***Exxon Valdez* Oil Spill Trustee Council**
Long-Term Research and Monitoring, Mariculture, Education and Outreach
Annual Project Reporting Form

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: 24210128

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

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Reporting Period: February 1, 2024 – January 31, 2025

Submission Date: March 31, 2025

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.**

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 2024. The early season surveys were conducted June 3 - 6 in Aialik and Northwestern Fjords (Figure 1). The middle season surveys were conducted during July 8 - 15 in Aialik, Northwestern, and McCarty Fjords (Figure 1). The late season surveys were conducted August 4 - 9 in Aialik and Northwestern Fjords.

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 54 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 are summarized in Table 2 and Figure 2. Distribution of murrelets and pigeon guillemots in Kenai Fjords during surveys in 2024 is presented in Figures 3-12.

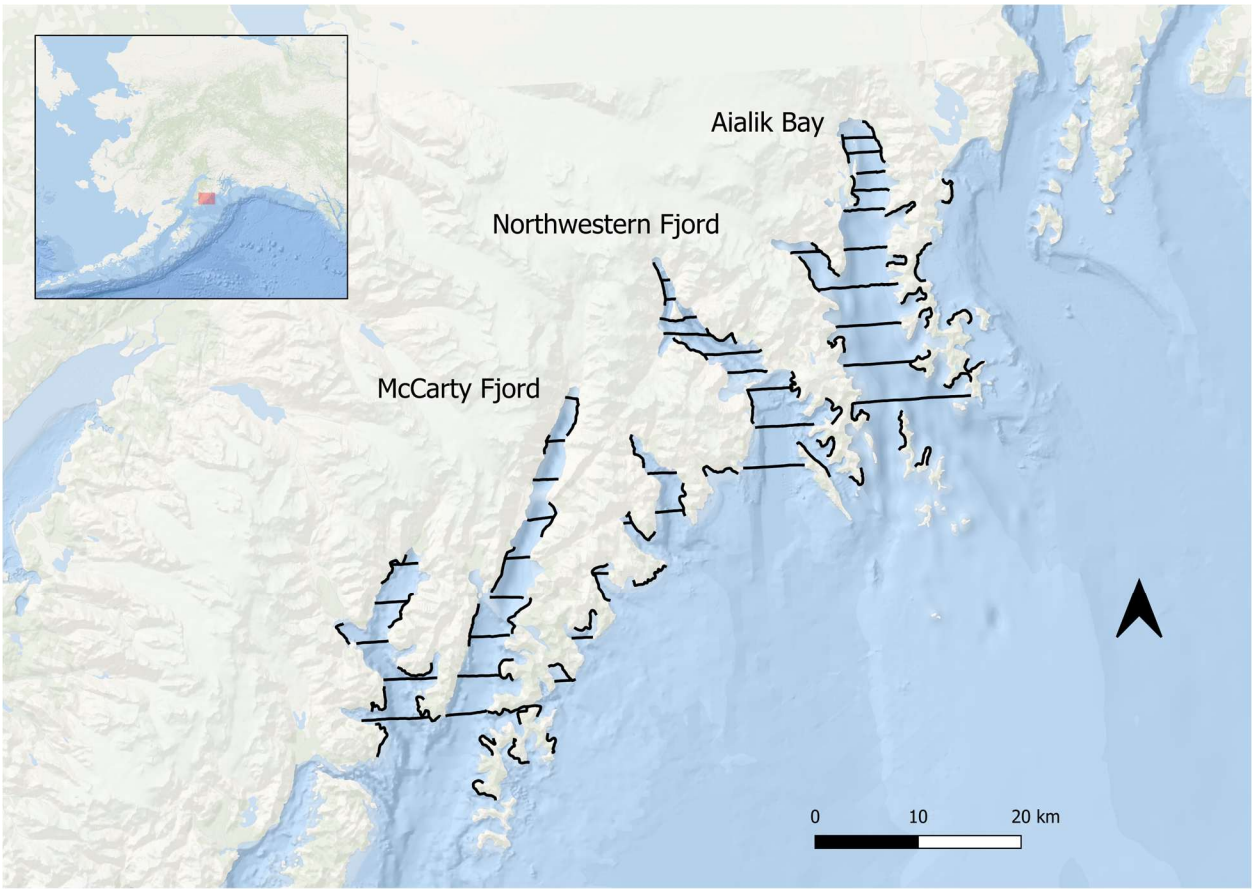

Figure 1. Transects completed in 2024 during either the early, middle, or late surveys.

Table 1. Marine bird and mammal observations recorded on water, on land, and in the air during surveys in Kenai Fjords, Alaska in 2024.

English Name	Scientific Name	Number
American Crow	*Corvus brachyrhynchos*	41
American Wigeon	*Mareca americana*	5
Ancient Murrelet	*Synthliboramphus antiquus*	30
Arctic Tern	*Sterna paradisaea*	1
Bald Eagle	*Haliaeetus leucocephalus*	42
Barrow's Goldeneye	*Bucephala islandica*	10
Belted Kingfisher	*Megaceryle alcyon*	1
Black Oystercatcher	*Haematopus bachmani*	27
Black-legged Kittiwake	*Rissa tridactyla*	1816
Bonaparte's Gull	*Chroicocephalus philadelphia*	1
Brachyramphus Murrelet	*Brachyramphus spp.*	19
Common Loon	*Gavvia immer*	3
Common Merganser	*Mergus merganser*	148
Common Murre	*Uria aalge*	40
Common Raven	*Corvus corax*	1
Double-crested Cormorant	*Nannopterum auritum*	225
Gadwall	*Anas strepera*	5
Glaucous-winged Gull	*Larus glaucescens*	3983
Greater Scaup	*Aythya marila*	3
Harlequin Duck	*Histrionicus histrionicus*	242
Horned Puffin	*Fratercula corniculata*	276
Kittlitz's Murrelet	*Brachyramphus brevirostris*	125
Mallard	*Anas platyrhynchos*	3
Marbled Murrelet	*Brachyramphus marmoratus*	3388
Northern Shoveler	*Spatula clypeata*	2
Pacific Loon	*Gavia pacifica*	3
Pelagic Cormorant	*Urile pelagicus*	666
Pigeon Guillemot	*Cepphus columba*	379
Red-breasted Merganser	*Mergus serrator*	4
Red-faced Cormorant	*Phalacrocorax urile*	10
Red-necked Phalarope	*Phalaropus lobatus*	60
Red-throated Loon	*Gavia stellata*	1

Rhinoceros Auklet	*Cerorhinca monocerata*	807
Sabine's Gull	*Xema sabini*	4
Short-billed Gull	*Larus canus*	65
Spotted Sandpiper	*Actitis macularius*	2
Surf Scoter	*Melanitta perspicillata*	180
Tufted Puffin	*Fratercula cirrhata*	23
Unidentified Goldeneye	*Bucephala spp.*	1
Wandering Tattler	*Tringa incana*	1
White-winged Scoter	*Melanitta deglandi*	18
Dall's Porpoise	*Phocoenoides dalli*	2
Harbor Seal	*Phoca vitulina*	443
Humpback Whale	*Megaptera novaeangliae*	3
Killer Whale	*Orcinus orca*	1
River Otter	*Lontra canadensis*	4
Sea Otter	*Enhydra lutris*	354
Steller Sea Lion	*Eumetopias jubatus*	25

Table 2. Focal species raw counts by survey and age group observed during the 2024 Kenai Fjords surveys. Note there are 27 transects covered during the June and August surveys and 96 transects covered during the July survey.

	June 3-5			July 8-15			August 4-9		
Species	Adult	Juvenile	Unknown	Adult	Juvenile	Unknown	Adult	Juvenile	Unknown
Marbled Murrelet	444	0	0	2404	11	1	525	4	0
Kittlitz's Murrelet	31	0	0	71	0	0	22	0	0
Unknown Murrelet	2	0	0	14	0	0	3	0	0
Pigeon Guillemot	37	0	0	298	0	0	42	2	0

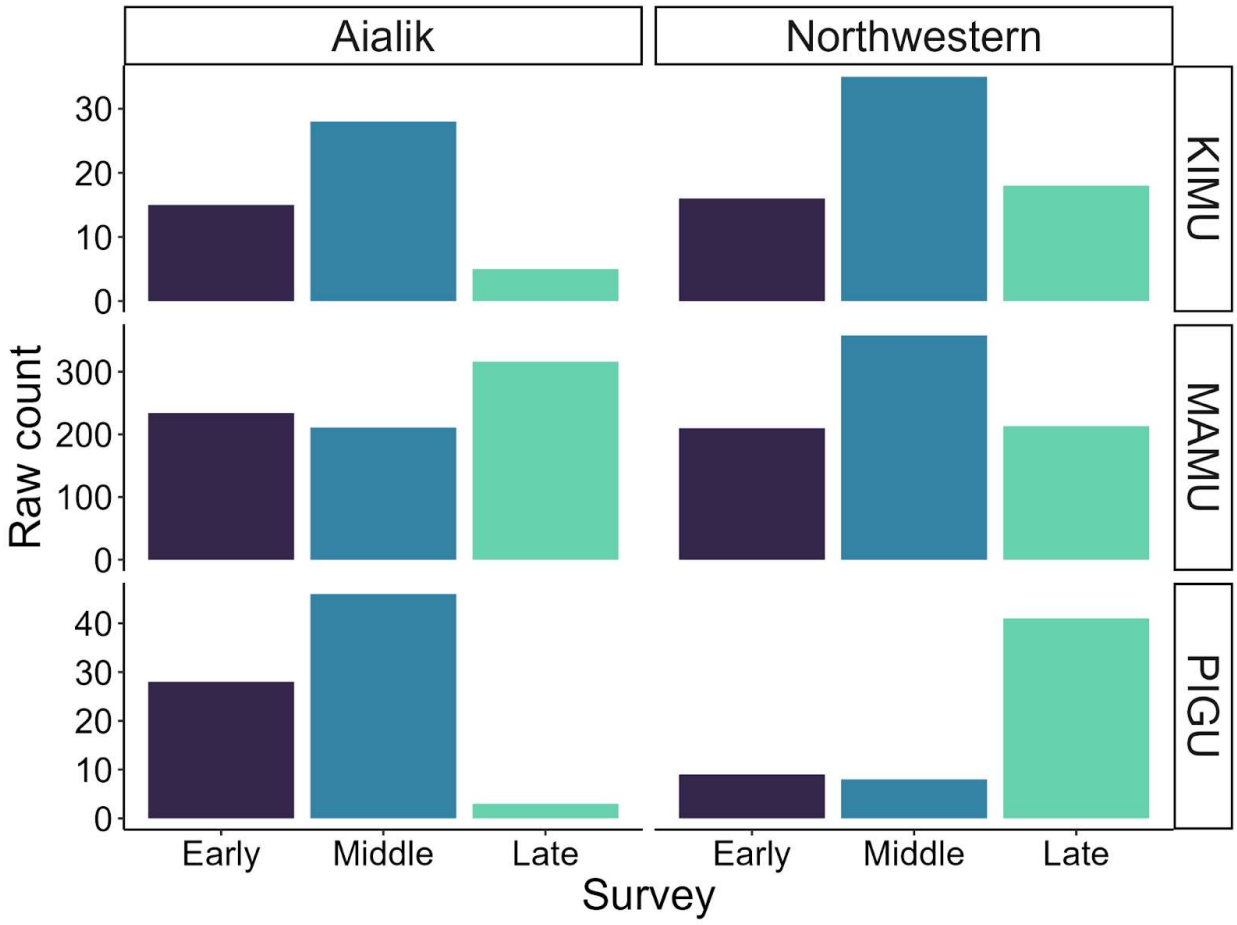

Figure 2. Raw counts for the three focal species in Aialik and Northwestern for transects surveyed during all three surveys in 2024 (early = June 3-5, middle = July 8-15, late = August 4-9). KIMU = Kittlitz's murrelet, MAMU = marbled murrelet, PIGU = pigeon guillemot.

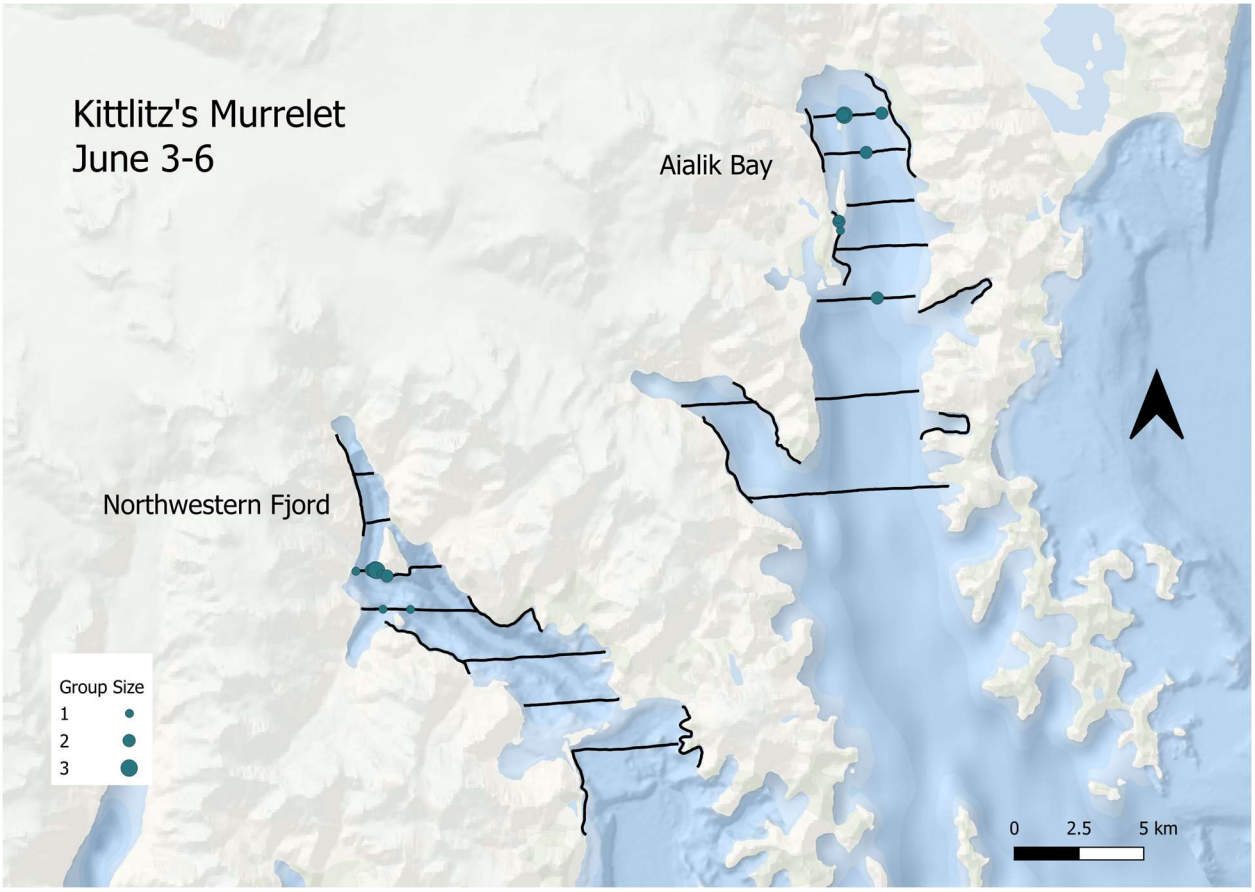

Figure 3. Distribution of Kittlitz's murrelet sightings in June 2024.

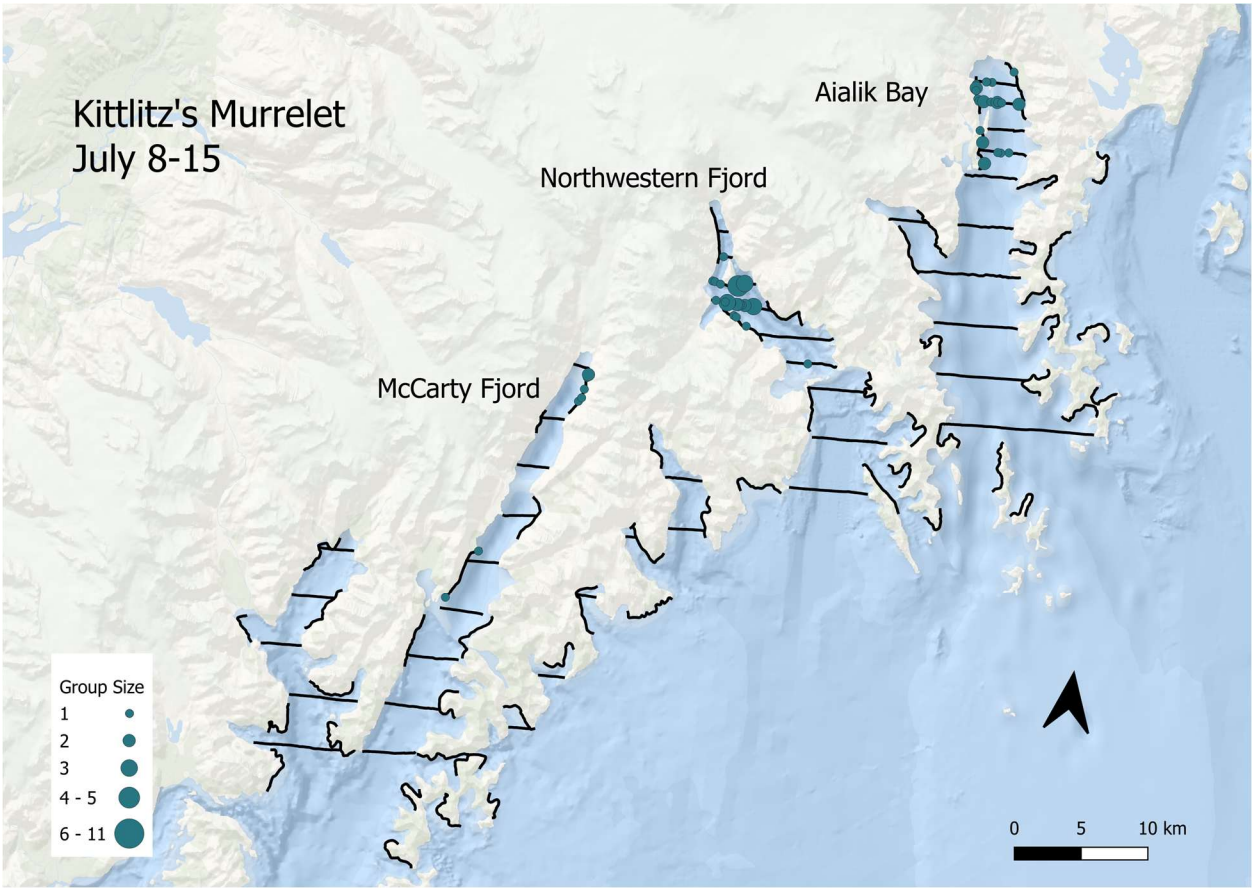

Figure 4. Distribution of Kittlitz's murrelet sightings in July 2024.

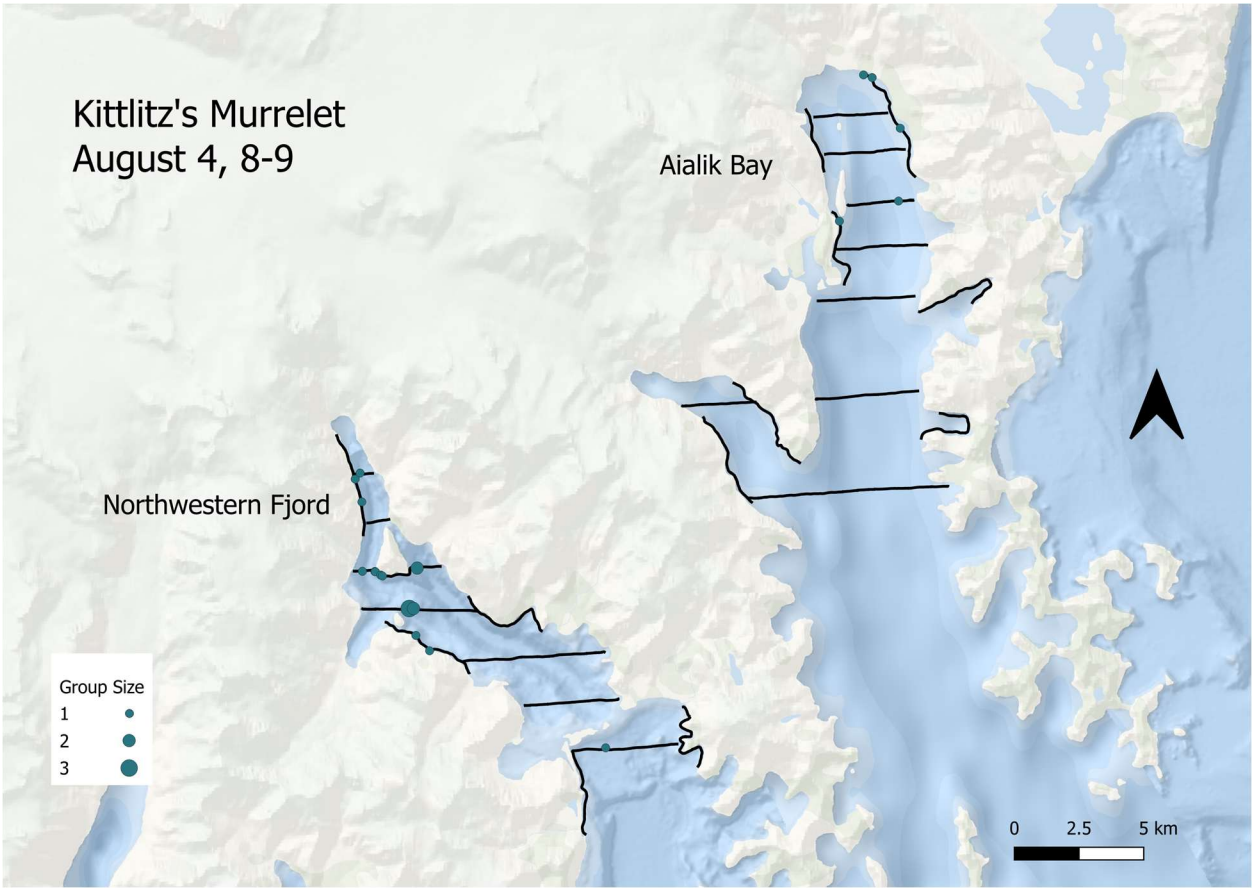

Figure 5. Distribution of Kittlitz's murrelet sightings in August 2024.

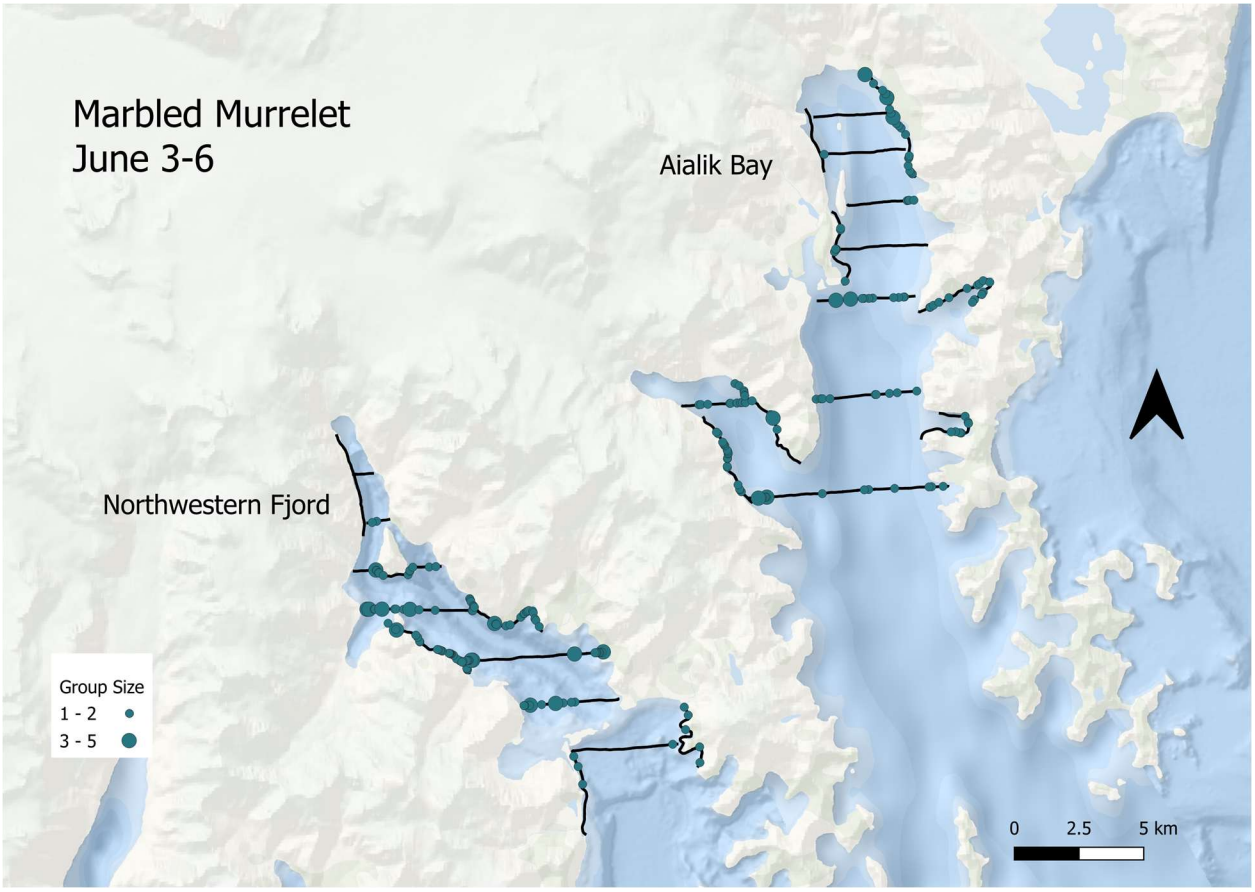

Figure 6. Distribution of marbled murrelet sightings in June 2024.

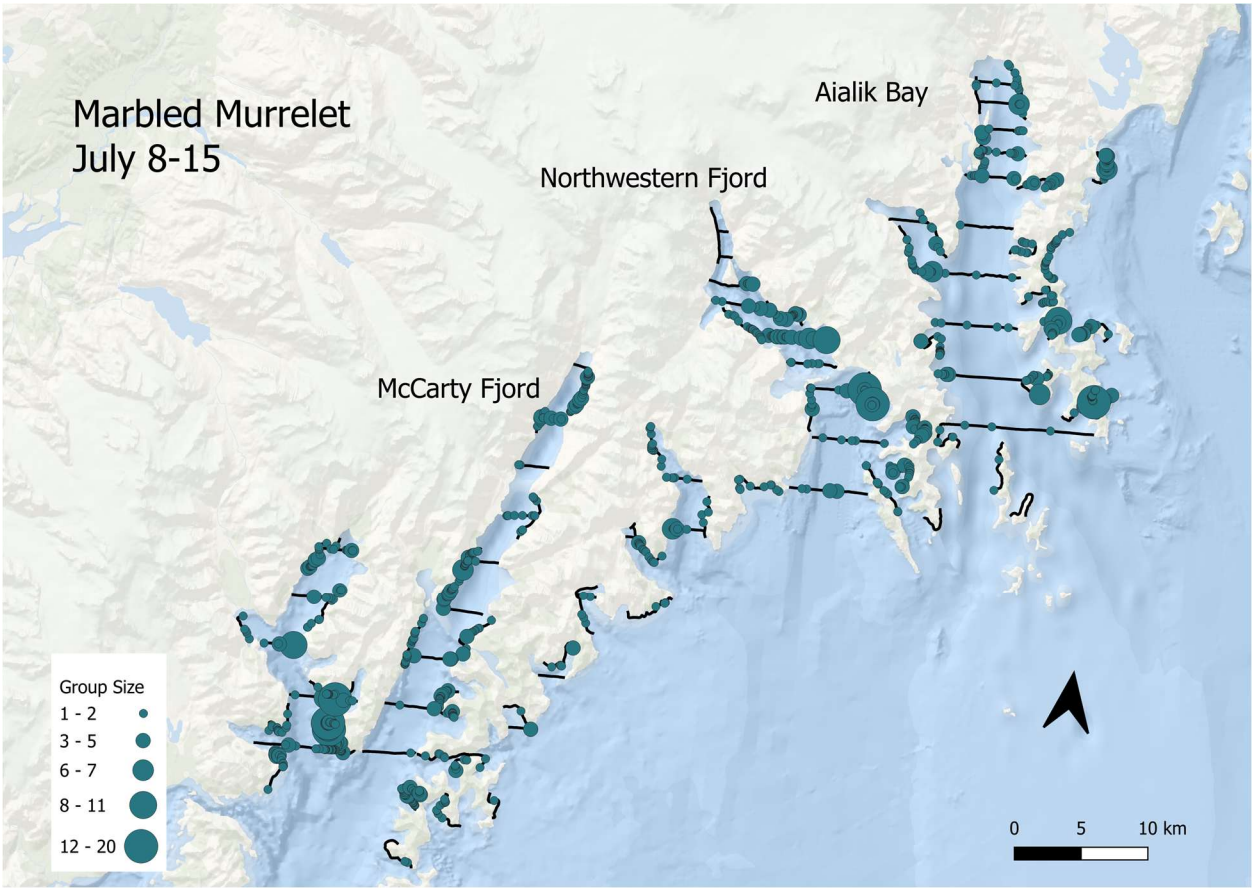

Figure 7. Distribution of marbled murrelet sightings in July 2024.

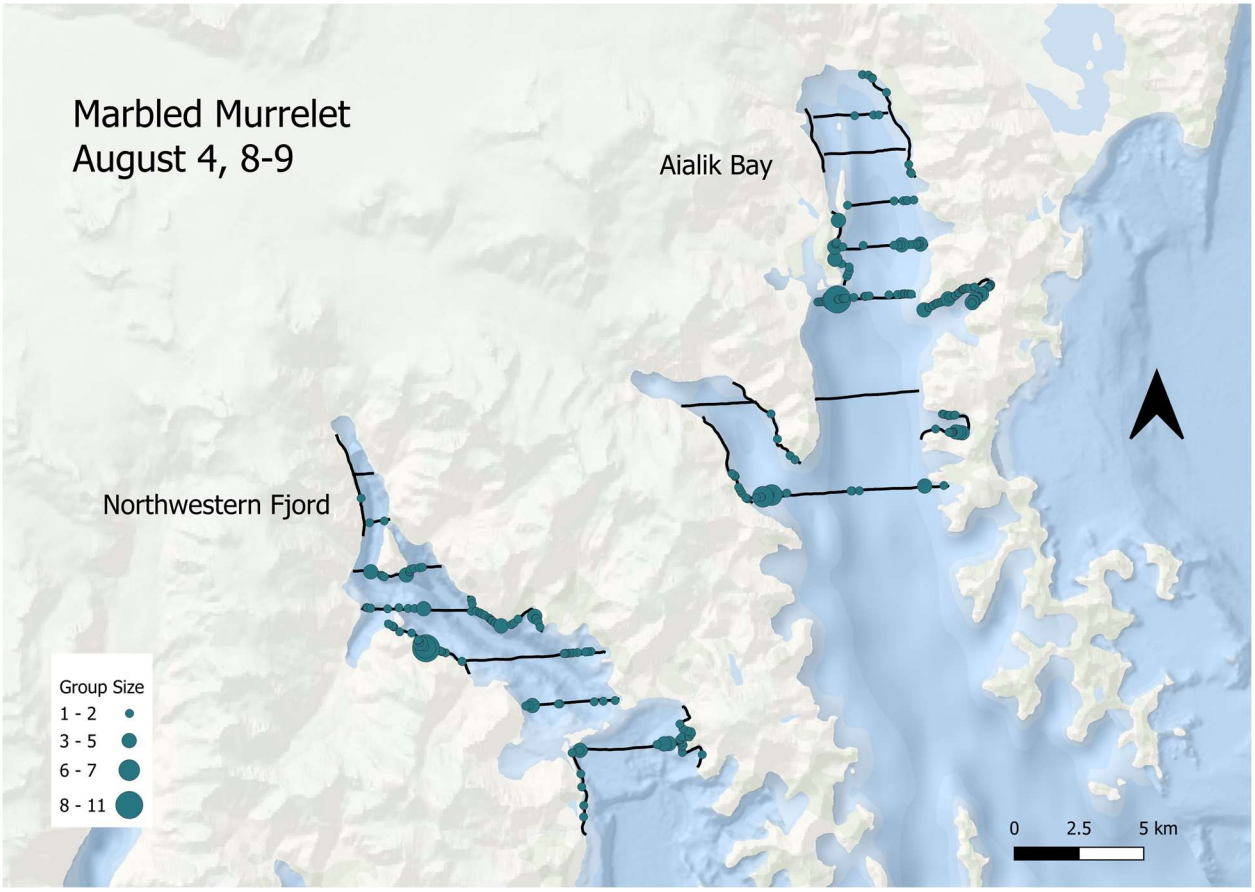

Figure 8. Distribution of marbled murrelet sightings in August 2024.

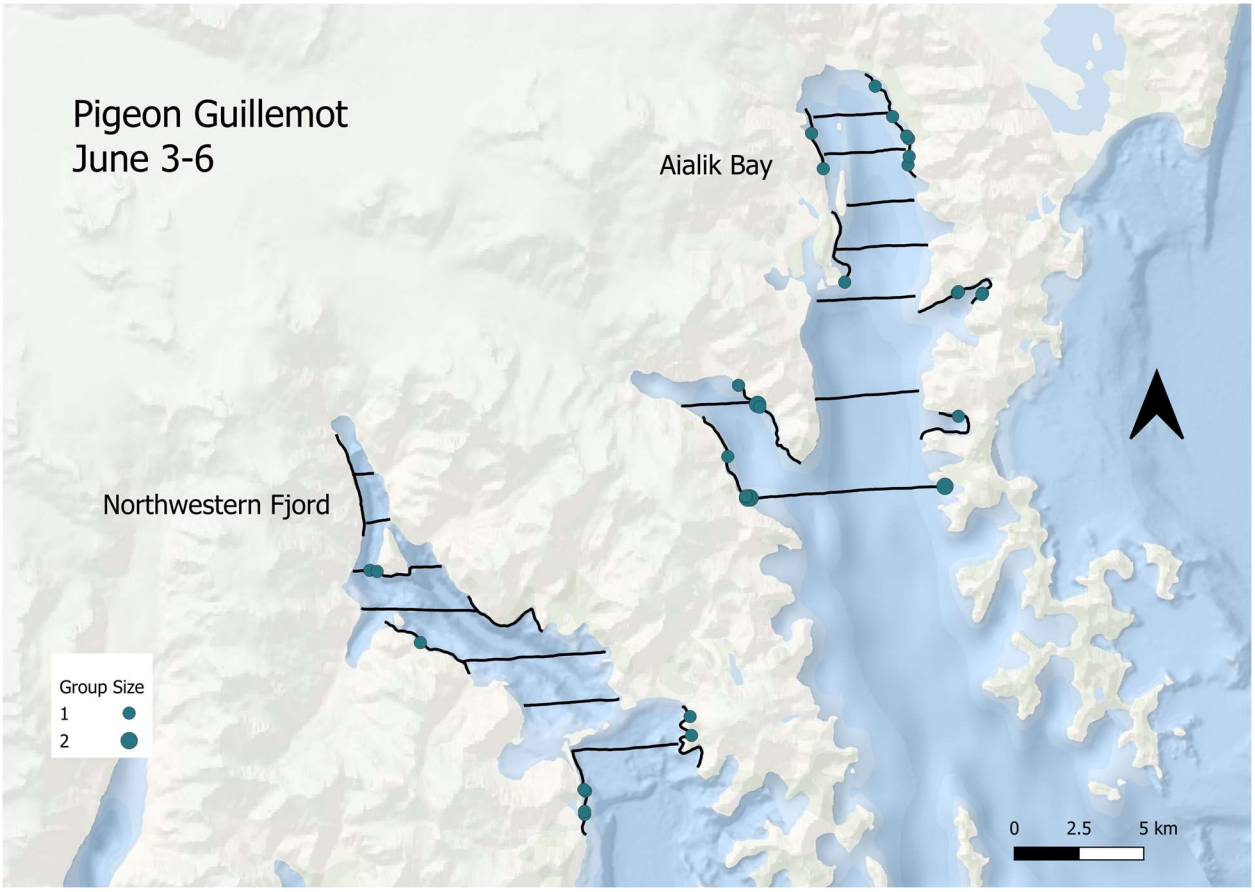

Figure 9. Distribution of pigeon guillemot sightings in June 2024.

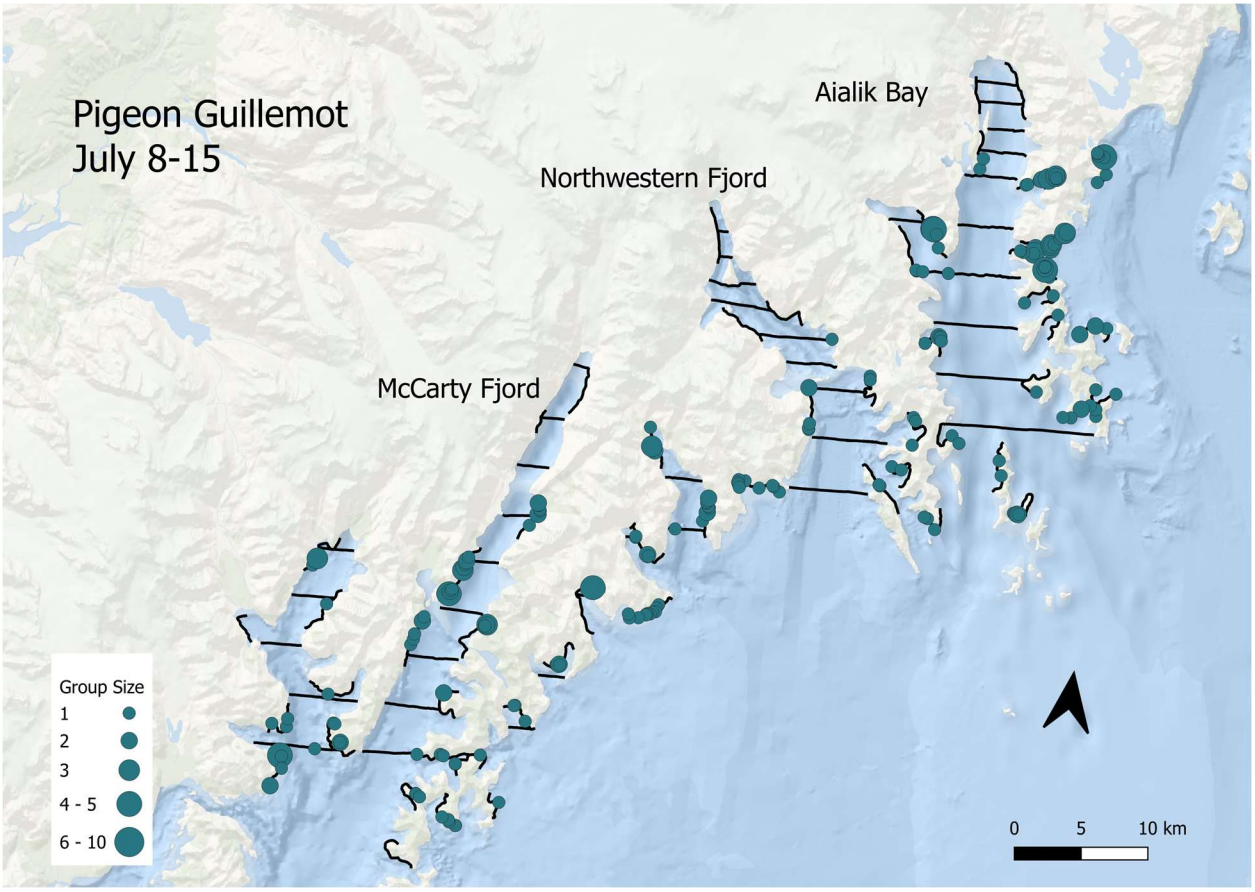

Figure 10. Distribution of pigeon guillemot sightings in July 2024.

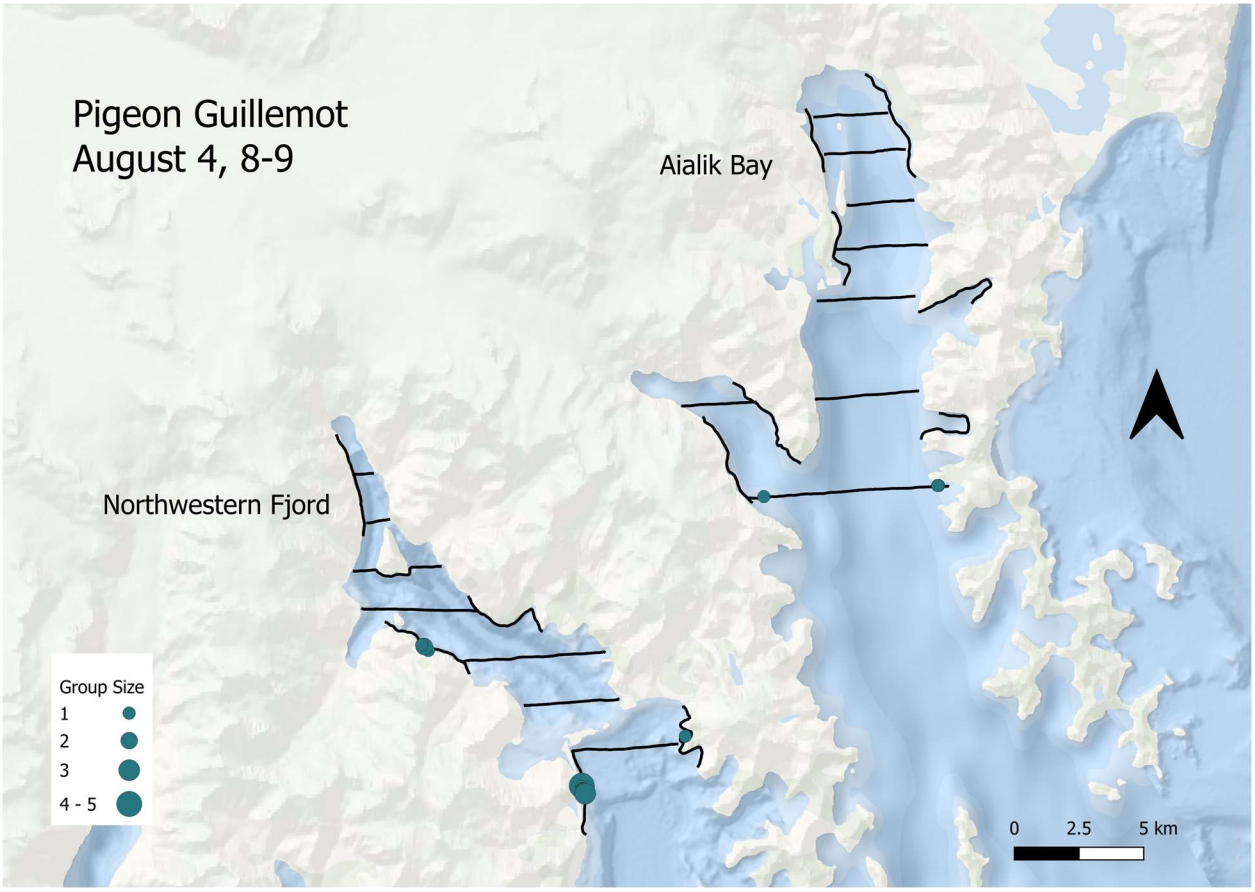

Figure 11. Distribution of pigeon guillemot sightings in August 2024.

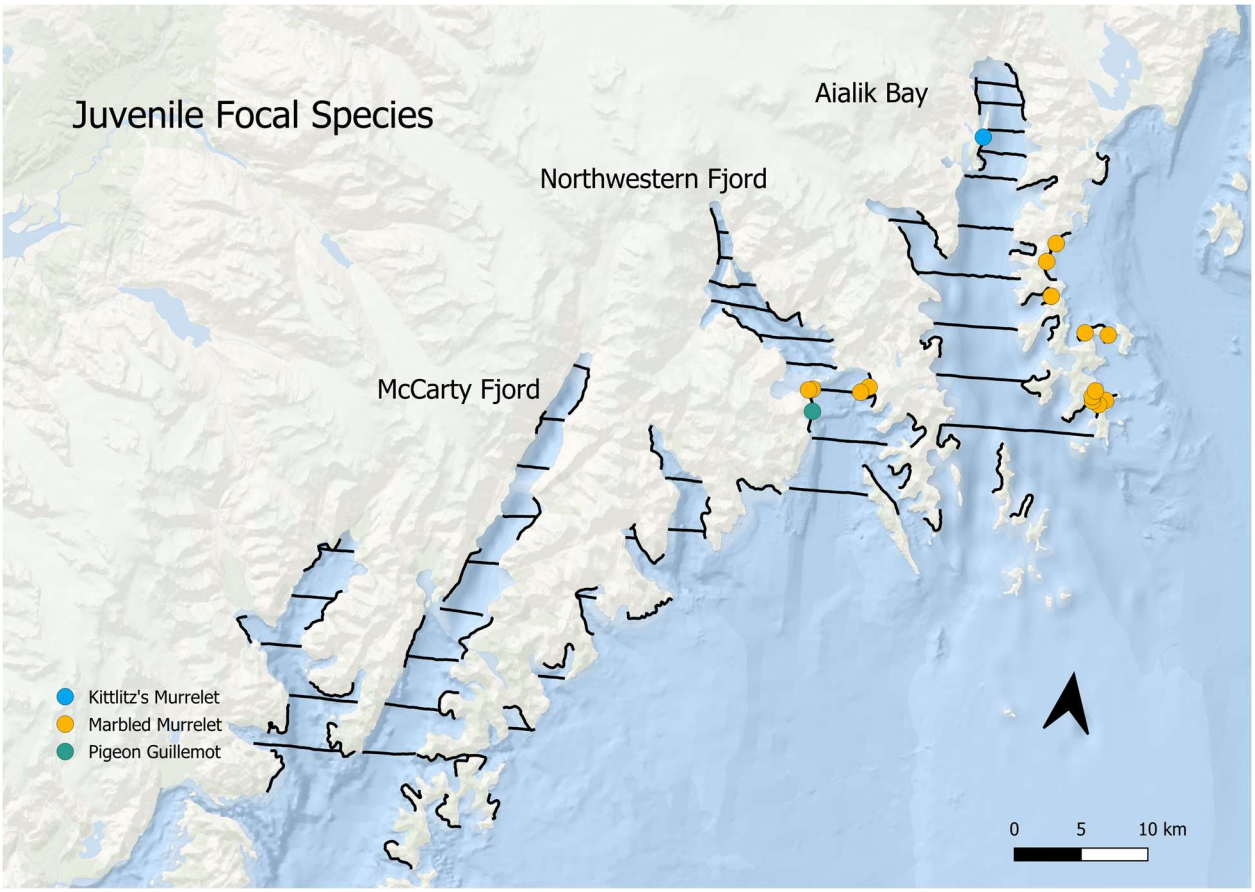

Figure 12. Distribution of juvenile murrelet and guillemot sightings in July and August 2024.

Marbled murrelet and pigeon guillemot surveys were continued in Resurrection Bay from July 23 - September 25, 2024 (Figure 13). 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 ($N = 1$). Number (Table 3), timing (Figure 14) and distribution of observations (Figure 15) are presented.

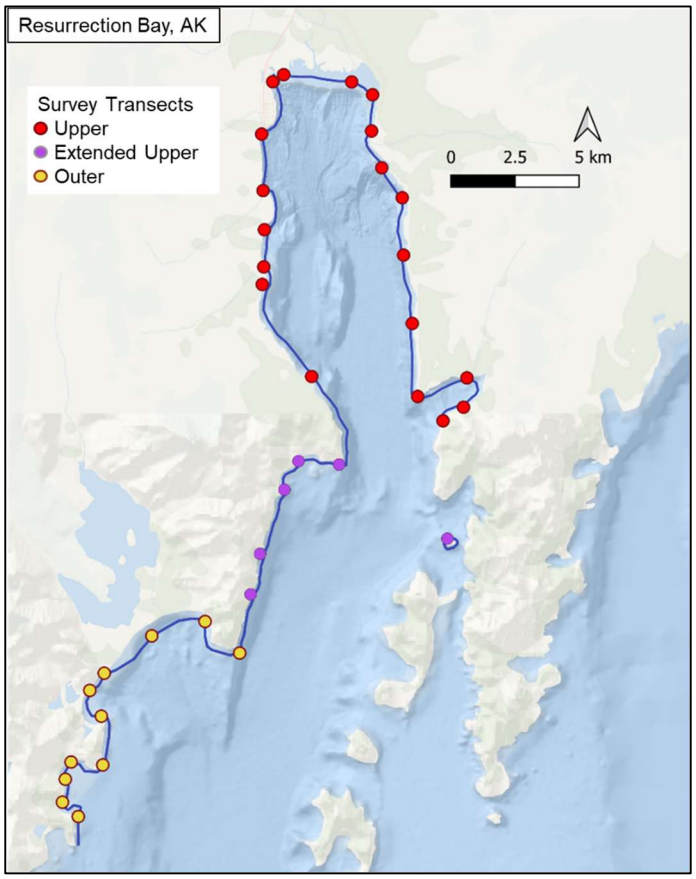

Figure 13. Survey route for marbled murrelet and pigeon guillemot in Resurrection Bay. Surveys (red and purple) were conducted weekly from July 23 - September 25, 2024. The yellow points represent outer bay transects which were surveyed once during the July-September observation period, August 19, 2024.

Table 3. Raw counts for murrelet and pigeon guillemot observations in upper Resurrection Bay surveys from July 23 - September 25, 2024, by age group.

Species	Adult	Juvenile	Unknown age
Marbled murrelet	1846	282	16
Kittlitz's murrelet	0	0	0
Unknown murrelet	2	0	0
Pigeon guillemot	819	24	2

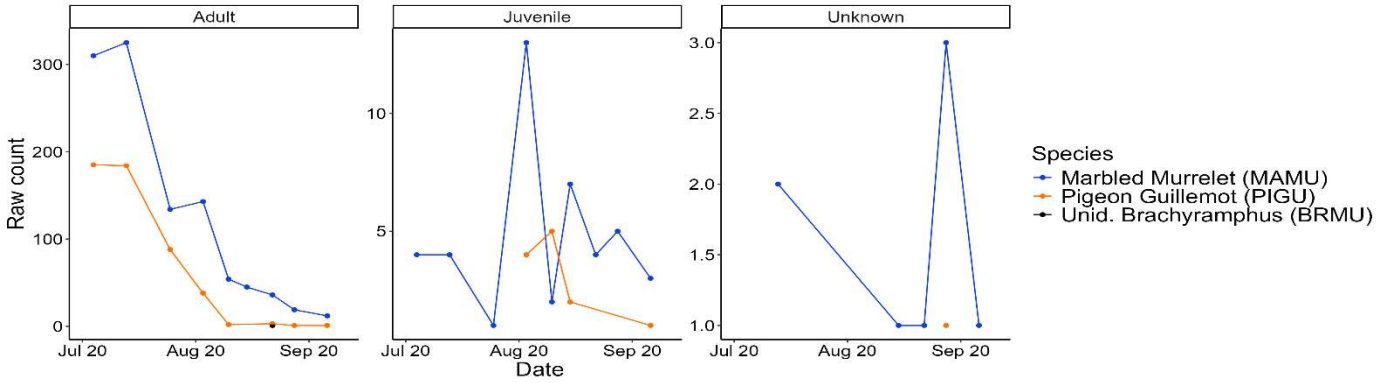

Figure 14. Season distribution of adult, juvenile, and unknown age murrelet and pigeon guillemot observations from surveys conducted weekly in Resurrection Bay, Alaska, between July 23 - September 25, 2024.

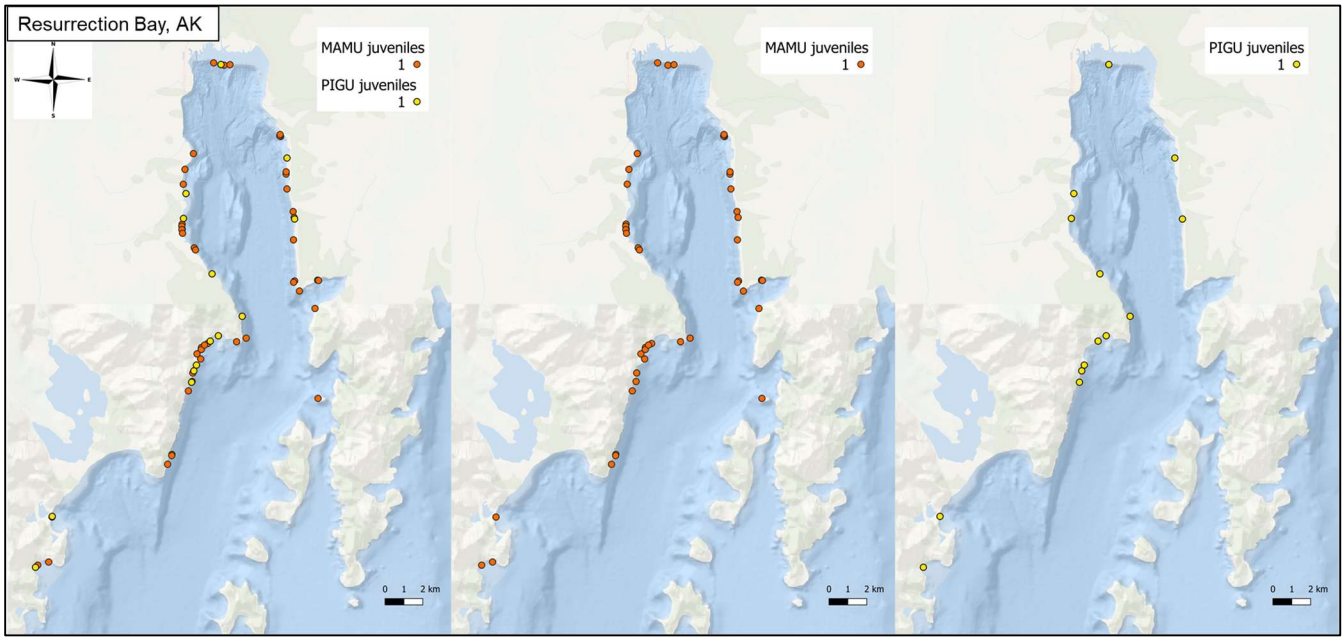

Figure 15. Distribution of observations of marbled murrelet (MAMU) and pigeon guillemot (PIGU) juveniles in Resurrection Bay from July 23 - September 25, 2024.

Oceanography

In 2024, we collected data on fjord hydrography at oceanography stations established by Gay and Armato (1999) and used by Arimitsu et al. (2012) (Figure 16). We conducted CTD casts in Aialik, Northwestern, and McCarty fjords (Table 4). 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 2024 are shown in Figures 17-26.

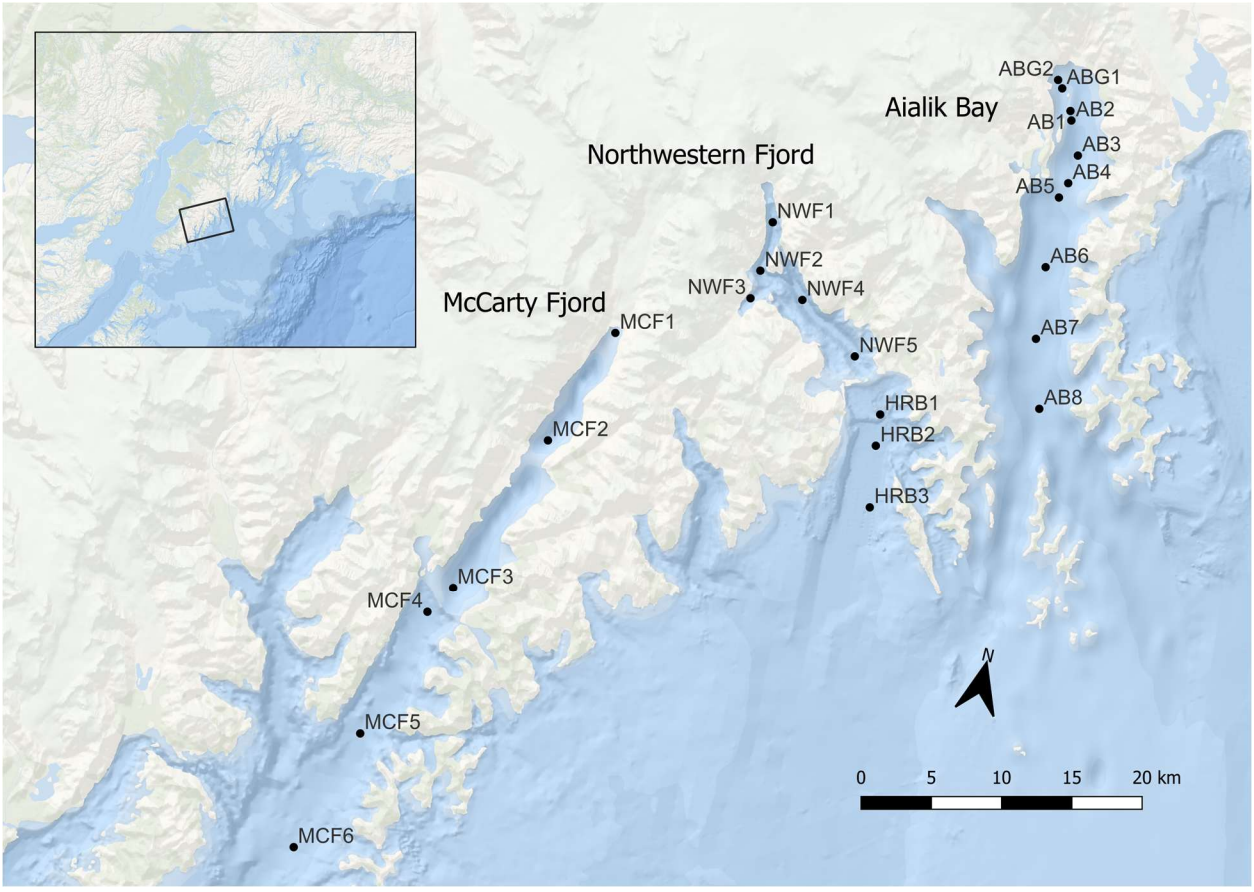

Figure 16. Map of oceanography stations surveyed in 2024. Stations were established by Gay and Armato (1999) and also sampled by Arimitsu et al. (2012).

Table 4. Number of CTD casts in 2024 in the Kenai Fjords study area, by season and fjord. (Early = June 3-5, Middle = July 8-14, Late = August 4-10).

	Early	Middle	Late
Aialik	10	10	10
Northwestern	8	7	8
McCarty	0	5	0

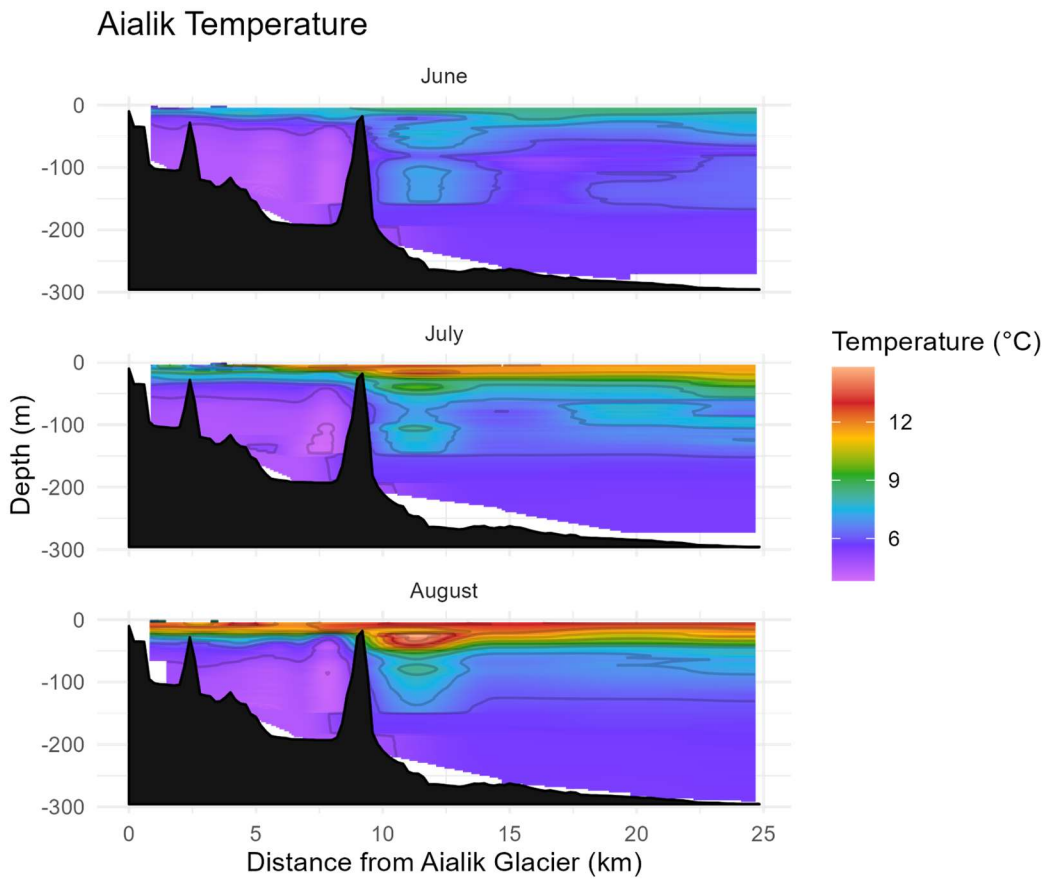

Figure 17. Latitudinal cross-section of water column temperature in Aialik Fjord during surveys in 2024. Measurements were taken using an RBR CTD.TU and interpolated using splines.

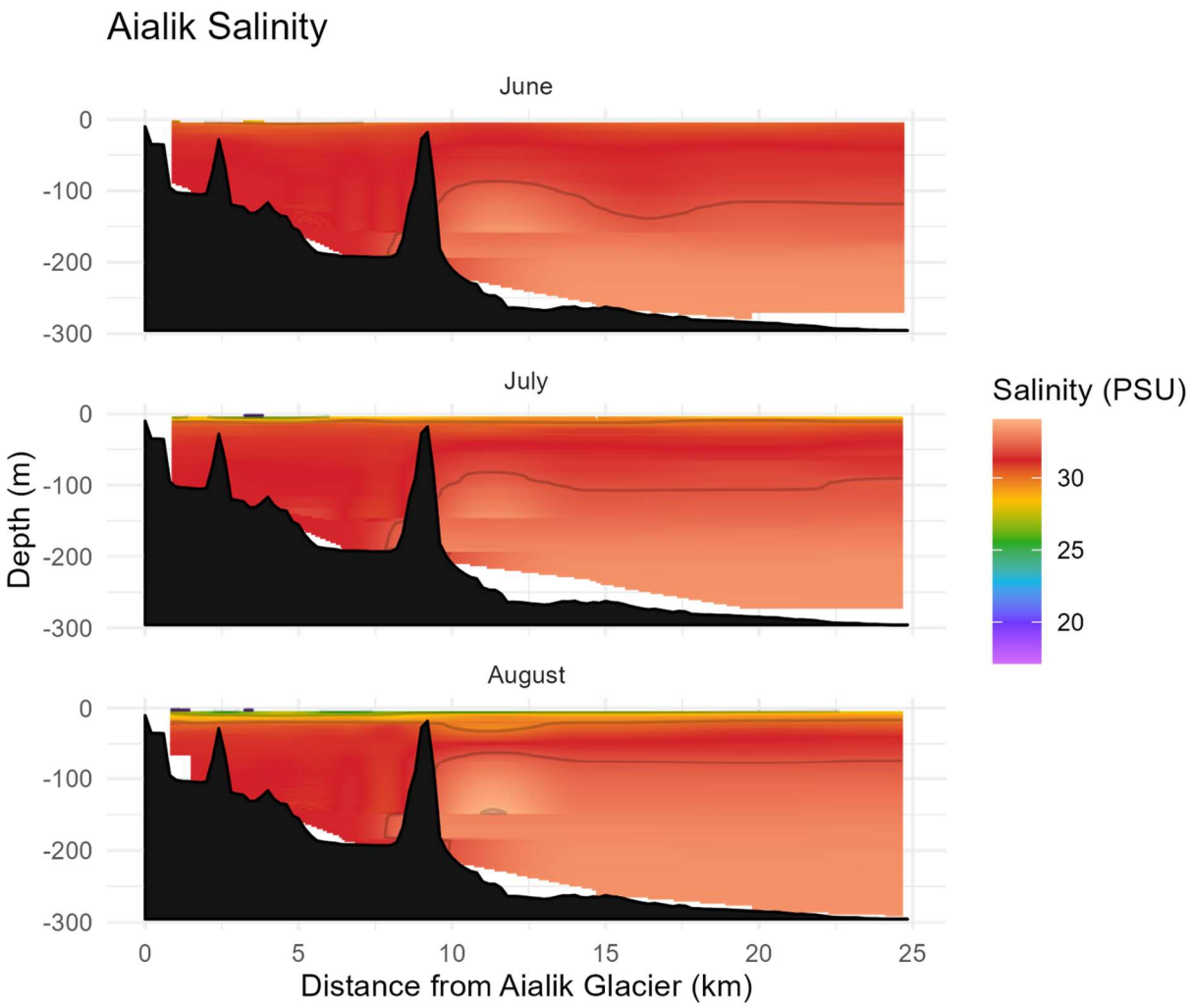

Figure 18. Latitudinal cross-section of water column salinity in Aialik Fjord during surveys in 2024. Measurements were taken using an RBR CTD.TU and interpolated using splines.

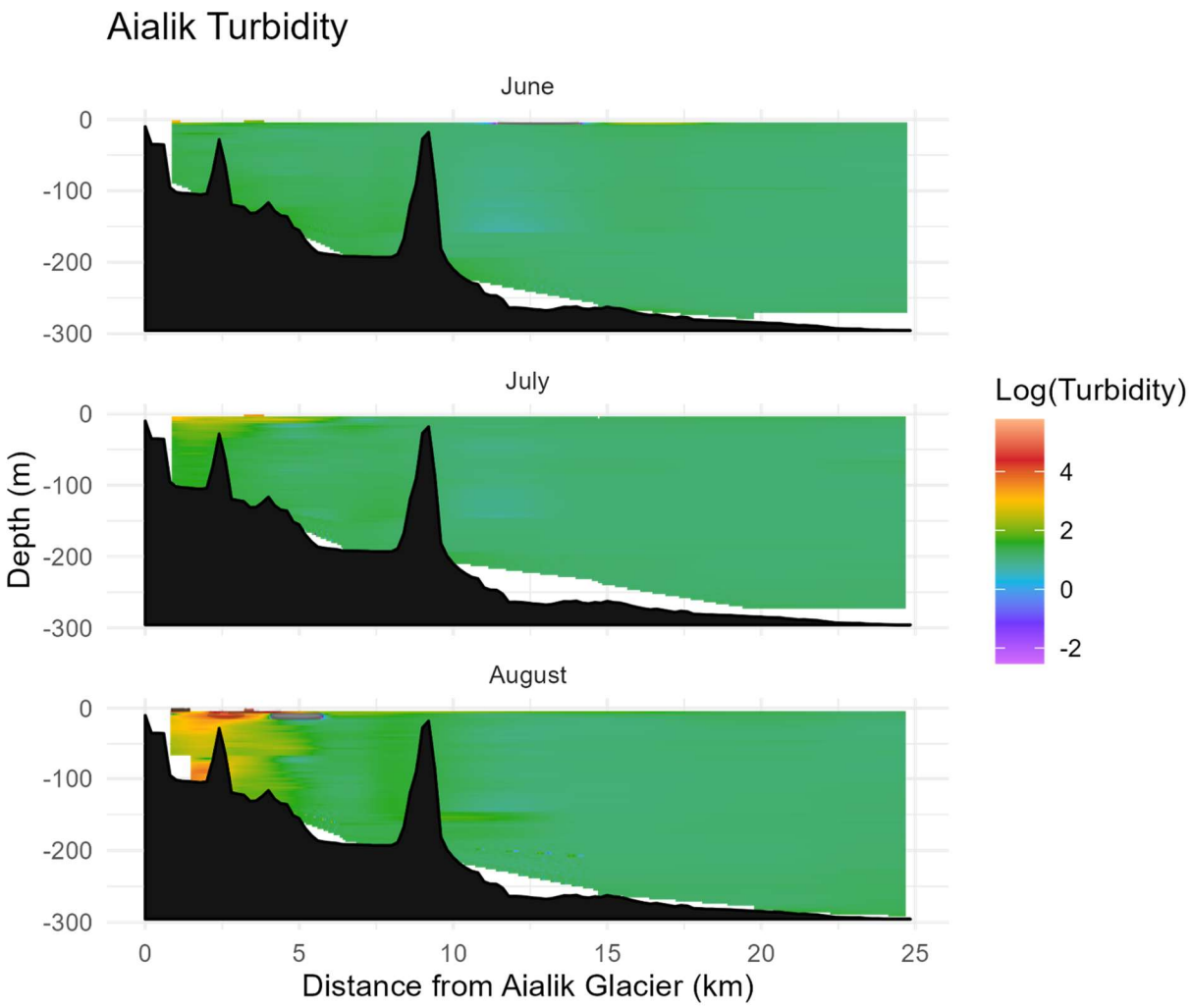

Figure 19. Latitudinal cross-section of water column turbidity in Aialik Fjord during surveys in 2024. Measurements were taken using an RBR CTD.TU and interpolated using splines.

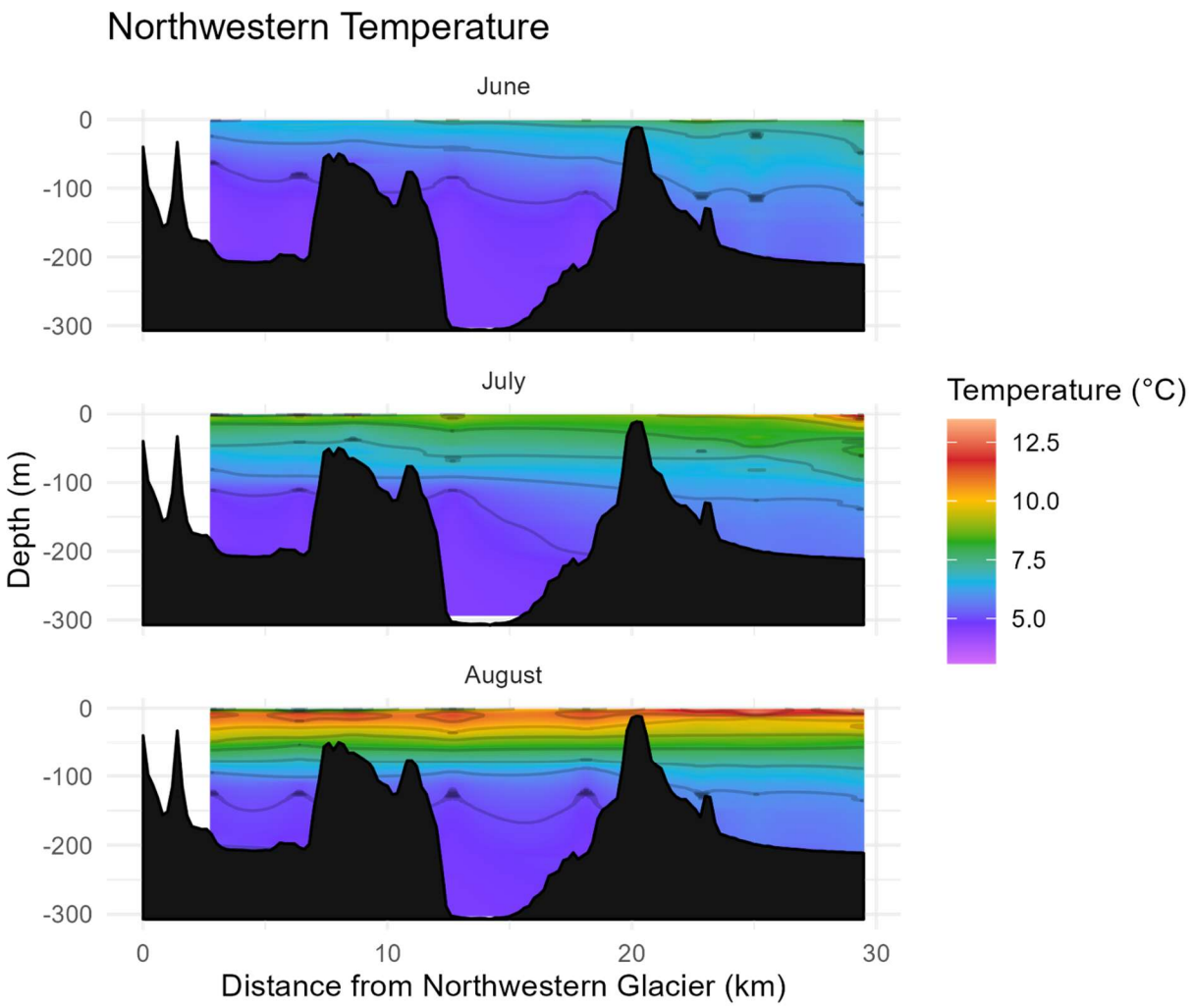

Figure 20. Latitudinal cross-section of water column temperature in Northwestern Fjord during surveys in 2024. Measurements were taken using an RBR CTD.TU and interpolated using splines.

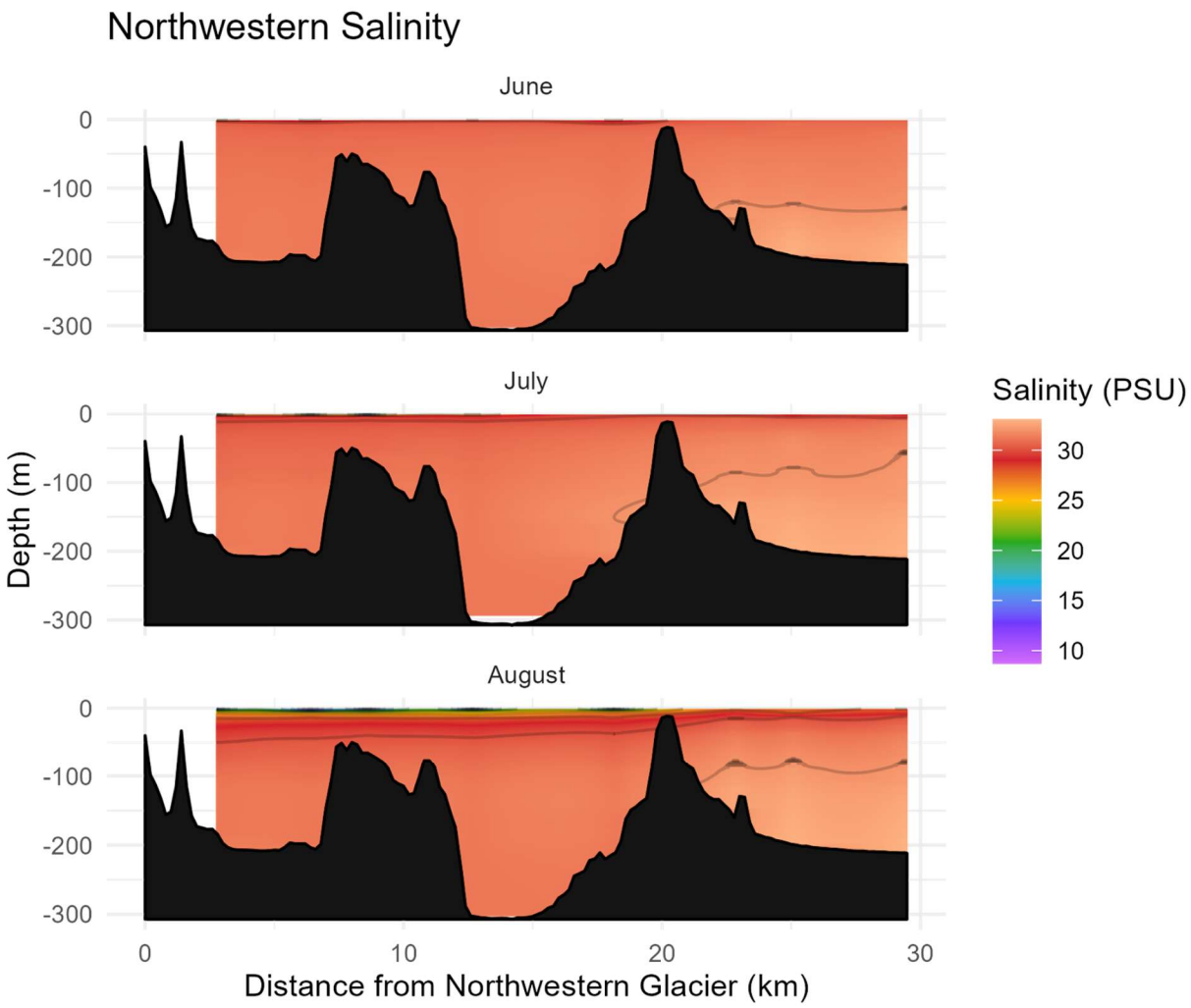

Figure 21. Latitudinal cross-section of water column salinity in Northwestern Fjord during surveys in 2024. Measurements were taken using an RBR CTD.TU and interpolated using splines.

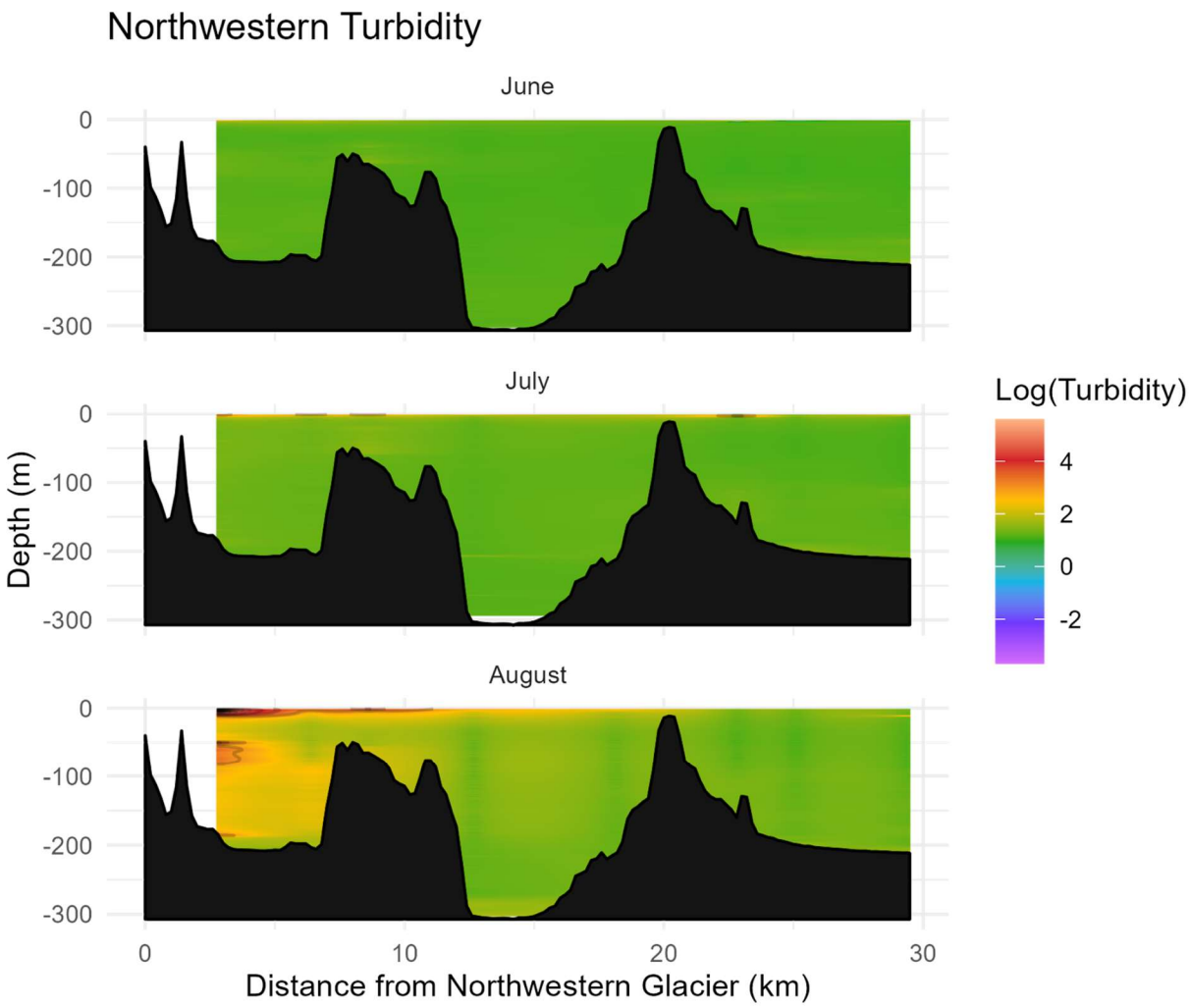

Figure 22. Latitudinal cross-section of water column turbidity in Northwestern Fjord during surveys in 2024. Measurements were taken using an RBR CTD.TU and interpolated using splines.

Intra-annual change

CTD profiles from all years displayed a general similar trend of seasonal change (Figures 23-26). The relatively homogeneous water column in June was strongly influenced by cold, fresh meltwater and became increasingly stratified throughout the season, as evidenced by decreased salinity and increase in mixed layer depth. Stations outside the sill experienced a greater

magnitude of change throughout the year. These patterns are consistent with our expectations of how fjord systems function. Analysis of the difference in magnitude of seasonal shift is ongoing.

Interannual change

Preliminary analysis suggests water column temperatures overall trended warmer between 2007-2008 and 2022-2024. Stations located inside marine sills appeared to change less than stations outside sills. Surface salinity inside sills was lower and decreased across years inside the sill, with a less noticeable change outside sills. We attribute this change to increased runoff. This trend also is reflected in an increase in stratification, which increased over the study period with the most marked change observed during August.

In the future, comparison with oceanographic data from the Northern Gulf of Alaska Long Term Ecological Research (LTER) site would allow us to explore hypotheses relating to the importance of cold "refugia" areas above the fjords and how such persistent colder conditions impact marine species. Our results demonstrate the importance of marine sills for isolating cold, fresh water from the warmer Gulf of Alaska water. The existence of consistently cold regions could have important implications for cold-blooded organisms, which may propagate across marine food webs.

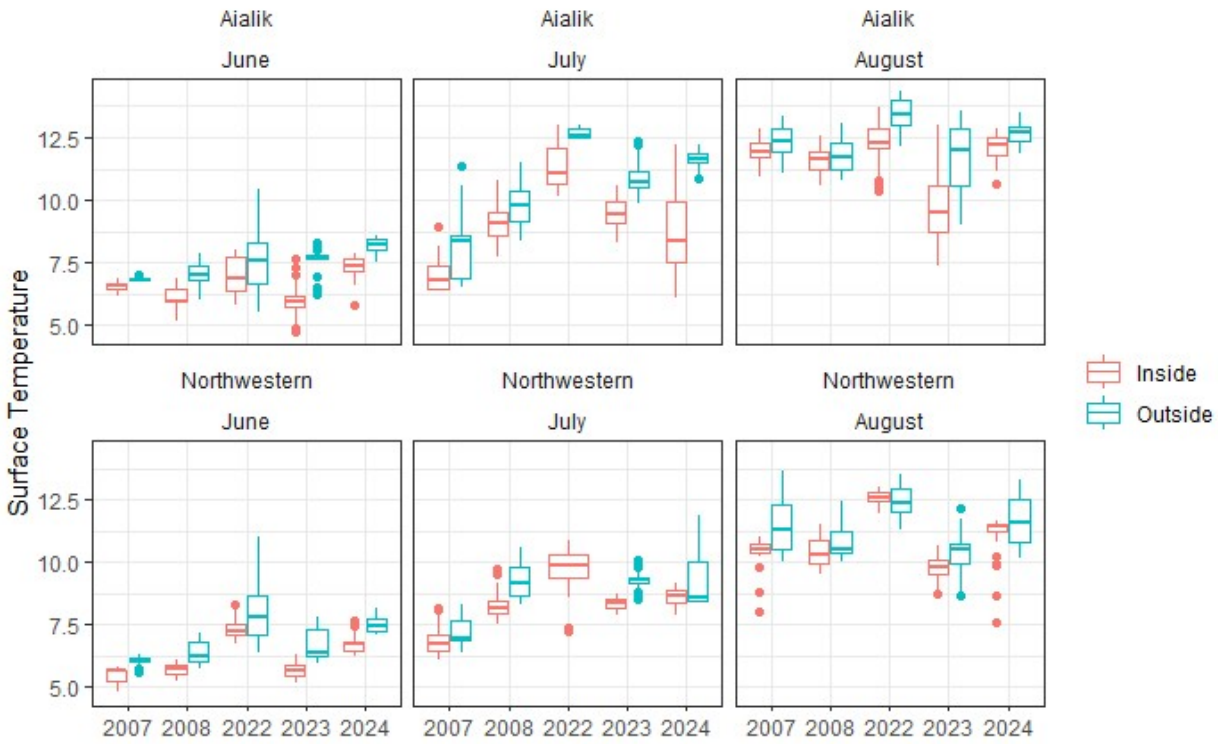

Figure 23. Water column temperature pooled across stations for the top 15m of the water column. Data separated by location with respect to marine sills.

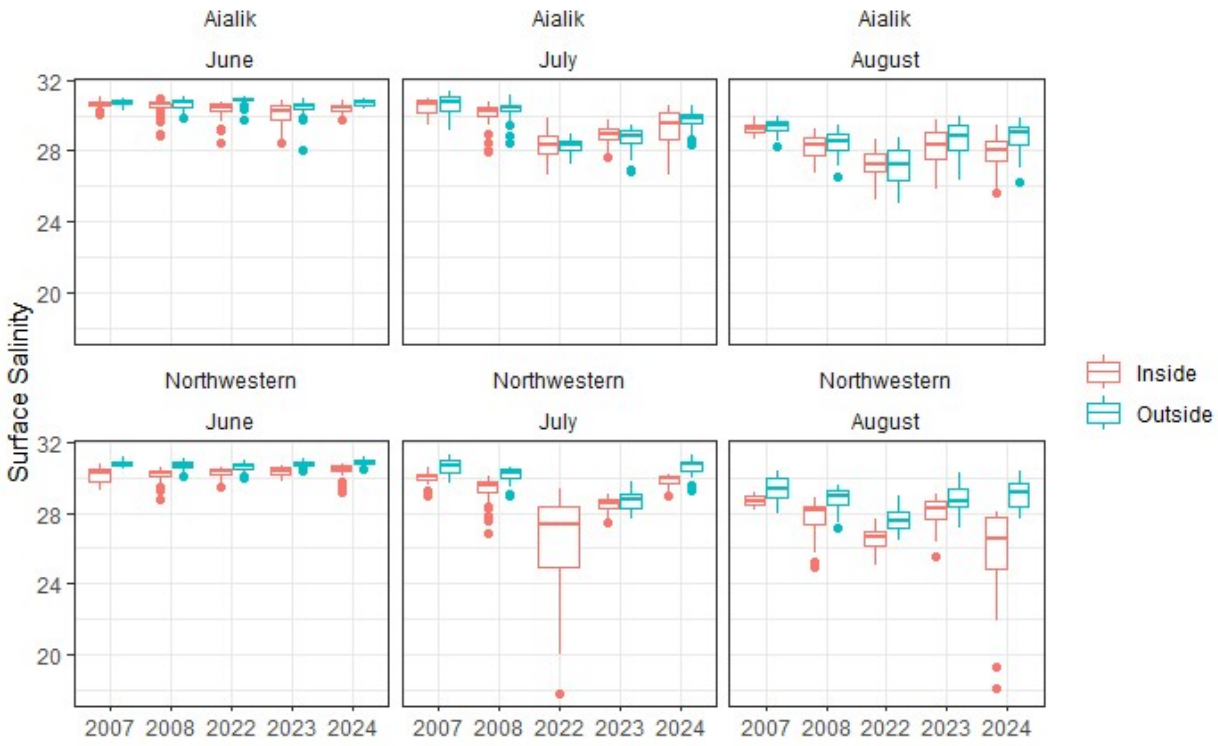

Figure 24. Water column salinity pooled across stations for the top 15m of the water column. Data separated by location with respect to marine sills.

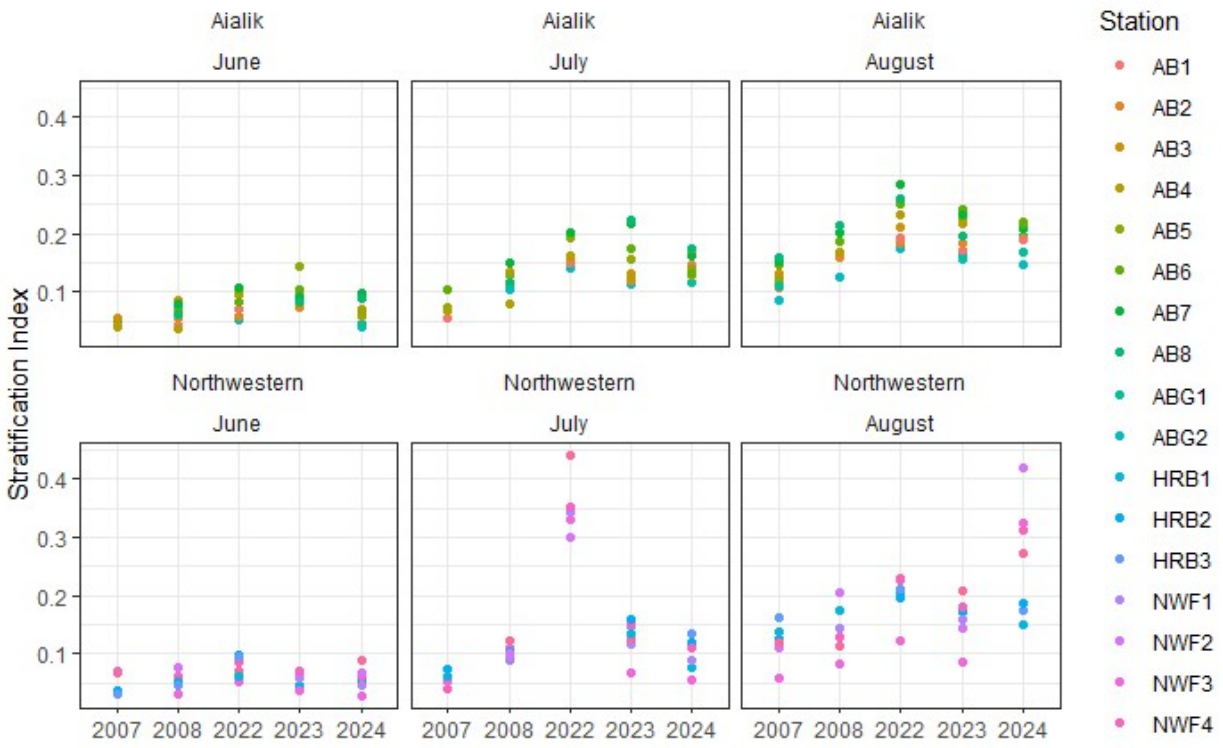

Figure 25. Stratification index, calculated as one minus the average density of the water column above the mixed layer divided by the average density of the water column below the mixed layer.

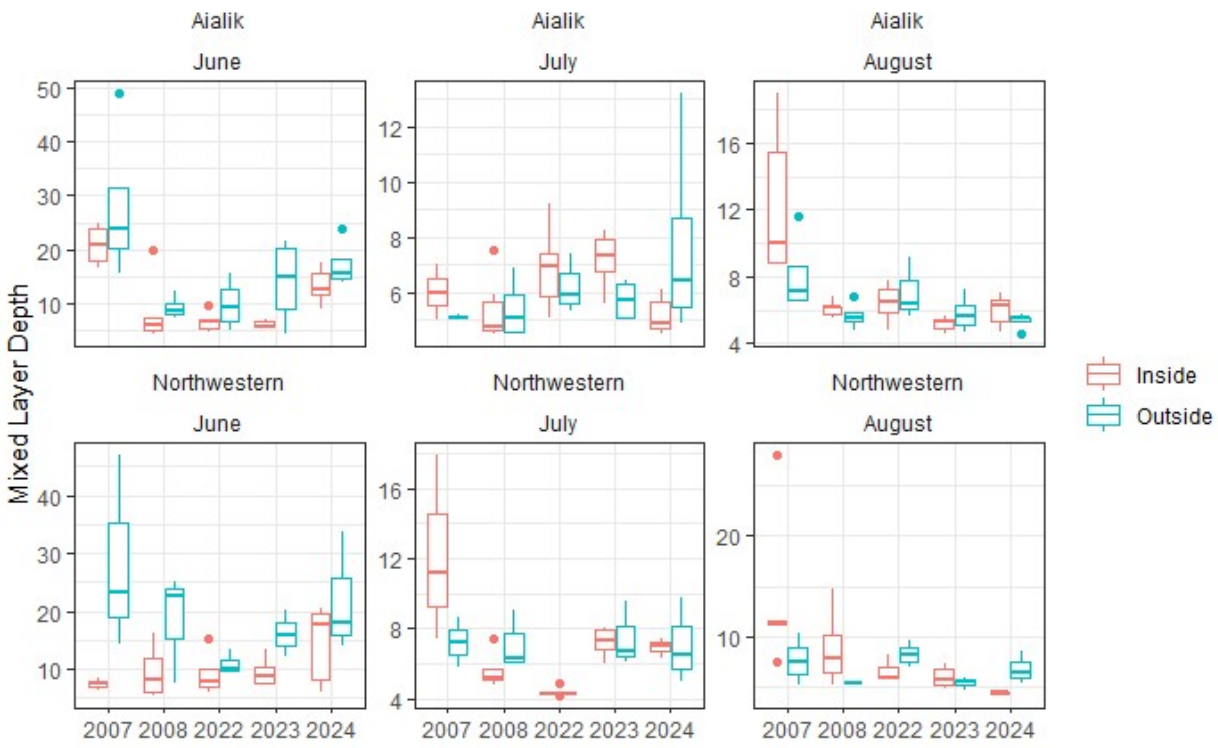

Figure 26. Mixed layer depth pooled across stations in Aialik Bay and Northwestern Fjord. Data separated by location with respect to marine sills.

Hydroacoustic surveys

We conducted hydroacoustic fisheries surveys in Aialik Bay in 2023. We surveyed all bird transects in Aialik Bay that are repeated three times a year as well as additional transects evenly spaced and at a higher density above the sill, where Kittlitz's murrelets are known to occur most frequently. We simultaneously conducted at-sea bird surveys and hydroacoustic surveys using a Biosonics DT-X 120 kHz transducer deployed 2m below the surface following the methods of Arimitsu et al. (2012). The transducer was calibrated by Biosonics and in the field using a 33mm tungsten-carbide calibration sphere.

We assessed the relationships between biomass abundance and turbidity, biomass depth distribution and turbidity, and biomass spatial distribution and focal species spatial distribution. Biomass was measured as a nautical area scattering coefficient (NASC), representing the raw biomass measurement adjusted for the area of the water column surveyed, which varies across

depths. Additionally, we used Echoview software (version 14) to identify discrete schools of potential murrelet prey.

NASC generally increased with proximity to Aialik Glacier. There was a positive relationship between turbidity and NASC. Turbidity did not have a strong effect on school depth (Figure 27) but there were more schools in the more turbid regions of the bay (Figure 28). Future analysis will focus on the relationship between biomass spatial distribution and seabird spatial distribution and abundance.

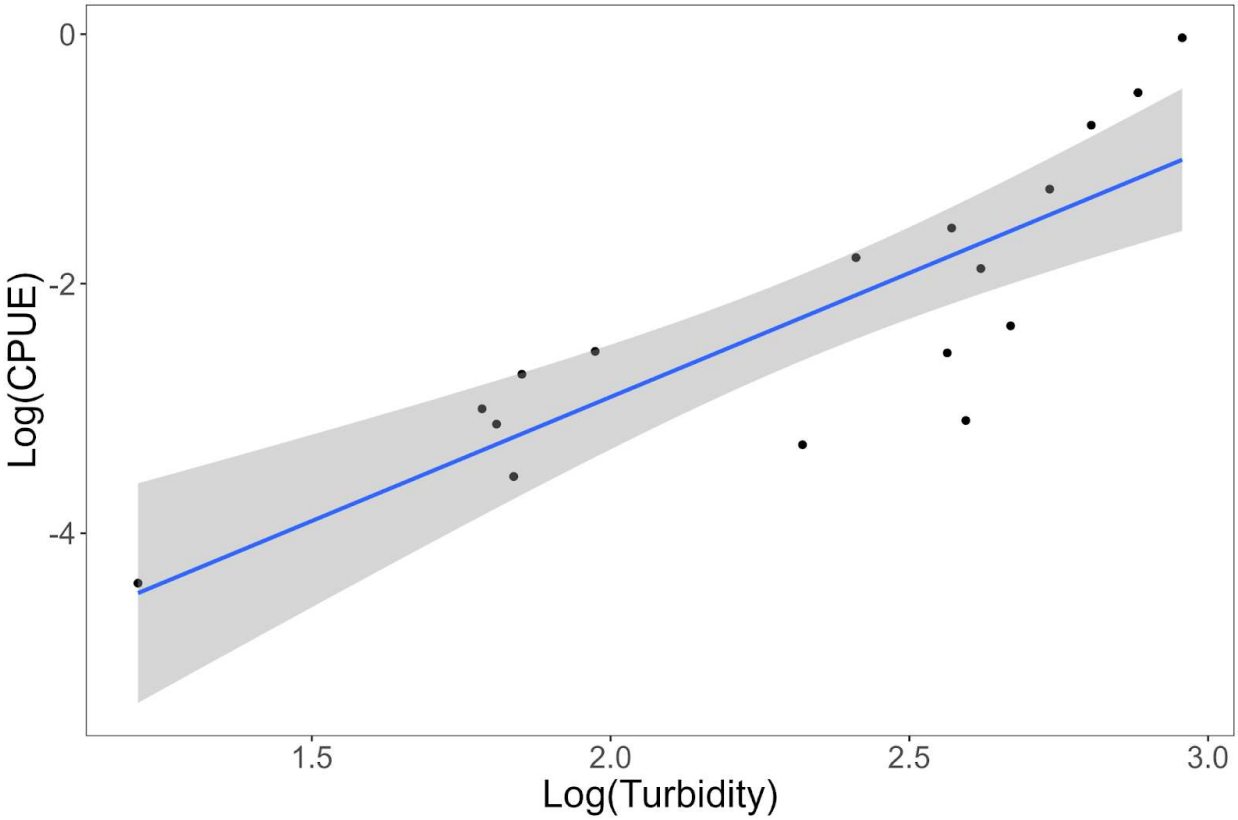

Figure 27. Forage fish schools per transect as a function of turbidity in Aialik Bay. Schools identified using the school detection function in Echoview version 14. Turbidity values were measured using an RBR CTD.Tu and interpolated across Aialik Bay using generalized additive models with soap film smoothers. Schools per transect were then adjusted for transect length and log transformed.

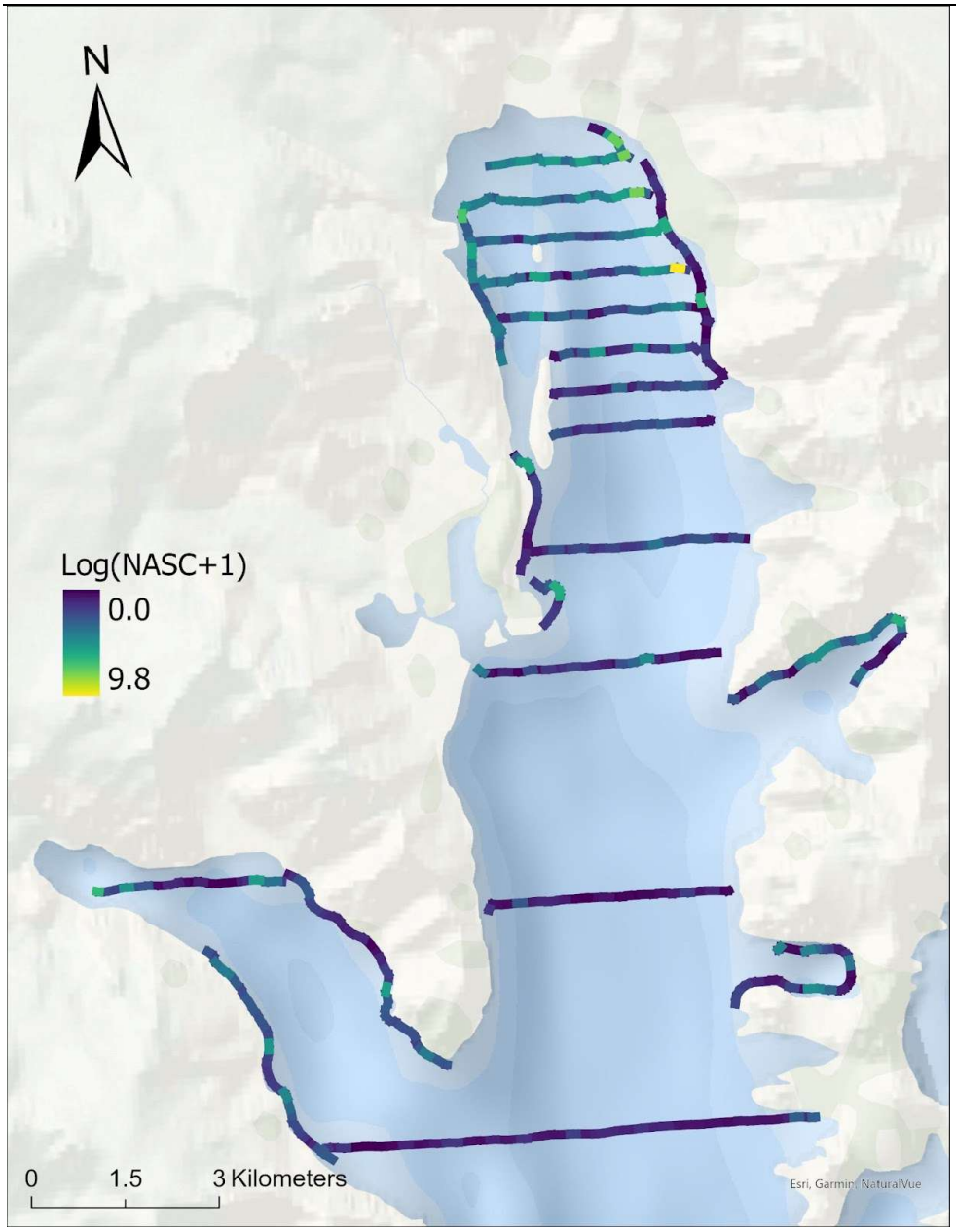

Figure 28. Nautical Area Scattering Coefficient (NASC) in Aialik Bay, a metric of biomass. Hydroacoustic surveys were conducted using a Biosonics 120 kHz transducer. Analysis was performed using Echoview version 14.

Kachemak Bay Component

The Kachemak Bay component in 2024 conducted the fourth and final field season in coordination with the Kenai Peninsula Coast component. The fourth 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.

In 2024 we successfully completed our primary set of transects in Kachemak Bay and additional historical transects that parallel the inner bay (Figure 29). Surveys were conducted in Kachemak Bay during July 13- July 27, 2024. Twenty four line transects bisecting the bay (north/south) were surveyed in July totaling approximately 440 km in Kachemak Bay. In addition we surveyed four historical transects parallel to the shore at the head of the bay totaling approximately 24 km allowing us to compare our results to historical data collected in the region dating back to 1988. We detected a total of 5278 marine birds (Table 5) and 709 marine mammals (Table 6) during the July surveys in Kachemak Bay.

Kittlitz's murrelet observations (54 individuals) were higher this year in Kachemak Bay (Table 5). Birds were primarily observed in the outer bay along the northern shore, and in smaller numbers in the inner bay along the southern shore near the Grewingk Glacier outflow (Figure 30). Marbled murrelets (865 individuals) were observed across all of Kachemak Bay (Figure 31). Both species of *Brachyramphus* murrelets overlapped in distribution along core areas including the coastal waters in the far inner and outer bay regions (Figure 30). We also documented a total of 155 pigeon guillemots during the survey. The birds were primarily scattered in the shallower nearshore waters along both coastlines and concentrated in larger numbers near colony sites on Hesketh Island and Seldovia Bay. No guillemots were recorded in the deeper waters in the middle of the bay (Figure 32).

Marine mammals were also recorded during this survey with sea otters (662 individuals) being the predominate marine mammal observed (Table 6). In addition, we recorded harbor porpoise, harbor seals, a humpback whale, and a minke whale in the bay (Table 6).

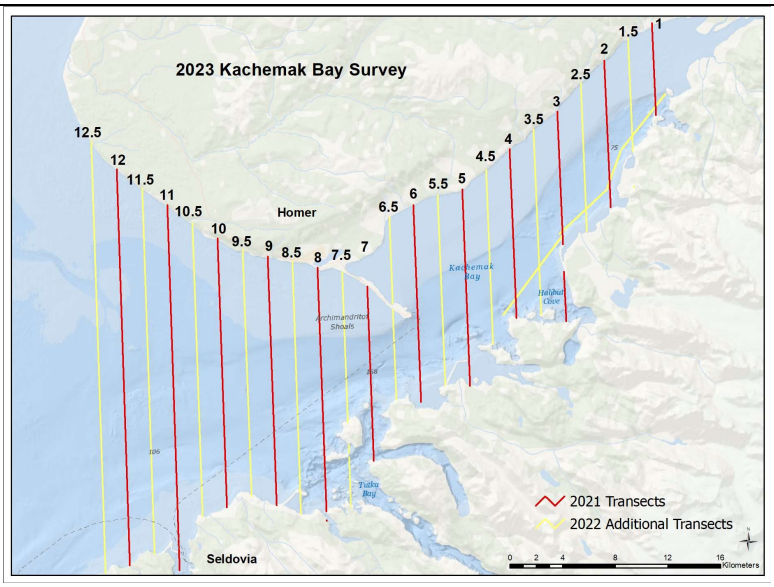

Figure 29. Transects surveyed in Kachemak Bay, Alaska, July 13 – July 27, 2024. Red lines represent the original set of transects surveyed in 2021. Yellow lines represent additional transects added and surveyed in 2022 - 2024.

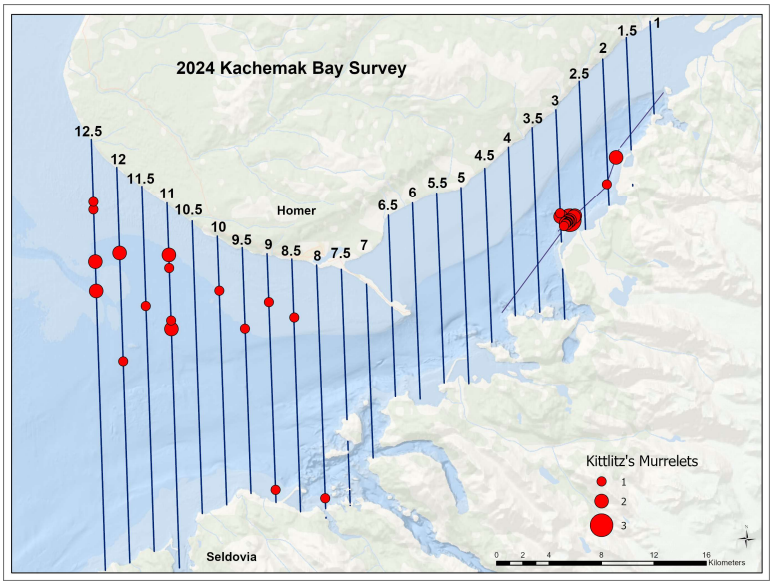

Figure 30. Kittlitz's murrelet distribution in Kachemak Bay, Alaska, July 13 – July 27, 2024.

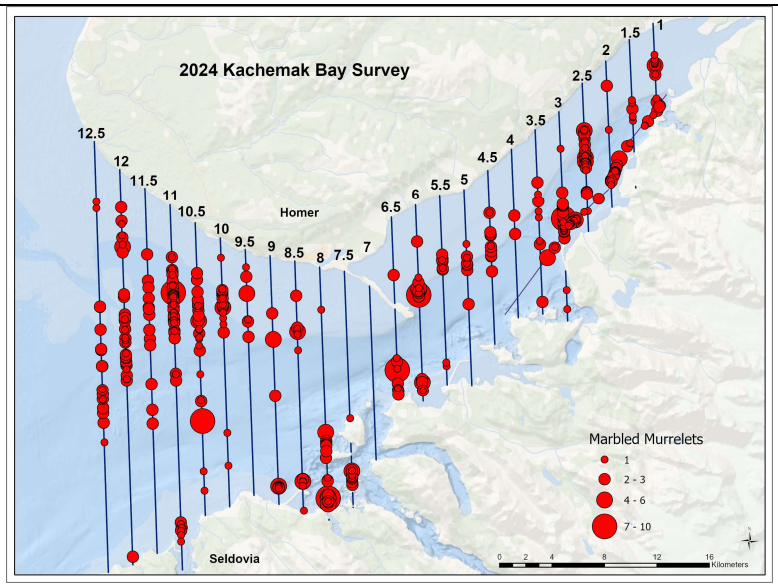

Figure 31. Marbled murrelet distribution in Kachemak Bay, Alaska, July 13 – July 27, 2024.

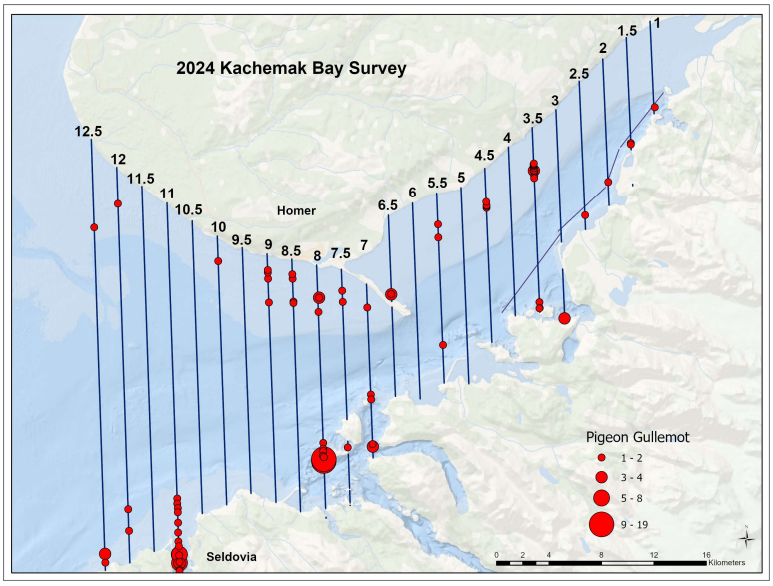

Figure 32. Pigeon guillemot distribution in Kachemak Bay, Alaska, July 13 – July 27, 2024.

Table 5. Marine bird observations recorded during surveys in Kachemak Bay, Alaska, July 13 – July 27, 2024.

English Name	Scientific Name	No.
Ancient Murrelet	*Synthliboramphus antiquus*	2
Arctic Tern	*Sterna paradisaea*	10
Bald Eagle	*Haliaeetus leucocephalus*	11
Black-legged Kittiwake	*Rissa tridactyla*	523
Brachyramphus Murrelet	*Brachyramphus spp.*	442
Common Loon	*Gavia immer*	39
Common Murre	*Uria aalge*	361
Glaucous-winged Gull	*Larus glaucescens*	91
Harlequin Duck	*Histrionicus histrionicus*	4
Herring gull	*Larus argentatus*	9
Horned Puffin	*Fratercula corniculata*	16
Kittlitz's Murrelet	*Brachyramphus brevirostris*	54
Marbled Murrelet	*Brachyramphus marmoratus*	865
Short-billed Gull	*Larus brachyrhynchus*	14
Northwestern Crow	*Corvus brachyrhynchos*	5
Pacific Loon	*Gavia pacifica*	12
Pelagic Cormorant	*Urile pelagicus*	15
Pigeon Guillemot	*Cepphus columba*	155
Pomarine Jaeger	*Stercorarius pomarinus*	3
Red-breasted Merganser	*Mergus serrator*	1
Red-necked Phalarope	*Phalaropus lobatus*	77
Sabine's Gull	*Xema sabini*	1
Sooty Shearwater	*Ardenna grisea*	1449
Short-tailed Shearwater	*Ardenna tenuirostris*	6
Surfbird	*Calidris virgata*	1
Surf Scoter	*Melanitta perspicillata*	75
Tufted Puffin	*Fratercula cirrhata*	8
White-winged Scoter	*Melanitta deglandi*	21
Unid. Bird	*Aves spp.*	1
Unid. Cormorant	*Urile spp.*	3
Unid. Duck	*Anatidae spp.*	1
Unid. Gull	*Larus spp.*	95
Unid. Jaeger	*Stercorarius spp.*	4
Unid. Loon	*Gavia spp.*	2

Unid. Murre	*Uria spp.*	3
Unid. Phalarope	*Phalaropus spp.*	11
Unid. Shorebird	*Charadriiformes spp.*	8
Unid. Scoter	*Melanitta spp.*	851
Unid. Shearwater	*Ardenna spp.*	28
Unid. Tern	*Sterninae spp.*	1
		5278

Table 6. Marine mammal observations recorded during surveys in Kachemak Bay, Alaska, July 13 – July 27, 2024.

English Name	Scientific Name	No.
Harbor Porpoise	*Phocoena phocoena*	2
Harbor Seal	*Phoca vitulina*	43
Humpback Whale	*Megaptera novaeangliae*	1
Minke Whale	*Balaenoptera acutorostrata*	1
Sea Otter	*Enhydra lutris*	662
		709

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 to be collected during our surveys.

We are planning on convening synthesis meetings and a collaborative workshop in 2025 to further integrate data analysis and synthesis among both components of this project. We also plan to discuss and develop recommendations for future monitoring of population size and abundance patterns of murrelets and pigeon guillemots in our region.

2. Products:

Peer-reviewed publications:

None at this time

Reports:

Annual EVOSTC Reports 2021-2023.

Popular articles:

None at this time

Conferences and workshops:

Higgins, B., and T. Hollmen. 2024. Temporal Change in Distribution and Abundance of Kittlitz's Murrelet Nesting Habitat in The Kenai Fjords Region. Pacific Seabird Group Meeting, February 21-23, 2024. Seattle, Washington.

Higgins, B., and T. Hollmen. 2025. Why Do Kittlitz's Murrelets (*Brachyramphus brevirostris*) Forage Near Tidewater Glaciers? Alaska Marine Science Symposium, January 27-31, 2025. Anchorage, Alaska.

Labunski, E. 2024. Kachemak Bay Marine Bird Survey Synopsis. Presented at the NOAA Seabird Incidental Take Working Group. March 2024. (virtual)

Labunski, E. 2024. USFWS Marine Bird Surveys in Alaska. Presented at the Pacific Arctic Working Group Meeting. October 2024. (virtual)

Public presentations:

Hollmen, T. Project outreach presentations, ASLC Education and Public Outreach Programs, 2024.

Hollmen, T., and S. Donahue. Project outreach presentations at Seward Seabird Festival, June 2024.

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

Produced finalized survey data files for the 2024 field season.
Created data products including species summary tables and species distribution maps.
Generated water column temperature, salinity and turbidity profiles for Kenai Fjords study sites.
Submitted data files from the 2024 field season on the Research Workspace.

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 are currently on track to finalize data dictionaries to archive transect location information, survey data, analysis output, and associated metadata for the project. The Kachemak Bay and Kenai Fjords project components 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.

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. Project PIs from both components continue 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 during 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. We virtually attended the Fall 2024 Gulf Watch Alaska PI meeting to examine mutual collaborative opportunities. Data collected in this study is available to researchers on the Northern Gulf of Alaska Long Term Ecological Research (NGA-LTER) projects. We have coordinated field work between the Kenai Peninsula Component and the NGA-LTER.

Our project also will provide marine bird and mammal distribution data and population estimates to the following projects to contribute to interpreting regionwide results: Project 24120114-M, Prince William Sound Marine Bird Population Trends and Offshore Surveys; Project 23110853, Pigeon Guillemot Restoration Research in Prince William Sound; Project 24120114-C, Long-term Changes in Forage Fish, Abundance, and Body Condition in PWS; and Project 24120114-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. PI Labunski has joined the US Fish and Wildlife Service (USFWS) Mariculture working group to share information and provide insight on several proposed mariculture project in Alaska. We have also been in contact with Anne Schaefer to discuss plans to coordinate marine bird and mammal surveys in Kachemak Bay to support the mariculture program. We have shared information on the timing of our surveys in Kachemak Bay, discussed historical transects that have been conducted over the years in Kachemak Bay, and agreed to collaborate on data sharing in the future.

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, including community outreach and education opportunities in the region.

The Kenai Peninsula Coast component participated with a booth in the Seward Seabird Festival in 2024, sharing information about our project with the public.

We have contributed outreach information to Audubon Alaska for a presentation on avian surveys in Alaska. Our Kachemak Bay murrelet project will be specifically highlighted to convey the importance of marine bird surveys to assess the recovery of EVOS impacted species.

Trustee or Management Agencies

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

We also will help inform the Bureau of Ocean Energy Management (BOEM) on migratory bird species in the Lower Cook Inlet Planning Area. PI Labunski has already met with Maureen De Zeeuw with BOEM to discuss how project data can be beneficial to help support effective energy resource development in the region.

In addition to informing EVOSTC regarding recovery of impacted resources, the project will inform other management agencies (ADFG, Alaska Maritime NWR, 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 and the Ocean Alaska Science and Learning Center.

Native and Local Communities

The Kenai Peninsula Component is closely linked to a community science project established in Seward in 2018, engaging local high school students in marine bird observations thought the school year and lead by PI Hollmen. The student science education program is continuing during

the school year of 2024-2025 with 20 students enrolled. The student science network will expand regionally through collaboration with the CORaL network.

We have been in contact with Aaron Poe with the Northern Latitudes Partnership regarding the Mariculture Kelp Values Project (project 24220301) which is designed to better understand how kelp mariculture can be compatible with cultural values of indigenous communities in southcentral Alaska. Our goal is to participate in workshops and share data to help inform this project.

We are planning to work cooperatively with the CORaL network to facilitate regional community presentations in local communities. In 2025, our project again plans to participate in the 2025 Seward Seabird Festival in Seward, Alaska.

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

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.

4. Response to EVOSTC Review, Recommendations and Comments:

Science Panel Comments
Date: September 2024

This project continues an important time series of at-sea surveys of seabirds and marine mammals in Kenai Fjords, Kachemak Bay, and Resurrection Bay to assess patterns of abundance

and distribution in relation to environmental variability. It is aimed primarily at Kittlitz's murrelets, marbled murrelets, pigeon guillemots, and sea otters (Kachemak Bay), all of which were injured by the EVOS. The information the PIs are obtaining is interesting and will be very useful in the broader context of understanding issues concerning the conservation of those species, and others, and the dynamics of marine ecosystems in the GOA.

An additional element of the study is hydrographic transects (temperature, salinity, and turbidity) in Kenai Fjords. The Science Panel has concerns about the scientific value of those surveys and the associated costs. There was no interpretation of the results, for example comparing profiles between the two years, or to earlier studies, or in the context of a broader understanding of fjord physical structure and dynamics. The PIs incurred cost overruns for this element of the study. We also have concerns about the hydroacoustic surveys and their value. Nothing was presented about the locations of those surveys or preliminary results.

The FY23 annual report was a notable improvement over that of FY22. The SP encourages more timely presentations of results in the scientific literature as senior authors, and submission of data and metadata to the Data Management project which was behind schedule as of the FY23 report. The Science Panel further expects to see significant improvements in the FY24 report to include clarification on the concerns outlined above. Future SP recommendations for the Trustee Council for this project will be dependent on progress in areas noted above.

PI Response: Thank you for the supportive feedback and guidance on our project. We have included preliminary findings from hydrographic sampling in our annual report, including locations, seasonality, interannual change, and comparisons with earlier studies. These data will continue to provide novel insights into the relatively poorly understood dynamics of subarctic fjord physical structure and ecological interactions. We also have included the locations of and preliminary findings from hydroacoustic surveys that were supported by leverage from other sources. Also in our annual report, we have included preliminary analysis of the relationship between forage fish and hydrographic conditions. Analysis of these data is in progress and will continue through the synthesis phase of our project.

During the reporting period, results from our project have been presented at four conferences and working group meetings, and manuscripts based on our work are in progress. Data from field season through 2024 has been submitted to the project workspace.

Executive Director Comments

Date: October 2024

This project is progressing as planned. Annual reports were submitted on time and required minor revisions. Funding for this project is comanaged by ADF&G, the EVOSTC Office and USFWS. The expenses on the annual report are not easy to track and the PIs are not responsive to budget questions. There has been high turnover at the ASLC which has resulted in even more delayed responses to staff communications regarding invoices and budgets. That said, staff do not have concerns regarding spending, which appears to be on track. The FY22 no cost extension request for the Kachemak Bay component was never submitted, despite email reminders to the USFWS PI. We would like to see an improvement in communications with the PIs, especially the USFWS PI, in the future.

PI Response: PI Labunski with the USFWS will follow up with EVOSTC staff in April 2025 to ensure all budget clarifications, no cost extensions, and administrative duties are fulfilled as requested.

PAC Comments
Date: October 2024

Stephens asked about the purpose of hydro-acoustic surveys. Hollmen confirmed they were completed to look for the presence of fish prey for birds and were mostly focused on the larger scale of the project. Whissel introduced a motion to proceed with no concerns. Stephens seconded, and there was no opposition. The motion passed unanimously.

PI Response: We would like to thank for the opportunity to present our project update at the review meeting, and the PAC for their questions, feedback, and guidance on our project.

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	$ 146,647.60
Travel	$595.0	$0.0	$0.0	$0.0	$670.0	$1,265.0	$ 1,037.66
Contractual	$72,300.0	$80,469.0	$76,702.0	$49,500.0	$50,985.0	$329,956.0	$ 138,043.59
Commodities	$5,000.0	$0.0	$0.0	$0.0	$0.0	$5,000.0	$ 20,191.09
Equipment	$5,000.0	$0.0	$0.0	$0.0	$1,037.7	$6,037.7	$ 13,118.00
Indirect Costs (*will vary by proposer*)	$34,291.0	$35,395.0	$34,479.0	$26,073.0	$27,069.0	$157,307.0	$ 97,894.33
SUBTOTAL	$146,449.0	$146,005.0	$142,226.0	$107,550.0	$112,696.7	$654,926.7	$ 416,932.27
General Administration (9% of	$13,180.4	$13,140.5	$12,800.3	$9,679.5	$10,142.7	$58,943.4	N/A
PROJECT TOTAL	**$159,629.4**	**$159,145.5**	**$155,026.3**	**$117,229.5**	**$122,839.4**	**$713,870.1**	
Other Resources (Cost Share Funds)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	

COMMENTS:
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.

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, preparation of data for workspace submission, and preparation of data summaries and analysis.

Travel: Costs were as anticipated.

Contractual: Contractual costs included vessel charters, intern housing, and PI time. Due to the COVID-19 related delay in starting the coast wide surveys (start year for three-year surveys was moved from FY21 to FY22), the contractual costs incurred later than anticipated during the project, but are as anticipated overall.

Commodities: Commodities costs were higher than originally anticipated, due to increased supply and shipping costs, and vessel fuel and food for fieldwork also being included in commodities.

Equipment: Oceanographic instrument and shipping cost was higher than originally anticipated.

Kachemak Bay Component

Budget Category:	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	$112,236.3
Travel	$7,440.0	$15,300.1	$15,696.8	$16,105.9	$9,773.0	$64,315.8	$32,146.2
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	$29,781.4
Equipment	$36,200.0	$0.0	$4,000.0	$0.0	$0.0	$40,200.0	$22,589.0
SUBTOTAL	$93,635.2	$118,868.1	$127,292.1	$124,188.4	$47,477.9	$511,461.7	$196,752.9
General Administration (9% of subtotal)	$8,427.2	$10,698.1	$11,456.3	$11,177.0	$4,273.0	$46,031.6	
PROJECT TOTAL	**$102,062.3**	**$129,566.2**	**$138,748.4**	**$135,365.3**	**$51,750.9**	**$557,493.2**	
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	

COMMENTS: Actual cumulative amount summarizes the funds spend for FY24. Spending deviated more than 10% below projected amounts for FY24. We will work with EVOSTC staff to discuss unspent funds and roll over appropriate amounts to FY25. Additional details provide for each spending category in the budget section of the annual report. This summary page provides a 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.

Personnel: Staff salary cost were lower than projected estimate in FY24. One seasonal employee's GS-7 salary was charged for the time that was allocated to prepare for the field study and the demobilization of the project at the end of the season. Additional time was allotted to finalize QA/QC data edits.

Travel: Travel costs were 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 to insure the survey would be entirely completed.

Contractual: We are in the process of procuring contractual obligations in FY25 now that the field season are complete. The contractor will assist in the analysis, data integration, and writing of the final report.

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

Equipment: In 2024 the survey vessel Sandlance underwent annual mechanical maintenance inspection, and it was determined that only minor repairs and maintenance measures were required as part of the annual operations.