



NORTHCOAST REGIONAL LAND TRUST

The Northcoast Regional Land Trust owns and manages the 74-acre Freshwater Farms Reserve located on former tidelands along Humboldt Bay. This property is found in an area historically dominated by salt marsh that has been converted, through diking and simplification of the slough systems, into drier land for agriculture during the early mid 1900s. The project site includes Wood Creek, which had been mostly cut off from the greater Freshwater Slough system by earthen dikes and a leaking wooden flap tide gate. The old gate allowed for outflow, but minimal inflow which prevented tidal influence on the property and within Wood Creek. However, surveys showed that endangered and threatened fish species, including coho salmon, steelhead trout, and coastal cutthroat trout, were capitalizing on the leaking tide gate and had still been using this area for rearing prior to their migration to the ocean. Feasibility studies made evident that Wood Creek had great potential to provide prime estuarine habitat to imperiled aquatic life through restoring greater tidal influence into Wood Creek and Freshwater Farms Reserve. From that the Wood Creek Aquatic Habitat Enhancement Project Phase I came to be. The focus of this restoration project was to improve and expand available habitat for special-status aquatic species and other wildlife, while at the same time preserving compatible agricultural use of the property by regulating floodwaters.

The construction phase of the restoration project began in August 2009, and took two-and-a-half weeks to complete. Fish screens were installed and CA Fish & Wildlife biologists manually removed all of the fish from the project area before construction. Four slough networks, of varying complexity and totaling about 3,700 feet in length, were excavated in the historic marsh plain. Two ponds were also excavated to provide year-round habitat for the endangered tidewater goby. A large pond was also excavated upstream of the crossing on Wood Creek in which hundreds of juvenile salmon have since been observed. Additionally, an existing dike on the north bank of Wood Creek (approximately 300 ft long) was removed to allow unimpeded tidal flow on the lower Wood Creek marsh plain.

The soil created from all of the excavation work was used on-site to construct shallow hills (hummocks) on the marsh plain. The hummocks were designed and constructed to only rise in elevation to where brackish wetland characteristics (e.g. frequent tidal inundation, specific plant communities) exist. Three redwood root wads were installed in the banks of the slough channels, while one root wad was placed in the large upstream freshwater pond. Five additional root wads were placed across the marsh plain within the project area to provide perches for the numerous raptors and wetland birds found in the area. Hand seeding with sterile erosion-control grass seed was done after construction to protect newly-constructed and unvegetated hummocks from tidal and raindrop erosion during the winter.

The existing wooden flap tide gate at the mouth of Wood Creek was opened and subsequently taken out in October 2009 allowing unimpeded full tidal influence and access to the expanded Wood Creek system for fish, crustaceans, and other aquatic species. The concrete infrastructure that once housed the tide gate is now being used by our agency partners to continue monitoring the success of the restoration efforts.

The revegetation phase for this project was completed in April 2010. A total of 46,300 native wetland-associated plants were planted across the constructed tidal hummocks and along the margins of the new slough channels by NRLT staff and a team of volunteers. Plant species include: Lyngbye's sedge, tufted hairgrass, softstem bulrush, saltgrass, pacific silverweed, small-fruited bulrush, and willow all native to the area and propagated from sources on or near the property. The revegetation plan was developed by John Bair, riparian botanist for McBain & Trush, and mirrors natural conditions at neighboring Fay Slough.

Five years of consistent monitoring revealed significant positive changes to the hydrology, water quality, vegetation composition, and salmon habitat availability within the system. The CA Department of Fish & Wildlife monitored water quality and fish populations during this time and found that the large freshwater pond serves as an overwintering habitat for juvenile salmonids as intended. By and large the project area has demonstrated rapid progress towards the desired outcome of conversion into native salt marsh. Initial transect surveys conducted by California Native Plant Society volunteers recorded that 15% of the dominant plant cover consisted of native species. In 2014, 79% of the dominant plant cover was identified as native, representing a four-fold increase in native species cover at the site. Ongoing monitoring efforts in 2017 show continued progress toward a complete restoration of native conditions friendly to myriad avian, aquatic, and terrestrial species.

Following five years of monitoring the Wood Creek Phase I project, it became evident that the juvenile coho salmon were consistently utilizing the most freshwater dominant portion of habitat. Given that information Northcoast Regional Land Trust began to explore an upstream restoration project, "Wood Creek Aquatic Enhancement Project Phase II". This portion of the project sought to create a series of freshwater dominant slough channels with deeper pools allowing for the expansion of available freshwater dominant habitat. After years of work to secure funding and permits, the Wood Creek Phase II Project broke ground in August 2016 and was completed four weeks later. The 20 acre site was restored to create habitat for salmonids, waterfowl, and native vegetation, while simultaneously alleviating flooding on the adjacent pasturelands.

The landscape shifted from a thick cattail forest to a clear open plain, where the designed channels, flood plain, pools, shallow wetland, and planting hummocks were constructed. It was a finely orchestrated operation, skillfully implemented by our contractor GR Sundberg Inc. The project area was kept separate from the main stem of Wood Creek through two sediment plugs at the designed points of connection, ensuring the project area would remain dry and workable. Over the next few weeks, the channels were cut and graded, the planting hummocks slightly raised between the network of channels and pools, approximately 100 cubic yards of wood was inserted into the channels to enhance habitat, and the pasture area was seeded with native seed to restore high brackish marsh vegetation. Following seeding and mulching, the sediment plugs were removed on an incoming tide allowing water to enter the network of channels for the first time. A month later, NRLT staff and Humboldt State University senior ecological restoration students planted over 225 grass plugs, shrubs, and trees in an outstanding and efficient group revegetation effort.

Monitoring of the project this past winter 2016-17 revealed over 300 juvenile coho salmon that were counted by hand from both project areas and over 500 coho salmon detected using the PIT tag infrastructure. In summer 2017, Northcoast Regional Land Trust will be installing additional large wood to the channels to enhance instream habitat, continuing to plant and manage for the establishment of native vegetation within the high brackish marsh restoration portion of the project,

and planting native shrubs and vegetation along the slough channels. We are always looking for volunteers at our monthly Stewardship Sundays. Please contact info@ncrlt.org to get on our mailing list!

Northcoast Regional Land Trust would like to thank the following private and public partners, who granted funding and in-kind assistance for the Wood Creek Phase I restoration project:

[US Fish & Wildlife Service](#)

[The Nature Conservancy](#)

[NOAA Fisheries](#)

[CA Department of Fish and Wildlife](#)

[National Fish & Wildlife Foundation](#)

[North American Wetlands Conservation Act](#)

[Natural Resource Conservation Service](#)

Freshwater Farms Nursery, Rick Storre

[Pacific Gas & Electric](#)

[CA Conservation Corps](#)

[Humboldt Redwood Company](#)

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[U.S. Fish and Wildlife Service National Coastal Wetlands Conservation Grant Program](#)

[CA Coastal Conservancy](#)

[NOAA Habitat Conservation Restoration Center](#)

[CA Department of Fish and Wildlife](#)

[Natural Resources Conservation Service](#)

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