A Decade of Adaptive Management: South Bay Salt Pond Restoration Project

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At over 15,000 acres, the South Bay Salt Pond Restoration Project is the largest tidal wetland restoration project on the west coast. Beginning in 2003, the Project committed to implementing a phased restoration approach using a science-based, adaptive management decision-making process with a high degree of transparency to the public. This session will provide an update on three critical areas of research: 1) sediment trends and availability, 2) management actions in response to legacy mercury contamination, and 3) trends for the western snowy plover, a species that breeds and winters in some of the former salt ponds being converted to tidal wetlands. Each talk will present key research findings as well as management actions in response to the science. At the end of the session, a Project overview will be provided on the assessment of Project's performance over the past decade, and the proposed next steps for science and management.

Keywords: wetlands, restoration, sediment, mercury contamination, western snowy plovers

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Speaker Biography: Cheryl is a wildlife biologist with the Don Edwards San Francisco Bay National Wildlife Refuge where she focuses on managed pond and tidal marsh restoration as part of the South Bay Salt Pond Restoration Project, with an emphasis on waterfowl and shorebird conservation, endangered species, and adaptive management. One of Cheryl's main objectives regarding this restoration effort is to balance the needs of endangered species such as the marsh-loving endangered Ridgway's rail and the dry salt-panne loving threatened western snowy plover with the tens of thousands of waterfowl and shorebirds that utilize the ponds during the winter and migratory months. Cheryl is the moderator of this session.

Sediment: The Macro and Micro of Patterns in the South Bay

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Restoration of the 6000 hectares of former commercial salt-evaporation ponds in the southern reach of San Francisco Bay, a major goal of the South Bay Salt Pond Restoration Project, requires sediment deposition to succeed. Sediment is needed in subsided ponds to obtain elevations high enough for plant colonization and, along with organic matter accretion, to help sustain tidal marshes as sea level rises. At the macro scale, sediment sources for the project are local watershed inputs (Guadalupe River and Coyote Creek) and transport from the greater San Francisco Bay. Available data to date indicate that the latter, net southerly transport from the greater San Francisco Bay past the Dumbarton Bridge, dominates sediment supply to the project area, although no large storms in the local watersheds have been observed during the sampling period. At the micro scale, sediment transport processes include tides, wind-generated currents, and wind-wave resuspension, leading to rapid sediment deposition and accretion on salt pond surfaces. In this presentation, we compare trends of net sediment transport at the macro scale to observed sediment accretion rates in existing and restored tidal marshes in the project area. Linking observations at these scales will guide current and future restoration project activities as well as inform sediment management practices at the regional level.

Keywords: accretion, restoration, resuspension, salt ponds, sediment transport, tidal marshes, tides

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Speaker Biographies:

Maureen Downing-Kunz: Maureen is a Research Hydrologist at the USGS California Water Science Center in Sacramento. Her studies include water quality and sediment transport throughout San Francisco Bay. She completed her PhD at UC-Berkeley in Civil and Environmental Engineering in 2011. Maureen spent her youth in Louisville, Kentucky climbing rocks and riding bicycles.

John Callaway: John is the Lead Scientist for the Delta Science Program and Delta Stewardship Council. He also is a Professor in the Department of Environmental Sciences at the University of San Francisco. John received his PhD from Louisiana State University.

Mercury: Physical and Biological Insights

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The goal of restoration is to reconstruct physical habitats which support desirable ecosystem functions believed to be important to target organisms. In South San Francisco Bay approximately 15,100 acres of former salt evaporator ponds were acquired in 2003 with a vision to restore salt marsh for wetland dependent biota. However, those restoration goals were tempered in certain areas by concerns over legacy contamination from historic mercury mining upstream in the Guadalupe River watershed. Therefore, the restoration project proceeded with a set of large-scale experiments to understand the physical and biological effects of opening up these areas to the Bay.

To test the effects of restoring these areas to tidal action, the A8 pond complex in the Alviso area was designed with reversible, variable flow tidal gates, allowing for an experimental approach to reconnecting the pond with tidal waters in the adjacent slough.

Through a series of studies over multiple years, a number of parameters were monitored to inform adaptive management of the tidal gates and, ultimately, the wider saltpond complex. These included physical parameters such as water quality, total mercury and methyl-mercury concentrations in the water column and on sediment particles, aquatic species abundance, diversity and condition in the pond complex and in Alviso Slough, and mercury concentrations in the tissues of select fish species and bird eggs.

This presentation will present the most recent relevant findings on the biotic and physical parameters that led to the June 2017 decision to open up all 8 gates on the water control structure.

Keywords: Restoration, tidal wetland, adaptive management, fish, invertebrates, habitat quality, hypoxia, mercury

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Speaker Biography: Darell Slotton has worked on mercury bioaccumulation issues in California for over 25 years. His research group and laboratory at UC Davis have studied mercury in water, sediment and, particularly, fish and other organisms in many applied research projects. They have specialized in the use of young-of-year wild fish and macro-invertebrates as sensitive, localized biosentinels of methylmercury exposure. The technique has been a valuable feedback tool for adaptive management in relation to mercury concerns, in projects throughout California and elsewhere. Darell received his doctorate in Ecology from the University of California.

Snowy Plovers: Doing More with Less?

Karine Tokatlian, San Francisco Bay Bird Observatory, ktokatlian@sfbbo.org

Federally threatened Western snowy plovers breed in the south San Francisco Bay, and rely on habitat provided by former salt evaporation ponds to lay their nests and raise their young. Beginning in 2003, the San Francisco Bay Bird Observatory (SFBBO) has monitored plover breeding activity and success in the south bay. Unfortunately the plover population continues to struggle as a result of mounting predator pressure in a highly urban landscape, and habitat loss due to tidal marsh restoration. With support from the South Bay Salt Pond Restoration Project, SFBBO has investigated a method of using oyster shell habitat enhancement to potentially maximize breeding success even as pond breeding habitat is restored to native tidal marsh. Federally threatened Western snowy plovers breed in the south San Francisco Bay, and rely on habitat provided by former salt evaporation ponds to lay their nests and raise their young. Beginning in 2003, the San Francisco Bay Bird Observatory (SFBBO) has monitored plover breeding activity and success in the south bay. Unfortunately the plover population continues to struggle as a result of mounting predator pressure in a highly urban landscape, and habitat loss due to tidal marsh restoration. With support from the South Bay Salt Pond Restoration Project, SFBBO has investigated a method of using oyster shell habitat enhancement to potentially maximize breeding success even as pond breeding habitat is restored to native tidal marsh.

Keywords: Snowy plovers, breeding success

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Speaker Biography: Karine Tokatlian oversees SFBBO's plover-related research and monitoring activities. Karine has a B.S. in Field and Wildlife Biology from California Polytechnic State University, San Luis Obispo. She has spent several years monitoring protected breeding bird populations along the California coast, including the Western Snowy Plover and California Least Tern. As a native of California, Karine has a profound respect for the conservation of coastal ecosystems and, gratefully, has the opportunity to nurture her interests through the efforts of the Bird Observatory.

South Bay Salt Pond Restoration Project: How are We Doing and Where are We Going?

John Bourgeois, State Coastal Conservancy, john.bourgeois@scc.ca.gov

The South Bay Salt Pond Restoration Project is the largest tidal wetland restoration project on the West Coast of the United States. As planned, the project will restore 15,100 acres of former industrial salt ponds to a mosaic of tidal wetlands and managed ponds for the benefit of native wildlife, public access, and flood risk reduction. As we finish up our first decade on the Project and ramp up design and planning for the next phase, we created a score card to gauge progress of our science and adaptive management program and investigations of key uncertainties. In collaboration with our project management and local science team, we derived a "traffic light" system for rating. Most topics ranked favorably, including sediment dynamics and mercury contamination; while water quality and island design for nesting birds clearly need more attention. This check-in on our progress comes at a time when reduced funding and impending sea level rise are key issues that are stressing the system. However, let's not forget the progress that has been made in just 10 years: >3000 acres restored to the tides, >700 acres of ponds enhanced for wildlife, and sightings of endangered species in new marsh habitat. This self-assessment in light of applied studies such as those discussed earlier in this session will help guide the use of future science and monitoring funds as we move forward to the next ten years of restoration.

Keywords: salt pond restoration, adaptive management, tidal restoration

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Speaker Biography: John Bourgeois became Executive Project Manager of the South Bay Salt Pond Restoration Project in December 2009. For the previous 12+ years, he worked as a restoration ecologist with H. T. Harvey & Associates, where he worked on the early planning and design for the South Bay Salt Pond Restoration Project starting in 2004. Prior to moving to California from Louisiana, John worked on wetland issues in the Gulf Coast and Central Pacific.