



South Bay Salt Pond Restoration Project: Adaptive Management in Action

Laura Valoppi, U.S. Geological Survey
 John Bourgeois, California Coastal Conservancy
 Cheryl Strong, U.S. Fish and Wildlife Service



Contact: Laura_Valoppi@usgs.gov

The South Bay Salt Pond Restoration Project (www.southbayrestoration.org) is the largest wetlands restoration project on the West coast of the United States. It is unique not only for its size-- over 15,000 acres--but for its location adjacent to one of the nation's largest urban areas, home to over 3 million people. The Project is intended to restore and enhance wetlands in South San Francisco Bay while providing for flood management and wildlife-oriented public access and recreation.

We have identified long-term alternatives for the Project, each representing a continuum toward different end-states: one end-state at 50% of the existing ponds converted to managed ponds for waterbirds and 50% restored to salt marsh habitat, and the other end of the continuum at 10% of the existing ponds converted to managed ponds and 90% restored to marsh habitat. The final ratio of managed ponds to salt marsh habitat will depend on the outcome of the Adaptive Management Plan, which will be implemented over the next 50 years. The Plan will allow for lessons learned from earlier phases and applied studies to be incorporated into subsequent stages as management objectives and designs of future actions are revised and implemented.

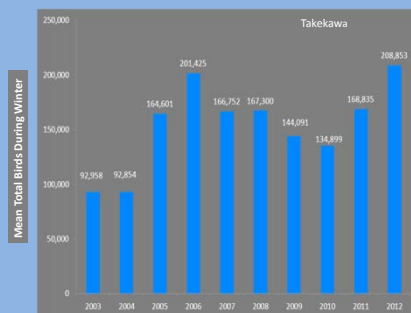
The Project has completed most of the Phase 1 studies, and much has been learned about key uncertainties. Researchers have completed studies on bird use of constructed islands, sedimentation rates, mercury contamination, and management of ponds for waterbirds that have changed managers thinking on tidal restoration and pond management.

Wintering birds

Monthly bird surveys have been conducted since 2003 to see how birds have responded to changes in habitat. Overall, total wintering waterbird numbers have grown from <100,000 in 2003 to >200,000 in 2012. Birds respond quickly to changes in water depth and salinity in these ponds.

Management Response - A Pond Management Working Group, comprised of bird researchers and managers, meets monthly to try and optimize pond management conditions for over 40 species of birds during spring and fall migrations, and nesting as well as the wintering months.

Wintering birds use islands for roosting, although to a lesser extent than breeding birds. Research indicated wintering birds, particularly shorebirds, are attracted to areas of shallow water depths. In the design of features of Pond E23/E13, managers have included shallow mounds and swales to attract roosting and foraging birds.



Nesting birds

Islands within managed ponds are important nesting habitat for large numbers of locally breeding waterbirds such as Forster's Terns and American Avocets.



In Pond SF2 we created 30 islands, half with linear shape and half with round shape; the pond was opened to bay water flows starting in September of 2010.



Several waterbirds nested on these islands in Spring of 2011 on all but 2 of the 30 nests. However, cracks began to form in the bay mud and some chicks were lost in the cracks (Ackerman and SFBBO.)



A "Marsh Master" was brought in to a few islands in order to rough up the surface prior to the following nesting season. Unfortunately, due to the surface cracking of the prior year, or other factors, few birds nested on the islands, with only 2 of the 30 islands used for nesting (Ackerman and SFBBO)



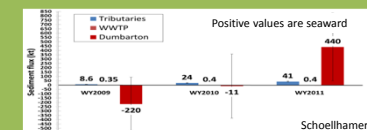
Management Response - In addition to using the Marsh Master on the remaining islands at SF2, managers have redesigned the way in which islands were built at Pond A16 by doing two "lifts" of bay mud in the construction in order to minimize cracking.

Preliminary analysis of use of islands by nesting birds has found that there is greater nest abundance on small to medium sized islands (<2 ha), linear compared to round islands, and is unrelated to island distance to the nearest levee. Researchers are recommending placing a few islands in several ponds, rather than several islands in a few ponds. These recommendations will be used in future phases of the design of managed ponds. Managers are also working to enhance and maintain existing islands.

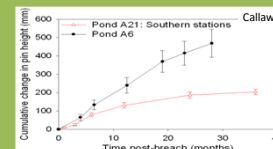
New islands in ponds E12/E13 are linear and smaller than islands previously built. In addition to constructing these islands using two "lifts", a pilot study of different types of surface treatment (shells, gravel, and gypsum) is being conducted to determine what surface treatment is best to use on the constructed islands to minimize cracking.

Sediment

Sediment entering South Bay has been very variable as measured from 2009 to 2011. In particular, in 2011, there was a large net sediment flux out of South Bay.



However, during that same time period, sediment accumulation inside pond A6 (breached December 2010) showed very large sediment accumulation,



Management Response -In response to research that suggests potentially diminished sediment supply to the South San Francisco Bay in the future, and also to accelerate marsh development as a response to future sea level rise, managers have begun to look for sources of fill material that are cost effective and safe to use in tidal marsh restorations. The use of dredge material for pond enhancements is being evaluated, but may be logistically impractical to the far south reaches of the Bay. In addition, a Mudflat Working Group has been convened to develop cost-effective methods of monitoring changes in mudflat extent as restoration proceeds.

Fisheries

Fish Monitoring in Alviso Complex from summer 2010 to spring 2013 has collected over 13,000 fish from 38 different species, the majority of which are native. The Alviso system is a vital nursery area for several key species of nearshore marine food web (Pacific herring and Northern anchovy), the estuarine food web (Pacific staghorn sculpin and Crangon shrimp), and winter feeding grounds for longfin smelt. (Hobbs)



Management Response - Monitoring of fisheries resources will be continued for the next 2 years. Greater emphasis is being placed upon how fish are using newly restored ponds as nursery areas. In addition, based upon recommendations by researchers, managers have decided not to further breach levees around Ponds A20 and A21 because they are such productive fisheries habitats.



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