NATIONAL *fish, wildlife & plants* CLIMATE ADAPTATION STRATEGY

Bear River Estuary Restoration

Brief Summary (Abstract): When non-Indian settlers first arrived in the region, Willapa Bay comprised 14,620 acres of saltwater wetlands. Now there are 5,277 acres. This represents a 64% loss of estuarine wetlands (Coastal Resources Alliance 2007). Estuarine wetland loss has been particularly extensive in the Bear River estuary, primarily due to diking and draining of shallow water nearshore areas. The salmon recovery strategies of each of the Lead Entity groups in the Coast Region make it clear that problems for salmon caused by shoreline modification, such as diking and armoring, are top priorities to address (WCSSP 2012). The removal of existing dikes and re-establishment of estuarine rearing habitat for juvenile salmonids was identified as a high priority in the Pacific County (WRIA 24) Strategic Salmon Recovery Plan (Applied Environmental Services 2001). The protection and restoration of estuarine and nearshore habitats were also cited as major ecoregional recovery goals in the Pacific Northwest Coast Ecoregional Assessment (TNC and WDFW 2006), the Northern Pacific Coast Regional Shorebird Management Plan (Drut and Buchanan 2000), and Pacific Marine and Estuarine Fish Habitat Partnership Strategic Framework 2012–2017 (PMEP 2012).

The Bear River Estuary Restoration project would restore 500 acres of high quality estuarine habitat in southern Willapa Bay. As detailed in the Willapa National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement (CCP/EIS) (USFWS 2011), the restoration of the Bear River estuary would benefit a wide array of estuarine-dependent species. It would also support local watershed restoration, salmon recovery, and waterfowl management efforts. For example, the Willapa Bay Regional Fisheries Enhancement Group (WBRFEG) has recently restored salmonid spawning and rearing habitat in four streams that drain to the Bear River estuary. Progeny from anadromous salmon and trout that spawn in these streams would be expected to directly benefit from the restoration of the Bear River estuary.

During the 1950s, a large portion of the salt marsh habitat present in Bear River estuary was eliminated by the construction of several miles of dike that ran parallel to the western shoreline of Willapa Bay. The dike disrupts physical, chemical and biological processes associated with tidally influenced areas; acts as a barrier to the movement of sediment, organic material, and aquatic organisms; and reduces the survival and productivity of several species, including chum, coho, and Chinook salmon, and cutthroat trout, that formerly spawned and/or reared in the diked-off areas.

Construction of the Bear River dike has made it difficult for fish to access 3 small streams in the Bear River estuary: Lewis, Porter Point, and Dohman Creeks. Resident non-anadromous populations of cutthroat trout were captured in Lewis and Porter Creeks in 1999 (Barndt, et al. 2000); the same survey reported that the two streams contain 2.5 miles of potential spawning and rearing habitat. Fish ladders were installed in the dikes in 2001 to enable fish to access Lewis and Porter Point during times of the year when tides were high. As a result, a small run of coho was re-established in Lewis Creek (USFWS 2011). Although Dohman Creek has limited spawning habitat, the removal of the dike would restore 0.5 miles of tidally influenced juvenile rearing habitat in its lower reach.

Project Location: The Bear River Estuary Restoration is within the Willapa National Wildlife Refuge (WNWR) in Pacific County, Washington at Township 10 North, Range 11 West, Sections 1, 6, 7, 11, and 12 and Township 10N, Range 10W, Section 6 (46^{o} 22.812 N, 23^{o} 59.160 W). The project area is within the

Lewis, Porter Point, and Riekkola Units of the Refuge at the southern end of Willapa Bay, just west of the mouth of Bear River.

Partners:

- Ron Craig, Craig Enterprises, will continue to play a large role in each phase of design and implementation of this project.
- John Evans, NDC Timber, assisted with design development and was contracted to remove the fish ladder and tidegate within the Lewis Unit in 2012. The Refuge will be contracting with John and NDC Timber to remove the fish ladder and tidgegate within the Porter Port Unit in 2013.
- Western Washington Fisheries Resource Office and Columbia River Fisheries Office will develop a long-term fish monitoring plan and assist with implementation beginning in 2013.
- Friends of Willapa National Wildlife Refuge will continue to assist the Refuge with education and outreach for the restoration.
- Willapa Fisheries Enhancement Group and the Salmon Recovery Funding Board funded the engineering designs for Phases 1, 2 and 5.
- AMEC Earth and Infrastructure, Inc. prepared the engineering design for Phases 1, 2 and 5 as well as developed the biological monitoring plan.
- Herrera Environmental conducted pre, during, and post construction biological monitoring in the Lewis Unit (Phase 1).
- Ducks Unlimited.
- Sustainable Fisheries Foundation.
- Washington Coast Sustainable Salmon Partnership.
- The Pacific Marine and Estuarine Fish Habitat Partnership provided funding for this project in 2013.

Project Goals: The goal of the project is to restore a large area of the Bear River estuary that has been degraded by past human activities to a healthy, naturally functioning condition. The Bear River Estuary Restoration project would remove 5.16 miles of existing dike, 38 culverts, 2 fish ladders, 2 tide gates, and 2 foot bridges. As a result, nearly 204 hectares (500 acres) of estuarine habitat would be restored, including 91.5 hectares in18 tidal channels that would convey water from upland and tidally-influenced areas directly to Willapa Bay. Re-establishment of natural estuarine processes and habitats will benefit a diverse array of aquatic and avian species, including marine invertebrates, salmon and trout, shorebirds, and waterfowl, with corresponding ecological and economic benefits.

The primary focus is juvenile salmonids for rearing; and for sturgeon and eulachon (candlefish), which are listed as threatened for habitat in this watershed. The entire area was blocked by dikes in 1950s, which destroyed the function of the estuary. Strategic planning for restoration stated in 1999, and 11 Strategic plans and studies were completed in the watershed to define the plans for restoring the estuary. The streams flowing into the estuary were restored for spawning and in-stream rearing first. The last stream completed in 2010. The missing element in the juvenile life cycle is estuary rearing for salmonids making their transitions to saltwater. This project provides that necessary element.

Strategy Goals Implemented: 2, 3, 4

Climate Impacts Addressed: 3.1, 3.2, 3.3, 3.5

Status of Project Implementation (Timeline, Milestones, Next Steps):

The five phases in the Bear River Estuary Restoration project include:

Phase 1 - Dike and fish ladder removal at Lewis Unit to restore 160 acres of estuary. This phase was completed in September 2012.

Phase 2 - Dike and fish ladder removal at Porter Point to restore 145 acres of estuary. This phase will be completed in 2013.

Phase 3, 4, and 5 restore up to 200 acres of estuary in the Riekkola Unit.

- Phase 3-Develop a design to raise the inner dike (RL4) to 14 ft. (2013-2014)
- Phase 4-Reconstruct RL4 in same footprint to 14 ft. (2014-2015)
- Phase 5–Removal of the outer dike and tide gate at the Riekkola Unit. Removal of roads, ditches, culverts, and restore tidal channels in Riekkola unit. (2015-2016)

Project Outcomes: Phase 2 of the Bear River Estuary Restoration restored 140 acres of estuary on the Willapa National Wildlife Refuge's Porter Point Unit. The removal of the dikes, fish ladder and associated structures restored natural tidal processes in the project area. The intensively managed pastures and freshwater impoundments were restored to historic estuarine conditions for the benefit of salmonids and a variety of migratory birds and will contribute to the health of the bay and associated habitats. Six of the seven historic channels were restored, one fish ladder/water control structure, one cross dike, and approximately 70% (6,000 of the 8,700 feet) of exterior dike was removed to restore 140 acres of salt marsh, intertidal flats, and open water.

Funding Sources for Phase 2:

- Pacific Marine and Estuarine Fish Habitat Partnership - $25,000
- US Fish and Wildlife Service - $49,000

Photos/Attachments:
http://www.pacificfishhabitat.org/media/Bear_River_Estuary_Restoration_Phase_2.pdf