

# ***Fort Clatsop Restoration Project Summary Report***

*Report written by the Columbia River Estuary Study Taskforce*



*October, 2007*

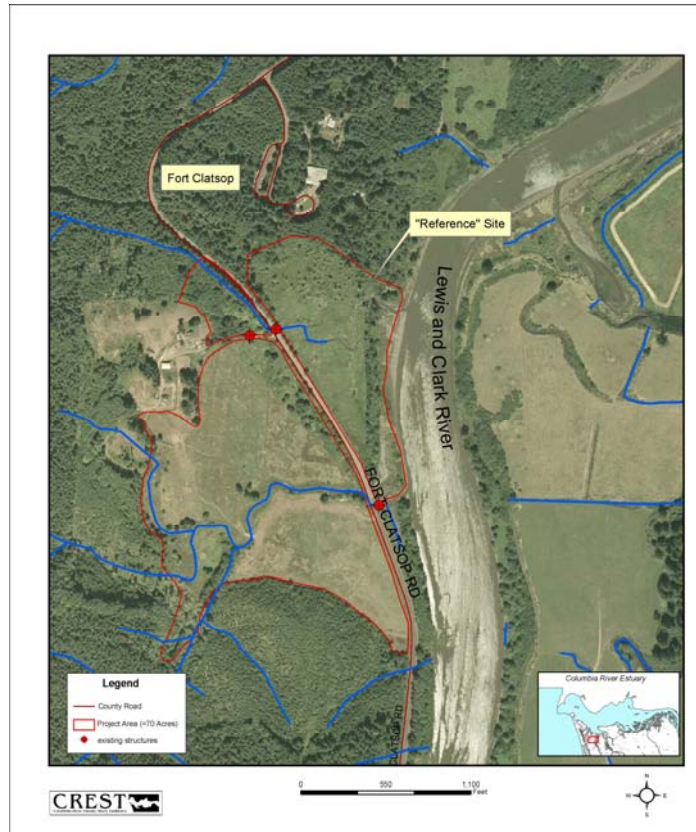


Figure 1: Site Map Fort Clatsop Estuarine Restoration Project  
Columbia River Estuary

## Regional Context and Import

Dairy farming on the lower Columbia River was the major impetus for diking, clearing and draining thousands of acres of riparian swamps and forests. This activity peaked between 1900 and 1940. Impacts to estuarine wetland habitat in and adjacent to the park are well documented and understood. Land use practices that predate formation of the park have left the natural resources in an overall degraded state. The Lewis and Clark River has been extensively diked for flood control, converting former tidal marsh and swamp wetlands to agricultural and development uses. Such land-use alterations have resulted in the loss of over 70% of critical estuarine habitat in the Columbia River Estuary. These habitats provide benefits for numerous species including anadromous fish, migrating waterfowl, shorebirds, invertebrates, mammals and native plants. Logs, root wads and other woody debris have been historically removed from the river to improve its navigability, increasing its flow rate and decreasing wildlife habitat quality. Activities within the Lewis and Clark River drainage that may impact the Park's water quality and wetlands include pesticide and fertilizer use, runoff from agricultural and logging operations, potential contamination due to tidal influences (such as oil spills), illegal dumping of household and industrial rubbish and toxic materials, erosion from forest roads and logging operations, and encroaching development.



Figure 2. Pre-restoration conditions: Diked Pasture



Figure 3. Pre-restoration conditions: Tidegate Structure



Figure 4. Pre-restoration conditions: Failing Tidegate Structure

## Restoration Project Summary

Property was purchased by the Conservation Fund (see figure 1) as part of the new Lewis and Clark National Historic Park expansion. The site was formerly 45 acres of diked pasture that was used for livestock. The site is located in a critical transition area (oligohaline zone) utilized by migrating salmonid species as they make the adjustment between tidal freshwater and brackish conditions in the Columbia River Estuary. Selection of restoration design was based on triggering tidal hydrology to maximize historic levels of inundation while minimizing the risk to existing county roadbed (Fort Clatsop road). Design led to the removal of an antiquated culvert/tidegate structure (figure 4) that effectively provided localized flood control but also a barrier for a variety of migrating salmonid species. The old structure was replaced with a 46 foot span bridge (see figure 5). Multiple partners assisted in all phases of the project from site assessment, restoration design through on the ground construction. They include: Aaland Evans, Inc., Bergerson Construction, Inc., Bonneville Power Administration, The Conservation Fund, David Evans and Associates, Inc., Fort Clatsop National Memorial, Mr. Ness (previous landowner), Clatsop County Road Department, CREST, Lower Columbia Estuary Partnership, The Nature Conservancy, North Coast Lands Conservancy, NOAA Community-based Restoration Program, and the Youngs Bay Watershed Council.

## Current and future ecological benefits

Currently estuarine habitat forming processes (figures 5-7) have manifest on the site passively providing opportunities for the propagation of native marsh plant communities. These historic habitat types are known to perform multiple functions for a variety of species in the Columbia River Estuary. These functions encompass both physical and biological functions such as habitat refugia and production of detritus valuable for supporting estuarine food web structures of multiple biotic communities (i.e. phytoplankton, zooplankton, benthic and epibenthic infauna).

Anticipated wetland habitat functions include:

- Detrital matter inputs that spur vital estuarine food web productivity (primary and secondary) processes
- Vegetated backwater refugia for a variety of estuarine dependent species:

Avian: including peeps, gulls, mallards, surf scoters, common mergansers, western grebes, cormorants, bald eagle, and great blue heron.

Fish species include: pacific staghorn sculpin, starry flounder, longfin smelt, cutthroat trout, coho, chinook, white sturgeon, peamouth, shiner perch, and lamprey species.

Mammal species: harbor seals, muskrats, beavers, and river otters.

- Sediment retention; and
- Nutrient cycling





Figure 5. New structure demonstrating established tidal signature (looking northeast)



Figure 6. Tidal processes at high tide entering pasture (looking west)



Figure 7. Initial extent of tidal inundation from restoration treatment (looking southeast)

## Next Steps

Effectiveness monitoring conducted by CREST allows the tracking of ecological changes on the site for a variety of parameters. This includes water quality, depth, fish use, vegetation, and tidal channel evolution patterns. Results of this monitoring will inform the design of future enhancements on the site which include but are not limited to: engineered logjams, channel enhancements, and additional native plantings. Site is located adjacent to a “reference site” that will serve as a benchmark for the site’s ecological performance over time (figure 8).

CREST is currently monitoring estuarine restoration projects throughout the region. A systematic approach to defining the physical and biological characteristics of each site is critical to the ultimate success of the restoration effort. CREST has developed a monitoring strategy that is consistent with monitoring efforts throughout the region so that comparisons can be made and applied to similar restoration treatments. In addition, the park has an active educational program, and efforts are underway to broaden its scope to include environmental elements. This project could act as a living classroom, demonstrating the fragile nature of estuarine ecosystems and the values they offer. This can be done in concert with existing curricula in place with the Astoria High School Biology class, Clatsop Community College and National Park Service Staff. Interpretive signs can be designed that can expand on existing efforts by the Park to educate citizens about the historical significance of estuarine habitat types.

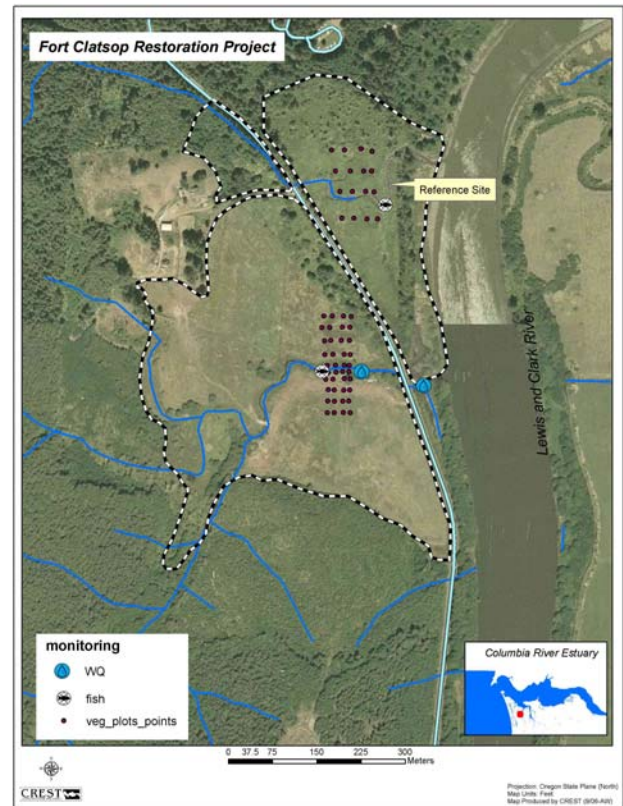


Figure 8. Effectiveness Monitoring Activities, Fort Clatsop Restoration Site