PUGET SOUND NEARSHORE ECOSYSTEM RESTORATION

APPENDIX A

PUGET SOUND NEARSHORE IMPLEMENTATION STRATEGY

Integrated Feasibility Report and Environmental Impact Statement

US Army Corps of Engineers®
Seattle District

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US Army Corps of Engineers.

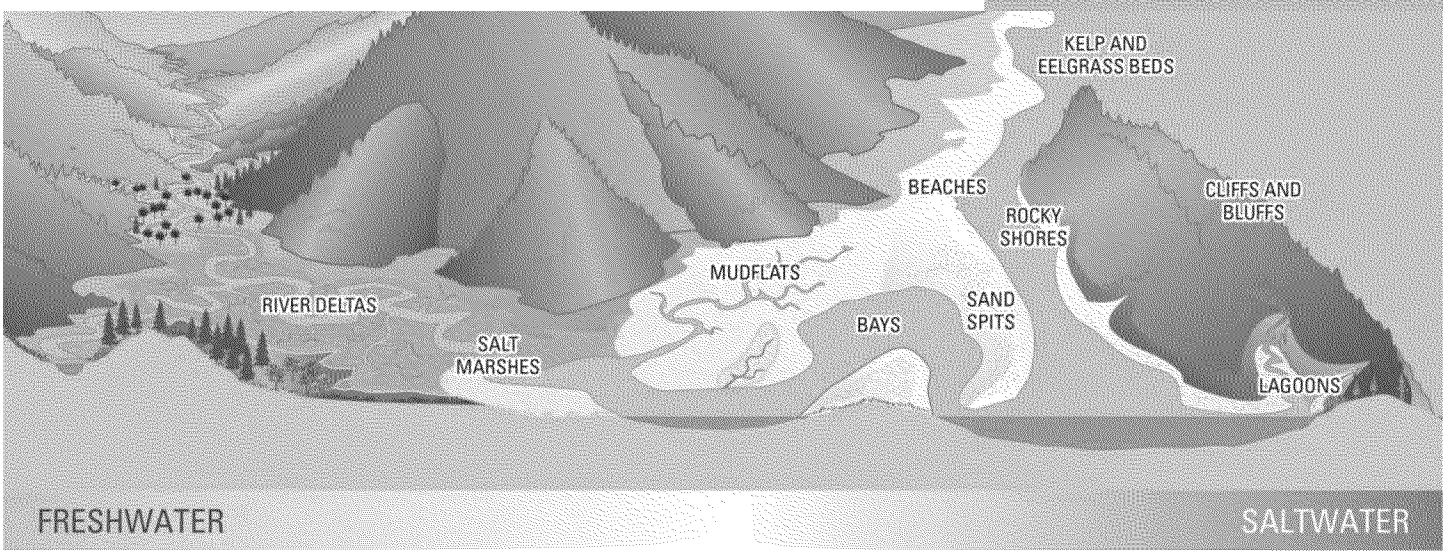
Washington Department of FISH and WILDLIFE

Background

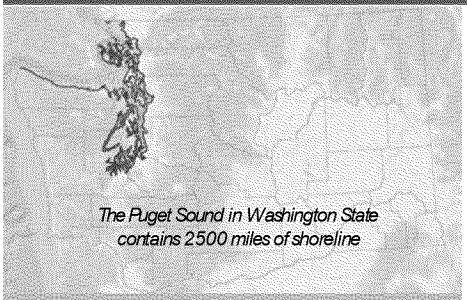
- The Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) is a large scale restoration initiative designed to remove man-made stressors in the nearshore zone of Puget Sound and restore natural, self-sustaining processes that are integral to supporting the structures and functions that provide ecosystem goods and services.
- The nearshore zone is the transitional area between terrestrial and aquatic (saltwater) ecosystems. It is constrained by geologic features rooted in Puget Sound's formative glacial history. Mountainous uplands transition rapidly to deep saltwater areas resulting in a narrow band of nearshore habitat at the shoreline of Puget Sound.
- The nearshore zone is a biologically rich and productive area supporting a diversity of species throughout the food web including concentrations of waterfowl, shorebirds and raptors; abundant shellfish; marine mammals; and some of the largest salmon runs in the lower 48 states. The nearshore zone provides commercial, recreational and aesthetic benefits to humans that support our livelihood and quality of life.
- The nearshore is also appealing to humans with 67% of Washington's population living in a county that touches Puget Sound. Human development within the nearshore zone and adjacent uplands has resulted in a diverse array of man-made stressors.
- Within the nearshore, stressors that include diking, dredging, filling, and armoring, have displaced, destroyed, or modified nearshore ecosystems.

Six major changes to the physical characteristics of the nearshore have been identified through PSNERP data analysis.

1. Large river deltas have significantly reduced in size (27% decrease in length due to tidal barriers and armoring)
2. 35% of historical coastal embayments have been lost by being filled in or disconnected by tidal barriers
3. Sediment input has been disconnected at beaches / bluffs (over 25% of the shoreline is armored)
4. 74% of tidal wetlands surrounding the shores of Puget Sound have been lost
5. The Puget Sound shoreline has become shorter and more artificial decreasing in length by 15%
6. Many shorelines are experiencing multiple stressors and cumulative impacts



Importance



The Puget Sound in Washington State contains 2500 miles of shoreline

The shoreline is divided into geomorphic segments called landforms. Priority landforms for restoration efforts, as identified in the Change Analysis technical document include:

- river deltas
- barrier embayments
- coastal inlets
- beaches / bluffs

The diversity of landforms is driven by different underlying processes that create and maintain these landforms.

The mosaic of landforms support ecosystem functions, goods and services valued by humans including ecological, economic, cultural, spiritual, and aesthetic values.

Restoration measures applied across the diversity of landforms will contribute to ensuring a healthy Puget Sound.

- Puget Sound and its adjacent waters support the largest area of remaining estuarine wetlands on the West Coast, exceeding the combined total area of Columbia River and San Francisco Bay estuarine wetlands by over 30%. Because of its size, tidal exchange, and freshwater inputs, Puget Sound supports more than twice the primary productivity of Chesapeake and San Francisco bays combined.

- Recognizing its uniqueness, the U.S. Environmental Protection Agency (EPA) designated Puget Sound as an "Estuary of National Significance" in 1988.

- The Puget Sound Action Agenda is the federal and state roadmap for restoring the health of Puget Sound by 2020. Proposed restoration by PSNERP is an integral component to achieving Action Agenda recovery targets. The Action Agenda has been approved by EPA as the Comprehensive Conservation and Management Plan for Puget Sound under the EPA's National Estuary Program and has also been endorsed by the Puget Sound Federal Caucus (which includes the Corps of Engineers).

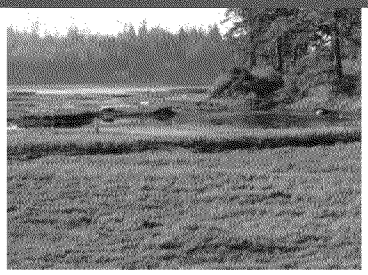
- Nearshore restoration actions that improve habitat function are critical to the recovery and protection of tribal treaty right resources, such as fish and shellfish, in Puget Sound. US v WA and sub-proceedings guaranteed Treaty Tribes 50% of salmon (Boldt decision) and shellfish resources (Rafeedie decision), and confirmed the value of habitat in order to maintain harvestable populations.

- Over a dozen species including fish, mammals and birds, are currently listed as federally endangered or threatened under the Endangered Species Act are dependent on the ecosystems of Puget Sound and either directly or indirectly on the Puget Sound Nearshore.

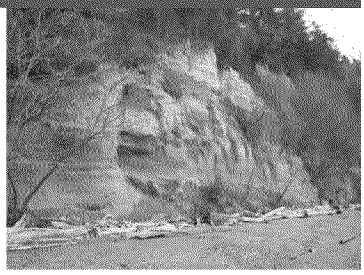
RIVER DELTAS

COASTAL INLETS

EMBAYMENTS



BEACHES / BLUFFS



Plan Formulation Strategy

543 — Develop comprehensive database of restoration ideas from restoration community.

198 — [illegible] areas

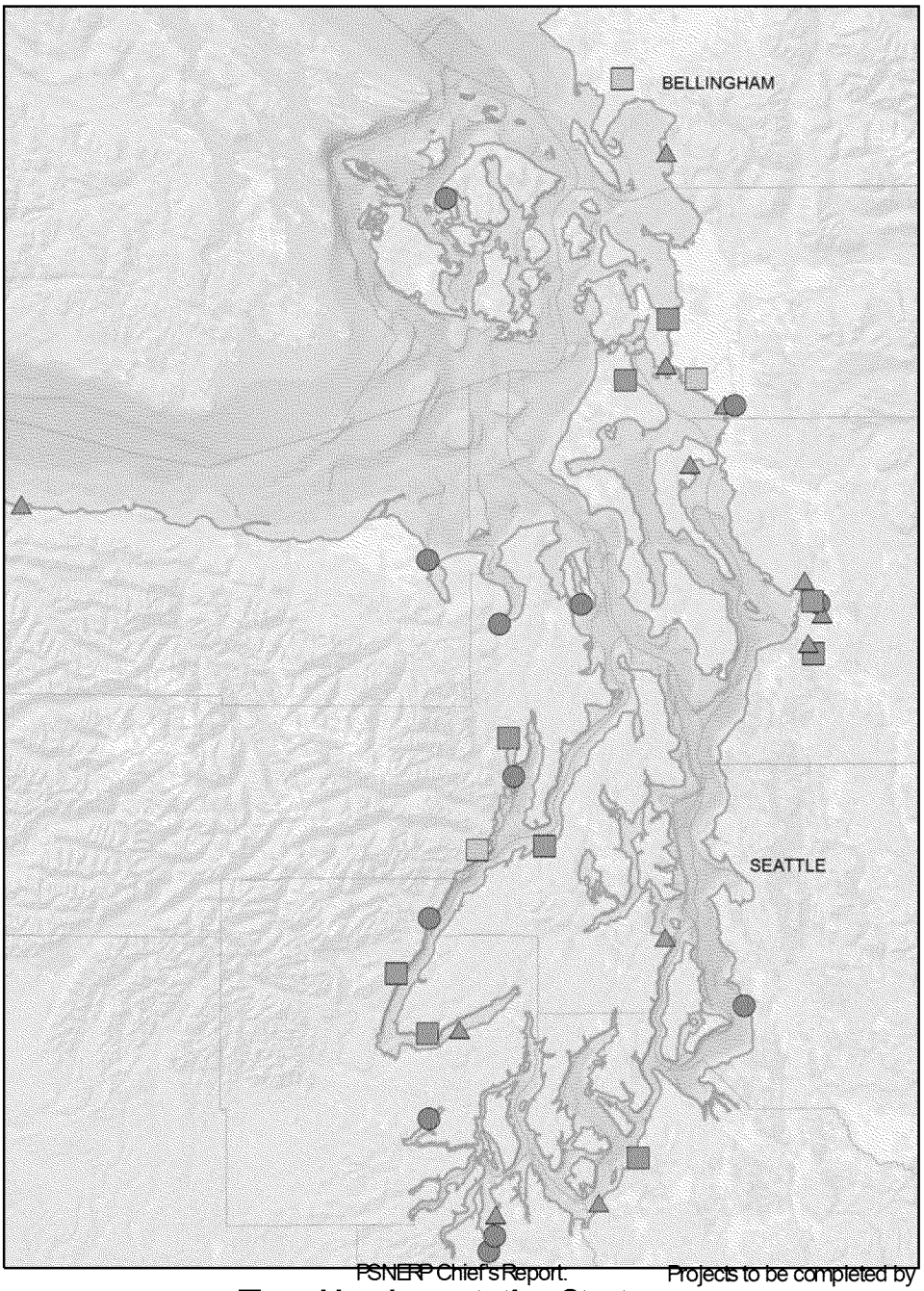
46 — [illegible]

36 — [illegible]

Tiered Implementation Strategy

Implementation Strategy

PSNERP's [illegible] estuaries.



Tiered Implementation Strategy

- [illegible] and Section 206 (Aquatic Ecosystem Restoration) existing authorities, $10M Federal per project limit
- PSNERP Chief's Report: [illegible] construction authorization
- PSNERP Chief's Report: 9 sites to be authorized for continued feasibility study
- Projects to be completed by others based on PSNERP design and analysis

Implementation Approach

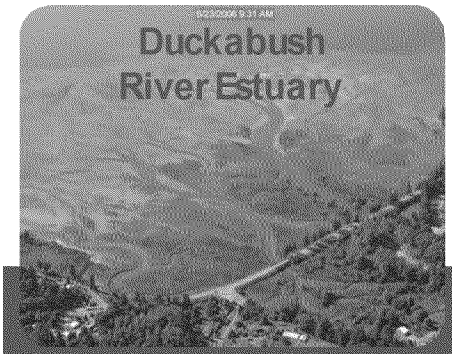
Section 544:
Quilceda Estuary
Spencer Island
Twanoh Beach
Twin Rivers

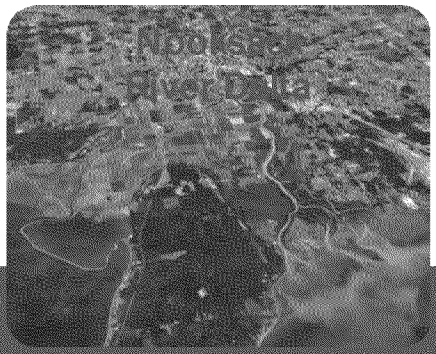
Section 206:
Chuckanut Estuary
Deepwater Slough
Everett Riverfront Wetland
Harper Estuary
Livingston Bay
McGlinn Island
Sequalitchew Creek
WDNR Budd Inlet Beach

PSNERP Chief's Report (3 sites):
Duckabush River Estuary
Nooksack River Delta
North Fork Skagit River Delta

Projects to be completed by others (12 sites)

PSNERP Chief's Report Additional Study (9 Sites):
Big Beef Creek Estuary
Big Quilcene River
Chambers Bay
Dugualla Bay
Everett Marshland
Lilliwaup Estuary Restoration
Snohomish Estuary Main Stem
Tahuya River Estuary
Telegraph Slough





Estimated Cost: $63.1 million
This project provides an opportunity to reconnect floodplain and intertidal wetlands, improving tidal exchange, sediment transport, and estuary development. Actions would remove existing roads, associated fill within the estuary, and construct a new bridge that spans the estuarine delta. Realignment of roads and strategic use of bridges will restore tidal inundation and hydrology, and reconnection of distributary channels to promote greater diversity of delta wetland habitats. Restoration in the Duckabush River will provide rearing habitat for Hood Canal summer chum. Additionally, this project addresses habitat constraints in Hood Canal, which is a partially isolated geographic section of Puget Sound.

Estimated Cost: $260 million
Restoration at the Nooksack River Delta is critical to some of the largest salmon runs in Puget Sound. Removal of stressors will help restore scarce tidal freshwater wetlands and support productive estuarine mixing and tidal freshwater marshes. Tidal marshes provide habitat for birds and waterfowl, and are used by five species of Pacific salmon during critical portions of their life cycle. Restoration will partially remove levees along the Nooksack River banks and construct levees on North Red River Road. The Lummi River channel will be graded to reconnect it to the Nooksack River flows. Agricultural ditches will be filled, tidal channels recreated and roads raised on bridges. This project benefits from local tribal involvement and support and would provide 25% of Puget Sound Action Agenda's 2020 estuarine habitat recovery goal.

Estimated Cost: $102.3 million
This project is an opportunity to restore estuarine emergent marsh, scrub-shrub, and forested floodplain along the North Fork, improving connectivity and reducing fragmentation along the channel. Restoration actions will remove or reduce stressors by removing structures, lowering the levee along the North Fork north and south banks, and constructing a levee along the current road alignment. Breaches in the lowered levees coupled with excavated channels allow for inundation of the newly restored floodplain. Replanting lowered levees will restore a natural riparian corridor along the river. This site is included in the Puget Sound Chinook Salmon Recovery Plan. Restoration at this site will provide habitat in an area where few restoration opportunities and limited estuary habitat exist.

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