State of Washington
DEPARTMENT OF FISH AND WILDLIFE
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Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia, WA

January 21, 2020

Dear Interested Parties:

The Washington Department of Fish and Wildlife (WDFW) has prepared a Draft Supplemental Environmental Impact Statement (Draft SEIS) titled "**Duckabush Estuary Restoration Project**." WDFW has prepared this Draft SEIS in compliance with the State Environmental Policy Act (SEPA) and other relevant state laws and regulations. The Draft SEIS is now available to other agencies and the public for a 30-day public comment period.

This Draft SEIS supplements the July 2016 Final Integrated Feasibility Report and Environmental Impact Statement titled "Puget Sound Nearshore Ecosystem Restoration." The Draft SEIS provides additional information and analyses of the impacts of an estuary restoration project at the mouth of the Duckabush River in Brinnon, Jefferson County, Washington, on Hood Canal. A 30-day scoping comment period was held from June 27, 2019, through July 26, 2019.

Key Environmental Issues and Options

The overall goal of the Duckabush Project is to restore tidal exchange and re-establish distributary channels to improve habitat and hydrologic connectivity in the Duckabush Estuary. The estuary is currently compromised by fill, dikes, and road infrastructure, including Highway 101, which partially blocks channels, limits tidal interaction, and reduces estuarine habitat available to fish and wildlife. The proposed project would reconnect the river to its floodplain and restore tidally influenced wetlands by modifying local roads and both moving and elevating Highway 101 onto a bridge spanning the estuary. Distributary channels would be re-established and riparian vegetation planted. This project was identified as a high priority restoration action by the Puget Sound Nearshore Ecosystem Restoration Project.

WDFW selected four key elements of the environment for additional analysis in this Draft SEIS based on interest during the scoping process with focus on specific sub-elements of each: Water; Plants & Animals; Transportation; and Noise.

A public hearing and open house will be held beginning at 10:00 a.m. on Saturday February 8, 2020, at the Brinnon School, 46 Schoolhouse Road, Brinnon, Washington. Both oral testimony and written comments will be accepted at the meeting.

Comments must be received by 5 p.m. February 20, 2020.

The following procedures govern the method to comment on agency SEPA proposals. Comments received through these procedures are part of the official SEPA record for this proposal.

- Online at: https://wdfw.wa.gov/species-habitats/habitat-recovery/nearshore/conservation/projects/duckabush/sepa or https://wdfw.wa.gov/licenses/environmental/sepa/open-comments
- Email to: SEPAdesk2@dfw.wa.gov
- Mail to the SEPA Responsible Official at:

  Lisa Wood, SEPA/NEPA Coordinator
  WDFW Habitat Program, Protection Division
  P.O. Box 43200
  Olympia, WA 98504-3200

- Orally or in writing at the public hearing in Brinnon, WA, on Saturday February 8, 2020.

See Fact Sheet included at the beginning of the Draft SEIS for more information.

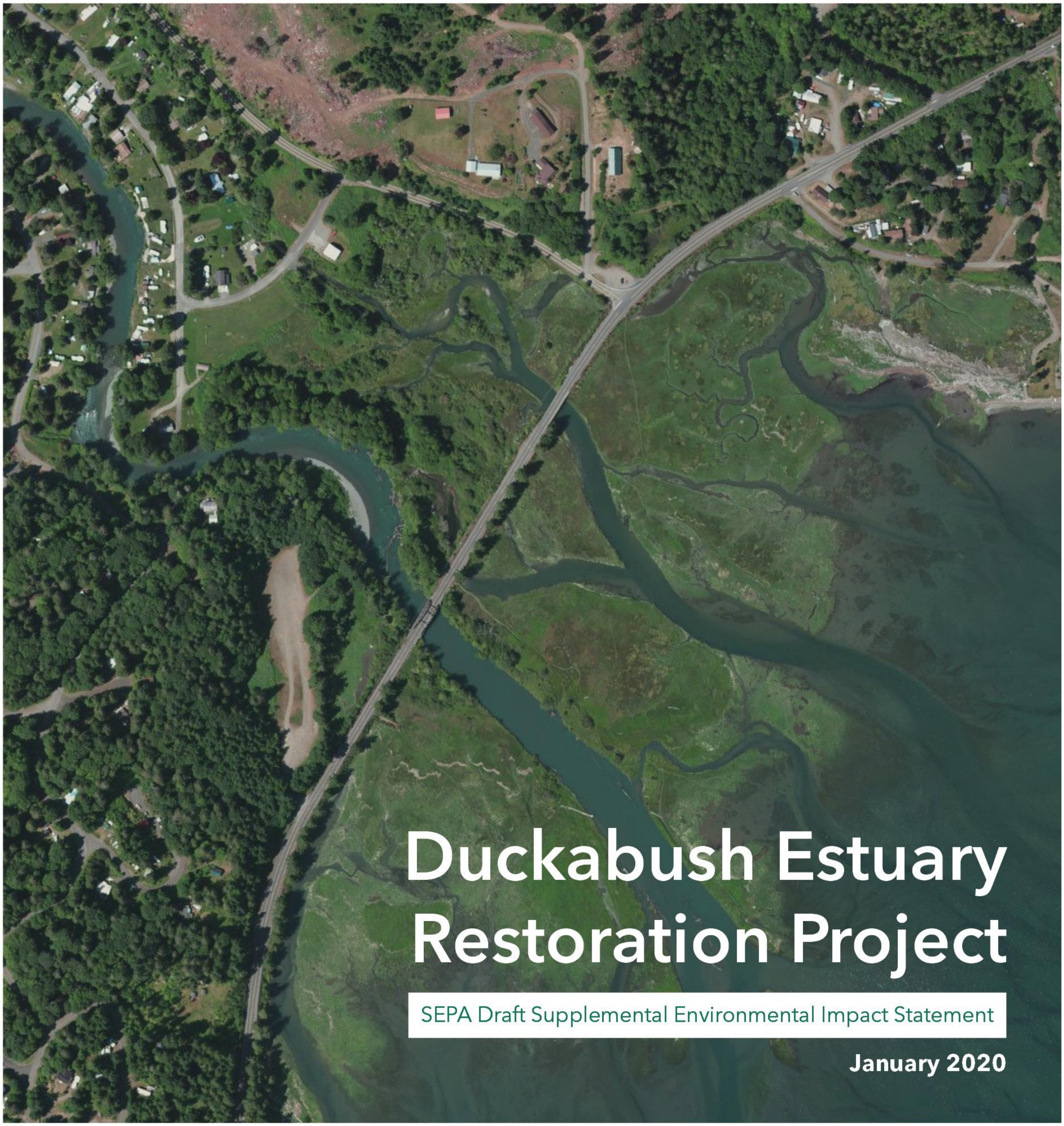
After the Draft SEIS comment period concludes, WDFW will review comments. A Final SEIS will be prepared that contains the responses to the comments and provides additional updates as appropriate. WDFW anticipates issuing the Final SEIS mid-year 2020.

Project information and updates can be found at: https://wdfw.wa.gov/duckabush. SEPA documents are available for review at: https://wdfw.wa.gov/licenses/environmental/sepa/open-comments.

Sincerely,

Lisa Wood

Lisa Wood
SEPA Responsible Official and SEPA/NEPA Coordinator
Protection Division
Habitat Program



Duckabush Estuary Restoration Project

SEPA Draft Supplemental Environmental Impact Statement

January 2020

Prepared for
Washington Department of Fish & Wildlife

Washington Department of FISH and WILDLIFE

DUCKABUSH ESTUARY RESTORATION PROJECT

Draft Supplemental EIS

Prepared for
Washington Department of Fish & Wildlife

January 2020

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D190255.00

FACT SHEET

PROJECT NAME

Duckabush Estuary Restoration Project

PROJECT LOCATION

The Duckabush Estuary is located at approximately mile 310 of U.S. Highway 101 in Brinnon, Jefferson County, Washington, on the west side of Hood Canal.

PROPOSED ACTION

The Washington Department of Fish and Wildlife (WDFW) proposes an estuary restoration project at the mouth of the Duckabush River in Brinnon, Jefferson County, Washington, on Hood Canal. The estuary is currently compromised by fill, dikes, and road infrastructure, including Highway 101, which partially blocks channels, limits tidal interaction, and reduces estuarine habitat available to fish and wildlife. The proposed project would reconnect the river to its floodplain and restore tidally influenced wetlands by modifying local roads and both moving and elevating Highway 101 onto a bridge spanning the estuary. Distributary channels would be re-established and riparian vegetation planted. This project was identified as a high priority restoration action by the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP).

PROJECT PROPONENT

Washington Department of Fish and Wildlife (WDFW)

STATE ENVIRONMENTAL POLICY ACT (SEPA) LEAD AGENCY

Washington Department of Fish and Wildlife (WDFW)

SEPA RESPONSIBLE OFFICIAL

Lisa Wood, WDFW

DATE OF ISSUANCE

January 21, 2020

PUBLIC COMMENT PERIOD AND DATE COMMENTS ARE DUE

This Draft Supplemental Environmental Impact Statement (Draft SEIS) will be available for a 30-day public comment period. Comments must be received by 5 p.m. February 20, 2020.

COMMENT SUBMITTAL AND CONTACT INFORMATION

The following procedures govern the method to comment on agency SEPA proposals. Comments received through these procedures are part of the official SEPA record for this proposal.

- Online at: https://wdfw.wa.gov/species-habitats/habitat-recovery/nearshore/conservation/projects/duckabush/sepa Or https://wdfw.wa.gov/licenses/environmental/sepa/open-comments
- Email to: SEPAdesk2@dfw.wa.gov
- Mail to the SEPA Responsible Official at:

  Lisa Wood, SEPA/NEPA Coordinator
  WDFW Habitat Program, Protection Division
  P.O. Box 43200
  Olympia, WA 98504-3200

Orally or in writing at the public hearing in Brinnon, WA, on Saturday February 8, 2020 (details below).

PUBLIC HEARING

A public hearing will begin at 10:00 a.m. on Saturday February 8, 2020, at the Brinnon School, 46 Schoolhouse Road, Brinnon, WA.

Both oral testimony and written comments will be accepted at the meeting.

AVAILABILITY OF THIS DRAFT SEIS

This Draft SEIS is available online at https://wdfw.wa.gov/species-habitats/habitat-recovery/nearshore/conservation/projects/duckabush/sepa Or https://wdfw.wa.gov/licenses/environmental/sepa/open-comments

The document is available to read at:

- Washington Department of Fish and Wildlife – Natural Resources Building
  1111 Washington Street SE, Olympia, WA, Monday–Friday, 8 a.m.–5 p.m.
- Olympic Canal Tracts Office
  310703 Highway 101, Brinnon, WA 98320

If you have questions about this action, contact Lisa Wood either at the address above, or via SEPAdesk2@dfw.wa.gov, or phone 360.902.2260.

PERMITS, LICENSES, AND APPROVALS LIKELY REQUIRED FOR PROPOSAL

- Clean Water Act Section 404, Nationwide Permit – U.S. Army Corps of Engineers (USACE)
- U.S. Rivers and Harbors Act Section 10 – USACE
- National Historic Preservation Act Section 106 Consultation – USACE in coordination with Washington State Department of Archaeology and Historic Preservation (DAHP)

- Endangered Species Act Section 7 Consultation (National Oceanic and Atmospheric Administration – National Marine Fisheries Service [NOAA Fisheries] and U.S. Fish and Wildlife Service [USFWS])
- Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation – NOAA Fisheries
- Marine Mammal Protection Act Incidental Harassment Authorization or Letter of Authorization – NOAA Fisheries
- Clean Water Act Section 401 Water Quality Certification – Washington State Department of Ecology (Ecology)
- Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit – Ecology
- Coastal Zone Management Act (CZMA) Federal Consistency Determination – Ecology
- Aquatic Use Authorization – Washington State Department of Natural Resources (DNR)
- Hydraulic Project Approval (HPA) – WDFW
- Building Permit – Jefferson County
- Shoreline Substantial Development Permit/Variance/Conditional Use – Jefferson County

AUTHORS AND CONTRIBUTORS

A list of authors and contributors is provided in Chapter 5 of this Draft SEIS.

LOCATION OF BACKGROUND MATERIALS

Background materials used in the preparation of this Draft SEIS are listed in Chapter 6, *References*.

The NEPA EIS can be read at: https://bit.ly/PSNearshore (case-sensitive).

Project information and updates can be found at: https://wdfw.wa.gov/duckabush.

TIMING OF ADDITIONAL ENVIRONMENTAL REVIEW

After the Draft SEIS comment period concludes, WDFW (as SEPA Lead Agency) will review comments. A Final SEIS will be prepared that contains the responses to the comments and provides additional updates as appropriate. WDFW anticipates issuing the Final SEIS mid-year 2020.

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ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AEP	Annual Exceedance Probability
AFRC	American Forest Resource Council
APE	Area of Potential Effects
BFE	Base Flood Elevation
BMPs	best management practices
CARA	Critical Aquifer Recharge Area
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
DAHP	Department of Archaeology and Historic Preservation
dB	decibel
dBA	A-weighted decibel
DNR	Washington State Department of Natural Resources
DOH	Department of Health
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
ESA	Environmental Science Associates
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GEO	Governor’s Executive Order
GI	General Investigation
HCM	Highway Capacity Manual
HCSEG	Hood Canal Salmon Enhancement Group
HPA	Hydraulic Project Approval
JCC	Jefferson County Code
L10	Noise levels that are equaled or exceeded 10% of a specified time period
L90	Noise levels that are equaled or exceeded 90% of a specified time period
lbs.	pounds
Leq	equivalent sound level
Leq(h)	equivalent sound level used to measure highway traffic
LiDAR	Light Detection and Ranging
Lmax	maximum sound level
LOS	level of service
mg/L	milligrams per liter

MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
mm	millimeter
mph	miles per hour
MPN	Most Probable Number
NAC	Noise Abatement Criteria
NAVD88	North American Vertical Datum 1988
NEPA	National Environmental Policy Act
NEPA EIS	Final Integrated Feasibility Report and Environmental Impact Statement
NHPA	National Historic Preservation Act
NOAA Fisheries	National Oceanic and Atmospheric Administration - National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWIFC	Northwest Indian Fisheries Commission
PA	Programmatic Agreement
PED	Preconstruction Engineering and Design
PHS	Priority Habitats and Species
ppm	parts per million
ppt	parts per thousand
PSNERP	Puget Sound Nearshore Ecosystem Restoration Project
RCW	Revised Code of Washington
SEIS	Supplemental Environmental Impact Statement
SEPA	State Environmental Policy Act
SIPZ	Seawater Intrusion Protection Zone
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

1. SUMMARY

Chapter 1 includes an introduction, information on the Draft Supplemental Environmental Impact Statement (Draft SEIS) process, a history of the Duckabush Estuary Restoration Project, a brief description of the proposed project, and a summary of impacts and mitigation.

1.1 INTRODUCTION

Washington Department of Fish and Wildlife (WDFW) is the State Environmental Policy Act (SEPA) Lead Agency for the Duckabush Estuary Restoration Project (Duckabush Project) located on the Hood Canal near Brinnon, Washington. The proposed Duckabush Project is required to be reviewed for impacts to the built and natural environment under SEPA for Washington State. The environmental review process helps state and local agencies identify and consider possible environmental impacts that could result from government actions, including permit actions.

WDFW adopted the Environmental Impact Statement (EIS) prepared in compliance with the National Environmental Policy Act (NEPA), published by the U.S. Army Corps of Engineers (USACE) and WDFW in 2016: *The Puget Sound Nearshore Ecosystem Restoration: Final Integrated Feasibility Report and Environmental Impact Statement* (NEPA EIS).

WDFW is now issuing this Draft SEIS with additional information about the Duckabush Project to comply with SEPA requirements. The information provided in the NEPA EIS combined with the information in this Draft SEIS form the entirety of the SEPA environmental review for the Duckabush Project. More information about the Draft SEIS process is provided below.

1.2 DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DRAFT SEIS)

As SEPA Lead Agency, WDFW determined that the Duckabush Project may have a significant adverse impact on the environment and issued a Determination of Significance/Adoption/Scoping Notice on June 27, 2019 under Washington Administrative Code (WAC) 197-11-360, WAC 197-11-600, and WAC 197-11-620. WDFW is following a Draft SEIS process to accomplish the following goals: (1) Provide the public with a summary of Duckabush Project analysis included in the NEPA EIS; (2) Build upon the previous analysis presented in the NEPA EIS; (3) Incorporate by reference the Draft and Final NEPA EIS documents as part of the SEPA documentation; and (4) Provide additional information to the public about the Duckabush Project for four elements of the environment: Water, Plants and Animals, Transportation, and Noise.

According to the WAC, a Supplemental EIS should be prepared in the same way as an EIS. However, it should not include an analysis of actions, alternatives, or impacts that were included in the previously prepared EIS (WAC 197-11-620). This Draft SEIS informs the public and decision-makers of the proposed action's potential impacts and, as appropriate, mitigation measures to avoid or reduce potential significant impacts. The Draft SEIS also provides cross-references to the elements of the environment that were analyzed in the NEPA EIS. Those elements (with reference to the location in the NEPA EIS) are listed in Appendix B of this Draft SEIS.

1.3 SEPA SCOPING PROCESS AND COMMENTS

Scoping refers to the process of determining the issues and range of alternatives to address in the environmental analysis, as presented in an EIS. Although scoping is not required with a Supplemental EIS, WDFW opted to conduct scoping to provide additional opportunity for public input and to better inform the analysis presented in this Draft SEIS. Scoping is a tool to inform and narrow the focus of an EIS (WAC 197-11-408).

The 30-day scoping comment period started on June 27, 2019, and ended on July 26, 2019. In addition, WDFW held a public scoping meeting at the Brinnon School in Brinnon, WA on July 13, 2019. Eighty-seven individuals signed in at the meeting, with an estimated 100 people in attendance. Sixteen individuals provided oral comments at the meeting. In addition, WDFW received 27 written comments submitted in person, on-line, by email, or through the mail delivery services.

Scoping comments were reviewed and sorted into the appropriate element of the environment. In general, comments received were related to the project description and to Earth, Environmental Health (except Noise), Climate Change, Cultural Resources, Plants and Animals, Traffic and Parking, Water, Land Use, Public Services/Utilities, and Recreation. No comments were received about Air Quality, Aesthetics, Energy and Natural Resources, or Light and Glare.

All comments received were considered in the development of the scope of the Draft SEIS. The Scoping Comment Summary and Responses can be found in Table A-1 of Appendix A of this document. At the conclusion of scoping, WDFW determined the issues and alternatives to be analyzed in this Draft SEIS.

Many of the SEPA elements of the environment were previously analyzed in the NEPA EIS (see Table 1-1, p. 1-6). These elements included Earth, Air, Water, Plants and Animals, Environmental Health, Noise, Land and Shoreline Use, Aesthetics, Recreation, Historic and Cultural Preservation, Transportation, and Public Services and Utilities. See Appendix B for references to the NEPA EIS analysis for these elements. Energy and Natural Resources, Light and Glare, and Agricultural Crops were not analyzed in the NEPA EIS because of a lack of relevance to the project or lack of interest during the scoping process.

No additional environmental review is required under SEPA. However, WDFW selected four elements of the environment for additional analysis in this Draft SEIS based on interest during the scoping process with focus on specific sub-elements of each:

- Water
- Plants & Animals
- Transportation
- Noise

1.4 HISTORY OF THE DUCKABUSH PROJECT SITE

1.4.1 Natural Environment

The Duckabush River is one of several major river systems in the Hood Canal Subbasin draining the east slope of the Olympic Mountains to Hood Canal (Figure 1-1). The broad river delta fans out into Hood Canal on the south side of Black Point Peninsula. The historical processes and functions of the Duckabush Estuary site differ from current conditions. By the early 1900s the estuary was bisected by road and bridge construction. These early roadways were replaced in 1934 with the Highway 101 roadway and two bridges; however, portions of the original roadway, dikes, and abutments still remain.

SOURCE: ESA, 2019

Figure 1-1 Project Location Map

Prior to road construction, the Duckabush River had two primary distributary channels that emptied into the Hood Canal estuary. Training berms are in place on the main south channel, just upstream of the Highway 101 crossing, to control the lateral movement of the channel. The historical north channel of the river has been cut off from the Duckabush River and as a result has filled with sediment. However, the channel is maintained by flow from Pierce Slough, which crosses under the Highway 101 bridge upstream. Although both channels are tidally influenced, the two bridges of Highway 101 constrict their hydrology (USACE and WDFW 2016).

The shoreline south of the river delta is primarily underlain by basaltic rock with a few pocket beaches, resulting in no appreciable sediment transport in this area. The shoreline north of the river (the south side of Black Point Peninsula) is composed mostly of bluff-backed beaches. The sediment from these bluffs combined with sediments from the river outflow are moved by wind and waves generally eastward along Black Point to create the cuspate spit at Quatsop Point.

1.4.2 Human Environment

Development in and adjacent to the lower river valley is mainly private residences. The only access to the north side of the lower river valley is from Highway 101 via Duckabush Road and Shorewood Road. A small culvert under Shorewood Road allows flow from a small tributary to reach the estuary. The Olympic Canal Tracts is the only dense residential development in the basin, with several hundred small lots on approximately 300 acres encompassing river valley and uplands between Duckabush Road and Canal View Street. Access to the south side of the lower river valley residences is from Highway 101 via Canal View Street through the upland residential development.

The former Duckabush Fire Station building is located at Shorewood Road on fill placed within the estuary. An overhead power line travels parallel to Highway 101 and provides power to the Olympic Canal Tracts via a westerly overhead line across the estuary. The entire valley floor at the project area is prone to flooding during large runoff events and high tides (USACE and WDFW 2016).

1.5 PROJECT PROPONENT

WDFW, in partnership with the USACE and the Hood Canal Salmon Enhancement Group (HCSEG), is proposing this restoration project on the Duckabush Estuary in Jefferson County.

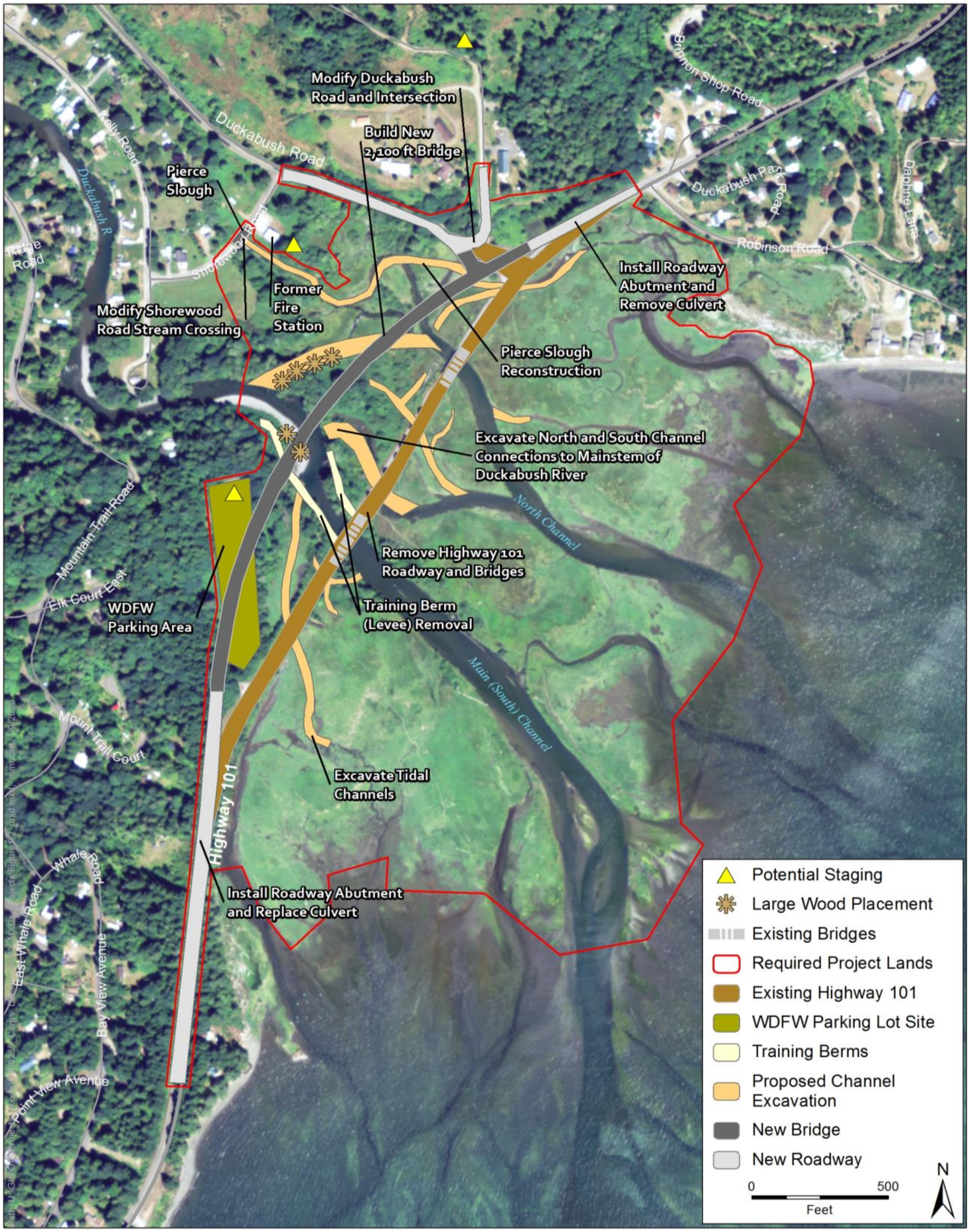
1.6 PROPOSED PROJECT

The Duckabush Estuary Restoration Project is one of 18 potential restoration projects in the region that were analyzed in an EIS prepared in compliance with NEPA, published by the USACE and WDFW in 2016: *The Puget Sound Nearshore Ecosystem Restoration: Final Integrated Feasibility Report and Environmental Impact Statement* (NEPA EIS). The NEPA EIS provided a programmatic-level analysis for all sites and project-level analysis for several of the sites, including the Duckabush Estuary Restoration site. The USACE and local sponsors have recommended the implementation of restoration actions at three sites (USACE and WDFW 2016), one of which is the Duckabush Estuary Restoration site (Figure 1-2).

The Duckabush Estuary Restoration Project would reconnect the Duckabush River to neighboring floodplains and wetlands by modifying local roads and elevating Highway 101 onto a bridge spanning the area where freshwater from the Duckabush River meets saltwater of Hood Canal.

1.7 PROJECT LOCATION

The Duckabush Estuary is located at approximately mile 310 of U.S. Highway 101 in Brinnon, Jefferson County, Washington, on the west side of Hood Canal, in Township 25N, Range 2W, Section 16 (see Figure 1-1).



SOURCE: ESA, 2019; USACE and WDFW, 2019

Figure 1-2 Duckabush Estuary Restoration Project

1.8 PROPOSED ALTERNATIVES

Two alternatives are analyzed in this Draft SEIS:

- No Action
- Proposed Action

See Chapter 2 for detailed descriptions of each of these alternatives.

1.9 SCHEDULE AND PHASING

The timeline of the project is dependent on receipt of state and federal funding. Additional studies on the road and bridge construction design will be conducted in the Preconstruction Engineering and Design (PED) phase. The construction of the project would begin as soon as designs are complete and local, state, and federal approvals are received. The anticipated period for removal of the existing bridges, roadways, and embankments; construction of the new bridges and roadway embankments; and channel excavation is approximately 2 years, but may take up to 3 years. Additional project-level environmental review may be provided in the future following the PED phase when more construction details are known.

1.10 DRAFT SEIS PUBLIC COMMENT PERIOD

The publication of this Draft SEIS initiates the public comment period, and WDFW invites the public to comment on the content of this Draft SEIS. After the comment period ends, WDFW will review comments. A Final SEIS will then be prepared that contains the responses to the comments and updated information, as appropriate, to the environmental analysis.

1.11 SUMMARY OF IMPACTS AND MITIGATION

Table 1-1 provides a summary of impacts and mitigation for environmental elements analyzed in this Draft SEIS. Additional information on impacts and mitigation measures to reduce construction and operational impacts in accordance with the SEPA Draft SEIS analyses is presented in Chapter 3.

Table 1-1 Summary of Environmental Impacts and Mitigation

		Potential Impacts	Potential Mitigation
Water Quality			
Fecal Coliform/ Drinking Water/ Flooding	Short-Term Construction Effects	None	None
Fecal Coliform/ Drinking Water/ Flooding	Long-Term Project Effects	None	None

Table 1-1 Summary of Environmental Impacts and Mitigation

		Potential Impacts	Potential Mitigation
Plants and Animals			
Marine Submerged Vegetation/ Wetlands/Riparian Vegetation	Short-Term Construction Effects	Temporary turbidity disturbance to kelp, eelgrass, and nearby wetlands. Riparian vegetation would be removed from structures being demolished.	Implementation of best management practices (BMPs) during construction
	Long-Term Project Effects	Minor conversion of freshwater to saltwater marsh plants from restoring tidal inundation is a benefit. Acres of tidal wetlands restored is a benefit.	None
Bivalve Shellfish	Short-Term Construction Effects	Recreational and tribal shellfish harvests may be reduced for 1–5 years post-construction.	Implementation of BMPs such as silt curtains and other sediment containment techniques.
	Long-Term Project Effects	Restoration of wetlands in the larger river delta and smaller embayments would provide long-term benefit to shellfish growing. It may change in nature, but improved recreational and tribal shell harvesting are expected in the long-term.	Limit construction timing or otherwise isolate work areas from inundation (e.g., cofferdams). Use silt curtains and other sediment containment techniques to minimize the potential for elevated suspended and bedload sediment inputs. Identify alternative recreational and tribal commercial harvest areas or strategies to offset potential short-term reductions in shellfish production at the site.
Transportation			
Traffic	Short-Term Construction Effects	Temporary road closures and vehicle traffic re-routing	Traffic control plans and adherence to permitting requirements.
	Long-Term Project Effects	No change to transportation routes. Structures would be less vulnerable to sea level change (may be larger or higher roads/bridges) and more resilient in natural disasters.	None

Table 1-1 Summary of Environmental Impacts and Mitigation

		Potential Impacts	Potential Mitigation
Noise			
Construction/ Underwater Noise/Traffic Noise	Short-Term Construction Effects	Short-term construction noise impacts are expected from construction equipment and activities. Short-term underwater noise is expected but not at a level that would harm water animals. Short-term traffic noise from increased construction vehicles activity is expected.	Implementation of BMPs for noise attenuation during construction. Adherence to permit mitigation measures.
	Long-Term Project Effects	Based on current modeling, no noticeable traffic noise impacts are expected as a result of the new roadway and bridge alignment.	None

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Chapter 2 provides information on project goals and objectives, summarizes the alternative development, and provides a description of alternatives and a detailed project description.

2.1 PROJECT GOALS AND OBJECTIVES

The overall goal of the Duckabush Project is the restoration of tidal exchange and re-establishment of distributary channels to improve habitat and hydrologic connectivity in the Duckabush Estuary. This project was identified as a high priority restoration action by the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP).

Project-specific objectives:

- Reconnect and restore estuarine and freshwater tidal wetlands.
- Re-establish distributary channels to promote greater diversity of delta wetland habitats.
- Restore mudflats and salt marsh.

Anticipated project benefits:

- Improved estuarine habitat for fish, birds, and wildlife, including endangered Hood Canal summer chum and Chinook salmon, which is a main food source for endangered Southern Resident Killer Whales (orcas).
- Modernized highway design with updated safety features.
- Improved opportunity for natural filtration of water flowing through the estuary.
- Reduced seasonal flooding by eliminating existing water bottlenecks and allowing for natural tidal flows.

2.2 PROPOSED PROJECT

The Duckabush Project would restore the natural geomorphology to the Duckabush River delta wetlands by removing major roadway obstructions, excavating channels, and removing fill. The action would realign Highway 101 across the estuarine delta to restore tidal connection to the estuary. Multiple tidally influenced distributary river channels would be re-established, and blind tidal channels would be excavated within the marsh areas (Figure 1-2).

2.3 ALTERNATIVES

This Draft SEIS evaluates two alternatives:

- No Action
- Proposed Action

2.4 ALTERNATIVES DEVELOPMENT

This Draft SEIS supplements the 2016 NEPA EIS document that evaluated restoration of 18 different sites, grouped in four different alternatives. The Duckabush Project was included in two of these alternatives. The USACE identified Alternative 4, Restore 3 Sites (including the Duckabush Project) as the preferred alternative and recommended plan. The USACE also selected an option for the complete removal and realignment of the Highway 101 roadway and bridges as part of the Duckabush Project (known as “Option 1”).[1]

The recommended plan from the NEPA EIS (Alternative 4, Option 1) represents the Proposed Action in this Draft SEPA SEIS.

2.5 NO ACTION

SEPA requires that an EIS evaluate the No Action alternative (WAC 197-11-440), against which the potential effects of the action alternatives can be evaluated and compared. For purposes of the No Action evaluation for this Draft SEIS, the construction and operations proposed for the Duckabush Project would not occur. Under the No Action alternative, ecosystem processes would likely remain degraded and impaired. Without restoration, the site is expected to experience continued delta cone growth and extension into Hood Canal, and increased sediment deposition upstream of the Highway 101 corridor due to river flow impediments. These processes could increase flood risk to private property by causing increased backwater elevations over time (USACE and WDFW 2016). Further changes would result from potential sea level rise and other occurrences due to climate change.[2]

2.6 PROPOSED ACTION

The Proposed Action evaluated in this Draft SEIS originated from the recommended plan in the NEPA EIS, Alternative 4, Option 1, as described above. The Duckabush Project would include the complete removal and realignment of the Highway 101 roadway, fill, and bridges. Project design, long-term operations, and short-term construction details from the NEPA EIS for the Proposed Action are provided in this section.

2.6.1 Project Design and Operations

The Proposed Action would realign Highway 101 farther upstream and install a longer and higher bridge over the Duckabush Estuary.[3] The new, realigned roadway portion of Highway 101 would be approximately 4,000 feet long and include an approximately 2,100-foot-long bridge located up to approximately 400 feet farther upstream from (and to the northwest of) the existing highway (Figure 1-2). Removal of fill and elevation of the new highway would allow for tidal exchange to occur and new distributary channels to develop in the estuary. The new Highway 101 roadway and bridge would need to be approximately 38 feet wide to accommodate two lanes of traffic (and potentially pedestrian and bicycle use) and shoulder space. The final roadway and bridge width would be

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[1] The NEPA EIS, Chapter 4, *Plan Formulation,* contains additional details about the alternatives development process. The design for the Duckabush Project was developed further by USACE and is described in the NEPA EIS, Chapter 6, *Recommended Plan,* and in NEPA EIS, Section 6.1.1.4, *Initial Plan Formulation.*

[2] The NEPA EIS, Section 3.6, *Future Without-project Conditions* (pages 76–99), summarizes the most likely future conditions without the recommended project and describes potential impacts with No Action.

[3] See the NEPA EIS *Appendix B – Engineering Appendix, Section 1: Duckabush River Estuary* for more information.

determined during final design. The intersection of Highway 101 and Duckabush Road would also be reconfigured and widened. Shorewood Road would be modified and the undersized Pierce Slough culvert would be replaced with a bridge or large culvert.

Two new large distributary channels would be excavated from the existing south (main) channel to the north channel, restoring the Duckabush River's historical north channel (Figure 1-2). Two existing distributary channels would be expanded farther east into Hood Canal. Additionally, four new small distributary channels would be created. One of the new small distributary channels would re-establish Pierce Slough at or near its historical alignment, connecting it from Shorewood Road to the restored historical north channel. The existing parking lot would be removed and parking for public access to WDFW lands would be provided in the vicinity. The specific location for parking has not yet been determined.

2.6.2 Construction

Project construction involves three main components: (1) removal of the existing highway, fill, bridge, and associated structures; (2) construction of the new bridge and highway; and (3) estuary and floodplain restoration. Table 2-1 provides a breakdown of the construction components for the Duckabush Project. The order of presentation of the project components below does not imply a construction sequence.

2.6.2.1 Removal of the Highway, Fill, Bridge, and Associated Structures

The description of work related to removal and construction of the highway and bridge is based on preliminary engineering design. Highway reconstruction details presented here are conceptual and subject to change during final design. While the design engineering details may change slightly, it is not anticipated that it will change the base assumptions about the impacts to the environment.

The Proposed Action would include the removal and realignment of approximately 4,000 feet of the existing Highway 101 roadway, fill, and two bridges across the estuary. One of the existing bridges is listed on the National Register of Historic Places (NRHP), and its removal would comply with an existing Programmatic Agreement prepared under Section 106 of the National Historic Preservation Act (NHPA). Substantive requirements of the State of Washington's Governor's Executive Order (GEO) 05-05 will be met through the federal Section 106 process.

For more information on compliance with cultural resources requirements, see NEPA EIS Section 3.3, *Cultural Resources* (on pages 67–68), Section 5.3, *Cultural Resources* (on pages 173–180), Appendix D, *Cultural Resources*, and Chapter 6 of Appendix F, *Summary of Cultural Resources in Puget Sound* (on pages 23–27). Appendix D of the NEPA EIS includes the Section 106 Programmatic Agreement.

The roadway and bridge would be demolished using heavy land-based construction equipment. The existing bridge superstructure and piles would be removed by crane. The concrete piles would be demolished to the ground surface, and timber piles would be cut or broken at the ground. Along the shoreline, careful excavation would occur around each pile, or as directed by permit requirements. The existing fill embankments and armoring would be removed by excavator. Additional details of the construction activities are presented in Table 2-1.

Table 2-1 Key Components of the Bridge and Roadway Design

Component	Description
Highway 101	
Removal	• Approximately 4,000 feet of Highway 101, including several culverts. The current highway roadway extends down to about the mean higher high water[a] (MHHW) line. • Remove two existing Highway 101 bridges. Existing bridge decks are at 22.5 feet above MLLW.
New Roadway and Bridge	• Approximately 1,900 feet of new highway including one new culvert. New highway roadway elevation would be at about 28.5 feet above MLLW. About 1,000 feet of the revised highway embankment may extend below the MHHW. • One new 2,100-foot bridge at approximately 25–35 feet above MLLW (the length of each span would be approximately 120–200 feet). • The bottom of the bridge would be raised about 5 feet to allow for the base flood, clearance for debris, and sea level rise (an intermediate level estimate of 2 feet over the next 100 years). • The foundation design assumes two 7-foot-diameter drilled shafts at 15-foot spacing (inside edge to inside edge) with a 135-foot embedment depth at the end of each span. • Seventeen cast-in-place concrete pile caps, 5 feet deep by 6 feet wide by 32 feet long. • Abutment at each end of the bridge with four 7-foot-diameter drilled-in shafts. • The span length of the bridge design will be refined to maximize environmental benefits by holding the total number of piers to the minimum required for structural safety, adherence to American Association of State Highway and Transportation Officials (AASHTO) specifications, and the Washington State Department of Transportation (WSDOT) Bridge Design Manual (WSDOT 2019a) requirements.
Duckabush Road	
Removal	• Approximately 900 feet of Duckabush Road.
New Roadway and Bridge	• Approximately 800 feet of new Duckabush Road. Duckabush Road would remain at a similar elevation to existing conditions, but the approach to Highway 101 would be raised. • New 60-foot bridge approach at Duckabush Road. • New approach section similar in construction to the main bridge (one span). • One cast-in-place concrete pile cap, 5 feet deep by 6 feet wide by 50 feet long. • Five concrete columns, 4 feet in diameter, at the pile cap. • One 7-foot drilled-in concrete shaft at each column. • One abutment with four drilled-in shafts, 7 feet in diameter.
Shorewood Road	
Removal	• Approximately 150 feet of Shorewood Road and the culvert at Pierce Slough.
New Roadway and Bridge	• Approximately 80 feet of new Shorewood Road. • Shorewood Road would remain at its current elevation (13.8 feet above MLLW). • One 70-foot bridge or large culvert at Shorewood Road.

[a] MHHW is 11.5 feet above mean lower low water (MLLW).

SOURCE: NEPA EIS Appendix B – Engineering Appendix (USACE and WDFW 2016).

2.6.2.2 Construction of the Highway and Bridge

The approximately 1,900 feet of new highway would have a roadway elevation of approximately 28.5 feet above MLLW. About 1,000 feet of the revised highway embankment may extend below the MHHW. The proposed alignment is located north of the current alignment to avoid complete road closures during construction.

One new approximately 2,100-foot bridge is proposed at approximately 25 to 35 feet above MLLW (the length of each span would be approximately 120–200 feet). The bottom of the bridge would be raised about 5 feet to allow for the base flood, clearance for debris, and sea level rise (an intermediate level estimate of 2 feet over the next 100 years). The foundation design of the bridge assumes two 7-foot-diameter drilled shafts at 15-foot spacing (inside edge to inside edge) with a 135-foot embedment depth at the end of each span. Seventeen cast-in-place concrete pile caps, 5 feet deep by 6 feet wide by 32 feet long would be required and there would be an abutment at each end of the bridge with four 7-foot-diameter drilled-in shafts.

The span length and number of piers in the bridge design will be refined to maximize environmental benefits by holding the total number of piers to the minimum required for structural safety, adherence to American Association of State Highway and Transportation Officials (AASHTO) specifications, and the Washington State Department of Transportation (WSDOT) Bridge Design Manual requirements (WSDOT 2019a and 2019c). The proposed multi-span concrete I-girder bridge would be supported by deep foundations. Drilled shafts are the preferred method of construction. If rock or till is encountered at a shallow depth under the bridge abutments, drilled shafts socketed in rock would be used. Each end of the bridge would tie into an earthen abutment. An excavator would be used to excavate bridge abutments and approach embankments. Pier depths for the bridge would be designed to extend below scour depth or to bedrock. Some armoring of the bridge abutments or roadway along the shoreline may be needed. Land-based drilling augers would be used to install the deep foundation at the bridge abutments and at each pier. Work would require land-based large augers, excavators, cranes, concrete trucks, and dump trucks.

A temporary platform of similar length to the proposed new bridge would be built adjacent to the proposed alignment during construction staging. It would be approximately 30 feet wide and 4 feet high, likely composed of granular fill over a geotextile fabric. The platform would not span any waterway. Additionally, 40-by-60-foot work pads would be located at piers. The entire temporary platform would be removed and the site restored after construction is complete with potential temporary minimal impact to wetlands. The temporary work platform is described in more detail in NEPA EIS Appendix B, Section 1-6.1.2.

Shorewood Road and Duckabush Road would be modified as necessary for project design, and training berms on the south (main) channel that direct the Duckabush River under the NHPA-listed Highway 101 bridge would be removed.

2.6.2.3 Estuary Restoration

Two new large distributary channels would be excavated from the existing south (main) channel to the north channel, as described in Section 2.6.1. Two existing distributary channels would be expanded farther east into Hood Canal, and four new small distributary channels would be excavated. The two new large distributary channels would be excavated to approximately 10 feet below existing grade (Figure 1-2). A track-mounted crane with a clamshell (or dragline) bucket could accomplish the excavation in the wet, and it is assumed that slopes would generally be stable during construction. However, some sloughing of the banks should be expected, and the limits of excavation should be evaluated to prevent impacts on adjacent areas.

Construction haul routes would be established for vehicles associated with excavation of materials from distributary channels within the estuary to minimize impacts on established access roads. Construction would be sequenced and access routes chosen to minimize disturbance, and the areas would be restored after construction is complete.

Subsurface exploration of soil properties and geotechnical investigations would be conducted to inform the design. All in-water work would occur during the designated in-water work windows when sensitive species are least likely to be present.

Rock excavating equipment would be needed to remove the rock armor; blasting is assumed to not be necessary. It is estimated that 500 cubic yards of rock armor (12- to 24-inch riprap) has been placed to protect the existing highway piers.

Large wood would be placed in the channels for stability and habitat complexity, and native vegetation would be planted in the riparian areas where appropriate. Overhead power, telephone, and telecommunications utility lines would be relocated to the new roadway alignment. The existing dirt parking area on the southwest side of the project would be revegetated, except for a portion that may be retained for parking. Additional details of the estuary restoration activities are presented in Table 2-2.

Table 2-2 Key Components of Estuary Restoration

Component	Description
Fill Removal	• Remove training berms along river (0.7 acre) (0 to 18 feet above MLLW), road embankment and roads (3.3 acres), and developed areas (2.5 acres) (these features are all above MLLW).
Distributary Channels (large)	• Channels would be excavated at or near their historical configurations. • North channel connection: Excavate approximately 675 feet (12.5 to 2.5 feet above MLLW). • South channel connection: Excavate approximately 480 feet (12.5 to 6.5 feet above MLLW). • Maximum channel depth would be 9 to 10 feet. • The restored north channel would be maintained, debris would be removed, and sediment may be removed if the new connection channel fills in to the point that flow is cut off from the main (south) channel.
Distributary Channels (small)	• Reconstruct 1,900 feet of Pierce Slough (12.5 to 6.5 feet above MLLW). • Reconstruct 2,300 feet of other tidal channels 12 to 6 feet above MLLW). • Maximum channel depth would be 5.5 feet.

[a] MHHW is 11.5 feet above mean lower low water (MLLW).
SOURCE: NEPA EIS Appendix B – Engineering Appendix (USACE and WDFW 2016).

2.6.2.4 Staging, Borrow Sources, and Disposal Sites

The former fire station area (on Shorewood Road), the WDFW parking area to the south of the southern-most Highway 101 bridge, and the private property area located north of Duckabush Road near Highway 101 are potential staging areas.

Approximately 21,300 cubic yards of borrow/fill material would be needed. Borrow/fill for the roadway transitions would likely come from a local quarry. Additionally, approximately 41,900 cubic yards of material would require disposal. Off-site disposal and borrow sites are available within 60 miles, either to the north in Port Angeles, or to the south in Tumwater. All disposal will be off-site at an approved location. The use of marine equipment is not considered practical for this site. Therefore, all hauling is assumed to be accomplished by vehicle on routes from the site to one or both of the disposal sites.

2.6.2.5 Construction Access

Construction activities would require the mobilization of heavy equipment on the site, which would be accessed via Highway 101 and Duckabush Road. Detours and traffic control measures would be required during construction. Construction would be sequenced to keep Duckabush Road and emergency access open for the duration of construction. Alternating one-way traffic on Highway 101 would likely be needed at times during daytime hours. Temporary closures may occur on Highway 101 for either brief daytime durations, or nighttime hours. Road or lane closures would not restrict emergency vehicles.

The anticipated period for removal of the existing bridges, roadways, and embankments; construction of the new bridge and roadway embankments; and channel excavation is approximately 2 years, but may take up to 3 years. Typical construction work hours would be Monday through Friday, 7 a.m.–8 p.m. (with a preference to start at 6 a.m. if permitted by Jefferson County). During the summer, work days may be longer if the construction contractor chooses to have double shifts. A maximum of 40 construction workers would be expected on-site at a given time.

Most of the truck trips used during construction-related activities would be for importing fill materials and exporting excavated materials/spoils. Assuming that trucks used to import and export materials would have a capacity of 13 cubic yards, this would equate to approximately 4,860 truck trips. A construction management plan would follow applicable local, state, and federal regulatory requirements.

2.6.3 Additional Project Information

The Draft SEIS provides cross-references to the elements of the environment that were analyzed in the NEPA EIS. Those elements (with reference to the location in the NEPA EIS) are listed in Appendix B of this Draft SEIS. In addition to that resource, general project information related to property acquisition, Endangered Species Act listed fish species, and Cultural Resources was requested during the scoping comment period for the Draft SEIS (see Draft SEIS, Appendix A). Those topics were adequately addressed in the NEPA EIS and the analysis is not repeated in this Draft SEIS. However, a short summary about property acquisition, Endangered Species Act listed fish species, and Cultural Resources is provided below, including information on how to access additional information provided in the NEPA EIS.

2.6.3.1 Property Acquisition Information

Based on the current conceptual design, the project features would affect approximately 58 acres of land across 26 parcels. Approximately 87% of the property area affected is publicly owned. This includes land that is currently owned or managed by WDFW. The remaining properties are privately held, including the Olympic Canal Maintenance Corporation. Additional real estate information can be found in the NEPA EIS document Appendix C. A map that depicts the project area and affected parcels as currently known is shown as Exhibit B 1.2.1 of that appendix. This information is preliminary in nature and will be revised during the design phase. Anticipated real estate interests for these parcels include Fee, Perpetual Road Easement, Temporary Work Area Easement, Perpetual Channel Improvement Easement, and Perpetual Flowage Easement. A detailed evaluation of necessary real estate interests will occur during the design phase.

Discussions with landowners about real estate interests would occur as project design is refined and prior to project construction. The former fire station parcel along Shorewood Road was purchased by the HCSEG in summer 2018 to support salmon recovery and estuary restoration objectives. Funding sources used to purchase currently held public lands will be reviewed and funding agreements evaluated for compatibility with the estuary restoration objectives.

2.6.3.2 Endangered Species Act Listed Fish Species

The NEPA EIS addressed potential impacts on Endangered Species Act (ESA)-listed fish species. Therefore, information from the NEPA EIS is not repeated in the Plants and Animals section of this Draft SEIS document. Instead, a brief summary of ESA-listed fish species in the Duckabush Estuary and how they would may be impacted by construction and how they may benefit from the implementation of the Duckabush Project is provided below. Additional information can be found in the NEPA EIS document in Section 3.2.7, Rare, Threatened, and Endangered Species (pages 60–67).

ESA-listed species found in the Duckabush River include steelhead, Chinook salmon, and summer chum salmon. Coho, pink, and fall chum salmon also inhabit the Duckabush. Each of these salmon species exhibits varying levels of dependence on the estuary environment.

Steelhead numbers in the Duckabush have increased since 2010 from a low of 30 spawning adults to an average of 72 spawners annually. Predation has been identified as a likely limiting factor for steelhead both at the juvenile and adult life stages. Increased channel complexity in the estuary would reduce foraging efficiency for steelhead predators, thus improving the survival of steelhead at both juvenile and adult life stages. Restoration of estuary habitat will also increase opportunity for prey resources, allowing additional growth for steelhead during their juvenile life stage.

The mid-Hood Canal Chinook population, comprised of the Hamma Hamma, Duckabush, and Dosewallips rivers, has been identified as essential to recovery of threatened Chinook salmon in Puget Sound. However, this population is struggling at chronically low numbers. Critically low escapements have become a primary driver of mixed-stock ocean fisheries under a fisheries management paradigm known as weak-stock fisheries management. The need to protect one weak stock while other stocks may have harvestable surpluses results in dramatic reductions in commercial and sport fishing opportunity. The mid-Hood Canal Chinook population will continue to limit these fisheries unless their numbers increase.

The Duckabush River accounts for about 40% of the spawning habitat for Chinook in mid-Hood Canal, but Chinook salmon have dropped to critically low numbers in the Duckabush River, averaging fewer than 20 spawners. Chinook depend on the estuarine environment for early rearing. Increasing channel complexity and overall estuarine habitat diversity would be one of the highest priorities for promoting increased survival and production by reducing predation efficiency and providing increased capacity and forage opportunity for juvenile Chinook.

Summer chum are also federally listed as threatened under the ESA. Unlike steelhead and Chinook, summer chum numbers have rebounded in mid-Hood Canal in the last decade. Average escapement for summer chum in the Duckabush was just under 5,000 annually between 1999 and 2018. A more recent downturn in numbers in 2018 was attributed to poor ocean conditions. Chum salmon can spawn low in a river system, typically between intertidal waters and river mile 3 provided that water depths and velocities are adequate to support spawning. Summer chum are critically dependent upon the estuarine and nearshore environment for early growth.

The NEPA EIS provides best management practices to avoid potential impacts to fish species during construction. Benefits that this project would provide to ESA-listed steelhead, Chinook, and summer chum would also apply to coho, fall chum, and pink salmon. Increased channel complexity would increase estuary productivity for all species of rearing juvenile salmon. Increased growth and size translate directly into increased survival in the marine environment. Improving estuary productivity in the Duckabush would also aid and support juvenile salmon from adjacent systems by contributing directly to nearshore habitat in Hood Canal.

2.6.3.3 Cultural Resources

The NEPA EIS addressed potential impacts on cultural and historic resources. Therefore, information from the NEPA EIS is not repeated in this Draft SEIS document. Instead, a brief summary of how the NEPA EIS addresses potential impacts (including potential construction impacts) on cultural and historic resources located in the Duckabush Estuary area is provided below. Additional information can be found in the NEPA EIS document in Sections 3.3, 5.3, 5.6.2.3, 5.6.3, 5.7.5, and 6.1.1.12, as well as Appendix D and Appendix F to NEPA EIS document.

The NEPA EIS addressed potential impacts on cultural and historic resources, including compliance with Section 106 of the NHPA of 1966. The state of Washington’s GEO 05-05 does not apply to projects already undergoing federal review under Section 106 pertaining to cultural resources and historic places. The NEPA EIS describes a plan for using a phased approach to assessing cultural resources (NEPA EIS, Appendix D, p. 3) - potential impacts are not yet known.

The USACE has prepared a Programmatic Agreement (PA) outlining the Section 106 process that will be followed (NEPA EIS, Appendix D). The PA includes the Section 106 tasks that need to occur prior to construction (e.g., fieldwork), how Section 106 consultation will occur, how determinations of eligibility will be made, how findings of no adverse effect will be determined, how findings of adverse effects will be made, how the PA will be implemented, and a dispute resolution procedure.

The project footprint is expected to contain cultural and historic resources. Identification of cultural resources could affect the design or location of project features. The PA for compliance with Section 106 of the NHPA of 1966 is provided as Appendix D to the NEPA EIS document and includes a map showing the area of potential effect (APE). The APE may change as project design is advanced.

The Section 106 PA documents roles and responsibilities of the PA signatories, the project review process (including coordination with the State Historic Preservation Office and Tribal Historic Preservation Officers), fieldwork protocol, determination of eligibility and effects, and dispute resolution. Identification of cultural resources could affect the design or location of project features. A cultural resources literature review and field inventory of the publicly owned portions of the site were completed in 2011 (Iversen et al. 2011) and provided to the state's digital repository. Consistent with the PA, early design work will include both a historic and ethnographic context for the site as well as a field inventory of the entire APE. Project partners will continue to coordinate with the local tribes and the Department of Archaeology and Historic Preservation (DAHP) throughout project design and construction.

3. AFFECTED ENVIRONMENT, IMPACTS, MITIGATION MEASURES, AND SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Chapter 3 presents additional information for the following resource topics: Water, Plants and Animals, Transportation, and Noise. These four elements of the environment were selected for additional analysis to supplement the NEPA EIS information and to respond to public scoping interest. Refer to Appendix B to view the cross-referenced list of information provided on elements of the environment not included in this Draft SEIS.

The affected environment, impacts, mitigation measures, and significant unavoidable adverse impacts for each of these four resource topics are described for the No Action alternative and the Proposed Action.

Formatting for this chapter includes a call-out box for each element of the environment to provide the reader with easy access to some of the references where additional information can be found in the NEPA EIS.

3.1 WATER

As identified during the scoping process for the SEIS, important issues of concern related to water resources include water quality (especially fecal coliform levels), potential impacts on drinking water, and flooding potential in the project area.

Information on Water in the NEPA EIS

Section 3.1, Physical Environment: Nearshore Processes and Structure—nearshore ecosystem processes, oceanography, sedimentation and erosion, and water quality (pages 39–49).

Section 3.5, NEPA Scoping Results. Provides information on elements that were not analyzed in the NEPA EIS (pages 73–76).

Section 3.5.5, Public Utilities—water supply and sanitary sewer (pages 75–76).

Section 6.1.1.1, Site Description, Geographic Location & Context (pages 212–213).

Appendix B – Engineering Appendix: 1-1 General –Duckabush River Estuary and 1-2 Hydrology and Hydraulics (pages 1-1 to 1-19).

3.1.1 Affected Environment

3.1.1.1 Water Quality – Fecal Coliform

Existing water quality in the Duckabush Estuary is degraded by pollutants from human and animal activity. Non-point source pollution is the leading cause of water quality problems in Jefferson County and pathogens associated with fecal bacteria are the primary pollutants. Fecal coliform is one of the main drivers of water quality concerns within the Duckabush Estuary. Contributors to high levels of fecal coliform include waste from wild and domesticated warm-blooded animals, and from humans in the form of failing septic systems. Failing septic systems in the vicinity of the Duckabush Estuary have been raised as a concern by the public health department (Jefferson County Public Health 2018, 2019).

Figure 3-1 shows the known and suspected septic systems in the vicinity of the Duckabush Estuary. Beginning in September 2017, the presence of fecal coliform above threshold levels set by the

Washington State Department of Health (DOH) has resulted in the seasonal closure of commercial and recreational access to shellfish harvesting in the Duckabush Estuary. In 2017 and 2018, some sites in the estuary were monitored and considered by Jefferson County Public Health to be fecal coliform hot spots (defined as an area where the average of all samples is >320 most probable number [MPN]).

In 2017, approximately 195 acres of the Duckabush Estuary was downgraded from Approved to Conditionally Approved for shellfish harvesting by the DOH. The Conditionally Approved area is closed for shellfish harvest from May 1 through October 31 every year (Jefferson County Public Health 2018).[1]

Jefferson County Public Health is currently developing monitoring and education plans to provide for source control activities in the Duckabush River drainage system (Dawson 2020). A major task will be to identify and correct failing onsite septic systems in the area, with a primary focus on the Duckabush drainage area.

3.1.1.2 Drinking Water

A number of drinking water wells are located on private parcels near the Duckabush Estuary. Several wells are adjacent to the Duckabush River (Ecology 2019a, 2019b), while most are located south of the site. The project area includes two Seawater Intrusion Protection Zones (SIPZ): Coastal SIPZ and High Risk SIPZ, as well as a few SIPZ wells. SIPZ zones, a type of Critical Aquifer Recharge Area (CARA), are aquifers and land overlaying aquifers with vulnerability to seawater intrusion (Jefferson County 2020).

In general, the Duckabush Estuary area has strong hydraulic flow coming from the mountains that prevents saltwater intrusion. As a result, the area has not experienced many problems with saltwater intrusion (Porto 2020).

3.1.1.3 Flooding

The Duckabush Estuary is confined within steep valley walls. High tides fill the estuary from one side to the other along Highway 101. The primary source of flooding near the Duckabush Project site comes from coastal storm surge associated with low pressure and large storms on the Pacific side of the Olympic Peninsula. The 1% Annual Exceedance Probability (AEP) coastal Base Flood Elevation (BFE) indicates a static rise of about 6.5 feet above the highest high tide level (15.3 feet North American Vertical Datum 1988 [NAVD88]) (NOAA 2020).

Flooding also occurs during high river flows, especially when such flows coincide with high coastal water levels ("tailwater elevations"). Prior studies included flood stages from the Federal Emergency Management Agency (FEMA 1982) and studies of the channel migration zone (USBR 2004). The NEPA EIS included model scenarios of high runoff coinciding with high water levels, and high runoff coinciding with low water levels. The former gives a prediction of maximum flood levels throughout the estuary. The latter gives a prediction of maximum flood velocities, for help with understanding scour in the channel and along the existing and future bridge.

[1] Jefferson County has developed a Shellfish Closure Response Plan (2018) to restore and protect water quality in the Duckabush River watershed. The Closure Response Plan is a requirement of Revised Code of Washington (RCW) 90.72, *Shellfish Protection Districts*.

SOURCE: Jefferson County Public Health, 2019

Figure 3-1 Septic System Inspection Status for Parcels Near the Project Area

3.1.2 Impacts

3.1.2.1 No Action Alternative

Water Quality – Fecal Coliform

Operating conditions of existing septic systems are expected to remain the same, with continued inputs of fecal coliform bacteria from improperly designed or failing septic systems under the No Action alternative. Funding to support efforts by Jefferson County to assist with septic improvements would be expected to continue, resulting in reduced input of fecal coliform into the environment (Dawson 2020). Population growth and new home construction may result in an increased number of septic systems; however, the new systems would be designed using modern standards and are assumed not to contribute to fecal coliform contamination in the estuary.

Backwater conditions upstream of Highway 101 during large rainfall events would continue and septic tanks in the flood area would continue to be inundated during these times, contributing to releases of fecal coliform during floods. Climate change scenarios indicate more rain events in the mountains and fewer snow events, which could increase the number of days flooding occurs in the lower river upstream of Highway 101.

No change would be expected in use of the area by wild and domesticated warm-blooded animals, meaning their contributions to fecal coliform levels would not be expected to change except due to variation as wild populations naturally fluctuate.

Drinking Water

The Jefferson County DOH regulates potential saltwater intrusion to groundwater wells for projects within ¼ mile of the shoreline through the Jefferson County Code composite seawater intrusion regulations and administrative water conservation measures (Jefferson County 2020). Their data originate from the early 1990s when they started receiving chloride readings through building permit application requirements.

A well is considered at high risk of saltwater intrusion if the chloride measurement is over 200 parts per million (ppm). The DOH has chloride readings for one well in the shoreline area that measured 2.0 ppm. Readings for two wells outside of the shoreline area have measured 4.9 ppm and less than 5.0 ppm. There was no apparent risk of saltwater intrusion because of the low chloride level readings at the time of providing potable water.

There are no current recorded issues with saltwater intrusion to groundwater wells, and that is not expected to change under the No Action alternative.

Flooding

Under conditions of sea-level change, inundation will become deeper and the coastal flooding will affect more of the river valley upstream of the estuary, including more of the residences (Washington Coastal Network, 2018). In addition, the north channel of the river in the estuary may naturally take on more of the flow as the south channel aggrades and becomes higher in elevation. Increased flow in the north channel could result in damage to Highway 101 as there are no features (e.g., training berms, levees) in place to direct the north channel under the flat bridge. Increased operations and maintenance costs could be expected to keep Highway 101 safe and open to traffic.

3.1.2.2 Proposed Action

Water Quality – Fecal Coliform

The removal of the existing roadway would allow for greater exchange of saltwater within the estuary and assist with moving fecal coliform bacteria out of the estuary. Funding to support efforts by Jefferson County to assist with septic improvements would be expected to continue (or even increase due to additional focus on the watershed as a result of the project), resulting in reduced input of fecal coliform into the environment (Dawson 2020).

There may be an increase in the presence of wild warm-blooded animals (i.e., deer, elk, etc.) as a result of the Duckabush Project environmental improvements, but that increase is not expected to be significant or greatly increase the amount of fecal coliform compared to current conditions.

Potential impacts on water quality from fecal coliform would be less than significant because of the increased estuary flushing and reduction of failed septic system impacts that would result from the Duckabush Project.

Drinking Water

The proposed project has a low level of increasing the risk of saltwater intrusion in groundwater wells used for drinking water or to the aquifer in the vicinity. The project area is not currently experiencing issues with saltwater intrusion and the risk of saltwater intrusion increasing is low, given the distance of the mapped drinking water wells to the channel excavation areas (Porto 2020).

Saltwater intrusion to groundwater wells is not currently a problem in the area and is not expected to be a problem that would result from the implementation of the Duckabush Project. This is because the hydraulic flow of water coming from the mountains would continue at the same rate whether or not the project is implemented.

Flooding

The conceptual design for the new Highway 101 bridge is based on the local BFE of 15.3 feet NAVD88 and a minimum clearance of 3 feet for floating debris under the bridge. Accounting for the thickness of the bridge deck, the current design is for a deck elevation of 26 feet NAVD88. Future phases of the design would incorporate the most current BFE plus projected sea-level change.

The replacement of the roadway at the Duckabush Estuary with an elevated bridge would not affect coastal flood elevations. This is because the existing bridge openings are large enough (and the rising tide is slow enough) to convey enough tidal flows that water levels are essentially the same on either side of the highway, even though they are constricted through only two openings. The design would remove the roadway and essentially create a larger conveyance for tides, but would not alter coastal water levels. The bridge removal will potentially reduce backwater and flooding associated with high flows on the Duckabush River. The FEMA flood maps were recently updated, with an effective date of June 7, 2019. The BFE from coastal flooding will be verified to inform the design of the final bridge and roadway elevation.

Based on modelling, the Duckabush River will have the same tailwater elevation for the base flood both with and without the project. The upstream end of hydraulic effects may extend above the BFE, since it is anticipated that the increased conveyance from the proposed bridge removal will likely reduce upstream water levels during high rainfall flow events without coastal flooding. Detailed river modelling and sedimentation analysis will be needed to ensure there are no adverse effects of the increased conveyance on the Duckabush River as well as to predict the evolution of restored channels and their effect on the estuary. Although the reconfigured roadway could alter drainage and flooding patterns in the project area, the proposed project is not expected to increase upstream flooding.

3.1.3 Mitigation Measures

3.1.3.1 No Action Alternative

No mitigation measures for water resources are proposed for the No Action alternative.

3.1.3.2 Proposed Action

Water Quality – Fecal Coliform

Potential impacts on water quality from fecal coliform and sediment are expected to be less because of the increased estuary flushing that would result from the Duckabush Project. Therefore, no mitigation measures are proposed.

Drinking Water

The potential for saltwater intrusion into private drinking wells is currently low, and that is not expected to change as a result of the Duckabush Project. No mitigation measures are proposed.

Flooding

The Proposed Action is not expected to increase upstream flooding. Therefore, no mitigation measures are proposed.

3.1.4 Significant Unavoidable Adverse Impacts

3.1.4.1 Both Alternatives

These impacts are similar to those documented in the NEPA EIS and are not likely to result in any significant adverse impacts related to water quality–fecal coliform, drinking water, or flooding–under either of the alternatives.

3.2 PLANTS AND ANIMALS

The plants and animals section of this Draft SEIS provides information on marine submerged vegetation, wetlands, riparian vegetation, and bivalve shellfish, including habitat and harvest. This Draft SEIS also provides site-specific information on bivalve shellfish habitat, as well as recreational and tribal commercial harvest.

Information on Plants and Animals in the NEPA EIS

Section 3.2, Biological Environment: Nearshore Functions (pages 51–67).

Section 6.1.1.1, Site Description, Geographic Location & Context (pages 212–213).

Section 3.2.2, Shellfish and Other Macroinvertebrates (pages 55–56).

Section 3.2.6, Aquatic Invasive Species (pages 59–60).

Section 3.2.7, Rare, Threatened, and Endangered Species (pages 60–67).

Section 3.4.3, Commercial Fisheries and Aquaculture (pages 71–72).

Section 3.4.2, Public Access and Recreation (pages 69–70).

Section 5.2, Biological Environment: Nearshore Functions (pages 159–173).

Section 6.1.1, Duckabush River Estuary (pages 212–224).

3.2.1 Affected Environment

3.2.1.1 Marine Submerged Vegetation

Two main types of submerged marine vegetation inhabit the nearshore zone of Puget Sound: marine algae (which includes kelp and a variety of other seaweeds) and eelgrass. Most marine macroalgae require solid substrate to attach to, but exposure to waves, currents, and sedimentation affect distribution. Kelp beds and eelgrass occur at the Duckabush Estuary site in patchy areas and some continuous distributions. Kelp plays a critical role in nearshore ecology by providing three-dimensional structure and refuge for a variety of organisms. It has an important role in primary production, directly by serving as a food source for grazers by providing drift kelp to the shoreline for scavengers, and indirectly by providing a source of carbon for phytoplankton as the kelp decomposes. Eelgrass (*Zostera marina*) is the most common native vegetation in intertidal and subtidal beach habitats of Puget Sound, as well as in embayments with minimal freshwater influence. Large eelgrass beds can grow on the fringes of large river deltas where the salinity is high enough and sediment supply is sufficient.

3.2.1.2 Wetlands

The Duckabush estuary historically supported wetlands that transitioned from freshwater (i.e., palustrine) to estuarine wetlands as the river flowed toward Hood Canal. Wetlands serve as transitional zones between upland and aquatic environments, and provide valuable foraging and rearing habitat for a variety of native fish and wildlife. Wetlands all along Puget Sound's river deltas and shorelines have either been reduced in size or altered by human activity and shoreline development. In the Duckabush Estuary, the main impacts to the historic wetlands are residential development and transportation infrastructure.

Currently, the National Wetlands Inventory (NWI) maps show extensive estuarine intertidal wetlands in the Duckabush Estuary. These are mainly classified as estuarine intertidal emergent wetlands (i.e., saltmarsh) in the vicinity of the existing Highway 101 roadway, and estuarine intertidal aquatic bed/unconsolidated shore waterward into Hood Canal (USFWS 2020). Extensive coastal saltmarsh habitat is also documented by WDFW in Priority Habitats and Species (PHS) data (2020). Palustrine forested, scrub-shrub, and emergent wetlands are mapped along the river above the intertidal areas.

The overall area of wetland has changed very little in the estuary since the late 1800s, with wetland losses generally offset by a prograding delta. The composition of wetland types has changed, however, resulting in a reduction in wetland habitat complexity and diversity. Development of estuarine wetland at the river delta is partially dependent on elevation and sediment deposition.

3.2.1.3 Riparian Vegetation

Riparian vegetation includes coniferous trees such as western hemlock (*Tsuga heterophylla*), Douglas fir (*Pseudotsuga menziesii*), and western red cedar (*Thuja plicata*). Pacific madrone (*Arbutus menziesii*) occurs in drier areas. Native deciduous trees such as red alder (*Alnus rubra*), big leaf maple (*Acer macrophyllum*), and vine maple (*Acer circinatum*) are present in areas with disturbance, minimal soil development, and a local seed source to facilitate colonization. Shrubs and understory plants such as ocean spray (*Holodiscus discolor*), Oregon grape (*Mahonia* spp.), Indian plum (*Oemlaria cerasiformis*), and sword fern (*Polystichum munitum*) are common in riparian areas.

Development in the Duckabush Estuary area has interfered with natural forest processes and allowed for invasive species to establish, which often include shrubby species such as Himalayan blackberry (*Rubus armeniacus*), butterfly bush (*Buddleja davidii*), reed canary grass (*Phalaris arundinacea*), and Japanese knotweed (*Polygonum cuspidatum*). The presence of invasive species can inhibit the establishment of native vegetation. Most of the riparian zones in the project area are now entirely devoid of trees or consist of sparse, narrow, and patchy strips of small- to medium-sized cottonwood (*Populus balsamifera*), willow (*Salix* spp.), and alder.

3.2.1.4 Bivalve Shellfish

Community Composition and Habitat Requirements of Bivalve Shellfish[2]

Bivalve (two-shelled) shellfish are found throughout the nearshore area of Hood Canal. Primary species include:

- Olympia Oyster (*Ostrea lurida*) (Native)
- Pacific Oyster (*Crassostrea gigas*)
- Bay Mussel (*Mytilus trossulus*) (Native)
- Geoduck (*Panopea generosa*) (Native)
- Horse Clam (*Tresus* spp.) (Native)
- Littleneck Clam (*Mercenaria mercenaria*) (Native)
- Butter Clam (*Saxidomus giganteus*) (Native)
- Manila Clam (*Venerupis phillippinarum*)
- Varnish Clam (*Nuttallia obscurata*)
- Cockle (*Clinocardium nuttallii*) (Native)
- Macoma Clams (*Macoma* spp.)
- Eastern Softshell Clam (*Mya arenaria*)
- California Softshell Clam (*Cryptomya californica*)

[2] Shellfish in the Puget Sound Basin are described in the NEPA EIS Section 3.2.2, *Shellfish and Other Macroinvertebrates* (pages 55–56), Section 3.2.6, *Aquatic Invasive Species* (pages 59-60), and Section 3.2.7, *Rare, Threatened, and Endangered Species* (pages 60-67). Shellfish harvest is described in Section 3.4.3, *Commercial Fisheries and Aquaculture* (pages 71–72) and Section 3.4.2, *Public Access and Recreation*, (pages 69–70). Section 6.1.1.1, *Site Description, Geographic Location & Context* (pages 212–213) includes some limited information on shellfish in the Duckabush Estuary. The following describes bivalve shellfish habitat and harvesting activities at the project site.

These bivalves are found in various substrates and tidal elevations. Clams burrow in sand, gravel, cobble, and partially muddy substrates, while oysters and mussels require hard surfaces to attach to. Geoducks occur in habitats deeper than -2 feet of tidal elevation estuary (WDFW 2019a).

Larval and juvenile (post-set) bivalves tend to be more sensitive to environmental conditions than adults, meaning that adults tolerate a wider range of conditions. Optimal habitat conditions for bivalves in Hood Canal include mean salinity being above 25 parts per thousand (ppt) for adults and between 27 and 32 ppt for larvae (Confluence Environmental Company 2017). Tolerances to lower salinities vary among species and life stages, but in general survival and strong growth can occur in conditions as low as 15 ppt (Suhrbier et al. 2016). Optimal mean habitat temperatures are less than 18°C for adults and between 10 and 15°C for larvae (Confluence Environmental Company 2017). Suspended sediment concentrations of less than 20 milligrams per liter (mg/L) are required with post-set/juveniles having a lower tolerance to higher concentrations than adults. Additionally, single oysters or post-set/juveniles have a low tolerance for sediment deposition, and sediment deposition as little as 1 to 2 millimeters (mm) may inhibit larval settlement entirely. For clams, minor burial events (up to 60 mm) tend to have no effect due to their ability to burrow (Suhrbier et al. 2016).

Bivalves have some ability to adapt to various environmental conditions in their habitats. Some of these conditions include changes in salinity, tidal elevations, food availability, substrate conditions, and other water quality conditions like temperature and dissolved oxygen. Additional conditions that may affect the health of shellfish in Hood Canal are predation, sediment composition, habitat stability, water velocity, as well as contaminants and pathogens (Confluence Environmental Company 2017).

The Duckabush Estuary forms a large river delta that provides favorable growing conditions for bivalve shellfish such as clams, oysters, and mussels. Manila clams are abundant at the Duckabush Estuary and are found in the mid-intertidal zone. Native littleneck clams, cockles, butter clams, and horse clams also grow in the low-intertidal zone of the estuary. Eastern softshell clams can be found in pockets of softer sediments, and varnish clams are distributed throughout higher tidal elevations. Additionally, Pacific oysters are abundant in the mid-intertidal zone, and Olympia oysters are patchily distributed in low abundance throughout the delta. A 9-acre commercial geoduck tract exists off the northeastern edge of the Duckabush delta.

Modifications that have been made in the past to the Duckabush Estuary currently restrict the number of tidal channels flowing across the river delta and the volume of river flow routed into each channel. The training berms also constrict the main river outlet channel in one alignment as it flows under the Highway 101 bridge and out to the river delta. These modifications contribute to favorable growing conditions for shellfish in the Duckabush Estuary. The modifications limit the locations where river outflows reduce salinities below the required levels for shellfish. In addition, the modifications reduce the delivery of suspended sediments and bedload sediments to some portions of the estuary. The modified estuary likely provides a more stable growing environment for shellfish than a more naturally dynamic estuary.

WDFW surveyed a portion (36.71 acres) of the Duckabush Estuary from 2002–2013 to estimate clam population numbers (Table 3-1). The estuary is especially productive for Manila clams. Additionally, in 2007, WDFW surveyed Pacific oysters in a 72.87-acre portion of the Duckabush Estuary and estimated there were more than 11 million legally harvestable oysters (those with a ≥64 mm shell size).

Table 3-1 WDFW Harvestable (>38 mm) Clam Population Size (lbs.) Estimates in the Duckabush Estuary

Year	Manila Clams	Native Littleneck Clams	Butter Clam	Varnish Clams
2002	245,554	—	no data	no data
2003	188,675	15,035	no data	no data
2004	190,828	no data	no data	no data
2005	227,822	3,000	16,965	no data
2006	269,154	15,062	6,948	no data
2007	286,624	2,759	3,422	3,046
2008	no data	no data	no data	no data
2009	267,005	6,508	no data	30,514
2010	254,253	6,901	15,546	16,872
2011	236,795	8,574	6,629	33,645
2012	no data	no data	no data	no data
2013	160,943	4,375	no data	50,670

NOTE: WDFW surveyed 36.71 acres and included only those clams ≥38 mm shell size.
SOURCE: WDFW (2019b)

Shellfish Harvesting

The west side of Hood Canal (from Dabob to Skokomish) includes a number of locations for recreational shellfish harvesting all within a 1-hour drive of Duckabush. DOH monitors water quality and assigns recreational shellfish harvest advisory status to protect public health. A map of Hood Canal with labels for recreational shellfish harvest areas as well as the 2019 DOH beach water quality status and commercial growing status is presented in Figure 3-2. The Duckabush Estuary was historically considered an outstanding area for recreational shellfish harvesting because: (1) it is accessible by walking (does not require a boat for access), (2) it extends across a wide area, and (3) it has a high production of shellfish (DOH 2019b).

There is currently no non-tribal commercial harvest at the Duckabush public tidelands, as the state manages its treaty share of the resource for recreational fisheries. Tribal harvest here includes commercial, ceremonial, and subsistence fisheries. Non-tribal commercial cultivation/harvest does or has occurred on private tidelands on the far north and south sides of the delta. There is a 9-acre commercial geoduck tract off of the Duckabush Estuary, but this tract is not currently harvested (WDFW, 2019c).

Shellfish health within the Duckabush Estuary has been affected by water quality conditions including an increase in fecal coliform bacteria (Jefferson County Public Health 2018). In September 2017, WDFW closed the Duckabush Estuary for shellfish harvest by emergency regulation in response to DOH changing the beach status from Open to Conditionally Open because of water quality issues, including elevated concentrations of fecal coliform bacteria. The area was re-opened for harvest on November 1, 2017. In 2018, WDFW changed the fishing rule for shellfish harvest such that harvest is closed from

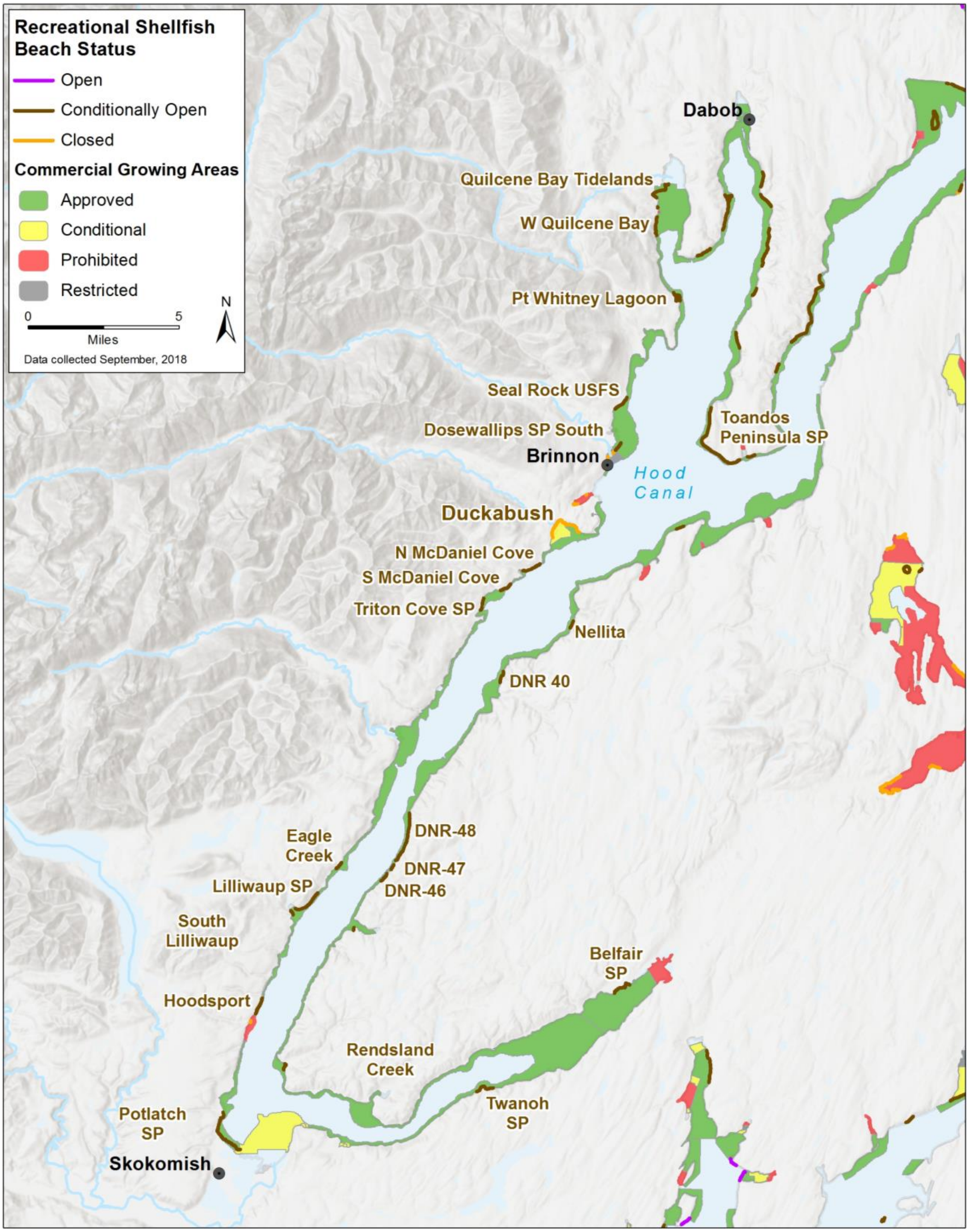
May 1 through October 31 each year until further notice. Shellfish species harvested at the Duckabush Estuary include the following:

- Manila Clam
- Native Littleneck Clam
- Butter Clam
- Horse Clam
- Cockle
- Eastern Softshell Clam
- Geoduck
- Pacific Oyster
- Varnish Clam

Figure 3-3 shows the total pounds (lbs.) of each clam species recreationally harvested in the Duckabush Estuary from 2002–2018 (WDFW 2019b). Manila clams are the primary species harvested and account for more than 70% of the total clam harvest each year. Total recreational harvest during the 2002–2018 period peaked in 2003, when 28,451 lbs. of clams were recreationally harvested at Duckabush. The amount of recreational harvest of clams has declined in more recent years, and since 2011 no annual harvest has exceeded 10,000 lbs.

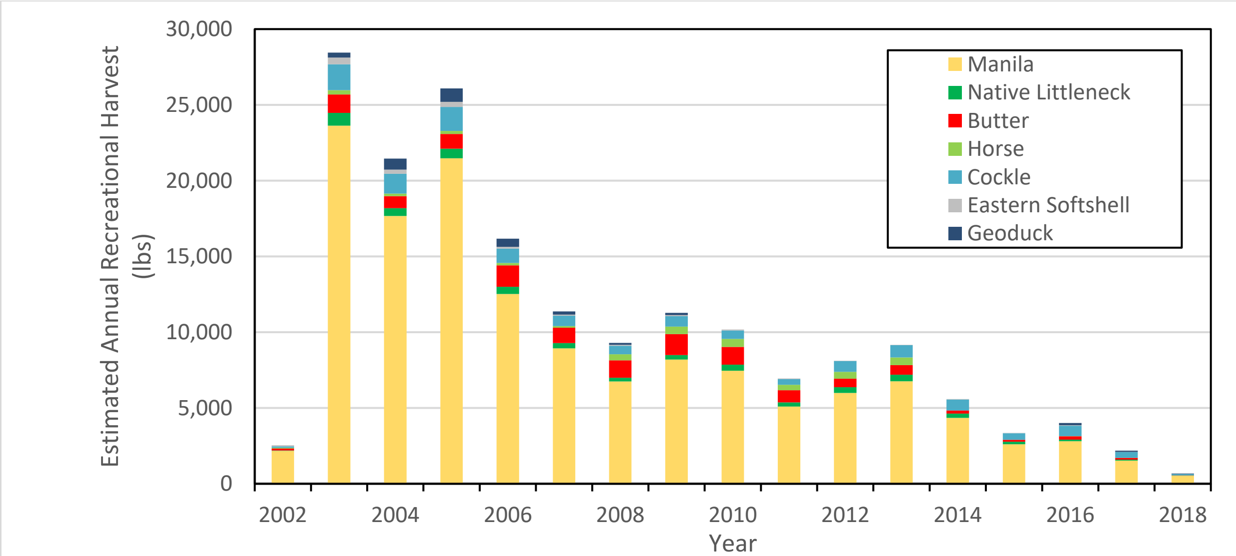
Similarly, harvest of Pacific oysters during the 2002–2018 period of record peaked in the early 2000s and has declined since that time (WDFW 2019b). Figure 3-4 shows the estimated number of Pacific oysters recreationally harvested in the Duckabush Estuary. Most recently, the conditional closure of shellfish harvest in September and October 2017 and from May through October 2018 contributes to the declining harvest trend, as the area is not open to harvest during the best daytime low tides of the year.

Tribes have rights to 50% of all shellfish from all of the usual and accustomed places in the state. Shellfish resources are co-managed by WDFW and the tribes. The only commercial harvesting in the public tidelands portion of the Duckabush Estuary occurs by tribes; tribes also have harvest rights on private tidelands here. The Skokomish Tribe (WA-0577-HA), Port Gamble S'Klallam Tribe (WA-0589-HA), Jamestown S'Klallam Tribe (WA-0588-SS), and Lower Elwha Klallam Tribe (WA-0587-HA) all hold commercial licenses for the outer portions of the Duckabush Estuary tideflats. The Skokomish Tribe claims primary rights in Hood Canal and reserves exclusive harvest rights south of Ayock Point (which is south of Duckabush Estuary). The Port Gamble S'Klallam, Jamestown S'Klallam, and Lower Elwha Klallam tribes also harvest in a portion of Hood Canal between Ayock Point and the Hood Canal Bridge owing to previous agreement with the Skokomish Tribe. Tribal winter harvest occurs during night time low-tides, typically with reduced effort due to the less-than-ideal weather and lighting conditions at this time of year. Tribal harvest is shown in Figure 3-5 for clams and oysters. The orange bars track the oyster harvest and the blue bars track the clam harvest.



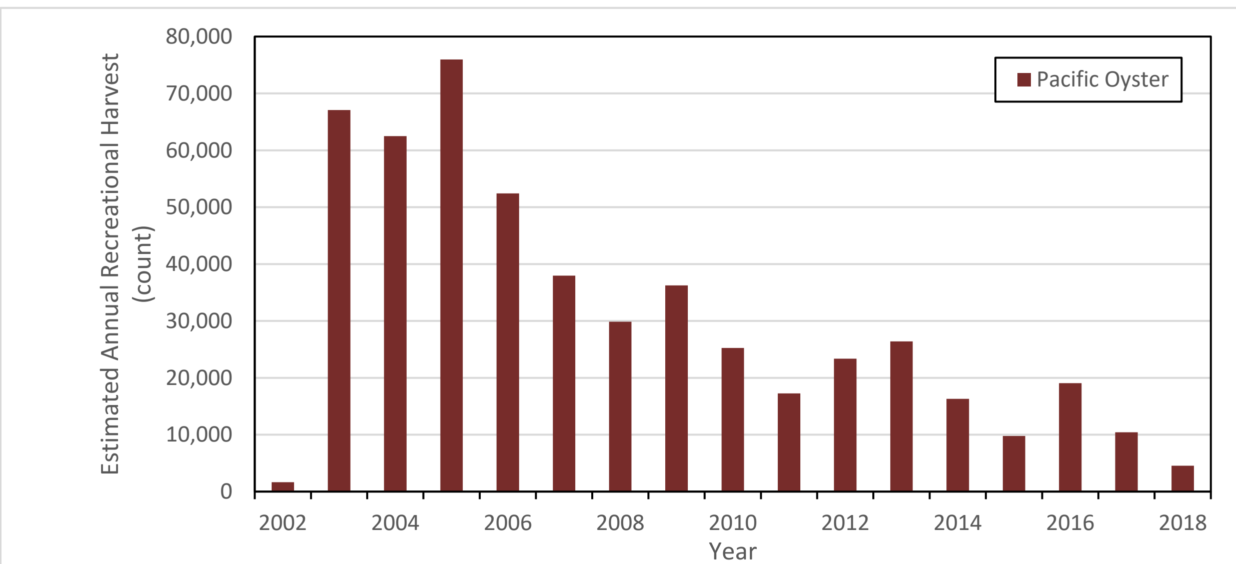
SOURCE: ESA, 2019; WDOH, 2019

Figure 3-2 Recreational Shellfish Beach Status and Commercial Shellfish Growing Areas



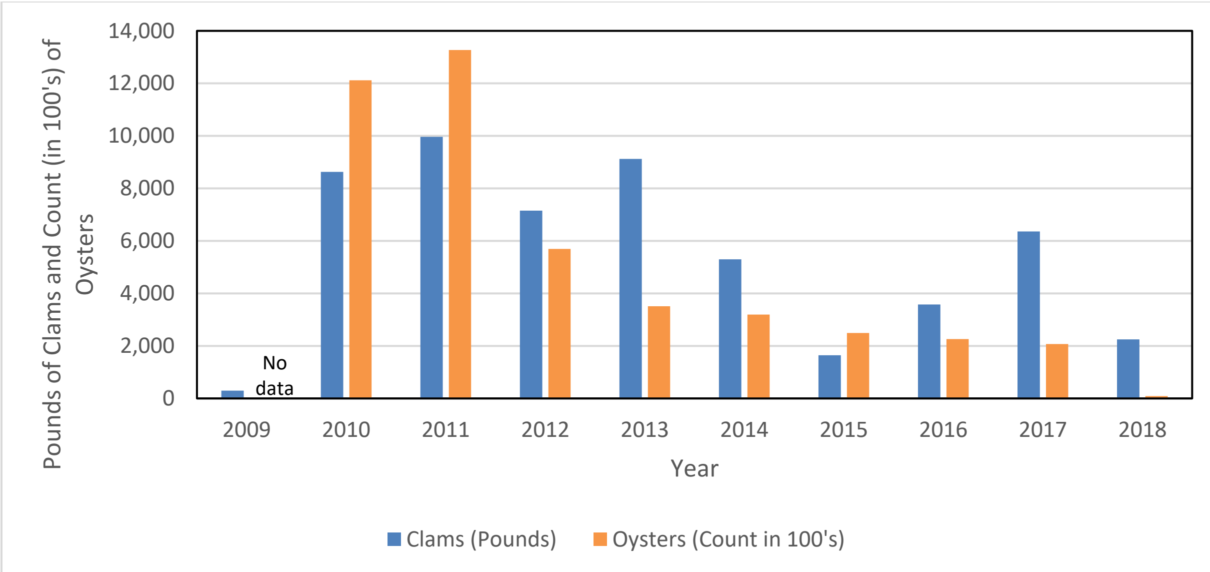
SOURCE: WDFW, 2019d

Figure 3-3 Duckabush Estuary Recreational Clam Harvest per Year in Pounds



SOURCE: WDFW, 2019d

Figure 3-4 Duckabush Estuary Recreational Oyster Harvest per Year by Count



SOURCE: Wolf, 2019

Figure 3-5 Duckabush Estuary Clam and Oyster Tribal Commercial Harvest per Year

3.2.2 Impacts

3.2.2.1 No Action Alternative

Marine Submerged Vegetation

No changes to the condition of the marine submerged vegetation would be expected under the No Action alternative. Stressors would remain along the shoreline and there would not be increases in light and nutrients that would nourish growth and expansion of the beds within or along the fringes of the site.

Wetlands

No changes to the condition of wetlands would be expected under the No Action alternative. The tidal barriers would remain at the site and restoration of tidal wetlands and potential benefits to the habitat in the Duckabush Estuary would not be realized.

Riparian Vegetation

No change to the condition of riparian vegetation would be expected under the No Action alternative. The native riparian vegetation would remain in the current state and would not serve to enhance habitat for birds and small mammals. It is anticipated that there would be no net increase in riparian vegetation in the Duckabush Estuary in the No Action alternative.

Bivalve Shellfish

No change to the condition of bivalve shellfish would be expected under the No Action alternative. Current seasonal harvesting would continue to be allowed. The growing conditions for shellfish would remain stable in the No Action alternative.

3.2.2.2 Proposed Action

Marine Submerged Vegetation

Temporary construction impacts to eelgrass and kelp would include turbidity caused by excavation and pulses of sediment released from newly inundated tidal areas, leading to a potential for decreased light penetration. Decreased light conditions may occur for the duration of construction and perhaps for a year as the storm season moves sediment away. Long-term benefits would occur as sediment and nutrient transport increase when stressors are removed along the shoreline, allowing for more suitable substrate and increases in light and nutrients to nourish growth and expansion of the beds within or along the fringes of the site. Benefits may take 2 to 4 years to appear, but would endure for decades.

Wetlands

Temporary construction impacts to wetlands would include a work trestle adjacent to the new highway that would be removed upon project completion and any construction access across wetlands to excavate channels. Impacted areas would be allowed to naturally recolonize and monitored for invasive species. In the long-term, the new highway bridge will result in wetland loss in the footprint of the new bridge supports, however the project increases physical area of wetland by removing existing highway support fill (that is currently acting as a tidal barrier) across the estuary. The removal of tidal barriers and fill would restore tidal wetlands by improving hydrology to restore the estuarine mixing zone. This would convert the freshwater marshes into brackish marshes, which are a rarer ecotype. As higher salinity water inundates the restoration sites, the freshwater marsh vegetation would be replaced over time with salt-tolerant species, forming salt marsh and estuarine habitats. Based on information from other estuarine restoration projects in the Puget Sound area, such as the Skokomish River estuary, high marsh vegetation would likely establish within the first 5 years and lower marsh vegetation would take decades before establishment. Restoring these tidally influenced marshes would create a distribution of wetland zones that more closely matches pre-disturbance conditions, providing rearing and foraging areas for a variety of estuarine-dependent species. The restoration of river channels and tidal exchange would allow sediment to move naturally across the estuary, similar to historic conditions. Over time, the project would restore and maintain a greater diversity of wetland habitats within the restored estuary.

Riparian Vegetation

Most riparian vegetation that would be impacted by construction activities, either by direct or indirect removal (removal of stressors with vegetation growing on them) consists of non-native species. Native vegetation would be protected from removal to the extent possible, and damaged areas would be replanted with native plants. As these native riparian species become established, they would form an overhanging canopy that provides thermal refuge and a source of organic input for aquatic systems, as well as habitat for birds and small mammals. It is anticipated that there would be a net increase in riparian vegetation associated with the Duckabush Project.

Bivalve Shellfish

Potential impacts on shellfish at the Puget Sound Basin level are described in the NEPA EIS in Section 5.2.2, *Shellfish and other Macroinvertebrates* (on pages 162–163) and Section 5.4.3, *Commercial Fisheries and Aquaculture* (on pages 184–186).

NEPA EIS Section 6.1.1.12*, Site-Specific Environmental Impacts,* includes potential impacts on shellfish; rare, threatened, or endangered species; and commercial fisheries (on pages 221–223). Shellfish are also addressed throughout Section 6.1.1 in the NEPA EIS.

The effects on shellfish relate to the species' habitat requirements and their ability to survive and grow through times when the environmental conditions have changed or are changing. Depending on species and life stage, bivalves can demonstrate tremendous flexibility and tolerance of habitat conditions but have tolerance thresholds that, once exceeded, can result in broad-scale losses of the resource (Confluence Environmental Company 2017). In general, larval and post-set/juvenile shellfish have lower tolerances for environmental conditions outside their preferred range than adult shellfish. In addition, some species are more sensitive to certain changes than other species (Confluence Environmental Company 2017).

During the construction of the Proposed Action, the excavation of new tidal channels across the estuary could increase suspended sediment loads and deposit sediment in areas with shellfish beds. Implementation of best management practices (BMPs) such as silt curtains and other sediment containment techniques during construction would reduce the potential for sediment inputs, and the construction impacts would not be expected to have a significant effect on shellfish production in the Duckabush Estuary.

Over the long term, the restoration of the Duckabush Estuary would re-establish multiple tidal channels across the river delta and allow for the site to naturally adjust to river flows and tidal inundation in the area. The tidal channels deliver water, sediment, and organic matter from the river watershed. The suspended sediment, depositional sediment, and freshwater delivered in tidal channels may affect shellfish conditions for growth and survival depending on whether the species tolerances are exceeded. While this restoration would return the river to its more natural, historical condition, it would make the growing conditions for shellfish more variable or less stable. The variable habitat conditions associated with restored channel dynamics (i.e., more channel movement) may displace shellfish completely in some areas, reduce habitat suitability in other areas, and improve habitat suitability in other areas.

Changes would likely occur to the distribution and abundance of shellfish and possibly to community composition following construction of the Duckabush Project. Parts of the estuary are expected to change in the initial years following construction, as tidal processes and river flows act on the area. Changes may include scouring channels deeper, scouring new channels, and depositing sediment (sand and gravel) along the channel margins. These changes are the intended benefits of the restoration as the Duckabush Estuary re-equilibrates to the new conditions.

After the initial years of site adjustment, the estuary is expected to be more stable—that is, less major adjustment, but continued smaller-scale natural adjustments. The duration of the active adjustment period before the site settles into a less-active adjustment period cannot be accurately predicted and depends on weather conditions, such as episodic high river flow events and high winds.

For the purposes of this Draft SEIS analysis, it is assumed that post-construction years 1 through 5 would be more dynamic than year 6 and beyond. Shellfish production in the Duckabush Estuary would likely be reduced in the short term compared to existing conditions due to the restoration of multiple channels to deliver freshwater to different parts of the estuary and the active adjustments described above.

Shellfish production at the site over the long term may also be reduced compared to current conditions, but the magnitude of the reductions cannot be accurately predicted. It is possible that the restoration would improve shellfish production over time, such as was documented following restoration at

JimmyComeLately Creek (Confluence Environmental Company 2017). However, it is expected that parts of the Duckabush Estuary would be less productive for growing shellfish post-construction, and other areas would benefit from the re-engagement of parts of the estuary that are currently blocked from the delivery of natural inputs of sediment from the river. There were no data to document changes in shellfish production following restoration of JimmyComeLately Creek except anecdotally from WDFW, tribal, and commercial growers. They experienced sites where shellfish numbers were initially reduced following salmon habitat restoration, but showed signs of recovery in as few as 6 to 10 years after construction (Confluence Environmental Company 2017). Shellfish population responses following restoration are dependent upon many factors; a commonly identified important factor is that those sites that recovered in this timeframe all had a source population of shellfish remaining in the impact area. Other sites where the source population was entirely lost were reported to have shown no signs of recovery in the first decade following restoration (Confluence Environmental Company 2017). Shellfish at the Duckabush Estuary would be expected to persist at locations throughout the site to serve as a contributing source population, producing larvae to allow the site to recover like those described above where recovery was underway in the 6- to 10-year timeframe.

When considering recreational harvest impacts, an important factor affecting the magnitude of impact is whether the harvest restrictions between May 1 and October 31 due to poor water quality would continue to be in place. Assuming the harvest restrictions continue, the impact of the Duckabush Project on harvest opportunity would be smaller because of the continued seasonal health closure. The May through October harvest restriction means the area is not open to harvest during the best daytime low tides of the year. Assuming the harvest restrictions are lifted through successful implementation of the Shellfish Closure Response Plan (Jefferson County Public Health 2018), there would be more potential for impact to recreational harvest opportunities in the Duckabush Estuary; however, any such impacts are expected to be relatively short-term (6 to 10 years) as the shellfish populations stabilize from short-term construction impacts and altered growing conditions. With or without the continuation of the harvest restrictions, the impact on recreational harvest would not be considered significant because the estuary will still support recreational harvest and other locations are available for recreational harvest within a 1-hour drive from the estuary.

Tribal commercial harvest is expected to be reduced, especially during the years 1 through 5 post-construction. Tribal commercial harvest opportunity is already reduced because of the May through October harvest restriction, although tribal commercial harvest is less impacted than recreational harvest due to their harvest efforts being less tied to daytime low tides. Given the uncertainty of the changes to the estuary that would occur as the site adjusts to its restored condition, the potential effects on tribal commercial harvest may be significant in the short-term (i.e., the first 6 to 10 years), and then diminish over time. In the long term (i.e., >10 years' post-construction), the effects are expected to be less than significant, as populations are expected to recover.

3.2.3 Mitigation Measures

3.2.3.1 No Action Alternative

No mitigation measures are proposed for the No Action alternative.

3.2.3.2 Proposed Action

Bivalve Shellfish

During construction, work would occur during allowable in-water work periods and low tides to minimize effects of turbidity. In the long term, restoration of wetlands in the larger river deltas and smaller embayments would benefit plants and animals. Removing tidal barriers would increase sediment and nutrient delivery to eelgrass beds in Hood Canal. WDFW may implement the following best management practices to reduce potential impacts on shellfish:

- Complete as much construction as possible at times when the work area is not inundated either by limiting construction timing or otherwise isolating work areas from inundation (e.g., cofferdams).
- Use silt curtains and other sediment containment techniques to minimize the potential for elevated suspended and bedload sediment inputs.
- Identify alternative recreational and tribal commercial harvest areas or strategies to offset potential short-term reductions in shellfish production at the site. This could include improved site access to harvest areas.

3.2.4 Significant Unavoidable Adverse Impacts

3.2.4.1 Both Alternatives

These impacts are similar to those documented in the NEPA EIS and are not likely to result in any significant adverse impacts that cannot be mitigated related to marine submerged vegetation, wetlands, riparian vegetation, or bivalve shellfish under either alternative.

3.3 TRANSPORTATION

Information on Transportation in the NEPA EIS

Section 3.4.4, Transportation (pages 49–51).

Section 5.4.4, Transportation (pages 186–188).

Appendix B – Engineering Appendix, Section 1-2, General – Duckabush River Estuary (pages 1-1 to 1-2), and Section 1-16, Access Roads (page 1-43).

The transportation section of this Draft SEIS provides information on the regional and local transportation setting, including potential construction-related and operational-related vehicle traffic.

3.3.1 Affected Environment

3.3.1.1 Regional Transportation Setting

Highway 101 provides access to the project site. Highway 101 is a north to south interstate highway that travels along the West Coast of the United States through Washington, Oregon, and California. In the vicinity of the Duckabush Project site, Highway 101 has one lane in each travel direction with a speed limit of 40 miles per hour (mph), and is classified by WSDOT as Other Principal Arterial and by Jefferson County as a Principal Arterial. Principal Arterials provide the most mobility of the County's roadway classifications, and they provide for regional and inter-regional travel, typically carrying large volumes of through traffic, with limited direct access to abutting properties (Jefferson County 2018). Highway 101 is the only roadway providing north-south access on the east side of the Olympic Peninsula.

Annual Average Daily Traffic (AADT) is defined as the total volume for the year divided by 365 days. WSDOT calculates AADT figures to determine the average traffic volumes at particular points along state roads throughout the state. WSDOT's data collection location on Highway 101 closest to project site is at milepost 101, south of the Eagle Creek Bridge near Lilliwaup (in Mason County). This data collection location is approximately 14.5 miles south of the project site. The AADT at this location was reported as 2,800, which represents vehicle travel in both the northbound and southbound directions (WSDOT 2019b).

Based on AADT-derived thresholds from the Highway Capacity Manual for a two-lane roadway, 2,800 AADT experienced at the Duckabush Estuary site is equivalent to level of service (LOS) A operating conditions (Transportation Research Board 2010[3]). WSDOT's LOS standard for this stretch of Highway 101 is LOS C, which meets WSDOT's operational standards for LOS (WSDOT 2019b). Therefore, LOS A exceeds the traffic volume standards.

3.3.1.2 Local Transportation Setting

Duckabush Road is located at the north end of the proposed new Highway 101 roadway and is a two-lane east-to-west roadway that connects Highway 101 to the Olympic National Park, a distance of approximately 2.3 miles. Jefferson County classifies Duckabush Road as a Minor Collector, which is characterized as a roadway that typically carries lower traffic volumes directly from local access roads or from less densely populated areas, and distributes the traffic to major collectors or directly to the arterial system (Jefferson County 2018).

[3] Level of service (LOS) is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection or roadway segment, representing progressively worsening traffic conditions.

A WDFW public parking lot is located on the west side of the Highway 101 and is accessed by a driveway. The parking lot is approximately 1.5 acres in size. A replacement parking location has not been designated at this time however, it is likely that a portion of this existing parking lot will remain as a parking area.

There are no dedicated bicycle or pedestrian facilities near the project site. The closest public transit access to the project site is a bus stop located approximately 0.7 miles to the north at Black Point Road. Jefferson Transit Route #1 (Brinnon to Port Townsend) serves this bus stop with two morning and two afternoon/ evening runs on weekdays, and one morning and one evening run on Saturdays (Jefferson Transit 2019).

3.3.2 Impacts

3.3.2.1 No Action Alternative

No direct impacts from transportation are expected from construction under the No Action alternative because no construction is proposed. Vulnerable infrastructure may experience occasional or prolonged loss of use due to sea-level change that could cause overtopping or flooding. There would be no improvements to address climate change or seismic risk.

3.3.2.2 Proposed Action

As described in the NEPA EIS, the Duckabush Project would: (1) construct a new Highway 101 bridge and raise and realign the highway; (2) construct a new raised interchange at the intersection of Duckabush Road, plus a private drive north of Duckabush Road and Highway 101; and (3) construct a new bridge at Shorewood Road. Potential impacts from implementation of the proposed Duckabush Project are described below, and would mainly result from construction activities.

As described on page 1-43 of *Appendix B – Engineering Appendix* of the NEPA EIS, construction activities would require the mobilization of heavy equipment at the site. Access to the site during construction would likely be via Highway 101 and Duckabush Road. Temporary traffic control measures would be necessary during mobilization and site access activities. Construction sequencing would maintain public access at all times to Duckabush Road. The existing Highway 101 roadway would remain open to traffic during construction, but some traffic control measures may be required when connecting the new roadway to the existing portion of Highway 101. A private parcel north of the project, the former fire station, and the existing parking area to the south of the Highway 101 bridge are potential staging areas.

The average on-site workforce may comprise approximately 25 personnel over the course of the approximate 2- to 3-year construction duration. The on-site workforce has been conservatively estimated to peak at approximately 40 individuals for short, temporary, and intermittent periods of time. The construction-related workforce would commute to the site each day from local communities. Construction-related staff not drawn from the local labor pool may utilize nearby over-night lodging (i.e., hotels/motels). Although carpooling would be encouraged, for purposes of this analysis (and to ensure that potential impacts are not underestimated), construction-related workers were assumed to commute as single-occupants in their own respective vehicles (i.e., no carpooling) and to arrive in the a.m. peak hour and leave during the p.m. peak hour each weekday.

As described in Chapter 2, *Description of Alternatives*, most of the truck trips used during construction-related activities of the project would consist of the import of fill materials and export of excavated materials/spoils. No borrow or disposal sites have been identified at the project site. Approximately

21,300 cubic yards of borrow/fill material would be needed, and borrow/fill for the roadway transitions would likely come from a local quarry. Additionally, over 41,900 cubic yards of material would require disposal. Off-site disposal and borrow sites are available within 60 miles, either to the north at Port Angeles, or to the south at Tumwater. This would equate to approximately 4,860 truck trips assuming that trucks used to important and export materials would have a capacity of 13 cubic yards. Truck trips to transport materials to and from the project site would occur throughout the day and would not be concentrated during the weekday peak hours. Approximately 6 or 7 truck trips per day would occur, assuming that these truck trips would be spread evenly across the 3-year construction period. However, there would be peaks in construction activity when the import and export of materials would be more concentrated.

Based on the information provided above, construction-related activities for the project could generate additional worker trips in both the a.m. and p.m. peak hours during short periods of time. The addition of project-generated construction-related trips on Highway 101 would increase the AADT from approximately 2,800 to 3,000, which would still be characterized as LOS A operating conditions based on AADT-based thresholds from the Highway Capacity Manual (HCM) for a two-lane roadway (Transportation Research Board 2010). Most construction vehicles accessing the project site would likely occur directly from Highway 101. Access could be from Duckabush Road depending on where the staging area is located. Although the AADT is not available for Duckabush Road, traffic volumes are assumed to be relatively low since it does not provide access to large population centers. Therefore, construction traffic that would use Duckabush Road for project site access could likely be accommodated with little effect on local traffic.

Project operations would consist of routine maintenance activities, which would typically require small work crews (i.e., less than 5 people) in 1 or 2 vehicles. Maintenance activities would result in the same or fewer vehicle trips traveling to/from the project site because the new Highway 101 facility would be upgraded to current safety standards and would be less susceptible to weather-related damage. These activities would not generate a substantial number of trips that would have a discernable effect on roadway operating conditions, and would be lower than the trips generated during the project construction-related activities described above.

The new highway would increase transportation safety within the project area with wider lanes, better non-motorized access, and intersections and bridges built to modern design standards that address issues such as visibility, and natural disaster resilience.

Parking for recreational access will be maintained in the project vicinity, although the exact location is dependent on final highway location and design. The existing gravel parking lot on the northwest side of Highway 101 is likely to be modified into smaller parking lot although a final location has not been confirmed. The highway will be designed to discourage parking on the shoulder of the highway.

Private property driveways that connect to Duckabush Road just west of the Highway 101 intersection may be temporarily impacted by construction. One or more driveways may need to be reconfigured to conform to the new intersection layout and higher road grades.

3.3.3 Mitigation Measures

3.3.3.1 No Action Alternative

No mitigation measures are proposed for traffic or transportation for the No Action alternative.

3.3.3.2 Proposed Action

The Duckabush Project would cause only temporary closures to Highway 101, with only minor traffic-related effects during construction. The traffic control plans will ensure that access is provided to the local community along Highway 101 and Duckabush Road for the duration of the project during construction. Any road closures would be short and temporary, resulting in minimal delay. Coordination with the Brinnon Fire Department will ensure no reduction to the provision of emergency services. Additional construction traffic mitigation measures may be implemented as part of project permitting.

3.3.4 Significant Unavoidable Adverse Impacts

3.3.4.1 Both Alternatives

Traffic impacts are similar to those documented in the NEPA EIS and are not likely to result in any significant adverse impacts under either alternative.

3.4 NOISE

Although an analysis of airborne noise was not included in the NEPA EIS, it was identified as a concern during the scoping process. The Draft SEIS includes an analysis of airborne noise, both during construction and for traffic levels after project implementation.

> **Information on Noise in the NEPA EIS**
>
> *Section 3.1.6, Underwater Noise for the Puget Sound Basin (pages 49–51).*
>
> *Airborne noise was not analyzed in the NEPA EIS. Section 3.5, NEPA Scoping Results, briefly describes elements of the environment that were not analyzed in the NEPA EIS, and noise is addressed in Section 3.5.6, Airborne Noise, (page 75).*

3.4.1 Affected Environment

Noise is defined as unwanted sound. The manner in which people respond to noise depends on its composition, intensity, frequency, and duration. The loudness of sound as interpreted by the human ear depends on fluctuations in air pressure. Sound is highly variable, from the quietest to loudest sounds perceived. Noise impacts on humans are measured in terms of air pressure, expressed in decibels or dB. Because of the variability in the loudness of sound, changes in sound (noise) are measured on a logarithmic scale. Because noise is measured on a logarithmic scale, an increase in noise of 10 dB would be considered twice as loud. A 3 dB change is a barely perceivable difference for the human ear.

Noise policies and regulations are outlined in Jefferson County Comprehensive Plan (2018), Jefferson County Code (JCC) Chapter 8.70 Noise Control, and WAC Chapter 173-60 Maximum Environmental Noise Levels.

Construction activities are exempt from environmental noise limits while occurring between the hours of 7 a.m. and 10 p.m. (WAC 173-60-050(3)). Outside of these exempted daytime hours, noise limits established within JCC Chapter 8.70 and WAC Chapter 173-60 must be followed. For example, if construction activities start as early as 6 a.m., a waiver would be required from Jefferson County. For transportation noise associated with the normal use of licensed vehicles on roadways, the Federal Highway Administration (FHWA) has established Noise Abatement Criteria (NAC) for activity categories, representative of specific sensitive receptor types (Title 23 Code of Federal Regulations [CFR] Part 772). WSDOT uses the same NAC (WSDOT 2012). The NAC apply to all roadway projects in the state, including projects on local roads. Title 23 CFR Part 772 defines noise impacts as "*impacts which occur when the predicted traffic noise levels approach or exceed the NAC, or when the predicted traffic noise levels in the design year will substantially exceed the existing condition noise levels*."

3.4.1.1 Methodology

Potential noise impacts were analyzed for this Draft SEIS by considering the proximity of existing noise-sensitive receptors (FTA 2006), which in the vicinity of the project site include residential uses and an unnamed park owned by Olympic Canal Tracts west of Highway 101 (Table 3-2). Within the project site, the nearest residence is approximately 290 feet from the existing Highway 101. The picnic shelter that is part of Olympic Canal Tracts is approximately 950 feet from the existing Highway 101, and portions of the park green space are about 650 feet away (Figure 3-6). The NAC are provided in Table 3-2. These criteria were used to determine the potential impact the proposed project would have on noise levels at three residential locations and one park.

Table 3-2 Activity Categories and Applicable Noise Abatement Criteria (NAC)

Activity Category[a]	Leq(h)[b] dBA	Evaluation Location	Description of Activity Category
B	67	Exterior	Residential.
C	67	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.

[a] Includes undeveloped lands permitted for activity categories.

[b] The Leq(h) are A-weighted (dBA) hourly equivalent steady state sound levels used for impact determination only and are not design standards for abatement.

SOURCE: Table 1 of 23 CFR Part 772.

Noise levels were measured to characterize the existing (or baseline) environmental noise conditions (Table 3-3) to assess the potential noise-related impacts from construction and operations. Existing noise levels were measured at three monitoring locations (Figure 3-6) within the project site on September 20, 2019, between 10:30 a.m. and 1:30 p.m. These time periods generally reflect existing daily noise conditions excluding weekends. During the weekday, the area is generally quiet and influenced by activities at the surrounding residential land uses and Highway 101. Peak traffic occurs on Sundays during the summer season.

Table 3-3 Noise Measurements

Monitoring Locations and Times		Noise Level (dBA)				
		Leq	Lmax[a]	L10[b]	L90[b]	Observations
Site 1	11:16 – 11:31 a.m.	55.0	70.2	58.2	35.3	Birds chirping and dogs barking in the distance.
	12:36 – 12:51 p.m.	52.9	70.6	55.6	35.9	
Site 2	11:42 – 11:57 a.m.	49.3	66.7	51.5	33.6	Overhead airplane (commercial jet) and sirens from ambulance heading northbound on Highway 101 triggering numerous dogs to bark and howl.
	12:55 – 1:10 p.m.	44.6	58.5	48.8	33.2	
Site 3	10:41 – 10:56 a.m.	50.0	62.4	53.5	40.1	Vehicle traffic, birds, and wind in the trees. Occasional compression brake use.
	12:11 – 12:26 p.m.	49.0	62.5	52.2	41.4	Truck engine running in the distance.

[a] Lmax is the instantaneous maximum noise level during a given period of time; Lmax events commonly occur momentarily, such as a loud passing motorcycle or child yelling nearby the noise meter.

[b] L10 and L90 are standard measures that represent the noise levels that are equaled or exceeded 10% and 90% of a specified time period, respectively.

Monitoring location Site 1 was located near the north terminus of the proposed Highway 101 and Duckabush Road improvements. Monitoring location Site 2 was located to the northeast of the former fire station on Shorewood Road. Monitoring location Site 3 was located near the south terminus of the proposed project in a forested area with no sight line to Highway 101. Each location was chosen based on proximity to sensitive receptors that could be affected by the proposed project. The existing average daily noise levels at the monitoring location sites ranged from 44.6 dBA at Site 2 to 55 dBA at Site 1.

SOURCE: Jefferson County, 2019

Figure 3-6 Noise-Sensitive Receptors and Locations for Noise Measurements

3.4.1.2 Impact Criteria

Construction Noise Methodology

To assess the potential noise-related impacts from construction and operations, noise levels were measured to characterize the existing environmental noise conditions and to estimate changes to the noise environment from the relocated roadway. Environmental noise conditions were assessed for construction and operation by reviewing policies in the Jefferson County Comprehensive Plan (2018), JCC Chapter 8.70 Noise Control, and WAC 173-60.

Traffic Noise Methodology

Prediction of future traffic noise levels with the proposed project was performed in a preliminary manner using a streamlined traffic noise spreadsheet. The spreadsheet calculates approximate existing and future expected noise levels at sensitive receptor locations, relying on existing noise measurements at representative locations and Highway 101 traffic survey data as input parameters. This spreadsheet uses standard rules for damping of sound levels over distance within a two-dimensional space, and reference sound levels for vehicle types at 50 mph consistent with FHWA Traffic Noise Model inputs (FHWA 2006).

The methodology provided in this Draft SEIS relied on the initial conceptual corridor of the proposed new roadway, and measured to the center of this alignment to approximate centerline. It should be noted that the noise impact assessment approach was inherently approximate, based on the level of project detail and data currently available. The assessment methods were not intended to achieve the level of detail within a traffic noise assessment consistent with FHWA and WSDOT guidelines. However, the preliminary assessment provides initial data to better understand potential impacts and what additional noise analyses may be required.

Updates to the noise analysis may be provided in the future, as appropriate, to further substantiate the assessment approach, to provide results as “approximate anticipated increases,” and to provide an initial indication of anticipated future environmental noise conditions within NAC / substantial increase limits established by FHWA regulations (23 CFR Part 772) and WSDOT Noise Policies and Procedures (WSDOT 2011).

3.4.2 Impacts

3.4.2.1 No Action Alternative

There would be no construction noise impacts under the No Action alternative because no construction would occur. In the long term, there would be no changes to the location of the existing roadway and bridges and, therefore, no increased noise impacts. Population growth in the region is likely to result in an increase in vehicular traffic over time, which may result in prolonged durations of increased vehicle presence and sound.

3.4.2.2 Proposed Action

Potential impacts related to underwater noise are described in the NEPA EIS in Section 5.18, *Underwater Noise* (pages 155–159). Airborne noise was not analyzed in detail in the NEPA EIS, although it was mentioned in Section 3.5*, NEPA Scoping Results* (page 75). Potential airborne noise-related impacts from the proposed project are summarized below.

Construction Noise Impacts

Noise would be produced during construction from internal combustion engines. Earth-moving equipment, material-handling equipment, and stationary equipment are all engine-powered. Truck noise would be present during most construction stages. Other noise sources would include impact tools, which should be limited to jack hammers (human-operated) and hoe rams (mounted on heavy equipment). No impact pile driving associated with the bridge piles is planned.

Construction noise would be intermittent, occurring at different times and at various locations in the project area. The maximum noise levels of construction equipment would be similar to the typical maximum noise levels from construction equipment listed in Table 3-4. All construction would be temporary and intermittent, resulting in impacts that are less-than significant.

Table 3-4 Typical Noise Levels from Construction Equipment

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Hoe ram (concrete breaker)	90
Jackhammer	85
Excavator	81
Roller	80
Concrete mixer	79
Concrete mixer truck	85
Concrete pump truck	82
Crane, Mobile	81
Dozer	82
Flatbed truck / dump truck	84
Paver	77
Backhoe	78

SOURCE: FHWA, 2006

Sounds originating from temporary construction sites as a result of construction activity are exempt from the requirements of JCC Chapter 8.70.060 and WAC 173-60, except when occurring between the hours of 10 p.m. and 7 a.m. and adjacent to residential uses. If nighttime construction were necessary for specific phases of project (for example, to avoid traffic impacts along Highway 101), a noise variance would be necessary from Jefferson County consistent with requirements of JCC Chapter 8.70 Noise Control.

Underwater Noise Level Impacts

The Duckabush Project would not result in any long-term change to underwater noise; however, construction at the proposed site would have short-term underwater noise outputs that must be analyzed for effects on priority fish, federally listed species, and marine mammal resources. At the current stage of site design, the duration of noise-inducing activities cannot be accurately estimated. Further noise analysis may be necessary if project design or construction schedule deviates considerably from those evaluated. The activities that have been identified as part of the necessary construction work for this ecosystem restoration project are briefly described below.

The Duckabush Project would have in-water work for bridge construction; however, the project would not have impact pile driving other than a minimal amount of test holes. Piles would be removed, but this noise is not as loud as driving piles. Bridge supports would be drilled and cast-in-place concrete piers to avoid causing noise impacts to aquatic species.

Traffic Noise Level Impacts

Four sensitive receptor locations were chosen (shown as A, B, C, and D on Figure 3-6) and modeled to predict the change in noise level as a result of the project traffic on the proposed new roadway. Modeled sensitive receptor locations were residential (Activity Category B)[4], and one recreational area (Activity Category C). Noise levels at the modeled receptor locations with the proposed project are predicted to range from 48.5 to 55.3 dBA during typical weekday traffic conditions and 50.7 to 56.1 dBA during peak traffic times. Peak traffic generally occurs on Sundays during the summer season, as determined through review of WSDOT Highway 101 Daily Volume Report data for Milepost 324.8 (WSDOT 2019d). When compared to the existing conditions, the implementation of the proposed project is predicted to increase noise levels between 0.9 and 3.3 dBA, with 3.3 dBA the highest predicted increase for typical weekday and peak traffic conditions (see Table 3-5).

Table 3-5 Traffic Noise Model Results

Modeled Receptor Locations[a]	Noise Level (dBA)[b]						Distance of Receptor from Roadway (feet)		
	Existing	Modeled	*Change*	Existing Maximum (Peak Traffic)	Modeled Maximum (Peak Traffic)	*Change*	Existing	Proposed	*Change*
A	47.9	50.3	*2.4*	50.1	52.5	*2.4*	950	615	*-335*
B	49.3	52.6	*3.3*	51.5	54.8	*3.3*	590	270	*-320*
C	54.4	55.3	*0.9*	56.1	57.5	*1.4*	290	185	*-105*
D	46.4	48.5	*2.1*	48.6	50.7	*2.1*	790	540	*-250*

[a] Locations shown on Figure 3-6.
[b] All dBA values are Leq.

Of the four locations used for the model, Receptor Location B would have the highest predicted noise level increase as a result of the project traffic on the proposed new roadway, with an increase of 3.3 dBA under both typical weekday traffic and peak traffic. Receptor Location B also would have the second greatest change in distance from the existing and proposed highway alignments (Receptor Location A has the greatest change), likely contributing to the greatest increase in predicted noise levels. In the model, none of the receptors were predicted to exceed or approach the NAC established by the FHWA, and no sensitive receptors would experience a "substantial increase" of more than 10 dBA, as defined by FHWA and WSDOT. Therefore, operation impacts associated with noise would be less than significant.

In general, noise from traffic on the new roadway would be similar to existing conditions because the project would not generate additional vehicle traffic. However, the new roadway and bridge would be up to 400 feet upstream of their current location. The new roadway would be approximately 185 feet

[4] FHWA has established noise abatement criteria (NAC) for transportation noise (Title 23 CFR Part 772); consistent NAC are also provided in WSDOT's 2011 Traffic Noise Policy and Procedures (WSDOT 2012). The NAC are applicable to all roadway projects in Washington State and assign an Activity Category as described in 23 CFR Part 772.

from the nearest residence (105 feet closer than the existing roadway) and approximately 650 feet from the park (335 feet closer). This could increase the noise level slightly over current levels.

3.4.3 Mitigation Measures

3.4.3.1 No Action Alternative

There would be no construction noise impacts and no changes to noise impacts in the long term under No Action. Therefore, no mitigation measures are proposed.

3.4.3.2 Proposed Action

Construction methods would make efforts to use sound attenuation devices to reduce the noise below the regulatory thresholds.

Each method of construction that produces underwater noise can be mitigated through physical means such as bubble curtains and sound dampening mats, or through conservation measures such as having a certified monitor watching for wildlife. While noise may be significant at the construction sites, as the sound wave travels away from the noise-producing activity, the sound should attenuate below levels that cause harm to aquatic species.

The project would incorporate temporary noise reduction measures during construction and comply with any mitigation measures for noise attenuation that are required during permitting.

Preparing a design for the bridge that directs road noise away from existing residents would also reduce potential noise-related impacts for long-term operations.

3.4.4 Significant Unavoidable Adverse Impacts

3.4.4.1 Both Alternatives

Noise impacts are not expected to result in significant adverse impacts that cannot be mitigated under either alternative.

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4. DISTRIBUTION LIST

Chapter 4 provides a partial list of public agencies and organizations that are on the distribution list for the Draft SEIS. A full list of agencies, organizations, and individuals on the mailing list is available for review upon request.

4.1 TRIBAL GOVERNMENT

Skokomish Tribe

Quinault Indian Nation

Jamestown S'Klallam Tribe

Port Gamble S'Klallam Tribe

Lower Elwha Klallam Tribe

4.2 FEDERAL GOVERNMENT

United States Fish and Wildlife Service (USFWS)

United States Army Corps of Engineers (USACE)

4.3 STATE GOVERNMENT

Washington State Department of Ecology (Ecology)

Washington Department of Fish and Wildlife (WDFW)

Washington State Department of Transportation, Olympic Region (WSDOT)

Washington Department of Archaeology and Historic Preservation (DAHP)

Washington Department of Natural Resources, Forest Practices Board (DNR)

Washington Department of Natural Resources, SEPA Center (DNR)

Washington State Parks and Recreation Commission

4.4 LOCAL GOVERNMENT

Jefferson County

4.5 ORGANIZATIONS

American Forest Resource Council (AFRC)

Conservation Northwest

Hood Canal Salmon Enhancement Group (HCSEG)

Northwest Indian Fisheries Commission (NWIFC)

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5. LIST OF PREPARERS

Chapter 5 provides a list of persons who prepared the Draft SEIS.

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APPENDIX A: PUBLIC SCOPING COMMENT SUMMARY AND RESPONSES

Sixteen individuals provided oral comments at the scoping public meeting held on July 13, 2019. In addition, WDFW received 27 written comments. Table A-1 presents questions or comments related to the scope of the Draft SEIS that were received during the scoping period The second column directs the reader where this topic is discussed in either the NEPA EIS document (*Puget Sound Nearshore Ecosystem Restoration Final Integrated Feasibility Report and Environmental Impact Statement*) or this SEPA Draft SEIS. The response column attempts to provide the locations in the two documents where the majority of the pertinent information can be found. Due to the diffuse presentation of content in the NEPA document, not all locations of relevant content may be captured in this table.

Appendix is referred to in the Draft SEIS document in the following locations: Section 1.3 and Section 2.6.3.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
General Comments		
1	WDFW should take advantage of the natural variability of the Duckabush River, estuary, and associated ecosystem to facilitate the restoration process, as opposed to having too much direct intervention in the restoration process.	Comment noted.
2	Has the Navy expressed interest in using the area for training once it’s cleared out?	WDFW is not aware of interest from the U.S. Navy in this location.
3	Caution expressed over over-indulging in too much “restoration” of nature. This river has everything it needs to destroy your good intentions and re-draw the land to its liking.	Comment noted.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
4	Where can information on project costs and effectiveness of the project be found?	Project costs are located in the NEPA document Chapter 6.7 and NEPA document Appendix B (Engineering Appendix), Attachment A. Total Project Cost, based on conceptual design, is $90.5 million. Need for and Objectives of the project action are described in NEPA EIS Chapters 2.3 and 2.4. Evaluation of site benefits and costs are discussed in NEPA EIS Chapters 4.3.1 and 4.3.2. Ecosystem restoration benefits are described in NEPA EIS Chapter 6.1.1.10. A monitoring plan framework is provided in NEPA EIS, Appendix E (Monitoring and Adaptive Management), Annex C.
5	What is the anticipated height of the proposed new bridge?	Conceptual bridge design information can be found in the NEPA EIS, Appendix B Sections 1-6 and 1-7. The existing bridge decks on Highway 101 are 22.5 feet above the mean lower low water (MLLW) elevation. The new Highway 101 roadway elevation would be at about 28.5 feet above MLLW.
6	Reminder about the numerous features and benefits to the engineering schools around Washington State (and other states as well) to have an opportunity to develop true engineering proposals to a true project. I am so very aware to offer the various engineering schools to have any input to the Duckabush estuary/Highway 101 project is a monumental step to think outside of 'the box'. There may be 'nay-sayers', but my opinion is … the invitation to the engineering schools would be an opportunity for the Washington State highway dept. to 'blow their own horn' on their inclusion of the engineering programs on this very 'Real World', high visibility project. Several very vocal groups will be watching carefully how this project pulls together and the offer to the schools could set an example of this type of collaboration. The state would of course have the final say, but the visual effect of this would be huge. I am envisioning a video of the project and how the highway dept. contacted the various colleges and universities with the need and how the schools developed their engineered proposals … the question becomes, 'does ego and fear steamroll over creativity'?	Comment noted.
7	What is the anticipated timing for this project?	Project schedule is discussed in the NEPA EIS, Appendix B, Section 1-20 and in Section 1.9 of this document.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
Earth		
8	Residents of the Olympic Canal Tracts area are concerned about the risk of landslide damage to their property that could be caused by the construction of Hwy. 101. What is the risk of possible landslides due to construction activities?	Geotechnical information for the project area can be found in the NEPA EIS, Appendix B, Section 1-4. A list of additional studies needed to complete design includes geotechnical investigations and can be found in the NEPA EIS, Appendix B, Section 1-21.
9	What are the potential impacts from dredging activities? How will dredge materials be removed and hauled away?	Dredging activities are discussed in the NEPA EIS Chapter 5.1.8.2 and best management practices to protect water quality are discussed in the NEPA EIS chapters 5.7.2 and 6.1.1.12. The use of marine-based equipment is not considered practical so all access and haul will be land-based. Discussion of constructability is found in the NEPA EIS, Appendix B, Section 1-6.1.2. NEPA EIS, Appendix B, Section 1-4.1.11 notes offsite disposal and borrow sites are available within a 60-mile distance from the site, either to the north at Port Angeles, WA, or to the south at Tumwater, WA.
10	What are the potential impacts from the use of highway fill materials?	The design assumes that all new roadway material is imported and existing fill materials will be disposed off-site. More information on fill activities can be found in the NEPA EIS Chapters 5.4.4.4, 6.1.1.12, and 6.2; and the NEPA EIS, Appendix B, Sections 1-4.1.9, 1-4.1.10, 1-4.1.11, 1-5.4, 1-6.1.2 and 1-20. A list of additional studies needed to complete design includes an excavated materials study and can be found in the NEPA EIS, Appendix B, Section 1-21.
11	Maintaining our wonderful shellfish bearing estuary depends on getting river sediment and large woody debris delivery now blocked by the highway levy berm.	Sediment delivery and channel reconnection are consistent with expected ecosystem restoration benefits of the project as identified in the NEPA EIS Chapter 6.1.1.10.
12	How will earthquakes impact the new bridge?	NEPA EIS Appendix B, Section 1-4.1.7 discusses earthquake studies for the project. Seismic design for deep foundations and bridge abutments will be performed in accordance with WSDOT requirements and seismic design specifications.
Climate Change		
13	What is the location and long-term viability of the new bridge in the context of predictions for sea level rise in the area?	Conceptual bridge location information is shown in the NEPA EIS, Appendix B, Annex 1-1, Exhibit A. Sea Level Rise discussion can be found in the NEPA EIS, Appendix B Sections 1-2.1.9, 1-2.2.4 and 1-6.1.1.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
Water		
14	What will happen to "Jesse Allen Creek"? It is on My Duckabush property. Cannot and must not be blocked from Hood Canal as has 7/24 flow. I am informed that the creek is a salmon spawning run that gets very busy near December. Creek is very close to or in your map Pierce Slough excavation. SEE: Washington Department of Natural Resources' Small Forest Landowner Office.	Jesse Allen Creek is planned to be connected to the larger distributary channel network similar to historic channel conditions. Ecosystem restoration benefits of the project are identified in the NEPA EIS chapter 6.1.1.10.
15	People here have private wells and there is concern about how this project will relate to the availability of fresh water. The Save our Salmon group has come to restore the estuary in the past and several wells turned to salt. Important to make sure this project doesn't impact the availability of fresh water.	Water is discussed in Section 3.1 of this Draft SEIS document. A list of additional studies needed to complete design includes hydraulic modeling and can be found in the NEPA EIS, Appendix B, Section 1-21.
Flooding		
16	What is the potential risk of upstream flooding during extreme high tides as a result of the removal of the roadway or berms?	Hydrologic and hydraulic features of the project are discussed in the NEPA EIS Chapter 6.1.1.6 and the NEPA EIS, Appendix B, Section 1-2.1. Water is discussed in Section 3.1 of this Draft SEIS document. A list of additional studies needed to complete design includes hydraulic and sediment modeling and can be found in the NEPA EIS, Appendix B, Section 1-21.
17	I live in the Olympic Canal Tracts and the river runs through our back yard. My feeling is that by removing the causeway, it will give us relief from the flooding events that happen in our neighborhood each year. The concern is that not only does the causeway restrict the outflow of the river but it also serves as a barrier between the canal and the upstream neighborhoods when we experience the 12 and 13' tides during the winter months. Has there been any study done with this concern in mind? The river backs up during all of the extreme high tides and without the causeway in place it is feared that there will be even more flooding events caused by the tidal action. High tides, early snow melt and large amounts of rain are a recipe for disaster in this area each winter and the hope is that the project will not add additional problems with flooding.	See response to item #16 above.
18	We own property at Olympic Canal Tracts subject to flooding that this project could help by eliminating road bottleneck to river outflow.	Comment noted.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
19	Some residents on Robinson Rd are concerned about flooding that might happen when the berms are removed and channels dug out.	See response to item #16 above.
Plants & Animals		
20	What are the potential impacts on the local elk population and other wildlife access to the Duckabush River?	Use of the area by elk and other wildlife access is not expected to change in the long term. The elevated highway design will allow wildlife to cross beneath the estuary-spanning highway and may result in fewer vehicle wildlife interactions on Highway 101.
21	What is the potential impact of dredging and sediment on salmon runs?	Best Management Practices for construction and to protect water quality are found in the NEPA EIS Chapter 5.7.1 and 5.7.2. Water Quality and Fishes are also discussed in the NEPA EIS Chapter 6.1.1.12. Additional discussion of erosion control and sedimentation can be found in the NEPA EIS, Appendix B, Section 1-2.5.9 through 1-2.5.11.
22	Concern that placement of large wood may reduce the number of Chinook salmon by enabling predators.	Comment noted.
23	Suggestion that large wood should be closer to the mouth of the estuary.	Comment noted.
24	How will the salmon run be addressed with the silt and sludge generated by excavation and construction of the new bridge?	See response to item #21 above.
25	Your LWD placement is in exactly the wrong place. It will only help predators of juvenile Chinook and summer chum.	Comment noted.
26	Enhancing the Duckabush Estuary will certainly lend itself to improving salmon habitat and hopefully eliminating some of the “damming” that occurs with the log jam at the old bridge, which leads to increased flooding upriver. Although enhancing the salmon run is a good thing, I hope due consideration will be given to the elk and other wildlife having safe access to the river at Duckabush Road. I’m concerned we may be a little singularly focused on just the salmon, which aren’t making it upriver to spawn more due to human interference than anything else. As one of the residents above Hwy 101 at Duckabush, I’m interested in more specifics on how the new bridge will tie into Duckabush Road and the existing US Highway 101 and not negatively impact the migration patterns of the elk and other wildlife dependent on the river.	See response to item #4, item #5, item #13 and item #20 above.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
27	Suggest buying the homes there and making the area into an elk park. This project would provide habitat and allow the elk to use the area.	Comment noted.
28	The Duckabush elk herd frequent our creek and we have seen cougar tracks, bear scat & fish bone piles, and there are lots of flora and fungi we don't see much anywhere else. Want to be a good land steward.	Comment noted.
29	The higher water line would alter the current fry pools on our tributary.	See response to item #16 above.
30	The placement of large woody debris will reduce the number of chinook. Chinook returns could triple if the woody debris is moved closer to the mouth of the estuary. Its current location enables predators to eat the endangered fish.	Comment noted.
Shellfish		
31	How will the restoration of the Duckabush Estuary affect the location of existing shellfish beds and what actions would be taken to mitigate the potential loss of shellfish harvesting areas.	Discussion of shellfish is dispersed throughout the NEPA EIS in chapters 3 and 5 and chapter 6.1.1.12. Chapter 5.4.3.4 notes that "Impacts from restoration of sediment transport process to shellfish habitat at the Duckabush estuary will be taken into careful consideration during the next phase of design for short-term and long-term effects. Negative effects to shellfish will be avoided to the maximum extent practicable." Further discussion is provided in Section 3.2 of this Draft SEIS document. A list of additional studies needed to complete design includes hydraulic and sediment modeling and can be found in the NEPA EIS, Appendix B, Section 1-21.
32	Removing the bridges and roadway would pose a huge containment problem for the silt and sludge along the whole Duckabush delta area. How would this be mitigated for shellfish and wildlife?	Best Management practices to protect Water Quality are presented in the NEPA EIS Chapter 5.7.2.
33	Changing the river channel will affect the shellfish areas of the state owned land and the Olympic Tracts property. What will be done to mitigate those clam, oyster, and crab harvesting areas if the effects are adverse?	See response to item #31 above.
34	Have you looked into the possibility of damage to the shell fish beds, both Private and State, and how will you restore them?	See response to item #31 above.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
35	Will the private bed owners be compensated for the loss of harvest due to this restoration effort and process?	See response to item #31 above.
Environmental Health (except Noise)		
36	What is the potential for contamination of the water from the residential septic systems by homes adjacent to the mouth of the estuary?	Water and septic systems are discussed in Section 3.1 of this Draft SEIS document.
37	The whole program should be expanded. There are lots of homes in the project area along the water. The septic systems associated with those homes contribute to fecal coliform problems for the local shellfish. The project is good but should be expanded to buyout the homes.	Comment noted.
38	The “flats” should be purchased to get rid of the septic contamination.	Comment noted.
Recreation		
39	Interest in providing and/or maintaining recreational opportunities including walking, biking, wildlife viewing, beach access, and waterfowl hunting.	Comment noted.
40	A mounted telescope for viewing the wildlife could be a locally sponsored project.	Comment noted.
Public Services and Utilities		
41	What is the potential for the project to cause saltwater intrusion into groundwater wells on properties near the site?	See response to item #16 above.
Cultural Resources		
42	There has undoubtedly been a very long period of human presence at that site. The name 'Ducqueboose' was used on the 1872 GLO survey map and by explorer/historian James Wickersham (1857-1939), during the 1890s. Myron Eells (1843- 1907), of the Skokomish area, wrote in an article for the American Anthropologist (Jan. 1892) that the geographic name was derived from 'the Twana word Dos-wail-opsh.'	Comment noted.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
43	Will an archaeologist be on hand for the Canal Tracts neighborhood as it was the site of an old Duckabush ghost town that flooded out and the entire estuary was home of the basically extinct Twana band of native americans as noted in "The History of Brinnon" book documented by the Bailey family in the 1990s.	Archaeology, Historic and Cultural Resources are discussed throughout the NEPA EIS and primarily in chapters 3.3, 3.6.3, 5.3, 5.5, 5.6.2.3, 5.6.3, 5.7.5, 6.1.1.12, Appendix B Sections 1-16 and 1-19, and Appendix F, Section 6. A programmatic agreement for compliance with Section 106 of the National Historic Preservation Act is found in Appendix D. Cultural Resources is also noted in Section 2.6.3.3 of this Draft SEIS document.
44	Included in attachments is an abstract of 100 years of man's involvement of the Duckabush estuary, including the original homesteader paper.	Comment noted and attachment received.
Traffic and Parking		
45	Request information on the new Highway 101 bridge, including the bridge height and location of pedestrian access.	See response to item #5 above. Additional highway features information will be developed throughout the design phase.
46	How will the project affect traffic patterns and volume in the area (including generating traffic noise and affecting access to local roads, neighborhoods, and adjacent properties during construction)?	Traffic is discussed in the NEPA EIS Chapter 5.6.2.3 and in the NEPA EIS, Appendix B, Section 1-16. Additional discussion is found in Section 3.3 of this Draft SEIS document.
47	Where will public parking be located to access the restored estuary?	Parking and access are noted in Section 2.6.1 of this Draft SEIS document.
48	Consider a parking lot in the name of safety for the public so that they can view and admire the natural beauty of this area. Efforts towards this parking lot idea would inspire the public to protect what they love.	Comment noted.
49	As part of this project I hope left turn lanes from Highway 101 into Olympic Canal Tracts (OCT) are included to improve safety.	Comment noted.
50	Suggest a walkway across the bridge.	Comment noted.
51	In light of the extreme importance of this highway for commerce, what it being done to consider coordinating with DOT to straighten out the road north of Duckabush Road to eliminate the deadly corner between Robinson Road and Black Point Road?	The conceptual project footprint for estuary restoration does not include the area described. A map depicting the conceptual design can be found in the NEPA EIS, Appendix B, Annex 1-1, Exhibit A or in Figure 1-2 of this Draft SEIS document.
52	What, if any, disruption in travel on 101 is anticipated with the building of the new bridge?	See response to item #46 above.
53	Will the public parking area be replaced that will be lost due to bridge location and what will be done about possible pedestrian crossings from the public parking area?	See response to item #47 above.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
54	How will foot traffic change and where people will park to get to the state beach?	See response to item #47 above.
55	The new highway position will help reduce traffic fatalities.	Comment noted.
Noise		
56	Will there be noise barriers around the newly located Highway 101 since it appears to be moving in towards parcels that are occupied and road noise will be a problem?	Noise impacts are discussed in Section 3.4 of this Draft SEIS document.
57	How will the level of noise change as the road encroaches closer to my home, less or more? If there is an increase in noise, what consideration has been given to noise abatement?	Noise impacts are discussed in Section 3.4 of this Draft SEIS document.
Construction		
58	Where will the thousands of tons of fill removed be transported to? This must be millions of cubic yards.	See response to items #9 and #10 above.
59	If the fill is moved by trucks, this would impact traffic along an already well used, by locals and tourists, route. The volume of truck wear and tear would exponentially surpass the current usage of road damage as well as environmental pollution.	Comment noted.
60	It would be best to complete the demolition and construction of roadways as quick as possible. One fast strategic effort. Do not draw out the time.	Comment noted.
61	Concerned about Duckabush Rd access during construction because of monthly trips to Seattle Children's hospital with grandson.	As noted in the NEPA EIS, Appendix B, Section 1-6.1.2 and 1-16, access to Duckabush Rd is expected to be maintained throughout the project.
Property and Easement		
62	Our property includes an easement on Old Highway 9 to Duckabush Road. It seems that this project will make that easement moot.	Property acquisition information can be found in Section 2.6.3.1 of this Draft SEIS document.
63	Note that the border of the proposed work area overlaps on our property and easement as it is written now.	Comment noted.

Table A-1. Summary of Public Scoping Comments

	Comment	Response
64	What happens to the annual dues to OCT for the parcels that are purchased?	Dues arrangements are between the property owner and the homeowner's association. Property Acquisition information can be found in Section 2.6.3.1 of this document.
65	What elevation will this project be compared to Elk Court? How will the project impact his property? There used to be an easement, but it is no longer there. He needs access to his property from Mountain Trail and doesn't know what future access will be with HWY-101 re-routed to run behind his property, and how that will impact his plans for his land.	See response to item #5 above. Elk Court East and Mountain Trail Road are not in the conceptual project footprint.
66	What money has been set aside for eminent domain as the modification will affect existing property owners?	Existing state and federal funding will be used to advance the design to better understand real estate needs. A detailed evaluation of necessary real estate interests will occur during design phase. Project partners will coordinate with affected land owners to acquire the necessary real estate interests (refer to the NEPA EIS, Appendix C, or Section 2.6.3.1 of this document for additional information on anticipated types of real estate interests). Funding for acquisition-related activities could come from a variety of potential sources including grant programs compatible with the project goals and objectives.
67	What are the potential impacts on private property encroachment?	See response to item #62 above.
68	How will existing easements to private property adjacent to the site be impacted?	See response to item #62 above.
69	How will this project impact properties on Duckabush Road?	See response to items #61 and #62 above.

APPENDIX B: NEPA EIS INFORMATION ON DUCKABUSH PROJECT

This appendix provides a quick reference to where relevant Duckabush Estuary environmental resource information content can be found in the NEPA EIS document (Puget Sound Nearshore Ecosystem Restoration Final Integrated Feasibility Report and Environmental Impact Statement.) See Table B-1 for information on location of analysis for the built environment in the NEPA EIS and Table B-2 for information on location of analysis for the natural environment in the NEPA EIS. Considerable effort has been made to provide this document for a "cross-walk" to existing content, however due to the diffuse nature of topics incorporated throughout the NEPA EIS this table may not be exhaustive. The NEPA EIS document is available electronically at: http://bit.ly/PSNearshore.

Chapters 3 and 5 of the NEPA EIS typically present information at the Puget Sound scale which is the context in which the Puget Sound Nearshore Ecosystem Restoration Project was evaluated.

Chapters 6 and Appendix B (Engineering Appendix) of the NEPA EIS typically present information at the site-specific scale of the Duckabush Estuary Restoration project.

Other chapters and Appendices of the NEPA EIS are also referenced as appropriate.

Table B-1. Reference Table for NEPA EIS Natural Environment

	NEPA EIS			
SEPA Element (WAC 197-11-444)	**NEPA EIS Chapter 3. Affected Environment**	**NEPA EIS Chapter 5. Comparison of Environmental Effects**	**NEPA EIS Chapter 6. Recommended Plan**	**NEPA EIS Appendices**
Earth Geology Soils Topography Unique physical features Erosion/ accretion	Chapter 3.1 Chapter 3.5.1 Chapter 3.6.1 Sediment quality was not carried forward from scoping into EIS analysis (see Chapter 3.5.1).	Chapter 5.1 Chapter 5.5	Chapter 6.1.1.12	Appendix B, Section 1-4 Appendix B, Section 1-7
Air Air quality Odor	Air quality was not carried forward from scoping into the EIS analysis (see Chapter 3.5.2). No discussion of odor.	Not discussed.	Not discussed.	Appendix B, Section 1-5.8
Air Climate Change	Chapter 3.1.7 Chapter 3.6.5 * interspersed throughout this chapter	Chapter 5.1.7 Chapter 5.5 Chapter 5.7.3	Chapter 6.1.1.12 Chapter 6.6	Appendix B. Section 1-2.1.9 Appendix B, Section 1-2.2.4 Appendix B, Section 1-6.1.1 Appendix B, Section 1-21
Water Surface and groundwater movement/quantity/quality Runoff/absorption Floods Public water supply	Chapter 3.1	Chapter 5.1 Chapter 5.5 Chapter 5.7.2	Chapter 6.1.1.6 Chapter 6.1.1.10 Chapter 6.1.1.11 Chapter 6.1.1.12	Appendix B, Section 1-2 Appendix B, Section 1-6 Appendix B, Section 1-10 Appendix B, Section 1-21

Table B-1. Reference Table for NEPA EIS Natural Environment

SEPA Element (WAC 197-11-444)	NEPA EIS			
	NEPA EIS Chapter 3. Affected Environment	**NEPA EIS Chapter 5. Comparison of Environmental Effects**	**NEPA EIS Chapter 6. Recommended Plan**	**NEPA EIS Appendices**
Plants & Animals Habitat for and numbers or diversity of species of plants, fish, or other wildlife Unique species Migration routes	Chapter 3.2 Chapter 3.6.2	Chapter 5.2 Chapter 5.5 Chapter 5.6.2.3 Chapter 5.7.1	Chapter 6.1.1.12	Appendix F, Section 2 Appendix F, Section 3 Appendix F, Section 4
Energy & Natural Resources Amount required/rate of use/efficiency Source/availability Nonrenewable resources Conservation and renewable resources Scenic resources (see Aesthetics, below)	Not discussed except as included in Greenhouse Gas/Climate Change sections.	Not discussed except as included in Greenhouse Gas/Climate Change sections.	Chapter 6.2	Appendix B, 1-4.1.11 Appendix B, 1-4.1.12 Appendix B, Section 1-5 Appendix B, Section 1-21

Table B-2. Reference Table for NEPA EIS Built Environment

SEPA Element (WAC 197-11-444)	NEPA EIS			
	NEPA EIS Chapter 3. Affected Environment	NEPA EIS Chapter 5. Comparison of Environmental Effects	NEPA EIS Chapter 6. Recommended Plan	NEPA EIS Appendices
Environmental Health Noise	Chapter 3.1.8 Airborne noise was not carried forward (see Chapter 3.5.6).	Chapter 5.1.8 Chapter 5.5 Chapter 5.6.2.3 Chapter 5.7.4	Chapter 6.1.1.12	Appendix B, Section 1-5.8 Appendix B, Section 1-6.1.2
Environmental Health Risk of Explosion Releases or potential releases, e.g., toxic or hazardous materials	Chapter 3.1.5	Chapter 5.1.5	Not discussed. Some general info in Chapter 7.14	Appendix B, Section 1-5 Appendix B, Section 1-9 Appendix B, Annex 1-1, Exhibit C Appendix F, Section 5
Land & Shoreline Use Relationship to existing land use plans	Not discussed in Chapter 3. Chapters 1 and 2 discuss how projects fit the Federal objective and Significance.	Not discussed in Chapter 5. Chapters 4.9 and 4.10 relate to some plans.	Chapter 6.1.1.4 Chapter 7 includes relationship to Federal regulations including Coastal Zone Management Act.	Not discussed.
Land & Shoreline Use Relationship to existing populations Housing Agriculture Socioeconomics	Chapter 3.4. Chapter 3.5.4 Chapter 3.6.4 Also related info in Chapters 1.5 and 2.3.2	Chapter 5.4.1 Chapter 5.6.2.3 Chapter 5.6.3	Chapter 6.1.1.12 Chapter 7.7 (Environmental Justice)	Appendix F, Section 7
Land & Shoreline Use Light and glare Aesthetics	Aesthetic resources not carried forward (see Chapter 3.5.3). Light penetration in aquatic environment noted in 3.6.2.1	Chapter 5.7.3 Light penetration in aquatic environment discussed in 5.2.1	Not discussed.	Not discussed.

Table B-2. Reference Table for NEPA EIS Built Environment

SEPA Element (WAC 197-11-444)	NEPA EIS			
	NEPA EIS Chapter 3. Affected Environment	NEPA EIS Chapter 5. Comparison of Environmental Effects	NEPA EIS Chapter 6. Recommended Plan	NEPA EIS Appendices
Land & Shoreline Use Recreation	Chapter 3.4 Chapter 3.6.4.2	Chapter 5.4.2 Chapter 5.5 Chapter 5.6.4	Chapter 6.1.1.12	Appendix F, Section 7
Land & Shoreline Use Historic and cultural preservation	Cultural importance of biological species throughout Chapter 3.2 Chapter 3.3 Chapter 3.6.3	Chapter 5.3 Chapter 5.5 Chapter 5.6.2.3 Chapter 5.6.3 Chapter 5.7.5	Chapter 6.1.1.11 Chapter 6.1.1.12 Chapter 7.4 Chapter 7.5	Appendix B, Section 1-13 Appendix B, Section 1-16 Appendix B, Section 1-19 Appendix B, Section 1-21 Appendix D Appendix F, Section 6
Transportation Transportation systems Vehicular traffic Waterborne, rail, air traffic Parking Movement/circulation people and goods Traffic hazards	Chapter 3.4.4 Chapter 3.6.4.4 Chapter 2.5 for planning constraints.	Chapter 5.4.4 Chapter 5.5 Chapter 5.6.2.3 Chapter 5.6.3 Chapter 5.7.1	Chapter 6.1.1.4 Chapter 6.1.1.5 Chapter 6.1.1.12	Appendix B, Section 1-2.2.4 Appendix B, Section 1-6 Appendix B, Section 1-7 Appendix B, Section 1-16

Table B-2. Reference Table for NEPA EIS Built Environment

	NEPA EIS			
SEPA Element (WAC 197-11-444)	**NEPA EIS Chapter 3. Affected Environment**	**NEPA EIS Chapter 5. Comparison of Environmental Effects**	**NEPA EIS Chapter 6. Recommended Plan**	**NEPA EIS Appendices**
Public Services & Utilities Fire, police, schools Parks or other reaction facilities Maintenance Communication Water, stormwater, sewer, solid waste	Chapter 3.4.5 (Public Safety) The public utilities element was not carried forward (see Chapter 3.5.5). Chapter 1.8.1 (maintenance)	Chapter 5.4.5 Chapter 4.3.2 (maintenance)	Chapter 5.5 Chapter 6.1.1.7 (maintenance)	Appendix B, Section 1-2.1.16 Appendix B, Section 1-2.2.6 Appendix B, Section 1-4.1.10 Appendix B, Section 1-6.3 Appendix B, Section 1-15 Appendix B, Section 1-16 Appendix B, Section 1-21