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Hamilton Wetlands Restoration



from **Engineering With Nature: An Atlas, Volume 1.**

by **US Army Engineer Research and Development Center**



Novato, California, United States

The Hamilton Wetlands site is located 25 miles north of San Francisco on the northwest edge of San Pablo Bay. It was diked and dried nearly 100 years ago to make the land suitable for commercial purposes, part of a trend that reduced marsh acreage by 95 percent in the San Francisco Estuary. This effort impacted both coastal resilience and habitat for endangered species. The Hamilton Wetlands site, like most of the diked and converted baylands, subsided significantly—by approximately 2 meters—over the last 100 years. To restore it, the U.S. Army Corps of Engineers (USACE) San Francisco District (SPN) deposited 5.9 million cubic yards of dredged material into the diked baylands between 2008 and 2013. This dredged material raised the overall elevation to within 1 to 2 feet of target marsh elevations over the tidal portions of the site and was also used to create berms approximately 0.85 meters tall. The berms were placed in the tidal areas to disrupt the fetch, reduce wave heights, and promote further sediment accretion, thereby accelerating the restoration process by decades.

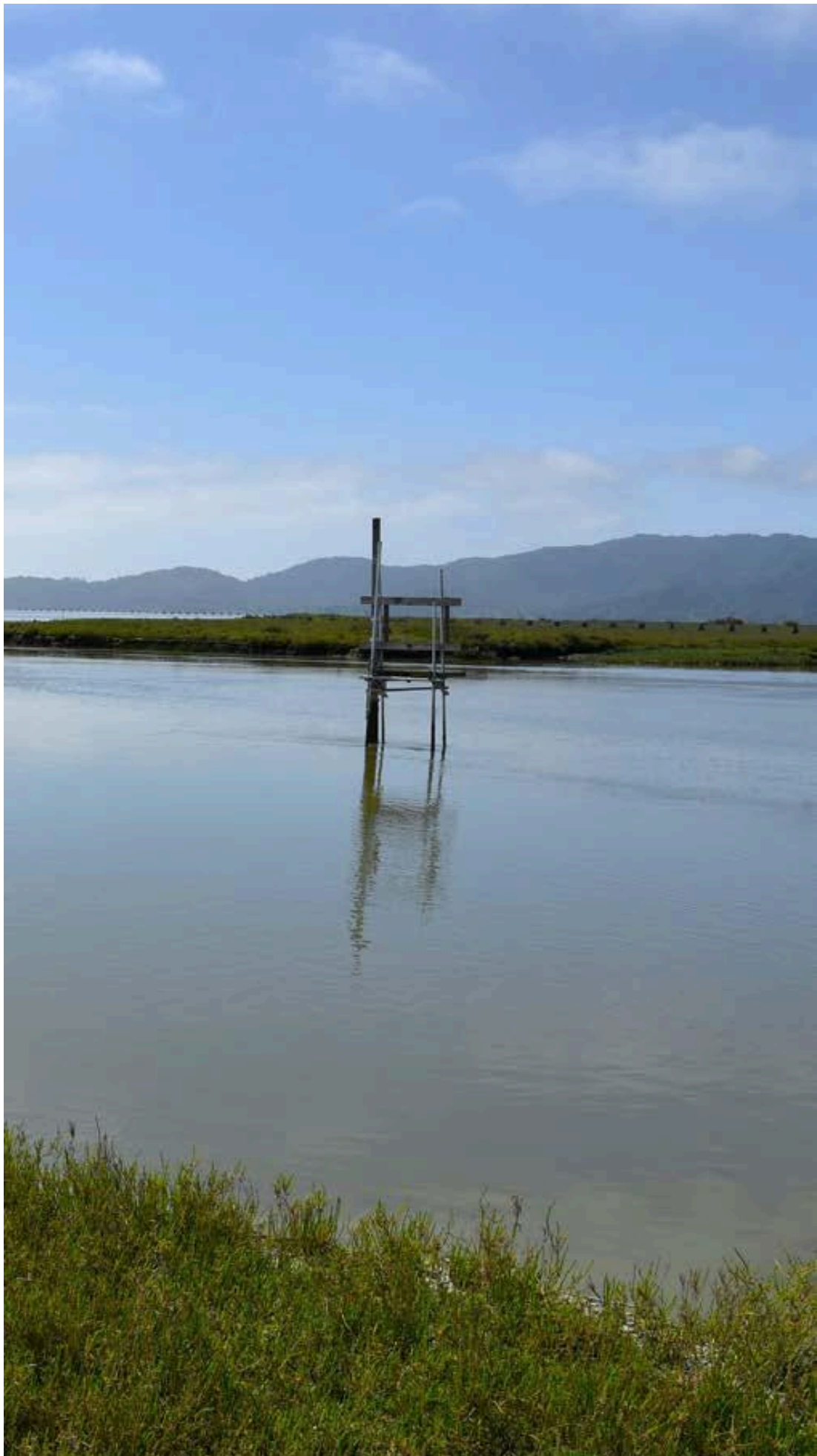
Article cover: The restored fringing marsh is in foreground. A berm with vegetation on top, located mid-left of the photo, showing accreted sediment behind it—Engineering With Nature in action at Brandon Beach, 2018. (Photo by USACE San Francisco District)

Producing Efficiencies

The project uses natural processes to balance restoration costs, time, and success. Berms help slow the water that is brought in with the tide, allowing sediment to fall out of suspension and accrete on the future marsh. This process will provide the last foot of sediment, which should be fine-grained, the optimal texture for plants to take root. Meanwhile, the berms are currently at marsh elevation, allowing pockets of marsh vegetation, pickleweed, and California cordgrass, to develop early in the project and serve as source areas for seeds and vegetation as the rest of the site achieves marsh elevation.

Using Natural Processes

Allowing nature to bring the last foot or two of sediment onto the site is not only less expensive than the direct placement of dredged material, it also ensures that as-built elevations are not too high for marsh development and that tidal creeks can evolve naturally. Once marsh elevations are achieved, the berms will facilitate the marsh's ability to keep pace with sea level rise via the same processes, ensuring the long-term stream of benefits. Already in the third year of monitoring, 30 percent of the site is vegetated, and 83 species of waterbirds have been observed using the site.





Breach and instrument station with recovered fringing marsh at Brandon Beach, 2018.

(Photo by USACE San Francisco District)

Broadening Benefits

Expediting the accretion of the site serves multiple goals. Two endangered species rely on California salt marshes, so rapid establishment of marsh on the site is critical. Restoring these diked former baylands is also a regional priority for maintaining coastal resilience, especially as sea level rise accelerates. The Hamilton Wetlands fringing berm is now part of a public trail system around the entire bay, helping to connect residents to the natural beauty of the area without compromising the ecosystem or habitat.



A snowy egret at the Hamilton Wetlands site.

(Photo by USACE San Francisco District)

Promoting Collaboration

Restoration of Hamilton Wetlands was made possible through a joint venture between USACE SPN and the California State Coastal Conservancy. Dredged material was supplied through USACE's dredging of the Oakland Port and other local operations. A native plant nursery was established at the site to supply plantings for upland and seasonal wetland portions of the restoration project, utilizing teams of volunteers and serving as science, technology, engineering, and mathematics (STEM) outreach to local students. In addition to professional monitoring, bird surveys are conducted by citizen scientists. Eventually, the site may become part of the U.S. Fish and Wild Service San Pablo Bay Wildlife Refuge along with other recently restored marshes in the north San Francisco Estuary.



Mid-construction overview of Hamilton Wetlands Restoration Project; airfield still visible.

(Photo by USACE San Francisco District)



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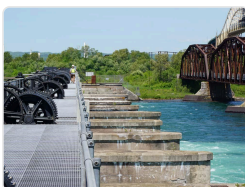
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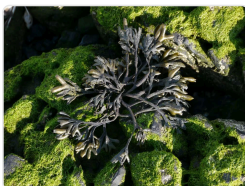
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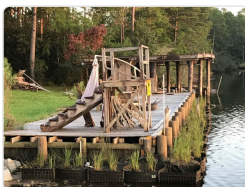
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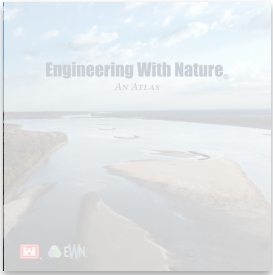
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