Nisqually National Wildlife Refuge Restoration Preliminary Data

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Introduction

The Nisqually River estuary is located in southern Puget Sound just north of Olympia, Washington. In the early 1900's an earthen dike was built converting a thousand acres of the estuary to agricultural land. In October 2009, the Nisqually National Wildlife Refuge, working cooperatively with the Nisqually Indian Tribe and Ducks Unlimited, removed the Brown Farm Dike that had separated 762 acres of the Nisqually Estuary from the tidal waters of Puget Sound for over one hundred years. The USGS Western Ecological Research Center will implement the Refuge monitoring plan and conduct applied studies. The monitoring of habitat development and ecosystem health include recording bird, fish and invertebrate populations, vegetation colonization, channel development, hydrology, water quality, marsh surface elevation, effects to the nearshore, and sediment accretion. The following shows the changes in channel development, bird population changes since the restoration and vegetation communities between pre-restoration, post-restoration and undeveloped marsh land.

Site Description

The study area consists of the Nisqually (NNWR) restoration site comprised of four units (units 1-4). Monitoring is also conducted on Nisqually Tribe sites; Pilot (restored in 1996), Phase I (PI; restored in 2002) and Phase II (PII; restored in 2006). These sites are compared to a reference marsh (Ref) that serves as a control.

Channel Development

Nisqually Delta Channels 1878

Sources: US Coast Survey - Topography of Puget Sound - Nisqually to Totten Inlet, US Geological Survey, Washington State Department of Natural Resources/University of Washington Puget Sound River History Project. Data derived by Jennifer Cutler

Nisqually Delta Channels 2009

Nisqually Delta Channels 2005

Data derived from Jennifer Cutler

Methods

•Channels were digitized on the December 2009 areal photo and compared to previously digitized maps from 2005 areal photo and a University of Washington Puget Sound River History Project 1878 T-sheet

•Monthly bird surveys were conducted throughout the NNWR, Nisqually Tribe and Reference sites

•Vegetation surveys were conducted in 2009 at the reference marsh, phase II ad before dike removal at NNWR

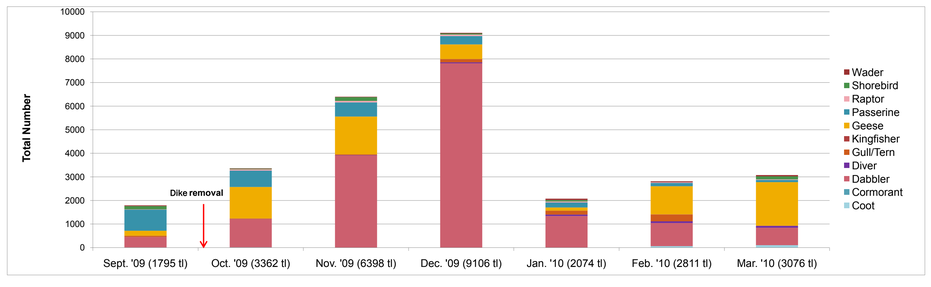
Results and Discussion

Since the tidal waters were restored, the site is transitioning from fresh water to salt water habitat. The results from the digitized channel maps indicate that tidal waters are reclaiming the historical channel beds from the 1878 T-sheets.

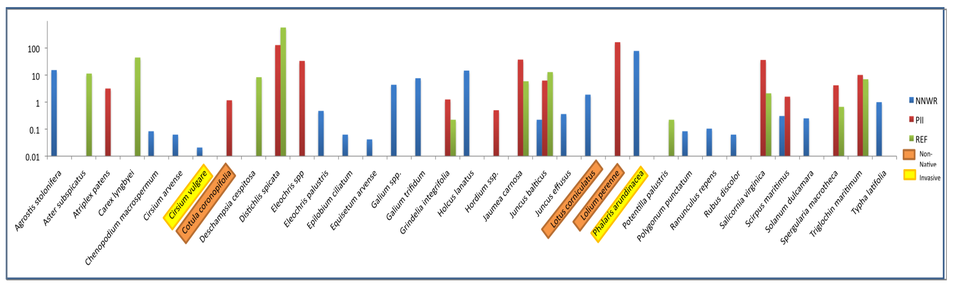
The dominant trend in the bird survey data is the increase in dabbling ducks attributed to fall migration. It should be noted that the bird populations reflect seasonality and therefore we will need to compile the data over multiple years to see any clear restoration trends.

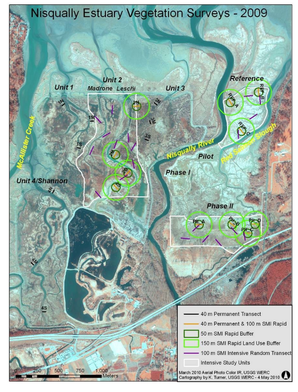
The NNWR site consisted primarily of freshwater plant communities which were largely invasive. This is in contrast to Phase II and Reference which were comprised primarily of salt marsh plant communities. The vegetation data comparing pre-restoration (NNWR), restored (Phase II) and Reference sites shows what we might expect in the newly restored areas.

Birds



Vegetation





Acknowledgements

Jennifer Cutler GIS Program Manager Nisqually Indian Tribe, Lisa Belleveau, Nisqually National Wildlife Refuge, Nisqually Indian Tribe (fish communities), USGS Washington Water Science Center (hydrology and sediment), USGS Pacific Science Center (geomorphology and nearshore), USGS Patuxent Wildlife Research Center (marsh elevation dynamics and biological assessments), and USGS Western Fisheries Research Center (salmonid otoliths)