

ATTACHMENT B. Annual Project Report Form (Revised 11.21.19)

1. Project Number:

20120114-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, 2020-January 31, 2021

5. Date of Report:

March 2021

6. Project Website (if applicable):

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); however, COVID-19 health mandates and travel restrictions caused the July 2020 survey to be postponed until 2021. After processing the 2018 marine bird survey data, data were archived and posting to the Research Workspace portal, and metadata were updated to reflect the additional survey data. An update on population trends is to be presented at the 2021 Pacific Seabird Group meeting (virtual meeting 23-26 February 2021; Fig. 1). Additionally, we worked with partner agencies and a contractor to develop an updated data logging application to streamlining the workflow of data collection, data proofing (QA/QC), and summarizing project results and reporting.

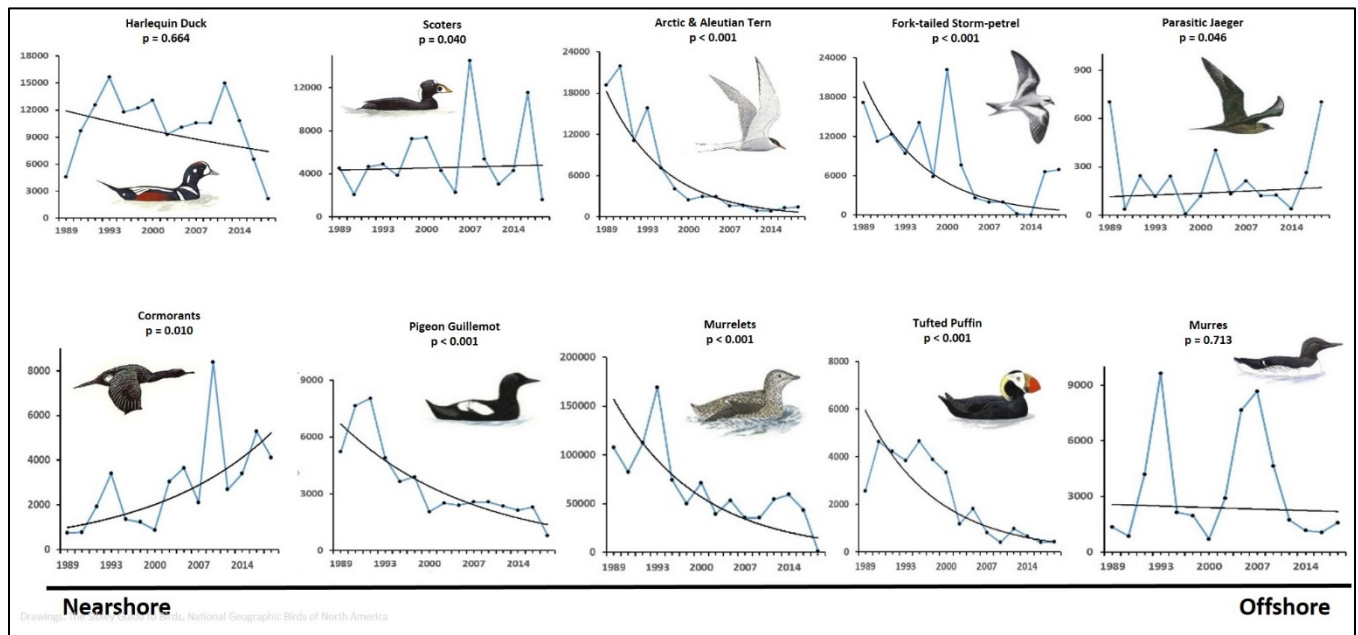


Figure 1. Summer marine bird status and trends for Prince William Sound, Alaska. Trends from 1989 to 2018 overall trended downward except for increases in abundance of pelagic species like storm-petrels, jaegers and murres. Nearshore species (e.g., harlequin duck, pigeon guillemot, and scoters) declined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

The Northern Gulf of Alaska Long-term Ecosystem Research (NGA-LTER) project was affected by COVID-19 health mandates and travel restrictions. The NGA-LTER had a reduced crew and reduced cruise length in spring (May) of 2020, but we were not authorized by the US Fish and Wildlife Service (USFWS) to send an employee or contractor to board the ship. We did obtain authorization for the fall (September) cruise, following safety protocols such as pre-boarding quarantine, COVID-19 testing, and agreeing to on-board protocols. The fall cruise was also limited in the size of the science team (to allow individual berthing) and length of the cruise, thus only a portion of the normal NGA-LTER sampling grid was completed. We contributed to the cruise report and submitted data to the Research Workspace following QA/QC. The processed data providing calculated densities will be submitted to the North Pacific Pelagic Seabird Database and to Alaska Ocean Observing System (AOOS) staff for final publication. In addition, we will be providing the NGA-LTER data to the Anchorage office of the Bureau of Ocean Energy Management (BOEM) to incorporate into their internal database.

A single USFWS observer conducted marine bird and marine mammal surveys as a component of the NGA-LTER, 1-9 September 2020, aboard the *R/V Sikuliaq*. The observer completed 756 linear km of surveys. On-transect, he observed a total of 1,165 individuals of 29 species of birds (including 12 species of non-marine birds), with an additional 17 species observed off transect during surveys or while at stations. Details on species observed and their distributions are available in the NGA-LTER Fall 2020 cruise report (<https://nga.lternet.edu/about-us/documents/>; pages 17-22). Fork-tailed storm-petrel was the most abundant species observed on transect, comprising 21% of total birds. These surface-feeding planktivores were most abundant near the shelf break and in PWS, but occurred throughout most of the sampled area (Fig. 2). Other species that comprised >10% of total

birds were glaucous-winged gull, tufted puffin, and black-legged kittiwake. Five species of marine mammal were observed, with 57 individuals on-transect and 466 off-transect.

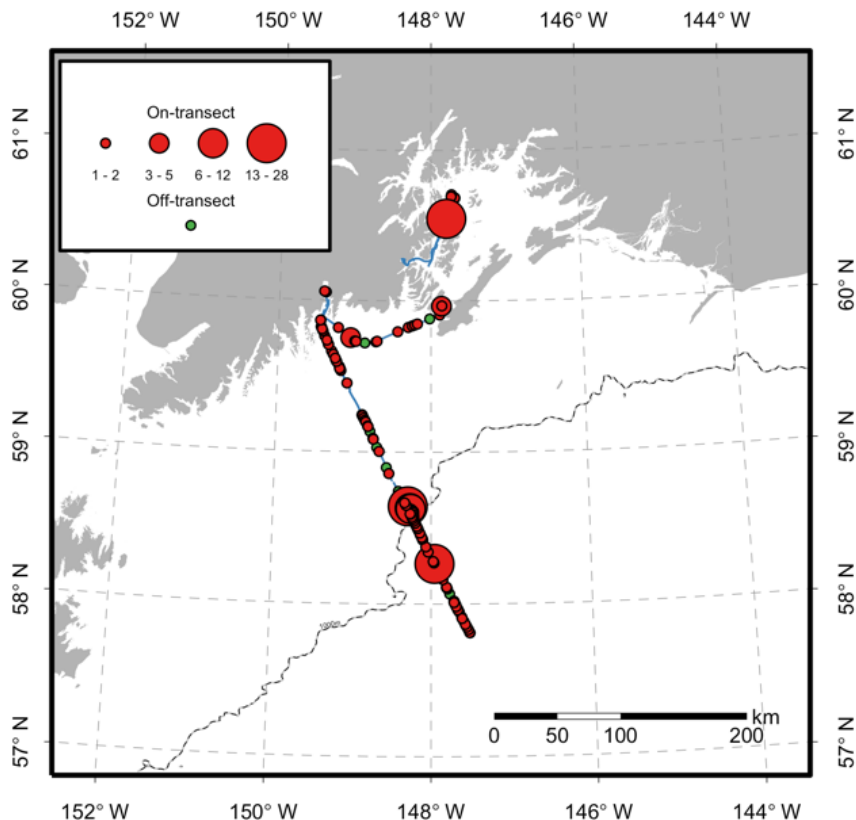


Figure 2. Fork-tailed storm-petrel observations during the September 2020 Northern Gulf of Alaska-Long Term Ecological Research survey. Blue lines indicate surveyed transects with no observed storm-petrels.

8. Coordination/Collaboration:

A. Long-term Monitoring and Research Program Projects

1. Within the Program

The Principal Investigators (PIs; Kathy Kuletz, Robert Kaler) have been participating in discussions and meetings to explore opportunities to integrate the July PWS marine bird data with the other projects, including those within the Gulf Watch Alaska (GWA) Pelagic Environmental Drivers components. Additionally, the PIs have been 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.

Collaboration within the GWA Pelagic Component (forage fish [project 20120114-C, PIs Arimitsu and Piatt], humpback whale [project 2012-114-O, PIs Moran and Straley], killer whale [project 20120114-N, PI Matkin], and marine bird [project 20120114-E, PI Bishop]), and between the pelagic and herring programs, will continue to focus on physical and biological features of locations where whales and seabirds have been found to overlap in time and space. The seabird component of the NGA-LTER also collaborates with the Environmental Drivers

Component of GWA. The seabird surveys are conducted from the NGA-LTER research vessel and we will be integrating the seabird data with environmental and zooplankton data collected during concurrent cruises (Seward Line project 20120114-L, PI Hopcroft). The NGA-LTER is funded by a National Science Foundation grant to Dr. Russell Hopcroft of the University of Alaska Fairbanks. The NGA-LTER is conducted in conjunction with the Seward Line (project 20120114-L, PI Hopcroft), also funded by the North Pacific Research Board.

In an effort led by the GWA Science Coordinator (Dr. R. Suryan), PIs from GWA Nearshore and Pelagic Programs will be compiling 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).

2. Across Programs

a. Herring Research and Monitoring

Depending on data to be collected by the Herring Research and Monitoring 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.

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.

B. Individual Projects

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) project 20110853 – 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.

Working with the Chugach Regional Resource Commission (CRRC) Board of Directors, changes in densities of marine birds in Prince William Sound from 1989 to 2018 were used to update the CRRC's list of identified subsistence marine bird species harvested by Alaska Natives in the Chugach region. The updated list provides information on changes in species distribution and abundance and provides an opportunity to combine information from boat-based surveys with Indigenous knowledge, particularly following the 2014-2016 marine heat wave in the Gulf of Alaska, and likely affecting abundance of subsistence species in PWS.

Work is underway to standardize data collection and management of marine bird and marine mammal data collected during nearshore and offshore pelagic surveys. The final product will provide scripts written in Program R for data processing (e.g., QA/QC), population trends analyses, reporting, and archival in the North Pacific Pelagic Seabird Database (administered by the US Geological Survey Alaska Science Center).

C. With Trustee or Management Agencies

Marine bird data from this study collected at the Naked Island group (Naked, Storey, and Peak islands in PWS) 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 marine bird data collected as part of the NGA-LTER has provided the USFWS and National Oceanographic and Atmospheric Administration (NOAA) with data on location, habitat use, and abundance of short-tailed albatross and two other albatross species. The short-tailed albatross is listed under the Endangered Species Act and is thus a concern in NOAA’s regulation of commercial fishing in the Gulf of Alaska. All three albatross species are subject to incidental take in commercial long-line fisheries, along with other species such as northern fulmar, shearwaters, and gulls. The Bureau of Ocean Energy Management (BOEM) has also requested the pelagic survey data from the NGA-LTER, to incorporate into their internal database. The Anchorage office of BOEM is responsible for environmental assessment of Cook Inlet oil and gas lease sales; assessments include adjacent waters and resources that could be impacted by development or accidents associated with these sales.

9. Information and Data Transfer:

A. Publications Produced During the Reporting Period

1. Peer-reviewed Publications

Arimitsu, M., J. Piatt, S. Hatch, R. Suryan, S. Batten, M.A. Bishop, R. Campbell, H. Coletti, D. Cushing, K. Gorman, 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. 2021. Heatwave-induced collapse of forage fish species disrupts energy flow to top pelagic predators. *Global Change Biology*.
<https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.15556>

Suryan, R.M., M. Arimitsu, H. Coletti, R.R. Hopcroft, M.R. Lindeberg, S. Batten, M.A. Bishop, R. Brenner, R. Campbell, D. Cushing, S. Danielson, D. Esler, T. Gelatt, S. Hatch, S. Haught, K. Holderied, K. Iken, D. Irons, D. Kimmel, B. Konar, K. Kuletz, B. Laurel, J.M. Maniscalco, C. Matkin, C. McKinstry, D. Monson, J. Moran, D. Olsen, S. Pegau, J. Piatt, L. Rogers, A. Schaefer, J. Straley, K. Sweeney, M. Szymkowiak, B. Weitzman, J. Bodkin, and S. Zador. In press. Ecosystem response to a prolonged marine heatwave. *Scientific Reports*.

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.

2020. 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. 2020. Continuing the Legacy: Prince William Sound Marine Bird Population Trends. *Exxon Valdez* Oil Spill Restoration Project Annual Report (Restoration Project 19120114-M), *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska.
- Northern Gulf of Alaska Long-Term Ecological Research Cruise Report September 2020 Cruise ID: SKQ2020-12S; Pages 17-22: Marine bird and marine mammal surveys (USFWS). Available at: <https://nga.lternet.edu/about-us/documents/>
- Suryan, R., M. Arimitsu, H. Coletti, R. Hopcroft, M. Lindeberg, S. Batten, M.A. Bishop, R. Brenner, R. Campbell, D. Cushing, S. Danielson, D. Esler, T. Gelatt, S. Hatch, S. Haught, K. Holderied, K. Iken, D. Irons, D. Kimmel, B. Konar, B. Laurel, J. Maniscalco, C. Matkin, C. McKinstry, D. Monson, J. Moran, D. Olsen, S. Pegau, J. Piatt, L. Rogers, A. Schaeffer, S. Straley, K. Sweeney, M. Szymkowiak, B. Weitzman, J. Bodkin, and S. Zador. 2020. Ecosystem response to a prolonged marine heatwave in the Gulf of Alaska. 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.

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., J. Piatt, S. Hatch, R. Suryan, S. Batten, M.A. Bishop, R. Campbell, H. Coletti, D. Cushing, K. Gorman, 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. 2021. Heatwave-induced collapse of forage fish species disrupts energy flow to top pelagic predators. Poster presentation. Alaska Marine Science Symposium. Anchorage, AK. 26-28 January.

Arimitsu, M., et al. 2020. Synchronous collapse of forage species disrupts trophic transfer during a prolonged marine heatwave. Oral Presentation. The 47th Meeting of the Pacific Seabird Group, Portland, OR. 12-15 February.

Cushing, D. et al. 2021. Summer tourists: The rare, amazing, out-of-their-range visitors observed during seabird surveys in the northern Gulf of Alaska. Poster Presentation. Alaska Marine Science Symposium, 26-28 January.

Kaler, R. 2020. Prince William Sound marine bird survey: Loon population trends. Oral presentation. Loons in northern Alaska: Information exchange and coordination meeting, Anchorage, AK. 25 February.

Data from GWA-funded Prince William Sound marine bird surveys and/or the NGA-LTER surveys were presented at the: (i) Marbled Murrelet Technical Committee, (ii) Kittlitz's Murrelet Technical Committee, (iii) Tufted Puffin Technical Committee, (iv) North Pacific Albatross Working Group, (v) Short-tailed Albatross Recovery Team, and (vi) Seabird Monitoring Committee.

2. Public presentations

Kaler, R. 2020. Prince William Sound marine bird population trends: 1989 – 2018. Oral presentation. Virtual Board of Directors Meeting of the Chugach Regional Resource Commission, 7 December.

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

Survey data from the 2018 NGA-LTER were published in 2020. The 2019-2020 data have been prepared and edited and are available for publication, pending final review by Axiom.

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

The 2020 July PWS marine bird survey data was postponed until July 2021. All previous metadata and data were uploaded, updated, and finalized on the Research Workspace in October 2019.

Data from the 2018 NGA-LTER surveys was published in DataOne in July 2020. Finalized data from the 2019 NGA-LTER surveys were uploaded to the AOOS Workspace in August 2020 and the finalized 2020 survey data were uploaded in December 2020.

10. Response to EVOSTC Review, Recommendations and Comments:

Science Panel Comment (FY21): The SP agrees with the plan to shift the survey from July 2020 to July 2021 and has no other comments or concerns.

GWA PI Response (FY21): We wish to thank the Science Panel and Science Director for their contributions towards improving this project, and for allowing us the flexibility to alter our field schedule. We anticipate being able to conduct field studies in FY21. In the event we cannot conduct Prince William Sound surveys, we will conduct surveys in July 2022 (pending approval of rolling over funds), and will continue analyses on existing data as appropriate. The LTER seabird component was able to conduct surveys in fall 2020, and we anticipate being able to do so again in 2021.

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 Coordinator 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.

11. Budget:

Please see provided program workbook. Because we were unable to conduct the PWS marine bird survey as planned in 2020, we intend to conduct the survey in 2021.

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
PROGRAM PROJECT BUDGET PROPOSAL AND REPORTING FORM**

Budget Category:	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	\$196.3
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	\$51.6
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
SUBTOTAL	\$22.9	\$203.8	\$22.9	\$214.1	\$33.2	\$496.9	\$306.6
General Administration (9% of subtotal)	\$2.1	\$18.3	\$2.1	\$19.3	\$3.0	\$44.7	N/A
PROJECT TOTAL	\$24.9	\$222.2	\$24.9	\$233.4	\$36.2	\$541.6	
Other Resources (Cost Share Funds)	\$23.0	\$56.0	\$23.0	\$57.1	\$118.8	\$277.9	