

**1. Program Number:**

18120114-M

**2. Project Title:**

Continuing the Legacy: Prince William Sound Marine Bird Population Trends

**3. Principal Investigator(s) Names:**

Kathy Kuletz, US Fish and Wildlife Service

Robb Kaler, US Fish and Wildlife Service

**4. Time Period Covered by the Report:**

February 1, 2018-January 31, 2019

**5. Date of Report:**

April 1, 2019

**6. Project Website (if applicable):**

[www.gulfwatchalaska.org](http://www.gulfwatchalaska.org)

**7. Summary of Work Performed:**

We successfully completed our planned Prince William Sound (PWS) marine bird survey, conducted 1-27 July 2018. Prior to the field season, principal investigator (PI) Robb Kaler hired three biological science technicians and recruited eight volunteer observers. Kaler arranged field logistics, contractual agreements, and with tremendous help from the technicians, prepared four aging (1982-1990) 25-foot survey vessels and all necessary field and boat equipment. Following three days of observer and boat captain training in Whittier, Alaska, we conducted surveys for marine bird and mammals in PWS during 4-26 July 2018.

Despite several mechanical and electrical issues with the survey fleet, we safely and successfully completed all transects from the three strata (shoreline, coastal-pelagic, and pelagic). In total, we surveyed 212 shoreline transects, 44 coastal-pelagic transects, and 29 pelagic transects. Kaler has completed post-season data quality and assurance checks and has begun preliminary analysis, which we anticipate will be completed by 31 March 2019. Using statistical methods described in our project plan, and additional analyses developed by Scott Wolfe (The Wildlifers, LLC) in 2017, Kaler will generate abundance estimates for the group of marine bird taxa described in the plan. Following completion of 2018 analyses, Kaler will upload the 2018 marine bird data to the Gulf of Alaska Data Portal by 30 April 2019.

**8. Coordination/Collaboration:**

**A. Projects Within a Trustee Council-funded program**

**1. Within the Program**

Kathy Kuletz and Robb Kaler (PIs) have been participating in discussions and meetings to explore opportunities to integrate marine bird data with the other projects, including those within the Pelagic component and Environmental Drivers component of the Gulf Watch Alaska (GWA) long-term monitoring effort. Additionally, the PIs have been coordinating with PI Heather Coletti (GWA-Nearshore component lead, project 18170114-H) and the GWA Science Coordinator (PI Rob Suryan, project

18120114-A) to merge GWA marine bird data sets into a broader geographic analysis of population trends.

Collaboration within the GWA Pelagic Component (forage fish, humpback whale, killer whale, and marine bird, projects 18120114-C, E, N, and O) and between the pelagic and herring programs will continue to focus on physical and biological features of locations and prey availability where whales and seabirds have been found to overlap in time and space.

Co-PI Kuletz is concurrently the PI for the seabird component of the Seward Line/Northern Gulf of Alaska-Long-Term Ecosystem Research program (LTER) led by PI Russell Hopcroft (GWA Environmental Drivers component lead, project 18120114-L). Data from these two marine and other marine bird surveys across GWA components will be merged to compare seabird patterns of distribution with respect to environmental conditions, from the inside waters of PWS to the Gulf of Alaska shelf and shelf break biomes. Projects 18120114-L and 18120114-M, in particular, have been collecting data since the late 1980s, maximizing the value of on-going surveys and data integration.

## **2. Across Programs**

### **a. Gulf Watch Alaska**

As stated in “Within the Program” section above, Kaler has been working with other GWA projects which collect marine bird data to support an effort led by the GWA Science Coordinator (Rob Suryan) to conduct a region-wide analysis on variability and connectivity following a major ecosystem perturbation (Title: Ecosystem Response to a Marine Heatwave in the Gulf of Alaska).

### **b. Herring Research and Monitoring**

Depending on data to be collected by the HRM Program in 2017-2021, reported information on abundance and distribution of herring in PWS will be used as a potential explanatory variable in interpreting observed changes in distribution and population trends of marine birds in PWS.

### **c. Data Management**

This project coordinates with the data management program by submitting data and preparing metadata for publication on the Gulf of Alaska Data Portal and DataONE within the timeframes required. Progress was made on data processing and data analysis to better streamline data transfer, updating metadata, and summarizing of project results and reporting. The 2018 marine bird data will be uploaded and metadata updated 30 April 2019; any issues we encounter will be addressed by working with Stacy Buckelew (Axiom Data Science).

### **d. Lingering Oil**

None

## **B. Projects not Within a Trustee Council-funded program**

The PWS marine bird surveys will provide population estimates and trends that will improve our ability to interpret results from the *Exxon Valdez* Oil Spill Trustee Council (EVOSTC)-funded project 19100853 – Pigeon Guillemot Restoration Program. The Pigeon Guillemot Recovery project will monitor pigeon guillemot numbers at islands in central PWS following removal of introduced mink and it will obtain an index of black-legged kittiwake reproductive success throughout PWS.

## **C. With Trustee or Management Agencies**

Marine bird data from this study collected at the Naked Island group (Naked, Storey, and Peak islands) will be used to help evaluate the recovery of pigeon guillemots and other marine bird species (e.g., Arctic tern, parakeet auklet, and tufted puffin) that were extirpated by mink introduced to the island group. It thus supports the management directives of U.S. Fish and Wildlife Service to conserve and maintain populations of migratory birds. Additionally, the pigeon guillemot remains listed by the EVOSTC as “not recovered” following the oil spill. These survey data will provide information important for the continued monitoring of guillemot recovery.

Co-PI Kuletz is concurrently the PI for the seabird component of the Seward Line /Northern Gulf of Alaska-Long-Term Ecosystem Research program (LTER) led by Dr. Russell Hopcroft (also the GWA Environmental Drivers component lead). The Seward Line component is funded by the North Pacific Research Board (NPRB) and the LTER component is funded by the National Science Foundation through a grant to Dr. Hopcroft. The two marine bird projects (PWS and LTER surveys) will be integrated to compare seabird patterns of distribution with respect to environmental conditions, from the inside waters of PWS to the Gulf of Alaska shelf and shelf break biomes. Both projects have been collecting data since the late 1980s, maximizing the value of on-going surveys.

## **9. Information and Data Transfer:**

### **A. Publications Produced During the Reporting Period**

None

### **B. Dates and Locations of any Conference or Workshop Presentations where EVOSTC-funded Work was Presented**

*Pacific Seabird Group (PSG) annual conference, 27 February-2 March 2019, Kauai, Hawaii:* Data from GWA-funded marine bird surveys and LTER surveys were presented at the Marbled Murrelet Technical Committee, Kittlitz’s Murrelet Technical Committee, Tufted Puffin Technical Committee, Seabird Monitoring Committee, and Short-tailed Albatross Recovery Team meeting. Also at PSG, K. Kuletz gave an oral presentation titled: “Seabird distribution relative to biophysical oceanographic properties in North Pacific Ecosystems”; it presented results from the northern Gulf of Alaska LTER surveys and compared seabird response to shifts in ocean conditions with comparable data from the California Current LTER.

### **C. Data and/or Information Products Developed During the Reporting Period, if Applicable**

Program R Scripts have been created by a contractor, Scott Wolfe, to analyze PWS marine bird and mammal data, with automated output for comparison between (i) oiled, unoled, and all of PWS; (ii) regression and population trends; and (iii) figure creation. Final corrections to program coding should be completed by 30 April 2019.

### **D. Data Sets and Associated Metadata that have been Uploaded to the Program’s Data Portal**

To be completed by 30 April 2019.

## **10. Response to EVOSTC Review, Recommendations and Comments:**

**Science Panel Comment (EVOSTC FY18 Work Plan):** The Panel is pleased with the work the PIs are conducting and impressed with the survey coverage. Would it be worth surveying a subset of sites to monitor annually?

**PI Response:** We agree with the Science Panel that, ideally, we would improve trends analysis by adding surveys to include even numbered years to our current ‘odd year’ July surveys. However, budgetary constraints make such an effort impractical. The additional time and costs would include boat preparation and post-survey maintenance, hiring extra personnel or covering salary of in-house personnel, lodging, per diem,

fuel, and additional data control and analyses. Even selecting a much reduced number of transects to survey during even years (by ‘subset of sites’ we presume the panel is referring to transects), the cost of gearing up and operating a survey in PWS is not substantially reduced by reducing the number of transects. A rough estimate of surveys during even years would be \$150-180K per year, in addition to the current \$222K per odd year under the current work plan.

If additional funds were added to this project to cover a reduced survey during even years, we would first want to conduct an analysis to determine what level of effort would be statistically robust, and how those transects or regions (sites) should be selected. Such an analysis could be useful for future planning but would require additional funds for a contract or to cover time for the U.S. Fish and Wildlife Service biometrician.

We have some indication of what a reduced level of effort can provide, based on an analysis conducted for USFWS by WEST, Inc. in 2003 (Nielson et al. 2003). In brief, although the effect varied among species, the conclusion was that, on average, the coefficient of variation (CV) would not decrease substantially at 80% of our current effort, but increased substantially after that, which would greatly reduce our ability to detect population trends of < 50%. The report states: “However, for many species with low CVs at 100% of the original sample size (i.e., CV around 0.2 or less), the CV almost doubles when the sampling effort is reduced to 30%.” We add that for species of conservation concern, typically with low or variable numbers, an unusually low or high abundance estimate in any given year will result in much reduced probability of detecting change in the population over time. The report also notes, however, that “... a systematic sample of blocks across habitats will likely provide more precise estimates of species abundance than the stratified random sample.” With additional years of data since 2003, analysis of sampling effort by habitats may help with design of a reduced effort during even years.

Alternative to reduced surveying during even years, additional funds for the PWS marine bird surveys could be directed towards ‘winter’ (March) surveys. The March survey had fewer transects than July surveys, but has not been funded since 2010. The species composition of PWS changes substantially between July and March, with nine species or species groups primarily represented only in March (see Table 1 of the WEST, Inc. report); these were waterfowl, seaducks, and grebes. March surveys would provide population estimates and trends for all species during this critical season.

#### Literature Cited:

Nielson, R., S. Howlin, L. McDonald. 2003. "Bootstrapping to investigate effects of sample size on variance and bias of estimated species totals for Prince William Sound Marine Bird Surveys". Report by WEST, Inc. to U.S. Fish and Wildlife Service, Anchorage, Alaska, April 28, 2003.

**11. Budget:**

No significant changes to this project’s budget. Please see provided program workbook. Contractual category includes a charter vessel to provide support during boat-based survey. The Per Day vessel charter cost was higher than anticipated, and only one vendor bid on the contract.

<b>Budget Category:</b>	Proposed FY 17	Proposed FY 18	Proposed FY 19	Proposed FY 20	Proposed FY 21	TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	\$22.9	\$108.1	\$22.9	\$108.1	\$22.9	\$284.8	\$103.0
Travel	\$0.0	\$12.5	\$0.0	\$12.5	\$0.0	\$25.1	\$27.3
Contractual	\$0.0	\$37.1	\$0.0	\$37.1	\$0.0	\$74.2	\$44.9
Commodities	\$0.0	\$40.1	\$0.0	\$40.1	\$0.0	\$80.2	\$40.3
Equipment	\$0.0	\$6.0	\$0.0	\$6.0	\$0.0	\$12.0	\$6.3
<b>SUBTOTAL</b>	\$22.9	\$203.8	\$22.9	\$203.8	\$22.9	\$476.3	\$221.8
General Administration (9% of	\$2.1	\$18.3	\$2.1	\$18.3	\$2.1	\$42.9	N/A
<b>PROJECT TOTAL</b>	\$24.9	\$222.2	\$24.9	\$222.2	\$24.9	\$519.1	
Other Resources (Cost Share Funds)	\$23.0	\$56.0	\$23.0	\$56.0	\$22.0	\$180.0	