Uma-Birch Floodplain Reconnection Project

Draft Environmental Assessment

April 2023

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ACRONYMS

ACS	American Community Survey
ACHP	Advisory Council on Historic Preservation
APE	area of potential effect
BMP	best management practice
CAFO	Concentrated Animal Feeding Operation
CEQ	Council on Environmental Quality
Cfs	cubic feet per second
CFR	Code of Federal Regulations
CO2e	carbon-dioxide equivalent
Council	Northwest Power and Conservation Council
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
Corps	U.S. Army Corps of Engineers
CRS	Columbia River System
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted decibels
DBH	diameter breast height
DPS	distinct population segment
EA	environmental assessment
EFH	Essential Fish Habitat
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
°F	degrees Fahrenheit
FCRPS	Federal Columbia River Power System
FEMA	Federal Emergency Management Agency
FONSI	finding of no significant impact
ft.	Feet
GHG	greenhouse gas
HIP	Habitat Improvement Program
MBTA	Migratory Bird Treaty Act
MPG	Major Population Group

NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
Northwest Power Act	Pacific Northwest Electric Power Planning and Conservation Act
NPDES	National Pollutant Discharge Elimination System
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OHWM	Ordinary High Water Mark
ORS	Oregon Revised Statutes
PM	particulate matter
PM_{10}	particulate matter 10 micrometers or less in diameter, or fugitive dust
$PM_{2.5}$	particulate matter 2.5 micrometers or less in diameter
RM	River Mile
RFFA	reasonably foreseeable future action
SHPO	State Historic Preservation Office
SPCC	Spill Prevention Control and Countermeasures Plan
TMDL	total maximum daily load
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGCRP	United States Global Climate Research Program

CHAPTER 1 INTRODUCTION

1.1 Background

The Bonneville Power Administration (Bonneville) is deciding whether to fund the Uma-Birch Floodplain Reconnection Project sponsored by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). This project is located in the proximity of the confluence of the Umatilla River and Birch Creek in Umatilla County near Rieth, Oregon, an unincorporated community approximately five miles west of Pendleton, Oregon, (Figure 1-1). The project is designed to improve habitat conditions for Endangered Species Act (ESA)-listed mid-Columbia steelhead (*Oncorhynchus mykiss*) and bull trout (*Salvelinus confluentus*) and other native fish species, benefit channel morphology and instream processes, and protect existing infrastructure at the Birch Creek confluence.

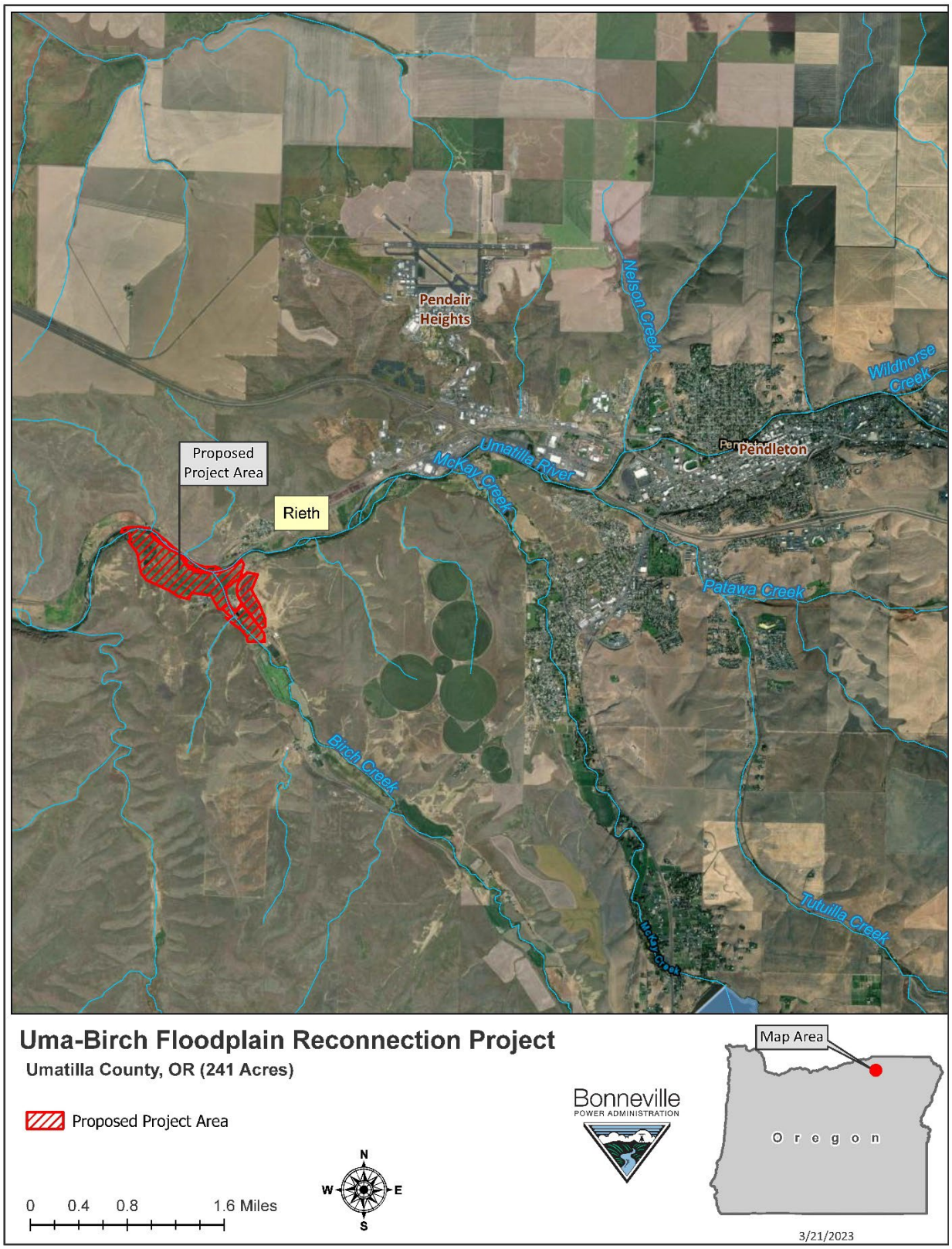
Proposed restoration activities would include modification or removal of most of a federally authorized levee and artificial berms, Umatilla River and Birch Creek confluence main-channel realignment and restoration, side-channel and floodplain restoration, habitat-forming instream structures, wetland and pond creation, feedlot decommissioning and effluent collection pond removal, and riparian and upland vegetation plantings.

Bonneville is the lead agency preparing this draft environmental assessment (EA) under the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [U.S.C.] 4321 §§ *et seq.*) and its implementing regulations. NEPA requires federal agencies to assess the impacts of proposed actions on the environment and disclose this information to the public.

Bonneville prepared this EA to determine if the Proposed Action would significantly affect the environment, and thus, warrant the preparation of an environmental impact statement (EIS), or whether it is appropriate to prepare a finding of no significant impact (FONSI).

This chapter describes Bonneville's need to act on the purposes that the agency seeks to achieve. The chapter also includes project background and summarizes the public-scoping process and comments received.

Figure 1-1. Project Vicinity Map



1.2 Purpose and Need

Bonneville is a federal power-marketing agency that is part of the U.S. Department of Energy. Multiple statutes govern Bonneville's operations, including the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act) (16 U.S.C. 839 §§ *et seq*.), which directs Bonneville to protect, mitigate, and enhance fish and wildlife affected by the development and operation of the Federal Columbia River Power System (FCRPS). To assist in accomplishing this, the Northwest Power Act requires Bonneville to fund fish and wildlife protection, mitigation, and enhancement actions consistent with the Northwest Power and Conservation Council's (Council) Columbia River Basin Fish and Wildlife Program and other purposes of the Act. The Council makes recommendations to Bonneville concerning which fish and wildlife mitigation measures to implement.

Bonneville needs to respond to the CTUIR's requests for funding the Uma-Birch Floodplain Reconnection Project. In meeting the need for action, Bonneville seeks to achieve the following purposes:

- Support ongoing efforts to mitigate for the effects of development and operation of the FCRPS on fish and wildlife in the mainstem Columbia River and its tributaries pursuant to the Northwest Power Act.
- Support conservation of ESA-listed species considered in the 2020 ESA consultations with National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) on the operations and maintenance of the Columbia River System (CRS).
- Assist in carrying out commitments in the 2008 Columbia Basin Fish Accords Memorandum of Agreements (Accords) that were reaffirmed in the subsequent amendments to the Columbia River Fish Accord Extension Agreement with CTUIR and others.
- Minimize adverse impacts to the human environment, avoid jeopardizing the continued existence of ESA-listed species, and avoid adverse modification or destruction of designated critical habitat.

1.3 Cooperating Agencies

1.3.1 US Army Corps of Engineers

The Proposed Action involves modifications or removal of most of a federally authorized levee (Pendleton 2a) managed by Umatilla County and artificial berms. Modification or removal of a federally authorized levee require US Army Corps of Engineers (Corps) (Civil Works) review and approval under Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. 408) (hereinafter referred to as Section 408). The Corps may approve the modification or removal as long as the modification or removal will not impair the usefulness of the project or be injurious to the public interest. Due to its responsibilities under the Section 408 process, the Corps is participating as a cooperating agency on this EA. The Corps also has jurisdiction over the project under Section 404 of the Federal Water Pollution Control Act (Clean Water Act) (CWA) (33 U.S.C. §§ 1251 *et seq*.), which regulates discharge of dredge and fill material into waters of the United States, and Section 10 of the Rivers and Harbors Act, which authorizes construction of any structure in or over navigable waters of the United States.

1.4 Public Involvement

1.4.1 Public Scoping and Key Issues

Through this NEPA process, Bonneville has engaged with affected communities to inform the assessment of environmental effects. To help determine the issues addressed in this EA, Bonneville conducted public-scoping outreach from **September 19, 2002** to **October 19, 2022**. Bonneville mailed letters to potentially

interested and affected persons, agencies, Tribes, and organizations, and held a public scoping meeting on **October 4, 2022** in Pendleton, Oregon. The letter provided information about the project, public scoping meeting, and EA scoping period, and requested comments on issues to be addressed in the EA, and described how to comment (through mail, fax, telephone, and Bonneville's website). Bonneville posted this on the project website to provide information about the Proposed Action and the EA process: http://www.bpa.gov/nepa/uma-birch.

Consistent with the Council on Environmental Quality's (CEQ) November 30, 2022 Memorandum and Guidance for Federal Departments and Agencies on Indigenous Knowledge, Bonneville engaged Tribes and Indigenous Peoples including the project sponsor, the CTUIR, for information and perspectives regarding environmental, cultural, and community impacts.

Bonneville received 5 written comments, posted at the project website above, during the scoping period. These comments focused on the following issues:

- Effect of levee modification on flood risk and effects to neighboring and downstream properties.
- Cost to the Bonneville ratepayer for the proposed levee modification and habitat enhancements.
- Land-use effects on property owners and effects from removing cattle from the project area.
- Effect of an upstream water treatment plant.
- Public health and safety concerns regarding potential recreational uses on proposed action area
- Potential for increased traffic and dust along Birch Creek Road.
- Removal and safe disposal of feedlot soils.
- Water supply for the Proposed Action during low summer flows.

These scoping comments are addressed in the appropriate sections of the EA.

CHAPTER 2 ALTERNATIVES

This chapter describes the alternatives analyzed in detail in this EA: The Proposed Action and the No Action alternatives. It compares the alternatives by potential environmental consequences and also identifies potential mitigation measures.

2.1 Proposed Action

Under the Proposed Action, Bonneville would fund CTUIR to complete the Uma-Birch Floodplain Reconnection Project, and would protect the restored habitat by including the project in the boundaries of a larger perpetual conservation easement to be funded by Bonneville and acquired and held by the Blue Mountain Land Trust, where Bonneville would hold third party rights of enforcement over that conservation easement. It would involve actions on about 227 acres in a project area of about 241acres along an about one-mile-long stretch of the Umatilla River (between river mile (RM) 47.8 and 49.9) and along Birch Creek (RM 0.0 to 0.7) at its confluence with the Umatilla River, near the town of Rieth, in Umatilla County.

The ultimate goal of the project is to restore fish and wildlife habitat along the Umatilla River and Birch Creek and to address the primary limiting factors identified in the Council's Umatilla Subbasin Plan (Council 2004), 2008 Columbia River Fish Accords (and subsequent amendments) and the Birch Creek Watershed Assessment and Action Plan (CTUIR 2016a) for steelhead in the Umatilla River and Birch Creek.

The project objectives are to improve habitat conditions for foraging, rearing, spawning, and migrating resident and ESA-listed fish. The Proposed Action would involve using a River Vision (Jones et al. 2009) based approach to construct project elements that initiate recovery of instream and floodplain processes through the addition of structural features, off-channel habitat creation, wetland creation, and riparian vegetation enhancement. The section below describes these activities in greater detail.

The primary proposed restoration elements associated with the Proposed Action are shown in Table 2-1. The location of these elements are depicted in Figure 2-1.

Table 2-1: Proposed Action Restoration Elements

Restoration Element	Quantity/Metric (in applicable unit)
Removal or modification of Levee and Artificial Berms	**Umatilla River:** Removal of about 1,200 feet along the authorized Pendleton 2a levee and 1,400 feet of non-authorized artificial berms. About 750 feet of new setback levee installed adjacent to Birch Creek Road. **Birch Creek:** About 4,900 feet of non-authorized artificial berms removed along both banks.
Main Channel Realignment and Restoration	About 1.4 miles (7,300 feet) of primary channel realignment, including 1 mile of the main stem Umatilla River and 0.4 miles on Birch Creek.
Improve Side Channel and Floodplain Interactions	About 141 acres of floodplain improved (based on a 2-year flooding event) and a new Taylor Lane bridge measuring about 200 feet long and 10 feet

	above the ordinary high-water mark on Birch Creek to allow for 100-year flood-level stream flows.
Install Habitat-Forming Instream Woody Structures	Between 370 and 550 pieces of wood per mile; and about 80 large-woody structures.
Construct Wetland and Side Channel Habitat	About 4 acres of created wetlands and side channel habitat.
Riparian and Upland Vegetation Plantings	Between 180 and 200 acres of native riparian vegetation and habitat enhanced, including invasive/noxious weed control.
Feedlot Decommissioning and Effluent Collection Pond Removal	Decommissioning actions include removing 36,929 cubic yards of effluent and waste material from a 26-acre Concentrated Animal Feeding Operation feedlot to an estimated depth to between 8 and 18 inches.
Overall Disturbance Area	About 227 acres.

2.1.1 Removal or Modification of Levee Modification and Set-back Levee Construction

To remove human-imposed constraints and return the project area to its historical condition at the confluence of the Umatilla River and Birch Creek, the Proposed Action would partially remove a 1,200-foot section of a Corps-authorized levee (Pendleton 2a) and about 6,300 feet of non-authorized artificial berms along the banks of Birch Creek and the Umatilla River. The removal areas would be excavated to the existing floodplain. Levee removals would allow increased access by the Umatilla River and Birch Creek to areas downstream of Birch Creek. These actions would promote floodplain reconnection and hydrological processes that sustain fish and wildlife habitat.

To maintain the current level of flood protection provided by the authorized levee upstream of Birch Creek, an approximately 750-foot new set-back levee would be constructed in closer proximity to Birch Creek Road consistent with Corps and Federal Emergency Management Agency (FEMA) standards. This setback levee would have culverts to allow for water to flow underneath. These standards include providing sufficient freeboard (i.e., the elevation, typically a minimum 3 feet, from the top of the levee to the water surface used in design). The design of this setback levee adheres to principles in the Corps' Manual for the Design and Construction of Levees (Engineering Manual 1110-2-1913) and other Corps resources. Corps' guidelines recommend that levee designs consider and analyze: (1) underseepage and through seepage; (2) slope stability; and (3) settlement (i.e., loss of freeboard) along the levee. The design could change based on feedback provided by the Corps or Umatilla County. Any updated feedback would be included in the Final EA.

Levee construction would include preparation of the levee foundation, placement of soil reinforcement material at the base of the levee fill, and the embankment and compaction of suitable levee fill material.

2.1.2 Main-Channel Realignment and Restoration

The Proposed Action would realign the Umatilla River to its historical channel along a one-mile-long reach (RM 48.7 to 49.7). Similarly, as measured from its confluence with the Umatilla River, a new main-channel would be constructed from RM 0.0 to 0.3 of Birch Creek. In addition, the main channel of Birch Creek would be realigned from RM 0.5 to 0.7 to restore historical meanders that would be more sinuous and less incised than the current stream alignment.

New channel excavation in the Umatilla River would work downstream to upstream toward the Birch Creek confluence. The new channel excavation would be excavated to an average depth of 4 feet. These realignment and restoration activities would seek to increase aquatic and riparian habitat diversity and complexity, reconnect stream channels to floodplains, improve long-term nutrient storage, provide substrate for macroinvertebrates, moderate flow disturbance, increase retention of organic materials, and provide refuge for fish and other aquatic species. Earthen plugs would be left in place at each end of the excavated length of the main channel before connecting to the main channel during the in-water work window.

Channel reconstruction would focus on improving channel process and function by reconnecting the primary active channels on the Umatilla River and Birch Creek to the floodplain, increasing instream structural complexity, installing structural elements, restoring the streambank, and enhancing "roughness." Material selection (e.g., large woody material) for the structural elements would include native species. These activities would result in enhancing natural stream processes by increasing the range of streamflow velocities, improving sediment routing, increasing hyporheic exchange (i.e., the mixing of surface and shallow subsurface water through a streambed's porous sediment) to improve floodplain water storage and capacity, improving flow timing and duration, and reducing water temperatures throughout the year.

2.1.3 Side Channel and Floodplain Restoration

These activities would focus on reestablishing stream-channel functions within the floodplains to increase floodplain connectivity, provide off-channel habitat features (e.g., alcoves and backwater refugia), promote hyporheic exchange, and reduce water temperatures. Another project objective is to promote channel migration, which would also encourage natural side channel formation over time. Although this cannot be measured at the onset of the project, it is anticipated that this would create a number of new side channels into the future by promoting these processes.

As described below, to improve side channel and floodplain interactions, the existing Taylor Lane bridge constricting Birch Creek would be replaced with a new, longer bridge to facilitate floodplain access and dynamic channel processes. In addition, fill material and large-woody structures would be added to both Birch Creek and the Umatilla River.

2.1.3.1 Taylor Lane Bridge Replacement and New Bridge Construction

To increase floodplain interactions and enhance the restoration benefits of the overall project, the existing Taylor Lane bridge crossing Birch Creek would be replaced with a newly constructed steel bridge. The existing bridge constricts flows because its supports limit access to the floodplain in the current Birch Creek alignment. A new bridge would increase connectivity to the floodplain by increasing the length of the bridge spanning Birch Creek, which would enhance the ability of Birch Creek to flow in a single thread underneath the bridge and reactivate the floodplain. This new steel bridge would measure approximately 150–200 feet across supported by one pillar below the ordinary high-water mark and utilize existing foundations to the extent practicable. Bridge material would be recycled by using it for other project restoration elements or storing onsite within disturbed areas such as those areas used for construction staging areas for a future project.

2.1.3.2 Install Habitat-Forming Instream Woody Structures

Fill material obtained from excavating side channels would be placed within the existing channel to raise the streambed elevation and create roughness. In addition, fill would be placed along the existing channels, alternating between the left bank and right bank to narrow the channel to a side channel width. Typical sections of these side channels would be designed and constructed to accommodate about 20 percent of the average two-year flow volumes. The downstream end of these side channels would be constructed to form alcoves and backwater habitat features at all flow levels to maximize habitat.

A total of around 80 large woody structures would be installed within the existing and the proposed new main channels within the ordinary high water (OHW) boundary. Placing structures made from natural habitat-forming large woody materials would resemble naturally formed log jams and provide complexity that encourages initiation of processes supporting spawning, rearing, and resting habitat for salmonids and other aquatic species. Structures would be built from locally sourced large wood and boulders. The boulders would be used as ballast within some of the log-jam structures and as individually placed rocks. The randomly placed individual rocks would be located in riffle habitat types to help create additional microsite complexity and increase juvenile rearing and adult resting cover.

Actions utilizing these structures would be designed to increase instream structural complexity and diversity, mimicking the processes and functions of natural input of large wood (e.g., whole conifer and hardwood trees, logs, root wads, etc.). Design criteria would focus on balancing biological benefit, structural resiliency, and enhancing or complementing stream and floodplain processes.

Large wood placement would use size classes for wood that include at least three different categories. Typically, these size categories include 12–18 inches, 18–24 inches and 24-inches plus at diameter breast height (DBH) (i.e., 4.5 feet above the ground with bark intact) and a minimum of 18 feet in length as the primary pieces within the placement or structure. Materials with dimensions smaller than this (e.g., shrubs, branches, smaller trees, etc.) may be incorporated (woven) into the structures for racking.

Techniques for wood placement would involve hauling trees from an area outside of the riparian zone and placing them individually or in aggregate in specified locations in the project area. Locations for wood placement would be driven by the objectives to increase coarse sediment storage, increase habitat diversity and complexity, retain gravel for spawning habitat, improve flow, provide long-term nutrient storage, increase retention of organic inputs, and provide refugia for fish during high flows.

Boulders sized about a minimum of 3 feet in diameter from a nearby quarry or from treated onsite riprap would be installed to stabilize large-wood structures and create resting habitat for fish.

2.1.4 Wetland and Side Channel Creation

About 4 acres of wetlands, ponds, and seasonally disconnected aquatic habitats would be constructed within the Umatilla River floodplain through excavations in discrete areas. These wetlands and ponds would be variable in depth to allow for some interaction under a variety of flow regimes. An objective of the project is to excavate some of these larger wetland areas to become perennial, open-water wetlands, which are connected to the channel. Each excavated area would advance the goal of restoring wetland habitats that provide high-velocity refuge, cover, and important food sources for salmon and steelhead in addition to other species of fish and wildlife. Wetland excavation work would begin on the downstream end of the project area to prevent seepage flow from upstream excavated areas.

2.1.5 Riparian and Upland Vegetation Planting

Riparian and upland vegetation planting efforts would have three objectives. The first objective would be to reestablish locally collected, native vegetation that would outcompete non-native and invasive plant species. The second objective would allow natural processes to occur while minimizing negative impacts—some areas would allow for re-adjusting to natural processes while other areas would focus on

preventing short-term soil erosion. These plantings may also provide shade, nutrient conversion, and woody material recruitment. The third objective would be to establish plants for tribal members' use as First Foods.[1]

During construction, willow (*Salix* spp.), black cottonwood (*Poplus trichocarpa*), and red-osier dogwood (*Cornus sericea*) cuttings would be utilized to plant within log jams.

During the first fall after construction activities begin, the project would begin planting in all of the disturbed areas. Some of these areas would only be sown with grass seed, while some would be planted with rooted shrub species, depending on the objective of each specific area

Newly constructed channels and side channels would be grass seeded the first fall. Project staff would then re-evaluate the situation and develop a planting plan for these areas within the first 2 to 3 years after construction.

Table 2-2 delineates the native grass seed mix that would be planted during the fall following construction. The seed source for all of these species would be locally collected within the region. Some would be collected for the project and sent to a commercial grass seed producer.

Table 2-2: Native Grass Seed Mix Composition

	Common Name	Scientific Name	Percent Composition
Riparian Sites	Blue Wildrye	*Elymus glaucus*	40%
	Idaho Fescue	*Festuca idahoensis*	40%
	Mountain Brome	*Bromus marginatus*	15%
	Tufted Hairgrass	*Deschampsia cespitosa*	5%
Mesic/Upland Sites	Basin wildrye	*Leymus cinereus*	30%
	Idaho Fescue	*Festuca idahoensis*	20%
	Sandberg Bluegrass	*Poa secunda*	15%
	Prairie Junegrass	*Koeleria macrantha*	15%
	Bluebunch Wheatgrass	*Pseudoroegneria spicata*	15%
	Mountain Brome	*Bromus marginatus*	5%

Some of the primary First Foods species that would be used in planting efforts include: elderberry (*Sambucas nigra*), chokecherry (*Prunus virginiana*), Western serviceberry (*Amelanchier arborea*), willow (*Salix* spp.), currant (*Ribes* spp.), rose (*Rosa* spp), spirea (*Spirea douglasii*), black hawthorn (*Crataegus douglasii*), oceanspray (*Holodiscus discolor*), red-osier dogwood (*Cornus sericea*), and snowberry (*Symphoricarpos albus*). These native plants typically show higher survival rates in restoration areas. Trees and shrubs would be planted in the floodplain to reestablish natural processes in restoration areas.

[1] First Foods are defined as the minimum ecological products necessary to sustain CTUIR culture (Jones 2009).

2.1.6 Feedlot Decommissioning and Effluent Collection Pond Removal

Existing feedlot infrastructure includes a manure-processing pit and associated feedlot-operations structures, compost stockpile area, and feedlot effluent collection ponds. Decommissioning would follow all conditions of the current CAFO National Pollutant Discharge Elimination System (NPDES) general permit (#01-2016) for the feedlot and effluent pond. Oregon Department of Agriculture (ODA) would develop an Animal Waste Management Plan setting forth the parameters for the safe disposal of manure and other solids from the feedlot site. Consistent with this plan, manure and soils from the site would be removed and some manure may be sold by the landowner as fertilizer or applied onsite; or alternatively, sent for disposal at a permitted disposal site after testing and approval by ODA.

This process would begin with feedlot decommissioning: removing manure, all solids to the bare soil to a minimum depth of 24 inches, and cleaning all stormwater conveyance features. Removal of most of the manure would occur by the private land owner. Manure would be disposed as described above. The feedlot effluent collection ponds would be decommissioned, which includes removal of solids, liquids, and sludge within the ponds, removal of a liner if present, processing pit and associated berm, and compost material stockpile areas determined unsuitable for natural riparian soils. In addition, the existing feedlot operation buildings and infrastructure would be removed. These subsequent removal phases for small buildings, fencing, and the final layer of manure adjacent to the underlying native soil would be disposed of with all materials sent to an approved landfill or similar location consistent with county and state regulations.

Removal of the effluent collection ponds would be the final step, and would require appropriate containment to ensure no effluent discharge to Birch Creek. This would also require inspection, review, and approval from the ODA, which may require soil testing and identification of an approved disposal site for removed solids among other requirements.

2.1.7 Temporary Staging Areas, Access Roads, and Water Crossings

Riparian vegetation would be cut to the ground level for temporary access roads. A staging area up to about 2 acres would be cut to grass level. A temporary main access road would be used with a width up to about 20 feet. This would allow for two-way traffic for large construction equipment. At least one temporary channel-spanning bridge made of wood or steel would be installed to allow for large construction equipment access to either side of wetted channels. This bridge would likely be moved several times during construction. Temporary water crossings would be made at locations that minimize the impacts to existing vegetation.

2.1.8 Conservation Easement and Water Rights Transfer

Bonneville is also working with the property landowner, CTUIR and the Blue Mountain Land Trust on the acquisition of a voluntary permanent conservation easement, containing the property associated with and restored by the Uma-Birch Floodplain Reconnection Project as well as additional property for potential restoration outside of this project area. The conservation easement would be funded by Bonneville, which would be acquired and held by the Blue Mountain Land Trust, and Bonneville would hold third party rights of enforcement. The conservation easement would permanently protect riparian

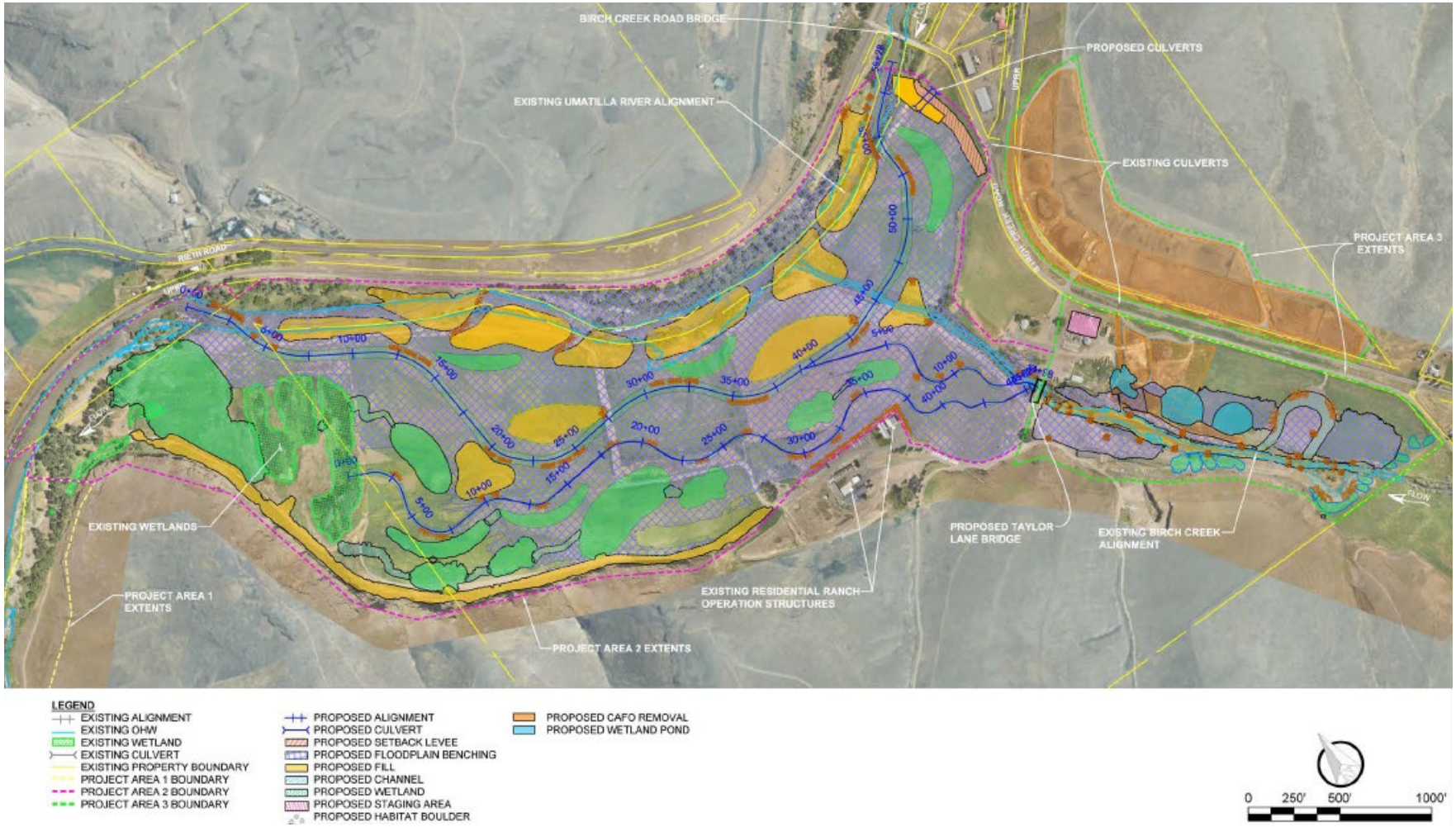
areas restored under the Proposed Action and other potential restoration actions not addressed in this EA,[2] and provide other conservation benefits.

The conservation easement would permanently limit uses of the property in order to protect its conservation values. Restrictions are expected to include, among others, a prohibition on subdivision and limitations on commercial, industrial, and residential use, such that residential and commercial use would be allowed only in certain building envelopes, and limited ranching and agricultural activities would only be allowed pursuant to a management plan and would occur mainly outside of a riparian management zone.

As part of the conservation easement transaction, it is expected that all or a portion of eleven surface water rights associated with the Umatilla River and Birch Creek, some of which are attached to land associated with the Uma-Birch Floodplain Reconnection Project area and some of which are attached to land outside the project area, would be transferred irrigation/domestic/stock to instream to provide permanent instream flows for the benefit of fish and wildlife. In total, the water rights included under the proposed Uma-Birch conservation easement include an estimated 9.725 cfs rate of primary surface water rights that would be transferred instream.

[2] CTUIR, with BPA funding, has proposed the Birch Creek Floodplain Restoration Project within the scope of this conservation easement. BPA completed an environmental assessment on that proposed project, which is available at the BPA project website: https://www.bpa.gov/learn-and-participate/public-involvement-decisions/project-reviews/birch-creek-floodplain-restoration-project-doe-ea-2135 (last accessed February 1, 2023).

Figure 2-1: Proposed Action Construction Elements.



2.2 Construction Sequencing and Timing

2.2.1 Construction Activities

The restoration elements in the Proposed Action would be conducted within stream channels, riparian areas, floodplains, and uplands. They would be accomplished using manual labor, hand tools (chainsaws, tree planting tools, augers, shovels, and more), all-terrain vehicles, flat-bed trucks, and heavy equipment (backhoes, excavators, bulldozers, front-end loaders, dump trucks, winch machinery, cable yarding, etc.).

Specifically, implementing the Proposed Action would require operating about 4 excavators, 1 bulldozer, 2 front-end loaders/scrapers, a large water truck, as well as about 4 off-road dump trucks. Materials would be hauled using an additional 2 or 3 end- or side-dump dump trucks, and between 2 and 4 logging trucks. A backhoe and excavator would deconstruct the existing levee and construct the new set-back levee.

The equipment and supporting vehicles would repeatedly make trips to the site and likely operate on site at the same time. Utilizing erosion control best management practices, mass excavation of channels and wetland features, transport and placement of soil and the existing channel would be performed using a variety of industry-standard earthmoving equipment such as tracked excavators and bulldozers. Dust abatement would be completed by keeping the roads and work areas watered down. This would also help alleviate fire concerns. Prior to entering the site, all vehicles and equipment would be power-washed, allowed to dry fully, and inspected to ensure plants, soil, or other organic materials have been removed. Watercraft, waders, boots, and any other gear to be used in or near water would be inspected for aquatic invasive species.

Crews would carry out construction of the large wood structures in the following sequence: First, during in-water work season, the area immediately surrounding each structure would be isolated with nets to prevent fish from entering the area. Then, qualified fish biologists would perform fish salvage to physically remove any remaining fish consistent with fish-salvage protocols described in Bonneville's Habitat Improvement Program (HIP) conservation measures. Prior to construction, a temporary cofferdam comprised of non-erodible materials would isolate each work area located within the nets previously installed. Next, construction crews would excavate trenches to a minimum depth of 6 feet to install each large wood structure. The area upstream of each structure would be excavated to facilitate development of side channels. Boulders would be installed along with spoils from excavation to backfill each structure, which would be compacted with an excavator bucket.

Earthen work associated with channel excavation, floodplain bench installation, and fill along with the existing Pendleton 2a levee material removal would be carried out with mechanical excavation using equipment described above adhering to the engineering design and implementation plan issued by CTUIR to the construction contractor. Wetland and pond creation would be carried out with mechanical excavation using tracked excavators. Areas would be prepared for plantings and maintenance by visiting the site with trucks and initially operating mechanical equipment to decompact soil after heavy equipment leaves the site.

2.2.2 Anticipated Construction Schedule and Phasing

The Proposed Action would be carried out seasonally during 2 to 4 calendar years starting in 2024. Work would be planned depending on whether it would occur in water, which would require work to occur during the in-water work window for the Umatilla River and Birch Creek (July 1–October 31) specified by Oregon Department of Fish and Wildlife (ODFW) to protect salmonids. New channel construction and wetland excavation in areas above the OHW mark would occur during fall and winter of the first calendar year. In addition, during the first calendar year's in-water work window, to improve side channel and floodplain interaction, fill would be placed to narrow the existing channel. The rest of the in-channel

work, such as installing instream structures, would occur during the in-water work window in the second calendar year.

Table 2-3: Anticipated Construction Schedule and Phasing

Before in-water work window (November 1 to June 30)

• Complete pre-construction activities:
  ○ Construction staking and flagging sensitive areas;
  ○ Mobilize to site and prepare it for construction; and
  ○ Install temporary erosion and sediment controls.
• Acquisition, hauling, and staging of large wood structures.
• Clear vegetation to the ground level for temporary access roads.
• Begin main channel, wetland, levee, and pond excavations above OHW, including initial construction of terrace fill and roughness, leaving a small earthen plug at the upstream end of the project to leave the area dry.

During in-water work window (July 1 to October 31)
• Install cofferdam, remove downstream earthen plug, and salvage fish. • Remove upstream earthen plug and slowly introduce flow into the new main channel and monitor for turbidity. • Isolate existing sections of Birch Creek and the Umatilla River and conduct fish salvage, if needed, to remove stranded fish. • Dewater existing Birch Creek and Umatilla River and construct roughness. • Construct side channels, distributary channels, levees, new channel meanders, and floodplains below OHW. • Install instream habitat-forming features such as large-woody structures. • Construct connections and rewater project site.
After in-water work window (after October 31)
• Seed and mulch all disturbed areas. • Site clean-up and demobilization. • Decompact soil and initiate first series of riparian and wetland vegetation plantings.

2.3 No-Action Alternative

Under the No Action Alternative, Bonneville would not fund the Uma-Birch Floodplain Reconnection Project and CTUIR would not construct the project. The area would remain in its current state, including the current Umatilla River and Birch Creek channel alignments. The current owner of the feedlot has removed the livestock. Under the No Action Alternative, the feedlot infrastructure would remain in place, which if there were a change in ownership or future landowner objectives, the area could resume operations in the future.

2.4 Comparison of the Alternatives

Table 2-4 compares the Proposed Action to the No Action Alternative, and provides a summary and comparison of the potential environmental consequences of each alternative. Chapter 3 provides detailed analysis of environmental consequences.

Table 2-4: Summary and Comparison of Potential Environmental Impacts of the Alternatives

Resource Category	Proposed Action	No Action
Geology and Soils	• Short-term low-level impacts to soil from implementing restoration actions. Low-level long-term effects of these restoration actions would ultimately improve soil quality and productivity.	• There would be no effect to geology and soils resulting from the Proposed Action; however, ongoing effects to geology and soils would continue. The feedlot and effluent pond area would remain and could continue contributing manure runoff and other sediment into Birch Creek.
Vegetation	• Short-term moderate adverse impacts to vegetation from construction and the resulting changes to plant communities. Long-term high beneficial impacts from restored floodplain function and revegetated native plant communities. Post-construction monitoring is informed by the Monitoring and Adaptive Management Plan.	• There would be no new impacts to vegetation from the Proposed Action. There would be no improvement in riparian vegetation and vegetation communities would remain dominated by non-native species. Vegetation communities would remain dominated by non-native species or no vegetation cover within the feedlot with the continued likely decline in the diversity of native plants.
Water Resources (Water Quality and Quantity, and Groundwater)	• Though restoration activities would have short-term, moderate, adverse impacts on water quality and stream temperature, the Proposed Action is expected to improve stream sediment and turbidity conditions overall. In addition, over the long term, a moderate to high beneficial impact from lower stream temperatures and the increased return volume and decrease in water temperatures for groundwater recharge; and a portion of water rights in the Umatilla River and Birch Creek would be transferred to facilitate instream flows, resulting in a low beneficial impact to water quantity with increased flows.	• There would be no effects to Water Resources from the Proposed Action, including improvements in stream structure, temperature, or groundwater, nor any increase in water dedicated to instream flows in the Umatilla River watershed because there would not be a transfer of existing water rights. The feedlot and effluent pond area would remain and could continue contributing manure runoff and other sediment into Birch Creek, particularly during flooding events.
Wetlands and Floodplains	• For wetlands and floodplains, there would be moderate long-term beneficial impacts from reconnecting the floodplain and wetland creation. Reconnecting the floodplain to the Umatilla River and Birch Creek would allow floodwaters to enter portions of the historical floodplain. Constructing a new set-back levee would maintain the existing level of flood protection for neighboring properties.	• There would be no wetland and floodplain creation nor improvements in connectivity to the floodplain. Ongoing effects due to the disconnection of the historical floodplain from the Umatilla River and Birch Creek would continue.

	Furthermore, an increased floodplain size and extent at the project location is expected to allow river flows to slow down and dissipate energy, thus reducing water velocity within, and downstream of the project area, and potentially, lessening the impacts from flood flows on downstream properties.	
Fish and Aquatic Species	• After the implementation of the design features and mitigation measures defined in Bonneville's Habitat Improvement Program (HIP) conservation measures, there would be a short-term adverse impact to fish and aquatic species from construction-related sedimentation. Longer term, there would a moderate long-term beneficial impact from improved flow and habitat conditions.	• Fish salvage and temporary habitat modification to fish and aquatic species would not occur. The long-term beneficial impacts to anadromous and resident fish would not be realized. The feedlot and effluent pond area would remain and could continue contributing manure runoff and other sediment into Birch Creek that would negatively affect fish and other aquatic species.
Wildlife	• Restoration activities would have short-term adverse impacts due to construction disturbance and associated conversion of existing habitat with long-term beneficial impacts with improved habitat conditions.	• There would be no impact from construction-related disturbances to wildlife individuals and habitat. Ongoing effects of noise and habitat degradation from ranching and agricultural land use would continue.
Cultural Resources	• Restoration activities would result in the removal of two historic built resources (Pendleton 2a levee and feedlot maintenance yard) eligible for the National Register of Historic Places, which would result in adverse effects. Mitigation measures such as providing documentation of the affected resources on a public-facing website would be implemented to reduce the impacts to cultural resources.	• There would be no ground disturbance with the No Action Alternative, and there would therefore be no potential to affect cultural resources.
Land Use	• Restoration actions would change land use because land previously used for agricultural and feedlot activities would be dedicated to floodplain habitat and a new hydrologic regime.	• Current land uses involving ranching and agricultural use activities would continue.
Air Quality	• Impacts would primarily occur from short-term emissions of criteria pollutants and dust from construction vehicles, which would be temporary and localized in nature.	• No emissions of criteria pollutants associated with construction would occur. Ongoing effects from agricultural, ranching, and residential land use that could generate dust would continue.

Climate Change	• Greenhouse-gas emissions would result from short-duration construction activities. Long-term contribution to the amelioration of climate change could result from restoring functional riparian, wetland, and floodplain habitats that store carbon. Increased water table inputs that could ameliorate effects of climate change on aquatic species by lowering water temperatures.	• No contributions from construction-vehicle or on-road vehicle emissions of greenhouse gases. There also would not be any amelioration of climate change through creation of wetland soils or its impacts through water table inputs that lower water temperatures. Continued agricultural and ranching activities such as the use of machinery would contribute greenhouse gases.
Noise	• Short-term low impacts from noise generated by the Proposed Action would be minimal due to the relatively short duration of construction.	• There would not be noise generated from construction; and the noise associated with ranching and agricultural land use and associated activities such as the feedlot operation could continue.
Public Health and Safety	• Construction of a new set-back levee would maintain the existing level of flood protection and not increase flood risk. The potential health and safety risks to workers and the public during construction would have low short-term effects during construction.	• There would be no change in public health or safety risks without implementation of the Proposed Action.
Socioeconomics	• Short-term beneficial economic impacts to local communities from an estimated $10-15 million in direct project spending and temporary employment for about 20 construction workers.	• There would be no change in socioeconomic conditions without implementation of the Proposed Action.
Environmental Justice	• The Proposed Action would not have an effect on environmental justice because short-term construction activities would not result in disproportionately high and adverse exposure to those effects by low-income or minority populations living near the project area.	• The Proposed Action would not induce a change that could affect an environmental justice population Ongoing adverse environmental effects from the current condition and activities in the project area would continue unabated. Because none of these effects are expected to be high, and the project area does not uniquely expose environmental justice populations to those effects, there would not be a disproportionately high and adverse effect to environmental justice populations.

2.5 Mitigation Measures

To minimize impacts to resources from the Proposed Action, the best management practices (BMPs) and mitigation measures described in Table 2-5 would be implemented during the design and construction of the project.

In addition to the mitigation measures described below, conservation measures from Bonneville's programmatic Habitat Improvement Program (HIP) ESA programmatic Section 7 consultation would be implemented to reduce impacts to ESA-listed fish species.

Table 2-5: Mitigation Measures

Resource Category	Mitigation Measures
Geology and Soils	• Create a Sediment Control Plan, and include daily monitoring during in-water construction, regular inspection, and recording control measures. • Use sediment barriers, such as silt fences, ballast berms, and straw wattles. • Minimize the area of disturbance. • Use water trucks to apply water to control dust, as needed. • Apply mulch or straw, or reseed exposed soil areas to reduce erosion and dust and completing work within a given area. • Sequence construction to minimize soil exposure and erosion potential. • Decompact staging areas and decommissioned access roads through subsoiling to a minimum of 18 inches and replanting. • Continue monitoring channel formation, particularly to ensure that functioning channels are experiencing sustainable levels of aggradation and erosion. • Follow all ODA requirements for decommissioning and animal waste removal for the feedlot and effluent pond including ODA's Animal Waste Management Plan and all permit conditions in the CAFO NPDES General Permit (#01-2016).
Vegetation	• Wash construction equipment before it is mobilized to the project area to control the spread of non-native species. • Minimize disturbance to native vegetation. • Replant with native seed mix as rapidly as possible following the completion of construction. • Develop a plan to monitor and maintain native-plant communities and control non-native and invasive plants. • Include mechanical and chemical treatment methods for non-native species.
Water Resources, Wetlands and Floodplains	• Obtain Clean Water Act permits and apply permit-specific protection measures. • Monitor turbidity during construction by taking a baseline measurement 100 feet upstream and a second downstream measurement (approximately 50 feet downstream from construction activities) to ensure turbidity does not exceed levels established under the ESA consultation with NMFS. If this monitoring indicates that turbidity controls are ineffective, immediately mobilize work crews to repair, replace, or reinforce controls as necessary. Work will stop until readings fall within an acceptable range. • Obtain on-site materials for restoration activities to the degree possible. • Develop a Spill Prevention Control and Countermeasures (SPCC) Plan prior to project initiation. • Identify and locate staging areas, storage sites (fuel, chemical, equipment, and materials) potentially polluting activities, and secure them using methods identified in the SPCC 150 feet or more from any natural water body or on an adjacent, established road area in a location and manner that would preclude erosion into, or contamination of, the stream or floodplain. • Use only hydraulic fluids approved for work in aquatic environments that are biodegradable.

	• Wash heavy equipment before delivery to project site to remove oils, fluids, grease, weed seed, etc. • Inspect and clean heavy equipment regularly. Repair any leaks immediately upon discovery. • Identify pollution and control measures that would be implemented in the SPCC. • Have a spill containment kit on site at all times during construction. • Operate all small engines within a non-permeable container when operating near water. • Perform all non-emergency maintenance of equipment off site. • Dispose all waste (solid waste, hazardous materials, etc.) off site, as regulated by the state. • Remove all equipment, materials, supplies, and waste from project site when complete. • Schedule activities and manage water flows and levels to provide dry working conditions as much as possible. • Stockpiled soils would be covered if they would be inactive for more than a few days. • Machinery for in-water work would be operated in out-of-stream areas as much as possible.
Fish and Aquatic Species	• Construct only during in-water work windows (July 1 to October 31) specified by ODFW and NMFS. • A qualified fish biologist would be on-site to conduct fish salvage after isolating work areas according to NMFS protocols for handling ESA-listed fish. • Limit the extent of stream that is dewatered to the minimum practicable to accomplish the project objectives. This includes not filling the entire current channel to reduce the mortality of all aquatic organisms. • Preserve riparian vegetation to the extent possible during construction. • Implement all conservation measures relevant to listed anadromous fish and bull trout from HIP Biological Opinions.
Wildlife	• Schedule tree removal between September 15 and March 1 to protect migratory birds. If tree removal is necessary outside this window, a qualified biologist would conduct a preconstruction survey to determine whether nesting birds are present. • If temporary construction areas provide suitable nesting habitat, implement actions that render that potential habitat unattractive to birds. • If a golden or bald eagle nest is located or determined to be active, avoid disruptive construction activities within a half mile of that nest during eagle breeding season and avoid removing snags and large trees to the extent practicable.
Cultural Resources	• Provide a historic context statement and documentation of the two built resources being adversely affected (Pendleton Levee 2a and Feedlot Maintenance Yard) on BPA's public facing cultural resources website, so the information would be available to the general public and future researchers. • Implement an Inadvertent Discovery Plan for cultural material (e.g., structural remains, Euro-American artifacts, or Native American artifacts) that details construction crew member responsibilities for reporting in the event of a discovery

	of cultural material during construction; require work to stop immediately and notification of local law enforcement officials (as required), appropriate Bonneville personnel, SHPO, and affected tribes if cultural resources or human remains are discovered during construction activities. • Implement an Inadvertent Discovery Plan for human remains, suspected human remains, or any items suspected to be related to a human burial (i.e., funerary items, sacred objects, or objects of cultural patrimony). This will include the following procedures: o Halt of activities. All survey, excavation, and construction activities shall cease. The human remains shall not be disturbed any further. o Notification. Local law enforcement officials, the local government, and the Indian tribal governments shall be contacted immediately. o Inspection. The county coroner, or appropriate official, shall inspect the remains at the project site and determine if they are prehistoric/historic or modern. Representatives from the Indian tribal governments shall have an opportunity to monitor the inspection. o Jurisdiction. If the remains are modern, the appropriate law enforcement officials shall assume jurisdiction and the cultural resource protection process may conclude. o Treatment. In Oregon, prehistoric/historic remains of Native Americans shall generally be treated in accordance with the procedures set forth in Oregon Revised Statutes (ORS) 97.740 to 97.760.
Land Use	None identified.
Air Quality	• Apply water from water trucks to excavation areas and set a low speed limit to reduce dust. • Limit idling for construction vehicles and machinery.
Climate Change	• Limit idling for construction vehicles and machinery.
Noise	• Limit construction to daylight hours (typically the hours between 7:00 a.m. and 7:00 p.m.) • Fit equipment with best available sound muffling devices to the extent practicable, and check mufflers on a regular basis to ensure they function properly. • Review construction phasing to minimize the duration of particularly noisy activities and the overall duration of construction near residences.
Public Health and Safety	• Conduct construction safety meetings to start each workday to review potential safety issues and concerns. • Notify local residents of anticipated construction timelines and potential for increased traffic along Birch Creek Road and Taylor Lane. • Ensure adequate alternate access for the areas affected by bridge construction along Taylor Lane bridge. • Post signage and assign personnel to direct traffic during construction to facilitate the flow of traffic and access by emergency vehicles. • Use adequate signage and other routine safeguards for worker and public safety, and especially when utilizing ingress and egress to ensure safe crossings for vehicle traffic.

	• Require workers to wear all necessary personal protective equipment when working with potentially hazardous materials. • Temporarily store any waste liquids generated at the staging areas under an impervious cover until they could be properly transported to and disposed of at a facility that is approved for receipt of hazardous materials.
Socioeconomics	None identified.
Environmental Justice	None identified.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental conditions in and around the project area that could be affected by the Proposed Action or the No Action Alternative, and evaluates the potential impacts that could arise from implementing either alternative. The impact levels are characterized as high, moderate, low, or no impact. These impact levels are based on the analysis provided, which considers the affected environment and degree of effect under CEQ's Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1501.3). For each resource category, Table 2-5 in Chapter 2 identifies minimization and mitigation measures that would help reduce or avoid impacts.

Table 3-1 identifies resources initially considered for impact analysis. Not all the resources present in the project area would experience impacts that require further analysis in this EA because alternatives would result in either no impact or a negligible impact on the resource.

Table 3-1: Resources Initially Considered for Impact Analysis

Resource	Resource Status	Resource Evaluation
Geology and Soils	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Vegetation	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Water Resources, Wetlands and Floodplains	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Fish and Aquatic Species	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Wildlife	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Cultural Resources	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Land Use	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Visual Quality	Present, Negligible Impact	Existing views of the project area would not change because the overall degree of visual change in the existing viewshed along the Umatilla River and Birch Creek would be limited under the alternatives. Visual Quality impacts in construction areas would be temporary with all equipment and materials removed after construction, resulting in a short-term low visual impact, and a long-term negligible impact.
Air Quality	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Greenhouse Gases	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Noise	Present, Affected	Impacts are further disclosed under Environmental Consequences.

Public Health and Safety	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Socioeconomics	Present, Affected	Impacts are further disclosed under Environmental Consequences.
Environmental Justice	Present, Affected	Impacts are further disclosed under Environmental Consequences.

3.1 Geology and Soils

3.1.1 Affected Environment

The project area is located within the plains and terraces of the Umatilla Plain geologic province, which generally consists of sedimentary deposits (CTUIR 2016a). The dominant soil type, covering almost half of the project area, is gravelly silt loam of the Freewater silt loam series with slopes of 0-to-3 percent. These are deep, somewhat excessively drained soils found in the Walla Walla valley and along the Umatilla River and its tributaries. They generally support land uses such as fruit tree production, small pasture, and alfalfa and small grain production (NRCS 2002). These soils are moderately susceptible to erosion from wind and water with runoff potential when thoroughly wet (NRCS 2013).

In order of prevalence, other soil types covering between 5% and 15% of the project area include anderly silt loam with 12- to 20-percent slopes, Yakima silt loam with 0- to 3-percent slopes, and condon silt loam with 20-35 percent slopes; and Hermiston silt loam and onyx silt loam with 0- to 3-percent slopes.

Based on these soil associations, the Natural Resources Conservation Service identifies farmlands as either prime farmland, unique farmland, or farmland of statewide importance. The farmland classification for most soils described above for the project area is “farmland of statewide importance” (NRCS 2015). In general, this includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable (NRCS 2021). Hermiston silt loam and onyx silt loam are “prime farmland only if irrigated” (NRCS 2015). Because these project-area soils are not currently irrigated, there is no prime farmland in the project area.

The feedlot site has an open pit collecting manure and runoff. Bonneville completed a phase-one environmental site assessment for the project area in 2020, including reviewing landowner and user questionnaires. A de minimis amount of stained soil from an above ground diesel storage tank was the only recognized environmental condition noted in the project area (not in the feedlot); recommendations included soil removal and proper disposal in accordance with acceptable regulatory practices. Bonneville will be conducting an updated phase-one environmental site assessment given changes in the project boundary and the lapse of time since 2020.

3.1.2 Environmental Consequences – Proposed Action

With the use of heavy machinery for restoration actions such as levee modification, wetland creation, and main channel realignment, the Proposed Action would compact and expose soils in the project area. The construction of the new Taylor Lane bridge would similarly affect soils and the subsurface geology in excavating soils to construct the bridge abutments.

The total area of disturbance within the overall 241-acre project area would be about 227 acres. During construction activities, relevant design criteria, mitigation measures, and BMPs (see Table 2-5) would apply to minimize impacts to soils and subsurface geology, to maintain long-term productivity of soils in riparian ecosystems, to minimize soil erosion, and to facilitate long-term recovery of soil properties and

function where needed. The use of heavy construction equipment would directly impact soils. Heavy equipment use would compact, displace (move from one place to another), mix horizons, and cause puddling.[3] These impacts would occur throughout the construction site but would be limited to the construction footprint. Soil productivity and function would be impaired in the short term, but would likely recover within 15 years (Fleming et al. 2006; Lloyd et al. 2013; Page-Dumroese et al. 2006). Further, soils from the feedlot decommissioning would be excavated, removed, and disposed of offsite or used as a fertilizer in an alternate, upland location.

As discussed throughout this EA, restoration actions intend to improve ecological function of the Umatilla River, Birch Creek, riparian areas, wetlands, and floodplains. Though the project area would experience short-term impacts to soil, the long-term impacts of these restoration actions would ultimately improve soil quality and productivity from improved floodplain interactions and reestablishing native plant communities resulting from the Proposed Action.

The Proposed Action is designed to restore natural flooding and sediment-deposition regimes. The feedlot and effluent pond currently deposit effluent and other manure runoff into Birch Creek. The removal of manure and associated soils and the restoration of the site would reduce soil contamination and reduce the runoff of those soils off site.

In the restored floodplain areas, seasonal flooding would contribute to fine sediment deposits, which promote riparian growth of vegetation with propagules,[4] seeds, and organic matter. The deposited sediment also amends the soil's physical function by increasing water-holding capacity and providing a substrate for seedlings to establish. Reestablishing these processes in riparian areas and floodplains allows soil hydrologic, biologic, and nutrient-cycling functions to be restored and maintained (Stromberg et al. 2007; Tabacchi et al. 1998).

In summary, there would be short-term low-level impacts to soil would occur from construction, which would result in a **low impact** to soils and geology. Low-level long-term effects of these restoration actions would ultimately improve soil quality and productivity, which would result in a **moderate beneficial impact**.

3.1.3 Environmental Consequences – No Action

There would be no construction activity associated with the No Action Alternative and therefore soils would not be affected from construction; however, there would not be an improvement in soil quality and productivity from the restoration actions. Without implementation of the floodplain reconnection and resulting restoration of project-area soils, disturbed soils and soils susceptible to runoff in the project area deposited by runoff from the feedlot and effluent pond area would continue to contribute manure and other sediments into Birch Creek. Overall, without construction changing the existing soil and geology in the project area, there would be **no impact** to geology and soils from the Proposed Action, and ongoing effects to geology and soils under the No Action Alternative would continue.

[3] Soil puddling is the effect of operating heavy machinery in soils with a high moisture content to produce uniformly soft structure-less mud.

[4] Propagules are vegetative structures that can become detached from a plant and give rise to a new plant (e.g., a bud, sucker, or spore).

3.2 Vegetation

3.2.1 Affected Environment

The project area contains 5 distinct vegetation communities, discussed below. Figure 3-1 illustrates the locations for each of these vegetation communities.

3.2.1.1.1 Riparian Vegetation Communities

Riparian vegetation occurs along the Umatilla River and Birch Creek and covers 35.25 acres (about 14.5 percent) of the project area. Canopy cover is most dense along the Umatilla River with greater than 90% cover. Tree species observed in riparian areas include alder (*Alnus* spp.), black cottonwood (*Populus trichocarpa*), box elder (*Acer negundo*), coyote willow (*Salix exigua*), Mackenzie's willow (*Salix prolixa*), and non-native tree species such as Russian olive (*Elaeagnus angustifolia*) and green ash (*Fraxinus pennsylvanica*). Shrubs observed in riparian areas included chokecherry (*Prunus virginiana*), blue elderberry, golden currant (*Ribes aureum*), and redosier dogwood (*Cornus sericea*). Herbaceous forbs and graminoids common in riparian areas include reed canarygrass (*Phalaris arundinacea*), common teasel, western Canada goldenrod (*Solidaga lepida* var. *lepida*), western goldenrod (*Euthamia occidentalis*), stinging nettle (*Urtica dioica*), common bedstraw (*Galium aparine*), catnip, and western clematis (*Clematis ligusticifolia*).

Small cobbled areas in floodplain areas along the Umatilla River also support rough cocklebur (*Xanthium strumarium*), sweetclover (*Melilotus officinalis*), bur ragweed (*Ambrosia acanthicarpa*), black mustard, and redroot amaranth (*Amaranthus retroflexus*).

As discussed below, eleven state-listed noxious weeds, including Russian knapweed (*Acroptilon repens*), common houndstongue, poison hemlock, field bindweed (*Convolvulus arvensis*), common St. John's-wort (*Hypericum perforatum*), Canada thistle, Scotch thistle, yellow starthistle, diffuse knapweed (*Centaurea diffusa*), rush skeletonweed (*Chondrilla juncea*), and Dalmatian toadflax (*Linaria dalmatica*) were also observed in riparian vegetation communities.

3.2.1.1.2 Wetland Vegetation

A wetland vegetation community covers 18.8 acres (around 8 percent) of the total project area. Vegetation in this area is a mosaic of wetland and upland vegetation. Common species observed in the wetland areas included coyote willow, reed canarygrass, annual rabbitsfoot grass (*Polypogon monspeliensis*), dock (*Rumex* spp.), cattail (*Typha* spp.), water speedwell (*Veronica anagallis-aquatica*), and bittersweet (*Solanum dulcamara*), as well as four state-listed noxious weeds: poison hemlock, Canada thistle, Himalayan blackberry (*Rubus armeniacus*), and perennial pepperweed (*Lepidium latifolium*). Upland vegetation observed in this upland/wetland mosaic primarily included non-native, invasive species such as cheatgrass, rattail fescue, mouse barely (*Hordeum murinum*), sot brome (*Bromus hordeaceus*), black mustard, kochia, Queen Anne's lace (*Daucus carota*), and common mullein.

3.2.1.1.3 Cliffs, Caves, and Talus

Due to its rocky nature, vegetative cover is low in this habitat and vegetation community type. It covers 5.7 acres (around 2 percent) of the project area. Vegetation that does occur in these areas includes weedy species such as cheatgrass and tall tumblemustard, as well as three state- or county-listed noxious weeds: Scotch thistle, yellow starthistle, and cereal rye. Native species within the cliffs, caves, and talus community include western clematis, blue elderberry, Lewis' mock orange (*Philadelphus lewisii*), strict buckwheat (*Eriogonum strictum*), and rubber rabbitbrush (*Ericameria nauseosa*).

3.2.1.1.4 Introduced Upland Vegetation Communities

Introduced (non-native) upland vegetation covers 8.8 acres (about 3.5 percent) of the project area. This vegetation community primarily consists of non-native grass and forb species such as cheatgrass (*Bromus tectorum)*, tall tumblemustard (*Sisymbrium altissimum*), black mustard (*Brassica nigra*), and several state and/or county-listed noxious weeds, including cereal rye (*Secale cereale*), Scotch thistle (*Onopordum acanthium*), yellow starthistle (*Centaurea solstitialis*), Russian knapweed (*Acroptilon repens*), and kochia (*Bassia* [*Kochia*] *scoparia*). Native vegetation species, such as Great Basin wildrye (*Leymus cinereus*), yarrow (*Achillea millefolium*), fiddleneck (*Amsinckia* spp.) are sporadically present. Scattered shrubs, primarily elderberry (*Sambucus nigra* subsp. *caerulea*) and big sagebrush (*Artemisia tridentata*), are also occasionally present in this vegetation community.

Introduced upland vegetation in the northern corner of the project area supports large stands of wetland plant species such as common teasel (*Dipsacus fullonum*) and poison hemlock (*Conium maculatum*), interspersed with upland species such as Scotch thistle, Canada thistle (*Cirsium arvense*), black mustard, common mullein (*Verbascum thapsus*), common houndstongue (*Cynoglossum officinale*), catnip (*Nepeta cataria*), bull thistle (*Cirsium vulgare*), and sterile brome (*Bromus sterilis*). As discussed below, bull thistle, Canada thistle, common houndstongue, and poison hemlock, are state-listed noxious weeds.

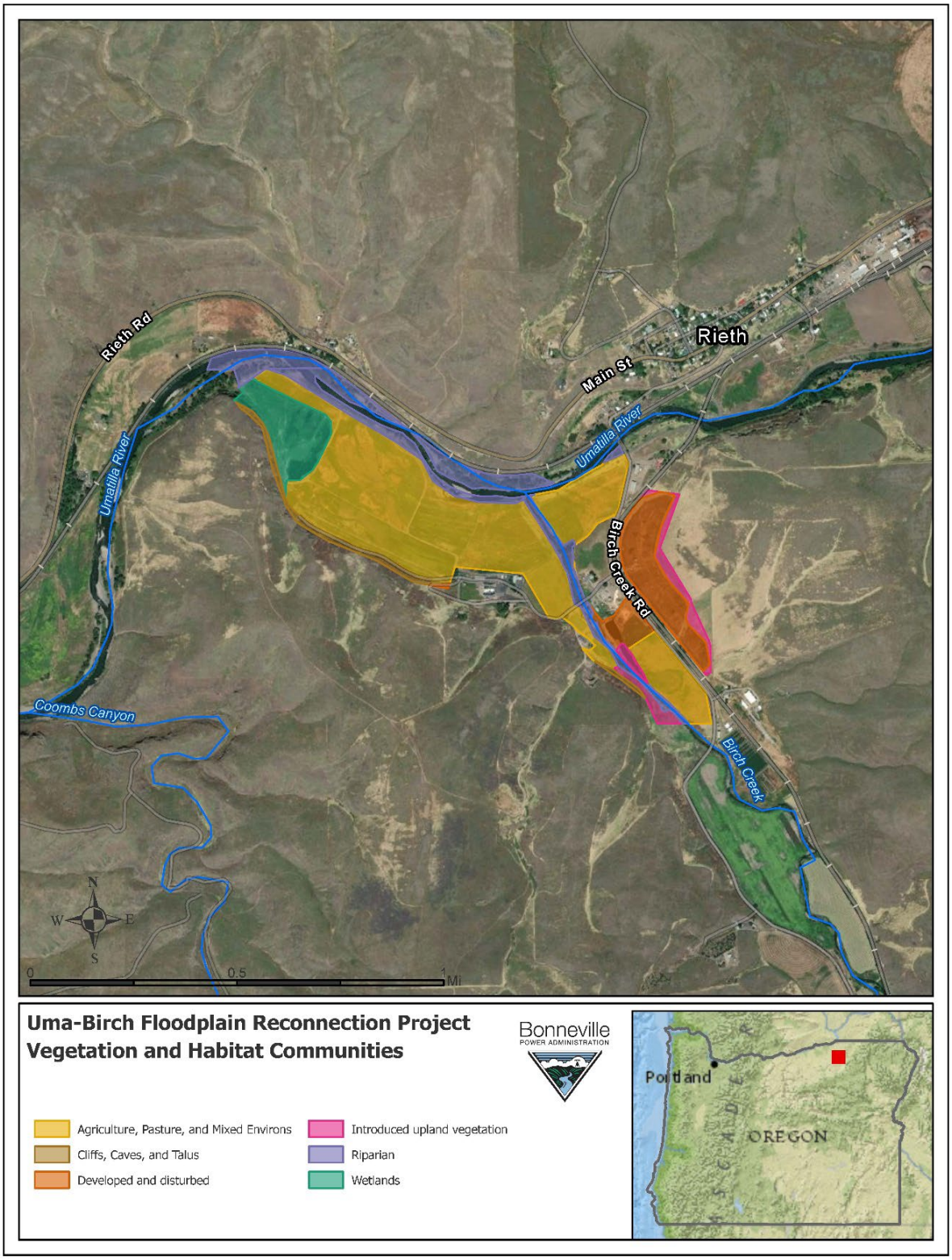
3.2.1.1.5 Agriculture, Pasture, and Mixed Environs

Agricultural and pasture plant communities cover 132.3 acres (around 55 percent) of the project area. Agricultural lands primarily consist of fallow fields; however, a few active hay fields and pastures occur in the north-central and central portions of the project area. Dominant plant species observed in these areas are forbs and graminoids such as alfalfa, tall tumblemustard, black mustard, and mowed pasture grasses.

3.2.1.1.6 Developed and Disturbed Areas

Developed and disturbed areas cover 40.7 acres (around 17 percent) of the project area. These areas, including the areas where buildings and the feedlot are located, are sparsely vegetated with planted tree species such as Siberian elm (*Ulmus pumila*) and black locust (*Robinia pseudoacacia*), and introduced forbs such as cheatgrass and kochia, a state-listed noxious weed.

Figure 3-1: Plant Communities in the Project Area



3.2.1.1.7 Special-Status Plant Species

Information on special-status (state and federally listed, including candidate species) plant species was obtained from the U.S. Fish and Wildlife Service (USFWS) for federal ESA-listed species, and from the Oregon Department of Agriculture (ODA) and Oregon Biodiversity Center for Oregon state-listed plants. Based on a review of species information and the results of field surveys, there are no federal ESA-listed plant species with potential to occur in the project area. Two state-listed plants would have a low potential to occur in the project area: the endangered northern wormwood (*Artemisia campestris* var. *wormskioldii*) and threatened lawrence's milkvetch (*Astragalus collinus* var. *laurentii*). In addition, five Oregon listed candidate species could potentially occur: Oregon bolandra (*Bolandra oregana*), Dwarf evening-primrose (*Eremothera* (*Camissonia*) *pygmaea),* Liverwort monkeyflower (*Erythranthe* (*Mimulus*) *jungermannioides*), Sessile mousetail (*Myosurus sessilis*), Columbia yellowcress (*Rorippa columbiae*) (ORBIC 2018).

Field surveys conducted within the project area did not document individuals of any of these seven species (Tetra Tech 2019a). Because these field surveys did not observe or document individuals or suitable habitat in the project area, special-status (including federally and state-listed species and candidate species for listing) plant species are unlikely to occur.

3.2.1.1.8 Noxious Weeds

Noxious weeds are non-native plants designated by the Oregon State Weed Board as posing the greatest public menace due their rapid spread on private, state, county and federally owned lands such that they are a top priority for action by weed-control programs (ODA 2018).

ODA classifies weeds based on economic and environmental significance and lays out recommendations for eradication and control of the species within each classification: A-Listed weeds occur in small-enough infestations to make eradication or containment possible; or if not known to occur, their presence in neighboring states make future occurrence in Oregon seem imminent. Infestations are subject to eradication or intensive control where found. B-Listed weeds are regionally abundant, but may have limited distribution in some counties. Recommended actions include intensive control at the state, county, or regional level, as determined on a site-specific, or case-by-case basis. T-Designated weeds, which are species selected from the "A" or "B" list, receive priority attention for prevention and control, including the development and implementation of a statewide management plan for each T-designated species (ODA 2022).

A 2018 survey of the project area found 23 species listed as noxious weeds in either the State of Oregon or Umatilla County as described in Table 3-2 (Tetra Tech 2019a). Of these noxious plant species, the most abundant observed in the project area include Canada thistle, field bindweed, poison hemlock, Scotch thistle, and yellow starthistle (Tetra Tech 2019a). In general, the highest densities occur in riparian areas along the Umatilla River and Birch Creek.

Table 3-2: Noxious Weeds Known or Potentially Occurring in the Project Area*

Noxious Weed Common Name	Noxious Weed Scientific Name	Oregon State Weed Board Classification†	Umatilla County Classification
bull thistle	*Cirsium vulgare*	B	—
Canada thistle	*Cirsium arvense*	B	B
common St. John's-wort	*Hypericum perforatum*	B	B
field bindweed	*Convolvulus arvensis*	B/T	—
Kochia	*Bassia* (*Kochia*) *scoparia*	—	B
perennial pepperweed	*Lepidium latifolium*	B/T	—
poison hemlock	*Conium maculatum*	B	B
Russian knapweed	*Acroptilon repens*	B	B
Scotch thistle	*Onopordum acanthium*	B	B
yellow starthistle	*Centaurea solstitialis*	B	B
Cereal rye	*Secale cereale*	—	B
Himalayan Blackberry	*Rubus armeniacus*	B	—
Spotted Knapweed	*Centaurea stoebe*	B/T	A
Diffuse knapweed	*Centaurea diffusa*	B	B
Rush skeletonweed	*Chondrilla juncea*	B/T	A
Dalmatian toadflax	*Linaria dalmatica*	B/T	B
garlic mustard	*Alliaria petiolata*	B/T	A
Common spikeweed	*Centromadia pungens*	—	B
Heart-podded hoarycress	*Lepidium draba*	B	B
Common houndstongue	*Cynoglossum officinale*	B	—
Common viper's bugloss	*Echium vulgare*	—	A
quackgrass	*Elymus repens*	—	B
puncture vine	*Tribulus terrestris*	B	B
ventenata	*Ventenata dubia*	B	—

* Noxious weed inventory based on Tetra Tech and CTUIR survey information (Tetra Tech 2019a; CTUIR 2019).

† A-Listed weeds occur in small-enough infestations to make eradication or containment possible; or if not known to occur, their presence in neighboring states make future occurrence in Oregon seem imminent. B-Listed weeds are regionally abundant, but may have limited distribution in some counties. T-Designated weeds, which are species selected from the "A" or "B" list, receive priority attention for prevention and control (ODA 2022).

3.2.2 Environmental Consequences – Proposed Action

The restoration of healthy riparian and upland vegetative communities as well as seeding and planting native species would involve ground-disturbing activity. Controlling invasive plants is also a component of the Proposed Action. Over the long term, therefore, the impacts to vegetation would be the restoration, improvement, or maintenance of native plant communities.

In the short term, however, the construction activity with heavy construction equipment could affect plant communities rather dramatically. Using construction equipment turns, uproots, buries, and tears apart plants. The construction of the new Taylor Lane bridge would damage vegetation during excavation and construction activities. About 77 acres of vegetation would be affected in this manner.

Planting native vegetation would stabilize the banks and floodplain and minimize long-term sediment contributions to the Umatilla River and Birch Creek. Similarly, revegetation of the feedlot and effluent lagoons would introduce native vegetation communities in an area that previously contained bare soils. Any bare soil would be seeded or planted with vegetation in the fall following the first major precipitation events. Native grasses would be seeded for short-term erosion protection, in conjunction with mulching of native materials where available, or using weed-free straw to ensure coverage of exposed soils and protection of seed and seedlings.

While the short-term mechanical damage to plants and plant communities is an obvious impact of construction activities, a more serious impact could be creating bare soil sites that invite colonization by invasive plants. To reduce this potential impact, the project area would be visually inspected for noxious and invasive species prior to commencing construction. Any identified weeds would be treated prior to the construction. Any ground disturbed by the project activities would be seeded with an appropriate native erosion-control seed mix to reduce the risk of erosion and invasion by noxious weeds. All materials imported to the project site would be inspected for weed and weed seeds prior to work initiating. Certified weed-free mulch may be applied as a short-term protection for disturbed soils. Noxious weed inventory or treatment would occur annually for a minimum of 5 years post-construction. This would be completed by CTUIR personnel.

Another impact to vegetation is introducing flows into a floodplain that has not experienced consistent flowing water for many decades. In the absence of frequent watering, the majority of this area has converted to upland plant communities. Applying flows to plants not suited to saturated soils for long periods of time would cause them to die out, and they would be replaced by plants capable of handling wetter conditions. Plant communities would thereby change to riparian or wetland communities. These changes could be dramatic, such as the conversion of upland communities throughout the project site to riparian plant communities.

In summary, there would be short-term adverse impacts to vegetation from construction and the resulting changes to plant communities. Long-term **high** beneficial impacts would result from restored floodplain function and revegetation of native plant communities. Overall, the short- and long-term impacts would be **moderate to high and beneficial.**

3.2.3 Environmental Consequences – No Action

Under the No Action Alternative, no construction impacts would occur. There would be no improvement in restored floodplain vegetation. Vegetation communities would remain dominated by non-native species or no vegetation cover within the feedlot with the continued likely decline in the diversity of native plants. Overall, there would be **low impacts** from ongoing actions**.**

3.3 Water Resources

3.3.1 Affected Environment

The Umatilla River originates in the Blue Mountains and flows westward in a single non-braided thread through the project site between RM 48.7 and 49.7. Constraining the Umatilla River as it flows through the upstream portion of the project area are the Pendleton 2a levee on its left bank, railroad tracks near its right bank, and the Rieth Bridge (Birch Creek Road). The river is naturally confined from protruding bedrock along both banks toward the downstream end of the project area. Peak flows occur during the spring runoff and reach their lowest flow levels in late summer.

Birch Creek, a tributary of the Umatilla River, flows southeast to northwest. From its confluence with the Umatilla River, its lowermost reach flows through the project site (RM 0.0 to 0.3; and RM 0.5 to 0.7).

Birch Creek typically has low flows, which can be exacerbated by upstream water withdrawals and result in little to no flow in late summer months. Historically, dry (zero-flow) conditions have been documented in its lower reaches in the mid-nineteenth century before agricultural settlement of the area (General Land Office 1860), which suggests that Birch Creek in the project area does not naturally have perennial flow conditions.

3.3.1.1 Water Quality and Quantity

The designated beneficial uses in the Umatilla Basin are administratively designated by the Oregon Department of Environmental Quality (ODEQ). Designated beneficial uses refer to the benefits that may be derived from a water body. They provide for the protection of public-water supplies, fish, shellfish, wildlife, as well as recreational, agricultural, navigation, and aesthetic purposes.

The beneficial uses designated for the Umatilla Subbasin are public/private domestic and industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and hydropower (Oregon Administrative Rule [OAR]) 340-041-0310, Table 310A). Under the beneficial use designated for fish and aquatic life, the administrative rules specifically make fish-use designations along the Umatilla River and Birch Creek, which include salmon and trout rearing and migration and salmon and steelhead spawning use from October 15 to May 15 (OAR 340-041-0310, Figures 310 A–B).

Under Section 303(d) of the Clean Water Act, ODEQ must regularly assess the quality of the state's waters and report conditions to the EPA. For reporting and approval by EPA, ODEQ identifies and maintains the Section 303(d) list of waterbodies considered impaired and thus not meeting state water-quality standards. A Section 303(d) listing requires development of a total maximum daily load (TMDL)—the numerical value that represents the highest amount of a pollutant that a waterbody can receive while still meeting state, tribal and national water quality standards.

The Umatilla River is impaired for several pollutants and water quality parameters including flow modification, fecal coliform, turbidity, temperature, iron, and excess algal growth (ODEQ 2022a).

Birch Creek is impaired for flow modification, habitat modification, bio-criteria, pH, temperature, and iron (ODEQ 2022b).

The Umatilla River and Birch Creek both appear on ODEQ's 303(d) list for iron. This indicates that iron impairs beneficial uses for fishing, drinking water, aquatic life, and human health, and therefore needs a TMDL, although one has not been developed. Iron levels found in project area reaches of lower Birch Creek likely originate from lumber operations near Pilot Rock because elevated iron concentrations are commonly found in waterbodies adjacent to chip piles and log yards (ODEQ 2020b).

Birch Creek also appears on ODEQ's 303(d) list for bio-criteria. This parameter evaluates the health of a waterway's biological community based on observed freshwater macroinvertebrates such as insects, crustaceans, snails, clams, worms, and mites. ODEQ determined that Birch Creek does not meet this parameter based on observed macroinvertebrate levels that are lower than benchmark reference sites.

Additionally, ODEQ considers the Umatilla River impaired for flow modification indicating impaired beneficial uses for salmonid rearing and spawning, as well as for bacteria (fecal coliform), temperature, and excess algal growth. Some reaches of Birch Creek do not meet ODEQ water quality standards for flow modification. In addition, ODEQ identifies Birch Creek as not meeting water quality standards for temperature and pH. ODEQ has an EPA-approved TMDL and Water Quality Management Plan for the Umatilla River Basin establishing TMDLs to address these water-quality limitations (ODEQ 2001).

Water temperatures vary throughout the year in the Umatilla River and Birch Creek. In general, the Umatilla River is relatively cooler than Birch Creek in the project area due to the influence of cooler water released from McKay reservoir upstream. Based on late-July monitoring data collected in 2016, the 7-day average maximum moving average water temperature in the Umatilla River was about 68 degrees whereas the lower section of Birch Creek was about 84 degrees (CTUIR 2016b). Water temperatures that promote salmon and steelhead survival range from 52 to 59 degrees Fahrenheit (NMFS 2009). Higher water temperatures adversely affect salmonid metabolism, growth rate, and disease resistance, as well as the timing of adult migrations, fry emergence, and smoltification (Bonneville 2012).

The feedlot and effluent pond contribute runoff to Birch Creek during rainfall and flooding events, which affects water quality through sedimentation and turbidity on an ongoing basis.

3.3.1.2 Groundwater

The project area sits within a region generally underlain by Columbia Plateau basaltic rock aquifers, which are thick, permeable aquifers at or near the surface. They are not vertically permeable due to their thickness, which slows the rate and movement of groundwater flow and recharge (UCCGTF 2008). In general, these aquifers typically flow at relatively shallow depths anywhere from 100 to 700 feet below the surface and tend to have declining water levels (USGS 1994).

The project area does not sit within the designated critical groundwater-restricted areas in Umatilla County (ODEQ 2020a). There are no sole-source aquifers in the project area.

3.3.1.3 Wetlands and Floodplains

3.3.1.3.1 Wetlands

A wetland delineation conducted in the project area identified four discrete areas of wetland totaling 0.75 acres (Tetra Tech 2019c).[5] These wetlands sit in an abandoned side channel of the Umatilla River and excavated ponds with wetland features and vegetation such as coyote willow and cattail.

3.3.1.3.2 Floodplains

Historically, the Umatilla River and Birch Creek had a wide main channel and tributary streams[6] developed through seasonal flooding, beaver activity, and sediment enrichment or mobilization. Their channels were lower-gradient and anastomosed,[7] with a tendency to migrate across the floodplain when flows exceeded the banks. Once a 290-acre floodplain from valley wall to valley wall historically, floodplain connectivity throughout the Umatilla River reaches is severely limited due to the construction of the Pendleton 2a levee, Union Pacific railroad, roads, bridges, and berms and agriculture practices; and in part, natural confinement by bedrock and valley hillslopes. The Pendleton 2a levee reduced the risk of inundation and channel migration to the agricultural field resulting in project-area reaches now having

[5] Wetlands were delineated in accordance with the 1987 Wetlands Delineation manual (Corps 1987). The wetland vegetation described in section 3.2 is one of three parameters of a delineated wetland, which include hydrophytic vegetation (plants that only grow in or on water), hydric soils, and wetland hydrology.

[6] A "connected" floodplain is one where high stream flows have the capability at varying flood levels to flow onto and across adjacent floodplains where its transported sediment can be deposited as the flows spread out, slow down, and lose energy.

[7] Stream anastomosis refers to the branching and interconnecting structure, or network, of main channels, side channels, and seasonal overflow channels that divide then reconnect, with the main stream flow migrating from one to another over time across a floodplain.

only isolated areas of floodplain connectivity: the 100-year flood currently inundates over half the historically available floodplain; while the 2-year and 10-year floods occupy less than 20 percent.

For similar reasons as the Umatilla River, Birch Creek is now deeply incised and disconnected from its historical floodplain. These activities have caused channel confinement and straightening, limiting access to the floodplain. As a result, the 100-year flood inundates only about 15 percent of the historical floodplain. The 10-year and 2-year floods inundate about 3 percent of the historical floodplain, respectively. Decreased floodplain connection has considerably lowered the water table (Tetra Tech 2019b).

FEMA designated the entire project area an Approximate Zone A floodplain. FEMA considers these floodplains subject to inundation by a 1-percent-annual-chance flood event.

3.3.2 Environmental Consequences – Proposed Action

3.3.2.1.1 Water Quality and Quantity

Construction activities would be the primary driver for short-term impacts to water quality, with sedimentation, turbidity, and temperature the primary variables of concern. Another concern would be the potential fuel and fluid leaks from heavy equipment, but the probability of such an event is low, and the extent of the problem would likely be small given the mitigation in place for these actions (see Table 2-5). Long term, the Proposed Action would be expected to improve water quality, and provide long-term benefits from improved floodplain function and reduced sedimentation.

Bio-Criteria and Iron

The Proposed Action would not contribute iron to stream reaches listed for iron because the restoration activities would not contribute iron to the Umatilla River or Birch Creek or remobilize iron from ground disturbance. For this reason, there would no impact to the level of impairment for iron in the project area.

The Proposed Action would improve conditions for macroinverebrates and the biological communities in Birch Creek. While there would be short-term damage to these existing communities, on a long-term basis, the Proposed Action would reduce impairment under the bio-criteria parameter from restoration activities improving floodplain function and overall water quality. Therefore, the Proposed Action would result in a short-term low negative impact and a long-term moderate beneficial impact.

Through the implementation of mitigation measures in Table 2-5 that minimize water quality impacts, the Proposed Action would not violate TMDLs established in the Umatilla Basin TMDL and Water Quality Management Plan.

Sedimentation and Turbidity

While the Proposed Action would restore the production, transport, and deposition of sediment throughout the watershed. Construction activities, including new Taylor Lane bridge construction, would cause short-term impacts on water quality. Operation of heavy equipment in the river and stream channels during instream structure placement, opening of side channels, and main channel realignment would increase turbidity. Main channel realignment and restoration would expose over a mile of channel to flow for the first time in decades. Removing fill plugs on the side channels would mobilize sediment and increase turbidity either during initial water flows or during the first high flows. Sediment transport and turbidity in side channels would depend on a channel's proximity to the project area, size, and stream gradient.

Sediment plumes would be most concentrated within, and downstream of, the project area during and immediately following construction activities. There is also potential for manure-contaminated soils to mobilize during construction in the feedlot and effluent pond areas. To reduce this risk, implementation of mitigation and monitoring measures (see Table 2-5) would restrict the plume to no more than a few

hundred feet, which would gradually decline in the hours and days after construction. At the feedlot and effluent pond areas, along with following all decommissioning requirements in the CAFO NPDES general permit, an Animal Waste Management Plan would be implemented to reduce the introduction of contaminated sediment and manure. Sediment plumes also could occur during future high-water events until vegetation is reestablished and the stream adjusts to newly established site characteristics. Reactivating existing, vegetated side channels would generate less sediment than allowing flow into recently constructed side channels before revegetation occurs.

Sediment delivery with increased turbidity would also occur during instream log and boulder placement as excavators travel across stream banks between material staging areas and the channel. Excavator tracks and dragging and pushing logs and boulders would disturb soil and may lead to deposits into the channel. Additionally, streamside trees could uproot and cause sediment to enter the channel. Limiting soil and stream bank disturbance would be accomplished by placing more than one instream structure per access route between the staging area and channel, if possible. Scarifying (i.e., shallow ripping of the soil surface with excavator bucket tines), seeding, and mulching access routes prior to the wet season would minimize overland sediment movement to streams from this potential source. Re-contouring stream banks adjacent to log and boulder placement sites would further minimize sediment production and turbidity.

Instream log and boulder placements would increase the sediment storage capability of the Umatilla River and Birch Creek in the project area. Instream structures reduce flow velocity, sorting and depositing sediment, and creating gravel spawning beds, and gravel, sand, silt, and clay bars, in addition to floodplains. While the Proposed Action's design includes placement of log and boulder structures in a series along the Umatilla River and Birch Creek, it can take years for downstream structures to capture sediment. In the case of a debris flow entering project-area reaches, one or more structures could capture tens to hundreds of cubic yards of sediment and wood that would otherwise be lost due to the current absence of structures in those reaches.

To address sedimentation concerns, activities would be scheduled to limit the amount of time that areas would be susceptible to disturbance. A sediment-control plan would be in place prior to commencing construction. Flows would be completely or partially diverted around the work site through a combination of pumping and pre-approved methods and returned to the channel below the project area. Water would be slowly released back into the channel (reaching full streamflow over a period of at least one hour) to minimize sediment movement in the channel.

Turbidity monitoring would occur downstream of the project during all instream work activities. Onsite turbidity measurements would be taken in two locations: a baseline measurement 100 feet upstream of construction activities and a second measurement 50 feet downstream of the activity. If turbidity exceeds the standards established in the ESA consultation with NMFS, activities would be paused to mobilize work crews to repair, replace, and reinforce controls with additional HIP conservation measures to bring the turbidity levels back into compliance.

In the short term, adverse impacts on water quality from increased sedimentation and turbidity would be **moderate**. However in the long term, the Proposed Action would improve stream functions by increasing stream sediment movement and retention while also decreasing turbidity during most flow events. Increased sinuosity, reduced gradient, and lower water velocity would improve sediment sorting and storage and enhance habitat within the project area stream reaches. Beneficial impacts on water quality due to reduced sedimentation and turbidity would be **moderate**.

Temperature

The Proposed Action could cause short-term increases in water temperature due to construction-related disturbance of riparian vegetation and stream channels and increased stream length.

The Proposed Action, combined with natural recovery and passive riparian restoration, would be expected to have long-term beneficial effects by lowering stream temperatures. Activities would improve streamside shade through revegetation of riparian areas; restore stream channel morphology in channels that are currently unnaturally wide and shallow or lack pools; and improve surface water-groundwater interactions that lower water temperatures.

Channel relocation would expose more surface area to sunlight, leading to short-term temperature increases, until stream bank revegetation occurs. Planting fast-growing willows (*Salix spp.*) and other riparian species along the new channel would reduce stream surface exposure over time.

Reconnecting historic side-channels with floodplains, and constructing new side channels and alcoves, would increase temperature heterogeneity (alternating patterns of water temperatures); create diverse habitat by increasing channel length and stream-floodplain interaction; and supply large amounts of subsurface flow to the main channel (IMST 2004).

The use of heavy equipment in the stream would damage or remove stream-shading vegetation. Placement of logs and boulders by heavy equipment would require access routes and staging areas for storage of trees, logs, and rocks for instream placement. The removal of shade-producing trees and shrubs, if necessary, to facilitate movement, storage, and placement of large wood and boulders, would have the potential to cause localized temperature increases for one or more years, or until vegetation is reestablished. Construction would avoid trees and existing shade-producing riparian vegetation during instream project implementation. The loss of scattered individual trees within densely vegetated riparian areas, however, would likely not produce a measurable increase in stream temperature.

Minimizing impacts to vegetation during project implementation and replanting the project area immediately after construction could reduce or eliminate potential impacts to stream temperature increases, and lessen the time to recovery should minor temperature increases occur. The impact of log and boulder structures would likely offset impacts associated with the development of instream habitat features that decrease water temperatures (e.g., pools). Logs placed over the channel would also provide shade. Restored sediment-deposition processes, and the action of narrowing and deepening channels, would increase flows and decrease the surface area of the stream exposed to direct sunlight.

In the short term, impacts on water quality (temperature) from removal of riparian vegetation in the immediate vicinity of the stream reconstruction area would have a **moderate impact**. However, long-term impacts would be positive as riparian vegetation matures and temperatures decrease to below preconstruction levels. Overall, long term, these beneficial impacts on water quality would be **moderate to high**.

As described in Section 2.1.8, the Proposed Action would increase instream flows in the Umatilla River and Birch Creek by transferring a portion of the water rights held in the Umatilla River and Birch Creek from previous irrigation/stock/domestic use. This would result in a **low** beneficial impact.

3.3.2.1.2 Groundwater

In the short term, restoration activities under the Proposed Action would not affect groundwater from construction activities because they would generally occur at and near surface level and not penetrate deep enough to affect the current groundwater level.

Over the long term, groundwater connectivity and recharge rates would increase within the project area due to increased channel complexity, expanded floodplain size and extent, and constant connection to wetlands. Because the current channelized alignments of the Umatilla River and Birch Creek prevent flows from connecting with the associated floodplains, those floodplains lack hydrologic connectivity and the capacity to absorb water because at present, when the Umatilla River and Birch Creek overtop their banks, water returns to the main channel relatively quickly. Through main channel realignment, side channel, and wetland creation, the Proposed Action would make floodplains more accessible and

facilitate widespread recharge of groundwater throughout flooded areas. Therefore, floodwater returned to the channel via groundwater would increase, as would the time it takes for that return to occur. Both conditions—greater return volume and greater return time—would also favor lower stream temperatures. Because the Proposed Action would improve channel complexity, expand floodplains, and add wetlands, which would improve the connection to groundwater, long-term **moderate** beneficial groundwater impacts would result.

3.3.2.2 Wetlands and Floodplains

3.3.2.2.1 Wetlands

The Proposed Action would create a total of about 4 acres of wetland within the project area. This would support an abundance of wetland habitats. Following construction, both the Umatilla River and Birch Creek would be redirected (at their upstream ends) to their former floodplain's surface elevation via a newly constructed channel. The Proposed Action would not directly result in impacts within the 0.75-acre area of delineated wetland because construction activities would not place fill material within this delineated wetland or otherwise alter it; but would result in the creation of an additional 43 acres of wetlands.

Reconstructing Birch Creek's incised stream channel would elevate ground water levels in former adjacent wet areas that are now upland pasture land. The adjacent excavated areas outlined in the engineering design would become sub-irrigated at the elevation of the wet meadow and floodplain. Stream bank excavations, plug construction, and channel relocation would ultimately have a long-term beneficial impact on wet meadows by recreating wetland conditions lost due to Birch Creek's incision.

Over the long term, creating wetlands and reconstructing main-stem channels for Umatilla River and Birch Creek would reduce stream-bank erosion and improve riparian and wet-meadow vegetation conditions in the floodplain. By raising the stream base level to the historic floodplain elevation, the groundwater table would be restored. This re-watering of the wet meadow would result in the reestablishment of riparian herbs and woody vegetation within a couple of years, though the constructed features may take longer. By raising the stream base level to floodplain elevation, the meadow's historic function of acting as a "sponge" and reservoir for runoff would be restored.

Overall, there would be a long-term beneficial **moderate impact** from wetland creation under the Proposed Action.

3.3.2.2.2 Floodplains

The Pendleton 2a levee would be partially removed, which would increase inundation levels comparable to those in the historical 290-acre floodplain. As a result, the Proposed Action would increase inundation in the immediate project area from the 2-year flood from about 20 percent to about 48 percent of the floodplain, 10-year flood from about 20 percent to about 60 percent of the floodplain, and 100-year flood from around 50 percent to 65 percent of the floodplain. Flooding events would inundate the floodplain to the south and west of the removed Pendleton 2a levee and to a new setback levee along Birch Creek Road. To replace the function of the levee section partially removed, a new set-back levee would be constructed to maintain the existing level of flood protection. This new setback levee would protect against flooding on the properties located to the east of the project area across Birch Creek Road because their design provides sufficient height and freeboard to match the current 100-year flood designation of the Pendleton 2a levee and will be an integral part of the planning and design under Section 14 of the Rivers and Harbors Act of 1899 (Section 408 process). For this reason, floodwaters reaching the Uma-Birch floodplain as a result of the Proposed Action would not reach areas outside of the reconnected floodplain where restoration activities would focus. Therefore, with flood protection maintained by the new set-back levee, flooding impacts from an increased floodplain area would be **low**.

Construction of side channels, alcoves, and roughness[8] treatments on the historical floodplain would have short-term impacts on the floodplain but would also improve long-term floodplain functions. Disturbance within the floodplain also would occur from the staging area and access roads during construction. Because the Umatilla River and Birch Creek have limited connection to their historical floodplains, these activities would have a limited impact to preexisting surface-water connections. Work within the historical floodplain would be completed in phases so that as each floodplain segment is improved, they each become capable of improving long-term function before the next high flows occur.

The Proposed Action would be constructed to encourage restoration of certain floodplain- and stream-channel features that have been lost or degraded over time. The current objective focuses on proper floodplain function and resilience rather than control.

An increased floodplain size is expected to allow river flows to slow down and dissipate energy, thus reducing water velocity within and downstream of the project area and potentially lessening the impacts from flood flows on downstream properties. By restoring stream-flow connection to the floodplain, either through raising the stream base level to floodplain elevation, or by increasing anastomosed conditions, the floodplain's function as a "sponge" and reservoir for runoff would be restored. An increase in hyporheic exchange would also occur as a result of this newly established reconnection. When floodplain function is restored, floodplain soils store a portion of winter and spring runoff where it is available for release later in the spring and summer. This restored function would result in some degree of improved flow timing and temperature, including augmentation of some seasonal flows, potentially resulting in benefits for aquatic species and downstream irrigators. The primary flow augmentation effect would typically occur in late spring as stored groundwater from winter and spring runoff flows out of floodplain soils to the stream channel. This augmentation of channel flow would often extend into summer months, but the degree of this impact would vary.

Overall, there would be short-term impacts to the floodplain from construction activities and a long-term beneficial impact to floodplains from the improved floodplain function resulting from the Proposed Action. Overall, there would be a short- and long-term **moderate impact** to floodplains**.**

3.3.3 Environmental Consequences – No Action

3.3.3.1 Water Quality and Quantity

There would be no improvements to stream structure, no increased connectivity to floodplains, stream-shading riparian vegetation would not be improved, road drainage conditions would remain unchanged, and the sediment-controlling and water-cooling impacts of these actions would not be realized. In addition, water rights would remain in their existing consumptive uses, and would therefore not result in an increased quantity of water dedicated to in-stream flows in Birch Creek or the Umatilla River. In addition, there would not be an improvement in water quality from restoring the feedlot and effluent pond area, which would continue to negatively affect water quality with continued sedimentation and turbidity during and after rainfall and flooding events. Therefore, there would be **no impact** to water quality and quantity under the No Action Alternative from the Proposed Action; however, ongoing adverse effects to water quality and quantity would continue.

[8] Floodplain roughness treatments includes the scarification or low level reshaping of soil surfaces, the planting of vegetation, and the placement of woody debris with the intent that these actions would slow the flow of water across the floodplain surface thereby increasing the potential for sediment to be deposited.

3.3.3.2 Groundwater

There would be no groundwater impacts from restoration activities under the Proposed Action. The groundwater benefits from the channel complexity and increased wetland and floodplain connectivity would not be realized. Therefore, there would be **no impact** to groundwater under the No Action Alternative.

3.3.3.3 Wetlands and Floodplains

Under the No Action Alternative, many areas of floodplain would remain disconnected and therefore continue to limit the ability of the Umatilla River and Birch Creek to provide flood attenuation, water storage, sediment transport and deposition, and floodplain and wetland habitat would be limited and remain unimproved. There would be no long-term beneficial impact resulting from creating wetlands where they currently do not exist. As a result, there would be **no impact** to wetlands and floodplains under the No Action Alternative from the Proposed Action and ongoing effects due to the disconnection of the Umatilla River and Birch Creek would continue.

3.4 Fish and Aquatic Species

3.4.1 Affected Environment

3.4.1.1 General Fish and Aquatic Species

The Umatilla River and Birch Creek have non-anadromous fish species such as redband trout (*Oncorhynchus mykiss gairdneri*)), mountain whitefish (*Prosopium williamsoni*), and native suckers such as bridgelip (*Catostomus columbianus*) and largescale sucker (*Catostomus macrocheilus*), which is most common. They also have native minnow species such as redside shiners (*Richardsonius balteatus*), and northern pikeminnow (*Ptychocheilus oregonensis*) (ODFW 2020). In addition, native species such as Longnose (*Rhinichthys cataractae*) and Umatilla Dace (*Rhinichthys umatilla*), Chiselmouth (*Acrocheilus alutaceus*), and sculpin (*Cottus* spp.) are potentially present. Non-native species commonly found in the Umatilla River include walleye, small mouth bass, and catfish. Non-native species commonly captured during monitoring efforts in Birch Creek include smallmouth bass, carp, and bullhead (ODFW 2022).

Records indicate the presence of individual native freshwater mussels (*Anodonta* and *Gonidea*) occurring in the Umatilla River downriver from, and outside of, the project area (CTUIR 2022b). Although the most recent survey information suggests their absence in the project-area reaches of the Umatilla River and Birch Creek, freshwater mussels could have beds in areas protected from higher flows in pools and eddies and behind boulders (USFWS 2009; Bonneville 2004).

The Umatilla River and Birch Creek also support aquatic invertebrate biota such as numerous species of insects (dragonflies, mayflies, stoneflies, caddisflies, butterflies, and beetles) including instream macroinvertebrates that support nutrient cycling and provide an important food source for fish.

3.4.1.1.1 Pacific Lamprey

Pacific lampreys (*Entosphenus tridentatus*) are anadromous, using both fresh water and marine habitats to complete their life cycle. They are a culturally important species to Tribes including the CTUIR, a Federal Species of Concern, and Oregon State sensitive species. Once considered functionally extinct from the Umatilla River basin, they have recently increased in number in the Umatilla River (Bonneville 2018). Lamprey could be found in the Umatilla River in different life cycles: in early life stages as larvae and migrating to the ocean, and when they return to fresh water as adults seeking to spawn.

CTUIR collects monitoring data at an index site on the Umatilla River located at the Rieth Bridge to monitor larval and juvenile lamprey. The density of lamprey has fluctuated at this site since data was first collected at the site in 1999. Based on this monitoring data, larval and juvenile lamprey are highly likely to be present in project-area reaches of the Umatilla River (CTUIR 2022a).

With their presence highly likely in the Umatilla River, lamprey could migrate to Birch Creek (USFWS 2019c) as well; however, recent monitoring data from the first mile of Birch Creek has not revealed the presence of Pacific lamprey (ODFW 2022). This could be due in part to a lack of suitable habitat in Birch Creek to support lamprey. For these reasons, Pacific lampreys are unlikely to be found in Birch Creek.

3.4.1.1.2 Spring- and Fall-run Chinook Salmon

The Umatilla River and Birch Creek provide spawning and rearing habitat for non-ESA-listed spring- and fall-run Chinook salmon (*O. tshawytscha*). For fall runs, adults return and spawn in fall, eggs hatch and emerge around March and juveniles out-migrate to the ocean the following May through July. For spring runs, adults return in the spring, spawn in the late summer or early fall, eggs hatch and emerge around March, spend a full year rearing in their natal stream and out-migrate the following fall, winter, and spring as sub-yearlings and yearlings to the Columbia River and the estuary. .

Spring- and Fall-run Chinook populations historically inhabited the lower three river miles of Birch Creek until populations declined as a result of habitat degradation and impeded passage associated with diversion dams. While Birch Creek was not targeted for the effort, CTUIR collaborated with ODFW to reintroduce them to nearby watersheds in the 1980s after their extirpation early in the 20th century (CTUIR 2016a; ODFW 2020). The current population occupies the lower 1.5 miles of Birch Creek within the project area. While no spawning is currently believed to occur in Birch Creek, juveniles and spring-run yearlings use Birch Creek as refugia (ODFW 2020).

3.4.1.1.3 Coho Salmon

The Umatilla River supports spawning and rearing habitat for coho salmon (*O. kisutch*). Birch Creek provides spawning habitat. Not known to be historically present in the Birch Creek watershed, they were reintroduced to surrounding watersheds in the middle of the 20th century and now occur in the lower 15 miles of Birch Creek, which includes the project area. Spawning and juvenile out-migration from Birch Creek occurs in low numbers, and not every year, but did occur with some numbers the last several years (ODFW 2022).

3.4.1.2 Special Status Fish and Designated Critical Habitat within Affected Area

Steelhead and bull trout (*Salvelinus confluentus*) are the only potential state-listed or ESA-listed species present in or near the project area.

3.4.1.2.1 Steelhead

Steelhead in the Umatilla River and tributaries such as Birch Creek belong to the Umatilla-Walla Walla major population group (MPG), part of the Middle Columbia River Steelhead Distinct Population Segment (DPS) listed as a threatened species (57 Fed.Reg.14517) under the ESA. The Umatilla River and Birch Creek are designated Critical Habitat (65 Fed.Reg. 7764; 70 Fed.Reg. 52685).

According to the 2016 Birch Creek Action Plan, the Birch Creek watershed serves as a priority summer steelhead habitat where the species occurs throughout its entire historic range (CTUIR 2016a). The recovery plan for the Middle Columbia Steelhead DPS identifies the Umatilla MPG as highly viable, with more than half that production from Birch Creek (CTUIR 2016a; Carmichael and Taylor 2010).

Steelhead spend spawning and rearing life stages in project-area reaches of the Umatilla River and Birch Creek. They spawn from February to late June. Rearing occurs for an average of two years. Outmigration occurs in small numbers from late November through June, with the largest numbers leaving the Birch Creek system in April and May (CTUIR 2016a).

3.4.1.2.2 Bull Trout

The initial review of special-status species information indicates the presence of ESA-listed bull trout (*Salvelinus confluentus*) subadult individuals in the mainstem Umatilla River. In addition, recent survey data confirms bull trout presence in Birch Creek.

The Umatilla River is designated critical habitat for bull trout (75 Fed.Reg. 63898). In general, bull trout in the Umatilla River spawn at the headwaters where juvenile rearing occurs. Subadults migrate to downstream reaches as far downstream as the Columbia River to grow and mature before adults return to tributaries to spawn. Subadult migration typically occurs in spring but could occur at any time during the year (USFWS 2013).

Recent monitoring efforts on Birch Creek captured bull trout adults (one in May 2020; and two, in February and May, of 2021) that had entered the mouth of Birch Creek from the mainstem Umatilla River to forage (ODFW 2022). This confirms bull trout presence in Birch Creek within the project area during winter and spring rearing and migration life stages. There is no designated critical habitat for bull trout in Birch Creek.

3.4.2 Environmental Consequences – Proposed Action

Short-term adverse impacts to fish may result from project construction. The largest potential impacts associated with the Proposed Action are the impacts from injury or mortality to all fish species at the time of project activities and impacts to fish species from increases in fine sediment during and immediately post-construction.

Construction activities could disturb, kill, and injure fish and aquatic species through sedimentation pulses and inadvertent crushing from operating heavy equipment during instream, main-channel, side-channel, or floodplain excavations. Noise and vibrations from heavy equipment may temporarily disturb fish and aquatic species residing in the immediate project area. Equipment operations and resulting pulses of turbidity may temporarily displace fish and aquatic organisms upstream or downstream. In addition, accidental spills of lubricants and fuels that could occur from heavy equipment operation in riparian areas can be lethal to fish and aquatic species when exposed.

Fish and aquatic species could also be harmed by the isolation and dewatering of in-water work areas in a stream segment. Though most actions would provide downstream passage in a bypass channel, dewatering a segment of the river would displace native fish from their home ranges and limit their movement during implementation. Aquatic species salvage would occur, but it would be focused on fish, and other aquatic species such as macroinvertebrates may experience mortality.

The most lethal effects to fish from the Proposed Action would result from their handling and removal from the dewatered work areas. All aspects of fish handling, such as electrofishing, dip netting, and time out of water are stressful and can lead to immediate or delayed mortality (Murphy and Willis 1996). Electrofishing causes physiological stress that may exceed a fish's physiological tolerance limits and cause physical injury or death, including cardiac or respiratory failure (Snyder 2003), or impairment of reproductive success, growth, resistance to infectious diseases, and survival (Wedemeyer et al. 1990). Primary contributing factors to these effects are differences in water temperature (between river and wherever fish are held), dissolved oxygen conditions, the amount of time that fish are held out of the water, and physical trauma.

Design features and mitigation measures (see Table 2-5) would be used during implementation to reduce potential impacts to all species, including ESA-listed steelhead and bull trout.

The Proposed Action would result in long-term beneficial impacts to fish and aquatic species. These long-term impacts of the Proposed Action would aid in reestablishing the hydrologic regimes, increase the area available for rearing habitat for fish, improve access to higher quality rearing habitat, increase the hydrologic capacity of side channels, increase channel and water velocity diversity and complexity, provide resting areas for fish at various levels of inundation, increase floodplain nutrient and sediment storage, promote wood retention, and establish and augment native plant communities. Increased vegetation and habitat complexity would improve thermal regulation, hydrologic and nutrient cycling, channel formation and sediment storage, floodplain development and energy dissipation, which would benefit fish and aquatic species.

The effects to ESA-listed steelhead and bull trout would be the same as those described above. Bonneville consulted with NMFS and USFWS for the Proposed Action under Section 7 of the ESA for Bonneville's HIP. As described in Chapter 2, the Proposed Action would adhere to the HIP conservation measures and terms and conditions.

Overall, with the implementation of the design features and mitigation measures defined in HIP conservation measures, there would be a **low** short-term adverse impact to fish and aquatic species from sedimentation and electrofishing. This short-term impact would be balanced out with a **moderate** long-term beneficial impact from improved flow and habitat conditions. On balance, because the project would substantially improve habitat conditions for fish and aquatic species, there would be **moderate beneficial impact** on fish.

3.4.3 Environmental Consequences – No Action

Under the No Action Alternative, potential short-term adverse impacts, such as disturbance from fish salvage and temporary habitat modification to fish and aquatic species would not occur, but the long-term beneficial impacts to anadromous and resident fish would not be realized. In addition, the feedlot and effluent pond area would remain and likely continue contributing manure runoff and other sediment into Birch Creek that would continue to negatively affect fish and aquatic species. There would be **no impact** to fish from the Proposed Action under the No Action Alternative.

3.5 Wildlife

3.5.1 Affected Environment

3.5.1.1 General Wildlife

Based on the plant communities described in Section 3.2.1 above, wildlife habitat in the project area is generally low quality from past disturbances likely the result of agricultural practices and other development along the Umatilla River and Birch Creek, which has affected the vegetation communities that are present. Vegetation largely determines wildlife site usage and results in some habitats hosting higher wildlife densities at certain times of the year.

The available habitat types in the project area include low- to moderate-quality riparian habitat, high-quality wetland habitat, moderate-quality habitat along cliffs, caves, and talus, and low-quality introduced upland vegetation. In addition, low-quality habitat occurs in agricultural, pasture, and very-low-quality habitat occurs in mixed environs and developed and disturbed areas. The sections below describe specific habitat types in their order of prevalence throughout the project area.

3.5.1.2 Riparian Vegetation

Riparian vegetation within the project area ranges from areas with sparse canopy cover and an abundance of non-native, invasive species, such as reed canarygrass, to areas of relatively dense canopy cover, with greater cover of native species in the understory. Although canopy cover in riparian habitat within the project area is predominantly native tree and shrub species that provide important wildlife habitat, much of the understory in these areas consists of non-native, invasive species.

Wildlife observed during the survey effort or that would likely occur in riparian habitat within the project area include American goldfinch (*Carduelis tristis*), American robin (*Turdus migratorius*), American white pelican (*Pelecanus erythrorhynchos*), bald eagle (*Haliaeetus leucocephalus*), bank swallow (*Riparia riparia*), black-capped chickadee (*Poecile atricapillus*), Bullock's oriole (*Icterus bullockii*), downy woodpecker (*Picoides pubescens*), eastern kingbird (*Tyrannus tyrannus*), great blue heron (*Ardea herodias*), house wren (*Troglodytes aedon*), MacGillivray's warbler (*Oporornis tolmiei*), mule deer (*Odocoileus hemionus*), osprey (*Pandion haliaetus*), red-winged blackbird (*Agelaius phoeniceus*), western kingbird (*Tyrannus verticalis*), western wood-pewee (*Contopus sordidulus*), and yellow warbler (*Dendroica petechia*). Beaver (*Castor canadensis*) likely use this habitat for feeding and passage; and the presence of beaver was recently confirmed within the project area, with at least one beaver per year detected over the past several years (ODFW 2022).

3.5.1.3 Wetlands

Wildlife species observed during the survey in the wetland vegetation included the American bullfrog (*Lithobates catesbeianus*), common toad (*Bufo bufo*), and Pacific chorus frog (*Pseudacris regilla*). In addition, red-winged blackbird and Great blue heron are likely to occur in this habitat type.

3.5.1.4 Cliffs, Caves, and Talus

Habitat in and among the cliffs, caves, and talus provide important perching, roosting, and nesting habitat for many wildlife species, including raptors and bat species. Wildlife observed during the survey effort were cliff swallow (*Petrochelidon pyrrhonota*), bank swallow, and red-tailed hawk (*Buteo jamaicensis*). In addition to wildlife species observed during surveys, American crow (*Corvus brachyrhynchos*); American kestrel; golden eagle (*Aquila chrysaetos*); prairie falcon (*Falco mexicanus*); turkey vulture (*Cathartes aura*); western fence lizard (*Sceloporus occidentalis*); yellow-bellied marmot (*Marmota flaviventris*); western pipistrelle bat (*Pipistrellus hesperus*); and California myotis bats (*Myotis californicus*), fringed myotis bats (*Myotis thysanodes*), and yuma myotis bats (*Myotis yumanensis*) are likely to occur in this habitat type.

3.5.1.5 Introduced Upland Vegetation

This habitat and vegetation community consists of areas heavily degraded by land-use activities such as past agricultural practices. These areas also include potentially fallow agricultural areas not cultivated recently. Habitat and vegetation quality in introduced upland vegetation in the project area is generally very low due to the high predominance of non-native species, including state- and county-listed noxious weeds, and high levels of disturbance.

Wildlife either observed during the survey effort or likely to use this habitat type include a variety of common wildlife species such as American crow, American kestrel (*Falco sparverius*), Eurasian-collared dove (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), gopher snake (*Pituophis catenifer*), horned lark (*Eremophila alpestris*), killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), mule deer, northern harrier (*Circus cyaneus*), prairie rattlesnake (*Crotalus viridis*), red-tailed hawk, turkey

vulture, western meadowlark (*Sturnella neglecta*), and wild turkey (*Meleagris gallopavo*) (Tetra Tech 2019a). Other species not observed during the survey effort but could occur in this vegetation and habitat community include turtle dove (*Streptopelia turtur*), Brewer's blackbird (*Euphagus cyanocephalus*), red-winged blackbird, yellow-headed blackbird (*Xanthocephalus xanthocephalus*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), cinnamon teal (*A. cyanoptera*), merganser (*Mergus merganser*), introduced ring-necked pheasant (*Phasianus colchicus*) and quail (*Callipepla californica*), and bald eagle.

3.5.1.6 Agriculture, Pasture, and Mixed Environs

Areas mapped as agriculture are considered low quality due to the highly altered nature of the vegetation within these areas. These areas provide little, if any, habitat for native plant species and only provide marginal habitat for wildlife species. Wildlife species that were observed in, or are likely to use, the areas mapped are American crow, wild turkey, brown-headed cowbird (*Molothrus ater*), coyote (*Canis latrans*), gray partridge (*Perdix perdix*), horned lark, killdeer (*Charadrius vociferus*), mule deer, northern harrier, ring-necked pheasant, rock pigeon (*Columba livia*), and western meadowlark.

3.5.1.7 Developed and Disturbed

Disturbed and developed areas are considered very-low-quality communities due to the highly altered nature of these areas such as the cattle feedlot in the north-central portion of the project area, lack of vegetation, and high abundance of non-native invasive plant species in these areas. Wildlife species that were observed in, or are likely to use, the areas mapped are American crow, European starling, black-tailed jack rabbit (*Lepus californicus*), Brewer's blackbird, brown-headed cowbird, Canada goose, common nighthawk (*Chordeiles minor*), common porcupine (*Erethizon dorsatum*), coyote, Eurasian collared-dove, gopher snake, horned lark, house sparrow (*Passer domesticus*), little brown myotis (*Myotis lucifugus*), mourning dove, mule deer, prairie rattlesnake, ring-necked pheasant, rock pigeon, turkey vulture, Say's phoebe, western meadowlark, and wild turkey.

3.5.2 Special Status Wildlife

Information on special-status species obtained from the USFWS for ESA-listed species and the ODFW for state-listed wildlife indicates low potential for ESA-listed species, and moderate potential for other special status wildlife species in the project area.

The threatened yellow-billed cuckoo (*Coccyzus americanus*) was identified as potentially occurring in the project area. Based on a review of information on special-status species, the survey effort did not find this species nor any sign of it. In addition, based on the record of known occurrences, it is unlikely to occur near the project site because the yellow-billed cuckoo has not actively bred in Oregon since the 1940s.

The Washington ground squirrel (*Urocitellus washingtoni*), which is endangered under the Oregon list, was also identified as having a low potential to occur based on the review of special-status species information. This survey effort did not observe the species or suitable habitat. For this reason, the Washington ground squirrel is unlikely to occur in the project area.

Although no nests were identified in the project area, bald and golden eagles have moderate to high potential of occurring in the project site. Bald eagles have a moderate likelihood of occurrence in the project area based on field observations and due to a few factors such as the presence of water. During the survey effort, one bald eagle was observed outside the project area occupying a tree near the Umatilla River. Golden eagles have a high likelihood of using the project area as they tend to favor areas of partially or fully open country around mountains, hills or cliffs. The project supports potential nesting habitat such as this along the small cliffs in the western portion of the project area and along both sides of

the Umatilla River. A known golden eagle nest is documented outside the project area north of the Umatilla River, about a half mile outside the project area.

3.5.3 Environmental Consequences – Proposed Action

In general, restoration activities would have short-term adverse impacts with long-term positive impacts on most wildlife species and their habitats. The goal of the proposed restoration actions is to restore the ecological function of native habitat: primarily aquatic habitats, riparian corridors, and floodplains. Improving impaired aquatic and riparian habitat function and condition would increase and improve wildlife habitat resilience, carrying capacity, and connectivity within and between watersheds. This would increase wildlife's reproductive potential both at the individual level (from improved site conditions within a home range) and at the population level (by improving dispersal capabilities between disjunct subpopulations).

Implementing restoration activities, however, temporarily disturbs wildlife individuals and their habitats. Though project design criteria (such as avoidance of known nest or den sites) and mitigation measures (such as timing restrictions and retention of large trees, logs, and snags; see Table 2-5) would apply to minimize such disturbance, some measure of disturbance impact would likely remain.

The Proposed Action may disturb wildlife by human presence (e.g., sound, movement, shadows) even without destroying vegetation. In these instances, the larger, more mobile, species such as birds and small mammals may be temporarily displaced. Such displacement forces individuals into nearby territories likely occupied by others of their kind, increasing competition for space and resources. This intra-species competition would be sustainable for the short term if individuals could return to their former habitats once the human disturbance had passed. For non-mobile species (e.g., invertebrates and amphibians), the presence of humans would be a source of stress (e.g., disrupted feeding, breeding, hiding, etc.) that they could not escape for the duration of the activity. Such stress or disturbance can make the animal more vulnerable to predation or impact its physical condition perhaps affecting its future survival.

Other types of disturbance can affect wildlife apart from the restoration site. These include noise, turbidity, smells, etc. While these activities do not modify habitats, they can temporarily disrupt wildlife behavior and displace their use of habitats. Birds, for example, would be directly affected and some amount of nest abandonment could most likely occur due to noise disturbance.

The Proposed Action would remove vegetation (i.e., the wildlife habitat). Mobile species would be permanently displaced (at least as far as their individually short lifespans are concerned) and it may take three to ten growing seasons to restore desired habitat conditions. Intra-species competition resulting from increased densities from displaced individuals in adjacent habitats would not be sustainable over multiple seasons. This is especially the case in aquatic and riparian habitats where available habitat is usually limited, and the ability of wildlife species closely associated with those habitats to relocate is limited. In general, slightly less upland habitat would be available to upland terrestrial species as more habitat would become available to wetland and aquatic species.

The adverse impacts described above would occur in the short term (one to ten years) on habitats likely in need of improvement. In nearly all cases, however, the resulting condition would be restored, improved, or expanded habitat over its prior condition, with vegetation affording a higher carrying capacity for both dependent and generalist wildlife than that of the existing condition. Though these restored conditions would likely not benefit the individuals affected by the Proposed Action, the local population of their species is anticipated to benefit for the long term.

In summary, there would be a short-term **low impact** to wildlife from construction disturbances and habitat removal. Long term, there would be a beneficial **moderate impact** from improved conditions that result from habitat restoration.

3.5.4 Environmental Consequences – No Action

There would be no short-term impact to wildlife such as disturbance or temporary habitat reduction from the No Action Alternative if the Proposed Action is not implemented. However, there would also be no improvement to wildlife or habitat disturbance from the No Action Alternative. There would also be no improvement in riparian areas or with floodplain and wetland creation, providing no opportunity for increase in wildlife numbers or productivity. Ongoing effects from ranching and agricultural land use and associated activities would continue. Overall, there would be **no impact** to wildlife under the No Action Alternative.

3.6 Cultural Resources

Cultural resources are those physical remains, objects, places, historic records, and traditional cultural practices or beliefs that connect people to their past. Historic properties, as defined by 36 CFR 800, the implementing regulations of Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C. 300108), are a subset of cultural resources that includes any prehistoric or historic district, site, building, structure, or object that meets defined eligibility criteria for the National Register of Historic Places (National Register). Historic properties can include artifacts, records, and remains that are related to and located within sites and properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization (also known as Traditional Cultural Properties). No Traditional Cultural Properties were identified within the project's Area of Potential Effect (APE) and are not discussed further.

The NHPA requires that cultural resources be inventoried and evaluated for eligibility for listing in the National Register and that federal agencies evaluate and consider effects of their actions on such resources. Cultural resources are evaluated for eligibility of listing in the National Register using four criteria commonly known as Criteria of Eligibility A, B, C, or D, as identified in 36 CFR Part 60.4 (a-d). These criteria include an examination of the cultural resource's age, integrity (of location, design, setting, materials, workmanship, feeling and association), and significance in American culture, among other things. A cultural resource must meet at least one criterion to be eligible for listing in the National Register and to be considered a historic property.

3.6.1 Affected Environment

Ethnographic

The project lies within the cultural area of several groups including the Sahaptin-speaking groups: the Cayuse (*Weyiiletpuu*) and Umatilla (*Imatalamlama*) (Stern 1998; Walker 1998), the Yakama and neighboring groups. The Walla Walla primarily used lands closer to the confluence of the Columbia and Walla Walla rivers, while the Cayuse primarily occupied lands southeast of the Touchet River (Ray 1936). The Yakama occupied lands to the west. Neighboring the Sahaptin-speakers were the Nez Perce to the east. Intermarriage was common between the Cayuse, Walla Walla, and Umatilla cultures and the Nez Perce. The peoples of the Columbia Plateau shared a similar lifeway organized around summer fishing camps on the Columbia River or a major tributary followed by winter villages located away from the river. Walker (1998) identified eight distinguishing features of cultural organization on the Plateau. Settlement patterns tend to be linear, within a riverine area, resources gathered are diverse (anadromous fish, game, roots), complex fishing technology, transmission of goods between groups, intermarriage between groups, extension of trade links through institutionalized trading partnerships, limited political integration, and a relatively uniform mythology and religious beliefs. Settlement and movement through the landscape follow a seasonal annual round subsistence cycle. Though a single well-placed site may double as a winter and summer village, these situations are rare. Summertime movement was directed by

dispersed resources, smaller groups were tasked with collecting their resources to store for the leaner winter months. Labor was divided into task groups included fishing, hunting, and gathering. Within these groups, labor was further divided based on sex. Women, children and elderly gathered, butchered, and tended to the domicile, while men focused their attention on hunting and fishing. The archaeological record suggests that these patterns persisted throughout aboriginal history. Over time as populations grew people became more settled, and sociocultural complexity increased.

Historic

Members of the Corps of Discovery Expedition were among the first non-indigenous people to travel to the Columbia Plateau. The resources created from this expedition provided a roadmap for future exploration and potential settlement opportunities in the region. Fur traders and explorers such as John Jacob Astor established a trading base at the mouth of the Columbia and set up posts between Fort Astoria and St. Louis from 1810 to 1812 (Toepel 1980). Astor then sold his Oregon interests to the North West Company in 1814, who built Fort Walla Walla in 1818. The North West Company entered into a coalition with the Hudson's Bay Company in 1821, and the post became a powerful center of trade for horses and other goods (Stern 1998). The Hudson's Bay Company was a dominant force in the fur trade in Oregon for the next twenty years.

Large-scale Euroamerican immigration into northeastern Oregon began in the early 1840s, after the Spalding Mission at Lapwai and the Whitman Mission at Waiilatpu were established in 1836 (Dodd 1982). The mission failed to convert the *Weyíiletpu* to Christianity and agriculture. Large scale migration of emigrants over the Oregon Trail began around 1843 when people traveled over the Blue Mountains and into the Umatilla River Valley near the town of Cayuse, Oregon (National Historic Oregon Trail Interpretive Center n.d.a). The expansion of Euroamerican settlement upon traditional aboriginal subsistence lands in the region led to repeated conflicts with Native Americans. This led to the negotiation and signing of the Treaty of 1855 between *Imatalamłáma*, *Weyíiletpu*, and *Walúulapam* and the United States government. The outcome of the treaty negotiations was that the *Walúulapam, Imatalamłáma*, and *Weyíiletpu* retained a reservation in the *Weyíiletpu* homeland (Miller 2019). The tribes ceded 6.4 million acres to the United States, reserved rights for fishing, hunting, gathering foods and medicines, and pasturing livestock, and reserved 510,000 acres on which to live. The treaty was signed on June 9, 1855.

Historic Property

Bonneville is identifying and documenting archaeological and historic built resources in the APE and evaluating them for eligibility for listing in the National Register. Bonneville conducted a literature review of known sites within one mile of the proposed project. This literature review identified a total of two built resources within a 1-mile search radius of the APE. No previously recorded cultural resources were identified within the APE.

Bonneville conducted cultural resource field surveys within the APE to locate previously unrecorded archaeological sites, as well as to revisit previously recorded sites to further evaluate their location relative to the project components. Surveys were conducted for the entire APE.

The cultural resource survey identified four new cultural resources—one historic site and three new historic built resources—within the APE (Table 3-3). Of the four resources identified during the survey, two were determined eligible for listing in the National Register. The remaining two resources were determined not eligible for listing on the National Register. The resources were not determined eligible because they do not meet the minimum requirements for the Criteria of Eligibility found in National Register regulations (36 CFR 60.4).

Table 3-3: Historic Properties Identified within the Project APE*

Site	Date Recorded	Type	Site Description	National Register Eligibility Determination
120410A	2020	Archaeological Site	Granary Foundation	Not Eligible
Pendleton Levee 2a	2020	Built Resource	Earthen Linear Berm	Eligible
Unnamed Levee	2020	Built Resource	Earthen Linear Berm	Not Eligible
Feedlot Maintenance Yard	2020	Built Resource	Feedlot maintenance yard (silage pit, culvert ditch, effluent pond, bathroom shed and barn/garage shed)	Eligible

* Cultural resources listed on, or eligible for listing on the National Register of Historic Places are referred to as historic properties. Unevaluated sites are considered in the same manner as eligible resources until an eligibility recommendation has been determined.

3.6.2 Environmental Consequences – Proposed Action

All proposed work and access areas were surveyed to determine if cultural resources are present and, if so, to avoid them, where possible. As shown in Table 3.3, two eligible sites (Pendleton Levee 2a and Feedlot Maintenance Yard) were identified within the project area. Both resources would be negatively affected by the Proposed Action because it would result in the destruction and removal of those resources. Bonneville initiated Section 106 consultation with the Oregon State Historic Preservation Office (SHPO), Confederated Tribes of the Umatilla Indian Reservation, and Confederated Tribes of Warm Springs on January 14, 2019, and received a response from the SHPO on February 8, 2019 concurring with Bonneville's APE. Through Bonneville's Section 106 consultation process, Bonneville will provide its eligibility determinations and its finding of adverse effect to the SHPO for concurrence. Bonneville will invite the Advisory Council on Historic Preservation (ACHP) to participate in the negotiation of a Memorandum of Agreement to address the adverse impacts to the two built resources. Bonneville will seek SHPO signature on the Memorandum of Agreement to address the adverse impacts. Proposed stipulations in the MOA to mitigate adverse effects would include providing historic context and documentation of the Pendleton Levee 2a and Feedlot Maintenance Yard on BPA's public-facing cultural resources website, so the information would be available to the general public and future researchers.

While Bonneville conducted a thorough inventory of cultural resources in the project areas, construction activities may have the potential to affect cultural resources, including human remains, though not currently known to exist in the APE. If an unanticipated cultural resource is encountered during project activities, implementation of the mitigation measures described in Table 2-5 would ensure that previously undiscovered resources would be managed properly under applicable laws and regulations, and would minimize both direct and indirect impacts from the project.

Therefore, the project would likely result in a **moderate** impact on cultural resources because two historic properties eligible for the National Register of Historic Places identified in Table 3.3 (Pendleton Levee 2a

and the Feedlot Maintenance Yard) would be demolished and removed from the built environment. The adverse effects would be mitigated under the MOA with the SHPO.

3.6.3 Environmental Consequences – No Action

Ongoing agricultural land use at the feedlot site would have no potential to affect cultural resources because the historic structures would remain in place; however, cultural resources could be affected by agricultural actions.

3.7 Land Use

3.7.1 Affected Environment

The general setting of the project is an agricultural landscape. The dominant past and present land use in the project area is ranching and agriculture with feedlot operations occurring within the project area. Livestock have been removed from the project area as of early 2023. Some private recreational activities such as hunting and fishing occur on the project area.

The project area is located on privately owned lands in Umatilla County near the small town of Rieth, Oregon. It sits several miles from downtown Pendleton, which has an estimated population of 16,810 people (PSU 2019). The project area is zoned for exclusive farm use, a designation adopted under state law to preserve and maintain agricultural lands for farming (UCDLUP 2018).

3.7.2 Environmental Consequences – Proposed Action

Restoration actions would change land use at the site because some lands previously in agricultural and ranching use would become dedicated to floodplain and upland native habitat. The conservation easement would restrict the land uses within the project area and would require that it be retained forever predominantly in a natural condition as a relatively natural habitat for fish, wildlife, or plants, or similar ecosystem. While the Umatilla County exclusive farm use zoning would not change, future agricultural and ranching activities would be diminished or cease within the project area. This would not result in a substantial reduction to overall agricultural lands available in the county or within the project site. New channels may change how lands are accessed. A new hydrologic regime with seasonal flooding might become the norm when previously those high waters were contained within a channelized river.

The private property subject to the conservation easement would continue to be used for recreational activities such as hunting, fishing, bird watching, and walking. The conservation easement would restrict uses to only low-impact recreational activities which would not adversely impact conservation values of the property.

In summary, because there would be limited change to current land use under the Proposed Action, there would be a **low-to-moderate impact** to land use.

3.7.3 Environmental Consequences – No Action

There would be no short- or long-term impacts to land use under the No Action Alternative. The proposed restoration project would not be implemented, therefore current land uses, including agricultural and ranching use such as the feedlot operation, could remain the same.

3.8 Air Quality and Climate Change

3.8.1 Affected Environment

3.8.1.1 Air Quality

Ambient (outdoor) air-quality standards prevent air pollution from reaching levels that are harmful to public health and the environment. Ambient air-quality standards are generally set at state and federal levels.

Under the Clean Air Act, 42 USC §§ 7401 *et seq.*, the U.S. Environmental Protection Agency (EPA) establishes National Ambient Air Quality Standards (NAAQS) to protect air quality and prevent air pollutants from reaching levels harmful to public health and the environment. These standards identify six criteria pollutants that raise particular concern for human health and the environment, including particulate matter (PM),[9] carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, and lead. The Oregon Department of Environmental Quality (ODEQ) maintains a monitoring network measuring the levels of these pollutants. Monitoring results that consistently exceed NAAQS result in EPA identifying a non-attainment area.

The project area and Umatilla County are in attainment for all six criteria pollutants (ODEQ 2019a). The closest ODEQ monitoring station is the Pendleton McKay Creek station a few miles from the project site, which monitors $PM_{2.5}$ annually and ozone during spring and summer months (ODEQ 2019b). While current readings for air-pollutant levels are below NAAQS, the primary air pollutant of concern in the project vicinity is elevated particulate matter, $PM_{2.5}$ or PM_{10}, which comes from all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. In the area near the project site, particulate matter is generally highest during winter months from local wood-burning stoves (Pendleton AQC 2012).

3.8.1.2 Climate Change

Greenhouse gases (GHGs) are chemical compounds in the earth's atmosphere that absorb and trap infrared radiation (heat) that is reflected or emitted from the surface of the earth. The trapping and subsequent buildup of heat in the atmosphere creates a greenhouse-like effect that maintains a global temperature warm enough to sustain life. Some forms of GHGs can be produced either by natural processes or as a result of human activities. However, the current scientific consensus is that human-made sources are increasing atmospheric GHG concentrations to levels that would raise the earth's average temperature. The United States Global Climate Research Program (USGCRP) found that since the 1970s, average U.S. temperatures and sea levels have risen and precipitation patterns have changed (USGCRP 2009). The Intergovernmental Panel on Climate Change found similar patterns on a global climate scale (IPCC 2007).

Ongoing global climate change has implications for the current and likely future status of aquatic species, but particularly for the Pacific Northwest, where snow melt into the Columbia River Basin (Basin) has substantial influence on regional hydrology. Recent studies describe the potential impacts of climate change in the Basin. These impacts may decrease snowfall, increase early year runoff, decrease summer and fall flow, and generally increase water temperatures (RMJOC 2018; USGCRP 2018). Specifically for

[9] $PM_{2.5}$ and PM_{10} refers to fine particulate matter (i.e., less than 2.5 or 10 microns in diameter) that reduce visibility, cause the air to appear hazy, and lodge deep in human lungs when levels are elevated.

the Birch Creek watershed, mean August stream temperatures are expected to increase by around 2.7 degrees Fahrenheit by the 2040s (USFS 2014).

3.8.2 Environmental Consequences – Proposed Action

3.8.2.1 Air Quality

Project impacts to air quality would be low both in concentration and duration. Construction equipment would emit some carbon monoxide, nitrogen oxide, unburned hydrocarbons, and particulate matter (primarily soot) from tailpipe emissions and cause dust during ground disturbance. These could affect air quality locally for short durations. The Proposed Action is not expected to generate long-term or short-term violations of state air quality standards. Impacts would primarily occur from construction and would be temporary and localized in nature, and thus would not have long-term impacts on air quality.

Overall, with the implementation of the mitigation measures in Table 2-5, short-term and localized emissions from construction would result in a **low impact** to air quality.

3.8.2.2 Climate Change

Greenhouse-gas emissions associated with the Proposed Action (primarily carbon dioxide, methane, and nitrous oxide) would be localized and temporary. They would be generated by the short-term emissions from construction equipment, off-road vehicles, and on-road vehicles (including worker commuting and material delivery). By comparison, after accounting for workers operating off-road construction equipment and making on-road vehicle round trips to the project area, BPA previously found that a large-scale habitat-restoration project comparable to the Proposed Action would result in GHG emissions of about 940 tons carbon-dioxide equivalent (CO2e) (Bonneville 2014). Based on the EPA's greenhouse gas equivalencies calculator (USEPA 2023), this CO2e level would equate to driving 184 gasoline-fueled passenger cars for one year. Consistent with this estimate, given the short construction duration and low number of vehicles and equipment (see Section 2.2.2), the estimated emissions resulting from the Proposed Action would be well below the EPA's reporting threshold,[10] the impact from greenhouse-gas emissions would be **low** and therefore the potential for the Proposed Action to accelerate climate change would be **low**.

The Proposed Action would, however, contribute to the amelioration of global climate change and its adverse warming impacts. The restoration of functional riparian, wetland, and floodplain habitats would expand the amount of wetland soils in which atmospheric carbon would be sequestered (Nahlik and Fennessy 2016). Wetlands can accumulate large carbon stores, making them an important sink for atmospheric carbon dioxide and holding up to, or in some cases, even more than 40 percent soil carbon (Vepraskas and Craft 2016), which is substantially greater than the 0.5- to 2-percent carbon commonly found in agricultural soils (Lal et al. 1995). By increasing stored carbon through the increase of wetland soils, the Proposed Action would help mitigate for the release of greenhouse gases.

The Proposed Action would also provide for an increase of long-term water table inputs through restoring floodplain function and increasing connectivity of the Umatilla River and Birch Creek to floodplains. It would also increase riparian shading of the Umatilla River and Birch Creek. Both of these results from the Proposed Action could help lower water temperatures.

[10] On October 30, 2009, the U.S. Environmental Protection Agency published a rule (40 CFR Part 98) for the mandatory reporting of 25,000 metric tons or more of carbon dioxide equivalent per year of greenhouse gases from large GHG emissions sources in the United States.

In summary, the Proposed Action would result in short-term and long-term **low impacts** by contributing low levels of global greenhouse-gas emissions from construction while also ameliorating certain effects from warming climates by restoring wetland and floodplain habitats and increasing riparian shading.

3.8.3 Environmental Consequences – No Action

3.8.3.1 Air Quality

Because construction would not occur, no emissions would occur and no dust would be generated from construction that could result in an air quality impact from the Proposed Action. Ongoing effects from agricultural and residential land use that could generate dust would continue. Therefore, the No Action Alternative would have **no impact**.

3.8.3.2 Climate Change

The No Action Alternative would neither contribute to the accumulation of GHGs (because there would be no use of fossil-fuel powered vehicles) nor contribute to the amelioration of such GHG accumulation by increasing wetland soils that could otherwise sequester those gasses. There would, however, be continued agricultural activities and livestock operations that would contribute greenhouse gases. In addition, long-term water table inputs from increased connectivity between Birch Creek and its floodplain would not occur. For these reasons, the No Action Alternative would have a **low impact** on climate change.

3.9 Noise

3.9.1 Affected Environment

The definition of noise is an unwanted sound that disrupts normal human activities or that diminishes the quality of the environment. It is usually caused by human activity that adds to the natural acoustic setting of a locale. For this assessment, the A-weighted decibel scale,[11] abbreviated as dBA, is used to describe sound and noise levels.

Natural sounds such as flowing water, wind moving through trees and vegetation, and wildlife generally characterize the soundscape in the absence of human-generated sounds. Human-generated sounds frequently elevate noise levels in the project area, notably from trains regularly passing along the north bank of the Umatilla River on the Union Pacific railroad, which can elevate noise levels to around 80dB or higher. In addition, low-level vehicle traffic on Birch Creek Road along the east boundary of the project area or from Rieth Road across the Umatilla River; or from distant vehicles on Interstate 84, over a mile away, could elevate noise levels to around 50dB or higher. The cattle from the feedlot operation also contribute to these existing noise levels from cows and vehicles. In general, typical day-night average sound levels for agricultural crop land similar to the project area is around 45 dB (USEPA 1974).

Table 3-3 displays different levels of noise, typical sources of specific noise levels, and the likely noise level created by different restoration actions.

[11] This is a logarithmic scale that ranges from 0 dBA to about 160 dBA and approximates the range of human hearing. The threshold of human hearing is about 0 dBA; less than 30 dBA is very quiet; 30 -60 dBA is quiet; 60-90 dBA is moderately loud; 90-110 dBA is very loud; and 110-130 is uncomfortably loud. A 10-decibel increase in sound levels is perceived as a doubling of the loudness.

Table 3-4: Example Noise Levels*

Source(s)	Sound Levels** (dBA)	Relevance of sound at this level
Shotgun, Rifle, Handgun Fireworks (at three feet (ft).)	>160	Sounds created by a shock wave
Jet engine (taking off)	150	Harmfully loud
Airplane (taking off)	140	Harmfully loud
Stock car races Jet takeoff (at 100-200 ft.)	130	Threshold of pain
Heavy machinery/Chainsaw	120	Threshold of sensation or feeling
Car horn Baby crying / Maximum vocal effort.	110	Regular exposure of more than one minute risks permanent hearing loss. Physical discomfort.
Snowmobile Garbage truck Jet takeoff (at 2000 ft.)	100	> 95 dBA- no more than 15 minutes/day unprotected exposure recommended; One hour per day risks hearing loss.
Heavy truck (at 50 ft.) Motorcycle (operator) Power lawnmower Jet ski Shouted conversation	90	Very annoying
Heavy traffic Many industrial workplaces Electric razor	85	Level at which hearing damage begins with eight hour exposure
Average city noise Freight train (at 50 ft.)	80	Annoying; interferes with conversation
Freeway traffic (at 50 ft.) Urban housing on major avenue (Ldn) Inside a car TV audio	70	Interferes with telephone conversation.
Normal conversation Sewing machine	60	Intrusive; Interference with human speech begins at about 60 dBA
Rainfall Refrigerator Wooded residential Light auto traffic (at 100 ft.)	50	Quiet Comfortable Sleep disturbance may occur at less than 50 dBA.
Soft whisper (at 15 ft.)	30	Very quiet
Normal breathing	10	Just audible
-	0	Threshold of human hearing

*Adapted from multiple sources, including USEPA 1974, League for the Hard of Hearing, www.lhh.org; and The Canadian Hearing Society, www.chs.ca

**These are typical levels near the noise source and some may be approximate averages of ranges; actual sound levels experienced by the public may depend on several factors, most importantly, distance from the sound source.

The project area is on private land several miles from the nearest schools or hospitals in nearby Pendleton, so there would be no impact on such sensitive receptor sites. Nearby residences sit on private property directly across from Birch Creek Road from the project area and across the Umatilla River in Rieth, near the Union Pacific railroad tracks that trace the north bank of the Umatilla River.

3.9.2 Environmental Consequences – Proposed Action

Implementing the Proposed Action would require use of heavy equipment for short periods during the construction timeline. This would increase ambient noise levels in the short term. On a short-term basis, construction activities would elevate existing noise level to between 80-100 dBA at the construction site. Such noise would come from construction, transportation, and site rehabilitation activities and the associated equipment (e.g., heavy machinery, heavy equipment, vehicles, generators, compressors, etc.). Many of these noises are loud, but they would vary in duration and timing. High noise levels would not be constant.

Because the cattle feedlot operation would be removed under the Proposed Action, it would cease as a contributor to noise levels in the project vicinity.

Construction-related noise could impact nearby residents and wildlife during construction. The project, therefore, would limit construction activities to normal daytime working hours. Short-term impacts from noise are expected to be minimal due to the relatively short duration of construction.

Once implemented, the resulting floodplain reconnection project would not make noise, except for that from limited vehicle access to the site to monitor and maintain it. Follow-up maintenance actions would likely be limited to infrequent use of equipment for vegetation replantings. The noise from these actions; however, is expected to be similar to or less than that generated near the project area prior to restoration actions, and from those in surrounding areas.

For these reasons, the Proposed Action would result in a **low impact** to noise levels.

3.9.3 Environmental Consequences – No Action

There would be no noise impacts associated with construction under the No Action Alternative. Noise levels associated with the feedlot operation could continue.

3.10 Public Health and Safety

3.10.1 Affected Environment

There are few existing risks to public health and safety on the project site. Umatilla County Sherriff's Office, City of Pendleton Police, and Pendleton Fire & Ambulance Department provide law enforcement and emergency services a short distance from the site.

The project site is served by Birch Creek Road and Taylor Lane, which are the primary roadways serving residences in and around the project area.

As discussed in section 3.3.1.3.2 above, FEMA-designated floodplains are found within the project area, which indicates the existing potential for health and safety hazards to occur during a 1-percent annual exceedance probability flood event. In general, FEMA-designated floodplains are found along the Umatilla River and Birch Creek, indicating existing potential for health and safety hazards during a similar flood event. The Pendleton 2a levee, operated and maintained by Umatilla County, provides flood protection for the landowner's property.

Bonneville conducted a phase-one environmental site assessment of the project area in 2020 and found a de minimis amount of stained soil near an above ground diesel storage tank where soil must be removed and properly disposed of in accordance with acceptable regulatory practices. Other than this de minimis condition, there were no recognized environmental conditions that would indicate contamination that would pose a hazard to public health. Bonneville plans to conduct an updated phase-one environmental site assessment to account for changed boundaries of the project area and lapsed time. Other than what was previously identified as a de minimus condition, the project site contains no known existing water and soil contaminants that would pose a risk to public health and safety under normal conditions.

3.10.2 Environmental Consequences – Proposed Action

The primary impact of the Proposed Action on public health and safety would be the potential to hinder traffic flow. This would be expected during construction occurring along Birch Creek Road and could congest the area for vehicle traffic. It also has the potential to extend emergency vehicle response time from the presence of construction equipment or supply vehicles on Birch Creek Road. New Taylor Lane bridge construction would also increase construction traffic and reduce access to areas across Birch Creek. Mitigation measures in Table 2-5 such as ensuring adequate alternative access, proper flagging, and signage to safely direct traffic would help ease the flow of traffic and facilitate emergency vehicle access when needed.

The short-term construction and restoration activities would not be expected to overburden the existing health and safety infrastructure. The potential health and safety risks to workers and the public during construction would not be greater than a standard construction project and appropriate mitigation measures, such as adequate signage and other routine safeguards for worker and public safety would minimize these impacts. Therefore, the short-term impacts of the project to health and safety would be low.

The Proposed Action incorporates a new setback levee designed to maintain flood protection for existing public and private infrastructure outside the project area during the 100-year flood event, matching the current Pendleton 2a levee standards. Construction of the setback levee would begin with building the levee so that its crest meets the FEMA standard for certification (3 ft. above the 100-year water surface elevation). Because this setback levee design would provide this FEMA-certified protection against 1-percent annual exceedance probability events, the level of flood protection would remain unchanged after the removal of the Pendleton 2a levee and therefore not increase the preexisting level of flood risk. In addition, increased floodplain connection within the project area would temporarily store flood water and may slightly decrease downstream flows and stages in short-duration flood events.

As part of the Section 14 of the Rivers and Harbors Act (Section 408) process with the Corps for the modification of the Pendleton 2a levee, close and direct coordination would occur with Umatilla County Commissioners, Planning Department, Road and Bridge Department and Flood District.

Restored flow regimes and seasonal flooding in the reconnected floodplain are intended outcomes from implementing the Proposed Action. The restored site could create low-lying or poorly drained areas which could seasonally pond water long enough to provide breeding habitat for mosquitoes, which are a nuisance and a public-health threat, since they can serve as vectors for disease. This impact is anticipated to be negligible given the minimal incremental increase in such habitat that the project area would create along the Umatilla River and Birch Creek when they experience high flows.

For these reasons, the Proposed Action would result in a **low impact** on public health and safety.

3.10.3 Environmental Consequences – No Action

Under the No Action Alternative, the project would not be implemented and therefore construction-related impacts would not occur. Conditions that may affect public health and safety would remain unchanged, so there could be **a low impact** from operations of the feedlot.

3.11 Socioeconomics

3.11.1 Affected Environment

This section primarily relies on the best-available demographic data obtained through the U.S. Census Bureau based on the American Community Survey (ACS) program updated annually. Five census tracts were chosen for the study area because they generally represent the baseline socioeconomic data on nearby populations.[12] These tracts are compared with county-wide totals for Umatilla County to provide regional context.

Community Character

The project area is situated near the town of Rieth on the outskirts of Pendleton, Oregon, which are agriculture-based rural communities. Pendleton's history is deeply rooted in agriculture, ranching, manufacturing such as the Pendleton woolen mill, and its well-known Pendleton Round-Up rodeo—a week-long event held annually the second week in September, which typically draws more than 50,000 visitors to town. Situated at the foot of the Blue Mountains, the community also serves as a jumping-off point for recreational activities such as hunting, fishing, skiing, snowshoeing, cycling, and hiking (City of Pendleton 2019).

Population, Demographics, and Housing

Based on 2018 population estimates, Umatilla County has a population of 77,129 people with the most populous areas in the county seat of Pendleton (16,810) and its largest city of Hermiston (18,200) (USCB 2019; PSU 2019). Growth across the county has averaged less than one percent in recent years (PSU 2019). The Umatilla Indian Reservation, located east of Pendleton, combined with nearby Off-Reservation Trust Land, has a population of 2,836 (USCB 2019. Study-area census tracts represent about 28 percent of the total current county population.

Table 3-5: Demographic Characteristics

Measure	Study Area	Umatilla County
Population	21,330	77,129
Median Age	39.4	36.5
% Minority Population	22.2%	14.2%
Households	7,689	30,499
Average Size	2.48	2.68
Median Income	$25,954	$54,699
% One-Unit Structures	64.68%	65.3%

[12] Tract 9505 includes the immediate project area near Rieth and rural Umatilla County, tracts 9504, 9506, and 9507 include Pendleton and rural areas of Umatilla County, and tract 9400 includes the Umatilla Indian Reservation.

% Two-or-More Units	21.73 %	16.7%
Poverty Rate	9.44%	17.9%
Unemployment Rate	7.8%	7.2%
% of Population Age 25 or Older With Bachelor's Degree or Higher	18.5%	17.2%

Employment and Income

The largest employment centers within Umatilla County are Hermiston and Pendleton. Within study-area tracts, the ACS estimates a total active labor force (civilian employed population older than 16 years) of approximately 17,700 people. As illustrated by Table 3-6, which summarizes employment by industry for the workforce living in the study area and compares it to Umatilla County, the top five industries employing study-area residents are education and health care (24 percent), manufacturing (12 percent), retail trade (12 percent), public administration (12 percent), and arts, entertainment, and recreation, and accommodation, and food services (11 percent). Compared to Umatilla County as a whole, the study area is mostly similar, with the exception of the percentage of people working in the industry category for agriculture, forestry, fishing and hunting, and mining—more people work in that category in the county as a whole. As discussed above and illustrated in Table 3-5, median income for the study area is about half that of the county.

Table 3-6: Employment by Industry for Study-Area Residents

Industry	Study Area		Umatilla County	
	%	Rank	%	Rank
Agriculture, forestry, fishing and hunting, and mining	3.2%	10	9.7	4
Construction	5.6%	7	4.8	9
Manufacturing	11.9%	2	12.0	3
Wholesale trade	1.9%	13	2.8	11
Retail trade	11.8%	3	13.5	2
Transportation and warehousing, and utilities	4.4%	8	6.9	7
Information	1.8%	12	1.5	13
Finance and insurance, and real estate and rental/leasing	2.6%	11	2.6%	12
Professional, scientific, and management, and administrative and waste-management services	6%	6	6.1%	8
Educational services, and health care and social assistance	24.4%	1	19.1%	1
Arts, entertainment, and recreation, and accommodation and food services	11%	5	7.9%	6
Other services, except public administration	4%	9	4.6%	10
Public administration	11.6%	4	8.5%	5

Environmental Justice

Identifying low-income, minority, and Indian Tribe populations in the study area lays the foundation for characterizing environmental justice in the study area. A census tract within the study area meets environmental-justice criteria if more than 20 percent of its population is below the poverty level or if the percentage of the population that identifies as a minority is greater than the percentage of the state identifying as a minority. Based on the 2017 ACS estimate, Oregon's minority population is 15.1 percent. On the basis that they are the home to minority populations higher than the statewide average, most environmental-justice populations reside in two census tracts: census tract 9400, coextensive with the Umatilla Indian Reservation, has a minority population of 49.2 percent; and census tract 9506, encompassing downtown Pendleton and an area south of town to the east of the project area, has a minority population of 21.1 percent.

3.11.2 Environmental Consequences – Proposed Action

Population, Demographics, and Housing

There would generally be little impact on local populations from implementing the Proposed Action. Construction crews would likely consist of about 20 local construction workers; however, based on the potential economic multiplier effect discussed below, overall employment associated with the Proposed Action could range as high as about 357 jobs. None of the actions would generate a requirement for additional permanent employees nor would they require individuals to leave the local area, or relocate within it. There would therefore be no impact on housing available for local populations in Pendleton and surrounding areas in Umatilla County. The Proposed Action would not displace people or eliminate residential suitability from lands being restored or from lands near restoration project sites. Overall, there would be **low impact** on population, demographics, and housing.

Employment and Income

Implementation of the restoration actions would likely create short-term beneficial economic impacts from the temporary employment of construction workers and for local businesses through purchases of food, fuel, lodging, and materials associated with the estimated $10 to $15 million in overall direct project spending. Materials necessary to build projects would also be sourced locally (e.g., large-woody material and boulders), and lodging, food, and other services would be required to support construction workers traveling from outside of the immediate area. When practicable, local companies would be utilized for restoration project activities, which could provide a short-term increase in jobs in Umatilla County. Accounting for the predicted multiplier effect for employment and economic output from a restoration project in Oregon—estimated at 15.7 and 23.8 jobs per $1 million spent and 1.4 to 2.4 times the direct project spending amount—the resulting employment and local economic output from the Proposed Action could range as high as 357 jobs and $36 million (Nielsen-Pincus and Moseley 2010).

The restoration actions under the Proposed Action may also improve fish runs and natural scenery leading to long-term benefits for fishing and tourism within the communities.

Land-use conversions in restored riparian areas from agriculture to natural habitats may require changes in grazing practices or some land uses, but no action is anticipated to impact agricultural productivity or revenue sufficient to change land uses, decrease ranching- or farming-related jobs, or lead to a decrease in agricultural support services.

Overall, for these reasons, there would be a **moderate impact** on employment and income.

Environmental Justice

As discussed above, environmental justice populations are present in the general proximity of the project area. The environmental justice population in the closest census tract (9505) covering Rieth, where short-term adverse environmental effects from construction activities would most likely be experienced, does not exceed the state-wide average. In addition, as described for the affected resources in the sections above, none of the adverse effects resulting from the Proposed Action would be high. The Proposed Action focuses on a private landowner allowing altered land use to accommodate restoration actions on their property in a rural, sparsely populated area and would therefore not create a unique pathway for environmental justice populations to experience disproportionately high and adverse environmental effects. For these reasons, the Proposed Action would not cause any effects to environmental justice populations.

The Proposed Action is unlikely to result in disproportionately high and adverse impacts on any population, including environmental justice populations. Overall, the Proposed Action would have a **no impact** on environmental justice populations.

3.11.3 Environmental Consequences – No Action

Under the No Action Alternative, the Proposed Action would not occur, and the project area would remain largely in its current condition. There would not be an opportunity realized for improved floodplain conditions that benefit fish and wildlife to the benefit of environmental justice populations such as Indian Tribes. Ongoing adverse environmental effects, such as effects to water and air quality described in the sections above, would continue unabated. Because none of these effects are expected to be high, and the project area does not uniquely expose environmental justice populations to those effects, there would be no disproportionately high and adverse effect to environmental justice populations.

3.12 Cumulative Impacts

Cumulative impacts describe the impact on the environment that results from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions irrespective of agency (federal or non-federal) or person undertaking such action. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. The effects of past actions in the vicinity of the Proposed Action are part of the affected environment baseline for each resource. Past actions of cumulative environmental consequence in the Umatilla River and Birch Creek watershed include agriculture, construction of transmission lines, levees, bridges, roads, and the Union Pacific railroad, water withdrawals, rural development, timber harvest, grazing, suppression of natural fire regimes, and harvests of fish and wildlife.

Sections 3.1 through 3.11 of this chapter present information about current environmental conditions and the environmental and socioeconomic consequences of implementing the Proposed Action.

Present actions include the use and maintenance of nearby roads and the Union Pacific railroad; ongoing land uses and management actions such as agriculture and associated water withdrawals from Birch Creek and the Umatilla River and nearby tributaries such as McKay Creek; grazing; lumber yard operations near Pilot Rock along Birch Creek; forest management in the Umatilla National Forest; annual winter flood-risk mitigation activities removing gravel deposits along a quarter-mile section of Lower McKay Creek carried out by the City of Pendleton; and the management and harvest of fish and wildlife populations.

The City of Pendleton Wastewater Treatment Plant, located at the confluence of McKay Creek and the Umatilla River about two miles upstream from the Proposed Action, conducts ongoing wastewater management activities, returning 1.8 to 2.5 million gallons per day (2.8-2.9 cubic feet per second) of treated water to McKay Creek near the its confluence with the Umatilla River consistent with the facility's NPDES permit issued by ODEQ.

Reasonably Foreseeable Future Actions

To identify potential reasonably foreseeable projects to consider in the cumulative effects assessment, Bonneville reviewed planned work by power, transmission, and fish and wildlife program functions within the agency, as well as planned work by the CTUIR, US Forest Service, and ODFW. In addition, Bonneville reviewed county planning documents and other publicly available planning information sources. Bonneville contacted the Oregon Department of Transportation as well as planning departments for the City of Pendleton and Umatilla County to discuss projects entering planning phases. The list below of reasonably foreseeable projects primarily includes planned work by Bonneville, CTUIR, ODFW, City of Pendleton, and Umatilla County. Bonneville identified these specific projects for the cumulative effects analysis because they could be considered reasonably foreseeable.

Reasonably foreseeable future actions (RFFAs) are actions where some form of planning (environmental or engineering) has been initiated or a planning document (e.g., transportation plan; forest management plan) exists that describes specific potential projects. RFFAs in the project's region of influence include:

- **Ongoing actions.** Continuance of the ongoing actions listed above, with some increases in those ongoing actions as populations and land-use pressures gradually increase.
- **ODEQ NPDES Permit Revision for the City of Pendleton Wastewater Treatment Plant.** The existing NPDES permit for the Pendleton Wastewater Treatment Plant is undergoing revision, with a new permit expected to be issued for the facility by ODEQ within the next few years. This revised permit is expected to include a temperature TMDL that would have a lower temperature limit for discharges of treated water from the facility.
- **Lower McKay Creek Watershed Analysis Project.** The Umatilla County Soil and Water Conservation District, Lower McKay Creek Improvement District, City of Pendleton, Umatilla County, Oregon Water Resources Department, and Bureau of Reclamation have partnered to study management actions to mitigate flood risk and increase flow capacity along Lower McKay Creek from McKay Reservoir to the Umatilla River (the McKay Creek confluence with the Umatilla River is about two miles upstream from the project area). This study is expected to result in recommendations for a management plan issued within the next few years that addresses flood risk management, floodplain and channel protection and enhancement activities such as increasing the current quarter-mile extent of ongoing gravel-deposit removals along Lower McKay Creek, as well as provide information to guide decision making by the Bureau of Reclamation related to flows from McKay Reservoir.
- **Birch Creek Floodplain Restoration Project.** CTUIR, with Bonneville funding, would restore about a one-mile section of Birch Creek starting about one mile upstream from the Proposed Action and the associated floodplains in an about 37-acre area. This project, expected to begin in 2023, focuses on aligning and restoring Birch Creek's main channel, improving its side channel and floodplain interactions, creating wetlands, and planting riparian and upland vegetation.[13]
- **East Birch Floodplain Restoration Project.** CTUIR, with Bonneville funding, is currently working on a proposal to reconnect the floodplain through about a one-mile reach located roughly 15 miles upstream of the Proposed Action. This project, expected to begin no earlier than 2024,

[13] This project's environmental assessment is available at Bonneville's website: https://www.bpa.gov/learn-and-participate/public-involvement-decisions/project-reviews/birch-creek-floodplain-restoration-project-doe-ea-2135 (last accessed February 8, 2023).

would initiate pool development, remove levees, restore topography and vegetation, and construct new channels, floodplain ponds, side channels, and alcoves.

- **Umatilla County Road Maintenance on Birch Creek Road.** Umatilla County conducts annual maintenance activities on Birch Creek Road that includes road grading on all sections from Rieth to the sections south of Pilot Rock.
- **ODFW and CTUIR Fish Enhancement Projects in the Birch Creek Watershed.** ODFW maintains multiple projects in the Birch Creek basin encompassing over 100 riparian acres (including yearly herbicide treatments) and over 5 miles of stream habitat and riparian fences. Planned projects along Birch Creek would focus on constructing and maintaining existing riparian fencing. In addition, CTUIR, with Bonneville fish and wildlife program funding, has identified opportunities to improve fish passage through the planned removal of water diversions and the replacement of culverts in the Birch Creek watershed.

Cumulative Impacts

Geology and Soils

The geographic area for cumulative impacts to geology and soils is the Umatilla River and Birch Creek watersheds. Past, present, and RFFAs that affect geology and soils primarily result from land-disturbing activities associated with rural development, agriculture, railroad and road maintenance, grazing, flood-risk mitigation activities, and the floodplain restoration projects. Grazing and agricultural activities during the planting and harvest cycle throughout the watershed would continue to disturb soils in upland and riparian areas and create the potential for erosion and sedimentation.

The Proposed Action would contribute to the cumulative impact on a short-term basis due to minor and temporary increases in erosion from construction. It would also add incremental improvement with the formation of floodplain and hydric wetland soils. On balance, the Proposed Action when combined with past and current actions and RFFAs, would result in a **low** cumulative impact to soils with the mitigation measures described in Table 2-5, which would decrease further with revegetation efforts.

Vegetation

The geographic area for cumulative impacts to vegetation includes the Umatilla River and Birch Creek watersheds. Past, present, and RFFAs that could cumulatively affect vegetation, including the spread of noxious weeds, are the use and maintenance of roads and the Union Pacific railroad, agriculture, forest management, grazing, and the floodplain restoration projects.

The Proposed Action would contribute to a low cumulative effect to vegetation during construction because other activities that affect vegetation would occur during the same timeframe as construction. Long term, the Proposed Action could incrementally improve vegetation by reestablishing native plants and limiting the spread of invasive plant species, which could combine with the beneficial effects from other restoration projects in the watershed. On balance, applying the mitigation measures described in Table 2-5 to construction activities when combined with past and current actions and RFFAs, would ensure that cumulative impacts would remain low during construction.

Water Resources (Water Quality and Quantity, Groundwater, Wetlands, and Floodplains)

The geographic area for cumulative impacts to water resources includes the Birch Creek and Umatilla River watersheds. For groundwater, it includes the underlying aquifer used for agricultural withdrawals for surrounding farmland. Past, present, and RFFAs that cumulatively affect surface and groundwater include road and railroad construction, maintenance, and use, agriculture and associated surface water withdrawals, and grazing, timber harvest and lumber yard operations, forest management, ongoing wastewater management and impending NPDES permit for the Pendleton wastewater facility, and floodplain restoration projects altering quality or quantity of water in the Umatilla River and Birch Creek.

The Proposed Action would likely cumulatively affect water quality through sediment discharges and vegetation removal on a short-term basis during and after construction since other actions would be occurring at the same time that would also affect water quality. Longer term, when combined with those actions and RFFAs that would improve water quality, the Proposed Action would incrementally improve downstream water quality in the Umatilla River and Birch Creek by improving temperature, sedimentation, and turbidity conditions. On balance, the design features and mitigation measures in Table 2-5 would ensure that cumulative impacts to water quality from construction would be **low**, with long-term **moderate** beneficial and cumulative impacts to water resources.

For water quantity, the Proposed Action, when combined with past, present, and RRFAs, would increase instream flows in the Umatilla River and Birch Creek contributing to a long-term beneficial cumulative water quantity impact.

For groundwater, the Proposed Action, when combined with past, present, and RFFAs including those that also improve groundwater and floodplains, would incrementally improve groundwater due to the increased return volume for groundwater recharge and therefore contribute to a **low** beneficial cumulative effect.

For wetlands and floodplains, the Proposed Action, when combined with past, present, and RFFAs, would create wetlands and expand floodplains where they do not exist or currently have limited function, and thereby contribute to **low** beneficial cumulative effect.

Fish and Wildlife

The geographic area for cumulative impacts to fish and wildlife includes the Umatilla River and Birch Creek watersheds. Past and present development, water withdrawals for agriculture, and other activities have had a cumulative impact on fish and wildlife and their habitats. The conversion of land for grazing, agriculture, and rural development have resulted in the loss of fish and wildlife habitat.

In the short term, the Proposed Action, combined with past, present, and RFFAs, would cumulatively affect fish and wildlife through temporary construction disturbance and vegetation removal although the project's contribution to this cumulative effect would be minimized to the extent practicable by implementing HIP conservation measures and mitigation measures in Table 2-5. Longer term, the Proposed Action would create thermal refugia and recruit large woody debris, creating habitat favorable to ESA-listed Steelhead and other anadromous species. It would also create and improve wildlife habitat, and increase the insteam flows in the Umatilla River for fish. Overall, project construction, when combined with past and current actions and RFFAs, would have a **low** adverse cumulative impact on fish and wildlife, resulting in long-term **moderate** beneficial cumulative impacts to fish and wildlife.

Cultural Resources

Cultural resources in the APE have likely been cumulatively affected by past, present, and current development activities. Most impacts have likely occurred as a result of inadvertent disturbance or destruction during ground-disturbing activities such as road work and facility construction. Other RFFAs in the vicinity of the APE have the potential to disturb previously undiscovered cultural resources. Implementation of the mitigation measures described in Table 2-5 would minimize potential proposed project impacts and would reduce the potential for construction activities to contribute incrementally to the adverse cumulative impact on cultural resources in the APE. The Proposed Action's moderate adverse effect, when combined with past, present, and RFFAs, would cumulatively result in **moderate** cumulative effects.

Land Use

The geographic area considered for cumulative impacts analysis includes the Umatilla River and Birch Creek watersheds. Land use has incrementally changed over time due to past and present development, particularly with rural development and conversion of open space to agriculture, which is expected to

continue at a gradual pace. In addition, restoration projects such as that under the Proposed Action and reasonably foreseeable floodplain restoration projects, may convert lands previously used for agriculture and grazing into riparian vegetation and wetlands that make them unsuitable for those prior land uses. Under the Proposed Action, existing land use is expected to slightly change in this manner, thus the impacts from the Proposed Action, when combined with past and current actions and RFFAs, would contribute to a **low** cumulative impact to land use.

Air Quality and Climate Change

Past, present, and reasonably foreseeable future actions affecting air quality and GHGs include all types of combustion engine use in trains and cars on nearby roads and highways, residential wood burning, industrial and agricultural operations, forest management, and grazing. The Proposed Action would result in some short-term emissions of criteria pollutants, including particulate matter, from construction equipment, but would not add a stationary source that would produce long-term emissions. The mitigation measures in Table 2-5 would minimize emissions from the Proposed Action, which when combined with past and current actions and RFFAs, would result in a **low** cumulative air quality impact.

The Proposed Action would have a cumulative impact on climate change by adding GHGs to the atmosphere. These sources of GHG emissions would continue, and any addition, when considered globally, would contribute incrementally to long-term atmospheric conditions for climate change. The Proposed Action would contribute such incremental additions of GHGs through restoration actions that require construction activities using heavy equipment.

GHG contributions globally have also contributed to a trend of less predictable and reduced flows as well as increasing temperatures in the Umatilla River and Birch Creek, which is expected to continue into the future. Combined with other habitat improvement projects in Birch Creek, such as the Birch Creek and East Birch floodplain restoration projects, the Proposed Action could contribute to a **low** cumulative impact in reducing local climate change impacts by improving water quality through increased riparian vegetation and alleviating stressors for anadromous and resident fish species by increasing the availability of habitat and cold-water refugia.

Noise

The geographic area considered for noise cumulative impacts includes neighboring properties and roads that encompass the area where sounds generated from within the project area could be heard by humans or wildlife. The ongoing activities accounting for noise impacts primarily include extended periods of noise generated by the trains passing on the Union Pacific railroad and intermittent vehicle traffic from nearby roads such as Birch Creek Road adjacent to the project site and I-84 in the distance. RFFAs such as annual Birch Creek road maintenance may add to these noise levels. Cumulatively, while the implementation of mitigation under Table 2-5 may reduce some noise, construction under the Proposed Action may unavoidably coincide with all other sources of noise, particularly passing trains, which may result in a **moderate** cumulative impact.

Public Health and Safety

The geographic area for cumulative impacts to public health and safety includes Pendleton, Birch Creek Road, and nearby floodplain areas along Birch Creek and the Umatilla River. While there are no known public health and safety risks associated with RFFAs, the potential cumulative impact to health and safety is primarily associated with the risk that an emergency response during construction could combine with other incidents in the Pendleton area to reduce the response time and availability of emergency services. The mitigation measures in Table 2-5 would minimize health and safety risks from construction and reduce the likelihood there would be no cumulative impact to health and safety related under the Proposed Action.

Regarding the cumulative impact to health and safety hazards relating to flood risk, combined with the past, present, RFFAs, such as planned floodplain restoration projects, the Proposed Action would modify the Pendleton 2a levee yet maintain existing flood risk levels through the construction of a set-back levee, and therefore would have **no** cumulative impact on flood risk.

Socioeconomics

The geographic area for cumulative socioeconomic impacts is Umatilla County and the Umatilla Indian Reservation. The Proposed Action would not directly add permanent jobs, so there would be no incremental cumulative impact on local populations and income, and therefore no need to change infrastructure and services to accommodate new residents. Forecasts of future returns of anadromous salmonids are not available, thus expenditures and income associated with their potential contribution to socioeconomic impacts cannot be predicted; however, the addition of the Proposed Action in concert with habitat-improvement projects in Birch Creek, such as the Birch Creek and East Birch floodplain restoration projects and ODFW and CTUIR Fish Enhancement projects in the Birch Creek watershed, would ultimately increase anadromous fish returns. The cumulative impact of these actions expected to increase anadromous fish returns would, over time, improve local and regional economies, and further support tribal social and cultural interests, and therefore would result in **no** cumulative adverse impact on environmental justice populations.

Environmental Justice

The geographic area for cumulative environmental justice impacts is Umatilla County and the Umatilla Indian Reservation. Due to its relatively minor contribution to adverse water and air quality impacts and limited exposure to environmental justice populations, when added to past, present, and RFFAs, the Proposed Action would not cumulatively result in long-term disproportionately high and adverse effects on environmental justice populations. The project would cumulatively benefit environmental justice populations, particularly Indian Tribes, when combined with other habitat-improvement RFFAs such as East Birch and Birch Creek Floodplain Restoration projects and other ongoing ODFW and CTUIR fish enhancement work, which, taken together, would focus on improving environmental conditions in the Umatilla and Birch Creek watersheds to enhance fish and wildlife.

CHAPTER 4 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMIT REQUIREMENTS

Several federal and state statutes, implementing regulations, Executive Orders, and other consultation, review, and permit requirements are potentially relevant to this project (see Table 4-1). For this table, similar resources (e.g., vegetation and wildlife) have been combined when statutes or regulations overlap multiple resource areas.

Table 4-1. Potential Applicable Statutory, Regulatory, and Other Considerations

Potentially Applicable Requirement	Relevant Project Information
All Resources	
National Environmental Policy Act (NEPA) of 1969 42 U.S.C. § 4321 *et seq.*	Bonneville has prepared this EA pursuant to CEQ and DOE regulations implementing NEPA, which requires federal agencies to assess, consider, and disclose to the public the impacts that their actions may have on the environment before taking major federal actions.
Council on Environmental Quality Guidance for Federal Departments and Agencies on Indigenous Knowledge (November 30, 2022)	Consistent with CEQ regulations and related guidance including CEQ's November 30, 2022 Guidance for Federal Departments and Agencies on Indigenous Knowledge, Bonneville has engaged affected communities, Tribes, and Indigenous Peoples including the Confederated Tribes of the Umatilla Indian Reservation to inform the assessment of environmental effects.
Geology and Soils	
The Farmland Protection Policy Act (7 U.S.C. 4201 et seq.)	The Farmland Protection Policy Act (7 U.S.C. 4201 *et seq*.) directs federal agencies to minimize the extent to which their programs result in the unnecessary and irreversible conversion of farmland to non-agricultural uses. The farmland classification for the project area is "prime farmland only if irrigated" (NRCS 2015). Because these project-area soils are not currently irrigated, there is no prime farmland in the project area and there would be no loss.
Vegetation, Wildlife, and Fish	
Endangered Species Act of 1973 16 U.S.C. § 1531 *et seq*.	Impacts to Endangered Species Act-listed anadromous fish and designated critical habitat, in addition to Pacific lamprey, are covered by a programmatic Biological Opinion issued by the National Marine Fisheries Service for Bonneville Habitat Improvement Program projects (NMFS 2020) and impacts to listed terrestrial, marine, and non-anadromous fish species are covered by a programmatic Biological Opinion issued by USFWS for Bonneville Habitat Improvement Program projects (USFWS 2020). These Biological Opinions are for habitat restoration projects in the Columbia River Basin funded by Bonneville under its HIP, which mitigates for impacts of the Federal Columbia River Power System on fish, wildlife, and their habitat. Bonneville completed a HIP restoration review team review, including obtaining approvals from USFWS and NMFS, and will submit a Project Notification Form prior to completing in-water work or upland work that would have the potential to impact ESA-listed species.

Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) of 1976 16 U.S.C. 1801 *et seq*.	Pacific salmon Essential Fish Habitat (EFH) is administered under the amended Magnuson-Stevens Act; EFH for steelhead, coho, and Chinook salmon are found in the Umatilla River and Birch Creek. Compliance with the Magnuson-Stevens Act would occur through adherence to the guidance in Bonneville's HIP programmatic Biological Opinion.
Bald Eagle and Golden Eagle Protection Act (Eagle Act) of 1940 16 U.S.C. § 668-668d	No active bald eagle nests have been documented or observed near the project site, and the nearest possible active golden eagle nest is about a half mile from the project area although the most recent observations suggest that it is unoccupied. Based on eagle observations, if this previously active nest is determined likely to be occupied and active or another bald or golden eagle nest discovered, the project would avoid construction activities within 0.5 mile of those active bald eagle or golden eagle nests during the breeding season and avoid snag and large tree removal to the extent practicable.
Migratory Bird Treaty Act (MBTA) of 1918 16 U.S.C. § 703-712 Responsibilities to Federal Agencies to Protect Migratory Birds Executive Order 13186	Many bird species protected under the MBTA are present in the project corridor and some nest in the general vicinity or the corridor. Potential impacts on nesting birds are described in Section 3.5, Wildlife. Compliance with the MBTA would be assured by adopting mitigation measures, such as using seasonal timing restrictions during the breeding season and avoiding removal of snags and large trees to the extent practicable.
Fish and Wildlife Conservation Act 16 U.S.C. § 2901 *et seq*. Fish and Wildlife Coordination Act 16 U.S.C. § 661 *et seq*.	Bonneville contacted USFWS and ODFW during scoping and the preparation of this EA. Consultation with USFWS and NMFS occurs through the application of their programmatic Biological Opinions and thereby incorporates conservation measures in addition to BMPs (Table 2-5) to avoid and minimize potential impacts on fish and wildlife resources. Impacts on fish and wildlife are described in Section 3.4, Fish and Aquatic Species, and Section 3.5, Wildlife.
Waters, Wetlands, and Floodplain Protection	
Clean Water Act (Sections 401, 402, 404, and 303(d)) 33 U.S.C. § 1251 *et seq*.	Birch Creek and the Umatilla River and wetlands in the project area constitute waters subject to regulation under the Clean Water Act (CWA). CTUIR would obtain the necessary permits for this project as regulated under CWA Sections 402 and 404. For Section 404, this project is anticipated to be covered by the Corps under Regional General Permit 6. For Section 402, Oregon Department of Environmental Quality would issue a National Pollutant Discharge Elimination System (NPDES) permit for construction that disturbs soils. This permit would authorize the CTUIR to construct, install, modify, or operate erosion and sediment control measures and stormwater treatment and control facilities, and to discharge stormwater to public waters in conformance with all the requirements, limitations, and conditions set forth in the NPDES permit. CTUIR would also comply with any applicable Section 401 certification conditions. In December 2018, the U.S. Environmental Protection Agency approved Oregon's 2012 CWA Section 303(d) list of impaired waterbodies that need pollution reduction plans, called Total

	Maximum Daily Loads or TMDLs. ODEQ uses the 303(d) list to determine requirements for water quality permits and total maximum daily loads. As discussed in Section 3.3.1.1, the Umatilla River is impaired for flow modification, fecal coliform, turbidity, temperature, iron, and excess algae growth (ODEQ 2022a). Birch Creek is impaired for flow modification, habitat modification, bio-criteria, pH, temperature, and iron (ODEQ 2022b). The Umatilla River and Birch Creek both appear on the section 303(d) list for iron, and a TMDL has yet to be established. Birch Creek also appears on the section 303(d) list for biocriteria. The project would not violate water quality standards and would adhere to the TMDLs established in ODEQ's Umatilla Basin TMDL and Water Quality Management Plan (ODEQ 2001).
Safe Drinking Water Act of 1974 (42 U.S.C. § 300 *et seq.*).	There are no designated sole-source aquifers protected under Section 1424(e) of the Safe Drinking Water Act in the project area.
Floodplain/Wetlands Environmental Review Requirements 10 CFR 1022.12 Floodplain Management Executive Order 11988 Protection of Wetlands Executive Order 11990	As part of this NEPA review, DOE NEPA regulations require assessing impacts on floodplains and wetlands along with an evaluation of alternatives for protection of these resources in accordance with Compliance with Floodplain and Wetlands Environmental Review Requirements (10 CFR 1022.12), Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands. Project corridor wetlands were delineated in 2018 and found 0.75 acre of wetlands are present in the project area (Tetra Tech 2019c), which would not be negatively affected by the Proposed Action because construction would not involve fill or alteration activities within the delineated wetland area. A FEMA-designated floodplain covers the project area. As discussed in Section 3.3.2.2, this evaluation determined that the Proposed Action would not result in long-term adverse impacts to wetlands or floodplains.
Oregon Removal-Fill Law (ORS 196.795–990)	Because the Proposed Action would involve removal and fill activity in waterways and wetlands, CTUIR would obtain the necessary removal-fill permit from the Oregon Department of State Lands.
Air Quality and Greenhouse Gases	
The Clean Air Act, as revised in 1990 42 U.S.C. § 7401 *et seq.*	Air quality impacts of the Proposed Action would be low, localized, and temporary, as described in Section 3.8.
Final Mandatory Reporting of Greenhouse Gases Rule (40 CFR 98)	Greenhouse gas emissions would be low and short in duration as described in Section 3.8. As discussed in that section, the estimated GHG emissions resulting from the Proposed Action would be around 940 tons CO2e, which is the amount of GHG emissions estimated to result from a large-scale habitat restoration project. This would fall well below the EPA's 25,000 metric ton carbon-dioxide equivalent reporting threshold for greenhouse gases.
Cultural and Historic Resources	

Antiquities Act of 1906 16 U.S.C. § 431-433 Historic Sites Act of 1935 16 U.S.C. § 461-467 National Historic Preservation Act, as amended, inclusive of Section 106 54 U.S.C. § 306108 *et seq.* Archaeological Data Preservation Act of 1974 (16 U.S.C. § 469 – 469-1) Archaeological Resources Protection Act of 1979, as amended 16 U.S.C. § 469 a-c Native American Graves Protection and Repatriation Act 25 U.S.C. § 3001 *et seq.* Indian Sacred Sites Executive Order 13007 American Indian Religious Freedom Act of 1978 (42 U.S.C. § 1996)	Bonneville identified and documented cultural resources in the project area and evaluated them for eligibility for listing in the National Register of Historic Places. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800, Bonneville initiated Section 106 consultation with the Oregon State Historic Preservation Office (SHPO), Confederated Tribes of the Umatilla Indian Reservation, and Confederated Tribes of Warm Springs on January 14, 2019, and received a response from the SHPO on February 8, 2019 concurring with Bonneville's APE. Bonneville's Section 106 process will include a determination of effects followed by the negotiation of a Memorandum of Agreement to mitigate adverse impacts from the Proposed Action, which is discussed in Section 3.6.2. If previously unidentified cultural resources that would be adversely affected by the Proposed Action are found during construction, Bonneville would follow the procedures set out in Table 2-5 and in compliance with applicable regulations.
Noise, Public Health, and Safety	
Noise Control Act of 1972 42 U.S.C. § 4901 *et seq*.	Noise disturbance would be short in duration, and would occur during daylight hours as described in Section 3.9.
Spill Prevention Control and Countermeasures Rule 40 CFR 112 Comprehensive Environmental Response, Compensation, and Liability Act 42 U.S.C. § 9601 *et seq*. Resource Conservation and Recovery Act 42 U.S.C. § 6901 *et seq*.	Small amounts of hazardous chemicals such as fuels, and motor and lubricating oils could be released into the environment by the Proposed Action or used during construction work. Use of chemicals would be controlled via use of a Spill Prevention Plan Spill Prevention Control and Countermeasures Plan. Any generated waste material would be disposed of according to state law and the Resource Conservation and Recovery Act. Solid wastes would be disposed of at an approved landfill or recycled.
State, County, and Local Plan Consistency	

Oregon Department of Agriculture Confined Animal Feed Operation Program (OAR Chapter 640 Division 74)	The decommissioning of the cattle feedlot would adhere to the requirements of the ODA CAFO Program as discussed in Section 3.3.2 and Table 2-5.
Umatilla County Development Code	BPA strives to meet or exceed the substantive standards and policies of state and local plans and programs to the maximum extent practicable. As discussed in Section 3.7.2, restoration actions would not create a major change in land use, although there may be small-scale use modifications given the changes in water distribution and vegetation patterns on specific acres within the project area. For this reason, the Proposed Action would be consistent with Umatilla County's Exclusive Farm Use zoning designation.
Environmental Justice	
Executive Order (E.O.) 12898	Potential environmental justice impacts resulting from the Proposed Action are discussed in Section 3.11.2. As described throughout this EA, none of the adverse effects resulting from the Proposed Action would be high. In addition, because the project occurs on private land where no environmental justice populations are present, no effects are expected. For these reasons, the Proposed Action would not cause any disproportionately high and adverse effects on environmental justice populations.

APPENDICES

APPENDIX A: TRIBES, AGENCIES, AND PERSONS RECEIVING THE EA

The project mailing list contains contacts for Tribes; local, state, regional, and federal agencies; public officials; interest groups and businesses; and potentially interested or affected landowners. These groups of stakeholders have directly received or have been given instructions on how to receive all project information made available so far, and they will have an opportunity to review the EA. Specific entities (other than private persons) receiving the scoping notifications and this EA are listed below by category.

Federal

National Marine Fisheries Service

Representative Greg Walden

Senator Ron Wyden

Senator Jeff Merkley

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

State

Oregon Governor's Office

Oregon Department of Fish and Wildlife

Oregon Department of Environmental Quality

Oregon Department of Transportation

Representative Greg Barreto, District 58

State Senator Bill Hansell, District 29

Tribes

Confederated Tribes of the Umatilla Indian Reservation

Local Governments

City of Pendleton

Umatilla County

Umatilla County Board of Commissioners

Wallowa County Board of Commissioners

Union County Board of Commissioners

Other

Mid-Umatilla River Coalition

Umatilla River Water Control District (No. 1 and No. 2)

Columbia Rural Electric Association

Native Fish Society

Northwest Sportfishing Industry Association

Save Our Wild Salmon

Snake River Salmon Solution

Trout Unlimited

APPENDIX B: REFERENCES

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