



Photograph courtesy of Sonoma Land Trust (Corby Hines)

# SEDIMENT FOR SURVIVAL

## THE BACKGROUND

- **San Francisco Bay's wetlands and mudflats are the first line of defense** from sea level rise for many of the Bay's shoreline communities and for critical infrastructure. They are more resilient and adaptive than levees and seawalls, and they provide both cost-effective protection and many essential ecological and recreational benefits for the people of the Bay Area.
- The economic assets (like highways, sewage treatment plants and buildings) of the SF Bay shoreline at risk from flooding due to climate change **are valued at \$100 Billion dollars.\***  
\*source: USGS
- There is broad scientific consensus that for much of the Bay's shoreline, **wetlands provide the most effective and beneficial method to protect infrastructure** from sea level rise and storm surge.
- **Each year about 2 million cubic yards of sediment enters the bay.** But only a fraction of that amount actually settles on the wetlands and mudflats. The rest either washes out to sea or settles elsewhere on the Bay floor.

Keeping the wetlands that buffer S.F. Bay's shoreline communities and infrastructure from sea level rise will require the largest multi-decade public works project in the Bay Area's history.

This is the conclusion of a new San Francisco Estuary Institute report – *Sediment for Survival* – which was developed in collaboration with local, state, and federal scientific experts.



Photograph by Shira Bezalel (SFEI)



Dusterhoff, S., McKnight, K., Grenier, L., and Kauffman, N. 2021. *Sediment for Survival: A Strategy for the Resilience of Bay Wetlands in the Lower San Francisco Estuary*. A SFEI Resilient Landscape Program. A product of the *Healthy Watersheds, Resilient Baylands* project, funded by the San Francisco Bay Water Quality Improvement Fund, EPA Region IX. Publication #1015, San Francisco Estuary Institute, Richmond, CA.

Report is available at [sfei.org/documents/sediment-for-survival](https://sfei.org/documents/sediment-for-survival)

# VOLUME OF SEDIMENT NEEDED FOR TIDAL WETLANDS AND MUDFLATS BY 2100

Amount of sediment that can be supplied by nature and current management approaches

The sediment need that could be met by changing management practices to access more in-bay and watershed sediment

Imagery courtesy Google Earth

# THE OPPORTUNITY

- *Much of the needed sediment for the wetlands could come from material dredged from the Bay's navigation channels.* Accessing the necessary volume of sediment will require a dramatic change in federal and state policies on dredging as well as new financing concepts.
- *New approaches to watershed management are also needed to help get sediment down to the Bay's wetlands and mudflats where it will be needed,* including changing how flows are released from dams and reconnecting local creek mouths to wetlands.
- *While the scale of the challenge is enormous, the region has already demonstrated great leadership on this issue.* The *Sediment for Survival* report provides recommendations to achieve this nature-based solution for shoreline resilience. For many parts of the Bay shoreline, these recommendations will be more effective, economical and adaptive than levees and seawalls, while also providing more ecological and public recreation benefits.



Photograph by Don DeBold, courtesy CC BY 2.0

# THE SEDIMENT CHALLENGE

- *Bay wetlands and mudflats can grow vertically as sea level rises, which is what makes them so resilient.* However, they need enough sediment (dirt carried by the tides) to do so. As sea level rises, the amount of sediment needed to maintain wetlands (current and restored) and mudflats at the right elevation will increase.

- *The new report "Sediment for Survival" estimates that over the next 80 years, Bay Area communities will need to greatly supplement nature's supply of sediment to sustain healthy wetlands and mudflats,* and the essential services they provide to people and wildlife. The report estimates that the Bay's wetlands and mudflats will need more than 450 million cubic yards of sediment between now and 2100 to maintain what we currently have and areas purchased and slated for restoration.

- Even with an optimistic future of a wetter climate providing high sediment supply, *under current watershed management approaches natural sediment supply will likely not come close to meeting the amount needed to maintain wetlands and mudflats until the end of the century.*

Illustration by Nate Kauffman

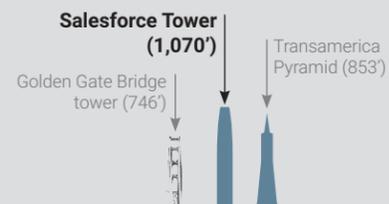


## VOLUME COMPARISON



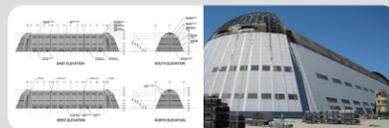
### AMOUNT OF SEDIMENT NEEDED

HEIGHT **1,089** feet  
 RADIUS **3,036** feet  
 VOLUME **477,000,000** cubic yards



### SALESFORCE TOWER (San Francisco)

HEIGHT **1,070** feet  
 VOLUME **711,000** cubic yards



### MOFFETT FIELD: Hangar One (Mountain View)

HEIGHT **200** feet  
 LENGTH **1,133** feet  
 VOLUME **1,800,000** cubic yards