

Sand Studies Commissioner  
Working Group  
July 2024 – October 2025

# STUDY PROCESS

## Funds Provided

Lind & Martin Marietta  
\$1.2 Million

## Sand Technical Advisory Committee

Management Questions  
Formed  
Study Scopes Developed  
RFQ Posted  
Proposals Reviewed

## Independent Science Panel

Proposals Reviewed  
Scope Revised  
Science Teams Identified  
Studies Completed  
Findings Report Developed

# SAND STUDIES TECHNICAL ADVISORY COMMITTEE



# INDEPENDENT SCIENCE PANEL

- Bob Battalio, PE, Environmental Science Associates
- Dr. Craig Jones, Integral Consulting
- Dr. John Largier, UC Davis at Bodega Marine Laboratory
- Dr. David Schoellhamer, US Geological Survey, Emeritus
- Dr. Paul Work, PE, US Geological Survey, Emeritus



# SAND STUDIES QUESTIONS

Is sand mining at existing lease areas, at permitted levels, having a measurable or demonstrable impact on sediment transport and supply within San Francisco Bay?

- What is a sustainable number? What is “substantial depletion”?

What are the anticipated physical effects of sand mining at permitted levels on sand transport and supply within San Francisco Bay and the outer coast?

- What is the impact to active sands and the consequences to the beaches and tides that it feeds?
- What’s the impact to relic sands? How much is the volume and where is it?

Are there other feasible sand mining approaches to consider in San Francisco Bay?

- Should there be a modification of volume and site and conditions?

# RESEARCH TEAMS

## Sand Budget, Supply, Morphological Change and Transport Analysis

### San Francisco Estuary Institute

- Lester McKee, Tan Zi, Sarah Pearce, Cristina Grosso, Adam Wong, Michael Weaver, Scott Dusterhoff, Jeremy Lowe, Jen Hunt

### Deltares, Netherlands

- Edwin Elias, Floortje Roelvink

### US Geological Survey

- Bruce Jaffee, Theresa Fregoso, Mathieu Marineau, Christopher Ely, David Hart



## Sand Transport Modeling

### Anchor QEA

- Michael MacWilliams, Aaron Bever



U.S. Geological Survey

## Sand Provenance

### University of Texas at Austin

- Matthew Malkowski, Zachery Sickmann

### US Geological Survey

- Bruce Jaffee, Theresa Fregoso



# INDEPENDENT SCIENCE PANEL KEY FINDINGS REPORT

- Provided context for sand studies
- Reviewed all studies
- Provided local scale findings
- Provided regional scale findings

<https://www.bcdc.ca.gov/wp-content/uploads/sites/354/2024/01/2024-06-20-SF-Bay-Sand-Budget-Transport-Provenance-and-Mining-Impacts.pdf>

Sand Studies:

<https://www.bcdc.ca.gov/wp-content/uploads/sites/354/2025/06/2025-06-24-Appendix-G.pdf>



# INDEPENDENT SCIENCE PANEL KEY FINDINGS

## Local Scale:

Depressions, removal of sand waves and bed lowering where sand replenishment is low

- Suisun Bay and north Central Bay mined areas 7779 West and 7780 North:11% to 28% replenishment, respectively

Reduced sand transport where sand replenishment is high

- South Central Bay mined areas 709 South - 91% to 351% replenishment
- Central Bay site 2036 (55% replenishment)

# INDEPENDENT SCIENCE PANEL KEY FINDINGS

## Regional Scale

- Sand mining exceeds sand supply
- Mined sand is 'relic' (delivered to the Bay thousands of years ago).
- Suisun Bay and Central Bay lease areas can be analyzed separately due to apparent limited sand transport connection.
- Sand is exchanged between the Central Bay sand mining areas and sand shoals and beaches on the Pacific side of the Golden Gate. Exchange is driven primarily by the ebb and flood of the tides with contribution from wave-driven sand transport into the Bay along the shore.
- Erosion of beaches due to sand mining was not investigated.

# Findings from the suite of scientific studies on physical systems

San Francisco Bay Sand Budget, Transport, Provenance, and Bathymetric Change Studies and Potential Physical Effects of Sand Mining Activities

- ▶ Appendix A Independent science panel members
- ▶ Appendix B BCDC permits
- ▶ Appendix C Sand Studies Technical Advisory Committee member roster
- ▶ Appendix D Study scopes and supporting documents
- ▶ Appendix E Independent science panel report development meeting summaries and discussion/responses to sand mining management questions
- ▶ Appendix F Quarterly research update meeting and independent science panel meeting summaries
- ▶ Appendix G Study deliverables and key findings
- ▶ Appendix H STAC comment letters

# PRESENTATIONS TO THE COMMISSIONER WORKING GROUP

## Overviews of:

- Sand mining activities in San Francisco Bay
- Sand studies process
- Independent Science Panel Key Findings Report
- Sand provenance study (UT@A)
- Understanding of sand mining impacts on sand transport, and bedform change and dynamics (Deltares)
- Whole Bay and Embayment Sand Budgets (original and revised) (SFEI)
- Two water years, sand transport modeling study (Anchor QEA)
- Contributions of erosion, deposition, and human activities to changes in sand storage (USGS)

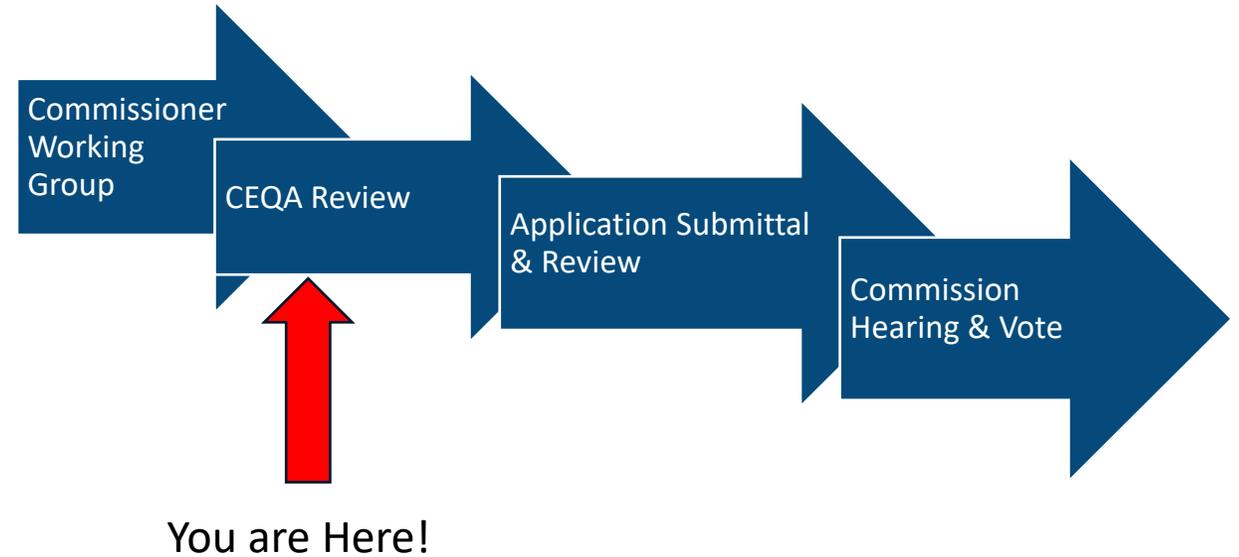
# PRESENTATIONS TO THE COMMISSIONER WORKING GROUP

## Overviews of:

- Benthic Ecology (BCDC)
- Two benthic invertebrate studies (Applied Marine Sciences & NewFields)
- Water quality impacts of mining (NewFields)
- Ecology of Central San Francisco Bay and considerations for sand mining (Farallone Institute)

# GOING FORWARD

New and improved science is available for use in decision making



✓ Commissioners' review of new studies complete

# ANTICIPATED NEXT STEPS

- Pre Application Meeting with Miners
- State Lands Commission finalized CEQA review, issues leases
- Miners submit applications – BCDC, Water Board, US Army Corps of Engineers, Cal Fish & Wildlife
- US Army Corps consults on ESA and Essential Fish Habitat
- NOAA & USFWS issue biological opinions
- Water Board issues WQC/WDR
- BCDC issues permits
- USACE issues permits



Current permits expire in June 2026

**THANK YOU ALL!**

- Independent Science Panel
- Researchers
- Technical Advisory Committee
- Mining Industry Representatives
- State Coastal Conservancy
- Stantec
- Presenters
- Interested parties
- Commissioners