

## *Final Project Report*

### **South Tongue Point Habitat Improvement**

*Project Number OCRF 2022-2-19*

#### **Background**

The South Tongue Point Habitat Improvement project began as a collaborative effort between CREST, Columbia Land Trust, and Clatsop Community College to acquire an 82+ acre property from Oregon Department of State Lands (DSL). DSL had inherited the site from the U.S. Army Corps of Engineers, which had originally built the entire South Tongue Point landform in the early 1950s out of dredge spoils as part of constructing the Mott Mooring Basin adjacent to the Tongue Point marina. When DSL put the parcel up for sale, it first appeared likely to be purchased by a timber company for use as a log sort yard. Local conservation interests saw such use as a significant loss, given the site's relatively high ecological function, location within the Columbia River estuary, and proximity to the Lewis and Clark National Wildlife Refuge. The funding application to Oregon Watershed Enhancement Board to purchase the 82+-acre parcel from DSL included plans for an estuarine wetland restoration project, to be completed by CREST.

The South Tongue Point landform vegetated naturally following its construction, with predominantly native wetland species in lower elevations and mix of natives and non-natives at upper elevations. While the vegetation community was pretty good, the site lacked complexity near the water's edge. Because it was built for stability rather than ecological benefit, the waterline was simple, lacking the tidal channels typical of estuarine shorelines. As a result, this significant chunk of estuarine shoreline offered little habitat for aquatic species, including juvenile ESA-listed salmonids. This restoration project was designed to modify the tidal shoreline of the project area, significantly increasing the area of tidal fish access for foraging and refuge while also increasing channel edge density and habitat complexity. The resulting project provides tidal off-channel habitat to fish and other aquatic species at every high tide while increasing macrodetritus exports to the estuary needed to support estuarine food webs.

#### **Project Overview**

CREST issued a public RFP for design/engineering of a tidal restoration project at South Tongue Point in the fall of 2020 and awarded a contract for project feasibility and conceptual designs to Stillwater Sciences. Design alternative considerations focused on the size and shape of tidal features (e.g., thin channels versus embayments) with an awareness of cost. The final design layout included six tidal channel networks on the site's eastern shore, two flow-through channels that connect existing wetlands on the northern end of the landform to a large beaver pond wetland complex on the southern end, and a pond-like scrapedown area for habitat complexity. Tidal channel networks were designed to fully inundate at high tide and empty at low tide, ensuring frequent fish use and strong plant recruitment. The flow-through channels were designed with flat bottoms for ease of passage, low enough to fill on big tides or by beaver damming, but high enough to be affordable to construct. The design included several

innovative ideas, including using horizontal willow fascine bundles for channel stability, applying composted wood mulch and salvaged topsoil to the finished grade of tidal channel networks, and collaborating with Pacific Northwest National Laboratory to design and install experimental large wood habitat features as part of a multi-year study on the biological effects of large wood in tidal wetlands. The total construction footprint was about 23 acres and called for moving 48,500 cubic yards of dirt from the excavated tidal features to two upland fill areas on the site's interior.

When the project's lead designer and project engineer – Ryan Kilgren – left Stillwater Sciences in late 2021 and started an independent consultancy, CREST opted to hire the new Kilgren Water Resources to finish designs and assist with construction support. The construction RFP went out to bid in December 2022 and CREST signed a contract with Thompson Bros Excavating that winter. Our permitted in-water work window was July 15 – October 15, and so that was our planned primary construction period.

## **Construction**

Construction started two weeks late due to a combination of slow permit processing and the contractor's logistical limitations (too many concurrent projects). Once the contractor did get moving, it quickly became clear that soil conditions were not what anyone had anticipated. Because the site is made of dredge sand and appeared relatively firm in all areas during pre-construction surveys, CREST and the contractor assumed relatively easy site access. This proved not to be the case. Site hydrology was complex, with pockets of what amounted to subsurface quicksand scattered throughout the site at varying elevations. During excavation, water would bubble out of the ground at 11 feet NAVD88 in some areas but still be dry at 8 feet NAVD88 in other areas, regardless of tides and depth of excavation. The shoreline had a thick mud layer sitting on top of a compressed sand layer, meaning that the tidal channel network sites were initially soft and muddy but became firm as the softer topsoil layers were removed. Construction costs escalated quickly in such conditions, as the contractor needed log mats and special, slow techniques to access project features and haul out the excavated material.

Once CREST and Thompson Bros Excavating (TBE) had completed sufficient work to determine what construction methods worked best and what the new cost would be, two decisions were made. The first was to reduce the area of clearing and excavation at each of the tidal channel networks (TCNs), particularly in the low marsh and mid-marsh areas. The low marsh is already low enough to inundate regularly, so relative benefits to lowering the elevation further were small, while the difficulty of hauling out wet mud from those areas was high. Reducing the footprint of scrapedown surrounding each TCN reduced our impact to existing vegetation without reducing benefits to fish access, wetted edge length, or macrodetritus exports.

The second decision was to eliminate the Scrapedown Area and Forested Swale features from our construction plan. While those features would have created interesting habitat, they were also less likely to provide significant benefits to juvenile salmonids, be more subject to gradual infill, and carry significant impacts to existing native vegetation. Flow-through Channel 2, which had been attached to the Scrapedown Area in the original designs, was realigned slightly to provide better tidal connectivity with Flow-through Channel 1 and existing tidal channels in the southern beaver dam complex.

Construction formally ended in November, when the last of the equipment was demobilized from the project area. The project succeeded in reducing the area of disturbance both above and below Ordinary High Water while still constructing nearly all designed features. Remaining tasks are limited to planting 37,000 native plants (funded entirely by Bonneville Power Administration), which will be completed by the end of February, 2024. A follow-up planting the following winter is anticipated to target any areas of incomplete vegetation cover or undesired species composition.

### **Post-Construction Monitoring**

CREST, Pacific Northwest National Laboratory (PNNL), and Columbia Land Trust have partnered on a study of the biological effects of large wood in tidal wetlands, sited at South Tongue Point. TCNs 1, 4, and 5 were selected for experimental treatment, with each TCN having three large wood structures built in one first-order tidal channel, with an adjacent first-order channel left without any wood additions as a control. Staff from CREST, PNNL, and Columbia Land Trust will monitor these channels once per month each spring for the next three years to determine the effects of large wood on macroinvertebrate diversity and abundance and fish presence.

CREST will conduct ongoing site monitoring for at least the next five years, in accordance with Bonneville Power Administration's Level 3 Action Effectiveness Monitoring and Research plan. Monitoring efforts will include water loggers to track inundation, sediment accretion stakes, channel cross-sections, vegetation sampling, and geomorphological mapping of tidal channel networks.

### **Media and Outreach**

CREST is waiting for full site stabilization before conducting any serious outreach, including inviting local media to the site. Thus far, Bonneville Power Administration has issued one media piece about the project, largely intended for an internal audience, which listed all project funders. CREST presented the project at the annual meeting of Bonneville's Expert Regional Technical Group in December and again acknowledged all project funders. This winter or spring, CREST will post project details and photos on its website and social media accounts, which will again acknowledge all funders and project partners. Any future publications by PNNL about the large wood research project will likewise acknowledge project funders and partners.