

**ATTACHMENT B. Annual Project Report Form (Revised 11.21.19)**

**1. Project Number:**

19120114-M

**2. Project Title:**

Continuing the Legacy: Prince William Sound Marine Bird Population Trends

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

Kathy Kuletz and Robb Kaler, U.S. Fish and Wildlife Service

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

February 1, 2019-January 31, 2020

**5. Date of Report:**

March 2020

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

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

**7. Summary of Work Performed:**

The Prince William Sound (PWS) marine bird survey is conducted in July of even years (2018, 2020), thus no field work was conducted in 2019. After processing the 2018 marine bird survey data, data were archived and posted to the Research Workspace portal, and metadata were updated to reflect the additional survey data. An update on population trends were contributed to the Gulf Watch Alaska (GWA) Pelagic Component poster presented at the 2020 Alaska Marine Science Symposium (Fig. 1). Additionally, we worked on streamlining the workflow of data collection, data proofing (QA/QC), and summarizing project results and reporting.

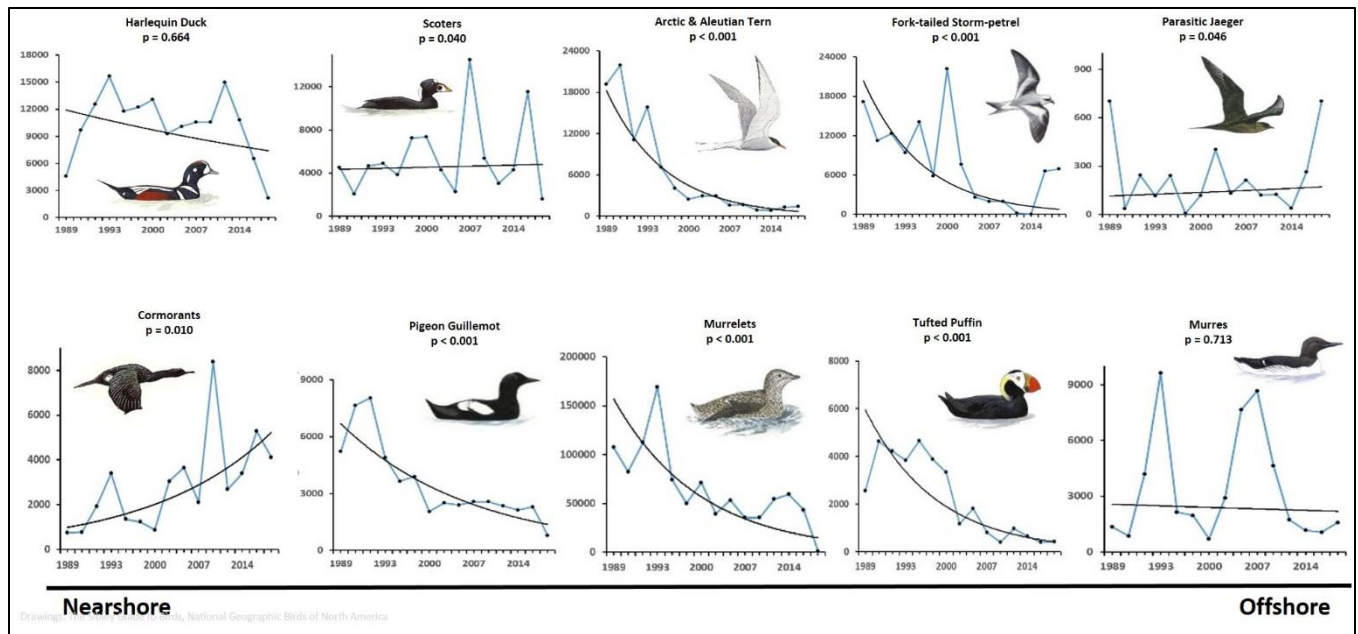


Figure 1. Summer marine bird status and trends for Prince William Sound, Alaska. Trends from 1989 to 2018 overall trended downward with the exception of increases in abundance of pelagic species like storm-petrels, jaegers, and murres. Nearshore species (e.g., harlequin duck, pigeon guillemot and scoters) declined in 2018.

## 8. Coordination/Collaboration:

### A. Long-term Monitoring and Research Program Projects

#### 1. Within the Program

The principal investigators (PIs; Kathy Kuletz, Robert Kaler) are participating in discussions and meetings to explore opportunities to integrate the July PWS marine bird data with the other projects, including those within the GWA Pelagic Component and GWA Ecosystem Drivers Component of the long-term monitoring effort. Additionally, the PIs are coordinating with Heather Coletti (GWA-Nearshore Component lead) and the GWA Science Coordinator (Rob Suryan) to merge GWA marine bird data sets into a broader geographic analysis of population trends.

In an effort led by the GWA Science Coordinator (Rob Suryan), PIs from GWA Nearshore and Pelagic components will compile data sets from marine bird surveys conducted in the Gulf of Alaska with the objective of a region-wide analysis to determine population status and trends of key species (species are yet to be identified).

Collaboration within the GWA Pelagic Component (forage fish, humpback whale, killer whale, and marine bird), and between the Pelagic Component and the Herring Research and Monitoring (HRM) program, will continue to focus on physical and biological features of locations where whales and seabirds have been found to overlap in time and space.

PIs Kuletz and Kaler coordinate with Environmental Drivers PI Russ Hopcroft (Seward Line, project 1912-1114-L) to provide a marine bird and mammal observer on Seward Line, and now extended long term ecological research (LTER), surveys in the Gulf of Alaska. These observations are reported in the Seward Line project annual report.

## **2. Across Programs**

### **a. Herring Research and Monitoring**

In addition to the collaboration listed above, we intend to use information on abundance and distribution of herring in PWS collected by HRM as a potential explanatory variable in interpreting observed changes in distribution and population trends of marine birds in PWS. The analysis depends on the data collected by the HRM program 2017-2021.

### **b. 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. Work is underway to standardize data management of raw marine bird and mammal data collected during nearshore and pelagic surveys. The final product will be programming scripts written in Program R used for data processing (e.g., QA/QC), population trend analyses, and reporting.

## **B. Individual Projects**

The PWS marine bird surveys will provide population estimates and trends that will improve our ability to interpret results from the newly-funded *Exxon Valdez* Oil Spill Trustee Council (EVOSTC) project: Project 19110853 – Pigeon Guillemot Restoration Program. The Pigeon Guillemot Recovery project is monitoring pigeon guillemot numbers at islands in central PWS following removal of introduced mink and is obtaining an index of black-legged kittiwake reproductive success across PWS.

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

Working with researchers at the U.S. Geological Survey Alaska Science Center, changes in at-sea densities of seabirds in Kachemak Bay, Alaska, were compared from 1996 to 2018. The combined data suggest a major food web perturbation in lower Cook Inlet following the 2014-2016 marine heatwave, and likely leading to extreme low densities of seabirds at sea in 2018.

Kathy Kuletz, with funding from the North Pacific Research Board (NPRB), the U.S. Fish and Wildlife Service (USFWS) Migratory Bird Management, and GWA, conducted marine bird and mammal surveys as part of the long-term monitoring program for the northern Gulf of Alaska (Seward Line and additional LTER lines), which is part of the multi-agency (University of Alaska Fairbanks, NPRB, USFWS) program.

Marine bird data from this study collected at the Naked Island group (Naked, Storey, & Peak islands) will be used to help evaluate the recovery of pigeon guillemots and other marine bird species (e.g., Arctic tern, parakeet auklet, tufted puffin) that were extirpated by mink introduced to

the island group. It thus supports the management directives of USFWS 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.

The PIs for this project provide a marine bird and mammal observer on the National Science Foundation-funded Northern Gulf of Alaska LTER spring and fall surveys that include the GWA Seward Line. The observer would not be possible without additional funding provided by the EVOSTC.

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

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

#### **1. Peer-reviewed Publications**

No new contributions for this reporting period.

#### **2. Reports**

Arimitsu, M., J. Piatt, R. Suryan, S. Batten, M.A. Bishop, R. Campbell, H. Coletti, D. Cushing, K. Gorman, S. Hatch, S. Haught, R. Hopcroft, K. Kuletz, C. Marsteller, C. McKinstry, D. McGowan, J. Moran, W.S. Pegau, A. Schaeffer, S. Schoen, J. Straley, and V. von Biela. 2019. Synchronous collapse of forage species disrupts trophic transfer during a prolonged marine heatwave. *In: The Pacific Marine Heatwave: Monitoring During a Major Perturbation in the Gulf of Alaska. Long-Term Monitoring Program (Gulf Watch Alaska) Synthesis Report Exxon Valdez Oil Spill Trustee Council Program 19120114* (Eds: Suryan, R.M., M.R. Lindeberg, and D.R. Aderhold). Exxon Valdez Oil Spill Trustee Council, Anchorage, Alaska.

Kuletz, K., and R. Kaler. 2019. Continuing the Legacy: Prince William Sound Marine Bird Population Trends. *Exxon Valdez Oil Spill Restoration Project Annual Report (Restoration Project 18120114-M)*, Exxon Valdez Oil Spill Trustee Council, Anchorage, Alaska.

#### **3. Popular articles**

No new contributions for this reporting period.

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

#### **1. Conferences and Workshops**

Arimitsu, M., M.A. Bishop, D. Cushing, S. Hatch, R. Kaler, K. Kuletz, C. Matkin, J. Moran, D. Olsen, J. Piatt, A. Schaeffer, and J. Straley. 2020. Changes in marine predator and prey population in the Northern Gulf of Alaska: Gulf Watch Alaska Pelagic update 2019. Poster Presentation. Alaska Marine Science Symposium, Anchorage, AK, January.

Kuletz, K., B. Hoover, C. Cushing, J. Santora, W. Sydeman, R. Hopcroft, S. Danielson, and E. Labunski. 2019. Seabird distribution relative to biophysical oceanographic properties in North Pacific Ecosystems. Oral Presentation. The 46<sup>th</sup> Meeting of the Pacific Seabird Group, Kauai, HI. 27 February – 2 March 2019.

Marsteller, C., M. Arimistu, J. Piatt, K. Kuletz, S. Schoen, B. Heflin, and E. Lubunski. 2019. Where have all the birds gone?: Changes in at-sea densities of seabird in Kachemak Bay, Alaska from 1996 to 2018. Oral Presentation. The 46<sup>th</sup> Meeting of the Pacific Seabird Group, Kauai, HI. 27 February – 2 March 2019.

## 2. Public presentations

Kaler, R. 2020. Sentinels of the Seas: Seabirds as ecosystem indicators, Part I and Part II. Oral presentation. Winter 2020 Opportunities for Lifelong Education, Anchorage, Alaska. 23 & 30 January 2020.

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

Non-parametric population estimates were derived from 10,000 bootstrap estimates for all birds counted during the 2018 PWS marine bird survey and were posted to the Research Workspace.

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

The 2018 July marine bird survey data and metadata have been uploaded, updated, and finalized on the Research Workspace in October 2019 (<https://portal.aos.org/gulf-of-alaska#metadata/6aac5903-f3af-4eb4-b4d7-11006e6ea497/project/files>).

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

**Science Panel Comment (FY20):** *The Science Panel raised some questions about the additional funding request, which is mainly a result of obtaining LTER funding that now requires longer trips (and an additional July sampling date) that were not judged by the PIs to be needed for this proposal until now. The Panel notes July data could be valuable, but the original proposal was funded for the spring and fall surveys, which were decided on as the most important times of the year for these projects. If additional days of funding were obtained, to allow for the extended duration of fall and spring surveys, it is not clear what the seabird observer would be doing during those additional days or whether critical data being gathered.*

*In addition, the Panel is still very concerned about the every other year sampling (see FY19 Work Plan comments). While we appreciate the financial constraints explained by the PIs in their previous responses, we wondered whether the LTER surveys are conducted every year and whether there would be an opportunity for the project to reallocate funds to put a bird observer on those cruises to obtain some data annually.*

**PI Response (FY20):** We appreciate the careful review of our request for funds to support a marine bird and mammal observer on recently expanded oceanographic surveys in and around the spill

affected area. Supporting additional survey days allows the seabird observer to continue collecting data following standardized protocols over a larger geographic area. This is significant when you consider the huge extent of the northern Gulf of Alaska and continental shelf, a spatially data poor region. Consideration of funding spring and fall surveys is appreciated and will ensure that we maintain the spring and fall Seward Line time series while also conducting seabird observations as part of the newly established National Science Foundation funded Northern Gulf of Alaska Long-term Ecological Research (LTER) survey lines from Cape Suckling to Kodiak Island.

Foregoing the July surveys would save \$10.3 K, or 44% of the requested \$23.3K per year. However, we believe this small amount of annual funding would provide a large benefit to understanding seabird ecology in the Gulf of Alaska. The July oceanographic and zooplankton surveys, though a recent addition to the Gulf of Alaska offshore studies, will continue into the foreseeable future as a long-term monitoring component of the LTER, with strong links to other Gulf Watch Alaska, EVOSTC projects. The seabird component would be a missing aspect of the mid-summer LTER program. An important part of conducting the July LTER surveys is that the time period overlaps with and thus complements EVOSTC and other projects, including:

- The July survey captures an important part of the seabird's life cycle, being the summer breeding period. It thus occurs in conjunction with seabird productivity monitoring at selected Gulf of Alaska colonies by the Alaska Maritime National Wildlife Refuge and others.
- July surveys would correspond to Prince William Sound (PWS) marine bird surveys (US Fish and Wildlife Service/Migratory Bird Management, EVOSTC funded); ongoing surveys in the Lower Cook Inlet (US Geological Survey, Bureau of Ocean Energy Management funded); Kenai Fjords (National Park Service and EVOSTC funded project 19120114-H); and Middleton Island seabird productivity and diet studies (EVOSTC funded project 19120114-C).
- Without the July component, the offshore data misses an important seasonal component to better understand the northern Gulf of Alaska marine ecosystem, particularly as it relates to the period of highest marine productivity.

We are a bit unclear about the every other year sampling comment. Comments referenced in the FY19 work plan state there were no "project specific comments" for this project. We are assuming the science panel is referring to comments made in the FY18 work plan. Our response to the FY18 comments are briefly summarized here.

- 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.
- Budgetary constraints make such an effort impractical (a rough estimate for an even year survey is \$180K per year).

- 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.
- We have some indication of what a reduced level of effort can provide, based on an analysis conducted for US Fish and Wildlife Service by WEST, Inc. (Nielson et al. 2003). In brief, although the effect varied among species, 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%. 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%; this would particularly affect power to detect trends for rare species and species of concern, such as Kittlitz’s murrelet.
- 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.

Again, we are willing to investigate the concept of an even year survey, but we would like to hear recommendations from the science panel given the options discussed (e.g., full survey or reduced survey after power analysis with a defined sampling area).

The Seward Line and LTER surveys do include transects within PWS and because the LTER surveys occur every year a July survey could help compensate for, but not replace, the lack of data on summer seabird abundance in PWS during ‘off years’ of the PWS surveys. July Seward Line and LTER surveys can provide information on trends in seabird abundance but cannot replicate the experimental design of current PWS marine bird surveys to determine population abundance in oiled vs. unoiled areas of PWS. If support for a seabird observer on the July LTER cruises is not approved, it would not be feasible to reallocate funding from other parts of the project without compromising the continuation of the spring and fall Seward Line time series, or of the PWS marine bird surveys.

We would also like to add that we have attempted to obtain funds to support seabird surveys in conjunction with the LTER. While we have received temporary supplements, the support was not long-term, other than the original Seward Line spring and summer surveys, which are currently supported by the North Pacific Research Board.

*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.*

*The Panel would like to know what the cost would be for only extending the spring and fall surveys. We recommend a fund for this project contingent on the removal of the new July survey on the LTER cruise from the FY20 proposal and budget.*

*Science Coordinator Notes: Additional funding request without the new July surveys including GA is \$14.5K, revised total for this project including GA is \$233,400.*

**Science Director Comments (FY20):** *Currently, this project provides data for assessing whether seabird populations injured by the spill are recovering in PWS. Project goals are being met on time. This project collaborates with the nearshore and forage fish components of the program, the Herring Research and Monitoring program and the pigeon guillemot restoration project (20110853). Alaska Maritime National Wildlife Refuge (USFWS) also includes these data in their annual report on the status and trends of seabirds in Alaska.*

*The USFWS PIs also have been conducting seabird surveys twice a year (spring and fall) as part of the Seward Line project (20120114-L) starting in 2006. Starting in 2018, the Seward Line survey expanded via an NSF Long-Term Ecological Research (LTER) which added significantly more days at sea (8 extra days during spring and fall surveys, 18 days for new July survey). Because the Seward Line is now part of the LTER surveys, it is not possible to conduct only the Seward Line portion of the cruises. The extended surveys in 2018 and 2019 were funded by the North Pacific Research Board, with contributions from NFS and NOAA. However, these leveraged funds are insufficient to continue the extended Seward Line/LTER seabird surveys starting in FY20. Information from this effort provides data on the seasonal and interannual variability of seabird distribution in the northern GOA along strong cross-shelf and alongshore environmental gradients and integrates with and informs other GWA components. Observers also document marine mammal activity that is important to protected resources managers. This project is requesting an additional \$25.8K annually (includes GA) for FY20 and FY21 to continue support for a seabird observer on the annual Seward line/LTER surveys and an additional July survey. I concur with the Science Panel's comments.*

**PI Response (FY20):**

We thank the Science Coordinator for a summary of the justification for requesting additional funds and description of the heavily leveraged aspect of this opportunity.

**Science Panel Comment (FY19):** *We have no project specific comments.*

<b>11. Budget:</b>
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Please see provided program workbook.



<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	\$153.8
Travel	\$0.0	\$12.5	\$0.0	\$12.5	\$0.0	\$25.1	\$12.5
Contractual	\$0.0	\$37.1	\$0.0	\$47.4	\$10.3	\$94.8	\$37.1
Commodities	\$0.0	\$40.1	\$0.0	\$40.1	\$0.0	\$80.2	\$40.1
Equipment	\$0.0	\$6.0	\$0.0	\$6.0	\$0.0	\$12.0	\$6.0
<b>SUBTOTAL</b>	\$22.9	\$203.8	\$22.9	\$214.1	\$33.2	\$496.9	\$249.6
General Administration (9% of subtotal)	\$2.1	\$18.3	\$2.1	\$19.3	\$3.0	\$44.7	N/A
<b>PROJECT TOTAL</b>	\$24.9	\$222.2	\$24.9	\$233.4	\$36.2	\$541.6	
Other Resources (Cost Share Funds)	\$23.0	\$56.0	\$23.0	\$134.3	\$100.4	\$336.7	