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YAKIMA RIVER DELTA COLDWATER REFUGE PROJECT
AMON CREEK WASTEWAY RELOCATION

McNary Lock and Dam Project, Benton County, Washington

In compliance with the
National Environmental Policy Act of 1970

ADMINISTRATIVE RECORD – DO NOT DESTROY

PROJECT FILE NUMBER: PPL-C-2024-0057

January 2025

Executive Summary

This Environmental Assessment (EA) examines the potential environmental impacts associated with the Benton Conservation District's proposed Yakima River Delta Coldwater Refuge Project. The proposed action involves the re-location of Amon Creek, and associated components of work, to improve conditions conducive to salmonid migration and reproduction success by addressing elevated water temperatures and limited habitat availability in the lower Yakima River. The U.S. Army Corps of Engineers (USACE), Walla Walla District, in coordination with the Benton Conservation District (BCD), has prepared this EA to evaluate the effects of the action in compliance with the National Environmental Policy Act (NEPA) of 1969 and other relevant federal, state, and local regulations.

Proposed Action

The U.S Army Corps of Engineers, Walla Walla District (USACE), proposes to issue the Benton-Conservation District a 5-year construction license to relocate Amon Creek, among other components of work, in efforts to create additional thermal refuge for migrating salmonid species within the lower Yakima River. It was determined that 5-year construction license would be required for monitoring activities post-construction. The proposed action would take place partially within the Yakima River Delta Habitat Management Unit (HMU), starting at the mouth of Amon Creek, approximately 2.5 miles upstream of the confluence of the Yakima and Columbia rivers. These lands are owned and managed by USACE for the purpose of wildlife management. Other portions of the proposed action would take place outside of USACE owned lands, along the shoreline and within the mainstem channel of the lower Yakima River.

It is important to acknowledge that the temporary construction license, issued by USACE, only authorizes construction activities that occur on lands owned by USACE. This would include areas of federal land that lie above the original ordinary high-water mark (OHWM), adjacent to the shoreline of the lower Yakima River. The construction license does not permit the implementation of action components that lie outside of the geographic boundaries of USACE lands, however, it would authorize the use of USACE lands to contribute to the implementation of those components. Implementation of the components outside of USACE property would require authorization and compliance with associated regulatory entities and state permissions. For this environmental analysis, all components of the BCD's proposed action are considered because they are interconnected and co-dependent components of the overall proposed action.

The lead project proponent for this action is the Benton-Conservation District, however, it was developed in close collaboration with the Mid-Columbia River Fisheries Council and funded through final design in large part from the Yakima Basin Integrated Plan (YBIP), the Washington Department of Ecology (Ecology), and the Salmon Recovery Funding Board.

Purpose of and Need for the Proposed Action

Changes to the Yakima River Basin have impacted the migration and spawning success of ESA-listed salmonids. Historically, the Yakima River provided vital habitat for salmonids, including Chinook, coho, and steelhead, offering critical resting and rearing areas during their migration to spawning grounds. However, extensive river modifications, including private dam construction, channelization, and land development, have altered the natural flow regimes, reduced habitat complexity, and impaired water quality. These impacts have been compounded due to increased annual water temperatures and decreased availability of suitable spawning and rearing habitats, leading to reduced survival rates during migration and lower spawning success. The disruption of sediment transport and altered flow patterns also contribute to habitat degradation, further impacting the ecological balance necessary for sustaining healthy salmonid populations in the Yakima River Basin.

The purpose of the proposed action is to enhance the migration and spawning success of salmonids in the Yakima River by creating additional cold-water habitat and thereby providing thermal refuge from increasing annual water temperatures. This is achieved through the relocation of Amon Creek and the other proposed components of work designed to enhance the existing aquatic habitat and improve the existing thermal conditions in the lower Yakima River. The action is needed to address barriers to salmonid migration and spawning success in the Yakima River, which are exacerbated by elevated water temperatures and limited habitat. The relocation of Amon Creek is essential to provide cooler water, reduce physiological stress, and improve reproductive outcomes for salmonid populations.

Alternatives Considered

Alternatives considered for evaluation are the following:

Alternative 1 No Action

Under this alternative, the USACE would not issue the Benton Conservation District a license to implement their proposed action. The re-channelization of Amon Creek and associated action components would not take place. As a result, there would be no change in the existing baseline conditions within the Yakima Delta HMU.

Alternative 2 Amon Creek Re-location

Under this alternative, USACE would issue the Benton Conservation District a license to implement their proposed Yakima Delta Coldwater Refuge Project. An overview of the major components for the proposed action include:

- The removal of existing non-native vegetation and the planting of native riparian vegetation.
- The excavation of the new Amon Creek Channel, to include additional length and natural sinuosity, and the filling of the old Amon Creek channel.
- Re-grading/ sloping of the shoreline where the new Amon Creek channel enters the Yakima River.
- The placement of coarse rock to create a deflector structure within the mainstem Yakima River and the installation of apex log jams.
- The creation of wetland benches to enhance the existing habitat and mitigate for impacts to existing wetlands channel relocation.

Summary of Environmental Resources Evaluated

The National Environmental Policy Act and the Council on Environmental Quality's implementing regulations specify that an environmental analysis should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact.

The following resource areas have been addressed in this Environmental Assessment (EA): geology and soils, noise, wetlands, hydrology, water quality, biological resources (fish and aquatic species, wildlife, vegetation, threatened and endangered species), treaty and cultural resources, recreation, aesthetic resources, socioeconomics and environmental justice, and greenhouse gas and climate change, and cumulative effects.

The potential impacts to the following human environment resource areas are considered to be negligible or non-existent so they were not analyzed in detail in this EA: air quality, land use, and public infrastructure utilities.

Summary of Potential Environmental Consequences of the Preferred Alternative

The proposed action would have less than significant effects to geology and soil resources, hydrology, water quality, terrestrial resources, fish and aquatic resources, treaty and cultural resources, recreation, aesthetic resources, socioeconomics and environmental justice, and greenhouse gas and climate change. The action is anticipated to result in less than significant effects to wetland resources, but the proposed action incorporates into design mitigative measures to further avoid or minimize such effects.

The following table provides a tabular summary of the potential impacts to the resources associated with the Preferred Alternative.

Summary of Impacts of the Proposed Action.

Resource	Less than significant effects	Insignificant effects as a result of mitigation	Resource unaffected by action

Geology and Soils	X	-	-
Wetlands	X	-	-
Noise	X	-	-
Hydrology	X	-	-
Water Quality	X	-	-
Terrestrial Resources	X	-	-
Fish and Aquatic Resources		X	-
Treaty and Cultural Resources	X		
Recreation	X	-	-
Aesthetic/Visual Resources	X		
Socioeconomics and Environmental Justice	X		
Climate Change	X		
Cumulative Impacts		X	

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Acronyms

°C	degrees Celsius
°F	degrees Fahrenheit
BA	Biological Assessment
BMP	Best Management Practice
CFR	Code of Federal Regulations
Corps	U.S. Army, Corps of Engineers, Walla Walla District
CWA	Clean Water Act
cy	cubic yards
DPS	Distinct Population Segment
EA	Environmental Assessment
EM	Engineer Manual
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
LSR	Lower Snake River
LSRP	Lower Snake River Projects
MBTA	Migratory Bird Treaty Act
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
NWP	Nationwide Permit
PSMP	Programmatic Sediment Management Plan
RM	River Mile
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention, Control, and Countermeasures
TCP	Traditional Cultural Property
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
Ecology	Washington State Department of Ecology
WOTUS	Waters of the United States

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1 Introduction

1.1 Introduction and Background

Man-made influences and modification to the Yakima River Basin have impacted the migration and spawning success of salmonids within the Yakima River, specifically the lower Yakima River/ Delta and the confluence with the Columbia River. These areas serve as a vital migration and resting corridor for salmonids, including Chinook, coho, and steelhead, as they migrate through the lower Yakima River to spawning grounds at the headwaters of the Yakima River. Extensive river modifications, including private dam construction, channelization, agricultural practices, and land development, have altered the natural flow regimes, reduced habitat complexity, and impaired water quality. The impacts of these alterations have become compounded due to climate change, which have resulted in increased annual water temperatures and further contributed to water quality degradation. These physiological stressors lead to reduced salmonid survival rates during migration, increased potential for disease, and lower chances of spawning success. The disruption of sediment transport at the Delta and altered flow patterns also contribute to habitat degradation, further impacting the ecological balance necessary for sustaining healthy salmonid populations in the Yakima River Basin.

The Benton Conservation District (BCD), one of 45 conservation districts in the State of Washington, is a community-driven and non-regulatory source of conservation expertise. The entity specializes in providing landowners with technical and financial assistance for the conservation of natural resources within Benton County. The BCD strives to improve the migration and reproductive success of salmonids within the both the Yakima and Columbia River Basins. For the proposed thermal refuge project, the BCD worked collaboratively with the Mid-Columbia Fisheries Enhancement Group (M-CFEG) and the Yakima Nation Fisheries for input on design features for the proposed action. Furthermore, the project has been funded through final design from the Yakima Basin Integrated Plan (YBIP), Department of Ecology (Ecology), and the Salmon Recovery Funding Board (SRFB).

In compliance with the National Environmental Policy Act (NEPA), this Environmental Assessment (EA) identifies, considers, and analyzes the potential environmental effects associated with the BCD's proposed action (issuance of a 5-year construction license to M-CFEG for relocation Amon Creek and construct associated features) and the No Action alternative. This EA was prepared in accordance with the Council on Environmental Quality *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA)* (Title 40 of the CFR Parts 1500-1508) and 33 CFR 230, *Procedures for Implementing NEPA*.

The U.S Army Corps of Engineers (USACE), Walla Walla District's objective in preparing this EA is to determine if the potential environmental effects of the BCD's proposed action would reasonably be significant, individually, or cumulatively. If such environmental effects are determined to be less than significant, a Finding of No Significant Impact (FONSI) would be issued, and USACE would proceed with the proposed action (issuance of 5-year real estate license), subject to availability of resources and funding. If any environmental effects are determined to be significant according to the USACE's analysis, either mitigation would be employed to ensure

effects are reduced below significant levels, or an Environmental Impact Statement (EIS) would be prepared before a decision is reached regarding implementation of the proposed action/preferred alternative. If mitigation is employed to ensure effects are less than significant a mitigated FONSI would be issued.

1.2 Proposed Action Location

The proposed action is located within McNary Lock and Dam Project, Benton County, Washington (Figure 1). More specifically, the action would take place where Amon Creek enters the Yakima River, on the river right side (as one faces downstream), approximately 2.5 miles up the Yakima River from the confluence of the Yakima and Columbia Rivers. The proposed action by BCD would take place partially within the Yakima Delta HMU. Other components of the proposed action would take place along the shoreline of the lower Yakima River, and within the mainstem Yakima River. Section 24, Township 09 N, Range 28 E, Willamette Meridian.

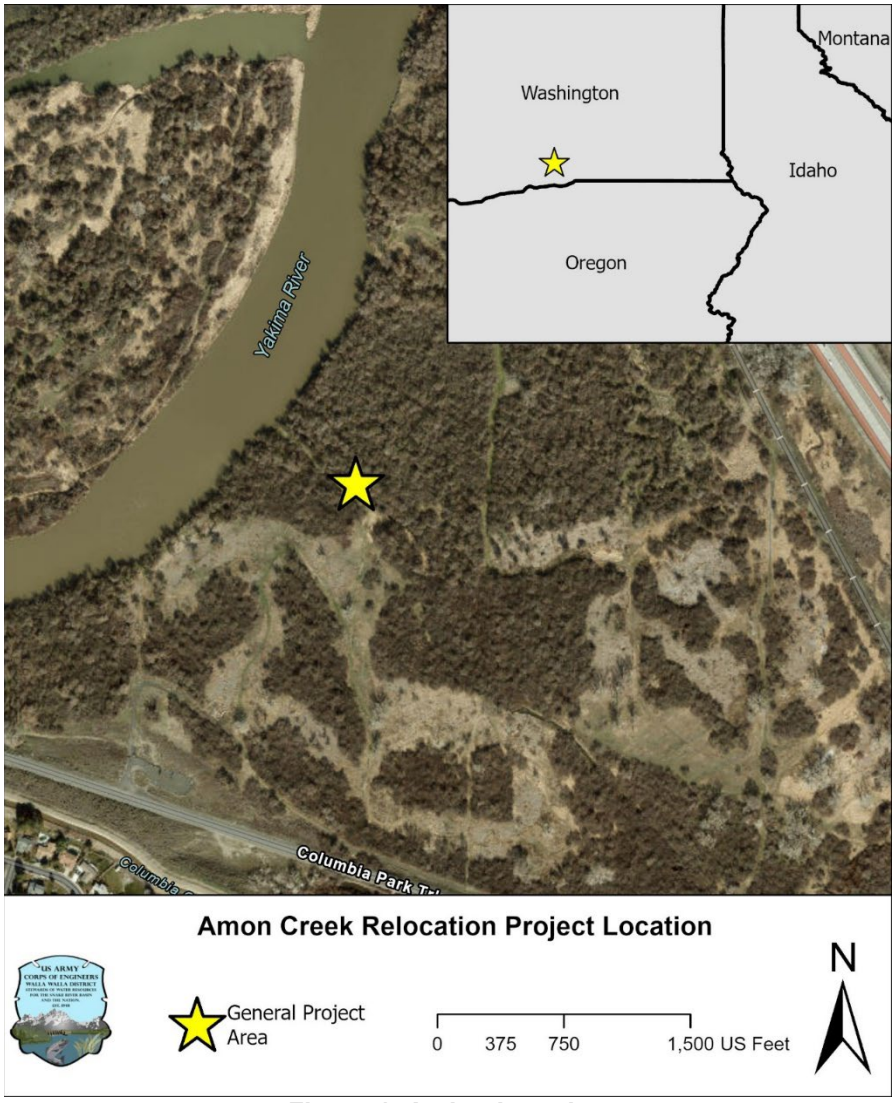

Figure 1. Action Location

1.3 Purpose of and Need for Action

The BCD's proposed action is needed as elevated water temperatures and water quality degradation in the lower Yakima River have negatively impacted the migration and spawning success of salmonids. These temperature and water quality conditions, exacerbated by climate change and habitat degradation, have diminished the availability of critical thermal refugia—localized areas of cooler water necessary for salmonids to survive during periods of thermal stress. The absence of these cooler habitats disrupts migration efficiency, increases physiological stress, and reduces overall likelihood of reproductive success. Existing channel configurations, sediment transport disruptions, and lack of habitat complexity further exacerbate these challenges. Without targeted intervention, these adverse conditions would persist, impacting ecological functions, salmonid recovery efforts, potentially impacting the long-term sustainability of salmonid populations in the Yakima River Basin.

The purpose of the proposed action is to address in a limited way the localized ecological impacts of elevated water temperatures through the proactive creation of thermal refugia within the lower Yakima River by relocating Amon Creek and construction of associated water quality features. This would support the migration and spawning success of salmonid species by redirecting colder water from Amon Creek into a deep, isolated pool in the mainstem Yakima River. This action aims to enhance habitat quality by providing a stable, localized zone of cooler water during critical periods of elevated temperatures, improving salmonid resilience, and increasing survival rates. Additionally, the proposed action seeks to restore habitat complexity and connectivity, through the physical modifications to the existing Amon Creek channel and the inclusion of additional action components intended to improve the existing terrestrial and aquatic habitat. By fulfilling this purpose, the proposed action contributes to regional salmonid recovery goals, supports ecological health in the lower Yakima River, and contributes to the long-term sustainability of salmonids populations within the Yakima River Basin.

1.4 Authority and NEPA History

The USACE authority for Walla Walla District, Real Estate Division, to issue construction licenses, leases, and easements to outside entities, to utilize USACE-administered lands is 10 U.S.C 2667. USACE would comply with ER 405-1-12, when administering these real estate actions, to ensure activities are consistent with federal laws and USACE project purposes, while balancing the public interest and environmental impacts. The USACE does not believe the Amon Creek and associated features on unimproved USACE managed federal lands would impair the function and usefulness of the McNary Lock and Dam Project. Therefore, a Section 408 (33 USC 408) permission is not required. The construction and modification of federal land is being authorized by real estate out grant (i.e., temporary construction license), in accordance with Engineer Regulation 1130-2-550 (Chapter 17), which would address any operational concerns prior to issuance.

There is no prior NEPA documentation pertaining to the Proposed Action.

2 Proposed Action and Alternatives

2.1 Proposed Action

The U.S Army Corps of Engineers, Walla Walla District (USACE), proposes to issue the Benton-Conservation District (BCD) a 5-year construction license to re-channelize Amon Creek. The BCD would re-locate Amon Creek from its existing location (at approximately river mile 2.5) to a new downstream location on the mainstem Yakima River. This would re-route colder water in the lower reach of Amon Creek to the north into natural deep hole in the Yakima River. The new Amon Creek would be developed with additional sinuosity, which would add length to the overall stream channel. In addition, a flow deflector would be constructed within the mainstem channel of the Yakima River, to isolate the Amon Creek cold water during low flows. Currently, Amon Creek channel is approximately 650 linear feet within the action area. The proposed re-channelization would increase the channel length to approximately 1,400 feet in length within the action area. Additionally, the proposed action incorporates the creation of wetland benches along the sides of the new Amon Creek channel, and the establishment of native vegetative plantings.

It is important to acknowledge that the temporary construction license, issued by USACE, would only authorize construction activities that occur on lands owned by USACE. This would include areas of federal land that lie above the original ordinary high-water mark (OHWM), with the bounds of the Yakima Delta HMU and adjacent to the shoreline of the lower Yakima River. Correspondingly, the license does not permit the implementation of action components that lie outside of the geographic boundaries of USACE lands, however, it would allow for the use of USACE lands to contribute to the implementation of those components once they are authorized and cleared by the appropriate entities. For this environmental analysis, all components of the BCD's proposed action are considered because they are interconnected and co-dependent components of the overall proposed action.

2.2 Alternatives Analysis

There are only two alternatives that would be carried forward for more in-depth consideration and environmental analysis. This is because the proposed action is applicant-funded and implemented, with USACE's role, as the landowner, limited to determining whether to issue the construction license to implement the proposed action. However, other alternatives/ design features were considered by the BCD in the development of the proposed action, but the only the proposed action alternative sufficiently achieves the intended purpose and need within the action area. The two alternatives include the No Action and Proposed Action Alternatives. The No Action (no change) Alternative sets the baseline from which other alternatives are compared. Although the No Action Alternative is named as such, that does not mean there would be no impacts from the implementation of this alternative. The Proposed Action Alternative would represent the USACE's intent to issue the BCD a 5-year construction license required to complete their proposed action on USACE managed lands.

- Alternative 1: No Action
- Alternative 2: Amon Creek Re-Channelization

2.3 Alternative 1: No Action

Under the No Action Alternative, USACE would not issue the BCD a temporary construction license to implement their proposed action within the Yakima Delta HMU. Therefore, there would be no changes or physical modifications to the existing conditions within the action area. The location and characteristics of Amon Creek would remain consistent with baseline conditions, and the placement of a flow deflector within the mainstem Yakima River would not occur. No terrestrial habitat restoration activities would occur. Finally, the existing physical characteristics of the lower Yakima would remain consistent with baseline conditions. Thermal barriers would remain unchanged and would reasonably continue to pose as a physiological obstacle to the migration and spawning success of salmonids, specifically within the Delta and lower Yakima River.

The No Action Alternative would not meet the purpose of and need for the BCD's proposed action; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EA. The No Action Alternative is used to analyze the consequences of not undertaking the Proposed Action and serves to establish a comparative baseline for environmental analysis.

2.4 Alternative 2: Amon Creek Relocation

Under the Proposed Action Alternative, USACE would issue the BCD a 5-year construction license to re-channelize and relocate Amon Creek, as it exists within the Yakima Delta HMU. The proposed action would involve the following core elements: re-routing of the Amon creek channel from river mile 2.5 to a location downstream on the mainstem Yakima River, lengthening the channel and incorporating natural sinuosity, terrestrial habitat improvements, and the placement of a flow deflector within the Yakima mainstem channel to isolate the Amon cold water during summertime low flows (Figure 2).

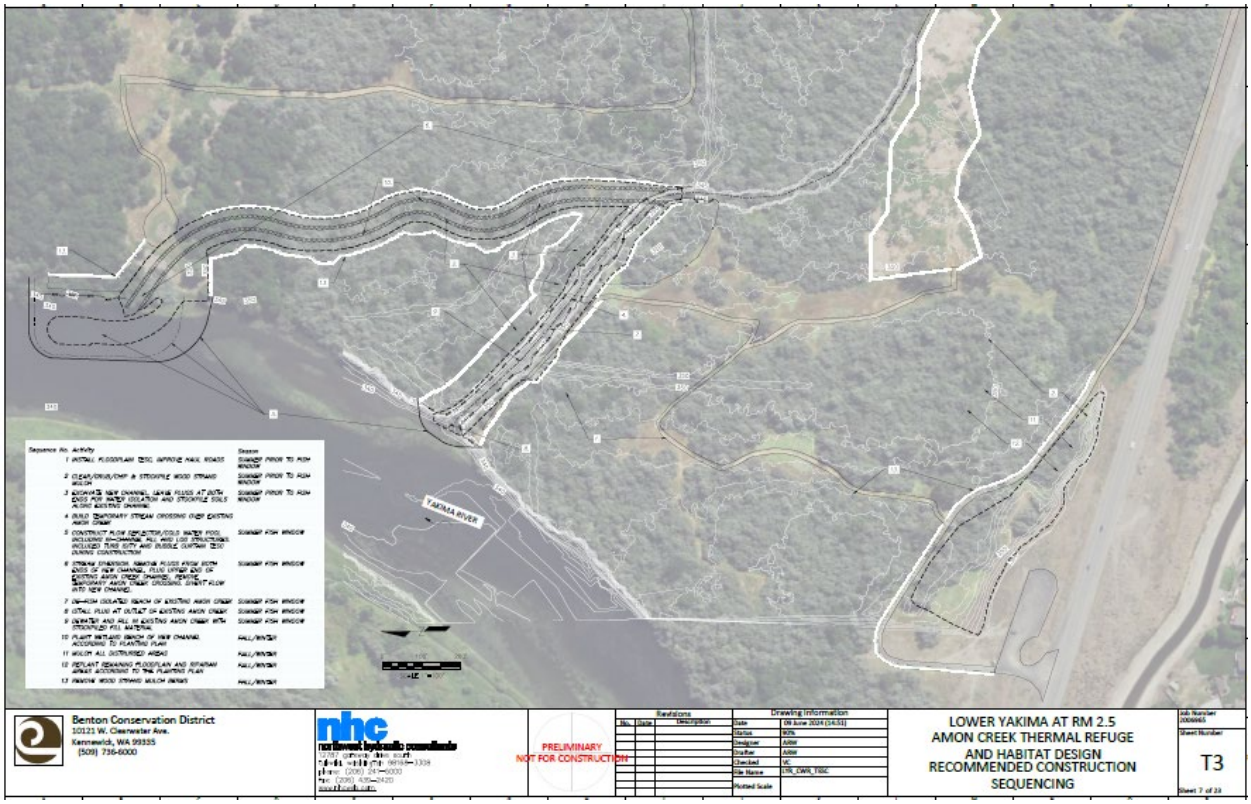

Figure 2. Proposed Action Overview and Construction Sequencing (Northwest Hydraulic Consultants and Benton Conservation District 2024).

The project would take place in three phases. The first phase occurring during the summertime, in preparation for work to be conducted within the in-water work windows for the lower Yakima River (from June 1 to September 15). The second phase would also occur during the summer in-water work window. And finally, the third phase which would occur in the fall and winter months after the in-water work window.

The different project phases are outlined below:

Phase 1 – Summer prior to in-water work window.

During Phase 1, preliminary preparation of the proposed channel re-location would occur. This would involve the establishment of staging areas and the mobilization of materials and equipment (Figure 3). The site would be accessed from the graveled Yakima Delta HMU parking lot area along the Columbia Park Trail.

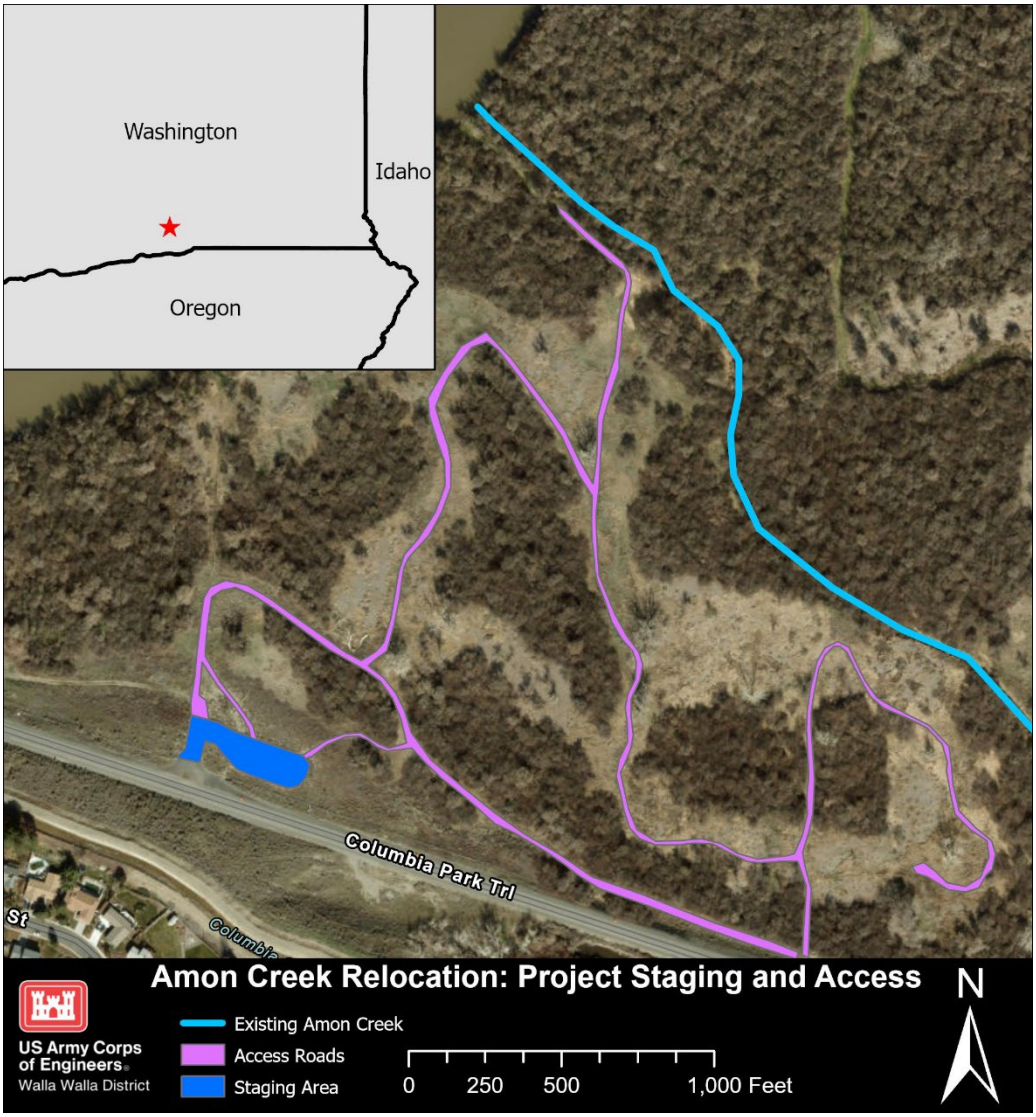

Figure 3. Project Staging and Access Areas.

Once staging is established, clearing, and grubbing of vegetation would occur within approximately 19.16 acres of the project area. The process is typically done at the beginning of a project to ensure the area is suitable for development and to prevent issues that could arise from leftover vegetation or roots. Equipment required for this process include, but are not limited to bulldozers, excavators, skid steer loaders, stump grinders, grubbing machines, dump trucks, chippers, rollers and compactors, and various hand tools.

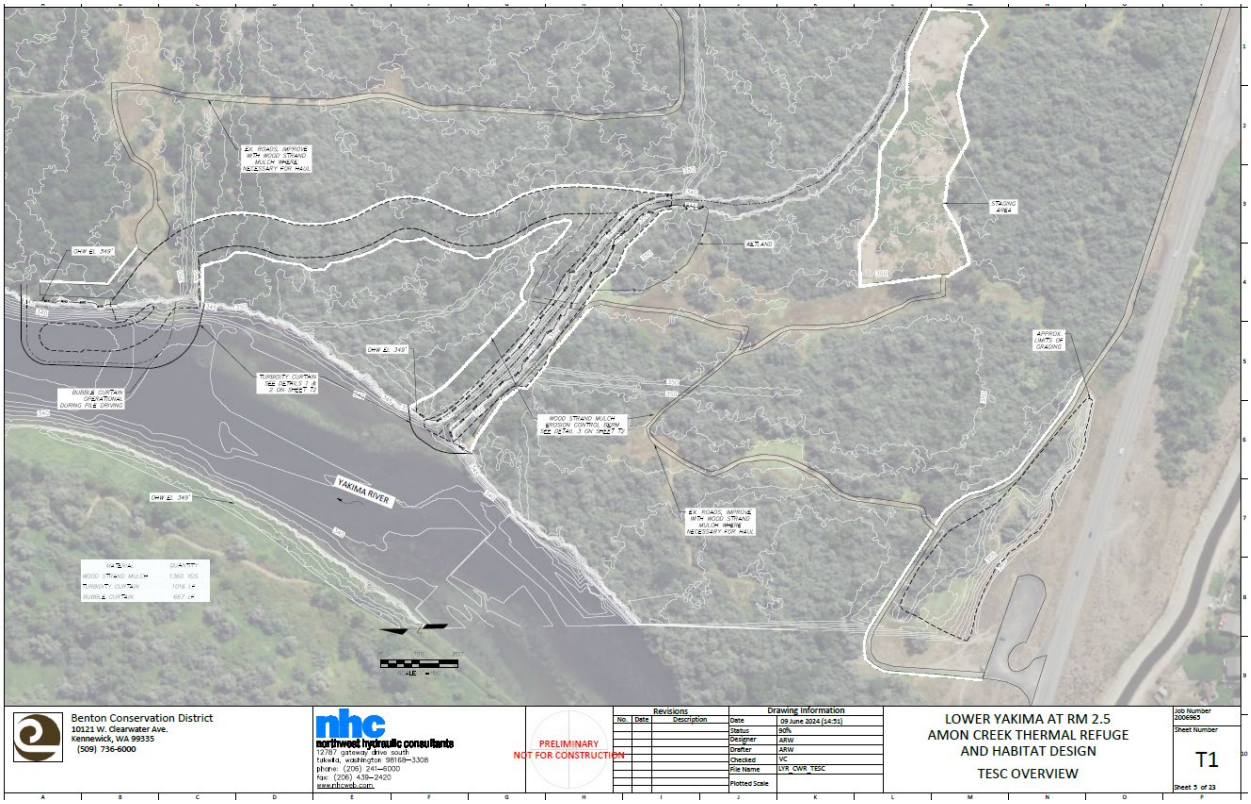

Figure 4. TESC Overview (Northwest Hydraulic Consultants and Benton Conservation District 2024).

Sequentially, once the construction area is stabilized, installation of Temporary Erosion Sediment Control (TESC) measures would occur (Figure 4). This would include measures such as: turbidity and bubble curtains, wood chip filter berms, and wood chip mulch over cleared areas. It is estimated the site would require approximately 1,593 cubic yards of wood strand mulch material. Mulch would be transported in via trucks and spreading would require additional heavy machinery and/ or hand tools. Furthermore, a temporary bridge would be placed across the existing Amon Creek channel to access the north bank and new channel location.

Once the site is prepared, excavation of the new Amon Creek channel would begin. The new channel is estimated to be approximately 1,400-foot in length and would incorporate natural sinuosity. Excavation on this scale would typically require heavy machinery such as excavators and dump trucks. The new channel would require approximately 955 cubic yards of excavated material to be removed (approximately 100 dump trucks).

After excavation of the new channel, wetland benches would be established immediately above the waterline. Plugs would be established at each end for water isolation. Establishment of the wetland benches and installation of the plugs would likely require the same equipment used to excavate the channel, with the inclusion of equipment required for vegetative plantings. This would include but is not limited to hand tools, hydro seeders, plug planters, and surveying equipment.

Soils would be stockpiled along the existing channel.

Phase 2 – Summer in-water work window.

Phase 2 would be characterized by activities conducted within the in-water work window. During which, the Yakima River work areas would be isolated using a turbidity and bubble curtains. The purpose of turbidity curtains is to contain and prevent the spread of suspended sediments in water during construction activities, protecting water quality in the surrounding environment. Furthermore, the purpose of bubble curtains is to reduce underwater noise and contain turbidity during construction activities, thereby protecting aquatic life and maintaining water quality. Approximately 1,016 linear feet of turbidity curtain would be installed to surround the in-water work area (below the ordinary high-water mark) in the Yakima River and at the confluence of Amon Creek and the Yakima River. The curtains would attach to anchors to keep the fabric skirt held in place below the water level. In addition, approximately 667 linear feet of bubble curtain would be installed around the deflector berm work area. Installation of turbidity curtains would typically require turbidity curtain panels, anchoring systems, buoys, ballast chains, tension cables, deployment vessels, and mooring lines. For bubble curtains, equipment required would typically be perforated pipe, air compressors, air supply lines, anchoring systems, deployment vessels, and control/ monitoring conditions.

The cold water refugia would be expanded within the Yakima River by removing sediment from the pool. The right bank of the Yakima River would be graded at a 2:1 slope. The total amount of material removed would be approximately 955 cubic yards of sediment and bank removed for reuse in upland locations. To achieve the desired slope of 2:1, would require approximately 8 cubic yards of fill material. Grading of the riverbank would likely require the use of heavy equipment such as, but not limited to excavators, bulldozers, tracked loaders/ skid steers, graders, and compactor/ rollers,

Approximately 2,985 cubic yards of clean, coarse, rock would be placed in the Yakima River to construct the deflector berm. This would require shore-based operations to transport the material, then likely a vessel to transport and deposition the material at the desired location within the channel.

Apex log jams would be placed within the channel of the Yakima River at the deflector berm. This would require driving piles 25 feet into the Yakima River channel and burying bottom logs ½ of the diameter deep into the channel. Approximately 34 piles would be installed in the bed of the Yakima River at the deflector berm and would displace approximately 296 square feet of habitat. These piles would be made of timber and would be 16-inches in diameter and 40-feet in length. The volume of log pile installation below the mudline is estimated at 65 cubic yards. Installation of the apex log jams would require a vibratory hammer.

Once these features are in place, the plugs would be removed from the ends of the new Amon Creek channel. A plug would be placed at the upper end of the existing Amon Creek channel. The temporary Amon Creek crossing would be removed, and flow would be diverted into the new channel.

A contractor would be hired to ensure that fish captured through the introduction of flow into the new channel are returned immediately to the Yakima River, outside the work area. The contractor would complete work in accordance with U.S Fish and Wildlife Service (2012) protocol.

Phase 3 – Fall/ Winter after in-water work window.

Phase 3 would occur after the in-water work window. Water would be discharged to an adjacent upland location and/or settled on-site. This would require water pumps.

Next, filling of various locations at the project site would occur. Approximately 27,461 cubic yards of spoils would be placed, including in the 0.072 acres of wetlands permanently impacted along the Amon Cree channel. Approximately 13,025 cubic yards of the spoils generated from the excavation of the new channel would be placed in the existing Amon Creek channel. These activities would likely require the same heavy equipment required for the initial excavation of the new Amon Creek channel.

Approximately 15,300 cubic yards of excess spoils would be used to regrade upland areas of the site for restoration. Wetland mitigation benches would be planted with native wetland vegetation. Floodplains and side slopes of disturbed areas would be restored. Installation of the wetland mitigation benches and plantings would typically require excavators, skid steers loaders, hydro seeders, and hand tools.

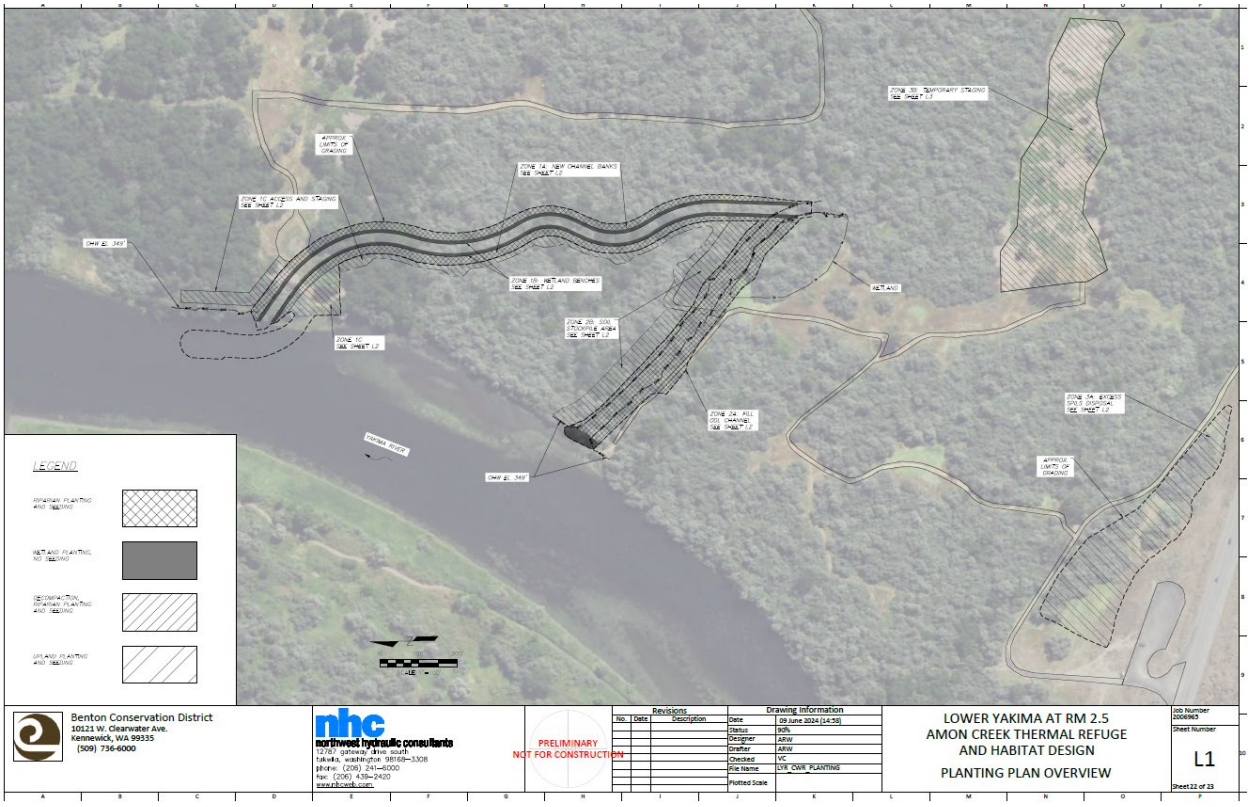

Figure 5. Planting Plan Overview (Northwest Hydraulic Consultants and Benton Conservation District 2024).

In addition, replanting of the riparian, floodplain, and wetland areas that were disturbed by the project would be planted 2:1 (Figure 5). Deep-rooted plantings would likely require the use of an expandable stinger along with specially grown, deep-rooted material to achieve restoration objectives more efficiently and compete with aggressive non-native vegetation. In areas where it is practicable, an excavator mounted expandable stinger would be used to install plants in riparian areas around the project.

In addition, hand plantings or the use of power-driven augers would be implemented for plants not able to be stinger planted. The revegetation contractor shall

Approximately 0.67 acres of wetland benches would be created, compared to the 0.072 acres of permanent impact and 0.055 acres of temporary wetland impact. The upland buffer of “Wetland A” (approximately 0.48 acres) would be enhanced at a 1:1 ratio. Upland areas cleared for roads, staging, and spoils placement would be covered with a wood chip mulch layer (1,593 cubic yards) and would be reseeded. The planting plan would be determined in later stages of the action.

Restoration plantings would be monitored for plant establishment, survival, and cover, including invasive species encroachment for five years following implementation of the planting plan. A detailed monitoring plan would be submitted to USACE and regulatory agencies upon permit approval and the issuance of the temporary construction license. This would allow for review and approval prior to implementation. Monitoring results would be distributed to USACE and the permit agencies as part of post-construction permit compliance.

Once the area is seeded and stabilized, TESC measures would be removed. Construction crews would then leave the site.

2.5 Best Management Practices Included in Proposed Action

This section presents an overview of the best management practices (BMPs) that are incorporated into the Proposed Action in this document. BMPs are existing policies, practices, and measures that the Benton Conservation District plan to implement to reduce the environmental impacts of designated activities, functions, or processes.

Although BMPs mitigate potential impacts by avoiding, minimizing, reducing, or eliminating impacts, BMPs are distinguished from potential mitigation measures because BMPs are (1) existing requirements for the Proposed Action, (2) ongoing, regularly occurring practices, or (3) not unique to this Proposed Action. In other words, the BMPs identified in this document are part of the Proposed Action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the Proposed Action.

BMPs include actions required by federal or state law or regulation.

Table 2-1. BMPs Included in the Proposed Action.

BMP	Description
Turbidity and Bubble Curtains (In-Water)	A turbidity curtain is a floating barrier designed to contain sediment and other pollutants in water during construction or dredging activities, preventing the spread of suspended particles to nearby areas, and minimizing water quality impacts. A bubble curtain is a series of bubbles released underwater to form a barrier that reduces underwater noise, particularly during activities like pile driving, to protect marine life from acoustic impacts.
Wood Chip Filter Berms	A wood chip filter berm is a barrier made of wood chips placed at construction sites to filter and trap sediment, preventing its transport into

	nearby surface waters during runoff or stormwater events, thereby protecting water quality. Wood chips would be generated from the removal of vegetation from the action area and re-utilized for this purpose.
Plugs	Plugs would be established at each end for water isolation. This would prevent turbidity at the mouth of the existing Amon Creek channel during construction.
Fish Salvage Activities	A contractor would be hired to ensure that fish captured through the introduction of flow into the new channel are returned immediately to the Yakima River, outside the work area. The contractor would complete work in accordance with U.S Fish and Wildlife Service (2012) protocol.

3 Affected Environment and Environmental Consequences

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives and includes an analysis of the potential direct and indirect effects of each alternative.

All potentially relevant environmental resource areas were initially considered for analysis in this EA. In compliance with NEPA and CEQ's regulations, the discussion of the affected environment focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

This section includes Geology and Soils, Wetlands, Hydrology, Water Quality, Floodplains, Terrestrial Resources, Fish and Aquatic Resources, Wetlands, Treaty and Cultural Resources, Land Use, Recreation, Floodplains, Aesthetic/ Visual Resources, Environmental Justice, and Climate Change.

The potential impacts to the following resource areas are negligible or non-existent so they were not analyzed in detail in this EA: Air Quality, Land Use, and Public Infrastructure/ utilities.

Table 3-1. Environmental Resources Not Evaluated Further.

Resource	Explanation
Air Quality	The action area meets Washington State's ambient air quality standards and is in "attainment". No Statement of Conformity is needed in attainment areas. Air quality would be negligibly affected by implementation of the proposed action alternative.
Land Use	The proposed action is anticipated to have short-term impacts to land use through the restriction of access during construction activities. However, these restrictions would be short-term, and ultimately result no change to the land use classifications of the area.
Public Infrastructure/ Utilities	The proposed action would not require the modification of any public infrastructure or utilities.

The following descriptors are used in the body of this chapter for consistency in describing impact intensity.

- No or Negligible Impact: The action would result in no impact, or the impact would not change the resource condition in a perceptible way. Negligible is defined as of such little consequences as to not require additional consideration or mitigation.
- Minor Impact: The effect to the resource would be perceptible; however, not major, and unlikely to result in an overall change in resource character.
- Moderate Impact: The effect to the resource would be perceptible and may result in an overall change in resource character. Moderate impacts are not significant due to their limited context (the geographic, biophysical, and social context in which the effects would occur) or intensity (the severity of the impact, in whatever context it occurs).
- Significant Impact: The effect to the resource would be perceptible and severe, or the effect would be unlawful or unpermitted. The effect would result in an adverse change in resource character and require the completion of an Environmental Impact Statement.
- Direct Impacts: Direct effects are caused by the action and occur at the same time and place. Activities that occur from implementation of the proposed action would directly effect a change, and initial effects would be immediately evident.
- Indirect Impacts: Indirect effects are caused by the action but are later in time or farther removed in distance but are still *reasonably foreseeable*. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Activities that occur from implementation of the proposed action would not effect this change, but would enable change to occur, or change would occur later in time, or farther in distance than the actions.
- Cumulative Impacts: Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

A clear statement regarding significance is presented at the beginning and end of each resource evaluation.

3.1 Geology and Soils

3.1.1 Affected Environment

This discussion of geological resources includes topography, geology, and soils of a given area. Topography is typically described with respect to the elevation, slope, and surface features found within a given area. The geology of an area may include bedrock materials, mineral deposits, and fossil remains. The principal geological factors influencing the stability of structures are soil stability and seismic properties. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility determine the ability for the ground to support structures and facilities. Soils are typically described in terms of their type, slope, physical characteristics, and relative compatibility or limitations regarding construction activities and types of land use.

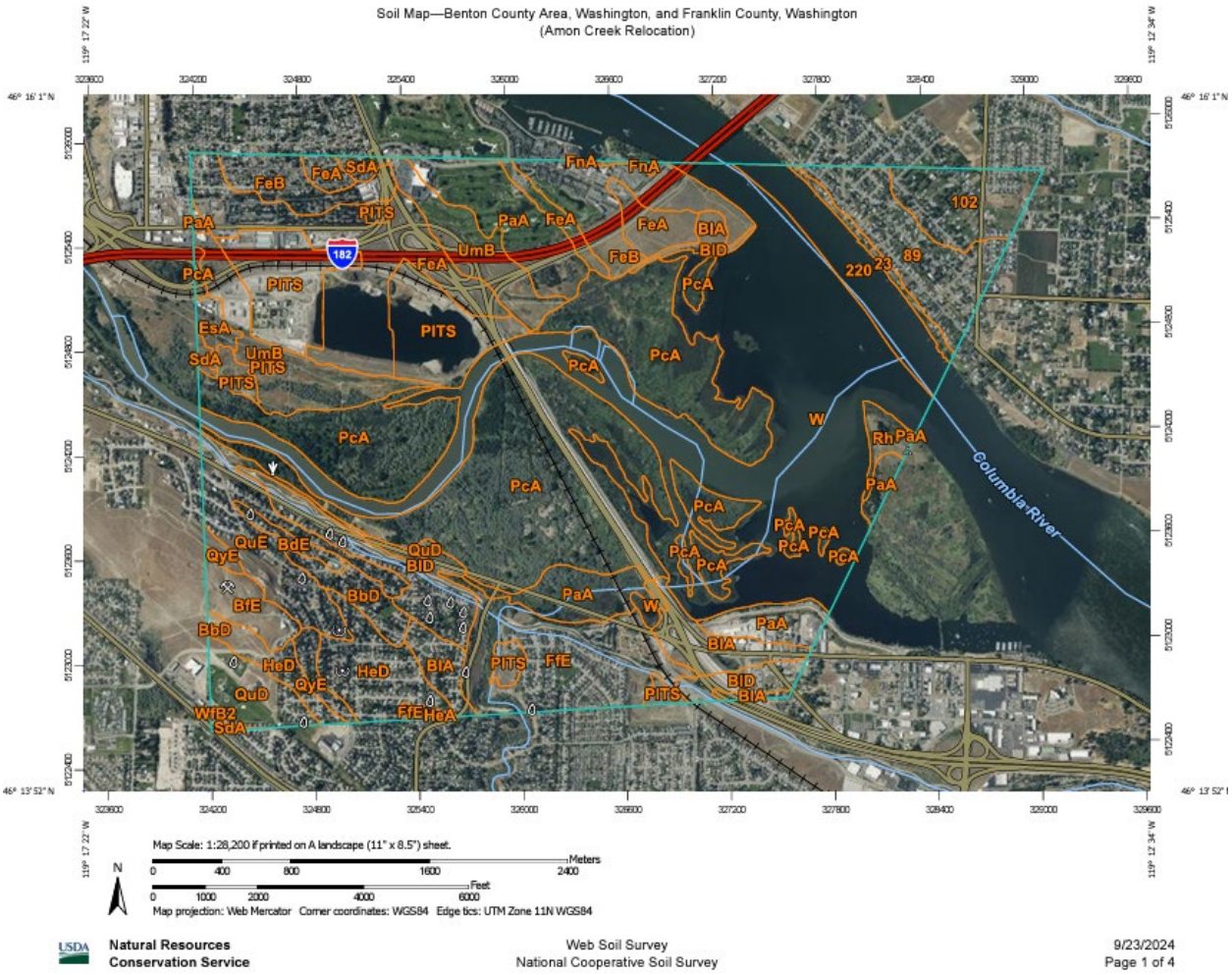

Figure 6. Soil Map for the Action Area (USDA NRCS 2024).

The action area is located within the Yakima River Delta (Delta), a topographically flat location, with an average elevation of 350 feet Mean Sea Level. The geology and soil characteristics are consistent with that of an alluvial fan or large floodplain. The USDA Soil Survey overview for the area suggests the action area consists of primarily Pasco silt loam (PcA), at 0 to 2 percent slopes (Figure 6). The Delta was formed over thousands of years, from sediment deposition transported by flowing water from the Yakima River. The soils present in the action area are alluvial in nature, and would consist of predominately silt, sand, and gravel, with varying proportions depending on the proximity to the river channels and floodplain. Finer sediments (silts and clays) are generally found in the floodplain areas and coarser materials (sand and gravel) tend to be located in more proximal deltaic fan areas. In the lower delta, especially areas likely to contain wetlands, are likely to have hydric soil indicators. These areas would likely be clay-rich, with poor drainage, and support wetland soils, vegetation, and hydrology. As one expands outwards, from the Delta area, the soils tend to be well drained sandy-loams and/or silty loams, which are suitable for agricultural practices. The underlying bed rock in the region consists primarily of Columbia River Basalt Group (CRBG), formed by vast lava flows that covered much of the Columbia Plateau during the Miocene epoch.

Although the action area was once utilized for agricultural use, the area now is utilized by USACE as a Habitat Management Unit. Publicly accessible activities would include primarily low density outdoor public recreation. However, according to the USDA Soil Data Access, the soil type (PcA) is conducive for farming practices and is generally classified as “Farmland of statewide importance” (USDA 2024).

Additionally, although possesses known local fault lines, the action area generally exhibits low amounts of seismic activity, especially in comparison to regions on the western side of the state.

3.1.2 Environmental Consequences

Significant impacts would occur if proposed activities would permanently and substantially alter the geology and soil features present within the action area, thus modifying the landscape to the extent that the action area no longer exhibits the resource characteristics and functions consistent with baseline conditions for the action area; if activities would substantially alter soil drainage characteristics; induce widespread erosion; meaningfully or substantively impact prime farmland or land subsistence practices; or induce seismic activity potentially threatening human health and wellbeing. The specific effects determinations for each alternative are outlined below.

3.1.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge with the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. As a result, there would be no change in the existing baseline conditions for geology and soil resources present within the action area. Without action, there would be no direct or indirect impacts to

resource characteristics such as drainage, erosion, prime farmlands, land subsistence practices, or the induction of seismic activity. Implementation of this alternative would result in a less than significant impact to geology and soils.

3.1.2.2 Alternative 2: Re-channelization of Amon Creek

Implementation of the proposed action would result in short-term minor adverse impacts to geology and soils, but these effects would be less than significant. The relocation and purposeful use of existing soils would result in minor short-term disturbances to the soils within the action area. The construction of the new Amon Creek channel would require the excavation of approximately 27,461 cubic yards of soil material, referred to as “spoil” material. The excavated spoils would then be utilized to fill the existing Amon Creek channel (~13,025 cubic yards), and the remaining material (~15,300 cubic yards) utilized to create wetland benches and other reclamation features. Furthermore, re-sloping of the Yakima River would require the excavation of approximately 955 cubic yards of shoreline soil material to expand the cold-water refugia, adjacent to the new Amon Creek channel. The spoil material from this location would then be re-purposed for use in upland locations at the site. Due to the low elevation, consistent slope, and consistency of soil type within the action area, the risk of inducing erosion is low. The action area is not currently utilized for agricultural or subsistence farming practices, and the overall drainage characteristics would remain un-changed. Impacts to soils would be short-term, and last for the duration of construction activities. Upon completion, there are no anticipated indirect impacts associated with the implementation of this alternative, as the characteristics and functions of geology and soil resources present would remain consistent with baseline conditions.

Therefore, implementation of the alternative would have short-term, minor adverse impacts, and result in a less than significant impact to geology and soils.

3.2 Noise

3.2.1 Affected Environment

The surrounding environment encompasses a mix of urban, agricultural, industrial, and natural settings, which contribute to varying levels of ambient noise within and surrounding the action area. Urban noise sources from nearby residential and commercial areas include vehicular traffic, construction activities, and the operation of businesses and light industries. Interstate 182 (I-182) runs adjacent to the HMU, contributing significantly to the area's noise levels. Traffic noise from I-182 is persistent throughout the day, peaking during morning and evening rush hours. Sound levels from interstate traffic are expected to range between 55 and 75 dB(A) depending on proximity and the presence of vegetation or other noise barriers. The broader area surrounding the HMU includes agricultural land uses. Typical agricultural noise sources include the operation of machinery, such as tractors and irrigation pumps, as well as periodic aircraft noise from crop-dusting activities during the growing season. These noises tend to be seasonal, with heightened activity during planting and harvesting periods. Agricultural operations generally produce noise levels ranging from 60 to 80

dB(A) at close range, although attenuation over distance and topography reduces their impact on the HMU. Within the Yakima Delta HMU itself, the natural soundscape dominates the noise environment, particularly in more remote sections. The HMU contains wetlands, riparian zones, and open water habitats that support a variety of wildlife, including waterfowl, songbirds, and other species that contribute to the natural soundscape. Wind moving through vegetation, water flowing in streams and channels, and wildlife vocalizations are the primary natural noise sources. Noise levels within these areas are typically low, ranging from 30 to 50 dB(A), contributing to a relatively quiet environment when human activity is minimal. The diversity of land uses surrounding the Yakima Delta HMU results in a gradient of noise levels, from relatively quiet natural areas within the HMU to more elevated noise conditions near urban and transportation corridors.

3.2.2 Environmental Consequences

Significant impacts would occur if generated noise were permanently intrusive to nearby sensitive receptors; if it exceeds applicable noise limit thresholds; or if it causes harm or injury to people or communities.

3.2.2.1 Alternative 1: No Action

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge within the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, there would be no anticipated direct or indirect impacts to the existing ambient noise conditions within and surrounding the action area.

Therefore, implementation of the alternative would result in less than significant noise impacts.

3.2.2.2 Alternative 2: Amon Creek Relocation

Implementation of the alternative would result directly in minor adverse noise impacts. These impacts would be short-term and persist for the duration of construction activity. Construction equipment operating at the site noise levels would range from approximately 68 decibels (dB) to 105 dB depending on the type of equipment utilized (WSDOT 2020). Guidance from WSDOT provides an estimate of existing environmental background noise levels. The action is within a rural setting, but the population is about 3,778 within a one-mile radius of the site (EPA 2022). WSDOT (2020) indicates the daytime noise levels for sites with a population density of 3,000 to 10,000 per square mile is 55 weighted decibels (dBA). The site is somewhat rural, but traffic from Columbia Park Trail and boats on the Yakima River will also contribute to overall background noise levels. Based on this, 55 dBA was selected as the background terrestrial noise level for the site. In addition to terrestrial noise, installation of the apex log jams utilizing a vibratory hammer would result in aquatic noise. Terrestrial noise is accounted for, any aquatic noise would have negligible impact on residential populations. However, the

impacts to fish and aquatic resources for aquatic noise is addressed within Section 3.7 of this EA.

The action area is spatially distant from residential areas, and it is expected that the forested and aquatic environment would aid in terrestrial noise attenuation. Noise attenuation refers to the reduction of sound intensity as it travels through a medium, such as air, water, or solid materials. This decrease in sound level occurs naturally over distance or can be achieved artificially through various techniques or barriers. The amount of attenuation depends on several factors, including the sound's frequency, the medium through which it travels, and the presence of obstacles or materials that absorb, reflect, or scatter sound.

Factoring in attenuation, the noise levels produced by construction activities would be within the range that is legally permissible. Construction work would occur during day light hours. Once the action is completed, there would be no anticipated indirect impacts to ambient noise within or surrounding the action area.

Therefore, implementation of the alternative would directly result in adverse impacts to noise, however, these impacts would be minor and short-term. Overall, implementation of the alternative would result in less than significant impacts to noise.

3.3 Wetlands

3.3.1 Affected Environment

Jurisdictional wetlands are jointly defined by USEPA and USACE as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.” The CWA has now been interpreted to extend only to those wetlands that are “as a practical matter indistinguishable from waters of the United States.”

Executive Order 11990, Protection of Wetlands, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

The National Wetlands Inventory was utilized as a preliminary analysis tool and identified the potential for a mixture of different wetland types within the action area (Figure 7). According to the inventory, the action area and surrounding environment potentially consists of “freshwater forested / shrub wetland” and “emergent wetland”. The Amon Creek channel is identified by the inventory tool as “riverine” habitat. These types of environments are consistent with that of the lower Yakima River basin.

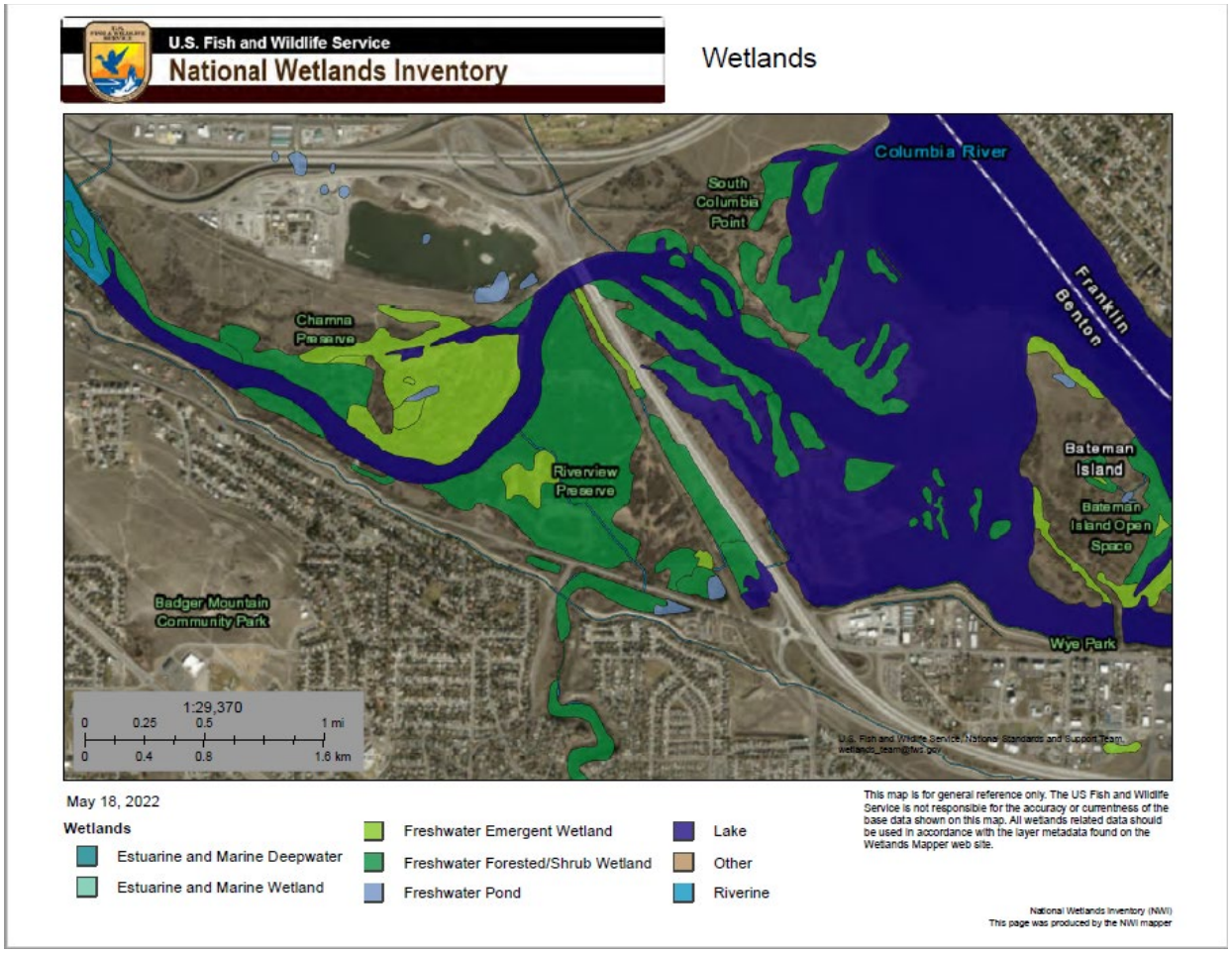

Figure 7. National Wetland Inventory (USFWS 2024)

On May 10, 2022, a wetland delineation and hydrological assessment of the action area was conducted by GeoEngineers' Inc, a subcontractor of Northwest Hydraulic Consultants (Appendix F). Field assessments and data samples were collected within the action area on May 10, 2022, and October 19, 2022. The assessment area was approximately 19.16 acres and focused primarily on the proposed limits of disturbance from proposed action activities. The disturbance area perimeter, data point collection locations, ordinary high-water mark outlines (OHWM) for Amon Creek and the Yakima River, wetland areas, and wetland buffer areas are detailed in Figure 8.

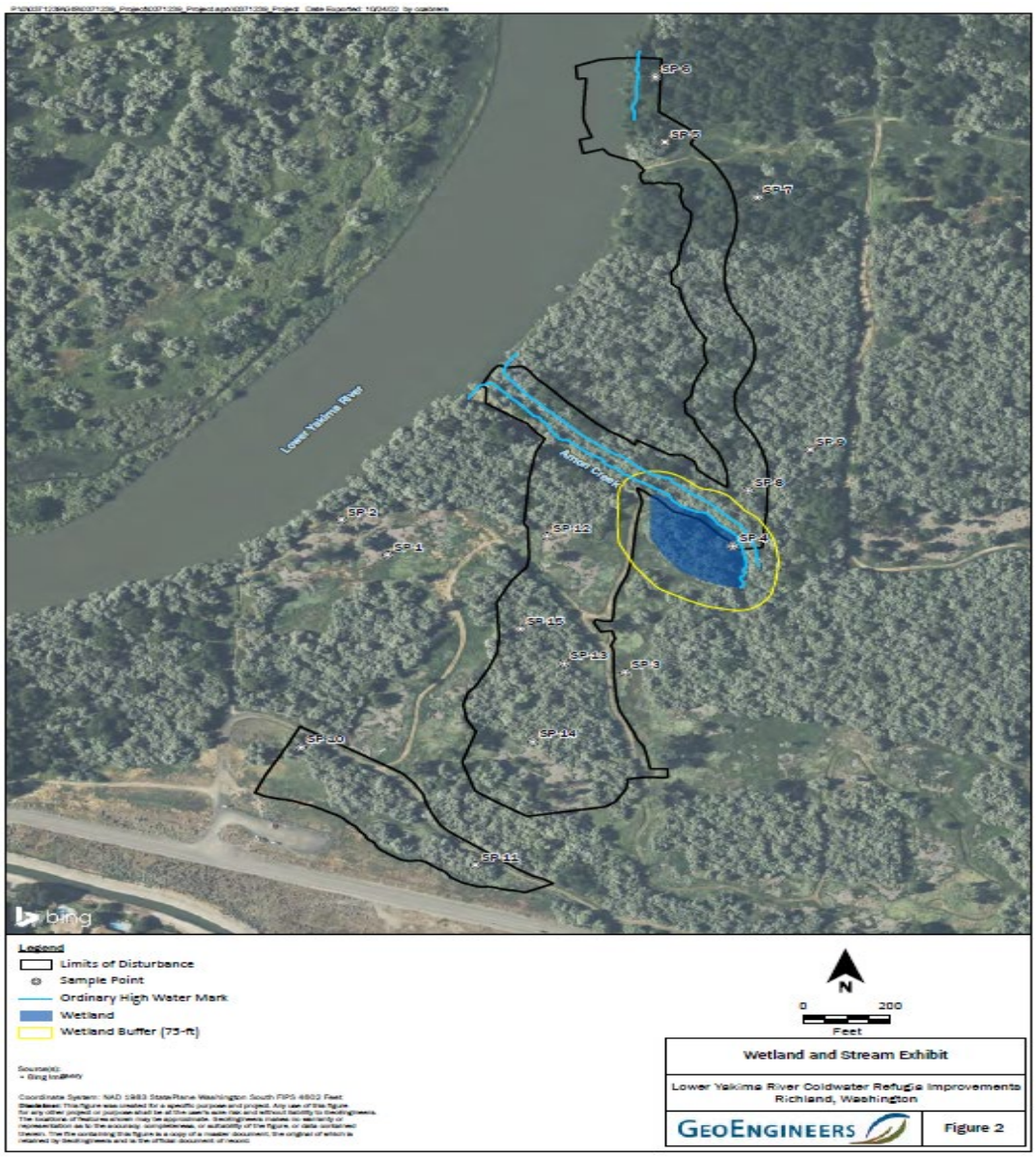

Figure 8. Wetland and Stream Exhibit Map (GeoEngineer's Inc 2022)

Wetland and stream delineation practices were conducted in accordance with the USACE Wetland Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0 dated September 2008) (USACE 2008). Due to concerns with potential historical/ cultural resources in the action area, soil pits were not utilized. Rather, the delineation was conducted using a two-parameter approach, with vegetation and hydrology identification, and ancillary soils data obtained from readily available public sources.

Results of the delineation indicated the action area contains riparian and upland areas, as well as wetland habitat. Riverine features include the Yakima River and Amon Creek, and the hydrology of these features are detailed within Section 3.3 of this EA. Furthermore, the delineation identified one riverine wetland (“Wetland A”) along the left bank of Amon Creek, approximately 600 feet upstream of its confluence with the

Yakima River (Figure 9). Characteristics of this wetland are consistent with that of a scrub-shrub wetland, dominated by vegetation such as Russian Olive, reed canary grass, and grey alder. Per the recommendation of USACE, Seattle District Regulatory, ancillary soils data was obtained from publicly available records to delineate this wetland's boundary.

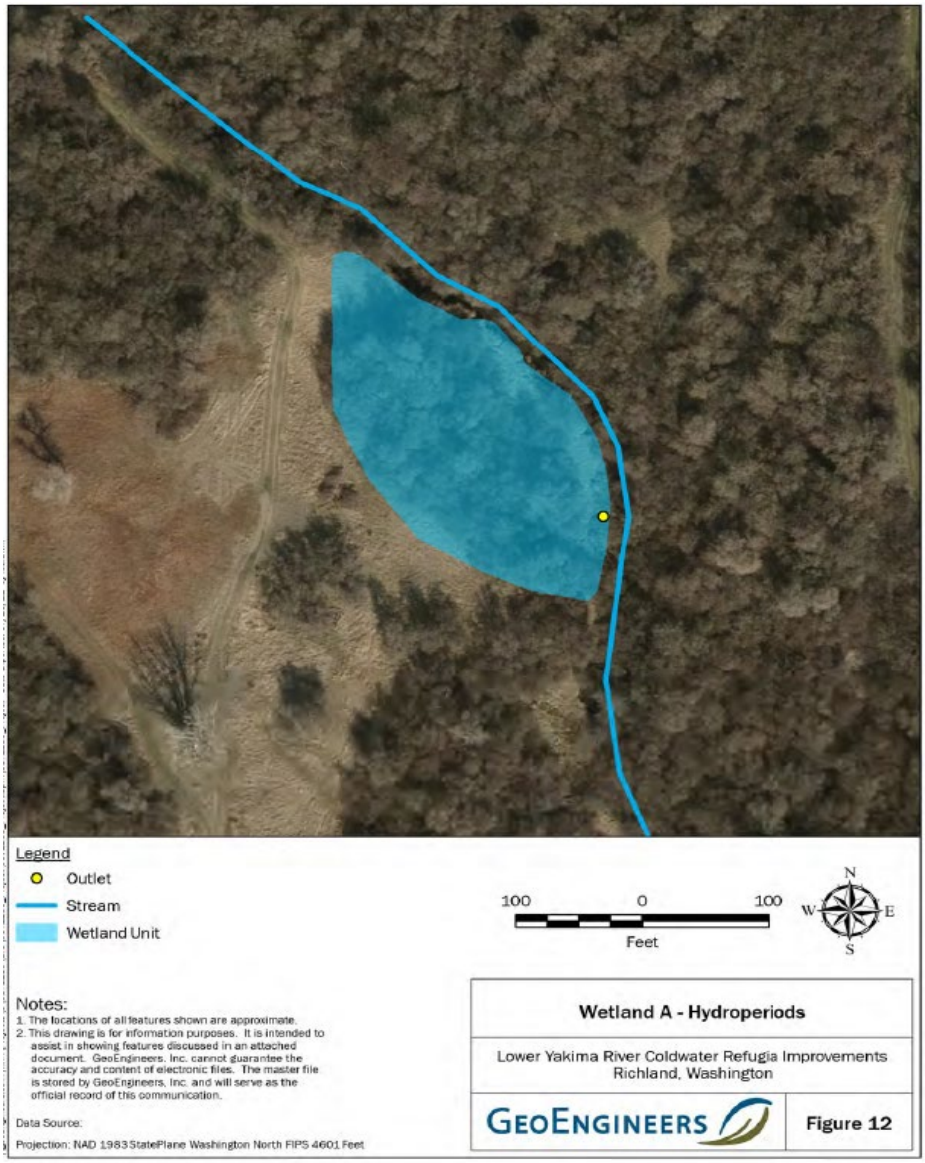

Figure 9. "Wetland A" Outline (GeoEngineers' Inc 2022)

According to the Washington State Department of Ecology's (Ecology) rating system for eastern Washington, the wetland-based functions for Wetland A is consistent with that of a Category 3 wetland. This category of wetland provides moderate functions and values, including water quality improvement and floodwater storage. They offer habitat for common wildlife but are less diverse and critical for rare species. These wetlands are more common and are not as ecologically important as higher-rated wetlands. While they contribute to hydrologic functions, their sensitivity to disturbance is moderate,

allowing them to recover more quickly from impacts. Overall, they play a functional but less critical role in the ecosystem compared to higher-rated categories of wetlands.

3.3.2 Environmental Consequences

Significant impacts would occur if proposed activities do not comply with wetland protection regulations or permits.

3.3.2.1 Alternative 1: No Action

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge with the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, there would be no direct or indirect impacts to existing wetland resources within the action area. The overall size, function, and health of the existing “Wetland A” would continue to remain consistent with baseline conditions. Therefore, implementation of the alternative would result in less than significant impacts to wetlands.

3.3.2.2 Alternative 2: Re-channelization of Amon Creek

Although the proposed action has been designed to avoid and minimize impacts to wetlands, unavoidable direct adverse impacts to the existing “Wetland A” would occur. “Wetland A" is located along the left bank of Amon Creek, approximately 600 feet upstream of its confluence with the Yakima River (Figure 9). The proposed action activities that would adversely impact the wetland area consist of minor clearing and grubbing along the eastern section (approximately 0.13 acres) and the placement of temporary fill material (0.072 acres). Permanent impacts are anticipated to be approximately 0.072 acres and temporary impacts are anticipated to be 0.055 acres of “Wetland A”.

These activities would directly result in short-term, moderate adverse impacts to “Wetland A”, with less than one tenth of an acre of permanent adverse impacts. In addition, the action incorporates measures intended to create additional wetland benches and riparian plantings on either side of the new Amon Creek channel (Figure 10). These measures are intended to improve the functional capacity of the existing “Wetland A” beyond its baseline condition. The wetland benches and riparian plantings along the new Amon Creek channel would utilize a topographical low point to resemble natural hydrology and increase wetland acreage with native species. Species richness would be improved through the establishment of a buffer zone, controlling aggressive non-native vegetation, and establishing colonies of native species. To maximize the replacement of lost functions, constructed wetlands would be placed in a similar hydrogeomorphic position as the effected wetland. Overall, total wetland acreage is expected to increase by 0.67 acres.

In summary, implementation of the proposed action would result in direct moderate adverse impacts to “Wetland A”. Anticipated impacts would be primarily temporary, with permanent impacts expected for less than a tenth of an acre for “Wetland A”. Furthermore, the proposed action incorporates measures intended to create additional

wetland and riparian habitat through the establishment of wetland benches and buffer zones, planting of native riparian vegetation, and the control of non-native species.

These measures would increase the total wetland acreage by 0.67 acres and provide a functional lift beyond baseline conditions, resulting in long-term moderate beneficial impacts to wetlands. Overall, implementation of the alternative would result in no net loss of wetlands and comply with existing regulations and permits. Therefore, implementation of the alternative would result in less than significant impacts to wetlands.

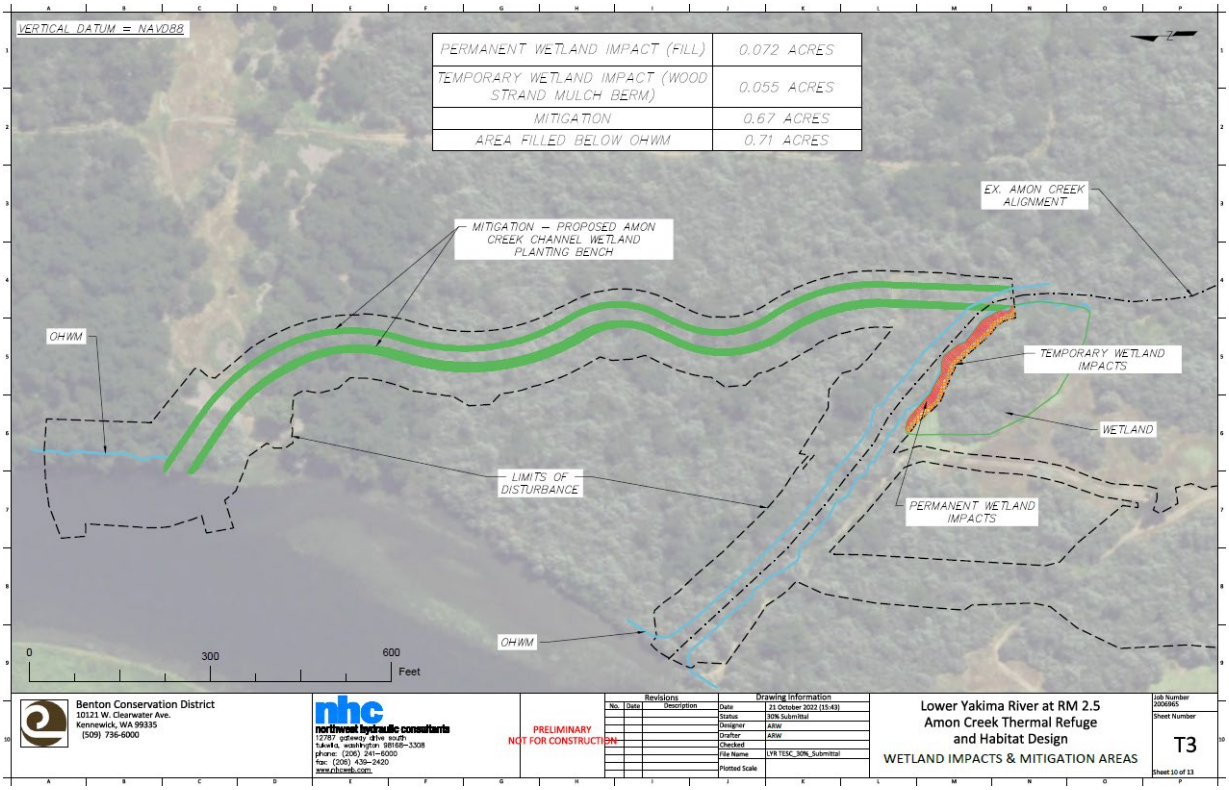

Figure 10. Outline of Impacts to Existing Wetland and Proposed Mitigation Measures (GeoEngineers 2022)

3.4 Hydrology

3.4.1 Affected Environment

Hydrology is influenced by the two primary riverine surface water features present within the action area. Those features include the lower Yakima River and Amon Creek.

The Lower Yakima River:

The headwaters of the Yakima River are located northwest of Richland on the eastern slopes of the Cascade Mountains, and the river generally flows south and southeast through undeveloped forests, agricultural land, and multiple cities and towns before draining into the Columbia River. The lower reach of the Yakima serves as a large source of irrigation water for the region. The river's discharge exhibits seasonal variability, with peak flows in the late spring to early summer and lower flows in the late

summer and fall (Figure 11). This variability is influenced by snowmelt and precipitation from the Cascade Range as well as upstream water management practices from dam releases and irrigation withdrawals. The lower Yakima River features an extensive floodplain, especially the Delta, near the confluence with the mainstem Columbia River.

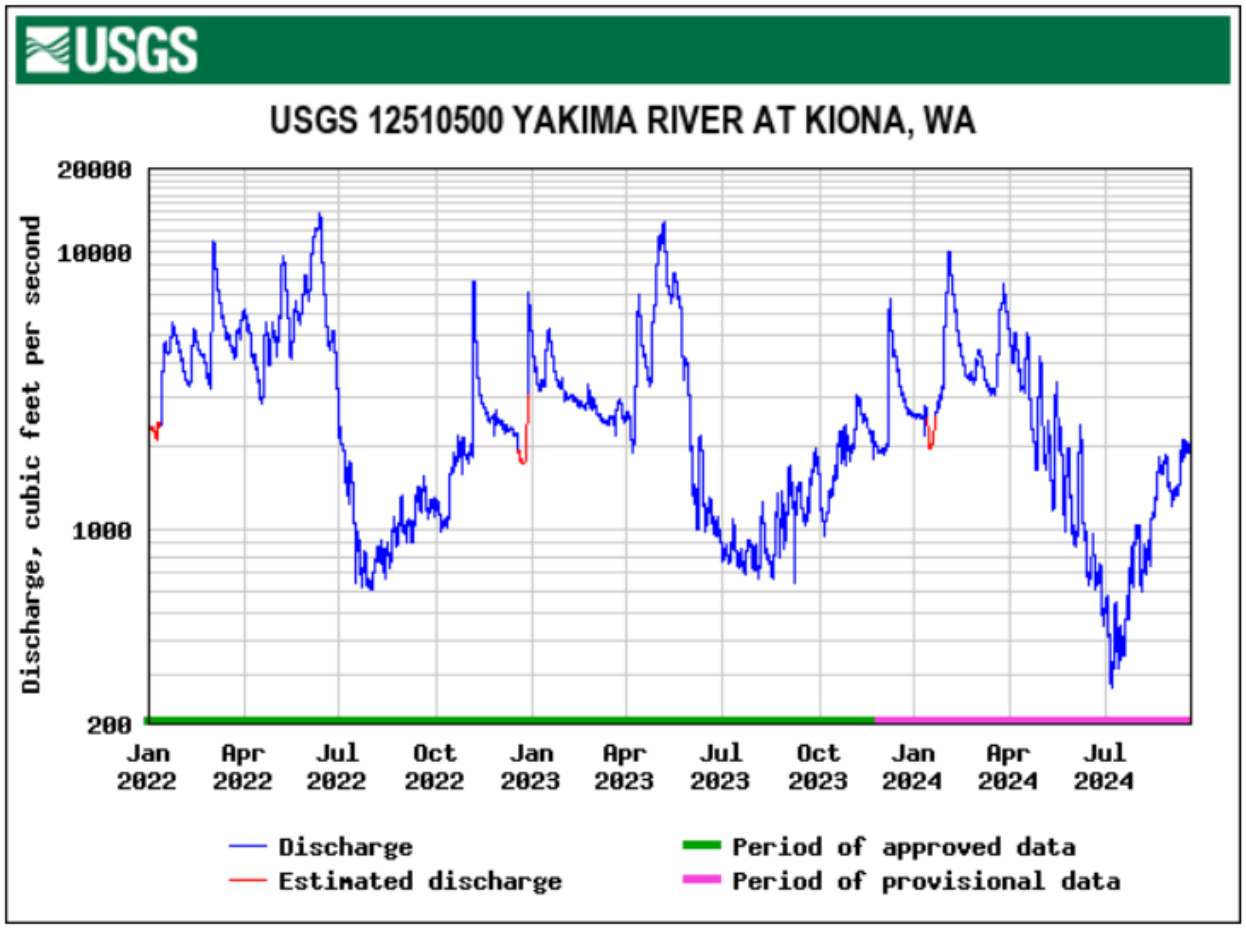

Figure 11. Annual Discharge Data for the Lower Yakima River (cubic feet per second) 2022 to 2024 (USGS 2024)

Amon Creek:

Amon Creek is considered a natural tributary of the Yakima River. The creek is a source of precipitation and snowmelt drainage from the Badger Canyon, and flows through the Tri-Cities area, passing through parts of Richland, before ultimately passing through the action area and entering the Yakima River at approximately 2.5 miles upstream of the Yakima and Columbia River confluence. Although this is considered a natural water way, it also receives occasional discharges from the Amon Wasteway, which is an artificial drainage structure managed by the Kennewick Irrigation District (KID). This wasteway is used to convey irrigation return flows, irrigated agricultural drainage, and stormwater discharge back to the Yakima River. Excess irrigation water and stormwater collected by the Amon Wasteway is routed into Amon Creek, to maintain proper water levels in the wasteway and manage the overall hydrology in the canal system. The portion of Amon Creek, as it flows through the action area, exhibits glide and pool habitat with dense vegetation along the banks. The creek flows through the action area

at a low gradient and in a straightened channel. Channel widths vary from approximately 25 to 30 feet, until it empties into the Yakima River. Consistent with regional riverine environments, the creek has variable discharges dependent on the time of year. These variations are driven largely by agricultural demands for water, but also climatic factors, such as timing of precipitation and snowmelt. Discharges are typically higher in the late spring and early summer from snowmelt and precipitation, and lower or intermittent during the dry summer months. Groundwater recharge also supports the creek, especially in areas where surface water is limited.

3.4.2 Environmental Consequences

Significant impacts would occur if proposed activities resulted in meaningfully adverse, long-term/permanent alterations to characteristics and functions of hydrological features within the action area (to include impacts to discharge quantity, flow regimes, sediment transport, flood attenuation, ecological support, or the navigability of surface waters).

3.4.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge with the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, there would be no anticipated direct or indirect impacts to the existing hydrological characteristics of the lower Yakima River or Amon Creek. Water discharge quantities, flow regimes, sediment transport, and ecological function would remain un-altered. Therefore, implementation of the alternative would result in less than significant impacts to hydrology.

3.4.2.2 Alternative 2: Re-channelization of Amon Creek

Implementation of the proposed alternative would directly result in minor adverse impacts to hydrology, but these impacts would remain less than significant. Due to the nature of the proposed action, modifications to the hydrological characteristics of the lower Yakima River and Amon Creek are un-avoidable. The proposed action would require the re-channelization of Amon Creek, the filling in of the old Amon Creek channel, and the removal of shoreline and sediment material from the lower Yakima River. These action components would likely have short-term impacts to hydrology, which would likely persist for the duration of construction activity.

However, once completed, the re-channelization of Amon Creek would result in the permanent modification to the flow path, conveyance capacity, length, and confluence point with the Yakima River. Furthermore, the removal of sediment from the Yakima River and re-sloping of the banks to create additional cold-water refugia would permanently alter the existing depth and hydraulic functions of the Yakima River in this area. Re-routing of the Amon Creek channel would provide connectivity to create wetlands and historical floodplain areas. In addition, the installation of native shrub and forested habitats would increase hydrologic function and erosion would be minimized

through the reduction in stream velocities. Deeping the pool within the Yakima River would provide a more suitable thermal refuge for salmonids. Overall, these modifications are intentionally incorporated as part of the action's design and are anticipated to improve the overall hydrological function of these features. Therefore, the proposed action would indirectly result in long-term, moderately beneficial impacts to hydrology.

In summary, implementation of the proposed action would directly have minor adverse impacts to hydrological features. These impacts would be short-term. Indirectly, the proposed action would result in moderately beneficial impacts to the existing hydrological function of the features, and these impacts are anticipated to be permanent. Therefore, implementation of this alternative would result in less than significant impacts to hydrology.

3.5 Water Quality

3.5.1 Affected Environment

This discussion of water resources includes groundwater, surface water, marine waters, wetlands, floodplains, and shorelines. This section also discusses the physical characteristics of marine waters, wetlands, etc.; Aquatic wildlife and vegetation are addressed in Section 3.5, Fish and Aquatic Resources.

Groundwater is water that flows or seeps downward and saturates soil or rock, supplying springs and wells. Groundwater is used for water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition. Sole source aquifer designation provides limited protection of groundwater resources which serve as drinking water supplies.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. However, the impacts to wetlands are specifically addressed within Section 3.2 of this EA. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load (TMDL) is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur.

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation, that is, the 100-year and 500-year flood. Floodplain delineation maps are produced by the Federal Emergency Management Agency and provide a basis for comparing the locale of the Proposed Action to the floodplains.

Shorelines can be located along marine waters, brackish estuaries, or freshwater bodies. Physical dynamics of shorelines include tidal influences, channel movement and

hydrological systems, flooding or storm surge areas, erosion and sedimentation, water quality and temperature, presence of nutrients and pathogens, and sites with potential for protection or restoration. Shoreline ecosystems are vital habitat for multiple life stages of many fish, birds, reptiles, amphibians, and invertebrates. Different shore zones provide different kinds and levels of habitat, and when aggregated, can significantly influence life. Organic matter that is washed onto the shore, or “wrack,” is an important component of shoreline ecosystems, providing habitat for invertebrates, and nutrients to upland terrestrial communities and aquatic ecosystems.

Groundwater is protected through many federal laws that control and limit pollution into groundwater. These include but are not limited to: the Safe Drinking Water Act (SDWA) (42 U.S.C. section 300f et seq.); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601 et seq.); Resource Conservation and Recovery Act (RCRA) (42 U.S.C. section 6901 et seq.); and Clean Water Act (CWA) (33 U.S.C. section 1251 et seq.). Groundwater is also regulated by a combination of appropriation systems, pollution statutes, and land ownership rights that vary by state. Though groundwater is often connected to surface water, most states regulate surface water and groundwater separately.

The SDWA is the federal law that protects public drinking water supplies throughout the nation. Under the SDWA, the USEPA sets standards for drinking water quality. Groundwater quality and quantity are regulated under several statutes and regulations, including the SDWA.

Through the National Pollutant Discharge Elimination System (NPDES) program, the CWA establishes federal limits on the amounts of specific pollutants that can be discharged into surface waters. The NPDES program regulates the discharge of point (i.e., end of pipe) and nonpoint sources (i.e., stormwater) of water pollution. Most states are authorized to administer NPDES permit programs. There are two types of NPDES permits: Individual and General. Individual permits are specifically tailored to an individual facility based on the type of activity, nature of the discharge and receiving water quality.

Construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more can obtain a NPDES Construction General Permit for stormwater discharges with development of a Stormwater Pollution Prevention Plan (SWPPP) and when other conditions are met.

The USACE regulates the discharge of dredge or fill material into “waters of the United States” (WOTUS), including wetlands, under Section 404 of the CWA. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill material into wetlands and other WOTUS. Waters of the United States may include (1) the territorial seas and traditional navigable waters, (2) tributaries, (3) certain lakes ponds, and impoundments, and (4) adjacent wetlands, and are regulated by USEPA and the USACE.

Section 10 of the Rivers and Harbors Act (33 U.S.C. section 401 et seq.) provides for USACE permitting for any in-water construction in navigable waters. States may also require a permit for any in-water construction.

The National Wild and Scenic Rivers System preserves certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The Coastal Zone Management Act of 1972 (CZMA) (16 U.S.C. section 1451 et seq.) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Actions occurring within the coastal zone commonly have several resource areas that may be relevant to the CZMA. The CZMA regulatory setting discussion is discussed in Section 3.6.X.

Executive Order 11990, Protection of Wetlands, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

Executive Order 11988, Floodplain Management, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a one percent chance of inundation by a flood event in a given year.

Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, amends Executive Order 11988 and establishes the Federal Flood Risk Management Standard to improve the nation’s resilience to current and future flood risks, which are anticipated to increase over time due to the effects of climate change and other threats.

This section provides an overview of the quality water present in the action area. Water quality resources present within the action area include surface water, wetlands, floodplains, and shorelines. Wetlands are considered within Section 3.2 of this EA. Water quality resources not relevant to the action area include those associated with marine environments.

3.5.1.1 Groundwater

As outlined above, impacts to groundwater is considered within the context of the protection of public water consumption needs. This would include the use of aquifers as sources of drinking, agricultural irrigation, and industrial applications. There are not any ground water resources present within the action area.

3.5.1.2 Surface Water

As outlined within Section 3.3, there are two primary surface water features present within the action area. Those would include the lower Yakima River and Amon Creek. Neither of these surface water features are identified by the National Wild and Scenic Rivers system. The state of Washington’s Depart of Ecology (Ecology) monitors the quality of surface water resources to identify resources that do not comply with state standards for various use cases. The Department of Ecology’s (Ecology) Water Quality Atlas is a web-based tool which tracks the water quality of surface waters across the state. The tool identifies waterways placed under the 303(d) list, which refers to

waterbodies that have been identified as "impaired" under Section 303(d) of the federal Clean Water Act (CWA). This section requires states, territories, and authorized tribes to assess the quality of their waters and create a list of waterbodies that do not meet established water quality standards.

Yakima River Water Quality:

According to the atlas, the lower Yakima River, as it flows within the action area, is considered a Category- 5- 303(d) listed waterway. The lower Yakima River is considered impaired based on the total maximum daily load (TMDL) concentration of pesticides. Concentration levels were collected from resident catfish tissue samples. These increased pesticide concentrations are likely a result run off from agricultural activity, as the river is a primary source of irrigation for the region. However, the TMDL concentration criteria for listing by the state is based on the criteria for chronic aquatic life and not the more stringent human health criteria. In addition to documented pollutants, the lower Yakima River's water quality is also influenced by water temperatures. Although data sets are limited, temperature data for the lower Yakima River was collected from 2018 to 2024 by the US. Geological Survey (USGS) sensor located at Kiona, Washington (Figure 12).

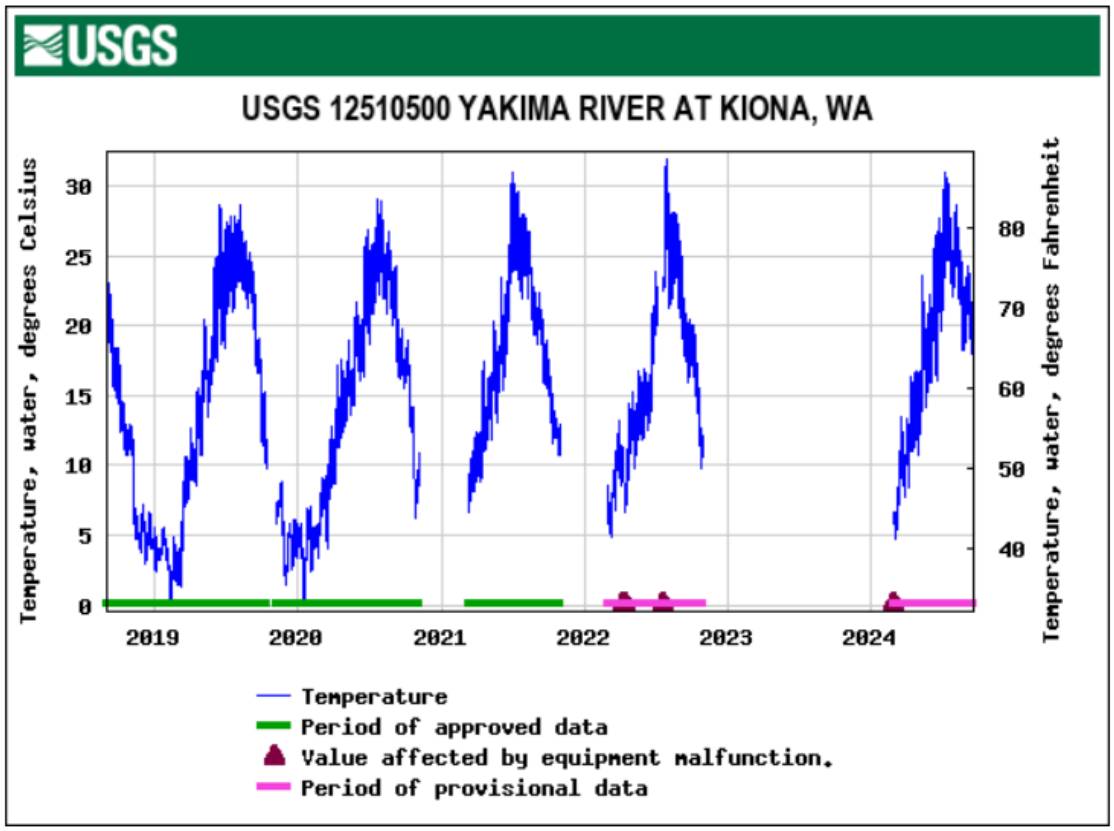

Figure 12. Lower Yakima Water Temperatures 2018 to 2024 (USGS)

According to the figure, temperatures range from low 40's degrees in the winter to well over 80 degrees Fahrenheit in the summer. Furthermore, trends in dissolved oxygen are likely to be dependent on water temperatures, with less dissolved oxygen available during periods of warmer water temperatures. Stagnation from flow restriction at the

confluence, coupled with sediment deposition decreasing average depths, and thermal radiation during the summer months have proven to decrease the water quality of the lower Yakima River through the decrease in dissolved oxygen levels and the promotion of bacterial growth outbreaks. These factors further contribute to the physical, chemical, and biological characteristics of the lower Yakima River.

Amon Creek Water Quality:

Amon Creek is not a waterway identified as being impaired by Ecology's Water Quality Atlas web tool. Furthermore, there are no publicly available data resources, such as sensors or gauges, to determine qualities such as average water temperatures, discharge rates, and dissolved oxygen levels. However, the creek has been documented to be utilized by salmonids as a source of thermal refuge during their spawning migration and even as spawning habitat. Salmonids, being cold-water species, are thermally sensitive and require a specific range of water temperature before experiencing detrimental physiological harm. Therefore, from the documented use of this waterway by salmonids, it can be reasonably inferred that water temperatures within the Amon Creek are naturally colder than that of the mainstem lower Yakima River, and thus likely contains other water qualities beneficial to aquatic organisms.

3.5.1.3 Wetlands

There is one wetland identified within the action area ("Wetland A"). The affected environment and environmental impacts associated therein are analyzed within Section 3.2 of this EA.

3.5.1.4 Floodplains

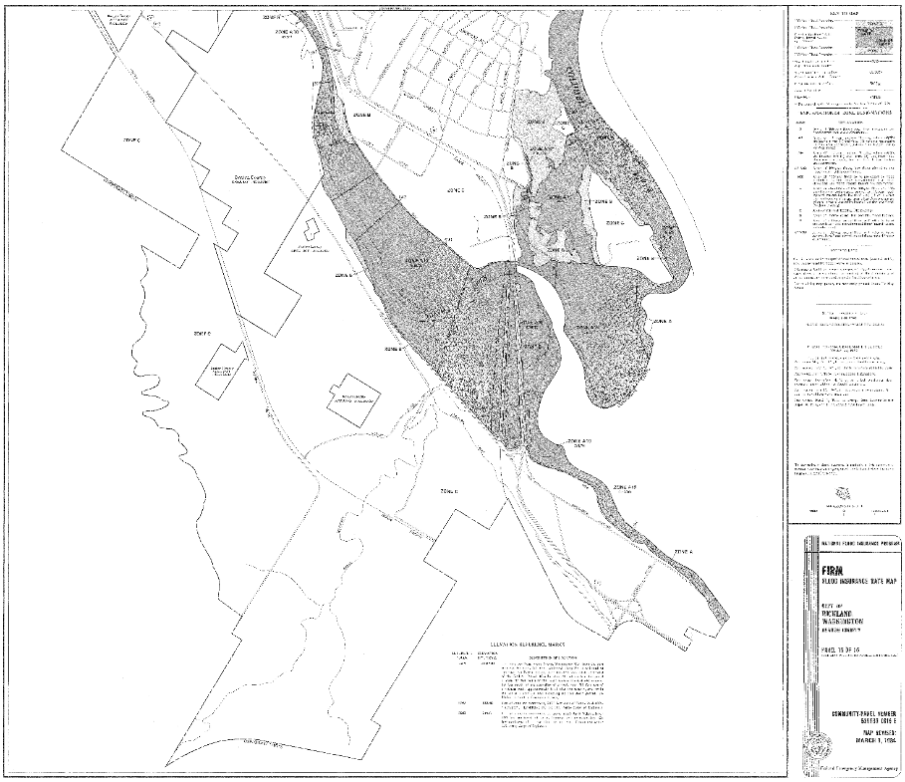

Figure 13. FEMA FIRM Flood Map

The 100-year floodplain is defined as the area of land that has a 1% chance of flooding in any given year. The Federal Emergency Management Agency (FEMA) is the entity responsible for the identification of floodplain boundaries. According to the FEMA Insurance Rate Map (FIRM) for the action area, the proposed action would be contained entirely within the 100-year floodplain (Figure 13).

3.5.1.5 Shorelines

Shorelines exist within the action area along the banks of the lower Yakima River and Amon Creek. Under the regulatory definition, riverbanks are transitional areas of land between aquatic and terrestrial environments, typically defined as being located between the water's surface and the ordinary high-water mark (OHWM). The banks along the lower Yakima River are highly vegetated and can be characterized as a quick transition to riparian buffer zone (Figure 14).

Figure 14. Looking at the banks of the Yakima River near the proposed outfall of Amon Creek (GeoEngineers 2022).

Similarly, the banks along Amon Creek are highly channelized with dense vegetation on either side (Figure 15).

Figure 15. Amon Creek's densely vegetated banks (GeoEngineers 2022).

3.5.2 Environmental Consequences

In this EA, the analysis of water resources looks at the potential impacts on groundwater, surface water, wetlands, floodplains, and shorelines.

Significant impacts would occur if proposed activities resulted in an exceedance of established water quality thresholds; substantially increase the amount of stormwater entering surface waters; substantially affect groundwater quantity or quality; or induce flooding in occupied areas.

3.5.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge with the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, the water quality of existing features would remain consistent with baseline conditions and therefore it can be reasonably discerned that there would be no direct or indirect impacts associated with the implementation of this alternative. Overall, implementation of this alternative would result in a less than significant impact to water quality.

3.5.2.2 Alternative 2: Re-channelization of Amon Creek

Implementation of the proposed action would result in no to negligible direct impacts to groundwater and the existing floodplain. There are no groundwater features present within the action area and the existing floodplain would not be impacted to any meaningful extent from action activities. However, due to the nature of the proposed action, un-avoidable impacts to the water quality of surface water and shoreline features are anticipated. The proposed action would result in minor to moderate adverse direct impacts to the surface water and shoreline qualities features of the lower Yakima River and Amon Creek. Impacts are largely associated with the ground disturbance required for the re-channelization of Amon Creek, the filling of the existing Amon Creek channel, the in-water placement of fill and the deflector structure in the Yakima River, the removal of sediment to create a deeper cold-water pool at the confluence with the Yakima River, and the re-sloping of the shoreline of the Yakima River. Despite these anticipated impacts, the action incorporates design features intended to minimize and avoid impacts to water quality. Design features include the installation of turbidity surrounded the in-water work areas within the lower Yakima River and wood chip filter berms/ wood chip mulch over cleared areas to prevent erosion and sediment transport to nearby bodies of water (Figure 16).

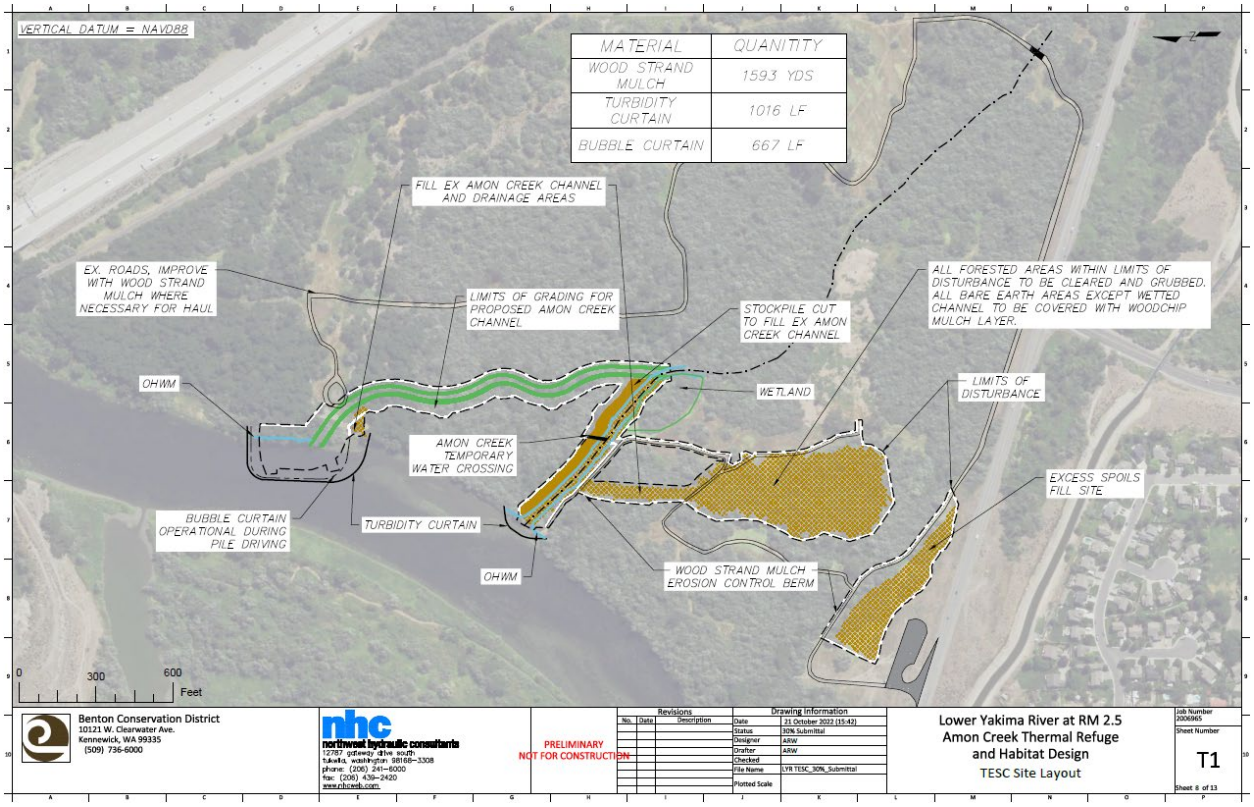

Figure 16. Water Quality and Erosion Control Measures (GeoEngineers Inc 2022)

These design features are intended to create a functional lift in the existing baseline water quality conditions through the re-routing and lengthening of Amon Creek, and the creation of cold-water refugia in the mainstem Yakima River. Decreasing water temperatures has secondary benefits to water quality in the form of increasing available

dissolved oxygen levels and decreasing the potential for bacterial growth. Overall, the net impact is anticipated to improve the physical, chemical, and biological qualities of surface water features within the action area. In addition, mitigative measures would be incorporated that would promote secondary improvements in water quality. These measures include the construction of wetland benches and the inclusion of riparian vegetation plantings, which are anticipated to further improve water quality through the filtering of contaminants/ pollutants entering the waterways.

For these reasons, the proposed action would result in moderate beneficial indirect impacts to water quality within the action area. Implementation of this alternative would result in a less than significant impact to water quality.

3.6 Terrestrial Resources

3.6.1 Affected Environment

Terrestrial resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are referred to generally as vegetation, and animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that support a plant or animal.

Within this EA, terrestrial resources are divided into terrestrial vegetation and terrestrial wildlife. Threatened, endangered, and other special status terrestrial species are discussed in their respective categories.

Special-status species, for the purposes of this assessment, are those species listed as threatened or endangered under the Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.) and species afforded federal protection under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. section 703 et seq.), or Bald and Golden Eagle Protection Act (16 U.S.C. section 668 et seq.).

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires action proponents to consult with the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species or result in the destruction or adverse modification of designated critical habitat.

Birds, both migratory and most native-resident bird species, are protected under the MBTA, and their conservation by federal agencies is mandated by EO 13186 (Migratory Bird Conservation). Under the MBTA it is unlawful by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, or possess migratory birds or their nests or eggs at any time, unless permitted by regulation.

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act. This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.

The following discussions provide a description of the existing conditions for each of the categories under biological resources at the Proposed Action Area. Threatened and endangered species are discussed in each respective section below with a composite list applicable to the Proposed Action provided in Table 3-2.

3.6.1.1 Threatened and Endangered Terrestrial Species

Table 3-2 lists species designated as threatened or endangered under the ESA that could occur on lands surrounding the Proposed Action Area.

Table 3-2. Threatened and Endangered Terrestrial Species Potentially Occurring in the Proposed Action Area.

Species	Listing Status	Critical Habitat Present?
Gray Wolf (Canis lupus)	Endangered	No
Yellow-billed Cuckoo (Coccyzus americanus)	Threatened	No

The above terrestrial Threatened and Endangered species have been identified by the U.S Fish and Wildlife Information for Planning and Consultation (IPaC) report, generated September 06, 2024 (Appendix A). The IPaC report identifies species that could exist within a given area, however, these species would likely not be present in the action area for the following reasons:

Gray Wolf: This species occupies expansive territories, through a diverse set of landscapes. They require adequate prey bases, typically where large ungulate populations and smaller mammals exist. Furthermore, this species requires areas with minimal human disturbances. These habitat conditions are not present at or surrounding the action areas.

Yellow-billed Cuckoo: This species requires large stretches of dense riparian forest habitat, adjacent to water sources to thrive. They tend to avoid areas with high levels of human activities. There have been only 20 sightings of yellow-billed cuckoos documented in Washington since the 1950s, with 19 of those sightings having occurred between 1974 and 2016, at an average rate of one sighting every 2.3 years. Sixteen of the twenty records occurred in eastern Washington. All or nearly all the birds recorded since the 1950s were likely non-breeding vagrants or migrants, indicating cuckoos are now functionally extirpated in the state (WDFW, 2017).

As yellow-billed cuckoos have been functionally extirpated from the state of Washington and grey wolves do not exist within the action area, therefore these species should not be considered as part of the affected environment and are not referenced further in the remainder of this document.

3.6.1.2 Vegetation

Riparian Vegetation: Riparian areas within the Yakima River Delta are dominated by riparian and grassland communities. Russian Olive (Elaeagnus angustifolia), a non-native invasive species, remains the dominant riparian tree within the Yakima Delta.

However, there are patches of native mature cottonwoods, willows, currant, and Woods' Rose (Rosa woodsii) throughout the landscape. These riparian areas provide shade to cool the river, provide habitat for insects important for several fish species, and support wildlife habitat as a transition zone between uplands and the river.
Invasive Species: Invasive species are found throughout the Yakima River Delta; and their spread is managed by local, state, and Federal agency programs. Terrestrial invasive species include spotted knapweed (Centaurea maculosa), cheatgrass (Bromus tectorum), Russian olive (Elaeagnus angustifolia), yellow star-thistle (Centaurea solstitalis), Canada thistle (Cirsium arvense), Russian thistle (Salsola tragus), purple loosestrife (Lythrum salicaria), common reed (Phramites australis), tree-of-heaven (Ailanthus altissima), and non-native cattail (Typha latifolia). Terrestrial invasive plant species form monocultures due to their ability to out compete native plant species. Monocultures lead to a loss in biodiversity which have lasting impacts on the overall health of the ecosystem and surrounding environment.

3.6.1.3 Wildlife

Riparian Wildlife: Various wildlife species are present on the Yakima River Delta including mink (Mustela neovison), muskrat (Ondatra zibethicus), river otter (Lontra canadensis), American water shrew (Sorex palustris), and American beaver (Castor canadensis). Many other species, however, spend much of their lives within the habitats immediately surrounding the waterways; they are dependent on mixed upland and lowland habitat. Species in this category include raccoon (Procyon lotor), coyote (Canis latrans), mule deer (Odocoileus hemionus), and striped skunk (Mephitis mephitis). Bats often forage on insects above the water. All these species, as well as many others, occasionally use the Yakima Delta as migration corridors.

Riparian birds: The most abundant wildlife in the Yakima River Delta are birds. Riparian and wetland habitats provide essential habitat for migrating birds and waterfowl. Many other shorebird species occur along rivers where mudflats develop. Belted Kingfishers (Megaceryle alcyon) patrol the river in search of small fish. Osprey (Pandion haliaetus) flourish along the river and many species of heron, rail, shorebirds, and waterfowl depend to a large extent on riparian corridors for food, roosting, and nesting sites. Bald Eagles (Haliaeetus leucocephalus) frequent the ravine corridors in search of fish and roosting areas. Birds such as cormorants, night herons, and gulls follow the river systems for many miles inland in search of good foraging areas. The river is also a major migration route for many species of songbirds such as vireos, flycatchers, thrushes, tanager, and wood warblers. Summer and winter resident species include Red-Winged Blackbird (Agelaius phoeniceus), Bank Swallow (Riparia riparia), Song Sparrow (Melospiza melodia), Bullock's Oriole (Icterus bullockii), Black-Headed Grosbeak (Pheucticus melancephalus), Dark-Eyed Junco (Junco hyemalis), White-Crowned Sparrow (Zonotrichia leucophrys), Yellow Warbler (Dendroica petechial), and American Goldfinch (Spinus tristis) (ERDC, 2010)

Shorebirds and waterfowl are most abundant during spring and fall migration in marshes, along shorelines, and foraging or loafing on mudflats. Common waterfowl year-round residents include American White Pelican (Pelecanus erythrorhynchos) and California Gull (Larus californicus). Common migratory birds include Caspian Tern

(Hydroprogne caspinia), Red18 Yakima River Delta Ecosystem Restoration Draft Feasibility Report with Integrated Environmental Assessment Breasted Merganser (Mergus serrator). Common winter waterfowl include Common Loon (Gavia immer), Western Grebe (Aechmophorus occidentalis), Double-Crested Cormorant (Phalacrocorax auratus), America Wigeon (Mareca americana), Ring-Necked Duck (Aythya collaris), Green-Winged Teal (Anas crecca), Common Golden-Eye (Bucephala clangula), Bufflehead (Bucephala albeola), Greater Scaup (Aythya marila), Redhead (Aythya americana), Ruddy Duck (Oxyura jamaicensis), Canvasback (Aythya valisineria), and American Coot (Fulica americana), Mallard, and Canada Goose (Branta canadensis). Resident shorebirds include Virginia Rail (Rallus limicola), Great Blue Heron (Ardea herodias), Killdeer (Charadrius vociferous). Migrants include Red-Necked Phalarope (Phalaropus lobatus), Wilson's Snipe (Gallinago delicata), Lesser Yellowlegs (Tringa flavipes), Semipalmated Sandpiper (Calidris pusilla), Black-Bellied Plover (Pluvialis squatarola), Long-Billed Dowitcher (Limnodromus scolopaceus), Dunlin (Calidrius alpine), and American Avocet (Recurvirostra americana).

3.6.2 Environmental Consequences

This analysis focuses on wildlife or vegetation types that are important to the function of the ecosystem or are protected under federal or state law or statute.

Significant impacts would occur if proposed activities resulted in substantial permanent loss or degradation of terrestrial habitat; result in unpermitted "take" of federally listed species; or violate regulations concerning special status species.

3.6.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge with the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, there would be no anticipated direct or indirect impacts to the terrestrial resources within the action area. The alternative would not result in the loss of habitat or disturbances to the behavior of existing wildlife species, nor would it result in the removal or loss of any vegetation within the action area. Furthermore, there are not any terrestrial ESA listed species or designated critical habitat to be considered within the action area. Overall, conditions within the action area would remain consistent with the baseline, and implementation of this alternative would result in less than significant impacts to terrestrial resources.

3.6.2.2 Alternative 2: Re-channelization of Amon Creek

Implementation of the proposed action would directly result in moderate adverse impacts to terrestrial resources, with impacts remaining overall less than significant. Due to the nature of the proposed action, impacts to terrestrial resources would be un-avoidable. However, these impacts would be short-term, and likely persist for the duration of construction activities. Impacts would include the removal of vegetation and

disturbance to habitat through excavation activities. In addition, noise from construction activities would present a disturbance to terrestrial wildlife within and surrounding the action area. Vegetation removal (primarily non-native Russian olive) would occur across 19.16 acres. Wooded material would be mulched and spread across the action site to prevent erosion. The disturbed areas would be revegetated with native herbaceous species, trees, and shrubs following construction. Although construction and ground disturbing activities would largely occur in uplands, some disturbance of riparian habitat is anticipated. As a result, the behavior of wildlife is anticipated to be disrupted and terrestrial species occupying these habitats would likely be displaced temporarily during construction activities. This would apply species of birds, mammals, reptiles, amphibians, and insects. There are no terrestrial ESA listed species or critical habitat within the action area. Therefore, implementation of the proposed action would not result in the potential for “take” pursuant to the ESA.

After completion of action activities, vegetation and wildlife would likely quickly re-colonize and return to the disturbed area. Indirectly, there would be moderately beneficial impacts to terrestrial resources through the enhancement of existing habitat. The re-introduction of native plant species, the establishment of wetland benches, and lengthened Amon Creek channel would all contribute to long-term improvements to the existing conditions for terrestrial wildlife and vegetation.

Overall, implementation of the alternative would directly result in moderate adverse impacts to terrestrial resources within the action area. These impacts would be short-term and temporary. The action incorporates design features intended to enhance the existing terrestrial habitat, and these modifications are anticipated to indirectly result in long-term benefits to terrestrial resources. Therefore, implementation of the proposed alternative would result in less than significant impacts to terrestrial resources.

3.7 Fish and Aquatic Resources

3.7.1 Affected Environment

Aquatic resources include living, native, or naturalized aquatic plant and animal species and the habitats within which they occur. Habitat can be defined as the resources and conditions present in an area that support a plant or animal.

Within this EA, aquatic resources are divided into anadromous fish, resident fish, and other aquatic resources. Threatened, endangered, and other special status species are discussed in their respective categories.

Special-status species, for the purposes of this assessment, are those species listed as threatened or endangered under the Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.) and species afforded federal protection under the Marine Mammal Protection Act (MMPA) (16 U.S.C. section 1361 et seq.) or the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. section 1801 et seq.).

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires action proponents to consult with the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and

endangered species or result in the destruction or adverse modification of designated critical habitat.

All marine mammals are protected under the provisions of the MMPA. The MMPA prohibits any person or vessel from “taking” marine mammals in the United States or the high seas without authorization. The MMPA defines “take” to mean “to harass, hunt, capture, or kill or attempt to harass, hunt, capture, or kill any marine mammal.”

The Magnuson-Stevens Fishery Conservation and Management Act provides for the conservation and management of the fisheries. Under the Act, essential fish habitat (EFH) consists of the waters and substrate needed by fish to spawn, breed, feed, or grow to maturity.

The following discussions provide a description of the existing conditions for each of the categories under aquatic resources at the Proposed Action Area. Threatened and endangered species are discussed below with a composite list applicable to the Proposed Action provided in Table 3-3.

3.7.1.1 Threatened and Endangered Aquatic Species

Table 3-3 lists species designated as threatened or endangered under the ESA that could occur on waters surrounding the Proposed Action Area.

Table 3-3. Threatened and Endangered Aquatic Species Potentially Occurring in the Proposed Action Area.

Species	Listing Status	Critical Habitat Present?
Bull trout (*Salvenlinus confluentus*)	**Threatened**	**Yes**
Middle Columbia River Steelhead (*Oncorhynchus mykiss)*	**Threatened**	**Yes**
Middle Columbia River Spring Chinook (*Oncorhynchus tshawytscha)*	**Threatened**	**Yes**
Middle Columbia River Fall Chinook (*Oncorhynchus tshawytscha)*	**Threatened**	**Yes**
Middle Columbia River Sockeye (*Oncorhynchus nerka)*	**Threatened**	**Yes**
Middle Columbia River Coho (*Oncorhynchus kisutch)*	**Threatened**	**Yes**

The U.S Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have determined that all the sub-populations of salmonids (to include Bull trout) are considered threatened and endangered species under ESA. All of the above species are present within the Yakima River at various times of the year, and the Yakima River is considered designated Final Critical Habitat for all the above species.

The anadromous nature of these species is outlined below.

3.7.1.2 Anadromous Fish

The Columbia River system, including the Yakima River and its tributaries, support several species of anadromous fish species. Anadromous species are unique in that they are born in freshwater, migrate to the ocean to grow and mature, and then return to freshwater to spawn. Pacific salmon species typically die after a single spawning event; however, steelhead can return to the ocean after spawning in freshwater and have the potential for multiple spawning events. This anadromous life cycle allows these species to take advantage of the abundant food resources in the ocean, while using rivers and streams as safe environments for reproduction.

Threatened and endangered anadromous fish species are present within the action area, and include spring and fall Chinook salmon, coho salmon, steelhead, sockeye salmon, and pacific lamprey. Each species travels up the Yakima River for specific reasons tied to its lifecycle, particularly for spawning, as well as for seeking appropriate habitats for the early development stages for their offspring. Salmonids have been documented utilizing the action area, particularly Amon Creek, as a source of cold-water refuge during summer months (Figure 17).

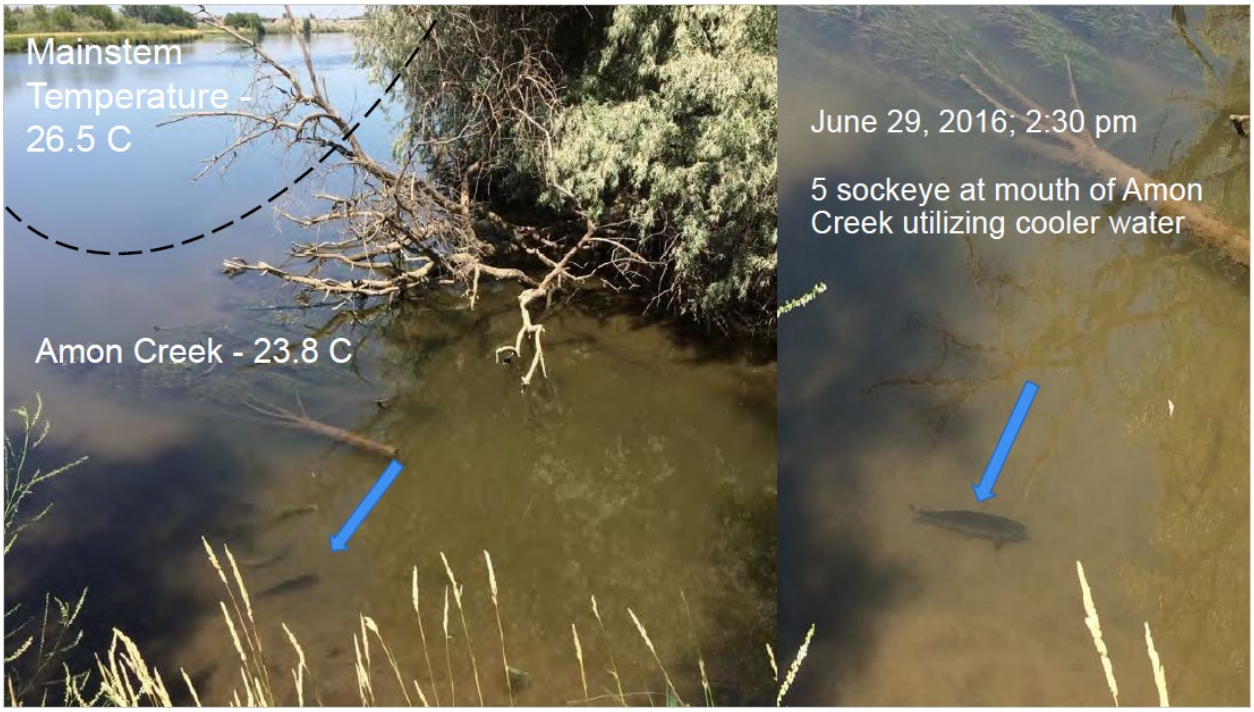

Figure 17. Salmonids at mouth of existing Amon Creek (Benton Conservation District and Mid-Columbia Fisheries Enhancement Group 2022).

Spring Chinooks migrate through the action area during March through May, typically seeking cooler upper river tributaries for spawning. They are the first of the Chinook runs to enter the river system, often migrating during high flow periods in the spring. Similarly, fall Chinook return to the Yakima River in late summer and fall, and prefer the mainstem Yakima River for spawning. They are known for being larger in size compared to spring Chinook.

Coho salmon return to the Yakima River and its tributaries in the fall. These fish are typically found spawning in smaller tributaries and side channels where there is good cover for their eggs.

Steelhead exhibit two migration runs within the Yakima. These would include summer steelhead, migrating in July through October, and spawning in the late winter to early spring. And winter steelhead, migrating in December through March, with spawning occurring in the spring.

Sockeye salmon travel up the Yakima River to reach Cle Elum Lake, which serves as their primary spawning area. The lake environment is crucial for their lifecycle, as sockeye require both river and lake habitats for spawning and rearing their offspring. They typically migrate in July through September timeframes.

Finally, Pacific lamprey migrate up the Yakima River to spawn in the river's clean, well-oxygenated gravel beds. Lamprey typically migrate from spring to early summer, and spawning occurs shortly after they reach their desired spawning grounds.

3.7.1.3 Resident Fish

Resident fish that are present within the Yakima River and its tributaries include rainbow trout (O. mykiss), northern pikeminnow (Ptychocheilus oregonensis), largescale sucker (Catostomus macrocheilus), three-spined stickleback (Gasterosteus aculeatus), sand roller (Percopsis transmontana), chiselmouth (Acrocheilus alutaceus), and sculpin (Cottus spp). These fish are native and are generally found in cooler waters of the Yakima River. In addition, several invasive, non-native resident fish occupy the lower Yakima River, near the confluence with the Columbia. These include American shad (Alosa sapidissima), largemouth bass (Micropterus salmoides), smallmouth bass (M. dolomieu), walleye (Sander vitreus), and channel catfish (Ictalurus punctatus). Many of these invasive species' feed on out-migrating steelhead, Chinook, sockeye, and coho salmon smolts in the spring. WDFW estimated smallmouth predation on salmonids (primarily fall Chinook salmon) within in the lower 68 kilometers of the Yakima River (WDFW 2000). Fritts and Pearson (2006) also found that Chinook salmon were the most abundant food item in smallmouth bass stomachs in spring and summer, although coho salmon and steelhead were also present. Smallmouth bass travel between the Columbia and lower Yakima Rivers, with peak abundance in the lower Yakima River typically occurring in mid-May to early June. Smallmouth bass are capable of consuming salmonids up to 56.6 percent of their own fork length (Fritts and Pearsons 2006). Other non-native species found within the vicinity of the lower Yakima include alligator gar, recently discovered in the McNary Pool; Asian clams, found in the Yakima Delta and the Columbia River near Hanford. The Yakima River, near the confluence with the Columbia, contains numerous resident fish species. Prominent warm-water fish species include smallmouth bass, largemouth bass, walleye, channel catfish, pike minnow, white sturgeon, yellow perch, carp, shad. Coldwater species include rainbow trout and bull trout.

Bull trout, classified as "Threatened" under ESA, are a native salmonid exhibiting a fluvial, adfluvial, or occasionally anadromous life history. Most of these individuals are residents in high mountain tributaries, but a small portion migrate within the mainstem

Columbia River and lower Yakima River, where they overwinter and feed and return the following summer to spawn in high mountain tributaries. The lower Yakima River is potentially a migratory and overwintering habitat for bull trout. The 2010 bull trout critical habitat final rule lists the entire mainstem Yakima River as designated critical habitat. Bull trout are listed as a threatened species and the action area is designated as critical habitat to support their recovery.

3.7.1.4 Other Aquatic Resources

Aquatic Invasive Species:

Aquatic invasive species found within the Yakima River Delta include flowering rush (Butomus umbellatus),European milfoil (Miriophyllum spicatum), and water stargrass (Heterantera dubia). Shallow areas of the Delta support patches of stargrass and flowering rush. However, recent dramatic improvements in water clarity within the Yakima River have allowed sunlight to penetrate the water column at greater depths allowing invasive species to colonize deeper water. The lower 43 miles of the Yakima River below Prosser Dam are dominated by water star grass. The pervasive expansion of aquatic invasive species negatively impacts stream flow, dissolved oxygen levels, sedimentation, and increased ambush habitat for predatory non-native fish species.

3.7.2 Environmental Consequences

This analysis focuses on aquatic species that are important to the function of the ecosystem or are protected under federal or state law or statute.

Significant impacts would occur if proposed activities resulted in substantial permanent loss or degradation of aquatic habitat; result in unpermitted “take” of federally listed aquatic species or designated critical habitat; or violate regulations concerning special status species.

3.7.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District’s action to create thermal refuge through the re-channelization of Amon Creek and associated action components. Without action, there would be anticipated no direct impacts to fish and aquatic resources in the lower Yakima River and its tributaries (to include Amon Creek). This would include anadromous and resident fish populations, as well as aquatic vegetation.

However, inaction would indirectly impact fish and aquatic resources, particularly cold-water species and ESA listed salmonids (i.e., salmon, lamprey, and bull trout), within the lower Yakima River and Amon Creek. Compared to resident species, these cold-water species are far more susceptible to any degradation in water quality. Due to changes in regional climate conditions, habitat degradation, water quality degradation, and numerous other external factors, these species are reasonably likely to experience increased thermal barriers impacting their migration and spawning success within the Yakima River basin. This would especially be true during the summer months, when

solar radiation has a large influence on increasing water temperatures. Increases in water temperatures, decreases in dissolved oxygen levels, increases in pollutant concentrations, and changes in flow regime are all water quality factors that add physiological stress to cold-water species. The effects of which can result in pre-spawn mortality, increase susceptibility to disease, and decreased overall spawning success. The existing conditions within the lower Yakima River are currently sub-optimal due to these water quality barriers, stemming primarily from high-water temperatures.

Additionally, aquatic invasive vegetation is likely to continue to thrive under existing conditions. Aquatic vegetation has been documented to be utilized by non-native resident fish species (such as smallmouth bass, largemouth bass, walleye) as ambush habitat for predating on ESA listed salmonid smolts. The presence of this un-natural habitat further exacerbates salmon recovery efforts, as less smolt populations are able to return to the ocean.

The proposed action's intended purpose is to create more favorable thermal conditions through the creation of cold-water refugia in both the Yakima River and Amon Creek. Without action, existing water quality conditions would continue to be sup-optimal for anadromous cold-water species and ESA listed salmonids. Water quality degradation would also reasonably impact resident fish population as well, but to a lesser extent. Regardless, implementation of this alternative could indirectly result in minor to moderate adverse impacts to the overall population and recovery efforts of ESA listed salmonids within the Yakima River basin. These impacts would be felt long-term, and reasonably persist indefinitely into the future. Implementation of this alternative could indirectly result in minor to moderate adverse impacts to fish and aquatic resources, depending on the extent of future water quality degradation and the future trends in population for ESA listed salmonids. Without action, these impacts would reasonably be felt long-term. However, these impacts would result from the worsening of existing conditions and not directly because of any specific given action. Therefore, implementation of the alternative would result in less than significant impacts to fish and aquatic resources.

3.7.2.2 Alternative 2: Re-channelization of Amon Creek

Implementation of the proposed action would directly have negligible to minor adverse impacts to fish and aquatic resources, with impacts remaining less than significant. The proposed action would be implemented with a phased approach which incorporates design features to avoid/minimize impacts to aquatic resources and water quality. These design features include the incorporation of in-water work windows to avoid impacts to ESA listed species, and BMP measures to minimize erosion, noise impacts on fish, sediment transport, and further impacts to water quality from in-water work activities. Impacts from construction activities would be minimal, as most ground disturbance would take place in upland locations. To prevent the transport of sediment from ground disturbing activities, mulch would be spread across the action site, with mulch berms placed in strategic areas. After excavation of the new Amon Creek channel, plugs would be established at each end for water isolation within the old channel. The old Amon Creek channel would be isolated, and fish exclusion/dewatering/ collection would be completed by a contractor in accordance with the USFWS (2012)

protocol. Fish collected would be returned immediately to the Yakima River, outside of the work area. These activities would have negligible impacts on fish and aquatic resources.

Proposed in-water activities would occur only during approved in-water work windows. This is intended to avoid/minimize impacts to ESA listed aquatic species such as bull trout and steelhead. In-water activities would include the grading and re-sloping of the shoreline along the Yakima River, the removal of sediment at the location where the new Amon Creek channel intersects with the Yakima River, the placement of fill material for construction of the deflector berm structure, and the placement of apex log jams at the deflector berm. The impacts to fish and aquatic resources would be minimized through the placement of turbidity and bubble curtains around the work area. However, despite implementation of these BMPs, impacts to fish and aquatic resources would be un-avoidable. These in-water activities would directly result in minor adverse impacts through the removal of aquatic vegetation and disturbances to resident fish populations from in-water construction noise (pile driving), turbidity, and the permanent modification of existing aquatic habitat. Construction noise impacts is addressed within the Biological Evaluation (BE) for Informal ESA Consultation, date November 2024. According to the BE, underwater noise generated during action construction could travel up to a maximum 3.34 miles from the location where the wood piles would be installed. However, it would encounter the shoreline at river bends approximately 2,125 feet upstream and 1,585 feet downstream from the pile installation site. Shoreline to the east and west of the action area will also truncate underwater noise propagation and limit this to within 315 feet of the pile driving area. Therefore, noise is expected to attenuate with nearby shoreline configurations prior to the 5,370-meter threshold to the point where it encounters adjacent land masses. The duration of underwater noise impacts due to pile driving is anticipated to be approximately one week with a maximum total of 480 hours of vibratory pile driving. Piles will be driven by a vibratory method in order to avoid use of an impact hammer, which produces louder sound levels. Work would be completed during daylight hours. Bull trout would not be present within the action area due to the temperature threshold for their survival. Steelhead migrate through the area starting in late September, which would be outside of the in-water work window. Any impacts to resident fish would be minimized through the before mentioned BMPs and any impacts would be short-term and persist for the duration of construction activity.

The proposed action’s intended purpose is to create more favorable thermal conditions for ESA listed species, through the creation of cold-water refugia in the lower Yakima River. Upon completion, the new Amon Creek channel would introduce approximately 750 feet of additional cold-water refuge, incorporating natural sinuosity, and ultimately connecting to a naturally deeper section of the Yakima River. The construction of flow deflectors are intended to isolate and direct the naturally colder water coming from Amon Creek during summertime low flows. The establishment of natural riparian vegetation, and wetland benches along the side of the new Amon Creek channel, are anticipated to improve water quality conditions which would be favorable for all aquatic species. There implementation of the proposed action would indirectly improve the water quality conditions within lower Yakima River and Amon Creek. These improvements would be favorable to all aquatic fish species, particularly cold-water anadromous species. These improvements would reasonably increase the migration and spawning success of ESA listed salmonids within the Yakima River basin, thus

improving conditions conducive to population recovery. Aquatic vegetation would largely remain un-impacted.

Therefore, implementation of the proposed action would indirectly have minor to moderate beneficial impacts on fish and aquatic resources. These impacts would be lasting and persist indefinitely into the foreseeable future. Overall, the proposed action would result in less than significant impacts to fish and aquatic resources.

3.8 Treaty and Cultural Resources

3.8.1 Affected Environment

This discussion of cultural resources includes tribal treaty resources, archaeological resources, cultural items, Indian sacred sites, historic properties, architectural resources and other properties of cultural significance.

Treaties are legally binding contracts between sovereign nations that establish those nations' political and property relations. Treaties between Native American Tribes and the United States confirm each nation's rights and privileges. In most of these treaties, the Tribes ceded title to vast amounts of land to the United States but reserved certain lands (reservations) and rights for themselves and their future generations. It is important to be clear that "the rights of sovereign Indian Tribes pre-existed their treaties; they were not granted them by treaties or by the United States government. Rather, the treaties gave their rights legal recognition" (Hunn et al. 2015:58). Like other treaty obligations of the United States, Indian treaties are "the supreme law of the land," and they are the foundation upon which Federal Indian law and the Federal Indian trust relationship is based.

Treaties with area Tribes, including Treaties with the Nez Perce (Treaty of June 11, 1855, Treaty with the Nez Perces, 12 Stat. 957 (1859); Treaty of June 9, 1863, Treaty with the Nez Perces, 14 Stats.647 (1867)), the Confederated Tribes of the Umatilla Indian Reservation (Treaty of June 9, 1855 with the Walla Walla, Cayuse, etc, 12 Stat. 945 (1859)), and the Confederated Tribes and Bands of the Yakama Nation (Treaty of June 9, 1855, Treaty with the Yakama, 12 Stat. 951) established reservations and explicitly reserved unto the Tribes certain rights, including the exclusive right to take fish in streams running through or bordering reservations, the right to take fish at all usual and accustomed places in common with citizens of the territory, and the right of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed lands. These reserved rights include the right to fish within identified geographical areas.

Cultural resources are governed by federal laws and Executive Orders, including, but not limited to, the National Historic Preservation Act (NHPA) (16 U.S.C. 470 et seq.) and the Archeological and Historic Preservation Act (AHPA) (54 U.S.C. 312501-312508). For the purposes of this analysis, the term "cultural resource" refers to all resources of cultural importance protected by these Federal laws and Executive Orders applicable to the Proposed Action.

The NHPA is the nation's primary historic preservation law, which defines the legal responsibilities of Federal agencies for the identification, management, and stewardship of historic properties. Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. Through consultation with interested parties, the Federal agency identifies historic properties potentially affected by the undertaking, assesses effects, and seeks ways to avoid, minimize, or mitigate any adverse effects on historic properties.

AHPA requires that Federal agencies provide for the preservation of historical and archaeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of any alteration of the terrain caused as a result of any Federal action.

In compliance with the NHPA, USACE will consult with regulators, Indian tribes and other interested parties to identify historic properties and other cultural resources that may be impacted by the Proposed Action. Per NHPA, historic properties are defined as any district, site, building, structure, or object listed in, or eligible for listing in, the National Register of Historic Places (NRHP). For the purposes of this analysis, historic properties can be divided into the following categories:

- Archaeological resources (prehistoric and historic) include the place or places where the remnants of a past culture survive in a physical context that allows for the interpretation of these material remains.
- Traditional cultural properties include properties associated with cultural practices and beliefs of a living community that are (a) rooted in the community's history and (b) important to maintaining the continuing cultural identity of the community.
- Tribal treaty resources include treaty-guaranteed rights and resources associated with ceded Tribal lands, including Tribal treaty hunting, fishing, and gathering rights.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.

The Benton Conservation District contracted the Plateau Cultural Resources Management (CRM) firm to conduct inventories of cultural resources at the Proposed Action Area to identify historical properties that are listed or potentially eligible for listing in the NRHP. In addition, USACE conducted its own analysis of the determinations made by Plateau CRM.

The area of potential effect (APE) for cultural resources is the geographic area or areas within which an undertaking (project, activity, program or practice) may cause changes in the character, visual setting, or use of any historic properties present. The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking. For this Proposed Action, USACE determined that the APE included approximately 12.8 acres within the Yakima Delta HMU.

3.8.1.1 Archaeological and Cultural Resources

As appropriate, USACE consults with federally recognized Indian tribes on actions with the potential to significantly affect archaeological resources of interest or significance to Indian tribes.

USACE sent letters to the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce Tribe, and the Confederated Tribes of the Colville Reservation, and Wanapum Band, on September 30, 2024, describing the proposed undertaking, the potential effects to archaeological resources of potential interest, and requesting comments on the undertaking.

Plateau CRM conducted numerous subsurface shovel probes (SSPs) throughout the APE. SSPs were opportunistically placed throughout the area and spaced at 20 m. Due to the density of vegetation or standing water, access to certain areas for survey work was restricted. A second site visit occurred where an additional 2 SSPs were excavated. No Native American or historic-era cultural materials or features were observed during either of these pedestrian surveys or excavations. USACE, in concurrence with the determinations and survey work conducted by Plateau CRM, determined that the undertaking would result in no adverse effects to historic properties.

3.8.1.2 Traditional Cultural Properties

Traditional Cultural Properties (TCPs), which include Historic Properties of Religious and Cultural Significance to Indian Tribes, are areas tied to beliefs, customs, and practices of a living community. TCPs have been identified in the action area due to its historical, spiritual, and subsistence-related importance. This area served as a key site for fishing, hunting, and gathering, especially for salmon, which plays a central role in the tribes' cultural and spiritual practices. The delta's waterways, including the confluence of the Yakima and Columbia Rivers, have long been vital for sustaining tribal lifeways, reinforcing tribal identity, and enabling cultural continuity across generations.

3.8.1.3 Tribal Trust Resources

USACE consulted with federally recognized Tribes on actions with the potential to significantly affect protected tribal resources, reserved treaty rights, or tribal lands. The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have protected treaty resources in the Proposed Action Area.

Treaty resources include access to fisheries, water resources, wildlife, plants, and cultural sites. Fisheries includes access to culturally significant species such as salmon, steelhead, lamprey, and other native fish species. Water resources includes waters to support fish populations and other traditional uses. Wildlife includes species significant for hunting and use for cultural resources. Traditional plants used for food, medicines, and cultural practices. Cultural sites include culturally significant areas for religious practices, burial sites, and traditional fishing locations, which are vital for to the tribes spiritual and cultural heritage.

3.8.1.4 Historic Properties

The USACE has a responsibility to document and evaluate archaeological sites, historic building, structures, objects, and districts for listing on the NRHP. USACE archaeologists conducted a record search of Washington Department of Archaeological and Historical Preservation's (DAHP) online Washington Information System for Architectural and Archeological Records Data (WISAARD). Both the record search and the pedestrian survey failed to identify any archaeological or historic sites within this action's APE.

3.8.2 Environmental Consequences

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment that contribute to the importance of the resource, introducing visual, atmospheric, or audible elements that are out of character for the period the resource represents (thereby altering the setting), or neglecting the resource to the extent that it deteriorates or is destroyed. Indirect effects to historic properties are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable.

Significant impacts would occur if the integrity of a historic properties is diminished such that it would no longer be eligible for listing in the (NRHP); if archaeological or cultural resources are permanently altered or impacted to a meaningful extent; if historic viewsheds would be substantially altered; or if significant tribal resources (to include sacred sites) are permanently compromised.

3.8.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge with the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, there would be no direct impacts to treaty or cultural resources. However, implementation of the alternative could indirectly impact tribal treaty resources. The main resource of concern being the health and stability of salmonid populations. Salmon and steelhead are a vital resource for Native tribes in the Yakima River Delta area, serving as a cornerstone for subsistence, cultural practices, and spiritual beliefs. The annual salmon runs are deeply tied to the tribes' connection to the land and water, representing both a source of food and a symbol of their cultural identity, traditions, and environmental stewardship. Any decline in the health and stability of salmon populations would adversely impact tribal treaty resource availability. The intensity of impacts would be dependent on uncertain future impacts to fish populations which is tied to many external variables.

Overall, implementation of the alternative is not anticipated to have any direct or indirect impacts to the integrity of historic properties, nor any known archaeological or cultural

resources. Without action, conditions would be consistent with the baseline, however, future impacts to tribal treaty resources remain uncertain. Therefore, the implementation of the alternative would result in less than significant impacts to treaty and cultural resources.

3.8.2.2 Alternative 2: Amon Creek Re-channelization

Implementation of the alternative is not anticipated to directly result in impacts to treaty and cultural resources. Per the contractor prepared report, and the analysis conducted by USACE archaeologists, there were no archaeological or cultural resources observed during pedestrian surveys of the APE. However, the area was known to be historically utilized by Native tribes as well as post-settlement groups for agricultural practices. Therefore, the possibility of archaeological or cultural resources being discovered during construction cannot be entirely ruled out. Stipulations and conditions for archaeological monitoring would be implemented during construction and protocols for inadvertent discoveries would be abided by. Furthermore, USACE archaeologists determined the proposed action would not result in adverse effects to any historic properties.

Furthermore, the proposed action is anticipated to indirectly result in minor benefits to tribal treaty resources through the creation of cold-water refuge for ESA-listed salmonids. These benefits are expected to be long-term, through the permanent modifications to the physical environment. Any improvement in the stability and population health of these fish would result in beneficial impacts tribal treaty resources. There are no anticipated indirect impacts to archaeological or cultural resources, or historic properties.

Overall, implementation of the proposed action is expected to result in beneficial indirect effects to tribal treaty resources, and these impacts are expected to be relatively minor in intensity. Therefore, the proposed action would result in less than significant impacts to treaty and cultural resources.

3.9 Recreation

3.9.1 Affected Environment

This section describes the existing condition of recreational resources that may be affected by the alternatives under consideration.

The proposed action area is located entirely within the Yakima Delta Habitat Management Unit (HMU), which is land managed by USACE for the purpose of public recreation and natural resource management. The action area offers a wide range of recreational activities that allow visitors to experience the area’s natural beauty and wildlife. The primary activity within the action area includes traversing the numerous walking and hiking trails that wind through the unit’s grasslands, wetlands, and riparian areas. One of the most popular activities is birdwatching, as the wetlands and riparian zones attract a wide variety of bird species, including waterfowl, raptors, and migratory birds. The diverse avian life makes it a prime spot for bird enthusiasts and wildlife photographers. Visitors and bird watchers frequently view birds such as herons, eagles, osprey, and various songbirds in their natural habitat. In addition, the general area

encompassing the lower Yakima, especially at the confluence of the Yakima and Columbia Rivers, offers numerous fishing opportunities, with anglers often seeking out bass, catfish, and other fish species native to the region's waters. Furthermore, boating and kayaking are popular, as the calm, meandering rivers provide ideal conditions for paddling. These activities allow visitors to explore the area's waterways while taking in scenic river views.

Overall, the Yakima River Delta HMU provides a variety of low-impact recreational opportunities to the surrounding urban community. The HMU and the action area highlights the Yakima River Delta's natural beauty, making it an ideal destination for nature lovers, outdoor enthusiasts, and anyone looking to recreate in a tranquil, wildlife-rich environment.

3.9.2 Environmental Consequences

The environmental consequences analysis for recreation evaluates how the alternatives could affect visitation, recreational opportunities, and the value of the recreation experience in the Proposed Action Area.

Significant impacts would occur if the proposed relocation of the Amon Creek channel, and corresponding construction activities, would interfere with established recreational activities or opportunity.

3.9.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge with the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, there would be no anticipated impacts to the recreational activities or opportunities available within the Yakima Delta HMU. Therefore, implementation of the proposed alternative would result in less than significant impacts to recreation.

3.9.2.2 Alternative 2: Amon Creek Re-channelization

Implementation of the proposed action would directly have short-term, minor adverse impacts to recreation, with effects remaining less than significant. During periods of construction, temporary access restrictions may be implemented to ensure public safety and ensure construction activities are completed on schedule and without disturbance. Signage would be placed notifying the public of restricted access to the HMU. These effects would be temporary and persist for the duration of construction activities. During which time, recreators would be forced to source recreational opportunities elsewhere.

Proposed activities would also result in permanent modifications to the existing environment and may change the recreational experience for visitors. These modifications could potentially alter existing hiking trails and the visual experience through the removal of non-native vegetation and the establishment of wetlands and riparian plantings. During construction activities, and potentially shortly after

construction, the presence and viewability of wildlife would be impacted. It is anticipated these impacts would be temporary and wildlife would eventually return to the action area, attracted by the incorporated habitat enhancements.

Upon competition, the proposed action would indirectly result in enhancements to the recreational experience within the Yakima Delta HMU, which would have minor beneficial, long-term impacts to recreational experience. Nature viewing is one of the primary recreational purposes within the Yakima Delta HMU. The proposed action would result in the overall enhancement of riparian habitat through the removal of non-native vegetation and the planting of native vegetation. Furthermore, the additional length added to the new Amon Creek channel and the establishment of wetland benches would further attract various types of wildlife to the area. These indirect impacts would be long-term, and reasonably persist indefinitely into the future. Implementation of the proposed action would directly result in minor adverse impacts to recreation. These impacts would be short-term and temporary. Upon completion, the proposed action would indirectly have minor beneficial impacts, which would lasting. Overall, implementation of the proposed action would result in less than significant impacts to recreation.

3.10 Aesthetic/ Visual Resources

3.10.1 Affected Environment

Visual resources include landforms, vegetation, water, color, adjacent scenery, and human-made modifications and any other aesthetic and scenic aspects of the environment that are visible to the human eye. Evaluating the visual qualities of an area, or viewshed, is a process that acknowledges the value that an observer places on a specific feature varies depending on their perspective and judgment. A qualitative visual resource assessment was conducted to assess the baseline visual environment and determine whether alterations associated with the alternatives would alter the visual environment. Accordingly, this section evaluates changes to the viewshed from the considered alternatives based on changes in visual qualities such as color, vegetation, and landforms, and how these changes affect different viewer types.

Visual resources have a social setting, which includes public expectations, values, goals, awareness, and concern regarding visual quality. This social setting is addressed as “visual sensitivity,” the relative degree of public interest in visual resources and concern over adverse changes in the quality of that resource. As applied to visual impact analyses, sensitivity refers to public attitudes about specific views, or interrelated views, and is key to identifying critical public views, assessing how important a visual impact may be, and whether or not it represents a significant impact.

The area of effect, or viewshed, is a portion of the analysis area where an object or visual intrusion can be seen. It includes all surrounding points that are in the line of sight and excludes points beyond the horizon or obstructed by terrain or other existing features.

The action area is characterized by diverse natural landscapes, offering a rich visual experience. The Yakima and Columbia rivers themselves create expansive, tranquil water views, bordered by lush riparian vegetation, including cottonwoods and willows.

Wetlands within the unit add to the scenic diversity, featuring aquatic plants like cattails and bulrushes.

Open grasslands and patches of shrub-steppe habitat contrast with the riverine environment, showcasing sagebrush and native grasses, particularly vibrant in the spring. Wildlife, especially birds such as herons, eagles, and osprey, further enrich the aesthetic experience, with their presence adding dynamic movement to the landscape.

Throughout the year, the visual appeal of the area shifts with the seasons, from the green vibrancy of spring and summer to the golden hues of autumn and the quiet stillness of winter. Sweeping views extend to the distant Horse Heaven Hills, providing a sense of vastness and natural solitude in this ecologically rich and visually diverse habitat.

3.10.2 Environmental Consequences

The effects to visual resources are analyzed by systematically measuring the degree of change created by a proposed alternative. This is done by comparing the basic elements of line, form, color, and texture within the existing viewshed to those introduced by the alternative. Factors that need to be considered are distance, viewing times, relative size and scale, season of use and light conditions, recovery time, spatial relationships, as well as noise and motion.

Impacts to the viewer are determined by analytically measuring the sensitivity of differing viewer groups. Sensitivity attaches relative importance values to differing landscapes based on perceived user expectations and activities. Tribal members and recreationalists are among the most sensitive of all viewing groups. Additionally, viewers are divided into two types: static and non-static. Static viewers include residents, reservoir and action employees, recreation management agencies, tribal members, and recreation visitors to an area. Non-static viewers are mainly defined as people traveling through area or along access roads and may have limited views of the viewshed. The sensitivity of the different types of viewers varies based on their perceptions of the area and the importance they place on the landscape, or how they interpret visual quality. Casual observers are typically engaged in other activities so they may not notice landscape changes. Sensitive viewers actively view the landscape and have a deeper connection to the visual environment. Recreationalists and tribal members have the highest sensitivity level. Even small visual changes may affect the experience for tribal members engaging in cultural activities or practices.

Significant impacts would occur if there were a permanent adverse alteration of the existing viewshed.

3.10.2.1 Alternative 1: No Action Alternative

Under this alternative, USACE would not authorize the Benton Conservation District to create thermal refuge within the Yakima Delta HMU. The re-channelization of Amon Creek and associated action components would not take place. Without action, there are no direct or indirect impacts anticipated to baseline aesthetic/visual resources.

Implementation of this alternative would result in less than significant impacts to aesthetic/ visual resources.

3.10.2.2 Alternative 2: Amon Creek Re-channelization

Implementation of the proposed action would directly result in minor adverse impacts to aesthetic/visual resources. Due to the nature of the proposed action, permanent modifications to the physical environment are un-avoidable, and these modifications would impact the viewshed within the action area. Visual resources include landforms, vegetation, water, color, adjacent scenery, and human-made modifications and any other aesthetic and scenic aspects of the environment that are visible to the human eye.

Action activities impacting aesthetic/visual resources would include the removal of existing non-native vegetation, the re-channelization of Amon Creek, the filling in of the old Amon Creek channel, the placement of fill into the Yakima (to include the deflector structure and apex log jams), the re-sloping of the shoreline along the Yakima River. Furthermore, the incorporation of mitigative measures, such as the establishment of wetland benches and native vegetative plantings along the new Amon Creek channel, would further alter the aesthetic/visual characteristics of the action area.

These modifications would have short-term and long-term impacts to aesthetic/visual qualities, particularly through the changes in vegetation type and the relocation of surface water features. These two physical modifications would impact the aesthetic qualities of the landscape and may impact the visual experience for various viewing groups. Viewer groups are largely static and consist of primarily local recreators and potentially Tribal members. These are among the most sensitive types of viewer groups and would be most impacted to any changes in aesthetic/visual resources.

However, despite short-term adverse impacts, it is anticipated that the physical modifications to the action area would potentially have beneficial long-term minor impacts to aesthetic/visual resources through the enhancement of habitat and existing landscape features. Over time, native riparian plantings would replace the existing non-native vegetation communities. Compared to the existing channel, the new Amon Creek channel would provide additional length and natural sinuosity. The establishment of wetland benches would increase the footprint of the existing visual qualities of wetland features. Furthermore, the enhancement of habitat is anticipated to attract wildlife, their presence adding to the dynamic nature of the landscape.

Overall, the proposed action would directly have minor adverse impacts to aesthetic/visual resources. These impacts would result in both short-term and long-term effects due to construction activities and the permanent modifications to the landscape. Any direct adverse impacts are expected to affect static viewer groups the most, but these impacts are expected to lessen, and even improve over time. The incorporation of design features intended to enhance the natural qualities of the existing environment would indirectly result in minor beneficial impacts to aesthetic/visual resources. These impacts would be long-term, and last indefinitely into the foreseeable future. Therefore, implementation of the proposed action would result in less than significant impacts to aesthetic/visual resources.

3.11 Socioeconomics and Environmental Justice

3.11.1 Affected Environment

Socioeconomics

Socioeconomics discusses population demographics, employment characteristics, schools, housing occupancy status, economic activity, tax revenue and related data which would potentially be impacted by the action.

Population and Demographics

The proposed action is located within a metropolitan area, and completely within Benton County. The County has an estimated population of 210,025 residents. The nearest city is Kennewick, with an estimated population of 84,488 residents. The table below breaks down the demographic, education, and income data for Benton County, which is representative of Washington State and the National data statistics. The table below breaks down the population demographics of Benton County.

Table 3-4. Demographic, Education, and Income, Benton County WA (U.S. Census 2021)

Demographic	Benton County WA	Washington State	National
Persons under 18	26.3%	21.7%	22.2%
Persons Over 65	15.5%	16.2%	16.8%
Percent Minority	40.1%	36.2%	43.1%
High School Graduates	90.3%	91.9%	88.9%
Four-Year Degree or Higher	32.1%	37.3%	33.7%
Percent in Labor Force	61.7%	63.7%	63.1%
Median Household Income	$76,612	$82,400	$69,021

Minority Groups

While less racially diverse than other areas of the country, Benton County is home to people of a broad variety of races Most of the population in the county is white, while the second highest racial identity is Hispanic or Latino (Table 3-5).

Table 3-5 Racial Identification in Benton County Compared to Washington State

Race	Benton County	Washington State
White	89.5%	77.5%
Black or African American	1.8%	4.5%
American Indian and Alaskan Native	1.5%	2%
Asian	3.4%	10%
Native Hawaiian and Other Pacific Islander	0.3%	0.8%
Hispanic or Latino	24%	13.7%

Note that percentages do not add to 100, as categories are not mutually exclusive (U.S Census Bureau 2021 data).

Low-Income

The average poverty rate for Benton County is approximately 10.6%, which is higher than Washington's average of 9.9%.

Economic Activity

Economic activities are primarily related to agriculture, transportation, and tourism. Agricultural operations, including irrigated farming and orchards, are common in the surrounding areas, utilizing the water resources from the Yakima River. The nearby roadways and river access support transportation and warehousing activities, particularly for agricultural goods. Some small businesses, like local food processing or supply stores, may operate in this zone, serving the agricultural industry. Outdoor recreational activities, including fishing and birdwatching, attract visitors, contributing to tourism and hospitality services. The proximity to the Tri-Cities urban area also brings residential and light commercial development, particularly in the form of housing, small retail, and services.

Environmental Justice

A key mechanism for evaluating socioeconomic impacts is through the consideration of Environmental Justice (EJ), which analyzes potential disproportionately high and adverse impacts to low-income populations and minority populations when implementing a federal action. Although the Proposed Action would occur within an urbanized environment, the proposed activities would have little to no, direct or indirect, impacts on factors influencing socioeconomics such as increased un-employment, population totals, housing availability, or new development. However, this does not mean EJ communities would not be impacted through the implementation of the federal action.

Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued in 1994.1 According to the Council on Environmental Quality (CEQ) guidance for implementing E.O. 12898 under NEPA, “[a]gencies should consider the composition of the affected area, to determine whether minority populations, low-income populations, or Indian tribes are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or Indian tribes” (CEQ 1997). The CEQ regulations define “human health or environmental effects” to include economic, environmental, social, cultural, or health-related impacts whether direct, indirect or cumulative (40 C.F.R. § 1508.8 and CEQ 1997).

EO 14008 *Tackling the Climate Crisis at Home and Abroad* states that environmental and economic justice are key concerns for the federal government and its implementing agencies. It further directs agencies to develop programs to address disproportionately high and adverse impacts to disadvantaged communities. A key tool for achieving these goals is the Justice40 Initiative which established a goal that 40 percent of the overall benefits of federal investments flow to disadvantaged communities.

EPA defines environmental justice as, “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (EPA 2018) Environmental justice analyses identify and address, when appropriate, disproportionately high and adverse effects of Federal agency actions on minority populations, low-income populations, and tribes.

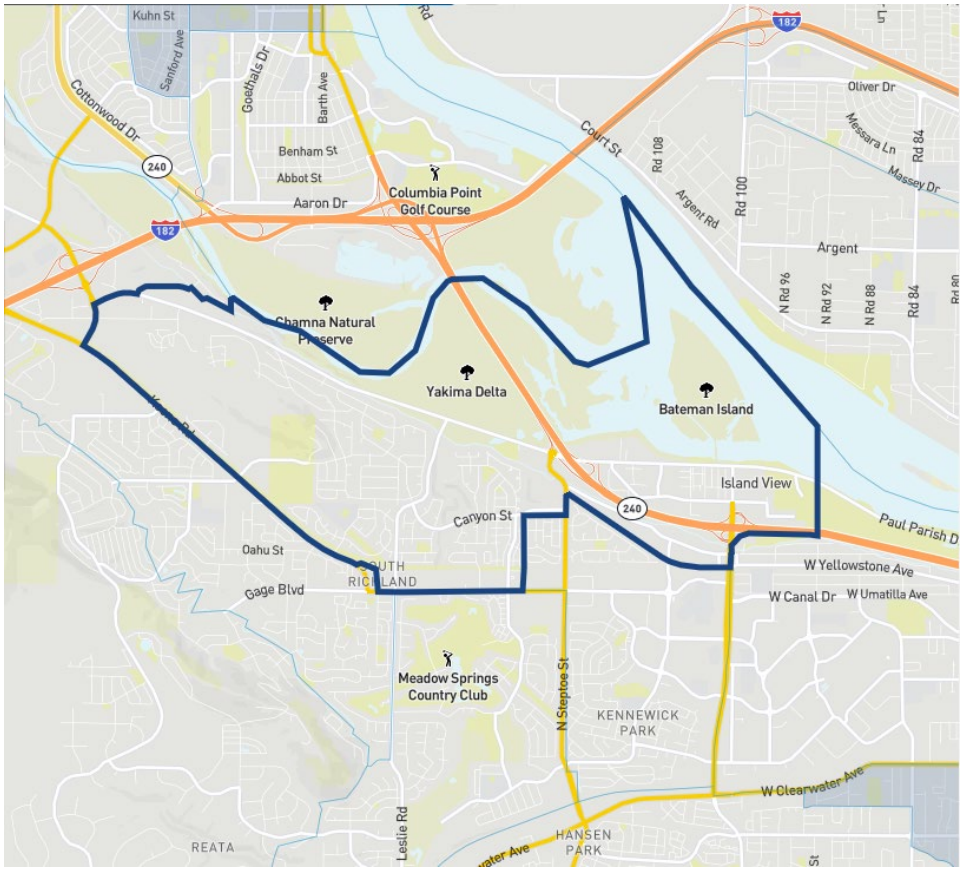

Figure 18. Tract Containing the Acton Area on the CEJST (CEQ 2024) (https://screeningtool.geoplatform.gov/en/#3.55/35.79/-102.71)

Consistent with E.O. 12898, this section identifies low-income and minority populations within the action area based on the most recent socioeconomic statistics currently available. The CEQ Climate and Economic Justice Screening Tool (CEJST) was used to search for disadvantaged communities that are marginalized, underserved, and overburdened by pollution on 06 September 2024. Census tracts are considered disadvantaged communities if they exceed both a burden threshold and an associated socioeconomic threshold. Tract # 53005010805 encompasses the action area entirely and is not identified as being considered disadvantaged. The nearest disadvantaged tracts (Tract #: 53005010400 and 53005010500) are located north of the action area, in the City of Richland (Figure 18). The proposed action is spatially distant from these tract and implementation of the action would likely have no effects.

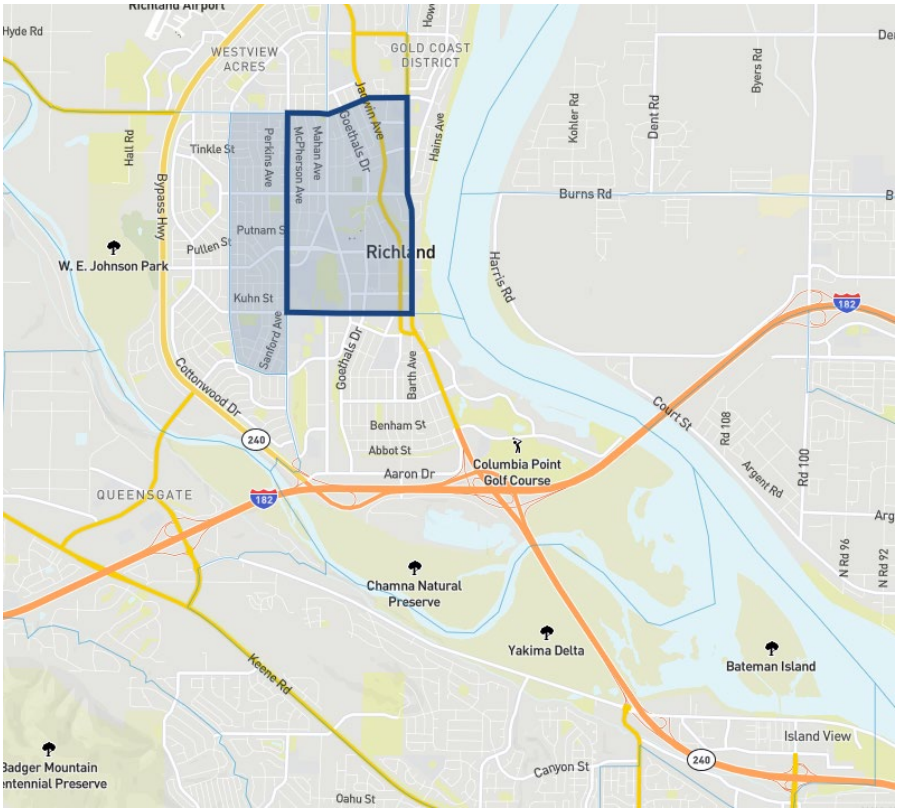

Figure 19. Disadvantaged Census Tracts North of the Action Area (https://screeningtool.geoplatform.gov/en/#12.22/46.2676/-119.27172)

3.11.1.1 Identification of Tribes

The CEQ has indicated that Federally Recognized Tribes, including Alaska Native Villages, are also considered disadvantaged communities. The Proposed Action is not located on a Federally Recognized Tribal Reservation, however the Proposed Action is located on the ceded lands of Confederated Tribes of the Umatilla Indian Reservation (CTUIR).

3.11.2 Environmental Consequences

This analysis focuses on the potential for impacts to socioeconomic factors or the disproportionate and adverse exposure of specific population groups to any potential adverse consequences.

Significant impacts would occur if there were substantial changes to the employment, population, or housing availability of nearby communities; if EJ communities (to include Tribes) are disproportionately adversely affected as determined by the CEQ guidance; or if products, substances, or activities could disproportionately affect children's health and safety.

3.11.2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, no actions would take place to create thermal refuge for salmonids within the Yakima River Delta. USACE would not issue the Benton Conservation District a construction license to relocate Amon Creek and implement the associated action components. Without action, there would be no direct impacts to disadvantaged or tribal communities. Although the action area is located on tribally ceded lands, implementation of the alternative is not anticipated to have any direct impacts to the access or availability of tribal treaty resources. This would include access to any culturally important resources or activities. Furthermore, there are no identified EJ communities within or surrounding the action area.

However, there is the potential to indirectly result in minor adverse long-term impacts to tribal communities. Salmon in the Yakima River are essential to the ecological health of the watershed, supporting biodiversity and nutrient cycling, while also embodying deep cultural importance for local tribes, symbolizing tradition, identity, and a spiritual connection to the land. Without action, the proposed creation of thermal refuge for salmonids within the Yakima River would not occur, and an opportunity to improve the conditions conducive to the overall health and integrity of these population groups within the Yakima River would remain unfulfilled. Trends in environmental conditions, and human factors, influencing water quality are likely to continue into the foreseeable future, further impacting salmon populations. The extent to which these impacts impact overall population health is yet to be determined, however, any decrease in populations of this culturally importance resource would result in adverse impacts to any tribal community within the action area, and the greater basin.

Therefore, implementation of the alternative would result in no direct impacts but could indirectly result in adverse impacts to tribal communities, with effects remaining less than significant.

3.11.2.1 Alternative 2: Amon Creek Re-channelization

Implementation of the alternative would directly result in negligible to minor impacts to socioeconomics and EJ communities. There are no anticipated adverse impacts to socioeconomic factors, however, implementation of the proposed action could result in minor beneficial effects to the local economic activity. During construction activities, action workers could potentially stimulate local businesses through the need for food, housing, and equipment/ material services. This would likely offset any lost economic activity attracted through recreational activities. Any benefits would be short term and persist for the duration of construction activities. There would be no anticipated indirect impacts to socioeconomics.

However, there is the potential for direct, minor, adverse impacts to EJ communities, particularly any tribal communities. Any restriction on access to the HMU would result in impacts to these communities by temporarily preventing access to tribal treaty resources. Although, it is anticipated that the proposed action would indirectly result in benefits to resources that are culturally significant to this community. For more detailed analysis, refer to Section 3.7 of this EA. Otherwise, there are no EJ communities within

relevant spatial distance of the action area. However, this does not mean there would be no impacts. Any individual from these communities who utilize this area for recreational activity would temporarily be restricted from access. However, implementation of the proposed action is not anticipated to result in any disproportionate environmental impacts directly or indirectly to these communities.

Therefore, implementation of this alternative would less than significant impacts to socioeconomics and EJ communities.

3.12 Greenhouse Gas (GHG) and Climate Change

3.12.1 Affected Environment

GHGs trap heat in the Earth's atmosphere, contributing to the warming of the planet and shifting climate patterns. Some GHGs occur naturally in the atmosphere, such as water vapor, carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), though human activities (such as the burning of fossil fuels for energy) increase their abundance. Other GHGs, such as fluorocarbons, are synthetic. GHGs are often measured in terms of their relative global warming potential (GWP). GWP communicates the relative contribution of a unit of a particular GHG to climate change. It is a measure of the radiative forcing of a GHG relative to CO_2 (Intergovernmental Panel on Climate Change 2014).

Multiplying an amount of a GHG by its GWP allows for emissions to be expressed in terms of carbon dioxide equivalent (CO_2e). This calculation allows for comparison in like terms of the relative effects of various GHG emissions. It also allows for emissions of multiple types of GHGs to be summed and expressed in total.

While global climate change has regional impacts in the Pacific Northwest, the objective of GHG emissions reduction targets is to broadly reduce global GHG concentrations. At a national level, the primary source of GHG emissions is fossil fuel combustion for electricity generation and transportation. However, due to the prevalence of hydropower in the Pacific Northwest, regional GHG emissions from electric power generation are relatively low compared to the rest of the nation.

GHGs are regulated under the Clean Air Act (CAA). New sources or modifications to existing sources that have the potential to increase GHG emissions by more than 100,000 tons CO_2e per year may be subject to New Source Review or Prevention of Significant Deterioration requirements, as well as Title V requirements for operational permits, provided they are also otherwise subject to these requirements. Additionally, the U.S. Environmental Protection Agency's (USEPA) Mandatory Greenhouse Gas Reporting Rule (40 CFR 98) requires sources in specific industrial sectors to report their GHG emissions, if they emit more than 25,000 metric tons CO_2e per year. The Proposed Action would not likely be subject to these permitting and reporting requirements.

Several Executive Order also require federal agencies to estimate and report their GHG emissions and set goals to reducing these emissions. These EOs include:

- EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*
- EO 14008, *Tackling the Climate Crisis at Home and Abroad*
- EO 14030, *Climate-Related Financial Risk*

Numerous studies document the recent trend of rising atmospheric concentrations of CO_2. The longest continuous record of atmospheric carbon dioxide monitoring extends back to 1958 (Keeling 1960; Scripps 2020). These data show that atmospheric CO_2 levels have risen an average of 1.5 parts per million (ppm) per year over the last 60 years, with the growth rate accelerating from around 1 ppm per year in the 1960s to 2 ppm per year in the 2000s (NOAA 2020). The global atmospheric CO_2 concentration has now passed 400 ppm, a level that last occurred about 3 million years ago when both global average temperature and sea level were significantly higher than today (USGCRP 2017). Rising atmospheric concentrations of CO_2 and other GHGs have been identified as the primary driver behind significant changes to global climate patterns. Observed changes to global climate include rising average temperatures, shrinking glaciers and sea ice, rising sea levels, increased drought and wildfires, increased flooding and other severe weather events, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges. International and national organizations independently confirm these findings and predict that these trends are likely to continue into the foreseeable future unless action is taken to reduce global GHG emissions (IPCC 2018; USGCRP 2017).

Emissions in the Pacific Northwest are generally low compared to other states and national averages (EIA 2018c). This is in large part because of the abundance of hydropower in the region, which does not create GHG emissions when generating power (EIA 2017b). As such, electric power generation is not the largest GHG-emitting sector in the region as it is nationally. Transportation accounts for the greatest share of GHG emissions in Idaho, Oregon, and Washington. Electric power generation is, however, associated with the greatest share of emissions in Montana where coal generation is relatively prominent (EIA 2018c).

Each Pacific Northwest state has developed at least one GHG emissions inventory, which are described below. The state inventories described below use consumption-based accounting for the electricity sector, meaning electricity use is calculated based on where the electricity is consumed, not produced.

Oregon and Washington inventories report GHG emissions, most recently in 2017 and 2013, respectively. Both inventories are created by state environmental agencies and evaluate multiple GHGs, which are then converted to CO2e for comparison by sector.

Oregon's total GHG emissions have declined from 70 million metric tons of CO2 e (MMT CO2 e) in 2000 to 65 MMT CO2 e in 2017 (Oregon Department of Environmental Quality [ODEQ] 2018a). In 2016, transportation (39 percent) and electricity use (26 percent) together account for the majority of emissions (ODEQ 2018a). Transportation emissions have stayed constant in Oregon at or around 24 MMT CO2 e since 2000, while electricity emissions fluctuated but have declined to about 16 MMT CO2 e from 23 MMT CO2 e since 2000.

In Washington, emissions were highest in 2000 at 110 MMT CO2 e but have remained between 90 and 100 MMT CO2 e for the last decade (Ecology 2016). In 2013, transportation (43 percent) and electricity use (19 percent) accounted for the majority of emissions (Ecology 2016). Emissions from other sectors (e.g., agriculture, industrial processes) have remained relatively constant in both Oregon and Washington (Ecology 2016; ODEQ 2018a).

Idaho and Montana have GHG emissions inventories for the years from 1990 to 2005 with projections until 2020. In 2005, Idaho's total emissions were measured at 37.2 MMT CO2 e; the largest sector was transportation at 10.2 MMT CO2 e, or 27 percent of emissions (IDEQ 2008). Electricity emissions totaled 6.4 MMT CO2 e with 5.5 CO2 e coming from imported electricity.

Within Benton County, there are a total of 5 facility level producers of GHG emissions that meet the EPA's Greenhouse Gas Reporting Program (GHGRP) reporting threshold of 25,000 metric tons of CO2e. Together, these facilities emit approximately 319,000 metric tons of CO2e annually. Roughly 50% of total U.S Emissions are reported by large emitting facilities subject to the GHGRP. The remaining percentage of contributing emissions would be consistent with an urbanized environment adjacent to large areas of land utilized for agricultural practices. Emissions sources are typically produced from transportation, use of industrial facilities, residential and commercial buildings, waste management, crop production, and commercial ranching practices.

Additionally, there are currently no Federal Greenhouse Gasses (GHG) emission thresholds. However, the White House's (2021) greenhouse gas emission goal is to reduce U.S. greenhouse gas emissions 50-52% below 2005 levels by 2030. The state of Washington enacted statutory targets in 2020 to reduce GHG emissions by 45% by 2030, 70% by 2040, and 95% by 2050, all compared to 1990 levels. The targets also aim for net-zero GHG emissions by 2050.

3.12.2 Environmental Consequences

This section evaluates how the considered alternatives may affect air quality and GHG emissions. This section also identifies expected effects from continued climate change to the considered alternatives impacts to other environmental resources.

Significant impacts would occur if proposed action activities produced quantities of GHG emissions that would prevent the federal GHG reduction goals from being met.

3.12.2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, no actions would take place to create thermal refuge for salmonids within the Yakima River Delta. USACE would not issue the Benton Conservation District a construction license to relocate Amon Creek and implement the associated action components. Without action, there would be no direct or indirect impacts to the quantity of GHG emissions consistent with baseline conditions for the action area. Without additional GHG emissions, there would be no need to quantify emissions or the social costs of those emissions. Furthermore, implementation of this alternative would have no impact on established federal or state GHG emissions target

goals, and no measurable impact to local, regional, or global climate change. Therefore, the proposed action would result in less than significant impacts to GHG and climate.

3.12.2.2 Alternative 2: Amon Creek Re-channelization

Implementation of the alternative would directly result in negligible releases of GHG emissions into the atmosphere. Emissions sources would be from the use of equipment during construction. An analysis of the proposed action's emissions is detailed within the *Greenhouse Gas Emissions Analysis: Amon Creek Re-location* (Appendix B). This analysis calculates GHG emissions (CO2, CH4, and N2O) through the equipment type, estimated hours of equipment operation (by action phase), average fuel consumption rates specific to equipment type, and appropriate emissions factors by fuel volume. Conservative estimates for these variables were utilized during emissions calculations, which means figures are likely over estimations. The proposed action would result in direct emissions, and no indirect emissions are anticipated as there would be no operation and maintenance activities required after construction.

Alternative 2 Amon Creek Relocation						
Pollutant Emissions (Clean Air Act)	**Grams**	**Pounds**	**Metric Tons**	**Grams**	**Pounds**	**Metric Tons**
Reactive Organic Gases aka Volatile Organic Compounds (ROG/VOC)	0	0	0	0	0	0
Carbon Monoxide (CO)	0	0	0	0	0	0
Sulfur Oxides (SOx)	0	0	0	0	0	0
Nitrous Oxides (NOx)	0	0	0	0	0	0
Particulate Matter - 2.5 micron ($PM_{2.5}$)	0	0	0	0	0	0
Particulate Matter - 10 micron (PM_{10})	0	0	0	0	0	0
Lead - (Pb)	0	0	0	0	0	0
Greenhouse Gas Emissions (NEPA)						
Carbon Dioxide (CO_2)	-112,091,385	-247,119	-112	-112,091,385	-247,119	-112
Methane (CH_4)	9,024,932	19,897	9	9,024,932	19,897	9
Nitrous Oxide (N_2O)	14,152	31	0	14,152	31	0
Carbon Dioxide Equivalents (CO_2e)	117,749,095	259,593	118	117,749,095	259,593	118

Figure 20. NEAT Tool Net GHG Emissions

	Social Costs of Greenhouse Gas Emissions in 2020 Dollars ($)				
Alternative 1 - No Action Alternative	**Construction Costs**	**O&M**	**Wetlands and Aquatic Habitat**	**Embodied Carbon**	**Total Social Costs by GHG**
Carbon Dioxide (CO_2)	$0	$0	$0	$0	$0
Methane (CH_4)	$0	$0	$0	N/A	$0
Nitrous Oxide (N_2O)	$0	$0	$0	N/A	$0
Total Social Costs By Activity	$0	$0	$0	$0	

Alternative 1 - No Action Alternative Gross Total	**$0**
Alternative 1 - No Action Alternative Net Total	**$0**

	Social Costs of Greenhouse Gas Emissions in 2020 Dollars ($)				
Alternative 2 Amon Creek Relocation	**Construction Costs**	**O&M**	**Wetlands and Aquatic Habitat**	**Embodied Carbon**	**Total Social Costs by GHG**
Carbon Dioxide (CO_2)	$18,710	$0	-$53,271	$0	-$34,561
Methane (CH_4)	$9	$0	$32,553	N/A	$32,562
Nitrous Oxide (N_2O)	$47	$0	$870	N/A	$916
Total Social Costs By Activity	$18,766	$0	-$19,848	$0	

Alternative 2 Amon Creek Relocation Gross Total	**-$1,083**
Alternative 2 Amon Creek Relocation Net Total	**-$1,083**

Figure 21. NEAT Tool Net Social Costs

Through this analysis, the gross emissions for the proposed action would be approximately 144 metric tons of CO2e. Using these gross emissions, the Net Emissions Analysis Tool (NEAT) was utilized to generate the net GHG emissions and

social cost for the proposed action. Net emissions and social costs factor in the No Action Alternative and any natural sequestration offsets from the creation of wetland habitat. The net emissions for the proposed action are estimated to be approximately 118 metric tons of CO2e and the net social costs are estimated to be approximately -$1,083 (Figures 20 and 21). According to the EPA's Greenhouse Gas Equivalencies Calculator, this quantity of CO2e would equate to approximately 28 gasoline-powered passenger vehicles driven for one year or 301,793 mils driven by an average gasoline-powered passenger vehicle (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results).

The intensity of direct impact and indirect impacts of the estimated net emissions and social cost were scaled based on comparison to local GHG emissions sources. Within Benton County, there are a total of 5 facility level producers of GHG emissions that meet the EPA's Greenhouse Gas Reporting Program (GHGRP) reporting threshold of 25,000 metric tons of CO2e. Together, these facilities emit approximately 319,000 metric tons of CO2e annually. Roughly 50% of total U.S Emissions are reported by large emitting facilities subject to the GHGRP.

The emissions produced by the proposed action would be negligible in comparison to the top facility level emitters within the County, and likely even more so inconsequential when compared to annual State emissions. Furthermore, these facility level emitters report on an annual basis, whereas the emissions from the proposed action would be short-term, temporary emissions during construction. There would be no emissions associated with operation and maintenance activities. Furthermore, the creation of wetland habitat would result in a net negative social cost, which means implementation of the proposed action would result in the beneficial reduction in social costs.

Therefore, it can reasonably be determined that implementation of the proposed action would not meaningfully impact any state or federal GHG emission reduction goals or measurably impact local, regional, or global climate change. Implementation of the alternative would directly result in production of GHG emissions, and these emissions would have short-term negligible adverse impacts to the climate. Overall, the emissions produced would result in less than significant impacts to climate change.

4 Cumulative Impacts

This section: (1) defines cumulative impacts, (2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts, (3) analyzes the incremental interaction the Proposed Action may have with other actions, and (4) evaluates cumulative impacts potentially resulting from these interactions.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of the NEPA, CEQ regulations, and guidance. Cumulative impacts are defined under 40 CFR § 1508.7 as "the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

To determine the scope of environmental impact analyses, federal agencies must consider cumulative actions, which when viewed with other Proposed Actions have cumulatively significant impacts and should therefore be discussed in the same impact analysis document.

In addition, CEQ and USEPA have published guidance addressing implementation of cumulative impact analyses—Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ 2005) and Consideration of Cumulative Impacts in EPA Review of NEPA Documents (USEPA 1999). CEQ guidance entitled Considering Cumulative Impacts Under NEPA (1997) states that cumulative impact analyses should:

"…determine the magnitude and significance of the environmental consequences of the Proposed Action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

Cumulative impacts are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

4.2 Scope of Cumulative Impacts Analysis

Guidance for setting appropriate boundaries for a cumulative effect analysis is available from CEQ (1997) and EPA (1999). Generally, the scope of cumulative effects analysis should be broader than the scope of analysis used in assessing direct or indirect effects. “Geographic boundaries and time periods used in cumulative impact analysis should be based on all resources of concern and all of the actions that may contribute, along with the action effects, to cumulative impacts” (EPA 1999). The analysis should delineate appropriate geographic areas including natural ecological boundaries, whenever possible, and should evaluate the time period of the action’s effects. The analysis should also include all potentially significant effects on the resources of concern (EPA 1999).

The term “cumulative impacts area” is used in this section to describe the geographic area analyzed for cumulative impacts for each resource. The geographic area of the cumulative effects analysis can be broader than the Proposed Action Area, which was the area defined for the assessment of direct and indirect environmental effects of the plan alternatives and is determined by the characteristics of each resource (CEQ 1997). The geographic scope of the cumulative effects analysis differs depending on the resource evaluated. Geographic extents would be more localized for resources such as geology and soils, terrestrial resources, treaty and cultural resources, recreation, aesthetic resources, and environmental justice. The scope of analysis for these resources would include the surrounding area, within the same county as the proposed action. However, for resources influenced by hydrological factors, the geographic extent would include the greater watershed, and more specifically, upstream of the proposed action area. The Yakima River basin, upstream of the action area, would be the geographic extent for analyzing cumulative impacts to resources such as wetlands, hydrology, water quality, and fish and aquatic resources. Only one resource would require cumulative effects analysis on a greater geographic extent. Due to the nature of GHG emissions, climate change would be considered on a regional basis, as GHG emissions, once released into the atmosphere, are free to travel great distances and influence climate on a greater scale.

A temporal or time boundary is the duration that impacts from the proposed action or other actions affecting the resources would last. The boundary can vary per resource. Predicting the effects of future actions can be difficult and highly speculative. The temporal scope extends from a relevant historical baseline, dependent on the specific resource, through the present and into the foreseeable future. For resources requiring historical context, such as treaty and cultural resources, the temporal extent would

extent further back in time, whereas the remainder of resources can reasonably be analyzed from the present onwards into the foreseeable future.

Discussed below are the past, present, and reasonably foreseeable future actions that were considered for the cumulative effects analysis, the effects of those actions on the resources assessed, and a summary of the cumulative effects of the alternatives. Table 4-1 summarizes the geographic and temporal boundaries used in the cumulative effects analysis.

Table 4-1. Geographic and Temporal Scope of the Cumulative Impacts Analysis.

Resource	Geographic Scope	Temporal Scope
Geology and Soils	The County Level: Benton	1980 to Foreseeable Future (~50 years).
Wetlands	The Yakima River Basin	1980 to Foreseeable Future (~50 years).
Hydrology	The Yakima River Basin	1980 to Foreseeable Future (~50 years).)
Water Quality	The Yakima River Basin	1980 to Foreseeable Future (~50 years).
Terrestrial Resources	The County Level: Benton	1980 to Foreseeable Future (~50 years).
Fish and Aquatic Resources	The Yakima River Basin	1980 to Foreseeable Future (~50 years).
Treaty and Cultural Resources	The County Level: Benton	Pre-development to Foreseeable Future (~50 years)
Recreation	The County Level: Benton	1980 to Foreseeable Future (~50 years).
Aesthetics/Visual Resources	The County Level: Benton	1980 to Foreseeable Future (~50 years).
Environmental Justice	The County Level: Benton	1980 to Foreseeable Future (~50 years).
Greenhouse Gas (GHG and Climate Change	The Pacific Northwest	1980 to Foreseeable Future (~50 years).

4.3 Past, Present, and Reasonably Foreseeable Actions

This section will focus on past, present, and reasonably foreseeable future actions at and near the Proposed Action locale. In determining which actions to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in Section 4.1, it was determined if a relationship exists such that the affected resource areas of the Proposed Action might interact with the affected resource area of a past, present, or reasonably foreseeable action. Actions included in this analysis are listed in Table 4-2 and briefly described in the following subsections.

Table 4-2. Past, Present, and Reasonably Foreseeable Actions Considered in the Cumulative Impacts Analysis.

Past, Present, or Future Action	Affected Resource(s)
Construction of McNary Lock and Dam (1954)	Hydrology, Water Quality, Fish and Aquatic Resources, Terrestrial Resources,

	Recreation, Aesthetic/Visual Resources, and Treaty and Cultural Resources.
Yakima Basin Integrated Plan (officially adopted 2012)	Hydrology, Water Quality, Fish and Aquatic Resources, and Climate Change.
Columbia Basin Irrigation Project (authorized 1935)	Hydrology, Water Quality, Wetlands, Terrestrial, Fish and Aquatic Resources, and Climate Change.
Yakima River Delta Ecosystem Restoration Project (USACE)	Hydrology, Water Quality, Fish and Aquatic Resources, Terrestrial Resources, Recreation, Aesthetic/Visual Resources, and Treaty and Cultural Resources.
Yakima Housing Action Plan (2024)	Water Quality, Fish and Aquatic Resources, Climate Change, Environmental Justice.

4.3.1 Past Actions

The Columbia Basin Irrigation Project (CBIP) was authorized in 1935 as part of the New Deal under President Franklin D. Roosevelt. The construction of the Grand Coulee Dam, which is the centerpiece of the project, began in 1933 and was completed in 1942. The irrigation component of the project was developed in phases, with the first water deliveries to farms beginning in the early 1950s.

This action significantly impacted the Yakima Delta's hydrology and ecology through various means. It has diverted large volumes of water from the Yakima River, altering flow patterns and degrading habitat quality for salmonids and other aquatic species. The project has also facilitated the drainage of wetlands for agriculture, leading to habitat loss crucial for wildlife. Increased agricultural practices have contributed to nutrient runoff, which adversely affects water quality and can result in harmful algal blooms. Additionally, the infrastructure changes associated with the CBIP have disrupted natural floodplain processes necessary for sediment transport and nutrient cycling. Historical land use changes driven by the CBIP have promoted urbanization, causing further habitat degradation in adjacent areas.

Furthermore, McNary Lock and Dam was constructed between 1947 and 1954, raising water levels in the Columbia River by creating Lake Wallula. The dam's regulated flow increased water surface elevations upstream, stabilizing the river and reducing its natural fluctuations. In the Yakima River, the backwater effect from the elevated Columbia River levels reduced flow velocity and natural gradients near the confluence, altering sediment transport and hydrology. This has impacted wetland formation and riparian habitats in the Yakima Delta area. McNary Dam also provides flood control, reducing extreme high-water events. However, these changes have modified habitats important for fish and wildlife in both rivers.

More recently, the Yakima River Basin Integrated Plan (YRBIP) was developed starting in 2009, and officially adopted in 2012 as a collaborative effort between federal, state, and local agencies, tribal governments, environmental groups, and other stakeholders. The YRBIP is a comprehensive water management strategy designed to address long-term water supply and environmental challenges in the Yakima River Basin. The plan was developed to balance competing demands for water from agricultural, municipal, and ecological stakeholders, while also addressing habitat restoration for fish populations, particularly salmon and steelhead. Key components include increasing

water storage capacity, improving irrigation efficiency, and restoring wetlands to enhance habitat for salmonids and other species.

The YRBIP emphasizes stakeholder collaboration, involving local communities, agricultural interests, and environmental organizations in decision-making processes. A significant aspect of the plan is its focus on ecosystem recovery, particularly for endangered species like the spring Chinook salmon and steelhead trout. It also outlines potential projects to enhance floodplain function and improve overall water quality in the basin. The plan seeks to balance the needs of water users while ensuring ecological health and resilience against climate change impacts.

4.3.2 Present and Reasonably Foreseeable Actions

The Yakima River Delta Restoration Project is a collaborative effort led by the U.S. Army Corps of Engineers (USACE) and the Washington Department of Fish and Wildlife (WDFW), focusing on ecological restoration in the Yakima Delta. The project aims to enhance habitat conditions for salmonids and other wildlife, which have been adversely affected by altered water flows and habitat degradation. Specific actions include the removal of the Bateman Island causeway to improve water flow and temperature, enhancing conditions for migrating fish. The project also includes invasive species management and the establishment of native plant communities to promote ecosystem health.

Community engagement is a critical component, with public feedback sought to inform the final project report. The overall goal is to restore ecological balance while supporting local communities and their interests.

Furthermore, the Yakima Housing Action Plan (HAP) is designed to address a significant housing shortage in Yakima, aiming to provide affordable housing options for residents across various income levels. The plan recognizes the impact of population growth, which has led to low vacancy rates and increased competition for housing, driving up costs. It emphasizes the importance of stable and affordable housing as a foundation for economic stability and personal development. Key strategies include increasing the variety of housing types and ensuring the maintenance of existing housing stock. The plan aims to assist over one-third of households in Yakima that are considered cost-burdened, meaning they spend more than 30% of their income on housing. By fostering the development of both market-rate and subsidized housing, the HAP seeks to create a more equitable housing landscape.

Increased housing could lead to greater community engagement and support for local environmental initiatives. Additionally, funding and partnerships may become more accessible, aiding habitat restoration efforts.

Conversely, rapid housing development could lead to competition for land and resources necessary for habitat restoration, potentially exacerbating environmental degradation if not properly managed. Thus, the HAP presents both opportunities and challenges that require careful integration with ecological goals.

4.4 Cumulative Impact Analysis

The cumulative impacts analysis requires consideration of past and present actions, as well as reasonably foreseeable future ones. It is apparent that for many of the environmental resources covered by this analysis, historic actions have already resulted in significant impacts. The level of impact to a resource from past and present actions has led to the present condition of each resource. However, to evaluate the cumulative impacts, it is also necessary to look forward in time. Future actions and ongoing present actions will continue to affect resources. However, future actions will take place in a dramatically different regulatory and political climate than most historic actions. Future actions are subject to detailed review at the federal, state, and/or local level. As appropriate, this review could include NEPA, ESA, CWA, NHPA, state wetlands and growth management regulations, and local protections for critical resources. Accordingly, unlike historic actions, future actions will be more apt to avoid and minimize detrimental effects to key resources.

Cumulative impacts analysis would not be required for resources that have been determined, through analysis of the proposed project, to result in no or negligible direct or indirect adverse impacts. These resources would include Treaty and Cultural Resources, Greenhouse Gas (GHG) and Climate Change, Socioeconomics and Environmental Justice,

4.4.1 Geology and Soils

The geographic scope should focus on the Yakima Delta area, including adjacent geological formations, soil types, and riverbank areas that could be affected by both past and present activities. This scope should encompass the entirety of the delta and surrounding landscapes, assessing both upland and lowland areas that interact with the riverine system.

The temporal scope for geology and soil cumulative analysis should include soil composition changes over the past several decades, particularly focusing on events that have altered land use and hydrology in the region.

4.4.1.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects on geology and soils would be minor and less than significant. Impacts from the implementation of the proposed action would be localized and would not transcend the geographic bounds of the action area. Considering past and present factors influencing the characteristics of these resources, one must acknowledge the influence of both natural and man-made factors. These would include the transportation and deposition of alluvial sediment from the Yakima River, creation of dams and water management practices for the Yakima and Columbia Rivers (largely governed by the Yakima River Basin Integrated Plan (YRBIP)), and the history of agricultural practices on the Delta. These past factors establish the baseline conditions for these resources. Foreseeable future actions would include the Yakima Delta Ecosystem Restoration project, which proposes to remove the Bateman Island

causeway. Removal of the causeway would alter the hydrology of the Delta, which may have negligible to minor influence on the soil characteristics. The overall geology of the area would remain unchanged.

Cumulatively, the consideration of past, present, and reasonably foreseeable actions would have negligible to minor impacts to the geological and soil resources within the geographic scope of analysis. Therefore, the action would not cumulatively result in significant impacts.

4.4.2 Noise

The geographic scope for noise impacts would encompass the entire Yakima River Delta, including the surrounding commercial and residential environment.

The temporal scope should include the baseline conditions within the past 10 years through reasonably foreseeable future actions out to 2040.

4.4.2.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in negligible impacts to noise impacts within the geographic scope. Implementation of the proposed action would result in short-term, and localized adverse noise impacts, that would persist for the duration of construction activities. Upon completion, there would be no anticipated long-term adverse noise related impacts within the geographic scope of analysis.

Considering past and present activities, the existing conditions for noise would be influenced by both the natural ambient noise of the Yakima Delta, and the surrounding residential and commercial environment. There are no foreseeable future actions that would cumulatively alter the ambient noise levels within the geographic scope of analysis to any significant level.

Overall, factoring in past, present, and reasonably foreseeable actions, the proposed action would result in less than significant impacts to noise within the geographic scope of analysis. The action would result in short-term, minor adverse noise impacts. These impacts would be localized to the action area and would not influence noise long-term to any meaningful extent.

4.4.3 Wetlands

The geographic scope for wetland resources encompasses the entire Yakima River Delta, including its associated wetlands, floodplains, and adjacent habitats that contribute to the region's ecological functions. This area is critical for understanding the interconnectivity of wetland ecosystems with other aquatic and terrestrial resources.

The temporal scope should include historical data from 1980 to the present, as this would provide insights into change in wetland area, function, and health, particularly in relation to land use and water management practices. Future projections extending through 2040 would consider anticipated changes due to climate variability, hydrology alterations, and urban development pressures.

4.4.3.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects to wetlands would be minor and overall beneficial. The alternative would result in direct impacts to existing wetlands, which would be mitigated through the compensatory creation of wetlands along the new Amon creek channel. The action is unique as it affords an opportunity to create additional wetland acreage, beyond that of the existing conditions. Overall, the proposed action is anticipated to result in net increase in total wetland acreage within the geographic scope of analysis. The benefits of which would likely be localized to the action area.

Considering past and present activities, the existing conditions for wetlands within the geographic scope are influenced by both natural and man-made factors. This would include the damming of the Yakima and Columbia River and water management practices (largely governed by the Yakima River Basin Integrated Plan), the flows from the Amon creek, and the history of agricultural practices on the Delta. These past and present factors establish the baseline conditions for wetland resources as they exist today. Foreseeable future actions would include the Yakima Delta Ecosystem Restoration project, which proposes to remove the Bateman Island causeway. Removal of the causeway would alter the hydrology of the Delta, which may have minor influences on the wetland resources. These impacts are not expected to result substantial impacts to existing wetlands.

Cumulatively, the impacts from past, present, and reasonably foreseeable actions would have negligible to minor impacts to the wetland resources within the geographic scope of analysis. The impacts from the proposed action would be overall beneficial to existing wetlands. Therefore, the action would not cumulatively result significant impacts.

4.4.4 Hydrology

The geographic scope should encompass the entire hydrological network associated with Amon Creek and the Yakima River. This includes not only the creek and river themselves, but also adjacent floodplains, wetlands, and tributaries that influence and are influenced by hydrological processes.

The temporal scope for this analysis includes historical data from 1980 to the present, allowing for a comprehensive understanding of changes in flow patterns, water quality, and sediment transport related to land use changes and water management practices. Current conditions from 2015 to the present would focus on recent actions influencing the hydrology of Amon Creek and the lower Yakima River. Future projections extending through 2040 would consider anticipated changes due to climate variability, urban development, and potential alterations to water management strategies.

4.4.4.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects on hydrology would be negligible and less than significant. The alternative would result in permanent modifications to the hydrological characteristics of Amon Creek, as it flows through the action area, and the area where the new Amon creek channel enters the lower Yakima River. The

geographic scope of analysis includes the greater hydrological network for these surface water features. This would include the Amon Creek channel, as it flows through urban areas, before reaching the action area, and the Yakima River upstream of the action area.

Considering past and present activities, the existing conditions for the hydrology of these surface water features are influenced by both natural and human activities. These features include the natural processes which influences the seasonality of discharge rates and timing, the periodic contributions and withdrawals of the Kennewick Irrigation District to the Amon Creek wasteway/ channel, and the water management practices on the Yakima River which seek to balance competing demands for water from agricultural, municipal, and ecological stakeholders. Foreseeable future actions would include the Yakima Delta Ecosystem Restoration project, which proposes to remove the Bateman Island causeway. Removal of the causeway would alter the hydrology of the Delta by removing restrictions on flow in that area. Overall, this would contribute beneficial impacts to the hydrology of the Yakima/Columbia River system. Implementation of the proposed action would influence hydrology only within the bounds of the action area.

Cumulatively, the impacts from past, present, and reasonably foreseeable actions would have negligible impacts to the hydrology of surface water features within the geographic scope of analysis. Therefore, the action would not cumulatively result in significant impacts.

4.4.5 Water Quality

The geographic scope should encompass the entire hydrological network associated with Amon Creek and the Yakima River. This includes actions/projects that would impact characteristics of water quality to include actions by local land use practices, agricultural runoff, and even restoration activities.

The temporal scope should include past actions, since 1980, within the past couple decades, which have affected water quality in the Yakima River system, alongside current conditions influenced by urban development, climate change, and ongoing restoration efforts. Additionally, it should include ongoing monitoring efforts and any future planned projects that could influence water quality over the next 10 to 20 years.

4.4.5.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects on water quality would result in minor beneficial impacts, with less than significant impacts. The alternative would result in permanent modifications to the hydrological characteristics of Amon Creek, as it flows through the action area, and the area where the new Amon creek channel enters the lower Yakima River. The intended purpose of the proposed action is to improve water quality conditions to support the migration and spawning success of ESA-listed salmonids.

The existing conditions for water quality is influenced heavily by past and present human activities to include the explosion of agricultural infrastructure and practices

since the mid 1930's, the history of agricultural practices within the Delta, runoff pollutants from urban areas, the adoption of the Yakima River Basin Integrated Plan (YRBIP), and changes in climate. Foreseeable future actions would include the Yakima Delta Ecosystem Restoration project, which proposes to remove the Bateman Island causeway. Removal of the causeway would alter the hydrology of the Delta by removing restrictions on flow in that area. In addition, the proposed urbanization of the Yakima is put forwards by the Yakima Housing Action Plan (HAP) could have minimal impacts to water quality upstream of the action area through increased urbanization and potential for pollutant runoff. However, the proposed action would have minor beneficial impacts, but these impacts would be largely localized to the action area. The intended purpose of the proposed action is to improve water quality conditions to support the migration and spawning success of ESA-listed salmonids.

Cumulatively, the implementation of the proposed action would have negligible impacts to water quality within the geographic scope of analysis, with minor beneficial impacts localized to the action area. When factoring in past, present, and reasonably foreseeable actions, the proposed action would have minor beneficial impacts to water quality. Therefore, implementation of the proposed action result in less than significant impacts.

4.4.6 Terrestrial Resources

The geographic scope should encompass the entire Yakima River Delta region, including wetland areas, riparian zones, and surrounding upland habitats.

The temporal scope for the cumulative analysis includes historical data from 1980 to the present, capturing long-term changes in vegetation and wildlife populations due to land use alterations and restoration efforts. Current conditions from 2015 to the present focus on ongoing monitoring and assessments that reflect the current ecosystem state. Future projections through 2040 would consider potential impacts from climate change, urbanization, and planned habitat restoration initiatives.

4.4.6.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in minor beneficial impacts terrestrial resources. Implementation of the proposed action would result in enhancements to the terrestrial environment within the action area through the introduction of additional wetland habitat, increased length and sinuosity of the new Amon Creek channel, and native riparian vegetation plantings. These enhancements represent an improvement over the baseline terrestrial habitat conditions, which are dominated by non-native plant species.

Considering past and present activities, the existing conditions for terrestrial resources are influenced by natural and human activities to include past agricultural activities within the Delta, the introduction of non-native species such as Russian olive, damming of the Yakima River system and water management practices. These actions shape the existing conditions for terrestrial resources. Aside from the proposed action, there are

no foreseeable future actions that would impact terrestrial resources within the geographic scope of this cumulative effects analysis. It is anticipated the proposed action would result in enhancements to the terrestrial environment that would be beneficial to terrestrial wildlife and native vegetation.

Overall, factoring in past, present, and reasonably foreseeable actions, the proposed action would result in enhancements to the terrestrial environment that would cumulatively have minor beneficial impacts on terrestrial resources. Therefore, implementation of the proposed action would result in less than significant impacts.

4.4.7 Fish and Aquatic Resources

The geographic scope for the cumulative analysis of fish and aquatic resources includes the Yakima River Basin, its tributaries, and adjacent aquatic ecosystems, such as wetlands and lakes that support fish and aquatic plants. This area is critical for assessing the habitat and water quality conditions that influence fish populations and aquatic vegetation.

The temporal scope encompasses several key periods: historical data from 1980 to the present would provide insights into changes in fish populations and aquatic habitats over time, particularly in relation to water quality and land use practices. Current conditions from 2015 to the present would focus on recent monitoring efforts and studies that reflect the existing status of fish and aquatic resources. Future projections extending through 2040 will consider anticipated impacts from climate change and potential alterations to habitat due to urban development and water management practices.

4.4.7.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in moderate beneficial impacts to fish and aquatic resources. Implementation of the proposed action would result in permanent enhancements to water quality, primarily through water temperature regulation, which indirectly benefits ESA-listed salmonids. This is the overall intended purpose of the proposed action, to make modifications to aquatic environment that would support the overall migration and spawning success of salmonids within the Yakima River basin.

Past and present actions to consider include the explosion of agricultural infrastructure and practices since the mid 1930’s, the history of agricultural practices and construction within the Delta, runoff pollutants from urban areas, damming of the Yakima River and Columbia River, water management practices, the adoption of the Yakima River Basin Integrated Plan (YRBIP), and impacts from climate change. These actions have contributed to the existing conditions and migration barriers experienced by salmonids. Foreseeable future actions would include the Yakima Delta Ecosystem Restoration project, which proposes to remove the Bateman Island causeway. Removal of the causeway would alter the hydrology of the Delta by removing restrictions on flow in that area. This would have beneficial impacts to salmonids through increasing flow and improving thermal regulation within the Delta. Furthermore, it is anticipated water depths

would decrease with the increased flow, which is also conducive to optimal thermal ranges for these species. In addition, the proposed urbanization of the Yakima is put forwards by the Yakima Housing Action Plan (HAP) could have minimal impacts to fish and aquatic resources through increased urbanization and the potential for pollutant runoff into waterways connected to the Yakima River. Overall, this would represent minimal impacts to fish and aquatic resources.

Overall, the proposed action would result in minor beneficial impacts fish and aquatic resources through improvements to water quality. These improvements would largely be localized and would not extend far beyond the geographic extent of the action area. When considered within the context of reasonably foreseeable actions, such as the Yakima Delta Ecosystem Restoration Project, it is expected there would be moderate beneficial cumulative impacts to fish and aquatic resources. Therefore, implementation of the proposed action would result in less than significant impacts.

4.4.8 Treaty and Cultural Resources

The geographic scope for the cumulative analysis of treaty and cultural resources should encompass the lower Yakima River Delta, including areas of traditional use by Indigenous tribes, historical sites, and culturally significant landscapes. It should also consider the broader Yakima Basin and the surrounding Tri-Cities region, as these areas contain treaty-reserved rights and cultural resources vital to the tribes, including fishing, hunting, and gathering areas. This scope should account for the historical and ongoing impacts on tribal lands, cultural practices, and treaty rights, influenced by land use changes and resource management within the region.

The temporal scope for the cumulative analysis of treaty and cultural resources should extend from pre-contact times, encompassing the historical use of the Yakima River Delta and surrounding areas by Indigenous tribes, through the periods of treaty signing and land settlement. It should also consider the long-term impacts of land use changes, infrastructure development, and natural resource management on cultural practices and treaty rights. Additionally, the scope should account for future trends, including ongoing resource management and potential impacts of future development, to assess the continued effects on treaty-reserved rights and cultural resources over time.

4.4.8.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in moderate beneficial impacts to treaty and cultural resources. Implementation of the proposed action would indirectly benefit treaty resources through enhancement of habitat intended to promote the improved migration and spawning success of ESA-listed salmonids. These fish represent both a source of food and a symbol of their cultural identity, traditions, and environmental stewardship.

Past and present actions to consider include the history of Tribal and pre-settlement use of the area, the history of agricultural practices and construction within the Delta and damming of the Yakima and Columbia Rivers. These actions/activities have contributed to the existing conditions for treaty and cultural resources. Foreseeable future actions

would include the Yakima Delta Ecosystem Restoration project, which proposes to remove the Bateman Island causeway. Removal of the causeway would impact cultural resources through possibly induce erosion through changes in hydrology. Erosion has the possibility to result in moderate adverse impacts through the exposure of cultural or otherwise archaeological resources. However, implementation of the proposed action would likely not exacerbate or otherwise contribute to the intensity of these impacts.

Overall, factoring in past, present, and reasonably foreseeable actions, the proposed action would result in less than significant impacts to treaty and cultural resources.

4.4.9 Recreation

The geographic scope for the cumulative analysis of recreation in the Yakima Delta Habitat Management Unit (HMU) project should include the entire Yakima River Delta, encompassing areas used for hiking, birdwatching, boating, fishing, and other recreational activities. It also extends to regional recreational sites along the lower Yakima River.

The temporal scope should start with historical data from 1980 to the present, focusing on how recreational use has evolved over time, especially with population growth and changing land use in the surrounding Tri-Cities area. Current conditions from 2015 to the present will assess the state of recreational infrastructure, public access, and the popularity of outdoor activities in the Delta. Future projections through 2040 will consider anticipated growth in recreational demand due to increased urbanization, changes in population, and potential shifts in the area's natural environment due to restoration or other management actions.

4.4.9.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in minor beneficial impacts to recreational experience within the Yakima Delta. Implementation of the proposed action is anticipated to enhance the habitat within the Yakima Delta HMU. These enhancements are likely to attract native wildlife as well as clear the area of non-native vegetation. This would result in improved hiking, birdwatching, and potentially fishing opportunity within the bounds of the action area. Implementation of the action would have relatively minor impact to the recreational experience within the geographic scope of analysis.

Past and present actions to consider would include the USACE gained responsibility for the Yakima Delta Habitat Management Unit (HMU), the action area, in the 1980’s as part of the larger Columbia River Basin ecosystem management and mitigation efforts following the construction of McNary Dam. The HMU has been managed under the wildlife management land classification, to support and enhance wildlife habitat and recreational opportunity. Furthermore, other past actions would include past agricultural activities within the Yakima River Delta. These actions resulted in the creation of the Bateman Island causeway, which permanently altered the hydrology of the Delta. Over time the area has transitioned from an agricultural focus to more of a recreational focus, through recreational access to Bateman Island. This area is a source recreational

opportunity through primarily hiking and bird watching. Foreseeable future actions impacting recreation in this area include the Yakima Delta Ecosystem Restoration project, which proposes to remove the Bateman Island causeway. Removal of the causeway would eliminate pedestrian access to the island, although public permission to utilize the island would remain permissible. This action would likely have more broad ranging recreational implications that the implementation of the proposed action.

Overall, factoring in past, present, and reasonably foreseeable actions, the proposed action would result in less than significant impacts to recreation within the geographic scope of analysis. The action would result in minor beneficial impacts to recreation through the enhancement of habitat and removal of non-native vegetation. These benefits would likely be localized to the action area.

4.4.10 Aesthetic/Visual Resources

For the cumulative analysis of aesthetic and visual resources in the Yakima Delta Habitat Management Unit (HMU) project, the geographic scope should encompass the entire Yakima River Delta and its surrounding landscapes. This area includes key viewpoints from public spaces such as parks, trails, and water bodies, as well as views from nearby urban and rural areas that experience the visual presence of the delta's natural and human-made features.

The temporal scope begins with historical data from 1980 to the present, providing insight into how visual landscapes have changed due to urbanization, industrial development, and conservation efforts. Current conditions from 2015 to the present focus on recent visual assessments and any modifications to landscape aesthetics caused by recent developments or restoration projects. Future projections through 2040 consider potential impacts from anticipated growth, changes in land use, and environmental restoration projects that could alter the visual character of the region.

4.4.10.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in minor impacts to aesthetic/visual experience within the Yakima Delta. Implementation of the proposed action would result in permanent modifications to the physical landscape within the action area through the re-location of Amon creek and other action components. These permanent impacts would impact the visual experience of the land scape. However, overall, the character of the area would remain consistent with baseline conditions, and perhaps be improved through the enhancement of natural habitat and the removal of non-native invasive vegetation. However, implementation of the action would have relatively negligible impact to the aesthetic/visual resources within the geographic scope of analysis.

Considering past and present activities, the existing conditions for terrestrial resources are influenced by natural and human activities to include past agricultural activities within the Delta, the introduction of non-native species such as Russian olive, damming of the Yakima/Columbia River systems and water management practices. These actions shape the existing conditions for aesthetic/visual resources. Aside from the

proposed removal of the Bateman Island causeway, there are no foreseeable future actions that would impact the visual characteristics of landscape features within the Yakima River Delta.

Overall, factoring in past, present, and reasonably foreseeable actions, the proposed action would result in less than significant impacts to aesthetic/visual resources within the geographic scope of analysis. The action would result in minor adverse impacts to recreation, within the geographic bounds of the action area. This would have negligible impacts to the overall visual character of the Yakima River Delta.

4.4.11 Socioeconomics and Environmental Justice

The geographic scope for cumulative impacts to environmental justice communities in the context of the Yakima Delta Habitat Management Unit (HMU) project should encompass the lower Yakima River Basin, including the communities around the Tri-Cities area.

The temporal scope begins with historical data from the 1980s, when environmental justice issues became more recognized in policy discussions, to the present. This period allows for the identification of long-term trends in how these communities have been impacted by environmental degradation, land use, and resource management decisions. Current conditions, particularly from 2015 to the present, focus on recent socioeconomic and environmental data that reveal disparities in exposure to environmental risks. Future projections through 2040 should consider how climate change, land use changes, and economic development might continue to affect these communities, both in terms of environmental health and access to natural resources.

4.4.11.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in negligible anticipated impacts to socioeconomics and environmental justice communities within the geographic scope of analysis. The proposed action would not influence socioeconomic factors and is spatially distant from known areas of disadvantaged communities. However, the action could impact tribal communities by influencing tribal treaty resources within the action area. It is anticipated the proposed action would benefit these resources, and in turn, benefit tribal communities. Overall, these benefits would be localized to the action area and have negligible impact to socioeconomics or EJ communities within the geographic scope of analysis.

Past and present actions to consider would include the explosion of agricultural infrastructure and practices since the mid 1930’s and the history of agricultural practices and construction within the Delta. Agriculture has been a source of economic opportunity, particularly for seasonal and low-wage jobs for minority and immigrant populations. Often these communities experience negative externalities associated with agricultural activities such as exposure to pesticide runoff, poor water quality, and air quality impacts. The construction of the dams and water management practices permanently altered the ecosystem and displaced some economic and cultural activities for Native American tribes through the loss of fishing grounds and the decline in salmon

populations. As future water management and restoration projects (such as the Yakima Basin Integrated Plan) are implemented, it is crucial to ensure that water resources are allocated equitably. Communities that have historically been marginalized, such as farmworkers in agricultural areas and members of the Yakama Nation, should benefit from improved water quality and habitat restoration efforts, rather than continuing to bear the brunt of water scarcity or pollution.

Overall, factoring in past, present, and reasonably foreseeable actions, the proposed action would result in less than significant impacts to socioeconomics and EJ communities within the geographic scope of analysis. The action would result in minor beneficial impacts to tribal communities through benefits to treaty resources. These benefits would be localized to the action area and would result in negligible impacts to overall socioeconomics and EJ communities within the geographic scope of analysis.

4.4.12 Greenhouse Gas and Climate Change

The geographic scope for cumulative impacts related to climate change in the context of the Yakima Delta Habitat Management Unit (HMU) project is broad, extending beyond the immediate action area. While local emissions and land-use changes can have direct impacts, greenhouse gas emissions contribute to global atmospheric changes, meaning their effects transcend regional boundaries and must be analyzed in both local and regional contexts.

The temporal scope should start with historical data from the 1980s, when the significance of climate change became more widely understood, to evaluate long-term emissions trends and their regional effects. Current conditions, particularly from 2015 onward, focus on recent climate data, emissions levels, and local climate adaptation measures. Future projections should extend through 2100, considering long-term climate models and potential cumulative impacts on temperature, precipitation patterns, and extreme weather events. This time frame allows for an analysis of both short- and long-term changes, and how they may affect regional hydrology, ecosystems, and human communities within the Yakima Delta.

4.4.12.1 Alternative 2: Re-channelization of Amon Creek

Under this alternative, the cumulative effects would result in negligible anticipated impacts to greenhouse gases and climate change. The proposed action would result in the production of greenhouse gas emissions, and these emissions are not anticipated to result in any meaningful or measurable impact to local, regional, or global climate. Emissions would not prevent the State or Federal emissions reductions goals from being met.

Past and present actions to consider would include GHG contribution from agricultural expansion and practices within the area. Historically, agriculture in the lower Yakima River Basin has been a significant source of greenhouse gas emissions, primarily from methane (CH_4) emissions from livestock, nitrous oxide (N_2O) emissions from fertilized soils, and carbon dioxide (CO_2) emissions from the use of fossil fuels for machinery and irrigation pumping. Urban growth in the Tri-Cities area and surrounding regions has led

to an increase in GHG emissions due to transportation, energy consumption, and the development of infrastructure. While hydropower generation is a relatively low-carbon energy source compared to fossil fuels, the construction of dams (such as the Yakima Project) has had indirect GHG impacts by flooding carbon-rich ecosystems and altering riverine environments, potentially leading to methane emissions from submerged organic material. Foreseeable future actions include anticipated increases in urban growth and transportation infrastructure which would contribute to increases in GHG emissions. Future planned ecosystem restoration projects would help sequester carbon emissions through the creation of riparian and wetland areas. These actions also aim to increase biodiversity and improve water quality, contributing to a healthier ecosystem that can better absorb climate change impacts.

Overall, factoring in past, present, and reasonably foreseeable actions, the proposed action would result in less than significant impacts to greenhouse gas and climate change within the geographic scope of analysis. The action would result in negligible GHG emissions, while contributing to sequestration efforts through the creation of wetland and riparian environments. Overall, the proposed action would have negligible impacts to the climate change within geographic scope of analysis.

5 Preferred Alternative

USACE has selected Alternative 2, Re-channelization of Amon Creek, as the Preferred Alternative, subject to public review. Final identification of a Preferred Alternative will occur after the public review and comment period. This alternative best meets the purpose and need for the action.

The Preferred Alternative includes the re-location of Amon Creek, the deepening of the cold-water refuge where the new Amon Creek channel will enter the Yakima River, the in-water placement of deflector structure and apex log jams, and the enhancement of the terrestrial environment through wetland and riparian creation and native vegetation plantings.

The environmental impacts of the Preferred Alternative are summarized in Table 5-1.

Table 5-1. Summary of Impacts of the Preferred Alternative.

Resource	Less than significant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Geology and Soils	X	-	-
Noise	X		
Wetlands	X		
Hydrology	X		
Water Quality	X	-	-
Terrestrial Resources	X	-	-
Fish and Aquatic Resources		X	-
Treaty and Cultural Resources	X		
Recreation	X	-	-
Aesthetic/Visual Resources	X		
Socioeconomics and Environmental Justice	X		
Climate Change	X		
Cumulative Impacts		X	

6 Compliance with Applicable Treaties, Laws, and Executive Orders

6.1 Treaties

Treaties are legally binding contracts between sovereign nations that establish those nations' political and property relations. Treaties between Native American Tribes and the United States confirm each nation's rights and privileges. In most of these treaties, the Tribes ceded title to vast amounts of land to the United States but reserved certain lands (reservations) and rights for themselves and their future generations. It is important to be clear that "the rights of sovereign Indian Tribes pre-existed their treaties; they had not granted them by treaties or by the United States government. Rather, the treaties gave their rights legal recognition" (Hunn et al. 2015:58). Like other treaty obligations of the United States, Indian treaties are "the supreme law of the land," and they are the foundation upon which Federal Indian law and the Federal Indian trust relationship is based.

Treaties with area Tribes, including Treaties with the Nez Perce (Treaty of June 11, 1855, Treaty with the Nez Perces, 12 Stat. 957 (1859); Treaty of June 9, 1863, Treaty with the Nez Perces, 14 Stats.647 (1867)), the Confederated Tribes of the Umatilla Indian Reservation (Treaty of June 9, 1855 with the Walla Walla, Cayuse, etc, 12 Stat. 945 (1859)), and the Confederated Tribes and Bands of the Yakama Nation (Treaty of June 9, 1855, Treaty with the Yakama, 12 Stat. 951) established reservations and explicitly reserved unto the Tribes certain rights, including the exclusive right to take fish in streams running through or bordering reservations, the right to take fish at all usual and accustomed places in common with citizens of the territory, and the right of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed lands. These reserved rights include the right to fish within identified geographical areas.

The action area is within the ceded lands of the Confederated Tribes of the Umatilla Indian Reservation. USACE would continue to honor treaty obligations. The USACE consulted with the tribes having treaties or resources within the area of potential effect. This includes the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce Tribe, the Confederated Tribes of the Colville Reservation, and the Wanapum Band.

No comments were received. The proposed action is not anticipated to adversely affect treaty resources, rights, or obligations.

6.2 Federal Laws, Regulations, and Executive Orders

6.2.1 National Environmental Policy Act

The National Environmental Policy Act requires federal agencies to use a systematic interdisciplinary approach to evaluate the environmental effects of a proposed federal action prior to implementing that action. This is usually accomplished through preparation of a statement, either an Environmental Impact Statement (EIS) if the action is a major federal action significantly affecting the quality of the human environment, or

an Environmental Assessment (EA) if the federal agency has not yet determined the significance of the effects.

This EA was prepared pursuant to regulations implementing NEPA, (42 United States Code [U.S.C.] 4321 et seq. and 87 FR 23453), and USACE supplemental NEPA regulations at 33 CFR Part 230, and identifies and considers the potential environmental effects of the Benton Conservation District's proposed Amon Creek relocation action. The draft Finding of No Significant Impact (FONSI), this EA and all supporting appendices will be made available to other federal and state agencies, Tribes, and the public for a 30-day review and comment period from January 13 to February 10, 2025. While preparing the EA and in the public review period, the USACE did not identify any impacts that would significantly affect the quality of the human environment. Therefore, compliance with NEPA would be achieved upon the signing of the FONSI. If significant impacts had been identified during public review, an EIS would be required. Completion of an EIS and the signing of a Record of Decision would then achieve compliance with NEPA.

6.2.2 Clean Water Act

The Federal Water Pollution Control Act (33 U.S.C. §1251 et seq., as amended) is more commonly referred to as the Clean Water Act (CWA). This act is the primary legislative vehicle for federal water pollution control programs and the basic structure for regulating discharges of pollutants into waters of the United States (WOTUS). The act was established to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA sets goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment.

Section 404 of the CWA established a program to regulate the discharge of dredged or fill material into WOTUS and Section 401 requires that any federal activity that may result in a discharge to WOTUS must first receive a water quality certification from the state in which the activity would occur.

The proposed Amon Creek re-location action would result in the removal of shoreline material and dredging of the Yakima River to create a deeper cold-water pool. These actions would not be authorized by the USACE's issuance of a construction permit, as the shoreline and mainstem Yakima River would be outside of USACE owned lands. However, this dredged material would be re-purposed and utilized on upland areas, on USACE property, to fill in the old Amon Creek channel and create wetland benches adjacent to the new Amon Creek channel. Because the BCD would not be disposing of any dredged material in waters of the U.S. in Washington, CWA Section 401 water quality certification (WQC) from the Washington Department of Ecology (Ecology) is not required. However, the placement of coarse rock (deflector structure) and apex log jams within the mainstem Yakima River would constitute the placement of fill material within WOTUS, which would trigger the CWA Section 404 compliance.

The Benton Conservation District would be required to obtain a Section 404 permit from USACE Seattle District, Regulatory Branch before implementation of the proposed action. On December 11, 2022, the Washington Ecology determined that Section 401 Water Quality Certification (WQC) was not required for the proposed action because the

action meets the programmatic decision for Nationwide Permit (NWP) 27. This NWP 27 is specifically designed for the “Aquatic Habitat Restoration, Establishment, and enhancement Activities” and allows actions that restore or enhance aquatic habitats in a manner that does not significantly impact water quality or the surrounding ecosystem. Therefore, 401 Certification is not required, but a 404 permit from Seattle Regulatory to the BCD would be required before implementation of the proposed action.

Section 402 of the CWA establishes the framework for the National Pollutant Discharge Elimination System (NPDES). This section regulates the discharge of pollutants into WOTUS. The section is triggered if an action results in greater than one acre of ground disturbance and has the potential for stormwater runoff into WOTUS, or an action results in the discharge (point or non-point source) into WOTUS.

The proposed action would require Section 402 compliance. The proposed action would result in greater than one acre of ground disturbance and the potential for stormwater discharge. The Benton Conservation District would be required to obtain a Construction General Permit (CGP) from Ecology. This would require the creation of a Storm Water Pollution Prevention Plan (SWPPP) to mitigate potential pollutant runoff, and the submission of a Notice of Intent (NOI) to Ecology to start the application process. Ecology would review the application, make modifications as needed, and issue the NPDES CGP prior to construction. Furthermore, the relocation of a natural channel, even if it does not introduce any new pollutants beyond what is already released by the existing channel, would still likely require a NPDES permit from Ecology because it would still constitute a point source discharge of pollutants into WOTUS. The new channel would be considered a point source because it is a discernable, confined, and discrete conveyance. Therefore, if this is required by Ecology, the Benton Conservation District would be required to obtain both a NPDES permit and CGP from Ecology prior to construction of the proposed action.

6.2.3 Rivers and Harbors Act

The Rivers and Harbors Act (RHA) refers to a conglomeration of many pieces of legislation and appropriations passed by Congress since the first such legislation in 1824. The Rivers and Harbors Act of 1899 was the first federal water pollution act in the U.S. It focuses on protecting navigation, protecting waters from pollution, and acted as a precursor to the CWA. Section 9 regulates the construction of any bridge, causeway, dam or dike across navigable WOTUS without consent from Congress or the approval of plans by the Secretary of the Army. Section 10 regulates the construction of structures, excavation/deposition of materials, and other work affecting course, location, condition, or capacity of a waterway. Section 13 prohibits the discharge of refuse into navigable WOTUS. The permitting authority has been effectively subsumed under EPA’s NPDES permitting authority under Section 402 of the CWA. Section 14 mandates obtaining USACE permission for activities impairing the usefulness of a USACE civil works project. Section 408 pertains to the authority of USACE to grant permission for modifications to existing federally constructed projects.

The proposed action may trigger compliance for Section 10 of the RHA, possibly because of the presence of structures or equipment in navigable waters (the Yakima

River), but BCD will need to identify the Section 10 requirements (if any) applicable to its proposed action. Compliance with Section 10 of the RHA is often handled through a joint permitting process for with USACE Regulatory Office in Seattle, WA and WA Dept. of Ecology. Typically, the issuance of a Section 10 permit requires the compliance with NEPA and associated federal and state environmental laws and regulations. The Benton Conservation District would be required to obtain a Section 10 permit from USACE Seattle District Regulatory prior to construction of the proposed action.

6.2.4 Endangered Species Act

The ESA established a national program for the conservation of threatened and endangered fish, wildlife, and plants and the habitat upon which they depend. Section 7(a)(2) of the ESA requires federal agencies to consult with the USFWS and the NMFS, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. Section 7(c) of the ESA and the federal regulations on endangered species coordination (50 CFR §402.12) require that federal agencies prepare biological assessments of the potential effects of major actions on listed species and critical habitat.

The applicant produced a *Biological Evaluation (BE) for Informal ESA Consultation* (Corps Reference number: NWS-2022-885) for the proposed action (Appendix A). The BE analyzed the anticipated impacts to USFWS ESA listed species within the area of potential affect (APE). The BE determined there would be No Effect to Gray Wolf (*Canis lupus*) and Yellow-billed Cuckoo (*Coccyzus americanus*) as these species would not be present within the APE. However, the APE is considered designated critical habitat for bull trout (*Salvelinus confluentus*). It was determined that this species would not be within the APE nor would the proposed action result in an adverse modification to bull trout critical habitat. Therefore, the proposed action would result in a No Effect determination for bull trout. For more details, refer to the BE (Appendix A).

USACE pulled an updated Information for Planning and Consultation report for the proposed action (Appendix A) (on 06 September 2024) and confirmed that there were no changes to the potential presence of ESA-listed species. The BE was reviewed by USACE biologists, and the information contained therein was determined to be accurate and consistent with existing knowledge of these species. USACE intends to accept the BE and the determinations contained therein. Therefore, there is no need for ESA consultation for USFWS species.

Furthermore, the Benton Conservation District intends to use the Limit 8 programmatic agreement to cover the ESA compliance for NMFS species within the APE. The Limit 8 programmatic agreement refers to a framework developed under the Endangered Species Act (ESA) to streamline consultations and compliance for specific activities that may affect listed species or their critical habitats. Specifically, the Limit 8 exemption is tied to Section 4(d) of the ESA, which allows the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) to establish regulations limiting the application of the ESA’s "take" prohibitions for threatened species when such limits contribute to their conservation. Aquatic ESA-listed species potentially present within the APE include mid-Columbia River steelhead (*Oncorhynchus mykiss*).

The Limit 8 coverage for the action, consistent with the State of Washington's Habitat Restoration Program (HRP), would extend to habitat protection and restoration projects funded by the Salmon Recovery Funding Board (SRFB) that meet the following criteria:

- Are part of a habitat portion of a salmon recovery plan approved by a Regional Salmon Recovery Organization and the State of Washington and published in the Federal Register.
- Are part of an adopted Implementation Schedule developed by a Regional Organization to implement the habitat portion of a Salmon Recovery Plan.
- Are funded in part or wholly with Washington State and/or Pacific Coastal Salmon Recovery Fund (PCSRF) monies managed by the SRFB and are consistent with the technical and procedural criteria outlined by SRFB.
- Are projects that fit within a specific list of eligible actions (In-stream Passage, In-Stream Diversion Screening, In-Stream Habitat, Riparian Habitat Restoration, Upland Habitat Restoration or Protection, or Estuarine and Marine Nearshore Habitat Restoration, Monitoring).

The proposed action is classified by the State's Regional Conservation Office as an "In-stream Habitat Project" and a "Riparian Habitat Restoration Project" and is funded in part by the Salmon Recovery Funding Board (SRFB). Therefore, the proposed action meets the criteria for the Limit 8 programmatic agreement and the action falls within the action types covered under restoration (as outlined by Appendix A of the Limit 8 Biological Opinion). The applicability of the Limit 8 Self-Certification process was evaluated and determined to be a valid by USACE biologists. USACE intends to accept the usage of the Limit 8 Programmatic Agreement for NMFS ESA-listed species. The Benton Conservation District submitted self-certification form on 05 October 2024 (Appendix A). Therefore, no individual ESA consultation for NMFS species is required as the action would be covered by the Limit 8 programmatic agreement.

6.2.5 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions, primarily for Native American Tribes. Take under this Act includes both direct taking of individuals and take due to disturbance.

Bald and golden eagles are known to nest throughout USACE managed lands in the Walla Walla District. While all nest sites have not been documented, locations of some are known. Although these species would exist within the Yakima River Delta area, there are no known nesting sites documented with the action area or near the action area. Therefore, there would be no effect or take (to include disturbance) of either bald or golden eagles.

6.2.6 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703-712, as amended) prohibits the taking of and commerce in migratory birds (live or dead), any parts of migratory

birds, their feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof.

There would be no take of migratory birds from this action because the proposed action would not result in the direct harm or death of migratory birds. Rather, the proposed action would enhance the habitat present within the action area and overall benefit migratory birds. Therefore, there would be no effect to birds under the MBTA.

6.2.7 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) of 1934, as amended (16 USC 661 et seq.) requires consultation with USFWS when any water body is impounded, diverted, controlled, or modified for any purpose. The USFWS and state agencies charged with administering wildlife resources are to conduct surveys and investigations to determine the potential damage to wildlife and the mitigation measures that should be taken. The USFWS incorporates the concerns and findings of the state agencies and other federal agencies, including the NMFS, into a report that addresses fish and wildlife factors and provides recommendations for mitigating or enhancing impacts to fish and wildlife affected by a federal project.

The proposed action would require consultation with USFWS because of the re-location of Amon Creek, and the corresponding modifications to the mainstem channel of the lower Yakima River. A letter soliciting coordination pursuant to the FWCA was sent to the USFWS Spokane field office on 11 November 2024 (Appendix A). Additionally, an appendix containing more detailed contextual information, as well as ESA compliance documentation, was included in this FWCA coordination request. No response was received. Follow up solicitation for response was conducted on 25 November 2024. No response was received.

6.2.8 Fishery Conservation Management Act of 1976

The Fishery Conservation and Management Act of 1976 (16 USC 1801-1882; 90 Stat. 331; as amended), also known as the Magnuson-Stevens Fishery Conservation and Management Act, established a 200-mile fishery conservation zone, effective March 1, 1977, and established the Regional Fishery Management Councils consisting of federal and state officials, including the USFWS. The fishery conservation zone was subsequently dropped by amendment and the geographical area of coverage was changed to the Exclusive Economic Zone, with the inner boundary being the seaward boundary of the coastal states. Columbia River salmon and steelhead are found in this zone.

6.2.9 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires agencies to consider the potential effect of their actions on properties that are listed, or are eligible for listing, on the National Register of Historic Places (NRHP). The NHPA implementing

regulations, 36 CFR Part 800, requires that the federal agency consult with the State Historic Preservation Officer (SHPO), Tribes and interested parties to ensure that all historic properties are adequately identified, evaluated and considered in planning for proposed undertakings. The consulting parties for this undertaking included the Washington Department of Archaeology and Historic Preservation (DAHP), the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama nation, the Nez Perce Tribe, and the Confederated Tribes of the Colville Reservation, and the Wanapum Band.

The potential effects of the alternatives on cultural resources have been examined in Section 3.8 of this EA. USACE archaeologists determined that the proposed action would result in No Adverse Effect to Historic Properties, and submitted their findings to consulting parties on 22 August 2024, for a 30-day review. A Letters of Concurrence from DAHP was received on 30 September 2024 (Appendix C). No comments were received from the Tribal consulting parties during the Cultural Resources review and comment period.

6.2.10 Executive Order 11988, Floodplain Management

This Executive Order outlines the responsibilities of federal agencies in the role of floodplain management. Each agency must evaluate the potential effects of actions on floodplains and avoid undertaking actions that directly or indirectly induce development in the floodplain or adversely affect natural floodplain values.

The proposed action would not contribute to the development activities within the floodplain, nor adversely affect the natural flood plain values within the action area. Therefore, the proposed action would comply with the EO.

6.2.11 Executive Order 11990, Protection of Wetlands

Executive Order 11990 requires federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when undertaking federal activities and programs.

The Benton Conservation District’s action incorporates mitigation design features which would result in the overall net increase in wetland acreage within the action area. Therefore, the action would comply with the EO through the enhancement of the natural and beneficial values of wetlands.

7.1 Tribal and Agency Consultation and Coordination

7.1.1 Tribal Consultation

Tribal consultation was solicited for the proposed action due to multiple tribal treaty resources present within the area of potential effect. Letters were sent to the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama nation, the Nez Perce Tribe, and the Confederated Tribes of the Colville Reservation, and the Wanapum Band. No comments or input received to be incorporated into the proposed action or the decision-making processes.

7.1.2 National Historic Preservation Act Section 106 Coordination

Concurrence on the determinations made by the USACE cultural resources Section 106 analysis of the proposed action was received from the Washington DAHP on September 30, 2024 (Appendix C).

7.1.3 Endangered Species Act Consultation:

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, USACE determined the proposed action would result in No Effect to USFWS species and therefore individual consultation was not required. Furthermore, USACE intends to use the Limit 8 Programmatic Agreement to cover the ESA compliance for NMFS ESA-listed species. Therefore, no individual ESA consultation was required for NMFS species.

7.1.4 Clean Water Act Compliance and Coordination:

The Benton Conservation District would be responsible for coordination with Ecology to gather the appropriate permits and comply with the CWA prior to implementation of the proposed action.

7.1.5 Rivers and Harbors Act:

The Benton Conservation District would be responsible for coordination with USACE Seattle District Regulatory Division to gather the appropriate permits and comply with the RHA prior to implementation of the proposed action.

7.2 Public Involvement

7.2.1 Public Review – Draft Finding of No Significant Impact and Environmental Assessment

In compliance with NEPA, the draft Finding of No Significant Impact (FONSI), EA, and all supporting appendices will be made available for a 30-day review and comment period beginning on January 13, 2025, and concluding on February 10, 2025. Comments would be received, summarized, and addressed within an attachment to the finalized EA.

In compliance with and to complete the NEPA process, the Corps will sign the FONSI and proceed with issuing the Benton Conservation District a construction license for their proposed Amon Creek Re-location action within the Yakima Delta HMU. This draft EA and FONSI and all supporting appendices are available on the Walla Walla District Corps of Engineers website at www.nww.usace.army.mil/Missions/Environmental-Compliance.

If significant environmental effects resulting from implementing the proposed action are identified during the review period, the Corps would proceed to write a Supplemental Environmental Impact Statement and the dredging and disposal action would be delayed until the Corps completed the NEPA process with the signing of a Record of Decision.

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