

**Wildlife Restoration MULTI-YEAR GRANT
INTERIM PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

**Alaska Department of Fish and Game
Wildlife Restoration Grant**

GRANT NUMBER: AKW-22

PROJECT NUMBER: P1.0

PROJECT TITLE: Steller sea lion recovery

PERIOD OF PERFORMANCE: July 1, 2017 – June 30, 2019

PERFORMANCE YEAR: July 1, 2017 – June 30, 2018; year 1 of a 2-year grant

REPORT DUE DATE: Submit to Coordinator August 24, 2018; due to FAC Sept 1, 2018

PRINCIPAL INVESTIGATOR: Michael Rehberg

COOPERATORS:

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Contribute to estimates of population abundance and vital rates of Steller sea lions.

ACCOMPLISHMENTS:

A set of three aerial surveys of the ephemeral, spring Steller sea lion aggregations at the Alesk/Doame/Akwe rivers on the outer coast south of Yakutat were conducted in March – April 2018 using flights from Juneau. This aggregation of mammals and birds coincides with a large eulachon run along the coastline, and has grown in size over the past 10 years. Aerial photos remain to be counted, but approximate observer reports are available: On March 29, approximately 6,400 Steller sea lions were hauled out in the area, and observers reported (accurate count not possible) tens of thousands of gulls in the estuary and hundreds of swans. On April 8, two smaller groups of sea lions

numbering in the thousands remained present. Approximately 350 harbor seals were present, and bird activity included >1000 swans and >1000 ducks. By April 14, numbers of sea lions had begun dropping to approximately 1000 as the eulachon run subsided. One new-to-us Steller sea lion haulout was identified and mapped at Libby Island, and the South Marble Island and Graves Rocks sea lion haulouts were occupied by hundreds. This work is cooperative with the US Forest Service, which also conducts survey flights, funding dependent.

By Significant Development Report, we redirected support to expand our usual Barren Islands reproductive rate surveys to become a survey of both the Barren Islands and Kodiak Island in July 2018. This provided coverage of an area that has seen recent (December 2017) 17% drop in pup production. During these surveys, we observed 1190 non-pups and 479 pups at Marmot Island rookery. The 76 females observed for reproductive rate surveys we conducted using skiff-based survey compared favorably to the 77 females observed the year prior by land-based surveys from Marmot Island field camp. Latax Rocks, Sea Otter, Sea Lion Rocks, Cape Chiniak and Long Island haulouts were also surveyed.

Four remote time-lapse camera installations were active and serviced this year. The camera at South Marble Island, a year-round non-breeding haulout in Glacier Bay National Park, collected 38,585 images while deployed since June 1, 2017. The camera was visited for data recovery and servicing on June 1, 2018. Because focusing problems were discovered in the previous data, the camera was serviced again to adjust focus on June 27, 2018 and will remain active through the next data download in Spring 2019. The camera at Graves Rocks, a summer breeding rookery on the outer Gulf of Alaska coast just north of Icy Strait, was deployed May 31, 2018 and removed for winter on September 21, 2018. Approximately 22,000 images were collected. Two cameras deployed at the winter non-breeding haulout on Cape Newenham, just north of Bristol Bay, were active through the year and serviced September 12, 2018. Earlier servicing trips planned during Year 1 were cancelled or turned back by weather. One camera recorded 79,701 images (July 2016 thru January 2018), another 71,348 (July 2017 thru September 2017). The camera at Seal Rocks, a summer breeding rookery just south of Prince William Sound, was deployed June 2017, serviced July 2017, and data downloaded July 2018. Analysis of these images, to identify individual sea lions present and trends in numbers of sea lions throughout camera deployments, is underway during Year 2 of this project. (Please note, the Cape Newenham and South Marble Island cameras were originally installed using other funding and are currently maintained by this project.)

OBJECTIVE 2: Determine population structure and habitat use of Steller sea lions.

ACCOMPLISHMENTS:

In order to collect skin samples for the purpose of genetic analysis, initially in support of the DNA methylation method for aging, and ultimately for other population structure and vital rates analysis, this year we developed our ability to collect skin samples using remotely-delivered biopsy darts. During these first trials were able to collect 13 skin

samples from known-age, branded females, using a biopsy dart propelled by crossbow from a skiff offshore the rookery. The darter-boat driver crew used our previous experience to maneuver close to hauled-out adult females and pups without causing disturbances, and biopsy-darted females did not escape to the water after darting. The advantage of this method is to permit skin sample collection without the need for capturing, handling and releasing live sea lions, a slow and expensive process requiring a crew of 12-14 and complete disturbance of the subject rookery. Collected samples are being held frozen until analysis, and biopsy darting continues into Year 2.

OBJECTIVE 3: Conduct a pilot project to examine retention time of new telemetry instruments that may provide information on movements, dive behavior, and environmental data as a means of long-term monitoring of adult and subadult Steller sea lions.

ACCOMPLISHMENTS:

During Year 1, we devised three test programs for the new, untested foreflipper-mounted Argos location satellite tags. Flipper mounted tags use semi-permanent attachments through the flipper, similar to the numeric ear tags used on terrestrial mammals. If successful, these tags will permit year-round, and potentially multi-year, tracking of sea lion locations, which is not currently possible with fur-mounted instruments that molt off every autumn. We attempted adult male captures to test these instruments in November 2017 out of Juneau, but were unsuccessful due to weather and ice. Meanwhile, we have been able to test these approaches during cooperative work with NOAA Fisheries.

As part of the ADF&G cooperative work with NOAA Fisheries Alaska Region to document, analyze and disentangle Steller sea lions (part of Objective 5, below), we participate in the deployment and testing of new satellite tagging methods. This year, three disentangled sea lions were dual-tagged with the head-mounted GPS tags (a known method) along with the new foreflipper-mounted Argos location tags (a new method) described above. The programming and data testing were performed by ADF&G and the tags in this case were provided by NOAA Fisheries. To date, 2 of 3 flipper tags have functioned for 11 weeks and continue functioning. The tag manufacturer anticipated these tags would fail early, after 5,000 of their 20,000 allotted transmissions, because they were designed for use on ice-associated species. Instead, 2 of the tags have reached 10,000 transmissions and the battery voltage has remained high, suggesting these tags will work well for sea lions. We have found a flaw in programming which causes the tags to transmit too frequently; we are working with the manufacturer to correct this flaw before deploying these tags during our adult male work in Year 2.

Coincidentally, we have secured separate funding to perform a focused Steller sea lion disentanglement methods project which begins January 2019. Because this new disentanglement project, and the current WSFR project, are targeting the same age class (adult males) in a similar location (northern Southeast Alaska), we are now discussing whether these two efforts may move forward cooperatively during Year 2, which would

allow a longer field cruise and fund staff to be in the field for a longer period of time. Keeping a capture crew present on-site for longer periods is a major factor in avoiding weather delays and cancellations (similar to our Year 1 adult male capture efforts). Cooperative work may also allow us a new comparison, of healthy adult male behavior vs. disentangled (and potentially compromised) adult male behavior.

OBJECTIVE 4: Assess foraging areas and diet of Steller sea lions.

ACCOMPLISHMENTS:

We collected scats at haulouts and breeding rookeries in southeastern Alaska and the Gulf of Alaska in July 2017 and June-July 2018, which are stored frozen for analysis. In this project, newly-collected scat, along with archived frozen scat, is planned to be analyzed for hard parts (to identify diet using prey remains) and DNA (another method to identify diet) during Year 2.

OBJECTIVE 5: Document marine debris and fisheries interactions with Steller sea lions.

ACCOMPLISHMENTS:

ADF&G participated in four marine debris / fisheries disentanglement attempts during July 2017 and June 2018 research cruises. Disentanglement work is cooperative with NOAA Fisheries regional staff. We attempted two disentanglements of ingested fishing lines (two successful), and two removals of a neck entanglement (one successful). Where possible, samples were collected, including vibrissae, fur, and skin. New this year, due to changes in our IACUC authorization, we were able to mark one animal with a single-digit brand, allowing its eventual fate to be tracked into the future during our regular brand-resight research. The sea lion was sufficiently sedated by the immobilization drugs to avoid any reaction to the branding. Improvements to our capture methods during these disentanglement captures improves our ability to conduct adult captures in other parts of our research program. Three adult males captured and disentangled during this work also served as a test platform for the new satellite tag programming described in Objective 3, above.

OBJECTIVE 6: Determine the health of individuals and identify residual and emerging threats to Steller sea lions.

ACCOMPLISHMENTS:

Samples collected as part of other objectives in this project (e.g. Objective 5) as well as from collaborators were received and archived. We cleaned and sectioned 3 whiskers from male Steller sea lions to determine if reproductive and stress-related hormones could be measured and to work out the initial protocols. These methods have already

been developed in our laboratory for use with female whiskers. Pools of extracted hormones from multiple samples were used to validate commercially available testosterone enzyme immunoassay kit (Arbor Assay, Ann Arbor, MI) using standard methods including recovery of added mass, parallelism and dilution linearity. Additionally, limited work was done on revising the analysis and manuscripts based on archived data looking at diet and contaminant exposure in young Steller sea lions.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

This is Year 1 of a two-year project. Summaries of work completed to date are included in Section I, above. Summarized results emerging from planned or ongoing analysis of data collected (e.g., photo processing, instrument testing) should occur during Year 2.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

Two Significant Development Reports were submitted and approved. These reports included the following no-cost changes:

1. Modification of Objectives 3, 4, and 5 to accommodate the change in adult male capture and satellite tagging work moving to Year 2, after poor weather frustrated a capture and tagging trip during Year 1.
2. Removing the objective to capture, sample and brand newborn pups on their natal rookeries during summer 2018, and reusing those funds to support additional long-term monitoring work in the Gulf of Alaska (item 3, below).
3. Modification of Objective 1 to expand our usual vital-rates surveys westward into the Kodiak Island region in summer 2018, in response to a recent (December 2017) unexpected 17% drop in pup production in this otherwise stable region. This work also replaced survey coverage normally provided by the NOAA Fisheries Marmot Island field camp, which was closed this year.
4. Documenting \$24,000 in-kind match provided by the vessel operator for the Kodiak Island survey (item 3, above).

IV. PUBLICATIONS

No publications were produced from Year 1 of this project.

V. RECOMMENDATIONS FOR THIS PROJECT

Project should continue into Year 2. The diet objective will be focused on analysis assessing the change in diet in the Kodiak Island region between scat collected in the current year and scats collected in previous years. The population objective will include continued remote biopsy sampling of adult and juvenile sea lions, and analysis if practical with the numbers collected. The foraging areas and telemetry instrument trials objective will be accomplished by capture and tagging of adult and subadult males, and analysis of instrument data and performance. The population abundance and vital rates objective will include remote time-lapse cameras and

surveys at ephemeral winter haulouts. Work on Objective 6 will continue into year 2 with the revision of a manuscript for publication and continuation of laboratory work focused on the diet and reproductive hormones in male Steller sea lions.

Funding-dependent, an expansion of the project to include a Year 3 of remote biopsy sampling and sample analysis would strengthen this methods-development component and potentially allow it to be expanded to other species, without seeking additional external funds for the additional field work and a relatively larger contracting component. Presently, permit and staffing limitations restrict the number of samples we can collect and analyze in Year 2.

Expansion of the project to include a Year 3, including a second season (July 2019) of surveys in the Kodiak Island region would be ideal, and we anticipate this would be fully supported by in-kind match. Expansion of the project into a Year 3 to include our other survey efforts, in Southeast Alaska, also fully supported by in-kind match, would also be a good use of WSFR funds to sustain long-term monitoring work.

Prepared by: Michael Rehberg

Date: 24 September 2018