South Bay Waterbird Surveys: Status Update & Evaluation of Monitoring Protocols

Prepared for California State Coastal Conservancy and Santa Clara Valley Water District

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# BACKGROUND

The South Bay Salt Pond Restoration Project (SBSPRP) is the largest tidal wetland restoration project on the West Coast of the Americas and aims to restore 50-90% of 15,100 acres of historic commercial salt evaporation ponds to tidal marsh in multiple decades. As an adaptive management project, the success of the SBSPRP depends greatly on using the best science to guide current and future management actions such that the resulting total project area supports a diverse species assemblage. In particular, assessments based on extensive monitoring are needed to fulfill SBSPRP Objective 1: “Create, restore, or enhance habitats of sufficient size, function, and appropriate structure to…[m]aintain current migratory bird species that utilize existing salt ponds and associated structures such as levees” (SBSPRP Final Environmental Impact Statement/Report 2007).

## Objectives

SFBBO has been monitoring waterbirds in SBSPRP sites and surrounding Cargill ponds since 2003, and our data are reported annually to the SBSPRP Management Team. Our first task is to create an updated assessment of the status of waterbirds in the context of the SBSPRP’s targets for waterbird populations.

Our second task is to assess ongoing monitoring efforts to ensure that they are both effective for evaluating SBSPRP targets and efficient to ensure sustainability. Specifically, we aimed to determine an approach that (1) is 50% cheaper than current survey protocols, and (2) can be used to answer the question of whether waterbird populations in the South Bay are above or below targets set by the SBSPRP. We also sought protocols that (1) generate data that are directly comparable to counts from previous years, and (2) allow for simultaneous collection of other data types (e.g. percent of the pond bottom that is vegetated).

# TASK 1 - South Bay Waterbird Population Trends

## Approach

We coordinated with SBSPRP managers through a series of meetings to confirm targets for waterbird guilds and/or species. We then used 15 years of monitoring data and a literature review to assess these targets for migratory waterbirds using the modeling framework developed in Tarjan and Heyse (2018). We further assessed the targets for nesting waterbirds using SFBBO’s 40-year dataset of colonially nesting waterbirds throughout the Bay Area. All analyses were performed following guidelines of reproducible research so future annual reports will recreate and build on these assessments.

# TASK 2 - Waterbird Survey Protocols

## Approach

We used power analyses and simulations informed by our existing dataset to explore the feasibility of decreasing survey effort using a subsetting protocol. We 1) researched approaches for decreasing survey effort by subsetting the sites, and 2) evaluated the effect of the subset protocol on our ability to detect trends (similar to power analysis performed previously, which evaluated our ability to detect trends with fewer surveys over time).

### Survey Cost

The three-year average of annual spending for 2015-2017 is $84371.46. We sought a survey protocol that could be implemented on an annual budget of $510^{4}, which represents a 41% decrease in survey costs. See Appendix I for a previous project budget. We expect that the following costs would remain the same with a new survey protocol: data analysis, data management, meetings, project management, and report writing, as well as supplies, mileage and tolls, and conferences. Reduced costs would be reflected in fewer staff hours spent on data entry and field work. Past data entry required 394 hours, while field work required 2377.25 hours each year. Roughly 30% of these hours can be fulfilled by interns. The rate for interns will remain at a minimum of $500 per month. Achieving the goal for cost decreases requires that staff hours on field work and data entry are decreased to 428 total hours, which would cost $1.16483810^{4} with overhead. Maintaining the ratio of field work hours to data entry hours indicates that staff would need to spend 367.224 hours on fieldwork and 60.776 hours on data entry, which represents a 85% reduction in field work hours.

### Trend Detection

# WORKS CITED

Tarjan, L.M. & V. Heyse. 2018. Evaluation of Waterbird Monitoring Protocols for the South Bay Salt Pond Restoration Project. Report prepared for the South Bay Salt Pond Restoration Project Management Team.