



# South Bay Salt Pond Restoration Project

*Restoring the Wild Heart of the South Bay*

## **Science with a Purpose: South Bay Salt Pond Restoration Project**

**Science Symposium, February 3, 2010**

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### ***Background***

We are in the midst of a large experiment in the South San Francisco Bay ecosystem. We are using science in an adaptive management approach to inform future restoration efforts. This applied research is being funded by the SBSP to an extent not previously done on such a large-scale restoration. We have studied the South Bay intensively for the last 2 years, we have started restoration efforts, and we will be studying what changes occur in response to the restoration.

Below is a summary of findings of SBSP Project applied studies that were presented at the February 3, 2010 Science Symposium. More detailed information on the studies is available on the South Bay Salt Pond Restoration Project website, [www.southbayrestoration.org](http://www.southbayrestoration.org).

### **Sediment & Mudflats**

- Preliminary data indicates there is sufficient sediment coming into the south bay to sustain the SBSP marsh restoration over the project life of the project (Shellenbarger)
- We have monitored the mudflat habitat, which is an important food resource for shorebirds, and found that the mudflat near SF2 is growing, and goes through an annual change of accreting in the winter and eroding in the summer/fall (Jaffe)
- We are using satellite images to track changes in habitat over time. We have developed a semi-automated remote sensing model with 80% accuracy (Fulfrost)
- A nearby marsh restoration, Cooley Landing, is showing rapid sediment accumulation and marsh development, with California clapper rail pairs detected within 10 years of restoration (Duke)

### **Benthic Invertebrates**

- We are looking at benthic invertebrate communities and are finding that a large decrease in benthic filter feeders coincided with a phytoplankton bloom in 2007-2009, which may be related to an increased predation by birds and not related to the restoration efforts (Thompson)
- We are also studying benthic invertebrates occupying the mudflat habitat and finding patterns in abundance and species from month to month – the invertebrate populations on mudflats are turning out to be very dynamic (Woo)

### **Fish**

- We have found over 31 different species of fish in the restored ponds and adjacent water, the majority of which are native species. Several of these species are of regional importance, such as longfin smelt and anchovy, which have declined elsewhere in the SF Estuary (Hobbs)

### **Shorebirds & Waterfowl**

- Since purchasing the salt ponds in 2003, the FWS and CDFG have managed the ponds in a way that has generally increased shorebird and dabbling duck populations, while maintaining diving duck populations. Newly restored ponds provide foraging habitat for birds similar to mudflat habitat during the initial stages of restoration, prior to vegetation establishment (Brand)
- Having salt ponds with islands for nesting habitat is critical for breeding water birds (Herzog)
- We are concerned with California gull predation on snowy plover (an endangered species) nests and chicks and will continue to monitor this problem. We need to improve nesting habitat for waterbirds to reduce the impact of predation by gulls. We will be working to haze and decrease gull habitat in sensitive breeding areas and evaluating the best methods of doing this (Robinson-Nilsen and Strong)
- Our research on snowy plover nesting habitat has found that trails need to be at least 150 meters (about 500 feet) away in order not to disturb the plovers (Trulio)
- We are concerned with the potential spread of Invasive Spartina (Olofson)

### **Mercury**

- We continue to study the amount of mercury bioaccumulation that occurs in restored areas, especially in the Alviso area where there is legacy mercury from mines in the upper watershed (Marvin-DiPasquale)

### **Climate Change and Sea Level Rise**

- Salt marsh habitat and endemic wildlife of San Francisco Bay are at risk from sea level rise associated with climate change. Maintenance and restoration of salt marsh habitat is crucial to the successful recovery of endangered species such as the California clapper rail and salt marsh harvest mouse, but it remains unknown how much SLR may affect the amount and quality of this habitat (Takekawa)
- Studies of the California clapper rail survival are finding that maximum higher high water levels are negatively associated with rail survival, likely due to the lack of dry habitat for the rail to retreat to safely during high tides. High tide refugia is being created by using artificial islands

and studies show it is being used by rails during high tide periods. This is a new tool for restoration, especially with SLR and climate change (Overton poster)

- A model, WARMER, is being developed which incorporates several marsh processes to investigate the effect of SLR on marsh habitats more comprehensively (Swanson)