February 2020
Proposed Chehalis River Basin Flood Damage Reduction Project
SEPA Draft Environmental Impact Statement

Appendix L
Tribal Resources Discipline Report

Publication No.: 20-06-002

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About this Document

This discipline report has been prepared as part of the Washington Department of Ecology's (Ecology's) State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS) to evaluate a proposal from the Chehalis River Basin Flood Control Zone District (Applicant).

Proposed Action

The Applicant seeks to construct a new flood retention facility and temporary reservoir near Pe Ell, Washington, and make changes to the Chehalis-Centralia Airport levee in Chehalis, Washington. The purpose of the Applicant's proposal is to reduce flooding originating in the Willapa Hills and improve levee integrity at the Chehalis-Centralia Airport to reduce flood damage in the Chehalis-Centralia area.

Time Frames for Evaluation

If permitted, the Applicant expects Flood Retention Expandable (FRE) facility construction would begin in 2025 and operations in 2030, and the Airport Levee Changes construction would occur over a 1-year period between 2025 and 2030. The EIS analyzes probable impacts from the Proposed Action and alternatives for construction during the years 2025 to 2030 and for operations from 2030 to 2080. For purposes of analysis, the term "mid-century" applies to the operational period from approximately 2030 to 2060. The term "late-century" applies to the operational period from approximately 2060 to 2080.

Scenarios Evaluated in the Discipline Report

This report analyzes probable significant environmental impacts from the Proposed Action, the Local Actions Alternative, and the No Action Alternative under the following three flooding scenarios (flow rate is measured at the Grand Mound gage):

- **Major flood:** Water flow rate of 38,800 cubic feet per second (cfs) or greater
- **Catastrophic flood:** Water flow rate of 75,100 cfs
- **Recurring flood:** A major flood or greater that occurs in each of 3 consecutive years

The general area of analysis includes the area in the vicinity of the FRE facility and temporary reservoir; the area in the vicinity of the Airport Levee Changes; and downstream areas of the Chehalis River to approximately river mile 9, just west of Montesano.

Local Actions Alternative

The Local Actions Alternative represents a local and nonstructural approach to reduce flood damage in the Chehalis-Centralia area. It considers a variety of local-scale actions that approximate the Applicant's purpose through improving floodplain function, land use management actions, buying out at-risk properties or structures, improving flood emergency response actions, and increasing water storage from Pe Ell to Centralia. No flood retention facility or Airport Levee Changes would be constructed.

No Action

Under the No Action Alternative, no flood retention facility or Airport Levee Changes would be constructed. Basin-wide large and small scale efforts would continue as part of the Chehalis Basin Strategy work, and local flood damage reduction efforts would continue based on local planning and regulatory actions.

SUMMARY

For the purposes of this document, tribal resources refers to the collective rights and access to traditional areas and times for gathering resources associated with a tribe's sovereignty or formal treaty rights. These resources may include plants, wildlife, or fish used for commercial, subsistence, and ceremonial purposes.

Potential impacts to fish, wildlife, and habitats are discussed in detail in the *Earth Discipline Report* (Shannon & Wilson and Watershed GeoDynamics 2020), *Fish Species and Habitat Discipline Report* (Anchor QEA 2020a), *Water Discipline Report* (ESA 2020a), *Wetlands Discipline Report* (Anchor QEA 2020b), and *Wildlife Species and Habitats Discipline Report* (Anchor QEA 2020c).

Cultural and historic resources related to tribes are discussed in detail in the *Cultural Resources Discipline Report* (ESA 2020b). Recreation resources are discussed in the *Recreation Discipline Report* (ESA 2020c), and environmental health and safety are discussed in the *Environmental Health and Safety Discipline Report* (ESA 2020d).

Construction and operation of the Proposed Action could result in impacts on tribal resources. The resource-specific discipline reports identify significant adverse impacts on fish and wildlife species, aquatic and terrestrial habitat, water resources, recreation, wetlands, and geomorphology. These impacts could impact tribal resources, including wildlife, vegetation, and fish available for harvest and use by tribes. Making a determination of significance related to treaty-reserved rights is not part of this discipline report. Mitigation associated with potential impacts on tribal resources would be addressed directly with the Confederated Tribes of the Chehalis Reservation, the Quinault Indian Nation, and other tribes during government-to-government consultations. Mitigation measures are expected to be developed as part of the permitting, regulatory, and consultation processes for fish species and habitat, wildlife, and cultural resources that could also affect tribal resources.

Tables L-1 and L-2 include a summary of the potential impacts that could affect tribal resources.

Table L-1

Summary of Potential Impacts from Proposed Action that Could Affect Tribal Resources

IMPACT	IMPACT FINDING
PROPOSED ACTION (FRE FACILITY AND AIRPORT LEVEE CHANGES) – CONSTRUCTION	
Significant adverse impacts to fish and aquatic species, aquatic habitat, wildlife species, wildlife habitat, geomorphology, and water quality, during construction of the Proposed Action.	Could impact tribal resources
Impacts to cultural resources will be determined through the Section 106 consultation process under the National Historic Preservation Act.	Could impact tribal resources
PROPOSED ACTION (FRE FACILITY AND AIRPORT LEVEE CHANGES) – OPERATIONS	
Significant adverse impacts to fish and aquatic species, aquatic habitat, wildlife species, wildlife habitat, water quality, and geomorphology during operation of the Proposed Action.	Could impact tribal resources
Impacts to cultural resources will be determined through the Section 106 consultation process under the National Historic Preservation Act.	Could impact tribal resources

Table L-2

Summary of Potential Impacts from Alternatives that Could Affect Tribal Resources

IMPACT	IMPACT FINDING
LOCAL ACTIONS ALTERNATIVE	
Impacts to cultural resources will be determined through the Section 106 consultation process under the National Historic Preservation Act.	Could impact tribal resources
Tribal resources could be vulnerable during a major or catastrophic flood.	**Continuing substantial flood risk**
NO ACTION ALTERNATIVE	
Tribal resources could be vulnerable during major and catastrophic floods.	**Continuing substantial flood risk**

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TABLE OF CONTENTS

ABOUT THIS DOCUMENT ..... L-i
SUMMARY ..... L-ii
1 INTRODUCTION L-1
1.1 Resource Description L-1
1.2 Regulatory Context L-1
2 METHODOLOGY L-4
2.1 Study Area L-4
2.2 Affected Environment L-6
2.3 Studies and Reports Referenced/Used L-14
2.4 Technical Approach L-14
2.5 Impact Assessment L-15
3 TECHNICAL ANALYSIS AND RESULTS L-16
3.1 Overview L-16
3.2 Proposed Action L-16
3.3 Local Actions Alternative L-37
3.4 No Action Alternative L-39
4 REFERENCES L-42

LIST OF TABLES

Table L-1 Summary of Potential Impacts from Proposed Action that Could Affect Tribal Resources ..... L-iii
Table L-2 Summary of Potential Impacts from Alternatives that Could Affect Tribal Resources. L-iii
Table L-3 Regulations, Statutes, and Guidelines for Tribal Resources L-1
Table L-4 Quinault Treaty Grays Harbor Salmon, Steelhead, and White Sturgeon Fisheries, Annual Catch (Number of Fish) L-10
Table L-5 Quinault Treaty Ocean Troll Fishery, Annual Catch L-11
Table L-6 Ethnographically Reported Natural Resource Species Used by Tribal Communities .. L-12

LIST OF FIGURES

Figure L-1 Vicinity Map L-5

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1 INTRODUCTION

1.1 Resource Description

For the purposes of this report, "tribal resources" refers to the collective rights and access to traditional areas and times for gathering resources associated with a tribe's cultural practices, sovereignty, or formal treaty rights. These resources include plants, wildlife, or fish used for commercial, subsistence, and ceremonial purposes and cultural resources. This document describes tribal resources in the study area, including resources identified by tribes as important to the Confederated Tribes of the Chehalis Reservation (Chehalis Tribe) and Quinault Indian Nation (Quinault). It describes potential impacts on resources that could result from the Proposed Action or alternatives that could affect tribal resources.

Potential impacts to fish and wildlife habitat and species are discussed in detail in the *Fish Species and Habitat Discipline Report* (Anchor QEA 2020a) and *Wildlife Species and Habitat Discipline Report* (Anchor QEA 2020c). Potential impacts to water and geomorphology that could impact species or habitat are discussed in the *Water Discipline Report* (ESA 2020a) and *Earth Discipline Report* (Shannon & Wilson and Watershed GeoDynamics 2020). Cultural and historic resources and potential impacts related to tribes are discussed in detail in the *Cultural Resources Discipline Report* (ESA 2020b). This report summarizes findings from these reports; additional information and analysis are detailed in the resource-specific reports.

1.2 Regulatory Context

Federal treaties, judicial decisions, laws, and regulations used for determining potential impacts on tribal resources are summarized in Table L-3.

Table L-3
Regulations, Statutes, and Guidelines for Tribal Resources

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
FEDERAL	
Treaty of Olympia of 1856	Set-aside reservation land and reserved fishing, gathering, and hunting rights for the Quinault Indian Nation throughout their usual and accustomed grounds.
United States v. Washington, 384 F. Supp. 312 (W.D. Wash. 1974), "Boldt Decision"	Federal district court interpreted the rights of treaty tribes to take fish in their "usual and accustomed places in common with all citizens" to mean that treaty tribes have a treaty-reserved right to harvest 50% of the harvestable portion of fish.
Washington v. Washington State, Commercial Passenger Fishing Vessel Association, 443 U.S. 658 (1979)	U.S. Supreme Court upheld the 1974 Boldt Decision.

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
United States v. Washington, 853 F. 3d 946, 965 (9th Cir. 2017), "Culverts Case" (Boldt Phase II)	Ninth Circuit upholds district court's grant of summary judgment to tribes and an injunction requiring salmon passage at all state-owned culverts.
Washington v. United States, 138 S. Ct. 1832, 584 U.S. (U.S. Supreme Court, 2018)	Supreme Court affirms Ninth Circuit "Culvert Case" decision.
Section 106 of the National Historic Preservation Act, and its implementing regulations at 36 Code of Federal Regulations 800, and National Register of Historic Places Bulletin No. 38	Requires federal agencies to consider the effects of their undertakings on historic properties. Historic properties are prehistoric or historic sites, districts, structures, or objects that are eligible for listing in the National Register of Historic Places.
Endangered Species Act (ESA; 16 USC 1531 et seq.)	Requires consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries when undertaking a federal action to ensure the conservation of any ESA-listed animal species and critical habitat, so as not to jeopardize the continued existence of any listed species. NOAA Fisheries manages ESA-listed marine and anadromous species, while USFWS manages listed terrestrial and freshwater species.
STATE	
Centennial Accord Between the Federally Recognized Indian Tribes in Washington State and the State of Washington (GOIA 1989) and its implementation plan (Millennium Agreement; GOIA 1999)	The Washington Department of Ecology consults with tribes in a government-to-government relationship to protect and manage shared natural resources. Fish and wildlife plans developed by Washington Department of Fish and Wildlife (WDFW) advance conservation and recovery of natural resources, and therefore influence negotiations between Native American tribes and Washington State on management of natural resources.
WDFW Grays Harbor Basin Salmon Management (Policy C-3621)	Sets a general management direction and provides guidance for WDFW management of all Pacific salmon returning to Grays Harbor Basin, which is defined as Grays Harbor and its freshwater tributaries.
WDFW Hatchery and Fishery Reform (Policy C-3619)	Advances the conservation and recovery of wild salmon and steelhead by promoting and guiding the implementation of hatchery reform.
WDFW Columbia River Basin Salmon Management (Policy C-3620)	Promotes orderly fisheries, advances the conservation and recovery of wild salmon and steelhead, and maintains or enhances the economic well-being and stability of the fishing industry in the state.
WDFW North of Falcon Policy (Policy C-3608)	Guides WDFW staff in considering conservation, allocation, in-season management, and monitoring issues associated with the annual salmon fishery planning process known as "North of Falcon."

Concurrent with the Washington State Environmental Policy Act (SEPA) review process, the U.S. Army Corps of Engineers (Corps), as federal lead agency, is conducting a review of the Proposed Action under the National Environmental Policy Act (NEPA). Pursuant to NEPA, the Corps is consulting under Section 106 of the National Historic Preservation Act with tribes, the Washington Department of

Archaeology and Historic Preservation (DAHP), and the Chehalis River Basin Flood Control Zone District (Applicant). The Corps is expected to assess potential impacts of the Proposed Action on tribal resources, including potential impacts related to tribal sovereignty and treaty rights. Also pursuant to NEPA, the Corps is expected to consult under Section 7 of the federal Endangered Species Act with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries.

Washington's salmon and steelhead fisheries are managed cooperatively in a unique co-management relationship (WDFW 2019). Co-management of fisheries occurs through government-to-government cooperation, communications and negotiations. One government is the State of Washington, and the other is Indian tribes whose rights were preserved in treaties signed with the federal government in the 1850s. In those treaties, tribes ceded vast areas of what is now Washington State while preserving their continued right to fish, gather shellfish, hunt in their "usual and accustomed" areas, and exercise other sovereign rights. A 1974 federal court case (*United States v. Washington*) decided by U.S. District Court Judge George Boldt reaffirmed the tribes' rights to harvest salmon and steelhead and established them as co-managers of Washington fisheries.

The annual North of Falcon process sets salmon fishing seasons for Indians and non-Indians in inland waters such as Grays Harbor and state rivers. State and tribal fisheries policy and technical representatives participate in the North of Falcon process and sit on its technical committees. The comanagers set conservation goals for wild fish, develop preseason forecasts of numbers of salmon expected to return each year, and plan state and tribal fisheries that focus harvest on healthy runs of hatchery and wild salmon. Tribal and state biologists also cooperate in analyzing the size of fish runs as salmon and steelhead migrate back to their native rivers and hatcheries.

In 2018 in the latest *United States v. Washington* ruling, an equally divided U.S. Supreme Court affirmed the Ninth Circuit decision upholding the grant of summary judgment to the tribes and an injunction requiring salmon passage at all state-owned culverts. Writing for the Ninth Circuit Court Panel, Judge William Fletcher wrote as follows:

> The Indians did not understand the Treaties to promise that they would have access to their usual and accustomed fishing places, but with a qualification that would allow the government to diminish or destroy the fish runs. Governor Stevens did not make, and the Indians did not understand him to make, such a cynical and disingenuous promise. The Indians reasonably understood Governor Stevens to promise not only that they would have access to their usual and accustomed fishing places, but also that there would be fish sufficient to sustain them. (*United States v. Washington*, 853 F.3d 946, 964; 9th Cir. 2017)

2 METHODOLOGY

2.1 Study Area

The study area for tribal resources includes areas that could be affected by the Proposed Action, including the following four specific areas (Figure L-1):

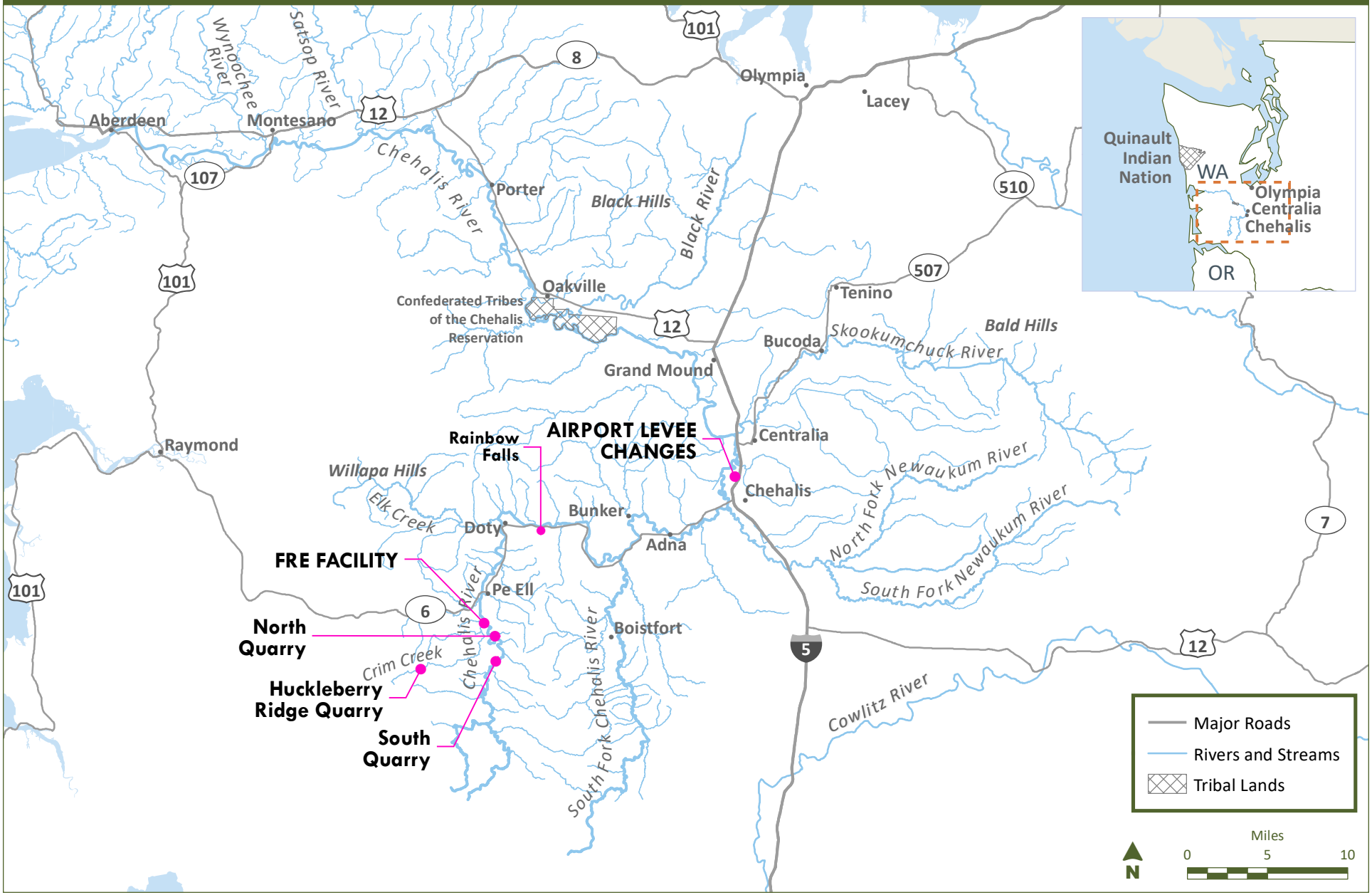
- Area of the proposed Flood Retention Expandable (FRE) facility and associated access, construction, and maintenance areas
- Area of proposed maximum inundation extent for the temporary reservoir and upstream tributaries
- Area downstream of the proposed FRE facility
- Area of the proposed Airport Levee Changes

The hydrologic effects of the Proposed Action were modeled and are predicted to occur across more than 100 miles of the Chehalis River mainstem and its floodplain. The study area extends from approximately 6 miles upstream of the proposed FRE facility to modeled limits of potential late-century catastrophic flooding, about river mile (RM) 9 just west of Montesano. This study area also includes the lower portions of major Chehalis River tributaries including the South Fork Chehalis, Newaukum, and Skookumchuck rivers.

To evaluate the indirect effect of migratory fish on larger food webs and communities, this evaluation also considers a broader study area. The salmon, steelhead, and Pacific lamprey that originate from the Chehalis Basin are migratory and anadromous, meaning they spend part of their life cycles migrating through the mainstem Chehalis River to access other major tributary rivers, and part in Grays Harbor estuary and the ocean. The broader study area for indirect impacts for fish and marine mammals includes the following:

- Lower reaches of the Chehalis River and associated floodplain areas where changes to hydrology would be small and infrequent
- Grays Harbor estuary and the Pacific Ocean where communities and food webs may be affected by the change in anadromous species (salmon and lamprey)
- Tributary subbasins to the Chehalis River and Grays Harbor that are included in the Chehalis Basin

Figure L-1
Vicinity Map



2.2 Affected Environment

The Chehalis Basin was traditionally inhabited by the Upper and Lower Chehalis, Cowlitz, and Suwal peoples, and Grays Harbor at the Chehalis River mouth was traditionally used by the Quinault people. The Chehalis River Basin and its tributaries are an area traditionally occupied by Salish, Athapaskan, and Chinookan speakers. Descendants of these groups are now members of five federally-recognized Tribes: the Chehalis Tribe, Quinault, Cowlitz Indian Tribe, Nisqually Indian Tribe, and Shoalwater Bay Indian Tribe of the Shoalwater Bay Indian Reservation, as well as the non-federally recognized Chinook Indian Nation.

The waters of the Chehalis River, its tributaries, and Grays Harbor were, and continue to be, important fishing areas for tribes in the region, while the banks of these bodies of water serve as productive hunting and plant gathering areas (Ecology 2016). The Chehalis Basin was, and continues to be, an important area for tribes for habitation, resource collection, and travel.

2.2.1 Confederated Tribes of the Chehalis Reservation

The Chehalis Tribe is a federally recognized Indian tribe in rural southwest Washington state. The Chehalis Reservation is located on the Chehalis River at the mouth of the Black River near Oakville, Washington, southeast of Hoquiam. The 4,849-acre reservation was established in 1864 by secretarial order. The reservation is rural agricultural with low-density residential, farms, open prairies, forest, and wetlands. The *Confederated Tribes of the Chehalis Indian Reservation's Park and Recreation Plan* states the Chehalis Reservation is home to 649 individuals based on 2010 census estimates, and the population estimate for tribal members on the reservation and on off-reservation trust land is 1,017 (Chehalis Tribe 2014). The study area includes portions of the Chehalis Reservation and lands and waters used by members of the Chehalis Tribe.

Preservation of land and culture is essential to the identity of the Chehalis people. It provides the living space, the sacred and cultural sites, and the natural resources that sustain the Chehalis people and culture. It provides spiritual and physical sustenance, and the means for economic self-sufficiency. Many tribal members hunt and fish to supplement their incomes (commercial harvest), to provide sustenance for their families, and for cultural reasons (subsistence and ceremonial harvest). Historically, tribal members were expert fishers and paddlers of shallow shovelnose canoes. Women wove fine baskets, clothing, canoe mats, and even diapers using grasses, bark, and reeds collected from the area. Men carved dugout canoes, masks, and ceremonial items from red cedar and other trees (Ecology 2016).

The location of the reservation at the confluence of the Chehalis and Black rivers provides a prime fishing area for salmon and steelhead returning to the Chehalis River. Salmon and steelhead have been important to the tribal diet for centuries. The present-day Chehalis commercial, subsistence, and ceremonial fishery is limited to the portions of the Chehalis and Black rivers on the Chehalis Reservation.

Because the Chehalis are a nontreaty tribe, hunting with a tribal-issued permit is limited to the reservation. However, the reservation size and setting do not provide meaningful hunting opportunities for deer and elk. Chehalis hunters that hunt deer or elk off-reservation obtain a state hunting permit and follow state regulations for seasons and bag limits.

The Chehalis Tribe in-river fishery is entirely on the reservation and managed by the Chehalis Tribe. Chehalis tribal members must have a valid Washington State fishing license to fish off-reservation and must follow state regulations. Primary commercial and subsistence fisheries are in the fall (for coho and Chinook salmon) and winter (for steelhead). Depending on the abundance of spring-run Chinook salmon returning to the river, there may be a Chinook salmon fishery in the spring. The number of harvestable spring-run Chinook salmon is low, and most fish are for subsistence or ceremonial consumption (Ecology 2016). A recreational fishery also occurs on the reservation with a tribal fishing license.

The nontreaty tribal harvest of salmon and steelhead is based on a sharing formula between the state and the tribe. The allowable catch of salmon and steelhead by Chehalis tribal members is calculated from the nontreaty harvestable share returning to Grays Harbor. The state and tribe have an agreement to share equally the nontreaty harvestable portion of fish returning to spawning areas upstream of the Chehalis Reservation boundary (Ecology 2016). The sharing formula applies to fall-run Chinook salmon, spring-run Chinook salmon, coho salmon, and steelhead. All chum salmon returning to the Chehalis River spawn downstream of the Chehalis Reservation and are not included in the sharing formula. Access to fishing sites by Chehalis tribal members is by small boats and bank access to set-net fishing locations. The number of fish available for harvest is developed from the preseason run forecast. Annual records of number of fish harvested are not publicly available for the Chehalis non-treaty fisheries.

2.2.2 Quinault Indian Nation

The Quinault Indian Nation is a federally recognized Indian tribe that consists of the Quinault and Queets Tribes and descendants of five other coastal tribes: Quileute, Hoh, Chehalis, Chinook, and Cowlitz (Ecology 2016). The Quinault Indian Reservation is located on the southwestern corner of the Olympic Peninsula. The reservation covers more than 208,150 acres of land and includes 23 miles of ocean beach. The reservation was established in 1855, when the tribes and bands that now make up the Quinault ceded land to the United States in the Treaty of Olympia (Ecology 2016).

The Quinault have treaty-reserved rights to fishing, hunting, and gathering and is a signatory to the Treaty of Olympia (1856). Under the treaty, the Quinault reserved the right to take fish at its “usual and accustomed fishing grounds and stations” and the privilege of gathering, among other rights, while ceding lands to the United States. The study area includes Quinault usual and accustomed fishing, hunting, and gathering areas. The Quinault have stated that these areas include the headwaters of the Chehalis River to Grays Harbor (Quinault 2016).

The Quinault have treaty-reserved commercial, subsistence, and ceremonial fisheries (Resource Dimensions 2015: 55-59). Quinault ocean fisheries include salmon (Chinook and coho), halibut, Dungeness crab, lingcod, rockfish, sablefish, and sardines. Grays Harbor gillnet fisheries include salmon (Chinook, coho, and chum), steelhead, and white sturgeon. The Chehalis, Humptulips, and several other smaller rivers entering the Grays Harbor estuary provide the freshwater and estuarine habitat that supports Chinook, chum, and coho salmon and steelhead of critical importance to the Quinault's river fisheries. The Quinault people have lived near and depended on Grays Harbor and the Chehalis Basin for generations. They have been called the canoe people because of the importance of the ocean, bays, estuaries, and rivers to every aspect of tribal life (Quinault 2018).

Salmon have particular historic significance as a vital cultural and economic resource of the Quinault people. Salmon represent a means for employment in fishing, guiding, and processing jobs. Often fish are used in trade between tribal members for other foods or goods. Salmon and razor clams are communally served at social and community events, such as ceremonies and funerals. Often, salmon and other fish and shellfish are shared with family members, elders, and others in the community who do not, or can no longer, fish (Resource Dimensions, 2015:56). Spring-run Chinook salmon are highly prized by the Quinault people because this is often the first salmon species to return to the rivers in the spring. In the Chehalis River, the first salmon ceremony has been traditionally observed for the first of these Chinook salmon. Historically, the fisherman obtaining the first salmon immediately sent messengers to notify all of the villagers of the event. People gathered at the house of the fisherman. The salmon was prepared in a way to ensure future fishing successes. Today, a first salmon ceremony is an individual experience. The fisherman prepares the salmon and disburses it to elders and prominent members of the community. Elders are often unable to fish themselves, so they rely on the generosity of the fisherman. The first salmon ceremony has been and continues to be of deep religious significance (Quinault 2018).

As a treaty tribe, the Quinault manage their fisheries and are responsible for regulating its fishers both on and off reservation. The Quinault are a co-manager with the Washington Department of Fish and Wildlife (WDFW) for salmon and steelhead. Each year the tribe and state meet to determine how many fish and crab can be caught in fisheries. The tribe and state then negotiate fishery schedules to ensure an equitable share of the catch. The process for co-management of the ocean and freshwater salmon fisheries has evolved over the years and now incorporates preseason meetings and use of model-based predictions of abundance, number of fish available for harvest, and catch. Grays Harbor salmon and steelhead fishery openings and predicted catch by week and season are based on models that consider fish timing, level of effort (number of fishers participating in the fishery), expected catch, and previous years' fishery data. Once the tribe and state reach agreement on fisheries, in the spring they release a preseason summary of planned fisheries and predicted catch (the planned fisheries include weekly schedules of weeks and days open).

An important aspect of fisheries management is the in-season review of catch and updated estimates of number of harvestable fish. The tribe and state can adjust fishery schedules in season if the actual number of fish and harvestable abundance are not as forecast or if bad weather has disrupted fishing schedules (Ecology 2016). These updates may result in adjustments to fishery schedules or closures to protect certain species, or they may add a fishing day in the same week (if bad weather affected a fishery), a run, or additional fishery openings if harvestable abundance is more than planned.

Management of treaty-reserved marine fish harvest is at the international or federal level. Quinault treaty gillnet fisheries for salmon, steelhead, and sturgeon can occur nearly year-round in Grays Harbor. Grays Harbor fisheries target salmon and steelhead adults returning to the Chehalis River and other streams entering Grays Harbor. White sturgeon caught in Grays Harbor are from river systems outside of Grays Harbor.

The Grays Harbor annual management cycle is divided into three seasons. The most intense fishery (maximum number of participants) and largest catches occur during the fall fishery from September to mid-November (Quinault 2015:2). Species harvested during the fall fishery are coho, chum, and fall-run Chinook salmon.

The winter fishery begins in late November and extends to mid-April. This fishery is directed at winter steelhead, and more fishers participate early in the season to target the more abundant hatchery steelhead. Later in the season (February to May) most fish entering the river are wild steelhead. Depending on abundance, the fishery may be modified to fewer days open per week and include gear restrictions to direct harvest at sturgeon (Quinault 2015:7).

The spring and summer management period is from April to July and directed at sturgeon foraging in Grays Harbor (Quinault 2015:3). This fishery is less intense than the fall fishery. The spring and summer fishery may include catch of spring-run Chinook salmon returning to the Chehalis River. However, the abundance of this run of Chinook salmon has been low. Generally, not enough fish are returning to the river to provide for a directed fishery. The spring and summer sturgeon fishery is typically open 5 days per week with gear restrictions on size of gillnet mesh to reduce the incidental catch of Chinook salmon. Quinault fisheries are generally closed August to mid-September to protect federal Endangered Species Act-listed green sturgeon. Gillnet fishing schedules vary from year to year depending on abundance of different salmon species entering Grays Harbor, their run timing, and number of fish available for harvest (Quinault 2015:4).

Resource Dimensions (2015:68) summarized the number of fishers reported by the Quinault who participate in treaty-right fisheries. The Quinault provided additional information on the number of active fishers in the Grays Harbor gillnet fisheries and number of fishers by area. Resource Dimensions (2015:68) reported 123 fishers in the Grays Harbor gillnet fishery. The Quinault (2015:4) reported 70 authorized Quinault gillnet fishers in Grays Harbor. Drift gillnet fishing effort in Grays Harbor during

the fall management period is concentrated in certain locations based on relative abundance of fish (Goodell 2015a, Quinault 2015:10).

The annual landed catch for 2004 to 2013 for Grays Harbor treaty gillnet fisheries (all areas and gear types combined) is summarized in Table L-4. Fall fisheries for coho, chum, and Chinook salmon harvested an average of 31,340 fish. The Chinook salmon catch is not reported separately for fall-run and spring-run fish. Thus, fall catch is an overestimate because some spring-run Chinook salmon are included in the total. However, the Chinook salmon catch in spring and summer is relatively small compared to the Chinook salmon catch in the fall (Quinault 2015:8). Coho salmon made up the largest portion of the fall harvest (averaging 20,387 fish). The winter fishery catch of steelhead is much smaller, averaging 3,129 fish. Quinault fishers harvested an average of 1,758 sturgeon.

Table L-4
Quinault Treaty Grays Harbor Salmon, Steelhead, and White Sturgeon Fisheries, Annual Catch (Number of Fish)

YEAR	CHINOOK SALMON	COHO SALMON	CHUM SALMON	WINTER STEELHEAD	WHITE STURGEON
2004	3,546	18,093	9,600	6,742	1,544
2005	2,297	23,428	5,804	4,992	3,374
2006	3,758	8,746	4,070	3,404	2,918
2007	2,483	8,927	598	3,975	1,766
2008	1,880	10,208	2,070	1,467	3,206
2009	2,512	28,487	4,397	697	1,373
2010	3,403	25,347	8,938	1,837	1,125
2011	6,417	27,982	17,207	3,341	947
2012	3,994	30,693	11,670	2,880	598
2013	2,909	21,692	11,976	1,955	726
Average	3,320	20,387	7,633	3,129	1,758

Source: Resource Dimensions 2015:61-62

The treaty ocean troll fishery typically begins May 1 and extends to September 15 (Quinault 2015:14). Troll vessels drag baited hooks or lures at the depth of the target species. Chinook salmon are harvested from May 1 to June 30 or when allowable catch has been attained. The fishery remains open from July 1 to mid-September for coho salmon and Chinook salmon if allowable catch has not been attained. The Chinook and coho salmon ocean fisheries may close early if allowable catch has been attained early.

Areas fished by Quinault fishers are coastal waters from Destruction Island just north of the Quinault Indian Reservation boundary to Grays Harbor (50 Code of Federal Regulations 660.50). Table L-5 summarizes the annual Quinault fisher participation and catch for Chinook and coho salmon in the ocean troll fishery. The Quinault have stated that on average (2003 to 2014), there are 13 ocean vessels per year participating in the salmon fishery. Across the decade, catch was generally evenly split between Chinook and coho salmon but varied significantly for each year. Chinook salmon are the more valuable

fish because of the higher price per pound and their larger size (Resource Dimensions 2015: 63–68). The Quinault do not maintain records of subsistence or ceremonial catch from the troll fishery, which is estimated to range from 5% to 20% of reported commercial catch based on interviews with fishers (Resource Dimensions 2015:78).

Table L-5
Quinault Treaty Ocean Troll Fishery, Annual Catch

YEAR	CHINOOK SALMON (NUMBER CAUGHT)	COHO SALMON (NUMBER CAUGHT)
2004	237	170
2005	3,113	578
2006	200	165
2007	367	1,039
2008	437	591
2009	432	4,039
2010	2,519	1,988
2011	1,944	719
2012	1,456	1,080
2013	616	997
Average	1,132	1,137

Source: Resource Dimensions 2015:64-69

2.2.3 Natural Resources Used by Tribes

The precontact and pre-Reservation traditional economy was tied to the seasonal cycle of plant and animals throughout the homelands of the Tribal communities in the Chehalis River Basin. Most people lived in villages near the mouths of or along rivers. Beginning in the spring and continuing well into the fall, members split into smaller living groups, left the village, and set up temporary camps to gather seasonal food. The Chehalis River Basin has been identified as a habitat for harvesting fish, lamprey ("eels"), birds, and other animals. Some Tribes may consider some resource gathering locations to be spiritually significant, and ceremonies may accompany the first fish caught, first roots dug, or first deer or elk killed (Shannon et al. 2019).

The Chehalis River was, and continues to be, a resource gathering location of importance, primarily as a fishery. Several species of salmon, steelhead, suckers, trout, and lampreys are important to the traditional economy. In the past, the harvest of fish, primarily salmon, was done using weirs, traps, nets, gaffs, spears, and arrows. Other fish like trout, smelt, and lamprey were also seasonally available and were caught with fish traps on smaller streams. Game animals hunted for meat and fur include deer, elk, bear, cougar, badger, skunk, beaver, and various small game and birds. Plants can be considered as serving three principal functions for the people of the Chehalis River Basin: primarily as food and

medicine; second as the source of supplies for material culture, such as baskets, tools, and houses; and third as the habitat for animals important to the traditional economy (Shannon et al. 2019).

An ethnographic study conducted for the project (Shannon et al. 2019) has identified some of the natural resources used by tribal members in ethnographic and modern times (Table L-6). Many of these are also noted by the Quinault in their comments on the 2017 *Chehalis Basin Strategy Programmatic EIS* (Quinault 2016). Several resources feature prominently in stories and ethnographic descriptions set in and around the study area, including salmon, trout, steelhead, lamprey ("eels"), elk, ducks, camas, acorns, and berries. Furthermore, some fish species found in the study area (salmon and steelhead) spend most of their life cycle in the ocean where they form part of an ecosystem that includes other resources important to tribes, including marine mammals such as killer whales (orcas).

Table L-6
Ethnographically Reported Natural Resource Species Used by Tribal Communities

NAMED RESOURCE	LIKELY COMMON NAMES	SCIENTIFIC NAME
FISH		
Lamprey ("eels")	Pacific lamprey	*Entosphenus tridentate*
	River lamprey	*Lampetra ayresi*
	Western brook lamprey	*Lampetra richardsonii*
Chinook salmon	Chinook salmon	*Oncorhynchus tshawytscha*
Chum salmon	Chum salmon	*Oncorhynchus keta*
Coho salmon	Coho salmon	*Oncorhynchus kisutch*
Trout (also includes rainbow trout)	Coastal/Puget Sound bull trout	*Salvelinus confluentus*
	Coastal resident/searun cutthroat trout	*Oncorhynchus clarkia*
Steelhead	Rainbow trout/steelhead	*Oncorhynchus mykiss*
Smelt	Eulachon[1]	*Thaleichthys pacificus*
	Longfin smelt[1]	*Spirinchus thaleichthys*
Whitefish	Mountain whitefish	*Prosopium williamsoni*
Suckers	Mountain sucker	*Catostomus platyrhynchus*
	Largescale sucker	*Catostomus macrocheilus*
Chub[1]	Longnose dace	*Rhinichthys cataractae*
	Northern pikeminnow	*Ptychocheilus oregonensis*
	Peamouth	*Mylocheilus caurinus*
	Redside shiner	*Richardsonius balteatus*
	Speckled dace	*Rhinichthys osculus*
Sturgeon	White sturgeon	*Acipenser transmontanus*
SHELLFISH		
Freshwater Mussels	Western floaters	*Anodonta spp.*
	Western pearlshell	*Margaritifera falcate*
	Western ridged mussel	*Gonidea angulate*
TERRESTRIAL MAMMALS		
Elk	Roosevelt elk	*Cervus elaphus roosevelti*
Deer	Columbian black-tailed deer	*Odocoileus hemionus columbianus*

NAMED RESOURCE	LIKELY COMMON NAMES	SCIENTIFIC NAME
Bear	Black bear	*Ursus americanus*
Cougar	Cougar, mountain lion	*Puma concolor*
Badger	American badger	*Taxidea taxus*
Skunk[1]	Striped skunk	*Mephitis*
	Spotted skunk	*Spilogale putorius*
Beaver	North American beaver	*Castor canadensis*
MARINE MAMMALS		
Orca whale	Orca (killer whale)	*Orcinus orca*
California sea lion	California sea lion	*Zalophus californianus*
Steller sea lion	Steller sea lion	*Eumetopias jubatus*
Northern fur seal	Northern fur seal	*Callorhinus ursinus*
Harbor seal	Harbor seal	*Phoca vitulina*
BIRDS		
Quail[1]	Mountain quail	*Callipepla pictus*
	Northern bobwhite	*Colinus virginianus*
	California quail	*Callipepla californica*
Mallard	Mallard	*Cistothorus palustris*
Other ducks[1]	American widgeon	*Mareca americana*
	Ring-necked duck	*Aythya collaris*
	Greater scaup	*Aythya marila*
	Gadwall	*Anas strepera*
	American coot	*Fulica americana*
	Green-winged teal	*Anas crecca*
	Cinnamon teal	*Spatula cyanoptera*
	Wood duck	*Aix sponsa*
Grouse[1]	Ruffed grouse	*Bonasa umbellus*
	Sooty grouse	*Dendragapus fuliginosus*
PLANTS		
Camas	Common camas	*Camassia quamash*
Acorns	Oregon white oak	*Quercus garryana*
Oregon grape	Oregon grape	*Mahonia nervosa*
Tiger lily	Tiger lily	*Lilium columbianum*
Sword fern	Sword fern	*Polystichum munitum*
Wild rhubarb	Unknown	Unknown
Wild carrot	American wild carrot	*Daucus pusillus*
Catnip	Unknown	Unknown
Red elderberry	Red elderberry	*Sambucus racemosa*
Blue elderberry	Blue elderberry	*Sambucus nigra* ssp. *caerulea*
Cranberry	Highbush cranberry	*Viburnum edule*
Strawberry	Blue-leaved strawberry	*Fragaria virginiana*
	Wood strawberry	*Fragaria vesca*
Bearberry	Bearberry	*Arctostaphylos uva-ursi*
Sunflower	Arrowleaf balsamroot	*Balsamorhiza sagittata*
Blackberry	Trailing blackberry	*Rubus ursinus*

NAMED RESOURCE	LIKELY COMMON NAMES	SCIENTIFIC NAME
Evergreen huckleberry	Evergreen huckleberry	*Vaccinium ovatum*
Red huckleberry	Red huckleberry	*Vaccinium parvifolium*
Blue huckleberry	Blue huckleberry	*Vaccinium ovalifolium*
Black raspberry	Black raspberry	*Rubus occidentalis*
Salalberry	Salal	*Gaultheria shallon*
Salmonberry	Salmonberry	*Rubus spectabilis*
Gooseberry	Gooseberry	*Ribes*
Spruce	Sitka spruce	*Picea sitchensis*
Cedar	Western red cedar	*Thuja plicata*
Willow	Pacific willow	*Salix lasiandra*
Wild cherry	Chokecherry	*Prunus virginiana*

Note:
1. It is unclear which species was noted in ethnographic literature; several species are shown.

2.3 Studies and Reports Referenced/Used

The following studies and reports were used to evaluate tribal resource impacts:

- *Chehalis Basin Strategy Programmatic EIS* (Ecology 2017)
- *Chehalis River Basin Strategy Traditional Cultural Property Inventory* (Shannon et al. 2019)
- *Chehalis River Basin Flood Control: FRE Dam Alternative Combined Dam and Fish Passage Supplemental Design Report* (HDR 2018)
- *Cultural Resources Discipline Report* (ESA 2020b)
- *Environmental Justice Discipline Report* (Anchor QEA 2020d)
- *Fish Species and Habitats Discipline Report* (Anchor QEA 2020a)
- *Wetlands Discipline Report* (Anchor QEA 2020b)
- *Wildlife Species and Habitats Discipline Report* (Anchor QEA 2020c)
- *Chehalis River Basin Flood Damage Reduction Archaeological Resources and Built Environment Existing Conditions* (Ostrander et al. 2018)
- *Economic Impacts of Crude Oil Transport on the Quinault Indian Nation and the Local Economy* (Resource Dimensions 2015)

2.4 Technical Approach

This report assesses how the Proposed Action and alternatives could affect tribes, tribal resources, and access to tribal resources in the study area, including access to places where fishing, hunting, gathering, and other community practices occur. Impacts could occur if tribal members' access to a resource or important place is reduced or limited, or if the resource or place is diminished.

Tribal communities are the best source of information about tribal resources. Since April 2018, the Corps has led monthly discussions related to the process of compliance with Section 106 of the National

Historic Preservation Act, which includes tribal resources. Participants include the Corps, Quinault, Chehalis Tribe, Washington Department of Ecology (Ecology), DAHP, and the Applicant. As part of the process, fieldwork and interviews were conducted and draft reports were developed and reviewed by participants and by interested tribes, including the Nisqually Indian Tribe, Shoalwater Bay Indian Tribe, and Cowlitz Indian Tribe. A draft archaeological report was completed in 2018 (Ostrander et al. 2018) and a draft ethnographic report in 2019 (Shannon et al. 2019) as part of this process to provide information on cultural and historical resources and tribal resources. Information from these reports is referenced here, and revised information from the finalized reports (if available) will be included in the Final EIS.

The analysis in this report considers information about fishing, hunting, gathering, and traditional areas provided by the tribes and agencies, including practices and areas used by the tribes. The Quinault and Chehalis Tribe provided scoping comment letters as part of this environmental review process, which included information on tribal resources (Quinault 2018; Chehalis Tribe 2018). In addition, the Quinault, Chehalis, and Northwest Indian Fisheries Commission submitted letters commenting on the 2017 *Chehalis Basin Strategy Programmatic EIS* that described tribal resources (Quinault 2016; Chehalis Tribe 2016; NWIFC 2016). An exhibit to the Quinault's comment letter on the Draft Programmatic EIS is a Resource Dimensions report that also includes information on tribal resources (Resource Dimensions 2015).

WDFW studies that have been ongoing in the Chehalis Basin as part of the Chehalis Basin Strategy also provide information for this environmental review. These studies have been included in the analysis for the appropriate resource area and are listed as references. These include studies relative to salmonid and non-salmonid aquatic species, including lamprey and amphibians. The impact analyses in the *Cultural Resources Discipline Report* (ESA 2020b), *Fish Species and Habitats Discipline Report* (Anchor QEA 2020a), *Water Discipline Report* (ESA 2020a), and *Wildlife Species and Habitats Discipline Report* (Anchor QEA 2020c) and also provide information on tribal resources. Assessment of the potential for impacts to tribal resources includes consideration of effects to fish and wildlife, subsistence and commercial activity, and cultural and spiritual uses.

2.5 Impact Assessment

The analysis for impacts on tribal resources considered the following:

- Construction and operation impacts on species used by tribal members
- Loss of or modifications to habitats of species used by tribal members (e.g., inundation, sediment deposition)
- Indirect impacts on species used by tribal members, including fragmentation of habitats and impediments to migration
- Loss of access to a traditional hunting, fishing, or gathering area, or to an area where other traditional practices occur

3 TECHNICAL ANALYSIS AND RESULTS

3.1 Overview

This section describes the probable impacts on tribal resources from the Proposed Action (Section 3.2), Local Actions Alternative (Section 3.3), and No Action Alternative (Section 3.4).

3.2 Proposed Action

3.2.1 Impacts from Construction

Potential impacts on tribal resources could occur from construction of the Proposed Action. Construction for the FRE facility is estimated to last 5 years, from 2025 to 2030, if permitted. The construction of the Airport Levee Changes would occur over 1 year during this period. Construction of the proposed FRE facility includes building the FRE structure, a temporary trap-and-transport system, the temporary reservoir area, and associated buildings, stockpile areas, and staging areas. A new overhead and/or buried power line would be built to construct and operate the power pumps, gates, instruments, and other controls for the FRE facility. The proposed facility would require upgrading existing roads and constructing some temporary roads. In addition, constructing the FRE facility includes developing a quarry site or sites, material storage, and materials processing as well as areas for construction offices and equipment storage near the site. For construction, a concrete production facility would also be located above and northeast of the FRE facility to produce concrete, and concrete aggregate may be mined within the temporary reservoir or nearby. In addition to removal of vegetation for the FRE facility, tree clearing and vegetation removal would occur within the temporary reservoir. A diversion tunnel would be created around the FRE facility site and used during construction to provide downstream fish passage. Upstream fish passage would be conducted using a temporary trap-and-transport method. Construction for the Airport Levee Changes would include raising the existing levee by 4 to 7 feet and raising roads near the levee.

These activities could impact tribal resources during construction in the following ways:

- Restricting or reducing access of tribal members to tribal resources
- Altering vegetation in the temporary reservoir and in riparian and flood-affected areas due to periodic inundation, which could affect water, habitat, fish, and wildlife
- Loss of fish habitat function within the reach of the Chehalis River, including loss of salmon spawning habitat
- Diminishment in the number of fish that would otherwise be available for tribal harvest, as well as wildlife and plants that are identified as a tribal resource
- Affecting cultural and historic resources important to tribes

This section summarizes findings from the referenced discipline reports which could impact tribal resources. The referenced discipline reports include details on affected environment, analysis, findings, potential mitigation, and identify significant and unavoidable impacts.

3.2.1.1 Direct

3.2.1.1.1 Fish and Aquatic Species and Aquatic Habitats

Aquatic Habitats: The *Fish Species and Habitats Discipline Report* (Anchor QEA 2020a) includes detailed analysis of probable impacts from the Proposed Action on salmonids, native fish, aquatic macroinvertebrates, shellfish and aquatic habitat. Probable impacts summarized here could affect fish, aquatic species, and aquatic habitats used by tribes and identified in stories and cultural practices.

Impacts on aquatic habitat would result from construction of the FRE structure and temporary trap-and-transport facility, construction of the river bypass tunnel, removal of vegetation and wood in the temporary reservoir area, and in-water work and construction in the riparian zone. Impacts would affect aquatic habitat at the FRE facility site, in the temporary reservoir area, upstream to the headwaters of the Chehalis River and downstream to the confluence with the South Fork Chehalis River. Impacts on aquatic habitat in the mainstem upper Chehalis River, including the FRE facility site and temporary reservoir, and downstream to the confluence with the South Fork Chehalis River are **significant** because of the permanent loss of 0.32 acre of riverbed habitat from constructing the FRE facility, degraded riparian function, reduced marine-derived nutrients from salmon carcasses, and reduced water quality from increased water temperatures and decreased dissolved oxygen levels.

Mitigation is proposed for the Applicant to develop plans for fish and aquatic species and habitat, riparian habitat, wetlands and wetland buffers, streams and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on aquatic habitat, unless the Applicant develops mitigation and management plans that meet regulatory requirements and for which implementation is feasible.

Aquatic Species: The probable impacts to fish and aquatic species from construction of the FRE facility would primarily result from dewatering and diversion of the river around the construction site, reduced fish passage performance, construction noise, reduced water quality, and removal of trees in riparian areas and uplands in the temporary reservoir area. Construction of the FRE facility would likely have the following effects on fish species and habitat:

- Degradation of aquatic habitat in the FRE facility area due to construction activities in the existing river channel
- Degradation of aquatic habitat in the temporary reservoir inundation area due to vegetation removal

- Increased water temperature and decreased dissolved oxygen above and below the FRE facility site due to the removal of vegetation from the temporary reservoir inundation area, including in the riparian zone
- Elevated turbidity levels due to excavation and earthwork involving soil disturbance in the Chehalis River channel
- Sound pressure waves generated from rock blasting for foundation work and construction of the diversion tunnel that could affect fish
- Vibration from placement of roller-compacted concrete for the coffer dams and FRE facility and from construction truck activity that may be transmitted through earth into water and affect fish behavior, particularly for adult and juvenile life stages attempting to move upstream around the construction site
- Reduction in fish passage effectiveness from the temporary trap-and-transport facility to move fish upstream past the FRE facility construction site

The *Fish Species and Habitat Discipline Report* determined construction of the Proposed Action would have **significant** impacts on spring-run Chinook salmon, fall-run Chinook salmon, coho salmon, and steelhead in the area above the FRE facility in the Crim Creek Subbasin and in the Rainbow Falls to Crim Creek Subbasin. Modeling showed the populations of salmon and steelhead upstream of the FRE facility (above Crim Creek Subbasin) and below the FRE facility (Crim Creek to Rainbow Falls Subbasin) would experience **significant** impacts during construction. Spring-run and fall-run Chinook salmon would be most affected by a decline in habitat quality in the temporary reservoir area because their spawning is concentrated in this area. Coho salmon and steelhead would be more affected by the trap-and-transport process to move fish above the construction site. These fish migrate and spawn during winter when trapping would be more challenging due to turbid (cloudy) water and high water flows. Vegetation removal during construction would degrade the quality of habitat for rearing juvenile salmon and steelhead in the temporary reservoir area. Passage upstream and downstream around the FRE facility construction site on the Chehalis River would be limited for juvenile salmon. The Applicant's temporary trap-and-transport method for upstream passage around the construction site is not specifically intended for juvenile salmon, and it is unlikely that these fish would migrate upstream through the bypass tunnel.

Construction would have a **significant** impact on migratory non-salmon fish such as Pacific lamprey ("eels"), largescale sucker, and mountain whitefish, and a **moderate** impact on non-migratory fish (e.g., minnows and sculpins). Passage upstream and downstream around the FRE facility construction site on the Chehalis River would be limited for non-salmon fish. The Applicant's temporary trap-and-transport method for upstream passage around the construction site is not specifically intended for non-salmon species, and it is unlikely that these fish would migrate upstream through the bypass tunnel. Downstream passage would be available via the bypass tunnel. Construction of the FRE facility would have a **significant** adverse impact on migratory non-salmon fish due to uncertainty about transport to

upstream habitat. Construction of the Proposed Project would have a **moderate** adverse impact on resident fish because they could continue to use habitat upstream and downstream of the construction site; however, they would still be affected by impacts on the aquatic habitat and disconnection from habitats on either side of the construction site.

The permanent loss of habitat to construct the FRE structure would be a **significan**t adverse impact on freshwater shellfish (mussels). Freshwater shellfish and aquatic macroinvertebrates would be impacted by in-water construction activities because of their inability to move away from the activity and their reliance on specific substrate types, water velocity, and water quality to survive. Dewatering of the Chehalis River channel in the construction area would likely kill shellfish and macroinvertebrates located in the portions of the existing channel that become dried out. Elevated levels of turbidity and sedimentation downstream of the construction site could also impact these species during construction, but permits would require best management practices to minimize water quality impacts. The permanent loss of habitat in the 0.32 acre of riverbed for the FRE structure would be a significant adverse impact on freshwater shellfish if shellfish currently colonize the area. The spatial scale of the habitat loss and alteration would be a **significant to moderate** adverse impact on aquatic macroinvertebrates.

Mitigation is proposed for the Applicant to develop plans for fish and aquatic species and habitat, riparian habitat, wetlands and wetland buffers, stream and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on fish and aquatic species and aquatic habitat, unless the Applicant develops mitigation and management plans that meet regulatory requirements and for which implementation is feasible.

For the Airport Levee Changes, no adverse impacts on fish species and habitat are expected because no in-water work would occur.

3.2.1.1.2 Wildlife Species and Habitats

The *Wildlife Species and Habitats Discipline Report* (Anchor QEA 2020c) includes detailed analysis of probable impacts from construction of the Proposed Action on terrestrial habitat and wildlife species, including mammals, birds, amphibians, and reptiles. Probable impacts summarized here could affect species used by tribes and in stories and cultural practices.

Potential construction impacts on wildlife habitat could occur from land clearing, excavation, grading, and fill placement activities that permanently remove, fill, or otherwise change existing habitats. Wildlife habitats including upland, riparian, stream and stream buffer, and wetland and wetland buffer vegetation communities are present within the proposed construction footprint of the FRE facility and associated access, construction, and maintenance areas, and the temporary reservoir area. The near

complete loss of tree canopy and cover would significantly reduce wildlife habitat functions in upland, riparian, stream and stream buffer, and wetland and wetland buffer areas. These probable adverse impacts are considered **significant** for wildlife habitat because all non-flood-tolerant trees and trees larger than 6 inches diameter at breast height within the 600 acres would be removed over the 5-year construction period. No probable significant adverse impacts on wildlife habitat downstream of the FRE facility from construction of the FRE facility are anticipated.

Probable construction impacts on wildlife species would result from FRE facility construction activities; including the clearing of upland, riparian, stream and stream buffer, and wetland and wetland buffer vegetation communities, impacts to water quality, or construction- and equipment-generated noise. Tree removal in the temporary reservoir area and a permanent decrease in habitat functions resulting from the loss of tree cover would result in a loss of breeding, foraging, resting, and overwintering habitat and mortality of some individual wildlife. Amphibian species would be unlikely to avoid construction activities. Species with more mobility, such as birds and small and large mammals, could avoid some construction activities. These probable adverse impacts are considered **significant** for wildlife species because large and all non-flood-tolerant trees on 600 acres of the temporary reservoir area would be removed during construction. Species likely to be impacted include the federally listed threatened and state-listed endangered marbled murrelet as well as amphibians, reptiles, and small mammals (including state candidate species Van Dyke's salamander and Dunn's salamander, along with Columbia torrent salamanders and some frog life stages, and North American beaver).

Mitigation is proposed for the Applicant to develop plans for wildlife species and habitat, riparian habitat, wetlands and wetland buffers, stream and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable; therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on wildlife species and habitats in the FRE facility and temporary reservoir areas, unless the Applicant develops mitigation and management plans that meet regulatory requirements and for which implementation is feasible.

For construction of the Airport Levee Changes, wildlife habitat in upland and wetland vegetation communities would be affected. Category II and III wetlands and wetland buffers would be permanently removed or filled and would be a **moderate** adverse impact. The probable adverse impacts on wildlife species are considered **minor** because of the limited quality of the upland and wetland vegetation communities that would be disturbed. The probable adverse impacts on the composition of wildlife species occurring in these habitats are considered **minor** due to the relatively small area of wildlife habitat associated with the airport levee, and the disturbed conditions and human activities within and in the vicinity of the airport levee.

3.2.1.1.3 Water

The *Water Discipline Report* (ESA 2020a) includes detailed analysis of impacts from construction of the Proposed Action on surface and groundwater. Probable impacts summarized here could affect tribal resources, including fish and wildlife species and habitat.

Construction of the FRE Facility: Construction would affect surface water quantity by diverting Chehalis River flows from the existing channel through a bypass tunnel, around areas of active construction in the riverbed. Construction of the FRE facility would affect surface water quality through in-water work activities in the Chehalis River, which would include the installation and later removal of stream diversion and work area isolation measures, including cofferdams and a diversion tunnel to route flows around the construction site. Vegetation clearing, excavation, and fill placement in upland areas for FRE facility construction would expose soils and increase the potential for stormwater runoff to transport soil to surface waters.

The removal of trees during construction would increase water temperatures in the temporary reservoir area due to the decrease in shading. Modeling showed that daily maximum temperatures of the Chehalis River could increase by up to 2°C to 3°C in mid- to late-summer in the temporary reservoir relative to the No Action Alternative, exceeding temperature water quality criteria. Additionally, modeling for Crim Creek in the temporary reservoir showed that loss of riparian cover and stream shading associated with the FRE facility is predicted to result in temperature increases of between 2°C and 5°C relative to the No Action Alternative, exceeding water quality criteria. The increased water temperatures would exceed water quality standards and be a **significant** adverse impact to surface water quality and designated uses of the Chehalis River and Crim Creek for salmonid habitat.

Warmer water holds less dissolved oxygen than cooler water and can also increase demand for dissolved oxygen by stimulating biological activity; therefore, the river temperature increase resulting from FRE facility operation would reduce dissolved oxygen by up to 0.4 milligram per liter in summer. This would be a **significant** adverse impact to surface water quality.

Mitigation is proposed for the Applicant to develop plans for wildlife species and habitat, riparian habitat, wetlands and wetland buffers, stream and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on surface water quality in the FRE and temporary reservoir areas and downstream approximately 20 miles unless the Applicant develops mitigation and management plans that meet regulatory requirements and for which implementation is feasible.

Downstream of the FRE Facility: The increased water temperatures would extend 20 miles downstream of the FRE facility, exceeding water quality standards and would be **significant** adverse impacts to

surface water quality and designated uses of the Chehalis River for salmonid habitat. Mitigation is proposed for the Applicant to develop and implement a Surface Water Quality Mitigation Plan to address these impacts. However, there is uncertainty if the implementation of a plan is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on surface water quality, unless the Applicant develops mitigation and management plans that meet regulatory requirements and for which implementation is feasible.

Water Use and Water Rights: Construction of the FRE facility would involve withdrawals of surface water from the Chehalis River for activities including concrete production. Water would likely be withdrawn upstream of the cofferdam from the bypass tunnel forebay area. An estimated 75 to 150 million gallons would be withdrawn for construction use over the construction period, with as much as 80% of the withdrawal in a 10- to 20-month window.

Construction-related withdrawals of water from the Chehalis River would represent a small but measurable proportion of Chehalis River flows at that location. The significance of the withdrawals would vary through the year based on flow conditions and seasonal water needs of others, with periods of highest concern when minimum instream flows (per WAC-173-522) are not met and/or when water demand is highest (typically in summer, during the irrigation season).

A short-term water use permit from Ecology would be needed to withdraw water from the Chehalis River for construction of the FRE facility. A plan would be developed to specify the withdrawal location, timing, and how much water would be used. With the considerations for instream flow requirements and withdrawal amounts and timing, and in compliance with an Ecology permit, the adverse impact of FRE facility construction on water uses and rights would be **moderate to minor**.

Construction of the Airport Levee Changes: Airport levee construction would not involve work within or immediately adjacent to the Chehalis River. Construction-related ground disturbance including excavation and fill would temporarily increase the erosion potential of the site and the potential for sediment to enter surface waters through stormwater runoff. Adverse impacts on water quality and water quantity are expected to be **minor** with the appropriate erosion, sediment, and pollution control measures in place, in accordance with permit requirements. Subsurface excavations, fill placement, and potential dewatering in areas of levee widening or existing structure (retaining wall) removal could result in **moderate to minor** adverse impacts on groundwater quantity by locally affecting shallow groundwater flows. Construction-related adverse impacts on groundwater quality would be **minor** with the appropriate pollution control measures in place, as required by permits.

3.2.1.1.4 Earth (Geology and Geomorphology)

The *Earth Discipline Report* (Shannon & Wilson and Watershed GeoDynamics 2020) includes detailed analysis of impacts from construction of the Proposed Action on geology and geomorphology that could

impact tribal resources related to fish and wildlife species and habitat. Construction would result in erosion as a result of soil disturbance at the FRE facility site, the airport levee site, use of unpaved roads to access the construction site and haul materials from the proposed quarry sites, and clearing trees in the 600-acre temporary reservoir area. The river channel at the FRE facility site would be disturbed permanently due to the construction of the structure, resulting in **significant** adverse impacts to substrate and geomorphic processes at that location; these impacts would be localized at the site.

Mitigation is proposed for the Applicant to develop a Fish and Aquatic Species and Habitat Mitigation Plan, Large Woody Material Management Plan, and a Surface Water Quality Mitigation Plan to mitigate impacts to the Chehalis River channel at the FRE facility site. However, there is uncertainty if the implementation of a plan is technically feasible or economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on the river channel, unless the Applicant develops mitigation and management plans that meet regulatory requirements and for which implementation is feasible.

3.2.1.1.5 Cultural Resources

The *Cultural Resources Discipline Report* (ESA 2020b) includes detailed analysis of impacts from construction of the Proposed Action on cultural resources. Determinations of eligibility and adverse impacts are being discussed as part of the Section 106 consultation process under the National Historic Preservation Act with the Corps, DAHP, and the Chehalis Tribe, Nisqually Indian Tribe, Cowlitz Indian Tribe, Quinault, Shoalwater Bay Indian Tribe, and Chinook Indian Nation. Consultation with the tribes is ongoing as of February 2020. The Governor's Executive Order 05-05 (EO 05-05) process is modeled on the Section 106 process. The Department of Archaeology and Historic Preservation (DAHP) will review what is being done under Section 106 for the Proposed Action. If DAHP verifies that Section 106 appropriately addresses cultural and historic resources, then no separate review would be needed under EO 05-05.

A Traditional Cultural Properties (TCP) report (Shannon et al. 2019) provides background information on potentially eligible TCPs within the study area. This report identifies these sites as being of possible interest to tribes. TCPs are discussed in the analysis in very broad terms, and include the following:

- City of Chehalis General Area, including the airport levee site
- Rainbow Falls General Area
- Pe Ell General Area
- Hiding Place of xʷani
- Chehalis River General Area

Construction-related activities associated with the FRE facility would directly affect four recorded archaeological sites within the footprint of the proposed FRE structure, staging, and stockpile areas. Because substantial site preparation (including grading, filling, and ground disturbance) would occur,

these recorded archaeological sites, as well as any unrecorded archaeological sites and isolates within these areas, would be expected to be partially or completely destroyed. The eligibility of these sites to be included in the National Register of Historic Places (NRHP) is being discussed through a separate consultation process under Section 106 of the National Historic Preservation Act. If eligible, these potential impacts will be reviewed, significance determined, and mitigation agreed upon through the Section 106 process. There are no known cemeteries within the FRE facility area.

The construction of the FRE structure would permanently remove 0.32 acre of the Chehalis River bed and habitat. Construction-related activities associated with the FRE facility could affect TCPs within the footprint of the proposed FRE facility, staging, and stockpile areas. Because substantial site preparation (including grading, filling, and ground disturbance) would occur, these would be expected to be partially or completely affected. TCPs are being studied as part of the Section 106 process of the National Historic Preservation Act.

A field survey found eight recorded archaeological sites in the airport levee area. Depending on specific construction footprints and methods, construction-related activities associated with the Airport Levee Changes could directly affect none, some, or all of the recorded archaeological sites and isolates adjacent to or beneath the levee. Potential impacts to eligible and potentially eligible archaeological resources will be reviewed, determined, and mitigation agreed upon through the Section 106 process.

3.2.1.2 Indirect

3.2.1.2.1 Fish and Aquatic Species and Habitats

Construction of the proposed alternative would have indirect effects on marine mammals and fish-eating birds. Southern Resident killer whales in particular depend on spring-run Chinook salmon as a food source. The population of Chinook salmon that originates from the upper Chehalis River is one of several subpopulations originating from Chehalis River and Grays Harbor tributaries that contribute to the Grays Harbor population overall. The degree to which a decline in the specific subpopulation of fish originating from the upper Chehalis River would affect the Southern Resident killer whale is unknown, and the magnitude of construction-related impacts on killer whales is highly uncertain. The number of fish which would likely be impacted by the Proposed Action represents a small proportion of the overall diet of the Southern Resident killer whales. However, the reduction of salmon and steelhead, specifically spring-run Chinook, from the Chehalis River would present a **moderate** adverse impact on Southern Resident killer whales. The loss of salmon and steelhead from the Proposed Action would have **minor** adverse impact on other marine mammals and fish-eating birds because they prey upon a more diverse set of fish species.

3.2.1.2.2 Wildlife Species and Habitats

Construction could indirectly reduce the quantity and quality of instream and floodplain habitats via reduced water quality for wildlife species such as amphibians in the reach downstream to Pe Ell. The

construction activities would be required to meet state water quality standards; therefore, this would be a **moderate** impact to wildlife habitat. The fragmentation of migratory routes through the FRE facility and temporary reservoir area may tend to concentrate wildlife species in some locations or cause them to move to other areas, causing increases in competition for food and cover and potentially increasing predation in other areas. This overall impact is considered **minor**.

3.2.1.2.3 Cultural Resources

TCPs are being studied as part of the Section 106 process of the National Historic Preservation Act.

3.2.2 Impacts from Operation

Operation of the Proposed Action is planned to begin in 2030, if permitted. The FRE facility would hold water for major floods or larger and would form a temporary reservoir that could extend up to 6.4 miles upstream. The FRE facility would release water in a controlled manner over a maximum of 35 days as described in the *Project Description and Alternatives Appendix* (Anchor QEA 2020e). For normal operations and flood events smaller than a major flood, fish would move upstream and downstream through the outlets in the base of the FRE structure. When the FRE facility is in operation and impounding water, fish passage upstream would be via a fish ladder and trap-and-transport method. For movement downstream, fish would remain in the temporary reservoir until the outlet gates are opened and then pass through the outlets in the FRE structure. FRE facility operation could affect fish and shellfish and their habitats as a result of the changes to streamflow and floodplain inundation with flood retention events, reduced fish passage around and through the FRE facility, maintenance removal of vegetation in the temporary reservoir, and reduction of large woody material and channel-forming flows downstream. Operation of the Airport Levee Changes could also affect tribal resources.

These activities could impact tribal resources during operation in the following ways:

- Restricting or reducing access of tribal members to tribal resources
- Altering vegetation in the temporary reservoir and in riparian and flood-affected areas due to periodic inundation, which could affect tribal fisheries and wildlife
- Losing fish habitat function within the reach of the Chehalis River inundated upstream of the FRE facility, including loss of salmon spawning habitat
- Diminishing the number of fish that would otherwise be available for tribal harvest, as well as wildlife and plants that are tribal resources
- Affecting cultural and historic resources important to tribes

This section summarizes findings from the referenced discipline reports which could impact tribal resources. The referenced discipline reports include details on affected environment, analysis, findings, potential mitigation, and identifies significant and unavoidable impacts.

3.2.2.1 Direct

3.2.2.1.1 Fish and Aquatic Species and Habitats

The *Fish Species and Habitats Discipline Report* includes detailed analysis of impacts from the Proposed Action on fish and aquatic species and habitat. Species analyzed included salmonids, native fish, invertebrates, and shellfish. Probable impacts summarized here could affect fish, aquatic species, and aquatic habitats used by tribes and identified in stories and cultural practices

Aquatic Habitat: Impacts on fish and shellfish habitat from operation of the Proposed Action would result from physical changes to river flows, water quality, riparian zone function, stream channel width, sediment transport, large wood inputs and transport, and floodplain functions.

For headwaters upstream of the maximum extent of the temporary reservoir inundation, habitat would not be directly affected. Fish passage upstream to tributary streams would be impaired, and integrated modeling results show that the abundance of migratory salmon and steelhead would be reduced. This would result in adverse impacts on habitat due to reduced inputs of marine-derived nutrients brought by salmon carcasses and the habitat benefits created by shellfish. During flood retention events, access to stream habitat would become temporarily disconnected by the reservoir that would act as a barrier to some species moving between habitats below, in, and above the temporary reservoir area. Following the flood retention event, these species could redistribute themselves into headwater tributaries unless sediment deposited in the reservoir area during a flood retention event creates a barrier to fish movement. Therefore, there would be **moderate** adverse impacts to aquatic habitat in the headwaters upstream of the temporary reservoir area from operations.

Habitat in the upper mainstem of the Chehalis River within the temporary reservoir area would be permanently degraded due to active maintenance to remove large trees and all non-flood tolerant trees and large woody material, and the long-term effects of inundation events. Riparian zone function, large wood availability, and typical riverine habitat types (such as pool-riffle complexes) would be degraded completely in the temporary reservoir area. The benthic macroinvertebrate community that provides food for fish would be temporarily reduced following flood retention events, but it is likely to recover between flood events. Fewer insects and leaf litter inputs to streams as a result of degraded riparian vegetation would reduce food supply.

During flood retention events, up to 6.4 miles of the Chehalis River upstream of the FRE facility and 847 acres of land would become a temporary reservoir, inundating and reducing habitat quality. Aquatic habitat would be rapidly converted from stream-type to lake-type habitat for up to 35 days with each flood event. This would lead to loss of riparian zone function, elimination of salmon spawning habitat, an increase in deepwater habitat that would be unsuitable for some stream-adapted fish species, an increase in turbidity, and a loss of salmonid and other species' eggs due to suffocation. Wetland, upland, and riparian vegetation would be affected by inundation events. Riparian zone function would be

reduced completely in areas that are more frequently disturbed, such as the backwater pool near the outlet gates. **Significant** adverse impacts would occur in aquatic habitat in the upper mainstem Chehalis River within the temporary reservoir area.

Aquatic habitat downstream of the FRE facility would also be impacted by the operation of the FRE facility. A reduction in large wood would change and simplify the structure of in-channel habitat, reduce pool areas and shelter for fish from flows and predators. A reduction in wood supply would result in more bed scour, reduced habitat complexity, and less spawning area for fish. Water temperatures downstream for 20 miles would increase. During flood retention events, fish habitat immediately downstream of the FRE facility would be temporarily reduced from decreased channel widths.

Downstream off-channel and floodplain habitat inundation could be temporarily reduced, but flows from other large tributaries, rain, and groundwater would likely maintain water levels at depths and extents that are typical for the season. After a major flood or larger, the FRE outlet gates would release retained water downstream for up to 35 days. Controlling the peak flows associated with major or larger floods would reduce the forces and inundation extents downstream and eliminate channel-forming flows. There would be **significant** adverse impacts to aquatic habitat in the upper and middle Chehalis River mainstem downstream of the FRE facility to the confluence with the South Fork Chehalis River.

Aquatic habitat would not be affected in off-channel and floodplain areas downstream of the FRE facility. Between flood retention events, off-channel and emergent floodplain habitat would be inundated and remain hydrologically connected to the mainstem Chehalis River at flows below the threshold for flood retention.

Mitigation is proposed for the Applicant to develop plans for Fish and Aquatic Species and Habitat, Vegetation Management, Riparian Habitat, Large Woody Material Management, Wetlands and Wetland Buffers, Streams and Stream Buffers, and Surface Water Quality to mitigate impacts to aquatic habitat in the off-channel and floodplain areas downstream of the FRE, However, there is uncertainty if the implementation of the plans would be technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on aquatic habitat, unless the Applicant develops plans as described above that meet regulatory requirements and for which implementation is feasible.

Aquatic Species: Based on modeling results for late-century, the operation of the Proposed Action would have **significant** adverse impacts on spring-run Chinook salmon, fall-run Chinook salmon, coho salmon, and steelhead in the area above the FRE facility in the Crim Creek Subbasin and in the Rainbow Falls to Crim Creek Subbasin. In addition to reduced abundance of salmon species, operation of the FRE facility is expected to reduce the species' productivity, diversity, and spatial structure. Spatial structure refers to the pattern of fish production among subbasins in the Chehalis Basin. The loss of production from one population in a subbasin could lead to a reduction in the resilience of the overall population

and an increase in vulnerability to environmental variables. The Proposed Action would decrease the spatial structure of populations in the basin by eliminating spring-run Chinook salmon, coho salmon, and steelhead populations in the Rainbow Falls to Crim Creek Subbasin by late-century; significantly impacting spring-run Chinook salmon in the Above Crim Creek Subbasin in both the mid-century and late-century periods; and impacting fall-run Chinook salmon in the Above Crim Creek and Rainbow Falls to Crim Creek subbasins in both the mid-century and late-century periods. The reduction or loss of salmon or steelhead from one population (subbasin) would also result in a loss of genetic diversity within and among populations of each species across the Chehalis Basin.

Operation of the FRE facility would create permanent adverse impacts on native fish within the temporary reservoir inundation area and downstream from the FRE facility to Elk Creek because spawning habitat would be reduced or eliminated for most native species, summer rearing area would be greatly constricted, and non-native predators like largemouth bass may expand their range year-round. In addition, fish passage survival would be reduced through the FRE facility for mobile and migratory species. Overall, operation of the Proposed Action would create a **significant** adverse impact on native fish within the temporary reservoir because spawning habitat would be reduced or eliminated for most native species, summer habitat would be greatly constricted, and a large degree of uncertainty surrounds the ability of native fish to take advantage of expanded habitat in winter.

Pacific lamprey ("eels") are likely to continue returning to areas upstream of Rainbow Falls, but the number of lamprey is likely to be reduced due to substantial contraction of the spawning and rearing habitat. By late-century, the amount of lamprey spawning habitat would be reduced by greater than 70% during peak spawning in June, and spawning would no longer occur in July. Warmer water temperatures would cause rearing habitat to contract in summer and expand in winter due to warmer temperatures year-round. Large portions of the upper mainstem Chehalis River are likely to become uninhabitable for rearing lamprey in July and August due to high temperatures, limiting the usefulness of the mainstem habitat for rearing juveniles. This would be a **significant** adverse impact to lamprey in the temporary reservoir area and downstream from the FRE facility to the confluence with Elk Creek, including at Rainbow Falls.

For freshwater mussels, beds that become inundated in the temporary reservoir are likely to become smothered by fine sediment that settles out of the water column. Recovery of disturbed freshwater mussel beds is not likely to occur due to loss of suitable habitat, changes in hydraulic conditions, impacts to host fish, and because of their slow growth and recolonization rates. The FRE facility would create a **significant** adverse impact to shellfish (mussels) due to loss of habitat.

Mitigation is proposed for the Applicant to develop plans for fish and aquatic species and habitat, riparian habitat, wetlands and wetland buffers, stream and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, operation of the

Proposed Action would have **significant and unavoidable** adverse environmental impacts on fish and aquatic species and aquatic habitat, unless the Applicant develops plans as described above that meet regulatory requirements and for which implementation is feasible.

3.2.2.1.2 Wildlife Species and Habitats

The *Wildlife Species and Habitats Discipline Report* and *Wetlands Discipline Report* (Anchor QEA 2020b) include detailed analysis of impacts from the Proposed Action on vegetation and terrestrial habitat. Probable impacts summarized here could affect wildlife species and habitats used by tribes and identified in stories and cultural practices. The FRE facility would affect habitat and would be located in an area that could be used by tribal hunters. The FRE facility and temporary reservoir would remove the availability of these areas for the collection of plants and the harvesting of deer and elk by tribal hunters and gatherers.

Wildlife Habitat at the Temporary Reservoir: All wildlife habitat within the 847-acre temporary reservoir maximum inundation area would be submerged during a catastrophic flood or larger. The probable adverse impacts are considered **significant** for wildlife habitat within the temporary reservoir because the vast majority of the upland, stream and stream buffer, wetland and wetland buffer, and riparian vegetation would not survive inundation every time the reservoir is filled, thus permanently changing the predominantly coniferous forest vegetation to grass, herbaceous, emergent, and early successional shrub/sapling vegetation that regrows after every event. In addition, there would likely be erosion and/or sedimentation associated with the inundation that could cause periodic changes to the upland and wetland morphology and could also promote the colonization of non-native invasive plant species.

Mitigation is proposed for the Applicant to develop plans for wildlife species and habitat, riparian habitat, wetlands and wetland buffers, streams and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse impacts on wildlife species and habitats in the FRE and temporary reservoir areas, unless the Applicant develops plans as described above that meet regulatory requirements and for which implementation is feasible.

Wildlife Habitat Downstream of the FRE Facility: FRE facility operations would reduce flood levels and for the catastrophic flood scenario, approximately 3,909 acres of vegetation cover would no longer be inundated by floods. Most of the wildlife habitat, more than 2,784 acres, includes hay/pasture and wetland cover type habitats. The *Earth Discipline Report* indicates that the reach of the Chehalis River between the FRE facility and the South Fork Chehalis River confluence would tend to narrow over time due to reduced channel-forming flows and encroachment of woody vegetation. The probable adverse impacts of temperature are considered **moderate** for wildlife habitat in the reach between the FRE

facility and the South Fork Chehalis River due to likely reduced quality of habitat for native species and increased habitat suitability for non-native predator species.

The reduction in peak flows downstream of the FRE facility would reduce the episodic disturbance of downstream riparian areas by major or larger floods. This could result in a reduction in the occurrence of channel avulsions and channel migrations, reducing sediment deposition and erosion processes and reducing the formation of bare alluvial surfaces that provide colonization space for cottonwoods. The *Cottonwood Habitat Study* (Meadow Run Environmental and Anchor QEA 2019) evaluated the potential for the FRE facility to reduce the long-term recruitment of cottonwoods and the quantity of this habitat in the downstream floodplain. While the potential changes in inundation area and depths are relatively minor for the entire downstream floodplain, they would disproportionately affect a very important habitat type for many wildlife species. Overall this adverse impact is anticipated to be **moderate** because it would not affect a large percentage of the downstream floodplain, but it would affect a unique flood-adapted plant community that has high value for many wildlife species. Similarly, floodplain habitats downstream of the FRE facility could transition to more woody species over time, but this is considered a **moderate** impact.

Wildlife Species at the FRE Facility Site and Associated Areas: Adverse impacts associated with operation of the FRE facility are anticipated to be **minor** because the construction of the facility and associated areas would have eliminated or disturbed all upland, riparian, and wetland vegetation communities and made permanent changes to wildlife habitat within this part of the study area.

Wildlife Species at the Temporary Reservoir: All wildlife habitat within the 847-acre temporary reservoir maximum inundation area would be inundated and submerged periodically during operations. Inundation of the reservoir would temporarily flood upland, riparian, wetland, and stream habitats. The loss of tree and shrub vegetation from the riparian zone in the temporary reservoir inundation area would directly remove nesting, denning, and feeding habitat used by wildlife including birds, mammals, and amphibians. Some species would successfully relocate to other suitable habitat and some species would be unsuccessful in relocating to other habitats and would perish. Conversion of forested upland, riparian, and wetland habitats to those dominated by herbaceous and shrubby vegetation would result in the loss of habitats used by some wildlife species in the temporary reservoir inundation area and could represent a gain of habitat for other wildlife species. Decreases in salmon abundance resulting from the temporary inundation of freshwater habitat will have an adverse impact on wildlife species that either feed on or otherwise benefit from salmon-derived nutrients. The periodic inundation of the temporary reservoir would also likely kill or displace terrestrial insects and mollusks, if present in the study area. These species are of limited mobility and would likely be dormant during the flood season.

The probable adverse impacts are considered **significant** for wildlife species because many individuals could not relocate within the 847-acre temporary reservoir every time the reservoir is filled. Low-mobility species would be particularly vulnerable to mortality during inundation. Birds and large and

small mammals are more mobile and would have more success avoiding and moving out of the area during inundation. The complete loss of wildlife habitat for breeding, foraging, resting, and overwintering habitat features during the temporary inundation would also result in wildlife mortality.

Mitigation is proposed for the Applicant to develop plans for wildlife species and habitat, riparian habitat, wetlands and wetland buffers, streams and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse impacts on wildlife species and habitats in the temporary reservoir area, unless the Applicant develops plans as described above that meet regulatory requirements and for which implementation is feasible.

Wildlife Species Downstream of the FRE Facility: Changes to the way floodwaters move through the system downstream of the FRE facility would disrupt many of the existing physical, chemical, and biotic processes of riparian areas, reducing or eliminating many of the important functions provided by the riparian zone. In addition to changes to floodplains, changes in the magnitude and duration of flow downstream of the FRE facility resulting from the drawdown of the temporary reservoir would change the aquatic habitat conditions in the reach downstream.

The probable adverse impacts are considered **moderate** for wildlife species due to the size of the study area relative to the change in the extent of flooding and potential changes in habitat features and because it would also likely affect the connectivity of off-channel habitats that could have more substantial long-term effects. It is not likely that changes in the extent of flooding downstream would result in mortality. The probable adverse impacts are considered **moderate** for wildlife species due to changes in the magnitude and duration of flow downstream of the FRE facility.

Wildlife Species at the Airport Levee: No operation impacts on wildlife species associated with the airport levee are identified. Downstream of the FRE facility, the probable adverse impacts are considered **moderate to minor** for wildlife species due to the size of the study area relative to the change in the extent of flooding and potential changes in habitat features and because it would also likely affect the connectivity of off-channel habitats that could have more significant long-term effects. It is not likely that changes in the extent of flooding downstream would result in any direct wildlife species mortality.

3.2.2.1.3 Water

The *Water Discipline Report* includes detailed analysis of impacts from operation of the Proposed Action on water, including water quality impacts that could impact tribal resources. Operation of the FRE facility would temporarily inundate a maximum area of approximately 847 acres of the existing river channel, its floodplain, tributaries, and nearby hillsides. The temporary reservoir would extend

approximately 5.3 miles upstream of the FRE facility on average during a major flood, and it would extend up to 6.4 miles upstream during greater floods.

Based on the computer model results, river temperatures would increase both within the temporary reservoir area and downstream of the FRE facility. The lack of trees shading the river, either removed during operations or from flood events, would cause the river temperature to increase. The increase would be as much as 5.4°F (3°C) in the reservoir area and immediately downstream and as much as 9°F (5°C) within the temporary reservoir at Crim Creek. Farther downstream, the increases in temperature would be less and would end about 20 miles downstream of the facility. Operation of the FRE facility would reduce dissolved oxygen levels by up to 0.4 milligrams per liter in summer in the temporary reservoir area and areas downstream. As with temperature, these dissolved oxygen impacts would be greatest near the FRE facility and less farther downstream.

Operation of the FRE facility would increase turbidity in the Chehalis River during certain periods and reduce turbidity during others. After a major flood or larger, use of the FRE facility and temporary reservoir would change turbidity levels in the river, especially downstream. The temporary reservoir would fill during a flood and the FRE facility would slowly release the water after peak flood levels pass. This filling and release would stir up sediment from the riverbed, moving it into the water and downstream and increasing turbidity levels in the river. Turbidity levels would exceed water quality standards downstream as the temporary reservoir is drained, especially near the end of the process.

The increased water temperatures and turbidity levels and decreased dissolved oxygen levels would exceed water quality standards and be **significant** adverse impacts to surface water quality and designated uses of the Chehalis River and Crim Creek for salmonid habitat in the temporary reservoir area and for 20 miles downstream of the FRE facility.

Mitigation is proposed for the Applicant to develop plans for wildlife species and habitat, riparian habitat, wetlands and wetland buffers, stream and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on surface water quality in the FRE and temporary reservoir areas and downstream approximately 20 miles, unless the Applicant develops plans as described above that meet regulatory requirements and for which implementation is feasible.

Groundwater levels would not be substantially affected when the FRE facility is in operation for major or larger floods because Chehalis River flows would be substantially reduced for a short period (2 to 3 days) during a major flood, but then would be increased by the outflow from the temporary reservoir for 28 to 35 days, potentially increasing bank recharge. Reduction in the occurrence and duration of overbank flooding inundation during major floods would not substantially affect groundwater recharge because recharge from overbank flooding is a minor contributor (a few percent) to groundwater recharge, and

the reduction in recharge would occur only in areas where flood inundation no longer occurs or is reduced in duration. Overall, adverse impacts on groundwater quantity from FRE facility operation are expected to be **moderate to minor**. **No adverse impacts** on groundwater quality are anticipated.

The Airport Levee Changes are not expected to adversely affect surface water quality. If the Airport Levee Changes are completed before the FRE facility is operational and a catastrophic flood occurs, there is the potential for **moderate** adverse impacts from increased flood elevations immediately upstream and downstream of the levee. Subsurface placement of fill material or structures for the Airport Levee Changes could locally modify shallow groundwater flows, representing a **moderate** adverse impact on groundwater quantity.

3.2.2.1.4 Earth (Geology and Geomorphology)

The *Earth Discipline Report* includes detailed analysis of impacts from operation of the Proposed Action on geology and geomorphology that could impact tribal resources. The potential for erosion and shallow-rapid landslides within the temporary reservoir area, including when the reservoir fills and drains, was analyzed. The net effect of these erosion mechanisms during FRE facility operation would be to decrease sediment input to the mainstem Chehalis River downstream of the FRE facility during impoundment events and increase fine sediment input in the mainstem Chehalis River as the temporary reservoir drains and during one or two intense rainstorms after the temporary reservoir is drained. Increased fine sediment input effects would be moderate during all of these periods (reservoir draining and one or two subsequent intense rainstorms) but could be significant during the latter parts of the reservoir draining period if incoming turbidity levels are low because eroded sediment could exceed 10% of background input. The fine sediment impacts would have a **significant** adverse impact on turbidity (water quality) as discussed in the section above.

During all of the flood scenarios, sediment would be stored in the reservoir area during the impoundment period and some of the stored sediment subsequently transported out of the reservoir area and into the downstream channel by the end of the following summer. Overall, modeling predicts **significant** adverse impacts to sediment transport and substrate characteristics within the temporary reservoir fluctuation zone. These significant adverse impacts could be detrimental to fish and aquatic habitat by increasing fine sediment deposition in the riverbed (substrate). The model predicts **moderate** impacts to geomorphology between the FRE facility and approximately RM 85. This would have **significant** adverse effects on fish and aquatic habitat as described in the *Fish and Aquatic Habitat Discipline Report*.

When the FRE facility is in operation and impounding water, all woody material would be trapped in the reservoir and removed as the reservoir level drops. As a result, very little wood from the watershed upstream from the FRE facility would move downstream into the mainstem Chehalis River. Lack of mobilization of the available large wood from the watershed above the FRE facility to the river below would further reduce channel complexity and diversity of the Chehalis River mainstem, particularly

between the FRE facility and the South Fork Chehalis River. Operation of the FRE facility would have a **significant** adverse impact on large woody material loading and function.

Operation of the FRE facility would have **moderate to minor** impacts on bank erosion and channel migration below the FRE facility by reducing bank erosion and channel migration rates slightly. Within the temporary reservoir, there are few areas that are subject to channel migration under current conditions. Deposition of sediment in the form of deltas during inundation events within the impoundment area would result in an increase in channel migration in the delta areas between RM 115 and RM 108 if they are in relatively unconfined reaches. The overall impact of increasing channel migration in the temporary reservoir area would be **moderate.**

Operation of the FRE facility would reduce flood peaks downstream and eliminate channel forming flows. When flows are reduced due to water backing up at the entrance to the outlets or water is held in the temporary reservoir during flood events, the stream power needed for most channel-forming processes would be reduced or eliminated. This reduction in peak flows and corresponding reduction in large wood and sediment transport would impact the creation of habitats that depend on channel-forming processes. This would be a **significant** adverse impact to geomorphology from the FRE facility to the South Fork River confluence.

The reduction in channel-forming flows and large woody material transport as described above would be **significant** adverse impacts to geomorphology. Mitigation is proposed for the Applicant to develop plans for wildlife species and habitat, riparian habitat, wetlands and wetland buffers, stream and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material. However, there is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on geomorphology in the FRE and temporary reservoir areas and downstream approximately 20 miles, unless the Applicant develops plans as described above that meet regulatory requirements and for which implementation is feasible.

3.2.2.1.5 Cultural Resources

The *Cultural Resources Discipline Report* includes detailed analysis of impacts from operation of the Proposed Action on cultural resources. Operation of the temporary reservoir during floods has the potential to affect nine recorded archaeological sites and isolates. Potential effects on archaeological sites and isolates include inundation, increased erosion, burial beneath reservoir sediments, burial beneath colluvial sediments (landslide or mass movement), and accelerated destruction of artifacts due to increased wet-dry cycles. The eligibility of these sites to be included in the NRHP is being discussed through a separate Section 106 process. If eligible, these potential impacts will be reviewed, significance determined, and mitigation agreed upon through the Section 106 process. As discussed earlier for construction, TCPs are being studied as part of the Section 106 process under the National Historic Preservation Act. There are no known cemeteries within the FRE facility area.

3.2.2.2 Indirect

3.2.2.2.1 Fish Species and Habitats

Indirect effects on fish and fish-eating birds may occur if the changes to habitat function and connectivity of the Chehalis River lead to changes in aquatic communities in tributary subbasins or the marine environment, if fish passage is reduced to headwater areas upstream of the temporary reservoir, or if the function of the Chehalis River as a migratory corridor is impaired. Over the long term, the increase in upper mainstem Chehalis River temperatures may result in an upstream shift in the fish community transition zone, from cool-water adapted species to warm-water adapted species including more fish from the minnow family, suckers, and non-native fishes.

The degree to which a decline in the specific subpopulations of salmon originating from the upper Chehalis River would affect the Southern Resident killer whale is unknown, and the magnitude of construction-related impacts on killer whales is highly uncertain. The number of fish which would likely be impacted by the Proposed Action represents a small proportion of the overall diet of the Southern Resident killer whales. However, the reduction of salmon and steelhead, specifically spring-run Chinook, from the Chehalis River would present a **moderate** adverse impact on Southern Resident killer whales. The loss of salmon and steelhead from the Proposed Action would have **minor** adverse impact on other marine mammals and fish-eating birds because they prey upon a more diverse set of fish species.

3.2.2.2.2 Wildlife Species and Habitats

The *Water Discipline Report* indicates that the operation of the FRE facility and associated changes in vegetation cover in the temporary reservoir inundation area would increase water temperatures by 2°C to 3°C in the downstream reach of the Chehalis River (to the South Fork Chehalis River confluence). This would likely reduce habitat quality for native amphibians in the river and floodplain habitats and increase the habitat suitability for non-native predator species such as bullfrogs and centrarchid fish species. This would be a **moderate** indirect impact on wildlife habitats and species such as the northern red-legged frog in the reach from the FRE facility to the South Fork Chehalis River.

3.2.2.2.3 Cultural

TCPs are being studied as part of the Section 106 process under the National Historic Preservation Act.

3.2.3 Required Permits

Multiple federal, state, and local permits will be required for the Proposed Action and are listed in the EIS Chapter 4.

Concurrent with the Washington SEPA review process, the Corps, as federal lead agency, is conducting a review of the Proposed Action under NEPA. Pursuant to NEPA, the Corps is expected to assess potential impacts of the Proposed Action on tribal resources, including potential impacts related to tribal

sovereignty and treaty rights. The Corps' NEPA Draft EIS is expected to be completed in September 2020.

In addition, the Corps is expected to consult under Section 7 of the federal Endangered Species Act with the USFWS and NOAA Fisheries. Additional measures may be identified under one or both of these processes that could further reduce potential impacts on fish, and therefore reduce potential impacts on tribal resources.

The Corps is the lead for the Section 106 review under the National Historic Preservation Act. The review includes a consultation process with the Chehalis Tribe, the Quinault Indian Nation, other affected tribes, DAHP, and the Applicant as part of this process. A Memorandum of Agreement would be developed for mitigation and treatment of any adverse impacts.

3.2.4 Proposed Mitigation Measures

Mitigation associated with potential impacts on tribal resources would be addressed directly with the Quinault Indian Nation, the Chehalis Tribe, and other tribes during government-to-government consultations. Mitigation measures are expected to be developed as part of the permitting and consultation processes for fish species and habitat, wildlife, and cultural resources.

Mitigation is proposed for the Applicant to develop plans for fish and aquatic species and habitat, riparian habitat, wetlands and wetland buffers, stream and stream buffers, vegetation management, surface water quality, wildlife species and habitat, and large woody material but there is uncertainty if mitigation is technically feasible and economically practicable.

3.2.5 Significant and Unavoidable Adverse Environmental Impacts

Construction and operation of the Proposed Action could result in impacts on tribal resources. Resource-specific discipline reports identified significant adverse impacts on fish and wildlife species, aquatic and terrestrial habitat, water resources, wetlands, water, and geomorphology. There is uncertainty if mitigation is technically feasible and economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on fish, aquatic species, aquatic habitat, wildlife species and habitat, wetlands, water, and earth, unless the Applicant develops plans as described above that meet regulatory requirements and for which implementation is feasible. These impacts could impact tribal resources, including wildlife, vegetation, and fish available for harvest and use by tribes. Making a determination of significance related to treaty-reserved rights is not part of this evaluation.

3.3 Local Actions Alternative

Local action elements include land use management, floodproofing, buy-out of at-risk properties or structures, floodplain storage improvement (riparian restoration, afforestation, floodplain reconnection, water flow abatement), channel migration protection, and early flood warning systems. The *Project Description and Alternatives Appendix* (Anchor QEA 2020e) provides additional detail about these elements.

Local actions could impact tribal resources during construction in the following ways:

- Restricting or reducing access of tribal members to tribal resources
- Altering vegetation in action areas that could affect water, habitat, fish, and wildlife
- Reducing the number of fish that would otherwise be available for tribal harvest (due to impacts to habitat or water quality), as well as wildlife and plants that are identified as a tribal resource
- Affecting cultural and historic resources important to tribes, particularly through ongoing substantial flood risk

This section summarizes findings from the referenced discipline reports that could impact tribal resources. The referenced discipline reports include details on affected environment, analysis, findings, potential mitigation, and significant and unavoidable impacts.

3.3.1 Impacts from Construction

Fish Species and Habitats

Of the six local action measures identified under this alternative, two elements could result in the need for construction activities adjacent to or within the river channel and, therefore, could result in impacts on fish, shellfish, macroinvertebrates, or aquatic habitat. Floodplain storage improvements and channel migration protection would be expected to result in sporadic, localized construction activity affecting aquatic habitat, with individual projects occurring over a long time.

Freshwater fish, shellfish, and fish habitat within the river reach of construction activities associated with the Local Actions Alternative may be directly affected during in-water work. Projects would be required to meet water quality and Forest Practices Act standards and require state, local, and federal permits for water quality and in-water work. Overall, due to the limited scale and duration of construction of local actions, their likely location around developed areas, and the fact that many activities would occur outside aquatic habitat, such impacts would likely be **minor** in the study area over the long term.

Wildlife Species and Habitats

No to minor probable adverse direct construction impacts on wildlife habitat or species under the Local Actions Alternative have been identified. **No** probable adverse indirect construction impacts on wildlife species or habitat under the Local Actions Alternative have been identified.

Cultural Resources

Construction activities for local actions could occur within recorded and unrecorded archaeological sites. Construction activities for local actions could occur in proximity to historic buildings and structures, or could directly alter historic structures, through floodproofing structures or demolition of buy-out structures. Construction activities for local actions could occur within cemeteries or could be located near or within TCPs. For any of these activities, eligibility, adverse effects, significance, and mitigation would be identified during required federal or state processes for historic and cultural resources.

3.3.2 Impacts from Operation

This section analyzes the potential impacts from operation and implementation of local actions.

Fish Species and Habitats

Local Action Alternative measures may have direct effects on fish, shellfish, and fish habitat if they occur in the river channel or nearby floodplain areas. Floodplain storage improvement could increase habitat complexity and adjacent floodplain habitat availability, benefitting fish species and habitats. Increased floodplain inundation is likely to benefit fish if the floodplain areas are connected to the mainstem and increase usable rearing habitat during wet seasons. Restoration of riparian areas may improve habitat function by providing key habitat elements such as shading and nutrient regulation. Channel migration protection activities, like the placement of large woody material, would immediately increase habitat complexity for fish species, but may have the potential to disrupt some benefits from natural channel migration processes and result in loss of habitat complexity over the long term. Overall, channel migration protection projects that are designed to reverse incision processes that have resulted from historic land uses will benefit aquatic habitat on the larger scale. Therefore, operation of local actions is likely to have **minor** adverse impacts on fish, shellfish, and aquatic habitat. The indirect effects of operation of local actions is likely **minor** impacts on fish, shellfish, and aquatic habitat.

Wildlife Species and Habitats

No probable adverse impacts on wildlife habitat or species for operations under the Local Actions Alternative have been identified.

Cultural Resources

The implementation of local actions could result in some localized protection of historic and cultural resources from flood damage. However, flooding would likely not be significantly reduced through local and non-structural approaches. Historic and cultural resources throughout the study area would continue to experience **substantial flood risk**.

3.4 No Action Alternative

Under the No Action Alternative, stream and floodplain restoration efforts include the Chehalis Basin Strategy-led Aquatic Species Restoration Plan and USFWS Chehalis Fisheries Restoration Program, both of which may result in broad restoration efforts spread across the entire Chehalis Basin. The *Project Description and Alternatives Appendix* (Anchor QEA 2020e) provides additional detail about these elements.

These activities could impact tribal resources during construction in the following ways:

- Restricting or reducing access of tribal members to tribal resources
- Altering vegetation in action areas, which could affect water, habitat, fish, and wildlife
- Reducing the number of fish that would otherwise be available for tribal harvest (due to impacts to habitat or water quality), as well as wildlife and plants that are identified as a tribal resource
- Affecting cultural and historic resources important to tribes

This section summarizes findings from the referenced discipline reports that could impact tribal resources.

Fish Species and Habitats

Construction of No Action Alternative elements that could impact fish or fish habitat include culvert replacement, flood and habitat mitigation projects, and restoration and stream modification projects. These activities could involve water diversions, cut and fill, vegetation disturbance, and elevated sound and vibration. This could lead to increases in turbidity or sedimentation, fish injury or stranding, or disruption of fish behavior. Overall, construction activities in the study area under the No Action Alternative would be limited in duration, and many activities would occur outside of aquatic habitat. Many of the stream restoration and modifications efforts would benefit fish and shellfish in the long term.

Operation of floodproofing projects may have impacts on fish, shellfish, and aquatic habitat by allowing continuation of activities in the floodplain that are harmful to fish and fish habitat.

Increases in water temperature and reductions in summer flows due to climate change over the long term are expected to have a large impact on spring-run Chinook salmon, fall-run Chinook salmon, coho salmon, and steelhead populations from the Above Crim Creek Subbasin and Rainbow Falls to Crim Creek Subbasin. The significant adverse impacts noted above for spring-run and fall-run Chinook salmon, coho salmon, and steelhead associated with the No Action Alternative would result in decreased abundance. Chinook salmon in the Above Crim Creek Subbasin spawn predominantly within the lower reaches of the Chehalis River and are therefore more susceptible to increased water temperatures compared to the upper tributaries that coho salmon and steelhead also occupy. Effects on non-salmon fish from the increase in temperatures and reduction in summer flows due to climate change include a

major reduction or loss of summer spawning and rearing habitat, a potential increase in winter rearing habitat, and a potential increase in habitat for non-native largemouth bass.

Many in-water projects considered in the No Action Alternative are expected to benefit aquatic species, including shellfish and aquatic macroinvertebrates. Mussel-friendly stream restoration could benefit shellfish in the long run. The impacts due to climate change may adversely affect shellfish and aquatic macroinvertebrates, mainly due to a reduction of wet areas with lower flows in summer and warmer summer temperatures.

Modeling of salmonids showed the productivity under the No Action Alternative in late-century would decrease significantly for spring-run Chinook salmon, coho salmon, and steelhead in the Above Crim Creek Subbasin and Rainbow Falls to Crim Creek Subbasin. Aquatic habitats and species will be affected by increased flooding and climate change that would reduce habitat suitability and likely restrict native species abundance and distribution. The quality and quantity of habitat available to aquatic species will be impacted, and the productivity of aquatic salmonid species throughout the study area will be reduced. Increased water temperatures and decreases in summer flows will substantially affect multiple cold-water adapted aquatic species. The distribution of warm-water adapted species could expand, including invasive species. The No Action Alternative would have **substantial flood risks** to wildlife species and habitats.

Marine predators that prey on Chehalis Basin salmon, either the outmigrating smolts or the returning adults, may be indirectly affected by a change in salmon population sizes. Southern Resident killer whales depend on spring-run Chinook salmon as a food source, and the overall number of these fish has been decreasing throughout the region. The degree to which a decline in the specific subpopulation of fish originating from the upper Chehalis River would affect the Southern Resident killer whale is unknown, and the magnitude of the impacts related specifically to the No Action Alternative is highly uncertain.

Wildlife Species and Habitats

The operation of projects undertaken to restore aquatic habitat under the No Action Alternative is not predicted to have direct adverse impacts on habitat in the study area. However, projected climate change effects would continue to degrade wildlife habitats and increase frequency and severity of droughts and storm events that could cause more frequent floods and lower flows. While flooding is a natural phenomenon that forms and sustains aquatic, riparian, and floodplain habitats, an increased frequency and intensity of flooding would cause more frequent disturbances to wildlife habitat that could promote the proliferation of non-native invasive species (both plants and animals) and cause more frequent mortality of wildlife individuals during flood events. Similarly, more frequent and severe droughts could cause mortality of native plants and animals and expand the suitability of habitat for non-native species. The No Action Alternative would have **substantial flood risks** to wildlife species and habitats.

Water Resources

Water levels for major and catastrophic floods are expected to continue to increase across the study area over time under the No Action Alternative. Water quality and use throughout the study area would continue to be vulnerable to damage during both major and catastrophic floods. Floods would continue to affect surface and groundwater and they would continue to experience **substantial flood risk** under the No Action Alternative.

Cultural Resources

Under the No Action Alternative, historic and cultural resources throughout the study area would continue to be vulnerable to damage during both major and catastrophic floods. Floods would continue to inundate historic and cultural properties and they would continue to experience **substantial flood risk** under the No Action Alternative.

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