



South Bay Salt Pond Restoration Project



Initial Opportunities and Constraints Summary

Stakeholder Forum
July 29, 2004

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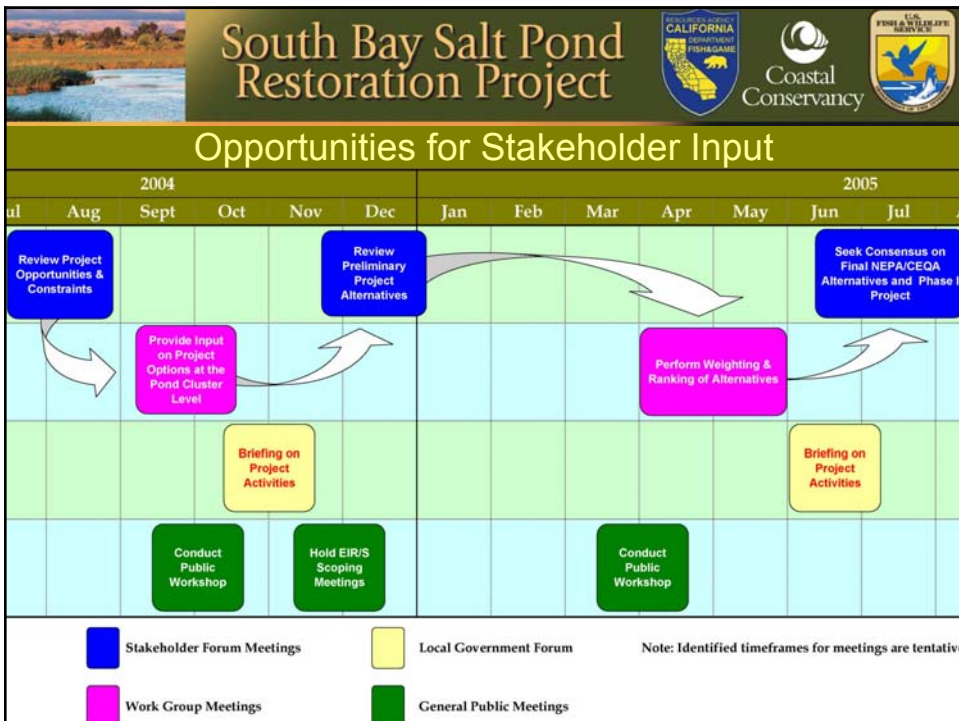


Overview

- Context
- Questions for the Stakeholder Forum
- Summary of key opportunities and constraints
- Discussion
- Report at: www.southbayrestoration.org; Click on “Documents”
 - Comments due to Steve Ritchie by July 29



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Give us your feedback on:

- Are the key opportunities and constraints correctly identified?
- Are there opportunities or constraints that should be added, subtracted, or revised?
- Any revisions to the maps?



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Key Opportunities & Constraints

- Tidal restoration
 - Opportunity: restore thousands of acres of tidal marsh
 - Opportunity: provide marsh corridors for connectivity and increase transitional habitat
- Managed Ponds
 - Opportunity: manage and reconfigure ponds for greater benefits to birds on the same pond “footprint”
 - Potential constraint: maintain sufficient managed pond habitat to support pond-dependent birds
 - taking into account potential mudflat loss in the South Bay



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Key Opportunities & Constraints

- Non-native and nuisance species
 - Constraint: non-native cordgrass will affect project phasing, though not the footprint
- Subsidence and sediment supply
 - Opportunity: many ponds only slightly subsided
 - Potential constraint: large sediment demand may affect extent and locations of tidal restoration



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Key Opportunities & Constraints

- Flood protection & Infrastructure
 - Opportunity: improve flood protection
 - Constraint: not worsen flooding
- Mercury
 - Potential constraint: not currently considered a constraint on restoration footprint, but will be tracked in adaptive management program and may affect implementation of later phases





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Key Opportunities & Constraints

■ Pubic access and recreation

- Opportunity: substantially increase and improve public access and recreation and enhance the visitor experience through the creation of a stronger interconnected public open space system
- Constraint: visitor use and intensity limitations based on ecological, management and physical limitations



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Tidal restoration

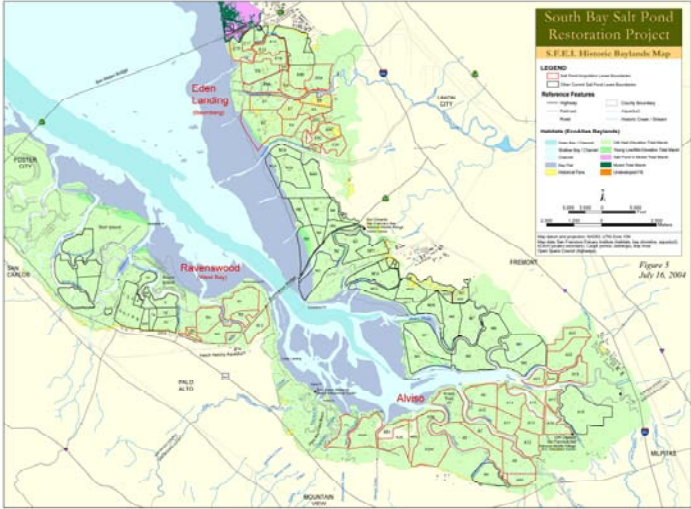
- Opportunity: restore thousands of acres of tidal marsh

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Outer Bair Island, late 1980's



Tidal action was restored to Outer Bair Island in the late 1970's and early 1980's through a series of planned and unplanned levee breaches.

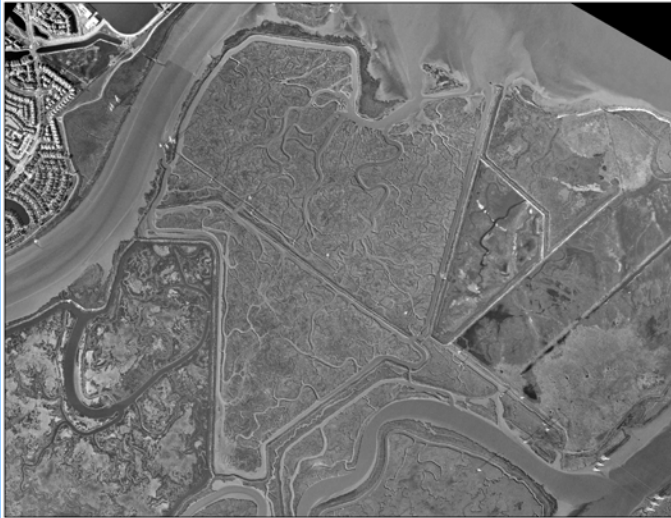
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Outer Bair Island, 2000



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2004

Cooley
Landing

Faber Tract





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Coyote Lagoon (Warm Springs), 1994



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Coyote Lagoon (Warm Springs), 2001



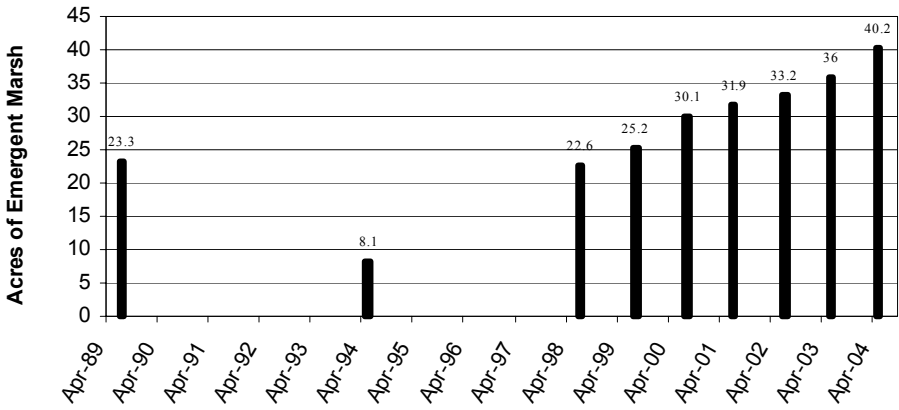
16



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Coyote Lagoon Restoration Site



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Alviso Marina, 1992





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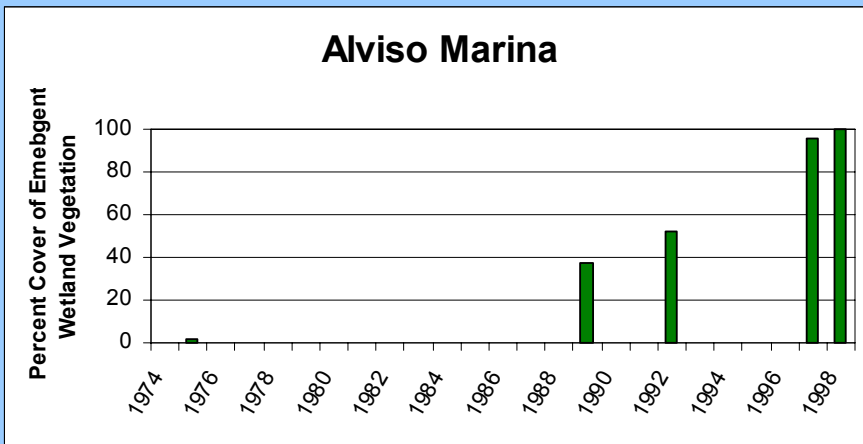
Alviso Marina, 2003



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Alviso Marina





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Tidal restoration

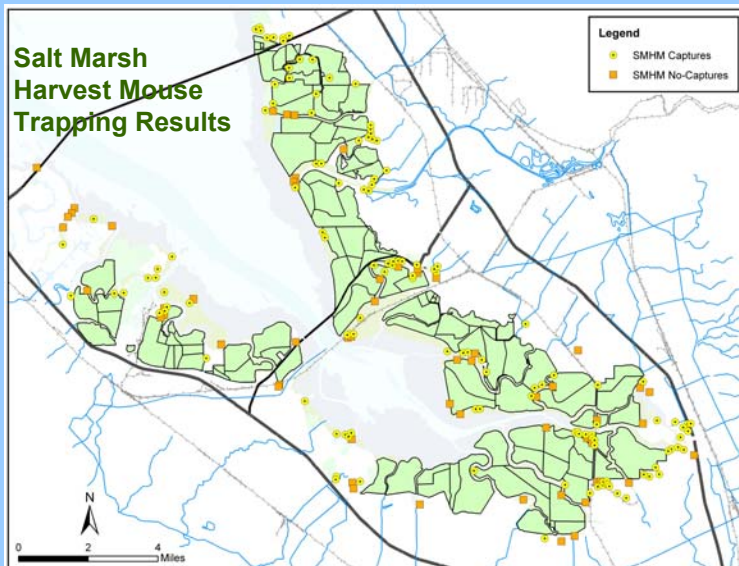
- Opportunity: provide marsh corridors for connectivity and increase transitional habitat

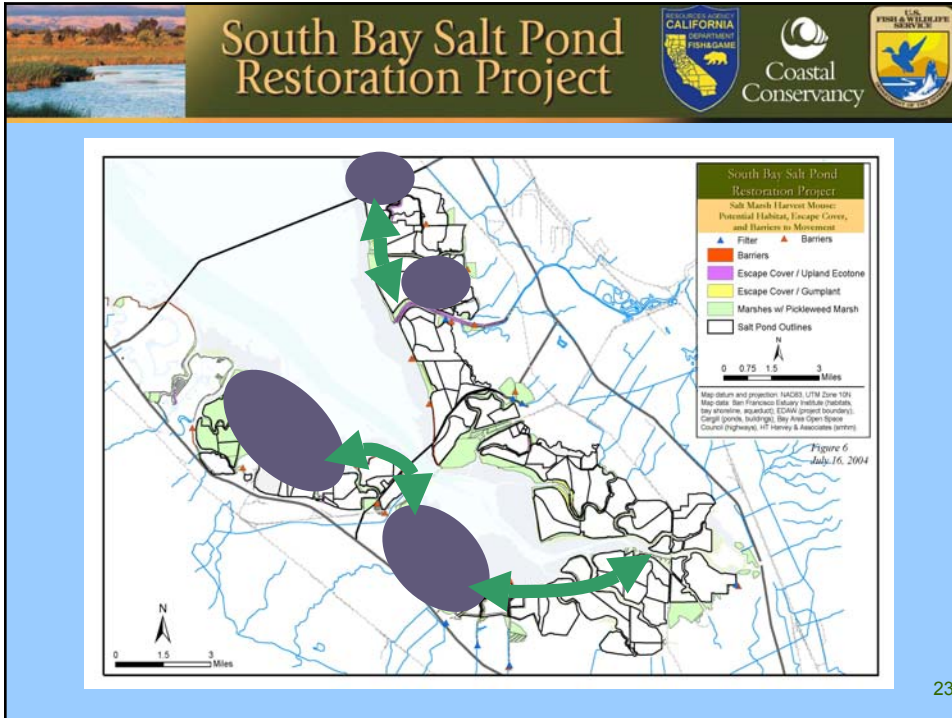


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Salt Marsh Harvest Mouse Trapping Results





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Tidal restoration: questions?

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Managed Ponds

- Opportunity: manage and reconfigure ponds for greater benefits to birds on the same pond “footprint”
- Potential constraint: maintain sufficient managed pond habitat to support pond-dependent birds, taking into account potential mudflat loss in the South Bay

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Salt ponds



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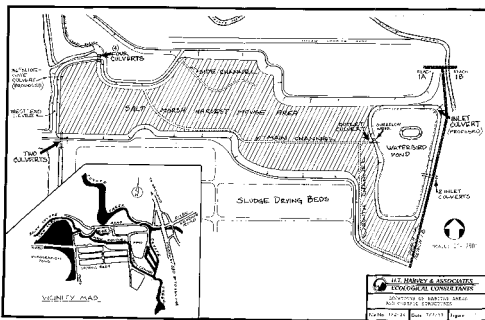
Water draw down



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Coyote Creek Reach 1A



Original Design

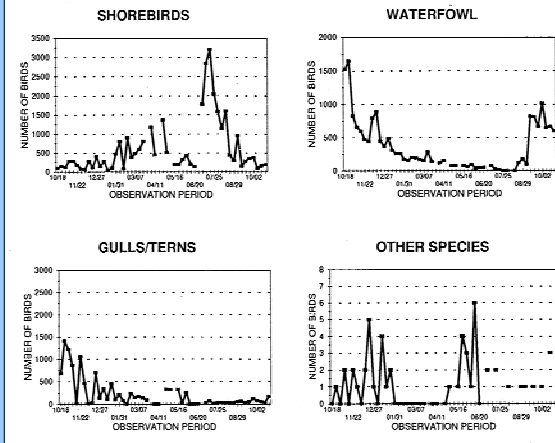
2003 CIR Aerial



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FIGURE 1. NUMBERS OF BIRDS OBSERVED DURING THE 1995-1996 SAMPLE PERIOD.



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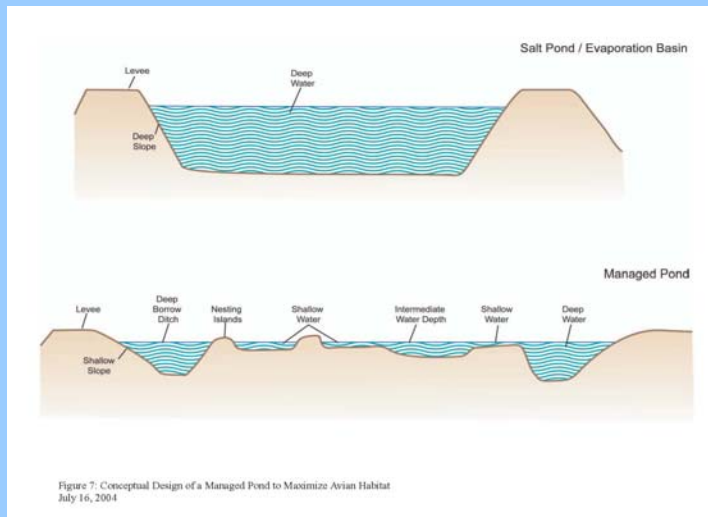


Figure 7: Conceptual Design of a Managed Pond to Maximize Avian Habitat
July 16, 2004



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Wetland Demonstration Project

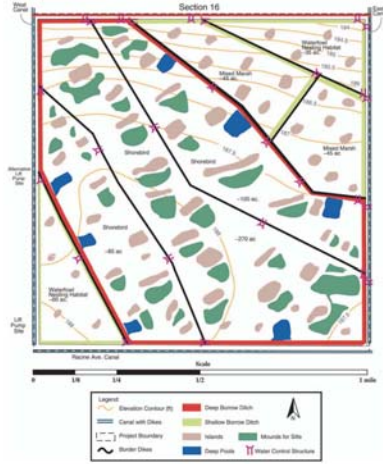






Figure 8. Highly Successful Wetland Demonstration Project Design of a Managed Pond at Woodlake Farms July 16, 2004



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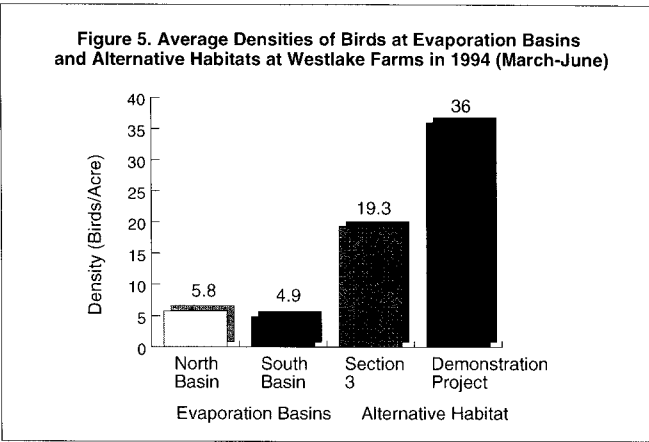




Figure 5. Average Densities of Birds at Evaporation Basins and Alternative Habitats at Westlake Farms in 1994 (March-June)



Habitat Type	Category	Density (Birds/Acre)
Evaporation Basins	North Basin	5.8
	South Basin	4.9
Alternative Habitat	Section 3	19.3
	Demonstration Project	36

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Relative Importance of Pond Depth

Westlake North (surveys biweekly throughout the year)

Ponds full (deep H₂O)

1998	Mean numbers birds/survey	228.50
	Mean numbers birds/acre	0.98 b/a
1999	Mean numbers	51.40
	Mean density	0.20 b/a

Ponds Shallow

2002	Mean number	1,384.0
	Mean density	10.2 b/a
2003	Mean number	1,749.5
	Mean density	10.1 b/a



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Sample Densities

Birds per acre *Calidris* (sandpipers)

Marsh	0.862
Mudflat	129.72
Salt Ponds	34.10
Managed Ponds	114.19



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Managed ponds: questions?

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Non-native and nuisance species

- Constraint: non-native cordgrass will affect project phasing, though not the footprint
 - The Invasive Spartina Project is currently implementing its eradication program.

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***Spartina alterniflora* and its hybrids can colonize mudflats, as well as existing marshes**



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Non-native and nuisance species: questions?

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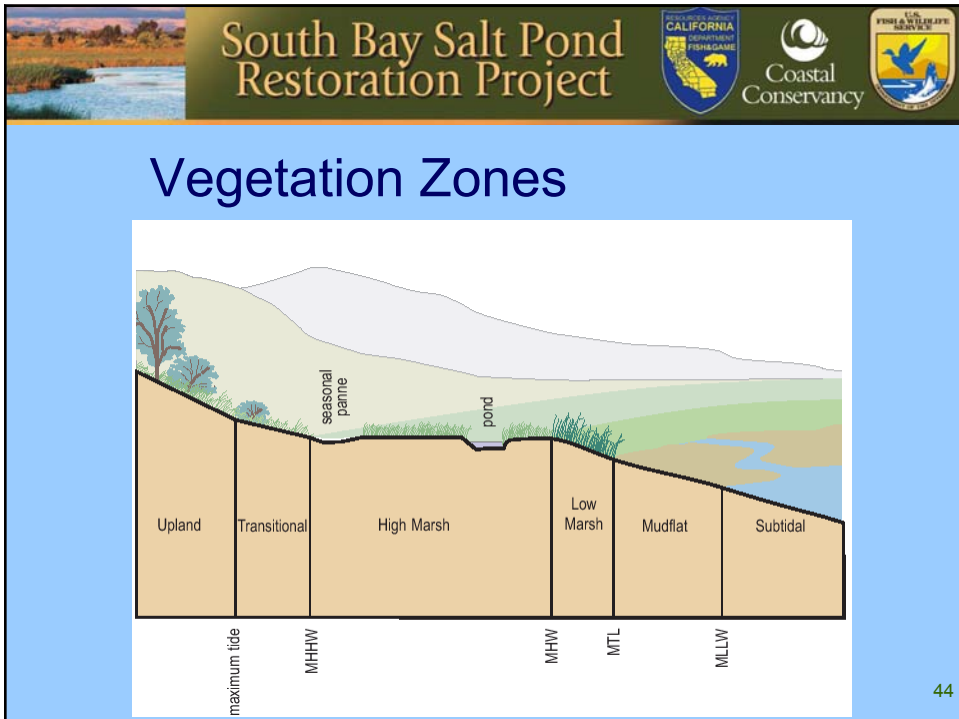


Subsidence and sediment supply

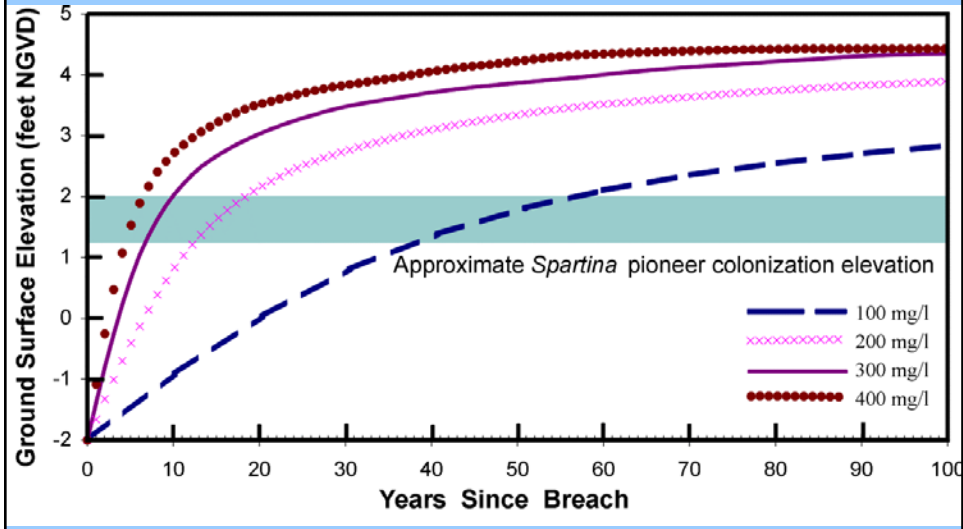
- Opportunity: many ponds only slightly subsided
- Potential constraint: large sediment demand may affect extent and locations of tidal restoration in order to slow net loss of existing mudflat



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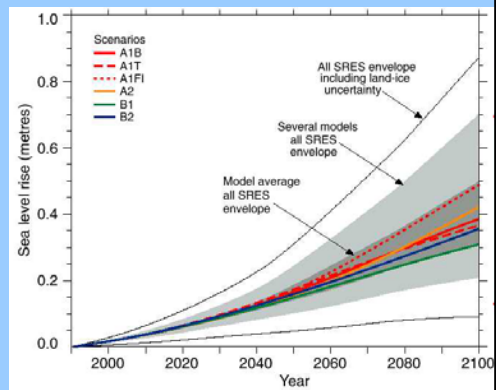


Evolution of Tidal Habitat Through Sedimentation



Sediment supply and demand

- Sediment demand
 - 120 MCY from tidal ponds (if all tidal) [SFO]
 - 35 MCY from SLR
 - 0.15 m (0.5 ft) SLR in 50 years (model avg)
- Sediment sources
 - Local watershed
 - mudflats



Source: IPCC, *Climate Change 2001: The Scientific Basis*

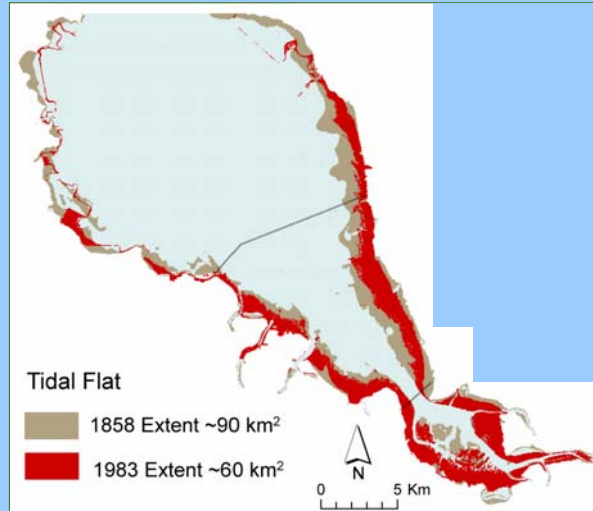


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Mudflat Conversion

- At historic rate, about 8200 acres of tidal flat converted to subtidal over 50 years
- What will happen in the next 50 years, with and without the project?



Source: Foxgrover *et al*, 2004

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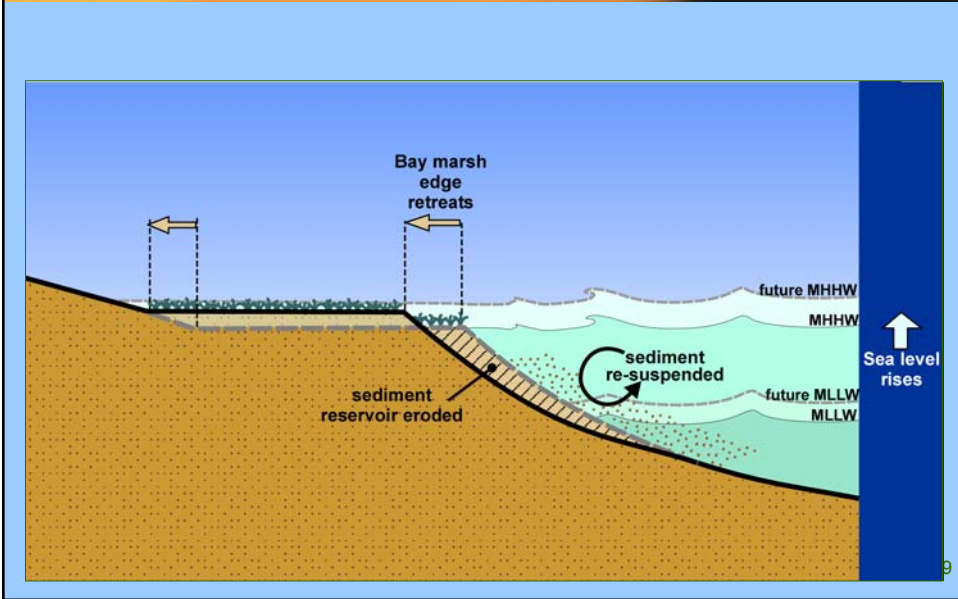
How do understanding of tidal marsh evolution and mudflat conversion affect design?

- How much new mudflat to create, in the ponds (several decades) and in the Bay (long term)?
 - Consider letting bayside levees erode
- How many acres of managed ponds should be retained to offset any decline in mudflat?
- Where should tidal restoration be located?
- Do we want to fill?
- Patience!

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Subsidence and sediment supply: Questions?



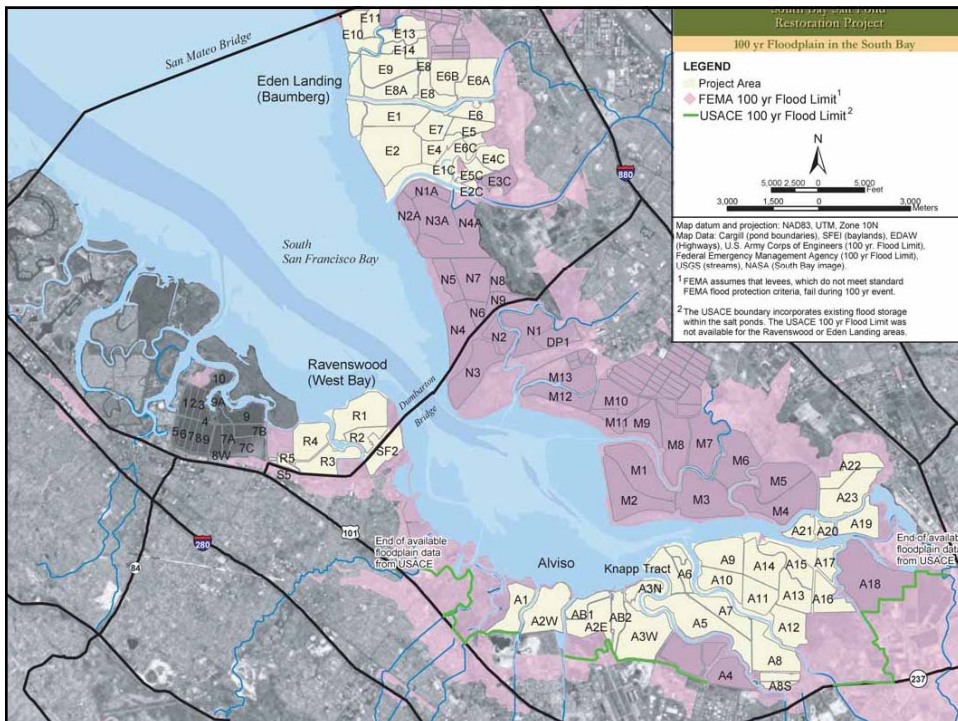


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Flood protection

- Opportunity: improve flood protection
- Constraint: not worsen flooding

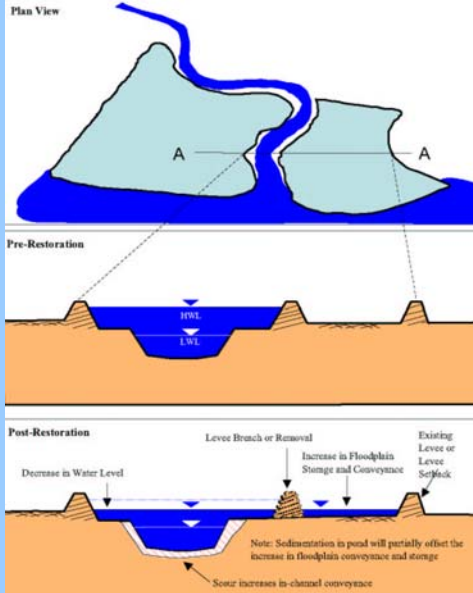




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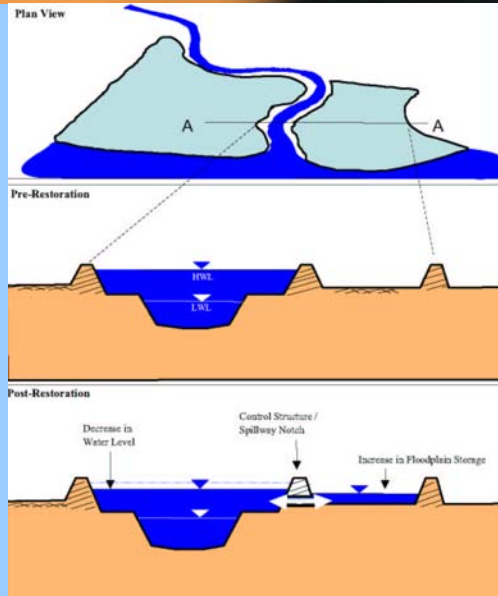
Tidal Restoration






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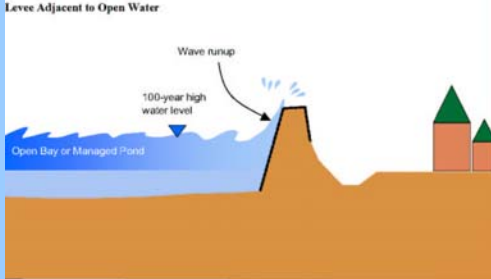
Managed Pond spillway




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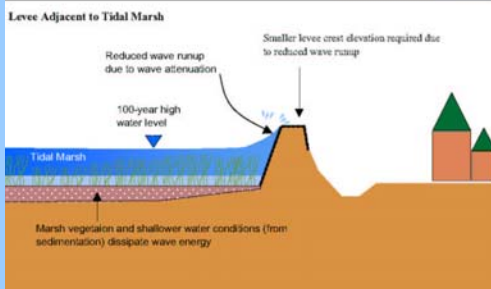





Levee Adjacent to Open Water








Levee Adjacent to Tidal Marsh

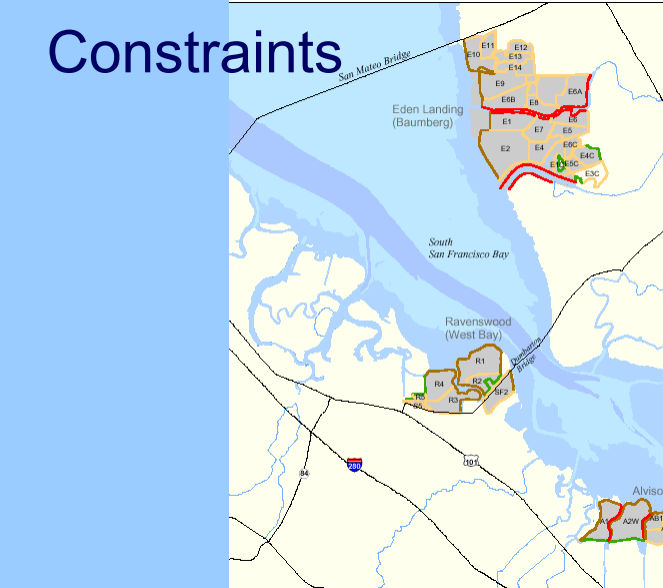




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Constraints




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Existing Levees

LEGEND

- Project Area
- Internal Salt Pond Levee
- External Salt Pond Levee
- High Ground
- Publicly Maintained Flood Control Levee Adjacent to Salt Ponds



0 500 1000 1500 2000 2500 3000 Feet

0 1000 2000 3000 Meters

Map datum and projection: NAD83, UTM, Zone 10N
Map Data: Siegel & Bachand, 2002 (levees & berms), Cargill (pond boundaries), SFEI (baylands), EDAW (Highways), SCWWD (levees)



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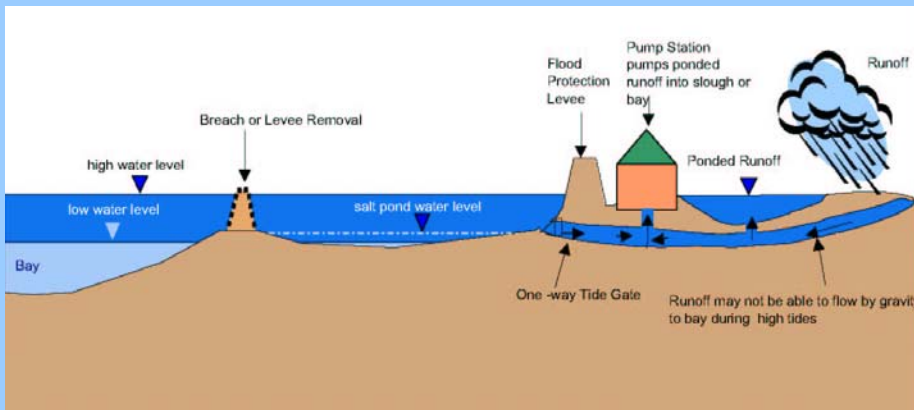
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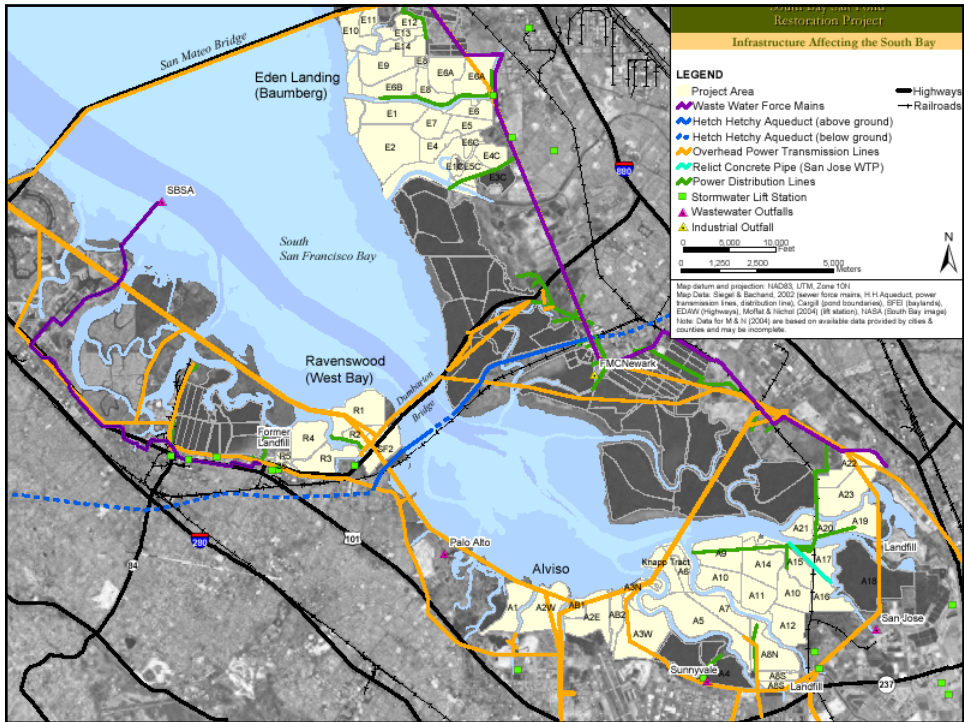
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Storm drainage




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Flood Protection Opportunities

- Breach along creeks to improve flood protection (check for other short term impacts)
- Design managed ponds to provide flood detention
- Provide a more consistent level of engineered flood protection
- Use restored tidal marsh as wave buffer to reduce the threat/maintenance of the flood levees

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Flood Protection Constraints

- Restoration of ponds to tidal marsh brings the Bay closer to the land edge. Design must provide adequate protection for this.
- The function of infrastructure (PG&E facilities, storm drains, pump stations, sewage treatment outfalls, pipelines, etc.) within and adjacent to the project site must be maintained.

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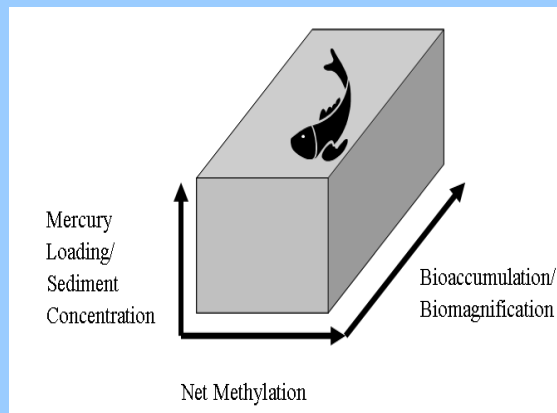
Flood Protection: Questions?



Overview of Mercury Issues and Direction



Three Key Factors Affect Mercury in Biota – Fundamental Model

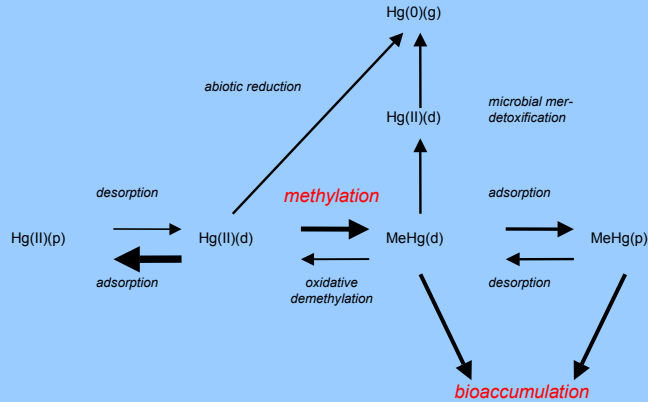




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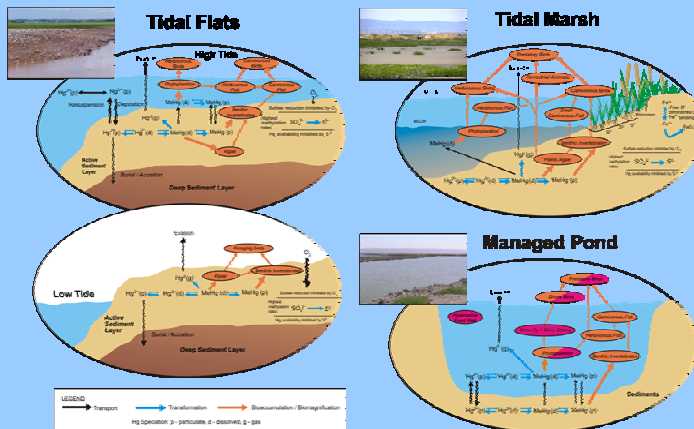
Cycling – Complex Processes Drive Methylation and Bioaccumulation



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How Do Restoration Habitats Affect Mercury? SBSP Conceptual Model

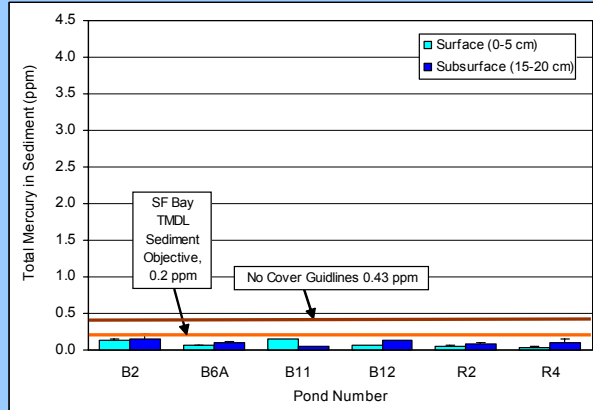




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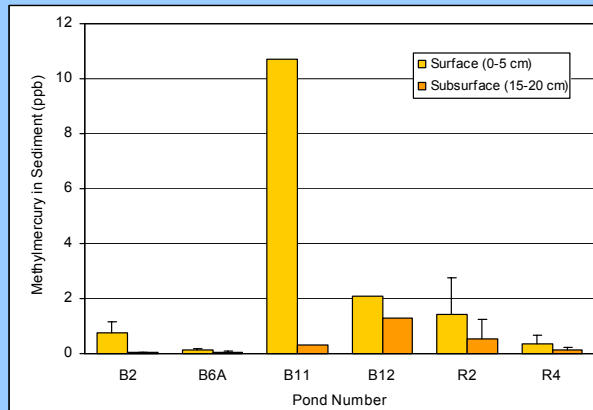
Total Mercury in Baumberg and Redwood Ponds



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Methylmercury in Baumberg and Redwood Ponds

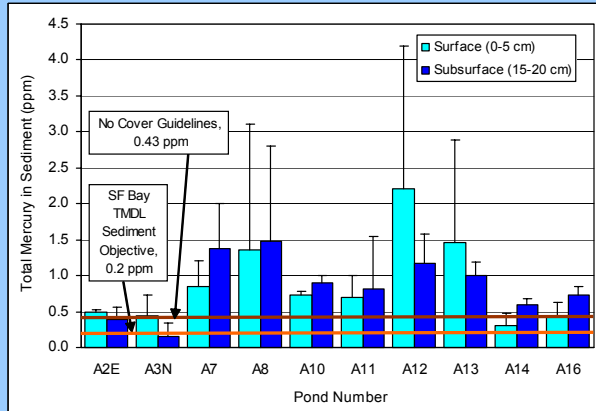




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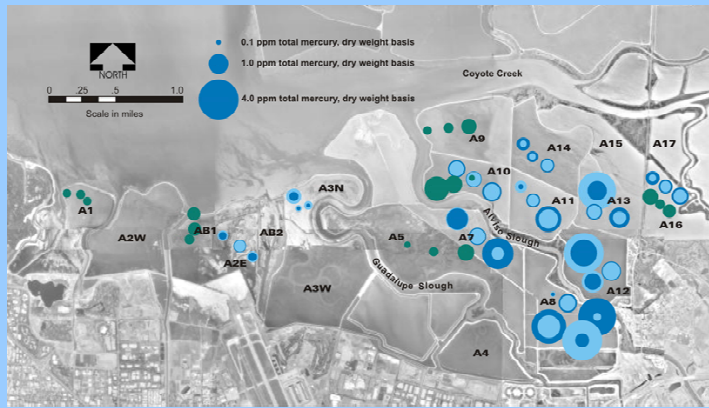
Total Mercury in Alviso Ponds



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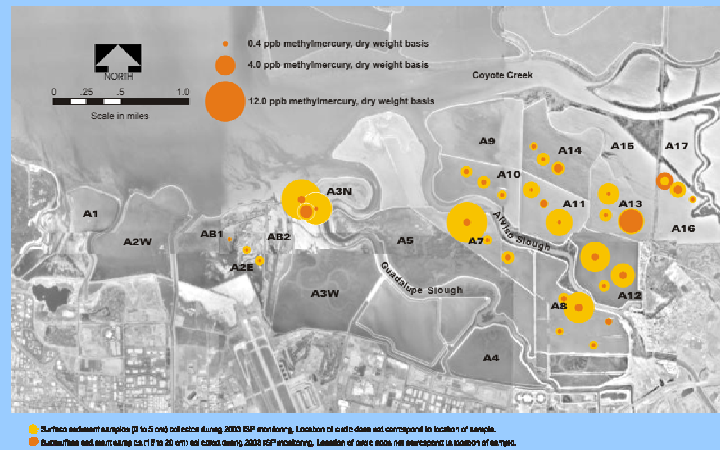


Total Mercury in Alviso Ponds



● 0.1 ppm total mercury, dry weight basis
● 1.0 ppm total mercury, dry weight basis
● 4.0 ppm total mercury, dry weight basis

Methylmercury in Alviso Ponds



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Mercury Bioaccumulation in Biota within the Alviso Ponds

- Invertebrates (i.e., snails)
 - Similar to South Bay invertebrates
- Fish
 - Similar to Bay-Delta, except for jack smelt in Pond A9
- Bird Eggs
 - Elevated relative to Bay-Delta, especially for higher trophic levels

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What Have We Learned for SBSP Restoration?

- Mercury is not a fatal flaw
- Still much more to learn
- Adaptive management process will be critical to answer remaining questions
- Mercury management measures (planning, design and operation) could help to manage mercury impacts

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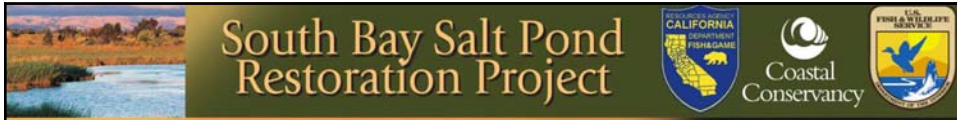
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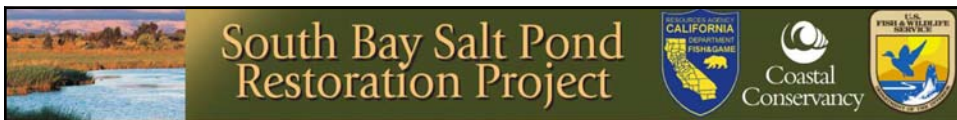
Recommendations and Next Steps

- Science Team to develop and prioritize list of “testable hypotheses”
- Use ISP monitoring to inform mercury data gaps
- Coordinate with pilot projects
- Refine conceptual model
- Refine sediment quality guidelines

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Mercury: questions?



Public Access and Recreation - Opportunities

- South Bay Trail spine-regional open space connections
- Develop partnerships-adjacent parks and open space
- Foster environmental education, interpretation and stewardship
- Incorporate South Bay historical and cultural resources
- Accommodate a diversity of visitors and provide multi-modal opportunities
- Provide the highest quality visitor experiences



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Public Access and Recreation - Constraints

- Species habitat limitations
- Physical (infrastructure, cost) limitations
- Management and legal limitations

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Public Access and Recreation: Questions?

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- Are there opportunities or constraints that should be added, subtracted, or revised?
- Any revisions to the maps?

