

# Leptospirosis in California sea lions: Population impacts and persistence in a long-term study of infectious disease in marine mammals

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## Data Policy Compliance

The project investigators will comply with the data management and dissemination policies described in the *NSF Award and Administration Guide* (AAG, Chapter VI.D.4) and the *NSF Division of Ocean Sciences Sample and Data Policy*

## Pre-Cruise Planning

Our proposal does not involve a research cruise.

## Description of Data Types

### (1) Observational

The following data will be collected from stranded and wild-caught California sea lions (CSL): size, age, sex, location, date, biological samples collected (e.g. blood and urine), morphometric measurements and details of anesthetic monitoring. Data on samples collected in the field will be recorded and will include date of collection and amount, method used, storage conditions, date sample was sent, laboratory where diagnostics are performed and diagnostic results. All animals will be assigned a unique accession ID and all associated data (field and laboratory) will be linked to this ID. Data will be stored in FilemakerPro with redundant backups following protocols established and used by the Marine Mammal Center for >20 years. Data collection from wild-caught and stranded CSL will continue until the end of 2016.

Additional CSL demographic data will be collected including resightings of tagged and branded individuals as well as reproductive success. These data will be collected through the end of 2016 and will be stored in the database of our collaborators at the NOAA/NMFS National Marine Mammal Laboratory (NMML).

### (2) Experimental

Data from laboratory results include those from serum chemistry, urinalysis, serology, culture, IHC, PCR and pulsed field gel electrophoresis. Data from these tests will be stored in FilemakerPro at the Marine Mammal Center (as described in

the Observational section) and will also be stored in central databases of the laboratories performing the various analyses.

*Leptospira* culture isolates will be stored and maintained at the Zoonotic and Select Agent Laboratory at the Centers for Disease Control using standard protocols. We have been archiving isolates with this reference laboratory for the past four years.

### **(3) Simulations**

Mathematical models developed during this project (as described in the project description) and their results will be made available through publication in peer-reviewed journals. Model code and sample raw output will be available upon request.

### **(4) Derived**

Existing data on leptospirosis strandings in California sea lions have been collected and saved in a database (FilemakerPro) by The Marine Mammal Center, Sausalito (TMMC). Researchers interested in acquiring these data may submit a formal request to TMMC (<http://www.marinemammalcenter.org/science/>).

The National Marine Fisheries Service operating under the National Oceanic and Atmospheric Administration maintain a marine mammal stranding database. Researchers can request these data by contacting the region specific Marine Mammal Health and Stranding Program coordinator (<http://www.nmfs.noaa.gov/pr/health/coordinators.htm>).

## **Data and Metadata Formats and Standards**

All animals will be assigned a unique accession ID and all associated data (field and laboratory – see “Description of Data Types” section) will be linked to this ID. Data will be entered and stored in FilemakerPro with redundant backups following protocols and using quality control measures established and used by the Marine Mammal Center for >20 years. These data will be exportable as .csv or .xlsx files.

Data will also be stored in central databases of the laboratories performing the various analyses.

Metadata on wild-caught and sampled CSL (number caught, age and sex by field site and sampling period) will be deposited in BCO-DMO as an Excel spreadsheet file (.xlsx). Metadata and individual level data from stranded CSL are available through the National Marine Mammal Health and Stranding Program and the

California Stranding Network.

## **Data Storage and Access During the Project**

All animals will be assigned a unique accession ID and all associated data (field and laboratory – see “Description of Data Types” section) will be linked to this ID. Data from laboratories performing analyses will be sent in Excel files to staff at TMMC who will (1) print out these results and save as a hard copy, (2) save the file on the TMMC server, and (3) enter these data into their central database (FilemakerPro). These data will be stored in FilemakerPro with redundant backups following protocols established and used by TMMC for >20 years. Project personnel at UCLA have login authority to FilemakerPro and will extract subsets of the data for their analyses. Only the project member responsible for database management will have permissions necessary to make changes to the master database, to protect data integrity.

Biological samples will be stored under the appropriate storage conditions (e.g. blood products, tissue and urine in -80 freezers, urine cultures in 30°C incubators, tissue samples for histopathology in formalin) at TMMC prior to shipment to laboratories for analysis. Duplicate serum samples from wild-caught CSL will also be banked in -80 freezers at the National Marine Mammal Laboratory. Samples not consumed for sample analyses will be stored at TMMC and the NOAA/NMFS National Marine Mammal Laboratory (NMML; wild-caught CSL only) as appropriate for that sample type and following regulations set by those institutions.

*Leptospira* culture isolates will be stored and maintained at the Zoonotic and Select Agent Laboratory at the Centers for Disease Control using standard protocols. We have been archiving isolates with this reference laboratory for the past four years.

## **Mechanisms and Policies for Access, Sharing, Re-Use, and Re-Distribution**

Existing data on leptospirosis strandings in California sea lions as well as data on wild-caught California sea lions have been collected and saved in a database (FilemakerPro) by The Marine Mammal Center, Sausalito (TMMC). Researchers interested in acquiring these data may submit a request to TMMC (<http://www.marinemammalcenter.org/science/>). If such requests are for access to data specifically collected for this NSF BIO-OCE project, this project supports re-use, re-distribution, and the production of derivatives of the data for the purpose of

scientific research and education. Data will be made available two years after project data collection has been completed. When requests are made, TMMC will consult with the project PI and co-PIs prior to sharing the data, and those making data requests must specify the research question(s) and expected outcome(s) before they use data. The data collectors reserve the right for their priority in publication and co-authorships of publications written by secondary data users. Any changes in the storage location of samples will be entered into the main Filemaker Pro database.

Data access and sharing will follow the regulations and guidelines set by the University of California, Los Angeles; the Marine Mammal Center; and the National Marine Mammal Laboratory. Data access and sharing will also follow the guidelines and best practice set by data providers when third-party data are used in the project.

Data sharing will also occur on a larger scale. All scientific publications, conference proceedings and reports as well as information on the ongoing research project will be available on the Marine Mammal Center Website (<http://www.marinemammalcenter.org/science>).

These mechanisms and policies are working well. Since the start of this project, community knowledge of our field sampling plans has enabled us to share and/or collect additional data for a number of researchers and government agencies including:

- A study investigating mercury levels in California sea lions conducted by Dan Costa at UC Santa Cruz (2013)
- A study investigating causes of increased California sea lion strandings that occurred in 2013 and designated by NOAA/NMFS as an Unusual Mortality Event (UME). Study conducted by NOAA/NMFS Marine Mammal Health and Stranding Program (2013).
- A study investigating influenza virus in California sea lions conducted jointly by Dr. Walter Boyce at UC Davis and NOAA/NMFS Marine Mammal Health and Stranding Program. (2015)
- A study investigating the presence and prevalence of *Klebsiella* infections in California sea lions conducted by Esteban Soto Martinez at UC Davis (planned starting August 2015).

## **Plans for Archiving**

Raw data on stranded marine mammals, and associated data on health studies linked with stranded marine mammals, are most appropriately stored in the Marine

Mammal Center's database, with summary data served from the National Marine Mammal Health and Stranding Program and the California Stranding Network. Therefore, raw data on stranded and wild-caught sea lions collected for this project will be archived in the TMMC database (FilemakerPro) as described in the section "Data Storage and Access During the Project". Raw data on resightings of tagged and branded individuals, as well as reproductive success, are most appropriately stored in the database at the NOAA/ NMFS National Marine Mammal Laboratory (NMML).

Biological samples will be archived at TMMC, NMML and CDC under the appropriate storage conditions as described in the "Data Storage and Access During the Project" section and following regulations set by those institutions.

Metadata from our project expeditions to sample wild-caught CSL (number caught, age and sex by field site and sampling period) will be deposited in BCO-DMO. Metadata and individual level data from stranded CSL will be available through the National Marine Mammal Health and Stranding Program and the California Stranding Network. Links to TMMC, NMML, CDC, the National Marine Mammal Health and Stranding Program and the California Stranding Network will be provided to BCO-DMO so that access to these repositories can be provided through the BCO-DMO website.

## **Roles and Responsibilities**

Data on stranded CSL will be entered into individual animal medical charts while they are at the Marine Mammal Center, then entered into the TMMC database (FilemakerPro) within a month of the animal leaving the center. TMMC personnel manage this process, and K. Prager will ensure compliance. For field sampling expeditions, K. Prager will oversee data collection and ensure that it proceeds as follows: (1) data from wild-caught CSL will be recorded on write-in-the-rain paper when collected and then into an excel spreadsheet each night while in the field; and (2) hard copies of the data as well as a copy of the Excel spreadsheet will be sent to TMMC within two days of returning from the field for entry into FilemakerPro. TMMC personnel will enter results from laboratory analyses into FilemakerPro as they are reported by the laboratory performing the analyses. Once in FilemakerPro these data can be exported for use by the project team. Co-PI K. Prager will coordinate the overall data management and sharing process, including the uploading of metadata to BCO-DMO. The lead PI, J. Lloyd-Smith, will be responsible for overall compliance with our project's data management plan.