

THIN-LAYER PLACEMENT PROJECT SHEET



Marsh Restoration at Elkhorn Slough

August 2026

Location: Elkhorn Slough, California

Type: Marsh Restoration

Area: 30 Acres

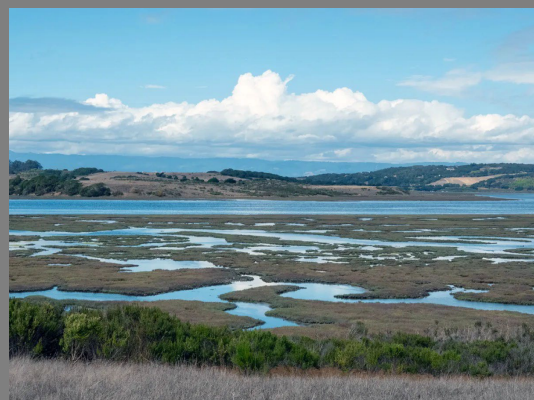
City: Moss Landing, California

County: Monterey County, California

Main Agencies: National Oceanic and Atmospheric Administration, Elkhorn Slough National Estuarine Research Reserve, California Department of Fish and Wildlife, Elkhorn Slough Tidal Wetland Program

State/Province: California

Country: USA



Thin Layer Placement site at Elkhorn Slough National Estuarine Research Reserve. Photo taken from Monterey Herald.

Background

Elkhorn Slough is a nationally significant estuarine system located along the central California coast and is managed in part by the Elkhorn Slough National Estuarine Research Reserve (ESNERR). Elkhorn Slough is comprised of Hester Marsh, Minhoto Marsh, Yampah Marsh, and Seal Bend Marsh. This system supports diverse habitats, including tidal marshes dominated by pickleweed (*Sarcocornia pacifica*), mudflats, and eelgrass beds (Garlinghouse et al. 2019). Over the past century, Elkhorn Slough has experienced significant hydrologic alteration due to harbor construction and tidal prism expansion, leading to increased tidal scour, channel deepening, and widespread marsh loss (ESTWP 2026).

For this reason, remaining marshes are experiencing elevation deficits, erosion, and conversion to mudflat (ES TWP 2025). Thin layer placement (TLP) has been implemented to restore marsh elevation and enhance resilience to sea level rise. Starting in 2017, planning for pilot-scale projects was initiated for sediment placement, feasibility evaluations, and ecological response of TLP in this estuarine environment.

Project Description

The Elkhorn Slough TLP project involved pilot-scale placement of dredged sediment that occurred in three (3) phases. According to the Coastal Conservancy (2019), the overall goal of this effort was to restore vegetated tidal salt marsh, ecotone, and ruderal grassland, which included raising the elevation of degraded tidal marsh, creating new marsh (including ecotone), restoring surrounding uplands to grasslands and upland buffer lands with native vegetation.

Phase I began in 2015 and involved the restoration of 47 acres of the southeastern portion of Hester Marsh to raise subsided tidal marsh and coastal grasslands using approximately 134,

400 cubic yards of sediment (ESA 2015, Xu et al. 2025). Sediment was sourced from nearby estuarine channels

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and delivered hydraulically using low-impact application techniques designed to minimize disturbance to sensitive habitats (Fountain et al. 2020). Phase II, beginning in 2019, encompassed restoration of the western portion of Hester Marsh, including sections of Minhoto Marsh (Xu et al. 2025). Approximately 400,000 cubic yards of sediment were placed in the Minhoto-Hester Marsh to raise the subsided land an average of 70 to 75 cm across 58 acres (Coastal Conservancy 2019). In Phase III, sediment was placed over approximately 30 acres of subsided marsh plain at Seal Bend Marsh, which was the final section of the 119-acre tidal marsh restoration effort (COPC 2026). Phase III sediment placement occurred in 2021, with a target sediment thickness of approximately 10 to 15 cm (COPC 2026; Raposa et al. 2020). Total sediment volumes placed in Phase III was approximately 130,000 cubic yards.

Due to the ecological sensitivity of the system, it was imperative to incorporate adaptive management principles into project design (TAMC 2024). Monitoring is a key component of the project, hence it includes detailed measurements of elevation change, vegetation response (particularly pickleweed recovery), and sediment dynamics, which are critical aspects that must be evaluated closely. Additional monitoring parameters imperative to ecosystem recovery include tidal hydrodynamics, channel morphology, and habitat use by estuarine species. Monitoring is ongoing over a multi-year period to assess both immediate and long-term outcomes (Thomsen et al. 2021; Wasson and Fork 2025). This project was supported by partnerships among the Elkhorn Slough National Estuarine Research Reserve, the California Coastal Conservancy, and federal agencies, with costs estimated at approximately \$1.3 million (Malsbury 2021).

Findings

The thin layer sediment placement effort at Elkhorn Slough was a multi-phase project conducted between 2015 and 2021. A summary of post-TLP monitoring and ecosystem response analyses can be found at: <https://doi.org/10.1007/s12237-021-009>.

References

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Points of Contact

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Dredging Operations Technical Support Program

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Main Agencies:

Funding for this project has been provided by:



**Elkhorn Slough National Estuarine Research Reserve
National Oceanic and Atmospheric Administration
California Department of Fish and Wildlife**

Information on thin layer placement (TLP) case studies has been compiled as part of a DOTS/EWN project to provide a source of information, knowledge, and experience on TLP of sediment or dredged material in aquatic environments. The Thin Layer Placement Website and Map-Portal are funded by the US Army Engineer Research and Development Center (ERDC). POCs for the Thin Layer Placement Website and Map-Portal are:

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