

## Plan Overview

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*A Data Management Plan created using DMPTool*

**Title:** Fish, Fur, Feathers, and some Scales: Applying integrated science across multiple taxa to optimize ecosystem-based management in Suisun Marsh, with application throughout the San Francisco Estuary

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**Funder:** Delta Stewardship Council & US Bureau of Reclamation

**Template:** Pacific Southwest Region UTC at UC Davis - Project Data Management Plan

### **Project abstract:**

Land use management strategies in Suisun Marsh, CA have emphasized waterfowl conservation for nearly 150 years. Lands are owned by a mosaic of private hunting clubs, California Department of Fish and Wildlife, environmental and advocacy groups and the National Estuarine Research Reserve. While a few naturalistic wetlands remain, most of the marsh is actively managed by a system of gated and leveed freshwater ponds connected by brackish channel networks, which can be highly productive of food for waterfowl. This system has kept lands protected from urban and agricultural development, preserving one of the largest wetlands on the western coast of North America. It has also maintained some of the best remaining habitat for many threatened and endangered species, including longfin smelt, splittail, salt marsh harvest mouse, and western pond turtles. Relative to other regions of the San Francisco Estuary, which has been highly altered by anthropogenic demands, Suisun Marsh retains a highly productive food web. This project is intended to better understand the unintended benefits of marsh management, especially food web

overlaps from ponds. The goal is to produce a Generalized Vertebrate Distribution and Food Web Model, that identifies hotspots of vertebrate concentration, evaluate the food resources at these hotspots, and develop landscape management practices that best support multiple taxa. We will provide management and habitat restoration recommendations to provide benefits for multiple stakeholders, including land owners in the system.

**Start date:** 07-01-2021

**End date:** 01-31-2024

**Last modified:** 02-06-2021

**Copyright information:**

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## **Fish, Fur, Feathers, and some Scales: Applying integrated science across multiple taxa to optimize ecosystem-based management in Suisun Marsh, with application throughout the San Francisco Estuary**

### **Data Description**

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**Provide a description of the data that you will be gathering in the course of your project. This could include, but is not limited to, new data you are collecting, or existing datasets (whether from a prior project or an external source). Refer to the PSR Center-wide Data Management Plan for additional examples.**

**Address the following, as applicable:**

- 1. Name the data, data collection project, or data producing program, if applicable.**
- 2. Describe the data your project will generate in terms of nature and scale (e.g., numerical data, image data, text sequences, video, audio, database, modeling data, source code, etc.).**
- 3. Describe methods for creating the data (e.g., simulated; observed; experimental; software; physical collections; sensors; satellite; enforcement activities; research-generated databases, tables, and/or spreadsheets; instrument-generated digital data output, such as images and video; etc.).**
- 4. Discuss the period of time data will be collected and the frequency of any updates, if applicable.**
- 5. If the project uses existing data, describe the relationship between the data you are collecting and the previously collected data.**
- 6. List potential users of the data.**
- 7. Discuss the potential value that the data will have over the long-term for the PSR and for the public.**
- 8. If you request permission not to make data publicly accessible, explain the rationale for lack of public access. Provide sufficient detail so that reviewers will understand any disclosure risks that may apply.**
- 9. Indicated who will be responsible for managing the data at the project level.**

1. Suisun Marsh fish study includes data on fish catch (including number captured, species and standard length), water quality and location. Data were collected during monthly cruises since 1980 using a variety of sampling tools, including otter trawl, beach seine, handheld water quality meter, Secchi disk, and GPS position finder. The data will be used in this project to determine hotspots of occurrence in the current project. These data are updated monthly.

2. Suisun Marsh ponds aquatic production data were collected for nutrient, water quality conditions, and primary and secondary productivity in managed wetlands, including chlorophyll-a and zooplankton density. Data were collected using EXO multi-parameter water quality sondes, but in transit and at fixed locations, whole water grabs for instrument validation, nutrients and chl-a, and zooplankton trawls. Data were collected periodically during key stages of pond flood up from 2017 to 2020. Comparative evaluation of zooplankton densities across regionally distinct managed wetlands will be collected from 2021-2024, pending funding.

3. Waterfowl food availability and carrying capacity data were collected from soil cores that were processed and evaluated for seed composition, density and energetic value; and data from experimental trials that used bird fecal samples to determine metabolizable energy from seeds. Data were collected during periodic trips to managed wetlands representing regional differences across Suisun Marsh from 2017-2020. Waterfowl data will be incorporated into a Spatially-explicit Waterbird Agent-based Modeling Program which compares waterfowl energy demand with food availability across marsh regions. Data will be assembled from 2021-2024.

4. Western pond turtle data were collected using hoop traps at geo-referenced locations. Data include recapture marks, sex, carapace and plastron length and width, shell height and weight. Blood samples were collected for osmolality. Genetic samples were collected to determine population structure and taxonomy. Water quality data, including salinity, were recorded at each site. Movement data were collected using GPS.GSM tags on select individuals to determine movement in response to seasonal and tidal shifts. Data were collected across regions of Suisun Marsh from 2017-2020, with blood assays, genetic testing and movement data expected in 2021-2024, pending funding.

5. Salt marsh harvest mouse data were collected using traps at geo-referenced sites over short time periods corresponding to tidal incursion. Water level, mouse numbers, identifying mouse characteristics and time period were collected to understand mouse movement. Data for diet studies were collected in cafeteria study trials that showed relative feeding preference. Additional diet data were collected from fecal pellet DNA analysis. Fecal analysis data also were geo-referenced from site of collection as a way of conducting non-invasive distributional information. Data were collected from 2017-2020, with genetic results expected in 2021-2024, pending funding.

6. Synthetic data. Outputs from the SWAMP model will be used to determine waterfowl hotspots of production or consumption. Empirical field data will be used to determine fish, mouse, and turtle distribution, and assembled into GIS mapping layers to determine if waterfowl and aquatic food production overlaps with hotspots of fish, mammal or turtle distribution. These hotspot maps will be integrated with public data on waterfowl habitat management and used as a basis for synthesis. Resulting numerical models and conceptual models will be presented in reports, papers and in GitHub as a way of archiving analytical approach.

## Data Format and Metadata Standards

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Your DMP should describe the anticipated formats that your data and related files will use. To the maximum extent practicable, and in accordance with generally accepted practices in your field, your DMP should address how you will use platform-independent and non-proprietary formats to ensure maximum utility of the data in the future. If you are unable to use platform-independent and non-proprietary formats, you should specify the standards and formats that will be used and the rationale for using those standards and formats.

Address the following, as applicable:

1. List in what type of format(s) the data will be collected, and indicate if they are open or proprietary.
2. If you are using proprietary data formats, discuss your rationale for using those standards and formats.
3. Describe how versions of the data will be signified and/or controlled.
4. If the file format(s) you are using is(are) not standard to transportation, describe how you will document the alternative you are using.
5. List what documentation you will be creating in order to make the data understandable by other researchers.
6. Indicate the type of metadata schema you are using to describe the data. If the metadata schema is not one that is standard for your field, discuss your rationale for using that schema.
7. Describe how the metadata will be managed and stored during the collection process.
8. Indicate what tools or software is required to read or view the data.
9. Describe the quality control measures you will implement in your project to ensure its accuracy, etc.

Data will be collected using various formats, consistent with a large, multi-pronged study.

Water quality spot measurements, animal observations, and location data are collected on paper and transferred to databases later in either spreadsheet (.xlsx) or Access database format (.accdb).

Water quality continuous recordings are stored as .csv files

Water quality grabs are collected in the field with environmental water quality data and transferred to spreadsheet databases (.xlsx). Grab analyses are returned from analysis in spreadsheet format (.xlsx).

Zooplankton, fecal, blood and genetic samples are collected in the field on paper and transferred to spreadsheet style formats (.xlsx) or Access databases (.accdb).

Spatial data are collected on paper, or using GPS recorders; electronic data are uploaded after field work and stored as coordinate data or transferred to GIS shapefiles (.mxd).

Model outputs (ie, SWAMP) are recorded and preserved as .csv files.

### Metadata

Detailed metadata will be embedded directly within each format for data storage before it is made public. Metadata will include summary, data descriptions, dates of collection, authorship and point of contact, field definitions, abbreviation definitions, access constraints (if any), and GIS project and datum (as necessary).

## **Policies for Access and Sharing**

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**Protecting research participants and guarding against the disclosure of identities and/or confidential business information is an essential norm in scientific research. Your DMP should address these issues and outline the efforts you will take to provide informed consent statements to participants, the steps you will take to protect privacy and confidentiality prior to archiving your data, and any additional concerns (e.g., embargo periods for your data). If necessary, describe any division of responsibilities for stewarding and protecting the data among Principal Investigators or other project staff.**

**If you will not be able to de-identify the data in a manner that protects privacy and confidentiality while maintaining the utility of the dataset, you should describe the necessary restrictions on access and use. In general, in matters of human subject research, your DMP should describe how your informed consent forms will permit sharing with the research community and whether additional steps, such as an Institutional Review Board (IRB), may be used to protect privacy and confidentiality.**

**Address the following, as applicable:**

- 1. List the roles that your project's data creation team members will have in data management, including any limitations on team member access due to the presence of personal or confidential information.**
- 2. Describe what data will be shared, how data files will be shared, and how others will access them.**
  - The data to be shared should, at a minimum, be the data required to reproduce**

your final results, subject to those restrictions imposed by data quality and the need to protect national/homeland security, individual privacy, and confidentiality.

3. Indicate whether the data contain private or confidential information. If so:
  - Discuss how you will guard against disclosure of identities and/or confidential business information.
  - Describe the processes you will follow to provide informed consent to participants.
  - State the party responsible for protecting the data.
4. Describe if there are any privacy, ethical, or confidentiality concerns due to the sharing of data.
5. If applicable, describe how you will de-identify your data before sharing. If this is not applicable to your project, then:
  - Identify what restrictions on access and use you will place on the data.
  - Discuss additional steps you will use to protect privacy and confidentiality.

Data are created and stored on local computers and backed up over internal networks to Linux file servers using enterprise backup applications.

Primary storage location is the Center for Watershed Sciences server, Drive X.

Upon completion of project, data will be assigned a DOI, and made publicly available through the project website, <https://suisunmarshecosystems.sf.ucdavis.edu/> . It will be available either by request or direct download.

Data may also be made available in a format as recommended by the Delta Stewardship Council Delta Science Program (such as Environmental Data Initiative, CDEN, or the California Open Data Platform), or on the UC Davis Library's association with Dryad, an open source platform with allow publication and archiving of data.

## **Policies for Re-use, Redistribution, Derivatives**

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Describe who will hold the intellectual property rights for the data created by your project. Describe whether you will transfer those rights to a data archive, if appropriate. Identify whether any copyrights apply to the data, as might be the case when using copyrighted instruments. If you will be enforcing terms of use or a requirement for data citation through a license, indicate as much in your DMP. Describe any other legal requirements that might

need to be addressed.

**Address the following, as applicable:**

1. **Name who has the right to manage the data.**
2. **Indicate who holds the intellectual property rights to the data.**
3. **List copyrights to the data, if any. If there are copyrights, indicate who owns them.**
4. **Discuss any rights to be transferred to a data archive.**
5. **Describe how your data will be licensed for re-use, redistribution, and derivative products.**

All rights in data arising from university employment or the use of university resources belong to the university. Title to the copyrightable materials and data that are developed under a contract or grant from a commercial sponsor normally belong to the university. As an academic institution, the university must ensure that the data, information and materials generated during the course of research remain widely available for academic dissemination and scientific validation. Retaining rights to such research products allows the university to ensure that its faculty can pursue their research without undue impediments.

The university regularly affords its research sponsors the right to use the data, information and reports, but the use of such data, information and reports is limited to research and evaluation purposes. Because the university owns such data, information and reports, any commercial use by a sponsor would require special licensing terms.

California Education Code section 92000 provides that the name “University of California” is the property of the State and that no person shall use that name without permission of The Regents of the University of California. University policy prohibits any statement or implication in any publication or other published announcement that the university has approved any product that is or might be manufactured, sold, or otherwise distributed. The university also requires that its name not be used in connection with any advertisement, press release, or other form of business promotion or publicity, or refer to a research agreement, without its prior written approval.

### **Plans for Archiving and Preservation**

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**Describe how you intend to archive your data and why you have chosen that particular option. You must describe the dataset that is being archived with a minimum amount of metadata that ensures its discoverability.**

**Address the following, as applicable:**



1. The data must be archived before the research project's DRAFT FINAL REPORT is delivered to the PSR UC Davis Program Manager. Discuss how you intend to archive your data and where if not on Dryad (include URL).
2. Indicate the approximate time period between data collection and submission to the archive.
3. The PI of each PSR-funded project should ensure that the data to be archived temporarily at their home institution is stored securely on a designated device (computer, external hard drive, etc.). Identify where data will be stored prior to being deposited to an archive.
4. The PI of each PSR-funded project should ensure that the data collected will be backed up prior to being archived. Describe how back-up, disaster recovery, off-site data storage, and other redundant storage strategies will be used to ensure the data's security and integrity.
5. Describe how data will be protected from accidental or malicious modification or deletion prior to receipt by the archive.
6. If you will not be using Dryad,
  - Discuss your chosen data archive's policies and practices for back-up, disaster recovery, off-site data storage, and other redundant storage strategies to ensure the data's security and integrity for the long-term.
  - Indicate how long your chosen archive will retain the data.
  - Indicate if the chosen archive employs, or allows for the recording of, persistent identifiers linked to the data.
  - Discuss how your chosen data repository meets the criteria outlined in the [Guidelines for Evaluating Repositories](#) with the DOT Public Access Plan.

All PSR researchers must have a unique ORCID (Open Researcher and Contributor ID) identification. [ORCID.org](https://orcid.org) provides a registry of persistent unique identifiers for researchers and scholars, and automates linkages to research objects such as publications, grants, and patents. Registration is free and takes about 5 minutes. If other researchers are added to a project after its initiation, they are also required to obtain an ORCID.

List all Principal Investigators, Co-PI(s), and key contributors, and their respective ORCIDs.

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