

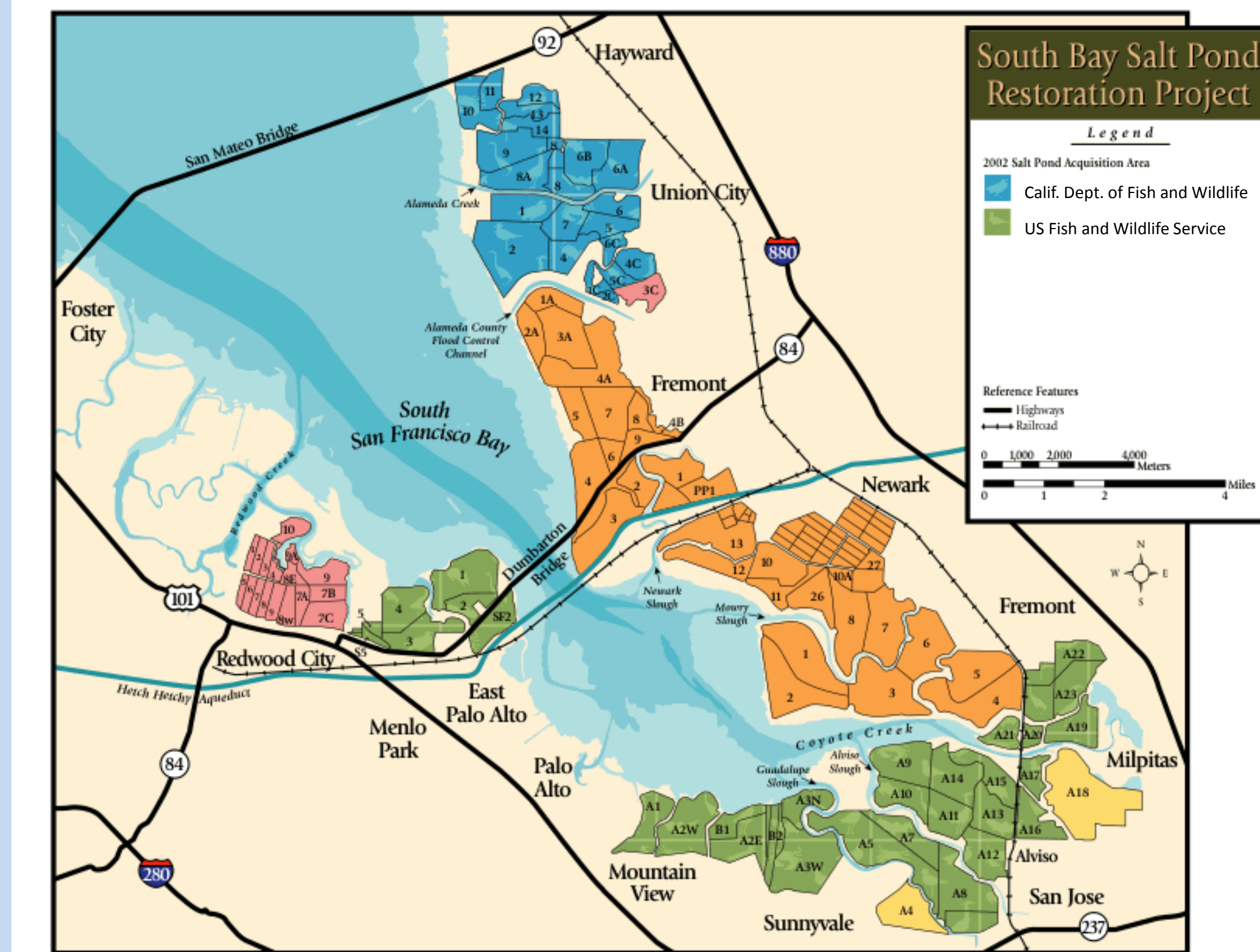
The South Bay Salt Pond Restoration Project (www.southbayrestoration.org) is the largest wetlands restoration project on the West coast of the US. It is unique for its size-- over 15,000 acres—and its location adjacent to one of the nation's largest urban areas, with >3 million people. The Project is intended to restore and enhance wetlands in South SF Bay Estuary while providing for flood management and wildlife-oriented public access and recreation.

We have identified long-term alternatives for the Project, 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 tidal habitat. The final ratio of ponds to tidal habitat will depend on the outcome of the Adaptive Management Plan, implemented over the next 50 years. The Plan will allow for lessons learned from earlier phases and studies to be incorporated into subsequent stages as management and restoration actions are revised and implemented. The Project has completed most of the Phase 1 studies, and much has been learned. Researchers have completed studies on mercury contamination, management of ponds for waterbirds, and use of ponds by fish.

Bird Foraging Habitat

USGS has conducted high-tide bird surveys of all the Project ponds from 2003 to 2013, including intensive observations at pond SF2 islands. One of their findings was that shorebirds often congregated on shallow mounds of dirt -- unintentionally created by the earth-moving equipment and leftover from pond construction.

Management Response -We are testing dirt mound designs at ponds E12/E13. A series of channels snake through the dry ground, alongside sausage-shaped dirt mounds -- both constructed to mimic the terrain favored by the shorebirds. Other studies in the ponds look at bird response to varying levels of water, salinity, the response of invertebrate prey, bird use of the shallow mounds for foraging, and bird use of higher islands as roosting and nesting habitat.



Information from Phase 1 studies has been essential to designing new restorations and changing management actions. The Project Management Team looks forward to continuing to work with the Science Team and Researchers to learn and adaptively manage the Project.

Steelhead smolt studies

Another concern opening the pond A8 notch was that of the federally threatened Central California Coast steelhead trout may become trapped in the pond. Steelhead smolts leave SF Bay for the ocean late winter -spring, and NOAA permit conditions required pond A8 notch be closed Dec-June to prevent steelhead smolt from becoming trapped. In conjunction with the mercury studies on pond A8, we opened the notch early in 2014, and will keep the gate open year round.



UC Davis began tagging steelhead smolt entering SF Bay from Guadalupe River watershed in 2013-2014. Researchers set up radio antennas on the notch of pond A8 to detect whether tagged smolts enter the pond, and whether they are able to leave or are trapped inside. Seventy smolts were tagged Dec 2013-March 2014. Six of those fish were detected near the entrance to pond A8 in spring of 2014. One of these entered pond A8, and left shortly thereafter.



Management Response – UC Davis will continue to tag and monitor the movement of fish in the Guadalupe River watershed and entrainment and escapement from pond A8 in 2014-2015. We will continue working with NOAA on possible management options for pond A8. This study is also providing valuable information on the movement of steelhead smolt in the watershed.

Mercury

One major uncertainty of the restoration effort has been mercury contamination. Due to historic mercury mining and use from more than a century ago, varying concentrations of mercury are locked within sediments. Through construction activities and natural sediment processes, restoration can release some of this mercury. Project managers hope to continue wetland restoration while minimizing mercury exposure to wildlife.

Restoration managers built a 40-foot adjustable notch between Pond A8 and Alviso Slough, to control the amount of tidal flow between sites, and study the response in mercury exposure. Researchers collected fish, water, and bird egg data prior to the opening and compared with trends after the notch opening.

Findings from USGS and UC Davis scientists found that mercury levels in fish initially increased, but then decreased shortly after the notch was opened. The trend suggests that fish became exposed to high amounts of mercury during the notch construction process and initial flood-up, a phenomenon often seen in initial flooding of reservoirs and wetlands. Initially upon opening the notch, mercury in fish in the slough receiving waters increase, but then decreased within a few months. By 2013, slough fish levels of mercury were consistent with reference locations.

The mercury response in waterbirds was variable. During the first nesting season after notch opening, terns showed higher mercury levels, while avocets showed little change. More recent studies found mercury in tern eggs had significantly decreased in 2013, but still are elevated compared to toxicity thresholds.



Management Response - We are continuing to manage Pond A8 with an eye to minimizing mercury impacts. The results from the USGS study indicate that periodically opening and closing the notch may be worsening the mercury effects. In concert with the regulatory agencies, restoration managers opened the notch in early March 2014, and the notch will remain open year round. We will be studying the effects of this in fish and bird eggs to gain more insights.

Chinook Salmon

Starting in summer of 2013, managers and fish researchers began to notice that adult fall-run Chinook salmon -- on their way to upstream migrations -- were entering pond A16 at low-tide through the outflow water control structure. Some salmon were rescued, and some perished inside the pond -- ironically trapped by the inflow water control structures connecting pond A16 with A17, which was designed to keep them out in the first place. No similar Chinook salmon fish entrapment has occurred in 2014, so it may have been an anomalous event in 2013.



Management Response – We are working with NOAA to determine management options to prevent the trapping of these migrating adult salmon.

