Point Blue Report

Application of a Broad-Scale, Multi-Species Monitoring Program to Assess Shorebird Population Response to Future Land Use and Climate Change

Report to the California Landscape Conservation Cooperative

August 22, 2014

Conservation science for a healthy planet

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Acknowledgements

This project would not have not been possible without the generous support of the California Landscape Conservation Cooperative, the U.S. Fish and Wildlife Service, the U.S. Forest Service International Program, the David and Lucile Packard Foundation, and the S.D. Bechtel, Jr. Foundation. We thank Mike Wolder and Kate Guerena for logistical support, as well as the Delta Conservancy, San Luis National Wildlife Refuge Complex, and Sacramento National Wildlife Refuge Complex for providing meeting space. Monica Iglecia, Kristin Sesser, Elliott Machett, Kevin Petrik, Rodd Kelsey, Beth Huning, Laura Valoppi, Mike Wolder, Kate Guerena, and Greg Yarris generously contributed presentations to the workshops. Most importantly, these workshops would not have succeeded without the enthusiastic engagement of all the workshop participants. Thank you for your time and sharing your insights.

Suggested Citation, and website link

Reiter, M. E., C. M. Hickey, J. K. Wood, and K. M. Strum. 2014. Application of a Broad-Scale, Multi-Species Monitoring Program to Assess Shorebird Population Response to Future Land Use and Climate Change. Final Report to the California Landscape Conservation Cooperative. Point Blue Conservation Science, Petaluma, California.

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BACKGROUND

Previous California Landscape Cooperative (CA LCC) funding for our project titled, "A Broad-Scale, Multi-Species Monitoring Protocol to Assess Wintering Shorebird Population Trends in Response to Future Land Use and Climate Change" resulted in the development and implementation of a CA LCC-wide monitoring program for shorebirds – The Pacific Flyway Shorebird Survey (PFSS; www.prbo.org/pfss). The PFSS has led to centralized databases in the California Avian Data Center (CADC; www.prbo.org/cadc), the quantification of the distribution, abundance and variability in shorebird habitat in the Central Valley, the development of shorebird habitat association models, online data summary applications available to resource managers and the public, and an "iterative learning" quantitative framework for adaptive management. These products are complete and continue to improve through leveraged funds, although efforts are needed to integrate this work into decision making processes of conservation practitioners. Specifically we hope that our efforts will help with setting shorebird population objectives, population tracking, and shorebird habitat conservation prioritization and management being completed in the coming year by the San Francisco Bay Joint Venture (SFBJV) and the Central Valley Joint Venture (CVJV) as part of revisions to their implementation plans, as well by wetland managers in the Central Valley.

Over the last year by conducting workshops separately with CVJV and SFBJV partners, we evaluated the capacity of the PFSS, its habitat association modeling framework, and data summary applications to (1) inform shorebird population objectives and over time assess whether progress is being made towards those objectives, (2) identify the impacts of habitat management and conservation actions on shorebird populations, and (3) result in management decisions that incorporate the impacts of climate change. These workshops included a discussion of how the resources we have developed in conjunction with the PFSS could be used most effectively by the JVs and specifically for their implementation plan revisions.

We also shared our data products more broadly across the Central Valley through two additional workshops (one in Sacramento Valley and one in San Joaquin Valley) of wetland habitat managers (e.g. Grasslands Water District, US Fish and Wildlife Service Refuge Managers, California Department of Fish and Wildlife Area Managers). We developed a list of ways in which the PFSS and associated data products (or some extension of them) can be effective for managers and their decision making. These workshops have already resulted in refinements to our existing decision support tools and we hope the development of new decision support applications that wetland managers will use in the future.

Herein, we present a brief summary of each workshop and some of the overall findings, as well as a list of data needs and recommended improvements to the shorebird monitoring framework and data products.

JOINT VENTURE WORKSHOPS

Central Valley Joint Venture

We convened a workshop of biologists, managers, and decision makers from the Central Valley Joint Venture on April 9, 2014 at the Delta Conservancy office in Sacramento, California. The goal of this workshop was to discuss application of newly acquired data, recent published literature, on-line data resources, and current modeling efforts, including those supported by the California Landscape Conservation Cooperative, to update the CVJV Implementation Plan for non-breeding shorebirds (Appendix 1). We also invited Joe Fleskes (U.S. Geological Survey) and Kevin Petrik (Ducks Unlimited) to present their LCC-funded research on climate change impacts to waterbirds and wetland habitat

tracking, respectively. There were 23 participants at the meeting representing 10 federal and state agencies, universities, and non-governmental organizations (Appendix 2).

The workshop group made key decisions to guide the revision planning process (Appendix 2). This included several ways in which data from the PFSS could inform CVJV planning and decision-making. First, data from annual PFSS surveys could be used to assess progress towards or away from CVJV shorebird population objectives. These survey data may also be used to revise species composition parameters used in the TRUEMET bioenergetics model applied by the CVJV (CVJV 2006). Habitat data collected as part of the PFSS could also be employed to track the availability of vegetation-free wetlands, annual changes in the amount of winter flooding, and coarse-scale changes in land cover type. Though satellite derived data could inform land cover change, they are not as readily available as is possible with data from the PFSS. Lastly, density estimates derived from PFSS surveys can provide a calibration for the TRUEMET model. If the observed density estimates as part of PFSS surveys are wildly different from carrying capacity density estimates generated through TRUEMET, additional assessments of both data sets would be warranted to evaluate why the difference exists.

We identified several ways in which the online PFSS data summary applications (www.prbo.org/pfss/exploredata; www.prbo.org/pfss/datamap) could be modified to allow for data summaries relevant for the CVJV. First, there should be options to summarize data by the CVJV planning regions (see CVJV 2006). Second, instead of listing the top six species and genera, summaries should provide composition data for all species. Third, data on habitat conditions should be summarized both in tables and graphs and, if possible, spatially as part of the map-based summary application. Finally, generating water distribution data (e.g. Reiter and Liu 2011) more regularly and presenting those could have great value for calibrating TRUEMET and for management decisions.

San Francisco Bay Joint Venture

We convened a workshop of biologists, managers, and decision-makers from the SFBJV on May 30, 2014 at the Point Blue Office in Petaluma, California. The goal of this workshop was to assess the effectiveness of PFSS and contributing San Francisco Bay Shorebird Survey (SFSS) data in evaluating conservation actions and informing decision-making for the SFBJV and its partners (Appendix 3). There were 11 participants at the meeting representing 6 federal and state agencies and non-governmental organizations (Appendix 4).

This workshop identified several ways in which data from the PFSS could inform SFBJV planning and decision-making (Appendix 4). First, the SFBJV plans by three regions of the estuary (north, central and south bay). Generating data summaries by these regions from the SFSS data would be helpful in assessing progress towards conservation objectives at a scale relevant to the SFBJV. Additionally, the South Bay Salt Pond Restoration Project (SBSP) would like to use the PFSS survey data from San Francisco Bay to determine how SBSP shorebird use compares to trends in other regions of San Francisco Bay. There was recognition from the group that decisions need to be made as to what level of population change is important and with what degree of certainty we need to estimate that change. Currently the PFSS is established to detect 50% declines over 10 – 20 years. We discussed opportunities to apply the adaptive management analytical framework developed for PFSS to assess the SBSP restoration activities as well. The group highlighted the need to evaluate the monitoring data collected as part of the SBSP more regularly and that the framework in place for PFSS and SFSS provides capacity to do that.

We summarized several next steps to build upon the workshop. These included (1) a presentation to the SFBJV Conservation Delivery Committee; (2) integration of SBSP baseline/target monitoring with

PFSS and SFSS; (3) investigation of ways to capture pond management data or pond conditions; and (4) working with the Pond Management Working Group to apply the adaptive management analytical framework (Appendix 4).

CENTRAL VALLEY MANAGER WORKSHOPS

We convened two workshops of wetland managers and biologists; one in the greater Grasslands Ecological Area of the San Joaquin Valley near Los Banos, California (June 24, 2014 at the San Luis National Wildlife Refuge Complex headquarters) and one in the greater Sacramento Valley (June 26, 2014 at the Sacramento National Wildlife Refuge Complex headquarters). The goal of these workshops was to identify the most effective ways to disseminate shorebird monitoring and habitat data, collected annually as part of the PFSS, to make them useful for wetland managers' decision-making and to facilitate more coordinated landscape-scale management decisions (Appendices 5 & 6). There were 17 participants representing 6 federal and state agencies and non-governmental organizations (Appendix 7) at the San Joaquin Valley workshop and 21 participants representing 8 federal and state agencies and non-governmental organizations at the Sacramento Valley workshop (Appendix 8). We also used this as an opportunity to explore the types of decisions regarding wetland and shorebird management that are being made both within wetland complexes and across connected wetland complexes and the data needed to inform those decisions.

The outcomes of both management-focused workshops were quite similar. Decisions in both regions, within and among wetland complexes are driven in large part by the constraints of water availability, budgets, regulations (e.g. mosquito abatement), and staff capacity. Managers regularly expressed uncertainty about how much habitat they should provide for shorebirds and when. Though some of the wetland areas collect data on bird abundance and habitat conditions this is not consistently done among sites within a region thus, managers at different wetland complexes have different data with which to make decisions. There also is not a regular system in place to track the availability of shorebird habitat across multiple wetland complexes (Appendix 9).

Table 1. Summary of recommended changes to the Pacific Flyway Shorebird Survey data summary applications to improve value for Central Valley Joint Venture, San Francisco Bay Joint Venture, and managers throughout the Central Valley of California.

Tables / Figures (www.prbo.org/pfss/exploredata)	**Map** (www.prbo.org/pfss/datamap)
Summary estimates by custom regions.	Add species distribution and prioritization maps to map-based summary application.
Composition of all shorebird species observed.	Add polygon tool to allow custom summary of data by region.
Habitat summaries through time at multiple spatial scales ("summarize more than just the bird data").	Add habitat data to map-based summary application.

Data needed for decision-making identified through the workshops included information on the distribution and abundance of shorebirds both in winter from PFSS and in the spring and fall migration window ("which areas are most productive?"); information on the amount of habitat available and how much should be supplied within a specific wetland complex; and also how much habitat is available and when it is available across the region (see CVJV 2006; Appendix 9). Managers identified the PFSS as one source of information on species distribution and abundance but noted that surveys in the migration window would increase the value for management decisions. The habitat data collected by the PFSS (%flooded, %vegetated, cover type) were seen as having great value for managers to assess the implications of their management decisions and to track changes in the availability of

shorebird habitat. Managers indicated that habitat data should be included in the data summary applications.

Managers provided several recommendations on ways in which data from the PFSS could be used including highlighting the importance of certain regions to facilitate conservation prioritization, allowing comparison of trend among wetland complexes to better understand what local changes (including restoration activities) mean to the broader population, and providing needed data on spatial and temporal trends in habitat. This discussion resulted in several common recommendations to improve the data summary applications developed to support the PFSS (Table 1). We will be working to try to implement the suggested changes and hope that managers increasingly use our applications for their decision making. One comment that resonated was the lack of capacity for managers and biologists to actually analyze their data. We hope by improving the data summary applications we will overcome that lack of capacity through the PFSS.

CONCLUSIONS

The four workshops provided a valuable opportunity to share the shorebird population monitoring and shorebird habitat tracking work that we have developed with the support of the California LCC and to get feedback on how these data and analytical capacities can best serve shorebird conservation and management. There was great enthusiasm about the potential for the PFSS to provide needed data to facilitate more landscape or regional level coordinated management. There was less certainty about the value of the program for within wetland complex decisions but that varied depending on whether existing data collection occurred at that site. For example, at Sacramento National Wildlife Refuge Complex, San Luis National Wildlife Refuge Complex, and SBSP intensive biological monitoring (year round and already ongoing) may be better for local decision making. However, for many sites that do not have a program of regular monitoring in place, the PFSS is the only opportunity to collect data on bird use, habitat, and the effectiveness of management actions within the wetland complex. Yet complexes with ongoing monitoring were still eager to be able to put their local population changes within the context of the broader Central Valley and Pacific Flyway populations.

Though none of the workshops resulted in the development of models to be used in the adaptive management analytical framework developed as part of the PFSS, we will continue to present this capacity to our partners. Discussions in the workshops highlighted great interest and a desire to do adaptive management. As the PFSS collects more data, we believe the value of using this type of framework can be better demonstrated and will result in application to multiple wetland complexes.

In summary, these workshops helped us to prioritize future improvements to the PFSS and the data summary applications that support it. Regular interaction with, what we hope are, the end-users of the monitoring program is essential to maximize its value and consequently to ensure its sustainability. We hope to be able to continue to have annual meetings with those who use our data to improve the products and our ability to inform conservation and management.

LITERATURE CITED

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