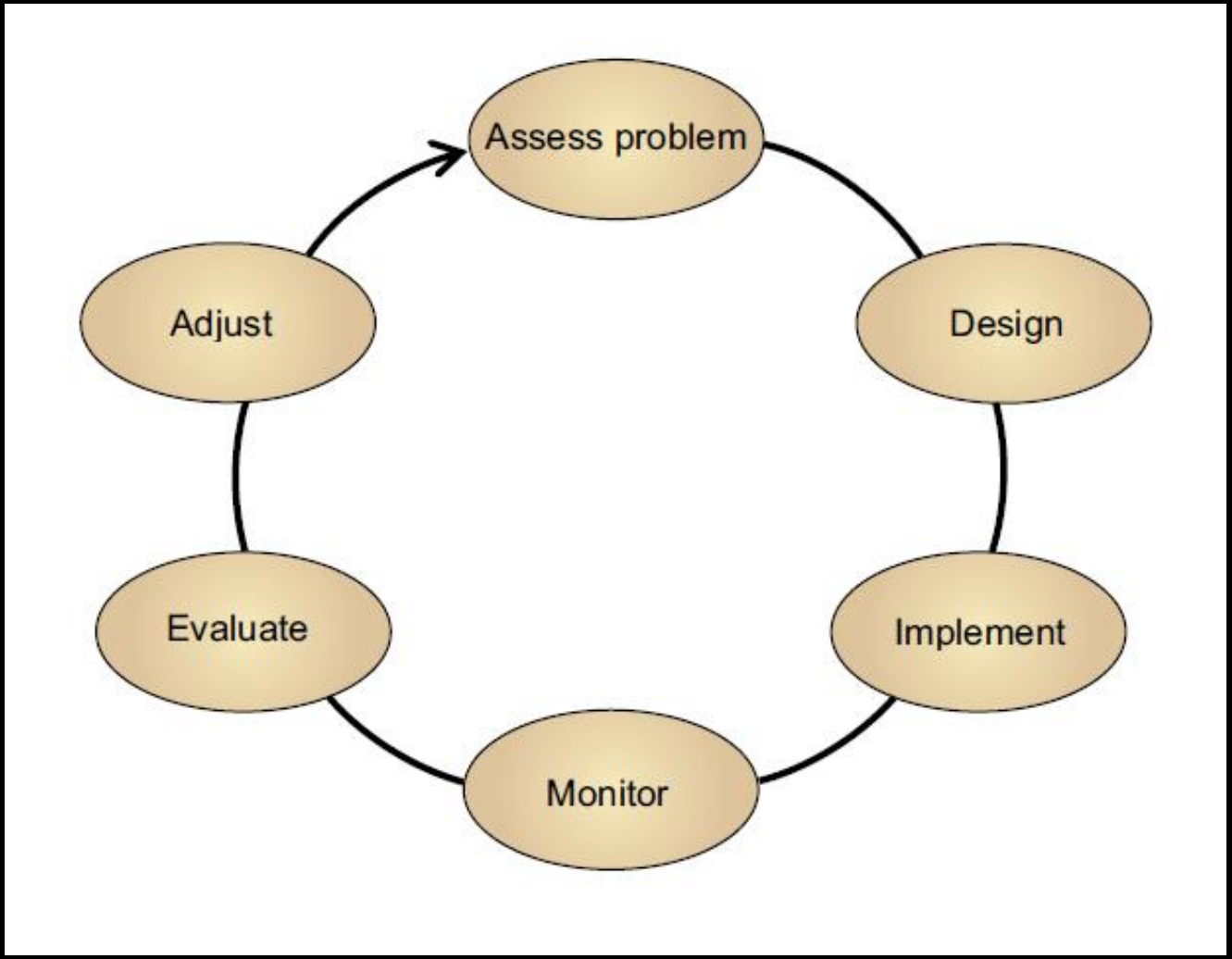
South Bay Salt Pond Restoration Project

Restoring the Wild Heart of the South Bay

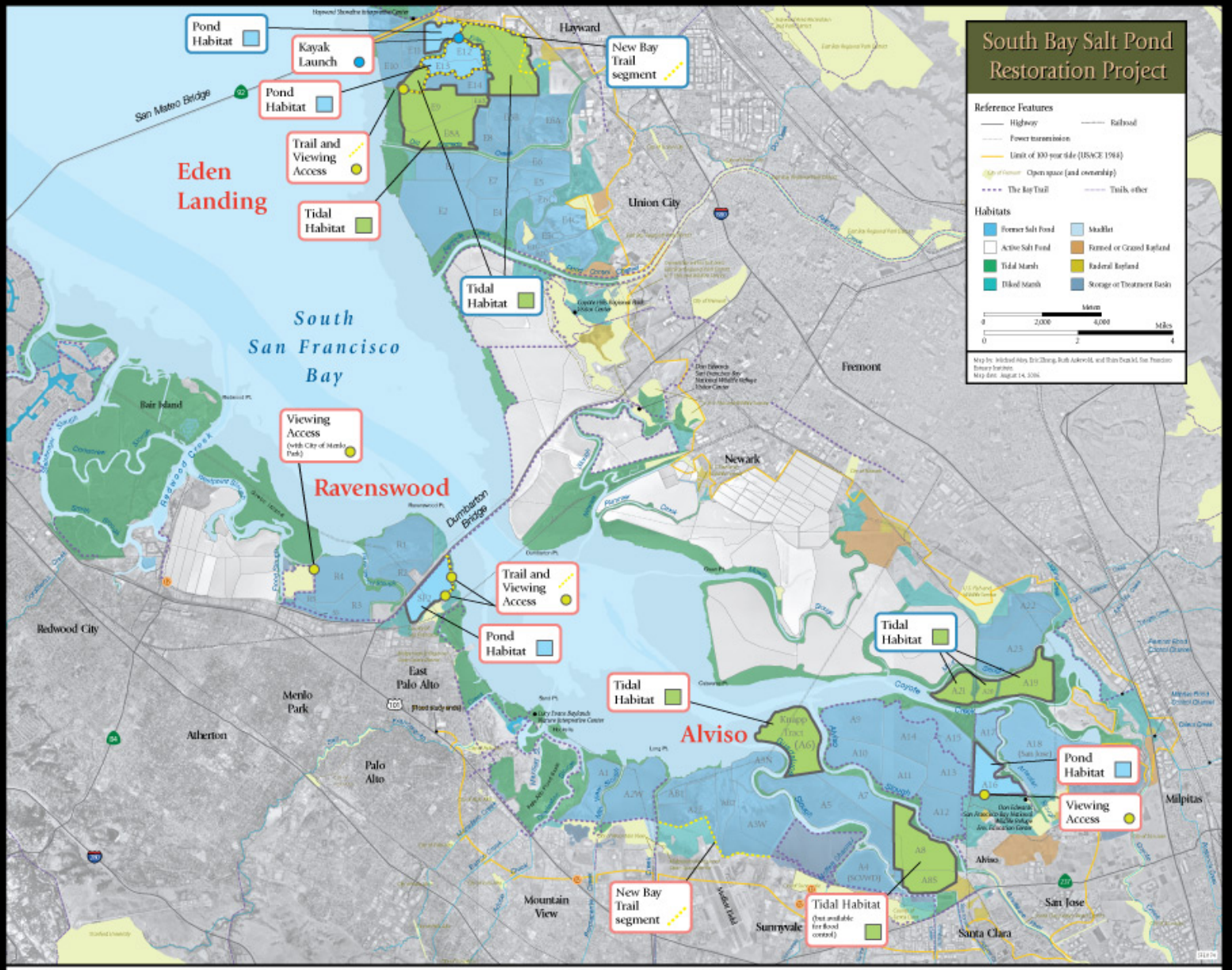
Ecological Trade-offs

Tidal Marsh species vs. Pond species

Adaptive Management



Tracking our Progress: Phase One Actions



Key uncertainties

- Bird use of changing habitats
- Habitat evolution and sediment dynamics
- Legacy Mercury
- Water Quality and Aquatic Species
- Invasive species
- Public access
- Infrastructure support
- Sea level rise and climate change

Sediment Dynamics

Is there sufficient sediment available in the South Bay to support marsh development without causing unacceptable impacts to existing habitats?

- Question 1. Will sediment accretion in restored tidal areas are adequate to create and to support emergent tidal habitat ecosystems within the 50-yr projected time frame?
- Question 2. Will sediment movement into restored tidal areas significantly reduce habitat area and/or ecological functioning (such as plankton, benthic, fish or bird diversity or abundance in the South Bay)?

Effects on Aquatic Species and Water Quality

Can restoration actions be configured to maximize benefits to non-avian species both onsite and in adjacent waterways?

- Question 1. To what extent will increased tidal habitats increase survival, growth and reproduction of native species, especially fish and harbor seals?

Will restoration adversely affect water quality and productivity?

- Question 1. What is the effect of a) pond management, including increased pond flows and associated managed pond effects, and b) increased tidal prism from tidal habitat restoration on water quality, phytoplankton and fish diversity and abundance, and food web dynamics in South Bay?

Mercury

Will mercury be mobilized into the food web of the South Bay and beyond at a greater rate than prior to restoration?

- Question 1. Will tidal habitat restoration and associated channel scour increase MeHg levels in marsh and bay-associated sentinel species?

- Question 2. Will pond management increase MeHg levels in ponds and pond-associated sentinel species?

Bird Use of Changing Habitats

Can the existing number and diversity of migratory, wintering, and breeding shorebirds and waterfowl be supported in a changing (reduced salt pond) habitat area?

- Question 1. Will the habitat value and carrying capacity of South Bay for nesting and foraging migratory and resident birds be maintained or improved relative to current conditions?
- Question 2. Will shallowly flooded ponds or ponds constructed with islands or furrows provide breeding habitat to support sustainable densities of snowy plovers while providing foraging and roosting habitat for migratory shorebirds?
- Question 3. Will ponds reconfigured and managed to provide target water and salinity levels significantly increase the prey base for, and pond use by waterfowl, shorebirds and phalaropes/grebes compared to existing ponds not managed in this manner?

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Panel Discussions

Potential Phase 2 studies: Sediment Dynamics

- Evaluate amount of sediment flux entering far South Bay
- Sediment accumulation in breached ponds of Eden Landing and Ravenswood Complexes.
- Assess landscape level changes in vegetation from Phase 1 restoration actions.
- Develop cost-effective and accurate methods to map baseline mudflat habitat and track future changes, and to determine how restoration actions may affect the extent of mudflats.
- Map the extent and quality of biofilm, understand its role in shorebird feeding, and how restoration actions might alter biofilm.
- Better understanding of sea level rise impacts on marsh habitat.

Potential Phase 2 studies: Aquatic Species and Water Quality

- Continue steelhead smolt studies to support continued management of Pond A8.
- Conduct studies assessing the growth and reproductive success of aquatic organisms, especially fish.
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- Contribution of local wastewater treatment plants to nutrient and low dissolved oxygen conditions.
- How pond management influences water quality, phytoplankton and fish diversity and abundance and food web dynamics in all the Complexes.

Potential Phase 2 studies: Mercury

- How to manage ponds to reduce mercury. Continued assessment of Pond A8 complex is needed. Other complexes?
- Assess other newly breached habitats to understand mercury accumulation over time.
- Establish a long-term mercury monitoring program at set marsh sites and indicator species.
- The effect of mercury on breeding birds.
- Effects of mercury on marsh species, such as the Ridgway's rail.

Potential Phase 2 studies: Bird Use of Changing Habitats

- Continued high-tide bird surveys on all the ponds to assess long term impacts of marsh restoration

- Develop optimal or target salinity and water levels for bird guilds and species.
- Continue enhancing habitat diversity to enhance carrying capacity and support species diversity.

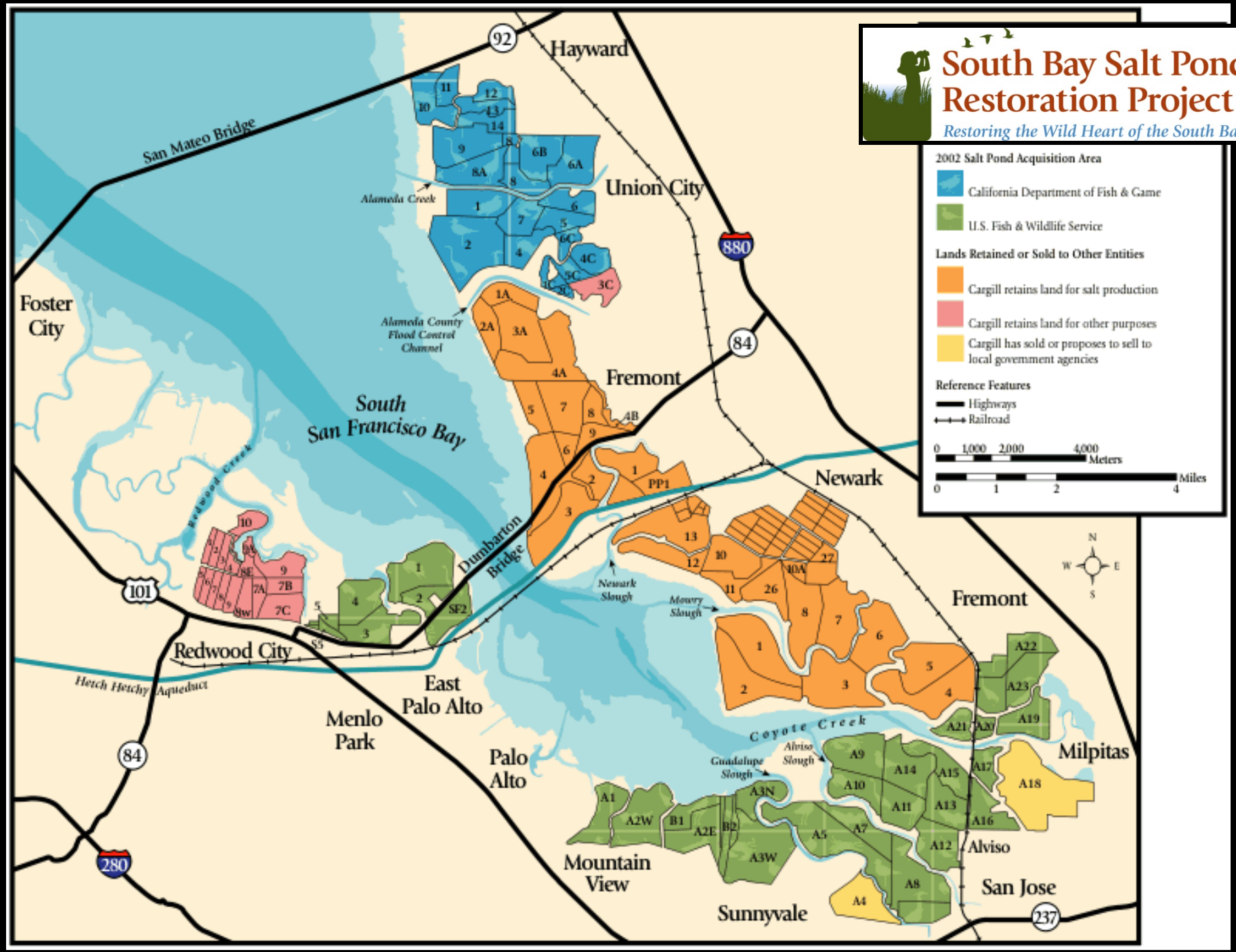
- Study how to enhance food availability and the carrying capacity of the ponds.

- Continue studying bird nest abundance/nest success in relation to island habitat creation/enhancement.

- Directed studies of specific guilds such as grebes and phalaropes?

Potential Phase 2 studies: Bird Use of Changing Habitats

- Continue enhancement and predator management of plover nesting areas and study the effectiveness.
- Monitoring of waterbird abundance and behavior in tidal ponds at low tide to assess use of marsh/panne habitat.
- Continue understanding carrying capacity of mudflat habitat and biofilm for shorebirds.
- Monitoring of Ridgway rail breeding success in newly restored areas.
- Use of telemetry studies to understand bird use of upland transition zone or marsh islands by rail.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2002 Salt Pond Acquisition Area
California Department of Fish & Game
U.S. Fish & Wildlife Service
Lands Retained or Sold to Other Entities
Cargill retains land for salt production
Cargill retains land for other purposes
Cargill has sold or proposes to sell to local government agencies
Reference Features
Highways
Railroad
0 1,000 2,000 4,000 Meters
0 1 2 4 Miles
N
W
E
S
Hayward
Union City
Fremont
Newark
Milpitas
Alviso
San Jose
Sunnyvale
Mountain View
Palo Alto
East Palo Alto
Menlo Park
Redwood City
Foster City
South San Francisco Bay
San Mateo Bridge
Dumbarton Bridge
Alameda Creek
Alameda County Flood Control Channel
Newark Slough
Mowry Slough
Coyote Creek
Alviso Slough
Guadalupe Slough
Redwood Creek
Hetch Hetchy Aqueduct
92
880
84
101
280
237