

# Baylands Ecosystem Habitat Goals Science Update 2014

Planning for healthy shoreline ecosystems  
in an urbanized estuary

Letitia Grenier

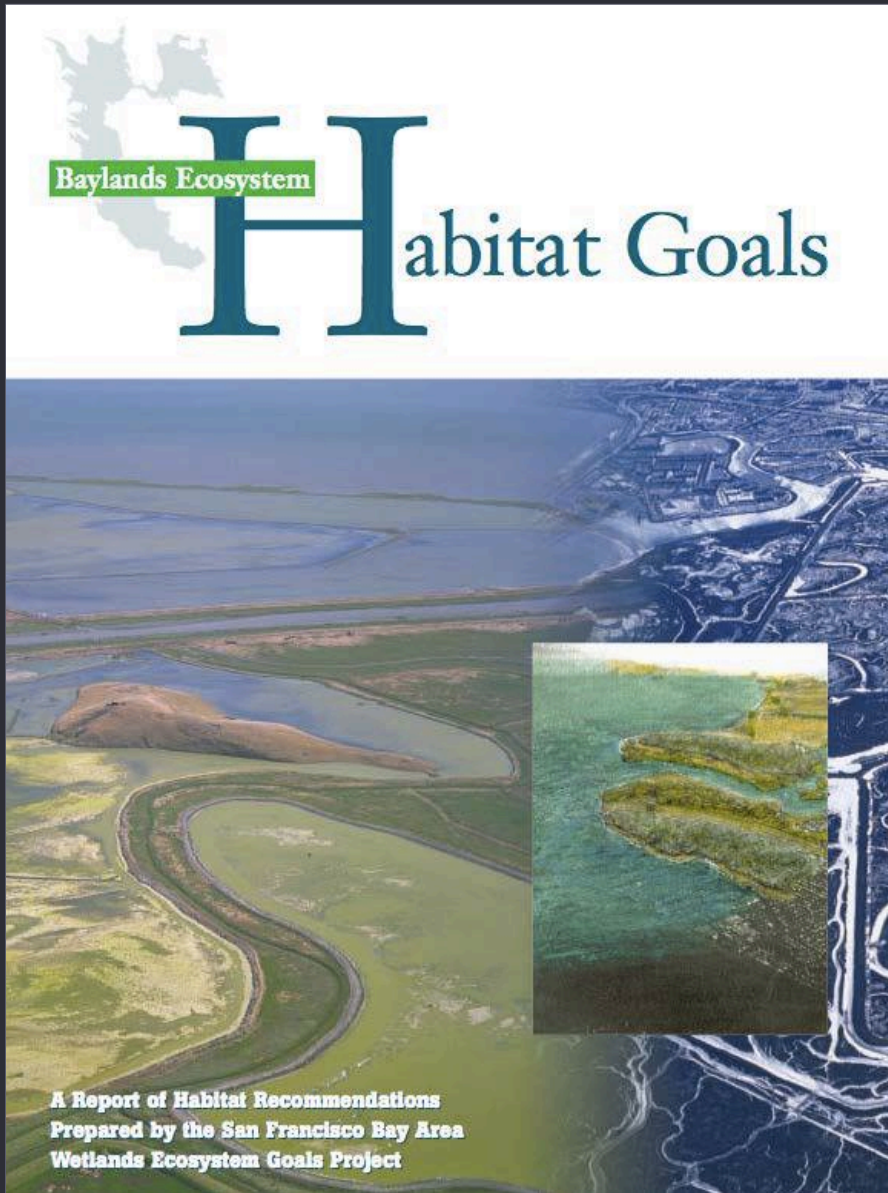
Science Coordinator, Baylands Ecosystem Habitat Goals

*Reconciling Ecosystem and Economy Seminar Series, UC Davis*

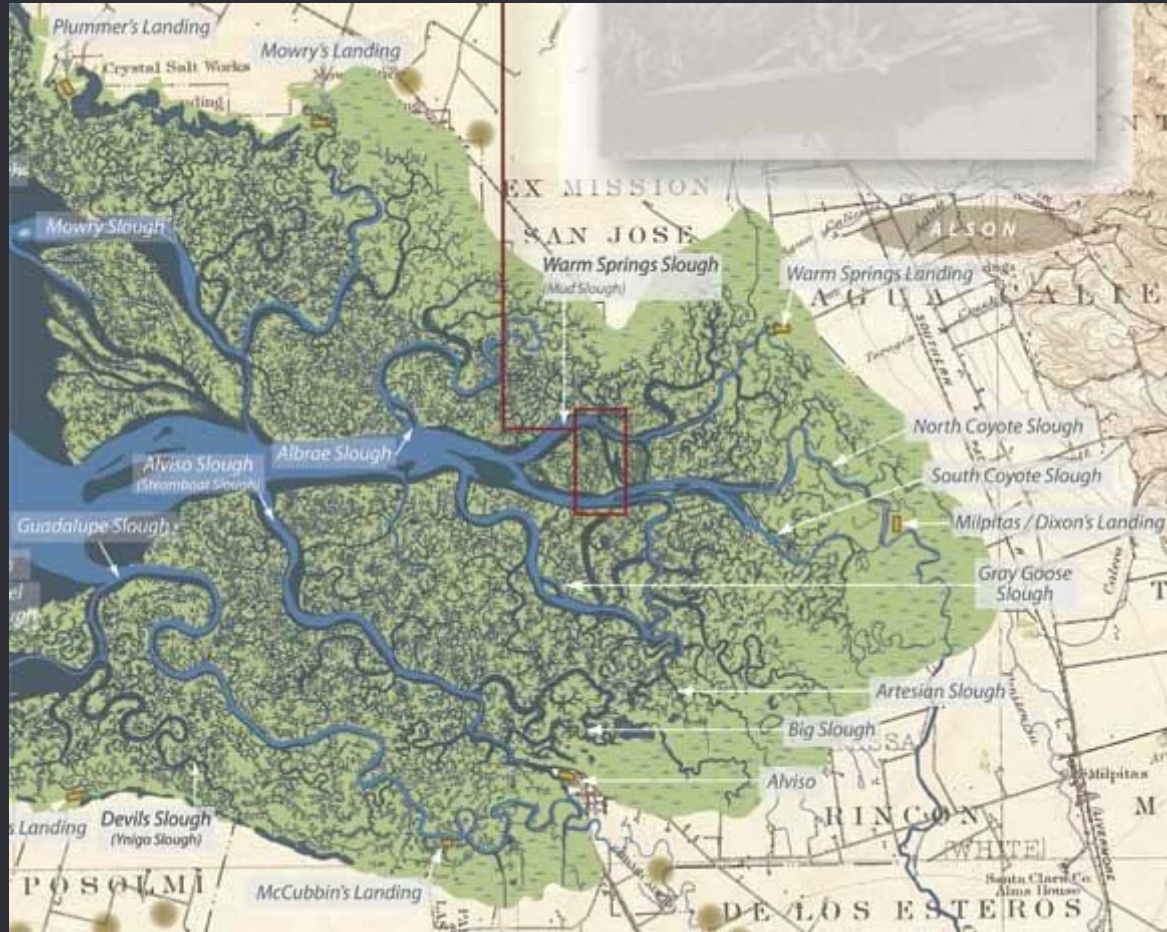
*10 February 2014*



# Baylands Ecosystem Habitat Goals (1999)

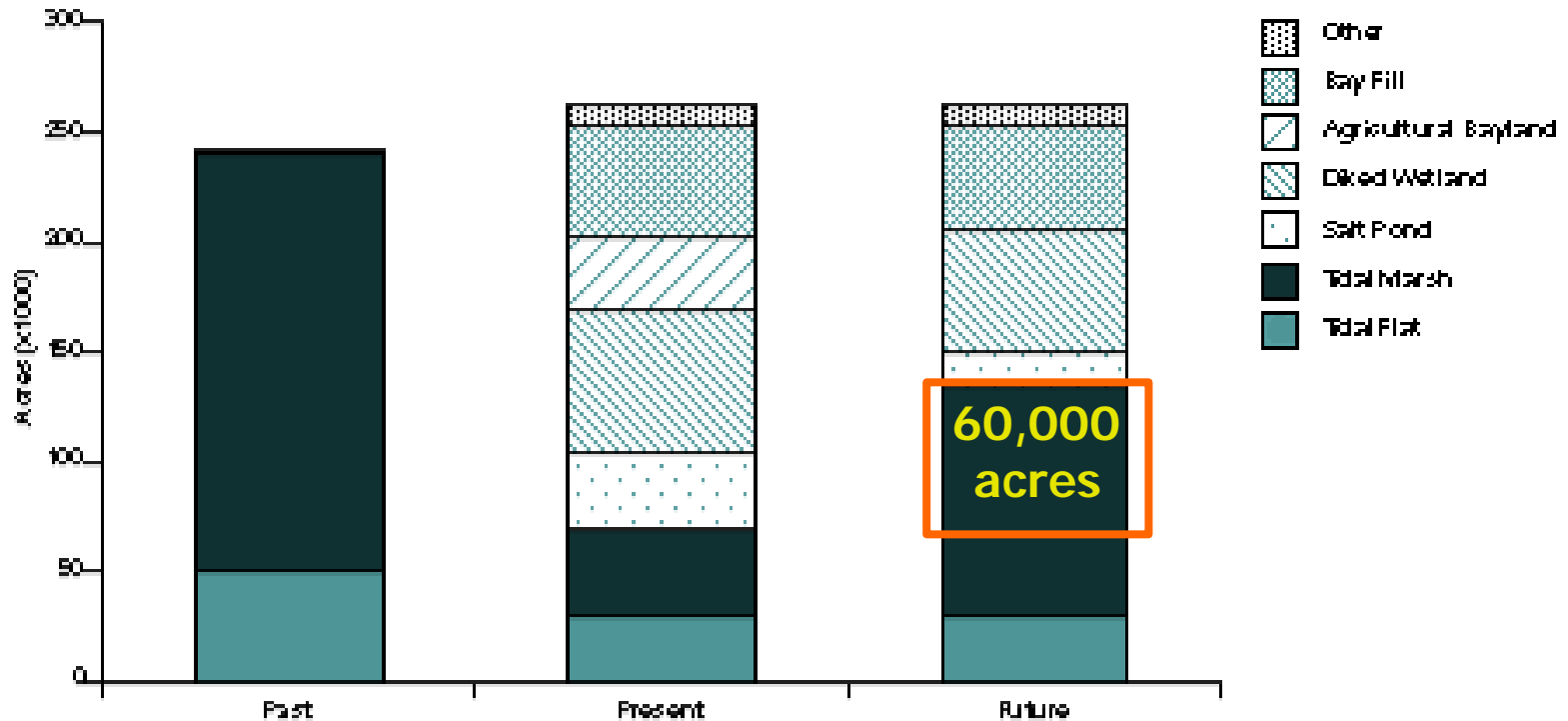


- ▶ Collaborative and inclusive
- ▶ Science synthesis
- ▶ Holistic goal of ecosystem health
- ▶ Inspired with a vision
- ▶ Specific recommendations
- ▶ Common mandate
- ▶ Unprecedented success

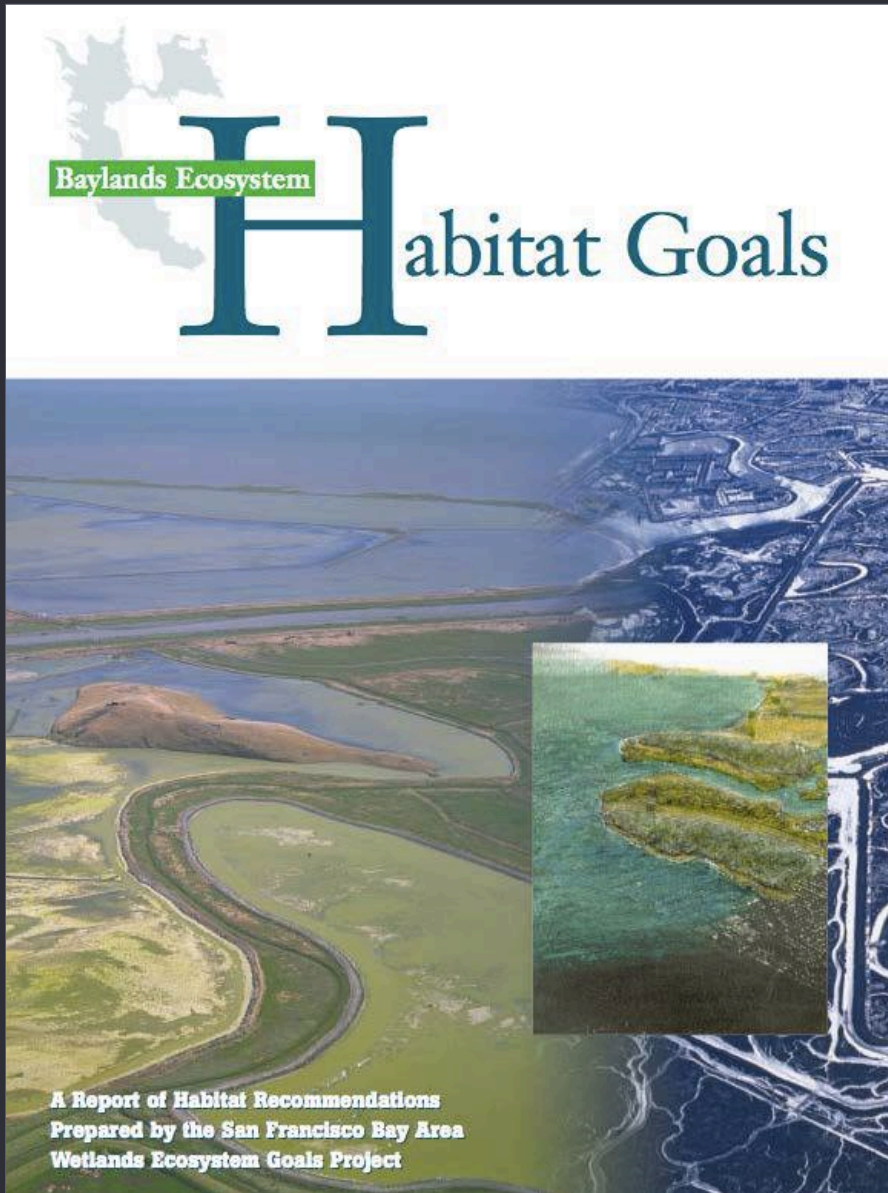


# Acreage Goals

**FIGURE 5.1 Past, Present, and Recommended Future Bayland Habitat Acreage for the Region**



# Must do the Real Work



## Baylands Goals (1999)

- ✓ Slow
  - ✓ Conflict
  - ✓ ~~Easy~~
- 
- ▶ Marshes vs. ponds – still working it out
  - ▶ Trade-off between these habitats is no longer holding up progress

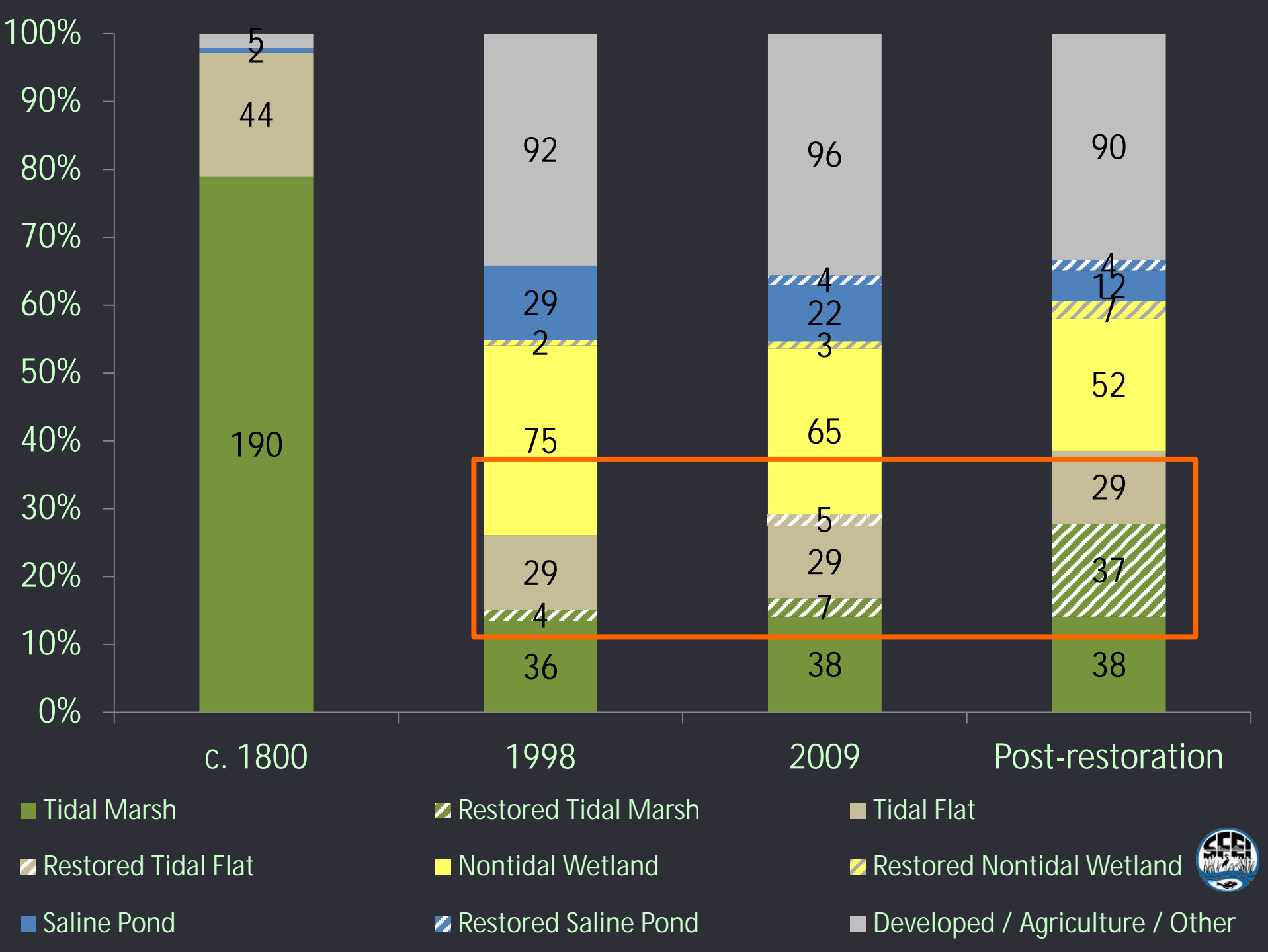
# 1800

## 1850 Wetlands

- Bay
- Non-wetland
- Ponded Saline Water
- Channel
- Tidal Flat
- Tidal Marsh



Wetland Data from SFEI includes: BAARI (2009), EcoAtlas v1.54b (1997 and 1850), and wetland tracker data (2020).



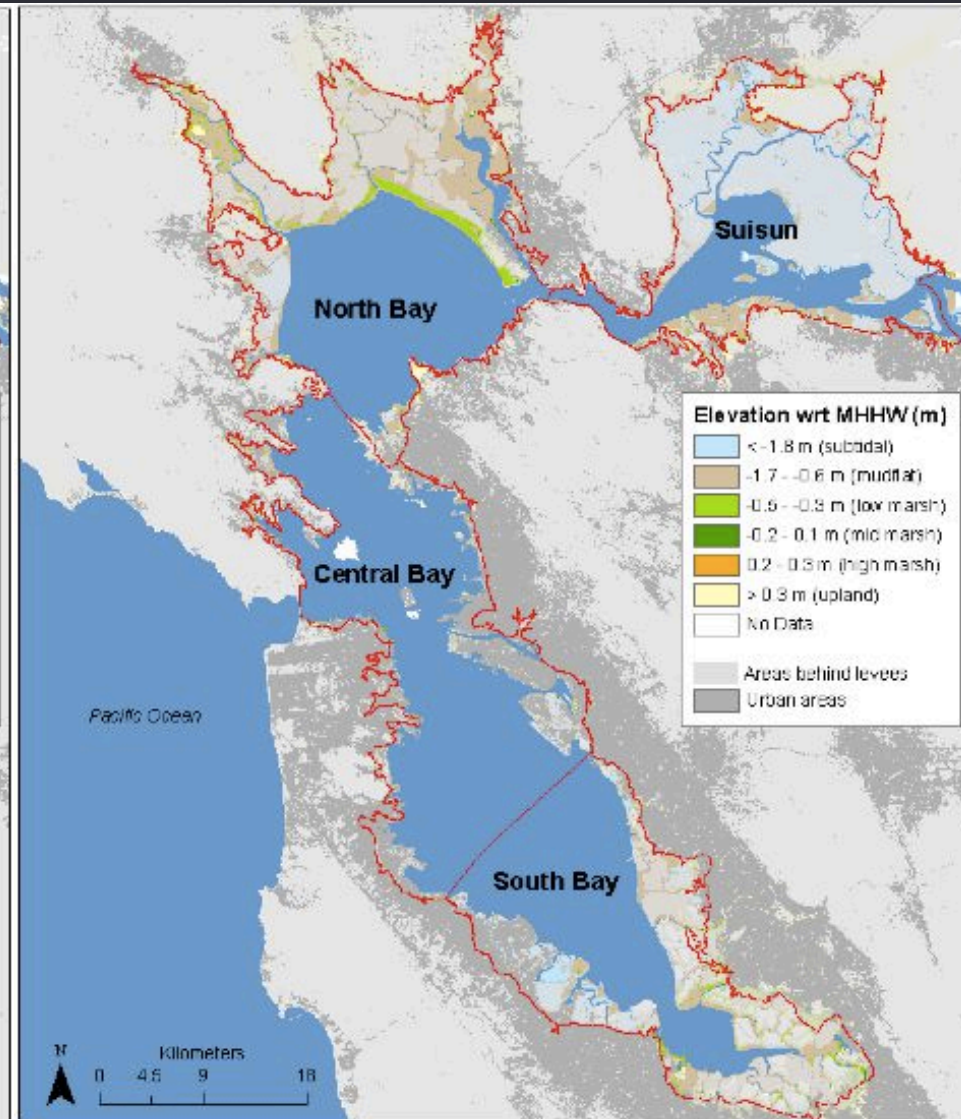
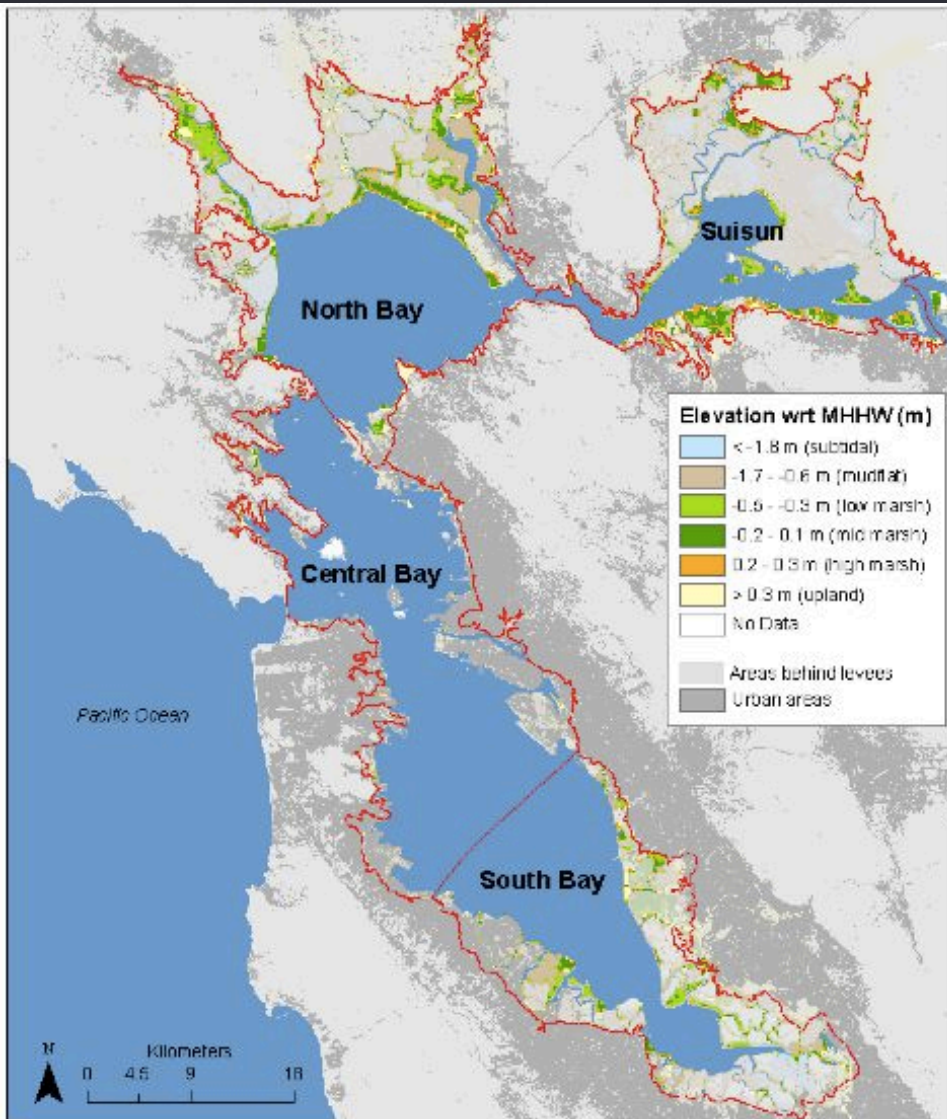


# Success of the Baylands Goals

- ▶ Largest restoration project went from 350 acres to 15,000 acres
- ▶ Written in to policy
  - Water Board, BCDC, SCC, SFBJV, etc.
- ▶ Dramatic increase in funding
  - SBSP, Prop 50, Restoration Authority
- ▶ Inspired other Goals projects
  - Uplands, Subtidal

# 2010

# 2100



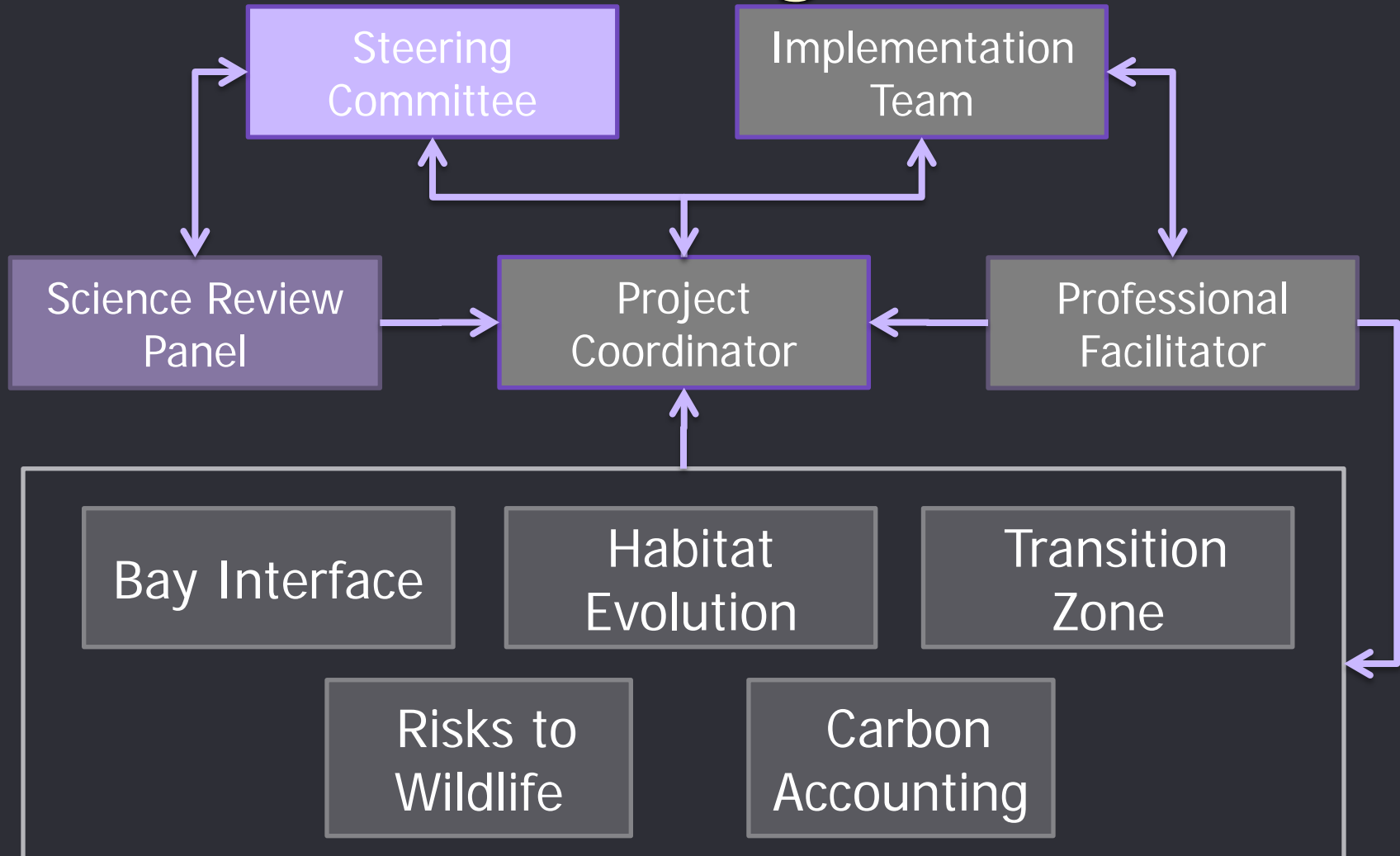
# THE BAYLANDS AND CLIMATE CHANGE: WHAT WE CAN DO

Baylands Ecosystem Habitat Goals  
Science Update 2014

# Science Update 2014

- ▶ Science synthesis and recommendations
- ▶ Effect of future change, especially climate change, on the Baylands
- ▶ Processes and functions in addition to habitat

# Critical to Have Proper Oversight



# Steering Committee

## ► Resource management, regulatory, restoration organizations

### **Coastal Conservancy: Sam Schuchat, Chair (Nadine Peterson)**

Delta Conservancy: Kristal Davis-Fadtke

Delta Stewardship Council: Marina Brand

EBRPD: Brad Olson (Chris Barton)

NOAA : Becky Smyth (Korie Schaeffer)

Point Blue: Grant Ballard (Julian Wood)

SFEI: Robin Grossinger (Lester McKee)

USACE: Tom Kendall (Fari Tabatabai)

USEPA: Sam Ziegler (Luisa Valiela)

BAFPAA: Carol Mahoney (C Morrison)

Water Board: Andree Greenberg (N Feger)

USFWS: Anne Morkill

BCDC: Joe LaClair

DFW: Carl Wilcox

DWR: Erin Chappell

EBDA: Michael Connor

NPS: Kristen Ward

SFBJV: Beth Huning

SFEP: Judy Kelly

Suisun RCD: Steve Chappell

URS: Mike Monroe

# Science Review Panel Members

- ▶ Chair: Glenn Guntenspergen, USGS Patuxent
- ▶ Members
  - Jim Morris, U South Carolina
  - Joy Zedler, U Wisconsin
  - Dan Cayan, Scripps Institution of Oceanography
  - Peter Goodwin, Delta Science Program
  - Nils Warnock, Audubon Alaska

# Science Contributors

- ▶ ~120 estuarine science experts
- ▶ Organized into 5 workgroups with co-chairs



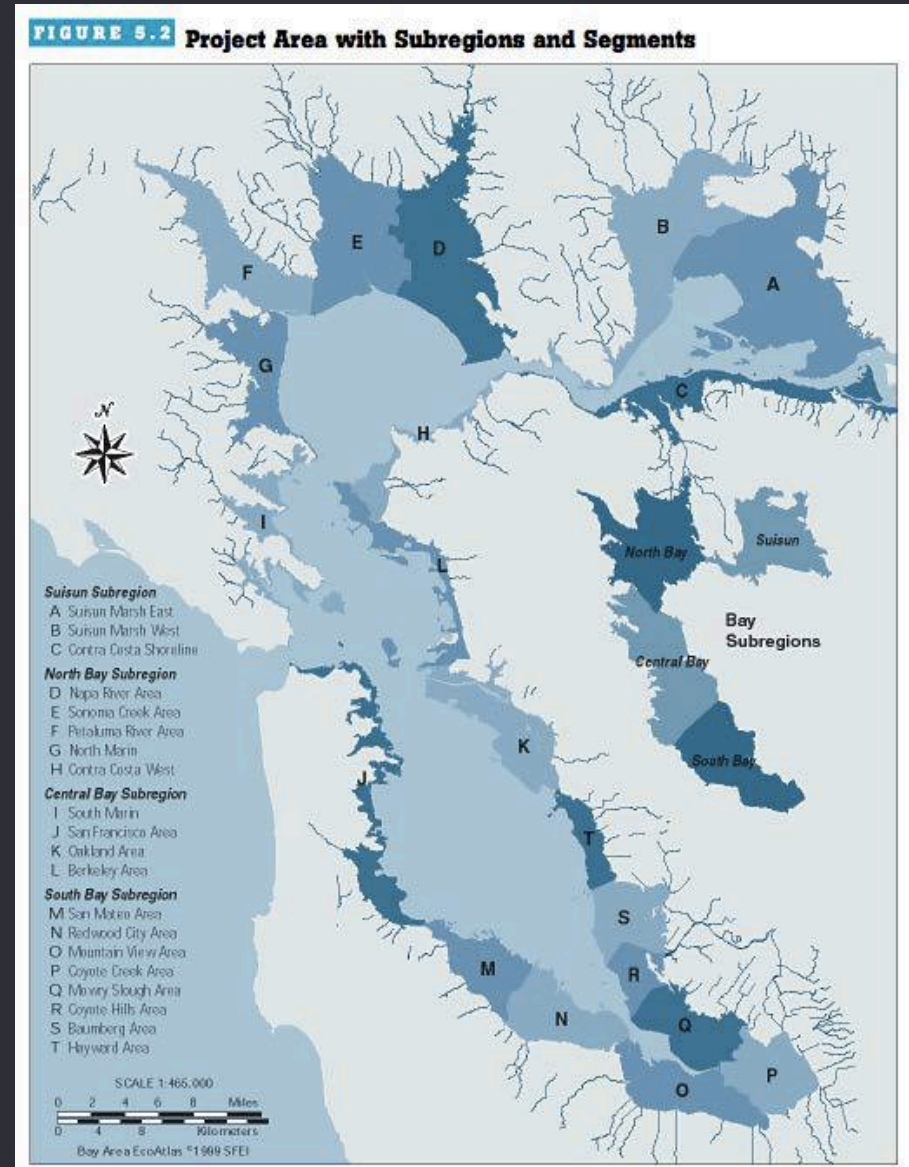


# Science Chapters

- ▶ Conceptual model of landscape change
- ▶ Evolution of Baylands habitats over time and space
- ▶ Influence of a changing Bay
- ▶ Transition zone between Baylands and terrestrial edge
- ▶ Risks to wildlife (animals and plants)
- ▶ Carbon accounting and greenhouse gas flux

# Spatial Extent and Scales

- ▶ Same as original Baylands Goals
- ▶ Geographic Scope
  - Through Suisun
  - Excludes Delta
- ▶ Spatial Scales
  - Region
  - 4 Subregions
  - 20 Segments



# Drivers of Change

- ▶ Sea level rise
- ▶ Temperature
- ▶ Precipitation
  
- ▶ Sediment supply
- ▶ Freshwater inflows
- ▶ Salinity
- ▶ Nutrients



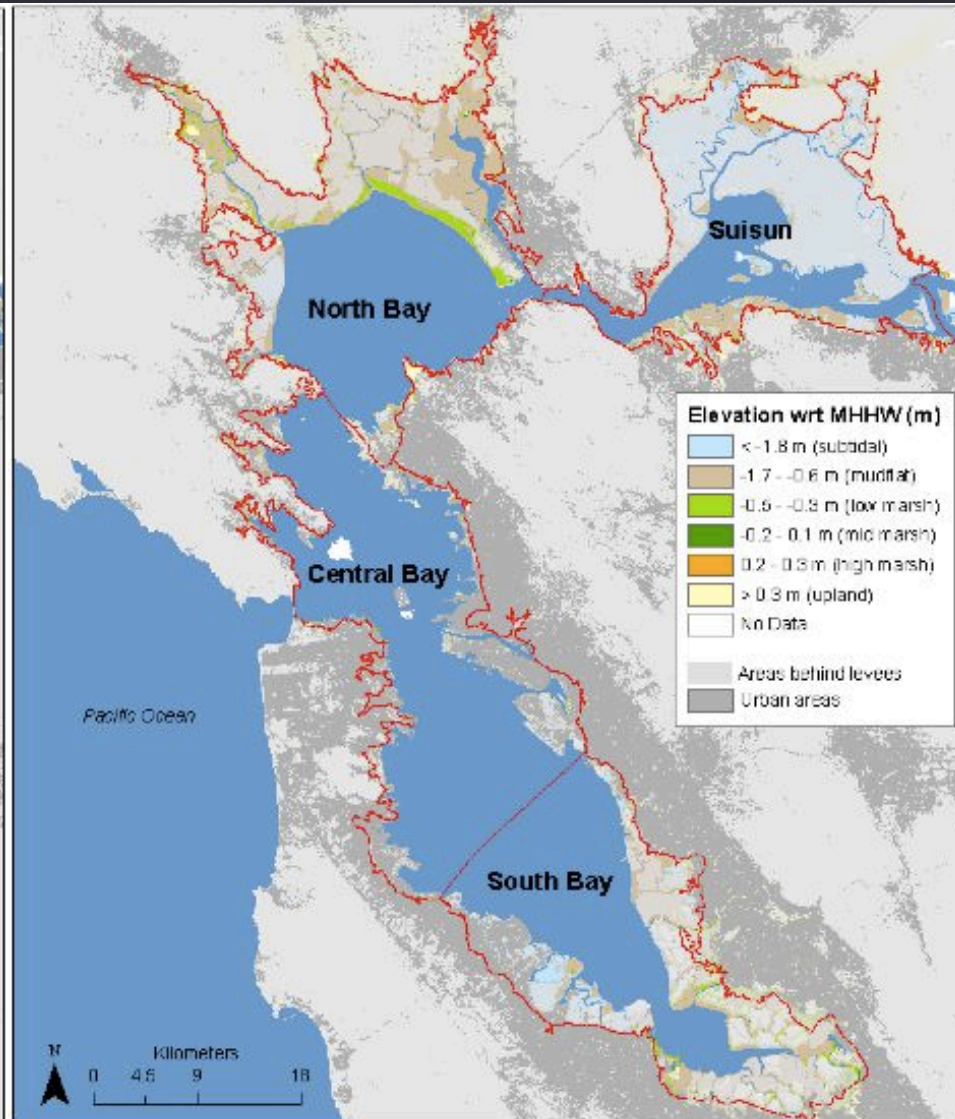
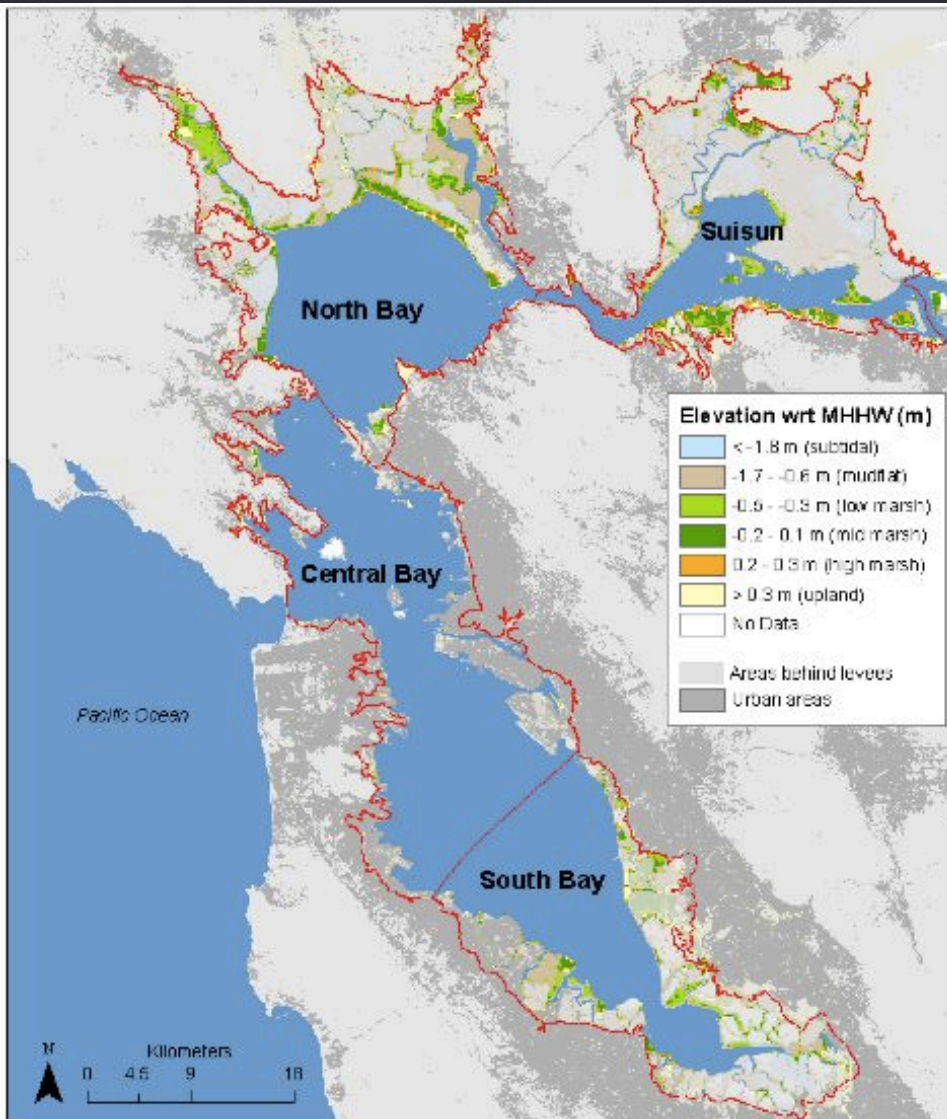
Larry Wyckoff, CDFW

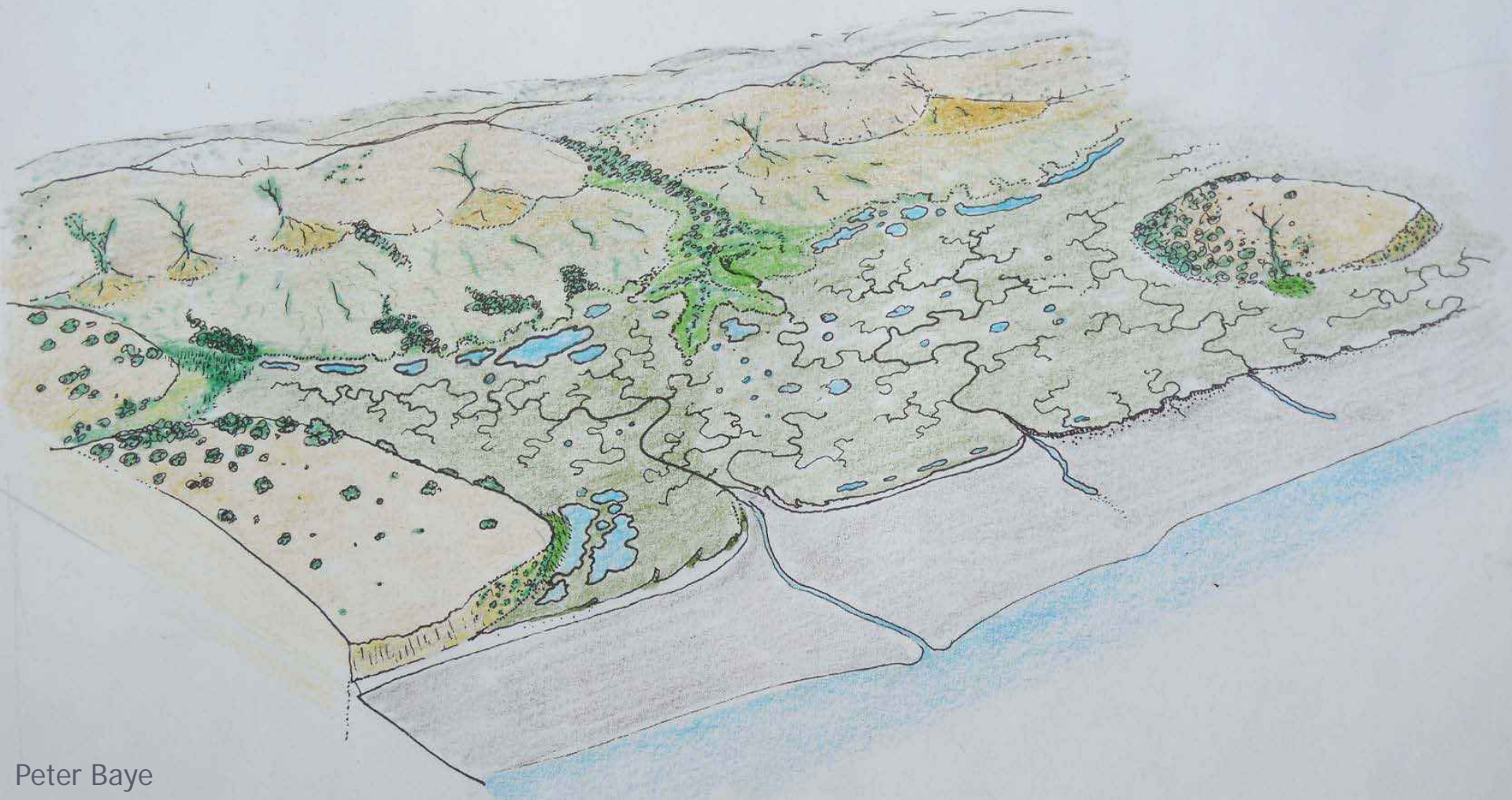
# Future Scenarios

- ▶ Sea level rise projections for three time periods (NRC 2012)
  - 4–30 cm by 2030 (relative to 2000)
  - 12–61 cm by 2050
  - 42– 166 cm by 2100
- ▶ High and low suspended sediment (Stralberg et al. 2011)
  - 25-150 mg/L
  - 50-300 mg/L
- ▶ CASCaDE downscaled projections for temperature, precipitation, snowmelt, runoff, and salinity (Cloern et al. 2011, Dettinger et al. 2008).
  - Ga: Much warmer and drier (GFDL model - accelerating A2 emissions)
  - Pb: Not so much warmer with no precipitation change (PCM model - B1 emissions)
- ▶ Winter storm event during El Niño and king tide

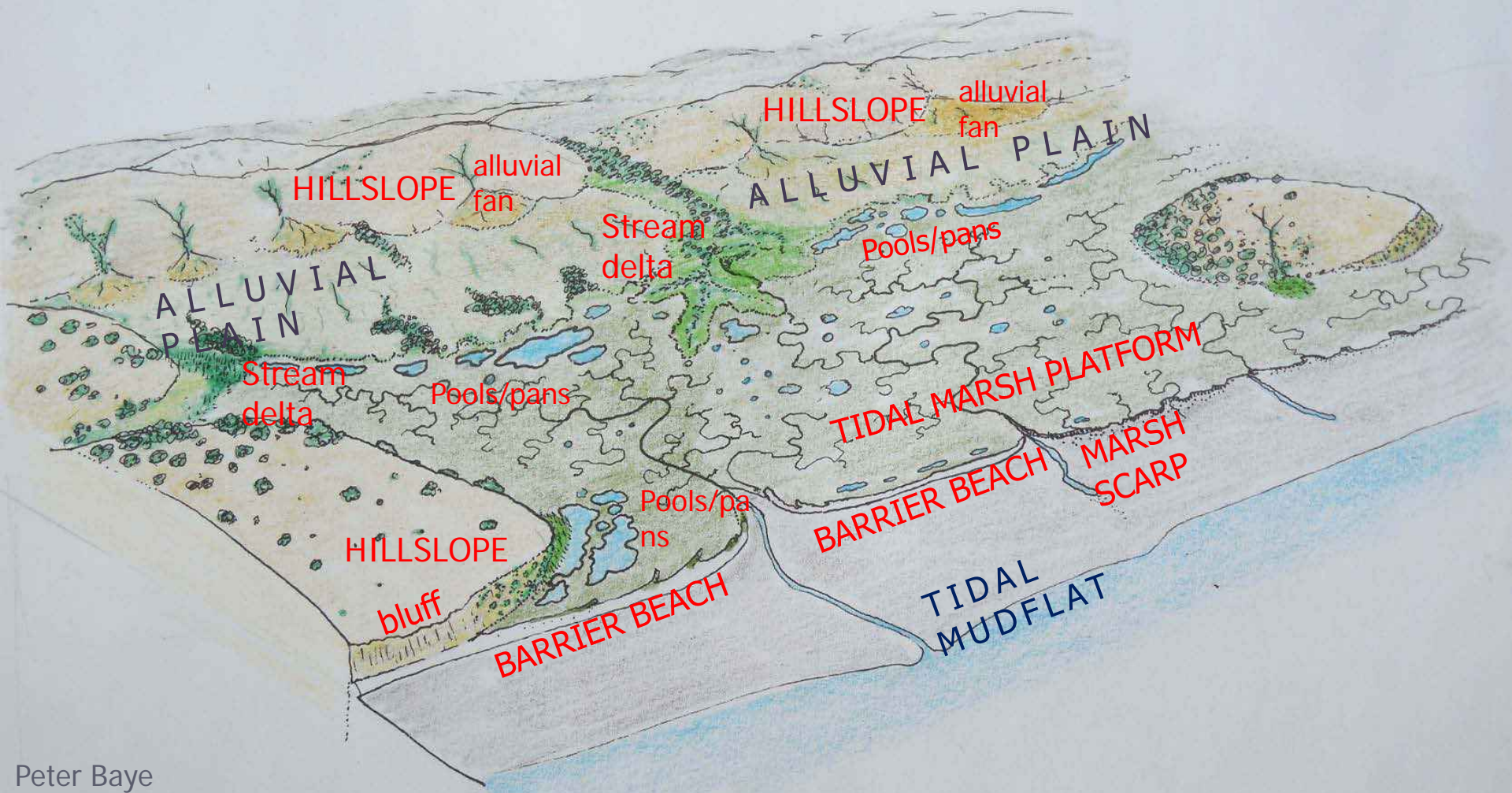
# Now

# Later

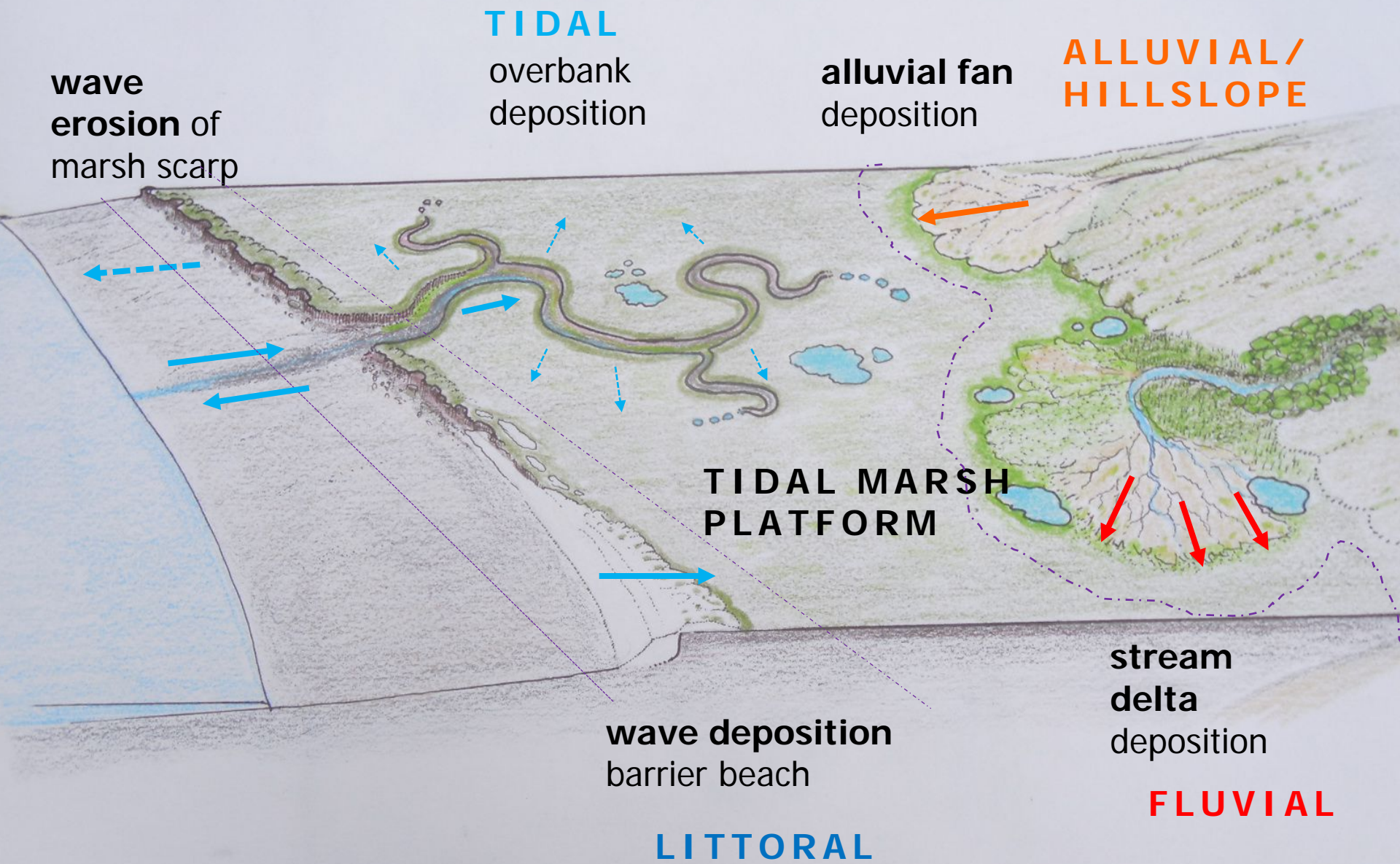




Peter Baye

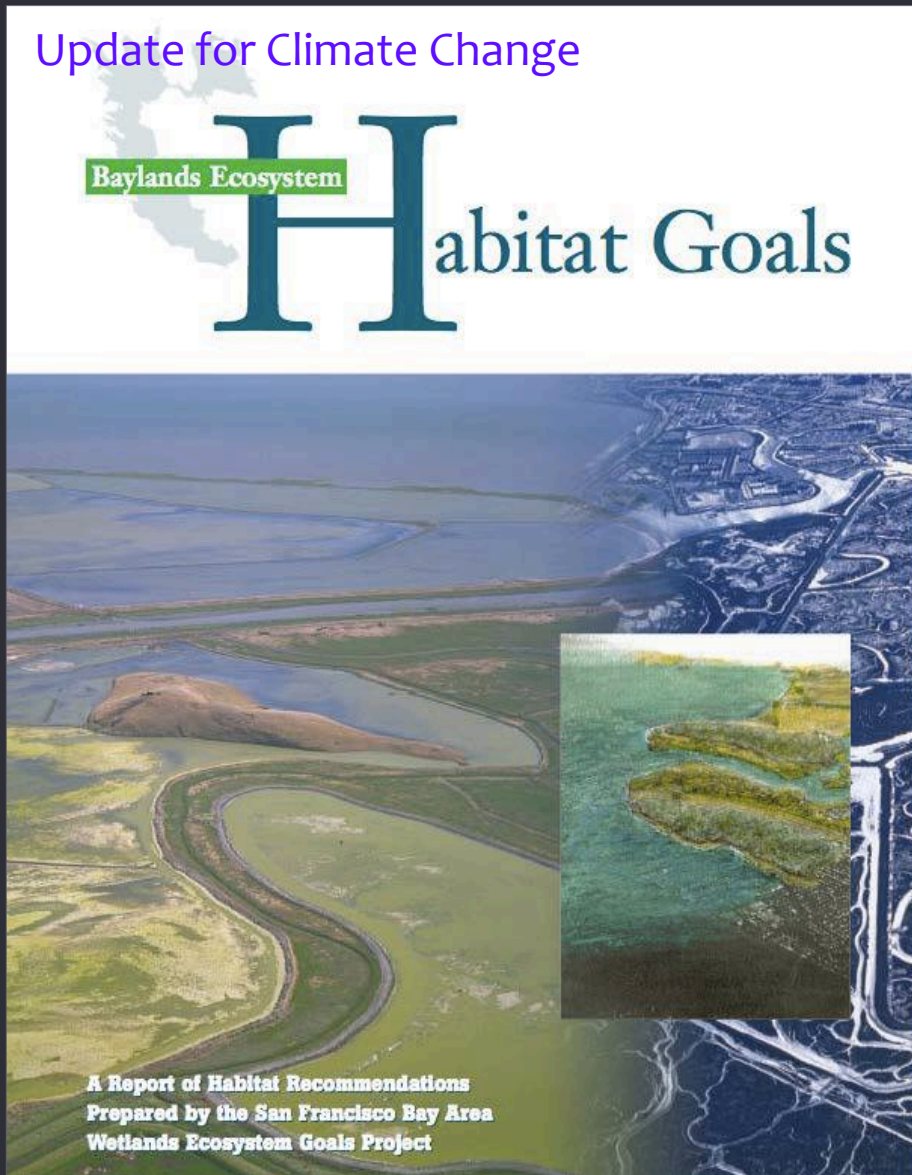


Peter Baye





# Welcome New Solutions

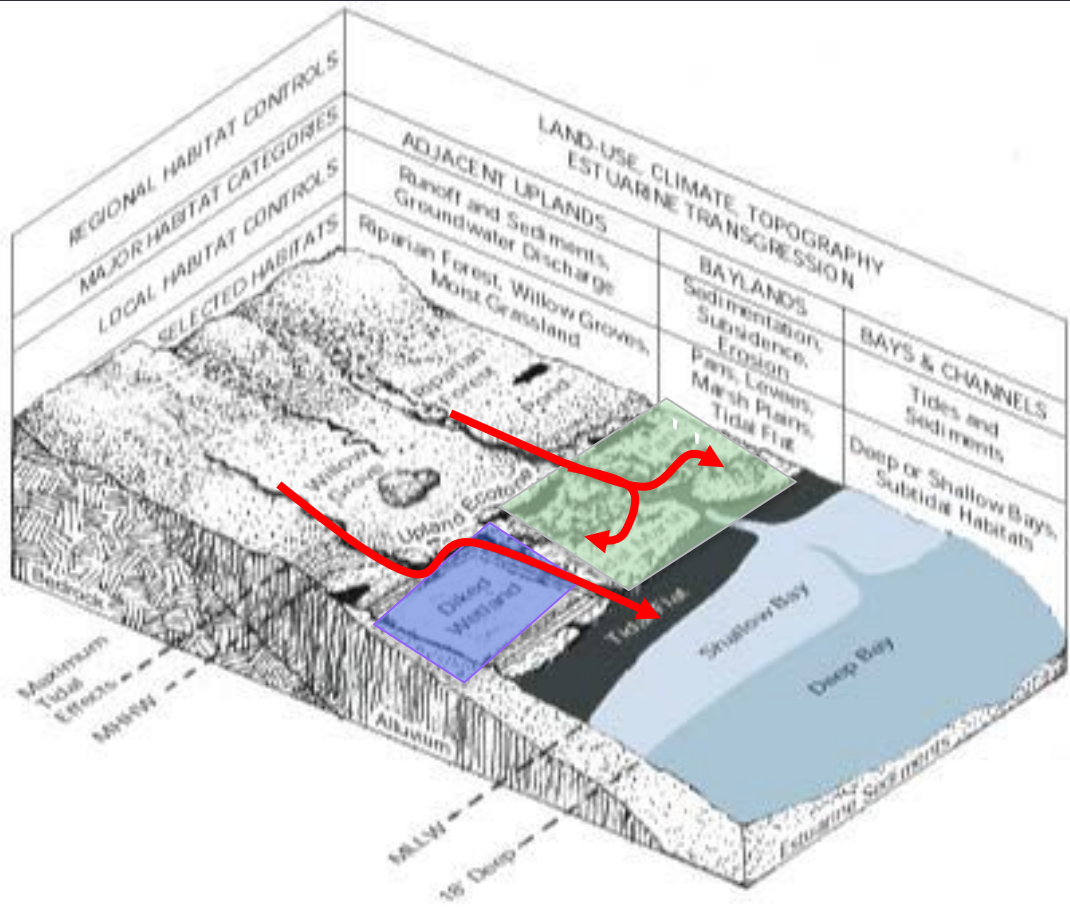


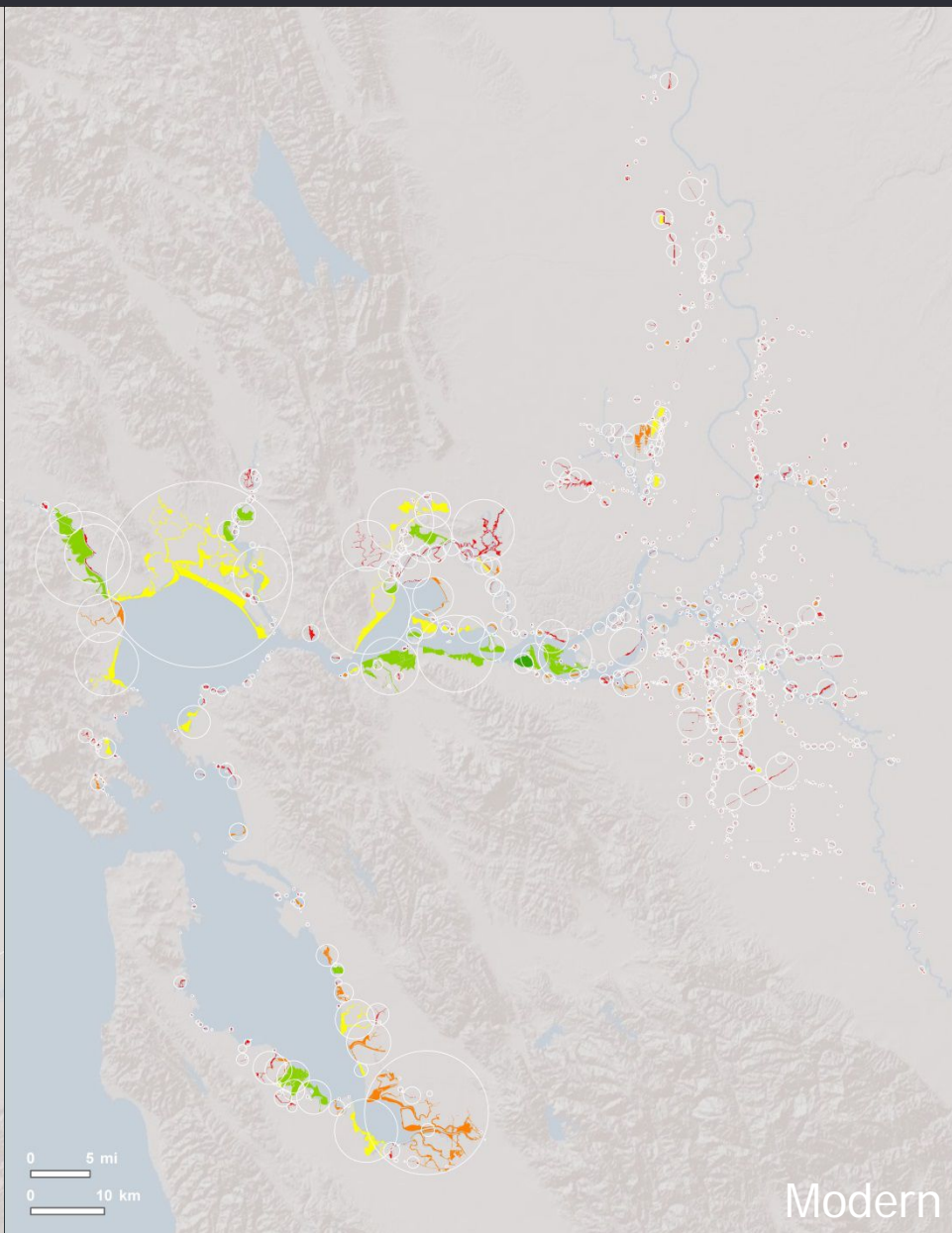
## ► Working Title

- Baylands and Climate Change: What We Can Do

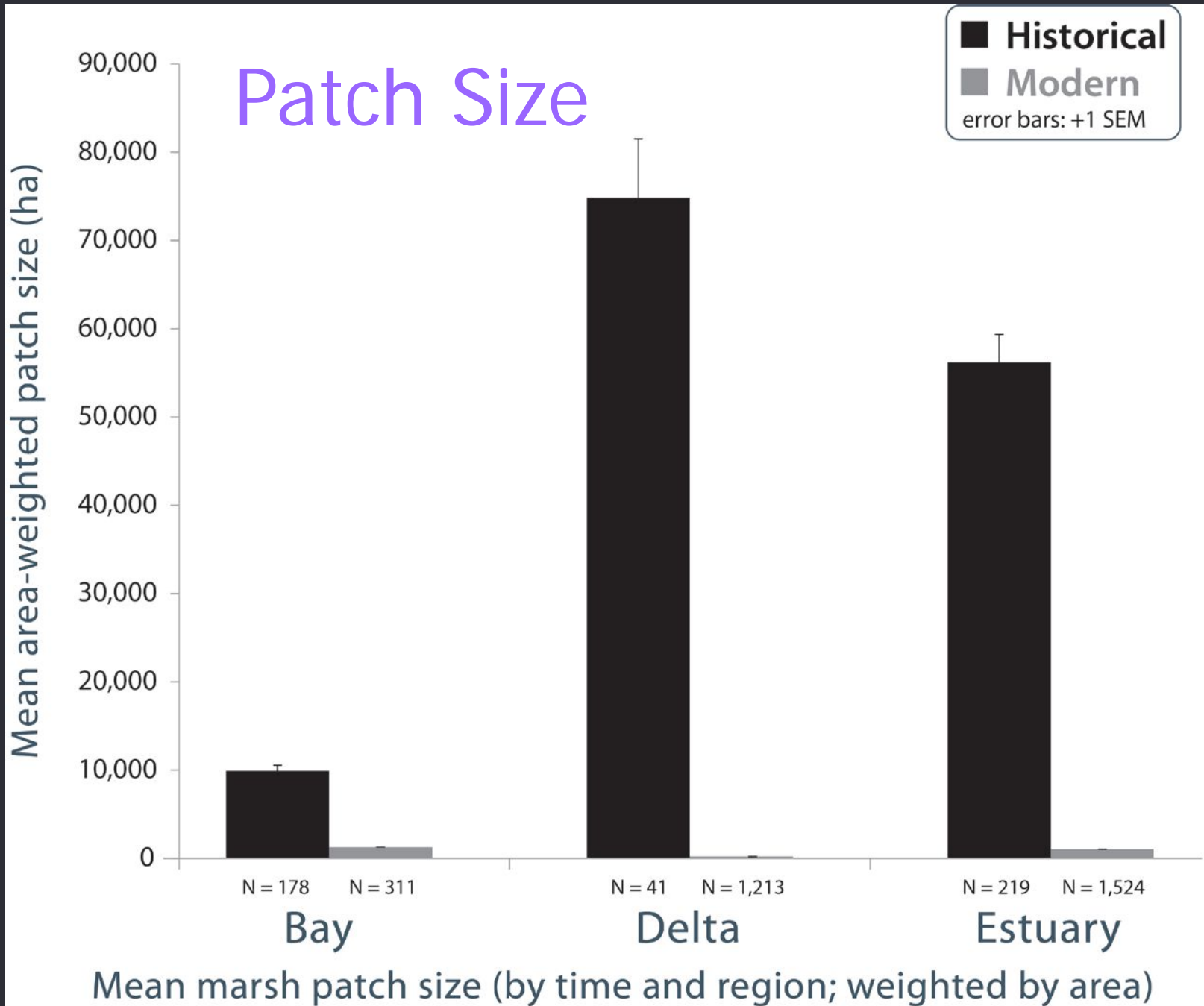
OR

- Baylands and Climate Change: Experimental, Unproven and Illegal

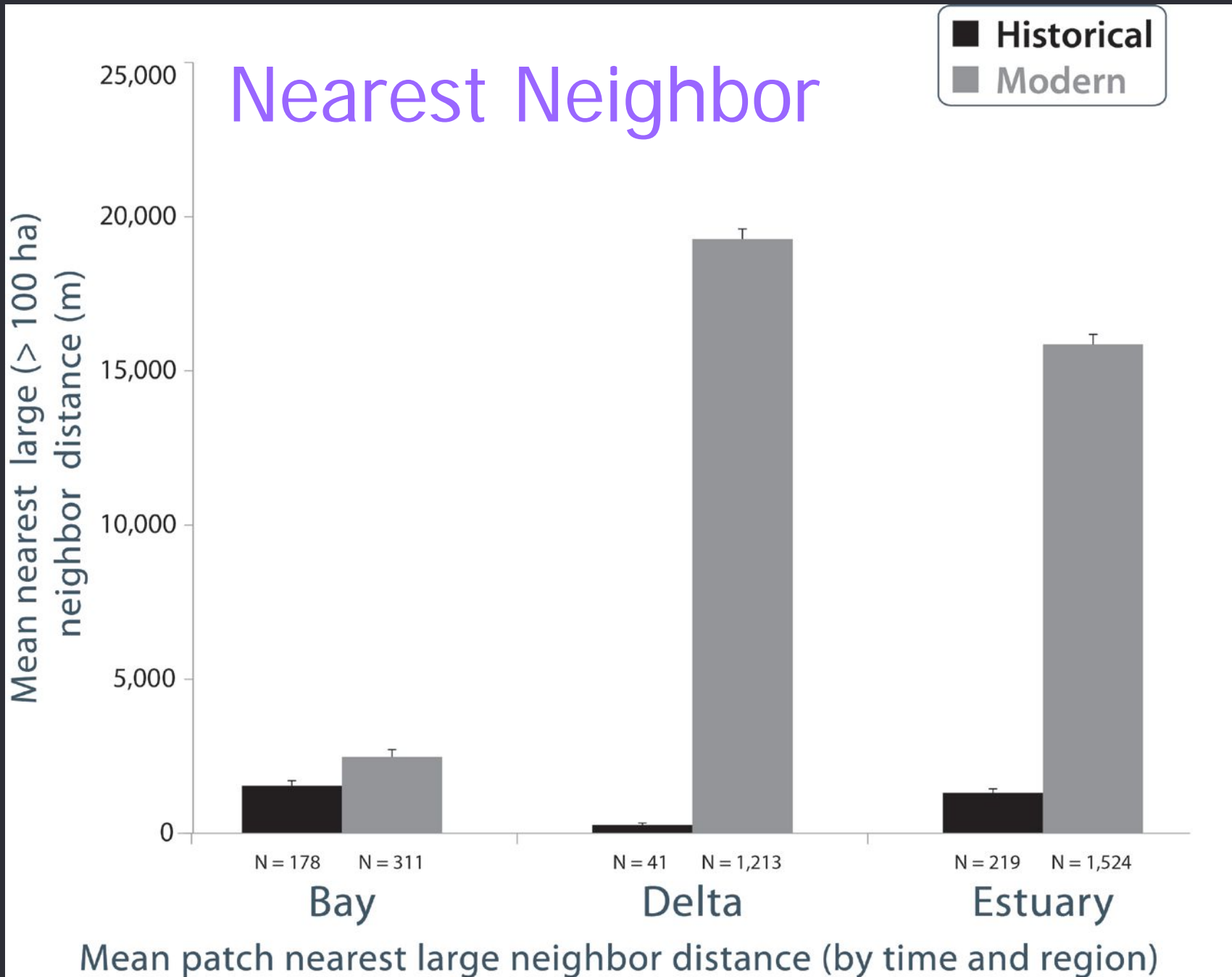




# Patch Size



# Nearest Neighbor

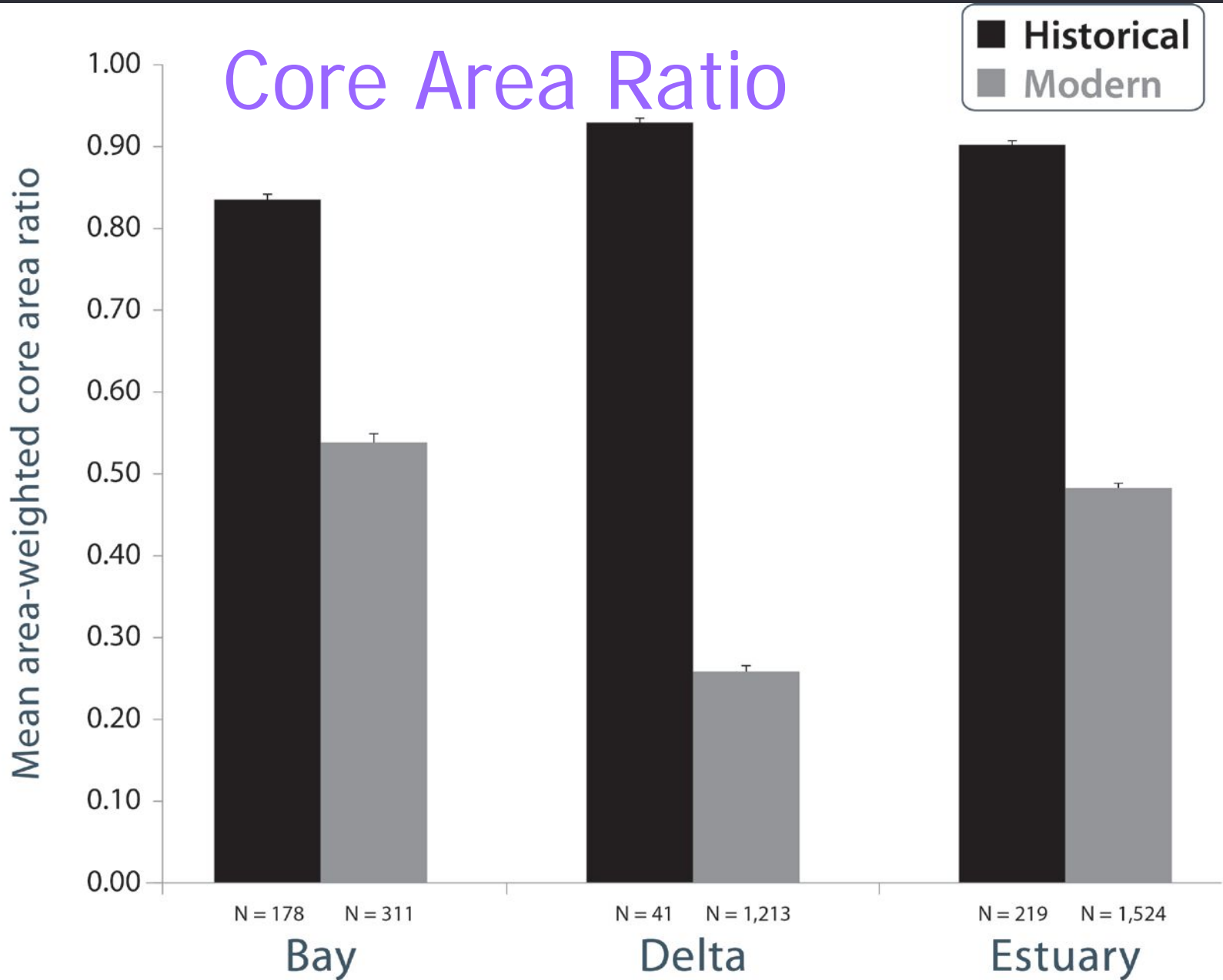


■ Historical  
■ Modern

Mean nearest large (> 100 ha) neighbor distance (m)

Mean patch nearest large neighbor distance (by time and region)

# Core Area Ratio



Mean patch core area ratio (by time and region; weighted by area)

# How to Give Ecology a Leg Up

- ▶ Build science communications for the users
- ▶ Inspire with a regional vision
- ▶ Collaborate to create a science mandate
- ▶ Implement through infrastructure updates
- ▶ Partner with stakeholder agencies: flood control, wastewater, regulators, etc.

# Acknowledgements



## Project Support

- ▶ State Coastal Conservancy
- ▶ Gordon and Betty Moore Foundation
- ▶ Goals Update Steering Committee Organizations



# Thank You

Letitia Grenier

letitia@letitia.org



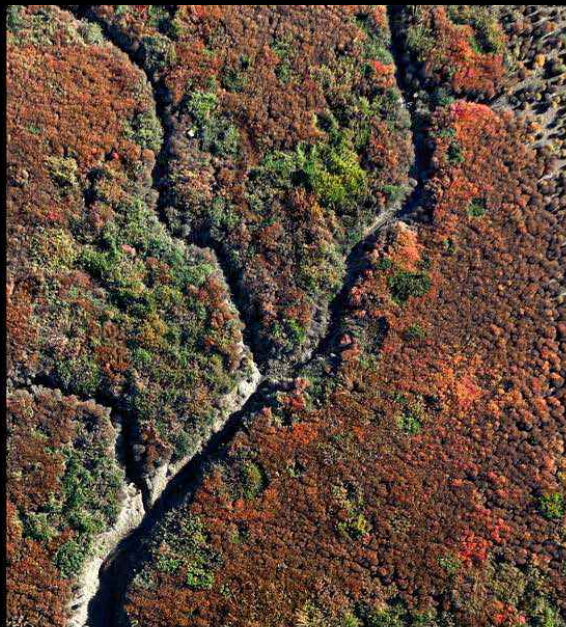
April 2008



September 2009



May 2010



October 2010



June 2011

Cris Benton