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*\*For Instructions for each section below, see Reporting Policy, II (B); the Reporting Policy can be found on the website, <https://evostc.state.ak.us/policies-procedures/reporting-procedures/>*

**Project Number:** 22210128

**Project Title:** Status and trends of EVOS injured seabirds in the Kenai Peninsula coast and Kachemak Bay

**Principal Investigator(s):**

Kenai Peninsula Coast Component

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John Maniscalco, Co-PI, Alaska SeaLife Center

Marc Romano, Co-PI, US Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge

Erik Osnas, Co-PI, US Fish and Wildlife Service, Migratory Bird Management, Alaska Region

Kachemak Bay Component

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Kathy Kuletz, Co-PI, US Fish and Wildlife Service, Migratory Bird Management, Alaska Region

Erik Osnas, Co-PI, US Fish and Wildlife Service, Migratory Bird Management, Alaska Region

**Reporting Period:** Feb 1, 2022 – January 31, 2023

**Submission Date:** Mar 1, 2023

**Project Website:** N/A

Please check all the boxes that apply to the current reporting period.

**Project progress is on schedule.**

**Project progress is delayed.**

**Budget reallocation request.**

**Personnel changes.**

Dr. Kathy Kuletz retired from the U.S. Fish and Wildlife Service in February 2022. She continues to be a collaborative member of this project and is involved on an informal basis.



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## **1. Summary of Work Performed:**

### **Kenai Peninsula Coast Component**

For the Kenai Peninsula component, work conducted during the reporting period contributed to project objectives 1-4:

1. Estimate current population size for Kittlitz's murrelet, marbled murrelet, and pigeon guillemot in the Kenai Fjords, and determine decadal trends in abundance for murrelets.
2. Characterize current distribution of Kittlitz's and marbled murrelet in Kenai Fjords, investigate temporal changes in density patterns, and identify factors that influence density patterns.
3. Estimate current population size, trends in distribution, and trends in relative abundance of pigeon guillemot in Resurrection Bay.
4. Estimate juvenile densities and age ratios as an index of productivity for marbled murrelet and pigeon guillemot in Resurrection Bay.

Surveys were conducted in Kenai Fjords during summer season of 2022. The early season surveys were conducted June 1 - 4 in Aialik and Northwestern Fjords (Figure 1). The middle season surveys were conducted during July 10-27 in Aialik, Northwestern, and McCarty Fjords (Figure 1). The surveys in McCarty Fjord were ended prior to completing all planned transect due to Covid-19 positive tests during the cruise, despite all precautions. The late season surveys were conducted August 8 - 10 in Aialik and Northwestern Fjords. Additional juvenile surveys were conducted on August 25 in Aialik Fjord and on August 29 in Northwestern Fjord.

These surveys were conducted from a landing craft with one observer on the port side and another on the starboard side, a data recorder, and a vessel operator aboard. For inshore transects the vessel traveled 100 m from the shoreline. All bird and marine mammal observations were recorded in 25 m bins within 150 m from each side of the vessel (with the exception of inshore transects which had a maximum of 100 m from the shoreline). Flying birds were recorded every 60 seconds. At the beginning and end of each transect the time, latitude, longitude, wind speed, wind direction, air temperature, and wave height were recorded. Additionally, during the survey observer conditions on each side of the boat were recorded along with cloud coverage, Beaufort number, ice size, and ice coverage and were updated if changes were observed while moving along the transect. A summary of all sightings is presented in Table 1, and raw count data for murrelets and pigeon guillemot is summarized in Table 2 and Figure 2. Distribution of murrelets and pigeon guillemot in Kenai Fjords during surveys in 2022 are presented in Figures 3-7.



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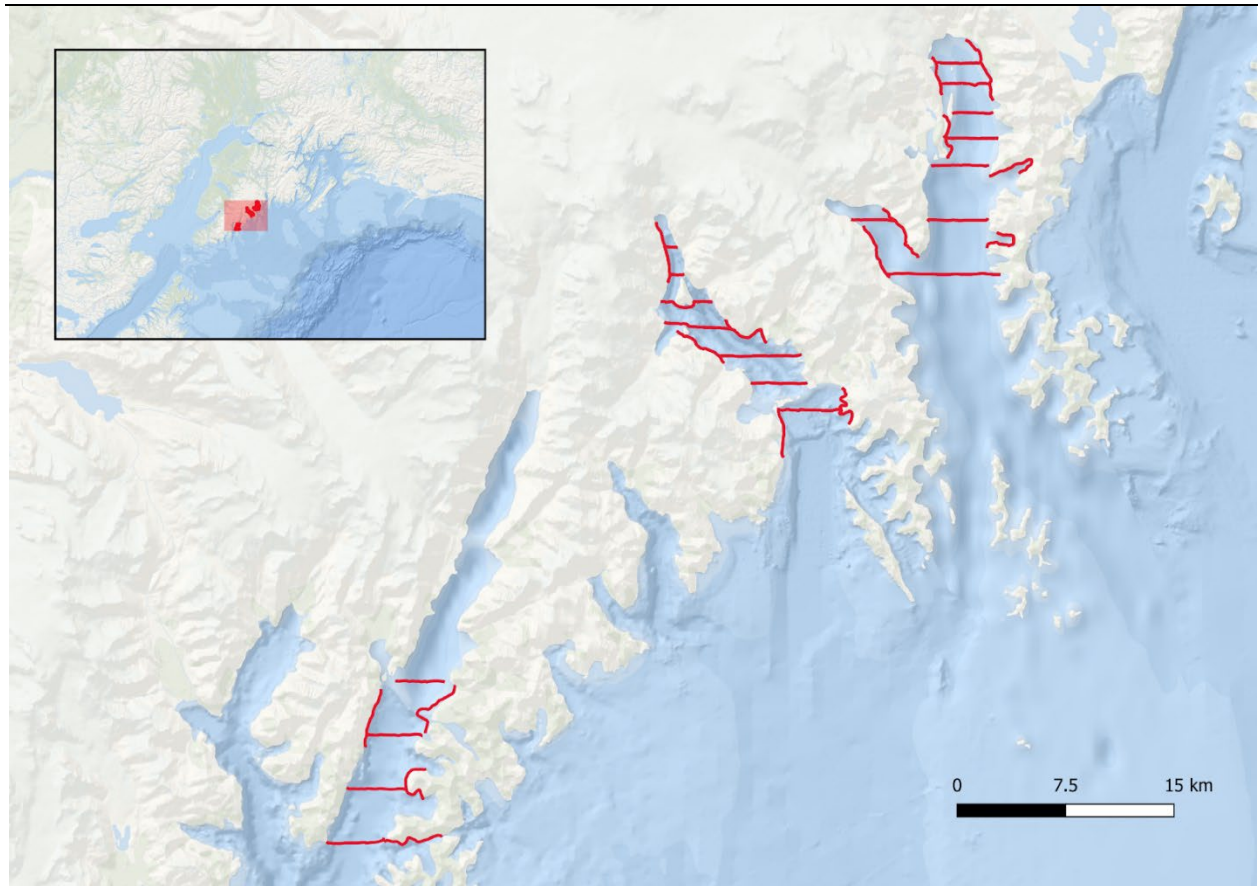


Figure 1. Transects completed in 2022 on either the early, middle, or late surveys.



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Table 1. Marine bird and mammal observations recorded on water, on land, and in the air during surveys in Kenai Fjords, Alaska during all surveys.

English Name	Scientific Name	Number
American Wigeon	<i>Mareca americana</i>	22
Bald Eagle	<i>Haliaeetus leucocephalus</i>	11
Barrow's Goldeneye	<i>Bucephala islandica</i>	7
Black-legged Kittiwake	<i>Rissa tridactyla</i>	817
Black Brant	<i>Branta bernicla</i>	5
Black Oystercatcher	<i>Haematopus bachmani</i>	11
Black Scoter	<i>Melanitta americana</i>	2
Common Loon	<i>Gavia immer</i>	2
Common Merganser	<i>Mergus merganser</i>	28
Common Murre	<i>Uria aalge</i>	6
Common Raven	<i>Corvus corax</i>	3
Double-crested Cormorant	<i>Nannopterum auritum</i>	79
Glaucous-winged Gull	<i>Larus glaucescens</i>	989
Greater Scaup	<i>Aythya marila</i>	4
Harlequin Duck	<i>Histrionicus histrionicus</i>	113
Horned Grebe	<i>Podiceps auritus</i>	1
Horned Puffin	<i>Fratercula corniculata</i>	106
Iceland Gull/Thayer's Gull	<i>Larus glaucoides</i>	1
Kittlitz's Murrelet	<i>Brachyramphus brevirostris</i>	65
Lesser Scaup	<i>Aythya affinis</i>	1
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	1728
Northern Shoveler	<i>Spatula clypeata</i>	1
Pelagic Cormorant	<i>Urile pelagicus</i>	97
Pigeon Guillemot	<i>Cepphus columba</i>	138
Red-breasted Merganser	<i>Mergus serrator</i>	1
Red-necked Phalarope	<i>Phalaropus lobatus</i>	82
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>	685
Short-billed Gull	<i>Larus canus</i>	66
Spotted Sandpiper	<i>Actitis macularius</i>	1
Surf Scoter	<i>Melanitta perspicillata</i>	13
Tufted Puffin	<i>Fratercula cirrhata</i>	12
Unidentified Murrelet	<i>Brachyramphus spp.</i>	2
Unidentified Shorebird	<i>Charadrii spp.</i>	2
White-winged Scoter	<i>Melanitta deglandi</i>	10
Harbor Seal	<i>Phoca vitulina</i>	548
Humpback Whale	<i>Megaptera novaeangliae</i>	1
River Otter	<i>Lontra canadensis</i>	5
Sea Otter	<i>Enhydra lutris</i>	165
Steller Sea Lion	<i>Eumetopias jubatus</i>	13



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Table 2. Raw counts for murrelets and pigeon guillemot by age group observed during the Kenai Fjords surveys.

Species	Adult	Juvenile
Marbled Murrelet	1717	11
Kittlitz's Murrelet	65	0
Unknown Murrelet	2	0
Pigeon Guillemot	135	3

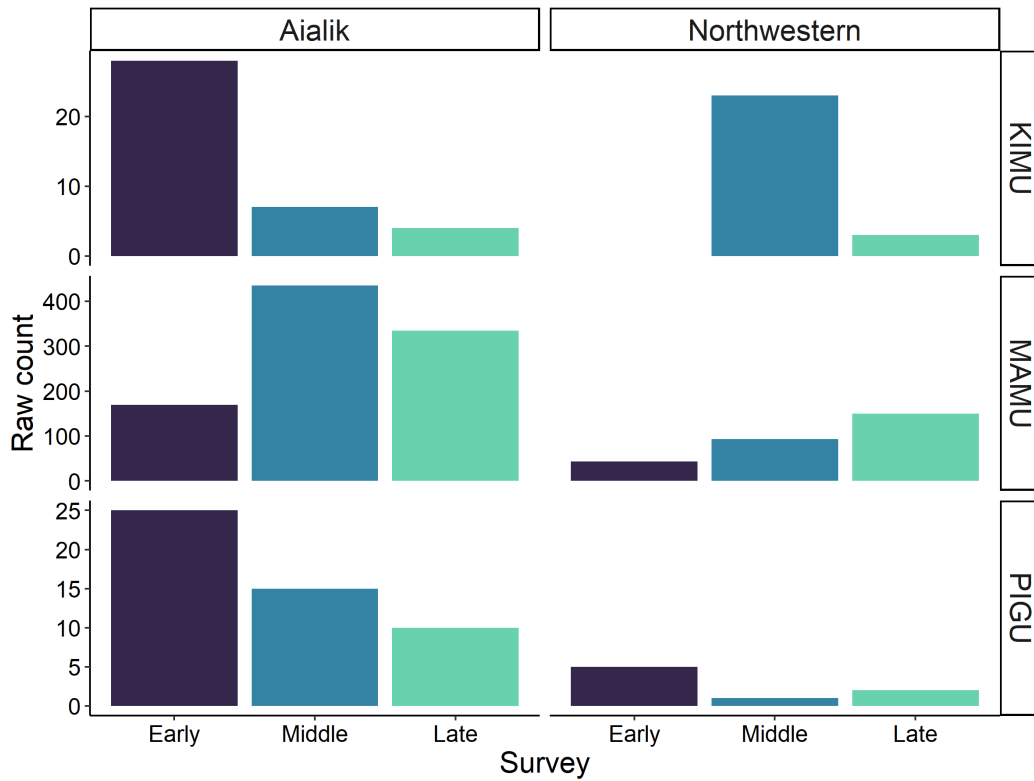


Figure 2. Raw counts of the three focal species in Aialik and Northwestern Fjords only for transects surveyed during all three surveys (data for transects not completed during all three surveys were excluded).



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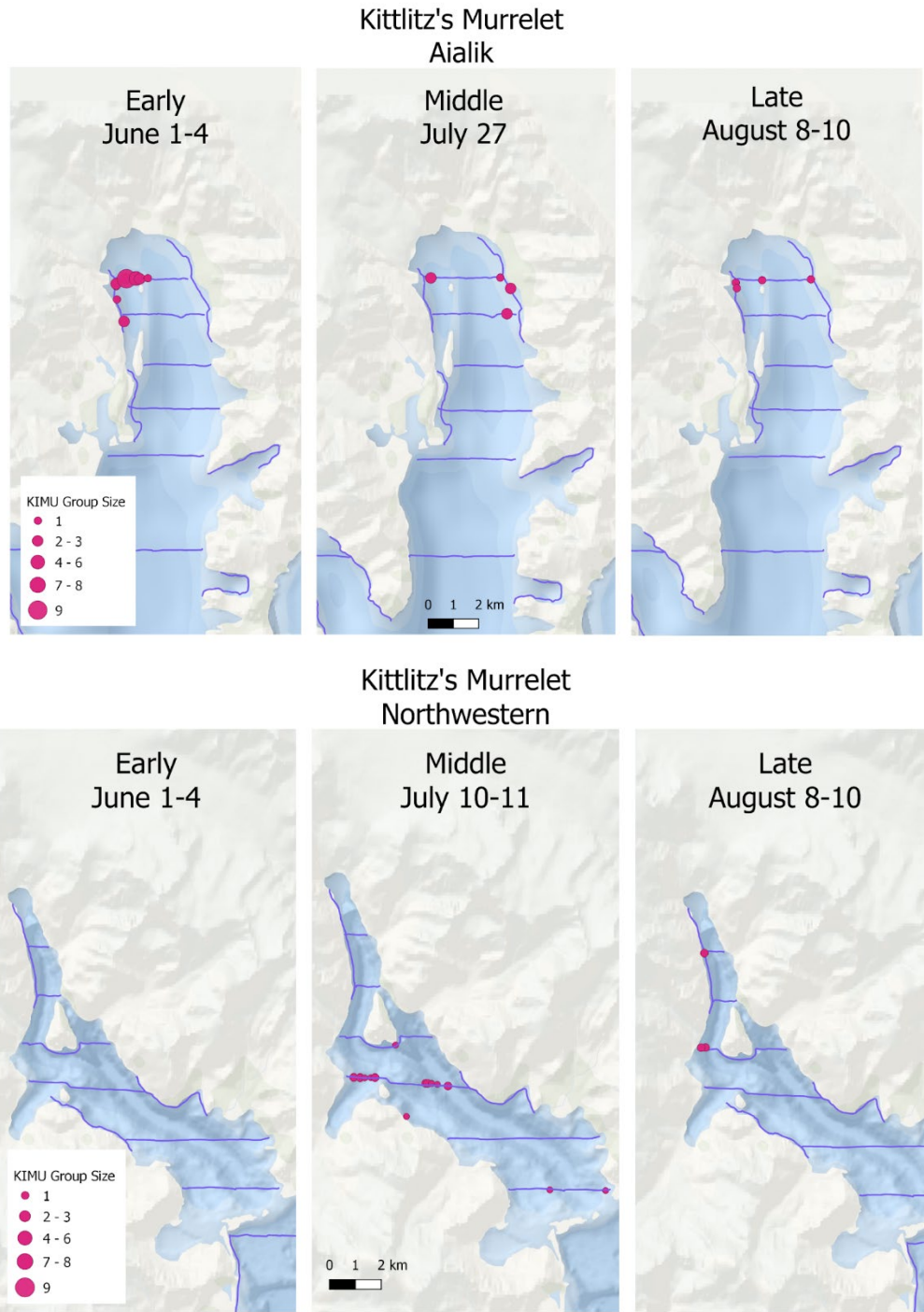


Figure 3. Distribution of Kittlitz's murrelet sightings in Aialik and Northwestern Fjords in 2022.





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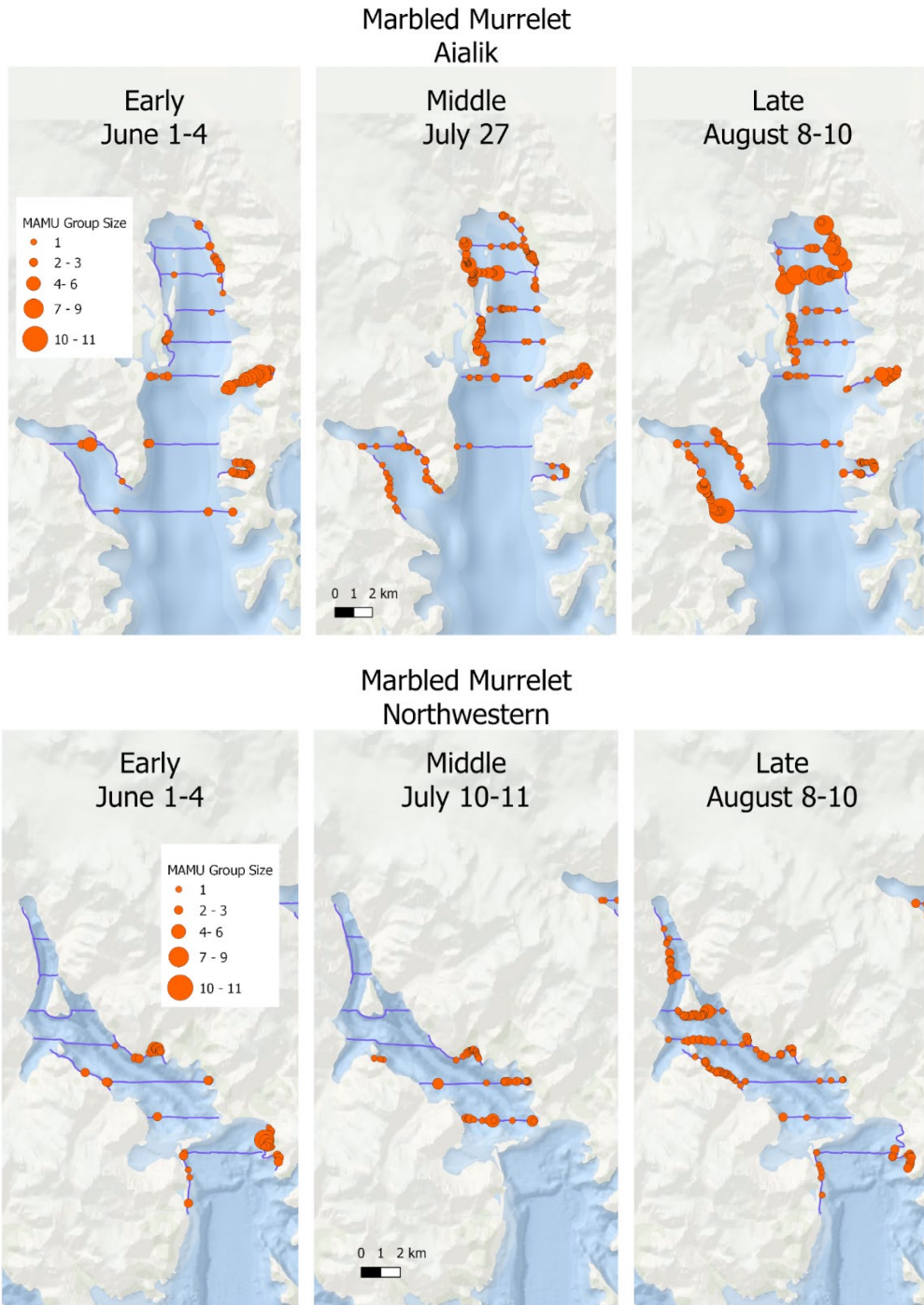


Figure 4. Distribution of marbled murrelet sightings in Aialik and Northwestern Fjords in 2022.



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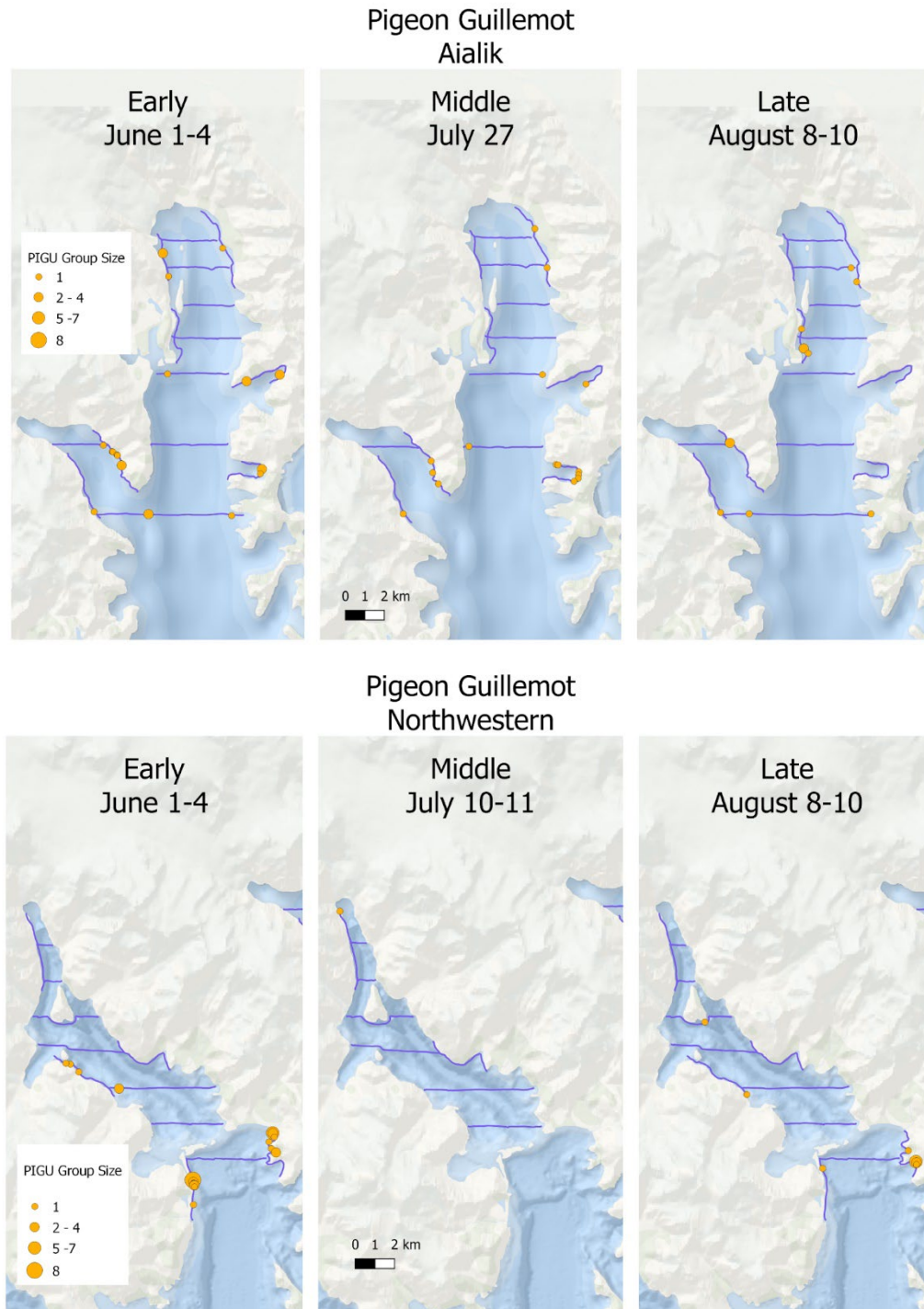


Figure 5. Distribution of pigeon guillemot sightings in Aialik and Northwestern Fjords in 2022.





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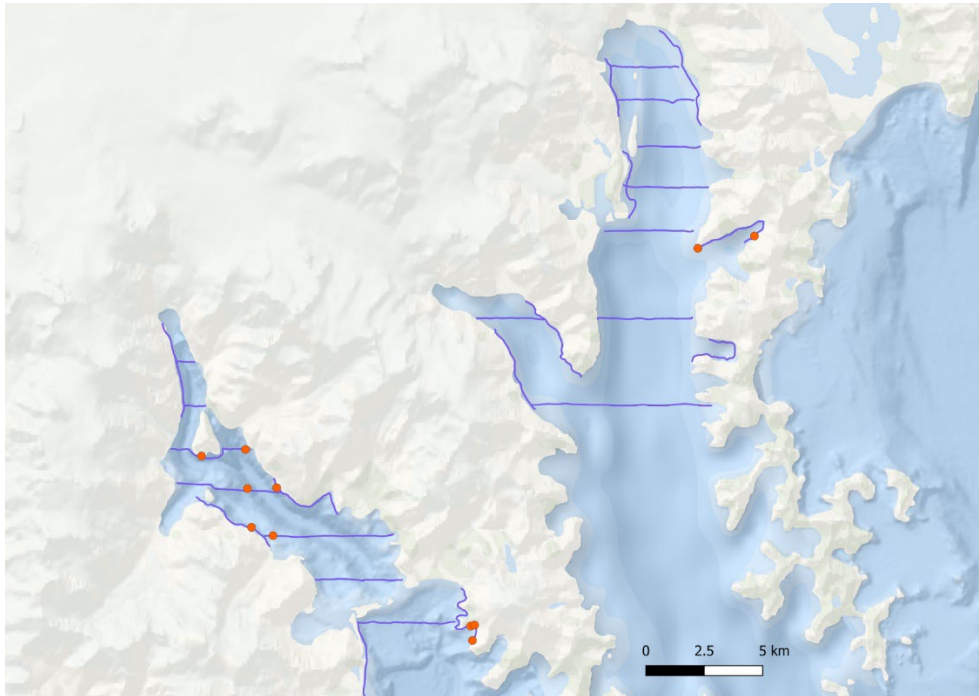


Figure 6. Locations of juvenile marbled murrelets seen on August surveys in 2022.



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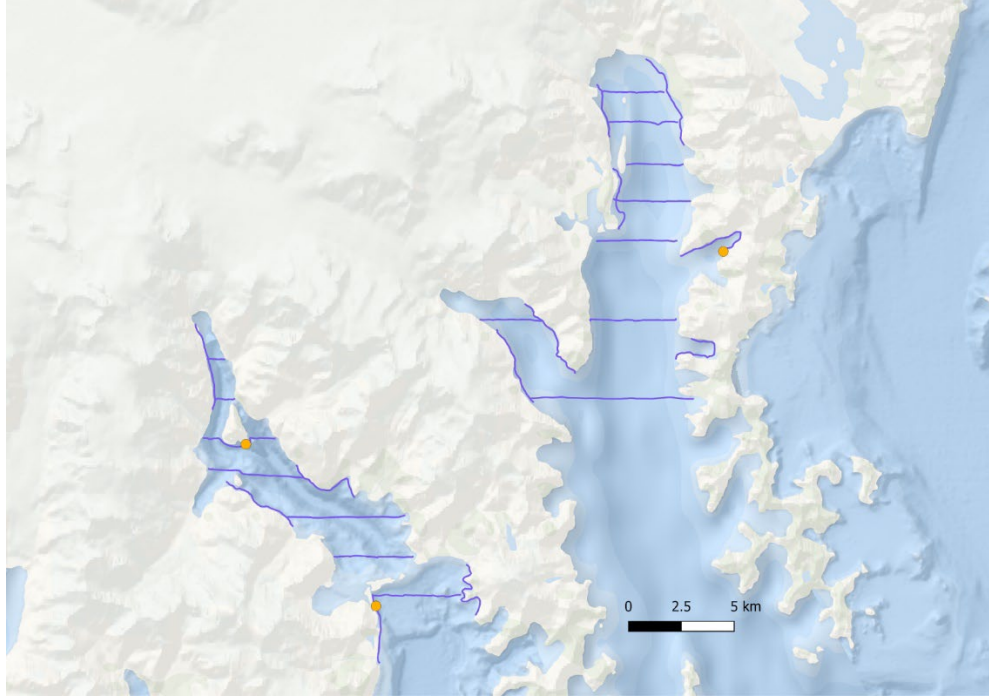


Figure 7. Locations of juvenile pigeon guillemots seen on August surveys in 2022.

Marbled murrelet and pigeon guillemot surveys were continued in upper and outer Resurrection Bay from July 26 - September 27, 2022 (Figure 8). Line surveys covered approximately 72 km of coastline and were conducted from a vessel traveling 100 m from the shore with an observer, data recorder, and vessel operator aboard. For these surveys, murrelets and pigeon guillemots were recorded in 25 m bins within 100 m from each side of the vessel in upper Resurrection Bay ( $N = 9$ ) and outer Resurrection Bay ( $N = 3$ ). Number, timing and distribution of observations are presented in Table 3 and Figures 9-10.



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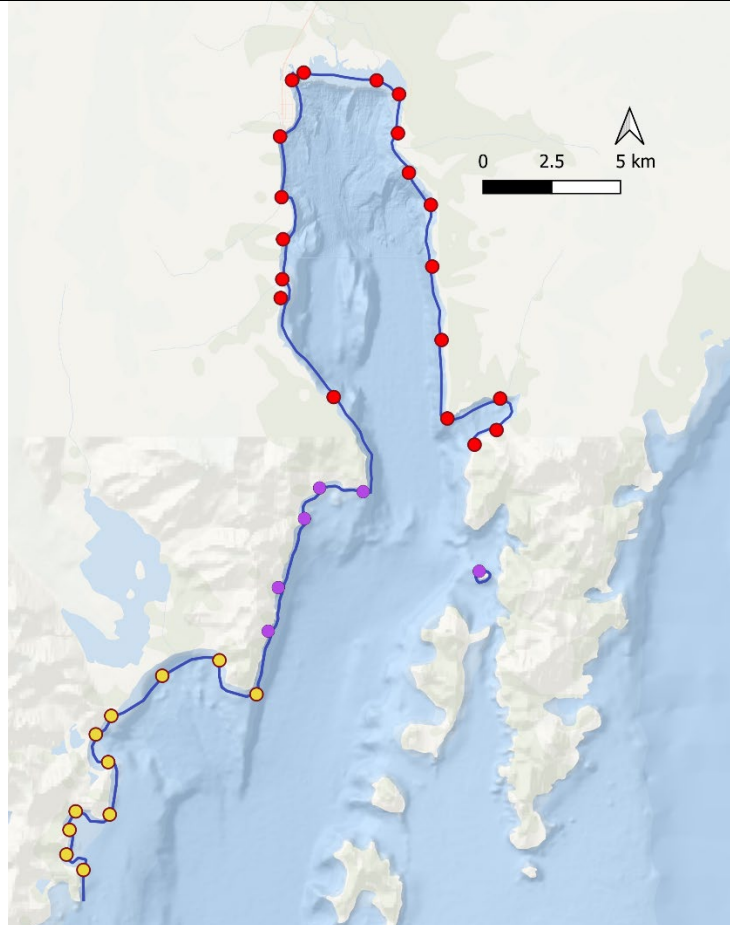


Figure 8. Survey route for marbled murrelets and pigeon guillemots in Resurrection Bay. Red points indicate beginning of upper bay transects and purple points are the beginning of an extended bay transect, these were conducted once every week from July 26 - September 27. The yellow points represent the beginning of outer bay transects which were surveyed once a month, three times total between July 26 - September 27, 2022.

Table 3. Raw counts for murrelets and pigeon guillemot in Resurrection Bay surveys from July 26 - September 27 2022 by age group.

Species	Adult	Juvenile	Unknown age
Marbled murrelet	1072	109	20
Kittlitz's murrelet	0	2	0
Unknown murrelet	0	0	1
Pigeon guillemot	262	33	1



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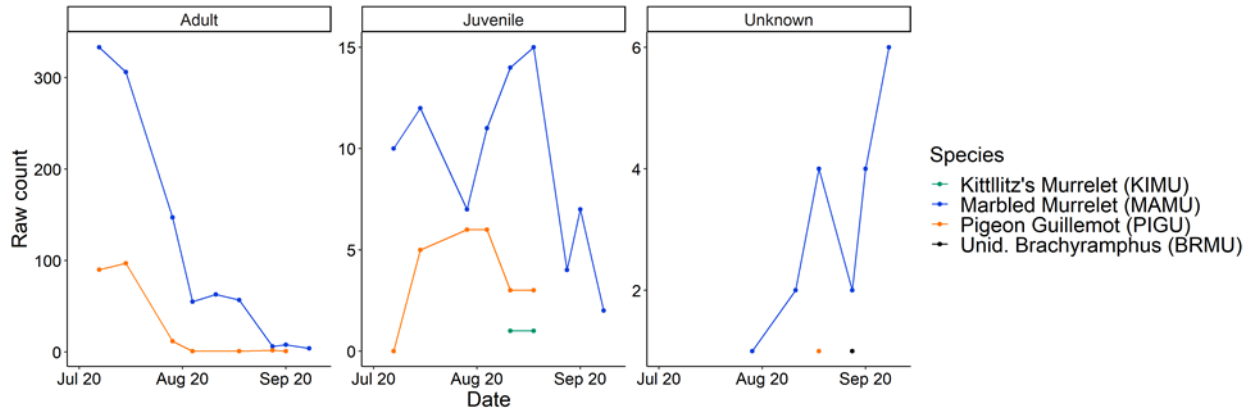


Figure 9. Timing of adult, juvenile, and unknown age murrelets and pigeon guillemots observations in surveys conducted during July 26 - September 27, 2022 in Resurrection Bay, Alaska. Observations include the upper bay and extended survey transects that were conducted weekly.

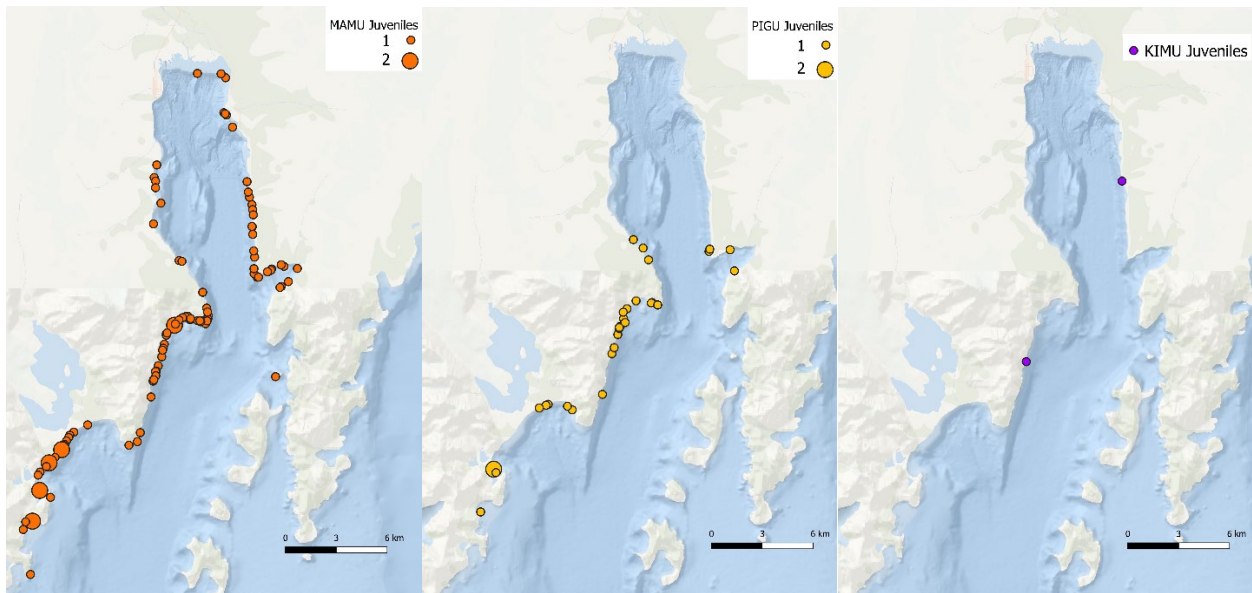


Figure 10. Observations of marbled murrelet, pigeon guillemot, and Kittlitz's murrelet juveniles in upper and outer Resurrection Bay from July 26 - September 27.

In 2022, we collected data on fjord hydrography at oceanography stations established by Gay and Armato (1999) and used by Arimitsu et al. (2012) (Figure 11). In addition to the established stations, we sampled a cross section of Aialik Fjord to evaluate cross-fjord hydrographic variability. We conducted a total of 56 CTD casts in Aialik, Northwestern, and McCarty fjords



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(Table 4). Additional sampling planned in McCarty Fjord was cancelled due to weather and Covid-19. Data was collected using a RBR Concerto CTD equipped with a turbidity sensor deployed with an electric fishing reel from the survey vessel. Preliminary findings from 2022 suggest that Aialik and Northwestern Fjords are hydrographically different and that water temperature generally increased throughout the season (Figures 12-17).



Figure 11. Map of oceanography stations surveyed in 2022. Stations were established by Gay and Armato (1999) and sampled by Arimitsu et al. (2012). Not all stations were sampled on all surveys in 2022 due to unforeseen circumstances.

Table 4. Number of CTD casts in 2022 in the Kenai Fjords study area, by season and fjord.

	Early	Middle	Late
Aialik	10	9	15
Northwestern	8	5	8
McCarty	-	1	-





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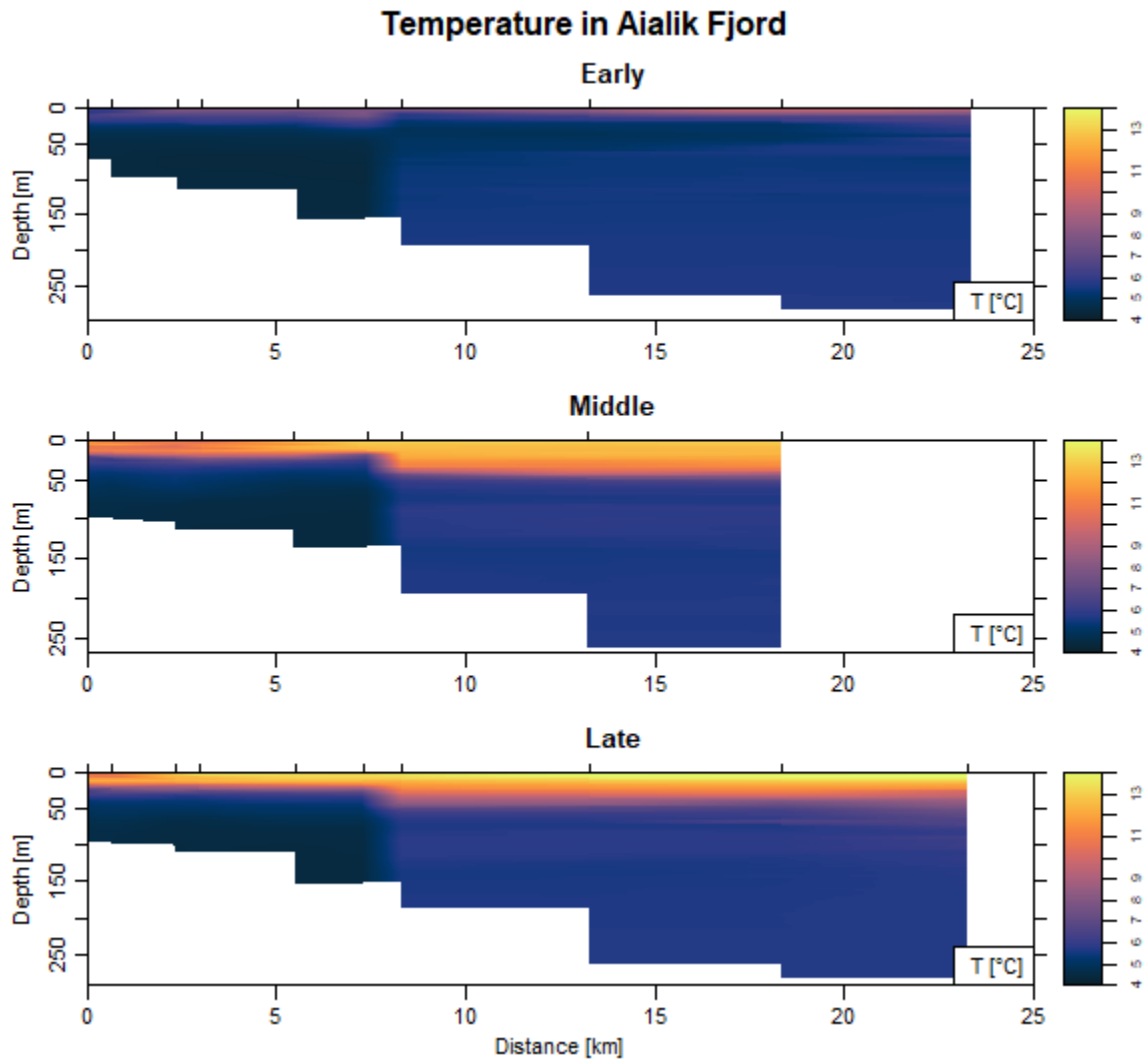


Figure 12. Latitudinal cross-section of water column temperature in Aialik Fjord during EVOSTC surveys in 2022. The x-axis represents distance from the first station, which is 800 m from the face of Aialik Glacier.



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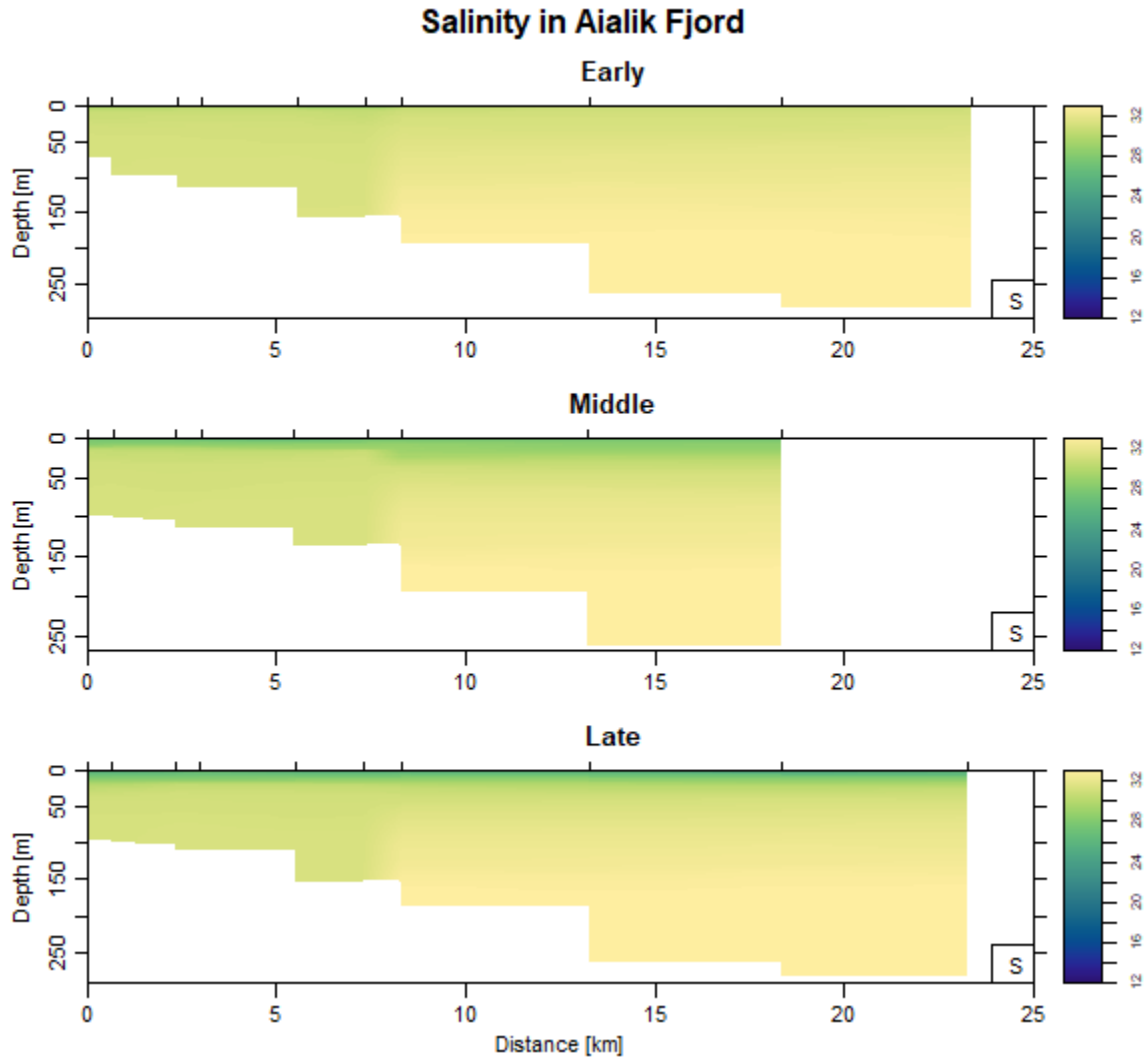


Figure 13. Latitudinal cross-section of water column salinity in Aialik Fjord during EVOSTC surveys in 2022. The x-axis represents distance from the first station, which is 800 m from the face of Aialik Glacier.



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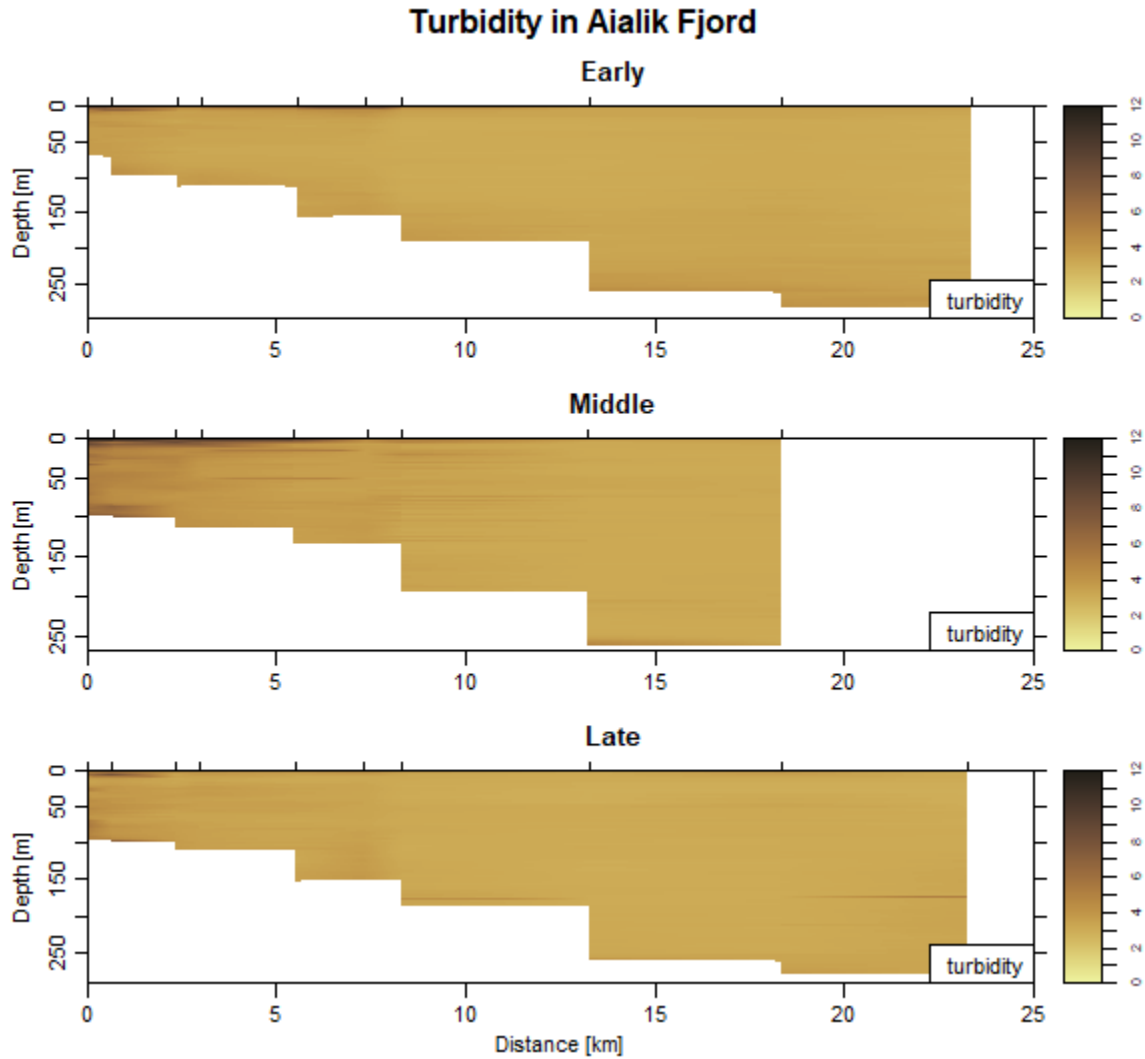


Figure 14. Latitudinal cross-section of water column turbidity in Aialik Fjord during EVOSTC surveys in 2022. The x-axis represents distance from the first station, which is 800 m from the face of Aialik Glacier.



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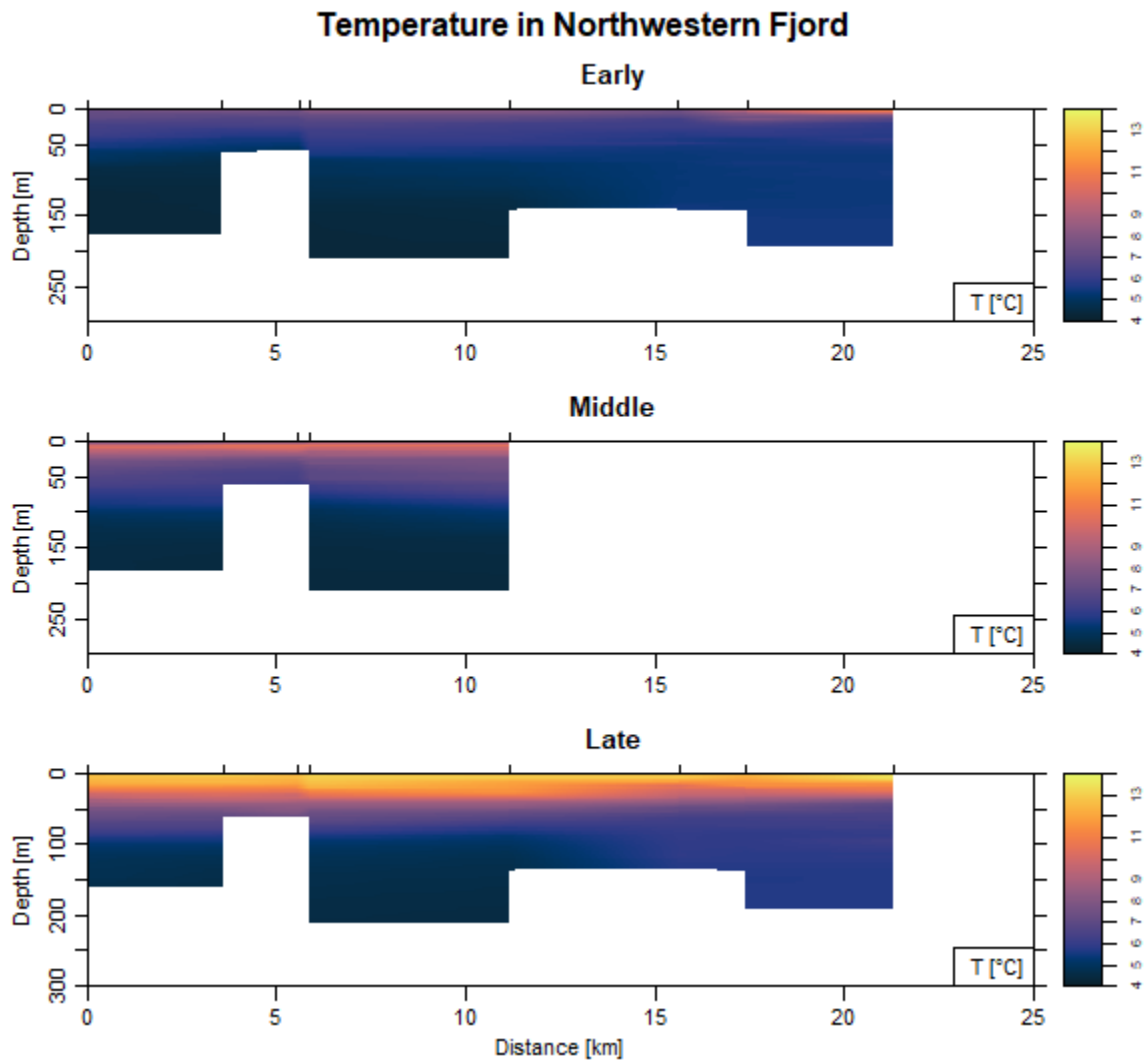


Figure 15. Latitudinal cross-section of water column temperature in Northwestern Fjord during EVOSTC surveys in 2022. The x-axis represents distance from the first station, which is 2.8 km from the face of Northwestern Glacier.



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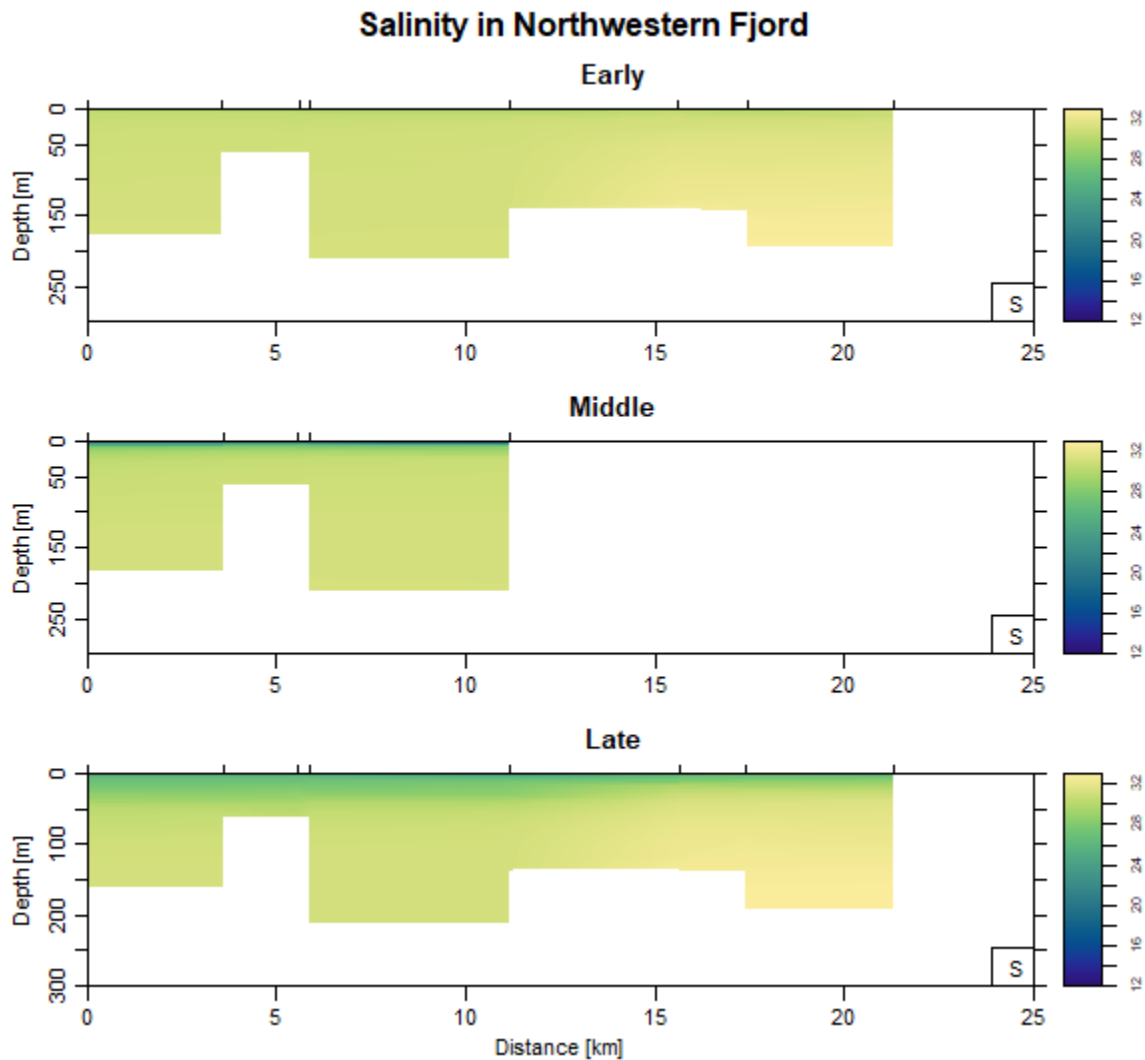


Figure 16. Latitudinal cross-section of water column salinity in Northwestern Fjord during EVOSTC surveys in 2022. The x-axis represents distance from the first station, which is 2.8 km from the face of Northwestern Glacier.





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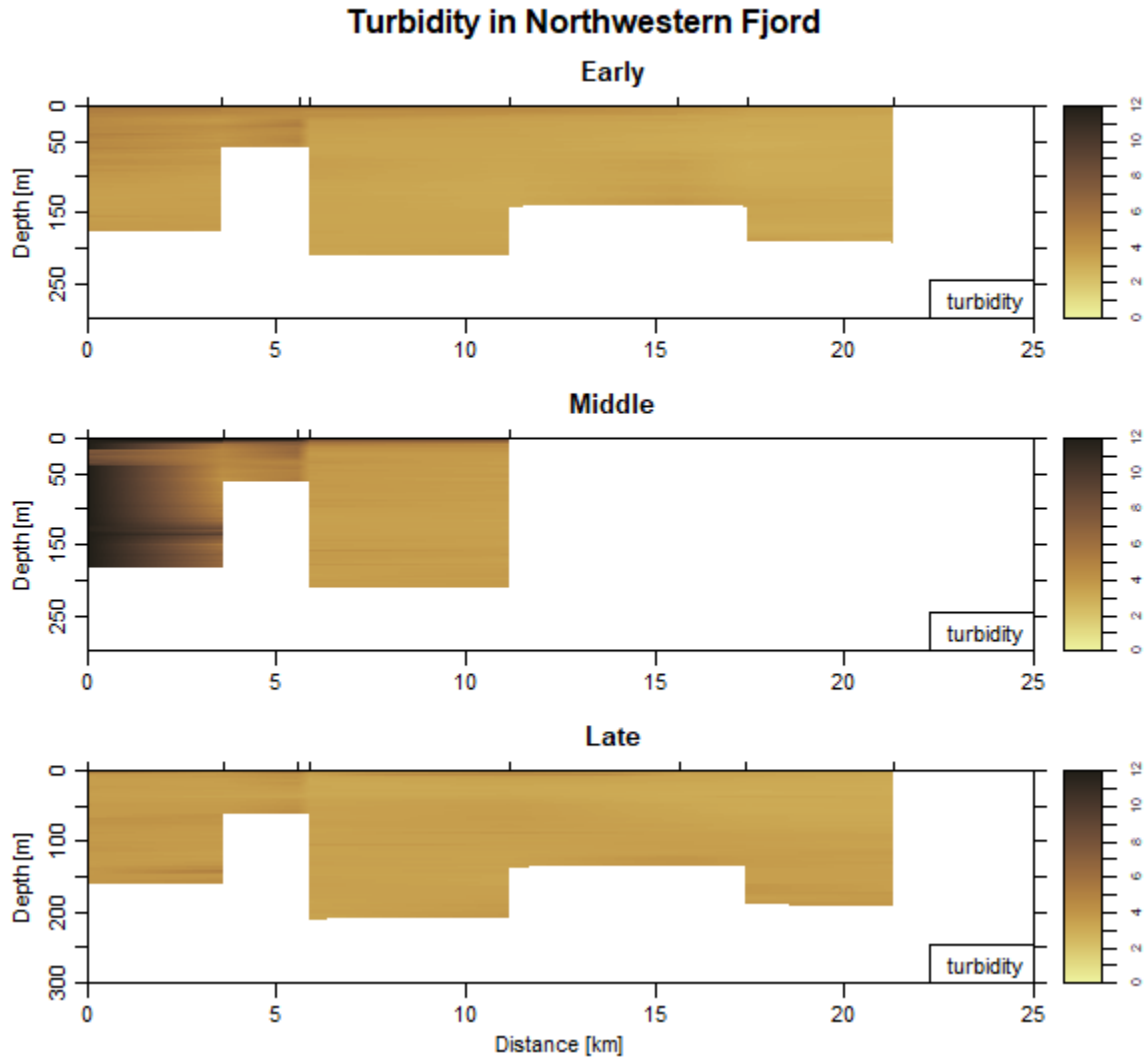


Figure 17. Latitudinal cross-section of water column turbidity in Northwestern Fjord during EVOSTC surveys in 2022. The x-axis represents distance from the first station, which is 2.8 km from the face of Northwestern Glacier.

We conducted exploratory hydroacoustic surveys using the survey vessel's echosounder to collect information about potential seabird prey availability and benthic habitat structure. During all transects, the echosounder log was recorded to a micro SD card as an .sl3 file. The survey vessel's transducer operates at both 50 and 200 kHz and both sonar logs are recorded simultaneously. The goal of these surveys is to explore quantifying both vertical and horizontal



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distribution of potential prey of EVOS affected species, and measure habitat variables that may relate to seabird and seabird forage habitat.

### **Kachemak Bay Component**

The Kachemak Bay component in 2022 conducted the second field season in coordination with the Kenai Peninsula Coast component. The second year of this study aimed to derive a robust population estimate for injured marine bird species that have not recovered following the *Exxon Valdez* oil spill, including *Brachyramphus* murrelets, in Kachemak Bay, Alaska. Following the 2021 survey results, we determined that we needed to increase our sample size by adding additional systematic transects to our study area to reduce the coefficient of variation for the population estimates.

In 2022 we successfully completed our primary set of 12 transects and the additional sets of transects in Kachemak Bay (Figure 18). Surveys were conducted in Kachemak Bay July 19 - July 30, 2022. Twenty three line transects bisecting the bay (north/south) were surveyed in July totaling approximately 424 km in Kachemak Bay. In addition we surveyed four historic transects parallel to the shore at the head of the bay totaling 24 km allowing us to compare our results to historic data collected in the region dating back to 1988. We detected a total of 5307 marine birds and 584 marine mammals during the July 2022 Kachemak Bay surveys (Table 5).

Kittlitz's murrelet observations (36 individuals) were generally low in Kachemak Bay (Table 5). Birds were primarily observed at the head of the bay along the south shore, and in the northern offshore waters in the bay (Figure 19). Marbled murrelets (1158 individuals) were more widely distributed in Kachemak Bay and occupied more coastal regions of the bay (Figure 19). We also documented a total of 94 pigeon guillemots during the survey. The birds were largely observed in the nearshore waters and near nesting colony sites.

Marine mammals were also recorded during this survey with sea otters being the predominate marine mammal observed (Table 5, Figure 19). In addition, we recorded harbor porpoise, harbor seals, humpback whale, minke whale and an undignified pinniped species (Table 5).

Kittlitz's murrelet observations were generally low in the study area but marbled murrelet were the most common observation type (Table 5, Figure 19). To adjust for detectability of each species, we fit a detection function using a uniform key model with cosine adjustment terms to five focal avian species (marbled murrelet, common murre, pigeon guillemot, *Brachyramphus* murrelet, and Kittlitz's murrelet) and to sea otter. In order to illustrate a common detection function across all avian species, we fit the same model as above to all species pooled, and the common detection function was overlaid on a histogram of distance bins across all species is shown in (Figure 20). Seabird detection was high out to the distance bin of 100 m and then dropped off quickly at 150 m. Average detection rate out to 150 m was 0.67 across all species.



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Detection rate was lowest for unidentified murrelets (0.65) and highest for pigeon guillemot (0.81). Abundance estimates for all seabirds had a reasonable coefficient of variation of 20-31% (Table 6). This level of precision was increase by about 2-fold over that achieved in 2021 due to the increased number of transects and is higher than found in past surveys (Kuletz et al. 2008) that did not use line transect distance sampling estimation methods. The additional survey effort will increase our ability to estimate population differences between current survey and past surveys, and map distribution of bird densities across the bay. For sea otters we detected 552 individuals in the bay (Figure 1). We fit the same detection model as for seabirds. We found detection to be 0.67 and estimated 4574 (SE = 542) sea otter in Kachemak Bay (Table 2), which is similar to but more precise than the estimate in 2021.

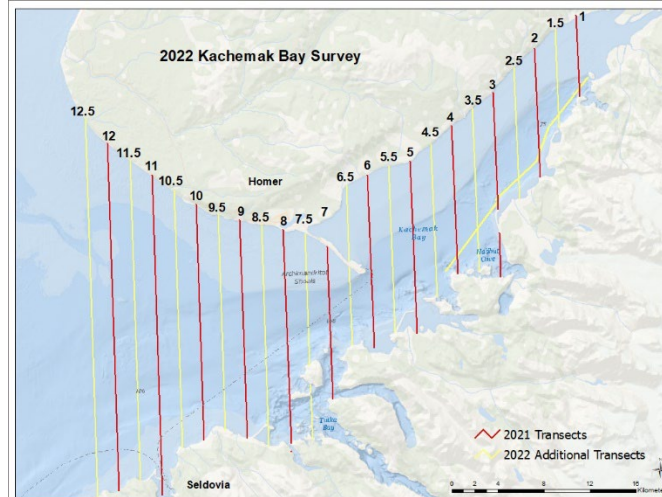


Figure 18. Transects surveyed in Kachemak Bay, Alaska, July 19 – July 29, 2022. Red lines represent original set of transects surveyed in 2021. Yellow lines represent additional transects added and surveyed in 2022.



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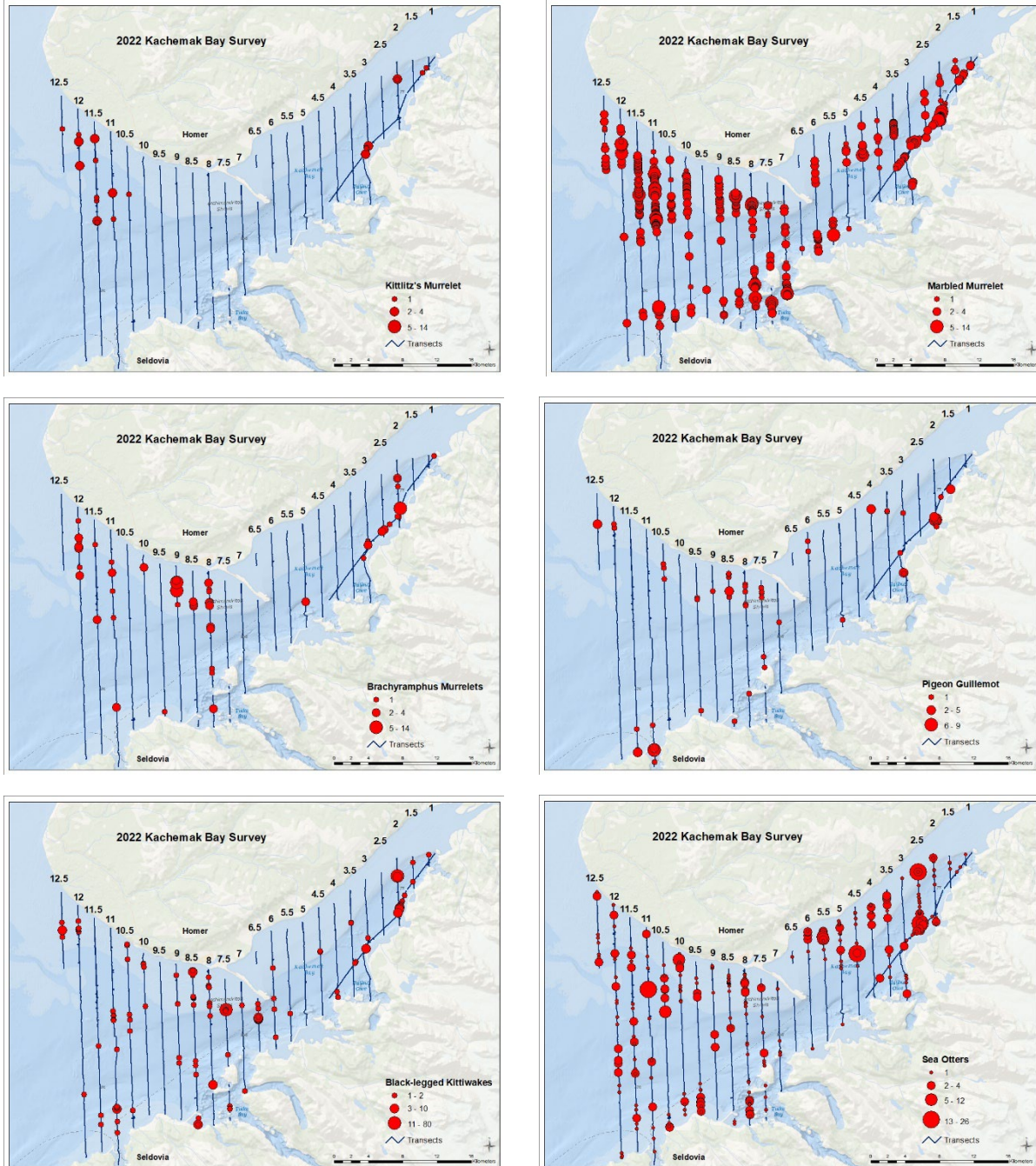


Figure 19. Species distribution maps for selected marine birds and sea otters in Kachemak Bay, Alaska, July 19 – July 29, 2022.



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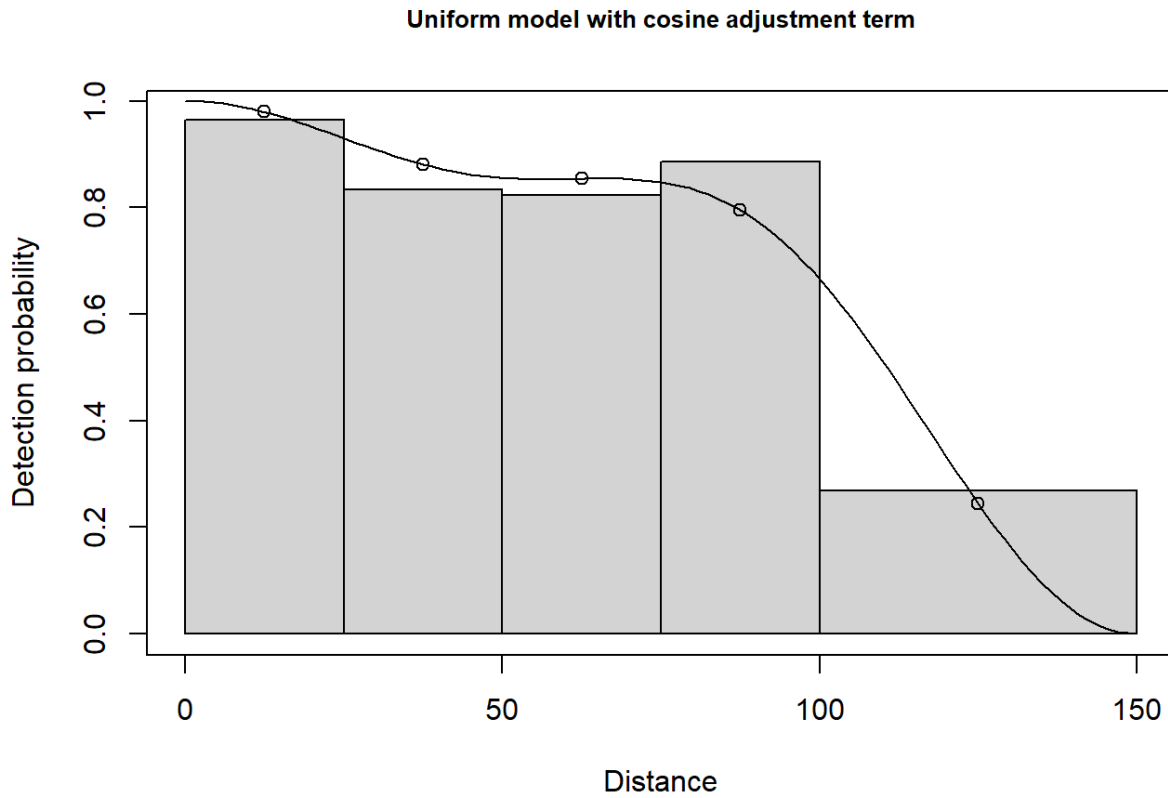


Figure 20. Histogram of observed distances for core seabird species, with the estimated detection function, during surveys in Kachemak Bay, Alaska, July 19 – July 29, 2022. The detection function was estimated using a half normal model, although other functional forms fit the data nearly equivalently. Average detection rate out to 150 m was 0.67 in 2022.





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Table 5. Marine bird and mammal observations recorded on the water and in the air during surveys in Kachemak Bay, Alaska, July 19 – July 29, 2022.

English Name	Scientific Name	Number
Aleutian Tern	<i>Onychoprion aleuticus</i>	7
Arctic Tern	<i>Sterna paradisaea</i>	24
Ancient Murrelet	<i>Synthliboramphus antiquus</i>	1
Black-legged Kittiwake	<i>Rissa tridactyla</i>	272
Black Turnstone	<i>Arenaria melanocephala</i>	4
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	7
Brachyramphus Murrelet	<i>Brachyramphus spp.</i>	103
Common Loon	<i>Gavia immer</i>	18
Common Merganser	<i>Mergus merganser</i>	25
Common Murre	<i>Uria aalge</i>	585
Fork-tailed Storm-petrel	<i>Hydrobates furcatus</i>	13
Glaucous-winged Gull	<i>Larus glaucescens</i>	101
Harlequin Duck	<i>Histrionicus histrionicus</i>	27
Harbor Porpoise	<i>Phocoena phocoena</i>	1
Harbor Seal	<i>Phoca vitulina</i>	22
Humpback Whale	<i>Megaptera novaeangliae</i>	6
Herring gull	<i>Larus argentatus</i>	3
Horned Puffin	<i>Fratercula corniculata</i>	2
Kittlitz's Murrelet	<i>Brachyramphus brevirostris</i>	36
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	1158
Short-billed Gull	<i>Larus brachyrhynchus</i>	1
Minke Whale	<i>Balaenoptera acutorostrata</i>	1
Pacific Loon	<i>Gavia pacifica</i>	10
Pelagic Cormorant	<i>Urile pelagicus</i>	1
Pigeon Guillemot	<i>Cepphus columba</i>	94
Pomarine Jaeger	<i>Stercorarius pomarinus</i>	1
Red Phalarope	<i>Phalaropus fulicarius</i>	30
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>	2
Red-necked Grebe	<i>Podiceps grisegena</i>	3
Red-necked Phalarope	<i>Phalaropus lobatus</i>	116
Rufous Hummingbird	<i>Selasphorus rufus</i>	1
Sea Otter	<i>Enhydra lutris</i>	552
Sooty Shearwater	<i>Ardenna grisea</i>	2337
Surf Scoter	<i>Melanitta perspicillata</i>	22
Tufted Puffin	<i>Fratercula cirrhata</i>	1



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Unidentified Alcid	<i>Alcidae (Family)</i>	2
Unidentified Bird	<i>Aves (Class)</i>	2
Unidentified Goldeneye	<i>Bucephala spp.</i>	3
Unidentified Gull	<i>Larus spp.</i>	51
Unidentified Loon	<i>Gavia spp.</i>	1
Unidentified Pinniped	<i>Caniformia (Suborder)</i>	2
Unidentified Scoter	<i>Melanitta spp.</i>	155
Unidentified Tern	<i>Sterninae spp.</i>	3
White-winged Scoter	<i>Melanitta deglandi</i>	84
Yellow-billed Loon	<i>Gavia adamsii</i>	1

Table 6. Population estimates from a uniform detection key model and cosine adjustments for each fit separately to each species. SE is  $\pm 1$  standard error, CV is the coefficient of variation, Lower and Upper are the lower and upper 95% confidence intervals on the population estimate, respectively. CVs were reduce by about one-half for each species compared to 2021.

Species	Population Estimate	SE	CV	Lower	Upper
<i>Brachyramphus</i> Murrelet	796	246	0.31	420	1509
Kittlitz's Murrelet	922	259	0.28	516	1650
Marbled Murrelet	9812	1998	0.20	6520	14764
Common Murre	5634	1209	0.21	3652	8690
Pigeon Guillemot	566	149	0.26	336	953
Sea Otter	4574	542	0.12	3626	5770

### Integration Component

Data collection methods were coordinated between the two component areas by joint training in distance sampling methods, coordination of survey data entry systems, coordination of field work plans, and holding regular meetings among the team of investigators. Data management was coordinated by development of a joint data management plan. To support integration, the joint project continued to standardize survey methods and protocols to facilitate future integrated data analysis between the two regions. Before the start of the surveys, we conducted test surveys, distance sampling tests, and coordinated the types of data we would collect during our respective surveys.



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**2. Products:**

Peer-reviewed publications:

None at this time

Reports:

None at this time

Popular articles:

None at this time

Conferences and workshops:

Labunski, E., Kaler, R., Kuletz, K. A project overview at the Pacific Seabird Group Kittlitz's and Marbled Murrelet Technical Committee meeting, February 2022.

Labunski, E., Kaler, R. A project update at the Fall Gulf Watch Alaska PI Meeting, October 2022.

Public presentations:

Hollmen, T.E. Project outreach presentations, ASLC Education and Public Outreach Programs, 2022

Labunski, E., Kaler, R. A project update presented at the Alaska Migratory Co-Management Council Meeting, September 2022.

Data and/or information products developed during the reporting period:

Produced species summary tables and distribution maps for Resurrection Bay and Kenai Fjords.

Produced species summary tables and select species distribution maps for Kachemak Bay.

Generated population estimates for five seabird species and sea otters based on July 2022 systematic surveys.



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Data sets and associated metadata:

We are coordinating with Axiom Data Science to archive transect location information, survey data, analysis output, and associated metadata for the project. We have created a joint data management plan and a research workspace to archive subsequent data sets to ensure comprehensive data sharing between the two project components. In addition, all finalized survey data will be formatted and archived in the North Pacific Pelagic Seabird Database (NPPSD) and made publicly available by the U.S. Geological Survey Alaska Science Center.

*Additional Products not listed above:*

None at this time.

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**3. Coordination and Collaboration:**

The Alaska SeaLife Center or Prince William Sound Science Center

PI Hollmen is affiliated with the Alaska SeaLife Center. Research and outreach aspects of our integrated project have been closely coordinated throughout the duration of our project. Prior to surveys, project PIs from both components conducted a field test in Seward, Alaska to coordinate survey methods between the two components of the project to ensure the standardization of data collection methods, and test distance sampling protocols. The team of investigators meets throughout the year to continue close coordination of integrated efforts.

EVOSTC Long-Term Research and Monitoring Projects

PI Labunski has participated in annual meetings of the EVOSTC LTRM program, presenting updates and facilitating coordination efforts between the projects. Future discussions will explore opportunities to share and integrate data for further region-wide analysis on trends and distribution of focal species, including sea otters. We attended the fall 2022 Gulf Watch Alaska PI meeting and presented an update to the group highlighting our projects objects and sampling schedule to seek collaborative opportunities. Marine bird and mammal data collected in this study will be available to researchers on the Northern Gulf of Alaska Long Term Ecological Research (NGA-LTER) projects. The Kenai Peninsula components has been in contact with NGA-LTER project PIs to coordinate shared efforts. Our project will provide marine bird and mammal distribution data and population estimates to the following projects to contribute to interpreting regionwide results: Project 22120114-M, Prince William Sound Marine Bird Population Trends and Offshore Surveys; Project 22110853, Pigeon Guillemot Restoration Research in Prince William Sound; Project 22120114-C, Long-term Changes in Forage Fish,



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Abundance, and Body Condition in PWS; and Project 22120114-H, Nearshore Ecosystem in the Gulf of Alaska.

*EVOSTC Mariculture Projects*

Data collected during our surveys will be made available to the mariculture projects in the region to assist in the development process. We have been in contact with Anne Schaefer (PWSSC\_ to discuss plans to coordinate marine bird and mammal surveys in Kachemak Bay to support the mariculture ReCon program (Project 22220302). We have shared information on the timing of our surveys in Kachemak Bay, discussed historic transects that have been conducted over the years in Kachemak Bay, and agreed to collaborate on data sharing in the future. Finalized datasets will be archived at the Project Workspace and the publicly available North Pacific Pelagic Seabird Database.

*EVOSTC Education and Outreach Projects*

PI Hollmen is on the project team for the CORaL network, facilitating close collaborations and coordination of activities between our project and the network.

The Kenai Peninsula Coast component participated with a booth in the Seward Seabird Festival in 2022, sharing information about our project with the public.

The Kachemak Bay component has been contacted by the organizers of the Kachemak Bay Shorebird Festival to participate in the 2023 festival in Homer, Alaska. Co-PIs Elizabeth Labunski and Robb Kaler will conduct a community presentation on Kittlitz's murrelets during the 31<sup>st</sup> Annual Shorebird Festival this upcoming spring.

*Trustee or Management Agencies*

Several investigators in our project team are from the US Fish and Wildlife Service, facilitating close coordination of efforts between our project and the agency. Marine bird data collected during the project supports the USFWS-MBM mission to advance the conservation of migratory birds.

In addition to informing the EVOSTC regarding recovery of impacted resources, the project will inform other management agencies (ADFG, AMNWR, BOEM, NPS, and USGS) with lands and waters in the Gulf of Alaska region. We also continue coordinating field and outreach efforts closely with our partners in the Kenai Fjords National Park.

*Native and Local Communities*





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The Resurrection Bay survey is closely linked to a community science project established in Seward in 2018, engaging local high school students in marine bird observations throughout the school year and lead by PI Hollmen. The student science education program is continuing during the school year of 2022-2023.

In Kachemak Bay, we will be presenting at the annual Kachemak Bay Shorebird Festival.

We also look forward to coordinating future outreach opportunities in native and local communities by coordinating with the CORaL network to assist in facilitating additional outreach opportunities.

**4. Response to EVOSTC Review, Recommendations and Comments:**

Previous review recommendations have been incorporated into our study plan.

**5. Budget:**

**Kenai Peninsula Coast Component**

Budget Category:	Proposed FY 21	Proposed FY22	Proposed FY23	Proposed FY24	Proposed FY25	TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	\$29,263.0	\$30,141.0	\$31,045.0	\$31,977.0	\$32,935.0	\$155,361.0	\$ 41,258
Travel	\$595.0	\$0.0	\$0.0	\$0.0	\$670.0	\$1,265.0	\$ 453
Contractual	\$72,300.0	\$80,469.0	\$76,702.0	\$49,500.0	\$50,985.0	\$329,956.0	\$ 22,319
Commodities	\$5,000.0	\$0.0	\$0.0	\$0.0	\$0.0	\$5,000.0	\$ 12,608
Equipment	\$5,000.0	\$0.0	\$0.0	\$0.0	\$0.0	\$5,000.0	\$ 13,118
Indirect Costs ( <i>will vary by proposer</i> )	\$34,291.0	\$35,395.0	\$34,479.0	\$26,073.0	\$27,069.0	\$157,307.0	\$ 24,524
<b>SUBTOTAL</b>	<b>\$146,449.0</b>	<b>\$146,005.0</b>	<b>\$142,226.0</b>	<b>\$107,550.0</b>	<b>\$111,659.0</b>	<b>\$653,889.0</b>	<b>\$ 114,280</b>
General Administration (9% of subtotal)	\$13,180	\$13,140	\$12,800	\$9,680	\$10,049	\$58,850	\$10,285.0
<b>PROJECT TOTAL</b>	<b>\$159,629</b>	<b>\$159,145</b>	<b>\$155,026</b>	<b>\$117,230</b>	<b>\$121,708</b>	<b>\$712,739</b>	<b>\$124,565</b>
Other Resources (Cost Share Funds)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	N/A

COMMENTS:  
**This summary page provides an five-year overview of proposed funding and actual cumulative spending.** The column titled 'Actual Cumulative' must be updated each fiscal year as part of the annual reporting requirements. Provide information on the total amount actually spent for all completed years of the project. On the Project Annual Report Form, if any line item exceeds a 10% deviation from the originally-proposed amount; provide detail regarding the reason for the deviation.



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**Kenai Peninsula Component:**

**Personnel:** Staff salary costs consisted of part time regular staff salaries and seasonal staff salaries, and were as anticipated. Staff participated in preparation for field work, survey work, data QA/QC, and preparation of data summaries.

**Travel:** Costs were as anticipated and consisted of Co-PI travel for field work and parking fees.

**Contractual:** Contractual costs included vessel charters, intern housing, and PI time. Due to the COVID-19 related delay in starting the coast wide surveys (survey start was moved from FY21 to FY22), the current cumulative costs are lower than originally anticipated at this time, but are as anticipated overall.

**Commodities:** Commodities costs were higher than originally anticipated, due to increased supply and shipping costs, and an unanticipated need for back up data logging system and retrieval system to operate the oceanographic instrument.

**Equipment;** Oceanographic instrument cost was higher than originally anticipated.

**Kachemak Bay Component**

<b>Budget Category:</b>	Proposed FY 21	Proposed FY22	Proposed FY23	Proposed FY24	Proposed FY25	TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	\$42,500.0	\$62,933.0	\$64,821.4	\$66,765.4	\$37,704.9	\$274,724.7	\$41,641.0
Travel	\$7,440.0	\$15,300.1	\$15,696.8	\$16,105.9	\$9,773.0	\$64,315.8	\$11,758.0
Contractual	\$0.0	\$30,000.0	\$30,000.0	\$30,000.0	\$0.0	\$90,000.0	\$0.0
Commodities	\$7,495.2	\$10,635.0	\$12,774.0	\$11,317.0	\$0.0	\$42,221.2	\$12,969.0
Equipment	\$36,200.0	\$0.0	\$4,000.0	\$0.0	\$0.0	\$40,200.0	\$14,275.0
<b>SUBTOTAL</b>	<b>\$93,635.2</b>	<b>\$118,868.1</b>	<b>\$127,292.1</b>	<b>\$124,188.4</b>	<b>\$47,477.9</b>	<b>\$511,461.7</b>	<b>\$80,643.0</b>
General Administration (9% of subtotal)	\$8,427.2	\$10,698.1	\$11,456.3	\$11,177.0	\$4,273.0	\$46,031.6	
<b>PROJECT TOTAL</b>	<b>\$102,062.3</b>	<b>\$129,566.2</b>	<b>\$138,748.4</b>	<b>\$135,365.3</b>	<b>\$51,750.9</b>	<b>\$557,493.2</b>	
Other Resources (Cost Share Funds) FWS in-kind support	\$48,144.0	\$49,408.3	\$50,710.6	\$52,051.9	\$47,433.4	\$247,748.2	
<p><b>COMMENTS:</b>Actual cumulative amount summarizes the funds spend for FY22. Spending deviated more than 10% below projected amounts for FY22. Unspent funds will be rolled over to FY23. Additional details provide for each spending category in the budget section of the annual report. This summary page provides an five-year overview of proposed project funding and actual cumulative spending. The column titled 'Actual Cumulative' must be updated each fiscal year as part of the annual reporting requirements. Provide information on the total amount actually spent for all completed years of the project. On the Project Annual Report Form, if any line item exceeds a 10% deviation from the originally-proposed amount; provide detail regarding the reason for the deviation.</p>							



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**Kachemak Bay Component:**

**Personnel:** Staff salary cost were lower than projected estimate in FY22. Two seasonal employee's GS-7 salary was charged for the time that was allocated to prepare for the field study and associated time conducting surveys in Kachemak Bay. Additional time was allotted to finalize QA/QC data edits. Personnel salary was also lower given COVID-19 mitigation policies prevented in person outreach opportunities and extended coordination meetings.

**Travel:** Travel costs were slightly lower than projected budget. In the original budget we planned on having crewmember switch out during the survey. COVID-19 mitigation policies prevented us from switching crewmembers out to lessen potential COVID-19 exposure risk. The survey crew traveled to Homer, AK by government vehicle and formed a "bubble environment" to minimize potential COVID-19 exposure. No airline travel was utilized.

**Contractual:** Given 2021 was the first year both components of this project conducted a field season, we did not have any data to analyze collaboratively in FY22 as originally planned by contractual obligation. We anticipate procuring contractual obligations in FY23 and will rollover unspent funds accordingly to conduct the data integration work.

**Commodities:** Commodities costs were lower than projected. We were able to maximize available USFWS survey supplies that offset and minimize costs.

**Equipment:** In 2022 we utilized rolled over funds from the 2021 field season to purchase equipment that was not available in 2021 due to supply chain issues. In FY22 we purchased a GPS plotter for the research vessel, crew safety equipment (float coats, immersion suits, life raft, emergency ditch bag supplies), and waterproof electronics case. The vessel also underwent annual mechanical maintenance inspection, and it was determined that only minor repairs and maintenance measures were required. Our FY21 projected budget also included the purchase of 2 survey laptops. We were unable to purchase these laptops in FY21 and FY22 given USFWS policy requires all computer purchase be made a USFWS storefront inventory. Unfortunately, due to supply chain issues the USFWS laptop inventory had no computers available for purchase in 2022. We are currently on the order list to purchase 2 survey laptops and plan to purchase the laptops in 2023 now that inventory has become available again.

**Literature Cited**

Arimitsu, M. L., Piatt, J. F., Madison, E. N., Conaway, J. S., and N. Hillgruber. 2012. Oceanographic gradients and seabird prey community dynamics in glacial fjords. *Fisheries Oceanography* 21(2–3): 148–169. <https://doi.org/10.1111/j.1365-2419.2012.00616.x>



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Gay, S. M., and P. J. Armato. 1999. Hydrography of McCarty Fjord, Northwestern Fjord and Aialik Bay, Kenai Fjords National Park, Alaska. Report to the National Park Service. Prince William Sound Science Center, Cordova, Alaska. 47pp.

Kuletz, K. J., Labunski, E. A., and S. G. Speckman. 2008. Abundance, distribution, and decadal trends of Kittlitz's and marbled murrelets and other marine species in Kachemak Bay, Alaska. Final Report (Project No. 14) by U.S. Fish and Wildlife Service for Alaska Department of Fish and Game, State Nongame Wildlife Grant, Anchorage, Alaska.