LOWER GREEN RIVER CORRIDOR FLOOD HAZARD MANAGEMENT PLAN

Draft Programmatic Environmental Impact Statement

Volume II

Appendix E: Tribal Matters

KING COUNTY FLOOD CONTROL DISTRICT

March 2023

KING COUNTY FLOOD CONTROL DISTRICT

Appendix E

Tribal Matters

March 2023

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

ARPA	Archaeological Resources Protection Act
BMPs	best management practices
Board	King County Flood Control District Board of Supervisors
Cal B.P.	calibrated years before the present
cfs	cubic foot per second
CIP	capital improvement plan/program
Corridor	Lower Green River Corridor
DAHP	Washington State Department of Archaeology and Historic Preservation
District	King County Flood Control District
Ecology	Washington State Department of Ecology
FCD Motion	Flood Control District Motion
HHD	Howard Hanson Dam
HRI	Historic Resource Inventory
KCC	King County Code
LWD	large woody debris
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
OHWM	ordinary high water mark
PEIS	programmatic environmental impact statement
PL	Public Law
Plan	Lower Green River Flood Hazard Management Plan
RCW	Revised Code of Washington
RM	river mile
SEPA	State Environmental Policy Act
SM	shoreline mile
TCPs	traditional cultural properties
TMC	Tukwila Municipal Code
U&A	usual and accustomed
WAC	Washington Administrative Code
WRIA	Water Resource Inventory Area

1. INTRODUCTION

The King County Flood Control District (District) is proposing a Lower Green River Corridor Flood Hazard Management Plan (Plan) for a reach of the Lower Green River and its associated floodplains that occur in portions of the cities of Auburn, Kent, Renton, SeaTac, and Tukwila, as well as unincorporated King County (**Error! Reference source not found.**). The Lower Green River Corridor (corridor) covers approximately 21 river miles (RMs), the equivalent to 42 shoreline miles (SMs), from RM 11 to RM 32. The District is preparing a draft programmatic environmental impact statement (PEIS) that analyzes three alternative approaches to flood risk management in the corridor. The District is a county-wide special purpose district created to provide funding and policy oversight for flood risk reduction capital projects and programs in King County. The goal of the Plan is to provide a long-term approach to reduce flood risks, to address Tribal interests, and to improve fish habitat, while supporting the economic prosperity of the region. In 2014, the District Board of Supervisors (Board) set a provisional level of flood protection for the Lower Green River: a median flow of 18,800 cubic feet per second (cfs), plus 3 feet of freeboard, as measured at the Auburn gage, as the desired level of protection to meet this goal (King County Flood Control District Motion (FCD) 14-09).

The Green River is within the Washington State Department of Ecology's (Ecology's) Water Resource Inventory Area (WRIA) 9. It is 65 miles long between its mouth and the Howard Hanson Dam (HHD) near Palmer in unincorporated King County. As shown in Figure 1-2, it originates from headwaters in the Cascade Mountains in southeastern King County (Upper Green River Subwatershed), flows westward through the Green River Gorge State Park to an alluvial valley in mid-basin (Middle Green River Subwatershed), then turns north near Auburn through a lowland valley (Lower Green River Subwatershed) to the mouth of the Duwamish (Duwamish Estuary Subwatershed). At its confluence with the Black River, the Green River becomes the Duwamish River and continues northward, emptying into Puget Sound's Elliott Bay.

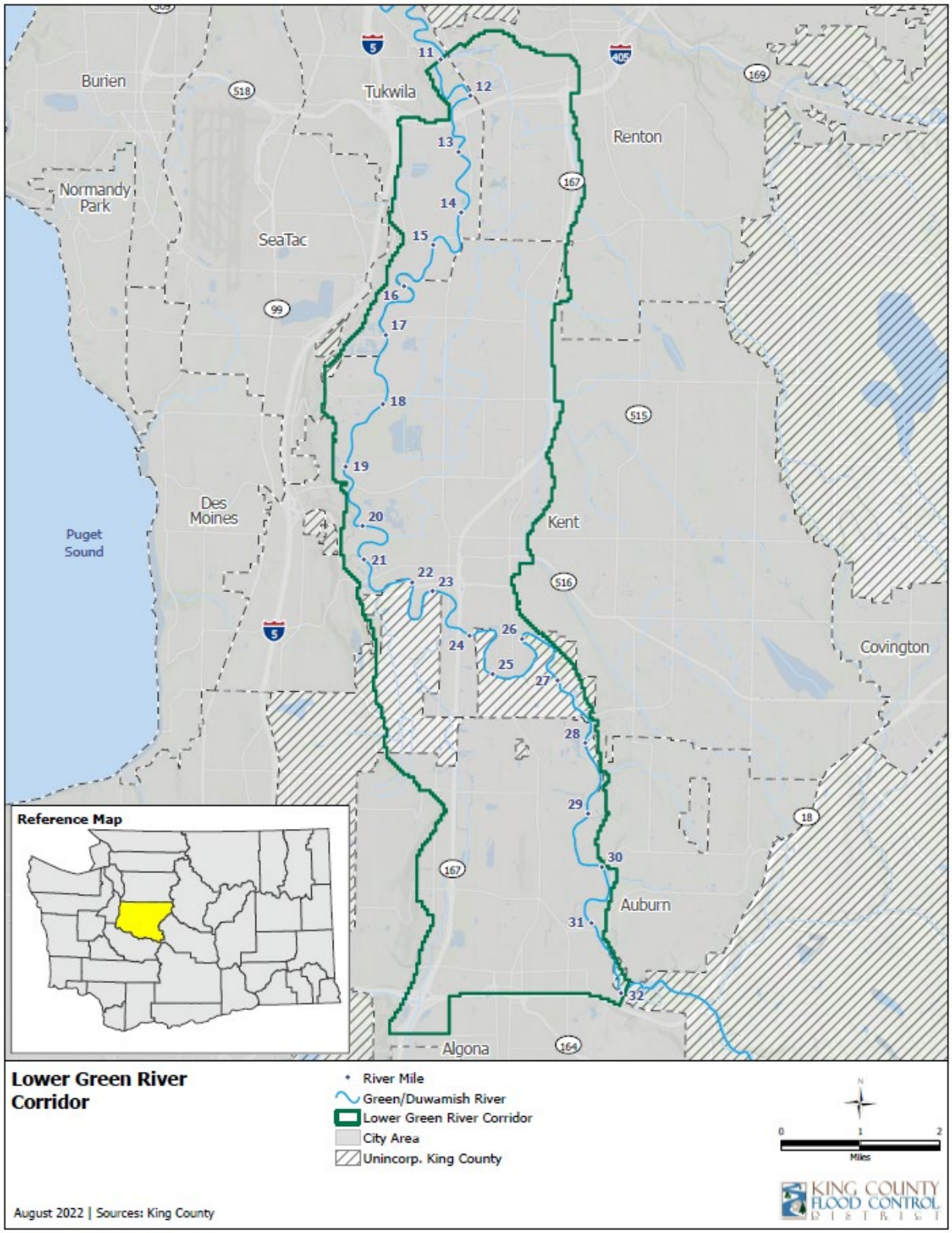

Figure 1-1. Lower Green River Corridor

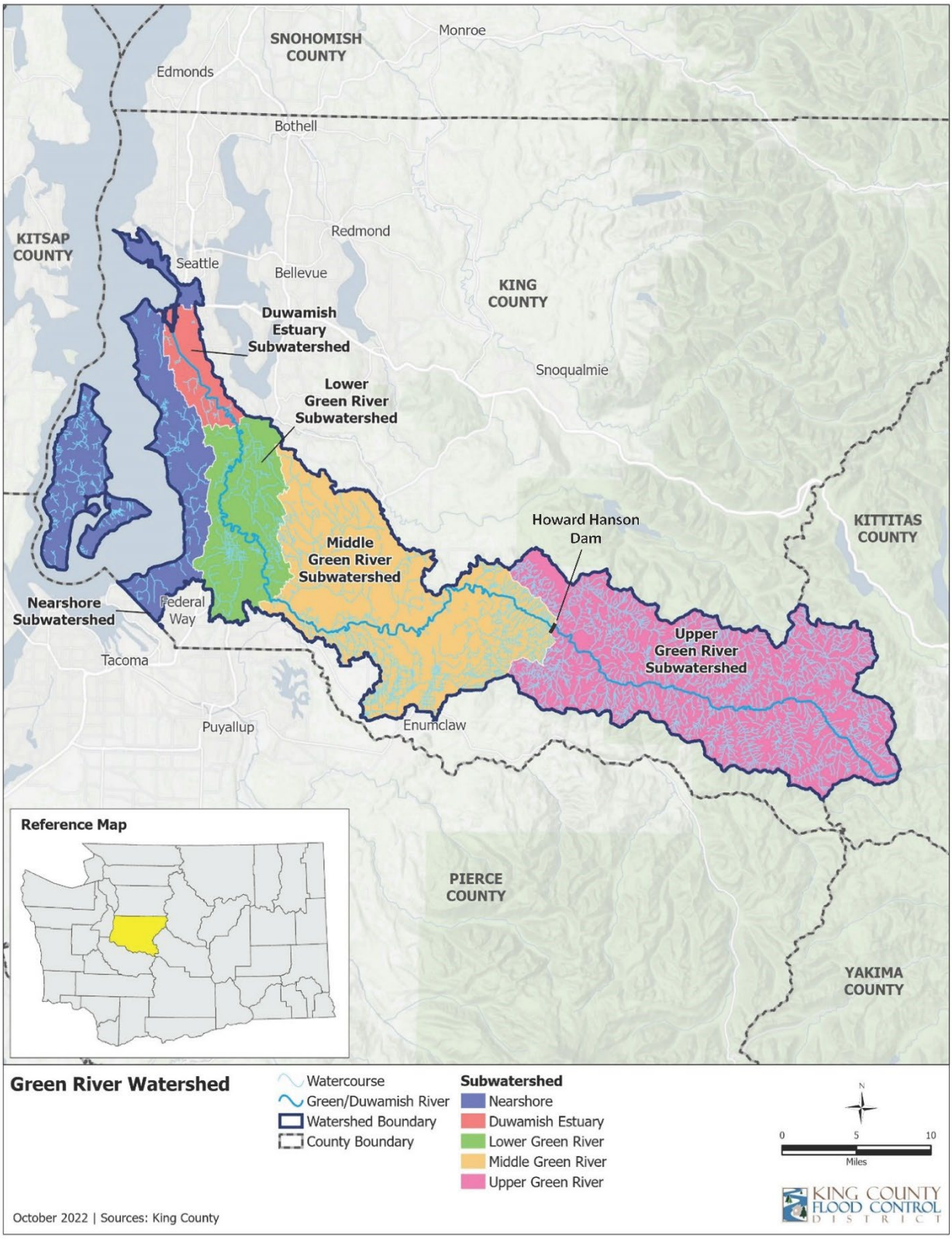

Figure 1-2. Green River Watershed

The information and analysis in the PEIS is based on the following technical appendices:

Appendix A: Alternatives Development describes the main policies and regulations that relate to flood hazard management on the Lower Green River. The appendix briefly explains the need for additional flood hazard management, the proposed alternatives, and how the alternatives were developed. The appendix describes structural and flood proofing approaches to flood management and includes preliminary, planning-level cost estimates.

Appendix B: Natural Environment describes the affected environment, methodologies, potential impacts, and mitigation for elements of the natural environment.

Appendix C: Built Environment describes the methodologies, affected environment, potential impacts, and mitigation for elements of the built environment.

Appendix D: Equity and Social Justice is based on information in appendices B and C and describes disadvantaged populations who experience inequities and how they could be impacted by flooding and flood hazard management.

Appendix E: Tribal Matters describes Tribal treaty rights and interests on the Lower Green River Corridor. The appendix is based on information in appendices B, C, D, and F and describes how Tribal treaty rights and interests intersect with existing conditions on the Green River and the potential impacts of flood hazard management.

Appendix F: Cumulative Impacts describes reasonably foreseeable and potential changes to the environment relevant to the Lower Green River Corridor. These changes are combined with past changes and potential impacts described in appendices B and C to evaluate the potential combined impacts over the 30- to 50-year planning horizon.

Appendix G: Outreach Summary contains outreach efforts during the scoping periods for the PEIS, as well as ongoing outreach and efforts to announce the availability of the draft PEIS.

PEIS Appendix A contains a description of the three alternative approaches to managing flood risk in the Lower Green River Corridor. They are summarized below for readers' convenience.

Alternative 1: Project-by-Project Multibenefit Implementation (No-Action Alternative)

This alternative illustrates how the District would provide flood hazard management on the Lower Green River following established policies and practices without the guidance of an area-specific Plan. Adoption of a Plan for the Lower Green River is the proposed action for the PEIS. This alternative is the benchmark for comparing alternatives.

The District adopted a multibenefit policy in 2020 (FCD Motion 20-07) that would be considered and incorporated to the extent feasible as individual projects were implemented. Flood hazard management projects would be implemented under successive capital improvement plans (CIPs) without guidance from an area-specific Plan for the Lower Green River. Alternative 1 incorporates the CIP approved in FCD Resolution 2021-16 (the 2022 6-year CIP list).

Alternative 2: Systematic Multibenefit Implementation

This alternative would systematically implement the multiple benefits described in FCD Motion 20-07. Implementation would include habitat conservation and fish restoration.

The District would develop an area-specific Plan for the Lower Green River Corridor in collaboration with Tribes, federal and state agencies, local jurisdictions, and stakeholders. The Plan would establish goals and indicators for managing flood hazards, would support a safe and healthy environment for communities along the river, and would conserve and, where possible, enhance aquatic and riparian habitats and conditions to support the recovery of threatened salmon and other species.

The Plan would describe actions the District would take under its authority and would highlight potential partnership opportunities with Tribes, federal and state agencies, local jurisdictions, and stakeholders. The multibenefits described in FCD Motion 20-07 would be systematically advanced in the Plan.

This alternative would introduce the potential use of flood proofing to reduce the effects of flooding, rather than to reduce the risk of flooding.

Alternative 3: Enhanced Systematic Multibenefit Implementation

This alternative would be a substantial shift from the District's current practices. Under this alternative, the District would continue to provide flood hazard reduction, but it would pursue habitat conservation and restoration to a notably greater extent than under either of the other alternatives, while achieving multiple benefits across the Lower Green River.

The District would develop an area-specific Plan for the Lower Green River in collaboration with Tribes, federal and state agencies, local jurisdictions, and stakeholders. This Plan would place a greater emphasis on conserving and restoring habitat for threatened salmon and other species. The Plan would establish goals and indicators for managing flood hazards in a manner that would protect, improve, and restore riparian and aquatic habitats, and it would establish conditions that would support the recovery of threatened salmon and other species. The Plan would describe the actions that the District would take under its authority, and it would highlight potential partnership opportunities with Tribes, federal and state agencies, local jurisdictions, and stakeholders. The multibenefits described in FCD Motion 20-07 would be systematically and rigorously advanced.

With this alternative, the District would maintain enrollment in the Public Law (PL) 84-99 facilities program, but it could, in conjunction with flood hazard management actions, pursue flood management improvements at a scale and design supporting progress towards achieving adopted salmon habitat goals. This alternative would include taking advantage of opportunities to restore habitat functions (e.g., increasing channel capacity to provide backwater or off-channel rearing habitat). With cooperation from local jurisdictions, some adjacent property owners could be provided with incentives to help accommodate these changes.

In addition to flood proofing, this alternative would introduce the potential acquisition of property that would meet certain criteria to preserve floodplain storage.

No Build Scenario

This scenario is included to illustrate the consequences of inaction. The description includes inundation maps and explanations of how the Lower Green River area would be affected by flooding. Because the core mission of the District is managing flood hazards, and this alternative does not provide flood hazard protection throughout the corridor, this scenario is not evaluated in detail as a potential alternative in the PEIS.

Under the No Build Scenario, the District would maintain existing facilities, including PL 84-99 facilities, to meet current requirements. Work would continue on facilities currently under construction. However, projects included in the CIP (2022 6-year CIP) that are not under construction would not proceed. Existing flood hazard management facilities would not be modified to provide the provisional 18,800 cfs level of protection, plus 3 feet of freeboard. No additional flood hazard management actions or related improvements on the Lower Green River would be undertaken.

This appendix evaluates these types of impacts:

- Direct:
  - Impacts that could primarily result from the District's actions to develop new, improved, or relocated flood hazard management facilities
  - Upstream or downstream increases in inundation, in depth, extent, or both, that could be caused by new, improved, or relocated flood hazard management facilities
- Indirect: Reasonably foreseeable impacts that could result from the District's flood hazard management actions, but that would be removed from the action in space and/or time
- Construction: Impacts that would be temporary in nature and that could primarily result from the development of new, improved, and relocated flood hazard management facilities
- Residual inundation: Flooding that could still occur at 18,800 cfs under the three alternatives, but that is not a result of the District's actions

This appendix is intended to summarize the potential impacts of the Plan on Tribal resources, rights, and interests. For purposes of this chapter, these rights and interests include treaty rights; access to traditional areas for fishing, hunting, gathering, and ceremonial purposes; fish, plants, and wildlife used for ceremonial, subsistence, and economic purposes; and cultural and archaeological resources.

This appendix is organized into the following sections:

- Introduction
- Background
- Methodology
- Potential Impacts
  - Natural Resources
  - Treaty Rights and Access
  - Cultural Resources
  - Traditional Cultural Properties

The primary concerns enunciated by various Tribes during the scoping process for the PEIS included potential impacts on fisheries resources that have cultural and economic importance. Specifically, these concerns relate to how Tribal treaty rights and interests intersect with existing conditions on the Green River and the potential impacts of flood hazard management actions. PEIS Appendix B (Natural Resources) and PEIS Appendix C (Built Environment) contain an evaluation of natural ecosystems and cultural resources impacts that could occur from each of the alternatives under consideration. Cultural resources discussed in this appendix include archaeological resources and traditional cultural properties (TCPs). This appendix summarizes the key findings from those appendices as they relate to Tribal resources.

2. BACKGROUND

Federal, state, and local laws, regulations, and permits related to Tribal resources are summarized below. These regulations provide the framework for identifying Tribal-related project effects and influence potential mitigation. Required mitigation largely pertains to implementation of specific flood hazard management projects rather than development of a flood hazard management plan, although Tribes could be key collaborators in developing an area-specific plan.

2.1 Federal Regulations

Federal requirements are triggered when a flood management action requires a federal approval or uses federal funding. When triggered, compliance with the following authorities and regulations is required:

- United States Constitution Article VI, Section II on Treaties. The United States government entered a series of federal treaties with Tribes in Washington in the mid-1850s. These treaties are recognized under the United States Constitution as the "supreme law of the land." Under the treaties, Tribes ceded millions of acres of land. In exchange, the Tribes were relocated onto small reservations. However, they reserved their rights to fish, hunt, and gather in their usual and accustomed (U&A) places.
- National Historic Preservation Act (NHPA) of 1966 (16 USC 470 et seq). Section 106 of the NHPA requires the lead federal agency to consider the effect of an undertaking on historic properties, which are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP). Section 106 requires Tribal consultation in all steps of the process when a federal agency project or effort may affect historic properties that are either located on Tribal lands, or when any Tribe attaches cultural significance to the historic property, regardless of the property's location.
- National Environmental Policy Act (NEPA) of 1969 (42 USC 4231, 4331-4335). Section 101(b) of NEPA states that "…it is the continuing responsibility of the Federal government to use all practicable means…to improve and coordinate Federal plans, functions, programs and resources to the end that the Nation may: (4) preserve important historic, cultural, and natural aspects of our national heritage…." Consideration of cultural resources under NEPA usually follows and is coordinated with the Section 106 process (see NHPA above). Although the Plan is undergoing SEPA review, NEPA will be required for federal permits needed for most flood hazard management facilities.
- Archaeological Resources Protection Act (ARPA) of 1979. The ARPA lays out permitting procedures and requirements for conducting archaeological fieldwork on federal lands.
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (Public Law 101-601; 25 United States code [U.S.C.] 3001-3013). NAGPRA applies on federal and Tribal lands. It includes provisions regarding the intentional excavation and removal of Native American human remains and objects, as well as the inadvertent discovery of Native American remains and objects on federal and Tribal lands.

2.2 State Regulations

- State Environmental Policy Act (SEPA) [Chapter 43.21C of the Revised Code of Washington (RCW)]. Washington Administrative Code (WAC) 197-11-330 includes cultural resources in SEPA review: "(3) In determining an impact's significance (WAC 197-11-794), the responsible official shall take into account the following, that: (e) A proposal may to a significant degree: (i) Adversely affect environmentally sensitive or special areas, such as loss or destruction of historic, scientific, and cultural resources…." Question 13 on the environmental checklist (WAC 197-11-960) addresses "historic and cultural preservation."
- Indian Graves and Records (RCW 27.44). This law describes the procedures that must be followed upon discovery of human skeletal remains and states the following: "Any person who knowingly removes, mutilates, defaces, injures, or destroys any cairn or grave of any native Indian, or any glyptic or painted record of any tribe or peoples is guilty of a class C felony."
- Archaeological Sites and Resources (RCW 27.53). This law defines archaeological sites and provides that it is a Class C felony to knowingly disturb an archaeological site, and discusses procedures for obtaining a permit for excavation of an archaeological site.
- Archaeological Excavation and Removal Permit (WAC 25-48). This regulation specifies the requirements for obtaining an archaeological excavation permit.
- Human Remains (RCW 68.50). This law requires that anyone who knows of the existence and location of human remains notify the medical examiner in the most expeditious manner possible.
- Washington State Executive Order 21-02. This executive order requires state agencies to consult with the Department of Archaeology and Historic Preservation (DAHP) and affected Tribes on state-funded construction and land acquisition projects that are not undergoing Section 106 review under NHPA to determine the project's potential effects on cultural resources. The state agency is then required to take reasonable actions to avoid, minimize, or mitigate identified adverse effects on cultural resources.

2.3 Local Regulations

- King County Code (KCC) Chapter 20.62 – Landmarks. This KCC chapter directs the King County Historic Preservation Officer to maintain a compilation of information on significant historic resources known as the Historic Resource Inventory (HRI). It requires that all development proposals for projects on or adjacent to a resource listed in the HRI be reviewed by the King County Historic Preservation Officer before approval. Ground disturbance on parcels with known archaeological sites may require archaeological survey and mitigation. Alterations of identified features of significance or designated landmarks must be approved by the Landmarks Commission (KCC 20.62.150).
- King County 2008 Budget Ordinance (Ordinance 15975) – Section 19 (Office of Management and Budget), P6 and Section 120 (Facilities Management Internal Service). "The facilities management division, in collaboration with the historic preservation program staff and landmarks commission, shall submit to the council for its review and approval by ordinance a detailed action plan for county stewardship of historic structures including, at a minimum, policies and procedures that ensure that either the historic preservation office or the landmarks commission, or both review and give technical expertise and guidance before proposed action,

such as the sale, remodel or demolition of any county property over 40 years of age or that possess archaeological value take place."

- King County Ordinance 16271 – Stewardship of Historic Resources. This King County ordinance directs the King County Historic Preservation Program to "develop and implement programmatic guidelines for treatment of buildings and structures" and "develop and implement guidelines for addressing identification and evaluation of archaeological properties." It also specifies procedures for review of buildings and structures and review for archaeological properties and TCPs that must be incorporated in executive policies and procedures.
- Interlocal Agreement for Landmark Services between King County and the city of Renton. King County provides landmark designation and protection services to the city of Renton, "using criteria and procedures adopted in King County Code (K.C.C.), Chapter 20.62 [references above] within the City Limits."
- Auburn City Code Chapter 15.76 – Historic Preservation. This code designates the King County landmarks and heritage commission to act as the landmarks commission of the city of Auburn. It incorporates procedures and penalties laid out in KCC Chapter 20.62 (referenced above).
- Kent City Code Chapter 14.12 – Landmark Designation and Preservation. This code designates the King County Landmarks and Heritage Commission to act as the landmarks commission of the city of Kent. It adopts procedures and penalties laid out in KCC Chapter 20.62 (referenced above).
- Tukwila Municipal Code Chapter 16.60 – Historic Preservation. This code designates the King County Landmarks Commission to act as the landmarks commission of the city of Tukwila. It adopts and incorporates procedures and penalties laid out in KCC Chapter 20.62 (referenced above).
- Tukwila Municipal Code Chapter 18.44.070 (Ord. 2346 §7, 2011) – Archaeological, Cultural, and Historical Resources. This code stipulates that land use permits for projects within the shoreline jurisdiction be coordinated with the affected Tribes. It requires survey by a professional archaeologist in areas documented to contain archaeological resources, and it specifies procedures for inadvertent discovery of archaeological resources.
- Tukwila Municipal Code Chapter 18.50.110 (Ord. 2076 §1, 2004) – Archaeological/Paleontological Information Preservation Requirements. This code stipulates that a cultural resources assessment be conducted in advance of development if there is a potential for archaeological resources to be disturbed. It recommends conducting an archaeological assessment during the geotechnical phase of a project, and it outlines procedures for archaeological monitoring and inadvertent discovery of archaeological resources or Native American burials.

3. METHODOLOGY

3.1 Technical Approach

The analysis in this appendix summarizes how implementation of the Plan could affect Tribal resources, including natural resources, cultural resources, access to treaty fishing, hunting, and gathering, and TCPs. This analysis relies on the analyses developed for cultural resources, aquatic species and habitats, and water quality contained in Appendices B and C. It also considers letters written by the Muckleshoot Indian Tribe and the Snoqualmie Indian Tribe in 2019 and 2022, the Lummi Indian Business Council in 2019, and the Duwamish in 2022.

A TCP is a "property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community" (National Park Service [NPS] 2012). The study of TCPs requires consultation with area Tribes and other communities, and it may require privilege and confidentiality status during and after the study. Only a few TCP studies have been completed in King County, and the results of those surveys are only available on a need-to-know basis (Kopperl et al. 2016). None of those formal TCP studies overlaps the Lower Green River Corridor.

3.2 Impact Analysis

The Green River supports migratory fish species including Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), chum salmon (*O. keta*), pink salmon (*O. gorbuscha*), steelhead, and other resources that are used by Tribes in Puget Sound and beyond. Western Washington Tribal culture is rooted in spiritual connections to, salmon and aquatic species and the water that supports them. Salmon and other fish provide subsistence, ceremonial, and economic value to Tribal communities. Applying the three alternatives could result in adverse impacts, enhancements, and benefits, or all three, for salmonids, supporting habitat, treaty fishing, and other tribal interests and cultural resources.

The District's approach to flood hazard management would include a combination of the following:

- Flood hazard management facilities—new, improved, or relocated levees and floodwalls—to reduce the risk of flooding, described by Flood Facility Project Types A, B, and C
- Flood proofing solutions such as home elevations to reduce the effects of flooding (also referred to a Flood Facility Project Type D)
- Land acquisition to preserve flood storage

Table 3-1 provides additional description of the different facility types. The manner in which these different actions could be applied is projected based on the policy-level approaches and guidelines for each alternative to facilitate the evaluation of potential impacts on Tribal rights and interests. PEIS Appendix A, Section 4, provides additional explanation of the alternatives and illustrations of the facility types. These are planning-level projections intended to facilitate a comparison of the alternatives rather than specific projects. Planning, design, and permitting of flood management project would occur after this programmatic evaluation of flood management policies for the corridor. Although the alternatives do not include specific measures to prevent channel migration and erosion (e.g., new revetments), there are existing revetments within the corridor that the District would continue to maintain under all three alternatives.

Table 3-1. Flood Facility Project Types

Facility Types	Description
Type A	These would be levees or floodwalls with riverward side slopes generally less than 2.5 to 1, with an approximate footprint of 100 feet or less, measured from the ordinary high-water mark (OHWM) to the landward side of the facility.
Type B	These would be levees or floodwalls with riverward side slopes, typically 2.5 to 1 or greater, that could be planted with vegetation and/or have a bench enhanced with large woody debris, scour protection, and native vegetation. Typical cross-sectional footprint would be approximately 100 to 150 feet from OHWM to the landward side of the facility.
Type C	These would be levee setbacks or floodwalls with benches, enhanced shade, and greater opportunity for riparian and aquatic enhancement. Typical riverward slopes would be 3 to 1, with a typical cross-sectional footprint of 150 feet or more from OHWM to the landward side of the facility. Setback distances for specific locations may be considerably larger.
Type D	These would be flood proofing solutions, such as home elevation, basement removal with utility addition, berms, ring levees, farm pads, and/or drainage improvements. This project type would include the potential acquisition of undeveloped floodplain habitats to provide flood storage.

4. AFFECTED ENVIRONMENT

The project area lies within the ancestral homelands and traditional territories of indigenous peoples who have been here since time immemorial. Many of the descendants of the region's original inhabitants belong to Tribes that have treaty fishing rights along streams, rivers, and coastal shores in King County. These Tribes are known today as the following:

- Muckleshoot Indian Tribe (bəqəlšuɬ, 'high point from which you can see')
- Puyallup Tribe of Indians (spuyaləpabš, 'people from the bend at the bottom of the river')
- Snoqualmie Indian Tribe (sdukʷalbixʷ, 'the transformer's people')
- Squaxin Island Tribe (sqʷaxsəd, 'in between' or 'piece of land to cross over to another bay')
- Stillaguamish Tribe of Indians (stuləgʷábš, 'people of the river')
- Suquamish Tribe (suq̓ʷabš, 'people of the clear salt water')
- Tulalip Tribes (dxʷlilap, 'far to the end')

The Lower Green River Corridor is also the home of the Duwamish people (dxʷdəwʔabš, 'people of the inside'), whose descendants are pursuing federal recognition.

As a Tribe with treaty rights in the Green River basin, the Muckleshoot Indian Tribe has the closest proximity to the corridor and an abiding interest in the stewardship and health of the Lower Green River. Impacts on Tribal fishing rights, access, and fish habitat are of particular concern. As a co-manager of the salmon resources, the Tribe is actively engaged in efforts to improve fish habitat conditions in the Green River basin. Ongoing areas of emphasis include riparian vegetation, riparian forest, off-channel and shallow edge habitat, water quality, and large woody debris (LWD).

The Green River basin provides habitat for fish and aquatic resources used by Tribes in Puget Sound and beyond. Many Tribes with treaty rights in Puget Sound rely on salmon and other resources that are affected by loss of habitat and diminished water quality in the Lower Green River basin.

4.1 Tribal Community Historical Context

Modern day Tribal members have a deep and longstanding relationship with the Lower Green River and the resources it supports. The abundant salmon, berries, shellfish, deer, elk, and countless other resources supported diverse and complex social groups throughout the valley. During winter, Tribal communities lived in permanent villages in cedar plank longhouses. In spring, summer, and autumn, the people used temporary pole and reed mat structures that were easily transported to hunting, gathering, and fishing locations. In addition to providing sustenance, waterways supported regional travel. The river was a vital transportation route between x̌ʷəlč (saltwater areas, including what is now commonly called Puget Sound) and upstream communities.

Many groups of indigenous people, including ancestors of the Duwamish People and the Muckleshoot Indian Tribe, occupied and used the Lower Green River Corridor (Haeberlin and Gunther 1930; Ruby et al. 2013; Spier 1936; Swanton 1952). The descendants now referred to as the Duwamish ethnographically consisted of many bands whose traditional territory stretched from the Duwamish River at Elliott Bay to Lake Union and Lake Washington. Ancestors of the Muckleshoot Indian Tribe, who occupied much of the area along the White and Green Rivers, were known as the Skekomish, the Smulkamish, and the Skoahmish (Ruby et al. 2013; Spier 1936).

The Duwamish and Muckleshoot descendants are considered members of the Puget Sound Coast Salish culture. Coast Salish people oriented settlement and subsistence systems toward saltwater, riverine, and inland environments in their territories (Haeberlin and Gunther 1930). Over the winter, Coast Salish groups inhabited permanent villages, usually located close to a major source of water. Winter villages consisted of one or more cedar plank longhouse in which as many as eight families resided (Haeberlin and Gunther 1930; Suttles and Lane 1990). The winter was spent not only repairing and constructing tools needed for the upcoming harvesting season, but in ritual storytelling and communal gatherings and travel between villages. Families subsisted largely on processed and stored foods from the previous seasons, although hunting and fishing activities continued to take place.

During the spring, summer, and autumn, the Coast Salish people used temporary pole and reed mat structures that were easily transported to traditional hunting, gathering, and fishing locations. Family groups moved to various environmental areas seasonally to harvest abundant resources, process them for storage, and then transport the supplies to the permanent village. Resources included roots, berries, and other plant products. Salmon and shellfish harvested from local lakes, rivers, and creeks were staple resources. Groups established fishing stations, at which salmon runs were available at various times throughout much of the year (Campbell 1981; Haeberlin and Gunther 1930). Inland groups hunted land mammals in addition to collecting marine and riverine resources. Some in these groups specialized in the pursuit of deer, elk, bear, or beaver. Waterfowl and other birds were also important parts of the Coast Salish diet, and they were either trapped in nets or hunted.

The arrival of Euro-American explorers and settlers in the middle of the nineteenth century disrupted indigenous lifeways in the Green River valley. In addition to new technologies and trade goods, the newcomers brought diseases such as smallpox and measles. With no natural immunity and a culture based on communal living and close family ties, indigenous populations suffered massive losses. In some areas, disease killed more than two-thirds of the indigenous residents. More than 30 percent of the indigenous population in the region died from new diseases introduced during the early nineteenth century. By the 1850s, Euro-Americans from other parts of the United States began clearing the land and creating permanent settlements in the Green River valley and its floodplain.

Between 1854 and 1856, Governor Isaac Stevens negotiated a series of federal treaties with Tribes in western Washington. These treaties are recognized under the United States Constitution as the "supreme law of the land." As part of the treaties, Tribes ceded millions of acres of land and moved to small reservations; however, they reserved their rights to fish, hunt, and gather in their U&A places. These treaties displaced indigenous people from their ancestral lands, disrupting their lifeways and forcing them to participate in agricultural and market economies.

Although the treaties between the United States Government and Tribes included assurances that Tribal members would be able to exercise their rights to hunt and fish in their U&A grounds and stations, Tribal members exercising these treaty rights were met with hostility and resistance, and they were displaced from fishing areas by Euro-American immigrants. Further, development continued to degrade habitat, and the abundance of fish stocks fell. After decades of struggle to exercise these treaty rights, the matter was settled in federal court. In 1971, Judge Boldt ruled that Tribes are entitled to half of the salmon and steelhead harvest in the landmark ruling, *United States v. Washington* (the Boldt Decision). Tribes were established as co-managers, with Washington State, of the salmon and steelhead harvest. Subsequent federal court rulings have also upheld Tribal shellfish harvest rights.

4.2 Pre-Contact Setting

Prior to the twentieth century, the Green River met the White River near Auburn and then joined the Cedar River and the Black River to create the Duwamish River. Historically, the Green River Watershed covered about 1,600 square miles and encompassed the Green River, White River, and Lake Washington.

Using maps and notes from the General Land Office, U.S. Geological Survey, and other sources, Collins and Sheikh reconstructed the historic aquatic habitats of the Lower Green River from approximately 1865 (Collins and Sheikh 2005). This stretch of the river included an extensive network of hydrologically connected wetlands and channels that meandered through the surrounding low gradient valley. The valley averages about 2.2 miles wide, with an average gradient of approximately 0.03 percent (about a tenth of the gradient of the Middle Green River Subwatershed) (Collins and Sheikh 2005). Of the 5,288 acres (8.26 square miles) analyzed by Collins and Sheikh, the river channel (including mainstem and tributaries) made up 1,025 acres (1.6 square miles), ponds made up 72 acres (0.1 square mile), and the rest (4,198 acres; 6.6 square miles) was wetlands (Collins and Sheikh 2005).

Common tree species documented along the active river channel and within the Lower Green River valley include red alder (*Alnus rubra*), willow (*Salix* spp.), black cottonwood (*Populus trichocarpa*), bigleaf maple (*Acer macrophyllum*), vine maple (*Acer circinatum*), and Oregon ash (*Fraxinus latifolia*) (Collins and Sheikh 2005). These trees likely provided LWD to the river channel. The most common streamside tree species was red alder. Approximately 75 percent of the floodplain was considered forested in 1865 (Collins and Sheikh 2005; King County Flood Control District 2016).

The permanent diversion of the White River to the Puyallup River, the diversion of the Cedar River to flow into Lake Washington, and the creation of the Ship Canal to drain Lake Washington shifted the flow of water. Today, the Green River Watershed is just a third of its original size (approximately 482 square miles) due to the redirection of the White River and outflows from Lake Washington. The diversion of the White River is estimated to have reduced the flows within the Lower Green River by approximately 50 percent (Kerwin and Nelson 2000).

In the 1950s, many of the existing Lower Green River levees and revetments were constructed to protect agricultural land from flooding. Since then, much of the study reach has been converted to other regional economic purposes, such as infrastructure, businesses, and housing (King County 2019).

In 1962, the HHD was completed to eliminate flooding in the Lower Green River. From its construction through 2012, HHD was believed to provide 12,000 cfs flow regulation at Auburn for up to the 500-year flood. In 2012, the Corps determined the dam can only provide full regulation up to a 140-year event. This information placed a new focus on the ability of the levee system to prevent flood damages during large events. This new understanding was not due to changes in the capacity of the dam but, rather, to a better understanding of the 500-year event. In 2014, the King County Flood Control District Board of Supervisors set a provisional level of flood protection for the Lower Green River: a median flow of 18,800 cfs, plus 3 feet of freeboard as measured at the Auburn gage, as the desired level of protection to meet this goal.

5. POTENTIAL IMPACTS

Potential impacts on Tribal resources include direct and indirect impacts on fish species including salmon and steelhead used by Tribal members for commercial, subsistence, and cultural purposes; modifications to habitat used by these species; and changes in access to traditional hunting, fishing, and gathering areas. Potential impacts also include effects on cultural resources and TCPs. These potential impacts are summarized in Table 5-1.

Table 5-1. Summary of Potential Impacts by Alternative

Topic	No Build Scenario	Alternative 1	Alternative 2	Alternative 3

Natural Resources	• Existing conditions:
	  ➢ 13.1 miles of natural, unmodified, bank
	  ➢ 19.6 miles of steep bank and other flood facilities with simplified habitat
	  ➢ 9.4 miles of hardened revetment intended to prevent channel migration
	• Could have the potential for increased shading to reduce water temperatures with growth of riparian areas, but also includes loss of vegetation with flooding.
		Direct:
		• Could have the greatest negative impact due to an increase in modified streambank and overall extent of levees (13%).
		• Could improve LWD density but would have no LWD recruitment.
		• Could create 85 to 125 additional acres of streambank available for floodplain and/or riparian habitat restoration.
		• Would not achieve WRIA 9 Salmon Recovery Plan restoration targets.
		• Largest percentage of facility types that could adversely impact water quality.
		• Could present the least opportunity to benefit water quality among the alternatives.
		Indirect:
		• Riparian habitat restoration and increased LWD could provide an increase in pool frequency and depth.
		• Projects would not be designed and sited to optimize the distribution of thermal refugia.
		Construction:
		• Temporary changes in habitat conditions and fish patterns/presence could occur during construction.
			Direct:
			• Could negatively impact salmonid habitat due to an increase in modified streambank and overall extent of levees (12%).
			• Could improve LWD density but no LWD recruitment.
			• Create 100 to 150 additional acres of streambank available for floodplain and/or riparian habitat restoration.
			• Would not achieve WRIA 9 Salmon Recovery Plan restoration targets.
			• Between Alternative 1 and Alternative 3 in the percentage of facility types that could adversely and beneficially impact water quality.
			• Some space could be available to support vegetation and other outcomes with new, improved, and relocated levees or floodwalls that would be located along the river.
			Indirect:
			• Additional riparian restoration and LWD could further improve habitat conditions for salmonids.
			• Projects could be designed and sited to optimize the distribution of thermal refugia.
			Construction:
			• Temporary changes in habitat conditions and fish patterns/presence could occur during construction.
				Direct:
				• Could negatively impact salmonid habitat due to an increase in modified streambank and overall extent of levees (18%). Note that the higher percentage is due to additional levee setbacks.
				• Could improve LWD density and potentially achieve the WRIA-9 10-year target.
				• Could create 265 to 405 additional acres of streambank available for floodplain and/or riparian habitat restoration.
				• Could acquire 195 to 295 acres of floodplain properties for restoration.
				• Could achieve Water Resource Inventory Area (WRIA) 9 Salmon Recovery Plan restoration targets.
				• Lowest percentage of facility types that would adversely impact water quality and the highest percentage of facilities that would benefit water quality.
				  • Could provide the most benefits to water quality compared to the other alternatives.
				Indirect:
				• The highest amount of riparian restoration and LWD density could further improve habitat conditions.
				  • Projects could be designed and sited to optimize the distribution of thermal refugia.
				Construction:
				• Temporary changes in habitat conditions and fish patterns/presence could occur during construction.

Table 5-1. Summary of Potential Impacts by Alternative (continued)

Topic	No Build Scenario	Alternative 1	Alternative 2	Alternative 3
Treaty Rights and Access	• Could continue to have impacts on access to Tribal treaty fishing areas. • Could be loss of native vegetation and areas for Tribal gathering due to flooding. • Would be no additional impacts on treaty rights and access due to project improvements.	Direct: • Could continue to have impacts on Treaty fishing rights, and access to fishing areas could be arranged individually project-by-project. • Individual projects might provide an opportunity to reduce slopes and result in more native trees and vegetation. Indirect: • Could be changes in fish distribution relative to existing fishing areas with riparian restoration and increased LWD. Construction: • Temporary changes in habitat conditions and fish patterns/presence could occur during construction. • Temporary restriction to U&A and gathering locations could occur.	Direct: • Could provide the opportunity to comprehensively evaluate Treaty fishing access and other improvements. • Improved riparian vegetation and area could be available for off channel features. • Could provide opportunities for comprehensive inclusion of habitat features and safe access to the river. Indirect: • Could improve additional habitat features and salmonid distribution and fishing opportunities. Construction: • Temporary changes in habitat conditions and fish patterns/presence could occur during construction. • Temporary restriction to U&A and gathering locations could occur.	Direct: • Could provide the opportunity to comprehensively evaluate Treaty fishing access and other improvements. • Could provide additional improvements in riparian vegetation and area available for off channel features. • Could provide more opportunities for comprehensive inclusion of habitat features and safe access to the river. Indirect: • Could improve habitat features, salmonid distribution, and fishing opportunities the most opportunity. Construction: • Temporary changes in land use and fish patterns or presence could occur during construction. • Temporary restriction to U&A and gathering locations could occur.
Cultural Resources	• Could have residual inundation of potential cultural resources at 18,800 cfs and lower flows. • Could have destruction of artifacts in flood waters, loss of context resulting from artifact displacement, loss of sediments within a site (deflation), and/or the burial of	Direct: • An estimated 147 unevaluated architectural resources are located within the 18,800 cfs inundation area. This inundation could be a result of District actions or residual inundation. • Damage from flooding could occur on up to 15 previously recorded archaeological resources. • Damage from facility work could occur on up to 8 previously recorded archaeological resources. • Consultation on a project-by-project basis would be required to ensure avoidance of cultural resources.	Direct: • An estimated 162 unevaluated architectural resources could be located within the 18,800 cfs inundation area. This inundation could be a result of District actions or residual inundation. • Damage from flooding could occur for up to 15 previously recorded archaeological resources. • Damage from facility work could occur for up to 8 previously recorded archaeological resources. • Development of a plan could include further research and consultation on cultural resources to provide avoidance.	Direct: • An estimated 162 unevaluated architectural resources could be located within the 18,800 cfs inundation area. This inundation could be a result of District actions or residual inundation. • Damage from flooding could occur on up to 15 previously recorded archaeological resources. • Damage from facility work could occur on up to 8 previously recorded archaeological resources. • Development of a plan could include further research and consultation on cultural resources to provide avoidance.

Table 5-1. Summary of Potential Impacts by Alternative (continued)

Topic	No Build Scenario	Alternative 1	Alternative 2	Alternative 3
	archaeological resources under flood deposits. • Would have no additional impacts on cultural resources due to project improvements.	Indirect: • There would be none. Construction: • Would be the same as for direct impacts related to ground disturbance, including earthwork, vegetation clearing, grading for a staging area, and temporary access routes.	Indirect: • There would be none. Construction: • Would be the same as for direct impacts related to ground disturbance, including earthwork, vegetation clearing, grading for a staging area, and temporary access routes.	Indirect: • There would be none. Construction: • Would be the same as for direct impacts related to ground disturbance, including earthwork, vegetation clearing, grading for a staging area, and temporary access routes.
Traditional Cultural Properties	• Could have residual inundation of potential TCPs at 18,800 cfs and lower flows. • Would have no additional impacts to TCPs due to project improvements.	Direct: • Could have ground disturbance within the TCP, alterations to the viewshed of the TCP, alteration in land use in an area containing a TCP, or damage from a flooding episode that could impact the integrity of the resource or destroy it. Flooding could be a result of District actions or residual inundation. • No differences between alternatives have been identified due to the lack of information regarding TCPs that are publicly available. • Would require consultation on a project-by-project basis to ensure identification and avoidance of TCPs. Indirect: • There would be none. Construction: • Would be the same as for direct impacts related to ground disturbance and site modification, including earthwork, vegetation clearing, grading for a staging area, and temporary access routes.	Direct: • Could have ground disturbance within the TCP, alterations to the viewshed of the TCP, alteration in land use in an area containing a TCP, or damage from a flooding episode that could impact the integrity of the resource or destroy it. Flooding could be a result of District actions or residual inundation. • No differences between alternatives have been identified due to the lack of information regarding TCPs that are publicly available. • Development of a systematic multibenefit plan could include further research and consultation on TCPs to provide avoidance. Indirect: • There would be none. Construction: • Would be the same as for direct impacts related to ground disturbance and site modification including earthwork, vegetation clearing, grading for a staging area, and temporary access routes.	Direct: • Could have ground disturbance within the TCP, alterations to the viewshed of the TCP, alteration in land use in an area containing a TCP, or damage from a flooding episode that could impact the integrity of the resource or destroy it. Flooding could be a result of District actions or residual inundation. • No differences between alternatives have been identified due to the lack of information regarding TCPs that are publicly available. • Development of a systematic multibenefit plan could include further research and consultation on TCPs to provide avoidance. Indirect: • There would be none. Construction: • Would be the same as for direct impacts related to ground disturbance and site modification, including earthwork, vegetation clearing, grading for a staging area, and temporary access routes.

5.1 Natural Resources

Natural resources include an analysis of hydraulics and hydrology, aquatic species and habitats, water quality, and climate change (refer to PEIS Appendix B). The focus of this section is on salmon and steelhead habitat because of the significance to Tribes that fish, hunt, and gather in their U&A places and are co-managers of fisheries resources in Washington State. Under all three alternatives and as described below, natural resources could be directly impacted by new, improved, or relocated flood hazard management facilities, as well as by inundation. This analysis focuses on direct impacts by alternative, with the understanding that the current condition (No Build Scenario) could continue to degrade conditions for salmon important to the Tribes.

5.1.1 Direct Impacts by Alternative

5.1.1.1 Alternative 1: Project by Project Multibenefit Implementation

Fish and Aquatic Habitat: Alternative 1 could have the greatest potential negative impact on ecosystem functions important to salmonids (e.g., off-channel habitat, tributary access, riparian vegetation, substrate conditions, pool habitat, macroinvertebrate community conditions) due to an increase in modified streambank and the overall extent of levees in the Lower Green River relative to existing conditions. This alternative could likely maintain existing degraded habitat conditions. There could be opportunities for Alternative 1 to improve LWD density in the Lower Green River channel, but a reliable long-term source of woody debris recruitment would not be provided. While Alternative 1 could increase the extent of modified streambank, it could also remove some existing revetments and replace existing levees with Type B or Type C facilities that would provide a higher degree of ecological function compared to the existing condition. Alternative 1 could create 85 to 125 additional acres of streambank available for floodplain and/or riparian habitat restoration. This could contribute to, but would not achieve, the 10-year target of 250 acres and 8.5 linear miles of riparian restoration recommended in the WRIA 9 (2021) Salmon Recovery Plan Update. PEIS Appendix B, Section 5.6.1.5, details the WRIA 9 habitat plan targets that could be achievable under Alternative 1. Overall, some improvements for salmonids could be achieved under Alternative 1, but not to the extent that would meet recovery goals.

Ecosystems and Water Quality: Flood facilities are well documented to substantially influence ecosystem processes. The processes considered in the analysis (refer to PEIS Appendix B) include floodplain interaction, habitat connectivity, hydrology/flow regime, sediment dynamics, wood load, trophic support, and temperature. Alternative 1 could increase the degree of floodplain confinement of the Lower Green River by approximately 13 percent, which could continue to degrade ecosystems and habitat quality. However, Alternative 1 could also result in restoration of riparian vegetation at targeted locations on the Lower Green River (85 to 125 acres), which could provide a means to moderate water temperatures, thus improving water quality conditions for salmonids during peak summer months. Habitat improvements associated with Type B and Type C facilities could contribute modestly to the WRIA 9 (WRIA 9 2021) recommended 10-year targets for future habitat conditions.

5.1.1.2 Alternative 2: Systematic Multibenefit Implementation

Fish and Aquatic Habitat: Alternative 2 would continue to degrade the ecosystem functions that support salmonids, but to a lesser degree than Alternative 1. Alternative 2 could contribute to and could potentially achieve the 10-year target for LWD density in the Lower Green River channel. Alternative 2 could increase the amount of partially inundated streambank area available for floodplain and/or riparian habitat restoration to 100 to 150 acres compared to the 85 to 125 acres available under

Alternative 1. Alternative 2 could contribute to, but would not achieve, the 10-year target of 250 acres and 8.5 linear miles of riparian restoration recommended in the WRIA 9 (WRIA 9 2021) Salmon Recovery Plan Update. PEIS Appendix B, Section 5.6.1.5 details the WRIA 9 habitat plan targets that could be achievable under Alternative 2. Overall, additional improvements for salmonids could be provided under Alternative 2 compared to Alternative 1, but not to the extent that would meet recovery goals.

Ecosystems and Water Quality: Alternative 2 could increase the degree of floodplain confinement of the Lower Green River by approximately 12 percent, which could continue to degrade ecosystems and habitat quality. However, Alternative 2 could also result in restoration of riparian vegetation at targeted locations on the Lower Green River (between 100 to 150 acres), which could provide slight improvements to water temperature compared to Alternative 1. Restoration of these habitats may support all analyzed ecosystem processes and would contribute to the recommended 10-year targets for future habitat conditions to a greater degree than Alternative 1 (WRIA 9 2021).

5.1.1.3 Alternative 3: Enhanced Systematic Multibenefit Implementation

Fish and Aquatic Habitat: Alternative 3 could result in the least amount of degradation of the ecosystem functions for salmonids compared to Alternatives 1 and 2. Alternative 3 could contribute to, and could potentially achieve, the 10-year target for LWD density in the Lower Green River channel, providing progressively greater net benefits compared to Alternatives 1 and 2. When properly designed, incorporation of woody debris into levees could promote pool formation, sediment sorting, introduction of organic substrates, and increase of habitat diversity for macroinvertebrate communities. Alternative 3 could also provide the greatest opportunity for restoration of habitats that could support juvenile salmonid rearing and adult migration compared to the other alternatives (between 265 to 405 acres).

In addition, Alternative 3 could include acquisition of selected floodplain properties for natural flood storage, 195 to 295 acres of which could potentially be available for restoration of floodplain wetlands and wetland buffers. The combined 380 to 580 acres of habitat available for floodplain and riparian restoration under Alternative 3 would more than double the amount made available under Alternatives 1 and 2, and could potentially provide opportunities to achieve the recommended restoration targets in the WRIA 9 (2021) Salmon Recovery Plan Update (refer to PEIS Appendix B, Section 5.6.1.5). Alternative 3 could also provide for strategic coordination of property acquisitions, flood facility project design, and project siting to optimize habitat restoration opportunities. As such, Alternative 3 could likely result in the greatest benefits to salmonids.

Ecosystems and Water Quality: Alternative 3 could increase the degree of floodplain confinement of the Lower Green River by approximately 18 percent, but would also include more Type C facilities and could increase the potential for habitat enhancements within the associated setbacks. This could also result in the most opportunities for riparian restoration (between 265 to 405 acres), which could provide the greatest potential for improvements to water temperature compared to Alternative 1 or Alternative 2. In addition, Alternative 3 could result in the restoration of 66 additional acres of floodplain wetlands and the 195 to 295 acres of habitat available for restoration on lands acquired for flood storage that could support fish, aquatic plants, and macroinvertebrates. Restoration of these habitats would likely achieve the recommended 10-year targets for high-flow channel, low-flow channel, and bank armor restoration, and it could contribute to the LWD restoration target (WRIA 9 2021). On this basis, Alternative 3 would provide the greatest opportunity to maintain and enhance ecosystem processes on the Lower Green River.

5.1.2 Indirect Impacts

The alternatives include several components with the potential to improve aquatic ecosystem function in ways that could benefit salmonids. Several of these components could interact synergistically, such

that the indirect effects of the alternatives could likely increase over time. For example, riparian restoration and increased woody debris density in the Lower Green River would build over time and could increase the frequency and depth of pool habitat, which are areas characterized by deeper water and slower moving currents. Restoration of riparian vegetation could also help ameliorate high water temperatures during the summer adult migration and juvenile rearing period and would offset some of the adverse effects of climate change on water quality. Depending on how these effects were distributed, channel shading could combine synergistically with pool habitat to create areas of cooler water that provides valuable habitat for adult and juvenile salmonids during the summer months. Riparian habitat restoration, increased floodplain habitat connectivity, and increased habitat complexity could, in turn, likely lead to an increase in biological productivity and improved habitat conditions for juvenile salmonid rearing.

These beneficial indirect effects would likely scale with the extent of floodplain and riparian habitat enhancements provided by each alternative, with Alternative 1 providing the least extensive indirect benefits. Alternative 2 could provide more opportunity for habitat and floodplain restoration, which would, in turn, translate to more extensive indirect habitat benefits for salmonids. Alternative 3 could make the most habitat available for floodplain and riparian habitat restoration, likely leading to greater indirect benefits. Alternatives 2 and 3 could include planning and implementing flood management projects systematically to optimize flood risk reduction and habitat benefits, whereas Alternative 1 would be developed on a project-by-project basis, meaning that projects would not be designed and sited to optimize the distribution of thermal refugia across the Lower Green River to provide the greatest habitat benefit. Overall, the planning potential and extent of restoration opportunities mean that Alternative 3 could likely lead to larger indirect benefits compared to Alternatives 1 and 2.

5.1.3 Construction Impacts

Each alternative would include levee construction, which could have short-term impacts on aquatic/riparian habitats and biota. Activities that could cause impacts to salmonids include (1) work zone isolation and fish exclusion, (2) generation of underwater noise, (3) generation of suspended sediments, and (4) riparian clearing. Overall, these impacts could also result in harm and disruption of normal behaviors, as well as causing anywhere from avoidance up to injury and mortality during construction activities. Levee construction could also result in temporary clearing in the riparian zone. Indirect effects associated with removal of riparian vegetation could include increased water temperatures and decreased water quality attributable to a loss of shade and cover adjacent to the active channel. Clearing could also reduce detrital input of insects and organic litter. The potential severity of these effects could depend on the existing vegetation community composition and density. Maturation of proposed restoration plantings would likely return disturbed areas to function in manners similar to, or improved over, the baseline within several growing seasons.

5.2 Treaty Rights and Access

The Lower Green River is part of the Muckleshoot Indian Tribe's U&A Fishing Area, as defined in *United States v. Washington, 384 F. Supp. 312,367* (W.D. Wash. 1974) (the Boldt decision). Within the U&A, the Muckleshoot Indian Tribe retains commercial, subsistence, and ceremonial treaty fishing rights, as well as the co-management authority for fisheries resources in Washington State. The construction and maintenance of flood control facilities such as levees along the Lower Green River have resulted in loss of historical Tribal treaty fishing sites. Additionally, in some areas, flood control gates and lack of access further restrict access to the treaty fishing areas that remain (Muckleshoot Indian Tribe 2022). The Boldt decision also confirmed that the Confederated Tribes and Bands of the Yakama Nation has a treaty

right to fish in certain riverine and marine areas in Puget Sound with the permission of the Tribes that have treaty rights and U&A in the area, such as the Muckleshoot Indian Tribe along the Green River.

Construction of the existing levees resulted in hardened steepened slopes that limit access to fishing areas, impact natural habitat features, and reduce eddies used by returning adult salmon that traditionally provided fishing locations. The steep rocky embankments also result in proliferation of invasive plants, including Himalayan blackberries, resulting in the loss of native vegetation and resources that were once gathered and used by Tribal members.

5.2.1 Direct Impacts by Alternative

5.2.1.1 Alternative 1: Project by Project Multibenefit Implementation

Under Alternative 1, flood risk reduction projects would be implemented on a project-by-project basis. The District would consult with the Muckleshoot Indian Tribe (and other Tribes as appropriate) on potential impacts to Treaty fishing resources and access to Treaty fishing areas. Alternative 1 would provide few opportunities to comprehensively evaluate Treaty fishing access and other improvements. However, this alternative could provide several opportunities for individual projects to be coordinated with the Tribes to address access and habitat features that could improve fishing. Individual projects might also present opportunities to reduce slopes and provide more native trees and vegetation.

5.2.1.2 Alternative 2: Systematic Multibenefit Implementation

Alternative 2 would provide limited improvement to treaty fishing access and habitat features. There could be some lessening of steep slopes, and more trees and native vegetation could be planted in the identified riparian restoration areas, which could also improve access and habitat. In some areas, features could be included that could provide holding areas for returning adults and safe access to the shoreline (e.g., pools, boat launches, trails, side channels). Overall, riparian vegetation could be improved, and there could be areas available for off channel features compared to Alternative 1.

5.2.1.3 Alternative 3: Enhanced Systematic Multibenefit Implementation

Alternative 3 would provide more opportunities than Alternatives 1 and 2 to create shallower slopes, off channel habitat, and setbacks that could allow more natural river features and riparian vegetation. The District could work with the Tribe to identify priority fishing access areas near improved habitat features that could provide holding for adult salmon. Alternative 3 could provide more opportunities for comprehensive inclusion of habitat features and safe access to the river.

5.2.2 Indirect Impacts

Indirect impacts are generally explained in Section 1. In the case of aquatic resources related to Tribal interests, indirect effects may occur as the result of synergistic effects of the proposed alternatives on the aquatic environment.

The proposed alternatives would include several components with the potential to improve aquatic ecosystem function in ways that could benefit adult salmonid migration and rearing that could support Tribal treaty fishing activities over time. The proposed alternatives could all be likely to result in an increase in the extent of mature riparian vegetation, amount of functional LWD, and frequency and depth of pool habitat in the Lower Green River over the next 30 years. Each alternative would include implementation of Type B and Type C flood control facilities that could support restoration of riparian vegetation and incorporate LWD density to varying degrees, generally scaling up from Alternative 1 to

Alternative 3. This indicates that each alternative could likely lead to beneficial indirect effects on adult salmonid habitat.

Alternative 1 would result in the fewest linear feet of Type B and Type C facilities, and it could make the least amount of habitat available for riparian restoration. These facilities could also be developed on a project-by-project basis, meaning that projects would not be designed and sited to optimize the distribution of thermal refugia across the Lower Green River to provide the greatest habitat benefit. In contrast, Alternative 2 could increase the extent of Type B and Type C facilities and the acres of habitat available for functional riparian restoration. Alternative 2 could also allow for planning and implementing projects systematically to optimize flood control and habitat benefits. Alternative 3 could present the greatest opportunity for beneficial indirect effects on adult salmonid habitat. This alternative could further increase the linear feet and acres of habitat available for riparian restoration and LWD recruitment, add properties acquired for flood storage, and could include strategic design and site flood control and habitat restoration projects to provide habitat benefits.

5.2.3 Construction Impacts

Construction of Type A, Type B, and Type C levee and floodwall capital projects share similar means and methods, equipment, best management practices (BMPs), and timing restrictions for in-water work. Flood facility construction is summarized in PEIS Appendix A, Section 4.5.5. Under all alternatives, construction activities including work zone isolation, in-water work, elevated noise, earthmoving, and increased sedimentation would all have the potential to displace Tribal treaty fishers from accessing fishing areas. Construction activities could also displace or affect the distribution of returning adult fish in the river and where traditional fishing areas could occur. Sedimentation clearing of riparian vegetation might also affect fish presence and habitat that could support fisheries resources, as discussed above in Section 3.1.

5.3 Cultural Resources

T. T. Waterman recorded many ethnographic place names in the Puget Sound area (Hilbert et al. 2001). These place names offer a glimpse into the typical uses of the landscape and locations of villages across the region. More recent studies have confirmed the presence of Waterman's ethnographically recorded villages and added several locations (Dailey 2018; Thrush 2007). Fifty-nine ethnographic place names have been documented within the Lower Green River Corridor. Generally, the ethnographic data indicate that the waterways and floodplains were used for a variety of resource collection activities and included numerous permanent and seasonal villages. The Green River Valley also played a prominent role in regional travel. Indigenous peoples used the river as a transportation route from the south to what is now Elliott Bay (Ruby et al. 2013).

As described in PEIS Appendix C, there are two notable time periods from which there are high sensitivity for sites in the corridor: (1) between 5000 calibrated years before the present (cal B.P.) and 2500 cal B.P., and (2) between 2500 cal B.P. and 200 years ago. During the first period, the Lower Green River Corridor provided abundant resources used through field camps on the floodplains and more permanent camps on the higher river terraces. However, site preservation would have been poor within the valley because of the alluvial forces created by the rivers (Kopperl et al. 2016). Archaeological sites in other portions of King County indicate status differentiation and complex social hierarchies developed in the region (Ames and Maschner 1999; Kopperl et al. 2016). Larson and Lewarch's (Larson and Lewarch 1995) excavations at West Point in Seattle illustrate the cultural sequence during this period. The site function is not static, but there is a shift from a base camp to a resource extraction location while the site is in use. The presence of personal adornment items in earlier deposits may indicate differentiation

in status within groups. An increased reliance on stored foods and controlled access to resources also developed during this period. Salmon harvesting, berry processing, and even shellfish gathering require a great deal of well-developed social organization to implement on the scale observed through the archaeological record (e.g., Duwamish No. 1 described in Campbell 1981).

The second period was one of resource intensification (e.g., salmon mass capture and storage), collector-like settlement patterns with winter village occupation, and complex social organization. There are two previously recorded archaeological sites within the Lower Green River Corridor that date to this ethnographic period. They are Tualdad Altul (45KI59) and the White Lake Site (45KI438). Tualdad Altul is a field camp used primarily for fishing, although evidence of hunting and plant gathering was also found at the site (Kopperl et al. 2016). The White Lake Site is another seasonal field camp, used primarily for plant gathering activities (Kopperl et al. 2016; Lewarch et al. 1996).

5.3.1 Direct Impacts by Alternative

5.3.1.1 Alternative 1: Project by Project Multibenefit Implementation

Under Alternative 1, flood risk reduction projects would be implemented on a project-by-project basis. The impacts on the archaeological resources could predominantly come from residual inundation during flooding episodes and not as a result of flood hazard management actions. Based on planning-level projections, up to eight previously recorded archaeological resources are situated in areas close enough to the Green River to have the potential to be directly impacted by facility work under Alternative 1. Of those resources, one has been determined eligible for listing in the NRHP, and one has been deemed not eligible for listing in the NRHP. The remaining resources have not yet been evaluated for listing in the NRHP.

King County's and DAHP's predictive models indicate that ground disturbing projects on land adjacent to the river have a high probability or a very high probability of encountering archaeological resources, particularly when the ground disturbance occurs outside of previously disturbed areas. Given the amount of development that has already occurred during the construction and maintenance of existing flood control facilities, the direct impacts on archaeological resources related to repairs and improvements of those facilities could likely be limited. Potential impacts on both previously recorded archaeological resources and archaeological resources that have not yet been identified along the Green River are more likely to occur through the relocation or extension of existing flood hazard management facilities and the construction of new flood hazard management facilities.

Approximately 15 previously recorded archaeological resources are within the 18,800 cfs inundation area, and they could be impacted by flooding episodes. These impacts are residual inundation from the flood event and are not a result of the District's flood hazard management actions. They include resources that have been deemed eligible for listing in the NRHP, resources that have been deemed not eligible for listing in the NRHP, and resources that have not yet been evaluated. Most of the resources fall within the inundation areas of lower flows, as well. These resources are on or near the surface, making them vulnerable to flood waters and erosion. The inundation area is modeled as having a high or very high probability of archaeological resources, so it is likely that unrecorded archaeological resources exist within the inundation area.

The impacts on the archaeological resources could include destruction of artifacts in flood waters, loss of context resulting from artifact displacement, loss of sediments within a site (deflation), and/or the burial of archaeological resources under flood deposits. All of these impacts would diminish the integrity of the resources. Given the nature of the potential impacts, repeated low-level flooding could result in cumulative impacts that could be as damaging to a resource as one high-flow inundation event, if not more so.

5.3.1.2 Alternative 2: Systematic Multibenefit Implementation

The potential impacts on archaeological resources under Alternative 2 would be similar to those under Alternative 1. The difference in potential impacts between the two alternatives rests in the addition of flood proofing to flood hazard management and restoration of riparian habitats under Alternative 2.

As described for Alternative 1, facility work under Alternative 2 could potentially impact one resource that has been deemed eligible for listing in the NRHP, one resource that has been deemed not eligible for listing, and six resources that have not been evaluated for listing. The potential for encountering archaeological resources during ground disturbance would be similar to Alternative 1 and would most likely occur through relocation or extension of existing flood hazard management facilities and development of new flood hazard management facilities. However, these resources could also be encountered during ground disturbance associated with flood proofing to flood hazard management and riparian habitat restoration under Alternative 2.

As under Alternative 1, approximately 15 previously recorded archaeological resources could be within the 18,800 cfs inundation area, and they could be directly impacted by inundation during flooding episodes. As under Alternative 1, these impacts are residual inundation from the flood event and are not a result of the District's flood hazard management actions. Because the residual inundation area is modeled as having a high or very high probability of archaeological resources, the likelihood that unrecorded archaeological resources could be present, and the types of impacts that could occur, would be the same for Alternative 2 as for Alternative 1.

The Lower Green River Corridor also includes approximately 3,275 unevaluated architectural resources constructed between 1900 and 1971. Of these, an estimated 162 resources (as compared to 147 under Alternative 1), approximately five percent, could be located within the 18,800 cfs inundation area, and they could be directly impacted by residual inundation during flooding events under Alternative 2. Most of these resources are commercial/industrial or residential/agricultural in nature. These resources have not been evaluated for listing in local, state, or national registers of historic places. However, due to their age, they have the potential to qualify for listing should they meet the eligibility criteria. Therefore, flood damage, at either 18,800 cfs or at lower flows, could impact resources that would qualify for listing in the NRHP, were they to be evaluated.

5.3.1.3 Alternative 3: Enhanced Systematic Multibenefit Implementation

The potential impacts on archaeological resources under Alternative 3 would be similar to those under Alternative 1. Alternative 3 would differ in the addition of flood proofing to flood hazard management and restoration of riparian habitats (also part of Alternative 2), as well as the inclusion of land acquisition and flood storage as project elements.

As described for Alternatives 1 and 2, facility work under Alternative 3 could potentially impact one resource that has been deemed eligible for listing in the NRHP, one resource that has been deemed not eligible for listing, and six resources that have not been evaluated for listing. The potential for encountering archaeological resources during ground disturbance are similar to Alternative 1, and they would most likely occur through relocation or extension of existing flood hazard management facilities and development of new flood hazard management facilities. However, these resources could also be encountered during ground disturbance associated with flood proofing to flood hazard management and riparian habitat restoration, as well as to development, operation and maintenance activities in areas acquired for flood storage under Alternative 3.

As described for Alternatives 1 and 2, approximately 15 previously recorded archaeological resources could be within the 18,800 cfs inundation area and could be directly impacted by inundation during flooding episodes. As under Alternative 1, these impacts are residual inundation from the flood event and are not a result of the District's flood hazard management actions. Because the residual inundation area is modeled as having a high or very high probability of archaeological resources, the likelihood that unrecorded archaeological resources could be present, and the types of impacts that could occur, would be the same for Alternative 3 as for Alternatives 1 and 2.

Although all three alternatives would substantially reduce the extent of flooding in the Lower Green River Corridor, previously recorded archaeological resources could still occur in areas that are inundated at 18,800 cfs. These archaeological resources could be on or near the surface, making them vulnerable to flood waters and erosion. Undiscovered archaeological resources could also be impacted by flood waters.

It is possible that undocumented burials or cemeteries could be present in locations within the Green River Corridor. Undocumented burials or cemeteries along and adjacent to the Lower Green River could be disturbed or destroyed by flooding events with the potential to wash out or further bury remains within a flood deposit. As with archaeological resources, cumulative impacts from repeated low-level flooding could be as damaging to buried human remains as a single, high-flow inundation event, if not more so.

5.3.2 Construction Impacts

Construction that could involve ground disturbance including earthwork, vegetation clearing, grading for a staging area, construction temporary access routes, and other earthwork could have the potential to permanently impact archaeological resources.

5.4 Traditional Cultural Properties

No information regarding TCPs is publicly available, but there is a potential that NRHP-eligible TCPs exist within the Lower Green River Corridor. Project facility work, flooding events within the 18,800 cfs inundation area, and flooding events at lower flows could each impact areas within the Lower Green River Corridor where TCPs are located. A direct impact to a TCP would depend on the characteristics of the TCP and its relationship to traditional cultural practices and beliefs. A direct impact could include ground disturbance within the TCP, alterations to the viewshed of the TCP, alteration in land use in an area containing a TCP, or damage from a flooding episode that could impact the integrity of the resource or destroy it. In each of these instances, project elements could alter the landscape to the point that the relationship between the TCP and the cultural beliefs and/or practices that contribute to its significance would be impacted. Because no differences have been identified between the alternatives, this topic is not further addressed in an alternative-specific analysis.

6. MITIGATION

PEIS Appendix B Section 5.7 (Aquatic Resources) describes mitigation measures to avoid, minimize, and mitigate for impacts on salmonids and habitat. PEIS Appendix B Section 4.4 (Water Quality) describes BMPs that could protect water quality.

Mitigation for specific impacts on Tribal resources could be addressed in government-to-government consultation with the affected Tribes as the project could be refined and impacts could become better known. Mitigation could address impacts on aquatic resources, habitat, treaty fishing access, and cultural resources. Development of a systematic multibenefit plan (i.e., Alternative 2 and Alternative 3) could also include further research and consultation on Tribal and cultural resources as well as TCPs to enable avoidance of these locations.

7. REFERENCES

Ames, Kenneth M., and Herbert D. G. Maschner. 1999. Peoples of the Northwest Coast, Their Archaeology and Prehistory. Thames and Hudson Limited, London, England.

Campbell, Sarah K. 1981. The Duwamish No. 1 Site: A Lower Puget Sound Shell Midden. Research Report 1, Office of Public Archaeology, Seattle, Washington.

City of SeaTac, 2018. Zoning Map. Accessed December 2022. https://www.arcgis.com/home/item.html?id=a51bf33abeca4dc89038f61ff36693b6

Collins, Brian and Amir Sheikh. 2005. Historical Aquatic Habitats in the Green and Duwamish River Valleys and the Elliott Bay Nearshore, King County, Washington. Department of Earth and Space Sciences, University of Washington.

Dailey, Tom. 2018. Coast Salish Villages of Puget Sound. Electronic document, http://coastsalishmap.org, accessed July 19, 2020.

Haeberlin, Hermann, and Erna Gunther. 1930. The Indians of Puget Sound. University of Washington Publications in Anthropology 4(1):1–83.

Hilbert, Vi, Jay Miller, and Zalmai Zahir. 2001. Puget Sound Geography: Original Manuscript. from T.T. Waterman. Edited with additional material from Vi Hilbert, Jay Miller, and Zalmai Zahir. Lushootseed Press, Seattle, Washington.

Kerwin, J. and T. S. Nelson. 2000. Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound Watersheds (WRIA 9 and Vashon Island). Washington Conservation Commission and King County Department of Natural Resources. Seattle, Washington.

King County Assessor. 2020. "King County Assessments Data Download." Accessed August 2020. https://info.kingcounty.gov/assessor/datadownload/default.aspx

King County Flood Control District. 2019. *System-Wide Improvement Framework, Lower Green River, King County, Washington.* Prepared by the King County Water and Land Resources Division.

King County Flood Control District. 2016. Green River, King County, Washington: System-Wide Improvement Framework (SWIF) Interim Report. February. King County, Washington.

Kopperl, Robert, Charles Hodges, Christian Miss, Johonna Shea, and Alecia Spooner. 2016. Archaeology of King County, Washington: A Context Statement for Native American Archaeological Resources. SWCA Environmental Consultants, Seattle, Washington. Prepared for the King County Historic Preservation Program, Seattle, Washington.

Larson, Lynn L., and Dennis E. Lewarch (editors). 1995. The Archaeology of West Point, Seattle, Washington: 4,000 Years of Hunter-Fisher-Gatherer Land Use in Southern Puget Sound Volume 1, Parts 1 and 2. Larson Anthropological Archaeological Services, Ltd., Seattle, Washington. Prepared for King County Department of Metropolitan Services, Seattle, Washington. Submitted to CH2M Hill, Bellevue, Washington. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

Lewarch, Dennis, Lynn Larson, Leonard Forsman, Guy Moura, Eric Bangs, and Paula Johnson. 1996. King County Department of Natural Resources Water Pollution Control Division Alki Transfer/CSO Facilities Project Allentown Site (45KI431) and White Lake Site (45KI438 and 45KI438a) Data Recovery. Larson Anthropological/Archaeological Services, Seattle, Washington. Prepared for King County Department of Natural Resources, Seattle, Washington. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.

Muckleshoot Indian Tribe. 2022. RE: Lower Green River Corridor Flood Hazard Management Plan (Plan) and Request for Comments on Scope of Programmatic Environmental Impact Statement (PEIS) submitted to the King County Flood Control District February 4, 2022.

National Park Service (NPS). 2012. National Register of Historic Places – Traditional Cultural Properties (TCPs), A Quick Guide for Preserving Native American Cultural Resources. Electronic document, https://www.nps.gov/history/tribes/documents/tcp.pdf, accessed August 1, 2020.

Ruby, Robert H., John A. Brown, and Cary C. Collins. 2013. A Guide to the Indian Tribes of the Pacific Northwest. Third Edition. University of Oklahoma Press, Norman, Oklahoma.

Spier, Leslie. 1936. Tribal Distribution in Washington. General Series in Anthropology No. 3. George Banta Publishing Company, Menasha, Wisconsin.

Suttles, Wayne, and Barbara Lane. 1990. Southern Coast Salish. In Northwest Coast, edited by Wayne Suttles, pp. 485–502. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Swanton, John Reed. 1952. Indian Tribes of Washington, Oregon and Idaho. Bureau of American Ethnology Bulletin 145, Smithsonian Institution, Washington, D.C.

Thrush, Coll. 2007. Native Seattle: Histories from the Crossing-Over Place. University of Washington Press, Seattle.

Water Resource Inventory Area 9 (WRIA 9). 2021. Green/Duwamish and Central Puget Sound Watershed Salmon Habitat Plan 2021 Update. Making Our Watershed Fit for a King. Approved by the Watershed Ecosystem Forum February 11, 2021.