



Sediment Workgroup 2026 Meeting #1

March 19, 2026

Goals for Today

- Receiving an update on select RMP Special Studies from outside the SedWG
- Decide on 2027 Special Study proposals and who will be the proposal leads

to do...



Agenda

Item	Time
1. Introduction & Meeting Overview	1:00 – 1:15 pm
2. Overview of Mudflat Morphology Study	1:15 – 1:45 pm
3. Overview of San Leandro Bay Optics Study	1:45 – 2:15 pm
BREAK	2:15 - 2:30 pm
3. Discussion of 2027 Special Study Proposal Ideas	2:30 – 3:30 pm
4. Discussion of Proposal Logistics and Timing	3:30 – 3:50 pm
5. Wrap Up	3:50 – 4:00 pm

Introductions

(please raise your virtual hand)



Workgroup Advisors



Dr. Patricia Wiberg

Professor, University of Virginia, Dept. of Envi. Sci.

Expertise: sediment erosion, transport, and deposition in coastal and tidal wetland environments; numerical modeling



Dr. David Schoellhamer

Research Hydrologist Emeritus, USGS CA Water Science Center

Expertise: estuarine and cohesive sediment transport; watershed sediment supply to estuaries



RMP Sediment Workgroup

Mission

To provide technical oversight and stakeholder guidance on RMP studies addressing questions about ***sediment delivery, sediment transport, dredging, and beneficial reuse of sediment.***



RMP Sediment Workgroup

Guiding Management Questions

1. What are the acceptable chemical levels in dredged sediment that minimize ecological impacts and maximize benefits of sediment placement in the Bay or baylands?
 - 2a. What are the short- and long-term impacts and benefits of direct or indirect placement of dredged sediment on aquatic species and habitats?
 - 2b. What are the impacts of hydraulic dredging on aquatic species and habitats?
 - 2c. Will allowing more in-Bay disposal in exchange for more beneficial use have a net environmental benefit on aquatic species and habitats?



RMP Sediment Workgroup

Guiding Management Questions

1. What are the acceptable chemical levels in dredged sediment that minimize ecological impacts and maximize benefits of sediment placement in the Bay or baylands?
 - 2a. What are the short- and long-term impacts and benefits of direct or indirect placement of dredged sediment on aquatic species and habitats?
 - 2b. What are the impacts of hydraulic dredging on aquatic species and habitats?
 - 2c. Will allowing more in-Bay disposal in exchange for more beneficial use have a net environmental benefit on aquatic species and habitats?
3. What are the sources, sinks, pathways and loadings of sediment and sediment-bound contaminants to and within the Bay and subembayments?
4. How much sediment is passively reaching tidal marshes and restoration projects and how could the amounts be increased by management actions?
5. What are the concentrations of suspended sediment in the Estuary and its segments?



Current Workgroup Efforts

Ongoing

- MQs 1 & 2 Workplan
- Update and enhance the DMMO database
- Benicia Bridge sediment flux
- Measure the temporal variability in sediment delivery North Bay and Central Bay marshes (2022-2023)
- Spatial variability of sediment accretion in San Francisco Bay restorations
- Study plan to improve characterization of bed sediments and settling velocity in San Francisco Bay



Current Workgroup Efforts

Ongoing

- Monitor sediment flux at Richmond/San Rafael Bridge
- Shoreline change in San Francisco Bay
- Refining the sediment conceptual model for Suisun Bay and San Pablo Bay
- Sediment dynamics in a fluvially influenced salt marsh



Current Workgroup Efforts

Ongoing -Started/Starting in 2026

- Modeling dispersal of a strategic dredged sediment placement in the shallows of South SF Bay
- A detailed analysis and understanding of fine sediment flux and development of a GitHub, community-based DFlow-FM sediment transport modeling platform for SF Bay
- Conceptual understanding of sediment transport processes in Central Bay
- **Workplan for Golden Gate flux monitoring***



Agenda

Item	Time
1. Introduction & Meeting Overview	1:00 – 1:15 pm
2. Overview of Mudflat Morphology Study	1:15 – 1:45 pm
3. Overview of San Leandro Bay Optics Study	1:45 – 2:15 pm
BREAK	2:15 - 2:30 pm
3. Discussion of 2027 Special Study Proposal Ideas	2:30 – 3:30 pm
4. Discussion of Proposal Logistics and Timing	3:30 – 3:50 pm
5. Wrap Up	3:50 – 4:00 pm



Mapping Mudflat Morphodynamics

By: Alex Braud

In collaboration with Don Yee, SFEI



Mudflats



Tidal Flats



Flat?
Depends on who's asking.

26,000+ acres

The intertidal zone we know least about.



Dynamic

“Sediment in these broad shallows is regularly mobilized by the combination of waves and tidal currents (Brand et al., 2010; MacVean and Lacy, 2014; Lacy et al., 2014).”



A Supply Limited System?

How do changes in the mudflats affect
changes in the marsh?

Are our mudflats supply-regulated or
transport-regulated?

Are restoring marshes drawing sediment from adjacent mudflats?

Is the mudflat profile a predictor of marsh edge erosion?

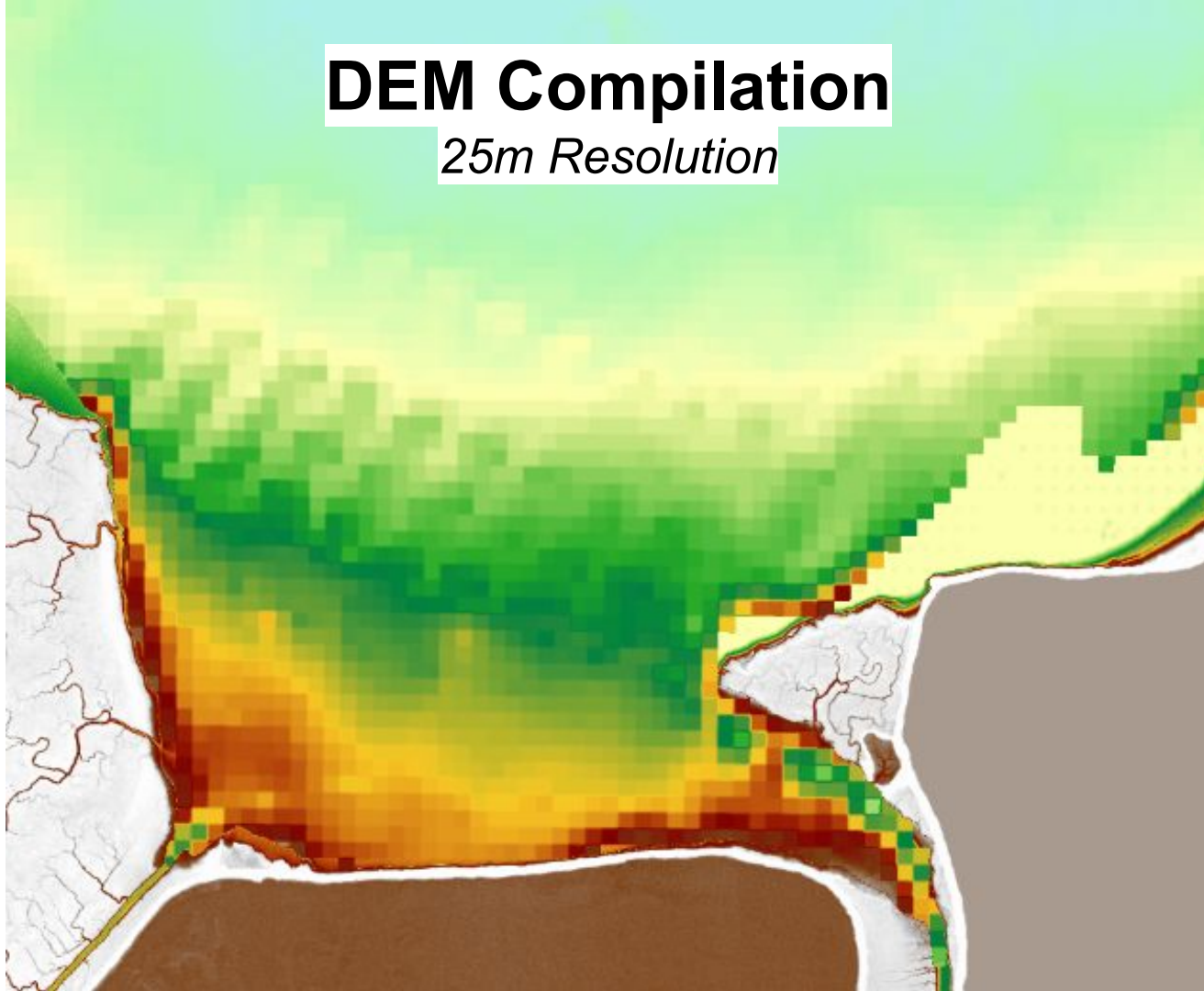
Ravenswood

Data rich or data poor?



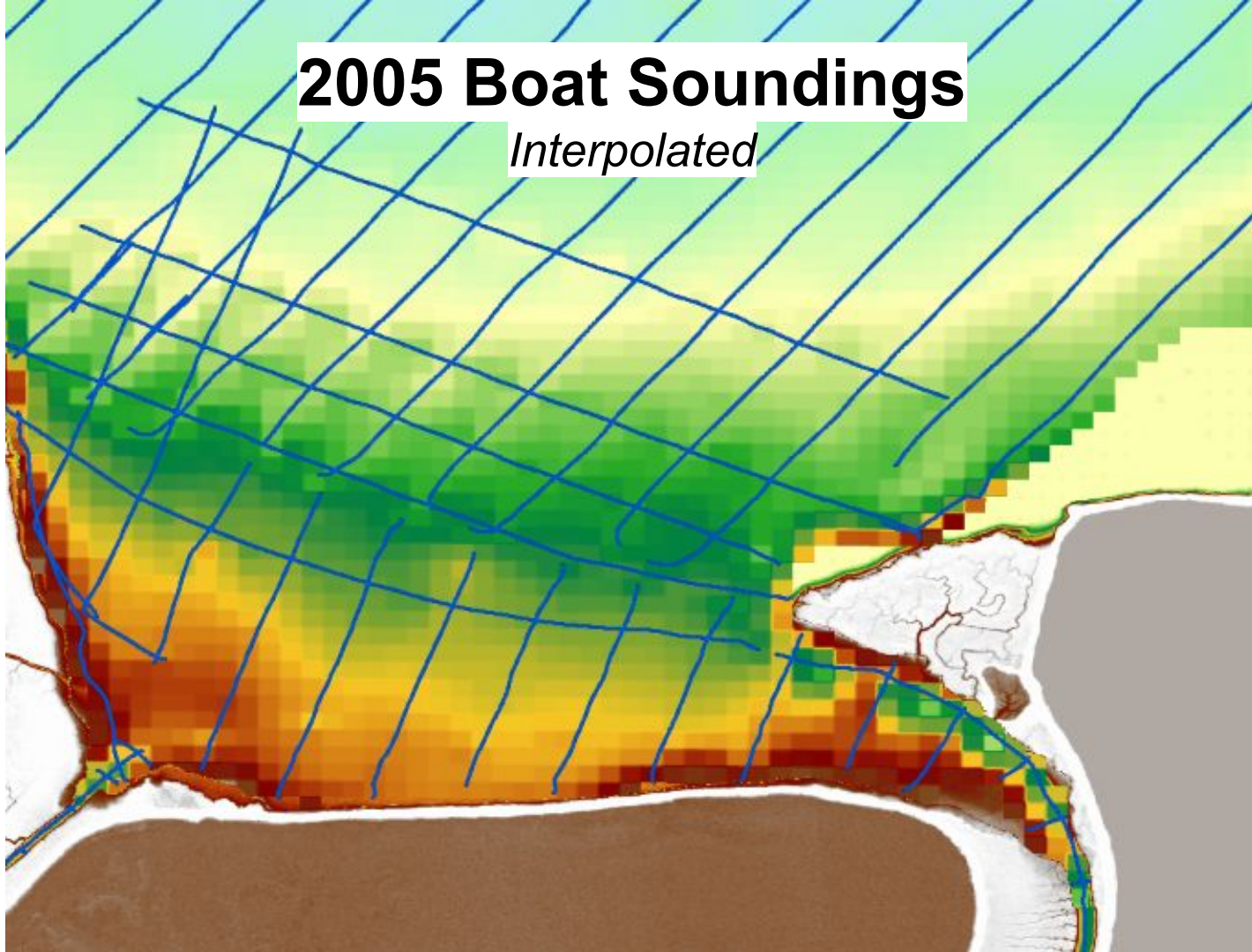
DEM Compilation

25m Resolution



2005 Boat Soundings

Interpolated

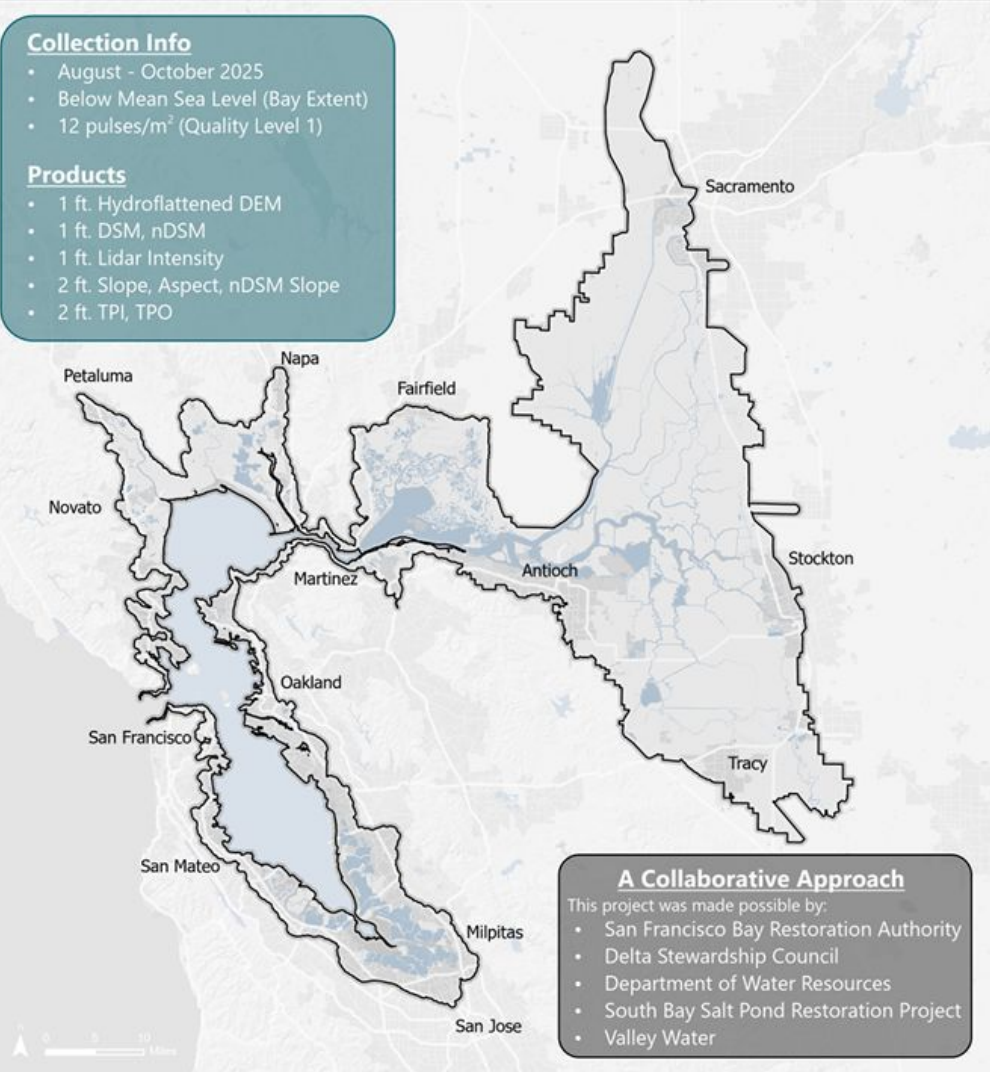


Collection Info

- August - October 2025
- Below Mean Sea Level (Bay Extent)
- 12 pulses/m² (Quality Level 1)

Products

- 1 ft. Hydroflattened DEM
- 1 ft. DSM, nDSM
- 1 ft. Lidar Intensity
- 2 ft. Slope, Aspect, nDSM Slope
- 2 ft. TPI, TPO



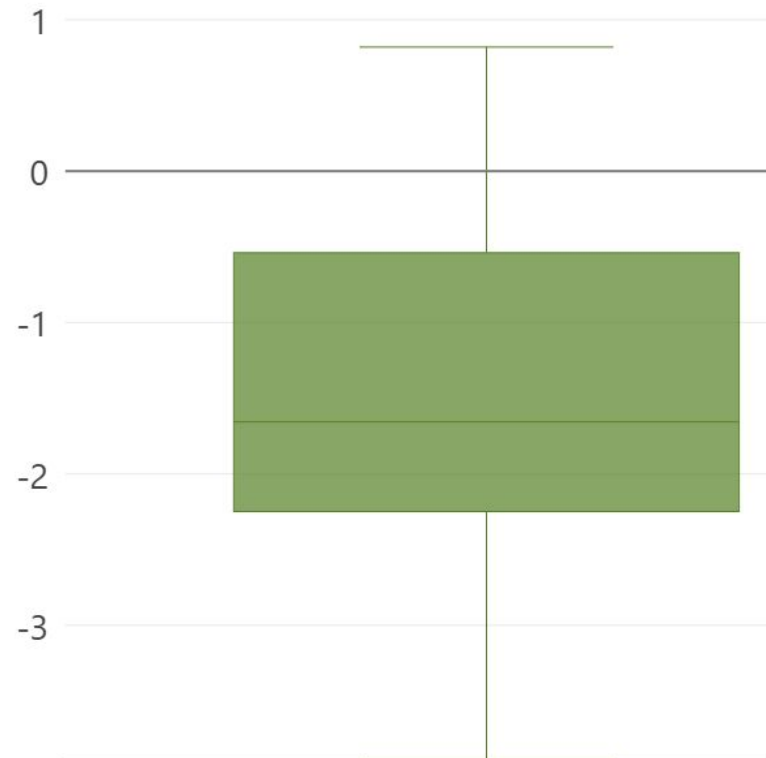
A Collaborative Approach

This project was made possible by:

- San Francisco Bay Restoration Authority
- Delta Stewardship Council
- Department of Water Resources
- South Bay Salt Pond Restoration Project
- Valley Water

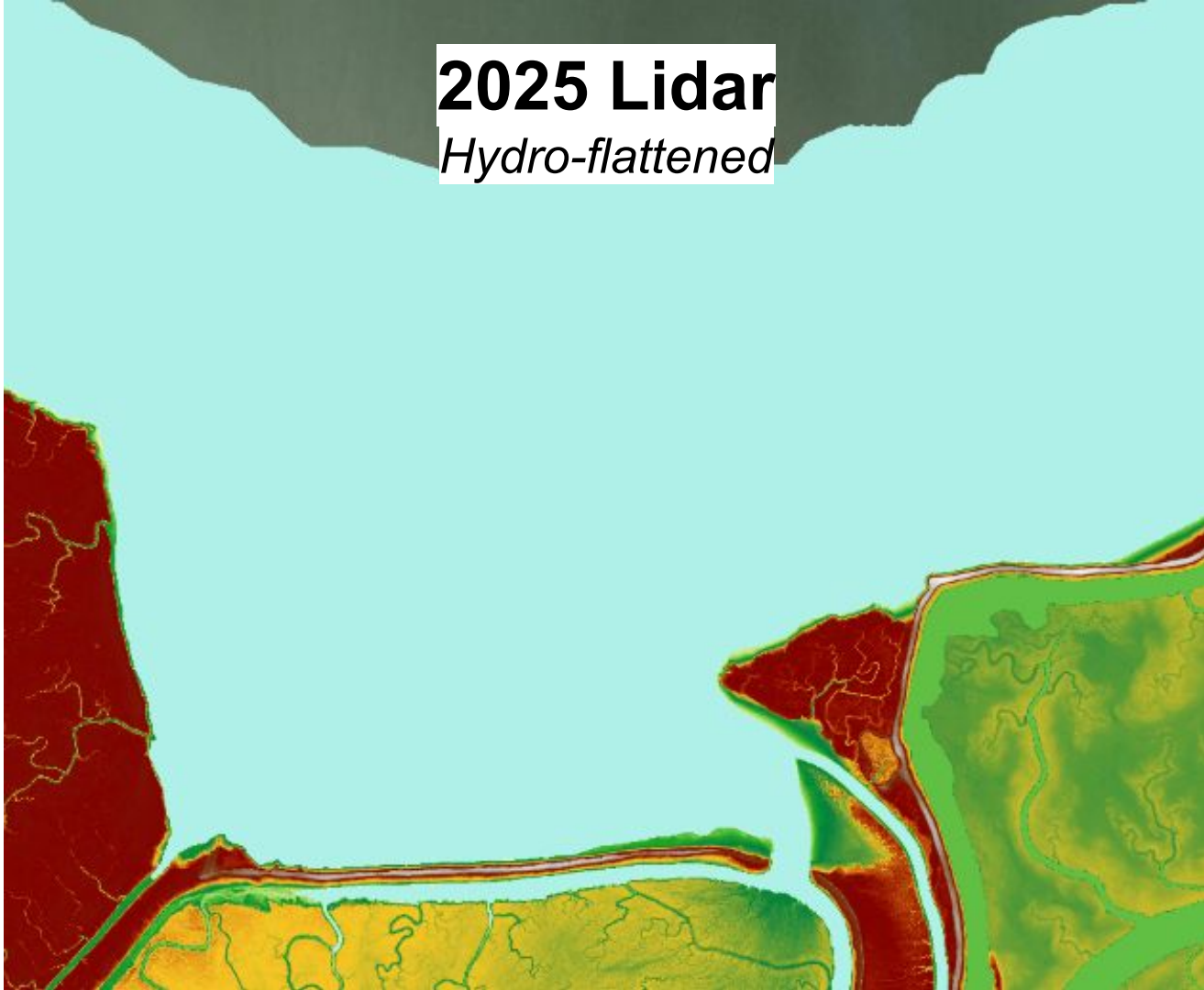
“Low Tide Collection”

Water Level Relative to Mean Sea Level in Feet

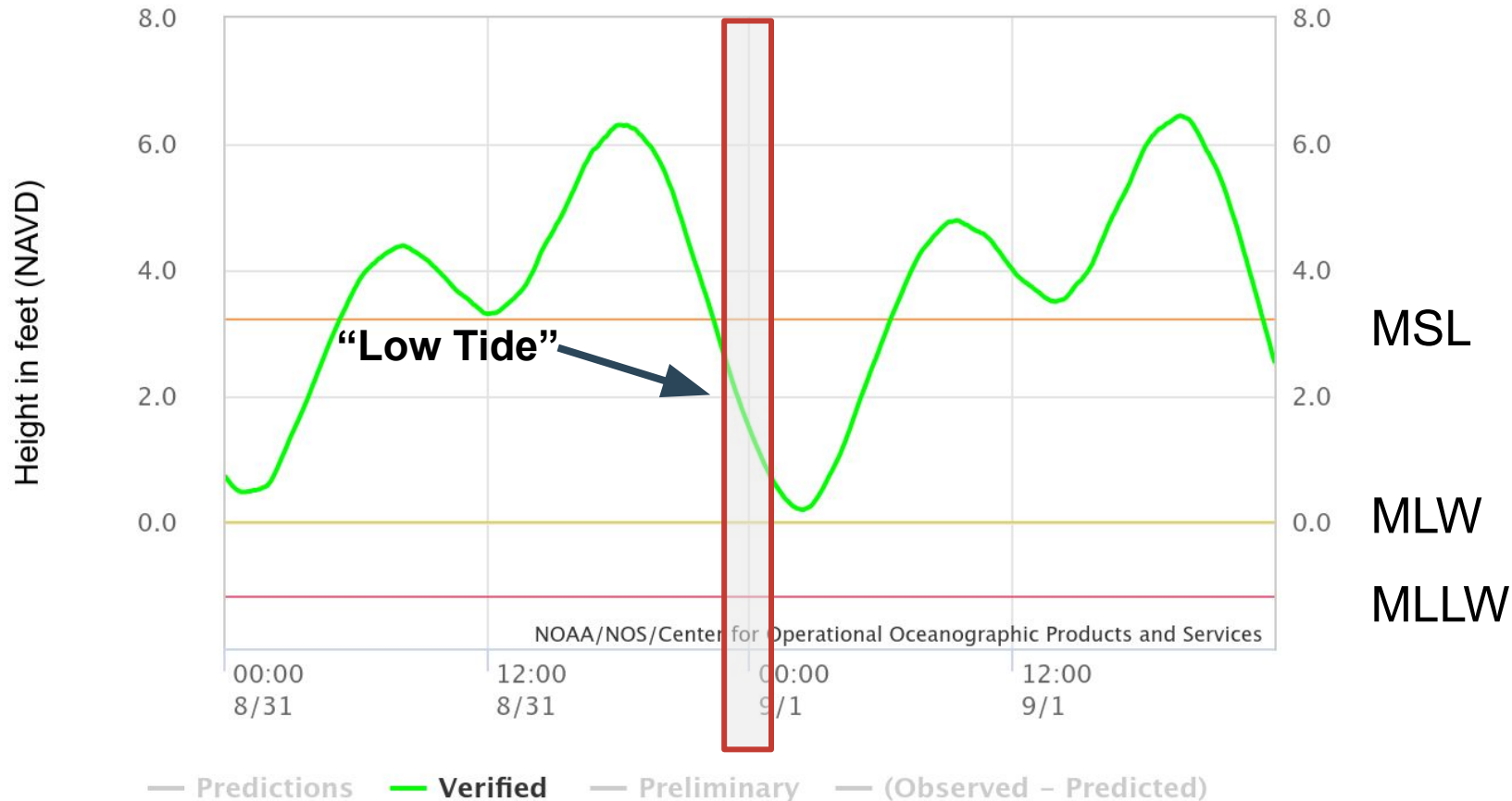


2025 Lidar

Hydro-flattened



NOAA/NOS/CO-OPS
Observed Water Levels at 9414523, Redwood City CA
From 2025/08/31 00:00 LST/LDT to 2025/09/01 23:59 LST/LDT

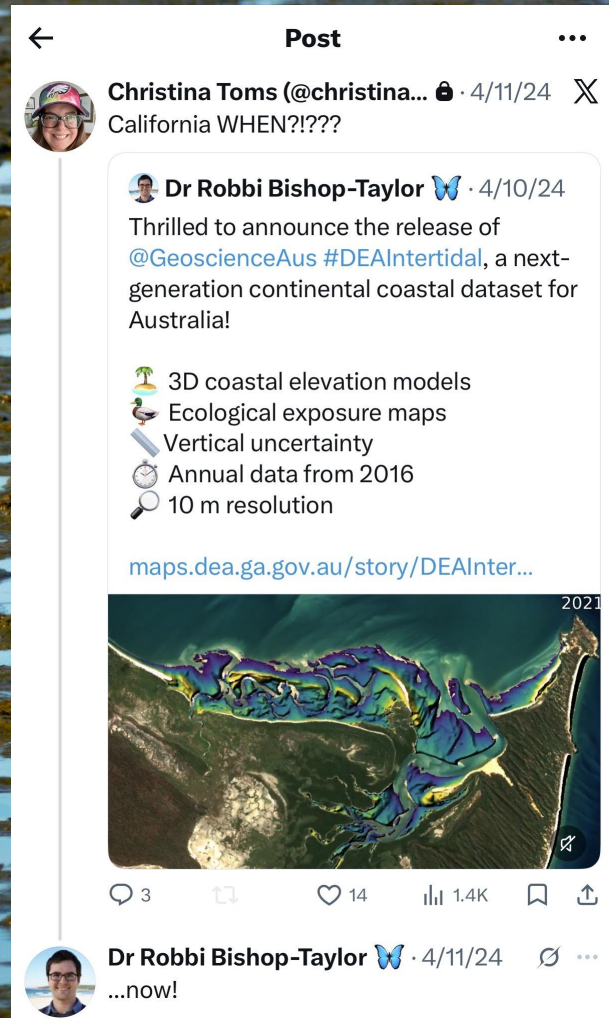




No Data

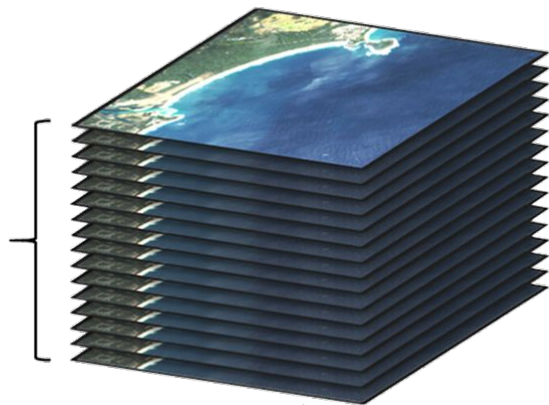
How do we resolve this data gap?

How do we characterize intertidal elevation at scale?



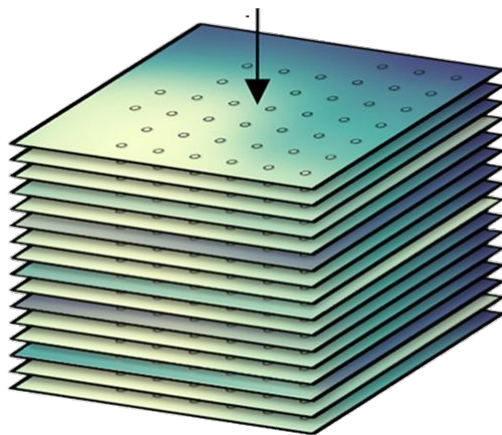


Satellite data array



Landsat and
Sentinel-2

Tide height array



Tides modelled for every satellite
pixel through space and time
using global ocean tide models

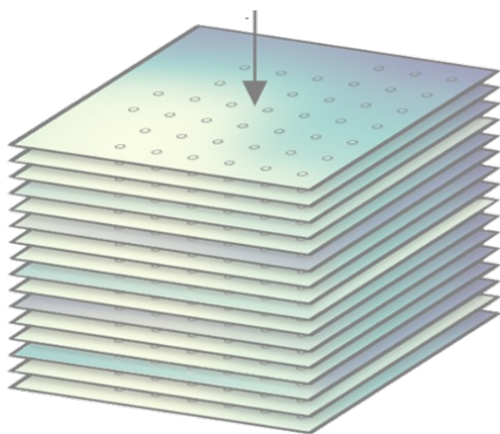
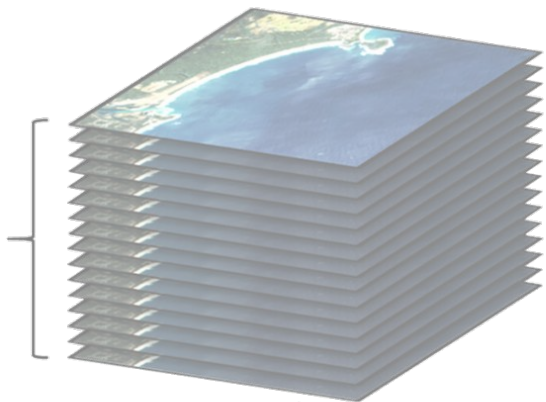




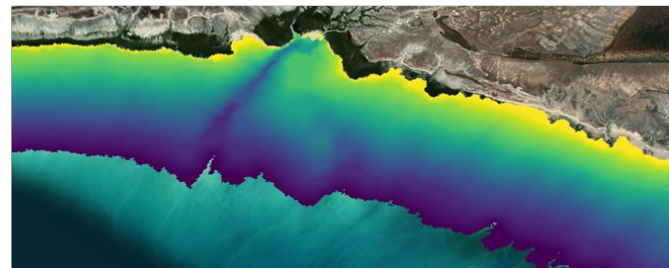
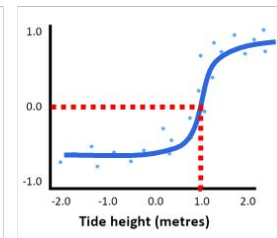
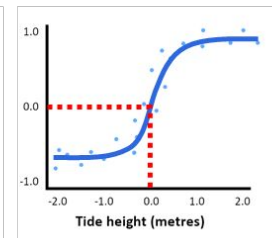
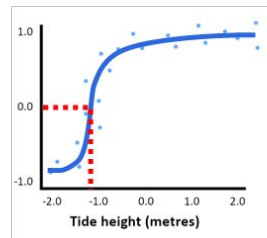
Satellite data
array

Landsat and
Sentinel-2

Tide height
array

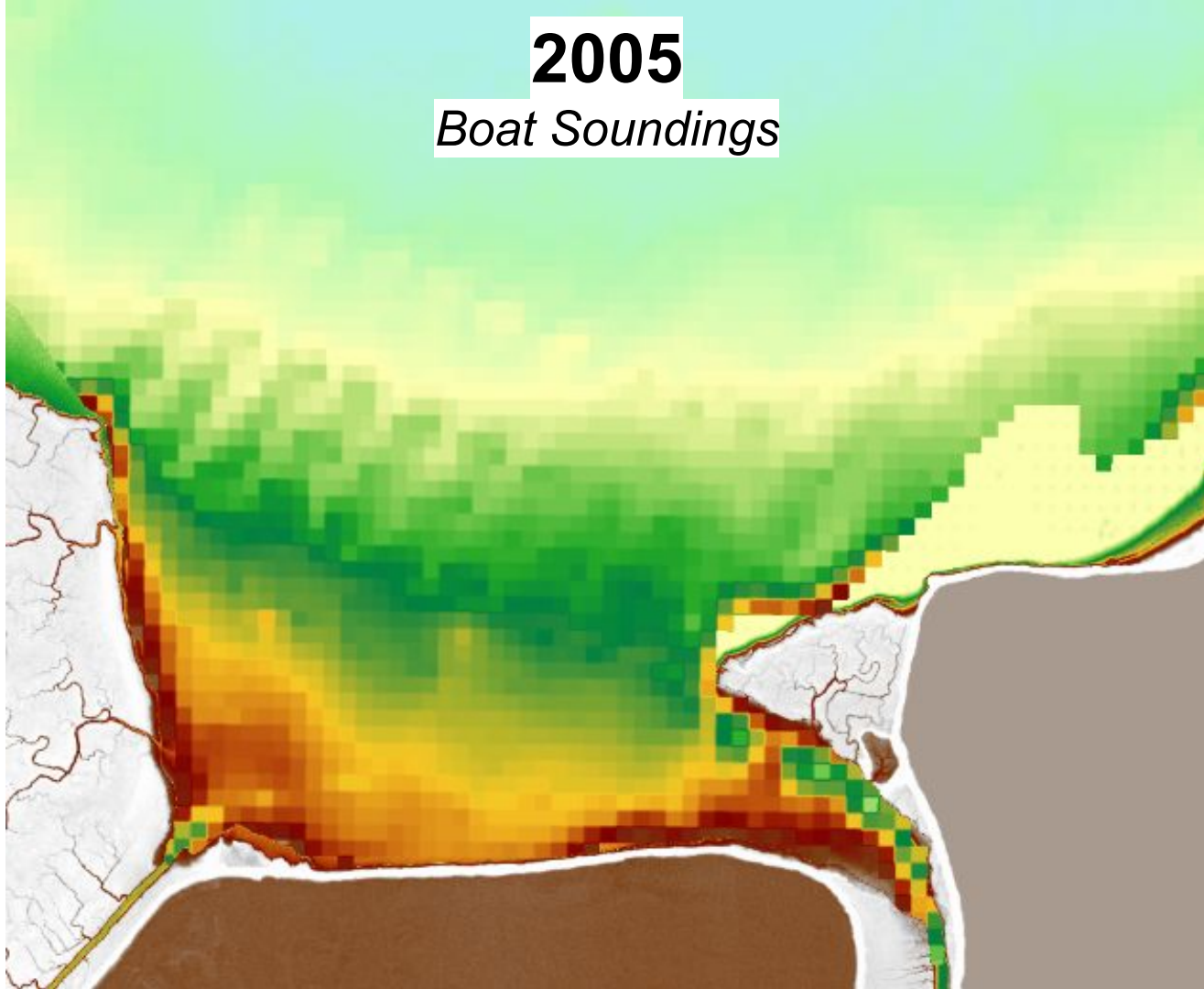


For every pixel:



2005

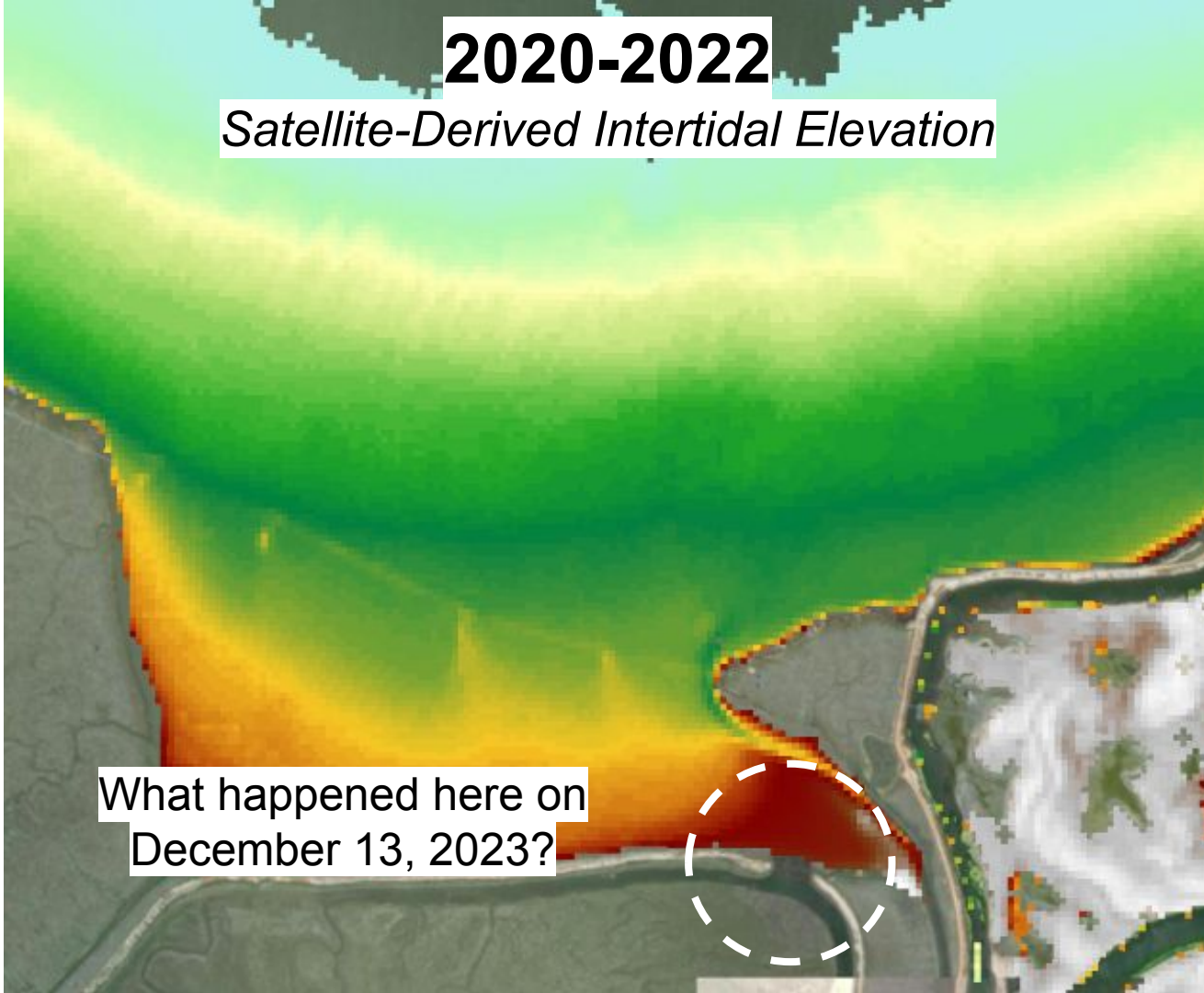
Boat Soundings



2020-2022

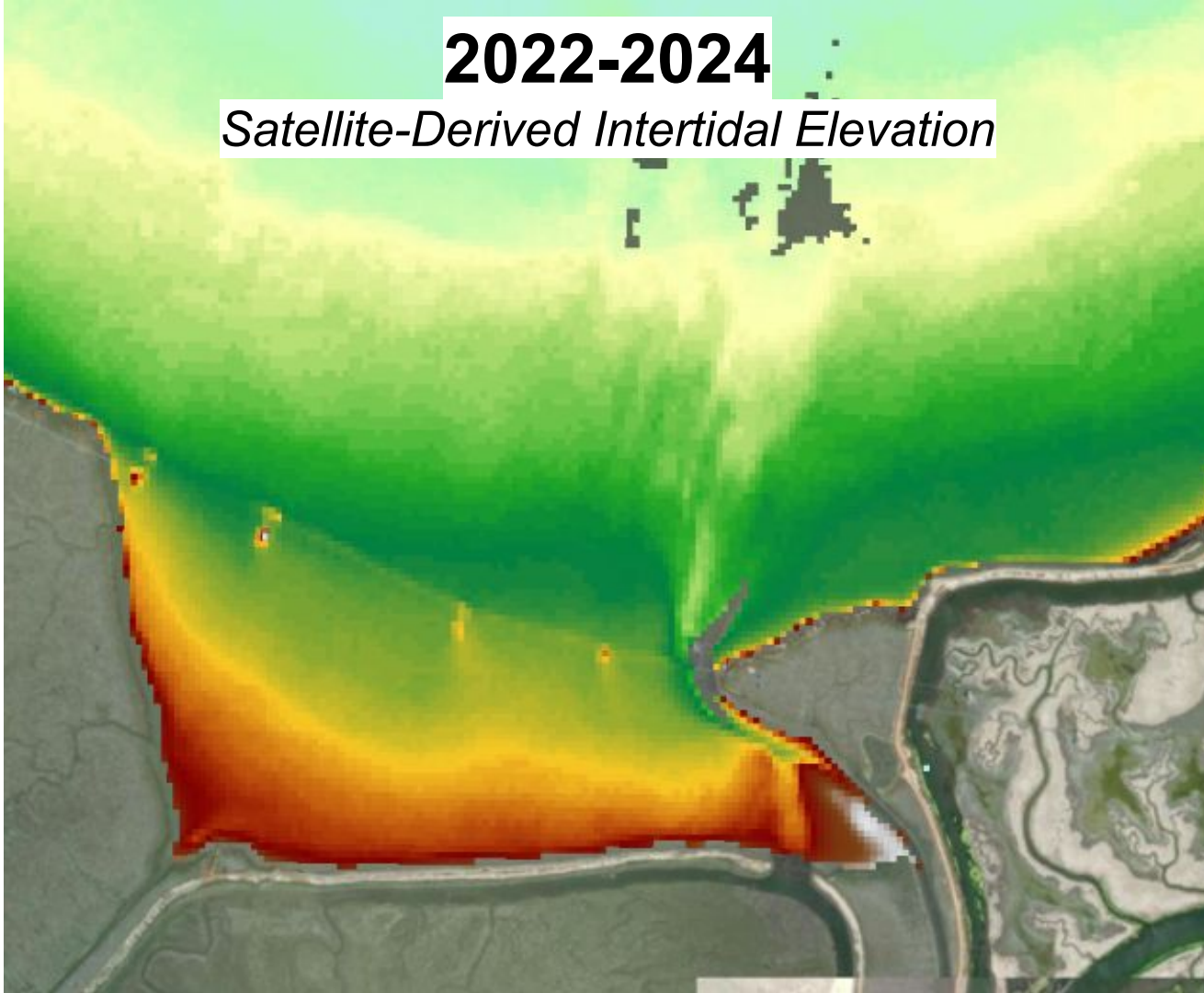
Satellite-Derived Intertidal Elevation

What happened here on
December 13, 2023?



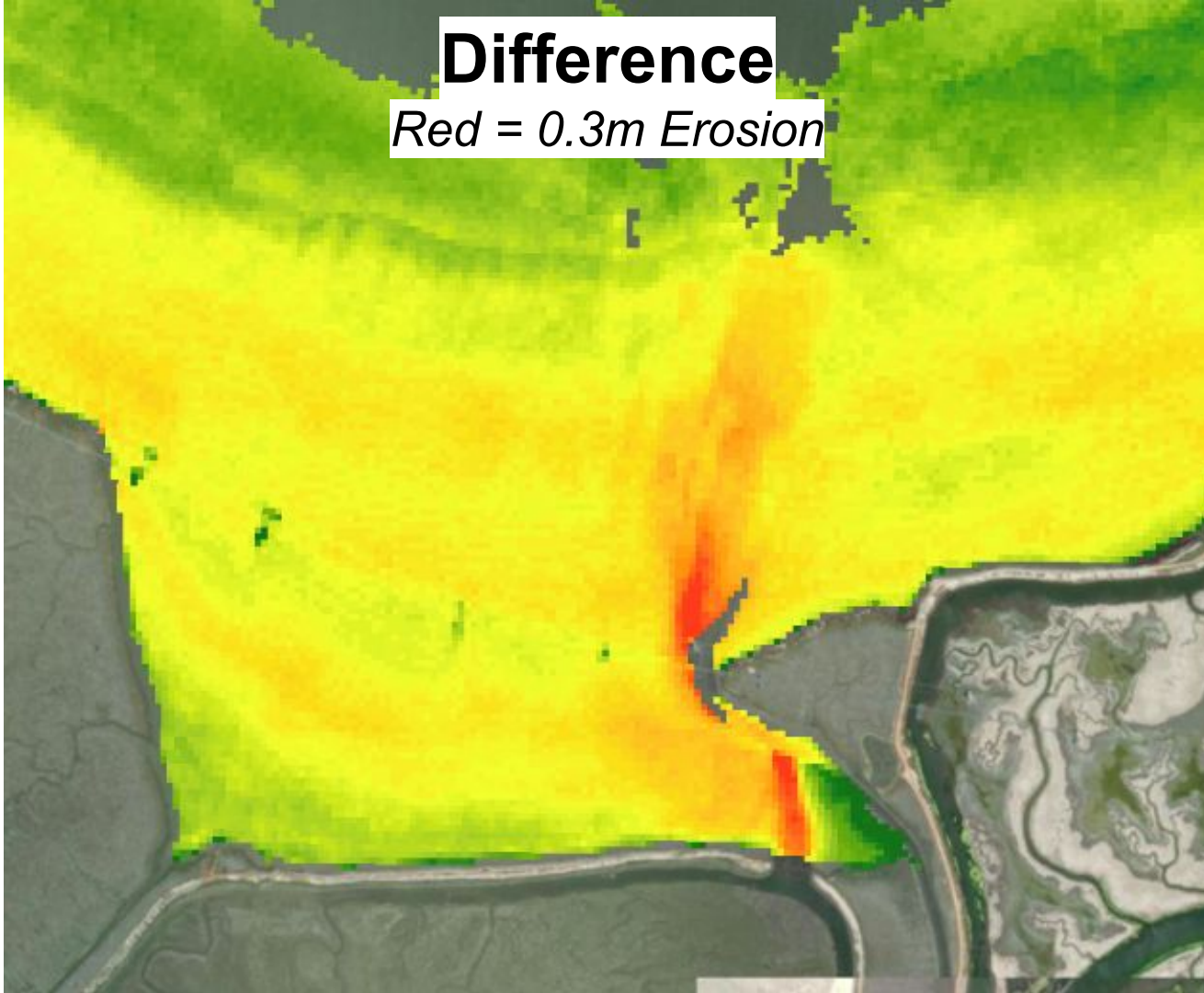
2022-2024

Satellite-Derived Intertidal Elevation

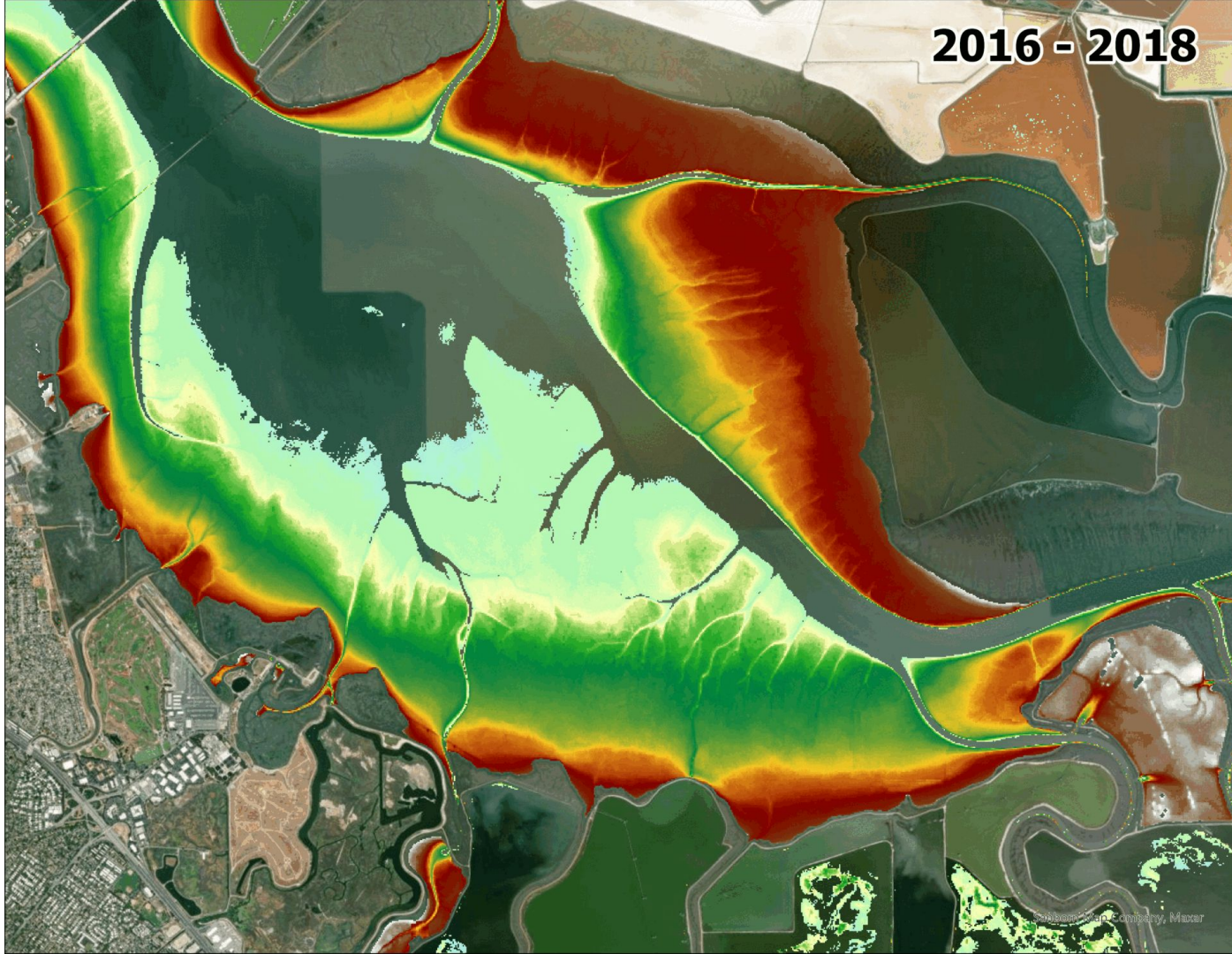


Difference

Red = 0.3m Erosion



2016 - 2018



Inputs

Imagery



Resolution

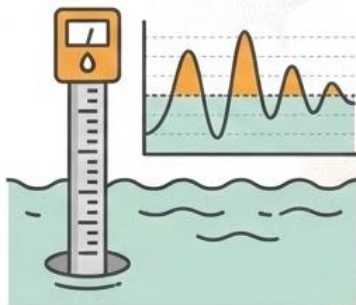


Frequency



Bands

Water Levels



Source



Frequency



Datum

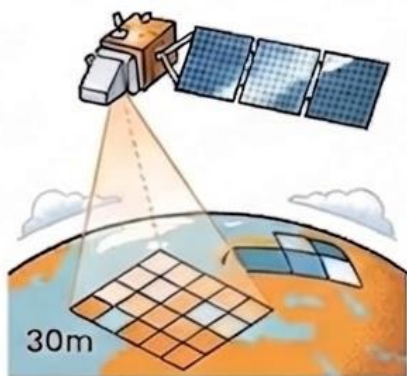
Indices/Thresholds



Spectral
Consistency

Imagery

Landsat (30m)

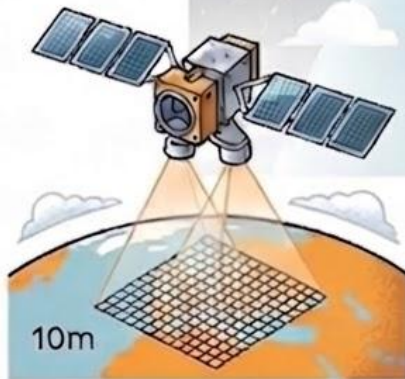


1984-Present



4-band

Sentinel-2 (10m)



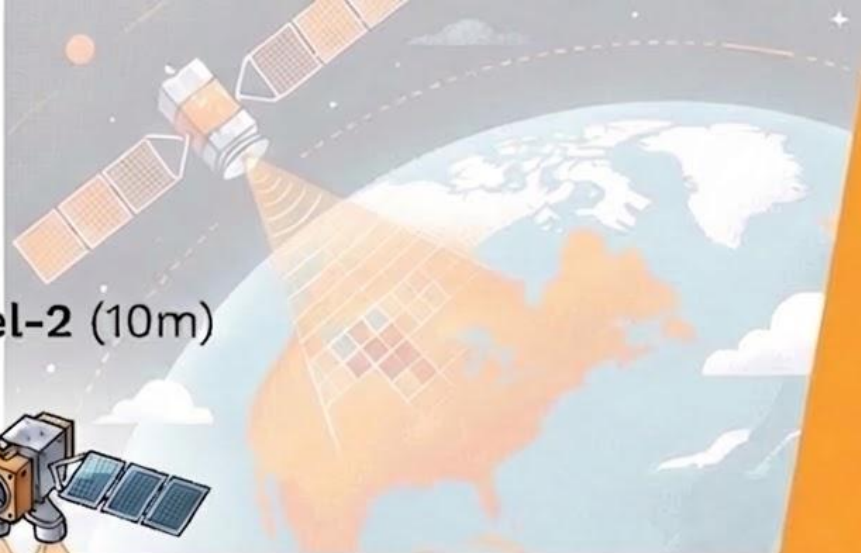
2016-Present



4-band

(plus 6 bands at 20m resolution)

Red Edge and **SWIR** bands



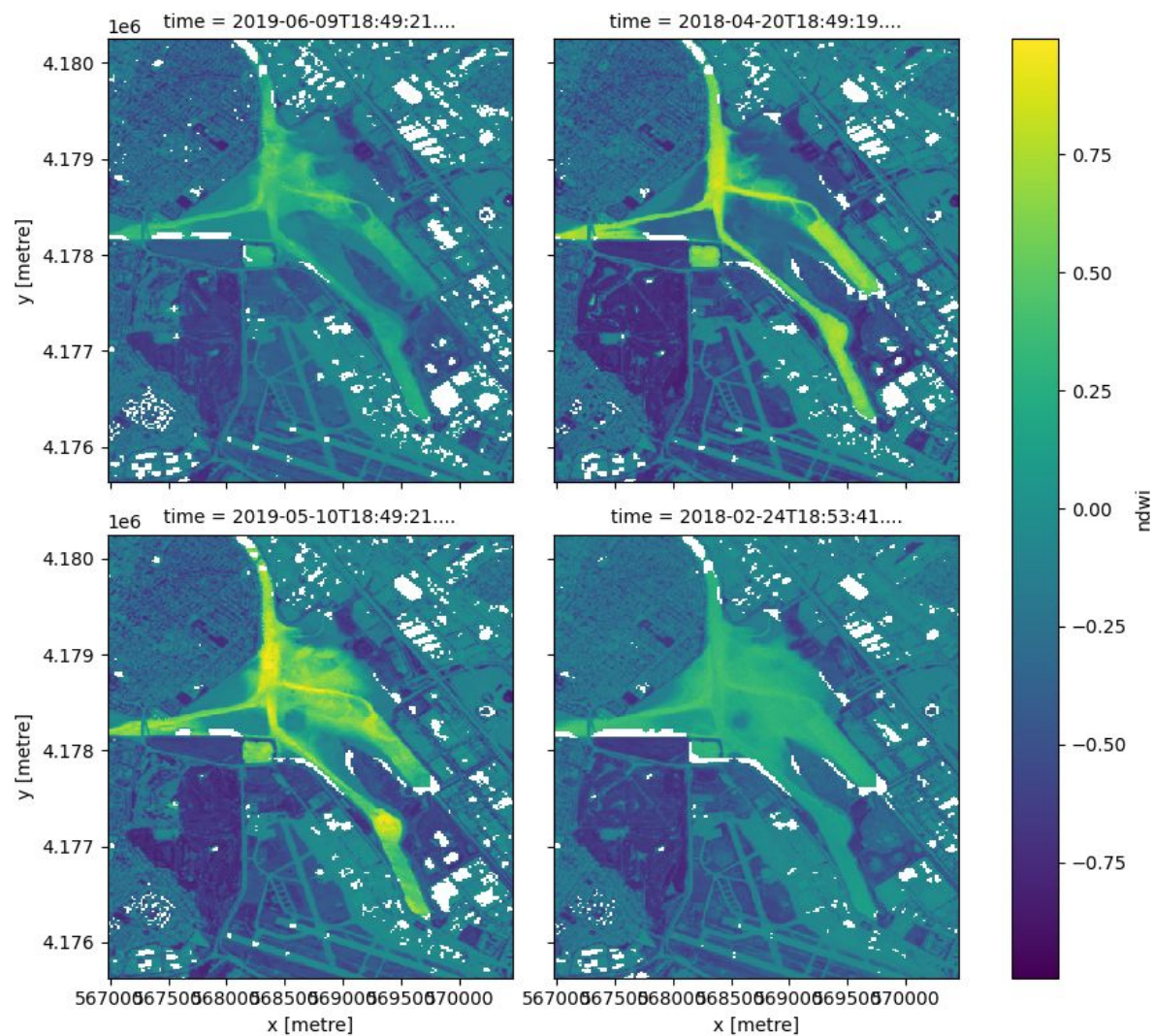
Landsat 30m



Sentinel-2 10m

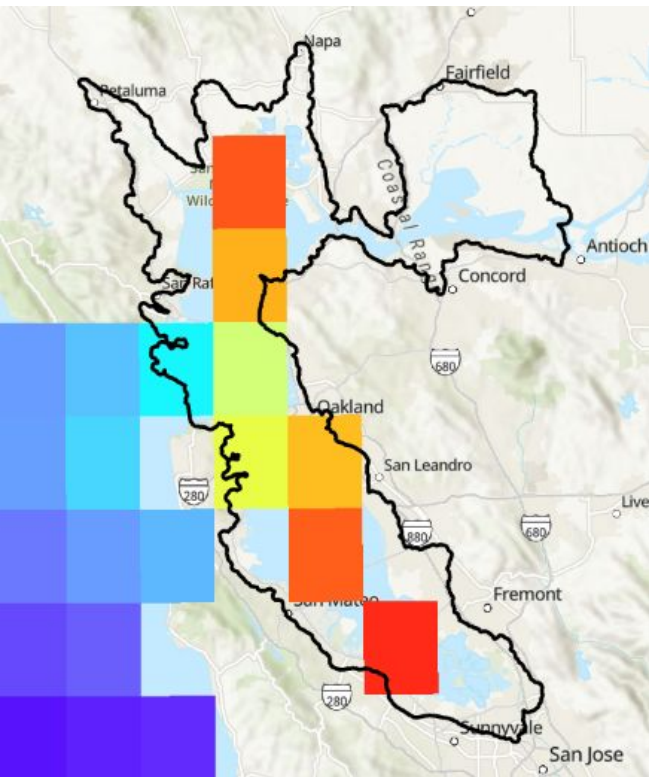


$$\text{NDWI} = \frac{\text{Green} - \text{NIR}}{\text{Green} + \text{NIR}}$$

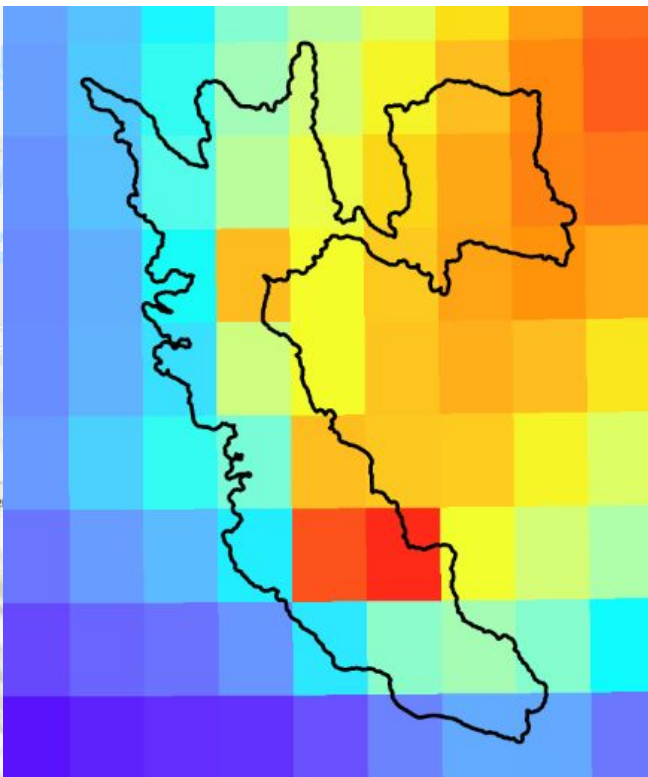


Global Tide Models (M2 Tidal Constituent)

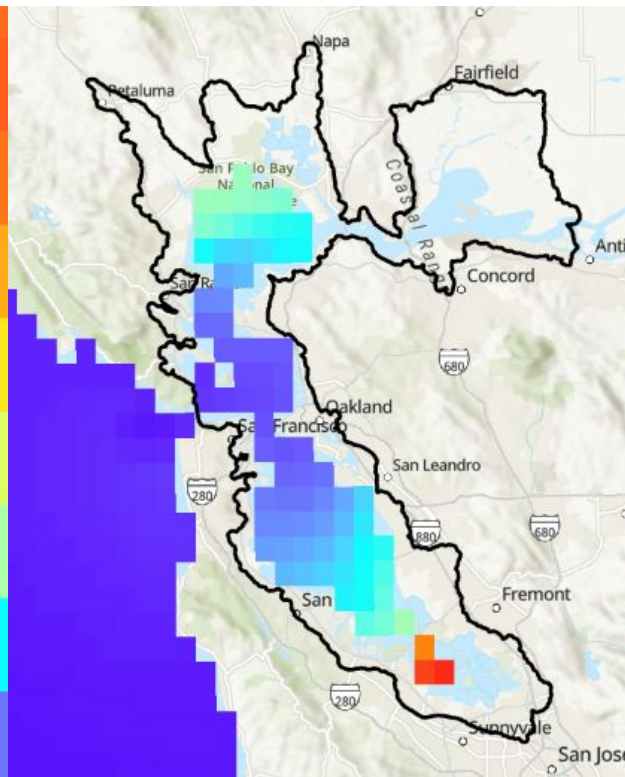
EOT20



GOT 5.5

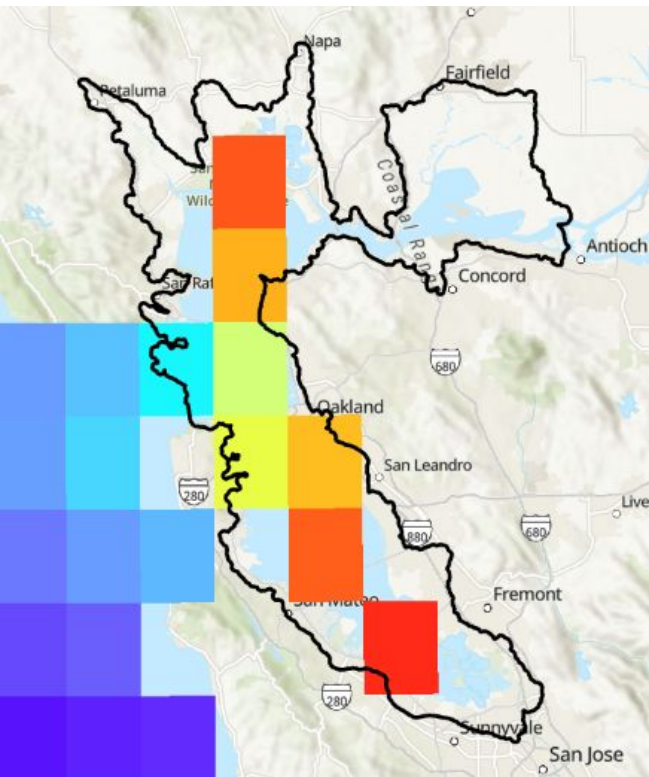


FES2022

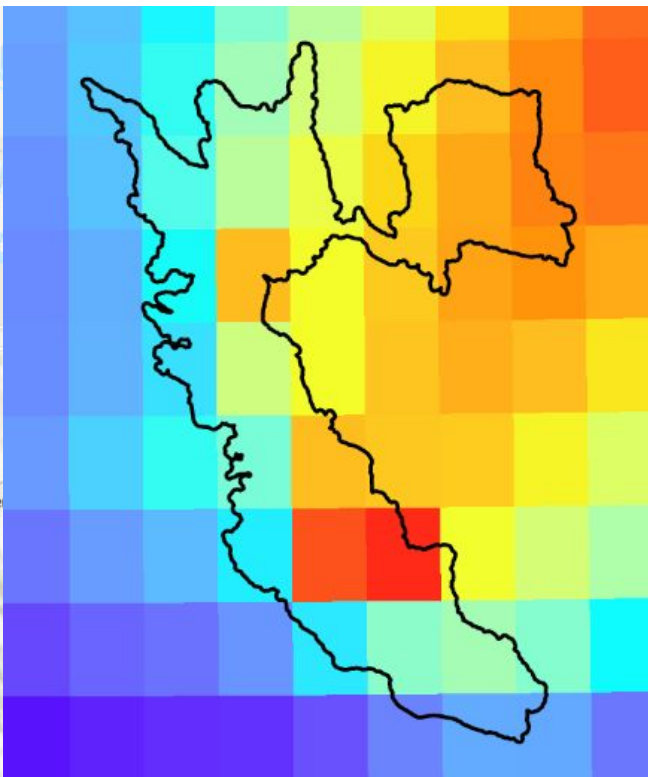


Global Tide Models (M2 Tidal Constituent)

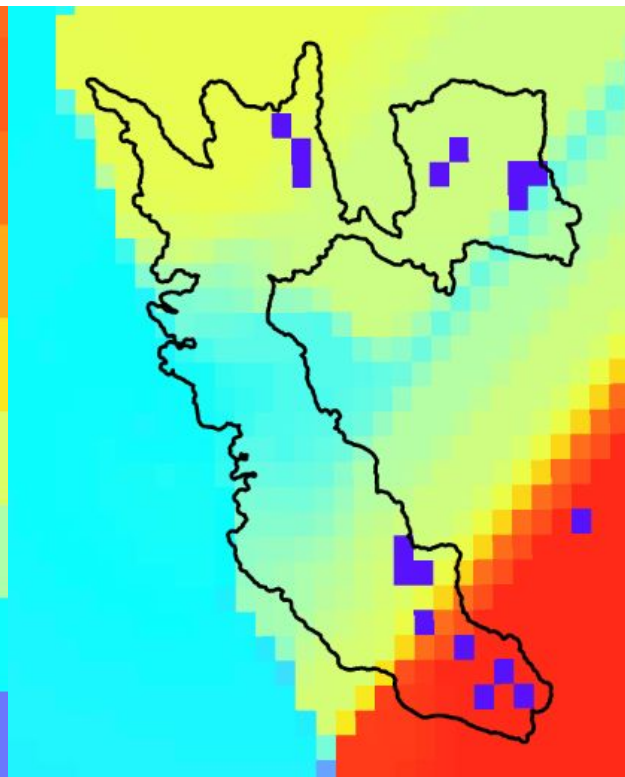
EOT20

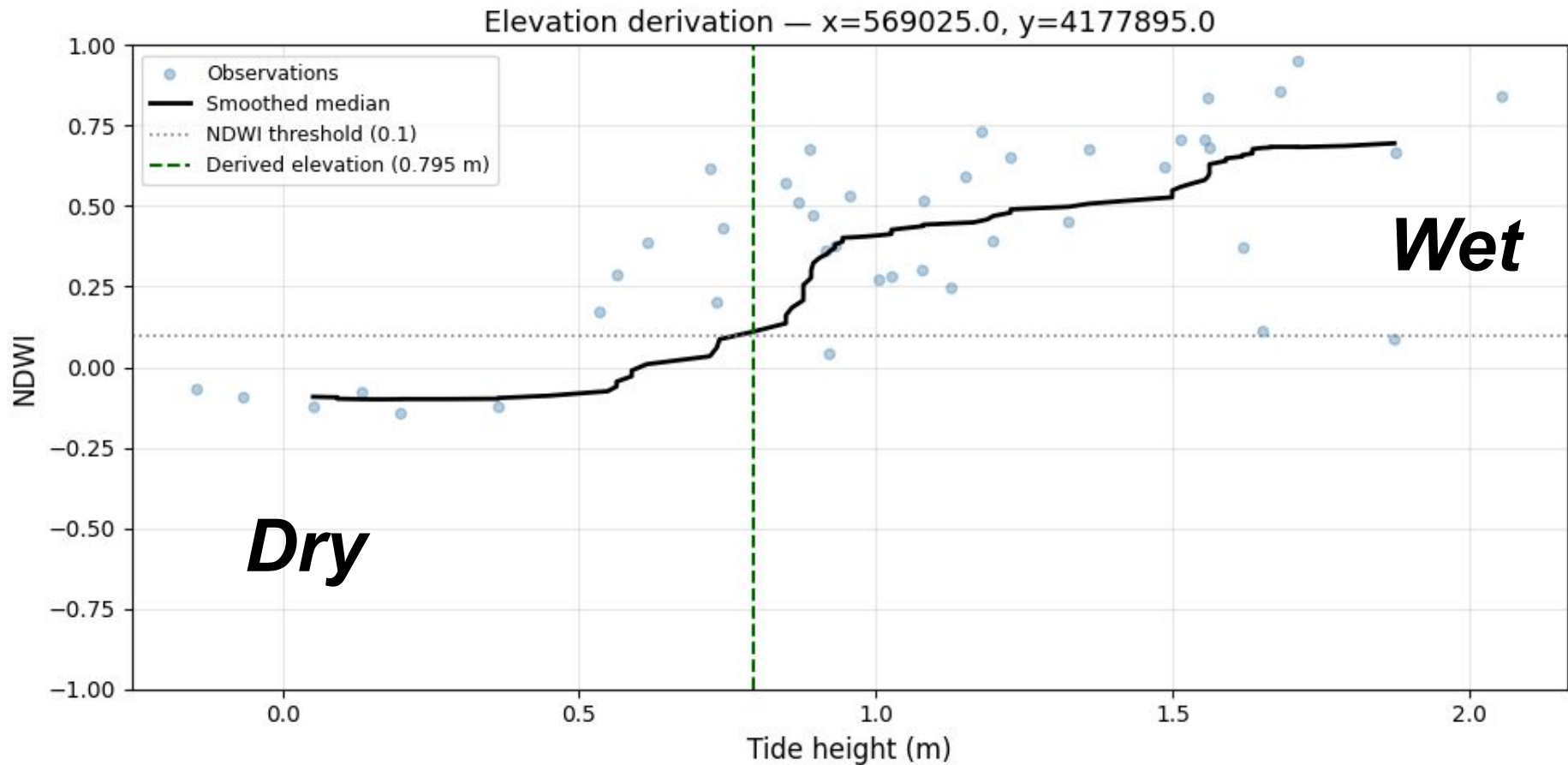


GOT 5.5



FES2022 (extrapolated)





Parameters: *NDWI Threshold, Windows (n), Window width (%), Smooth Radius*

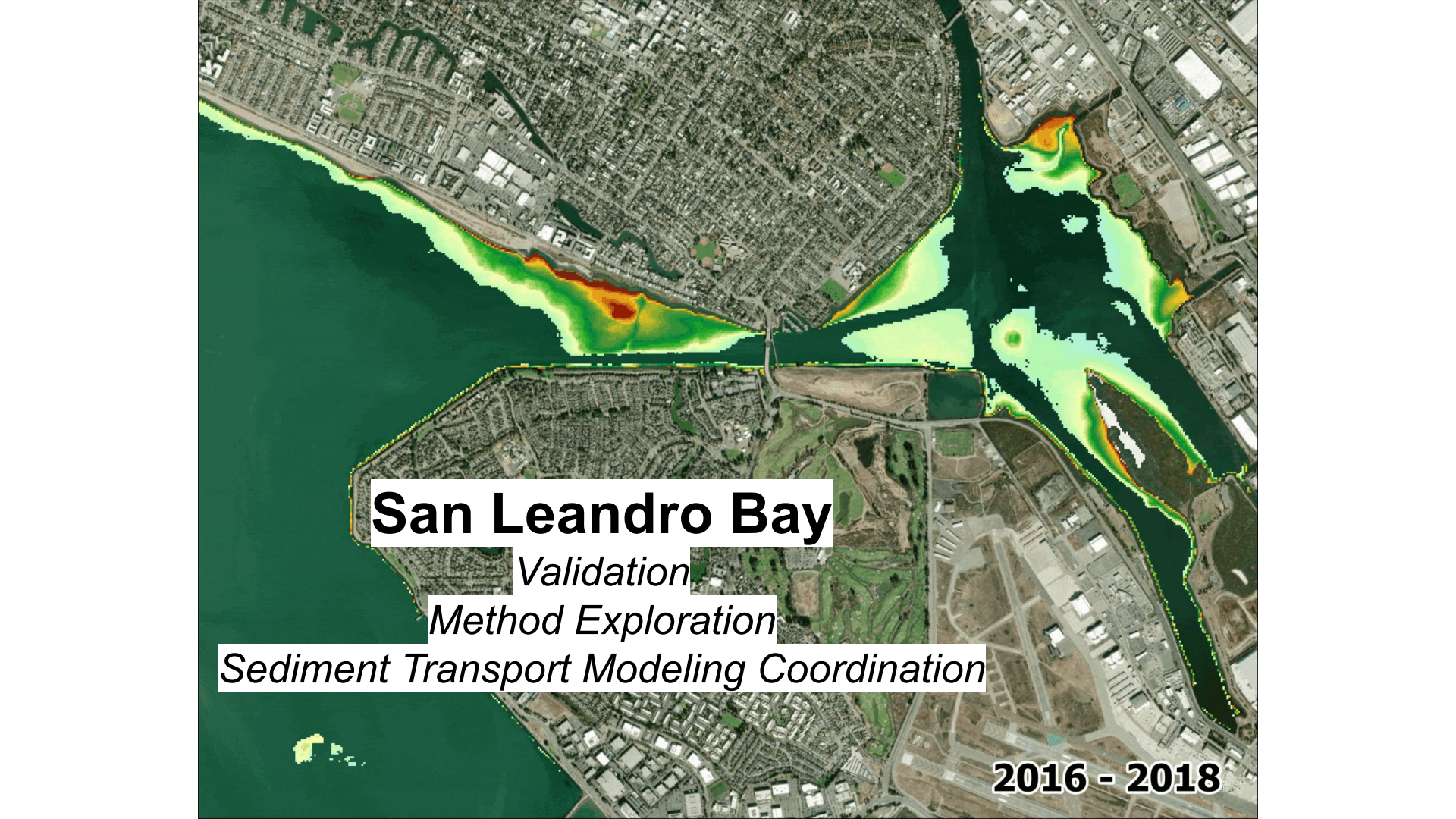
Default Values: 0.0 or 0.1, 100, 15%, 20

Limitations:

- **Compilation over Time; not a snapshot**
 - Con: Most Dynamic Areas
 - Pro: Captures Long Term Trends
- **Global Tide Models**
 - Cons:
 - Lack Resolution
 - Local Effects
 - Not NAVD88
 - Pro:
 - Ease of Use
 - No Time Constraint
- **Imagery distinguishing mudflats and water can be tricky**

Questions:

- **Compilation over Time; not a snapshot**
 - What amount of images are needed?
 - Can we capture seasonal trends?
- **Global Tide Models**
 - How can we relate to NAVD88
 - Can we integrate local water level data?
 - How does the output change between water level data sources?
- **Imagery distinguishing mudflats and water can be tricky**
 - What threshold(s)/parameters work best in San Francisco Bay?
 - Do other indices work better?

An aerial photograph of San Leandro Bay, California, showing the city of San Leandro to the north and the city of Fremont to the south. The bay is filled with water, and the surrounding land is densely developed with residential and commercial buildings. Overlaid on the map are several colored regions representing sediment transport modeling results. These regions are primarily green and yellow, with some areas of orange and red, indicating higher sediment concentrations. The modeling results are concentrated in the central part of the bay, near the mouth of the San Leandro River, and along the southern shore. The text "San Leandro Bay" is overlaid in a white box in the center of the image.

San Leandro Bay

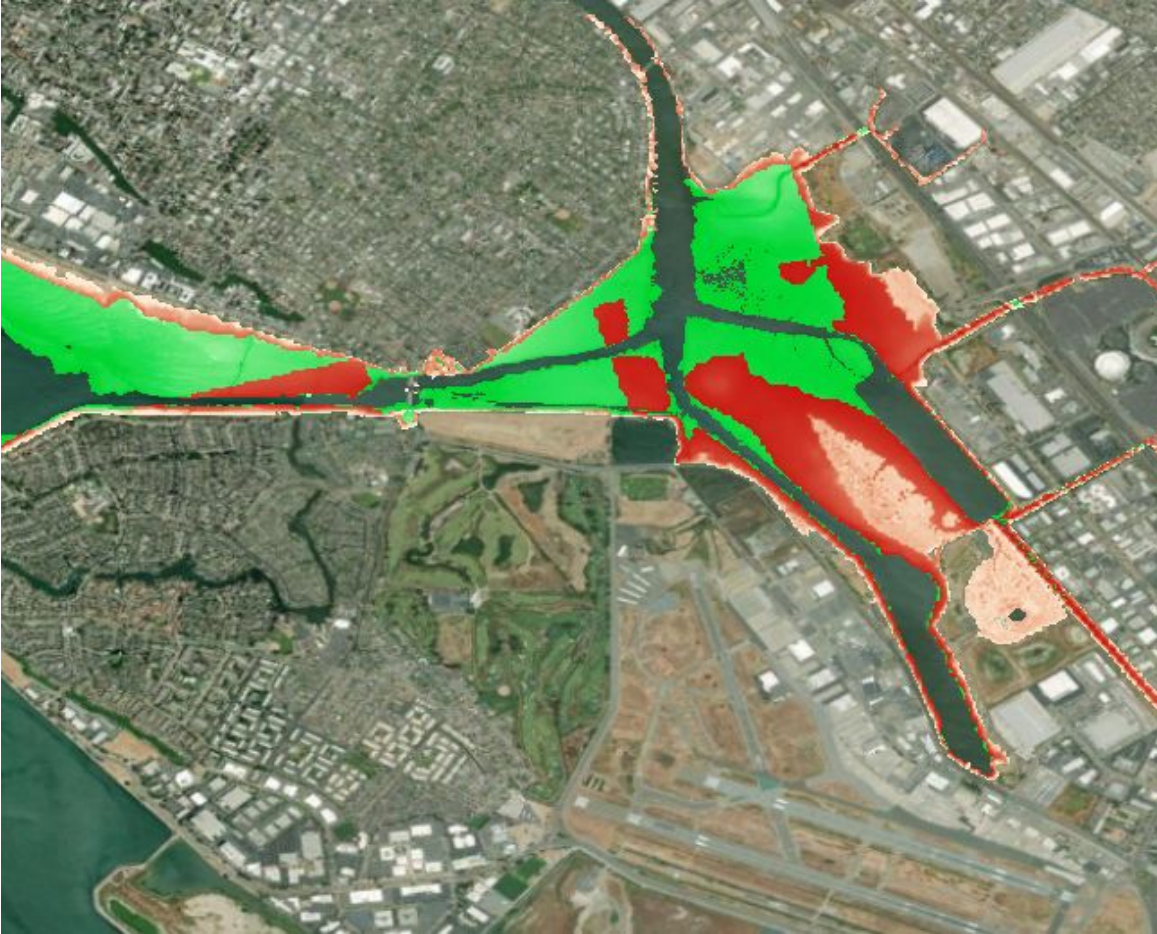
Validation

Method Exploration

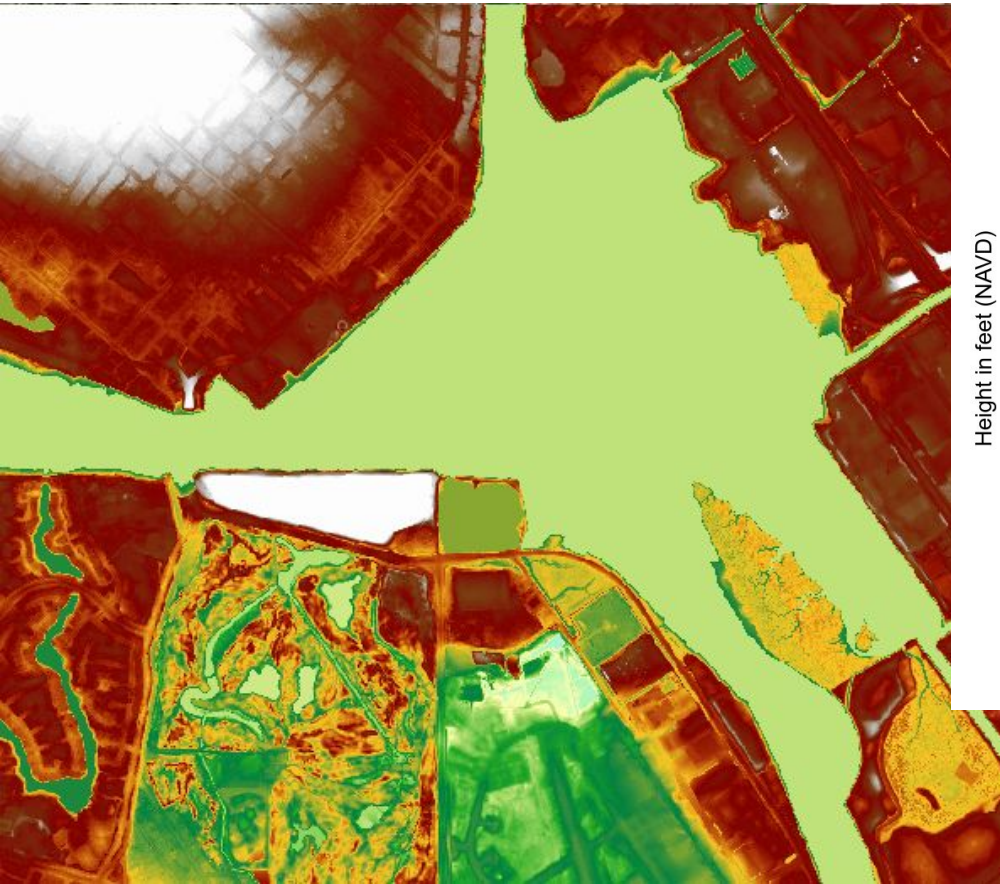
Sediment Transport Modeling Coordination

2016 - 2018

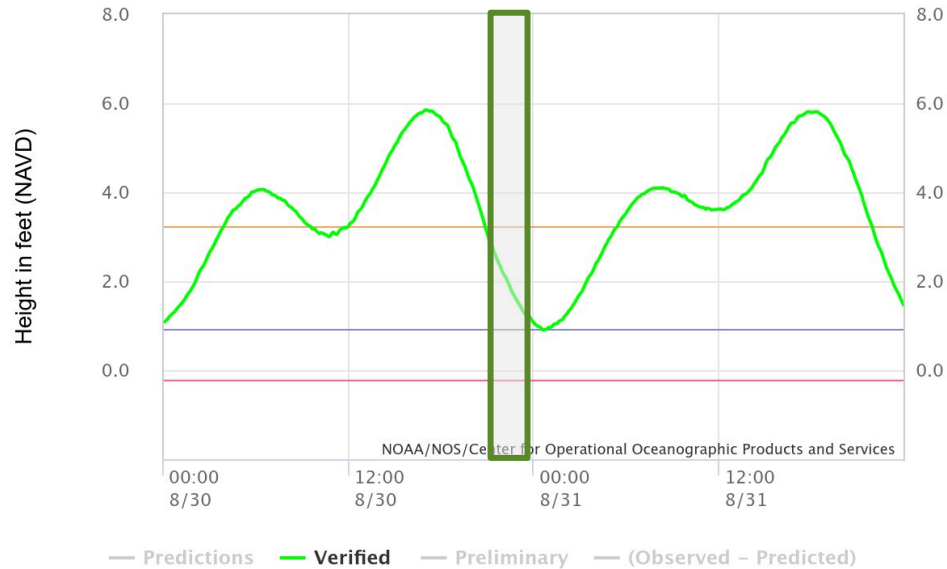
Validation - Alameda Lidar Aug. 2019 (red)



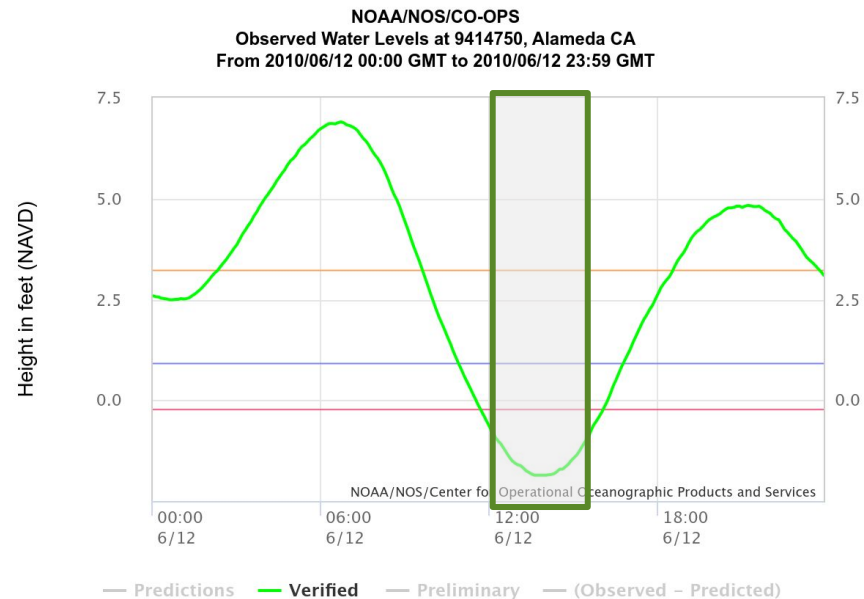
Validation? - Lidar August 2025



NOAA/NOS/CO-OPS
Observed Water Levels at 9414750, Alameda CA
From 2025/08/30 00:00 LST/LDT to 2025/08/31 23:59 LST/LDT

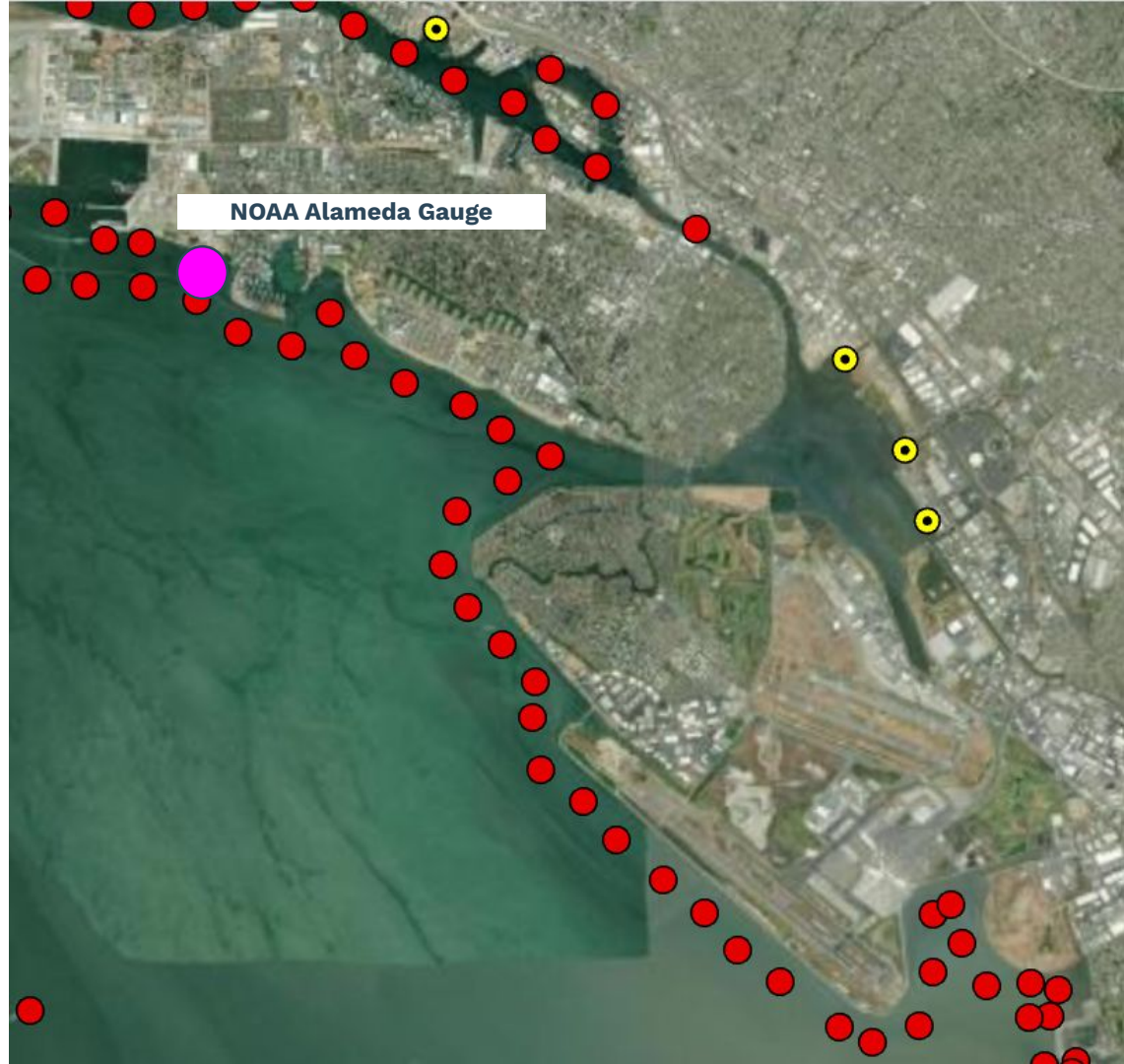


Validation - Alameda Lidar June 2010



NAVD88 Water Levels

- **Alameda Tide Gauge**
 - 6 minute interval
- **USGS/Deltares Community Model**
 - 10 minute interval
 - 1950-2021
- **Adjusted Tide Gauge**
 - Offset, amplitude, lag
- **NOAA CORA** (*Available Sept. 2026*)
 - 1 hour interval
 - 500m Grid
- **SFEI Open Bay Model**



Sentinel-2 Outputs

11/1/2018 - 9/30/2019

72 images

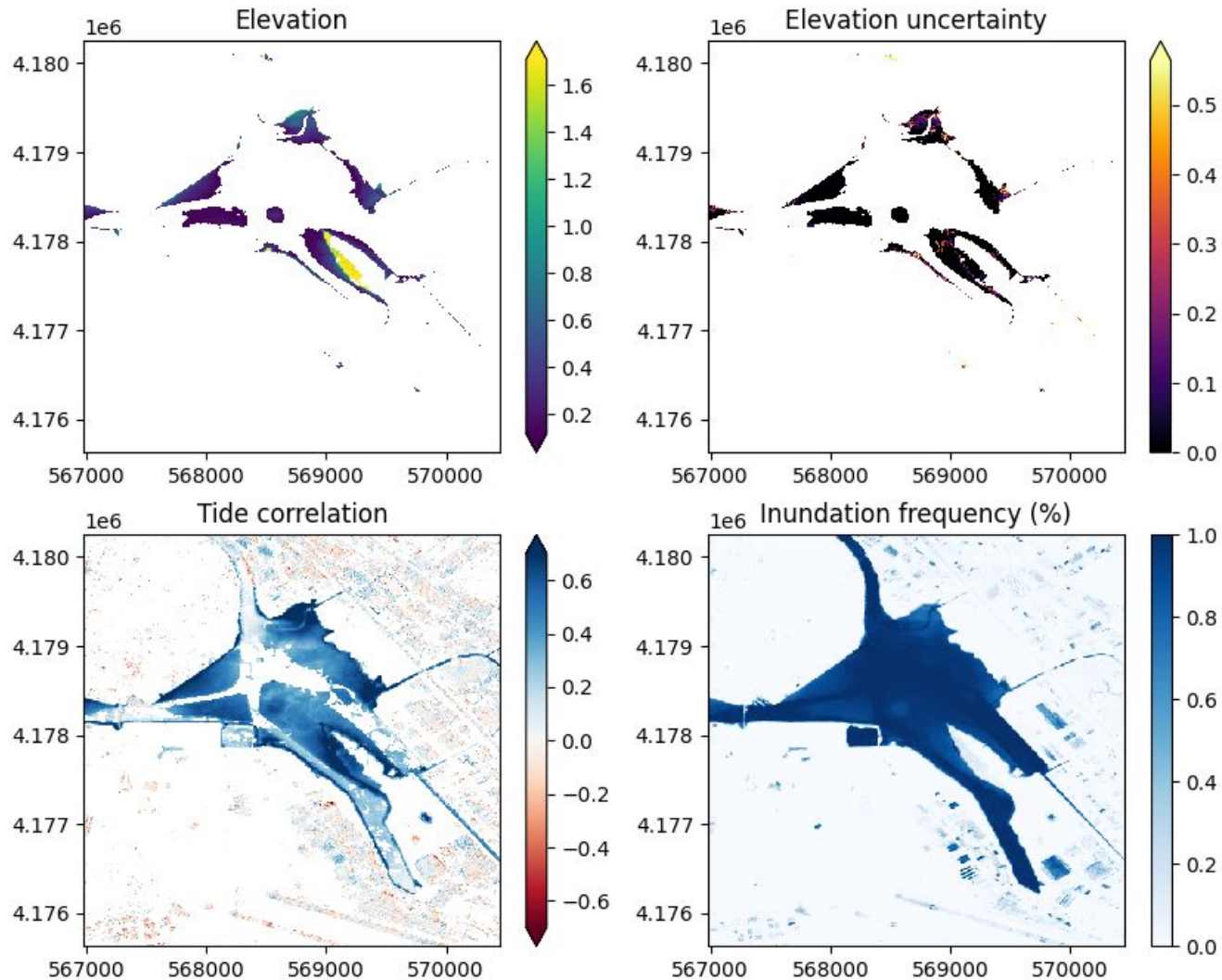
$n = 4,271$

Bias = 0.014m

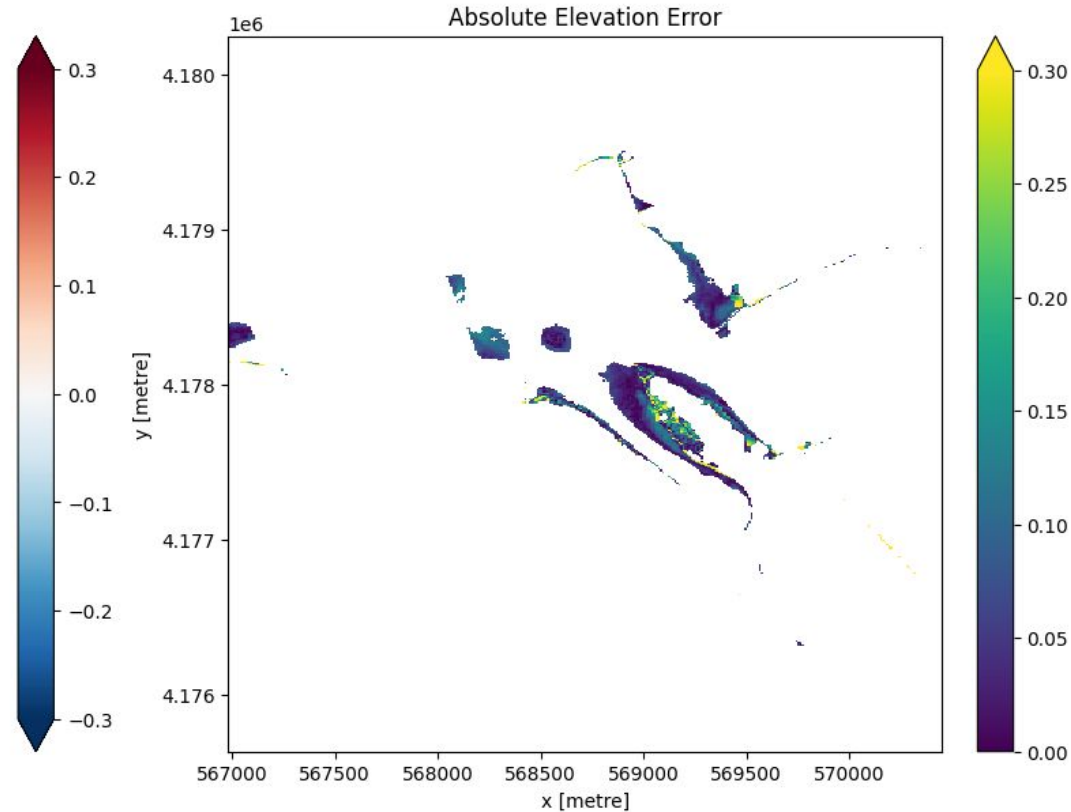
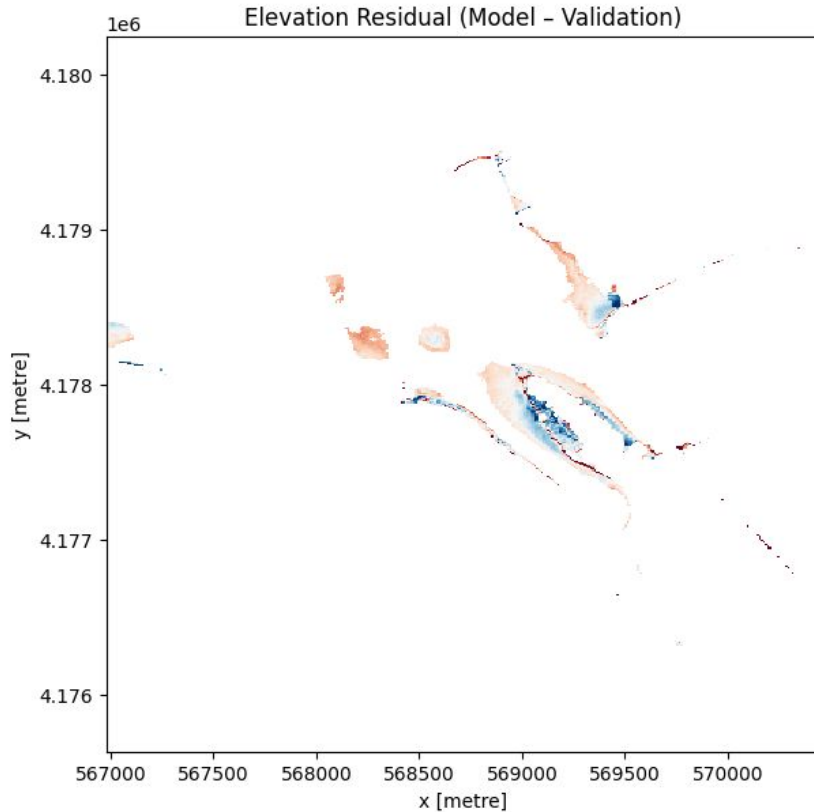
MAE = 0.08m

RMSE = 0.121m

Median Error: 0.025m



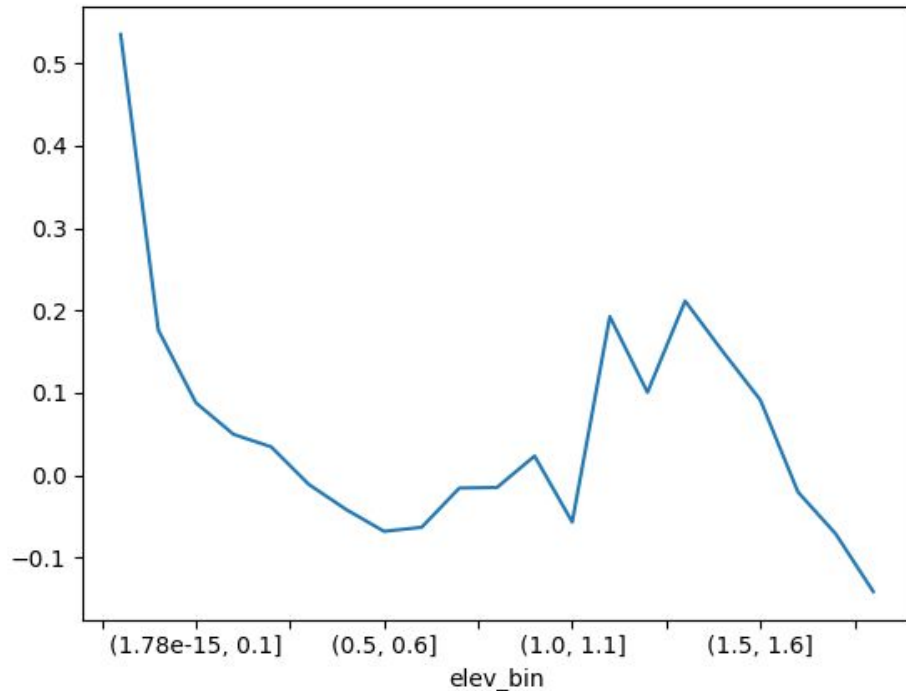
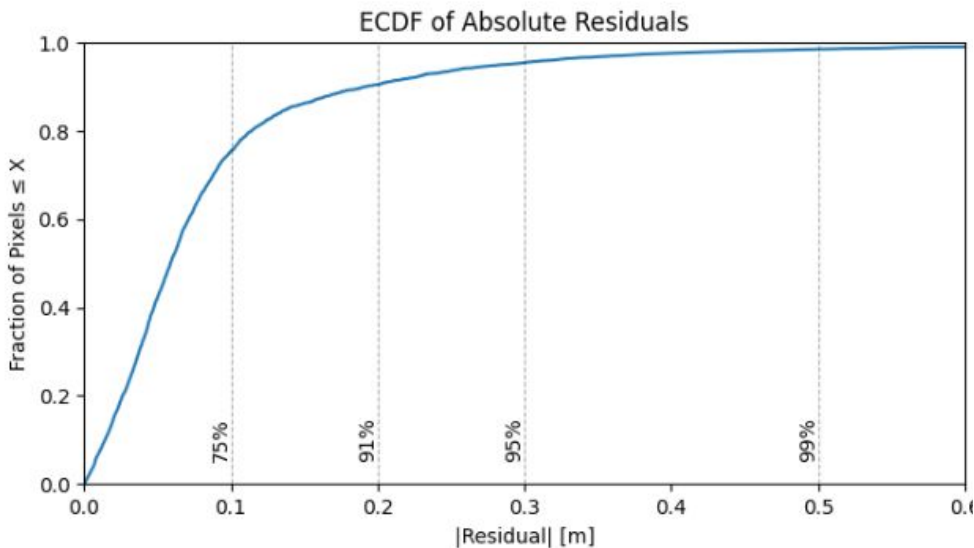
Sentinel-2 Validation



Sentinel-2 Residuals

- 75% of pixels have less than 10cm error
- 91% less than 20cm

- Higher accuracy within mudflat range
- Errors increase into subtidal and marsh elevations





Not Perfect, but...

Cost-Effective

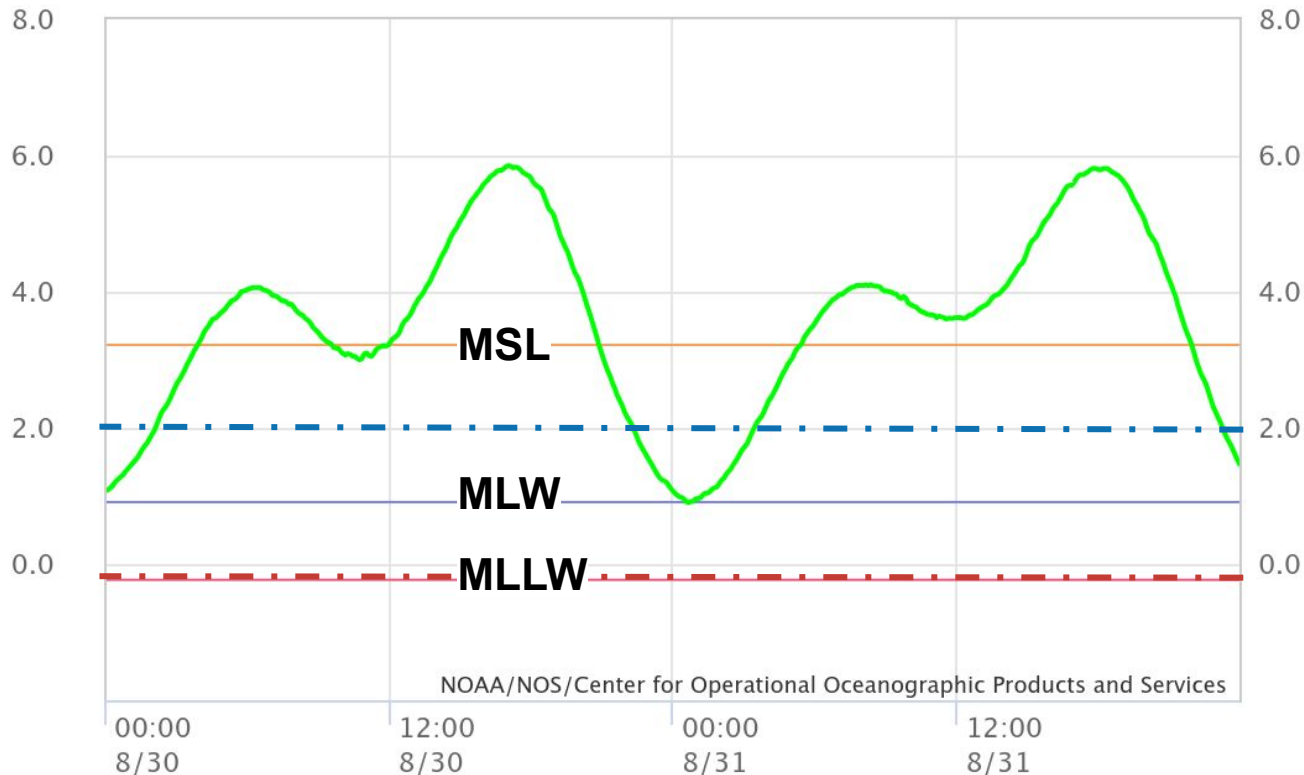
Scalable

Not Time-Dependent

Fills Data Gap

NOAA/NOS/CO-OPS
Observed Water Levels at 9414750, Alameda CA
From 2025/08/30 00:00 LST/LDT to 2025/08/31 23:59 LST/LDT

Height in feet (NAVD)



Baylands
Lidar
Acquisition
Cost
Estimates

~\$350,000

~\$400,000

~\$500,000

— Predictions — Verified — Preliminary — (Observed - Predicted)

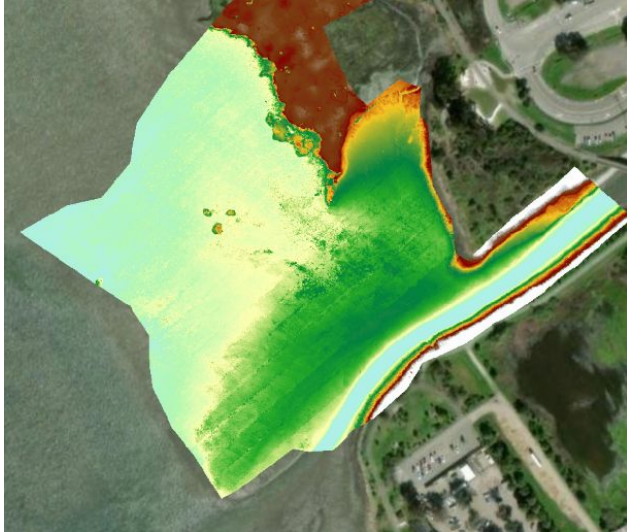
Drone-Based Green-Wave Lidar Testing Depth:

- 2 - 2.5 secchi depths
- Averaging 2.3 meters



Data provided by Enso Geospatial

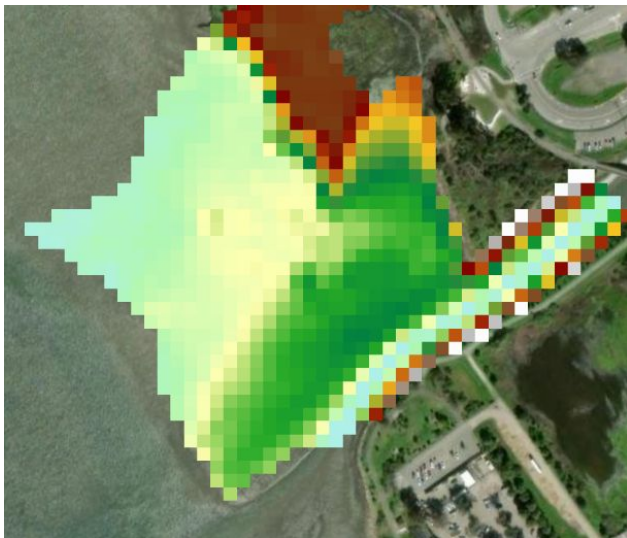
December 3,
2024 Topobathy
Lidar (Drone)



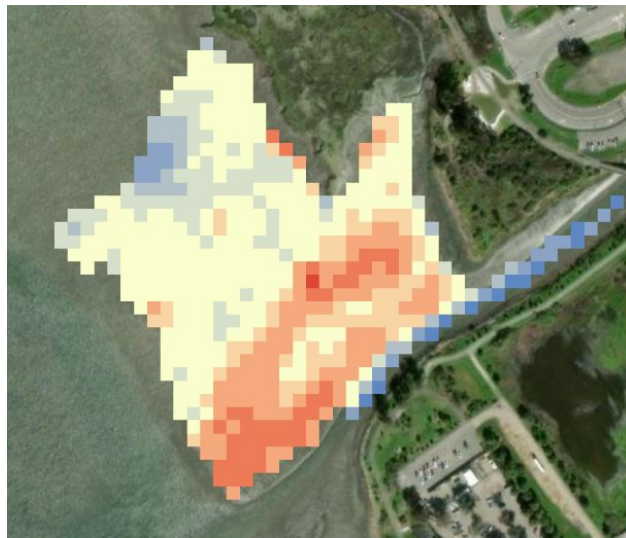
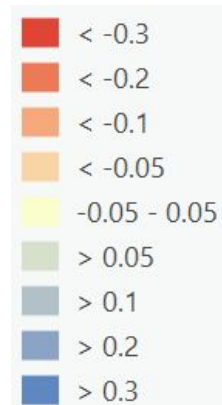
2024 Derived
Sentinel-2 DEM



2024 Topobathy
Lidar
(Resampled 10m)



Difference in
meters



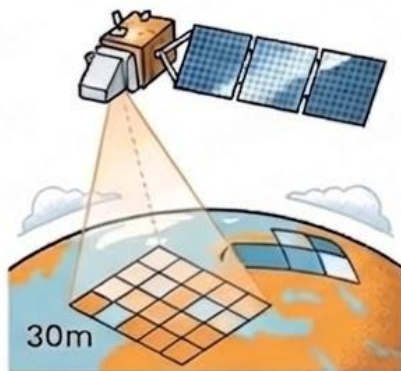


Can we do better?

Can we get better resolution?
Can we understand seasonal change?

Imagery

Landsat (30m)



1984-Present



4-band

Sentinel-2 (10m)

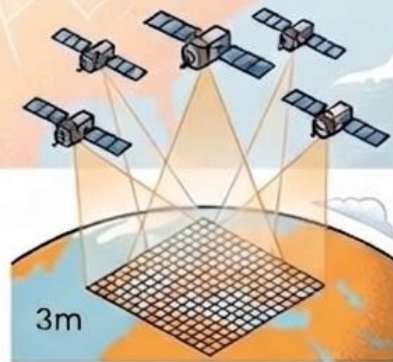


2016-Present



4-band
(plus 6 bands at
20m resolution (Red
Edge and SWIR))

Planet (3m)



Dove



4-band



Superdove



~2021-Present



8-band

Better Resolution

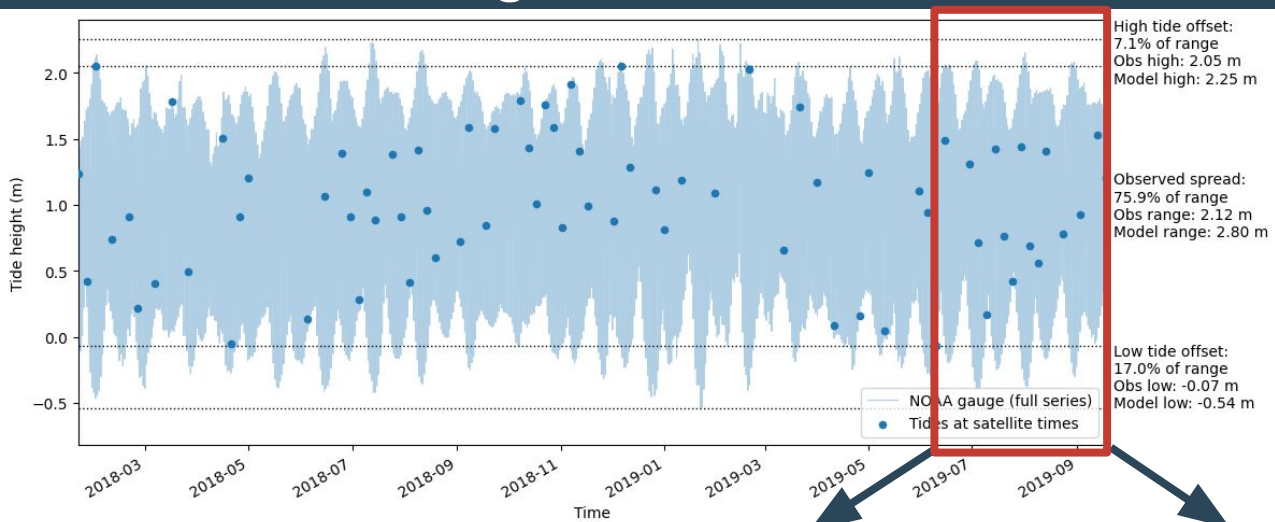
Sentinel-2 10m



Planet 3m



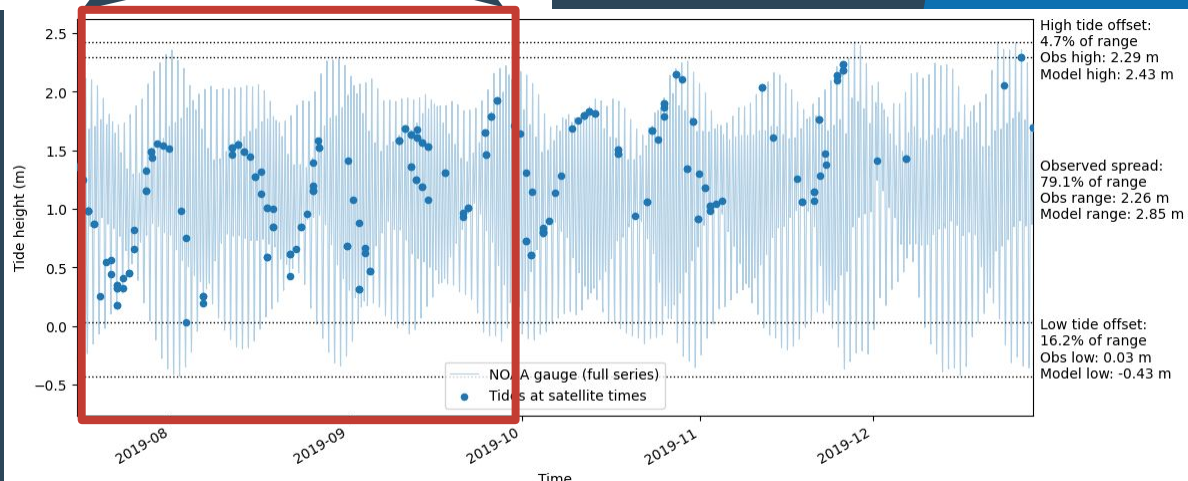
Sentinel-2 Images 2018-2019



Better
Frequency

Planet Images 2019

Between July 15 - September 30, 2019
Sentinel 2: ~10 images (Weekly)
Planet Dove: ~100 images (Daily)

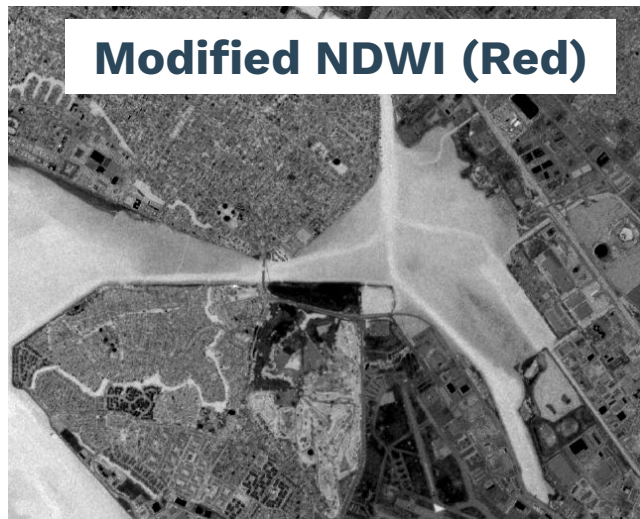
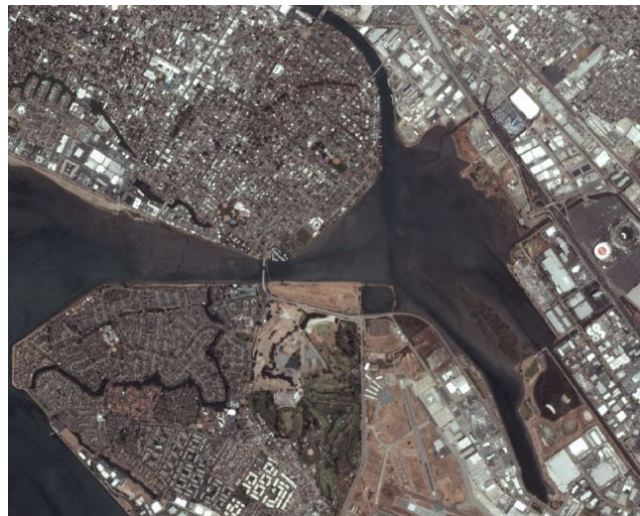


Indices

PlanetScope
Dove



4 Bands

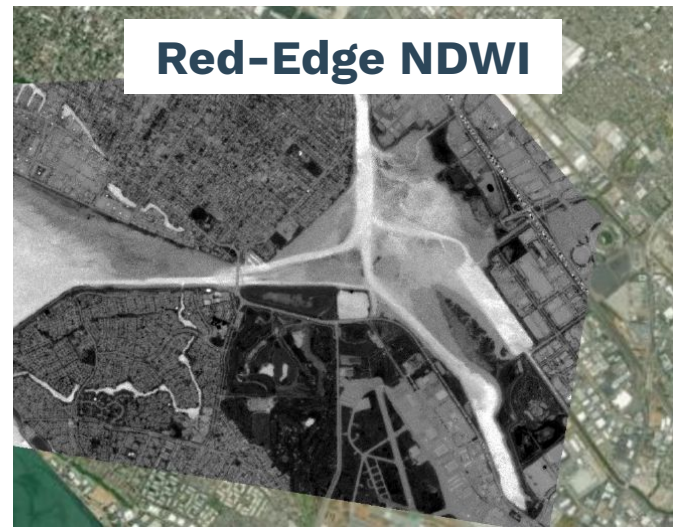
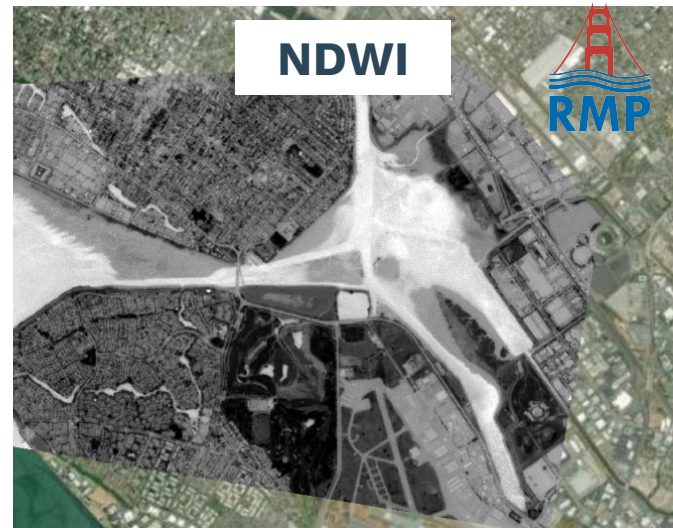


Indices

PlanetScope
Super Dove



8 Bands



PlanetScope Testing

Found older (2019) Planet Dove imagery to be radiometrically inconsistent

NDWI output values varied scene to scene

Applied a baseline adjustment to NIR band

Calculated 1% min value and subtracted from scene

Found NDWI threshold to be higher than Landsat/Sentinel-2

Increased from 0.0 to values between 0.15-0.2

Planet Outputs

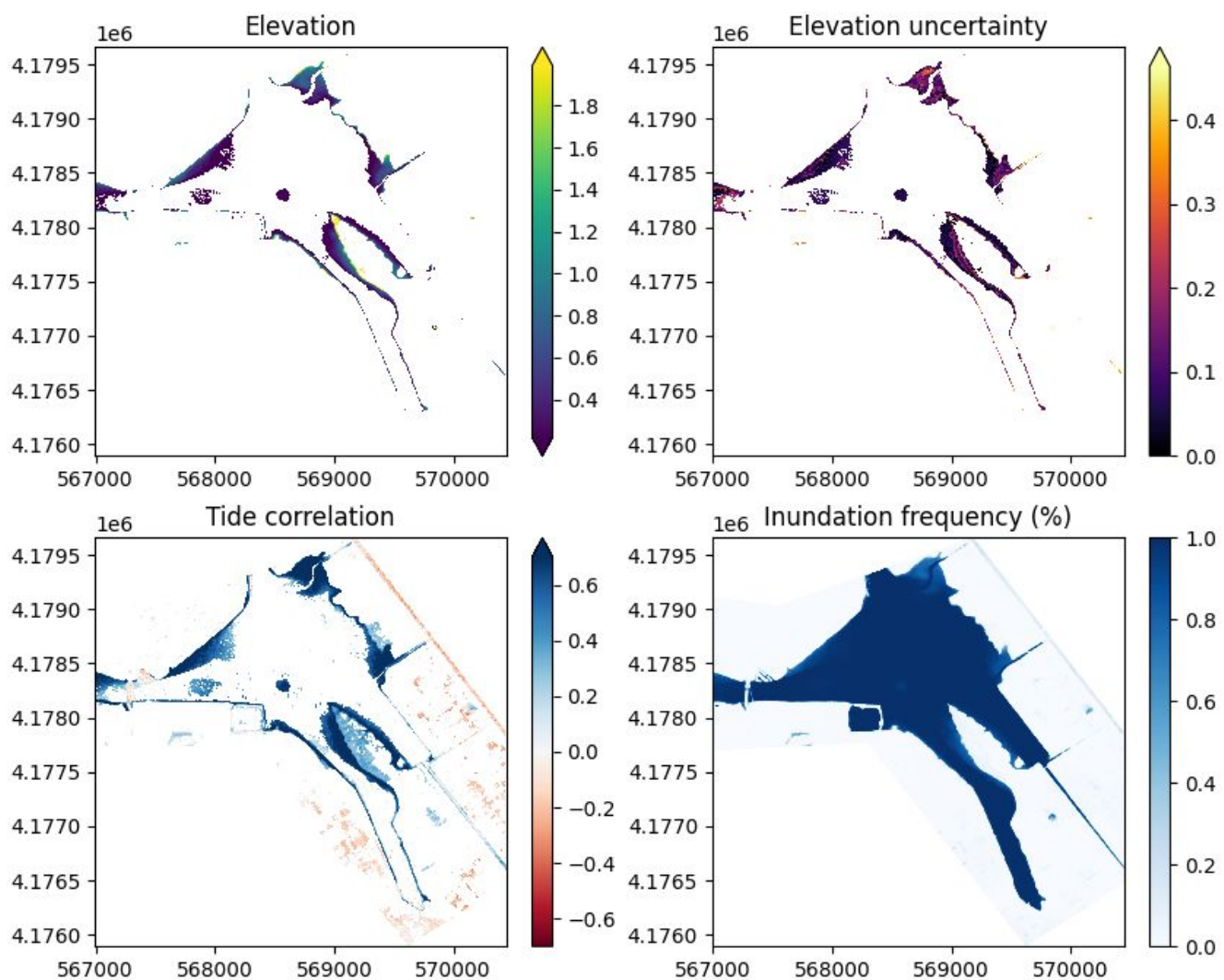
$n = 31,374$

Bias = 0.08m

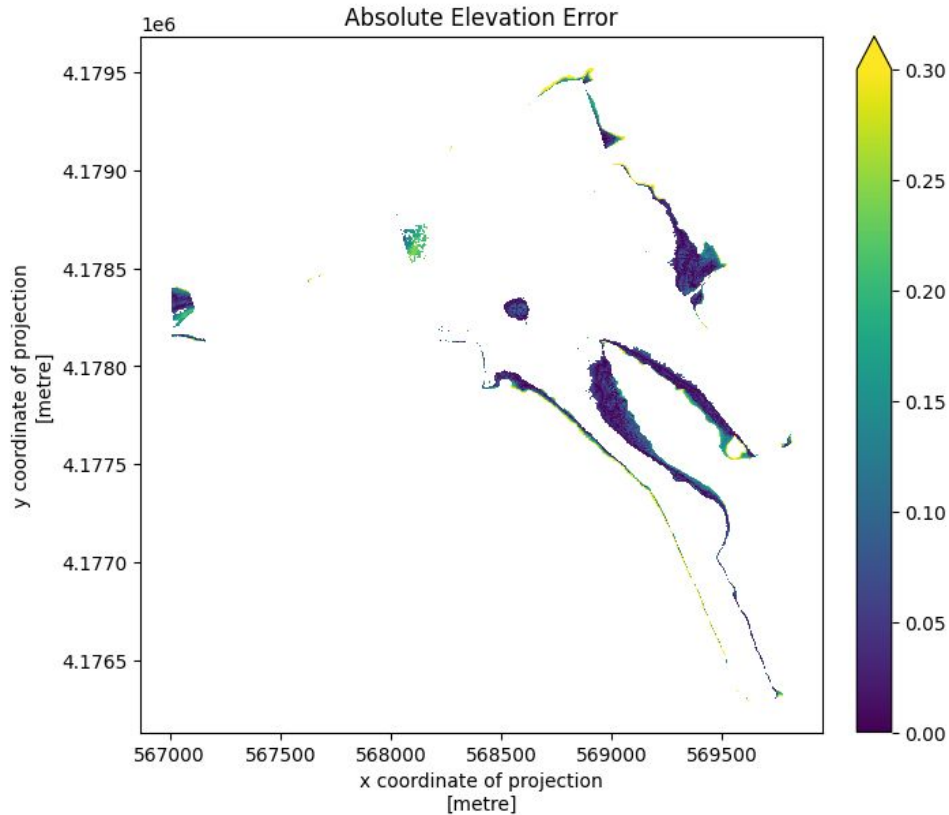
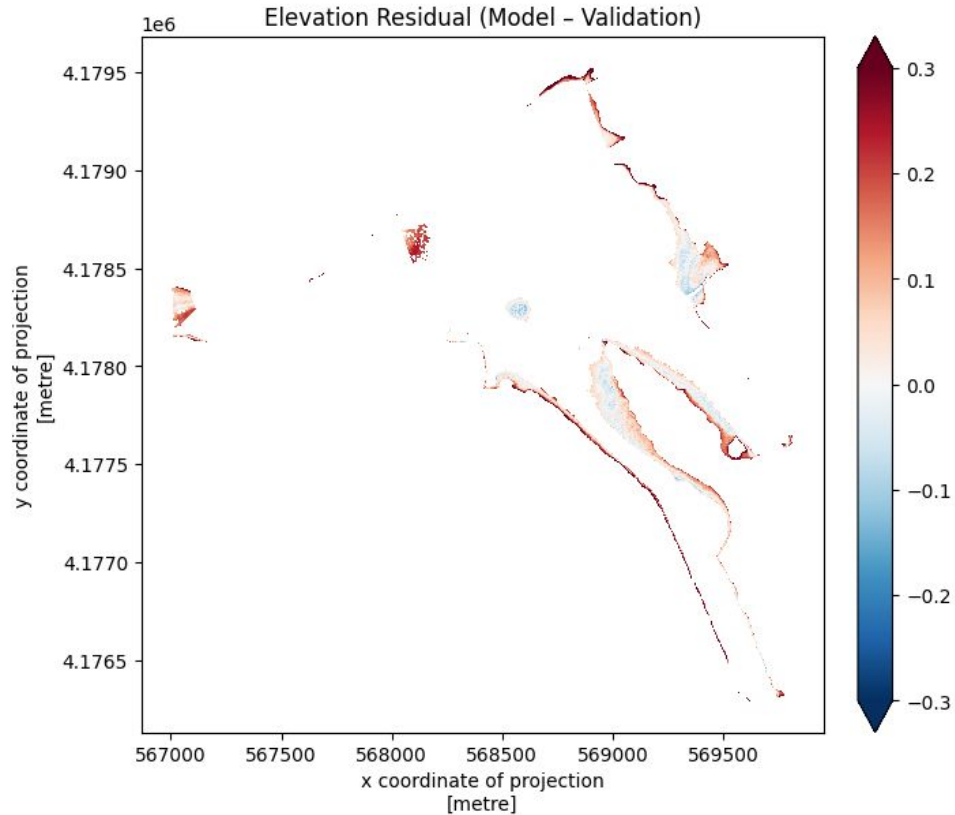
MAE = 0.09m

RMSE = 0.14m

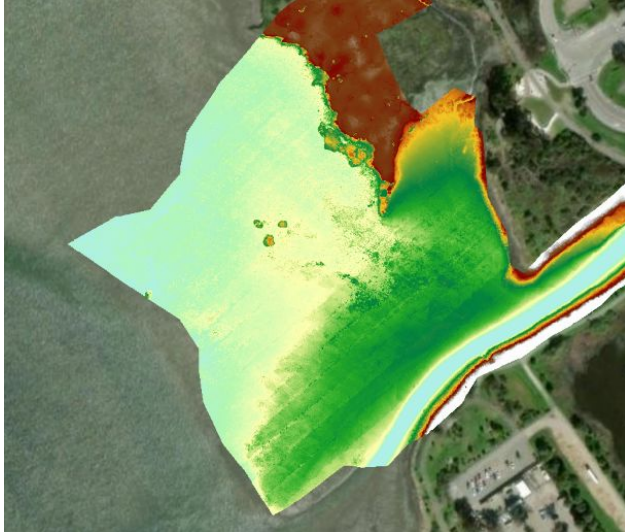
Median Error: 0.025m



PlanetScope Validation



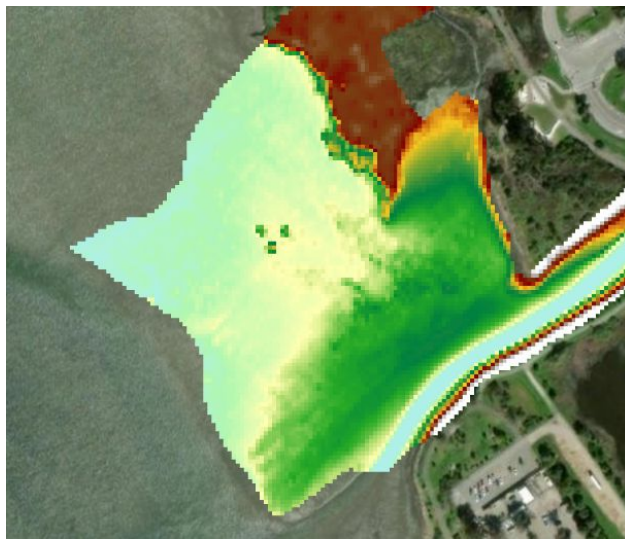
December 3,
2024 Topobathy
Lidar (Drone)



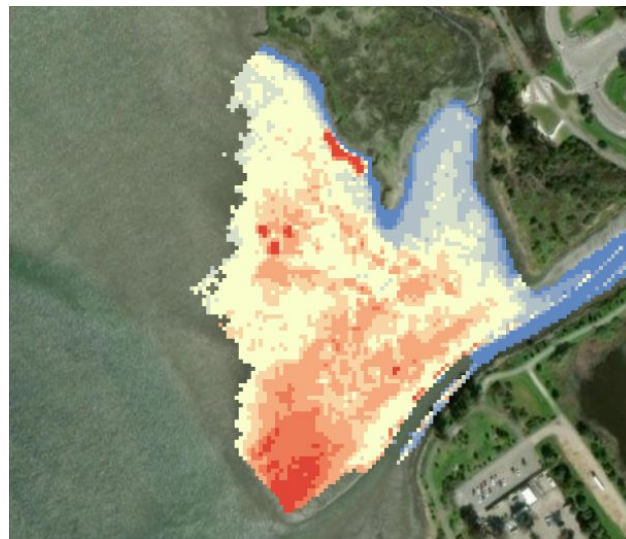
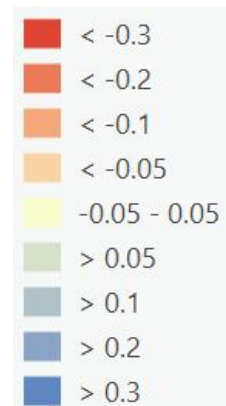
September -
December 2019
Derived Planet
DEM



2024 Topobathy
Lidar
(Resampled 3m)



5 Year Difference i
meters



Bay Sediment Transport Modeling



Figure 11. Sediment deposition (meters) after 10 months.

- Integral Sediment Transport Modeling
 - October 2016 - July 2017

Integral 10-month Deposition WY 2017

Change between 2016 and 2017
DEM (Red = -0.3m erosion)



Figure 11. Sediment deposition (meters) after 10 months.

Bay Sediment Transport Modeling

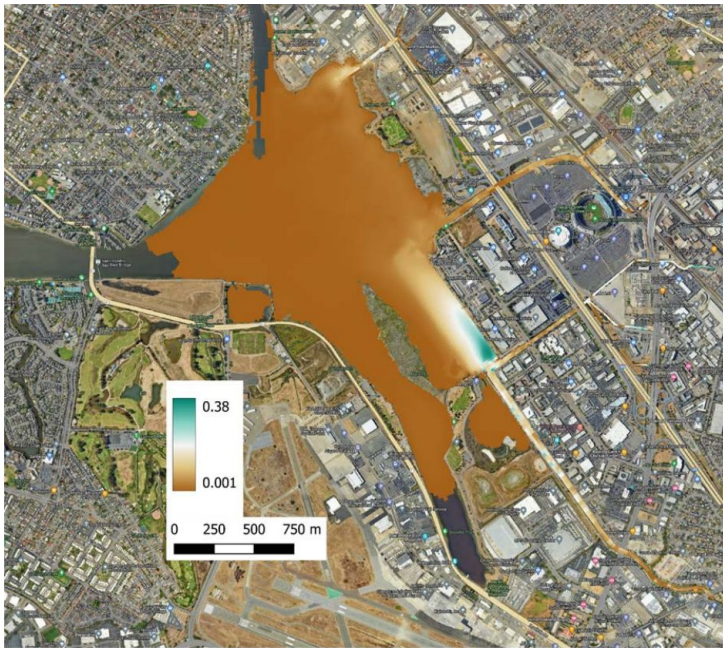
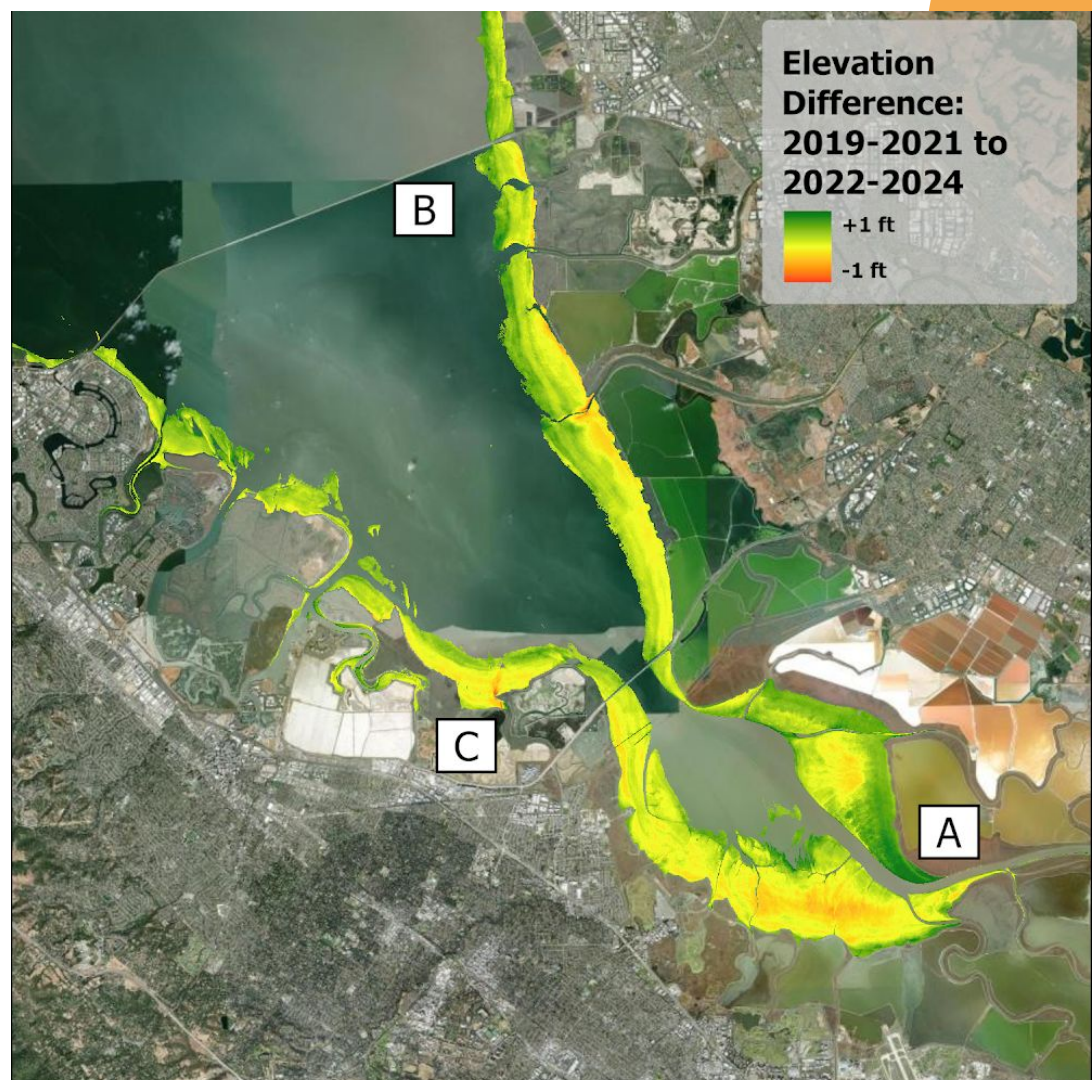


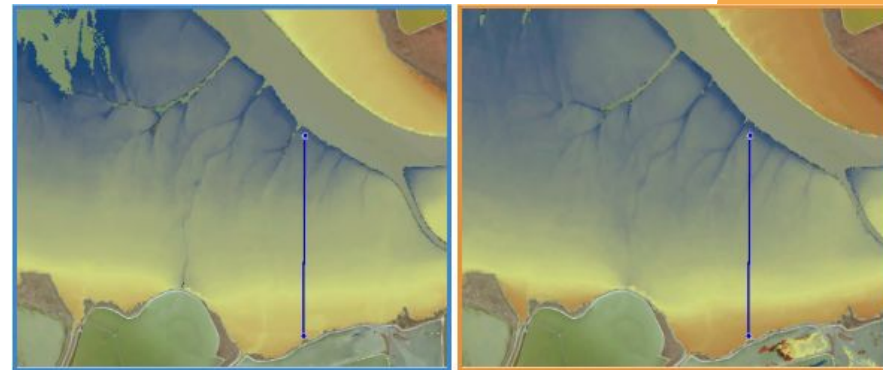
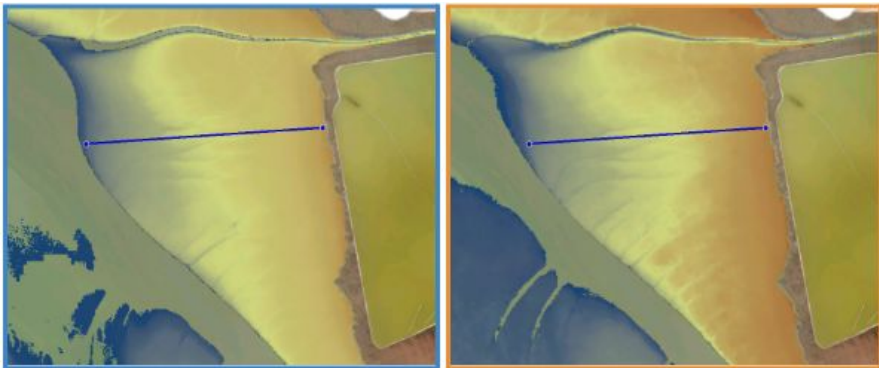
Figure 11. Sediment deposition (meters) after 10 months.

- Bay Model Comparison
 - Tributaries, Potential Sites using Planet
 - Petaluma River Mouth
 - Steinberger Slough
 - Guadalupe Slough

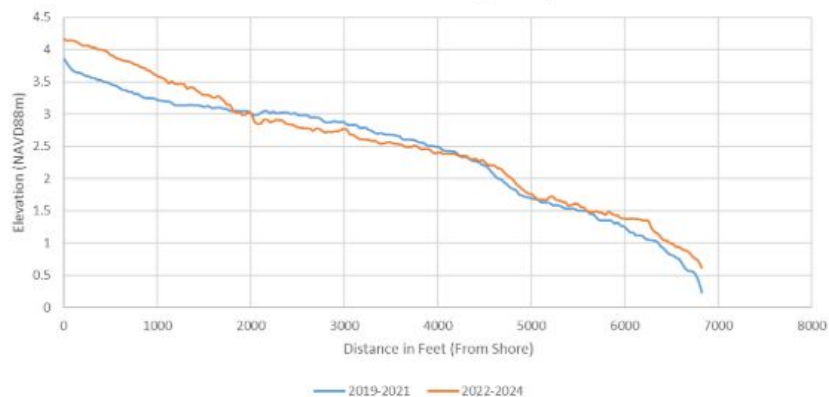
Application Change Detection



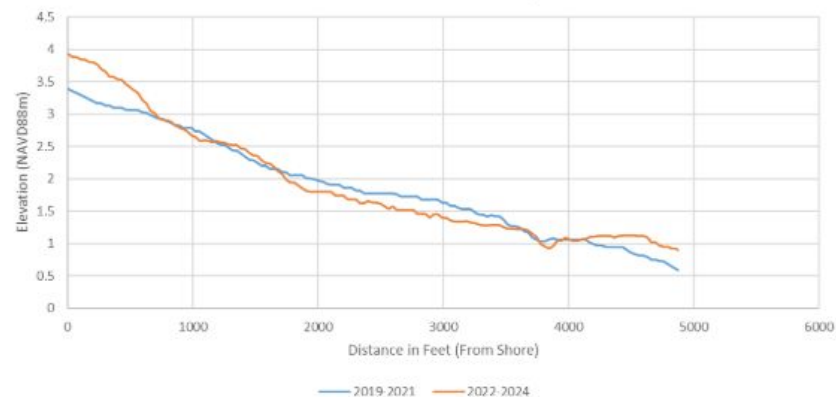
Application - Mudflat Curvature



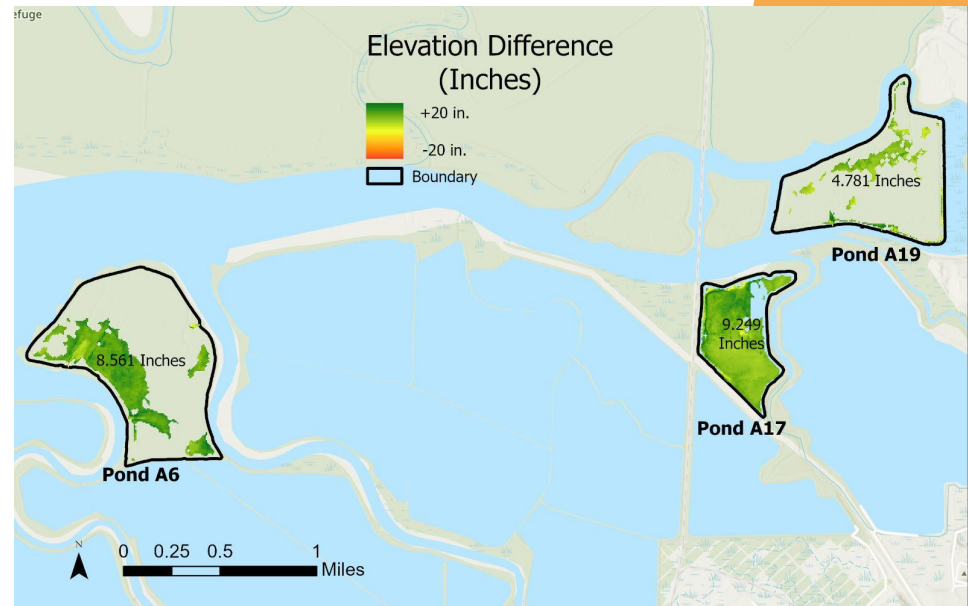
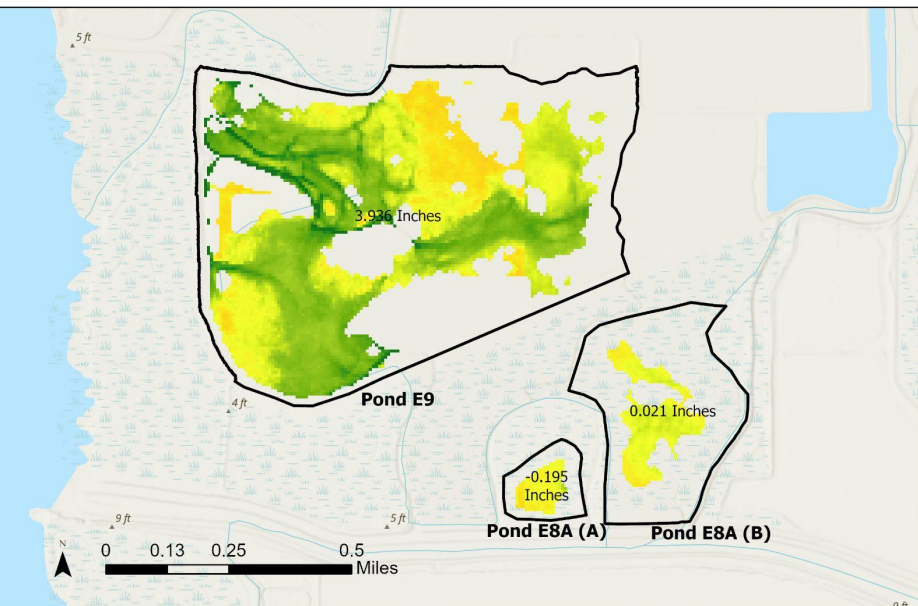
Intertidal Mudflat Elevation: South Bay, West/Calaveras Point



Intertidal Mudflat Elevation: South Bay, South Shore

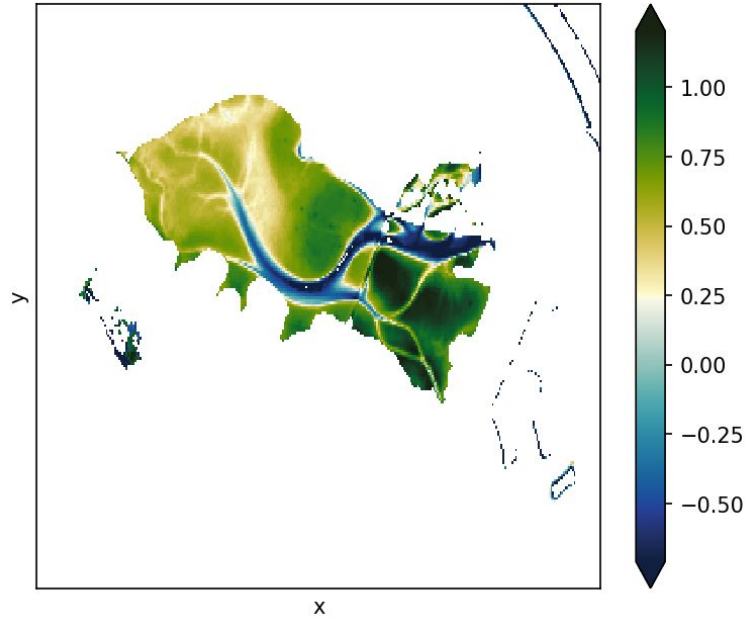


Application - Restoration Accretion



Related Projects

Intertidal Elevation
2017-2019



1. Integral/SFEI Sediment
Transport Modeling

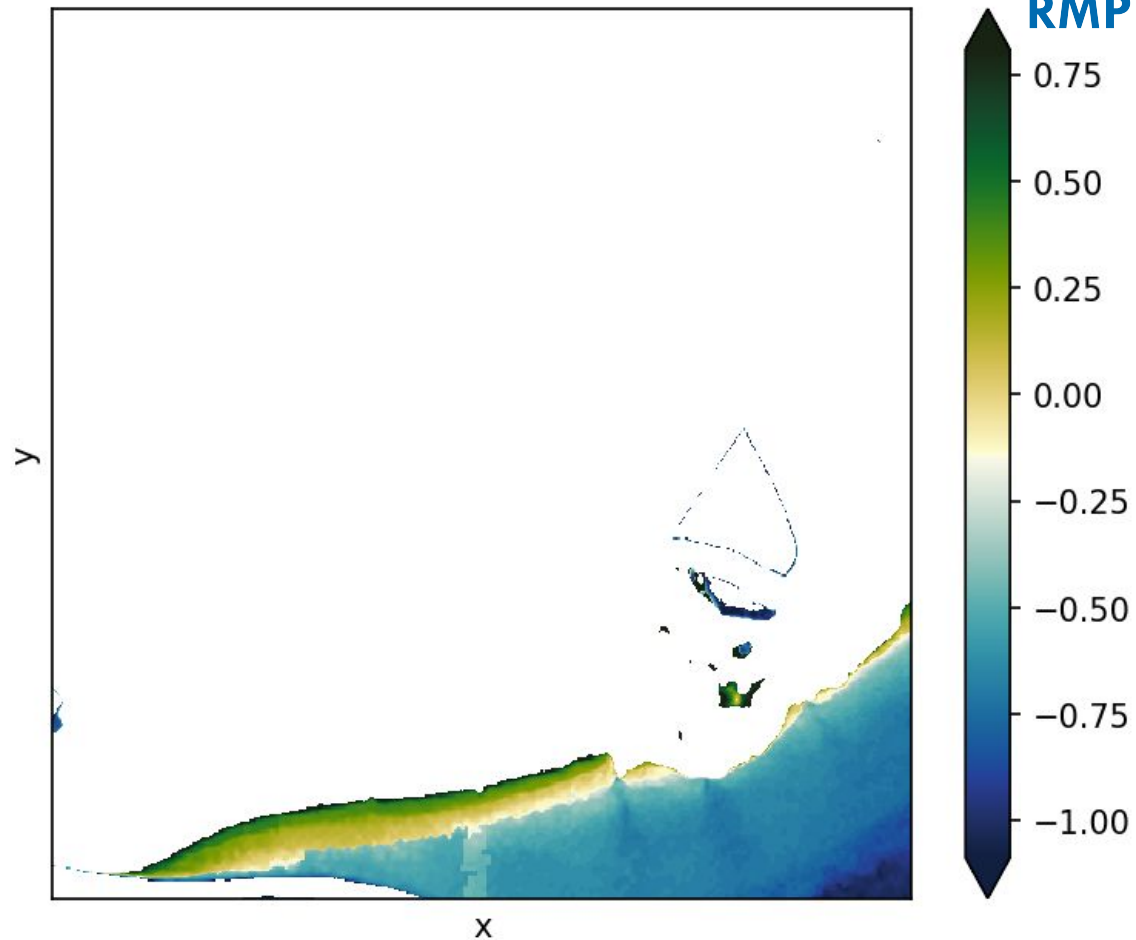


2. San Pablo Bay/Suisun
Sediment Conceptual Model

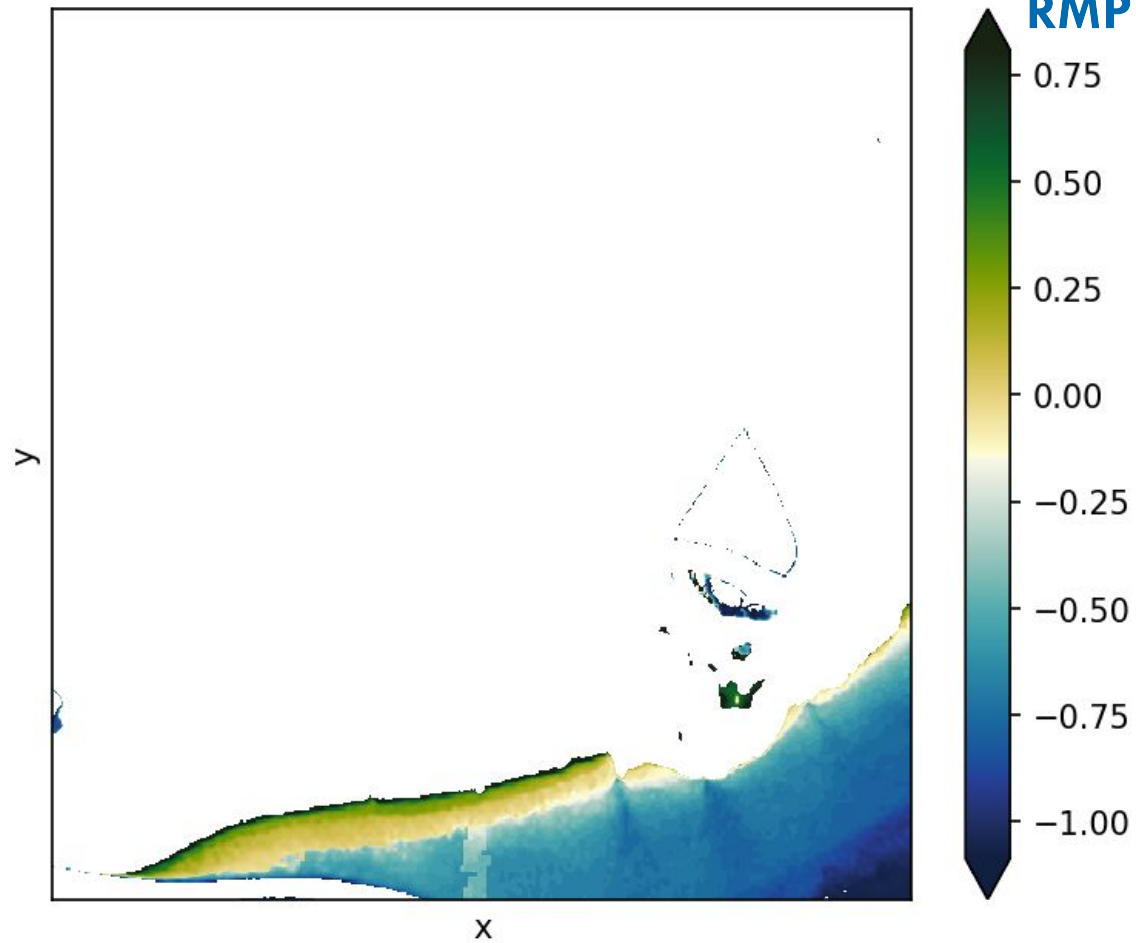


3. USGS Restoration Accretion
Analysis

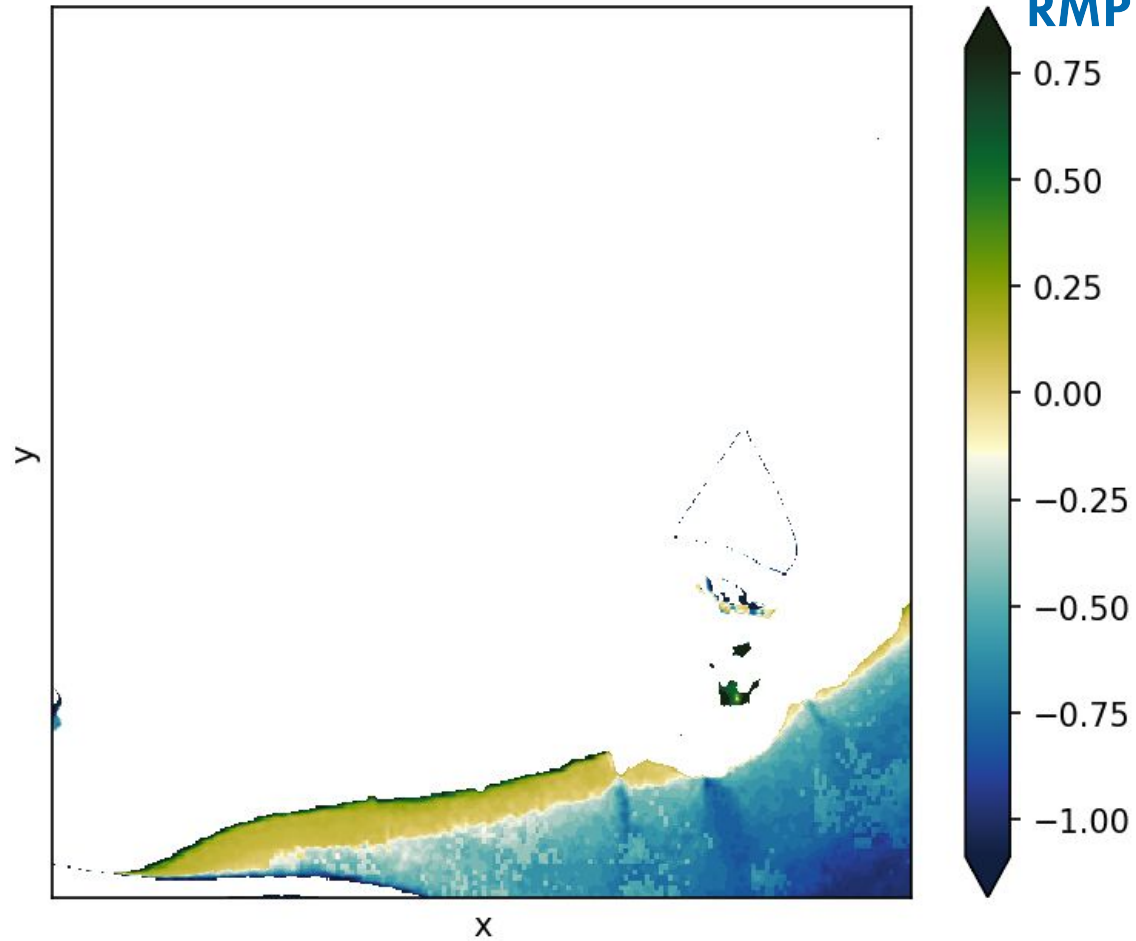
Intertidal Elevation 1985-1989



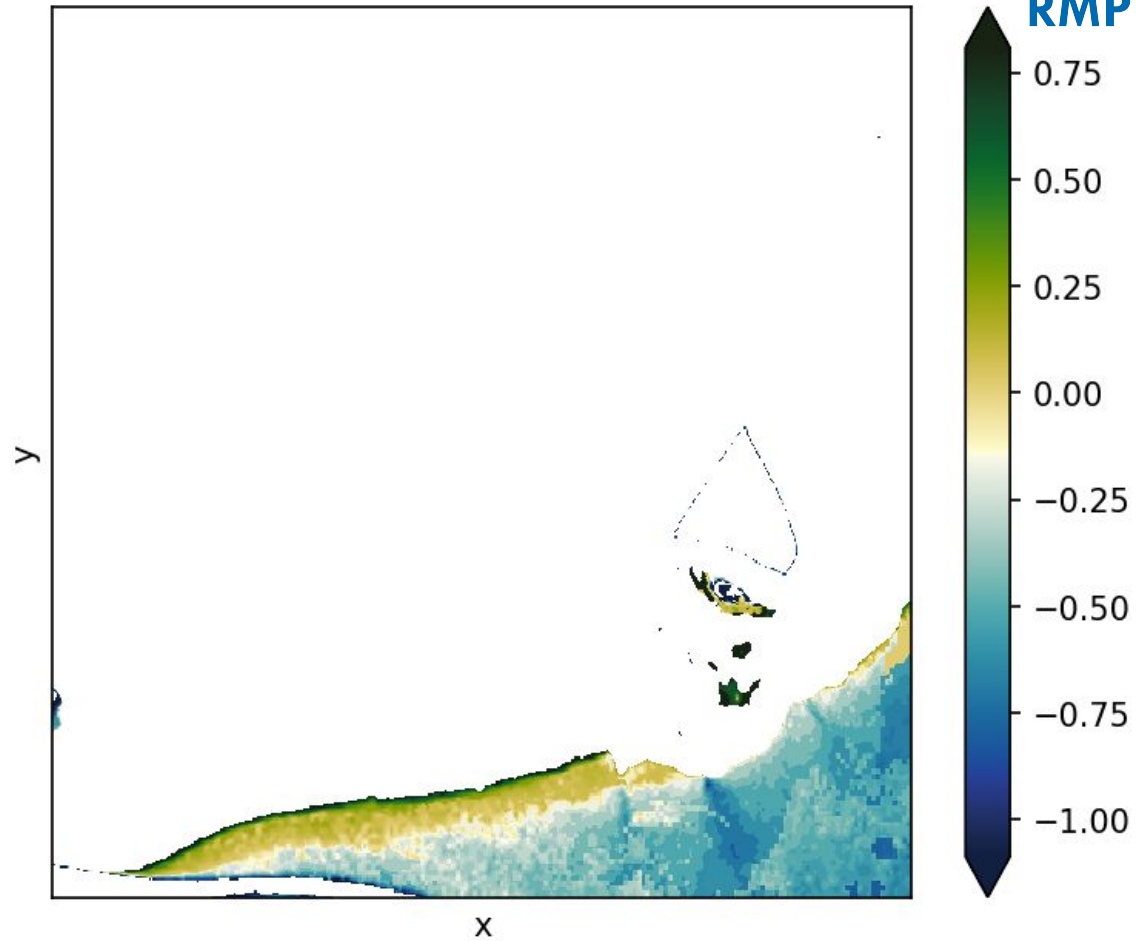
Intertidal Elevation 1986-1990



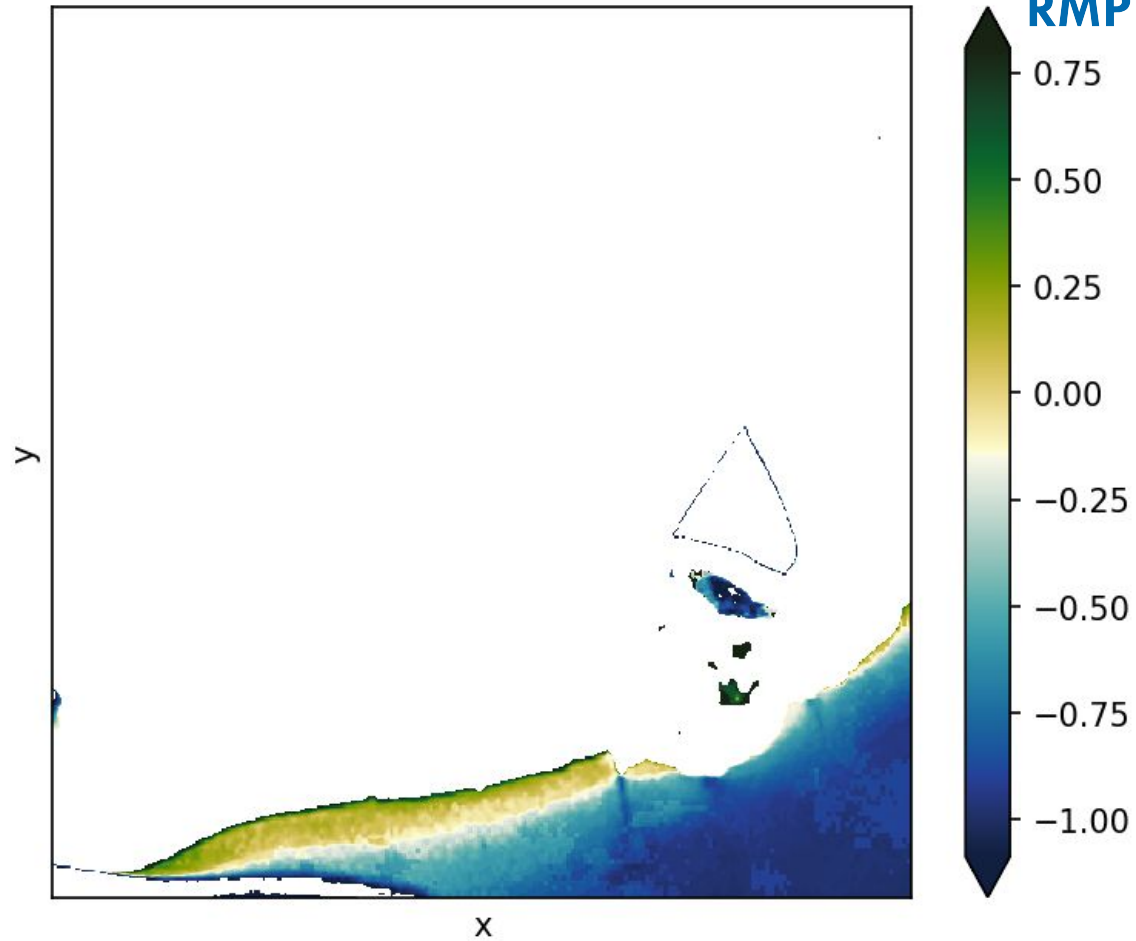
Intertidal Elevation 1987-1991



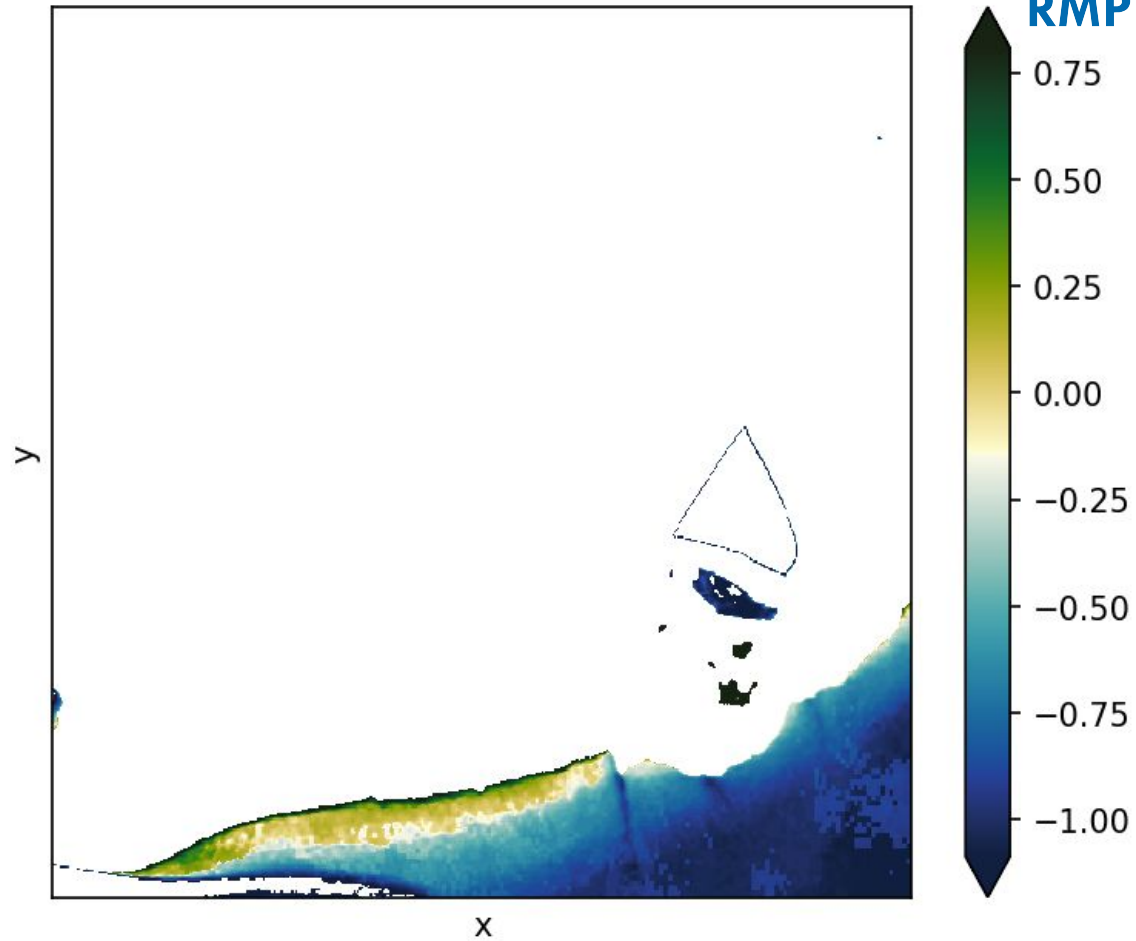
Intertidal Elevation 1988-1992



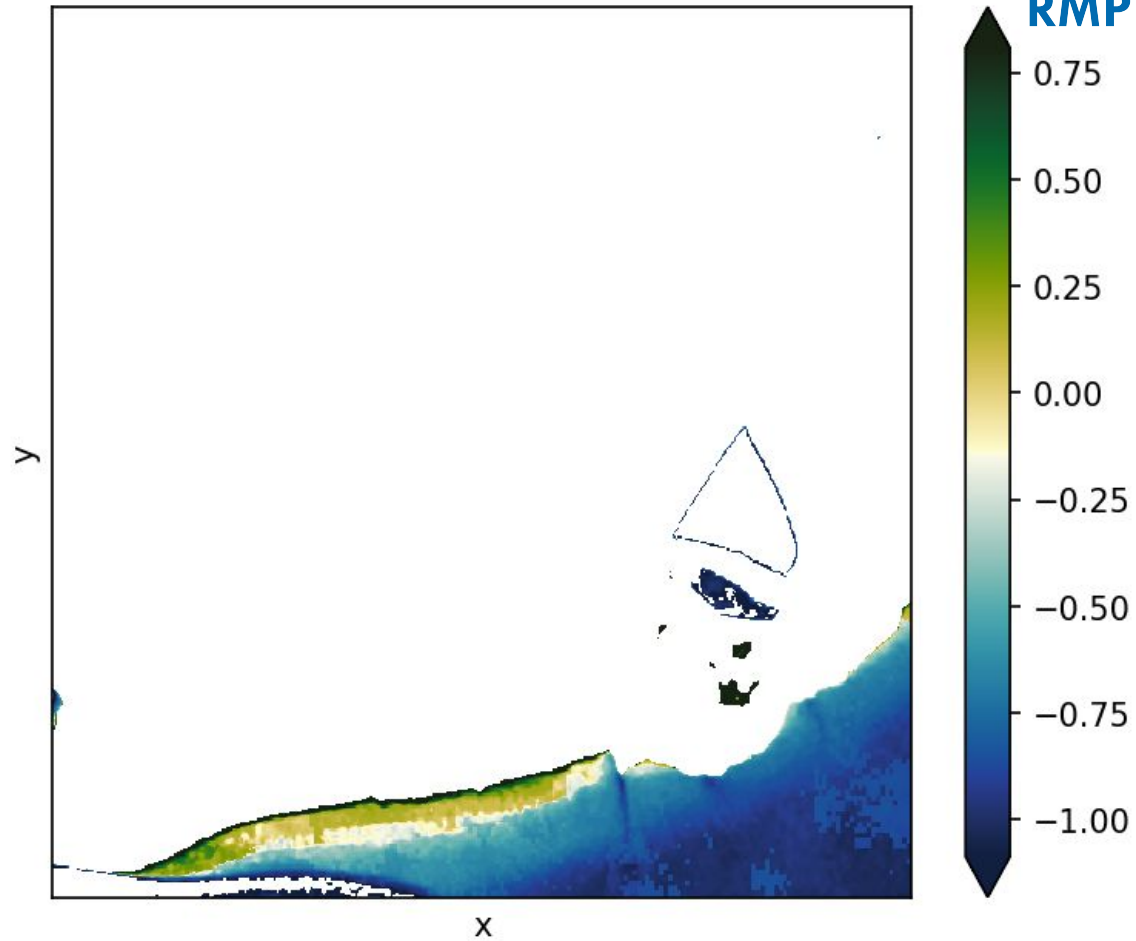
Intertidal Elevation 1989-1993



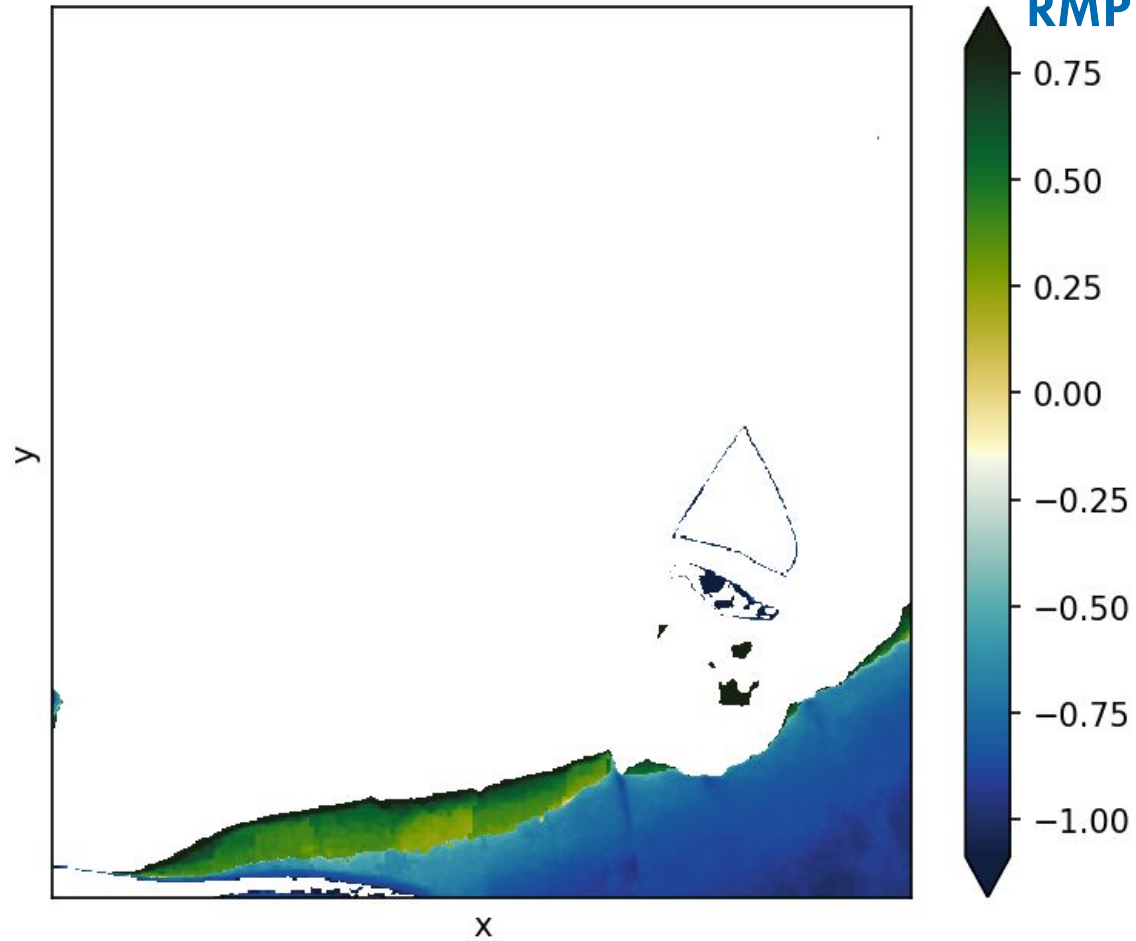
Intertidal Elevation 1990-1994



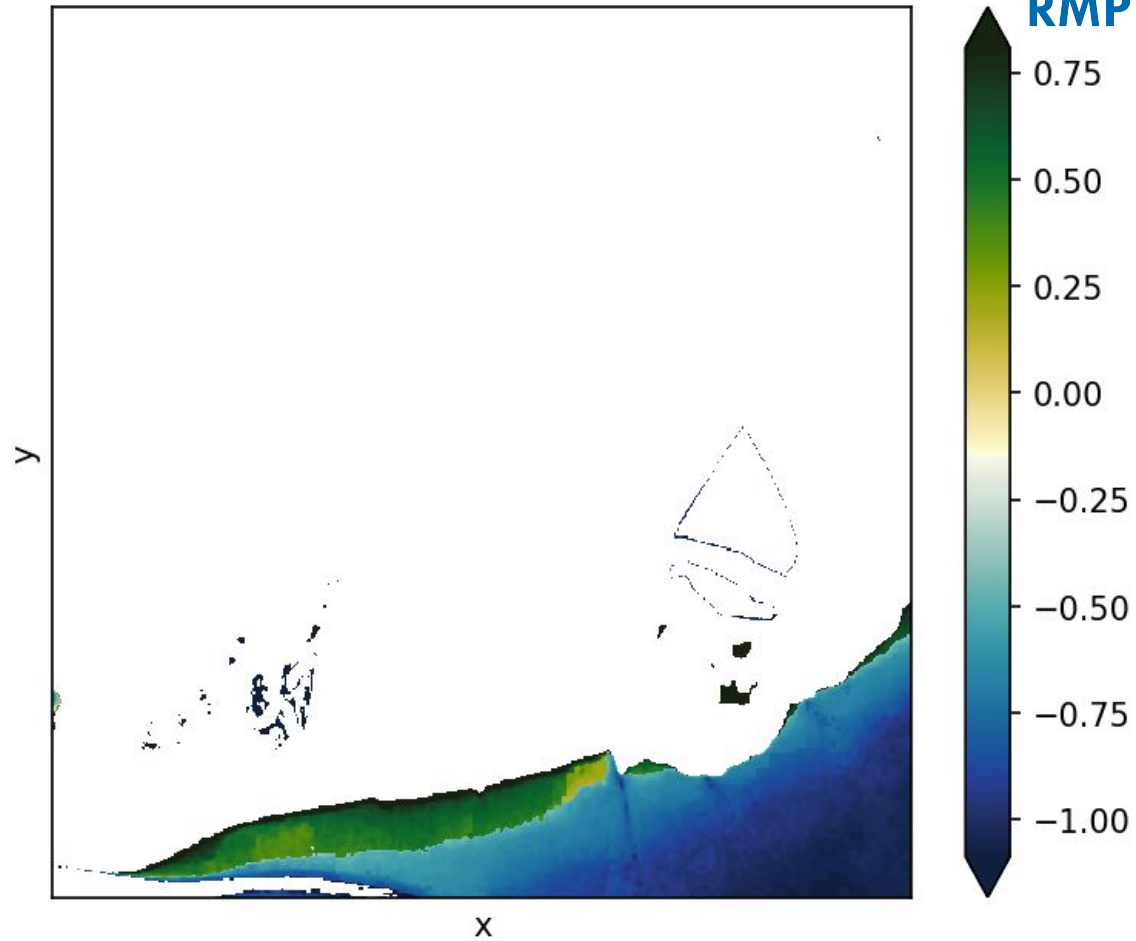
Intertidal Elevation 1991-1995



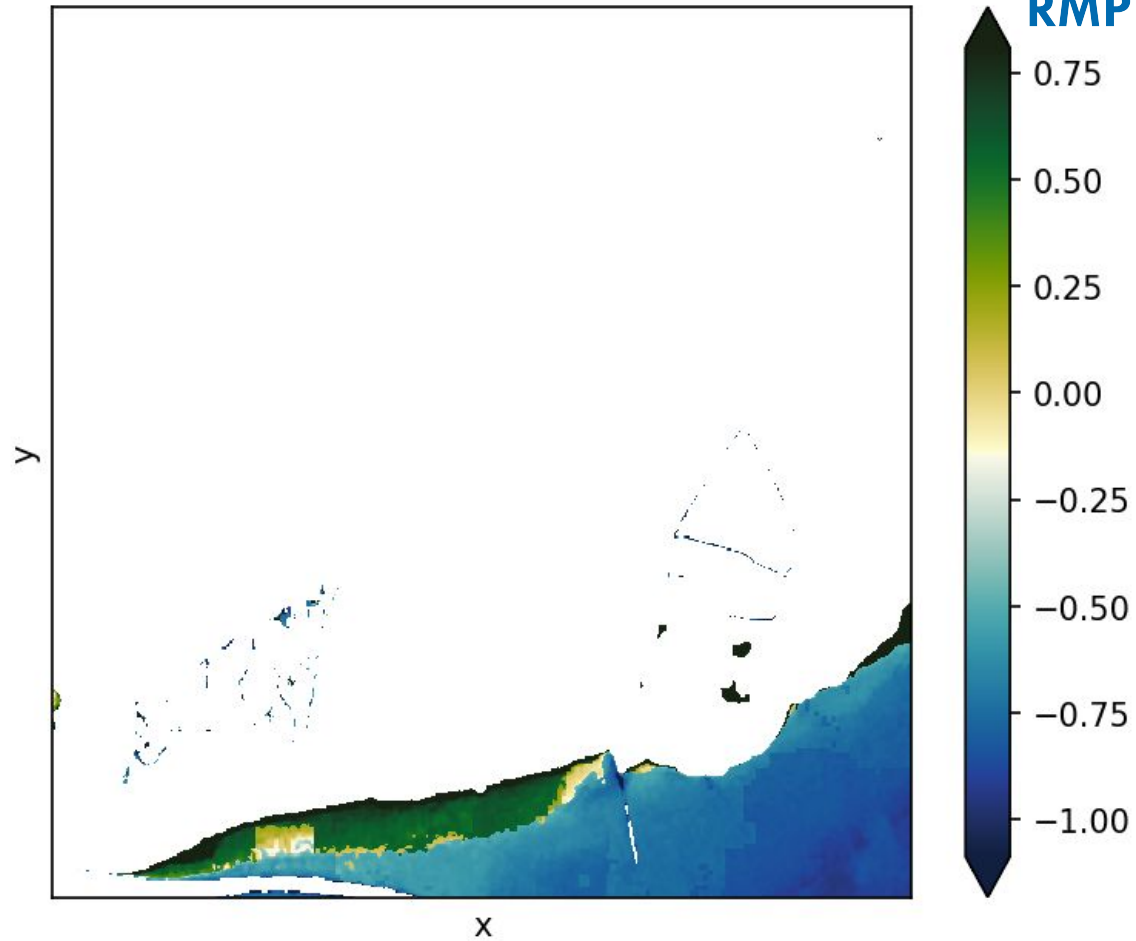
Intertidal Elevation 1992-1996



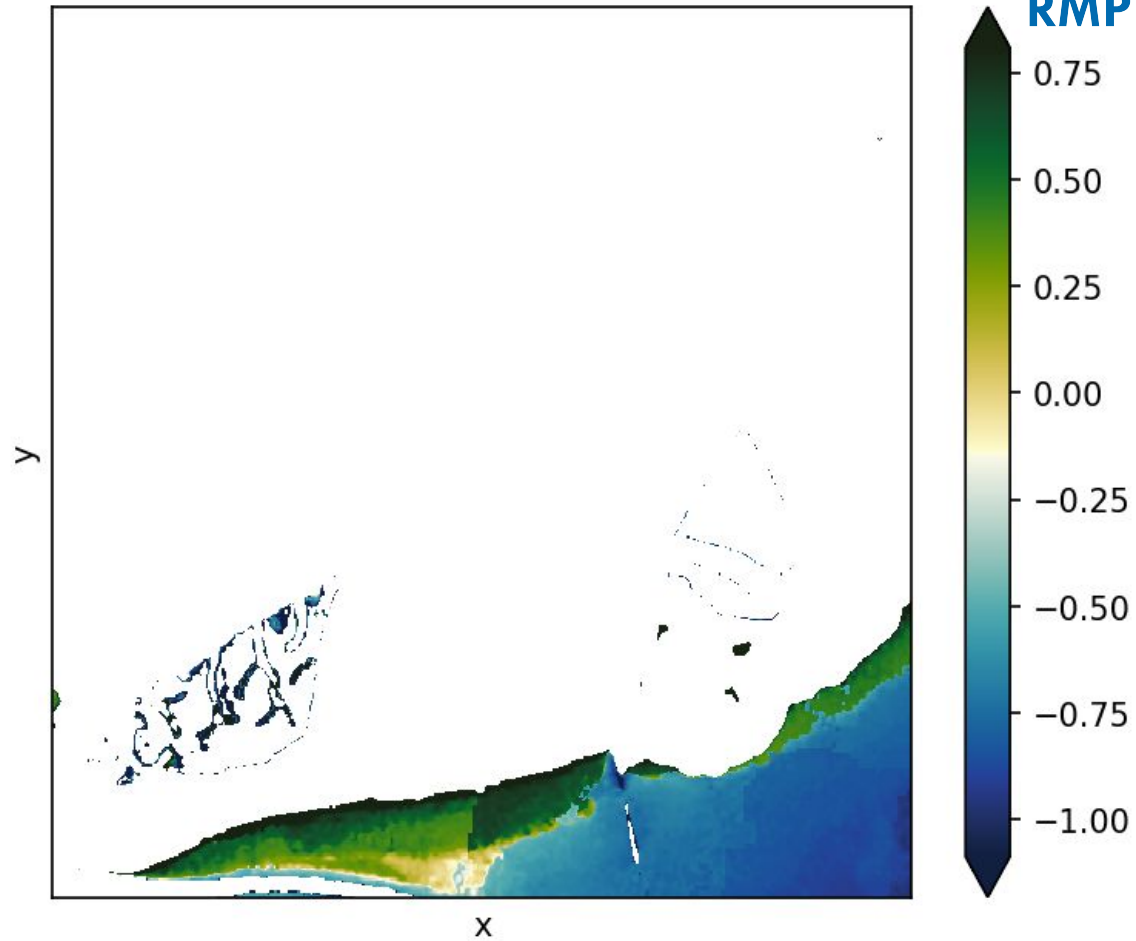
Intertidal Elevation 1993-1997



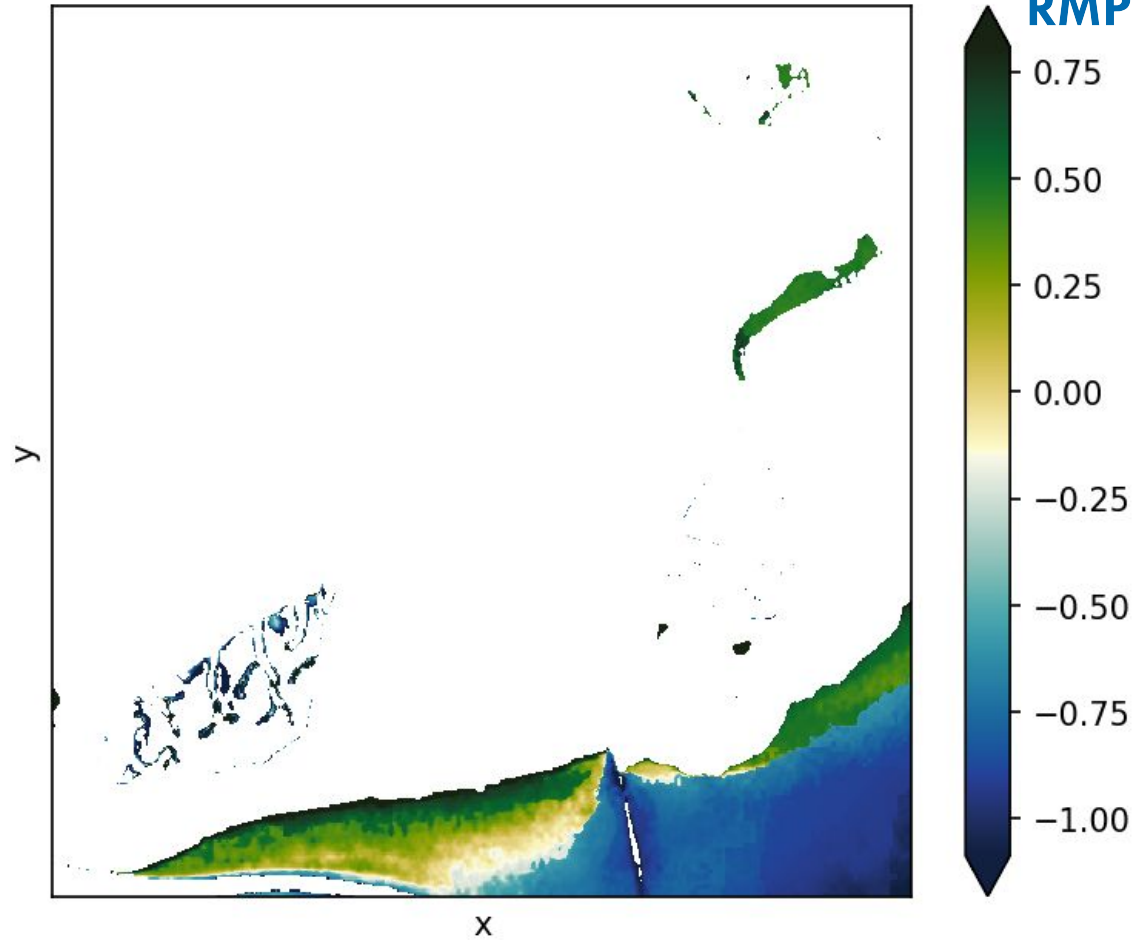
Intertidal Elevation 1994-1998



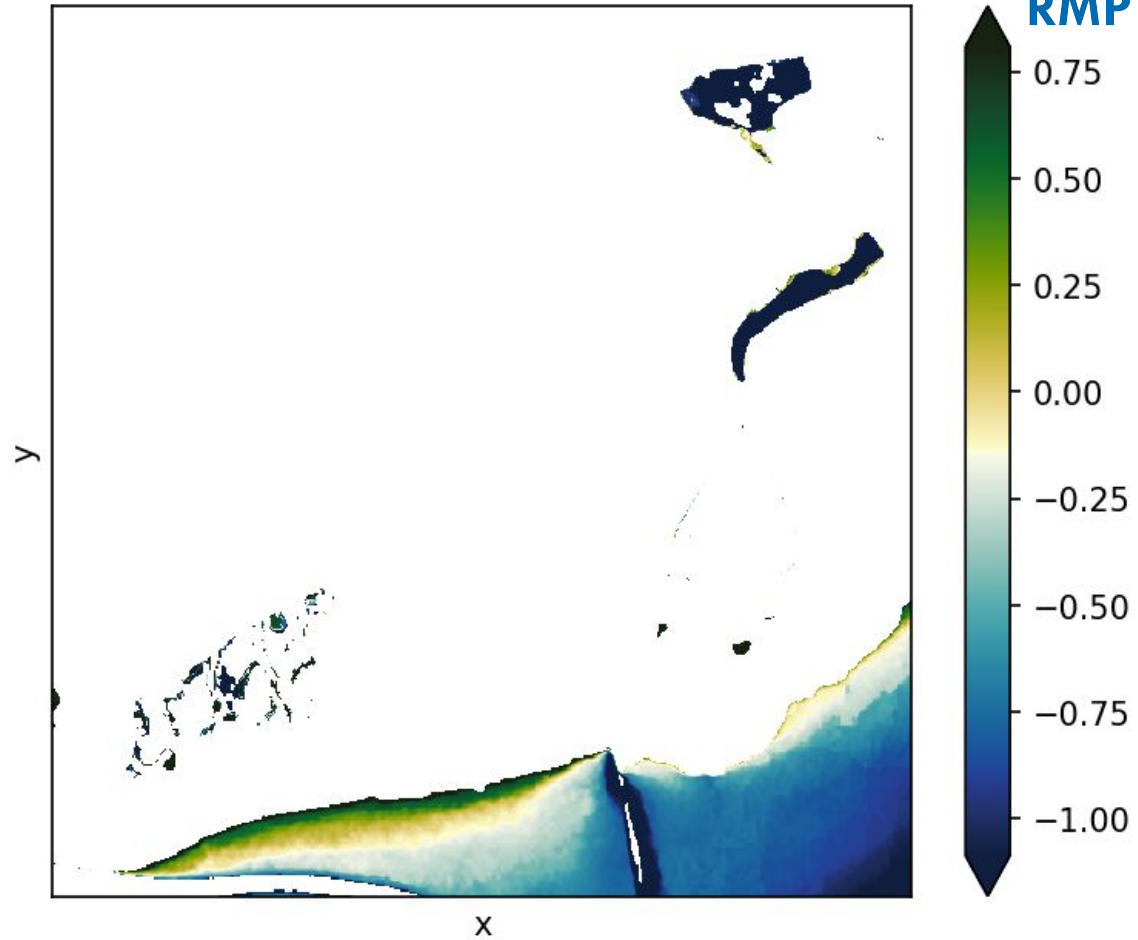
Intertidal Elevation 1995-1999



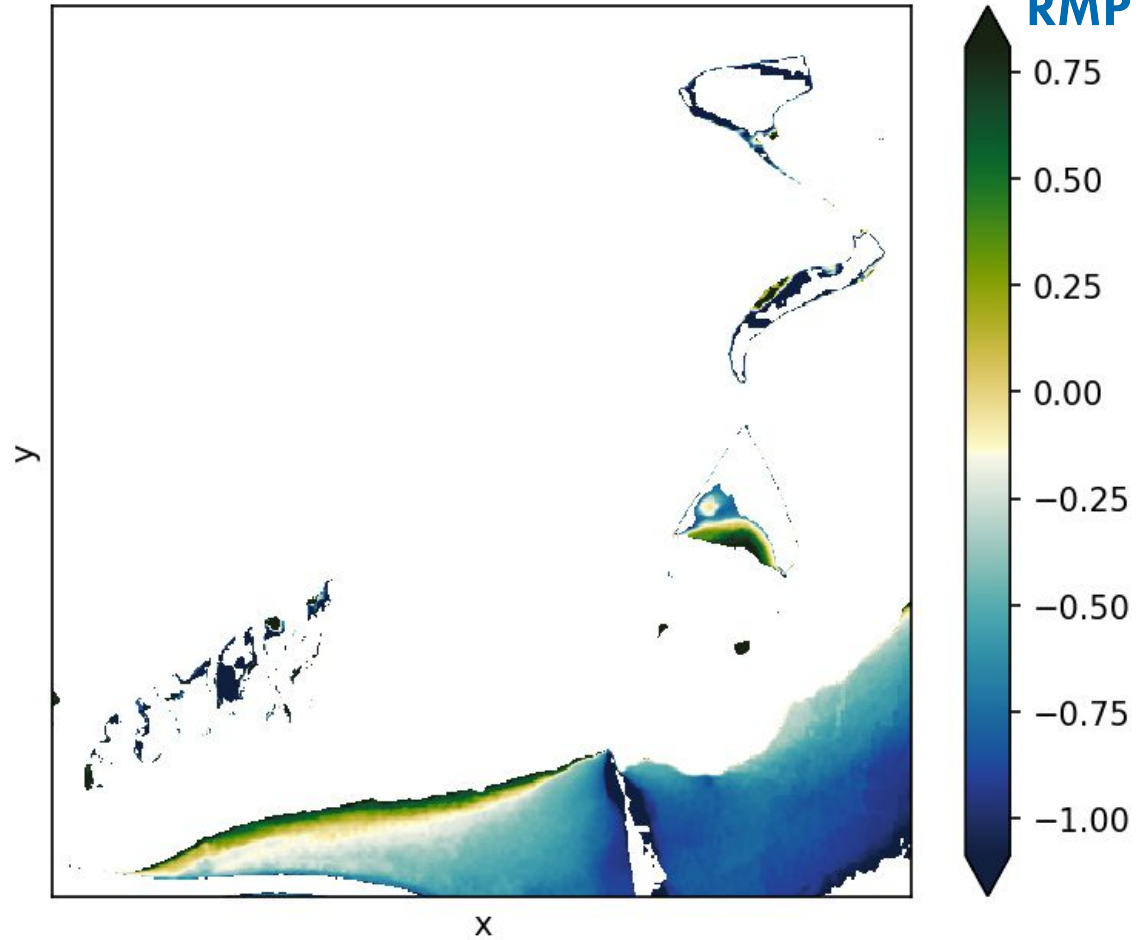
Intertidal Elevation 1996-2000



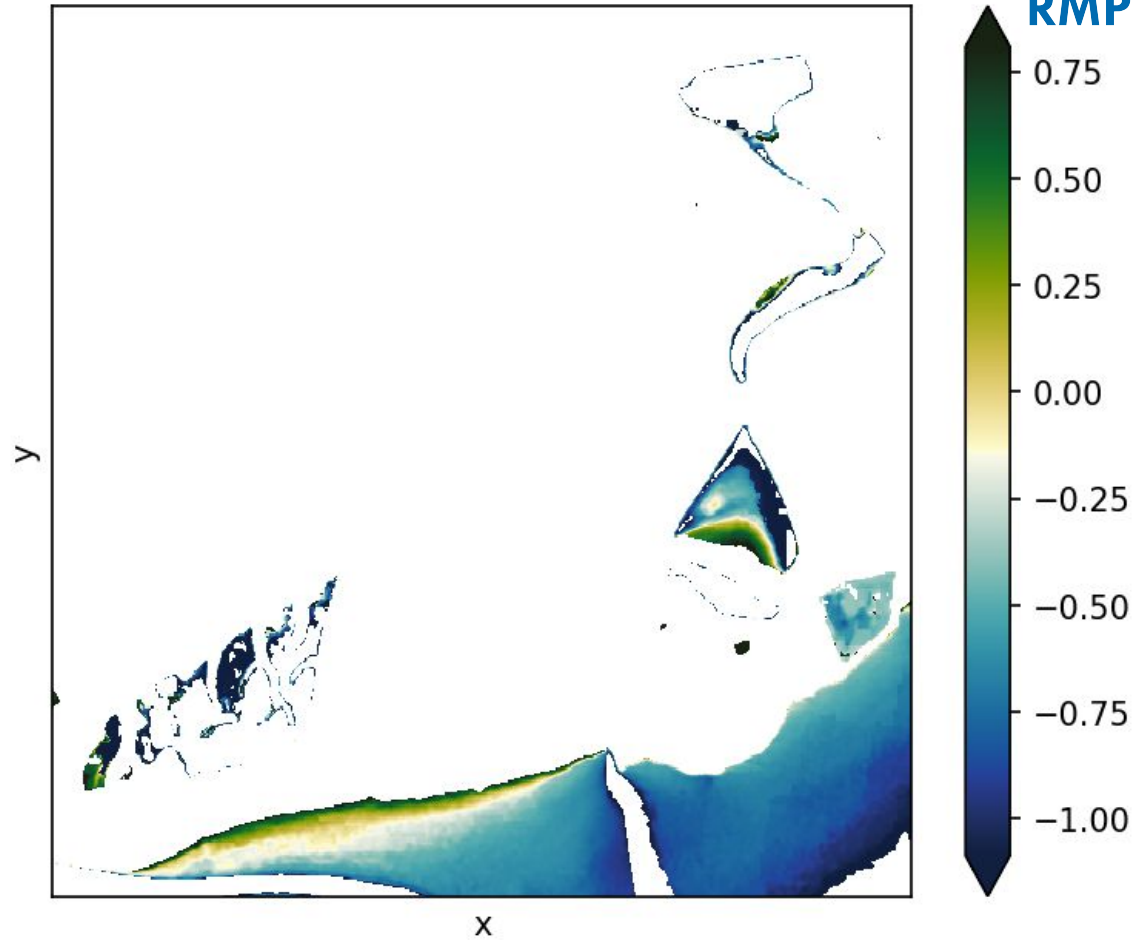
Intertidal Elevation 1997-2001



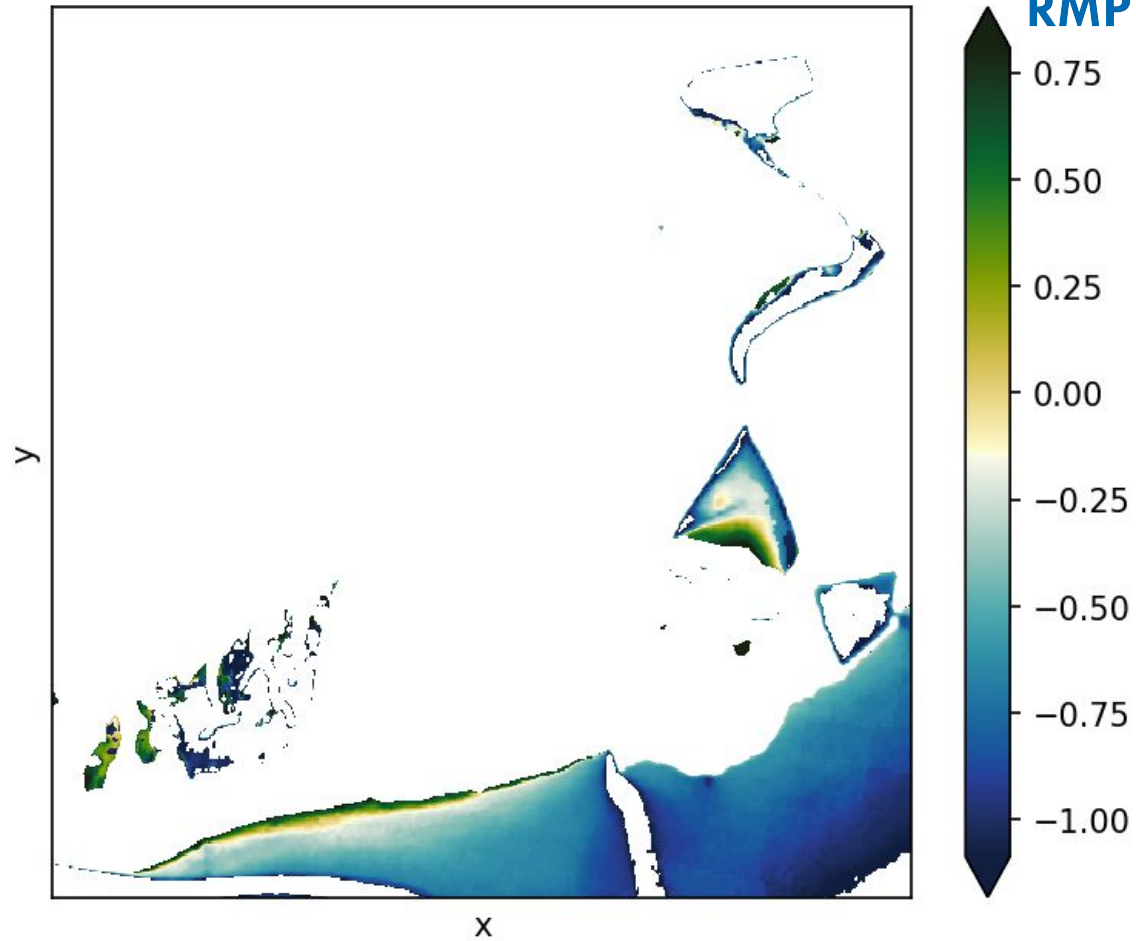
Intertidal Elevation 1998-2002



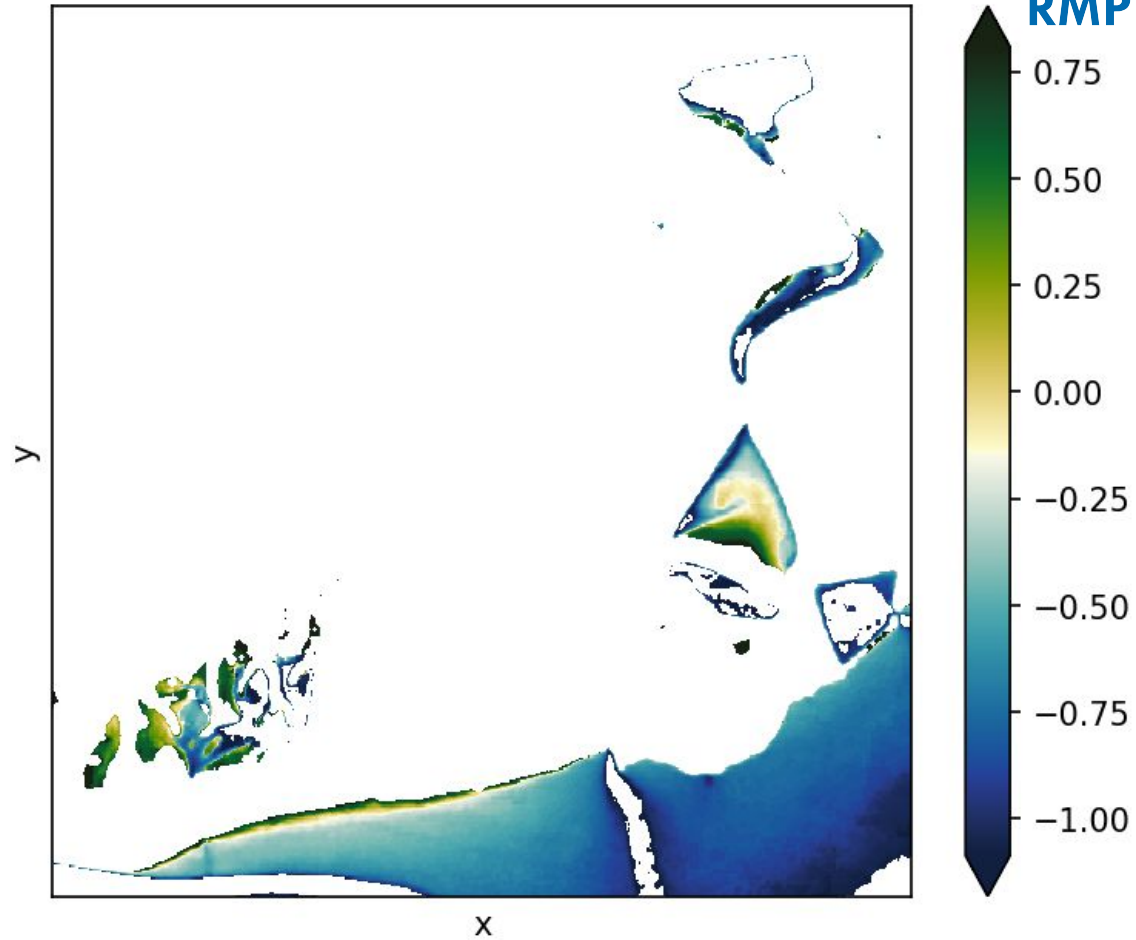
Intertidal Elevation 1999-2003



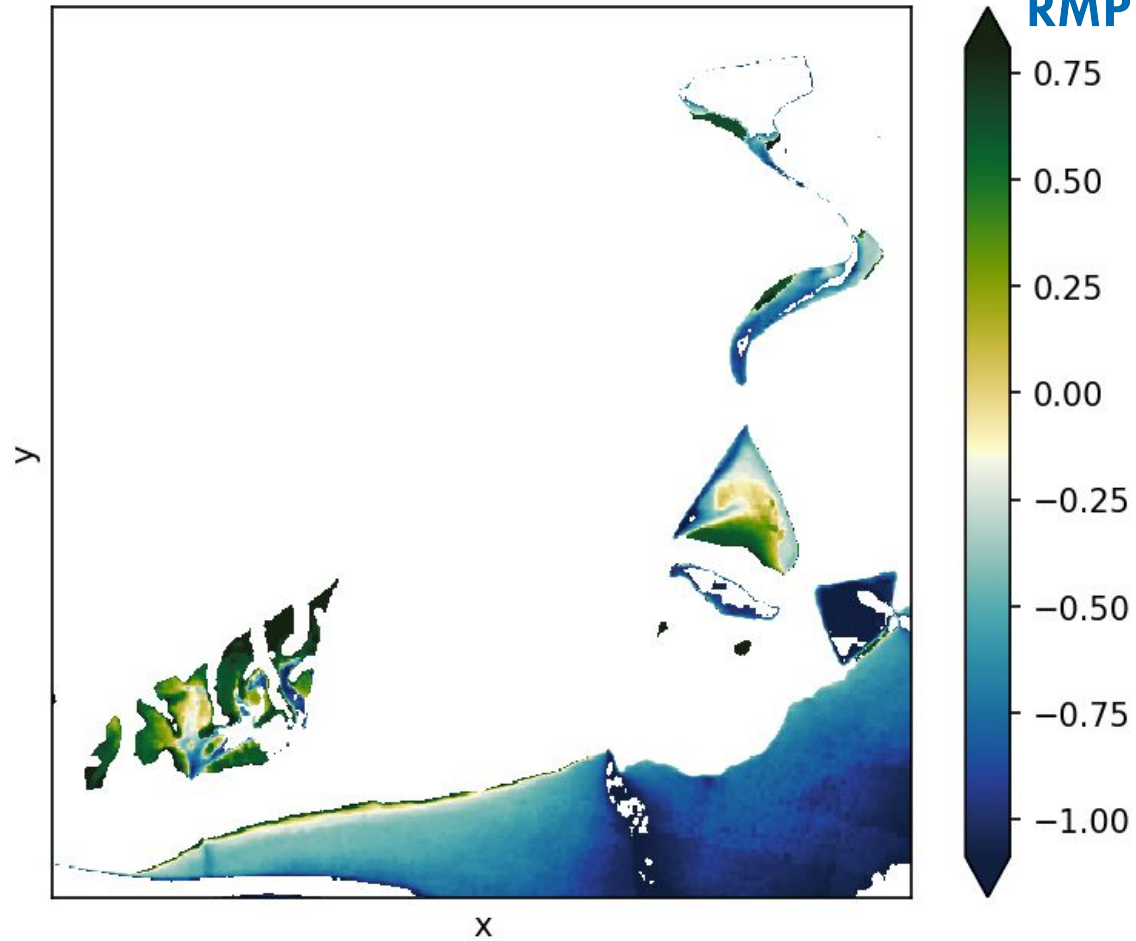
Intertidal Elevation 2000-2004



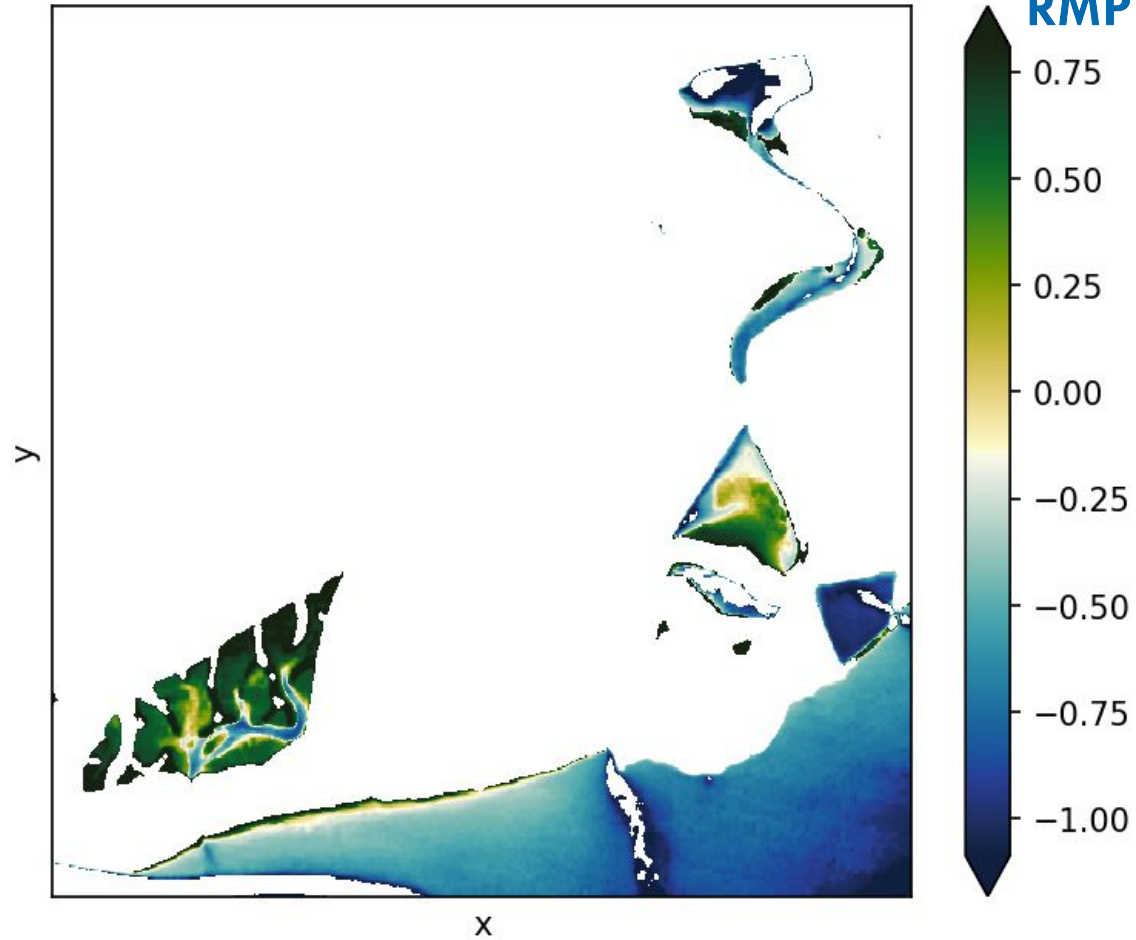
Intertidal Elevation 2001-2005



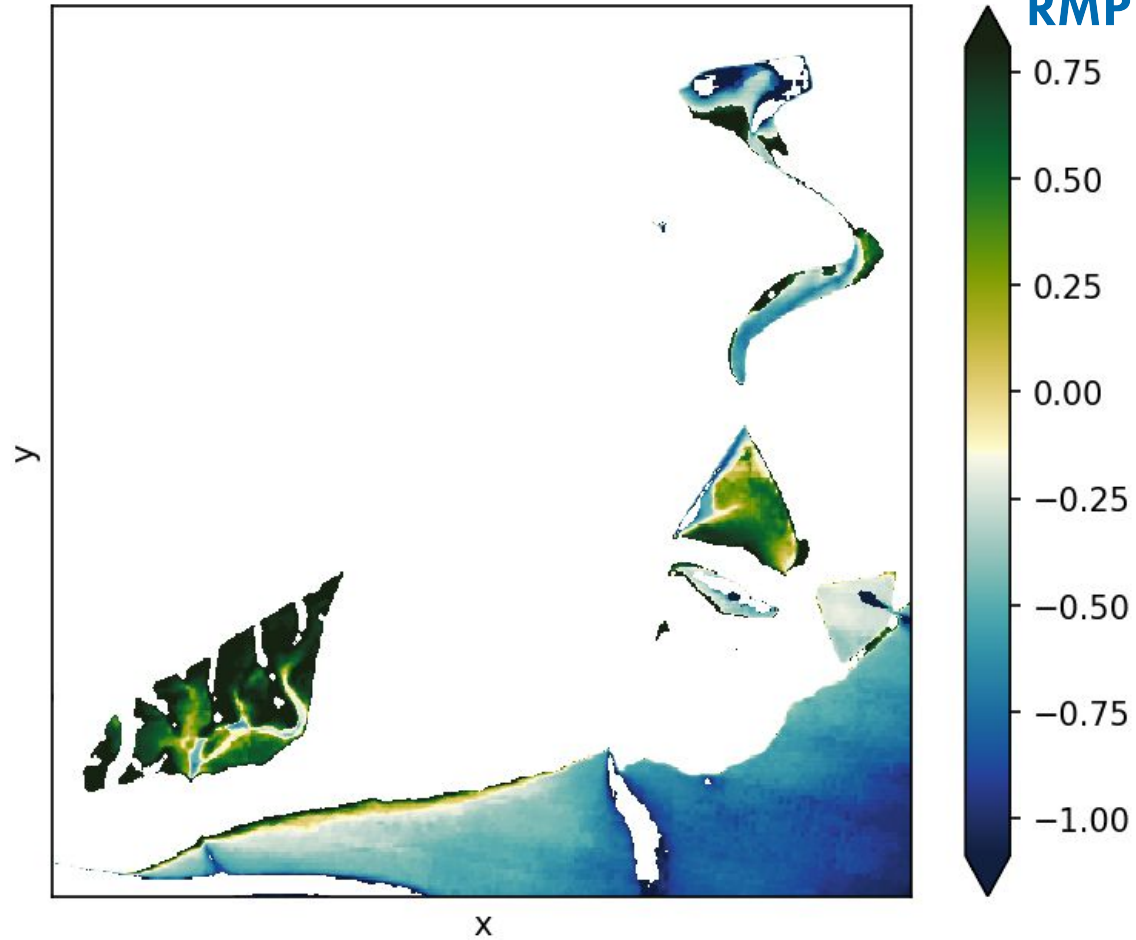
Intertidal Elevation 2002-2006



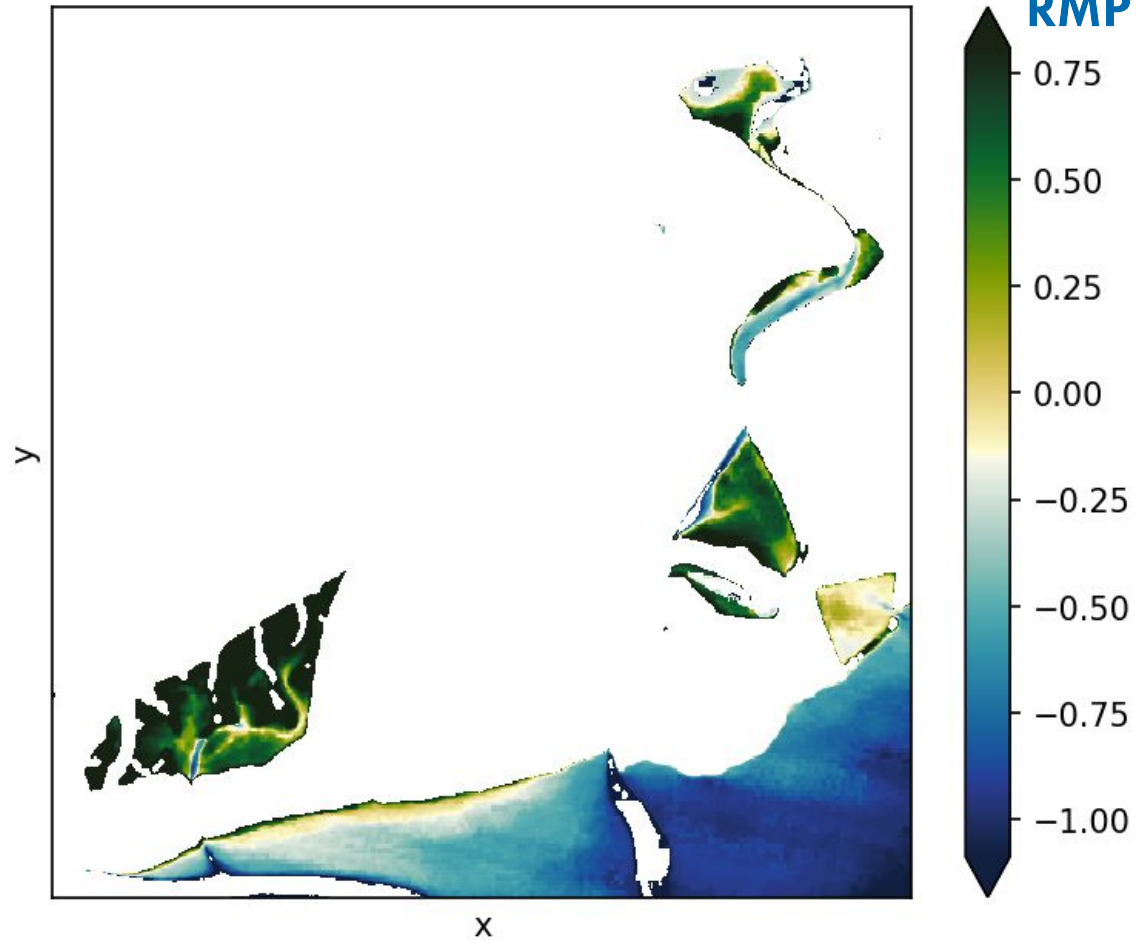
Intertidal Elevation 2003-2007



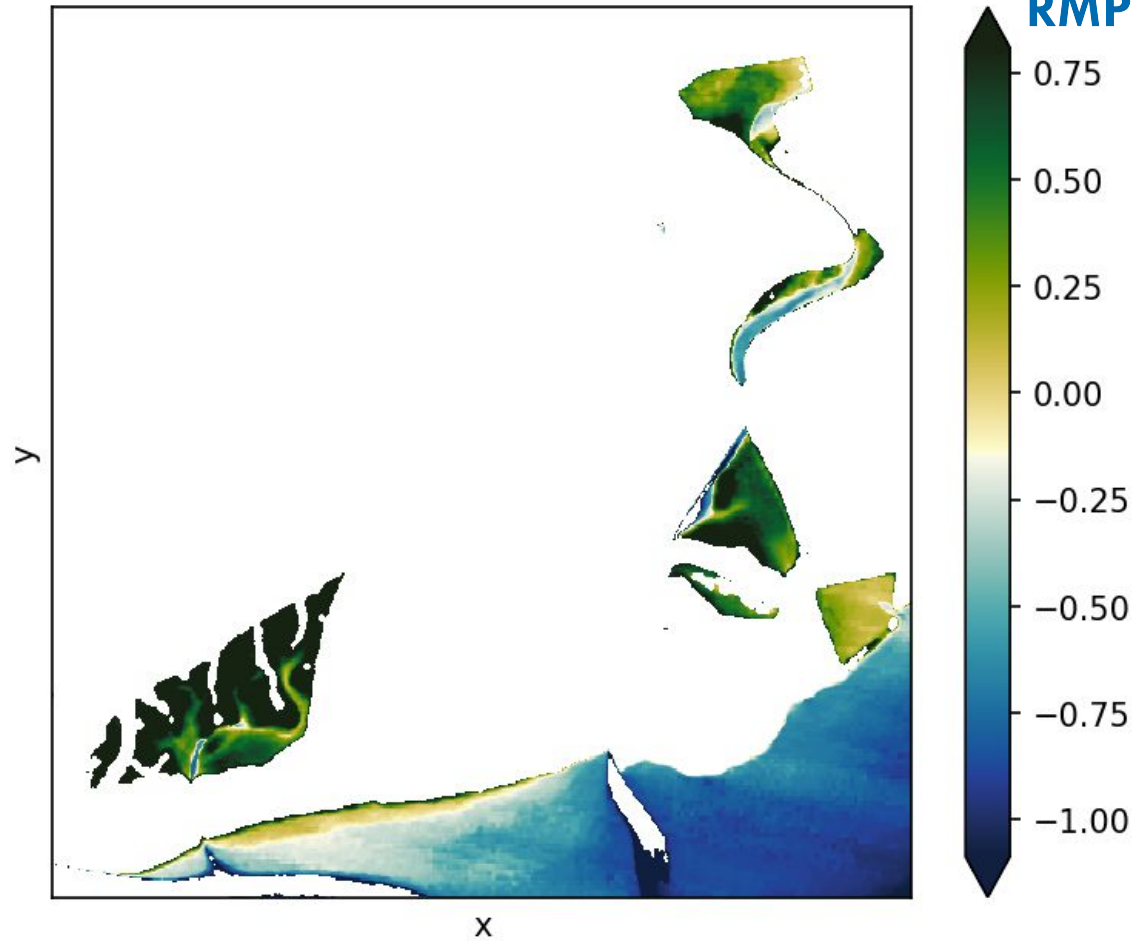
Intertidal Elevation 2004-2008



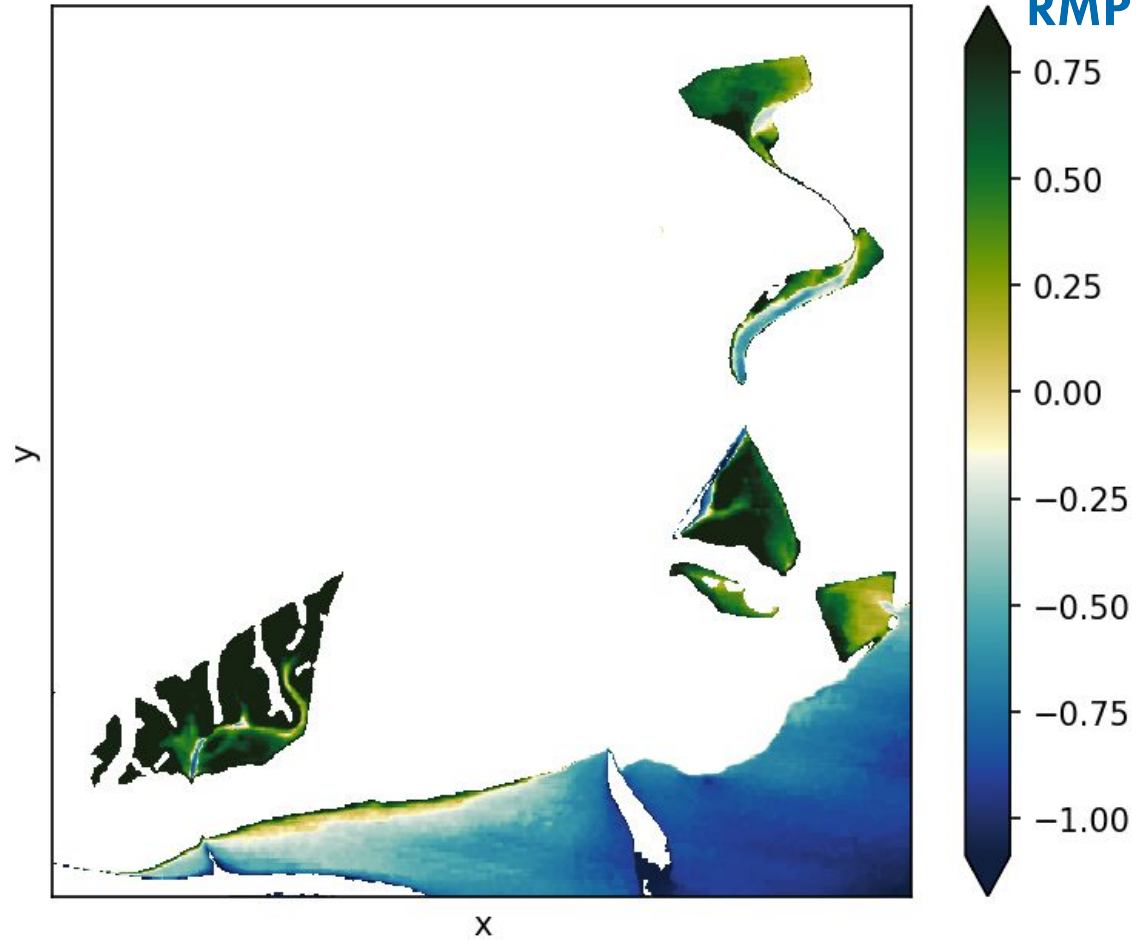
Intertidal Elevation 2005-2009



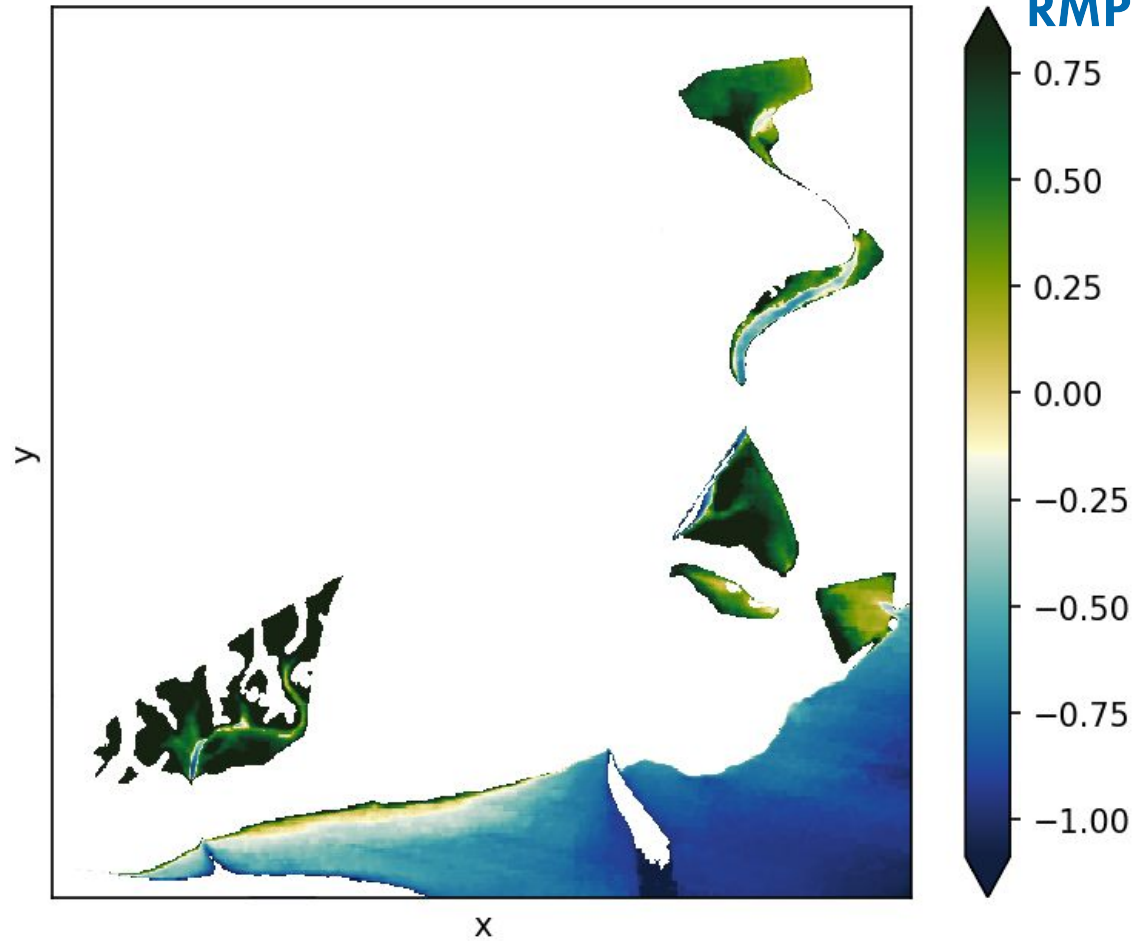
Intertidal Elevation 2006-2010



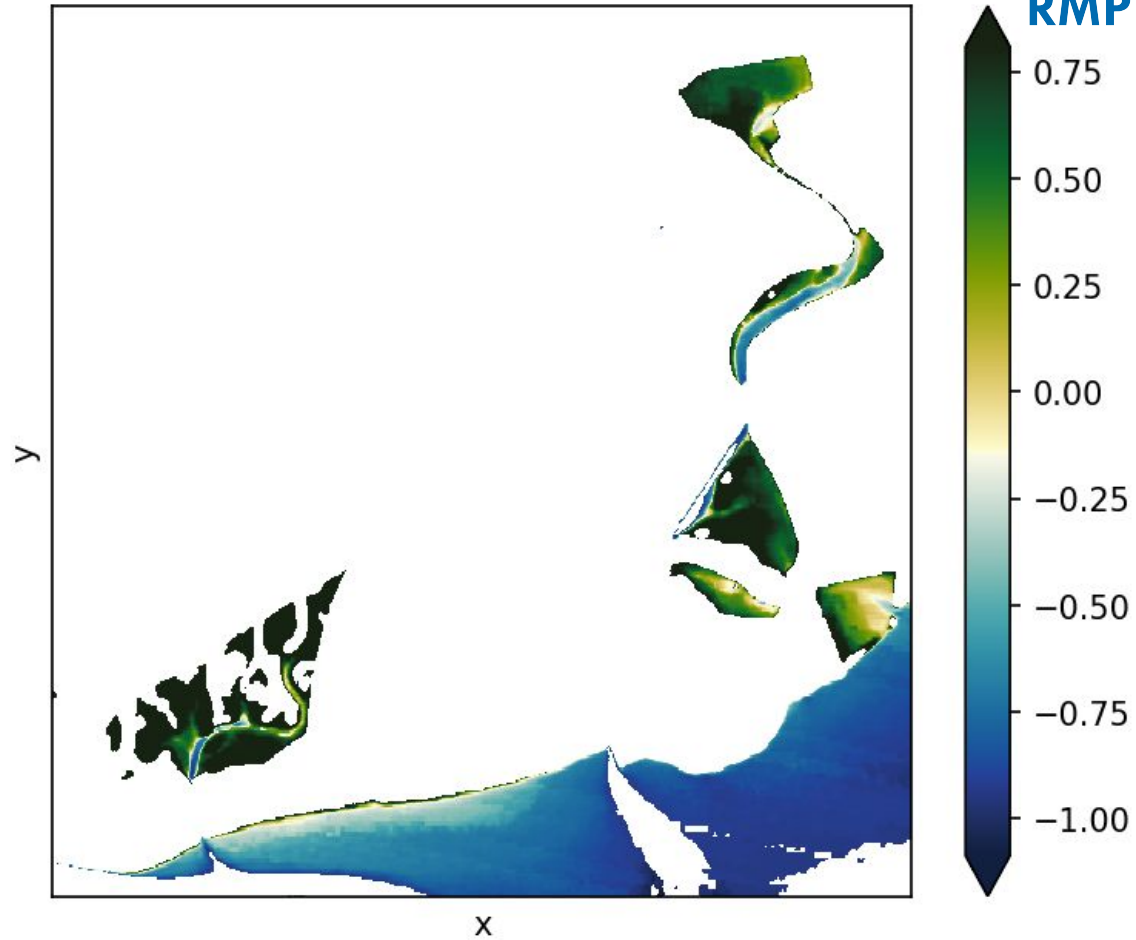
Intertidal Elevation 2007-2011



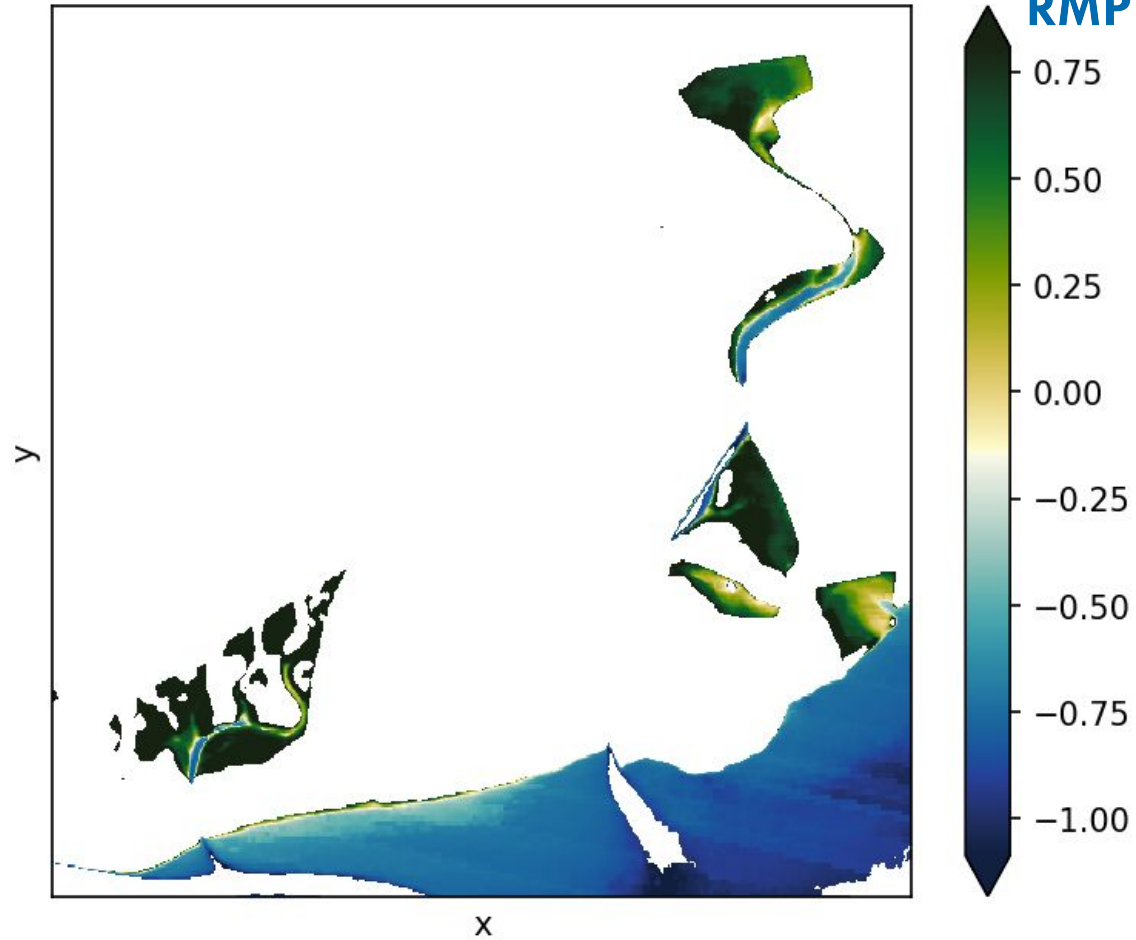
Intertidal Elevation 2008-2012



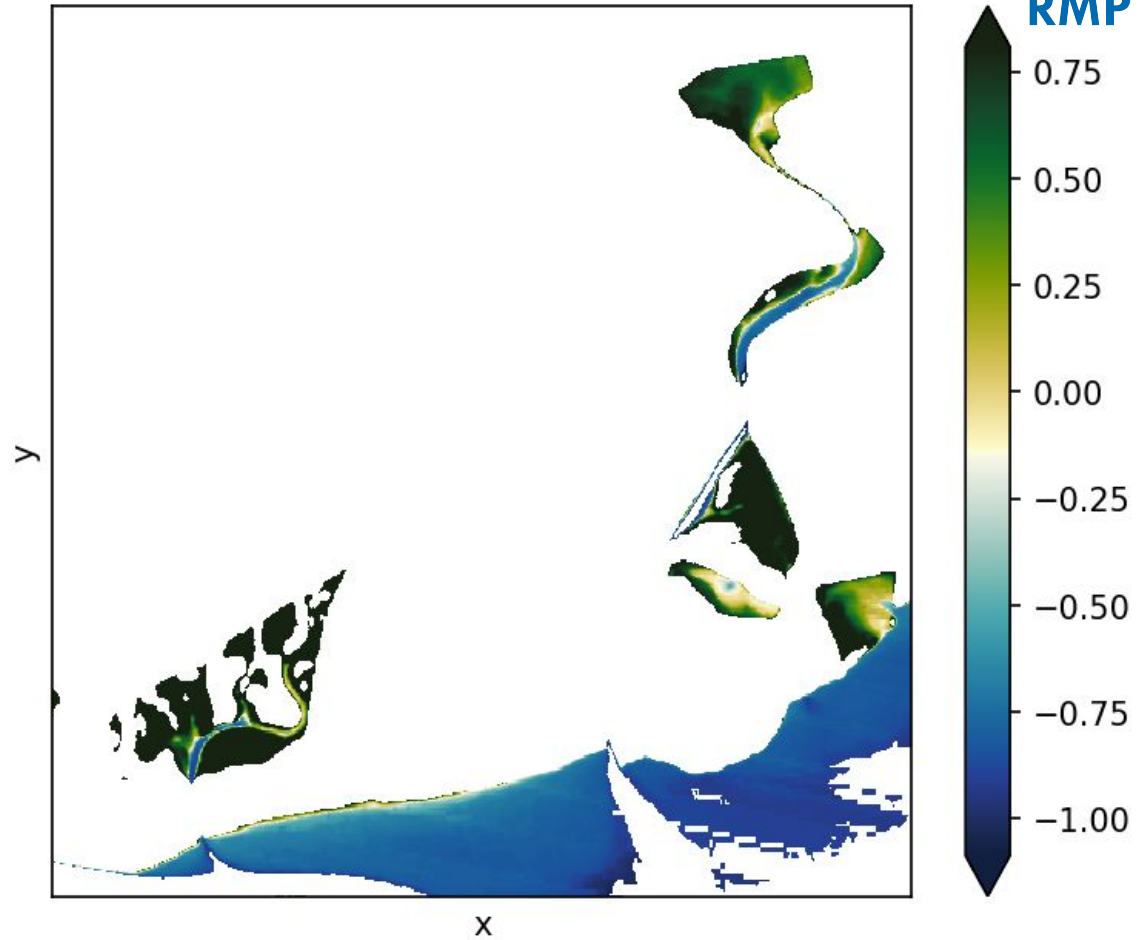
Intertidal Elevation 2009-2013



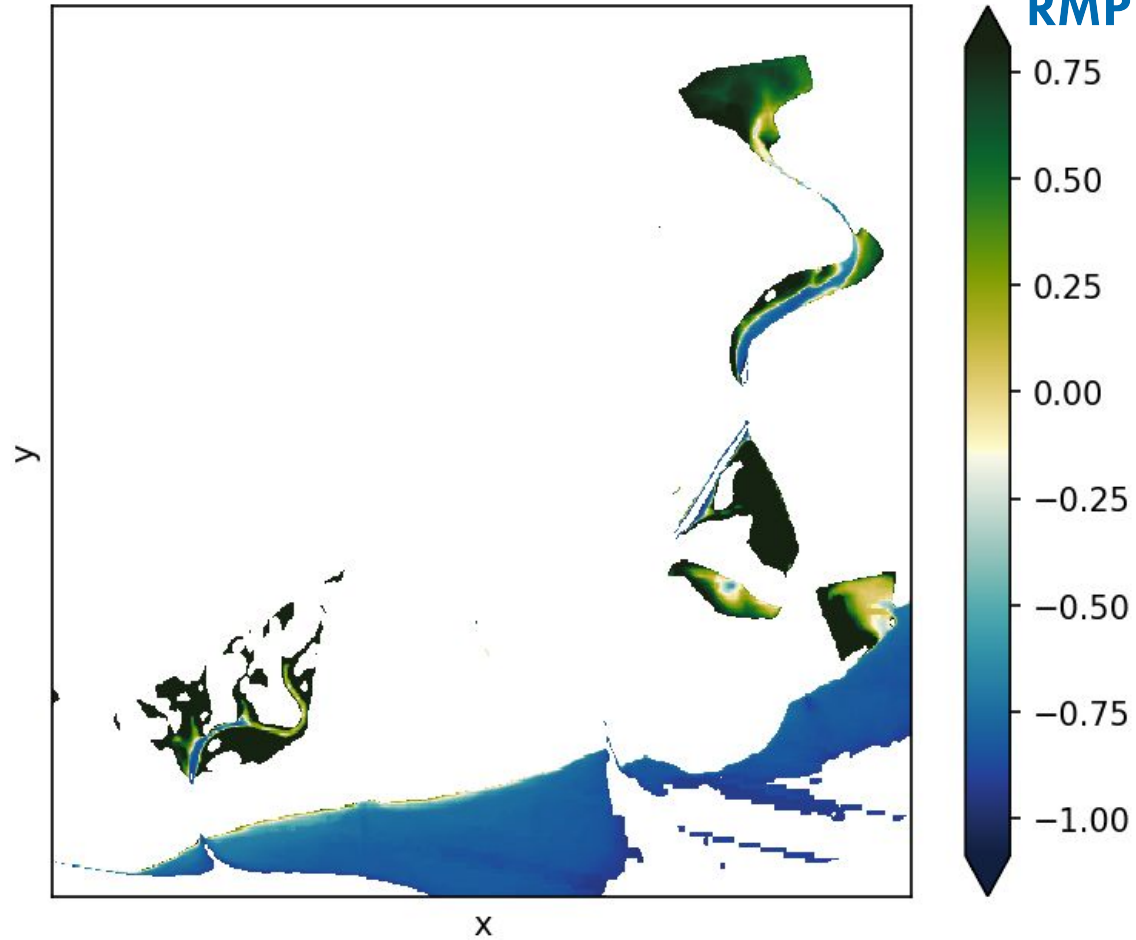
Intertidal Elevation 2010-2014



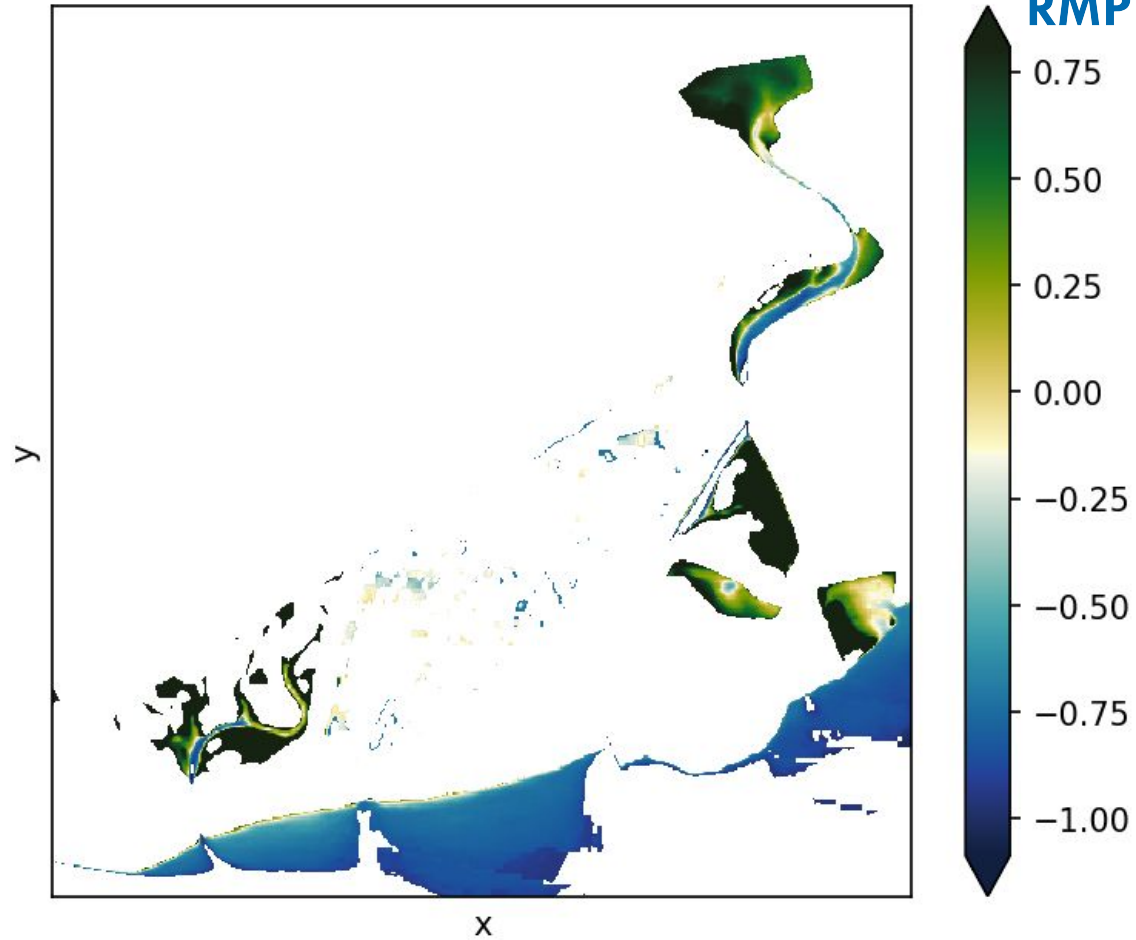
Intertidal Elevation 2011-2015



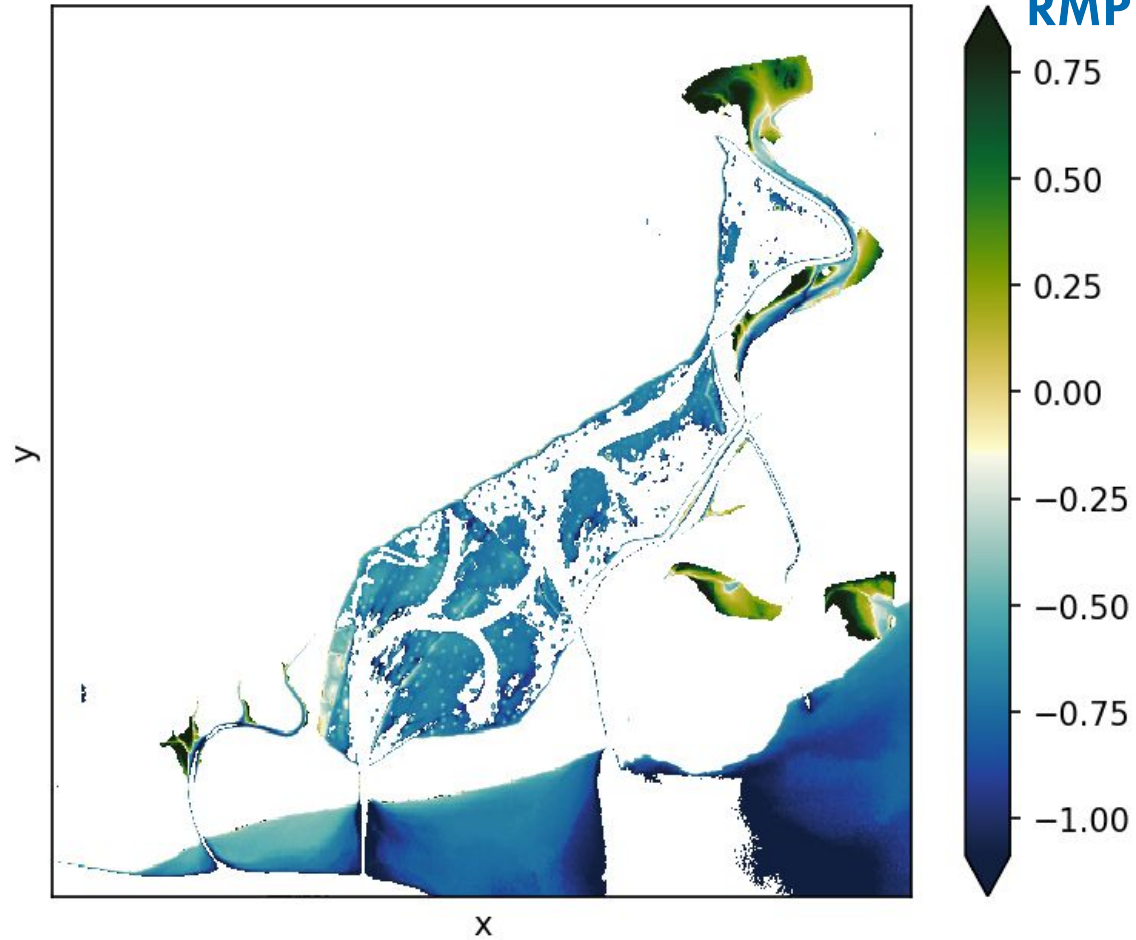
Intertidal Elevation 2012-2016



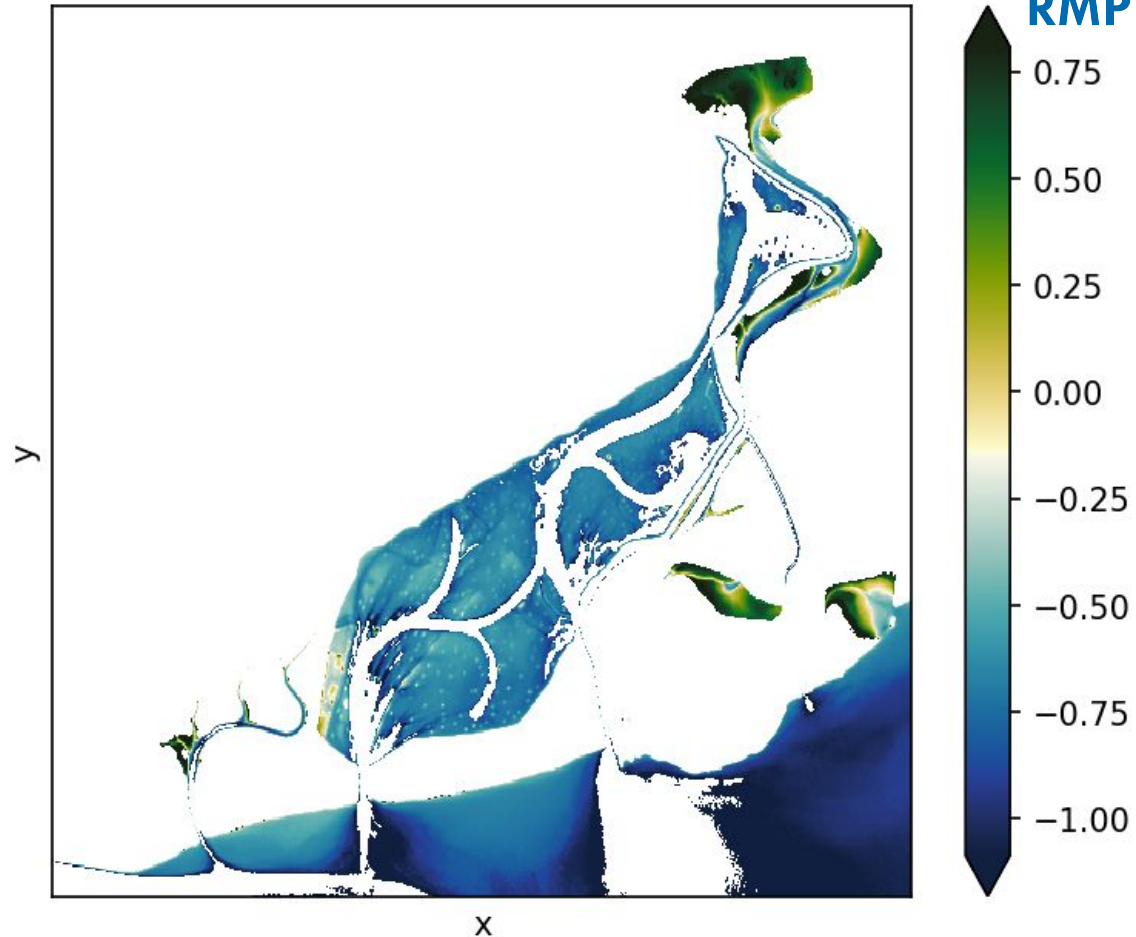
Intertidal Elevation 2013-2017



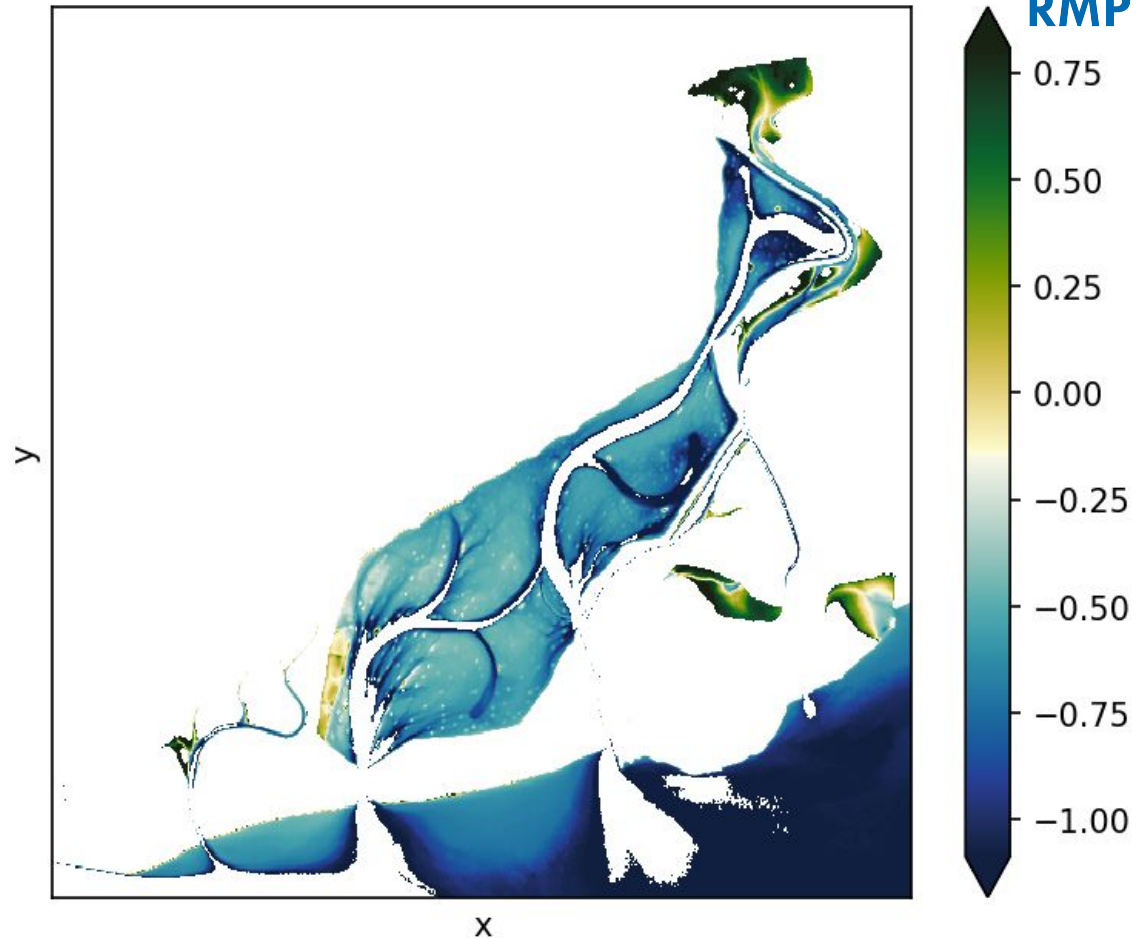
Intertidal Elevation 2016-2018



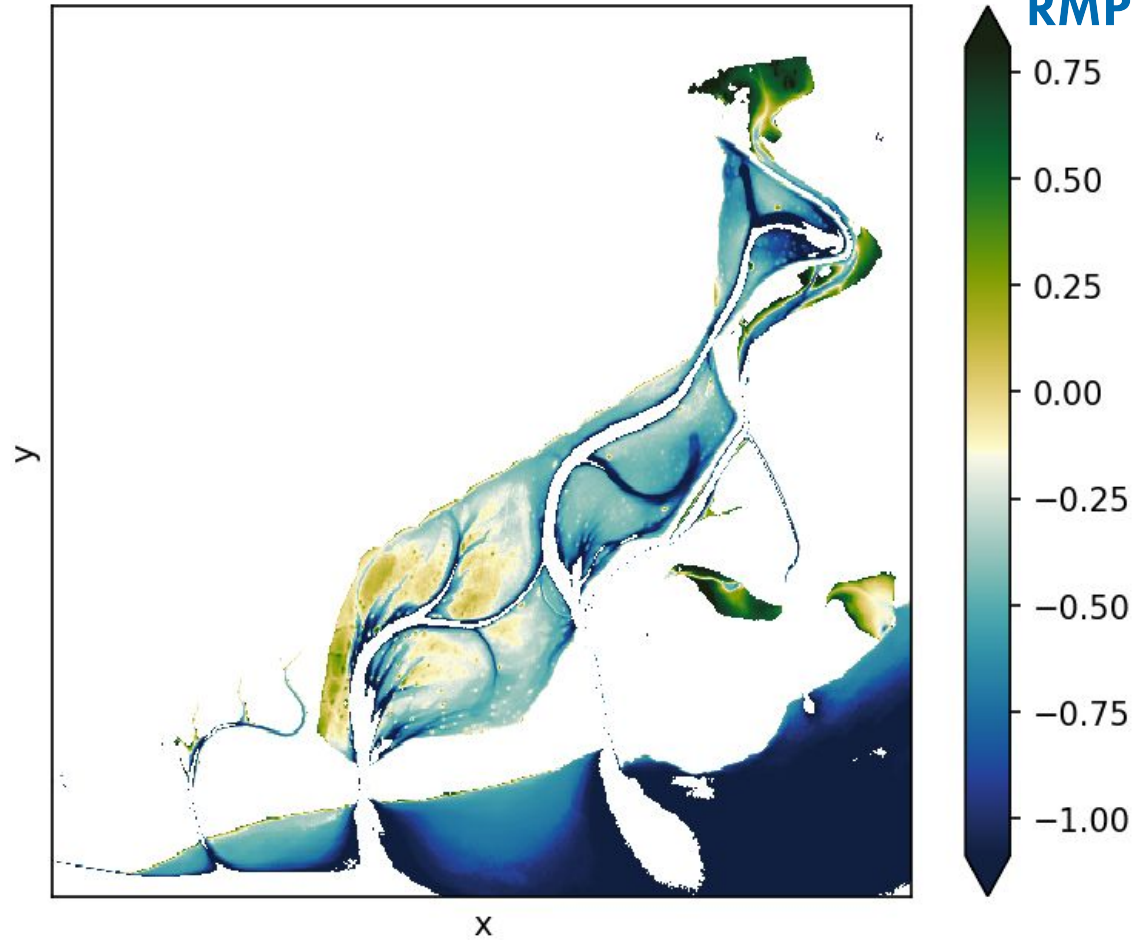
Intertidal Elevation 2017-2019



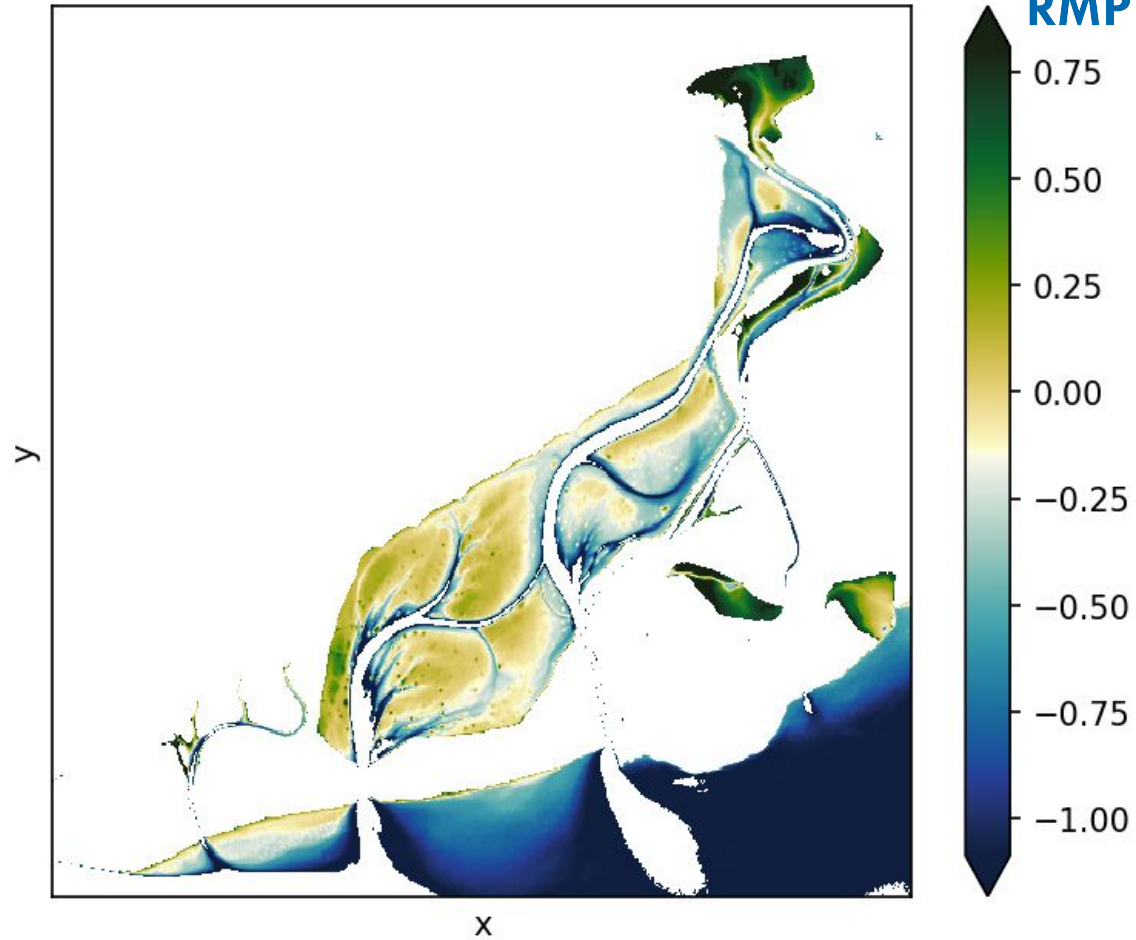
Intertidal Elevation 2018-2020



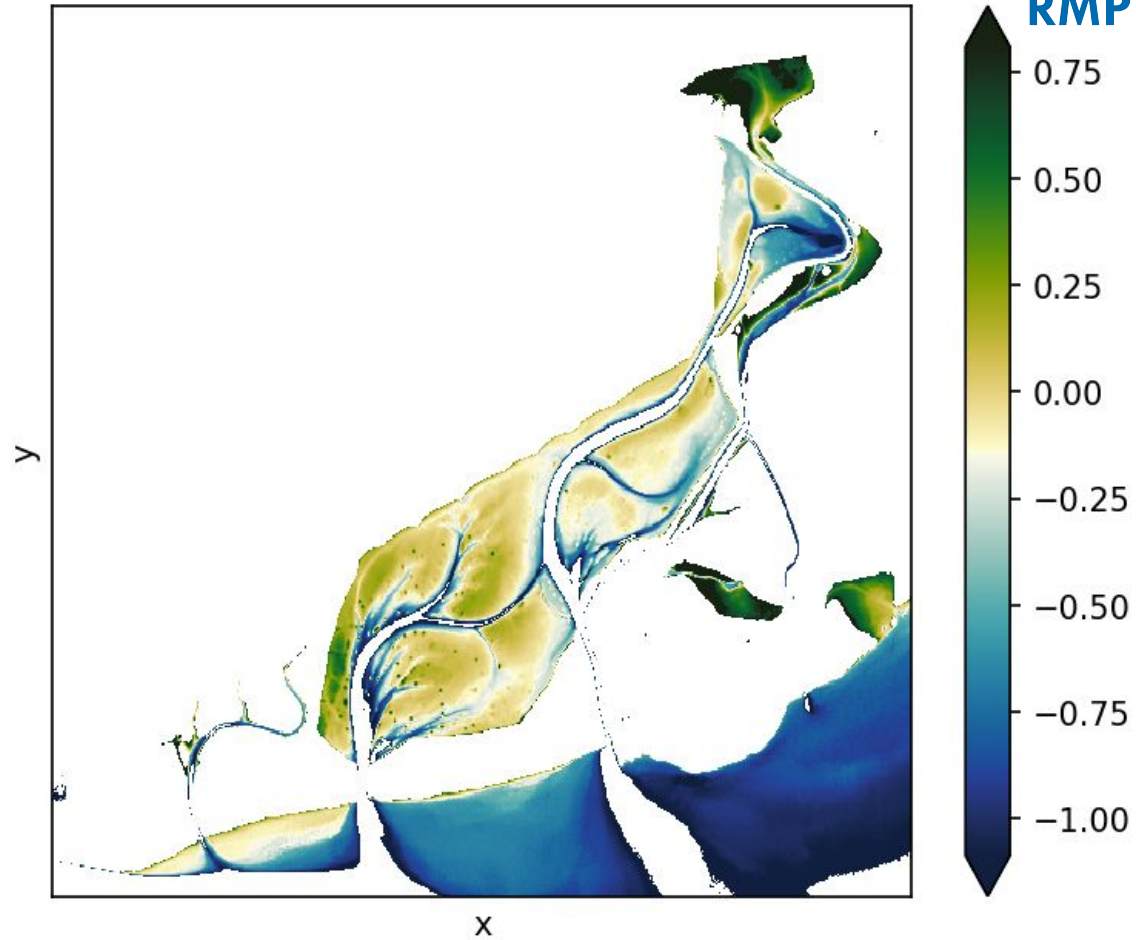
Intertidal Elevation 2019-2021



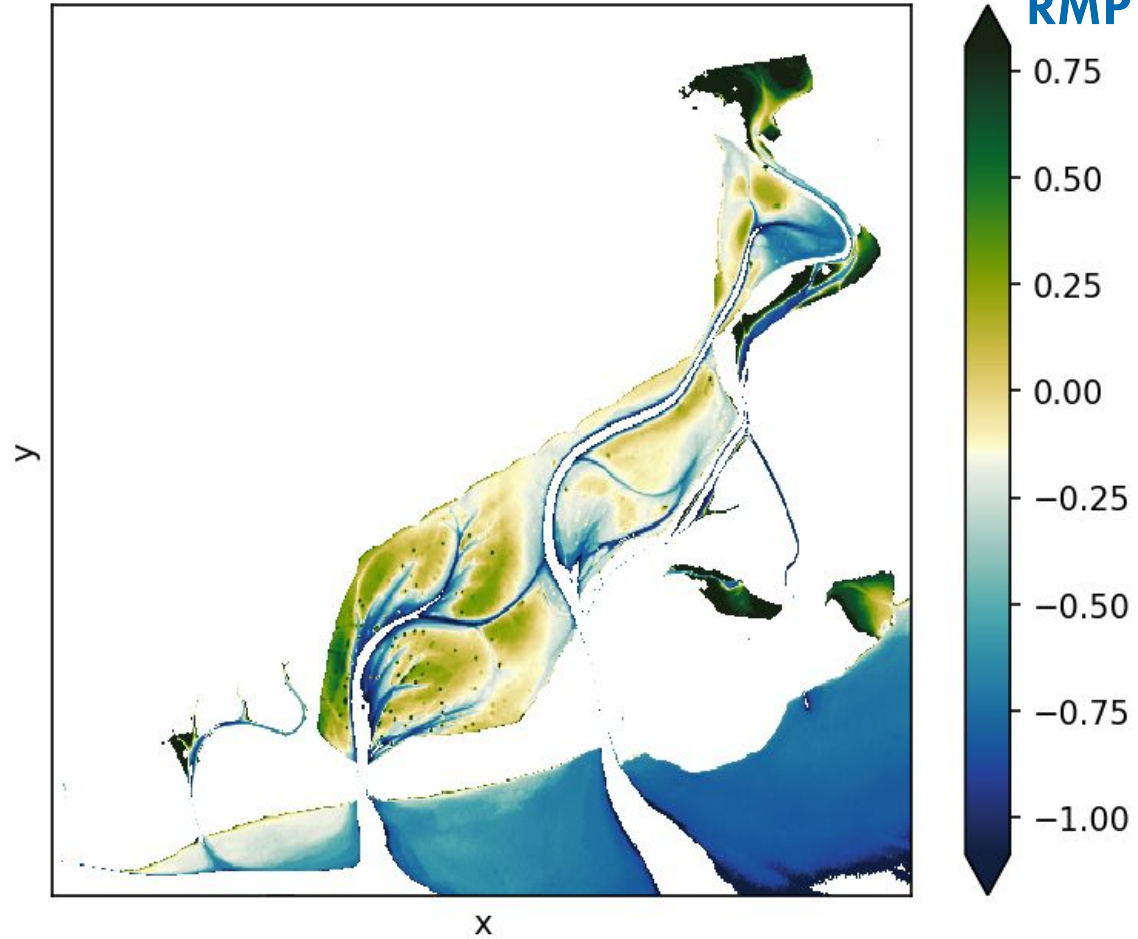
Intertidal Elevation 2020-2022



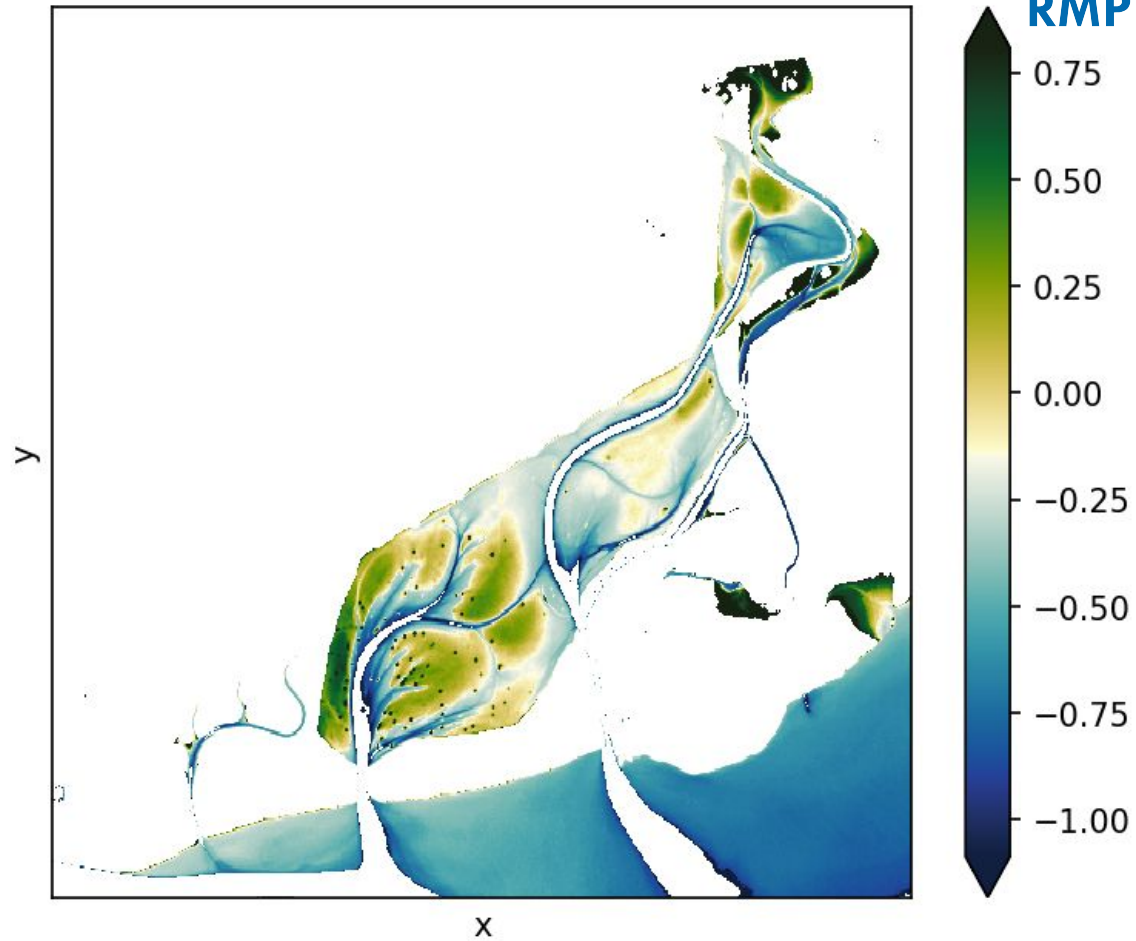
Intertidal Elevation 2021-2023



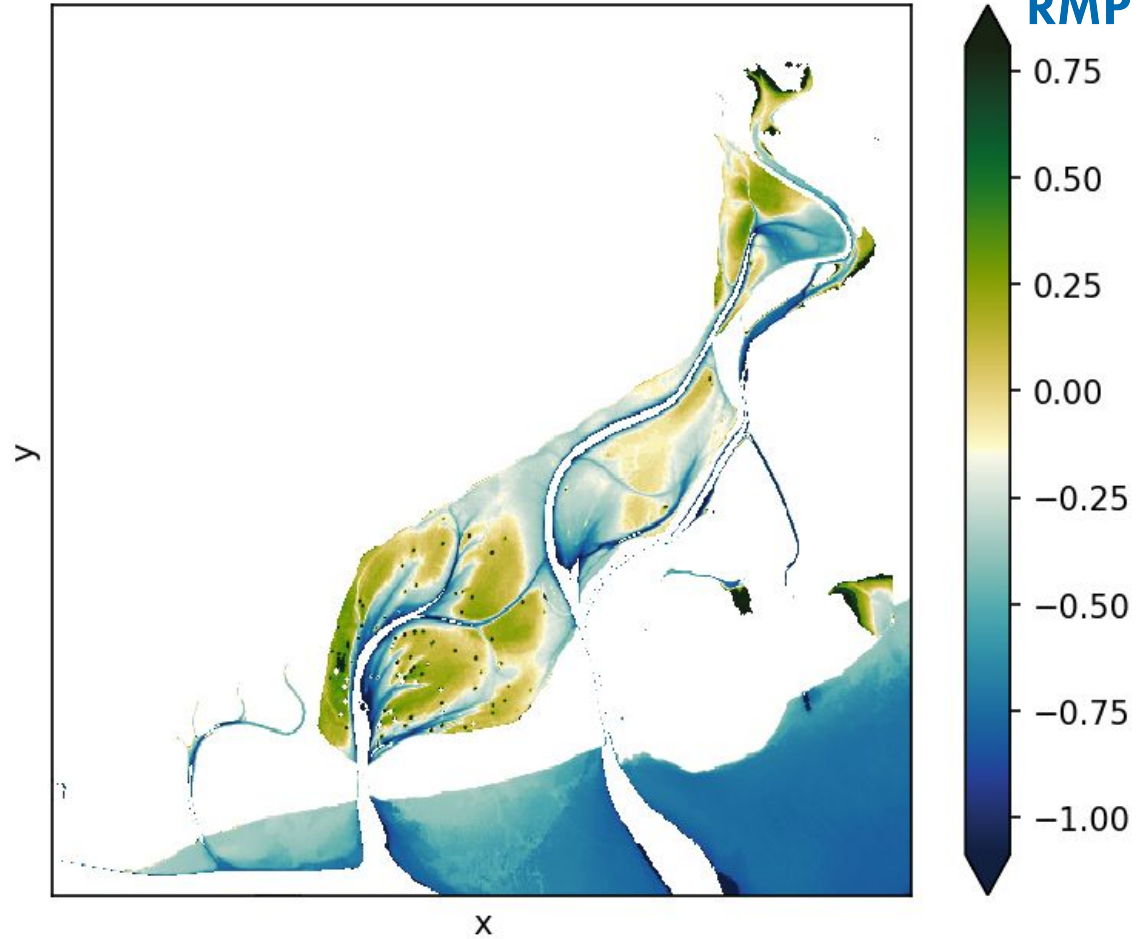
Intertidal Elevation 2022-2024



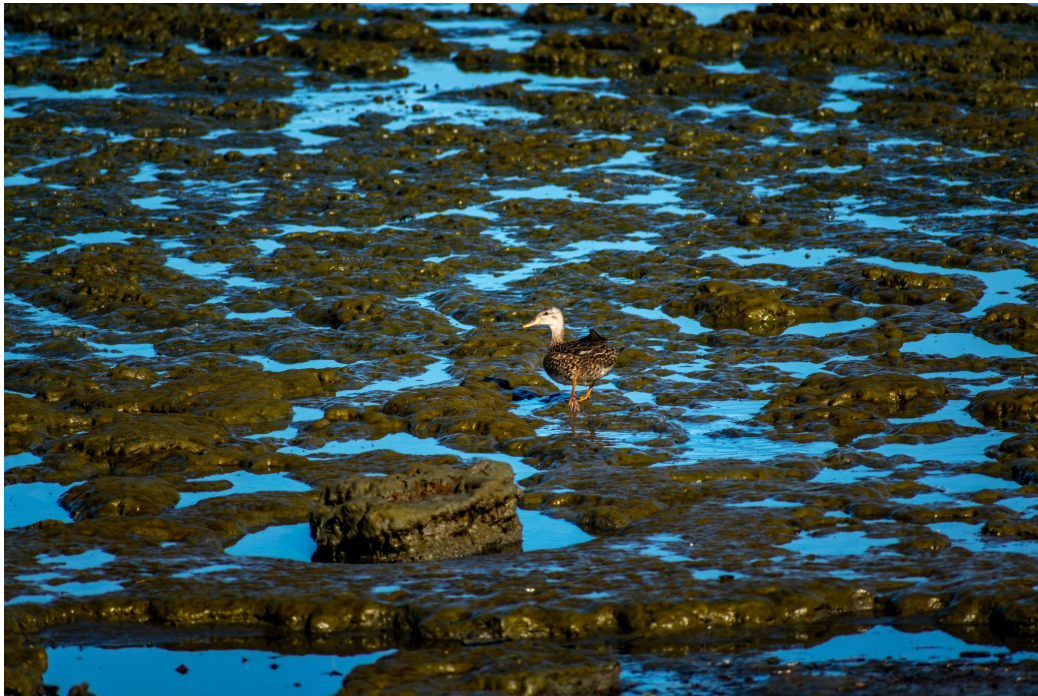
Intertidal Elevation 2023-2025



Intertidal Elevation 2024-2026



Next Steps



- Expand Validation using new Lidar/Planet SuperDove Imagery
- Continue to evaluate comparison of inputs/parameters
- Coordinate with Related Projects

How can this data
be most useful?

Are there additional
applications?



Q&A

Where should we
do additional
validation?

Suggestions for
expanded
exploration?



**THANK YOU FOR
YOUR TIME**

alexb@sfei.org





This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement #97T22601 to San Francisco Estuary Institute. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the Environmental Protection Agency endorse trade names or recommend the use of commercial products mentioned in this document, as well as any images, video, text, or other content created by generative artificial intelligence tools, nor does any such content necessarily reflect the views and policies of the Environmental Protection Agency.





Sediment Studies Update

San Leandro Bay Studies and Bay Wide Sediment Transport

Craig Jones
Kara Scheu
Samuel McWilliams

Jay Davis
Don Yee
Lester McKee
Allie King
Pedro Avellaneda



Agenda

- San Leandro Bay OPTICS
- San Leandro Bay SEDflume
- Whole Bay Sediment Modeling

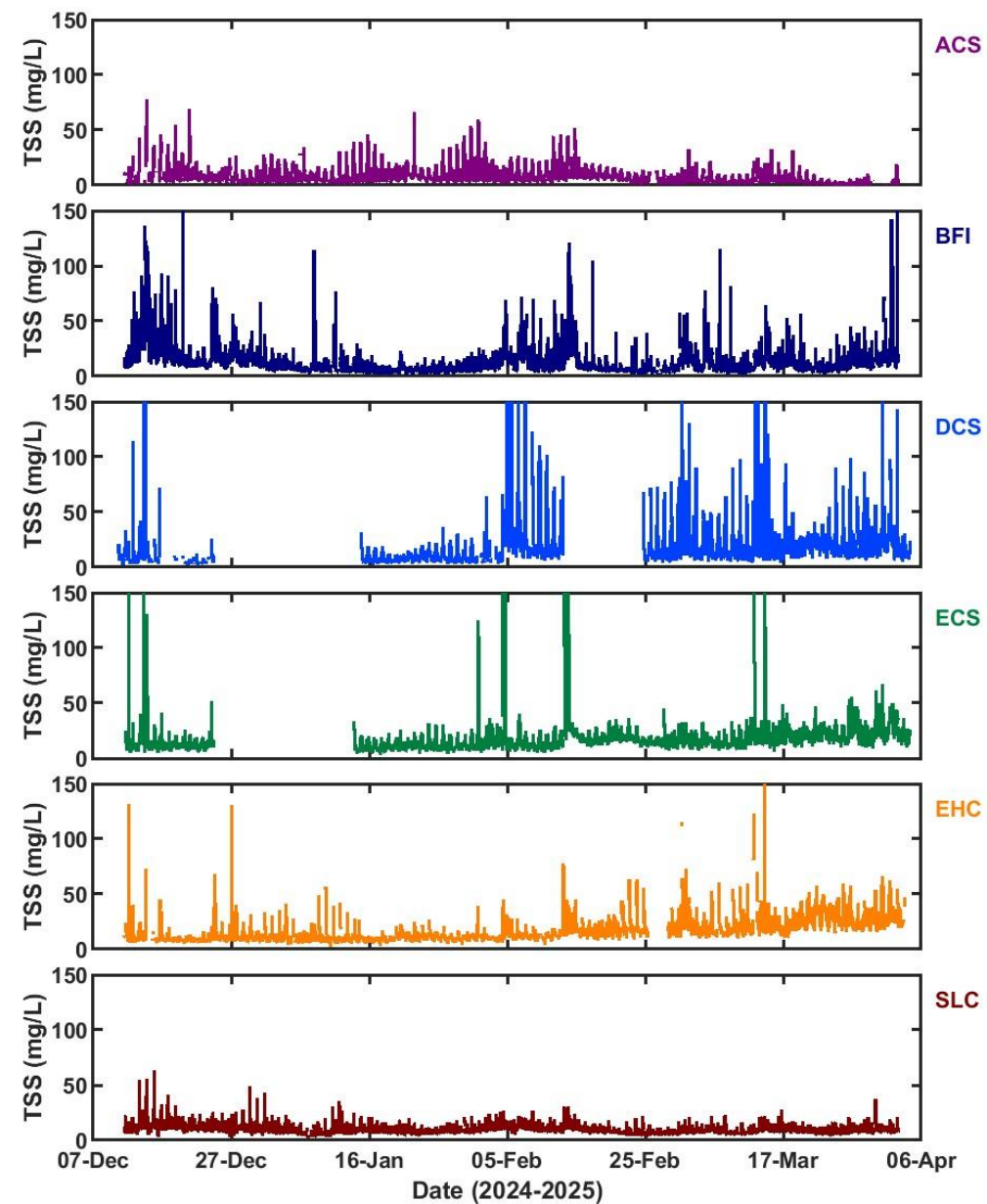
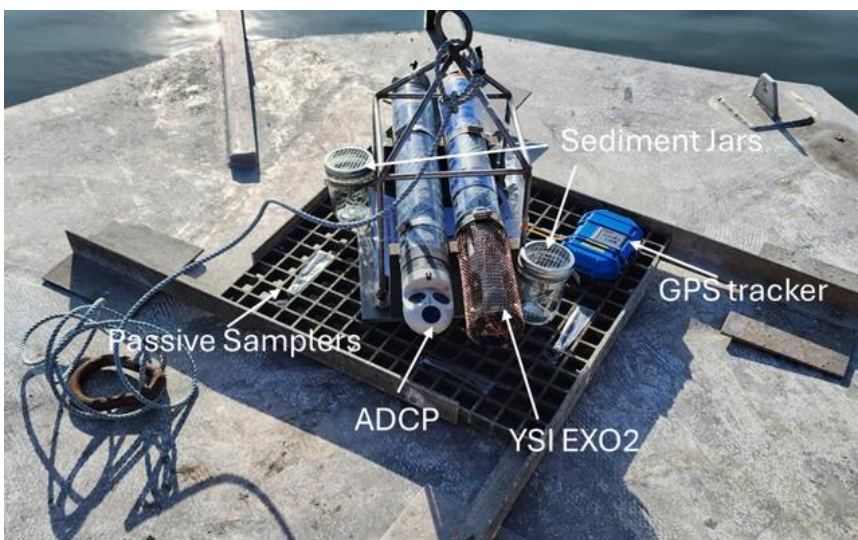
SLB OPTICS

- Estimate sediment (and PCB) flux at all inputs to SLB
 - Deployed platforms for 4 months to measure *in situ* physical and optical properties of the water column
 - Collected discrete sediment (and PCB) water samples
 - Used OPTICs methodology to derive estimated time series of sediment (and PCB) concentration and flux at all locations
- SLB OPTICS used to verify models (WDM and in-water) and support understanding of sediment/contaminant transport



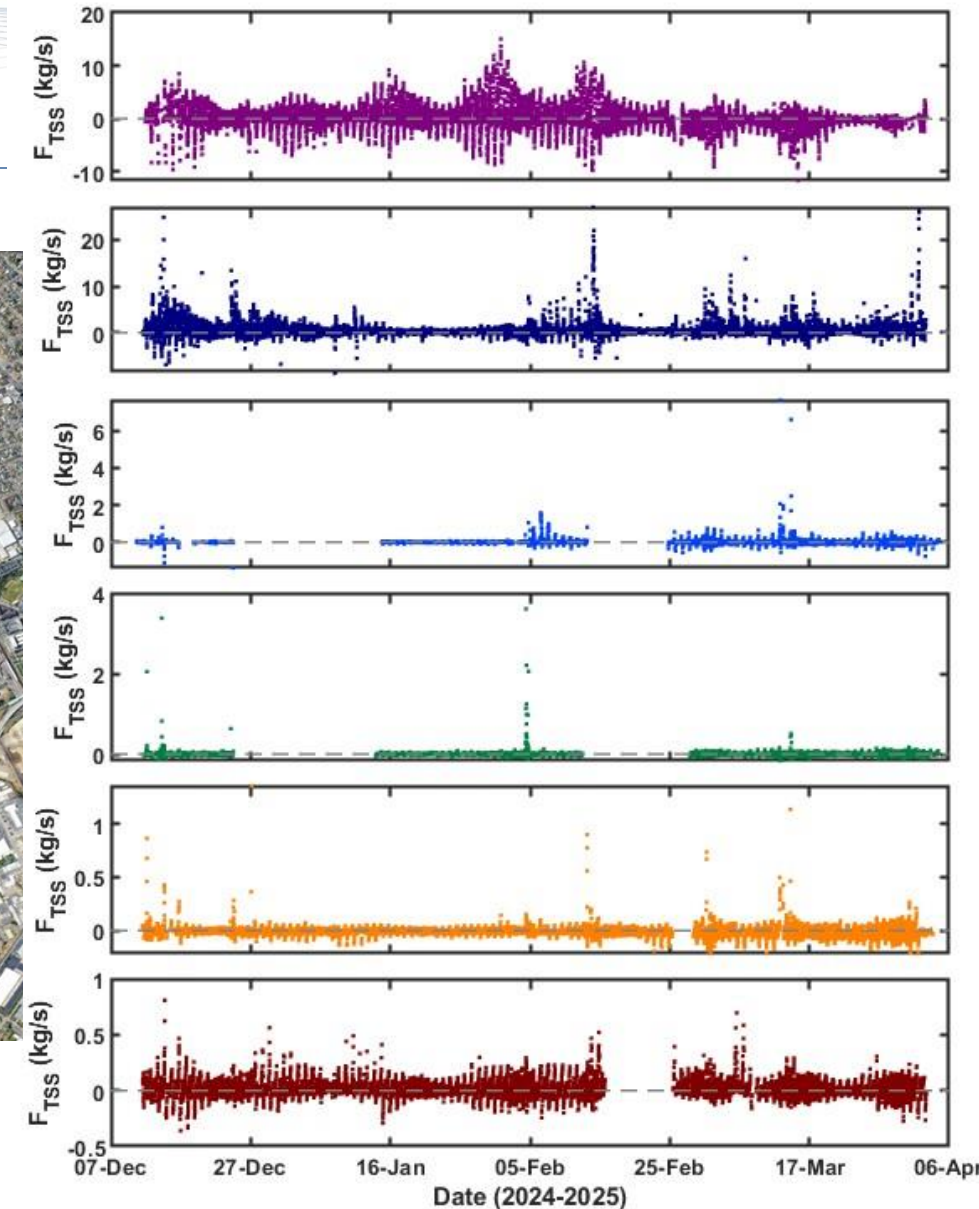
Measurements

In situ platform measurements + Discrete Samples ->



Sediment Flux

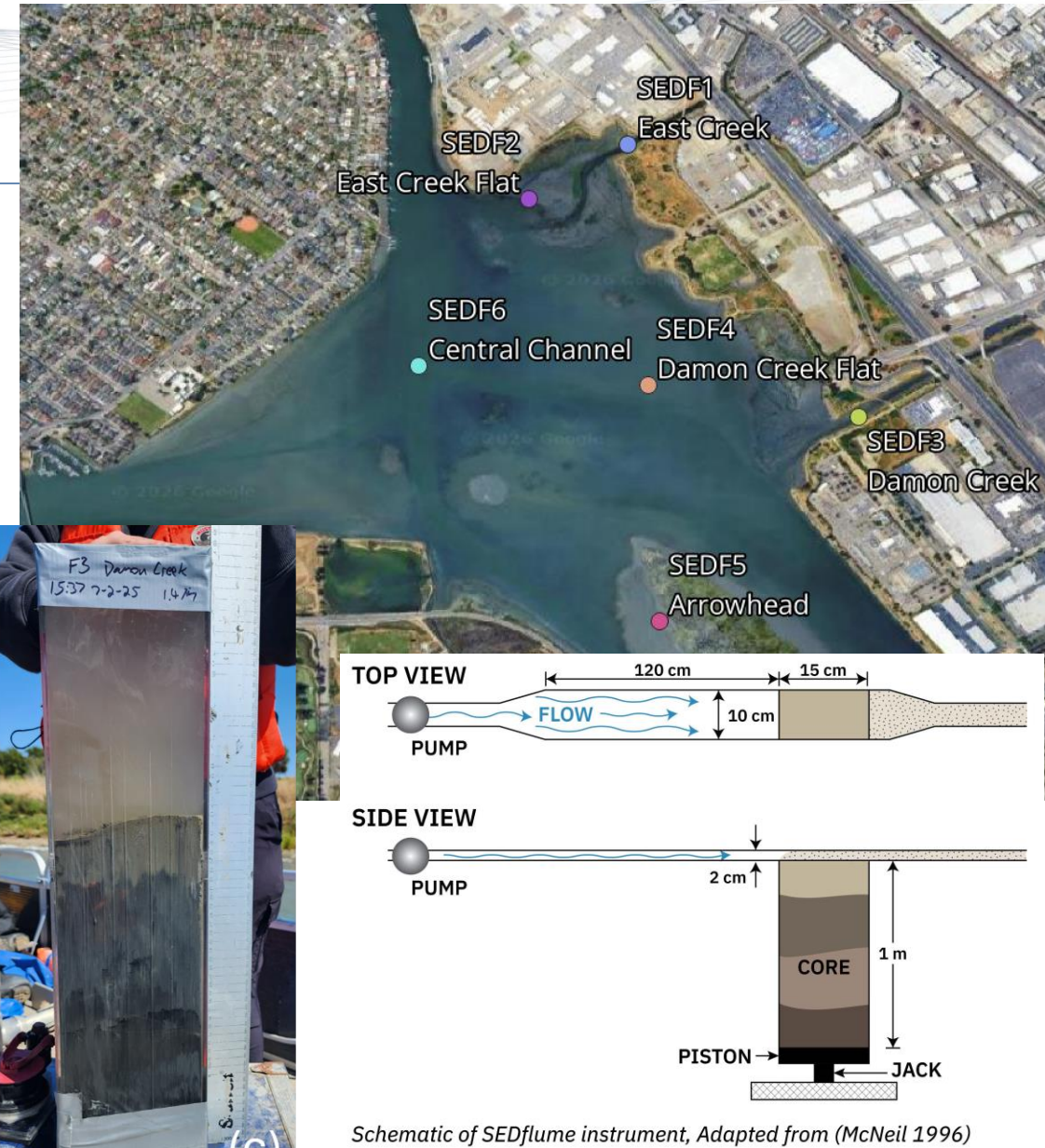
- Net flux in from Bay Farm Island and out Alameda Channel (tidal circulation)
- Net import of sediment from tributaries, particularly San Leandro Creek
- Small (near zero) tidal flux for smaller watersheds



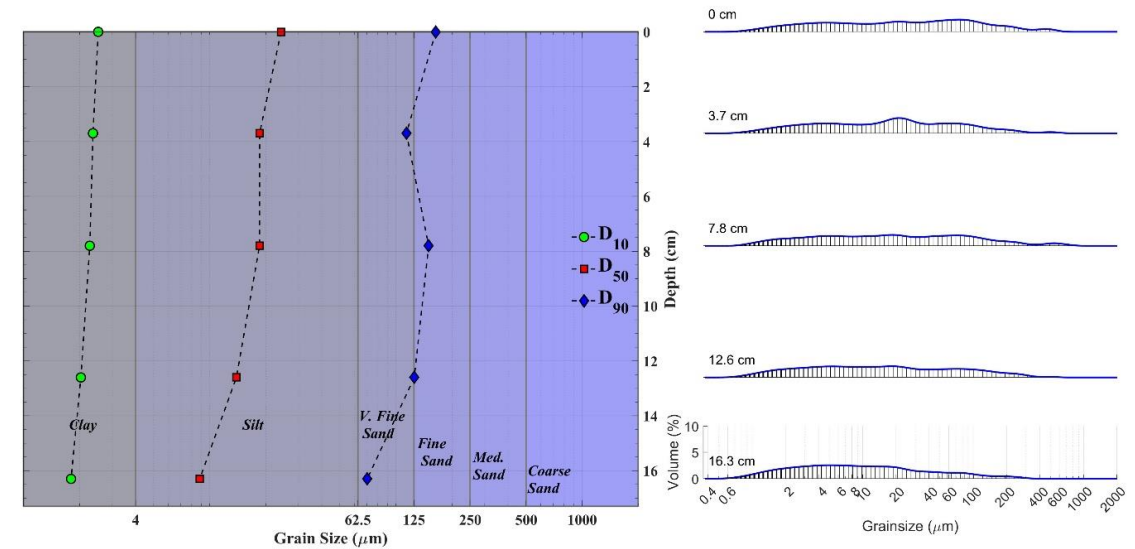
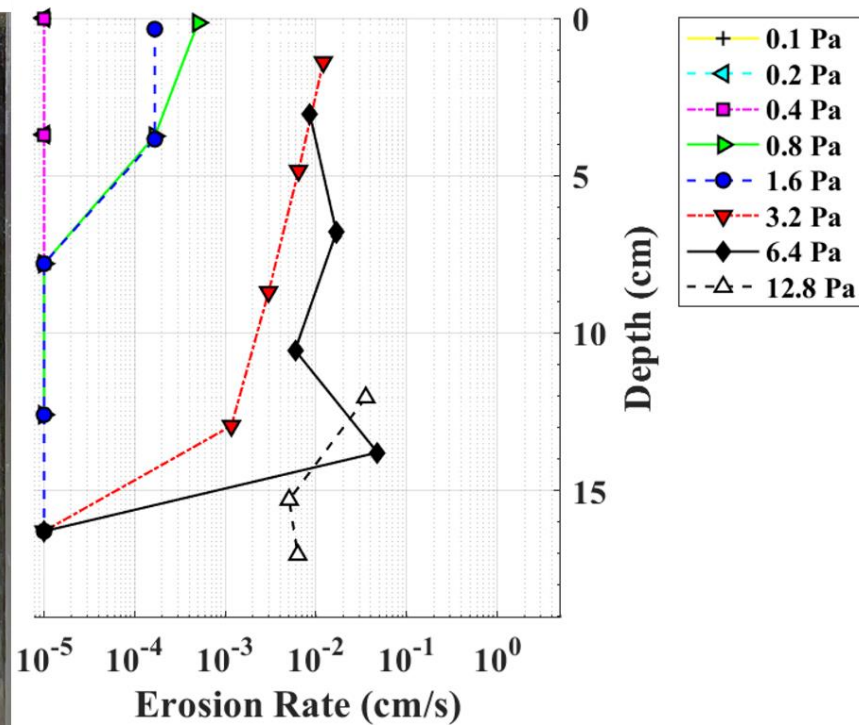
SLB Sediment Mobility Characteristics

SEDflume Study

- What is the potential for sediment mobility in San Leandro Bay?
- Collected 6 SEDflume cores and tested in laboratory experiment
 - Measured erosion rates at range of forces
 - Particle size distribution and density
 - Derived critical shear stress for erosion
- Cores were from intertidal mudflats, central area of bay, and in creeks to highlight different energy regimes



Example SEDflume Data- Damon Creek



The Bay is Alive!

- The presence of biotic activity is also noted at multiple sites
- This affects erosional processes through bioturbation and sediment mixing
- Note the variety and types of influence!



Benthic Organisms- Damon Creek



Marphysa sanguinea - Central Bay



Worm Tubes- East Creek Flat

Insights into Margin Sediment Dynamics

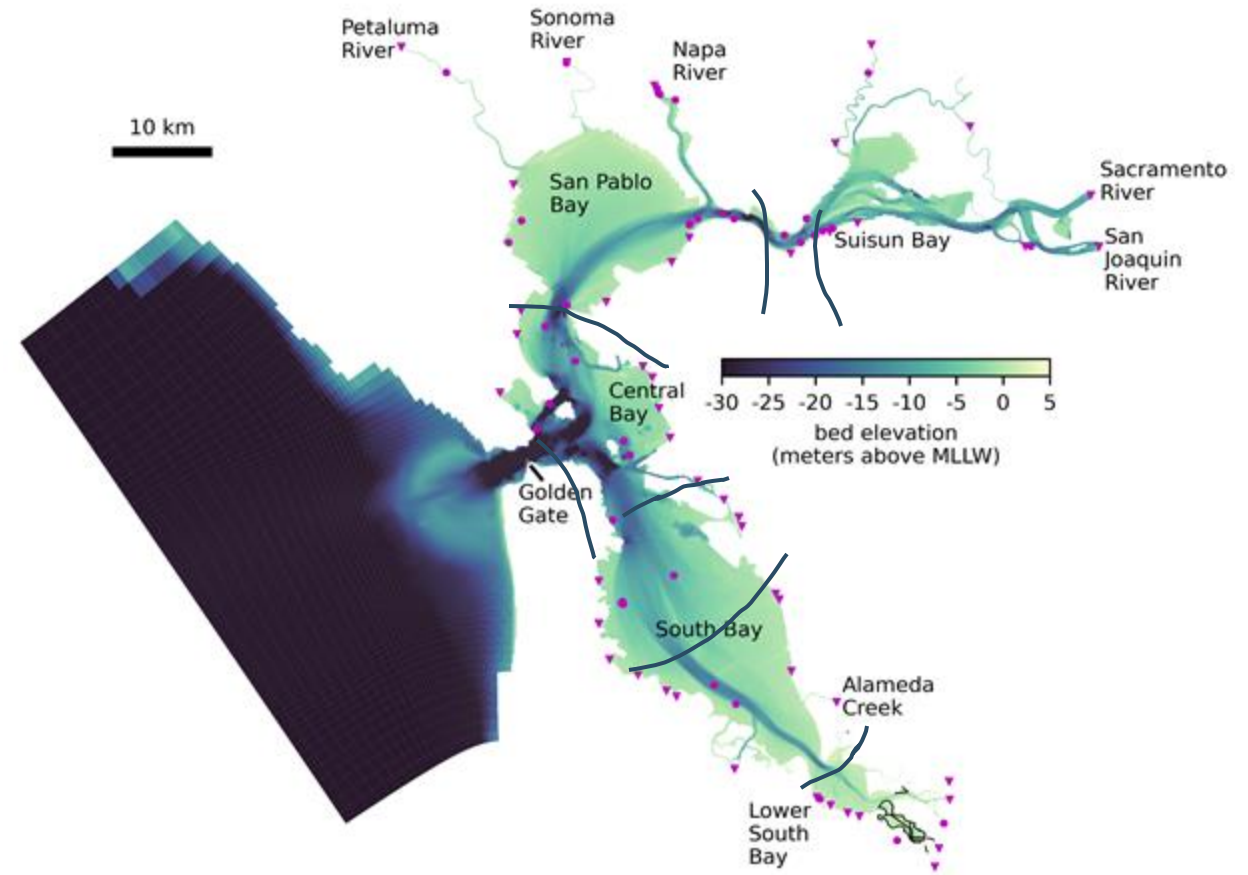
- Variation in Sediment Characteristics
 - Composition
 - Critical shear stress for erosion
 - Associated erosion rates
- Can refine San Leandro Bay PMU model
 - More robust sediment transport estimates
 - Potential improvements to recovery estimates through more robust bed representation



Bay-Wide Sediment Transport

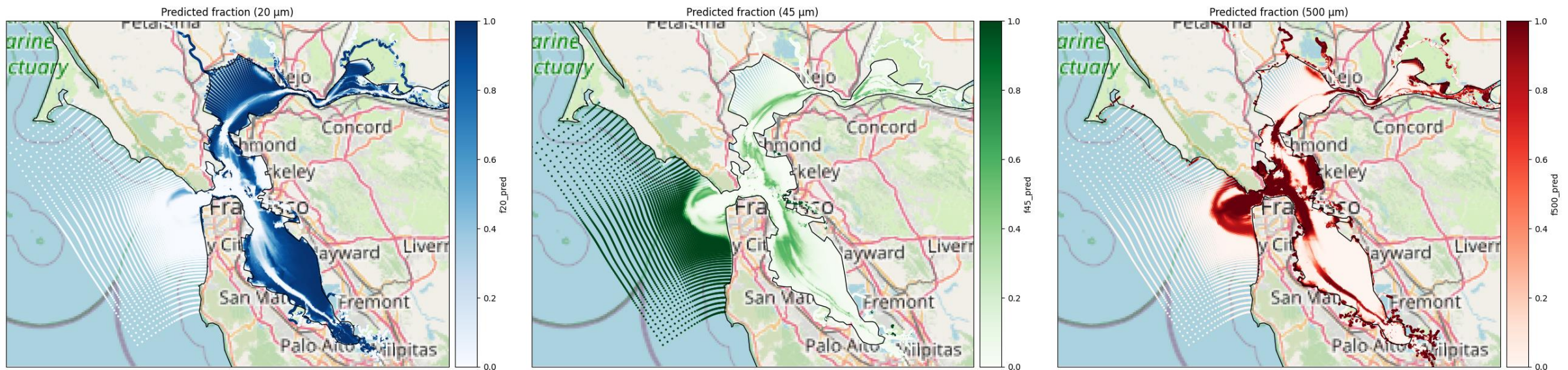
Bay-Wide Sediment Model Approach

- Integrated into hydrodynamic model used for nutrient evaluations
 - Robust model with tidal currents, winds, and watershed inputs
- Sediment model includes three sediment grainsize classes:
 - Fine silt (20 μm)
 - Medium silt (45 μm)
 - Medium sand (500 μm)
- Spatially variable sediment bed composition informed by hydrodynamics and available grainsize data
- Sediment from key sources (e.g., watersheds and discharge) and from 6 bay reaches are tracked separately

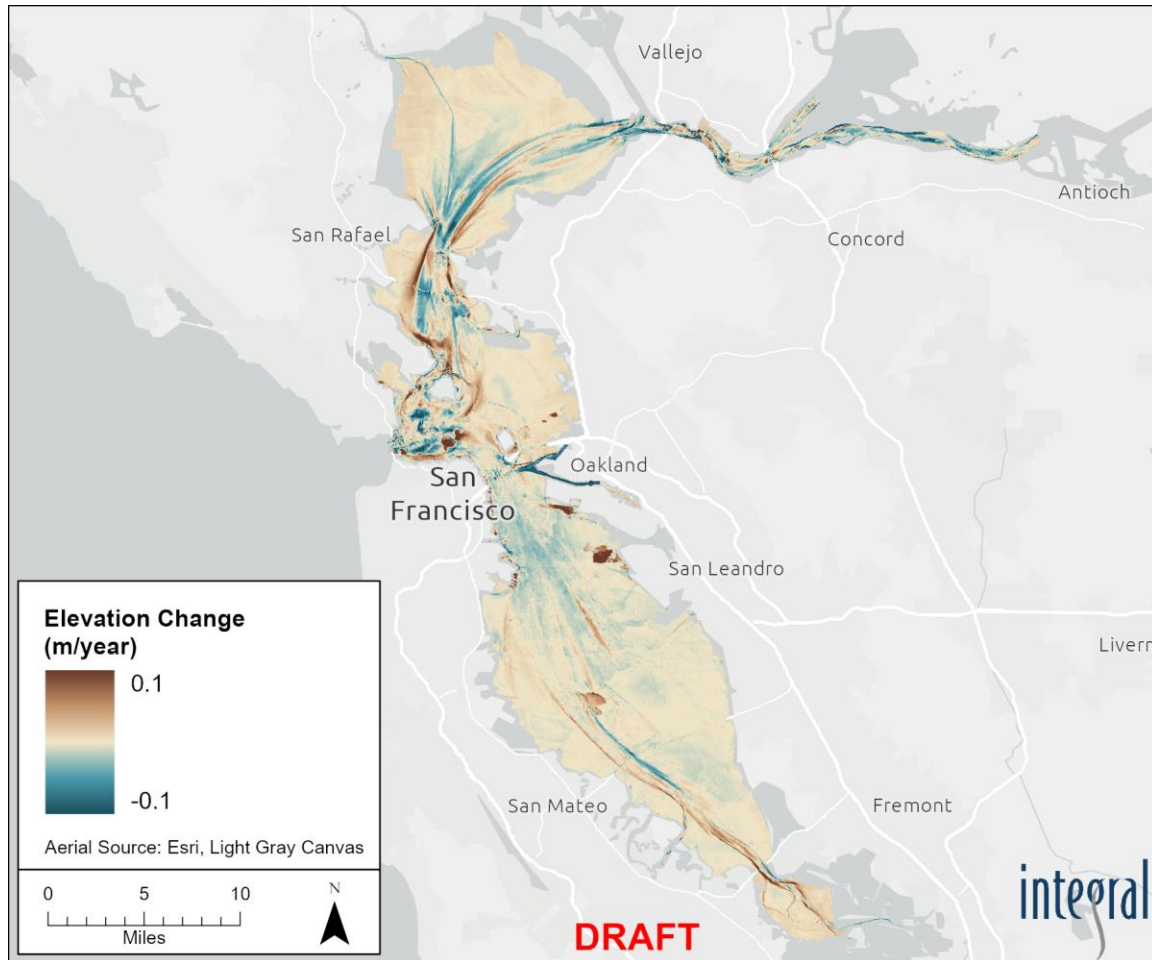


Sediment Bed Composition

- Sediment bed composition was specified using average modeled shear stress (provided by SFEI) and available USGS particle grain size data (Barnard et al., 2013)
- Utilizing least squares fitting of water depth and modeled shear stress to measured grain size, sediment distributions were calculated for each model grid cell



Sediment Bed Changes in the Bay

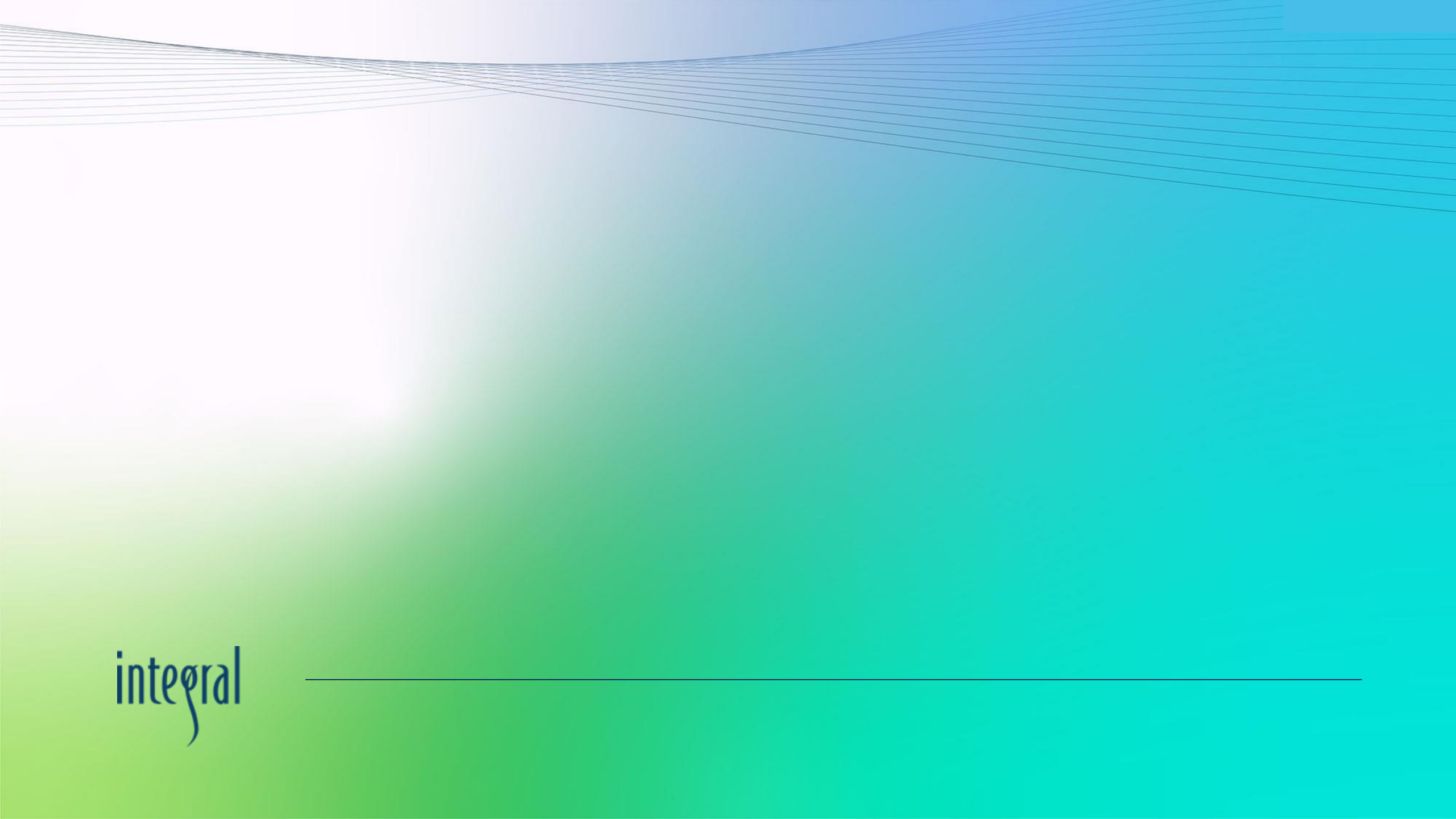


- Derived from USGS Bathymetry Change maps
- Patterns and volumes useful for model comparison

Reach	Average Elevation Change (m/yr)	Sediment Volume Change (m ³ /yr)
Suisan Bay	-1.80E-02	-5.13E+05
Carquinez Strait	-9.00E-03	-1.51E+05
San Pablo Bay	-1.80E-03	-3.76E+05
Central Bay	1.80E-04	6.73E+04
South Bay	-7.40E-04	-1.75E+05
Lower South Bay	1.10E-02	2.85E+05

In Progress

- Model Bed Changes over three water years to capture range of watershed loadings
 - WY 2016 as an average year (533 mm)
 - WY 2017 was selected as a wet year (889 mm of rainfall)
 - WY 2021 as a dry year (208 mm)
- Compare with bed change analyses (USGS) and other sediment data
- Evaluate contaminant recovery by tracking changes in sediment bed through combination of water year simulations and associated contaminant loads



integral

A photograph of the Golden Gate Bridge in San Francisco, viewed from a low angle over the water. The bridge's red-orange structure is prominent on the left, extending towards the right. In the foreground, a large splash of white water is visible. The background shows the blue sky with light clouds and distant hills.

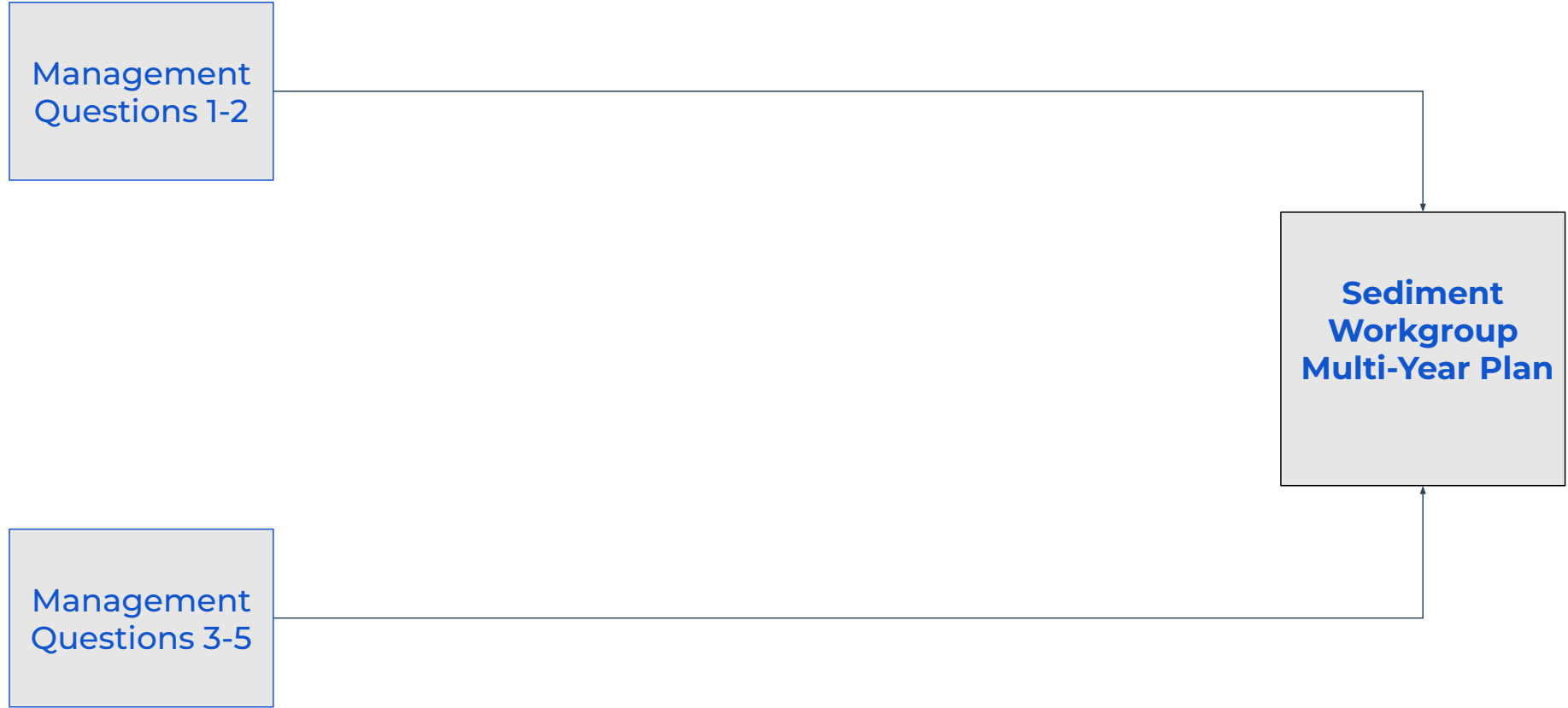
2027 Special Study Proposals Ideas Discussion

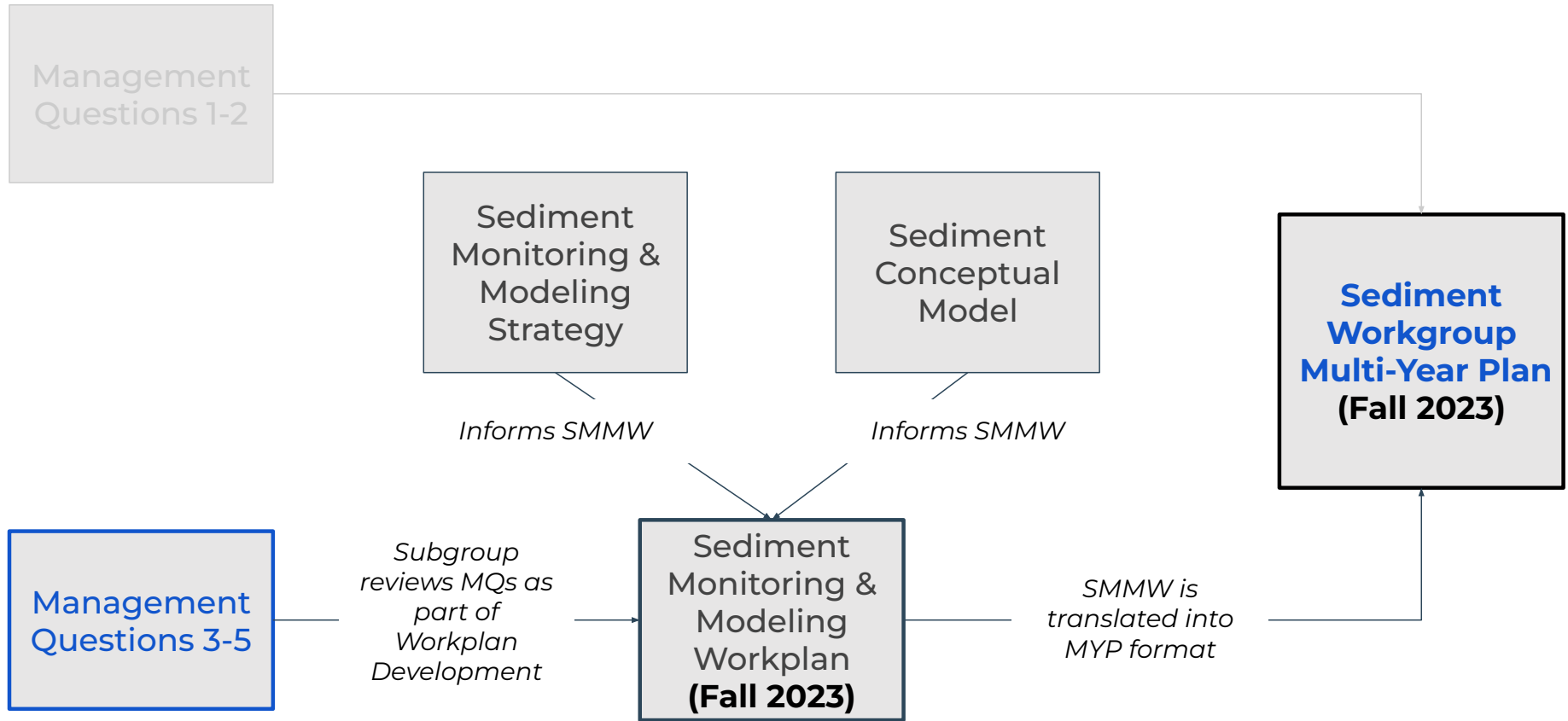


Management
Questions 1-2

Management
Questions 3-5

**Sediment
Workgroup
Multi-Year Plan**





Management
Questions 1-2

***Have been updated and a workplan is currently
in development***

Sediment
Monitoring &
Modeling
Strategy

Informs SMMW

Sediment
Conceptual
Model

Informs SMMW

**Sediment
Workgroup
Multi-Year Plan
(Fall 2025,
2026)**

Management
Questions 3-5

*Subgroup
reviews MQs as
part of
Workplan
Development*

Sediment
Monitoring &
Modeling
Workplan
(Fall 2023)

*SMMW is
translated into
MYP format*

Guidance for 2027 Special Study Proposals

- We can expect to get ~**\$489,000** for 2027 Special Studies (a little less than we received last year)
- We want to develop a set of proposals that total more than \$489,000
- **We need to include proposals for multi-year Special Study ideas**
- **Ongoing conversations re: funding Bay modeling efforts outside of the Workgroups will affect how much funding we put towards modeling**
- Proposals will be presented and ranked at the May meeting
- Proposals not moved forward for funding will go on to the SEP list



2027 Special Study Proposal Ideas

1. Strategy funds (~\$25k)
2. Develop sediment conceptual model for South Bay & LSB (~\$83k in 2027)
3. Bay Modeling Study Plan: Phases 1 & 2 (up to ~\$570k in 2027)
4. Eden Landing Strat. Place. Follow-up Study: Year 3 Bathymetry (~90k)
5. Eden Landing Strat. Place. Follow-up Study: Year 3 Benthic Surveys (~\$91k)
6. Expanded SSC & Accretion Monitoring in Fluvially Influenced Restored Marsh (~\$150k)
7. Expansion of Sedimentation Estimates in Restored Marshes (~\$120k)

TOTAL: ~\$1.1M



Study Name	Approx 2027 Budget	Approx 2028 Budget	Approx 2029 Budget	Approx 2030 Budget
1. Strategy Funding	\$25,000			
2. Develop Sediment Conceptual Model for South Bay and LSB	\$82,500	\$82,500		
3.1. Bay Modeling Study Plan (Phase 1a)	\$212,000	\$121,000		
3.2. Bay Modeling Study Plan (Phase 1b)		\$112,000	\$234,000	
3.3 .Bay Modeling Study Plan (Phase 2a)	\$147,000			
3.4 .Bay Modeling Study Plan (Phase 2b)	\$212,000	\$121,000		
3.5. Bay Modeling Study Plan (Phase 2c)		\$112,000	\$234,000	\$241,000
4. Eden Landing Strategic Placement Follow-up Study: Year 3 Bathymetry	\$90,000			
5. Eden Landing Strategic Placement Follow-up Study: Year 3 Benthic Surveys	\$91,000			
6. SSC & Accretion Monitoring in Fluvially Influenced Restored Marsh	\$150,000			
7. Expansion of Sedimentation Estimates in Restored Marshes	\$120,000			

TOTAL 2027 funds available \$489,000

Sum of 2027 Study Ideas \$1,129,500

Difference (\$640,500)

2027 Special Study Proposal Ideas

Study Type	MQs	2027 Budget	2028 Budget	2029 Budget	2030 Budget	Overall Summary	Potential Lead
2. Develop sediment conceptual model for South Bay & LSB	3.3 3.4	~\$83k	~\$83k			- Next step in the "Schoellhamer Cycle" * 2025 - Suisun Bay & San Pablo Bay concept model * 2026 - Central Bay concept model - Focus on adding new elements and incorporating results from recent studies - Would be developed in coordination with WRMP and other partners	Kyle Stark (SFEI)

2027 Special Study Proposal Ideas

Study Type	MQs	2027 Budget	2028 Budget	2029 Budget	2030 Budget	Overall Summary	Potential Lead
3. Bay Modeling Study Plan - Phase 1a	3.3 5.2 5.3	\$212k	\$121k			Develop 1DV FLOCMOD model and compare to past observations	Oliver Fringer (Stanford)
Phase 1b			\$112k	\$234k		Develop data-assimilative 1DV model	
Phase 2a		\$147k				Develop calibrated 3D sediment transport model	
Phase 2b		\$212k	\$121k			Implement FLOCMOD in 3D model	
Phase 2c			\$112k	\$234k	\$241k	Develop data-assimilative 3D sediment transport model	
TOTAL		\$571k	\$466k	\$468k	\$241k		

2027 Special Study Proposal Ideas

Study Type	MQs	2027 Budget	2028 Budget	2029 Budget	2030 Budget	Overall Summary	Potential Lead
4. Eden Landing Strategic Placement Follow-up Study: Year 3 Bathymetry	4.4 4.5	~\$90k				- Multi-beam bathymetry survey of the dredged sediment mounds - Sediment sampling and analysis to determine bed properties (grain size, bulk density) to understand compaction and change in seabed texture over time - Deployment of instrumented tripods on and off the mound to characterize hydrodynamic roughness	Andrew Stevens (USGS)

2027 Special Study Proposal Ideas

Study Type	MQs	2027 Budget	2028 Budget	2029 Budget	2030 Budget	Overall Summary	Potential Lead
5. Eden Landing Strategic Placement Follow-up Study: Year 3 Benthic Surveys	2a	~\$91k				- Resample a uniform 50-m grid overlaid across the entire placement and the reference areas just north of San Mateo Bridge - Translate response of the benthic invertebrate community into impacts on trophic support for commercially important fish species. - Compare Year 3 findings to those from 6 months and 12 months after the strategic placement	Susan De La Cruz (USGS)

2027 Special Study Proposal Ideas

Study Type	MQs	2027 Budget	2028 Budget	2029 Budget	2030 Budget	Overall Summary	Potential Lead
6. Expanded SSC & Accretion Monitoring in Fluvially Influenced Restored Marsh	4.4 5.1 5.4	~\$150k				- Use Gray's Marsh monitoring approach on a larger river (e.g., Napa River or Sonoma Creek) - The study goal would be characterizing the trajectory and status of restored salt marshes next to larger fluvial sed sources. - The study would be a combination SSC monitoring, coring, vegetation surveys, and sediment accretion pads	Dan Nowacki (USGS)

2027 Special Study Proposal Ideas

Study Type	MQs	2027 Budget	2028 Budget	2029 Budget	2030 Budget	Overall Summary	Potential Lead
7. Expansion of Sedimentation Estimates in Restored Marshes	4.4 5.1 5.4	~\$120k per year				- Expand the marsh accumulation work being done at WRMP benchmark sites to marsh restoration sites around SF Bay - Use newly collected data, newly available LiDAR, and other data to determine accumulation rates - Could also determine recent accumulation rates in established marshes	Karen Thorne (USGS)

Study Name	Approx 2027 Budget	Approx 2028 Budget	Approx 2029 Budget	Approx 2030 Budget
1. Strategy Funding	\$25,000			
2. Develop Sediment Conceptual Model for South Bay and LSB	\$82,500	\$82,500		
3.1. Bay Modeling Study Plan (Phase 1a)	\$212,000	\$121,000		
3.2. Bay Modeling Study Plan (Phase 1b)		\$112,000	\$234,000	
3.3 .Bay Modeling Study Plan (Phase 2a)	\$147,000			
3.4 .Bay Modeling Study Plan (Phase 2b)	\$212,000	\$121,000		
3.5. Bay Modeling Study Plan (Phase 2c)		\$112,000	\$234,000	\$241,000
4. Eden Landing Strategic Placement Follow-up Study: Year 3 Bathymetry	\$90,000			
5. Eden Landing Strategic Placement Follow-up Study: Year 3 Benthic Surveys	\$91,000			
6. SSC & Accretion Monitoring in Fluvially Influenced Restored Marsh	\$150,000			
7. Expansion of Sedimentation Estimates in Restored Marshes	\$120,000			

TOTAL 2027 funds available \$489,000

Sum of 2027 Study Ideas \$1,129,500

Difference (\$640,500)

A photograph of the Golden Gate Bridge in San Francisco, viewed from a low angle on the water. The bridge's red-orange steel structure is prominent, with a large splash of white water in the foreground. The sky is blue with light clouds, and the water is dark blue.

Proposal Logistics and Timing



Proposal Development Timeline

- **March 20 to April 15 – Draft proposals developed**
- **April 16 to April 23 – Draft proposals reviewed by Jay, Amy, and Scott**
- **April 24 to May 12 – Draft proposals revised**
- **May 13 – Final proposals to all Workgroup members in advance of May 20 Workgroup meeting**



Wrap Up



May 20th Meeting Overview

Full Day HYBRID Meeting (9 am – 4:30 pm)

MORNING

- Brief presentations of completed and in-progress studies

AFTERNOON

- Proposal presentations
- Proposal ranking



Thank you!

See you on May 20th!

