



# South Bay Salt Pond Restoration Project

*Restoring the Wild Heart of the South Bay*

**SBSP Project Researchers & SBSP Project Management Team**

**Summary Meeting Notes**

**Monday, December 9, 2013, 9 a.m. – 4:30 p.m.**

**Room 1, Sobrato Center, 600 Valley Way, Milpitas, CA**

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**Objectives:** This annual meeting seeks to bring all researchers up to date on latest studies/results, foster collaboration among researchers, seek ideas for funding for science/applied studies, and foster direct dialogue between researchers and managers on proposed management actions.

## **Session 1: Mudflats and Biofilm**

### ▪ ***Mudflats Working Group***

- Mr. Fulfrost (SFBBO) gave an overview of the mudflat working group's progress to date. He described challenges in tracking the growth/erosion of mudflats and establishing a baseline from which to work against and monitor.
- The main question we are trying to answer is: Are the mudflats growing or shrinking? The answer is we do not yet know – the techniques we have used so far are not adequate to answer the question. We have some evidence from the bathymetry studies that Bruce Jaffe is doing on the mudflats off of Pond A6 in the Alviso Complex that at a local level, mudflats are not decreasing in response to Pond A6 and Island Pond restorations, and the opening of Pond A8.
- Mr. Fulfrost defined the root cause of the difficulty in tracking the growth/erosion of mudflats as being caused by challenges associated with remote sensing and aerial photography. Sub-issues include timing of the tides and positioning of remote sensing vehicles to capture the conditions consistently.
- There was a discussion about the possibility of using balloon LiDAR technology, other satellite platforms such as Landsat 8, and frequency/interval of monitoring needed.

### ▪ ***Biofilm Studies***

- Ms. Smith (USGS) presented findings of ongoing biofilm study by John Takekawa's team (USGS) that is taking place just bayside of Pond SF2. Biofilm studies at SF2 have been being conducted since 2010.
- Noted that shorebirds consume biofilm as a primary food source. Chlorophyll is used as an indicator to assess biofilm biomass.
- Biofilm is spatially distributed across the mudflat. Studies at Pond SF2 suggest that biofilm is most concentrated in areas close to shore, with greatest density in April/May.
- Study of shorebirds revealed juvenile birds rely on biofilm for large proportion of food intake when compared to adults. Unclear if this is because adults are blocking juvenile access to other food sources, or if the biofilm is truly preferred food source for juveniles.
- USGS team is investigating the stability of mudflats (Shellenbarger).
- Sediment characteristics, adjacent habitat, and other factors likely also influence foraging habitat quality.
- An ongoing question is whether breaching levees to form tidal marshes – and any associated scour – would help or hurt the nutrient exchange that is necessary for biofilms.

## **Session 2: Alviso Mercury Studies**

### ▪ ***Pond A8 and Alviso Summary of Physical and Chemical Results to Date***

- Ms. Valoppi, Lead Scientist, presented findings for mercury mobilization and the ambient conditions that appear to be associated with higher concentrations of mercury at Pond A8 and Alviso Slough.

- There has been erosion in the lower reaches of the slough since the Phase 1 actions (e.g. near the mouth of Alviso Slough), some deposition just upstream of the Pond A6 breaches, and little to no change in the middle reaches.
- Preliminary results on mercury and sediment fluxes in Alviso Slough (USGS) were presented. Preliminary data are showing a very large movement of sediment controlled by tidal flows in the slough (on the order of 62,000 kg of sediment/day), and that mercury associated with the suspended sediment reflects the sediment fluxes.
- Fish and birds, along with water were sampled at Pond A8 to evaluate how levels of mercury within the water might be influencing the rate and amount of bioaccumulation of mercury in fish and birds in different scenarios.
  - o When notch was closed researchers found mercury levels increased in tern eggs and fish within the ponds, but not in avocet eggs.
  - o When notch was opened found mercury levels decreased in fish within the pond, but increased in fish in Alviso Slough. Levels in bird eggs remained the same as prior to the notch opening because birds had already accumulated and transferred their mercury to the bird eggs. In this scenario, found mercury levels spiked then decreased in the fish sampled from the slough over time.
- Ponds A7 and A8 are above toxicity thresholds for eggs both before and after the opening of Pond A8 (90% above threshold and 100% above the threshold, respectively).
- From other studies on other wetlands and reservoirs, continued perturbing the system by changing water levels seems to enhance methyl mercury production. Also, keeping Pond A8 closed may enhance phytoplankton production, which may be associated indirectly with production of methyl mercury. To prevent this it would be beneficial for the notch to be open consistently, and all year round. However, the notch must be closed during steelhead migration, and existing permits with NMFS state that the notches must be opened incrementally.
- **Discussion and Recommendations for Pond A8**
- There is discussion about opening the notch earlier in 2014 (in February) than in past years, but there is a requirement to do a "steelhead smolt study" to find out if any steelhead smolt enters Pond A8/A8S/A5/A7, and if they can then exit.
- There was discussion of whether to open Pond A8 notch fully (all 8 gates compared to the 3 out of 8 gates opened to date). There was concern that this would lead to increased scour of mercury-laden sediment in Alviso Slough and increased mercury outside Pond A8. Researchers also wanted to avoid a sudden perturbation in the system that might spike Hg levels higher by increasing mercury methylation and/or remobilizing mercury buried in sediments. Some researchers say that mercury levels are already very high and were concerned that opening all the gates at once would increase the risk to birds.
- Yet there was general agreement that the notch should be opened as early in the year as possible to help minimize mercury methylation, and stabilize pond water levels to benefit nesting birds. Ideally, gates could be opened year round after the smolt study is complete.

### **Session 3: Pond Management**

#### **▪ Report from Pond Management Working Group**

- Cheryl Strong (USFWS) presented ideas from the Pond Management Working Group for improving Eden Landing's managed ponds and getting the birds there what they need. Winter Use at E8/E6A/E6B includes:
  - o E8 - shorebirds (BBPL, WESA)
  - o E6A and E6B – variable waterfowl use
  - o E8 and E6 B – SNPL
  - o E6A – AMAV
  - o Manage E6A and E6B for diving ducks in the winter and nesting birds in the summer. Study underway with USGS on diving ducks and food resources.
  - o Manage Pond E8 for ducks in the winter and plover in the summer
- Ponds E10/E11
  - o E11 – Seasonal, shorebird and some duck use in winter, SNPL nesting, but have lost chicks to cracking of clay soils when ponds dry
  - o E110 – long history of tern nesting that is limited in recent years, always wet
- Ponds E1C, E2C, E3C, 4C, and 5C –
  - o Decent dabbling duck and shorebird habitat, not a lot of nesting, could be enhanced with increased plumbing as there is limited water control ability
- E1, E2, E4, E7
  - o E1, E2 – deep water, low salinity attracts waterfowl in winter. Haze gulls on E2 islands?

- E7, E4 – acts as one pond, shorebirds in winter, FOTE, AMAV nesting; water should be kept up in nesting season to reduce potential predation
  - E5, E6, E6C
    - low bird use in winter, E6 has shorebirds, mew gulls, predator access and flooding issues
    - Could enhance levees/borrow ditches to prevent flooding
  - Salinity and depth are the major drivers to birds using the ponds, but there may be other factors that will require overall analysis at a larger scale to say what is going on at the landscape level.
  - The Pond Management Working Group will continue to meet starting in February to start reviewing data and making recommendations for management for Ravenswood and Alviso Complexes.
  - The bird team is working on establishing baseline birds numbers
- **Discussion and Recommendations for Pond Management Changes for Eden Landing**
- There was a discussion about needing to consider recreational use in pond management planning, enhancing ponds by increasing variation in the pond bottom (which would result in variation in water depth), enhancement of nesting islands in other ponds, management of ponds for fish as well as birds, and reduced waterbird nesting in Ponds A7/A8 since opening.

#### **Session 4: Bird Use of Islands**

- **Island Studies – Summary of Results to Date**
- Mr. Hartman and Ms. Smith (USGS) gave an overview of the success of the islands constructed as part of Phase 1.
  - The studies were done at 3 spatial scales:
    - Pond-level (# of islands per pond, location within a pond)
    - Island-level (size and shape of the islands)
    - Nest site-level (topography, elevation, vegetation)
  - There is a large historic dataset from USGS (2005-2013) with data for more than 15,000 nests and 400 islands.
  - Studies measured the number of birds utilizing islands and how successful nests have been for breeding as an indicator for design of future islands (island size, shape, location, topography). Researchers are looking at number of nests as well as breeding success of the nests.
  - No relationship has been found between the number of islands/pond and the number of nests/pond. So, in general, results find that fewer islands in more ponds attract larger numbers of birds and those islands have more productive nests (compared to putting lots of islands into a few ponds).
  - Thus, a target of 3-5 islands per pond would be good
  - Long / linear islands are preferred over circular. “Scalloping” the shape of the islands may be important for improving foraging/roosting habitat.
  - Nests are most often found 0.5-1 meter above the high water line, so elevation is important. However, many nests are still being flooded every year. Flooding can occur from wind/waves from the bay.
  - For breeding birds, the size of the island should be small to medium in size (about the size of SF2 islands, 1500 to 2000 sq. meters)
  - Nesting on islands was observed in Pond SF2 in 2011, but not in 2012 and 2013. Cracking in the islands may have resulted in the loss of chicks, discouraging birds to nest there in subsequent years.
  - For wintering birds, 12 – 15% of birds used the islands. In SF2, most wintering birds are observed in the pond rather than on the islands, potentially due to predators. Divers were observed almost entirely in ponds. Fish-eating birds were seen both on the islands and ponds, but dabblers, gulls, herons, and shorebirds, and terns more likely to be seen on the pond surface not on the islands.
  - The presence of islands may also affect the density of birds. More dabbling ducks were observed in ponds with islands, but fewer shorebirds were observed in ponds with islands. Diving ducks had higher densities in ponds with islands. Perimeter/area ratio of island was not a significant factor in non-wintering bird use.
- **Discussion and Recommendations for Islands**
- There was a discussion of potentially creating larger islands initially to allow for erosion, creating islands in pairs to serve as wave breaks to limit erosion from wave action, and the importance of vegetation on the islands for various nesting bird species.
  - Should do additional research on bird use of levees.
  - Fewer islands may lead to less gull predation.

#### **Session 5: Phase 2 Alternatives**

▪ **Summary of Phase 2 Alternatives**

- Mr. Halsing (URS) presented an overview of the Phase 2 Alternatives and the individual design components of each. In general, there is a “no-project” alternative, a “do everything” alternative, and one in between that looks a lot like what the most likely action alternative would be. This is not a premature selection of a Preferred Alternative; rather, it is bracketing the range of alternatives and trying to assess something like what the eventual decision might be.

**Island Ponds**

- Generally, restoration of Ponds A20 and A21 is going well. Pond A21 is likely getting sediment from the bay while Pond A19 might only be getting sediment from the channel.
- There was discussion of the effect of opening breaches on the Mud Slough side of the ponds and the impacts from scour, whether scour of mudflats has occurred from the existing breaches on the Coyote Creek channel, and the design specifics of the Island Ponds such as adding islands for nesting birds.

**Pond A8/Alviso Area**

- Discussed possibility of adding fill to the A8 Ponds to create a barrier between the existing pond bottom and the water in order to reduce the amount of mercury released from sediment resuspension, and raise pond bottom elevations to support future marsh development.
- Adding upland transition zones and the potential sources of material was discussed.
- Discussed the potential for seeding mudflats by placing fill at the mouth of the Dumbarton Bridge, or elsewhere in South Bay, to allow sediment to naturally redistribute through the bay.
- Other ideas included: staging restoration in phases, using ditch blocks, leaving levee pieces intact for bird nesting.

**Mountain View Ponds**

- There is a proposal to include Charleston Slough in the restoration of Pond A1, but City of Mountain View owns Charleston Slough and has a regulatory obligation for a tidal marsh.
- Discussion of Charleston Slough supports a large number of nesting and roosting birds and the need to mitigate this use elsewhere, benefits of constructing islands for nesting birds (though it was noted gulls frequent nearby area and could disrupt nesting birds), specifics on where and how to construct nesting islands, the potential to offset lost mudflat habitat at Ravenswood Ponds, high visitor use at these ponds, where to construct a levee, needing to raise utility towers, and incorporating a diversity of habitat types and transitional habitats,

**Ravenswood**

- At the Ravenswood Pond Complex, the future of Pond R3 was discussed. Phase 2 allows this pond to remain in its current condition (salt panne), which provides nesting habitat for the snowy plover.
- Several researchers recommended the project should Pond R3 never progress to tidal marsh because of its value for snowy plover habitat. Instead, consideration should be given to improve R3 as much as possible for plovers to make up for plover habitat lost throughout the project. Because the south and west edge of Pond R3 are in close proximity to developed/urban areas, it was noted that public access to Pond R3 should be limited in order to protect the plover. Limited access would ensure the habitat remains viable for the snowy plover. It was also noted that Pond R3 dries out in July/August there is easy access to the pond. The current design is to construct a low fence along the southern border of R3 that would discourage dogs/people from entering, keep trash out and keep plover chicks inside.
- Suggestion also made to bring in more habitat/topographic complexity to these ponds.
- R5/S5 is not the best for plover habitat because these ponds are small. There is a proposal to have R5/S5 receive floodwaters from Redwood City. Managers are working with the RWQB to ensure water quality is acceptable for release into R5/S5.
- There was a discussion of the pros and cons of constructing a public access route to connect this area with Greco Island.

**Eden Landing**

- Eden landing was only briefly discussed since it is not included in the current EIS/R.
- It was noted that any boardwalks included in Eden Landing would increase the cost of the project. Could also build bridges to connect public access at C ponds.

**Session 6: Priorities for Future Studies**

▪ **Hg 2014**

- SCC has provided funding to continue taking mercury samples in water, fish and birds. Sediment flux in Alviso Slough and development of a scour model in the slough will also be conducted in 2014.
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- **E12/E13 and E6A/E6B**
  - Study will be conducted in Ponds E12/E13 with variable salinities (with reference ponds E4, E8, E11, E14)– looking at bird use of ponds of varying salinities, use of islands and mounds, bird diet preferences, and water quality.
  - Another diving duck diet study will be conducted at Ponds 6A, 6B, 8 and Reference Ponds 1, 7, 10.
- **Islands**
  - There was a recommendation to do some experiments to discern how best to build and maintain islands to optimize nesting and wintering bird use.
- **Plover Habitat Enhancement**
  - Pond E14 may be left to support snowy plover habitat. SFBBO is hoping to scale up pilot project and provide oyster shell covering in differ zones in Pond E14. Oyster shell may be cost prohibitive, and there may not be a consistent source of shells. Other materials (e.g., sand gravel), may need to be investigated with a pilot study. Study would look at effect of oyster shell/other substrate on nest success, chick survival, fledging success.
- **Monthly Surveys**
  - SFBBO will be monitoring all SBSP and Cargill ponds with 7 surveys/year (2 surveys/season, except for summer 1 survey). Surveys data collection and analysis cycle will take about six weeks. This is an interim measure driven by funding constraints; previously data had been collected by USGS and SFBBO on a monthly basis.
  - We also need to do analysis of the data we have to date (about 10 years).