

Ecosystem Services Coordinated Case Study: PACIFIC NORTHWEST

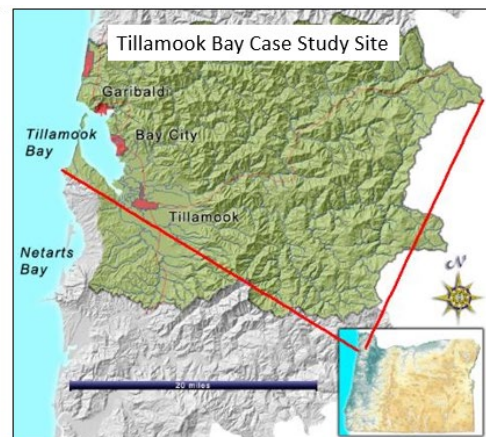
Background

EPA’s Sustainable and Healthy Communities Research Program is working with five communities across the U.S. to develop and apply research that helps the communities solve sustainability-related environmental challenges and provides decision-support.

EPA researchers are developing approaches and tools for the communities that integrate ecosystem goods and services (EGS) concepts into community-level decision making, and emphasize *final* EGS since these are “the components of nature, *directly* enjoyed, consumed, or used to yield human well-being.”¹

Results of these five coordinated case studies will offer lessons learned and practical strategies that can be used in other locations and under different conditions.

Research in the Pacific Northwest (PNW), the setting of one of the case studies, will work closely with stakeholders throughout the region to provide systems-based tools. The primary goal is to assist local, state, and federal jurisdictions seeking to evaluate how alternative decision options affect EGS and human well-being.



Pacific Northwest Case Study sites in the Mashel and Tolt River watersheds in Washington’s Puget Sound Basin, and in Oregon’s Tillamook Bay estuary and contributing coastal watersheds.

Issue

The PNW is a region of diverse and highly valued natural resources that provide a variety of EGS vital to human well-being. However, these resources and services are being strained by population growth, land use change, and environmental stressors. Many PNW communities, tribes, and state agencies are seeking assistance for mitigating and/or adapting to projected changes in climate and land use, particularly with water resource issues.

Environmental issues in the PNW include degradation of salmon and shellfish habitat, environmental change and land use impacts on supplies of clean water (due to

nutrient pollution, pathogens, sediments), flooding, carbon sequestration, agricultural and forest products, and recreation.

The PNW case study includes two different national estuaries – Puget Sound in Washington, and Tillamook Bay on the Oregon Coast. While each involves unique sets of stakeholders and watershed impairment issues, scientists are finding that community-based restoration planning goals can be addressed through a common decision-support approach.

Project Context

The PNW case study will identify ecosystem-based management solutions that consider the linkages between terrestrial and aquatic

systems. A wide range of stakeholder partners are directly involved in developing decision alternatives (empirical or model-based), and EPA scientists are working with stakeholders to identify EGS deemed essential to community well-being, and how to estimate them.

Identification of watershed management practices for restoring EGS important to the economic, human health, and cultural goals of communities and tribes is a primary focus of the Puget Sound and Tillamook Bay studies.

Project Objectives

EPA scientists are working with a wide range of case study stakeholders to identify (1) impairments to intermediate and final EGS deemed essential to community well-being; and (2) methods and measures for restoring those services at relevant spatial and temporal scales.

Within Puget Sound, EPA scientists are collaborating with Pacific Northwest National Laboratory and NOAA scientists to link an EPA terrestrial watershed model (VELMA)² with an ocean circulation model (Salish Sea Model)³ and an ocean food web model (Atlantis).³ EPA's goal is to identify best management practices for reducing impacts of land use and climate change on a comprehensive suite of EGS provided by terrestrial, stream, and estuarine habitats. A primary focus is recovery of endangered populations of Chinook and other salmonid species, while also providing clean drinking water and sustainable local forest-sector jobs.

Within Tillamook Bay, researchers are applying innovative tools to distinguish natural and human causes of estuarine water quality impairments (nutrients, pathogens) that affect ecosystem services (shellfish production, recreation) that are essential to the economy (fisheries, tourism) and public health of local communities. EPA scientists are also working with wetlands managers to incorporate ecosystem services into restoration planning and monitoring.

Project Impact

These methods and tools are being applied in collaboration with Puget Sound and Tillamook Bay community and regional stakeholders to address restoration of hydrological and ecological processes critical to salmon recovery, and more broadly, to the functioning of entire watersheds and the EGS they provide.

In Puget Sound, EPA researchers are providing model results and/or training in the use of modeling tools for tribes and communities to identify best management practices for restoring terrestrial and estuarine habitats and mitigating potential climate impacts. For example, Nisqually Community Forest tribal and community partners are using VELMA results to help obtain grants to expand the Nisqually Community Forest in support of local jobs, recreation, and tourism. Seattle and other communities are engaged in model applications for identifying urban green infrastructure best practices for reducing toxic stormwater runoff responsible for high rates of coho salmon pre-spawn mortality in urban streams.⁴



Natural and restored tidal wetlands in Tillamook Bay, OR. *Source: Used by Permission, DonBestPhotography.com.*

In Tillamook Bay, results of EPA studies on prediction of fecal bacteria blooms inform the seasonal and location-specific monitoring for shellfisheries closures. EPA tools to identify priority EGS are also being used to develop restoration goals and monitoring plans for tidal wetland sites.

References:

1. Boyd, J.W. and S. Banzhaf. (2007). What are ecosystem services? The need for standardized environmental accounting units. *Ecological Economics*, 63:616-626
2. <https://www.epa.gov/water-research/visualizing-ecosystem-land-management-assessments-velma-model-20>
3. <https://www.pugetsoundinstitute.org/salish-sea-modeling-center/>
4. <https://science.sciencemag.org/content/371/6525/185.abstract>

CONTACTS:

Bob McKane and Ted DeWitt
U.S. EPA, Office of Research and Development
541-754-4631 mckane.bob@epa.gov
541-754-4029 dewitt.ted@epa.gov

July 2021