while still providing benefits to fish and wildlife.

To make this a successful working landscape Project, Project partners worked together to define specific objectives. At the completion of the Project, the following objectives would be achieved:

- Isolate Unit 2 to the extent required to allow independent operation and control of water levels.
- Provide flexibility for future adaptive management of water levels to benefit all units.
- Ensure design does not raise 100-year water surface elevations.
- Ensure design does not reduce ability of BSDD to drain out Units 1 and 3 in spring.
- Ensure design does not raise groundwater levels in Units 1 and 3 that would cause adverse impacts.
- Ensure design of any new main canals provide sufficient capacity to maintain ability of BSDD to drain out Units 1 and 3 in the spring.
- Provide suitable Coho overwintering habitat, including diverse water depths and structure/cover.
- Enhance habitat for multiple species including waterfowl, shorebirds, Neotropical migratory birds, raptors, mammals, amphibians, and fish.
- Restore native plant communities as much as practicable given property elevation constraints.
- Minimize habitat for non-native fish species.
- Improve water quality conditions (i.e. temperature, dissolved oxygen).
- Modified berms should provide sufficient width and slopes for regular operation and maintenance access to canals, culverts, tide gates, and other on-site features.
- Berm construction materials will provide suitable stability to minimize erosion when overtopped during annual flooding.

CHAPTER 2: PURPOSE AND NEED

This chapter describes the purpose of and need for the Project. It also discusses the state, federal, local, and tribal agencies or organizations with regulatory or coordination authority over the Project.

2.1 Purpose and Need

The purpose of this Project is to improve fish passage and habitat quality, and increase flexibility for BSDD landowners to manage water on the site.

The need for this Project is the restricted accessibility for Coho to use overwintering floodplain habitats, the poor water quality within the Project area, and the need for adequate infrastructure to manage water levels for fish and wildlife conservation, grazing, and other authorized land uses.

2.2 Agencies with Jurisdiction and Coordination Requirements

The Service coordinates and consults with a number of local, state, and federal agencies, and Tribes when awarding restoration grants (Table 1). Coordination and consultation is underway, and numerous discussions and meetings have included the following agencies, Tribes, and organizations: Coos County Commissioners, Coos County Lane Use Planning Department, U.S. Army Corps of (Corps), Oregon Department of Environmental Quality (DEQ), NOAA Fisheries, Oregon State Historic Preservation Office (SHPO), Oregon Department of Fish and Wildlife (ODFW), the Coquille Indian Tribe, Confederated Tribes of the Coos, Umpqua, and Siuslaw Indians, Confederated Tribes of the Siletz Indians, Rancheria Band of Indians from Smith River, Cow Creek Band of Umpqua Tribe of Indians.

Table 1. Agencies and 0rganizations with permitting or consultation requirements.

Organization	Permit of Required Consultation
Corps	Clean Water Act Section 404 Permit
Oregon DSL	Removal-Fill Permit
Confederated Tribes of the Siletz Indians Tribe	Consultation on impacts to resources of interest
Confederated Tribes of the Coos, Umpqua, and Siuslaw Indians	Consultation on impacts to resources of interest
Coquille Indian Tribe	Consultation on impacts to resources of interest
Rancheria Band of Indians from Smith River	Consultation on impacts to resources of interest
Cow Creek Band of Umpqua Tribe of Indians	Consultation on impacts to resources of interest
NOAA-Fisheries	ESA Section 7 Consultation
Oregon State Historic Preservation Office	National Historic Preservation Act (NHPA) compliance

2.2.1 U.S. Army Corps of Engineers

The Corps has the regulatory authority under Section 404 of the Clean Water Act (CWA) to permit the discharge of dredged or fill material within Waters of the U.S. The Corps also regulates work and the construction, modification, or removal of structures within navigable waters through Section 10 of the Rivers and Harbors Act. The proposed Project involves the discharge of dredged material into jurisdictional wetlands as well as the replacement of

structures (tide gates) and work within navigable waters (restoration of the historic wetlands of Unit 2). The Service entered into discussions with the Corps in the winter of 2015 to clarify the permitting process, and applications are under development. Regularly scheduled reoccurring meetings and multiple conference calls with Corps staff have occurred, during which the Project and permitting requirements were discussed. The Service anticipates providing the Corps with information outlining compliance with 2012 Nationwide Permit #27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities), including compliance with 2012 Nationwide Permit General Condition 18(c) and 20(c) in May 2016.

2.2.2 Oregon Department of State Lands

The Oregon Department of State Lands (ODSL) is responsible for issuing a removal-fill permit for Project construction.

2.2.3 Tribal

The Project area is an important area to the Native Americans, who used it for thousands of years while in its historic estuarine condition.

2.2.4 NOAA-Fisheries

NOAA-Fisheries conserves and protects marine resources, including federally listed anadromous fish. Because the Coho salmon, green sturgeon, and eulachon are listed as threatened under ESA and because Coho is present at the Project site, along with its designated critical habitat, The Service is required to consult with NOAA-Fisheries to avoid or minimize adverse effects to this species and its critical habitat during Project implementation. The agencies must also comply with the Magnuson-Stevens Fisheries Conservation and Management Act (MSA) (Public Law 94-264) as amended and reauthorized by the Magnuson-Stevens Fisheries Conservation and Management Reauthorization Act (Public Law 109-479), also under the authority of NOAA-Fisheries. This Act protects Essential Fish Habitat (EFH), a term used to describe aquatic habitat essential for continued existence of commercially important species. It is defined in the MSA as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC 1802 MSA sec 3[10]).

2.2.5 State Historic Preservation Office

The Oregon State Historic Preservation Office (SHPO) is charged with protecting and preserving the historic resources of the State of Oregon.

2.2.6 Oregon Department of Fish and Wildlife

The ODFW is responsible for managing the State's fish and wildlife resources. Implementation of the Preferred Alternative would follow ODFW guidelines for in-water work periods to minimize impacts to fish during construction.

2.3 Laws, Regulations, and Policies

A decision whether to proceed with the Proposed Action rests on numerous factors such as schedule, availability of funding, safety, and environmental considerations. In addressing environmental considerations, the Service is guided by relevant statutes (and their implementing regulations) and Executive Orders (EOs) that establish standards and provide guidance on

environmental and natural resources management and planning. These Federal standards and guidance include, but are not limited to, the following sections.

2.3.1 Clean Air Act

Clean Air Act of 1970 (42 U.S.C. 7401-7671), as amended: The action as proposed is in compliance with the Clean Air Act.

2.3.2 Clean Water Act

CWA of 1977 (33 U.S.C. 1251), as amended: A joint Removal/Fill application will be submitted to determine compliance with Section 404 of the CWA and the Oregon Removal/Fill requirements. A water quality certification has been requested from the Oregon Department of Environmental Quality. A National Pollution Elimination Discharge System permit under Section 402 of the CWA would be required and would be obtained by the contractor immediately prior to construction.

2.3.3 Coastal Zone Management Act

Coastal Zone Management Act of 1972: The proposed action is within the coastal zone and subject to review by the Oregon Department of Land Conservation & Development (DLCD) to ensure consistency with the Oregon Coastal Management Plan (OCMP). CWA Section 10 and 404 permits are also subject to federal consistency review. However, recognizing that nationwide permits authorize Projects with only minimal adverse effects, DLCD has reviewed the overall nationwide permit program and addressed the nationwide permits on a programmatic basis. DLCD considered the various activity and use categories that nationwide permits may authorize, along with conditions that the Corps places on each permit, and has provided conditional "advance concurrence" to Projects authorized by most nationwide permits. As part of the advance concurrence, DLCD negotiated with the Corps to establish specific coastal zone conditions. Therefore, if the Corps decides to authorize the proposed action with Nationwide Permit #27 (for restoration actions), further review from DLCD will not be required.

2.3.4 Endangered Species Act

Endangered Species Act of 1973, as amended: The preliminary determinations reached per listed species are being coordinated internally with the Service, and with NOAA Fisheries. The preliminary determinations are noted in the Environmental Effects – Threatened and Endangered Species section. The ESA consultation process would be completed prior to making decisions on alternatives.

2.3.5 Marine Protection, Research, and Sanctuaries Act

Marine Protection, Research, and Sanctuaries Act of 1972, (MPRSA) as amended: The MPRSA is not applicable to this activity.

2.3.6 Cultural Resources Acts

Cultural Resources Acts: No known cultural or historic resources would be affected by the Project work. A letter would be provided to the SHPO for a determination of concurrence.

2.3.7 Comprehensive Environmental Response, Compensation, and Liability Act

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601-9675) and Resource Conservation and Recovery Act (RCRA): The location of the proposed work is not within the boundaries of any site designated by EPA or the State of Oregon for a response action under CERCLA nor is it part of a National Priority List site under CERCLA. The proposed action is in compliance with this law.

2.3.8 Magnuson Fishery Conservation and Management Act

Magnuson Fishery Conservation and Management Act (16 U.S.C. 1801): An evaluation of effects on Essential Fish Habitat has been developed for the draft Biological Assessment that accompanies this EA and permit application. The ESA consultation with NOAA Fisheries will also address compliance with this act.

2.3.9 Executive Orders

- Executive Order (EO) 11988, Flood Plain Management, May 24, 1977: The proposed Project would improve floodplain function and value and would not encourage further development in the flood plain. The proposed action is in compliance with this EO.
- EO 11990, Protection of Wetlands: Approximately 400 acres of wetlands and riparian habitat would be restored and planted with native species in Unit 2 via the proposed Project, and 1,300 acres would have improved river-floodplain connectivity. The proposed action is in compliance with this EO.
- Analysis of Impacts on Prime and Unique Farmlands: The proposed action would occur on parcels zoned for Exclusive Farm Use by Coos County, but is not on prime or unique farmlands designed by the State of Oregon. The proposed action is in compliance with this EO.
- EO 11514 Protection and Enhancement of Environmental Quality, 5 March 1970: The proposed action is in compliance with this EO.
- EO 11593 Protection and Enhancement of the Cultural Environment, 13 May 1971: The proposed action is in compliance with this EO.
- EO 12962 Recreational Fisheries, 7 June 1995: The proposed action would restore floodplain and tidal salmonid rearing and refuge habitat as well as complexity and diversity to the aquatic environment. Restoration of these habitats will have a positive impact on recreational fisheries. The action is therefore in compliance with the EO.

CHAPTER 3: ALTERNATIVES

This chapter describes the alternatives considered for the Project; these include No Action Alternative and the Preferred Alternative. NEPA requires analysis of the No Action Alternative to provide the reader an understanding of baseline conditions that would persist without the proposed federal action and how these compare to the effects resulting from the federal action.

3.1 No Action Alternative

Under the No Action Alternative, TNC would not take any action to restore habitat on the ODFW or CCGC properties in Unit 2 and the failing tide gate affecting all units would not be replaced. The Winter Lake area in Unit 2 would remain as converted tidal wetlands that are currently degraded, leveed pasture and provide limited habitat for fish and wildlife. No other changes would occur in Unit 2. The irrigation ditches would continue to convey water, drain wetland habitat, and provide limited nursery habitat for resident and migratory fish and wildlife. Berms and tide gates on small channels and China Camp Creek would continue to isolate the Project area from tidal inundation by the Coquille River, thus restricting fish and wildlife use of historically available freshwater marsh.

Under the no-action alternative, infrastructure and tide gates will continue to deteriorate and the Winter Lake/China Camp Creek area would become an unmanaged wetland. The land would likely become unsuitable for grazing. Roads, berms utilities and other infrastructure would continue to deteriorate.

3.2 Preferred Alternative

The Preferred Alternative would restore intertidal marsh, freshwater marsh, and riparian habitat values and functions lost when the site was converted to pasture, while still fulfilling landowner grazing and land use objectives. The Project includes redevelopment of over seven miles of sinuous tidal streams, tide gate replacement of the three major tidal/drainage channels, planting of native woody vegetation on portions of just over 400 acres, rebuilding extensive diking networks, moving several berms to protect neighboring properties, and improving river-floodplain connectivity on the entire 1,700 acre site

3.2.1 Federally Funded Actions

This section consists of the Project actions that are federally funded through the NCWCG Projects. Maintenance Projects conducted by BSDD and its landowners (Section 3.2.3) are only included in this EA as cumulative effects.

3.2.1.1 Tide Gate Replacement

The existing four round 8-foot diameter corrugated metal pipe culverts (inverts -4 feet NAVD88) and wooden top-hinged flap tide gates and bulkheads would be removed and replaced by seven 10-foot wide by 8-foot high concrete box culverts (invert -2 feet NAVD88) with aluminum side-hinged tide gates, mounted on a vertical slide, controlled by a Nehalem Marine's Muted Tidal Regulator (MTR) and supplemental power (Model NSRG 10X8 RK) at the outflow into the Mainstem Coquille River of channels emanating from Units 1, 2, and 3 (Figures 6 and 7).

Figure 6. Existing Project tide gate infrastructure.

Figure 7. Example of a muted tide gate.

The mechanical lift system for the slide gate frame would be powered by electric motor activated by sensors triggered by interior water levels. The side hinged gates would open and the frames would rise on an outgoing tide with the side hinged gates closing and the slide gate frame dropping when a predetermined adjustable set point, based on the inside water level, triggers the muted tide gate mechanism. Auxiliary power would be used to adjust the slide gate frames to achieve desired set points for winter operations and storm events.

The new muted tide gate will allow unrestricted outflow and provide redundancy for the system in contingency situations. In addition, it will significantly improve fish passage and also allow adjustable water management operations. The ability of the tide gate frame, controlled by the muted tide gate, to move vertically, creating an unrestricted opening at the bottom of the culvert, will enable the system to achieve the open time, velocity, fish passage and access conditions specified in the ODFW and NOAA Fisheries approved fish passage plan.

3.2.1.1.1 Tide Gate Drainage Canal Realignment

Associated with the installation of the culverts/tide gates would be a slight realignment of the two main drainage canals (East and West Canals) to meet the new culvert locations. Realignment would require excavation of 2,700 cubic yards (CY) of existing soils that would then be placed into the lower 150 feet of the existing canals. The existing berms at the culvert/tide gate structure would be rebuilt to a uniform width of 14-feet wide on top and slope down from an elevation of 18.5 feet (NAVD88) on top of the culverts to meet the Unit 2 berms at 6.5 feet elevation (NAVD88).

3.2.1.1.2 Infrastructure Cleanup

Tide gate reconstruction over several periods from 1950 to current resulted in installation of steel and wood piling infrastructure in the access channel from the Coquille River to the Unit 1, 2, and 3 tide gates that is no longer in use. As part of the culvert/tide gate replacement, several existing wooden pilings would be cut to the mud line, steel I-beams would be removed, concrete blocks and older Corrugated Metal Pipe (CMP) culverts from earlier construction and maintenance operations would also be removed.

3.2.1.2 Unit 2 Wetland Restoration

Unit 2 would be restored to the extent possible, to a tidally influenced wetland that would support a wide variety of plant, fish, and wildlife species (Appendix B).

3.2.1.2.1 Staging and Access Areas

There are three potential staging areas within the action area (Figure 2). Each potential area occurs within Unit 2. Staging activities include: installing survey stakes and fencing, providing containment, installing erosion control and other best management practices (BMPs) as necessary, removing sod for site access, and grading and importing rock for access routes as necessary.

Most activities would occur within the identified staging locations, with the exception of: 1) vehicles, which primarily would be parked at the far north staging area or along Highway 42 at the east staging area -- neither of these locations is within the wetland or floodplain; and 2) earthen material, which would be transferred and stored all along the inner side of the raised perimeter berms as needed – this will allow the material to dry prior to final placement and compaction and it would not be stored at specific staging areas.

3.2.1.2.2 Channel Excavation

Channels would be excavated to facilitate tidal inflow/outflow, and would be constructed from the tide gate to the upper extent of Unit 2. The primary channel proposed for Unit 2 would

provide the conveyance pathway for water and fish to move into and out of the Unit 2 channel network. The primary channel would be connected to the Coquille River at the proposed new culvert and tide gate structure at the southwest corner of the CCGC property.

The primary channel is designed to drain toward the new culvert and tide gate structure and is sloped generally at a 0.02% constant slope downward toward these structures. The bottom width of the primary channel is typically 25 feet wide in most of the site and widens to a 50 foot bottom width at the culvert/tide gate structure to span the width of the new culverts. The 25-foot bottom width generally matches the width of existing larger remnant tidal channels on the site and allows flows from the tide gate structure to reach the NE corner of the site on a daily basis. The top width of the channel ranges from 40 to 65 feet depending upon existing ground elevation. The elevation of the channel would range from -3 feet NAVD88 at the culvert/tide gate structure up to 0 feet NAVD88 at the upstream end. The side slopes on the channel would be at 1 foot horizontal to 1 foot vertical (1H:1V) to minimize excavation and generally replicate natural tidal channels that have fairly steep side slopes. It is expected that the channel width and side slopes would evolve somewhat over time based on the volume of tidal exchange. This is expected to result in somewhat steeper banks and potentially the evolution of additional channels on the site. This may also result in the transport of minor amounts of sediment through the tide gate structure. This minor volume of sediment is not anticipated to cause adverse effects on the river or tide gate structure.

Shorter tributary connection segments would be excavated to reconnect remnant tidal channels to the primary channel and new channels would be constructed as needed to provide complete access for aquatic obligate species to the extent of Unit 2. The length of the new these channels would be approximately 22,050 feet. Both the primary channels and tributary channels would be constructed on grade with the overall Unit 2 elevations in order to slope evenly from the downstream end at the new culverts, elevation -3 feet (NAVD88) up to 0.0 feet (NAVD88) to the eastern side of Unit 2. Construction of the channels to grade was considered needed in order to provide conditions for proper outflow/inflow hydrologic function and ensure that there are not sections that de-water during low flow periods and strand fish. The primary channel would have a bottom width of 50 feet for the first 1,600 feet from the new culverts, transitioning to a 25-foot bottom width for the remainder.

Old remnant channels would be excavated to approximately the existing width of primary remnant channels and would be constructed to widths that are deemed appropriate at the time of on-site design. Connected to the primary channel through Unit 2, four tidal depressions would be constructed to provide marsh habitat on the CCGC property. These depressions have been designed with a bottom elevation +1 foot, NAVD88 and would serve to maximize aquatic macrophyte production and use by waterfowl; however, they are also expected to be highly valuable feeding areas for juvenile salmonids and other native fish. Material excavated for both the primary and tributary habitat channels would be re-used entirely within the Project site for berms and topographic diversity (e.g., nesting mounds and planting areas).

Secondary habitat channels would generally maximize the length and area of complex slow-water refuge habitat. The bottom width of the secondary channels would generally be 15 feet with 1H:1V side slopes up to existing ground. As many of the secondary channels exist as

remnant channels, excavation would primarily be focused on connecting the channels to the primary channels and to ensure constant slope to the primary channels. The width of the existing channels would generally be left as is – which average approximately 15 feet. The secondary channels typically would meet the primary channel at its elevation (depending on secondary channel location) and slope up to meet the existing remnant channels.

3.2.1.2.3 Interior Drainage Canal Fill

Two large ditches within the ODFW property would be filled in to allow the new habitat channels to convey all tidal flows, facilitate preventing the new channel from cross flowing between newly constructed stream reaches, and prevent stranding of fish. Additionally, the portion of the China Camp Creek Canal, that is located between the northern boundary of the CCGC property and the south part of the ODFW property, would be backfilled to divert China Camp Creek into the new North-South Canal (Section 2.1.2.7). The material used to backfill these canals would be from on-site excavated mineral soils. These canals may need dewatering during backfilling to facilitate compaction during fill placement. The backfill would be placed up to match existing adjacent ground elevations and minimize any low spots.

3.2.1.2.4 Depression Fill

In order to provide topographic diversity for a variety of native vegetation and to reduce costs dramatically by reducing haul of excavated material offsite, excavated materials would be placed at predetermined locations where there would be substantial benefit for increasing hydrologic variability/complexity allowing for plantings of native trees and shrubs that would otherwise struggle to grow due to excessively wet conditions. "Mounds" have also been considered advantageous to provide for waterfowl, amphibian habitat, and cover for a variety of wildlife including raptors, songbirds, and riparian forest dwelling species. These mounds would be placed to an average elevation of 5 feet NAVD88 in the northwestern portion of the CCGC property and southwestern portion of the ODFW property (elevations would vary from approximately 4.0 feet to 6.9 feet NAVD88 to provide diverse topography for more diverse vegetation). This area is already generally higher than the rest of Unit 2 and the fill area would comprise approximately 60 acres. The fill would transition to existing ground at a 5H:1V slope. These fill areas are at or below MHW and would continue to be inundated on an annual basis (i.e. they would remain wetlands).

Numerous small vegetation mounds would be placed in multiple locations alongside secondary channels and in the remainder of the floodplain on the ODFW property as excess excavated material is available. These mounds would also average at about 5 feet NAVD88 (elevations would also vary from 4.0 to 6.0 feet NAVD88) in elevation and range from 3,000 to 5,000 square feet. The fill would transition to existing ground at variable slopes (3H:1V to 5H:1V).

3.2.1.2.5 Re-Vegetation and Long-term Vegetation Management

Native tree and shrub species would be used to re-vegetate Unit 2. Plantings would primarily occur on the slopes of the berms, and other areas that are high enough in elevation to sustain woody vegetation. CCGC would continue short-term grazing on the higher western portion of their property to control reed canary grass and maintain shorter vegetation for waterfowl. ODFW would allow short-term grazing in some areas to control reed canary grass in areas not planted

with trees or shrubs. Grazing areas would be controlled by temporary electric fencing. Grazing would be managed by using a grazing plan currently under development by ODFW.

3.2.1.2.6 Unit 2 Berm Modification

To meet the Project objective of ensuring that Unit 2 is isolated from Units 1 and 3, berms would be modified and or constructed around the entire perimeter of Unit 2 except for the northeastern area adjacent to the railroad and Highway 42 where there is high ground. The existing berms in Unit 2 would be modified (including both lowering and raising them) to a uniform height of 6.5 feet (NAVD88) and top width of 14 feet to isolate this unit from others. The berm reconstruction efforts will include modifying existing berms along the north, west and south sides of Unit 2 including the south border of the ODFW property along China Camp Creek, and the south border of the CCGC property along the East-West Canal. Material needed to reconstruct and/or construct berms would be excavated from tidal channels that are constructed and the depressions created in the CCGC property of Unit 2.

3.2.1.2.7 North-South Canal Excavation and Berm Construction

A new North-South drainage canal is proposed along the east side of the CCGC property with associated berms on both sides (Figure 5). This canal would replace the western portion of the existing China Camp Creek Canal and become the new outflow for China Camp Creek. The new North-South canal would be constructed with the same dimensions as the existing canal through which China Camp Creek flows. The bottom width would be 25 feet and the bottom elevation would be at -6 feet NAVD88, which matches the connection points on the China Camp Creek Canal and East Canal. The canal side slopes would be constructed at 1H:1V or slightly flatter to match existing drainage canal slopes as desired by BSDD for operation and maintenance. The new canal would be fully constructed prior to diverting China Camp Creek into it. Dewatering may be necessary during the new canal construction, as the groundwater table would likely be at approximately 1 foot NAVD88. A berm would be constructed on both the west and east sides of this new canal.

The North-South canal and China Camp Creek alignment would allow for the hydrologic isolation of Unit 2. Additionally, this new canal and berms around Unit 2 would allow for water management to function separately from canals and drainage ditches draining Units 1 and 3.

3.2.1.2.8 Culvert Removal

Eleven interior culverts/tide gates that were installed historically on the perimeter of Unit 2 to provide more precise water level management would be removed as part of the Project in order to provide appropriate connectivity to the new primary and tributary channels and prevent inflow/outflow from moving a direction that conflicts with design hydrology. Through time the East-West canal (Wheeler Canal) on the north side of the ODFW property has filled in, due primarily to livestock impacts on the canal banks. Minor dredging of the eastern end of the Wheeler/ODFW Canal would occur to bring this canal down to a uniform depth of -4 feet NAVD88 and provide for drainage from those properties.

3.2.2 Other Project components

The components listed in this subsection are part of a larger action, but are not funded by the Service.

3.2.2.1 Berm Modification/Creation

Modifying (including both lowering and raising) existing and creating berms ***outside of Unit 2*** to a uniform height of 6.5 feet (NAVD88) and top width of 14 feet to provide construction access and future permanent access for operation and maintenance of all units would be completed. Construction of proposed raised and new berms requires placement of 0.5 to 4.5 feet of fill above the existing ground surface. (Appendix B).

This Project includes raising the existing berm along the north side of the Wheeler/ODFW Canal within Unit 3 (Figure 5), and reconstruction of the existing berm on the north side of the North Dike Canal. Access for construction and long-term access to berms, canals, and waterways would be facilitated by using the existing berms on the east side of the North Canal in Unit 3 and along the north side of the East Canal. This network would be connected to Highway 42 and North Bank lane. The reconstructed berms would be surfaced with gravel/pit-run material in order to provide a long-term drivable surface. Material excavated from the construction of tidal channels would be used for berm creation and enhancement.

3.2.2.2 Culvert Installation

This Prolject would install up to five new 48-inch High Density Polyethlene (HDPE) culverts with aluminum side-hinged tide gates at interior locations to allow for continued drainage from Units 1 and 3 into canals where new berms would be constructed to isolate Unit 2. These pipes would be placed at an invert elevation of -1 feet NAVD88, which would provide for appropriate hydrologic connection and reduce the potential for stranding of fish in the field areas.

3.2.2.3 Bridge Installation

The Project includes installing five concrete bridges (Figure 5) (Appendix B) with spans of 55-65 feet to cross the new North-South Canal (Bridges B-1 and B-2, one at the south end and one at the north end), one to cross the primary habitat channel on the ODFW property (Bridge B-3), one to cross the Wheeler/ODFW Canal (Bridge B-4), and one to cross the North Canal at the North Dike (Bridge B-5). These bridges would provide permanent crossings over the drainage canals and tidal channels for construction, operation, and long-term maintenance/access to all three units.

3.2.2.4 Water Control Structure Installation

A side-hinged 8-foot by 8-foot gate and sheet pile frame water control structure would be installed immediately downstream of Highway 42 to prevent backflow into Garden Valley in the case that there is any increase in the Unit 1 and 3 canal water levels when Unit 2 tidal channels are filled. Water levels in the canals draining Units 1 and 3 are generally managed for elevations below 5.5 feet from late spring through early fall. The BSDD DWMP's identifies planned normal operations of tide gates to allow tidal inflow into canals that would include periodic higher levels during summer to improve forage growth for grazing. In the winter, water levels in the Winter Lake floodplain often exceed elevation 5.5 feet due to backflow flooding from mainstem Coquille River. The water control structure has been designed so that when water levels exceed 5.5 feet NAVD88 in the mainstem Coquille River during the winter condition, the water control structure would remain open and flows would enter Garden Valley similar to existing conditions. This water control structure would meets ODFW and NOAA-Fisheries fish passage standards.

3.2.2.5 Monitoring

The Service, OWEB, BSDD, ODFW, and TNC are developing a Monitoring and Adaptive Management Plan for the Project that will include monitoring velocities and flows in the culverts, surface and groundwater elevations, water temperatures, fish sampling, mosquito sampling, and bird and wildlife observations. Regular monitoring and maintenance of the plantings will occur, including replacing plantings as necessary until the native communities are established. It is anticipated that the tide gate opening/closure elevations will be adjusted and monitored over the long-term to optimize water levels for fish access and to benefit agricultural landowners.

3.2.3 Future Operation and Maintenance

In addition to the primary restoration Project construction, it is anticipated that both BSDD and individual landowners would undertake future operation and maintenance activities to make minor repairs to berms from winter storm damage. Additionally, internal culverts and tide gates will need to be replaced as they age, and to take advantage of the increased hydrologic inflow/outflow capacity due to the restoration. The Project specifies that replacement culverts and tide gates would need to meet both ODFW and federal NOAA Fisheries fish passage guidelines, and generally conform to BSDD standard size and type, as described in more detail in the following sections. These maintenance actions may require permit instruments through either the Corps or ODSL.

By policy and law, BSDD is obligated to manage and operate the District in a manner that is equitable to all landowners. The DWMP provides the parameters and process for managing water levels and District operations including facilitation of input from landowners. Landowners are free to pursue their individual management objectives within the scope of the DWMP.

Operation and maintenance actions likely to occur shortly after the primary Project construction or within the next ten years are identified in the Project description. Each of the actions in 3.2.3.1 and 3.2.3.2 would require site-specific permit instruments from ODSL and the Corps as they occur on an annual basis.

3.2.3.1 BSDD Maintenance

Future operation and maintenance activities by BSDD are integral to the on-going maintenance of the Winter Lake and China Camp Creek Project (Table 2). These actions are not covered within the scope of Project actions federally funded.

Table 2. BSDD Maintenance activities likely to occur within the next ten years.

Activity	Explanation
Maintenance excavation in primary drainage canals.	This activity would be to maintain current depths in the eight primary canals. The total length of the primary canals is about 38,000 linear feet. The typical excavated quantity would range from 0.5 to 1 CY per lineal foot. Fish are currently present in canals and as fish presence is expected to increase following installation of improved tide gates the BSDD would work with the following BMP's when excavating canals: 1) Conduct excavation during low water (In Water Work period) season when there is very little flow in the system and temperatures are generally above lethal limits for salmonids, thus it would be expected that no ESA listed fish would be present and 2) Use the tide gate network to draw water out and minimize elevation of water/flow in the canals. Within the first 10 years following construction (within the current ESA consultation and timeframe allotted by forthcoming or future Corps permit instruments), it is likely that several of the canals would require additional maintenance dredging due to the hydrologic and geomorphic stabilization of the original restoration design and potential increase of sediment shoaling within canals following the original unit restoration. While it is not likely that the entire length of every canal would require excavation/cleaning, the possible range of volumes for excavation ranges from about 9,000 CY to 38,000 CY (maximum total if all canals were excavated for their entire length).
Repair of berms.	Following winter storms and inundation of BSDD, minor repair of the berms may be periodically necessary. It is anticipated that this would include minor grading to smooth the surface and placing additional gravel or soil to fill in rills, ruts, or sink holes caused by beaver or nutria. It is anticipated that approximately 100-500 CY of material might be placed for any individual repair. Within the first 10 years following construction (within the current ESA consultation and timeframe allotted by forthcoming or future Corps permit instruments), it is likely that multiple smaller repairs or a larger repair could be required, and may result in the need to utilize estimated placement of rock or soil ranging from 1,000 CY to 10,000 CY.
Replacement of scour protection at culverts/tide gates.	Following winter storms, it may be necessary to replace some of the rock scour protection around the culverts and tide gates. It is anticipated that up to 100 CY of rock may need to replace rock that may have sunk into the fine substrate or rolled downslope into the deeper outflow channel to the Coquille River from the tide gate channel . Within the first 10 years following construction (within the current ESA consultation and timeframe allotted by forthcoming or future Corps permit instruments), it is likely that two repairs may be required consisting of a maximum total of 200 CY of rock placed for scour protection.

3.2.3.2 Individual Landowner Operation and Maintenance

Individual landowners maintain minor drainage ditches and smaller culverts and tide gates on their properties (Table 3). Currently culverts/tide gates on many properties are small and sized for the small volume of water currently allowed in the system during summer. Landowners would likely upgrade their existing culverts and gates to match the new BSDD standard size and type (48-inch HDPE culvert with side-hinged tide gate) in future years. Replacement of existing tide gates in the future would be further improve water management and pasture quality on individual properties, improving life expectancy and function of ditches, and providing structures that fully meet federal and state fish passage criteria. Landowner activities would require site-specific permit instruments from ODSL and the Corps as they occur on an annual basis.

Table 3. Individual landowner maintenance activities.

Activity	Explanation
Excavation of minor drainage ditches.	Similar to excavation on the primary drainage canals, individual landowners would likely have a need to excavate interior minor drainage ditches to maintain current depths through time. The total length of interior minor drainage ditches is approximately 42,000 linear feet in Units 1 and 3 with some additional length in Garden Valley. It is anticipated that an individual landowner might excavate 0.5 CY of material per lineal foot from an interior drainage ditch. The total length that might be excavated would be dependent on parcel size and might range from a couple of hundred feet up to 2 miles on a given 10 year cycle. It is unlikely that the entire length of all drainage ditches in the district would be cleaned in any 10 year cycle, but the range of excavation could be from about 3,000 CY to 22,000 CY. In general, this activity would occur regardless of the primary restoration Project. These maintenance actions may require permit instruments through either the Corps or ODSL.
Replacement of interior culverts and tide gates.	It is anticipated there would be replacement of interior culverts and tide gates with the proposed BSDD standard 48-inch HDPE culverts with an aluminum side-hinged tide gate. For crossings where a tide gate is not needed, there would only be installation of a culvert. Culverts with tide gates are needed in some cases as a second stage feature to control water levels into a specific pasture area if the water level in the main canals is being managed at an elevation greater than desired. Appropriately sized culverts are necessary to facilitate water management and to provide for fish passage out of individual channels/property locations after fish have moved into these sites when the landscape is completely inundated during winter and spring flooding. Currently most of the individual landowner's culverts and tide gates are more than 15 years old and are smaller plastic pipes with wooden or steel flap-gates. These culverts and gates are undersized and upgrading to the standard larger size as an inter-related action would allow better water management and allow substantial improvements toward less hindered fish movements whenever fish need to move from these individual pastures and channel networks. These maintenance actions may require permit instruments through either the Corps or ODSL.
Repair of individual berms.	Existing berms on individual properties would likely need minor periodic repairs following winter storms. Repair would include minor grading to smooth the surface and placement of up to 100 CY of gravel or soil per site to repair ruts, rills, or sinkholes. In general, this activity would occur regardless of the primary restoration Project. These maintenance actions may require permit instruments through either the Corps or ODSL.
Installation of minor infrastructure.	Minor infrastructure may be installed to take advantage of the DWMP, including additional pipes, watering troughs, etc. This would be an inter-related action to take advantage of further possible benefits of the improved DWMP. These maintenance actions may require permit instruments through either the Corps or ODSL.

CHAPTER 4: AFFECTED ENVIRONMENT

This chapter describes the existing environment and environmental consequences of both the No Action Alternative and the Preferred Alternative.

4.1 Soils and Geology

4.1.1 Existing Environment

The Coquille River basin is located within two geological provinces, the Klamath Mountain Province and the Coast Range Province (Coquille Indian Tribe 2007). The Klamath Mountain Province has hard rock comprised of volcanic, diorite, and serpentine rocks. The Coast Range Province is comprised primarily of sandstones. The Project area is predominant Quaternary-aged alluvium derived from sediments deposited in a riverine and estuarine environment.

The Project area is an historic tidal wetland in the lower Coquille River watershed, which was separated from the river by levee construction and drained for agricultural purposes in the late 19th or early 20th century. Soil characteristics are typical of pasture and degraded wetlands that have not experienced daily tidal flood events for approximately 100 years. Before its agricultural conversion, the Project area was shaped by periodic earthquakes and tsunamis within the Cascadian subduction zone and the daily tidal processes associated with the Coquille River.

Twelve subduction earthquakes between 6,500 and 6,720 years before present dropped the Coquille River estuary to tidal flat elevations (Witter et al. 2003). Each of these events reduced local elevations and resulted in more flooding of the site. Over time, accretion of fine sediments resulted in the formation of a classic tidal mudflat and marsh system (Bryam and Witter 1999).

The soils of the Project area vary widely. The Soil Survey Report indicates that there are four predominant soil types within the Project area (NRCS 2014). These include:

1. **Chetco silty clay loam, slope 0-3 percent**: This soil type covers approximately 4 percent of the site. It is a deep, very poorly drained soil on floodplains and deltas formed in alluvium. Permeability is very slow; available water capacity is 5 to 8.5 inches. Typically, the surface layer is very dark grayish brown silty clay loam about 10 inches thick. The subsoil is mottled, dark gray silty clay about 14 inches thick. Minor components include Coquille, Nestucca and Langlois soils. Chetco is a hydric soil due to frequent ponding and flooding for a long or very long duration; Coquille, Nestucca, and Langlois soils are also hydric (NRCS 2014).
2. **Coquille silt loam, slope 0-1 percent**: This soil type covers approximately 10 percent of the site. This is a deep, very poorly drained soil that occurs on floodplains and is formed in alluvium. Permeability is slow; availability water capacity is 4 to 8.5 inches. Typically the surface layer is very dark grayish brown and dark grayish brown silt loam about 14 inches thick. The subsoil for a thickness of about 22 inches is dark grayish brown and olive gray silty clay loam and then to 60 inches is very dark gray silty clay loam. Minor components include Langlois, Clatsop and Chetco soils, which are hydric (NRCS 2014).
3. **Langlois silty clay loam, slope 0-1 percent:** This soil type covers approximately 52 percent of the site. This is a deep, very poorly drained soil that occurs in depressional areas of floodplains and old tidal flats formed in recent alluvium. Permeability is slow; availability water capacity is 2 to 4.5 inches. Typically, the surface layer is mottled, dark grayish brown silty clay loam to about 10 inches thick. The subsoil is dark grayish brown

and dark gray silty clay. In some areas the surface is peaty. Minor components include Chetco and Nestucca soil, which are hydric (NRCS 2014).

4. **Langlois peaty silty clay loam, slope 0-1 percent:** This soil type covers approximately 28 percent of the site. This is a deep, very poorly drained soil that occurs in depressional areas of floodplains and old tidal flats formed in recent alluvium. Permeability is slow; availability water capacity is 2 to 4.5 inches. Typically, the surface is covered with a very dark grayish brown layer of peat about 5 inches thick. The surface layer is mottled, dark grayish brown silty clay loam to about 10 inches thick. The subsoil is dark grayish brown and dark gray silty clay. Minor components include Coquille, Chetco and Nestucca soil, all of which are hydric (NRCS 2014).

The soils observed on the site were typically loam and gravelly loam, which are similar to Camas gravelly sandy loam, but were not confirmed to match any of the mapped soils.

4.1.2 Environmental Consequences

Alternative A: No Action Alternative

The continued degradation of tidal wetland soils would be expected under the No Action Alternative. Sediment would continue to be deposited at an unnatural rate when Project area lands are inundated during flood events. Agriculturally induced subsidence associated with the draining of organic soils and compaction by grazing animals and farm equipment would continue, hindering the establishment of native fish and wildlife habitat. The No Action Alternative would not assist the Service in meeting its publicly mandated missions to assist in the recovery of threatened and endangered species, preserve and enhance wildlife habitat, and provide opportunities for wildlife-oriented public uses.

Alternative B: Preferred Alternative

There would be beneficial effects to restoring the natural process of sediment deposition in Unit 2 as a result of the Preferred Alternative. Restoration and creation of natural channels and ditch fill in Unit 2 would allow unimpaired conveyance of sediment from Unit 2 to the Coquille River. Tidal sediment deposition onto Unit 2 would occur as a result of the restoration of the full tidal process of the Coquille River onto the Project area. The increase in tidal sediment deposition and the likelihood of increased inundation could cause an eventual rise in land elevation and a return to anoxic soil conditions, which would promote the formation of productive wetlands and mudflats and, therefore, productive fish and wildlife habitat. Short-term soil disturbance would occur during the tasks associated with the wetland restoration; however, construction areas would be re-seeded, replanted, and graded to avoid long-term impacts to soils. Short-term effects of the Preferred Alternative are considered a less-than-significant adverse impact on soil resources.

Overall, the Preferred Alternative would have a long-term beneficial effect on the natural soil processes of the site.

4.2 Water Resources

4.2.1 Existing Environment

The Project site is immediately adjacent to the Coquille River between River Mile (RM) 21-23. The Coquille River is tidally influenced up to approximately RM 38 (CWA 1997). Salt has been

measured in low concentrations at RM 20 in dry years during low flows (Coquille Indian Tribe 2007), but the Project area is considered entirely freshwater. Tidal fluctuations near the Project site range from approximately two to six feet.

The Coquille watershed has a typical precipitation regime similar to other Coast Range watersheds with high levels of winter rainfall and dry summers. Average annual precipitation ranges from 45 inches per year in the Camas Valley area to approximately 120 inches per year in the upper South Fork drainage (Coquille Indian Tribe 2007).

The mean annual discharge of the Coquille River is 3,288 cubic feet per second (cfs) and ranges from a mean monthly discharge of 130 cfs in September to 8,250 cfs in February (Coquille Indian Tribe 2007). Hydrology developed for this Project estimates that the 100-year discharge in the Coquille River at Coquille is 111,000 cfs (FEMA 2014). China Camp Creek flows through the Project site and is ungaged. Estimated hydrology for China Camp Creek ranges from a base low flow of 1 cfs to a 100-year flow of approximately 281 cfs (based on USGS regional regression equations for drainage area and precipitation).

The Project area is bounded on the south by the Coquille River. The entire site lies within the boundary of the 100-year floodplain (FEMA 1984). China Camp Creek runs through the Project area. Once flowing into the Project area, it serves as a drainage ditch that dewaters the historic tidal wetland for agricultural purposes. The creek has been routed into a straight-line ditch running north of Unit 2.

Water quality in the mainstem Coquille River, China Camp Creek, and the drainage canals within the action area have been degraded by historical and current land use. Under Section 303(d) of the CWA, the Oregon Department of Environmental Quality (ODEQ) prepared a list of stream segments that do not meet water quality standards, referred to as the "303(d) list." Table 4 includes the river mile, water quality parameter, and the water quality limiting status for the impaired waterbodies within the Project area. Water quality parameters that are most important to fish include water temperature and dissolved oxygen. The only completed and approved Total Maximum Daily Load (TMDL) is for dissolved oxygen.

Table 4. Impaired segments of the Coquille River (ODEQ 2010).

Rivermiles	Parameter	Category	TMDL Status
Coquille River 0-35.6	Alkalinity	3B	--
Coquille River 0-35.6	Ammonia	3B	--
Coquille River 4.2-35.6	Chlorophyll a (summer)	5	Needs a TMDL
Coquille River 0-35.6	Dissolved oxygen (year-round)	5	Approved
Coquille River 4.2-35.6	E. coli (fall/winter/spring)	5	Needs a TMDL
Coquille River 4.2-35.6	pH	2	--
Coquille River 4.2-35.6	Nutrients	3	--
Coquille River 4.2-21	Temperature	2	--
Coquille River 4.2-35.6	Sedimentation	3	--
Coquille River 25.5-35.6	Turbidity	3B	--

Category 2 = Waters of concern; Category 3 = Insufficient data; Category 5 = Polluted waters that require a TMDL

ODFW measured water temperatures in the drainage canals and China Camp Creek (up to 22.5°C; 72.6°F) and there are generally elevated water temperatures during summer and fall

(typically 20-22°C; 68-72°F; ODFW unpublished data). Additionally, there is extensive growth of algae and aquatic plants that contributes to biological oxygen demand (and low dissolved oxygen) in the fall and winter when the plants die back and sink to the bottom.

4.2.2 Environmental Consequences

Alternative A: No Action Alternative

Agriculturally induced unnatural water levels and poor water quality would continue as a result of the No Action Alternative. Existing tide gates and levees would continue to obstruct tidal action, thus limiting full tidal function. Stormwater flowing untreated into the adjacent waterways would remain untreated. The No Action Alternative would not assist the Service in meeting its publicly mandated missions to assist with the recovery of threatened and endangered species, to preserve and enhance wildlife habitat, and to provide opportunities for wildlife-oriented public uses.

Alternative B: Preferred Alternative

The tide gate replacement and channel creation would allow normal tidal inundation in Unit 2, which would promote water and vegetation conditions needed to re-establish fish and wildlife habitat in Unit 2. After the restoration, normal tidal regime in Unit 2 would essentially match the tidal water level on the adjacent Coquille River.

Beneficial long-term changes to water quality would result from the Preferred Alternative. Sediment would be conveyed more effectively from the created historical channel network and appropriately sized culverts. The berm modification and repairs would include stormwater treatment best management practices (BMP) (e.g., vegetated swales, natural infiltration, and vegetated slopes). The tide gate replacement and DWMP will also provide long term management of water levels in BSDD.

Re-establishment of more consistent tidal exchange on the floodplain in Units 1 and 3 will improve water circulation in ditches and sloughs and preclude stagnation thus improving variables such as dissolved oxygen and temperature, and limit the concentration of nitrogen and phosphorous accumulating in ditches and sloughs originating from grazing, particularly in the warmer summer months.
Temporary impacts to water quality could result from exposure of soils during construction at the Project site. Exposed soils could erode at higher rates than under current conditions. All ground-disturbed areas would be re-seeded after completion of the restoration work. Because of this and because the site is relatively flat, surface runoff after completion would be low energy, and onsite erosion would be minimal. Therefore, the contribution of sediment to the local stream channels and the estuary from the proposed Project are expected to be a less-than-significant adverse impact.

Construction activities would require the use of heavy equipment to move earth, disc the site, excavate the new culvert crossings and channels, and resurface the road. These activities pose the risk of water contamination from petroleum products. Implementation of BMPs and other measures associated with all construction activities, including working during the dry season, would reduce the likelihood of contamination (see Chapter 6).

4.3 Air Quality

4.3.1 Existing Environment

The Project area is not located within a Class I air shed, nonattainment area, or maintenance area (EPA 2008). Air pollution sources include forestry slash burning and vehicle traffic on U.S. 101 and Highway 42.

4.3.2 Environmental Consequences

Alternative A: No Action Alternative

There would be no effect on air quality as a result of the No Action Alternative.

Alternative B: Preferred Alternative

The use of heavy equipment would create limited, short-term adverse impacts to air quality during Project activities. Most of the soil disturbing activities would occur on compact soils and would therefore not generate significant airborne dust. Heavy equipment would generate diesel fumes, but these impacts would dissipate quickly and would not occur after the conclusion of Project activities. These short-term adverse impacts are anticipated to be less than significant.

4.4 Vegetation and Wetlands

4.4.1 Existing Environment

Vegetation. The Project area is a mixture of native and non-native plants that exist in a disturbed unnatural ecological regime and habitat. Artificial levees and ditches were constructed in the late 19th and early 20th centuries for creating dry agricultural pastures from tidally influenced wetland. Non-native plants were introduced for dairy and cattle forage; hence, the current degraded wetlands, un-maintained pastures, and ditches support a mix of native and non- native plants that are of limited use to fish and wildlife.

Although the site has been used for grazing for many decades, numerous remnant channels still exist on the site from former Coquille River and China Camp Creek meandering as well as likely historical tidal channels. The lower channels are dominated by creeping bent grass (*Agrostis stolonifera*) and the higher ground is dominated by reed canary grass (*Phalaris arundinaceae*). The Project area is grazed in the summer and fall by cattle. Sparse shrubs are present including Himalayan blackberry (*Rubus armeniacus*) and spirea (*Spirea douglasii*) that have been mowed and/or browsed. The site was not yet flooded to its typical winter extent when viewed in winter 2014, but many areas of standing water were present and several channel remnants were visible, also with standing water.

The adjacent Beaver Slough can be considered a reasonable reference area for Unit 2 restoration. This area is a shrub and small tree dominated wetland that has not been cleared and is representative of natural tidal floodplain wetlands. The site is dominated by willows (*Salix* sp.), Oregon ash (*Fraxinus latifolia*), slough sedge (*Carex obnupta*), and various grasses. Conifers including Sitka spruce (*Picea sitchensis*) and Western red cedar (*Thuja plicata*) were present on adjacent slightly higher ground and are a natural component of coastal wetlands and tidal surge plains.

Wetlands. In the mid-19th century, up to 25,000 acres of the Lower Coquille River Basin

floodplain was estimated to be wetland (Ecotrust 1997). Up to 70 percent of these wetlands was thought to be timbered swamp or wooded bottom lands. It is estimated that just less than 40 percent (9,500 acres) of these wetlands has been converted into uplands and, of the remaining wetlands, 90 percent has been converted into scrub/shrub wetlands. This means that approximately 22,500 acres (90 percent) of the original 25,000 acres have either been converted to upland or modified from its original type. The Project area is an example of historic wetlands that have been converted to another type of wetland.

Historically, much of this area was subject to the ebb and flood of the tide, providing habitat to myriad fish and wildlife species. Winter Lake is now separated from the river by an artificial levee and tide gate. Although a wetland delineation has not been conducted for the Project area, it is likely that conditions necessary to classify much of the area as a wetland subject to the Corps jurisdiction are met. The area would be classified as palustrine emergent seasonally flooded bermed wetland (Cowardin et al. 1979). The National Wetland Inventory maps the entire unit as freshwater emergent wetland. TetraTech conducted a wetland delineation for the Project. The study found the majority of the site is wetland. The Corps concurred with a preliminary jurisdictional determination.

4.4.2 Environmental Consequences

Alternative A: No Action Alternative

Under the No Action Alternative, the Project area would remain a degraded freshwater wetland separated from the Coquille River by artificial levees and tide gates. These areas are historic tidally influenced wetlands that have been converted to pasture by the establishment of levees separating them from the river and by the construction of approximately 7.5 miles of drainage ditches. The existing vegetation would remain essentially unchanged. These areas have transitioned from native to invasive non-native plant species. The invasive species found along the road, such as reed canarygrass, would continue to invade the pastures and eventually displace native wetland plants. The invasion by reed canarygrass could eventually lead to monotypic pastures of non-native species that would add to the degradation of the Project area for fish and wildlife species. Wetlands would continue to be present in a degraded condition with seasonal drying from outflow through drainage ditches and tide gates. Seasonal flooding and high groundwater levels would maintain the low-quality wetlands found along the creeks and in the degraded pastures. The No Action Alternative would not assist the Service in meeting some of its missions and priorities to assist with the recovery of threatened and endangered species, to conserve and enhance wildlife habitat, and to provide opportunities for wildlife-oriented public uses.

Alternative B: Preferred Alternative

The Preferred Alternative would restore Unit 2 to a regularly flooded estuarine intertidal and emergent freshwater wetland. Plant communities indicative of freshwater wetland and expected to become re-established in the Project area are: willow (*Salix sp*), Oregon ash (*Fraxinus latifolia*), red alder (*Alnus rubra*), red osier (*Cornus sericea occidentalis*), Oregon crab apple (*Malus fusca*), and other shrubby species with black cottonwood (*Populus tricharpa*) and Sitka spruce (*Picea sitchensis*).

About 0.75 miles of irrigation ditches would be directly filled using soil obtained from elsewhere

on the site, and approximately 7.5 miles of existing remnant tidal channels would be reconstructed and reconnect. The replacement of the new muted tide gate would result in the regular tidal inundation of Unit 2 and would start the restoration of habitat for fish and wildlife. Overall, this action would result in the restoration of 400 acres of historic tidal wetlands formerly converted to agricultural pastures. The conversion from pasture to tidal marsh would impact the existing vegetation within the degraded pastures; however, the bulk of these are non-native species and not considered sensitive resources. Therefore, the adverse impacts to vegetation resources resulting from the restoration actions are anticipated to be less than significant.

Estuarine and freshwater wetlands have declined by approximately 90 percent in the Coquille Watershed. Restoration of the Winter Lake would result in a 400-acre net increase in tidal wetland habitat in the Coquille Estuary. Whereas this increase is locally beneficial, it amounts to about 1.6 percent of the historically present wetlands and is therefore anticipated to be a less-than-significant beneficial impact on wetland resources and vegetation communities.

4.5 Fish and Wildlife

4.5.1 Existing Environment

Birds. The Coquille River Valleys supports large populations of shorebirds, ducks, migratory songbirds, and wading birds (USFWS 1999b). For wintering waterfowl, the Coquille Valley has long been recognized as one of the most important coastal sites in the Pacific Flyway. The Pacific Coast Joint Venture (PCJV) identifies the Coquille River Valley as the most important waterfowl area between San Francisco Bay and the Columbia River. Composed largely of flooded pasturelands, the valley is critically important to numerous species of waterfowl and shorebirds during migration and wintering periods. Taylor (1994). According to the PCJV, the area is rated as "high priority" in the Service's ranking of waterfowl habitat protection needs, and is the agency's top priority for protection in Oregon (1989). Mid-winter waterfowl surveys typically record anywhere from 10,000 to 60,000 ducks in the Coquille Valley, numbers that often represent nearly half of the total wintering population on the Oregon coast (Joseph Sands, USFWS, personal comm.). The valley also hosts significant numbers of wintering geese and swans.

Lovvorn and Baldwin (1996) evaluated dabbling duck use of intertidal areas absent of surrounding agriculture and intertidal areas in proximity to flooded agriculture in western Washington. They determined that birds appear to shift to agricultural habitats almost exclusively as intertidal resources are depleted, and actually depart areas where intertidal habitats are void of adjacent agricultural lands prior to mid-winter. This Project site possesses similar landscape characteristics (i.e. an agricultural/intertidal habitat mosaic). It is expected that the maintenance of agricultural land will continue to help support large mid-winter waterfowl numbers, and actually improve fall and spring migration habitat as a result of the Project area being inundated on a more regular basis via improved tidal influence.

Shorebirds are also frequently documented in the Bandon Marsh and Coquille River Valley complex, including the Project area; because of the numbers of shorebirds that use this area during migration, this site qualifies for special designation under the Western Hemisphere Shorebird Reserve Network (Drut and Buchanan 2000).

Mammals. Winter Lake supports at least 16 mammals species, including black-tailed deer (Odocolileus hemionus columbianus), beaver (Castor canadensis), and river otter (Lutra canadensis).

Reptiles and Amphibians. Reptiles and amphibians range from common species such as the Pacific treefrog (Pseudacris regilla) and Western pond turtle (*Actinemys marmorata*) to less common species such as the Pacific giant salamander (Dicamptodon tenebrosus) and the northern red-legged frog (Rana aurora aurora). Adults of some species such as the Pacific giant salamander are relatively terrestrial while others spend the entire year in or immediately adjacent to water.

Fish. The Coquille River watershed covers about 1,060 square miles of land and is the largest watershed entirely bounded by the Coast Range (CWA 2009). The ecological dynamics within this complex riverine valley were substantial and once resulted in high levels of production of fish and wildlife. The historical Coho salmon peak has been estimated at 412,000 returning adults (Lawson et al. 2007). The valley supports a wide variety of fish species.

ODFW has been sampling overwinter fish assemblages at the site, and has documented Coho use, however, Coho represent a small fraction of the species composition (approximately 2% of over 6,000 individual fish trapped), while bullhead catfish in contrast represent 80% of the total. The difference is likely related to the inability of juvenile Coho to readily access the floodplain and the ability of catfish to survive in the site's canals and ditches throughout year due to their tolerance for anoxic and high temperature conditions.

4.5.2 Environmental Consequences

Alternative A: No Action Alternative

Under the No Action Alternative, the restoration Project would not proceed and Unit 2 would not be improved and the tide gate would not be replaced. At some point, the tide gate would fail and the pastures would be subject to some level of tidal action. This would likely result in habitat changes as the area floods, but the 7.5 miles of existing drainage channels would quickly drain the area and preclude the return of a productive freshwater marsh suitable for use by fish and wildlife. If Unit 2 is not restored, it is not expected to provide additional benefit to fish or wildlife.

Under the No Action Alternative, waterfowl would continue to use the pasture seasonally. Bird habitat occurs primarily during the wet winter season in flooded portions of the degraded pastures or in the limited open water after substantial rainfall. The No Action Alternative would not replace the tide gate and no DWMP would be available to manage the site for wildlife. Habitat for shorebirds and wading birds would exist only along the narrow margins on the outside of the levees adjacent to the Coquille River and along some of the drainage channels within the Project area. Habitat for other wildlife (mammals, reptiles, and amphibians) would remain essentially unchanged from existing conditions.

Juvenile salmonids would continue to have limited access to the site. The suitability of the Project area would remain sub-optimal.

Alternative B: Preferred Alternative

Under the Preferred Alternative, Unit 2 restoration would restore large expanse of freshwater wetlands that would improve the amount of foraging habitat available for raptors, waterfowl, shorebirds, and wading birds. The increased availability of wetland habitat in association with seasonally flooded agricultural areas will likely enhance shorebird use during winter and migration (Drut and Buchanan 2000); the availability of loafing habitat inland during high tide in coastal marshes is extremely important. The nutrient- and resource-rich habitat resulting from the implementation of the Preferred Alternative is expected to greatly enhance the value of the larger Bandon Marsh/Coquille River habitat for both waterfowl and shorebirds. The improved tidal channels would provide perching and shelter areas above typical high tide levels and offer cover to small birds and mammals along with foraging habitat for rails, egrets, herons, ducks, and other species.

Wildlife species currently using the Winter Lake area are expected to benefit from the restoration of Unit 2. Beavers would likely benefit from the restoration Project, which would create new stream channels more suitable for beaver activity. The existing pastures provide some marginal habitat for common species.

Reconnection of Coquille River to China Camp Creek with less tide gate interference would provide improved access and rearing habitat for freshwater and anadromous fish. The reconstructed channels would allow for unrestricted movement juvenile Coho salmon in and out of the Project area. Culvert replacements and new bridges would create a more natural tidally influenced streambed crossing for fish, amphibians, and aquatic resource-dependent mammals. Work done to reconstruct the channels and install habitat elements would also improve overall rearing habitat for fish and invertebrates.

Construction activities would be phased so that the bulk of the earthmoving activities would occur during the dry season. New stream and tidal channels would be constructed under dry conditions and connected to active stream or river flows when construction is complete. To minimize effects to fish, all in-water work would occur during the ODFW in-water work window (July 1 to September 15). Additionally, all fish present would be captured and relocated (Section 5), and all in-water work areas would be isolated from the active stream or river channels. In-water work is expected to be a relatively short duration. Working during the summer months would also minimize disturbance to birds because few migrating waterfowl and shorebirds use the degraded pastures and drainage ditches at that time.

As discussed in Section 4.4, estuarine and freshwater wetlands have declined in quality and abundance along the Oregon Coast and by about 90 percent in the Coquille watershed. While the Preferred Alternative would result in the restoration of more than 400 acres of habitat for fish and wildlife use, this increase is not considered beneficially significant in the context of ongoing and historic wetland loss and degradation within the watershed. At the local scale, the implementation of the Preferred Alternative would benefit estuarine-associated species within the lower Coquille River watershed, but at larger scales is anticipated to have a minor but beneficial effect on fish and wildlife resources.

4.6 Threatened and Endangered Species

4.6.1 Existing Environment

Wildlife. The Service reviewed a list of federally threatened and endangered wildlife species known to occur in Coos County (USFWS 2015). Four wildlife species occur in the vicinity of the Project area, but habitat does not exist within the action area.

Marbled Murrelet

The marbled murrelet was federally listed as threatened on October 1, 1992 (57 FR 45328). Critical habitat was designated on May 24, 1996 (61 FR 26256) and revised on October 5, 2011 (76 FR 61599). Critical habitat in Oregon is only located within the Coast Range. In the Project vicinity, all critical habitat for marbled murrelet is located further east in Township 27, Range 10W, approximately 15 miles from the action area. The critical habitat is only designated on federal and state lands in late successional reserves.

Marbled murrelets are small seabirds of the family Alcidae that occur along the north Pacific coast from the Aleutian Islands and southern Alaska south to central California. Murrelets feed on small fish and invertebrates usually within 2 miles of shore in open but somewhat sheltered marine waters, such as bays or sounds where water depth is less than 330 feet (Carter 1984). The nesting period begins around the end of March and continues through mid-September (Hamer and Nelson 1995). Nest sites are restricted to stands of mature and old-growth forest (Carter 1984). Because of the scarcity of such stands, it is common for murrelets to fly inland many miles to nest; *over* 40 miles in some studies (Cooper et al. 2006, 2007). Marbled murrelets only fly to and from their nest sites during crepuscular hours, spending their diurnal hours foraging. The loss of old growth forests is the main cause for the decline of this species. In addition, it is believed that forest fragmentation forces nests closer to forest edges making them vulnerable to predation by jays, crows, ravens, and great horned owls. Other threats to this species include fishing nets and oil spills.

There is no designated critical habitat in the action area. Marbled murrelets require old growth forest to nest and proximity to marine areas for feeding. Marbled murrelets are unlikely to be present in the action area that is entirely grazed pasture.

Northern Spotted Owl

The Northern spotted owl was first listed on June 26, 1990 (55 FR 26114) and is currently designated as threatened in its entire range. Critical habitat was designated on January 15, 1992 (57 FR 1796) and revised on August 13, 2008 (73 FR 47326). Critical habitat is located in coniferous forested lands in both the Coast Range and Cascades of Oregon. In Coos County, critical habitat for the Northern spotted owl is located in late successional forest in the Coast Range east of the action area.

The Northern spotted owl is a forest bird that inhabits old-growth or late successional coniferous and mixed conifer-hardwood forest with multilayered canopies over a range extending from southwestern British Columbia south to San Francisco Bay (USFWS 1992). Northern spotted owls can be found throughout the west slope of the Cascade Range below elevations of 4,200 ft. in areas with habitat characteristics of moderate to high canopy closure, large overstory trees,

substantial amounts of standing snags, in-stand decadence, and coarse woody debris of various sized and decay classes scattered on the forest floor (USFWS 2008). Northern spotted owls do not build their own nests but rely on naturally occurring nest sites, such as broken tree tops and cavities. In Oregon they only successfully breed in late-successional mixed conifer forests, usually dominated by Douglas fir (Csuti, *et al.* 2001}. Critical habitat for Northern spotted owl was revised and finalized on December 4, 2012 (77 FR 71876) and does not include the Project area.There are no known occurrences of Northern spotted owl in the action area or floodplain of the Coquille River.

Mature upland coniferous forests provide suitable foraging and nesting habitat for the spotted owl. Other habitats *may* provide foraging or dispersal habitat for the species. Critical habitat is not located in the action area; the nearest designated critical habitat is approximately 15 miles east in the Coast Range.

Western Snowy Plover

The Western snowy plover is a small shorebird, roughly 7 inches long that occurs in Western North America along the Pacific coast from southern Washington to Baja, California and from interior Oregon and California east to Texas. The Pacific DPS was listed as a threatened species on March 5, 1993 (58 FR 12864). Critical habitat was originally designated in 1999 and revised in 2005; critical habitat was recently revised on June 19, 2012 (77 FR 36728) and includes coastal beaches, spits, and tidal flats along the Oregon coast. The closest critical habitat to the action area is located at the Coos Bay North spit and beaches south of Bandon.

The Pacific coast population of the Western snowy plover breeds predominantly on coastal beaches and spits, and in some areas of salt pans, dredged disposal sites, and salt pond levees. These are unstable areas influenced by winds, storms, and waves and generally with sparse vegetation. The Coos Bay North spit and Bandon sites were two of only six active nesting sites at the time of listing. Birds are often very site faithful in returning to the same vicinity to nest each year (Warriner et al. 1986 cited in USFWS 1993). The breeding season extends from mid-March through mid-September. Eggs hatch in about 27 days and chicks leave the nest site within hours of hatching to search for food (USFWS 1993). Plovers feed on invertebrates in sand and mud flats, salt marshes and salt ponds. Poor reproductive success from predation, human disturbance, weather, and loss of nesting habitat due to invasion of beaches by European beachgrass *(Ammophila arenaria)* and other species is the main cause of decline for this species.

Coastal ocean beaches and tidal flats provide suitable nesting and foraging habitat for the Western snowy plover. There are no known occurrences of the Western snowy plover in the action area or floodplain of the Coquille River, approximately 20 miles upstream of the mouth.

Pacific Fisher

The Pacific fisher is associated with late successional and old growth forest habitats. The Project area and its surroundings contains very limited suitable habitat for these species as the landscape is highly fragmented and converted to younger forest or agricultural lands. Given the lack of occurrences and habitat suitability for the Pacific fisher, it is unlikely there will be any disturbance from Project activities. The determination for these species is no effect.

Fish. One known fish species occurs on site, and two other fish species may occur within the Project area.

Coho Salmon

The only commonly found federally listed fish species found in the Coquille River is Coho salmon. The Coho salmon found in the Coquille River belong to the NOAA-Fisheries designated Oregon Coast Evolutionarily Significant Unit 4 (73 FR 7816). Adult Coho salmon migrate from the ocean to coastal rivers and swim upstream to spawn. They are found migrating into the estuary and lower Coquille River beginning in August of most years. Spawning occurs in the upper basin of the Coquille River watershed in gravel riffles where there is abundant cool water flow to oxygenate and remove waste from the eggs. Juvenile Coho salmon spend 1 to 2 years in freshwater or estuarine brackish water before migrating to the ocean as juveniles. Preferred habitats for juveniles are pools and backwater areas of freshwater streams or brackish estuary waters where abundant vegetation and large in-water wood provide cover and foraging habitat. The population of Coho salmon in the Coquille River is one of the larger populations in southern Oregon. Population estimates ranged from more than 2,000 spawning adults in 1995 to more than 28,500 spawning adults in 2006 (ODFW 2009). The number of adults returning to spawn is a direct result of the number of juveniles that migrate into the ocean. Estimates of juvenile production for three brood years in the late 1990s indicate that total juvenile production for the Coquille River was between about 120,000 and 300,000 individuals. Spawning adult population associated with these estimates was about 3,000 to 5,700 fish.

Small numbers of juvenile Coho salmon have been observed in the Project area (ODFW Unpublished file data 2015). No spawning habitat is within the drainage ditches, channels, or creek within the Project area.

Critical habitat was designated for the Oregon Coast Coho salmon ESU at the time they were federally listed as a threatened species (73 FR 7816). The definition of critical habitat is that area necessary for the survival and persistence of a species. Critical habitat is categorized by primary constituent elements (PCE) that describe the habitats required by the species. The PCEs for Coho salmon include freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, estuarine areas, and near shore marine habitats (73 FR 7816). The Coquille River is considered critical habitat; the PCEs within the Coquille are freshwater rearing areas, freshwater migration corridors, and estuarine areas. Freshwater rearing habitat within the Project area is limited to the unnatural drainage ditches.

Eulachon

The Southern DPS of Pacific eulachon were listed as a threatened species on March 18, 2010 (75 FR 13012). The Southern DPS includes Pacific eulachon from the Skeena River, BC to the Mad River, CA (inclusive). Critical habitat was designated on October 20, 2011 (76 FR 65324).

Eulachon are anadromous smelt that spend most of their life in nearshore marine waters from northern California to Alaska, and return to freshwater rivers to spawn. Spawning typically occurs from January through March in Oregon and Washington (USFWS 2011). As they are small fish (typically 6-7 inches), they only migrate a short distance into freshwater to spawn. They spawn beginning at age three to four and typically die afterwards. The eggs are broadcast

over coarse sand and small gravel substrate and the fertilized eggs become adhesive and stick via a short peduncle to the substrate (Wydoski & Whitney 2003). After approximately one month they hatch into larvae that drift downstream to estuaries.

Pacific eulachon may enter the Coquille River and spawn, although this has not been documented. Two eulachon were captured by ODFW during mainstem Coquille River seining efforts during February and March 2013 (ODFW Unpublished file data 2015) at RM 24 on the Coquille River and the Coquille River is currently considered occupied by Eulachon when they are present annually (generally January through May). The Project site is not considered critical habitat.

Green Sturgeon

The Southern DPS of green sturgeon were listed as a threatened species on April 6, 2006 (71FR17757). Critical habitat was designated on October 9, 2009 (74 FR 52300), and includes marine waters out to 60 fathoms from Monterey Bay north to Cape Flattery, Washington, and certain coastal bays and estuaries in Washington, Oregon, and California. Critical habitat includes Coos Bay, but does not include the Coquille River or its estuary.

Green sturgeon is a long-lived, anadromous sturgeon that occurs most commonly in marine waters from California to Alaska, but spawns in freshwater rivers. Spawning has been confirmed only in the Rogue, Klamath, and Sacramento Rivers. Green sturgeon migrate into freshwater beginning in February, with spawning occurring from March to July (USFWS 2009). Spawning occurs well upriver in deep fast water over gravel, cobble, and boulder substrates (USFWS 2009). Eggs are adhesive and stick to the substrate and larvae are believed to develop in freshwater nearby the spawning site (Kynard et al 2005 cited in USFWS 2009). Juveniles rearing from one to four years in freshwater and estuaries and then migrate into marine waters (Nakamoto et al 1995 cited in USFWS 2009).

Green sturgeon adults and juveniles may occur in the Coquille River, but have not been documented. Green sturgeon have been documented in Coos Bay (ODFW Unpublished file data 2010).

Plants. According to the Oregon Natural Heritage Program (ONHP), only two species of federally listed plants occur in the south coast drainages of the state: Western lily (*Lilium occidentale*) and Red Mountain rockcress (*Arabis macdonaldiana*) (ONHP 2009). The only species known from Coos County is western lily (USFWS 2008). Western lily occurs in shrubby forest habitats, often along margins of streams or ponds (ONHP 2009). The records for Coos County show an extremely limited distribution in the southern part of the County and nearby Curry County (ONHP 2009). The Western lily has neither been observed on the Project area nor does suitable habitat for it exist there (David Ledig, Refuge Manager, personal communication).

4.6.2 Environmental Consequences

Alternative A: No Action Alternative

Wildlife. Because no listed wildlife species occur in the Project area, the No Action Alternative would have no effect.

Fish. Under the No Action Alternative, Coho salmon would continue to migrate upstream and spawn in suitable habitat within the Coquille River above the Project area. Small numbers of juvenile Coho salmon would continue to use the limited, ditched habitat as rearing habitat. The tide gate and culverts would continue to restrict passage of fish. The tide gate limits movement of fish to periods when the gate is open, and mutes tidal flow. It is expected that if no action were taken, that small numbers of Coho salmon would continue to pass through the tide gate when possible. Overall, conditions are not optimum for rearing juvenile Coho salmon or other estuary-dependent fish, and these conditions would be expected to persist into the future under the No Action Alternative. A complete analysis of the effects to listed fish species will be conducted through the ESA compliance process by NOAA-Fisheries.

Plants. Because no listed plant species occur in the Project area, the No Action Alternative would have no effect.

Alternative B: Preferred Alternative

Wildlife. Because no listed wildlife species occur in the Project area, the No Action Alternative would have no effect.

Fish. Effects to Coho salmon under the Preferred Alternative would be short-term (associated with construction) and long-term (associated with fish habitat restoration and water management). Short-term construction activities would include all in-water described in Section 3. Positive effects are associated with overall changes in habitat availability, improved ease of access, and improvements to water quality.

Construction

To minimize potential effects to fish, all in-water work would occur only during the approved ODFW in-water work window of July 1 to September 15. All areas where in-water construction is required would be dewatered and any fish remaining in these work areas would be captured and removed from the construction sites. Fish capture and transport would be conducted by appropriately trained staff in accordance with the terms and conditions provided by NOAA-Fisheries (Section 5.2).

Direct. The creation of new channels would be completed before connecting them to existing streams or the Coquille River. Filling existing ditches that may support Coho salmon would not occur until the fish are removed and relocated following the terms and conditions provided by the NOAA-Fisheries (Section 5). Therefore, effects resulting from dewatering of these areas would be minimal.

Replacement of the tide gate and water control structures would potentially impact Coho salmon in the river channel: however, fish would be expected to move away from the disturbance.

Indirect. The Preferred Alternative could have indirect effects on Coho salmon by affecting water quality through sedimentation caused by ground-disturbing activities. However, Winter Lake is a relatively low-energy environment, and erosion is expected to be minor. The Project area would be seeded after completion. Other factors that could affect water quality include the accidental discharge of pollutants such as oil or grease from equipment. These water quality

issues would essentially be eliminated through implementation of BMPs (Section 5).

Operation

Restoration. The Preferred Alternative would positively affect Coho salmon, eulachon, and green sturgeon through an overall improvement to habitat availability and quality, and by providing fish access to better quality habitat. Habitat would be increased because the Project would restore full tidal action to more than 400 acres of historic tidal marsh; this would substantially increase rearing habitat for juvenile Coho salmon. In addition, it would ensure that the additional 1,300-acres are flooded in the winter months according to the DWMP to provide fish over-wintering habitat.

400 acres of tidal salt marsh and provide an additional 1,300 acres of overwintering habitat.

The re-establishment of historic ecological conditions to the area would increase high-flow refugia for adult and juvenile Coho salmon and eulachon. The improvements to habitat created would improve overall freshwater rearing habitat. See Table 5 for a comparison of the No Action (current tide gate configuration) and Preferred Alternative (post Project, new muted tide gate infrastructure installed) tidal influence/river connectivity and associated ecological benefits**.**

Conclusion

During the construction phase of the Project proposed under the Preferred Alternative there is a potential for direct and indirect negative effects on Coho salmon and its designated critical habitat, and on eulachon and green sturgeon. Short-term direct negative effects to individual fish would be minimized by fish removal procedures and the use of BMPs. Other measures to reduce sedimentation and contamination would minimize indirect effects associated with degraded water quality. Incidental take of individual juvenile Coho that may occur during construction would be offset by the sheer number of juvenile Coho salmon produced in the Coquille River in most years and the anticipated increase in juvenile production as a result of the restoration. Thus, the loss of a small number of salmon during construction would be considered a less-than-significant adverse effect of the Preferred Alternative.

To summarize, the Preferred Alternative is anticipated to have a less-than-significant, short-term adverse impact on Coho salmon, eulachon, and green sturgeon during construction and a much larger long-term beneficial impact because of the restoration.

Plants. The Preferred Alternative would have no effect on listed plant species because none occurs in the Project area.

Table 5. Summary of current (no-action) and potential post-Project (preferred alternative) tidal influence/river connectivity and ecological benefits.

Season	Unit	Tidal Influence/River Floodplain Connectivity Current	Ecological Benefits	Tidal Influence/River Floodplain Connectivity Post Project with muted tide gate	Ecological Benefits
Summer	Unit 1/3	Minimal to none	Few to none	Periodic muted tidal	Tidal influence will improve water quality by flushing canals. This results in increased DO, lower temperatures, and improved fish/amphibian habitat.
	Unit 2	Minimal to none	Few to none	Muted tidal	Tidal influence will improve water quality by flushing canals. This results in increased DO, lower temperatures, and improved fish/amphibian habitat.
Fall	Unit 1/3	Minimal to none	Few to none	Muted tidal	Early fall tidal influence in canals will dramatically improve water quality. Tidal influence later in fall will benefit early migrant waterfowl and shorebirds as well as being to provide off-channel access for juvenile Coho (in particular through periodic floodplain inundation).
	Unit 2	Minimal to none	Few to none	Muted tidal	Early fall tidal influence in canals will dramatically improve water quality. Tidal influence later in fall will benefit early migrant waterfowl and shorebirds as well as being to provide off-channel access for juvenile Coho (in particular through periodic floodplain inundation).
Winter	Unit 1/3	Only during high water events	Juvenile Coho and waterfowl use when the floodplain is inundated	Muted tidal and high water events	Daily tidal influence in addition to high water events will benefit wintering waterfowl, and provide off-channel access for juvenile Coho through regular floodplain inundation.
	Unit 2	Only during high water events	Juvenile Coho and waterfowl use when the floodplain is inundated	Muted tidal and high water events	Daily tidal influence in addition to high water events will benefit wintering waterfowl, and provide off-channel access for juvenile Coho through regular floodplain inundation.
Spring	Unit 1/3	Only during high water events	Juvenile Coho and waterfowl use when the floodplain is inundated	Muted tidal and high water events	Early spring tidal influence will benefit spring migrant waterfowl and shorebirds, and provide consistent off-channel access for juvenile Coho through periodic floodplain inundation; late spring tidal influence will dramatically improve water quality in canals.
	Unit 2	Only during high water events	Juvenile Coho and waterfowl use when the floodplain is inundated	Muted tidal and high water events	Early spring tidal influence will benefit spring migrant waterfowl and shorebirds, and provide consistent off-channel access for juvenile Coho through periodic floodplain inundation; late spring tidal influence will dramatically improve water quality in canals.

Units 1-3 – Private agricultural properties; 1,300 acres.
Unit 2 – ODFW and CCGC properties; 400 acres.

4.6 Cultural Resources

4.6.1. Existing Environment

An 1857 GLO plat did not include data for the current Project area, instead referring to a large portion of the township as "Marshy Mountainous and Unfit for Settlement." The 1871 GLO plat did include the course of the Coquille River, but documented no features or landmarks within the Project area. Today, the Project area is owned by multiple landowners and portions of it are managed for agriculture while others are managed for wildlife.

Livestock grazing from late April to November is the primary agricultural activity within the area. The corridors for the major canals were cleared and the canals dug with the material excavated being used to create the berms in 1908 and 1909. The major canals and their associated berms have been maintained continuously since their creation.

A record search of files at the Service's Cultural Resources Team office in Sherwood, Oregon, and the digital database of the Oregon State Historic Preservation Office identified no archaeological investigations within the Project area (Table 6).

Table 6. Cultural resource record searches of the Project area.

SHPO #/ Results in vicinity of APE	Author	Date	Title
Within or Immediately adjacent to the APE			
#13067 (-)	Connolly, Thomas	1992	Archaeological Survey of the Chrome Plant-Cedar Point Road Section, Coos Bay-Roseburg Highway (OR 42), Coos County. Prepared for Oregon State Highway Division.
#17275 (-)	Connolly, Thomas	2000	Archaeological Survey of the Overland Road-China Creek Road Section (MP 4-MP 7.8), Coos Bay-Roseburg Highway (OR 42), Coos County. Prepared for Oregon Department of Transportation.
(+)	Tetratech	2014	Letter Report: Cultural Resources Records Search and Reconnaissance for the Nature Conservancy's Winter Lake Restoration Project, Coquille, Oregon
Within 1 Mile			
#18086 (-)	Bourdeau, Alex	2001	Archaeological and Historical Resources Identification Report: Beaver Hill/ Leslie. Prepared by US Fish and Wildlife Service.
#720 (-)	Dumond, D and R Pettigrew	1979	Report on the archaeological survey of the Fat Elk Creek-Pulaski Creek Section, Coquille-Bandon Highway, Coos County. Prepared for Oregon State Department of Transportation.
#23566 (-)	Musil, Robert	2010	Letter Report 10-15: Archaeological Survey of Beaver Creek (North Bank Lane) Bridge (#08926), Coos County, Oregon (Key No. 16047). Prepared for David Evans and Associates, Inc., by Heritage Research Associates, Inc.
#20328 (-)	Cabebe, Theresa et al	2005	Archaeological Survey of Thirty One (31) Culverts in Region 3 for the Oregon Department of Transportation. Prepared by State Museum of Anthropology, Research Report No. 2005-260.
#7210 (-)	Pettigrew, R.M	1986	Report on the archaeological survey of the proposed improvements of the Coquille Re-Route, Coos Bay-Roseburg Highway, Coos Bay. Prepared for Oregon Department of Transportation.

Tetra Tech (2016) inventoried the BSDD within the historic context of early twentieth century agricultural development in Coos County. Draining the slough and tidal flat for agricultural development began in about 1907. The canals, berms, and channel leading to the Coquille River

are slightly altered due to maintenance activities that occur every 10 to 15 year. The original tide gates have been replaced, along with other renovations that occurred in the 1950s. Based on their research and documentation of the resource, Tetra Tech determined that the BSDD does not contribute to the history of early ranching economy of Coos County (Criterion A); there is no direct association of the BSDD with a significant personage (Criterion B); the earthen and unlined nature of the canals is typical and lack engineered features. The secondary ditches and water control features appear to have been haphazardly constructed and are an assortment of new and old. Most are in poor condition (Criterion C); Recordation of the system has likely exhausted the data potential (Criterion D). As a result, the water control system was recommended ineligible for listing on NRHP given a lack of clear significant association and poor integrity (Tetra Tech 2016).

The Oregon SHPO digital database identifies a reported village site, *Lhanhasdan*, located within an oxbow on the south side of the Coquille River immediately to the west of the current Project area but there is no site form or other information about the site. It is located outside the Project area.

4.6.2 Environmental Consequences

Alternative A: No Action Alternative

The No Action Alternative would not affect cultural resources. The Project site would continue to provide limited and degraded fish and wildlife habitat; as fish and wildlife generally and salmon in particular are valued in northwestern tribal culture, the No Action alternative is likely less desirable to affected tribes than the Preferred Alternative.

Alternative B: Preferred Alternative

The Preferred Alternative would restore the natural hydrological and biological processes. None of the restoration construction activities are anticipated to affect known cultural resources. FWS accepts the Tetra Tech recommendation and has determined that the BSDD system of canals, ditches, berms, etc. do not meet eligibility criteria to be considered a historic property.

4.7 Economics

4.7.1 Existing Environment

The Project area is located approximately two miles west of the City of Coquille in Coos County, Oregon. The 2010 census of Coquille was 3,866 (COA 2010), and the population of Coos County was estimated at 63,042 (COA 2010).

The site was historically used for cattle grazing. In 2012, ODFW purchased 286 acres in Unit 2 to manage for fish and wildlife habitat. The number of grazing animals on the Project area varies depending on the season, with more animals present in the spring and summer months to reduce vegetation for wildlife management and pre-restoration purposes.

4.7.2 Environmental Consequences

Alternative A: No Action Alternative

The No Action Alternative would result in no effect to the local economy. Under the No Action Alternative, grazing would likely continue for wildlife management purposes on Unit 2, and the

number of visitors and recreational activities would not change.

Alternative B: Preferred Alternative

Construction of the restoration Project under the Preferred Alternative would require construction crews, logistical support (such as food and lodging), materials, and other products. Sourcing has yet to be determined, but some crews and materials would be from local sources, thus increasing local revenue generation. Out-of-town staffing would require local support services, also increasing local revenue. The restoration of the current degraded pastures to tidal salt marsh would require that current grazing for wildlife management purposes would nearly cease. The Wild Rivers Coast Alliance to calculate the economic benefits of the Unit 2 restoration action, based on past Projects of a similar size and scope. In the short-term, the Project would create between 18-25 jobs and generate between $2.6-$3.4 million to the local economy (Sheeran and Hesselgrave, 2013).

Once restoration is complete, public access and recreational opportunities would increase by individuals seeking wildlife-dependent recreational opportunities that are not currently available. These additional visitors could potentially generate additional revenue to the local economy. Overall, the Preferred Alternative is anticipated to have a less-than-significant beneficial effect on the local economy.

4.8 Land Use

4.8.1 Existing Environment

The lands within Unit 2 are held in fee title by ODFW and CCGC. The site is zoned for agriculture by Coos County. Lands within Units 1 and 3 are privately owned and used for cattle grazing. All units are currently degraded leveed pasture with no public access.

4.8.2 Environmental Consequences

Alternative A: No Action Alternative

The No Action Alternative would result in no effect on land use.

Alternative B: Preferred Alternative

Under the Preferred Alternative, Unit 2 would be restored to historic freshwater wetlands that were converted to pasture by levee and drainage ditch construction. ODFW would allow public access to its site and TNC is working with CCGC to create a Conservation Easement for its parcel. A specific grazing plan (currently under development) would be implemented to use cattle grazing for fish and wildlife benefits as well as reducing invasive species in restricted areas in Unit 2.. After a century of wetland conversion for agricultural use in the Coquille River floodplain, freshwater tidal wetlands are now a rare habitat type in the basin. Given the sheer number of acres of wetland habitats lost to conversion, the Preferred Alternative would result in a less-than- significant but positive effect and is not anticipated to adversely affect local land use.

The working landscapes model allows water levels in Units 1 and 3 to continue to be managed independently which would result in a less-than-significant effect.

4.9 Soundscape

4.9.1 Existing Environment

The Project area is rural in nature and is currently outside the Urban Growth Boundary of the City of Coquille. Industrial development is present along the highway and rural residential development is present upstream in Garden Valley. A lumber mill is located east of the action area at the edge of BSDD. Highway 42 runs parallel to the Project area on the north. No large-scale industrial operations or large-point sources of human-generated sound are near or within the Project area. Human sources of sound include traffic on U.S. Highway 42, and occasional target or waterfowl shooting at the CCGC property. To assess the effects of sounds that are above ambient levels, resources that would be disturbed by Project-generated sounds are identified.

4.9.2 Environmental Consequences

Alternative A: No Action Alternative

Under the No Action Alternative, no changes to the soundscape on or near the Project area would occur.

Alternative B: Preferred Alternative

The Preferred Alternative would result in a short-term impact to the local soundscape from construction activities involving heavy equipment; however, work would be seasonal and confined to average weekday work hours. With new public access to the ODFW parcel in Unit 2, waterfowl shooting will increase. Local traffic is not expected to change with access to the site; therefore traffic sounds would not increase. The Preferred Alternative is anticipated have a less-than-significant effect on the soundscape on or near the Project area.

4.10 Cumulative Effects

4.10.1 Existing Environment

Cumulative effects result from the incremental impact of the Preferred Alternative when added to other "past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). The effects of an action may be insignificant when evaluated individually, but when added to other actions outside of the immediate Project area may contribute cumulatively to measurable environmental change. The scope for analysis of cumulative impacts is therefore larger than the immediate Project area to more broadly consider the effects of other activities occurring within the adjacent landscape.

The area considered in the evaluation of the Preferred Alternative's contribution to cumulative impacts is the Lower Coquille River basin. This area is generally rural in nature with limited urban development. The natural resources of the area are diverse, ranging from mountain forests to coastal beaches. Towns are relatively small and the economic base generally does not support large-scale urbanization found in other areas of the state. The primary industries in the basin include fishing, forestry, livestock and cranberry production, and tourism. Tourism is growing due to the scenic nature of the Oregon coast and is supported by numerous state and county parks, public beaches, and recreational opportunities.

Beginning with Native American settlement and the construction of fishing weirs, historical activities modified the Lower Coquille Basin, especially the tidal areas. The most significant changes occurred when levees were constructed to separate the river from its floodplain. In the late 19th or early 20th centuries these former floodplain areas were drained and converted to agricultural or industrial uses. In the upper basin, past and ongoing forestry practices have altered stream channels, water quality, and flow patterns.

In the mid-19th century, up to 25,000 acres of the Lower Coquille River Basin floodplain was estimated to be wetland (Ecotrust 1997). Up to 70 percent of these wetlands was thought to be timbered swamp or wooded bottom lands. It is estimated that just less than 40 percent (9,500 acres) of these wetlands has been converted into uplands and, of the remaining wetlands, 90 percent has been converted into scrub/shrub wetlands. This means that approximately 22,500 acres (90 percent) of the original 25,000 acres have either been converted to upland or modified from its original type.

Past: Similar restoration actions completed in the Coquille watershed include the Ni'les'tun Unit restoration at the Bandon Marsh National Wildlife Refuge on the Coquille River estuary about 10 miles downstream from the proposed Project area. The refuge was established in 1983 with 307 acres of salt marsh and was expanded between 2000 and 2004 to include an additional 582 acres, including 430 acres of bermed tidal wetlands. The Service, OWEB (OWEB grant 210-2032-7450), Ducks Unlimited, and others, restored the Ni'les'tun Unit in 2011 by removing the berms, filling existing drain ditches, and reconnecting three remnant stream channels to the Coquille estuary, which allowed unrestricted tidal influence to the Project site. The Ni'les'tun restoration represents the largest estuary restoration completed to date in Oregon, and restored nearly fifty percent of the lower-Coquille's salt marsh habitat.

Present: There are no other tidally influenced freshwater wetland restoration actions underway in the Lower Coquille River basin at this time.

Reasonably Foreseeable Future: Reasonably foreseeable future activities are those that are included in planning documents and have allocated funding. Such activities can be identified by reviewing the local land management plans, state transportation plans, and local government budgets, and by interviewing local government officials. The Coos County Planning Department indicated no known development Projects in the Winter Lake area or in the Lower Coquille River Basin in the planning stage at this time. The only reasonably foreseeable future actions likely to occur are those identified in Sections 3.2.3.1 and 3.2.3.2.

4.10.2 Environmental Consequences

Alternative B: Preferred Alternative

Soils and Geology

The Preferred Alternative, in combination with past, present, and reasonably foreseeable future activities, would have no cumulative effect on soils and geology. BMPs would be required to minimize impacts from all road Projects.

Air Quality

The Preferred Alternative, in combination with past, present, and reasonably foreseeable future activities, would have no cumulative effect on air quality. Neither the Preferred Alternative nor the other roadway Projects would increase capacity; therefore, there is no anticipated increase in traffic-generated pollution.

Water Resources, Vegetation and Wetlands, Fish and Wildlife, Threatened and Endangered Species

Because the cumulative effects to these resources are similar, they are discussed in this one section. The Preferred Alternative, in combination with past, present and reasonably foreseeable future action, would result in a cumulative effect on these resources. The Preferred Alternative would result in the restoration of more than 400 acres of tidal salt marsh and provide an additional 1,300 acres of overwintering habitat. It is currently the largest restoration Project of its kind in Oregon. When considered with the effects of the past from the Ni'les'tun Unit restoration at the Bandon Marsh National Wildlife Refuge (582 acres), this only amounts to less than one percent of the historically present wetlands that have been converted to either uplands or scrub/shrub wetlands in the Lower Coquille River basin watershed. The short-term impacts from the reasonably foreseeable future actions are also not likely to rise to the level of significance when considered with other similar actions

In the context of what wetlands remain in the Lower Coquille River basin, , however, the addition of 400 acres to the 582 acre Ni'les'tun Unit at the Bandon Marsh Refuge will contribute more than 11 percent to the wetland estate that exists now. Overall, the effect this Project is anticipated to have on water resources, vegetation and wetlands, and fish and wildlife species is beneficial but, in the context of past impacts and current gains, less than significant. Opportunities to restore freshwater and saltmarsh wetlands of the magnitude proposed by this action along the Oregon Coast are relatively rare, opportunistic, and not easily anticipated. Gains in wetland acreage might be offset by unanticipated losses elsewhere, equally difficult to quantify or anticipate. Thus, the cumulative effects from multiple such restorations or losses is not reasonably foreseeable and therefore challenging to analyze.

Cultural Resources

The Preferred Alternative would have a beneficial effect on cultural resources by providing habitat for trust resources but, given the context and setting, is anticipated to be less than significant.

Economics

The Preferred Alternative, in combination with past, present, and reasonably foreseeable future activities, would likely result in an increase in demand of goods and services in Coquille and the Lower Coquille Basin, although this demand would be temporary, lasting only for the duration of the restoration activities. However, Unit 2 will be accessible to the public once restoration is complete. It is anticipated the Preferred Alternative would have long-term beneficial effect on the area's economies through the public's use of Unit 2.

Land Use

The Preferred Alternative, in combination with past, present, and reasonably foreseeable future activities in the Lower Coquille River Basin, would have no cumulative effect on current land use because the area is currently managed for fish and wildlife.

Soundscape

The Preferred Alternative, in combination with past, present, and reasonably foreseeable future activities in the Lower Coquille River basin, would have no cumulative effect on the soundscape. There would be a localized temporary increase in sound due to construction activities, but because the Preferred Alternatives and the other identified activities are distant from each other, would occur in different years, and would not increase vehicular capacity, no cumulative impacts would occur.

4.11 Environmental Consequences Summary

This EA was prepared to "provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement…or a finding of no significant impact" (40 CFR Part 1508.9). The analysis is intended to determine whether a significant impact could occur as a result of implementing the proposed action. The term "significant impact" is broadly defined, allowing for impact evaluations to vary by affected resource and context (i.e., at the Project or regional scale). The process for choosing the appropriate context is discussed in Section 3.13.

The implementation of the Preferred Alternative for the restoration of freshwater habitat for fish and wildlife at the Winter Lake Restoration Project in Unit 2, and the improvements in the river-floodplain connectivity in Units 1 and 3were found to have less-than-significant impacts to all the evaluated resources. Where adverse impacts were found, they would be of too short a duration to be considered adverse. Limited to construction activities, these impacts would be minimized through the use of BMPs (see Chapter 5) and would be generally short-term and limited to construction activities.

Overall, implementation of the Preferred Alternative is expected to have beneficial impacts to natural resources, mainly fish and wildlife resources, but also to cultural resources and economic opportunities. However, in the context of historic losses of tidal wetland habitat along the Coquille River and continuing habitat loss and degradation resulting from human activities in the area, the beneficial effects associated with the Preferred Alternative are not considered to represent a significant impact.

CHAPTER 5: ENVIRONMENTAL COMMITMENTS

A wide variety of measures are incorporated into the Project's design to minimize adverse environmental impacts. The majority of these measures are nondiscretionary design criteria associated with terms and conditions from the Programmatic Restoration Opinion for Join Ecosystem Conservation By The Services (PROJECTS) biological opinions issued by the Service and NOAA-Fisheries to avoid jeopardizing the continued existence of Oregon Coast Coho salmon, eulachon, and green sturgeon in the Project area or adversely modifying Coho's designated critical habitat.

5.1 PROJECTS Design Criteria

The following BMPs were taken from both the PROJECTS biological opinion.

5.1.1 Construction Considerations

The following construction considerations would be applied during Project construction (Table 7). Full reference information for the citations and acronym definitions in this section are available in the PROJECTS biological opinion, which can be found at: http://www.fws.gov/oregonfwo/toolsforlandowners/RiverScience/Documents/201505.15PROJECTS-FINAL.pdf

Table 7. Winter Lake Project construction considerations.

BMP #	Activity
15	Site Layout and Flagging
16	Staging, Storage, and Stockpile Areas
17	Erosion Control
18	Hazardous Material Spill Prevention and Control
19	Equipment, Vehicles, and Power Tools
20	Temporary Access Roads and Paths
21	Dust Abatement
22	Temporary Stream Crossings
23	Surface Water Withdrawal and Construction Discharge Water
24	Temporary Fish Passage
25	Timing of In-Water Work
26	Fisheries, Hydrology, Geomorphology, Wildlife, Botany, and Cultural Surveys in Support of Habitat Restoration
27	Work Area Isolation
28	Fish Capture and Release
29	Invasive species and non-native plant control
30	Piling Installation
31	Site Restoration
32	Revegetation

5.1.2 Restoration Activities

Each restoration activity categories (Table 8) would be designed and implemented to help restore wetland ecological processes. Full reference information for the citations and acronym definitions in this section are available in the PROJECTS biological opinion.

Table 8. Winter Lake Project restoration activities.

PCD #	Activity
36	Fluvial Channel Reconstruction/Relocation
37	Off- and Side-Channel Habitat Restoration
38	Streambank Restoration
42	Piling and Other Structure Removal
49	Wetland Restoration
50	Tide/Flood Gate Replacement
51	Native Vegetation Restoration and Management

5.2 Additional Best Management Practices

5.2.1 Cultural Resources

If cultural resources are discovered, the following actions will be taken:

- Consult with the Service, SHPO, the Tribes, and the contractor to determine the appropriate course of action.
- Record the placement of any archaeological soils if they are moved from their original location.
- Collect and record diagnostic artifacts for storage in approved facilities.

Should human remains be discovered, all work in the vicinity shall be immediately halted. The appropriate law enforcement agency, the Service, SHPO, and the Commission on Indian Services shall be immediately notified. No human remains shall be moved or reburied without consultation with all concerned parties.

CHAPTER 6: COMMENTS AND COORDINATION

6.1 Public Involvement

Public comments for this Project were solicited on one occasion: a formal scoping period from February 2, 2016, to March 2, 2016.

Table 9. Comments and Correspondence.

Comment Author	Topic	Summarized and/or Paraphrased Comment

6.2 Coordination and Review of the EA

The Service is seeking public review of the proposed action and will accept all public comments related to this proposed action for a thirty day (30) from the date the assessment is published on the Service website. The Draft EA can be found at: http://www.coquilleworkinglandscapes.com

Written comments will be accepted until 5:00pm, March 2, 2016, and can be mailed to the address below:

Draft Environmental Assessment – Winter Lake Restoration Project

U.S. Fish and Wildlife Service
Wildlife and Sport Fish Restoration Program
Pacific Region
911 NE 11th Avenue
Portland, Oregon 97232

CHAPTER 7: LIST OF PREPARERS AND REVIEWERS

The individuals identified below participated in the preparation and review of this EA.

Service:
Sarah Bielski
Paul Hayduk
Kathy Hollar

TNC:
Steve Denney

BSDD:
Fred Messerle

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