


**South Bay Salt Pond
Restoration Project**

**Progress on Alternatives Development:
Landscape Scale
Assessment**


Stakeholder Forum Workshop
May 25, 2005



**South Bay Salt Pond
Restoration Project**


**Overview of the Landscape
Assessment**

- **Geomorphic Assessment (sediments)**
 - How do South Bay and tidal pond habitats evolve over time (50 years)?
 - No Action and With Project alternatives
- **Bird Use Assessment**
 - How do birds respond to the changes in Bay, tidal pond, and managed pond habitats?
- **Collaborative**




Why do we need a Landscape Assessment?

- Understand evolution of No Action and project alternatives
 - Significant changes over 50-years
 - Considers the entire South Bay landscape
- Informs alternatives development
 - How well does the restoration meet the project objectives compared to no action?
 - Quantifiable metrics for weighting and ranking



Not “The” Answer


- Landscape Assessment is a tool to help us understand the limits of the system
- Provides regional characterizations, not detailed spatial resolution
- Series of underlying assumptions based on the eventual detailed restoration design
- Does not include restoration phasing
- Based on preliminary topography data



The banner features a landscape photograph on the left, the project title 'South Bay Salt Pond Restoration Project' in the center, and logos for the California Department of Fish and Game, Coastal Conservancy, and the U.S. Fish & Wildlife Service on the right.

Landscape Scale Geomorphic Assessment

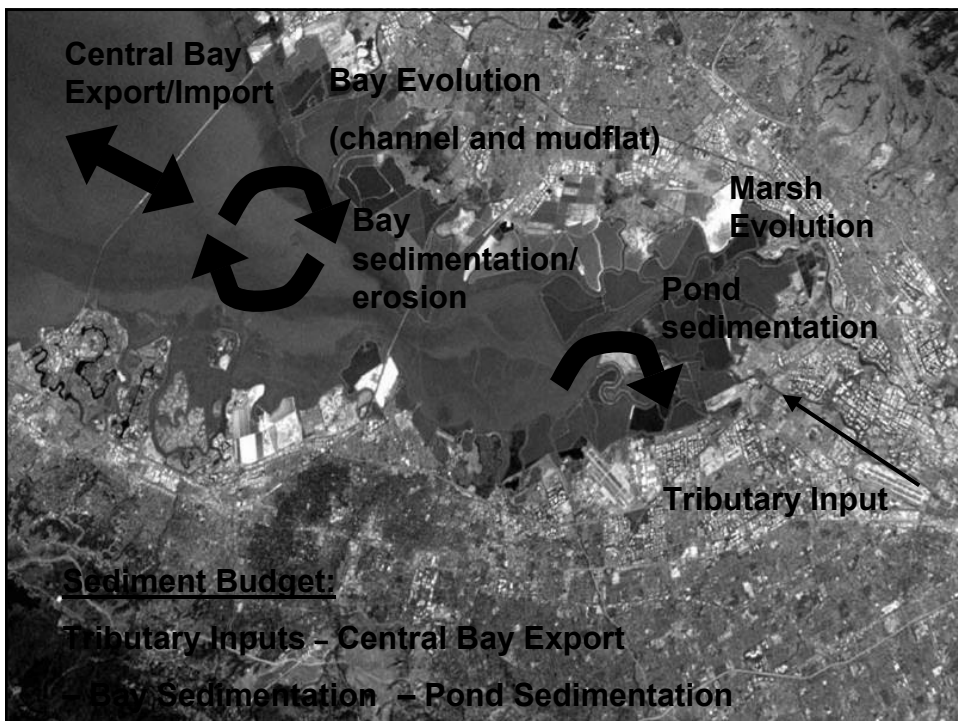
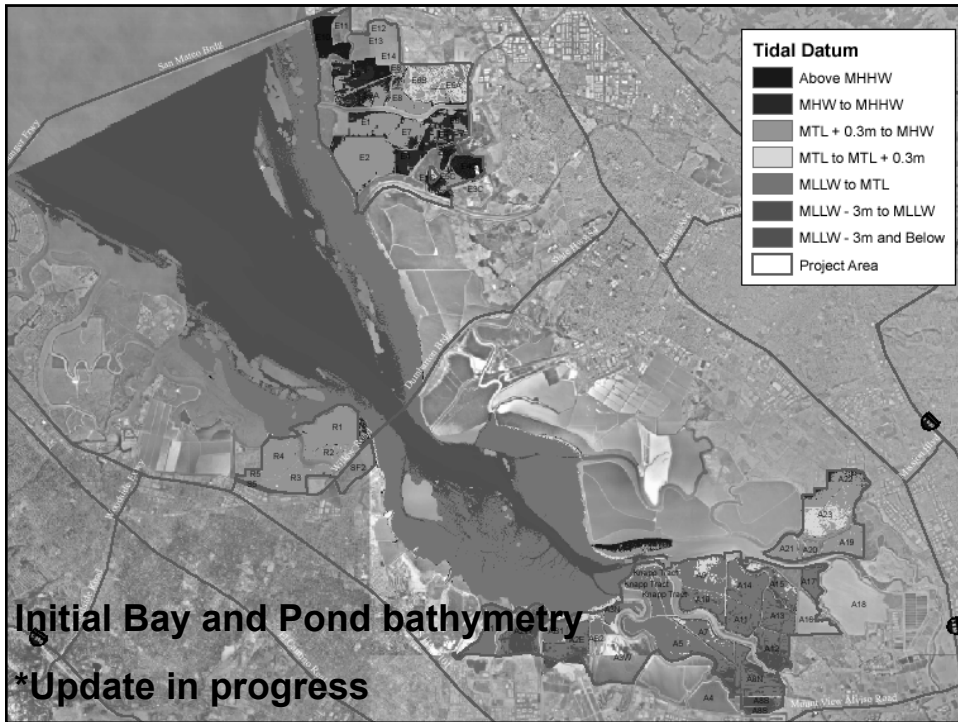
- Methodology
- Preliminary results
- Conclusions – What does this mean?




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Methodology


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Tools

- Sediment Budget
 - Uncles-Peterson (UP) Model
- Marsh Sedimentation (in the ponds)
 - Uncles-Peterson
 - Marsh98
- Mudflat Evolution (in the Bay)
 - Uncles-Peterson Model
 - Observed deposition/erosion trends between 1983 and 2004



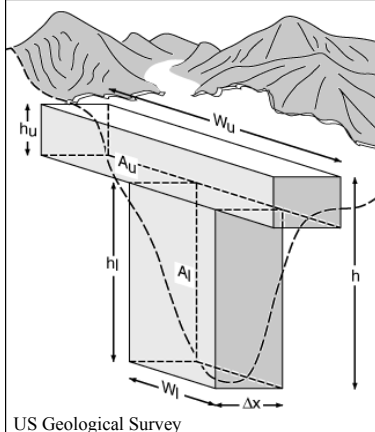
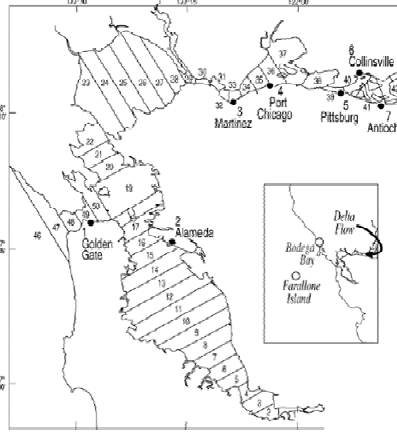
Uncles-Peterson Model

- Sediment Budget Accounting Tool
- Adapted by the USGS (Schoellhamer & Lionberger, in prep)
- Processes modeled
 - Tidally-averaged currents
 - Salinity
 - Sediment dynamics + bed changes
- Calibrated to past bathymetric changes

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Uncles-Peterson Model Segmentation



US Geological Survey

Schoellhamer and Lionberger, 2003

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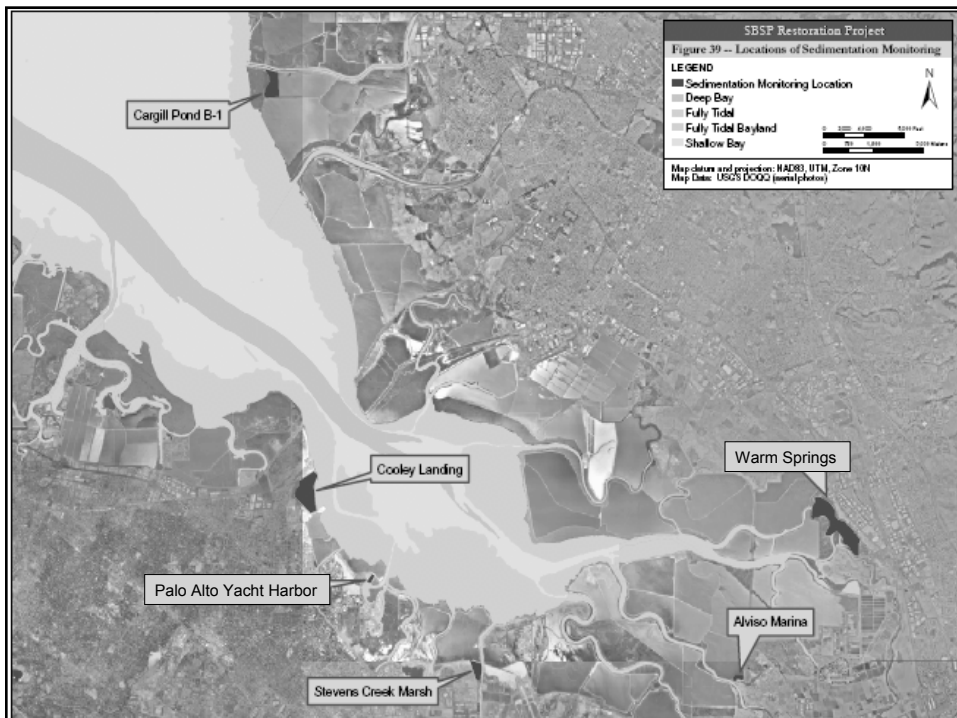
Outputs from the Uncles-Peterson Model


- Sediment budget trends
- Marsh sedimentation (in the ponds)
 - Trends in long-term suspended sediment concentrations by region
 - Total sediment accreted by the breached ponds (by cluster or complex)
- Mudflat Evolution (in the Bay)
 - Deposition and erosion trends within the upper and lower layers in the South Bay

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Marsh Sedimentation


- Initial sedimentation rates
 - Utilized empirical sedimentation data
 - Calculated an effective suspended sediment concentration using MARSH98
- Future sedimentation rates (by decade)
 - Scaled the effective suspended sediment concentration based on output from Uncles-Peterson model
 - Modeled sedimentation using MARSH98
- Key vegetation colonization thresholds used to predict colonization timeframe
- Assumed all tidal ponds are breached on Day 1






Marsh sedimentation model (MARSH98)

- Based on Krone (1987)
- Input
 - Initial bed elevation
 - Tides
 - Suspended Sediment Concentration
 - Sea Level Rise
 - Density of Deposited Material
 - Wind-wave resuspension / hindered settling

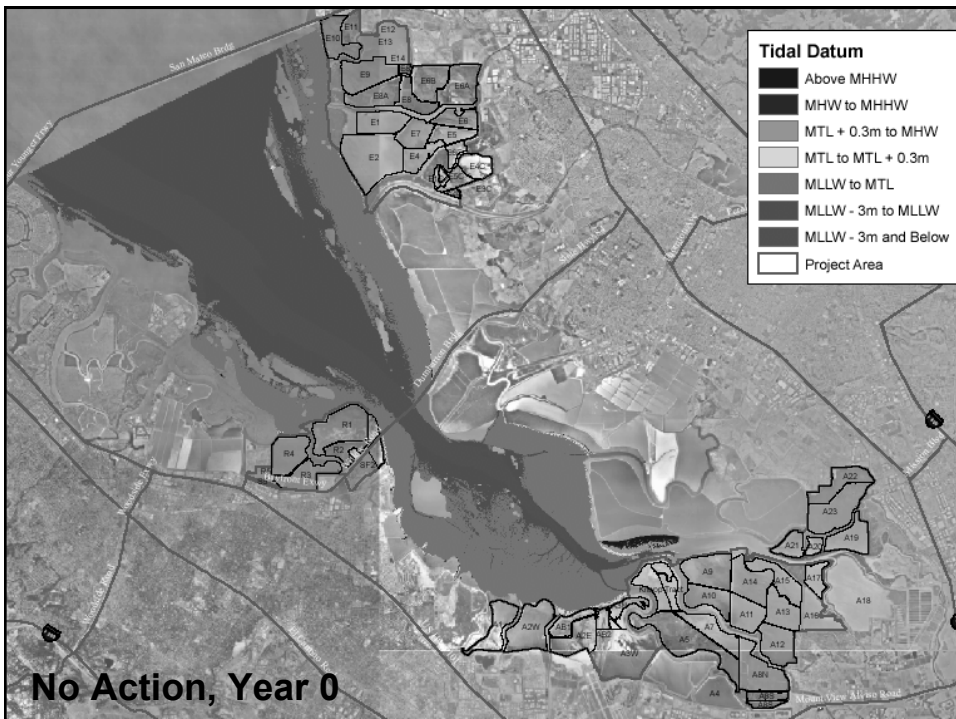


Mudflat Evolution

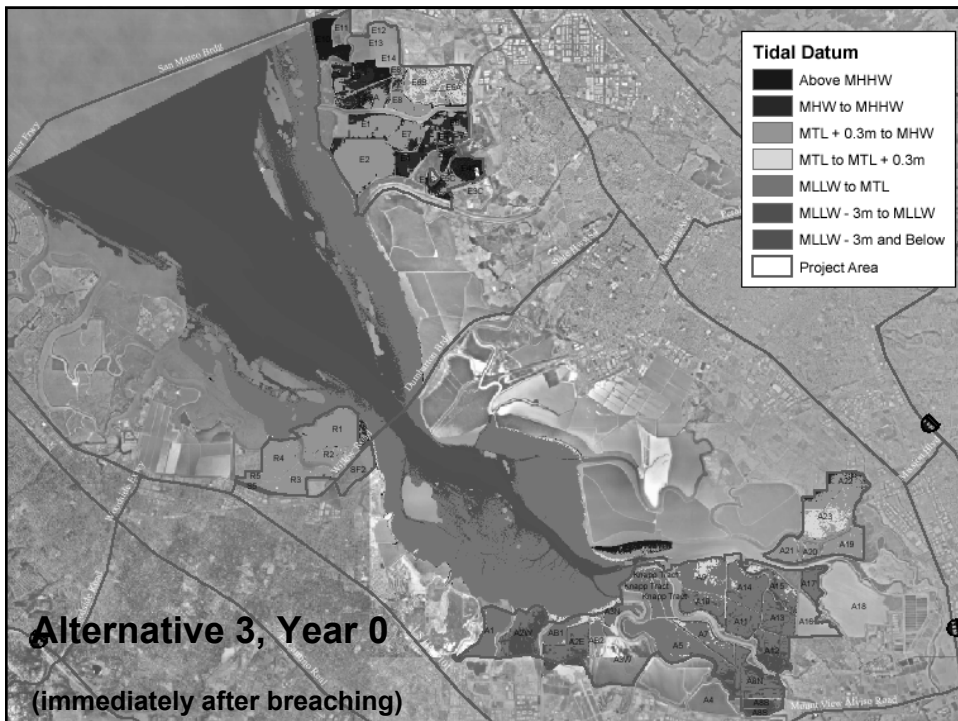
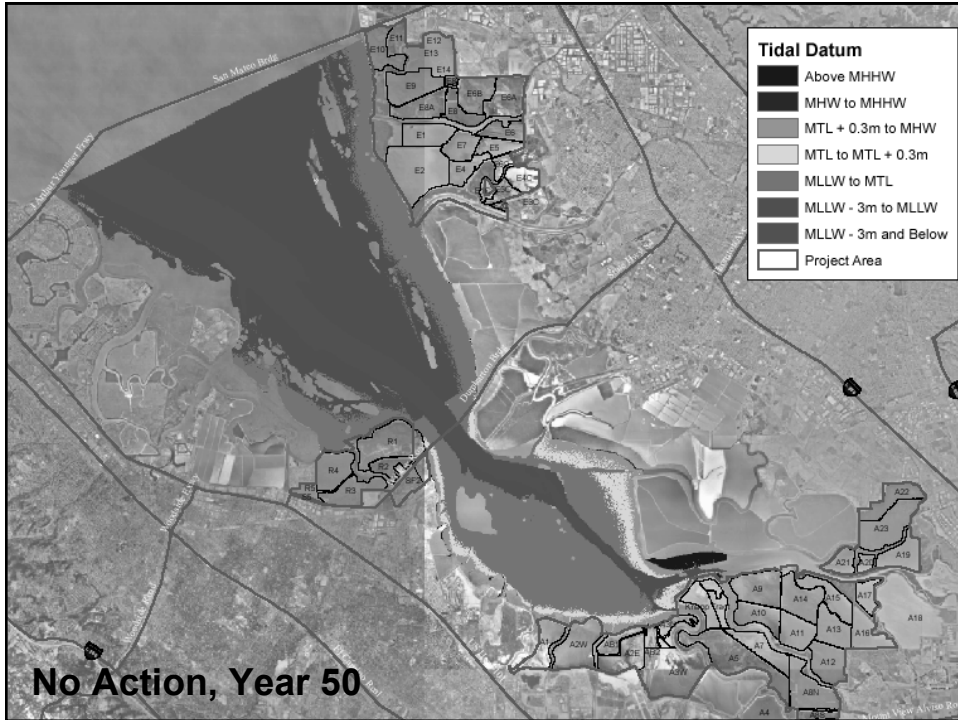
- Initial conditions
 - Mudflats: 2004 LiDAR data
 - Shallow subtidal and deep subtidal: 1983 bathymetry
- Evolution
 - Applied by region based on Uncles-Peterson Model output and observed rates of change between 1983 and 2004



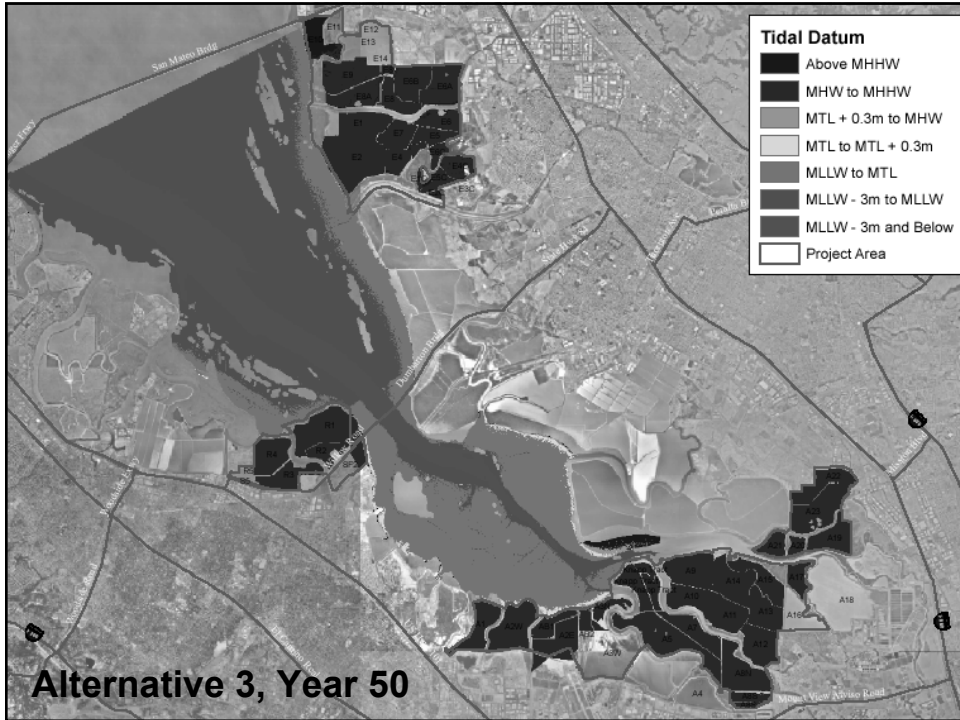
Preliminary Results



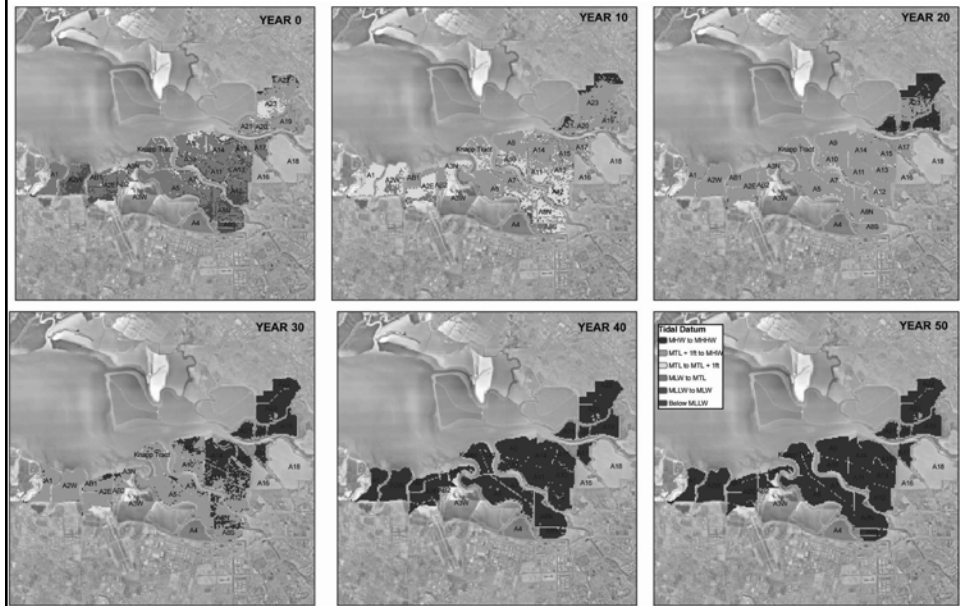
Progress on Alternatives Development: Landscape Scale Assessment



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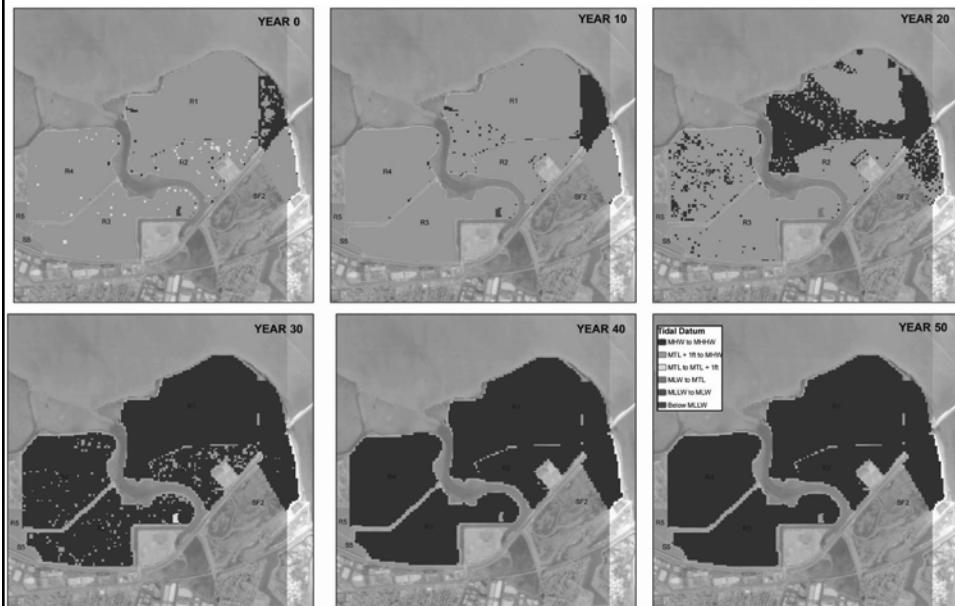
Alviso Complex Alternative 3



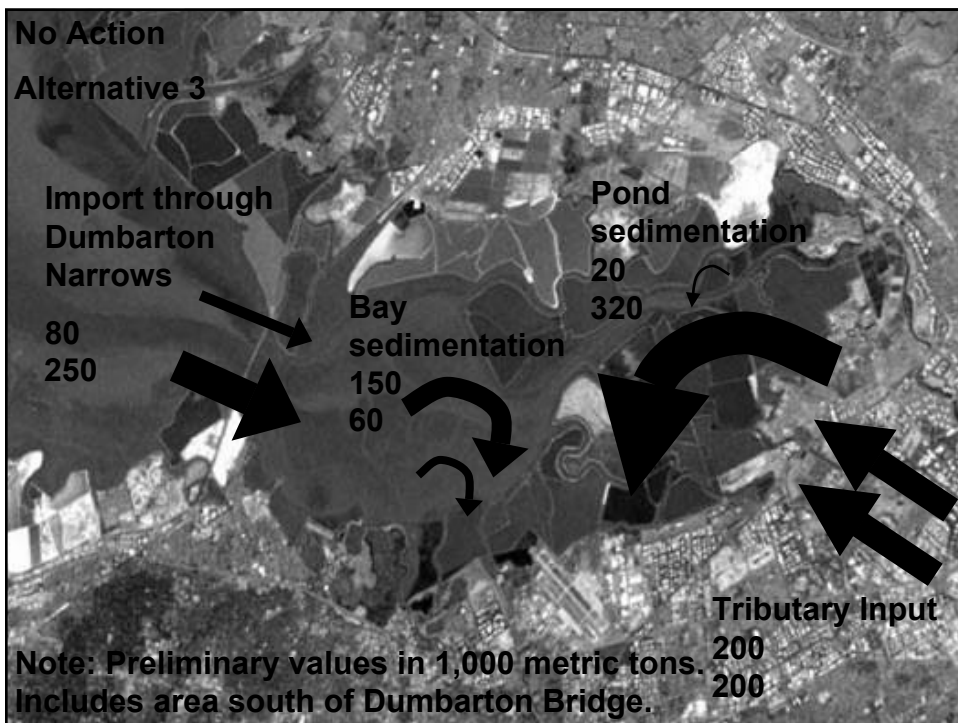
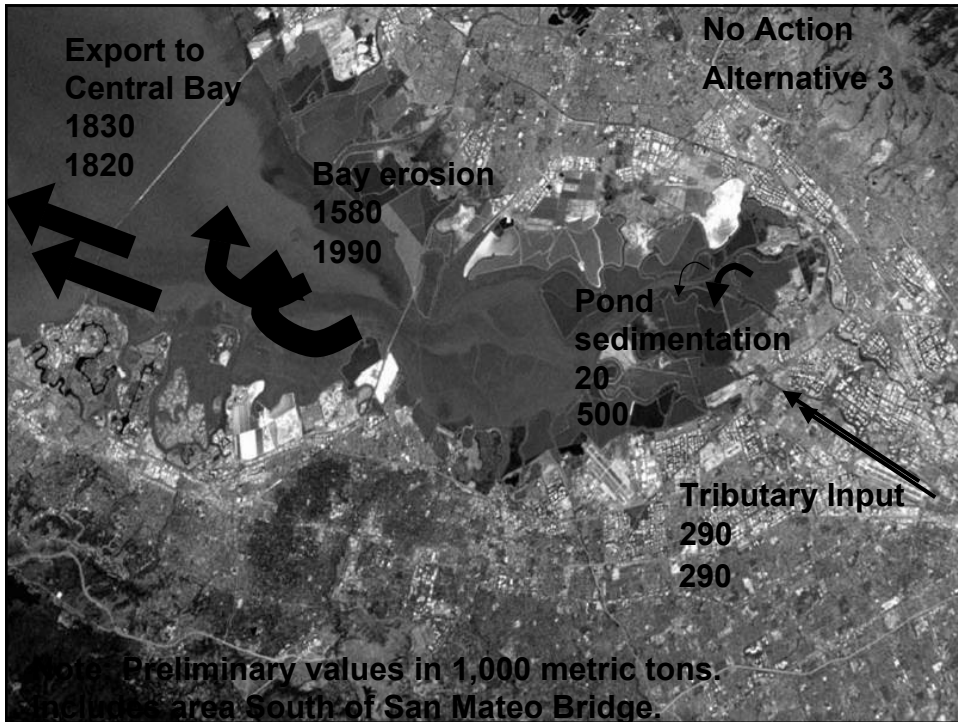
Eden Landing Complex Alternative 3

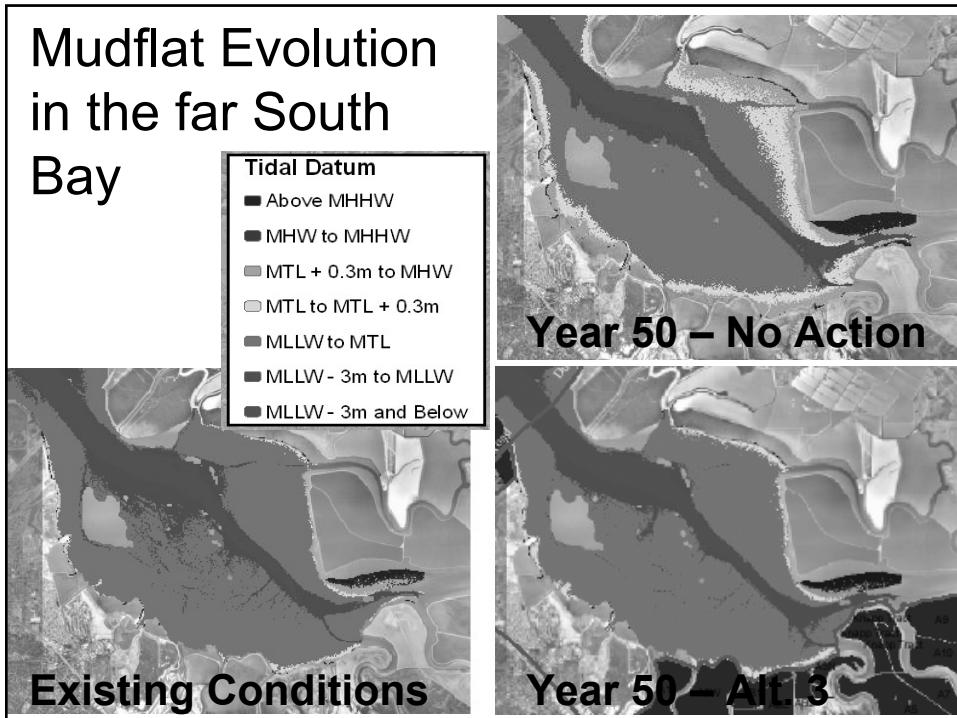


Ravenswood Complex Alternative 3



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Habitat Changes South of San Mateo Bridge, Yrs 0 to 50, Preliminary Results

	No Action		Alternative 3	
	Acres	%	Acres	%
Deep subtidal	0	0%	100	3%
Shallow subtidal	800	6%	2,200	17%
Intertidal mudflat	-1,600	-16%	-2,300*	-18%
Tidal marsh	900	NA	11,400*	NA
Managed pond	0	0%	-11,200	-88%

* Approximately 1,400 acres of tidal channels will be created in the ponds (included in tidal marsh acreage). Much of this will be mudflat.




Conclusions – What does this mean?



Take Home Messages*

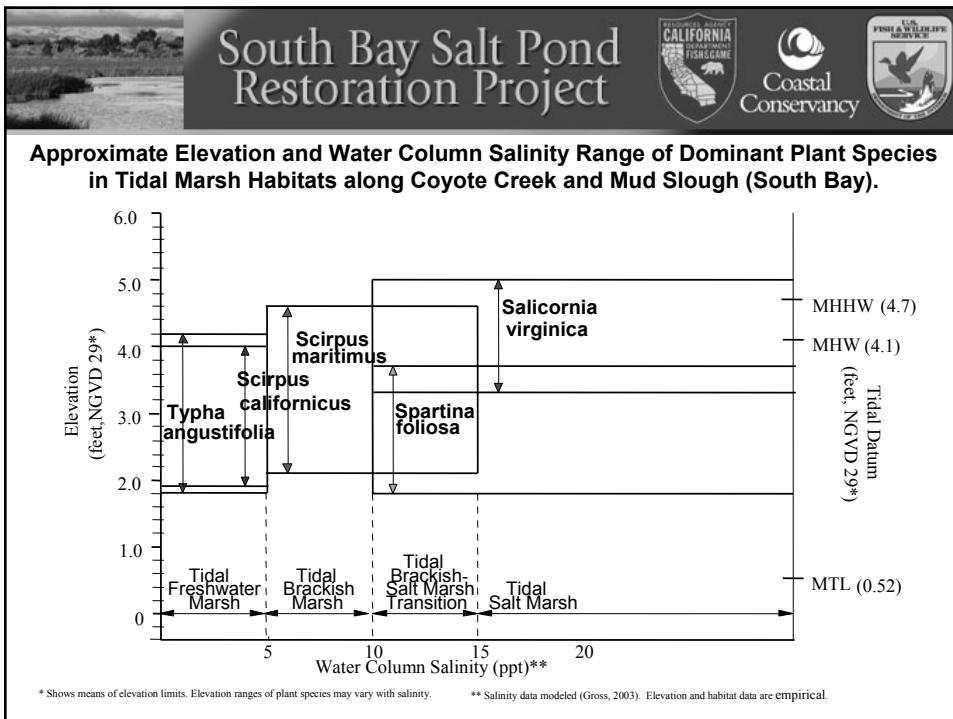
- South Bay is a great place to restore tidal marsh
 - ~11,400 acres in Alt 3
 - South of the Dumbarton is an efficient sediment trap
- Expect a loss of Bay mudflat over 50 years with No Action (~13%)
- Expect a somewhat greater loss of Bay mudflat over 50 years with Alternative 3 (~18%)
 - ~5% greater than No Action (~700 ac)
- Loss of Bay mudflat partially offset by creation of channel-associated mudflat inside the ponds


* Based on preliminary results



Conversion of Geomorphic Modeling Data to Wildlife Habitat Data

- Added tidal marsh categories to account for salinity, high/low marsh, tidal channels, and marsh ponds and pans
- Added specificity of managed pond types by alternative
- Provided detailed assumptions for reconfigured ponds (types, water depths, salinities)






Distribution of Habitats by Alternative (acres)

	Restoration Alternative				
	No Action (yr 0)	No Action (yr 50)	1 (yr 50)	2 (yr 50)	3 (yr 50)
Deep Subtidal	3,800	3,800	3,900	3,900	3,900
Shallow Subtidal	13,000	13,800	15,100	15,200	15,200
Intertidal Mudflat	12,800	11,200	10,600	10,500	10,500
Cordgrass Marsh	130	860	130	130	160
Pickleweed Marsh	150	280	5,800	8,200	9,700
Tidal Channels Within Marshes*	30	30	870	1,200	1,400
Marsh Ponds and Pans	20	20	260	400	430
Managed Ponds	12,800	12,800	6,100	3,400	1,600
TOTAL	42,700	42,800	42,800	42,900	42,900


*Includes substantial acreage of shallow subtidal and intertidal mudflat habitats.






Extent of Managed Pond Types by Alternative (acres)*

	Restoration Alternative			
	No Action	1	2	3
System (Enhanced)	7,700	2,000	770	0
System (winter) / High-Salinity	360	0	0	0
System (winter) / Seasonal (summer)	1,500	750	310	0
Seasonal Ponds	1,600	860	170	0
Seasonal (summer) / High Salinity	790	410	0	0
High Salinity Ponds	830	520	520	**
Reconfigured Ponds	0	1,600	1,600	1,600
Total Managed Ponds	12,800	6,100	3,400	1,600

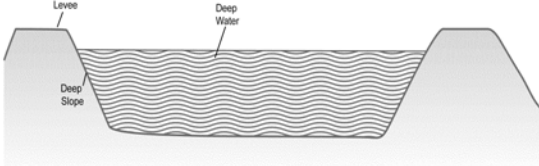
* Except for reconfigured ponds, pond type designations are preliminary, based on ISP management.
 **Approximately 450 acres of reconfigured ponds are proposed to be managed for high salinity.



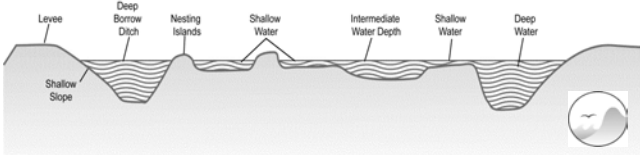
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Comparison of Reconfigured and Enhanced Ponds




Enhanced Pond






Reconfigured Pond

“Reconfigured” ponds will be extensively graded, and will be managed to achieve highly productive habitat for foraging, roosting, and breeding waterbirds.

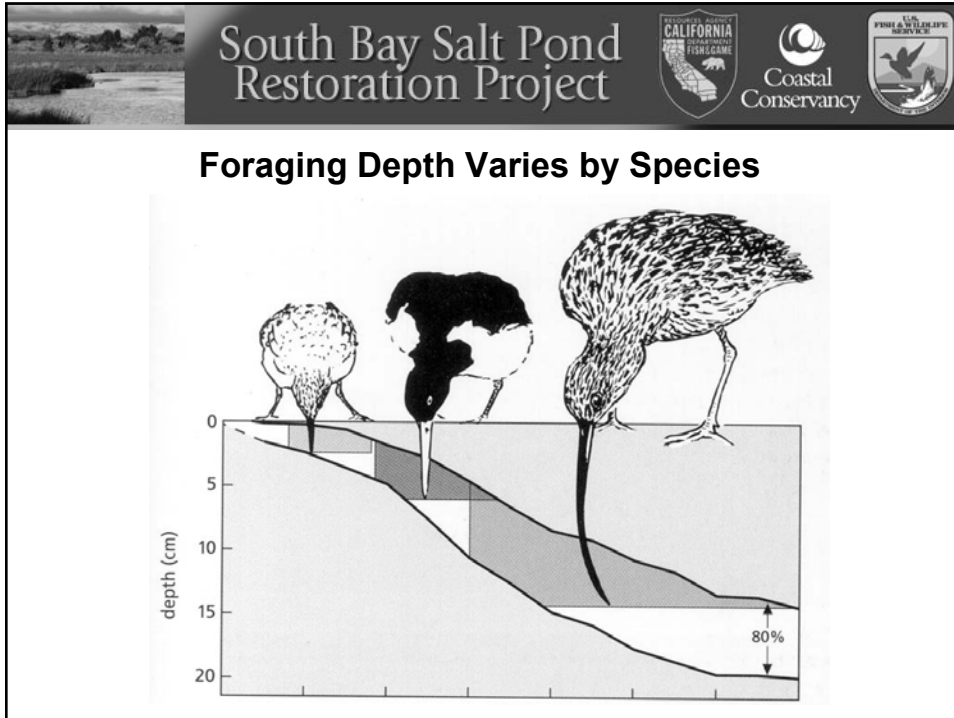


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Summary of Reconfigured Pond Management Alternatives 1-3 (preliminary)

Pond Configuration / Management	Target Species	Acres
Furrowed (extensive, very shallow water with narrow, raised furrows and small irregular islands)	Nesting by Snowy Plovers, Black-necked Stilts, and American Avocets; foraging by other shorebirds	230
High Salinity (mostly shallow, with 30% nesting islands)	Nesting by Snowy Plovers, Black-necked Stilts, and American Avocets; foraging by other shorebirds (including phalaropes)	450
Low Salinity (mostly shallow, with 30% nesting islands)	Nesting by Snowy Plovers, Black-necked Stilts, and American Avocets; foraging by other shorebirds and dabbling ducks	610
Deep Water (with 5% nesting islands)	Nesting by terns, foraging by diving ducks and piscivores	290
TOTAL		1,600



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Subset of Habitat Attributes in Managed Ponds by Alternative (in acres)

	Restoration Alternative			
	No Action	1	2	3
<15 cm water (shorebirds), summer	1300	1100	840	810
<15 cm water (shorebirds), winter	2000	1500	910	810
>1 m water (diving ducks), summer	1300	1000	470	150
>1 m water (diving ducks), winter	1700	1300	630	250
Nesting/roosting islands	30*	390	390	390

* Value given is for Year 0; presumed to be near zero at Year 50.