

# Closing the Loop Can Happen Whether You Plan for It or Not

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**San Francisco Bay**  
National Estuarine  
Research Reserve



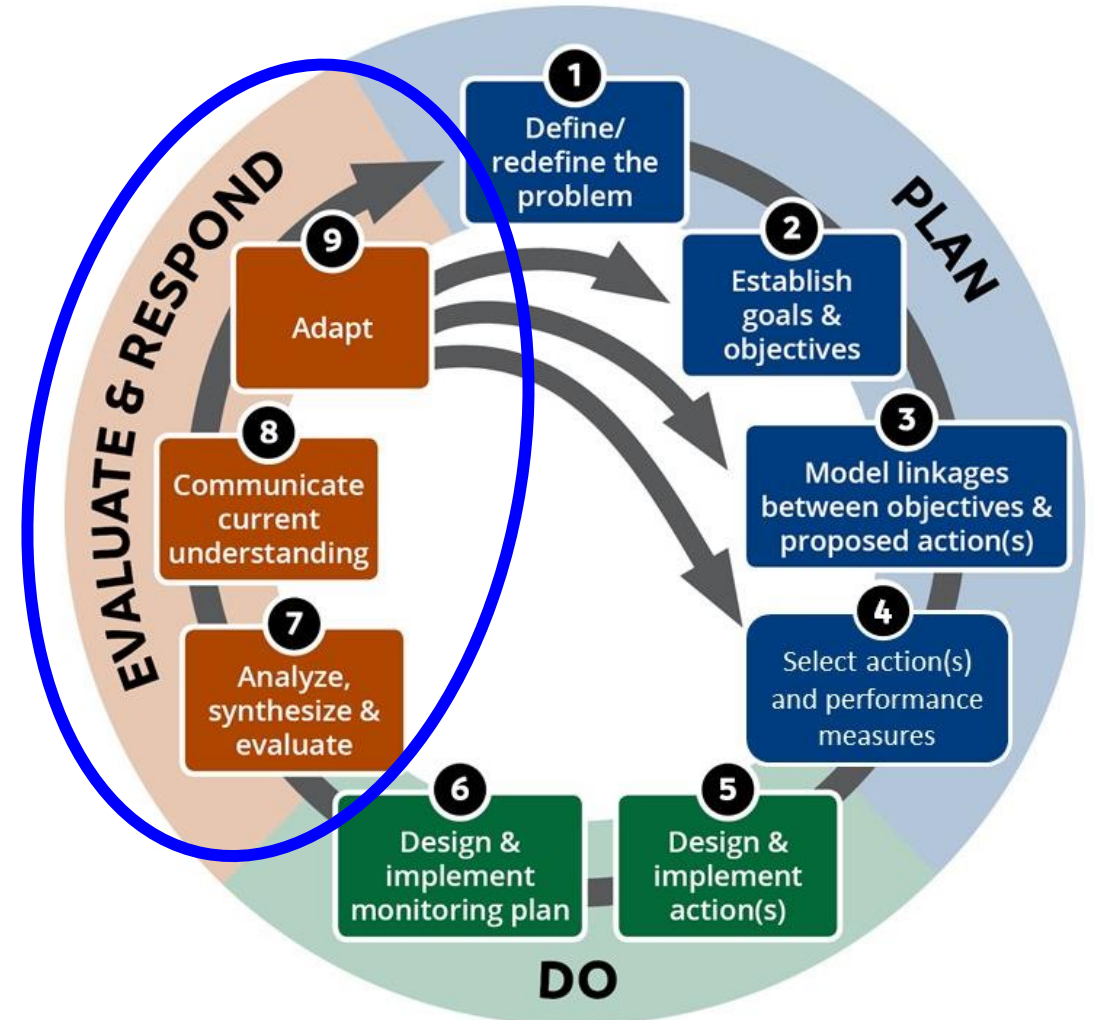
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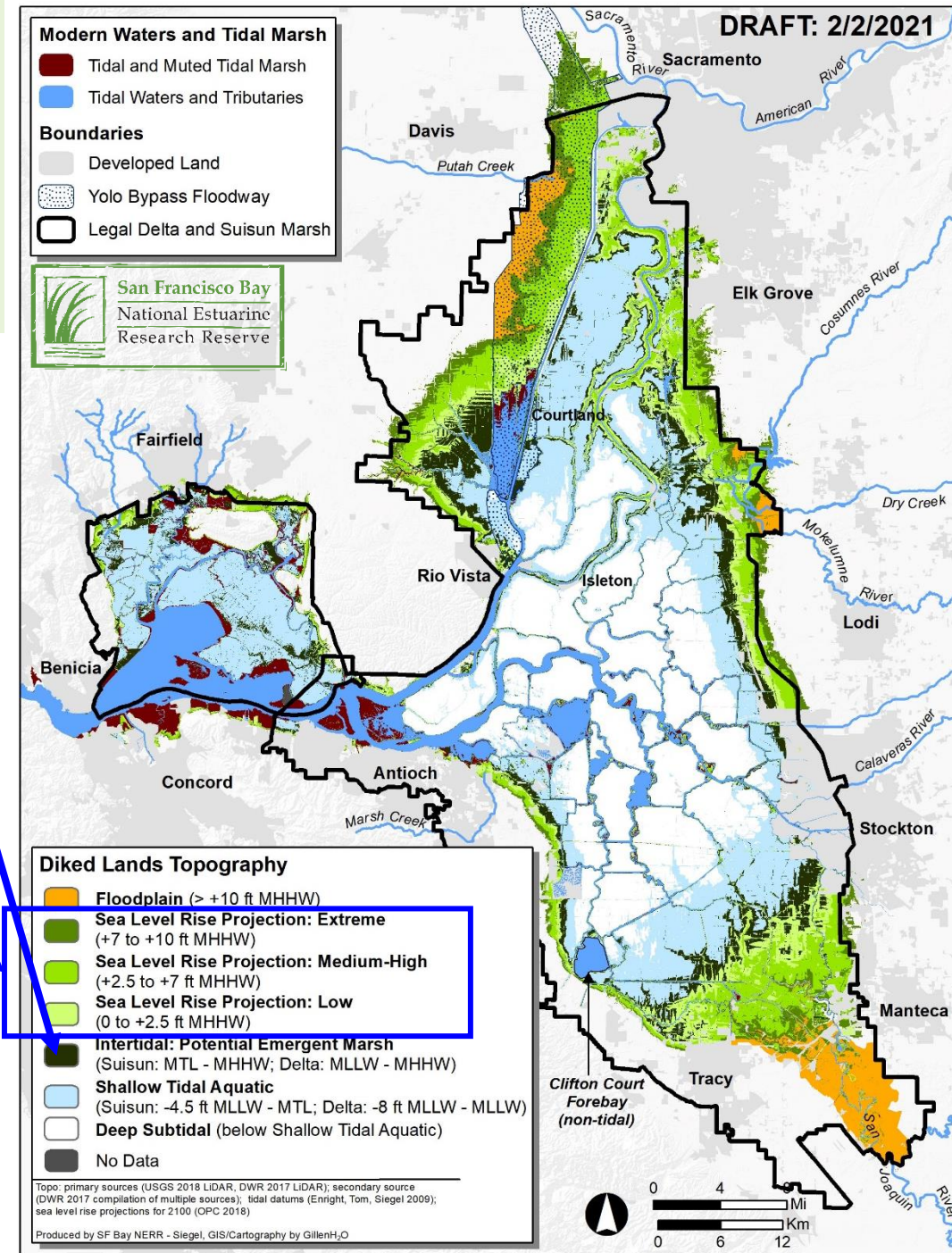
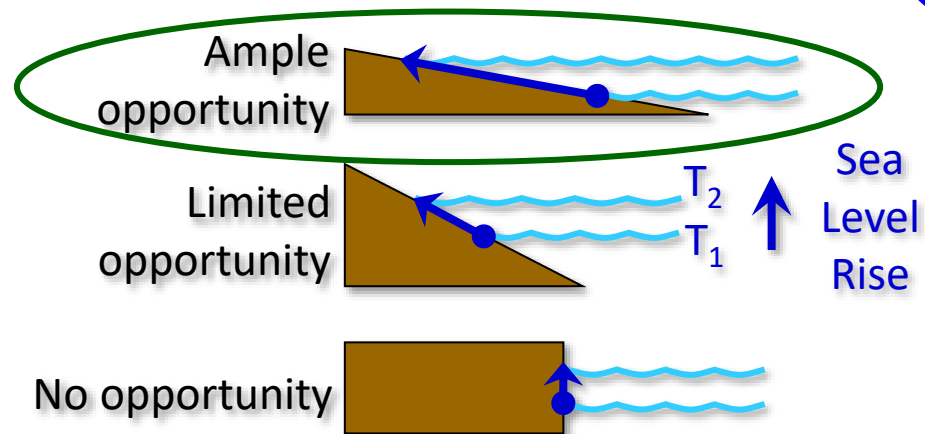
# Why “Closing the Loop” in the Adaptive Management Cycle Is So Important

Projects take time  
+  
Climate change is running out our clock  
+  
Nature bats at will – may implement on our behalf  
+  
We know a lot already  
=  
Necessity to put our best feet forward



# We Know a Lot Already: Sea Level Rise Resiliency for the Estuary's Tidal Wetlands

- 1) Start closer to high marsh elevations
- 2) Promote sediment, plant accretion
- 3) Expand into adjacent uplands

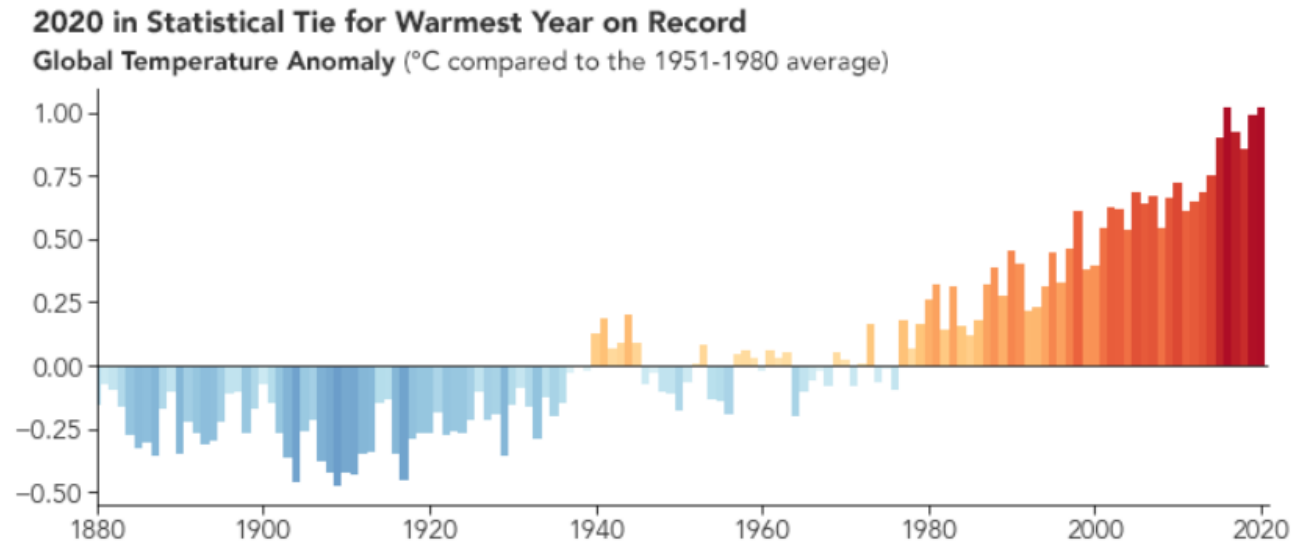
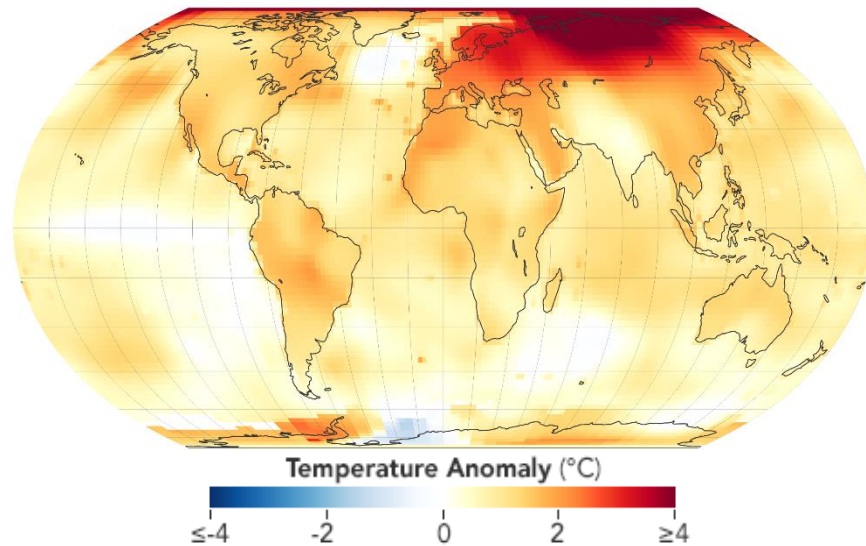




# Time's a Tickin' Away

## NASA: 2020 Tied for Warmest Year on Record

<https://earthobservatory.nasa.gov/images/147794/2020-tied-for-warmest-year-on-record?src=eoaiotd>



*Accelerating warming → need to accelerate our response  
(Coupled ocean-atmosphere system shifts extremely slowly)*

**Picking up our pace → improves likelihood of achieving visions and targets of the Delta Plan, Suisun Marsh Plan, BEHGU, EcoRestore, Recovery Plan, ERP Conservation Strategy, etc.**

# Key Part of the Solution: Adaptive Management as Tool to Get to Implementation Faster

- Projects take a long time
- Landscape change requires permits to change the landscape
- Outcomes take time to develop
- Complex societal dynamics drive diverse interests and divergent goals and objectives
- Communities generally more supportive when they participate

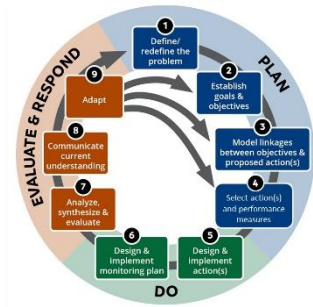
**The Big Caveat: Nothing Gets Done without Permits!  
(Unless Nature Does it For You, its Way...)**

*State Agencies: BCDC, RWQCB, CDFW, DSC, SLC, SHPO, CVFPB, Caltrans*  
*Federal Agencies: USFWS, NMFS, USACE, USEPA, USCG*

**Clean Water Act Section 401**  
Clean Water Act Section 402  
Suisun Marsh Protection Act  
**McAteer-Petris Act**  
Delta Reform Act  
Title 23  
Migratory Bird Treaty Act

**Porter-Cologne Water Quality Control Act**  
Rivers and Harbors Act  
**California Endangered Species Act**  
Magnussen-Stevens Act  
**Federal Endangered Species Act**  
33 USC Section 408  
National Environmental Policy Act

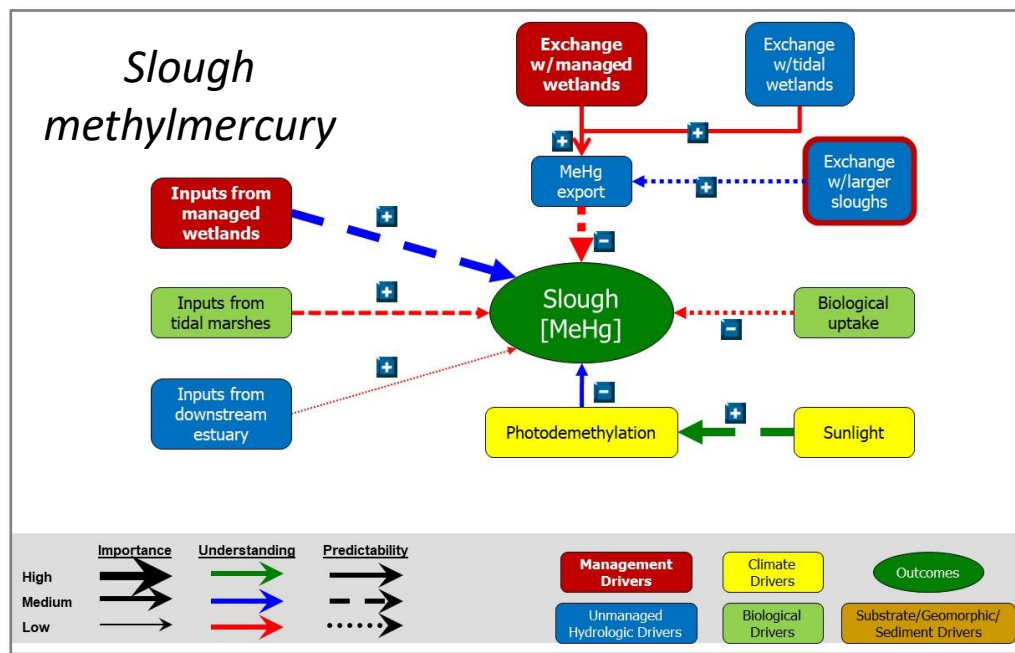
**Clean Water Act Section 404**  
**Fish and Game Code**  
Clean Water Act Section 303(d)  
Federal Navigation  
**National Historic Preservation Act**  
California Environmental Quality Act  
State Leases and Encroachment



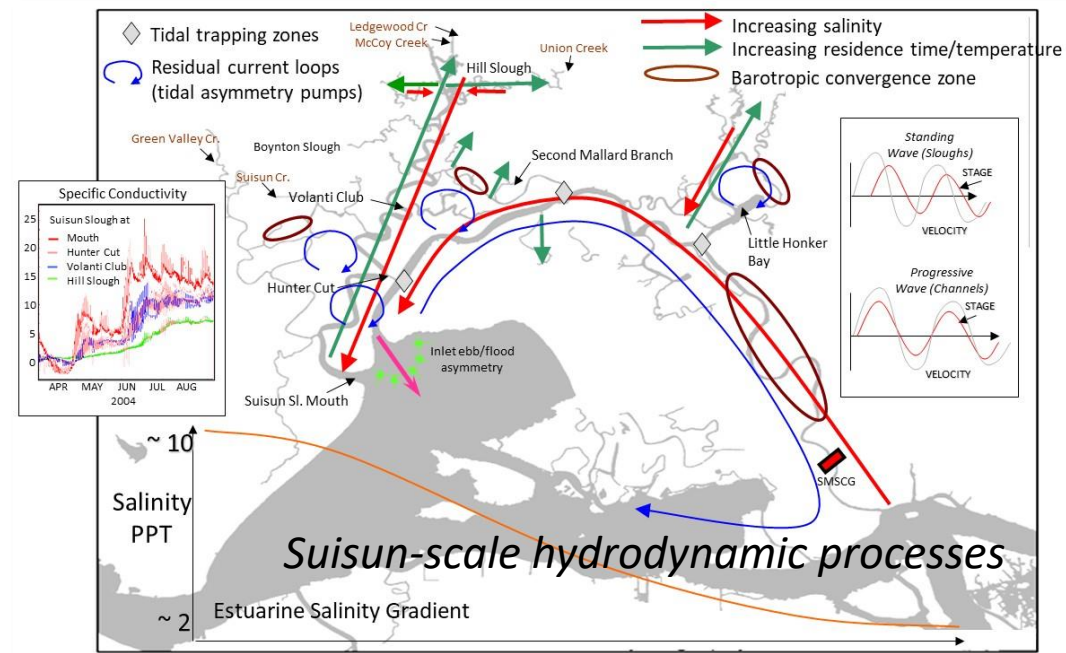
**\* Attend this afternoon's  
Permitting workshop!**

# Part 1: Planning to Close the Loop

- Actions based on **conceptual models** that communicate clearly and simply
- Testing conceptual models (stay focused)
- Lessons learned emerge from synthesis
- Long term, consistent funding to carry out
- Mechanisms to ensure lessons applied (programs, staff, remove barriers)



Source: Siegel et al. 2011



Source: Enright 2011



## Part 2: Closing the Loop without Prior Planning

Two sources of critical lessons learned that are not automatically part of any adaptive management endeavor:

Past projects without active, science-based ongoing assessment (e.g., old restorations)

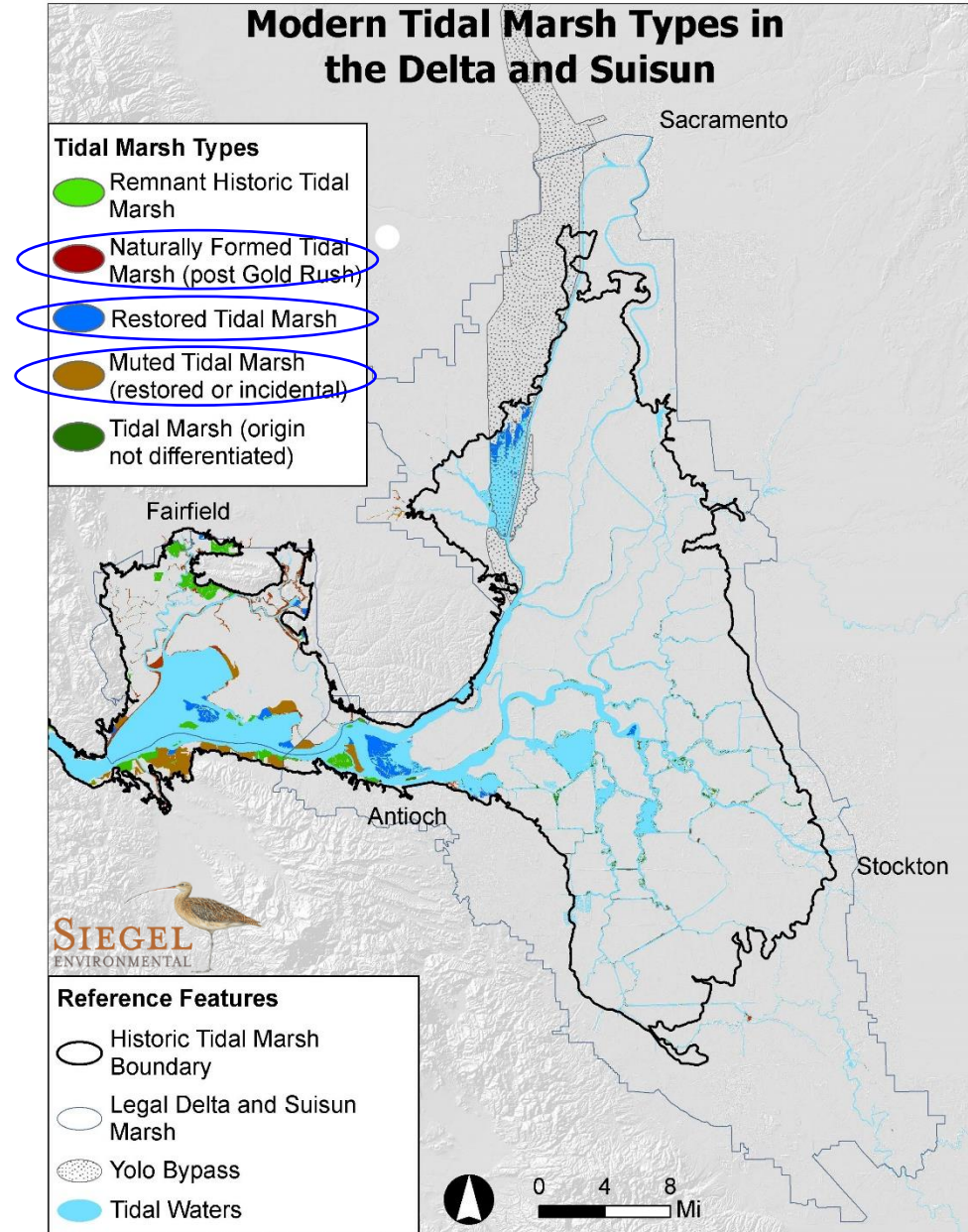
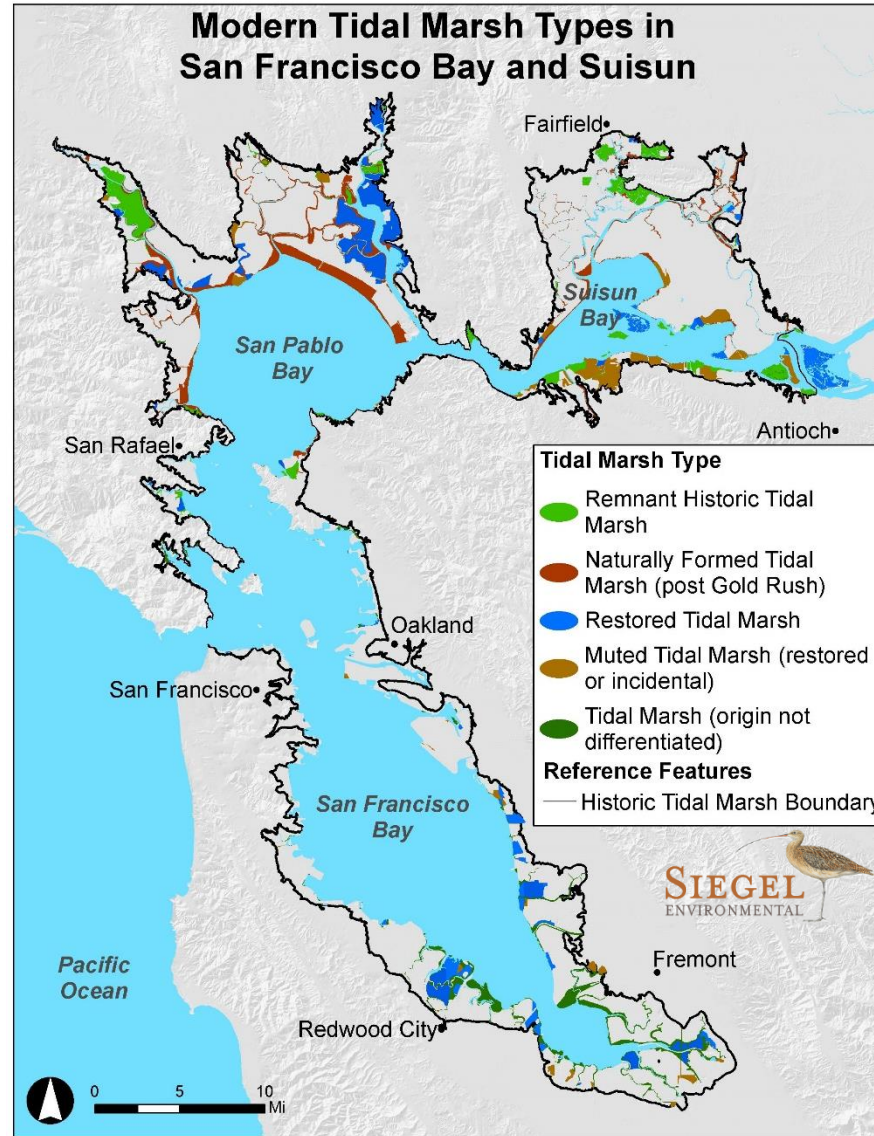
Naturally occurring actions past and future – unrepaired levee failures (e.g., Liberty Island, Franks Tract), repaired levee failures (e.g., Jones Tract), future events (floods, levee failures, earthquakes, etc.). Climate change anticipated to increase likelihood and magnitude of future change-causing events.

***Both types are “experiments” awaiting knowledge extraction!***



# Extracting Knowledge from Past Restorations

*Note: maps from 2014, many constructed restorations since then have Adaptive Management Plans*





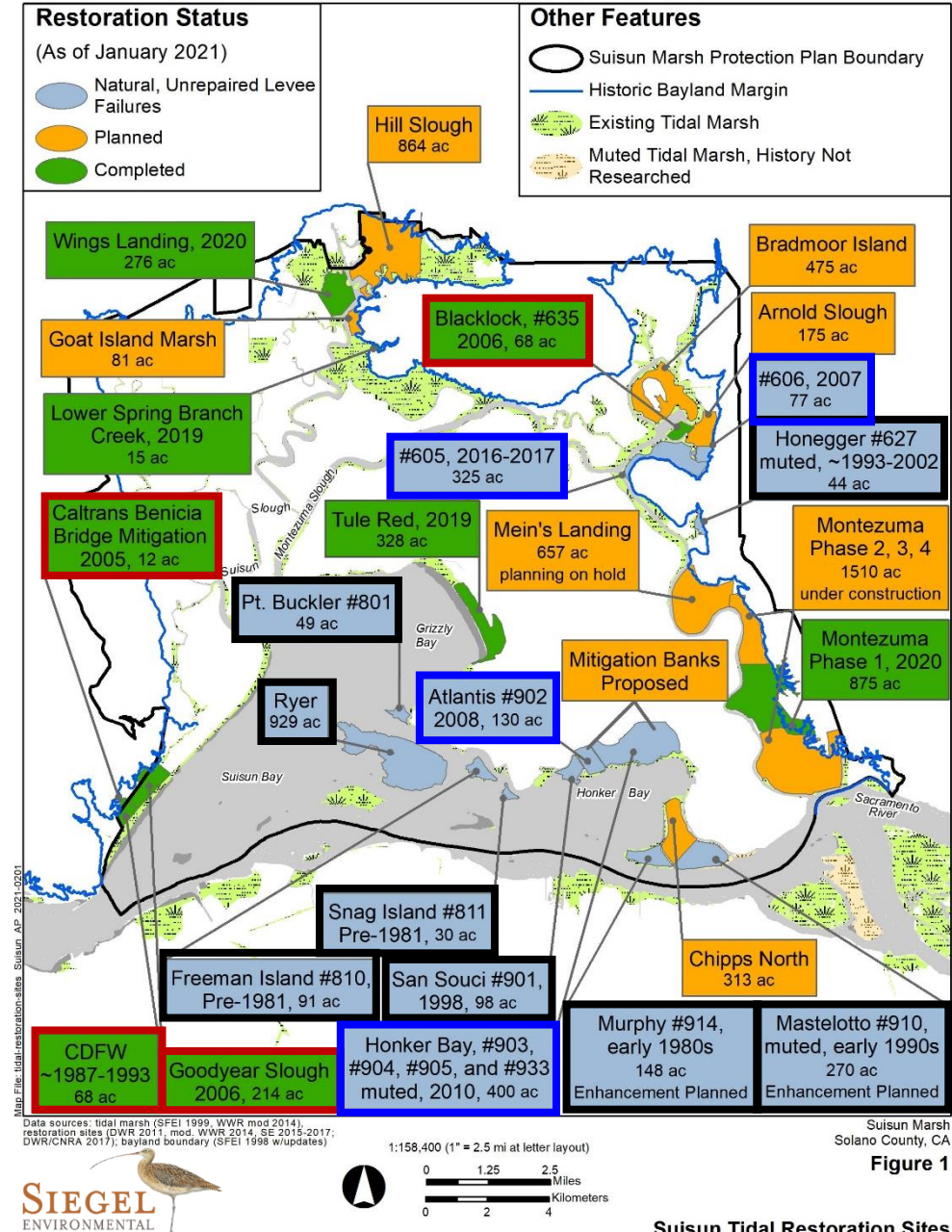
# Extracting Knowledge from Past Restorations: Suisun

*There is no Suisun-wide restoration assessment (DSP starting to look at)*

*Some research has taken place/is underway at some of these places*

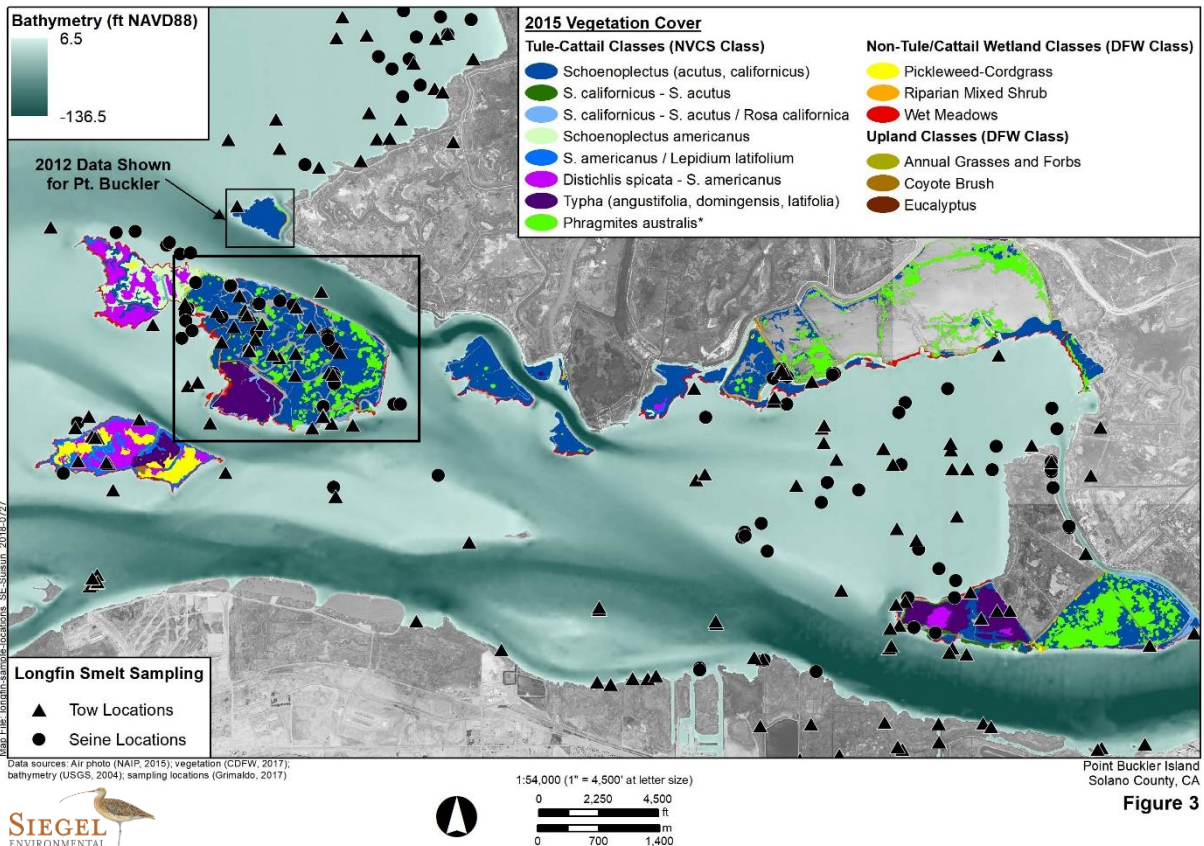
Suite of sites that exist:

- Older constructed restorations: 4
- Older natural restorations (>~15 yr): 8
- Newer natural restorations (<~15 yr): 4

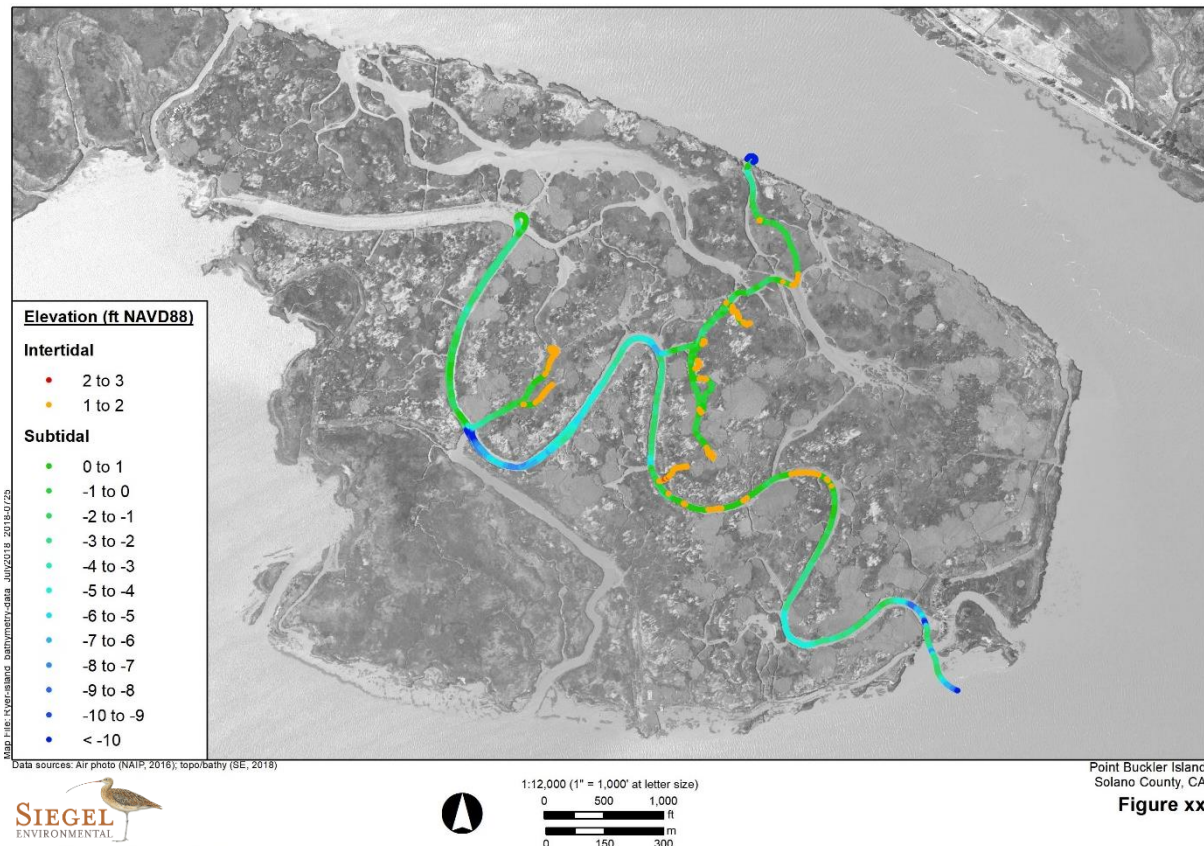




# Value to Overlapping Studies: Greater Insight, Lessons Learned



Base air photo: 2012 California NAIP Mosaic



July 2018 Channel and Near Offshore Bathymetry - Ryer Island





# Putting These Opportunities to Use!

**Stay focused** – what do decision makers, planners, funders, regulators, project designers, community members need to know?

**The world is imperfect** - the universe of potential sites is not that large and the sites do not fall neatly along gradients of applied scientific interest.

**In selecting places to examine:**

- Consider how representative a site is for prospective future actions
- Consider sites with past and ongoing research to build a more robust and cost-effective understanding
- Use clear and concise conceptual models to select metrics that reflect ecological functions, climate change threats, etc.



# Let's Buck the Trend. Thank you!

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Courtesy of Susanne Moser / Point Blue

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