Suisun Resource Conservation District
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A Pilot Project to Augment Sediment on Suisun Marsh Wetland Levees for Climate Adaptation: A Sedimatch Partnership Proposal

Background:

During the Gold Rush era of the mid-1800s, placer mining in the Sierra Nevada washed large amounts of sediment downstream into the San Francisco Bay-Delta estuary. This sediment pool has been valuable for wetland conservation efforts including in passive tidal restoration where the surplus sediment creates the marsh plain and in managed wetlands where dredged sediment supplies the material for levee maintenance. However, over the past several decades, construction of upstream dams has reduced supplies of estuary sediment (Schoellhamer et al. 2014), and we are now facing threats from climate change. Sea-level rise and the frequency of storm events are projected to increase through the end of the century. Thus, there is an increasing need for sediment for wetland conservation at the same time that the supply is decreasing.

Over the same period, infrastructure including docks, marinas, and channels has grown to support the maritime activities of estuary communities. Build-up of sediment occurs regularly at these facilities, and periodic maintenance dredging is required to keep them functional. The dredged material is removed for disposal, but in the past few decades, this has become highly regulated to minimize any harmful effects on fish, wildlife, and the environment (LTMS 2001, DMMO 2018). Disposal of the dredged material is now an expensive proposition with limited options. In-bay disposal has strict limits on volumes, while transport to the ocean for disposal is very expensive.

One solution promoted to alleviate the economic and environmental expense of dredged material disposal has been to encourage beneficial reuse and upland placement (DMMO 2018). Beneficial reuse includes providing sediment for wetland restoration and conservation. In support of this effort, several environmental agencies have developed a collaborative database called “Sedimatch” which allows sources of dredged material to be matched with projects in need of sediment. One of the Sedimatch participants that can supply material, the Valero Benicia Refinery (Valero) is located at the upstream end of Carquinez Strait near the I-680 Benicia-Martinez Bridge and requires regular maintenance dredging to allow its docks to remain accessible for large, ocean-going vessels. Valero conducts maintenance dredging of up to 50,000 cubic yards of sediment annually. It currently disposes 20% of its dredged material in-bay, but much of the remainder is barged to Montezuma Wetlands, an upland fee disposal site located at the upper end of Suisun Bay more than 16 miles away.

Located between Valero and Montezuma Wetlands on the north side of Suisun Bay is the 116,000-acre Suisun Marsh. Suisun Marsh is the largest brackish wetland on the Pacific coast and represents more than 10% of California’s coastal wetlands. It is known for its biodiversity and supports a large number of fish, wildlife, and plant species. In 2014, the Suisun Marsh Habitat Management, Preservation, and Restoration Plan EIR/EIS established 30-year goals to enhance 40,000-50,000 acres of managed wetlands while restoring 5,000-7,000 acres of tidal wetlands. The managed wetlands are dependent on well-maintained external levees with water control structures that allow managers to flood and drain the wetlands facilitating moist soil management and creating the best wetland habitats. The Suisun Resource Conservation District (SRCD) represents the private wetland landowners in Suisun Marsh, and it also

owns and manages a 1330-acre wetland property know as Lower Joice Island located between Montezuma and Suisun Sloughs. SRCD is a proposed recipient of sediment under Sedimatch.

Objectives:
Here, we propose a pilot project to examine the feasibility of applying dredged sediments from the Valero Benicia Refinery docks to benefit the managed wetlands of Suisun Marsh. Our initial effort will use dredged material to improve the climate resilience of three levee segments on Lower Joice Island along Hunters Cut and Montezuma Slough less than 9 miles from Valero.

1. Develop a pilot project to examine beneficial reuse of dredged material for climate resilience in Suisun Marsh.
2. Apply under existing SRCD managed wetland maintenance permits to add sediment to the inside toe of the outer levee and historical borrow ditch on SRCD's Lower Joice Island property.
3. Beneficial reuse up to 10,000 cubic yards of dredged material from Valero to improve the climate resilience of up to 3 at-risk, levee areas.

Scope of Work:
We propose to initiate the pilot project in July-October 2021. Valero typically conducts one of its annual maintenance dredging projects in the late summer (August) working with The Dutra Group (Chris Milam). A clamshell dredge will be used to remove the dredged material which will be placed into a skow (5,000 cuyd capacity) for disposal. The SRCD will obtain authorization under existing permits with the U. S. Army Corp of Engineers (RGP #3) for managed wetlands that allows for beneficial sediment reuse. The sediments from Valero are regularly tested, and the SF Bay Regional Water Quality Control Board (A. Farres) has indicated that the Valero in-bay report satisfies Dredged Material Management Office (DMMO) suitability.

The sediments will be offloaded from the deep-water (21 feet) Hunter's Cut channel or Montezuma Slough with the clamshell dredge to a borrow ditch and inside toe of the exterior levee (Fig. 1). The borrow ditch and exterior levee toe are not part of the vegetated wetland pond bottom and are regularly maintained to retain the integrity of the levee. The material will be placed in the borrow ditch or stacked along the levee toe and allowed to dry for 30-60 d or longer before being worked and spread with a SRCD bulldozer to support the levee toe. The estimated volumes include: Site #1: ~5,000 cuyd; Site #2: ~1,835 cuyd; and Site #3: ~3,165 cuyd or a total estimated volume of 10,000 cuyd.

Cooperators:
Steve Chappell, Executive Director, Suisun Resource Conservation District
Agnes Farres, Environmental Scientist, SFB Regional Water Quality Control Board
John Lazorik, Senior Staff Environmental Engineer, Valero Benicia Refinery
Selina Louie, Environmental Scientist, SFB Regional Water Quality Control Board
Chris Milam, Engineer, The Dutra Group
John Takekawa, Operations Manager, Suisun Resource Conservation District

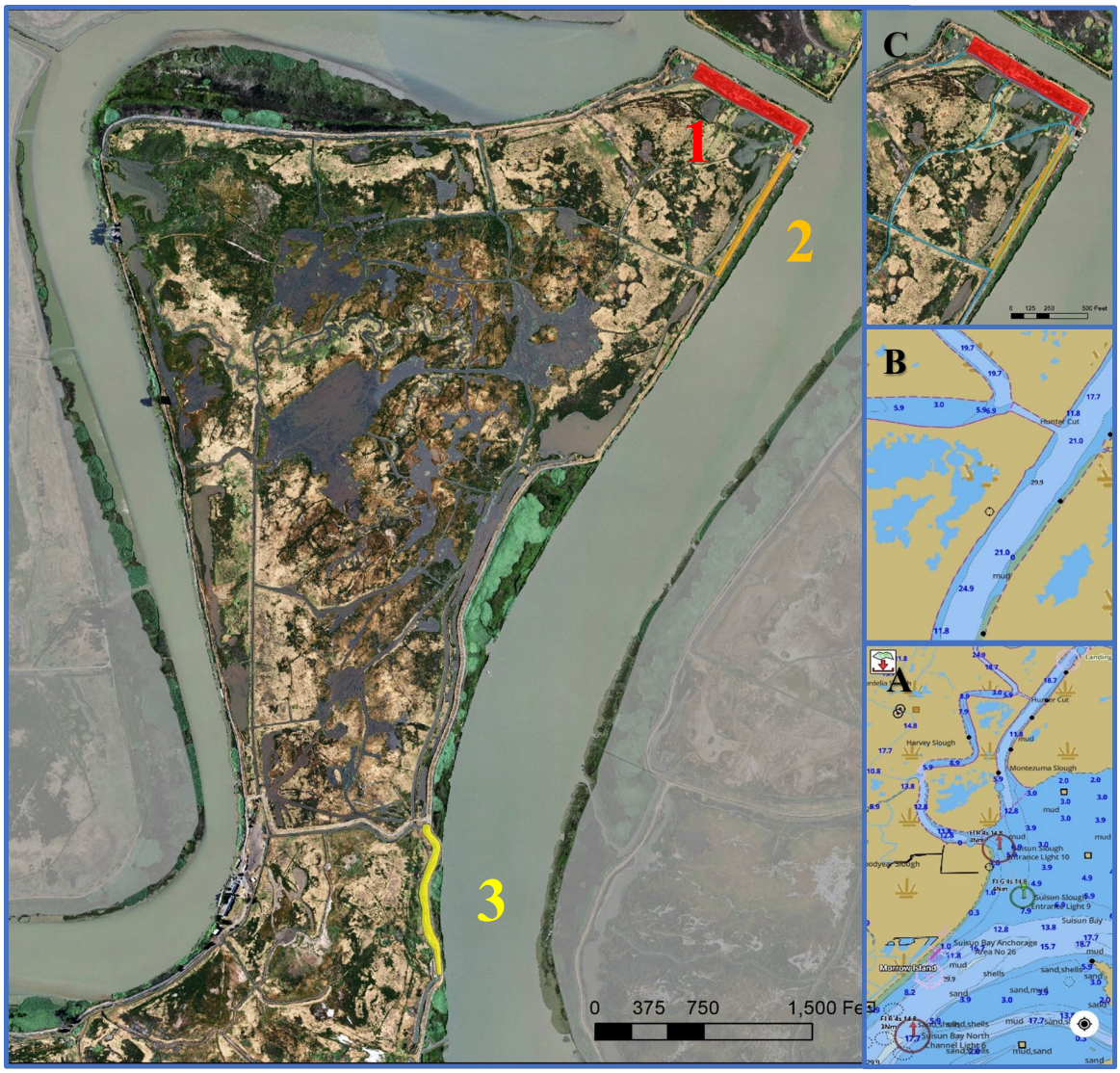

Fig. 1. Lower Joice Island (LJI), a 1330-ac wetland in Suisun Marsh owned and managed by SRCD. Sites denoted by #1-3 are suitable for beneficial reuse of dredged material with deep water (>12 feet) near the levee. The greatest need is at Site #1. The estimated volume for each site is (**1**) ~5,000 cuyd; (**2**) ~1,835 cuyd; and (**3**) ~5,000 cuyd. Insets: (**A**) Bathymetry of Suisun Bay, Montezuma Slough, and Suisun Slough indicating the 12-ft deep channel from Suisun Bay to Montezuma Slough and the 21-ft depth at Hunter's Cut located at the north end of LJI. (**B**) Close-up of water depths along Montezuma Slough and Hunter's Cut (21 ft). (**C**) Close-up of the Hunter's Cut site showing the 32-ft wide x 852 ft-long levee toe (red rectangle) and 18-ft wide x 852 ft-long x 3 ft deep borrow ditch (blue line) at the interior edge of the levee toe (total = ~5,000 cuyd).