

NOAA
FISHERIES

Alaska Fisheries Science Center
Marine Mammal Laboratory

Alaska Ecosystems Program

Results of the Steller Sea Lion (*Eumetopias jubatus*) Surveys in Alaska, June–July 2024

FEBRUARY 2025

AFSC Processed Report

This document should be cited as follows:

Sweeney, K. L., B. Birkemeier, K. Luxa, and T. Gelatt. 2025. Results of the Steller sea lion (*Eumetopias jubatus*) surveys in Alaska, June–July 2024. 2025. AFSC Processed Rep. 2025-02, 47 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115.

This document is available online at: <https://repository.library.noaa.gov/>

Reference in this document to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

Results of the Steller Sea Lion (*Eumetopias jubatus*) Surveys in Alaska, June–July 2024

Katie Sweeney¹, Burlyn Birkemeier^{1,2}, Katie Luxa¹, and Tom Gelatt¹

¹National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Fisheries Science Center
Marine Mammal Laboratory
7600 Sand Point Way N.E.
Seattle, WA 98115-6349

²Cooperative Institute for Climate,
Ocean, & Ecosystem Studies
University of Washington
3737 Brooklyn Ave N.E.
Seattle, WA, 98195-4550

February 2025

ABSTRACT

The Alaska Fisheries Science Center's Marine Mammal Laboratory (MML) conducts annual crewed aircraft and vessel-based surveys of known terrestrial Steller sea lion (*Eumetopias jubatus*) rookery and haulout sites to collect visual counts and high-resolution imagery. In 2024, MML focused effort on the western distinct population segment (DPS) in Alaska, where the vessel-based team surveyed in the western and central Aleutian Islands regions while the crewed aircraft team surveyed the Gulf of Alaska regions (except for Southeast Alaska) for the first time since 2021. We collected counts from 148 sites, totaling 22,082 non-pups and 7,017 pups. We used agTrend (R package) to model all raw count data through 2024 to estimate modeled counts (as an index of abundance) and annual rates of change since 2009. The estimated model count for the western DPS of Alaska was 39,774 non-pups and 12,953 pups. Between 2009 and 2024, non-pups and pups significantly increased 0.96 and $0.90\% \text{ y}^{-1}$, respectively; however, there was high variability among regions. Non-pups ($-5.67\% \text{ y}^{-1}$) and pups ($-4.07\% \text{ y}^{-1}$) in the western Aleutian Islands region declined significantly while the central Aleutian Islands region was stable, but uncertainty in this region remains high due to low survey coverage since 2018. The eastern Aleutian Islands region (only three sites surveyed in 2024) significantly increased ($2.36\% \text{ y}^{-1}$, CI $1.1\text{--}3.53\% \text{ y}^{-1}$). The non-pup count in the western Gulf of Alaska region, which had been increasing since 2001, was stable between 2009 and 2024 ($0.76\% \text{ y}^{-1}$, CI $-0.31\text{--}1.88\% \text{ y}^{-1}$), and the pup count significantly increased ($1.27\% \text{ y}^{-1}$). In the central Gulf of Alaska, non-pups and pups significantly increased (2.52 and $1.46\% \text{ y}^{-1}$, respectively). Non-pups in the eastern Gulf of Alaska region significantly declined between 2009 and 2024 ($-1.88\% \text{ y}^{-1}$, 95% CI $-3.78\text{--}-0.11\% \text{ y}^{-1}$) while pups were stable ($0.16\% \text{ y}^{-1}$). This is a notable change from the 2021 survey, when we reported the eastern Gulf of Alaska region as stable for non-pups and significantly increasing for pups. While we have observed significant increases in annual rates of change for the western DPS, the magnitude of increase has been slowing since around 2016, and the population appears to be approaching stable. Given these trends and the documented effects of the 2014-2016 marine heatwave, it is evident that this population remains sensitive and susceptible to

external factors. As warming events are expected increase in the North Pacific Ocean, regular Steller sea lion surveys continue to be critically important to the management of the western DPS in Alaska.

CONTENTS

ABSTRACT	iii
INTRODUCTION.....	1
METHODS.....	2
Steller Sea Lion Surveys and Raw Counts.....	2
AgTrend Modeled Steller Sea Lion Counts and Trends	4
RESULTS	5
Steller Sea Lion Surveys	5
Steller Sea Lion Raw Counts.....	6
AgTrend Modeled Steller Sea Lion Counts and Trends	6
DISCUSSION.....	8
ACKNOWLEDGMENTS	11
CITATIONS.....	13
TABLES and FIGURES.....	17
APPENDIX	33

INTRODUCTION

NOAA Fisheries is charged with monitoring and managing the two distinct population segments (DPS) of the Steller sea lion (*Eumetopias jubatus*) under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA; Young et al. 2023). Within the United States, the western DPS extends west from Cape Suckling (144° W) through the western Aleutian Islands (172° E; Fig. 1). The eastern DPS extends east of Cape Suckling (144° W) and south through California (117° W; United States).

In 1990, the Steller sea lion was listed as threatened under the ESA and in 1997, the western DPS listing status was elevated to endangered. After over 30 years of monitoring, the eastern DPS was declared recovered and subsequently delisted under the ESA in 2013 (NMFS 2013). The western DPS, however, remains endangered (NMFS 2020) and a 5-year review has been initiated (U.S. Federal Register 2024) to evaluate its status.

The Marine Mammal Laboratory (MML) conducts an annual crewed aircraft survey and a vessel-based survey to collect visual counts and high-resolution aerial imagery to count Steller sea lions at known terrestrial rookery and haulout sites in Alaska (Fritz et al. 2016a). Generally, MML alternates crewed aircraft surveys annually between the Gulf of Alaska (Southeast Alaska region and west through the western Gulf of Alaska region) and the Aleutian Islands (eastern to western Aleutian Islands regions). Challenges associated with operating a crewed aircraft in the western and central Aleutian Islands (e.g., inclement weather and remote airfields) led to the implementation of vessel-based surveys to collect ship-, skiff-, and land-based visual counts, and uncrewed aircraft system (UAS) surveys to collect aerial imagery since 2014. There are several research priorities on the vessel-based trips and collecting counts is typically the highest priority during years when the crewed aircraft team is also surveying the Aleutian Islands. Due to the COVID-19 pandemic, MML canceled all surveys in 2020, and conducted only a crewed aircraft survey (no vessel-based survey) in 2021 in the Gulf of Alaska. In 2022 and 2023, both crewed aircraft and vessel-based surveys resumed in the Aleutian Islands (Sweeney et al. 2023a, b).

MML's objective in 2024 was to conduct a crewed aircraft survey in the eastern, central, and western Gulf of Alaska regions. Since the Gulf of Alaska was not surveyed on

schedule in 2023, MML omitted the Southeast Alaska survey to allow for a more focused and complete effort in the western DPS regions. The vessel-based survey team conducted surveys in the central and western Aleutian Islands regions.

METHODS

MML conducts count surveys of Steller sea lions during the peak of the breeding season from late June through mid-July (typically 24 June–11 July) when Steller sea lions aggregate onshore to pup and breed. Surveys begin about 10 days after the mean pup birth dates in the survey area (4–14 June) by which time approximately 95% of all pups are born (Pitcher et al. 2001, Kuhn et al. 2017b). Surveys are targeted to occur between 1000 and 1800 Alaska Standard Time when Steller sea lions are more likely to have returned from foraging. Non-pup counts do not account for Steller sea lions at sea during the survey. Pup counts are considered a census because pups tend to remain on the rookery until they are older than one month old (Kuhn et al. 2017a); however, pup counts are not corrected for those that are born or die after the survey.

Steller sea lion sites are categorized as either rookeries or haulouts. A site is designated a rookery if there has been at least one pup count ≥ 50 within the breeding season (Fritz et al. 2013). Sites remain rookeries even if pup counts fall below the 50-pup threshold.

Steller Sea Lion Surveys and Raw Counts

The crewed aircraft survey team operated from a NOAA Twin Otter fixed-wing aircraft mounted with a vertically oriented camera mount (as used since 2009; Fritz et al. 2013) to collect imagery from which to count sea lions. In 2023 and 2024, the camera mount was equipped with three Sony Alpha a7R IIIA mirrorless digital cameras with Sony FE 85mm f/1.8 lenses. For sites with fewer than ten animals, observers conducted visual counts of non-pups. The planned survey area for the crewed aircraft team extended from the western Gulf of Alaska (Sanak Islands, 163°W) to the eastern Gulf of Alaska region (Kayak Island, 144°W; Fig. 1). The crewed aircraft team did not survey the Southeast Alaska region in 2024.

The vessel-based survey team operated aboard the U.S. Fish and Wildlife Service Research Vessel (RV) *Tiglâx* conducting visual counts from land, ship, and small boats, and collecting UAS imagery from which to count Steller sea lions. The survey area for this team extended from Attu Island (172° E) in the western Aleutian Islands region through the Delarof Islands (178° W) in rookery cluster area (RCA) 3 of the central Aleutian Islands region (Fig. 1). The vessel-based survey team also planned to survey Kasatochi Island, a large rookery in RCA 4 of the central Aleutian Islands region.

Research partners provided Steller sea lion survey data from some remote and restricted islands. The Ecosystem Conservation Office (ECO) of the Aleut Community of St. Paul Island (Pribilof Islands) conducted UAS surveys of Walrus (rookery site) and Otter Island (haulout site) in the eastern Aleutian Islands (Bering) region on 9 and 10 July, respectively. MML biologists counted the UAS imagery as in previous years (Fritz et al. 2013). The Alaska Department of Fish and Game provided a count of Round (Walrus Is.) in the eastern Aleutian Islands (Bering) region on 2 July, which was not included in time for this report but will be included in the future.

MML biologists have been developing an artificial intelligence (AI) approach to processing and counting imagery, and implemented a hybrid count workflow to analyze 2024 imagery. As in previous years, two MML biologists independently processed imagery (i.e., manually mosaicked images for each site; Fritz et al. 2013). An AI detection and classification model (“FUSION” model; Kitware, Inc. 2024) was used on mosaicked images to annotate and classify individuals into one of the five age and sex classes (adult male, sub-adult male, adult female, juvenile, and pup). One MML biologist conducted traditional counts (Fritz et al. 2013) on the first half of sites and reviewed AI model detections for the second half of sites. The second MML biologist did the inverse, reviewing AI detections on the first half of sites and conducting traditional counts on the second half of sites. Each detection was reviewed and edited, and box annotations were drawn around missed animals. The biologists compared and reconciled counts as in previous years (Fritz et al. 2013).

AgTrend Modeled Steller Sea Lion Counts and Trends

Our method for modeling raw count data produces estimated counts and annual rates of change (i.e., trends) for regional and temporal aggregations, which NOAA Fisheries uses for monitoring the Steller sea lion population. The agTrend model (R package; Johnson and Fritz 2014, Gaos et al. 2021) augments missing counts from raw data collected at all sites (with at least two non-zero counts) rather than relying solely on counts at “trend” sites (Fritz et al. 2013, 2016b). The agTrend model uses the penalized spline model to reduce variance for years where missing data are interpolated. This model employs a logarithmic linear regression model to fit the data and is not informed by population dynamics or biological constraints, which means the estimates derived for the most recent year in the data series (i.e., 2024) could change with the addition of new information collected in subsequent survey years.

The agTrend model produces two types of count estimates: realized and predicted counts. Realized counts use the standardized variance of raw counts at each site throughout the time series to estimate survey counts we would expect to collect if we had surveyed all sites. Therefore, the more complete the survey, the more similar raw counts are to the realized counts, which is evident by smaller credible intervals. Predicted counts are smoothed and account for both observation and process errors, which we use to estimate annual rates of change.

Steller sea lion raw counts were modeled and summarized for the western DPS in Alaska; western, central, and eastern Aleutian Islands (ALEU) regions; central ALEU region further delineated into RCA 2 through 5; west of Samalga Pass; western, central and eastern Gulf of Alaska (GULF) regions; eastern GULF and central GULF regions combined; and east of Samalga Pass. We did not provide an update for Southeast Alaska in the eastern DPS because this region was not surveyed by MML in 2024. We used predicted count estimates to summarize total counts and realized counts for temporal comparison to highlight fine-scale changes.

We modeled raw counts since 1978 for non-pups (Fritz et al. 2015) and 1973 for pups (Fritz et al. 2019). In order to be consistent with the Recovery Criteria identified in

the Steller sea lion Recovery Plan (NMFS 2008), we reported trends over a 15-year period (2009–2024) and generated figures of modeled counts beginning in 1994, with 2002 noted on the x-axis as the year with the lowest non-pup and pup counts for the total western DPS. Count trends with two positive 95% credible interval (CI) values were considered to be a statistically significant increase, two negative values as a statistically significant decrease, and a negative and positive value were considered to be statistically stable.

RESULTS

Steller Sea Lion Surveys

In total, MML surveyed 146 sites in 2024. The crewed aircraft team conducted surveys between 23 June and 8 July 2024 and surveyed 131 of 132 planned sites: 42 in the western GULF (missing one site because of fog, Bird), 59 in the central GULF (no sites missed), and 30 in the eastern GULF (no sites missed; Table 1 and Fig. 1). Visual counts were conducted at 48 sites and camera imagery were captured at 83 sites.

The vessel-based team conducted surveys between 24 June and 6 July 2024 and surveyed 15 Steller sea lion sites: six in the western ALEU (nine sites not surveyed), eight in the central ALEU in RCAs 2 and 3 (35 sites not surveyed), and one site was surveyed opportunistically in the eastern ALEU. Observers conducted visual counts at eight sites and UAS surveys at seven sites.

There was a small area cut off in the imagery for Walrus (eastern ALEU [Bering]) where there could have been sea lions present. While we would typically treat this as an incomplete count and exclude it from the analysis, we were confident that only a few animals could have been missed and data is sparse for this site and region, so we included it.

Steller Sea Lion Raw Counts

Non-Pups

We counted 22,082 live non-pups on 102 sites that had at least one non-pup present (Table 1). In the Aleutian Islands, we counted 337 non-pups in the western ALEU, 331 in the central ALEU, and 275 in the eastern ALEU. In the Gulf of Alaska, we counted 8,836 non-pups in the western GULF, 8,140 in the central GULF, and 4,163 in the eastern GULF.

Pups

We counted 7,017 live Steller sea lion pups at 54 sites that had at least one pup present (Table 1). In the Aleutian Islands we counted 126 pups in the western ALEU, 107 in the central ALEU, and 68 pups in the eastern ALEU. In the Gulf of Alaska, we counted 3,041 pups in the western GULF, 2,584 pups in the central GULF, and 1,091 pups in the eastern GULF.

Pup counts at Sea Otter (central GULF) and Glacier (eastern GULF) haulout sites had pup counts greater than or equal to 50 individuals for the first time in 2024, and Cape St. Elias (eastern GULF) had ≥ 50 pups for the second time since 2021.

AgTrend Modeled Steller Sea Lion Counts and Trends

Non-Pups

Steller sea lion non-pups in the western DPS in Alaska increased $0.96\% \text{ y}^{-1}$ (95% CI $0.32\text{--}1.65\% \text{ y}^{-1}$) between 2009 and 2024 (Table 2), and the predicted count estimate in 2024 was 39,774 (95% CI 36,626–43,078; Fig. 2 and APPENDIX Table 1). Regional modeled counts can be found in APPENDIX Table 2 and Figure 3.

From 2009 to 2024, non-pups west of Samalga Pass were stable (Fig. 4) with significant declines in the western ALEU ($-5.67\% \text{ y}^{-1}$, 95% CI $-7.88\text{--}-3.36\% \text{ y}^{-1}$) and overall stability in the central ALEU ($0.33\% \text{ y}^{-1}$, 95% CI $-1.68\text{--}2.77\% \text{ y}^{-1}$). Within the central ALEU, significant decreases in RCAs 2 and 3 were offset by stability within RCAs 4 and 5 (Fig. 5). However, this region, especially RCAs 4 and 5, have maintained high uncertainty (i.e., high CIs) because of low survey coverage since 2018.

Non-pups east of Samalga Pass significantly increased between 2009 and 2024 ($1.22\% \text{ y}^{-1}$, 95% CI $0.58\text{--}1.86\% \text{ y}^{-1}$). The western GULF was stable from 2009 to 2024 ($0.76\% \text{ y}^{-1}$, 95% CI $-0.31\text{--}1.88\% \text{ y}^{-1}$) while central GULF non-pups significantly increased $2.52\% \text{ y}^{-1}$ (95% CI $1.48\text{--}3.59\% \text{ y}^{-1}$). The eastern GULF region significantly declined from 2009 to 2024 ($-1.88\% \text{ y}^{-1}$, 95% CI $-3.78\text{--}-0.11\% \text{ y}^{-1}$). The combined eastern and central GULF regions were stable ($0.69\% \text{ y}^{-1}$, 95% CI $-0.31\text{--}1.69\% \text{ y}^{-1}$; Fig. 6).

Pups

Steller sea lion pup counts in the western DPS in Alaska increased $0.90\% \text{ y}^{-1}$ (95% CI $0.24\text{--}1.61\% \text{ y}^{-1}$) between 2009 and 2024 (Table 2), and the predicted count estimated for 2024 was 12,953 (95% CI 11,996–13,990; Fig. 7 and APPENDIX Table 1). Regional modeled counts can be found in APPENDIX Table 2 (Fig. 8).

Pups in the western ALEU region significantly decreased from 2009 to 2024 ($-4.07\% \text{ y}^{-1}$, 95% CI $-5.27\text{--}-2.93\% \text{ y}^{-1}$). Similar to non-pup counts, the central ALEU pup counts were stable from 2009 to 2024 ($-0.22\% \text{ y}^{-1}$, 95% CI $-2.44\text{--}2.34\% \text{ y}^{-1}$), with significant decreases in RCA 2 and 3 (-4.95 and $-4.86\% \text{ y}^{-1}$, respectively) being offset by stability (with high uncertainty) in RCAs 4 and 5 (Fig. 9). The 15-year trend west of Samalga Pass was also stable ($-0.48\% \text{ y}^{-1}$, 95% CI $-2.62\text{--}1.88\% \text{ y}^{-1}$; Fig. 10).

East of Samalga Pass, pups significantly increased by $1.32\% \text{ y}^{-1}$ (95% CI $0.74\text{--}1.88\% \text{ y}^{-1}$) between 2009 and 2024. The western ($1.27\% \text{ y}^{-1}$) and central GULF ($1.46\% \text{ y}^{-1}$) regions increased significantly. In the eastern GULF, the pup count trend was stable at $0.16\% \text{ y}^{-1}$ (95% CI $-1.23\text{--}1.59\% \text{ y}^{-1}$). In the central and eastern GULF regions combined, pup counts were significantly increasing ($1.07\% \text{ y}^{-1}$; Fig. 11).

DISCUSSION

Analysis of the 2024 Steller sea lion survey data found that the population trend for the western DPS in Alaska significantly increased from 2009 to 2024. The magnitude of increase has been slowing since around 2016, and the population appears to be approaching stable. We observed highly variable counts and trends among regions, with increases in the eastern ALEU and western GULF regions largely driving the overall western DPS trend. Under the current model, realized counts of non-pups and pups decreased approximately 2% from 2023 to 2024.

As in previous years (e.g., Sweeney et al. 2023a, b), 15-year non-pup and pup trends in the western ALEU region continued to significantly decline, though we estimated little (decrease of 34 non-pups) or no (pups) change in realized counts in this region from 2023 to 2024. There was limited survey effort in the central ALEU region in 2024—and since 2018—resulting in high uncertainty (i.e., high CIs), especially in RCAs 4 and 5. Collecting more data in this region is vital towards a better understanding of trends in the central ALEU and west of Samalga Pass, which have oscillated between decreasing and stable in previous reports (e.g., Sweeney et al. 2023b). MML intends to prioritize this region during the 2025 Steller sea lion surveys.

Except for Walrus and Otter Island in the Bering Sea and Avatanak/S, which was surveyed opportunistically, new counts for the eastern ALEU region were also sparse. Through 2021, 15-year trends for non-pups were steadily increasing less than 2% y^{-1} while pups increased over 2.5% y^{-1} . Since then, non-pup and pup growth rates dropped to around 1% y^{-1} , then non-pups began increasing (>2% y^{-1}) at a higher rate than pups. Given that we have previously observed slowing or stabilizing pup count trends preceding the slowing of non-pup trends (e.g., western DPS, Southeast Alaska region; Sweeney et al. 2022), this could signal a slowing in future non-pup counts in the eastern ALEU.

Steller sea lions in the Gulf of Alaska were impacted by the marine heatwave that occurred from 2014 to 2016 (Suryan et al. 2021, Hastings et al. 2023, Warlick et al. 2023, McHuron et al. 2024). Evidence of this was first reported in 2017 (Sweeney et al. 2017), when we observed an atypical movement (east to west) of juveniles and adult females from

the eastern to the central GULF (Sweeney et al. 2017, McHuron et al. 2019). Subsequent surveys documented a downturn in eastern GULF non-pup 15-year trends, from increasing (Sweeney et al. 2017, 2019) to stable (Sweeney et al. 2022) to significantly decreasing in 2024. Western GULF pup trends continued to increase, but non-pup 15-year trends shifted from increasing in 2021 (Sweeney et al. 2022) to stable in 2024. This could indicate a detrimental effect on non-pup survival in this area or movement (likely by juveniles) out of the region during the breeding season. Central GULF non-pups continued to increase this year, although at a lower rate than in 2021 (Sweeney et al. 2022).

Continued trend changes in the Gulf of Alaska are concerning because these regions had previously been steadily increasing since the early 2000s. Movement of sea lions from eastern to central GULF sites could still be a factor, as well as reduced non-pup survival post-heatwave. Interestingly, among central GULF sites that were surveyed in both 2023 (Sweeney et al. 2023b) and 2024, raw counts decreased at rookeries (616 non-pups or 13%, 209 pups or 9%) and increased at haulouts (295 non-pups or 8%, 43 pups or 45%), which could mean that some adult females did not pup and instead moved to haulout sites, likely with their juvenile (i.e., pup from the previous year).

New rookeries are rarely identified, however, since 2021, pup counts at four haulout sites reached the threshold to be designated as rookery sites: Aiktak (eastern ALEU; Sweeney et al. 2023b), Sea Otter (central GULF), Glacier (eastern GULF), and Cape St. Elias (eastern Gulf; Sweeney et al. 2022). Future counts at these sites may help us understand why females choose to pup at sites other than their natal rookery.

MML did not include Southeast Alaska in the 2024 survey since including this region typically results in an incomplete survey of the western GULF region. However, we acknowledge that surveying Southeast Alaska is important, as sea lion counts and survival were also affected by the Gulf of Alaska heatwave (Hastings et al. 2023, McHuron et al. 2024). A range-wide eastern DPS joint survey effort, as guided by the delisting criteria (NMFS 2013), is planned for 2026, at which time the MML crewed aircraft survey will prioritize Southeast Alaska.

This was our first year implementing a hybrid traditional-and-AI count workflow. Although it took slightly more time reviewing and editing AI annotations compared to traditional counting (two independent counters took 13 and 30 more hours), it was just as effective. The most significant benefit was that it allowed subject matter experts to assess AI models and create training and validation data, while also processing survey imagery at the same time. A detailed report of this process is currently in preparation.

Given continued declines in the western ALEU, lack of recovery in the central ALEU, and downward-shifting trends in the Gulf of Alaska, it is evident this population remains sensitive and susceptible to external factors. Marine heatwaves are anticipated to increase in frequency and magnitude in the North Pacific Ocean (Litzow et al. 2020, Suryan et al. 2021), and it will be critically important monitor Steller sea lion counts and trends following such events. Regular surveys are an essential requirement for estimating and detecting changes in populations, and are the cornerstone of managing the endangered western DPS in Alaska.

ACKNOWLEDGMENTS

We want to acknowledge that these surveys were conducted throughout the southern coast of Alaska, on the traditional lands and waters of the Unanga, Sugpiaq, Yup'ik, Eyak, Tlinkit, Haida, and Tsimshian Peoples (Krauss 2011) who have stewarded these lands since time immemorial.

We thank LCDR William Carrier, LT Max Anderson, Ron Pauley, LCDR Lauren Feeley and the entire NOAA Aircraft Operations Center for conducting the crewed aircraft surveys, and Captain John Faris and the crew of the U.S. Fish and Wildlife Service RV *Tiġlâx* (pronounced TEKH-lah; Unangam Tunuu or 'Aleut' for "eagle") for their continued support of our Aleutian Islands vessel-based survey. Each survey presents a unique set of logistical, mechanical, and weather-related challenges, and because of their dedication, we were able to complete as much as possible. Thank you to NOAA Uncrewed System Operations Center for their contribution to our continued, successful implementation of UAS. MML also greatly appreciates the commitments of Tomo Eguchi, Morgan Lynn, Jim Gilpatrick and Wayne Perryman (Southwest Fisheries Science Center), and Don LeRoi (Aerial Imaging Solutions, LLC) for their assistance in making aerial surveys possible, and the Bureau of Land Management for being the 'eye in the sky' for the crewed aircraft flights.

B. Birkemeier (UW CICOES), and K. Luxa, and B. Hou (MML) conducted the Twin Otter survey, and B. Hou led camera mount and software updates. K. Sweeney and B. Fadely (MML) conducted the UAS surveys, and T. Gelatt, B. Fadely, and K. Sweeney (MML) conducted visual counts during the RV *Tiġlâx* survey. K. Sweeney and B. Birkemeier processed and counted aerial imagery and wrote this report. B. Fadely, T. Gelatt, K. Luxa, and K. Raum-Suryan reviewed this report and provided feedback. Technical edits were provided by James Lee of the Alaska Fisheries Science Center's Communications Program.

Research was conducted under authority of U.S. Marine Mammal Protection Act/Endangered Species Act Permit 27499 and 22289, and NMFS IACUC Protocol NWAK 24-02.

CITATIONS

- Fritz, L., K. Sweeney, D. Johnson, M. Lynn, and J. Gilpatrick. 2013. Aerial and ship-based surveys of Steller sea lions (*Eumetopias jubatus*) conducted in Alaska in June–July 2008 through 2012, and an update on the status and trend of the western stock in Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-251, 91 p.
- Fritz, L., Sweeney, K., Lynn, M., Gelatt, T., Gilpatrick, J., and R. Towell. 2015. Counts of Alaska Steller sea lion adult and juvenile (non-pup) conducted on rookeries and haul-outs in Alaska Aleutian Islands, Bering Sea, and others from 1904-01-01 to 2015-07-18 (NCEI Accession 0128190). <https://doi.org/10.7289/v54f1np1>.
- Fritz, L., Sweeney, K., Lynn, M., Gelatt, T., Gilpatrick, J., and R. Towell. 2016a. Steller sea lion haulout and rookery locations in the United States for 2016-05-14 (NCEI Accession 0129877). <https://doi.org/10.7289/v58c9t7v>.
- Fritz, L., K. Sweeney, R. Towell, and T. Gelatt. 2016b. Aerial and ship-based surveys of Steller sea lions (*Eumetopias jubatus*) conducted in Alaska in June–July 2013 through 2015, and an update on the status and trend of the western distinct population segment in Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-321, 72 p.
- Fritz, L., Sweeney, K., Lynn, M., Gelatt, T., Gilpatrick, J., and R. Towell. 2019. Counts of Steller sea lion pups collected from terrestrial, aerial, ship, and unoccupied aircraft surveys of rookeries and major haulouts in Alaska during the Steller sea lion aerial survey project from 1961-06-22 to 2019-07-04 (NCEI Accession 0128189). <https://doi.org/10.7289/v5862ddr>.
- Gaos, A., L. Kurpita, H. Bernard, L. Sundquist, C. King, J. Browning, E. Naboa, I. Kelly, K. Downs, T. Eguchi, G. Balazs, K. Van Houtan, D. Johnson, T. Jones, S. Martin. 2021. Hawksbill Nesting in Hawai'i: 30-Year Dataset Reveals Recent Positive Trend for a Small, Yet Vital Population. Front. Mar. Sci. 8. 10.3389/fmars.2021.770424.
- Hastings, K. K., Gelatt, T. S., Maniscalco, J. M., Jemison, L. A., Towell, R., Pendleton, G. W., & Johnson, D. S. 2023. Reduced survival of Steller sea lions in the Gulf of Alaska following marine heatwave. Front. Mar. Sci. 10: 1127013.

- Johnson, D. S., and L. W. Fritz. 2014. agTrend: A Bayesian approach for estimating trends of aggregated abundance. *Methods in Ecology and Evolution* 5(10): 1110-1115.
- Kitware, Inc. Sea Lion Models: FUSION pipeline, multi-class. Version 2.11. Github: <https://github.com/VIAME/VIAME/wiki/Model-Zoo-and-Add-Ons#sea-lion-models>. Accessed 01 September 2024.
- Krauss, Michael, Gary Holton, Jim Kerr, and Colin T. West. 2011. Indigenous Peoples and Languages of Alaska. Fairbanks and Anchorage: Alaska Native Language Center and UAA Institute of Social and Economic Research. Online: <https://www.uaf.edu/anla/collections/map/>
- Kuhn C. E., K. Chumbley, L. Fritz, and D. Johnson. 2017a. Estimating dispersal rates of Steller sea lion (*Eumetopias jubatus*) mother-pup pairs from a natal rookery using mark-resight data. *PLoS ONE*. 12(12):1-12. 10.1371/journal.pone.0189061
- Kuhn C. E., K. Chumbley, D. Johnson, and L. Fritz. 2017b. A re-examination of the timing of pupping for Steller sea lions *Eumetopias jubatus* breeding on two islands in Alaska. *Endang. Species. Res.* 32:213-222. 10.3354/esr00796
- Litzow, M., M. Hunsicker, E. Ward, S. Anderson, J. Gao, S. Zador, S. Batten, S. Dressel, J. Anderson, E. Fergusson, R. Hopcroft, B. Laurel, and R. O'Malley. 2020. Evaluating ecosystem change as Gulf of Alaska temperature exceeds the limits of preindustrial variability. *Prog. Oceanogr.* 186:1-15.
- McHuron, E. A., Sweeney, K. L., & Fadely, B. S. 2024. Effects of the 2014-2016 marine heatwave on Steller sea lions in the Gulf of Alaska and implications for top-down forcing. *Mar. Ecol. Prog. Ser.* 736: 129-145.
- NMFS (National Marine Fisheries Service). 2008. Recovery Plan for the Steller Sea Lion (*Eumetopias jubatus*). Revision. National Marine Fisheries Service, Silver Spring, MD. 325 pages. <https://repository.library.noaa.gov/view/noaa/15974>
- NMFS (National Marine Fisheries Service). 2013. Status review of the eastern Distinct Population Segment of Steller sea lion (*Eumetopias jubatus*). Protected Resources Division, Juneau, Alaska, 144 p. <https://repository.library.noaa.gov/view/noaa/16214>

- NMFS (National Marine Fisheries Service). 2020. Western Distinct Population Segment Steller sea lion *Eumetopias jubatus* 5-Year Review: Summary and Evaluation. Protected Resources Division, Juneau, Alaska, 61 p.
<https://www.fisheries.noaa.gov/s3//dam-migration/steller-sea-lion-5year-review-0220.pdf>
- Pitcher, K. W., V. N. Burkanov, D. G. Calkins, B. J. LeBoeuf, E. G. Mamaev, R. L. Merrick, and G. W. Pendleton. 2001. Spatial and temporal variation in the timing of births of Steller sea lions. *J. Mammalogy* 82(4): 1047-1053.
- Suryan, R. M., M. L. Arimitsu, H. A. Coletti, R. R. Hopcroft, M. R. Lindeberg, S. J. Barbeaux, S. D. Batten, W. J. Burt, M. A. Bishop, J. L. Bodkin, R. Brenner, R. W. Campbell, D. A. Cushing, S. L. Danielson, M. W. Dorn, B. Drummond, D. Esler, T. Gelatt, D. H. Hanselman, S. A. Hatch, S. Haught, K. Holderied, K. Iken, D. B. Irons, A. B. Kettle, D. G. Kimmel, B. Konar, K. J. Kuletz, B. J. Laurel, J. M. Maniscalco, C. Matkin, C. A. E. McKinstry, D. H. Monson, J. R. Moran, D. Olsen, W. A. Palsson, W. S. Pegau, J. F. Piatt, L. A. Rogers, N. A. Rojek, A. Schaefer, I. B. Spies, J. M. Straley, S. L. Strom, K. L. Sweeney, M. Szymkowiak, B. P. Weitzman, E. M. Yasumiishi, and S. G. Zador. 2021. Ecosystem response persists after a prolonged marine heatwave. *Sci. Rep.* 11:6235.
- Sweeney, K. L., L. Fritz, R. Towell, and T. Gelatt. 2017. Results of Steller Sea Lion Surveys in Alaska, June-July 2017. Memorandum to The Record.
<https://repository.library.noaa.gov/view/noaa/18790>
- Sweeney, K. L., R. Towell, and T. Gelatt. 2018. Results of Steller Sea Lion Surveys in Alaska, June-July 2018. Memorandum to The Record.
https://media.fisheries.noaa.gov/dam-migration/ssl_aerial_survey_2018_final.pdf
- Sweeney, K. L., B. Birkemeier, K. Luxa, and T. Gelatt. 2019. Results of Steller Sea Lion Surveys in Alaska, June-July 2019. Memorandum to The Record.
https://media.fisheries.noaa.gov/dam-migration/ssl_aerial_survey_2019_final_508.pdf

- Sweeney, K. L., B. Birkemeier, K. Luxa, and T. Gelatt. 2022. Results of Steller Sea Lion Surveys in Alaska, June-July 2021. Memorandum to The Record.
https://media.fisheries.noaa.gov/2022-02/ssl_aerial_survey_2021_final.pdf
- Sweeney, K. L., Birkemeier, B., Luxa, K., and Gelatt, T. 2023a. Results of the Steller sea lion surveys in Alaska, June-July 2022. AFSC Processed Rep. 2023-02, 32 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115.
<https://media.fisheries.noaa.gov/2023-05/2022-SSLsurveyreport-PR2023-02.pdf>
- Sweeney, K. L., Birkemeier, B., Luxa, K., and Gelatt, T. 2023b. Results of the Steller sea lion surveys in Alaska, June-July 2023. AFSC Processed Rep. 2023-08, 36 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115.
<https://www.fisheries.noaa.gov/s3//2023-12/2023-SSLsurveyreport-PR2023-08.pdf>
- Warlick, A. J., Johnson, D. S., Sweeney, K. L., Gelatt, T. S., & Converse, S. J. 2023. Examining the effect of environmental variability on the viability of endangered Steller sea lions using an integrated population model. *Endang. Species. Res.* 52: 343-361.
- Young, N. C., Brower, A. A., Muto, M. M., Freed, J. C., Angliss, R. P., Friday, N. A., Boveng, P. L., Brost, B. M., Cameron, M. F., Crance, J. L., Dahle, S. P., Fadely, B. S., Ferguson, M. C., Goetz, K. T., London, J. M., Oleson, E. M., Ream, R. R., Richmond, E. L., Sheldon, K. E. W., Sweeney, K. L., Towell, R. G., Wade, P. R., Waite, J. M., Zerbini, A. N. 2023. Alaska Marine Mammal Stock Assessments, 2022. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-474, 325 p.

TABLES and FIGURES

Table 1. -- Raw counts of live Steller sea lion non-pups and pups in the western (W), central (C), and eastern (E) Aleutian Islands (ALEU) and Gulf of Alaska (GULF) regions in 2024. The C ALEU region is further broken down into rookery cluster areas (RCA) 2–5. ROOK indicates whether the site was a rookery (≥ 50 pups historically; 1) or haulout (0) site. SURVEY indicates whether the data were a Twin Otter visual (TO-V) or image (TO-I), RV *Tiġlâx* visual (RV-V), or UAS image (RV-I) count. Walrus and Otter Island were surveyed by the Ecosystem Conservation Office (ECO) and counted by the Marine Mammal Laboratory.

SITE	REGION	RCA	ROOK	NON-PUP	PUP	SURVEY
AGATTU/CAPE SABAK	W ALEU		1	99	28	RV-I
AGATTU/GILLON POINT	W ALEU		1	83	60	RV-I
ALAID	W ALEU		0	32	4	RV-I
ATTU/CAPE WRANGELL	W ALEU		1	104	34	RV-I
ATTU/CHICHAGOF POINT	W ALEU		0	12	0	RV-V
ATTU/CHIRIKOF POINT	W ALEU		0	7	0	RV-V
AMCHITKA/EAST CAPE	C ALEU	2	0	89	22	RV-I
AYUGADAK	C ALEU	2	1	96	38	RV-I
KISKA/CAPE ST STEPHEN	C ALEU	2	1	33	22	RV-I
KISKA/LIEF COVE	C ALEU	2	1	53	24	RV-V
KISKA/SOBAKA-VEGA	C ALEU	2	0	19	0	RV-V
SEMISOPOCHNOI/PETREL	C ALEU	2	0	0	0	RV-V
SEMISOPOCHNOI/POCHNOI	C ALEU	2	0	19	1	RV-V
ILAK	C ALEU	3	0	22	0	RV-V
OTTER ISLAND	E ALEU (BERING)		0	14	0	ECO
WALRUS	E ALEU (BERING)		1	252	68	ECO
AVATANAK/S	E ALEU		0	9	0	RV-V
ATKINS	W GULF		1	596	322	TO-I
ATKULIK	W GULF		0	0		TO-V
BIG KONIUJI	W GULF		0	0		TO-V
BIRD (SHUMAGINS)	W GULF		0	0		TO-V
CASTLE ROCK	W GULF		0	63	0	TO-I
CATON	W GULF		0	804	6	TO-I
CHANKLIUT	W GULF		0	0		TO-V
CHERNABURA	W GULF		1	943	420	TO-I
CHERNI	W GULF		0	0		TO-V
CLUBBING ROCKS NORTH	W GULF		1	506	320	TO-I
CLUBBING ROCKS SOUTH	W GULF		1	624	496	TO-I
EGG (SAND POINT)	W GULF		0	58	0	TO-I
HAGUE ROCK	W GULF		0	0		TO-V

SITE	REGION	RCA	ROOK	NON-		SURVEY
				PUP	PUP	
HUNT	W GULF		0	0		TO-V
JUDE	W GULF		1	830	470	TO-I
KAK	W GULF		0	180	3	TO-I
KUPREANOF POINT	W GULF		0	170	2	TO-I
LIGHTHOUSE ROCKS	W GULF		1	339	12	TO-I
MITROFANIA	W GULF		0	242	6	TO-I
NAGAI/MOUNTAIN POINT	W GULF		0	237	1	TO-I
NAGAI/RK W OF CAPE WEDGE	W GULF		0	0		TO-V
OLGA ROCKS NE	W GULF		0	37	0	TO-I
OLGA ROCKS SW	W GULF		0	314	6	TO-I
OMEGA	W GULF		0	21	0	TO-I
PAUL	W GULF		0	0		TO-V
PINNACLE ROCK	W GULF		1	1317	732	TO-I
SANAK	W GULF		0	0		TO-V
SANDMAN REEF ROCK	W GULF		0	4	0	TO-I
SEA LION ROCKS (SHUMAGINS)	W GULF		0	134	0	TO-I
SEAL CAPE	W GULF		0	0		TO-V
SIMEONOF	W GULF		0	232	7	TO-I
SOUTH ROCKS	W GULF		1	445	78	TO-I
SOZAVARIKA	W GULF		0	0		TO-V
SPITZ	W GULF		0	150	0	TO-I
SUSHILNOI ROCKS	W GULF		1	302	87	TO-I
THE HAYSTACKS	W GULF		0	15	0	TO-I
THE WHALEBACK	W GULF		1	130	73	TO-I
TWINS	W GULF		0	0		TO-V
UMGA	W GULF		0	0		TO-V
UNGA/ACHEREDIN POINT	W GULF		0	105	0	TO-I
UNGA/CAPE UNGA	W GULF		0	0		TO-V
WOSNESENSKI	W GULF		0	38	0	TO-I
AFOGNAK/TONKI CAPE	C GULF		0	5		TO-V
AGHIYUK	C GULF		0	16	0	TO-I
AIUGNAK COLUMNS	C GULF		0	1		TO-V
CAPE DOUGLAS	C GULF		0	0		TO-V
CAPE GULL	C GULF		0	61	0	TO-I
CAPE KULIAK	C GULF		0	0		TO-V
CAPE NUKSHAK	C GULF		0	0		TO-V
CAPE UGYAK	C GULF		0	0		TO-V
CHIRIKOF	C GULF		1	418	151	TO-I
CHOWIET	C GULF		1	838	590	TO-I
EAST CHUGACH	C GULF		0	0		TO-V
ELIZABETH/CAPE ELIZABETH	C GULF		0	0		TO-V

SITE	REGION	RCA	ROOK	NON-		SURVEY
				PUP	PUP	
FLAT	C GULF		0	102	0	TO-I
GORE POINT	C GULF		0	0		TO-V
KILOKAK ROCKS	C GULF		0	187	0	TO-I
KODIAK/BIRD ROCK	C GULF		0	3		TO-V
KODIAK/CAPE ALITAK	C GULF		0	0		TO-V
KODIAK/CAPE BARNABAS	C GULF		0	248	0	TO-I
KODIAK/CAPE CHINIAK	C GULF		0	228	0	TO-I
KODIAK/CAPE IKOLIK	C GULF		0	240	0	TO-I
KODIAK/CAPE KULIUK	C GULF		0	0		TO-V
KODIAK/CAPE PARAMANOF	C GULF		0	0		TO-V
KODIAK/CAPE UGAT	C GULF		0	341	10	TO-I
KODIAK/CAPE UYAK	C GULF		0	0		TO-V
KODIAK/GULL POINT	C GULF		0	44	0	TO-I
KODIAK/IZHUT BAY	C GULF		0	76	2	TO-I
KODIAK/MALINA POINT	C GULF		0	0		TO-V
KODIAK/STEEP CAPE	C GULF		0	85	0	TO-I
KODIAK/STURGEON HEAD	C GULF		0	0		TO-V
KODIAK/SUNDSTROM	C GULF		0	0		TO-V
KODIAK/TOMBSTONE ROCKS	C GULF		0	0		TO-V
LATAK ROCKS	C GULF		0	476	31	TO-I
LONG ISLAND	C GULF		0	33	0	TO-I
MARMOT	C GULF		1	991	666	TO-I
NAGAHUT ROCKS	C GULF		0	31	0	TO-I
NAGAI ROCKS	C GULF		0	408	6	TO-I
NOISY	C GULF		0	0		TO-V
NUKA POINT	C GULF		0	0		TO-V
OUTER (PYE)	C GULF		1	214	104	TO-I
PERL	C GULF		0	126	5	TO-I
PERL ROCKS	C GULF		0	0		TO-V
PUALE BAY	C GULF		0	180	1	TO-I
SEA LION ROCKS (MARMOT)	C GULF		0	25	0	TO-I
SEA OTTER	C GULF		0	212	50	TO-I
SHAKUN ROCKS	C GULF		0	256	4	TO-I
SHAW	C GULF		0	2	0	TO-I
SITKINAK/CAPE SITKINAK	C GULF		0	342	0	TO-I
SUD	C GULF		0	0		TO-V
SUGARLOAF	C GULF		1	894	756	TO-I
SUKLIK	C GULF		0	2		TO-I
SUTWIK	C GULF		0	188	30	TO-I
TAKLI	C GULF		0	0		TO-V
TWOHEADED	C GULF		1	548	92	TO-I

SITE	REGION	RCA	ROOK	NON-		SURVEY
				PUP	PUP	
UGAIUSHAK	C GULF		0	0		TO-V
UGAK	C GULF		0	0		TO-V
USHAGAT/NW	C GULF		0	7	0	TO-I
USHAGAT/ROCKS SOUTH	C GULF		0	102	0	TO-I
USHAGAT/SW	C GULF		1	210	86	TO-I
WEST AMATULI	C GULF		0	0		TO-V
AIALIK CAPE	E GULF		0	63	0	TO-I
CAPE FAIRFIELD	E GULF		0	24	0	TO-I
CAPE HINCHINBROOK	E GULF		0	0		TO-V
CAPE JUNKEN	E GULF		0	0		TO-V
CAPE PUGET	E GULF		0	2	0	TO-I
CAPE RESURRECTION	E GULF		0	41	0	TO-I
CAPE ST. ELIAS	E GULF		0	456	62	TO-I
CHISWELL ISLANDS	E GULF		1	126	78	TO-I
DANGER	E GULF		0	82	0	TO-I
DUTCH GROUP	E GULF		0	124	4	TO-I
FOX	E GULF		0	476	1	TO-I
GLACIER	E GULF		0	440	71	TO-I
GRANITE CAPE	E GULF		0	106	0	TO-I
HOOK POINT	E GULF		0	256	2	TO-I
MIDDLETON	E GULF		0	36	1	TO-I
PERRY	E GULF		0	109	0	TO-I
PILOT ROCK	E GULF		0	0		TO-V
PLEIADES	E GULF		0	0		TO-V
POINT ELEANOR	E GULF		0	0		TO-V
POINT ELRINGTON	E GULF		0	74	0	TO-I
POINT LaTOUCHE	E GULF		0	0		TO-V
PROCESSION ROCKS	E GULF		0	92	9	TO-I
RABBIT	E GULF		0	0		TO-V
RUGGED	E GULF		0	25	0	TO-I
SEAL ROCKS	E GULF		1	988	650	TO-I
SEAL ROCKS (KENAI)	E GULF		0	84	0	TO-I
STEEP POINT	E GULF		0	120	0	TO-I
THE NEEDLE	E GULF		0	100	26	TO-I
VALDEZ ARM	E GULF		0	1	0	TO-I
WOODED (FISH)	E GULF		1	338	187	TO-I

Table 2. -- Annual rates of change (% y^{-1} with $\pm 95\%$ credible intervals [CI]) of counts of Steller sea lion non-pups and pups modeled with agTrend. We modeled the total western DPS in Alaska and spatial areas therein for the 15-year period, 2009–2024: west of Samalga Pass; western (W), central (C), and eastern (E) Aleutian Islands (ALEU) regions; rookery cluster areas (RCA) 2–5 within the C ALEU region; east of Samalga Pass; western (W), central (C), and eastern (E) Gulf of Alaska (GULF) regions; and the eastern GULF and central GULF regions combined.

AREA/REGION	RATE	NON-PUP		RATE	PUP	
		-95% CI	+95% CI		-95% CI	+95% CI
West of Samalga Pass	-0.15	-2.05	2.14	-0.48	-2.62	1.88
W ALEU	-5.67	-7.88	-3.36	-4.07	-5.27	-2.93
C ALEU	0.33	-1.68	2.77	-0.22	-2.44	2.34
RCA 2	-3.00	-5.28	-0.61	-4.95	-7.62	-2.22
RCA 3	-2.98	-4.63	-1.19	-4.86	-6.19	-3.55
RCA 4	0.98	-2.47	4.96	2.30	-3.79	8.64
RCA 5	2.25	-1.79	7.05	2.03	-1.15	5.25
East of Samalga Pass	1.22	0.58	1.86	1.32	0.74	1.88
E ALEU	2.36	1.10	3.53	1.67	0.76	2.63
W GULF	0.76	-0.31	1.88	1.27	0.24	2.23
E+C GULF (combined)	0.69	-0.31	1.69	1.07	0.03	2.03
C GULF	2.52	1.48	3.59	1.46	0.16	2.77
E GULF	-1.88	-3.78	-0.11	0.16	-1.23	1.59
Western DPS (Alaska)	0.96	0.32	1.65	0.90	0.24	1.61

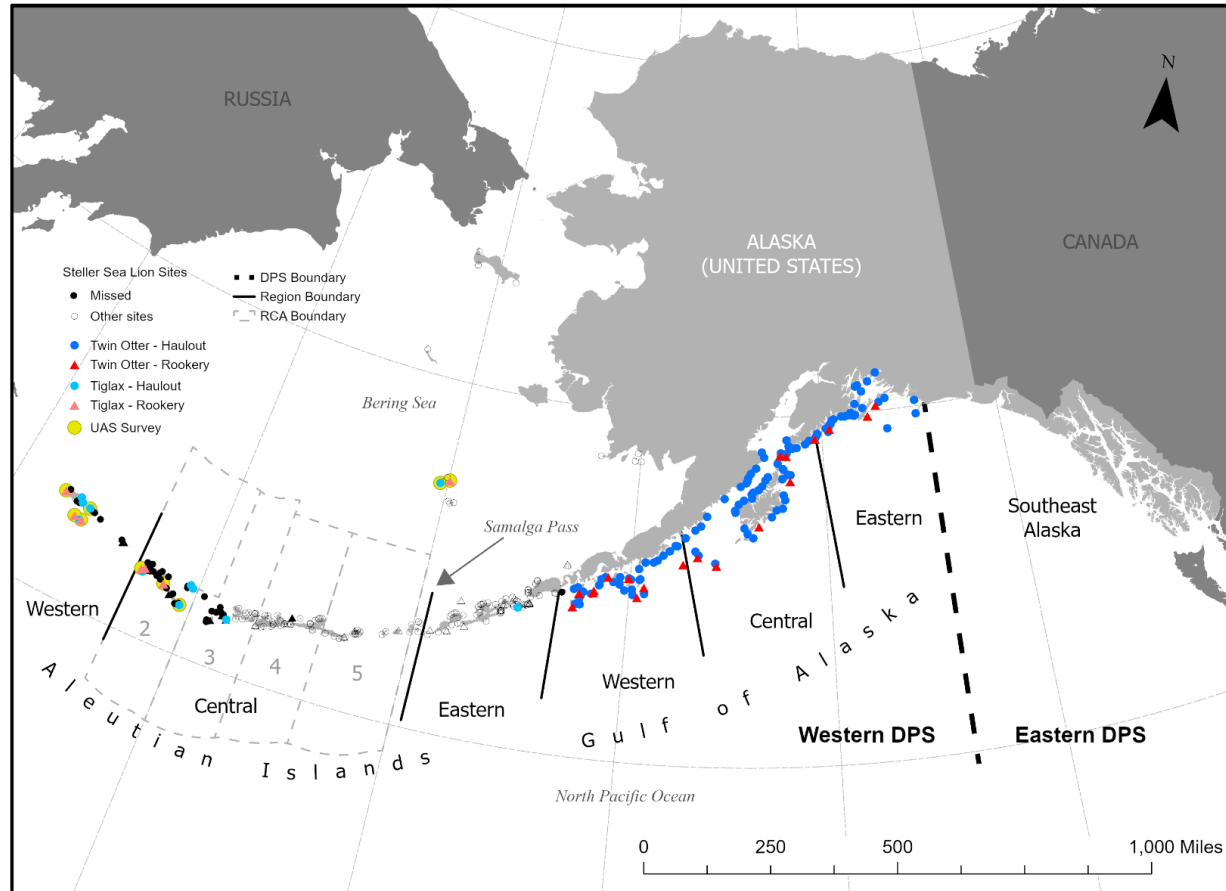


Figure 1. -- Steller sea lion terrestrial haulout and rookery sites surveyed in June–July 2024. Steller sea lion management regions and areas are shown: eastern, central, and western Aleutian Islands and Gulf of Alaska regions; rookery cluster areas 2–5 within the central Aleutian Islands region; and the boundary between the eastern and western distinct population segments (DPS).

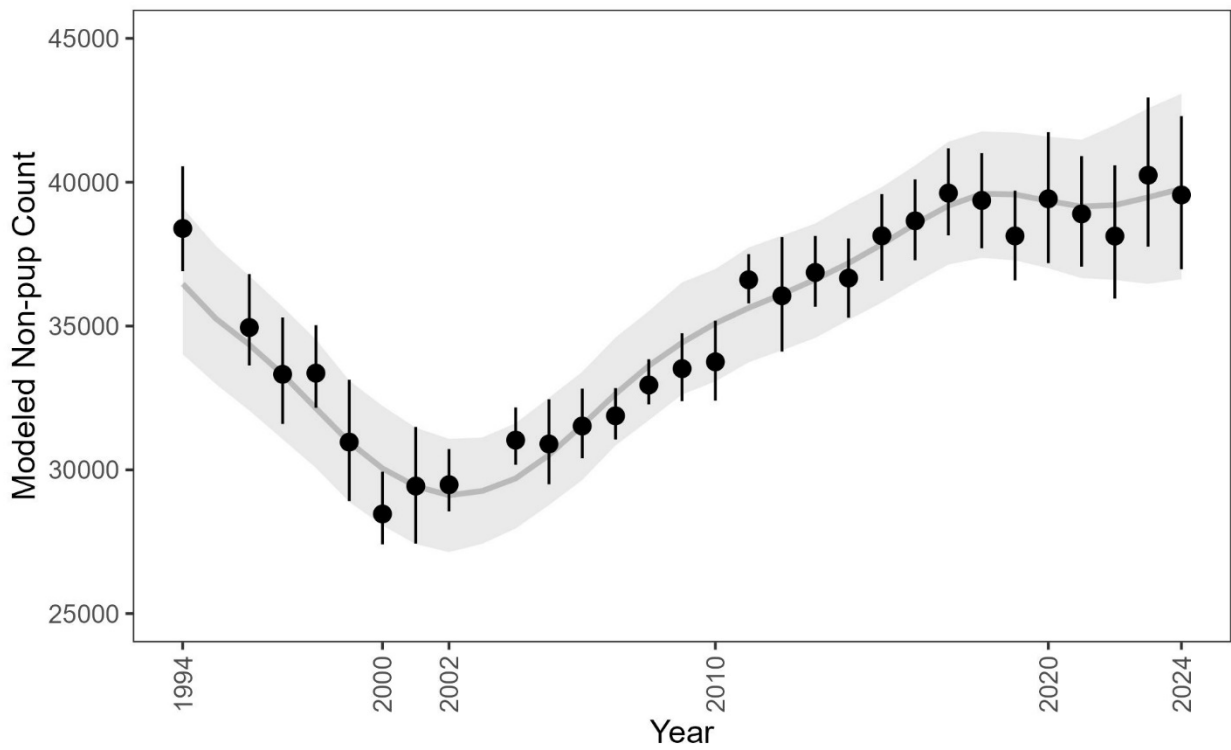


Figure 2. -- Steller sea lion modeled non-pup counts in the total western distinct population segment in Alaska, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

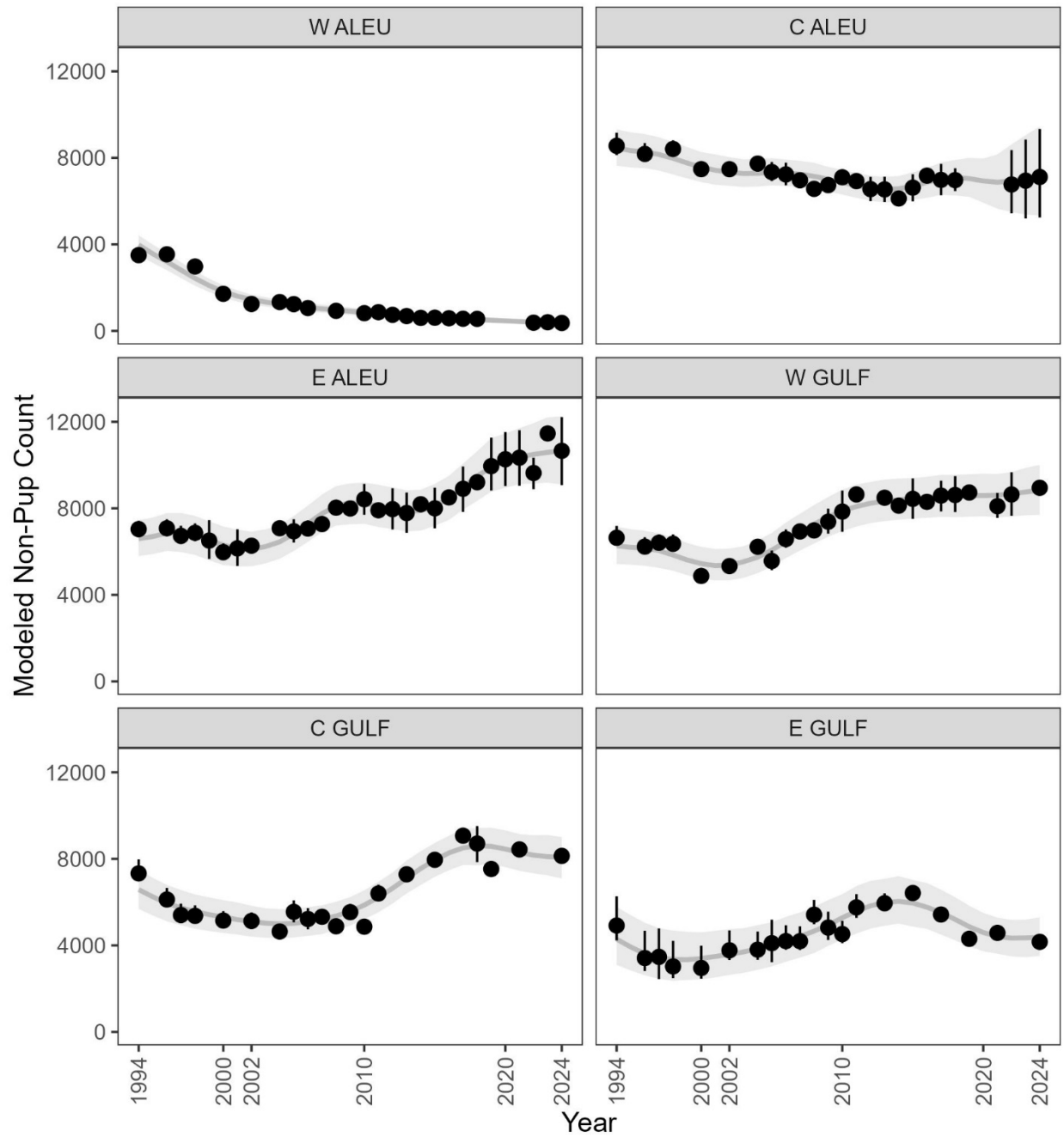


Figure 3. -- Steller sea lion modeled non-pup counts in the western (W), central (C), and eastern (E) Aleutian Islands (ALEU) and Gulf of Alaska (GULF) regions, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

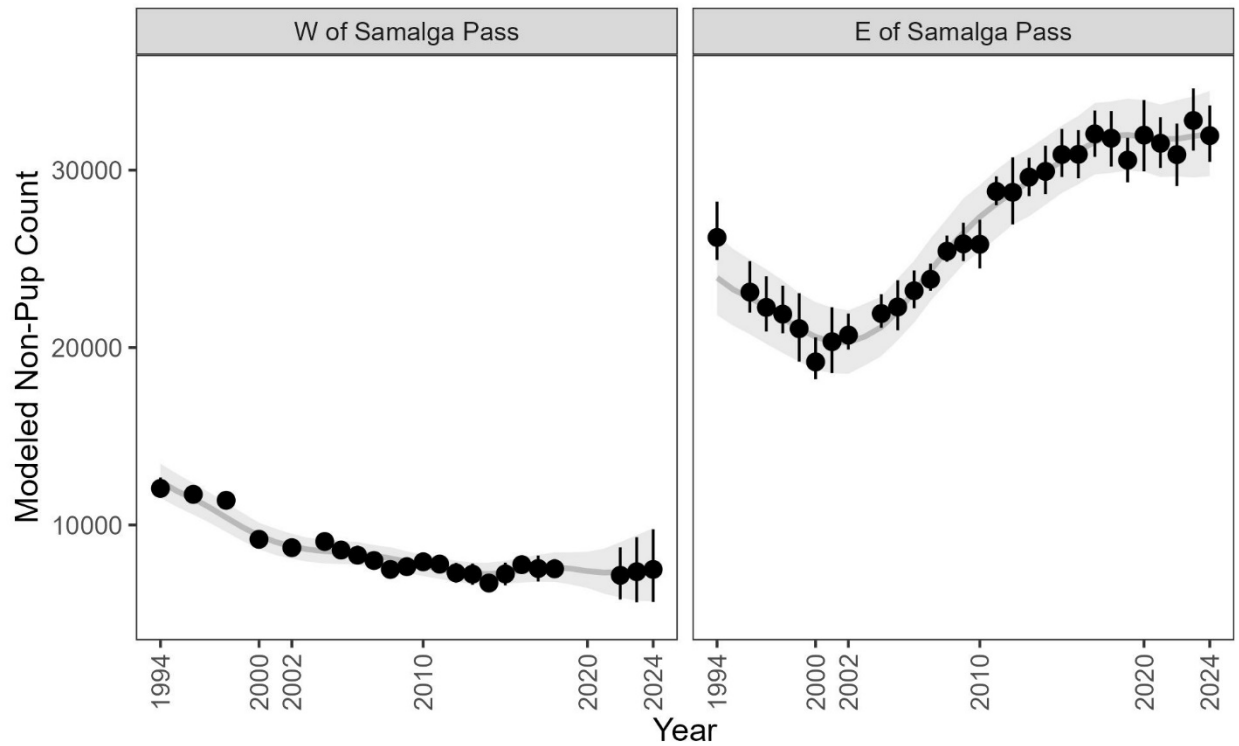


Figure 4. -- Steller sea lion modeled non-pup counts west (W) and east (E) of Samalga Pass, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

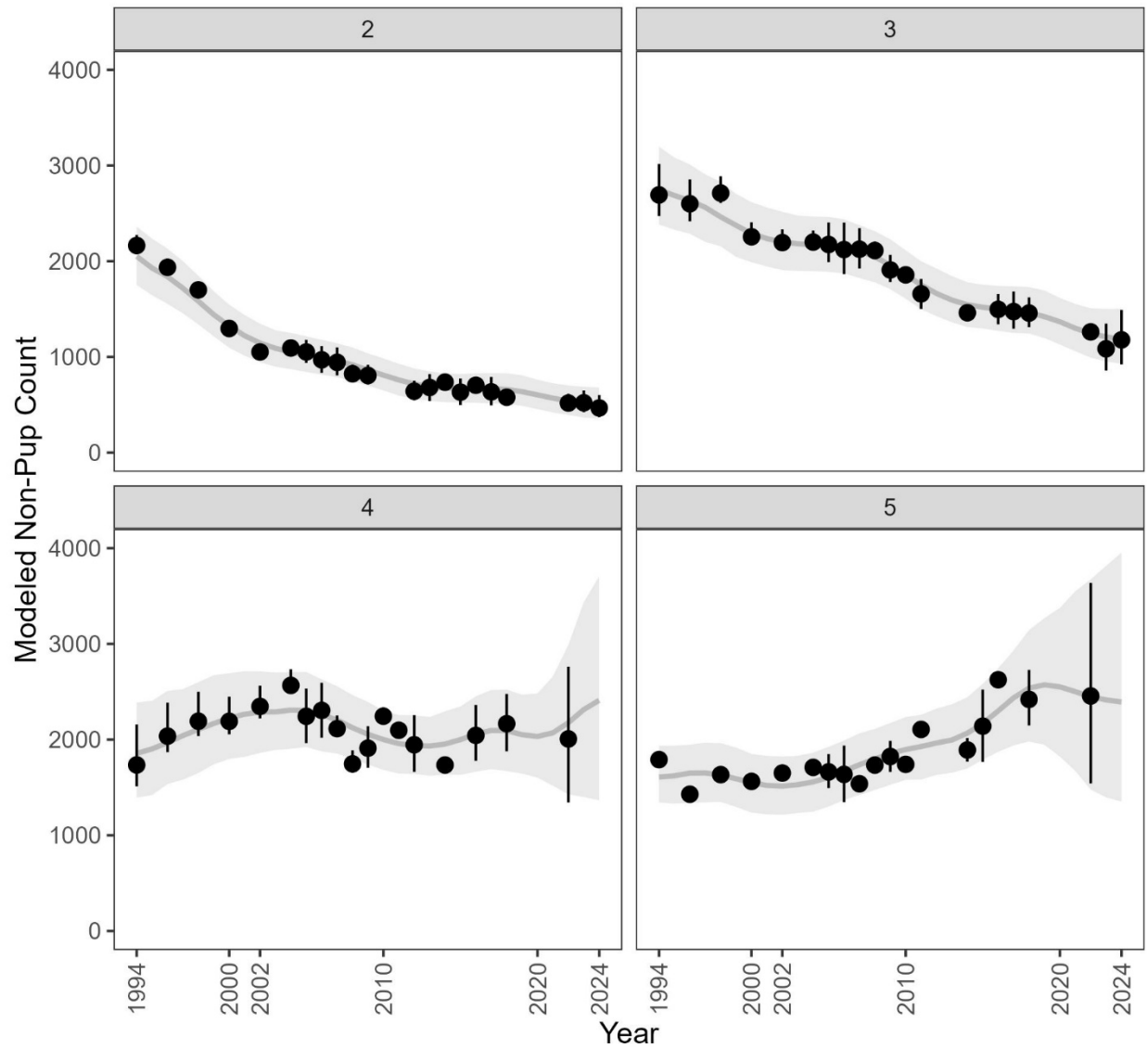


Figure 5. -- Steller sea lion modeled non-pup counts in rookery cluster areas 2-5 (Fig. 1) within the central Aleutian Islands region, 1994-2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

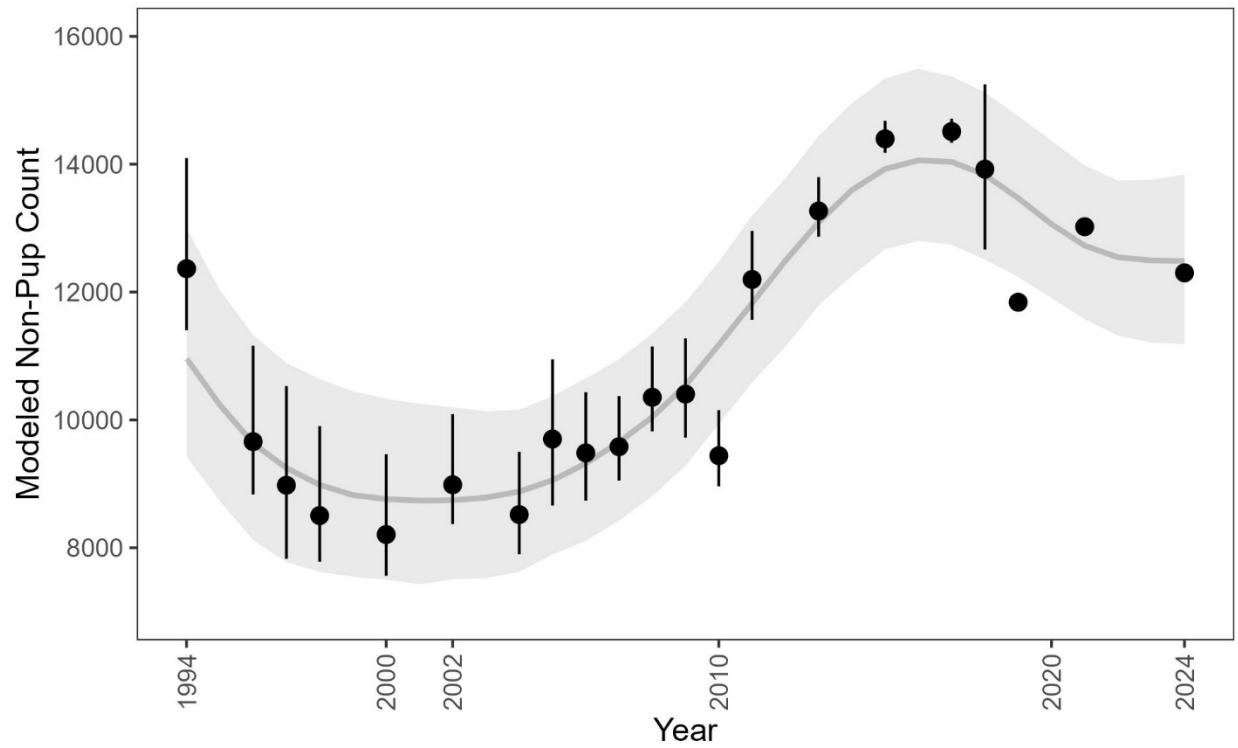


Figure 6. -- Steller sea lion modeled non-pup counts in the combined eastern and central Gulf of Alaska regions, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

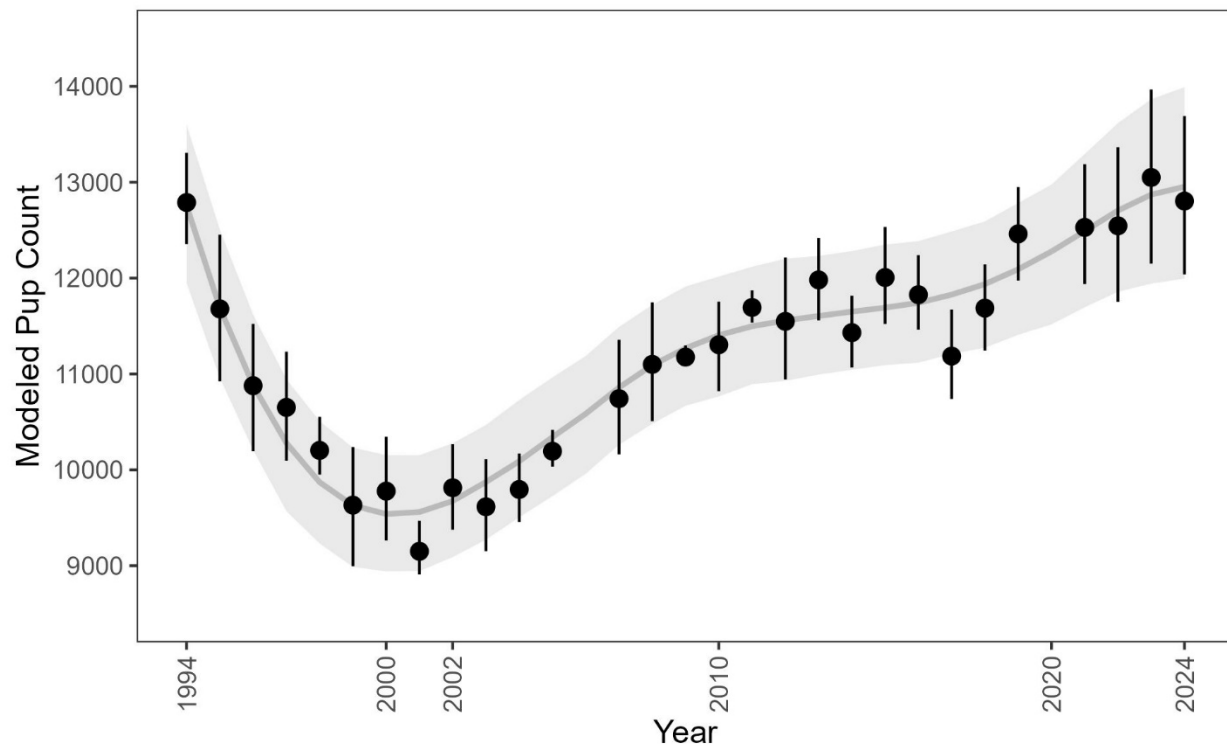


Figure 7. -- Steller sea lion modeled pup counts in the total western distinct population segment in Alaska, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

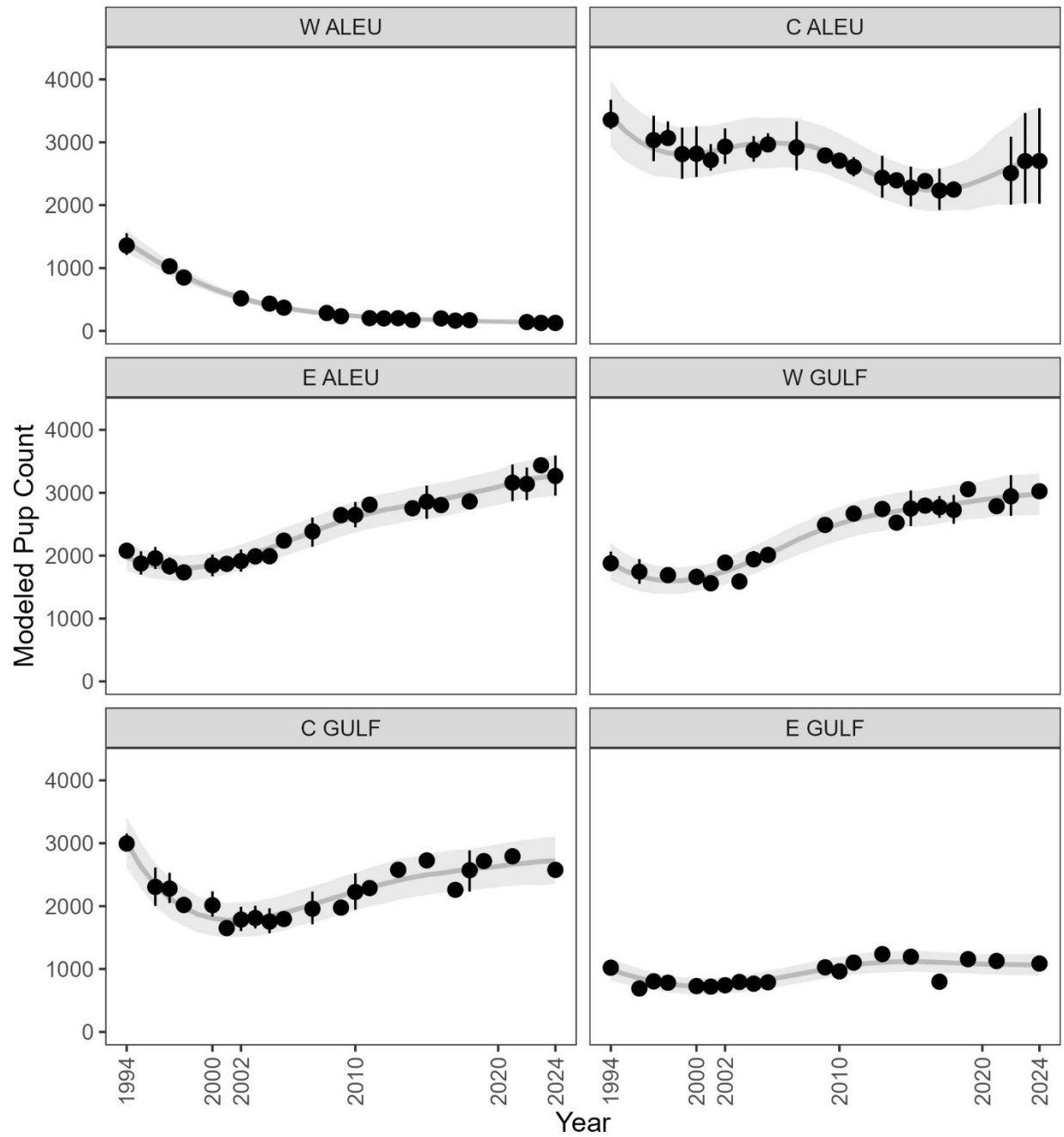


Figure 8. -- Steller sea lion modeled pup counts in the western (W), central (C), and eastern (E) Aleutian Islands (ALEU) and Gulf of Alaska (GULF) regions, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

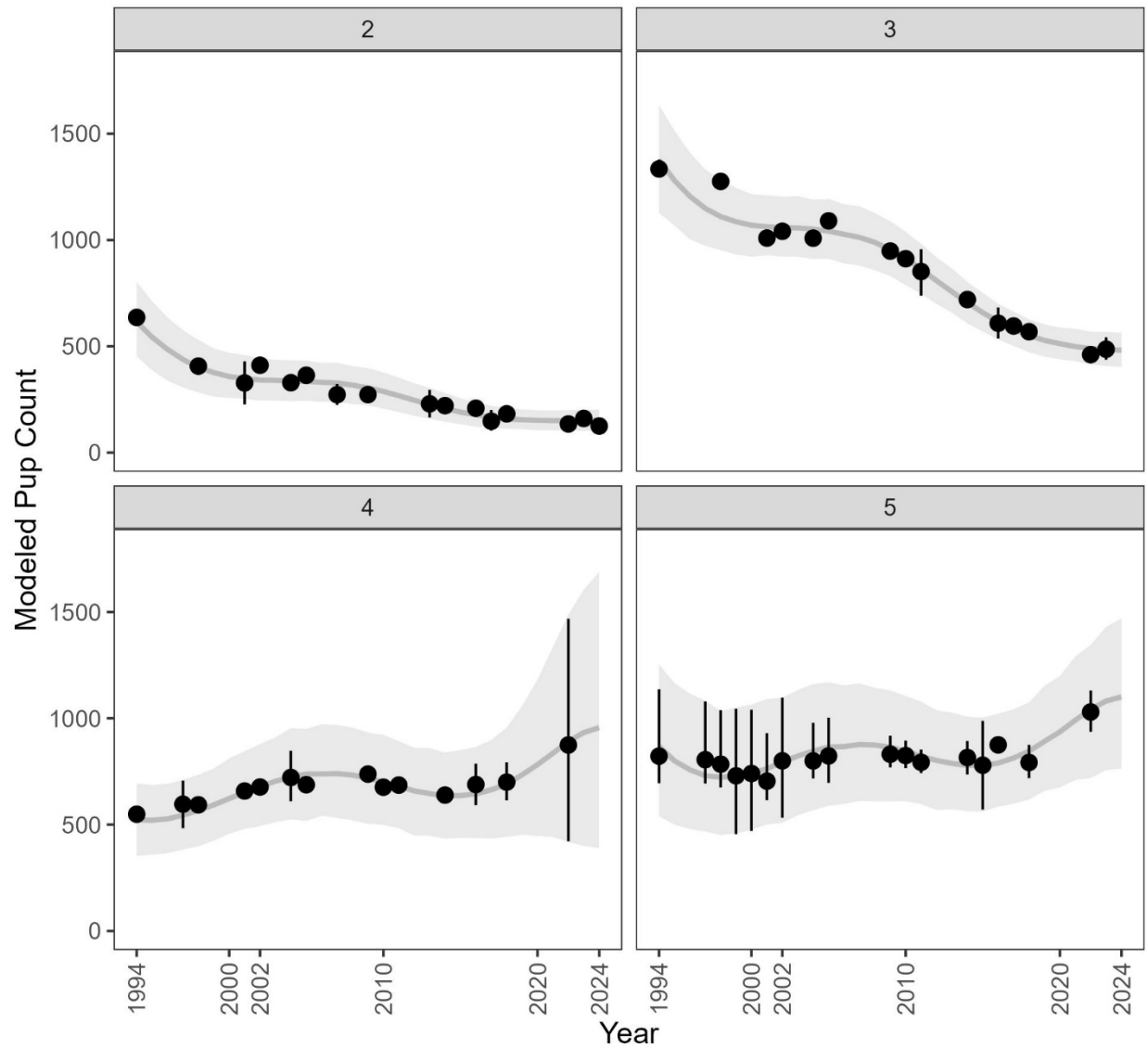


Figure 9. -- Steller sea lion modeled pup counts in rookery cluster areas 2–5 (Fig. 1) within the central Aleutian Islands region, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

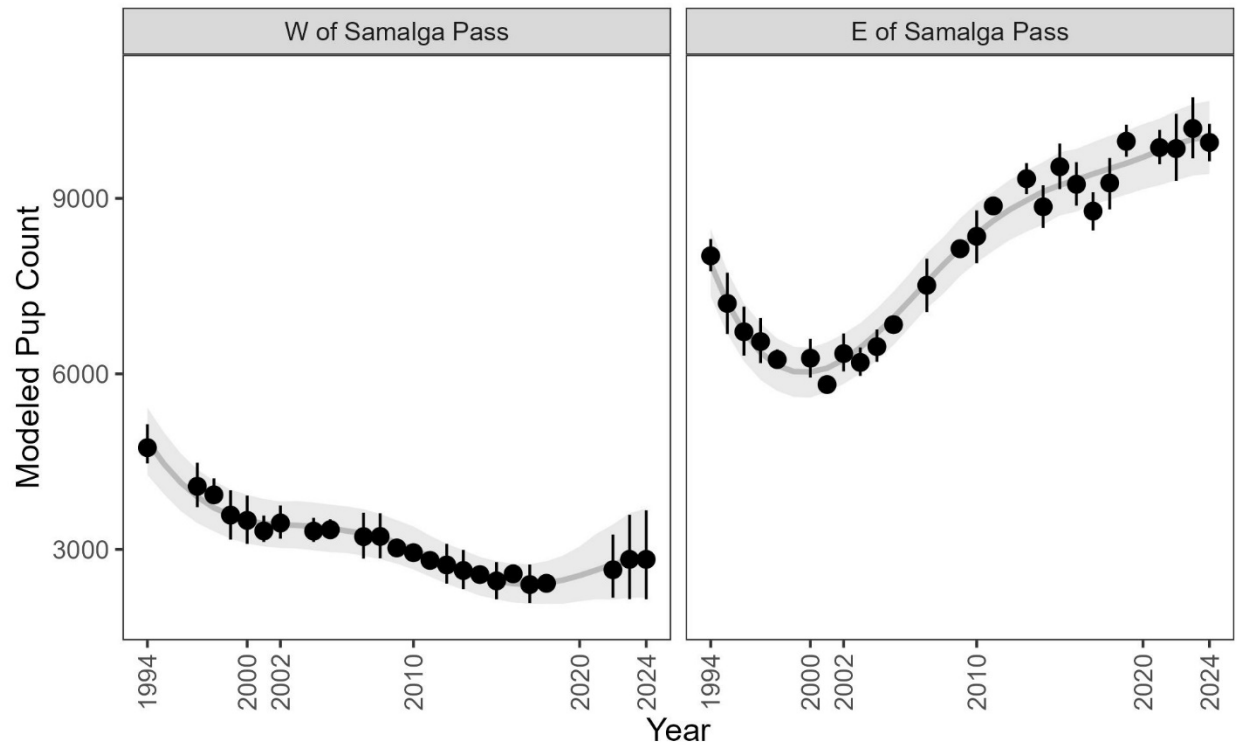


Figure 10. -- Steller sea lion modeled pup counts west (W) and east (E) of Samalga Pass, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

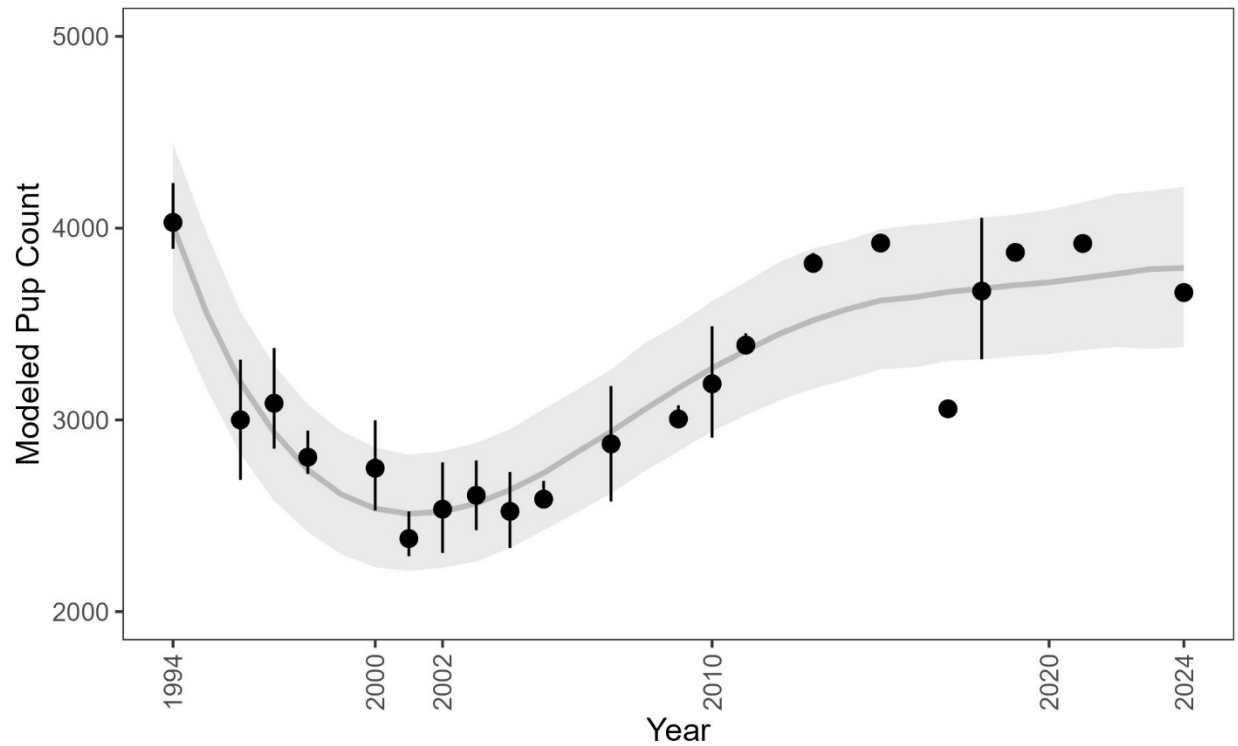


Figure 11. -- Steller sea lion modeled pup counts in the combined eastern and central Gulf of Alaska regions, 1994–2024. Realized counts are represented by points and vertical lines ($\pm 95\%$ credible intervals). Predicted counts are represented by the gray line and shaded area ($\pm 95\%$ credible intervals).

APPENDIX

Table 1. -- Predicted (PRED) and realized (REAL) counts with $\pm 95\%$ credible intervals (CI) of the western distinct population segment of Steller sea lions in Alaska. Modeled counts of non-pups (1978–2024) and pups (1973–2024) are listed separately. Column S indicates if there was (1) or was not (0) at least one site surveyed that year.

YEAR	NON-PUP							PUP						
	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
1973								66,635	58,476	75,782	67,049	58,925	76,186	1
1974								64,154	57,194	72,370	64,154	57,194	72,370	0
1975								61,803	55,368	68,844	61,803	55,368	68,844	0
1976								59,569	53,884	66,070	59,569	53,884	66,070	0
1977								57,588	52,528	63,378	57,588	52,528	63,378	0
1978	173,458	154,348	195,188	177,534	159,777	199,789	1	55,745	50,961	60,870	53,806	49,562	58,264	1
1979	165,927	148,617	184,793	168,753	152,971	187,992	1	52,642	48,468	56,950	52,582	48,956	56,350	1
1980	153,714	139,891	168,896	153,714	139,891	168,896	0	48,779	45,176	52,256	48,779	45,176	52,256	0
1981	144,602	133,159	157,821	144,602	133,159	157,821	0	45,411	42,403	48,493	45,411	42,403	48,493	0
1982	137,992	127,232	149,645	138,014	127,223	149,640	1	42,535	39,910	45,334	42,545	39,943	45,363	1
1983	128,249	118,387	138,716	128,260	118,397	138,718	1	39,349	36,945	41,849	39,349	36,945	41,849	0
1984	115,382	106,530	124,647	116,214	107,386	125,328	1	36,582	34,257	38,882	37,504	35,503	39,687	1
1985	100,689	93,487	108,661	106,049	99,602	113,217	1	33,557	31,480	35,636	36,402	34,638	38,296	1
1986	85,781	79,695	92,222	90,368	84,774	96,609	1	30,343	28,531	32,347	30,977	29,421	32,657	1
1987	72,403	67,578	77,778	72,301	67,667	77,808	1	27,082	25,417	28,795	27,082	25,417	28,795	0
1988	61,570	57,512	66,163	61,651	57,687	66,001	1	24,285	22,735	25,802	24,285	22,735	25,802	0
1989	53,201	49,518	57,169	49,221	46,640	52,682	1	21,895	20,522	23,324	21,107	20,033	22,260	1
1990	47,086	43,701	50,582	46,662	44,205	49,756	1	19,619	18,363	20,909	17,550	16,716	18,490	1
1991	42,759	40,050	46,223	44,363	42,350	47,144	1	17,558	16,404	18,687	17,487	16,502	18,535	1
1992	39,836	37,092	42,822	41,372	39,696	43,904	1	15,699	14,639	16,706	15,423	14,501	16,407	1
1993	37,898	35,274	40,624	37,832	35,269	40,590	1	14,092	13,155	15,018	14,059	13,240	14,936	1

YEAR	NON-PUP							PUP						
	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
1994	36,464	34,016	39,110	38,392	36,905	40,557	1	12,755	11,949	13,599	12,788	12,354	13,306	1
1995	35,250	32,979	37,771	35,250	32,979	37,771	0	11,690	10,959	12,504	11,678	10,923	12,452	1
1996	34,352	32,060	36,741	34,947	33,631	36,806	1	10,882	10,207	11,618	10,877	10,193	11,521	1
1997	33,322	31,066	35,665	33,322	31,597	35,301	1	10,280	9,569	10,947	10,651	10,094	11,232	1
1998	32,139	30,069	34,531	33,360	32,155	35,029	1	9,870	9,232	10,507	10,203	9,950	10,553	1
1999	30,966	28,883	33,104	30,964	28,912	33,132	1	9,628	8,988	10,231	9,632	8,994	10,237	1
2000	30,048	28,067	32,220	28,465	27,406	29,936	1	9,539	8,940	10,152	9,778	9,263	10,344	1
2001	29,428	27,417	31,462	29,435	27,437	31,488	1	9,560	8,944	10,153	9,150	8,909	9,468	1
2002	29,115	27,139	31,076	29,483	28,553	30,722	1	9,675	9,090	10,277	9,813	9,375	10,267	1
2003	29,265	27,430	31,122	29,265	27,430	31,122	0	9,873	9,272	10,467	9,614	9,151	10,112	1
2004	29,700	27,960	31,621	31,032	30,176	32,166	1	10,089	9,505	10,728	9,795	9,456	10,169	1
2005	30,514	28,774	32,503	30,898	29,496	32,454	1	10,341	9,726	10,964	10,194	10,033	10,417	1
2006	31,551	29,646	33,406	31,523	30,399	32,821	1	10,585	9,959	11,187	10,585	9,959	11,187	0
2007	32,638	30,847	34,599	31,878	31,054	32,840	1	10,858	10,262	11,491	10,742	10,162	11,356	1
2008	33,619	31,722	35,517	32,949	32,277	33,843	1	11,091	10,480	11,720	11,100	10,508	11,746	1
2009	34,421	32,621	36,518	33,517	32,388	34,746	1	11,268	10,668	11,911	11,176	11,090	11,296	1
2010	35,092	33,074	36,979	33,753	32,403	35,183	1	11,404	10,765	12,015	11,305	10,819	11,753	1
2011	35,629	33,738	37,730	36,606	35,788	37,497	1	11,497	10,893	12,118	11,693	11,536	11,871	1
2012	36,105	34,154	38,141	36,051	34,112	38,090	1	11,557	10,928	12,201	11,549	10,943	12,215	1
2013	36,618	34,586	38,565	36,861	35,668	38,134	1	11,605	10,994	12,231	11,981	11,559	12,418	1
2014	37,185	35,211	39,230	36,666	35,291	38,046	1	11,650	11,044	12,281	11,431	11,067	11,816	1
2015	37,840	35,817	39,829	38,136	36,573	39,585	1	11,692	11,092	12,349	12,006	11,521	12,533	1
2016	38,549	36,502	40,583	38,657	37,287	40,095	1	11,742	11,118	12,385	11,826	11,463	12,240	1
2017	39,182	37,138	41,408	39,621	38,152	41,175	1	11,827	11,210	12,486	11,186	10,739	11,671	1
2018	39,596	37,371	41,763	39,366	37,703	41,008	1	11,937	11,273	12,591	11,686	11,244	12,143	1
2019	39,575	37,283	41,728	38,132	36,584	39,707	1	12,092	11,408	12,783	12,461	11,973	12,949	1
2020	39,350	37,011	41,582	39,423	37,185	41,742	1	12,277	11,517	12,975	12,277	11,517	12,975	0

YEAR	NON-PUP							PUP						
	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
2021	39,153	36,666	41,478	38,899	37,065	40,907	1	12,490	11,695	13,294	12,528	11,939	13,188	1
2022	39,204	36,604	41,981	38,127	35,956	40,585	1	12,704	11,858	13,616	12,545	11,752	13,365	1
2023	39,474	36,466	42,568	40,243	37,756	42,944	1	12,871	11,942	13,866	13,049	12,150	13,967	1
2024	39,774	36,626	43,078	39,556	36,977	42,300	1	12,953	11,996	13,990	12,803	12,039	13,691	1

Table 2. -- Predicted (PRED) and realized (REAL) counts with $\pm 95\%$ credible intervals (CI) of Steller sea lions in the western (W), central (C), and eastern (E) Aleutian Islands (ALEU) and Gulf of Alaska (GULF) regions. Modeled counts of non-pups (1978–2024) and pups (1973–2024) are listed separately. Column S indicates if there was (1) or was not (0) at least one site surveyed in the region that year.

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
W ALEU	1973								3,236	1,988	5,191	3,236	1,988	5,191	0
W ALEU	1974								3,226	1,995	5,020	3,226	1,995	5,020	0
W ALEU	1975								3,214	2,104	4,964	3,214	2,104	4,964	0
W ALEU	1976								3,200	2,065	4,779	3,200	2,065	4,779	0
W ALEU	1977								3,192	2,171	4,771	3,192	2,171	4,771	0
W ALEU	1978	24,935	23,136	26,734	27,219	26,172	28,340	1	3,179	2,156	4,634	3,179	2,156	4,634	0
W ALEU	1979	23,264	21,756	24,977	22,440	22,437	22,463	1	3,153	2,212	4,483	3,141	2,216	4,421	1
W ALEU	1980	20,562	18,892	22,283	20,562	18,892	22,283	0	3,112	2,215	4,251	3,112	2,215	4,251	0
W ALEU	1981	18,436	16,399	20,655	18,436	16,399	20,655	0	3,067	2,274	4,098	3,067	2,274	4,098	0
W ALEU	1982	16,776	14,269	19,708	16,776	14,269	19,708	0	3,037	2,294	3,937	3,037	2,294	3,937	0
W ALEU	1983	14,841	11,868	17,876	14,841	11,868	17,876	0	2,966	2,290	3,738	2,966	2,290	3,738	0
W ALEU	1984	12,624	10,036	15,541	12,624	10,036	15,541	0	2,900	2,293	3,563	2,900	2,293	3,563	0
W ALEU	1985	10,420	8,422	12,702	10,649	8,702	12,816	1	2,782	2,252	3,360	2,782	2,252	3,360	0
W ALEU	1986	8,485	7,086	10,136	8,485	7,086	10,136	0	2,625	2,160	3,107	2,625	2,160	3,107	0
W ALEU	1987	6,988	5,959	8,044	6,988	5,959	8,044	0	2,453	2,068	2,885	2,453	2,068	2,885	0
W ALEU	1988	5,956	5,182	6,734	5,670	5,146	6,229	1	2,291	1,934	2,661	2,291	1,934	2,661	0
W ALEU	1989	5,332	4,734	5,991	5,886	5,468	6,315	1	2,157	1,842	2,514	2,174	1,898	2,493	1
W ALEU	1990	4,965	4,421	5,520	4,965	4,421	5,520	0	2,016	1,718	2,341	2,023	1,766	2,331	1
W ALEU	1991	4,737	4,225	5,255	5,122	5,122	5,122	1	1,869	1,600	2,175	1,869	1,600	2,175	0
W ALEU	1992	4,542	4,049	5,035	4,714	4,711	4,723	1	1,718	1,474	1,982	1,718	1,474	1,982	0
W ALEU	1993	4,298	3,797	4,756	4,298	3,797	4,756	0	1,565	1,349	1,780	1,565	1,349	1,780	0
W ALEU	1994	3,978	3,511	4,422	3,504	3,502	3,512	1	1,412	1,238	1,604	1,360	1,207	1,554	1

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
W ALEU	1995	3,566	3,146	3,993	3,566	3,146	3,993	0	1,265	1,127	1,431	1,265	1,127	1,431	0
W ALEU	1996	3,206	2,812	3,616	3,544	3,543	3,550	1	1,123	1,003	1,267	1,123	1,003	1,267	0
W ALEU	1997	2,814	2,443	3,176	2,814	2,443	3,176	0	994	887	1,111	1,028	981	1,117	1
W ALEU	1998	2,433	2,090	2,761	2,979	2,979	2,979	1	873	783	978	849	807	922	1
W ALEU	1999	2,099	1,800	2,416	2,099	1,800	2,416	0	769	690	857	769	690	857	0
W ALEU	2000	1,820	1,560	2,111	1,716	1,716	1,716	1	674	605	749	674	605	749	0
W ALEU	2001	1,608	1,358	1,874	1,608	1,358	1,874	0	593	534	657	593	534	657	0
W ALEU	2002	1,454	1,210	1,681	1,247	1,247	1,247	1	521	466	575	518	499	542	1
W ALEU	2003	1,337	1,130	1,562	1,337	1,130	1,562	0	462	412	509	462	412	509	0
W ALEU	2004	1,234	1,025	1,439	1,335	1,335	1,335	1	411	368	453	435	412	458	1
W ALEU	2005	1,152	949	1,350	1,240	1,169	1,303	1	368	329	407	370	370	370	1
W ALEU	2006	1,085	895	1,286	1,058	1,024	1,097	1	333	297	369	333	297	369	0
W ALEU	2007	1,025	844	1,217	1,025	844	1,217	0	301	269	338	301	269	338	0
W ALEU	2008	966	793	1,148	929	929	929	1	275	244	306	285	277	293	1
W ALEU	2009	909	738	1,082	909	738	1,082	0	255	223	283	234	234	234	1
W ALEU	2010	849	692	1,016	821	766	878	1	237	210	266	237	210	266	0
W ALEU	2011	796	645	959	867	820	921	1	222	195	250	203	195	213	1
W ALEU	2012	746	600	895	745	745	745	1	209	183	235	200	200	200	1
W ALEU	2013	700	556	843	688	567	813	1	198	173	224	203	203	203	1
W ALEU	2014	659	530	798	604	597	620	1	189	165	215	174	174	174	1
W ALEU	2015	622	497	758	612	488	736	1	180	156	204	180	156	204	0
W ALEU	2016	591	472	725	587	587	587	1	172	150	197	199	199	199	1
W ALEU	2017	556	438	691	564	448	685	1	165	142	187	164	144	188	1
W ALEU	2018	527	411	651	558	532	586	1	159	137	180	171	170	174	1
W ALEU	2019	496	377	612	496	377	612	0	153	132	175	153	132	175	0
W ALEU	2020	465	365	587	465	365	587	0	148	127	170	148	127	170	0
W ALEU	2021	435	326	553	435	326	553	0	144	122	165	144	122	165	0

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
W ALEU	2022	412	304	529	381	344	447	1	140	120	163	141	140	147	1
W ALEU	2023	397	285	524	403	366	479	1	138	116	161	128	126	134	1
W ALEU	2024	390	278	521	369	332	448	1	137	115	159	128	126	134	1
C ALEU	1973								16,705	11,741	23,086	16,705	11,741	23,086	0
C ALEU	1974								15,806	11,537	21,377	15,806	11,537	21,377	0
C ALEU	1975								14,941	10,993	19,530	14,941	10,993	19,530	0
C ALEU	1976								14,173	10,922	18,388	14,173	10,922	18,388	0
C ALEU	1977								13,475	10,477	17,081	13,475	10,477	17,081	0
C ALEU	1978	42,446	39,023	46,481	42,449	38,796	46,253	1	12,880	10,229	16,005	12,880	10,229	16,005	0
C ALEU	1979	41,212	37,828	44,630	42,911	41,365	45,755	1	11,919	9,736	14,478	11,004	9,308	13,255	1
C ALEU	1980	39,048	36,283	42,361	39,048	36,283	42,361	0	10,846	9,033	12,780	10,846	9,033	12,780	0
C ALEU	1981	37,534	34,732	40,476	37,534	34,732	40,476	0	9,969	8,495	11,578	9,969	8,495	11,578	0
C ALEU	1982	36,552	33,943	39,635	36,552	33,943	39,635	0	9,302	8,002	10,661	9,302	8,002	10,661	0
C ALEU	1983	34,266	31,529	37,023	34,266	31,529	37,023	0	8,632	7,511	9,918	8,632	7,511	9,918	0
C ALEU	1984	30,774	28,320	33,399	30,774	28,320	33,399	0	8,122	6,985	9,278	8,122	6,985	9,278	0
C ALEU	1985	26,406	24,222	28,656	28,989	27,745	30,632	1	7,608	6,568	8,715	9,990	9,688	10,607	1
C ALEU	1986	21,883	20,071	23,814	21,883	20,071	23,814	0	7,068	6,098	8,096	7,068	6,098	8,096	0
C ALEU	1987	17,893	16,359	19,539	18,177	16,645	19,782	1	6,452	5,547	7,377	6,452	5,547	7,377	0
C ALEU	1988	14,705	13,345	16,153	14,705	13,345	16,153	0	5,943	5,114	6,824	5,943	5,114	6,824	0
C ALEU	1989	12,355	11,196	13,639	10,282	9,478	11,358	1	5,503	4,753	6,344	4,988	4,360	5,657	1
C ALEU	1990	10,728	9,694	11,904	10,929	10,146	11,928	1	5,032	4,298	5,772	3,850	3,655	4,266	1
C ALEU	1991	9,665	8,706	10,704	10,521	9,889	11,375	1	4,574	3,904	5,261	4,574	3,904	5,261	0
C ALEU	1992	9,031	8,129	9,979	9,414	8,921	10,187	1	4,135	3,532	4,762	4,135	3,532	4,762	0
C ALEU	1993	8,673	7,849	9,612	8,673	7,849	9,612	0	3,743	3,187	4,347	3,743	3,187	4,347	0
C ALEU	1994	8,468	7,642	9,318	8,558	8,132	9,166	1	3,424	2,929	3,980	3,357	3,211	3,679	1
C ALEU	1995	8,335	7,558	9,179	8,335	7,558	9,179	0	3,182	2,704	3,676	3,182	2,704	3,676	0
C ALEU	1996	8,277	7,527	9,100	8,182	7,836	8,687	1	3,009	2,571	3,498	3,009	2,571	3,498	0

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
C ALEU	1997	8,158	7,415	8,955	8,158	7,415	8,955	0	2,895	2,465	3,348	3,035	2,700	3,423	1
C ALEU	1998	7,980	7,237	8,730	8,412	8,138	8,813	1	2,829	2,444	3,277	3,068	2,949	3,332	1
C ALEU	1999	7,763	7,051	8,501	7,763	7,051	8,501	0	2,810	2,421	3,234	2,813	2,420	3,233	1
C ALEU	2000	7,574	6,881	8,265	7,479	7,292	7,813	1	2,818	2,437	3,253	2,817	2,448	3,256	1
C ALEU	2001	7,427	6,760	8,158	7,427	6,760	8,158	0	2,850	2,461	3,260	2,719	2,547	2,971	1
C ALEU	2002	7,334	6,710	8,033	7,476	7,306	7,749	1	2,896	2,519	3,311	2,931	2,657	3,222	1
C ALEU	2003	7,276	6,659	7,932	7,276	6,659	7,932	0	2,948	2,557	3,356	2,948	2,557	3,356	0
C ALEU	2004	7,286	6,677	7,956	7,737	7,581	7,970	1	2,980	2,591	3,399	2,876	2,692	3,098	1
C ALEU	2005	7,311	6,729	7,983	7,347	6,929	7,810	1	3,000	2,582	3,389	2,966	2,837	3,145	1
C ALEU	2006	7,300	6,699	7,925	7,236	6,732	7,774	1	2,982	2,606	3,397	2,982	2,606	3,397	0
C ALEU	2007	7,249	6,661	7,864	6,965	6,646	7,300	1	2,975	2,596	3,386	2,917	2,554	3,330	1
C ALEU	2008	7,147	6,588	7,774	6,568	6,386	6,785	1	2,936	2,551	3,318	2,936	2,551	3,318	0
C ALEU	2009	7,018	6,448	7,582	6,741	6,379	7,114	1	2,860	2,503	3,248	2,791	2,726	2,877	1
C ALEU	2010	6,864	6,306	7,454	7,103	6,912	7,300	1	2,760	2,405	3,137	2,707	2,601	2,821	1
C ALEU	2011	6,725	6,158	7,307	6,927	6,685	7,172	1	2,651	2,317	3,017	2,608	2,459	2,765	1
C ALEU	2012	6,622	6,014	7,170	6,557	6,004	7,123	1	2,534	2,213	2,895	2,534	2,213	2,895	0
C ALEU	2013	6,553	5,947	7,126	6,544	5,958	7,131	1	2,433	2,099	2,772	2,436	2,118	2,787	1
C ALEU	2014	6,574	5,952	7,162	6,123	5,977	6,266	1	2,342	2,026	2,684	2,396	2,318	2,476	1
C ALEU	2015	6,691	6,059	7,335	6,625	5,992	7,246	1	2,280	1,951	2,602	2,280	1,981	2,613	1
C ALEU	2016	6,867	6,154	7,531	7,179	6,829	7,539	1	2,242	1,912	2,570	2,383	2,262	2,507	1
C ALEU	2017	7,029	6,298	7,788	6,982	6,273	7,724	1	2,239	1,904	2,580	2,232	1,923	2,581	1
C ALEU	2018	7,099	6,260	7,903	6,971	6,465	7,520	1	2,263	1,923	2,647	2,249	2,125	2,371	1
C ALEU	2019	7,043	6,204	7,999	7,043	6,204	7,999	0	2,323	1,912	2,732	2,323	1,912	2,732	0
C ALEU	2020	6,935	5,929	7,967	6,935	5,929	7,967	0	2,405	1,974	2,912	2,405	1,974	2,912	0
C ALEU	2021	6,874	5,652	8,160	6,874	5,652	8,160	0	2,504	2,015	3,133	2,504	2,015	3,133	0
C ALEU	2022	6,932	5,499	8,622	6,770	5,440	8,357	1	2,604	2,002	3,280	2,509	2,010	3,090	1
C ALEU	2023	7,066	5,380	9,051	6,947	5,196	8,846	1	2,689	2,035	3,482	2,700	2,024	3,465	1

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
C ALEU	2024	7,166	5,343	9,441	7,118	5,248	9,338	1	2,731	2,036	3,559	2,701	2,022	3,543	1
E ALEU	1973								12,467	8,937	16,409	12,879	9,349	16,710	1
E ALEU	1974								11,875	8,670	15,421	11,875	8,670	15,421	0
E ALEU	1975								11,347	8,427	14,510	11,347	8,427	14,510	0
E ALEU	1976								10,826	8,097	13,590	10,826	8,097	13,590	0
E ALEU	1977								10,365	7,945	12,932	10,365	7,945	12,932	0
E ALEU	1978	20,787	15,359	27,679	20,840	15,559	27,659	1	9,901	7,634	12,103	9,901	7,634	12,103	0
E ALEU	1979	19,950	15,258	25,675	19,993	15,276	25,686	1	9,192	7,451	11,193	8,607	6,898	10,534	1
E ALEU	1980	18,559	14,782	22,874	18,559	14,782	22,874	0	8,286	6,803	9,778	8,286	6,803	9,778	0
E ALEU	1981	17,504	14,336	20,824	17,504	14,336	20,824	0	7,527	6,353	8,743	7,527	6,353	8,743	0
E ALEU	1982	16,712	14,222	19,482	16,736	14,229	19,482	1	6,836	5,866	7,761	6,840	5,903	7,785	1
E ALEU	1983	15,499	13,397	17,746	15,518	13,393	17,733	1	6,119	5,405	6,922	6,119	5,405	6,922	0
E ALEU	1984	13,905	12,230	15,787	14,670	13,500	16,313	1	5,506	4,892	6,131	5,506	4,892	6,131	0
E ALEU	1985	12,114	10,671	13,757	13,152	12,358	14,339	1	4,916	4,408	5,460	5,328	5,152	5,604	1
E ALEU	1986	10,389	9,058	11,725	11,377	10,287	12,603	1	4,364	3,914	4,846	4,333	3,924	4,737	1
E ALEU	1987	8,903	7,770	10,103	8,880	7,763	10,098	1	3,870	3,484	4,309	3,870	3,484	4,309	0
E ALEU	1988	7,758	6,750	8,815	7,752	6,775	8,804	1	3,441	3,071	3,825	3,441	3,071	3,825	0
E ALEU	1989	6,979	6,136	7,979	4,785	4,268	5,409	1	3,064	2,733	3,420	2,908	2,624	3,205	1
E ALEU	1990	6,525	5,693	7,391	6,406	6,082	6,885	1	2,744	2,444	3,073	2,467	2,336	2,622	1
E ALEU	1991	6,315	5,547	7,177	6,781	6,502	7,198	1	2,482	2,218	2,791	2,557	2,377	2,756	1
E ALEU	1992	6,306	5,526	7,129	7,104	6,832	7,496	1	2,270	2,013	2,541	2,287	2,054	2,524	1
E ALEU	1993	6,437	5,654	7,268	6,369	5,606	7,166	1	2,102	1,868	2,344	2,077	1,876	2,280	1
E ALEU	1994	6,594	5,798	7,454	7,039	6,685	7,431	1	1,972	1,754	2,211	2,078	2,005	2,157	1
E ALEU	1995	6,697	5,888	7,573	6,697	5,888	7,573	0	1,887	1,681	2,106	1,875	1,700	2,070	1
E ALEU	1996	6,861	6,035	7,786	7,081	6,704	7,495	1	1,830	1,631	2,047	1,959	1,787	2,138	1
E ALEU	1997	6,880	5,984	7,788	6,729	6,349	7,195	1	1,799	1,606	2,017	1,831	1,699	1,972	1
E ALEU	1998	6,734	5,850	7,650	6,869	6,482	7,304	1	1,795	1,592	1,999	1,734	1,704	1,767	1

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
E ALEU	1999	6,519	5,603	7,404	6,512	5,659	7,458	1	1,816	1,620	2,018	1,816	1,620	2,018	0
E ALEU	2000	6,305	5,379	7,164	5,972	5,619	6,381	1	1,847	1,648	2,045	1,846	1,674	2,017	1
E ALEU	2001	6,144	5,314	7,009	6,152	5,340	7,034	1	1,900	1,703	2,108	1,870	1,846	1,895	1
E ALEU	2002	6,107	5,325	6,926	6,275	6,011	6,567	1	1,964	1,762	2,177	1,915	1,745	2,098	1
E ALEU	2003	6,235	5,462	7,030	6,235	5,462	7,030	0	2,039	1,824	2,252	1,989	1,878	2,099	1
E ALEU	2004	6,452	5,671	7,233	7,081	6,840	7,373	1	2,120	1,909	2,345	1,991	1,864	2,122	1
E ALEU	2005	6,826	6,028	7,644	6,942	6,419	7,499	1	2,206	1,998	2,442	2,239	2,212	2,266	1
E ALEU	2006	7,302	6,458	8,130	7,065	6,740	7,445	1	2,290	2,065	2,523	2,290	2,065	2,523	0
E ALEU	2007	7,757	6,897	8,638	7,274	7,084	7,481	1	2,380	2,138	2,607	2,385	2,141	2,605	1
E ALEU	2008	8,113	7,209	9,028	8,031	7,862	8,223	1	2,465	2,218	2,700	2,465	2,218	2,700	0
E ALEU	2009	8,263	7,262	9,153	7,993	7,669	8,369	1	2,543	2,308	2,792	2,645	2,642	2,649	1
E ALEU	2010	8,236	7,286	9,191	8,423	7,704	9,133	1	2,609	2,366	2,862	2,648	2,452	2,855	1
E ALEU	2011	8,102	7,139	9,090	7,911	7,599	8,252	1	2,671	2,426	2,934	2,810	2,797	2,825	1
E ALEU	2012	7,954	7,043	8,959	7,964	7,025	8,931	1	2,726	2,470	2,982	2,726	2,470	2,982	0
E ALEU	2013	7,857	6,939	8,836	7,784	6,871	8,729	1	2,767	2,515	3,025	2,767	2,515	3,025	0
E ALEU	2014	7,894	6,973	8,861	8,190	8,060	8,345	1	2,818	2,560	3,081	2,754	2,718	2,788	1
E ALEU	2015	8,104	7,198	9,128	8,001	7,074	8,958	1	2,858	2,585	3,119	2,858	2,588	3,115	1
E ALEU	2016	8,482	7,469	9,506	8,507	8,392	8,626	1	2,896	2,617	3,160	2,804	2,785	2,823	1
E ALEU	2017	8,966	7,942	10,065	8,906	7,833	9,934	1	2,940	2,665	3,199	2,940	2,665	3,199	0
E ALEU	2018	9,494	8,348	10,637	9,209	9,080	9,351	1	2,991	2,721	3,258	2,862	2,843	2,883	1
E ALEU	2019	9,898	8,777	11,247	9,953	8,825	11,267	1	3,039	2,763	3,303	3,039	2,763	3,303	0
E ALEU	2020	10,199	8,949	11,466	10,270	9,034	11,531	1	3,095	2,805	3,365	3,095	2,805	3,365	0
E ALEU	2021	10,384	9,122	11,709	10,343	9,048	11,616	1	3,155	2,867	3,456	3,161	2,866	3,450	1
E ALEU	2022	10,495	9,149	11,938	9,635	8,886	10,337	1	3,211	2,905	3,508	3,139	2,882	3,402	1
E ALEU	2023	10,592	9,189	12,211	11,462	11,193	11,832	1	3,245	2,930	3,559	3,437	3,415	3,462	1
E ALEU	2024	10,652	9,106	12,250	10,658	9,072	12,221	1	3,273	2,955	3,594	3,267	2,954	3,593	1
W GULF	1973								11,221	9,168	13,404	11,221	9,168	13,404	0

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
W GULF	1974								10,785	8,804	12,776	10,785	8,804	12,776	0
W GULF	1975								10,424	8,595	12,295	10,424	8,595	12,295	0
W GULF	1976								10,042	8,324	11,700	10,042	8,324	11,700	0
W GULF	1977								9,686	8,183	11,354	9,686	8,183	11,354	0
W GULF	1978	20,625	16,648	25,624	22,150	18,919	26,838	1	9,364	7,929	10,872	8,248	7,618	9,087	1
W GULF	1979	19,387	15,518	23,660	18,922	15,747	22,944	1	8,818	7,492	10,202	9,741	9,505	10,398	1
W GULF	1980	17,367	14,176	21,070	17,367	14,176	21,070	0	8,101	6,928	9,317	8,101	6,928	9,317	0
W GULF	1981	15,784	12,872	18,902	15,784	12,872	18,902	0	7,464	6,393	8,616	7,464	6,393	8,616	0
W GULF	1982	14,506	11,975	17,526	14,506	11,975	17,526	0	6,880	5,900	7,960	6,880	5,900	7,960	0
W GULF	1983	13,011	10,797	15,666	13,011	10,797	15,666	0	6,257	5,375	7,257	6,257	5,375	7,257	0
W GULF	1984	11,450	9,408	13,710	11,450	9,408	13,710	0	5,696	4,842	6,632	6,073	5,812	6,692	1
W GULF	1985	9,987	8,238	11,843	10,392	9,262	11,976	1	5,137	4,375	6,007	5,137	4,375	6,007	0
W GULF	1986	8,699	7,233	10,252	9,599	8,503	10,846	1	4,576	3,874	5,347	4,481	3,977	5,087	1
W GULF	1987	7,688	6,453	9,010	7,313	6,225	8,486	1	4,037	3,382	4,710	4,037	3,382	4,710	0
W GULF	1988	7,002	5,947	8,175	7,260	6,207	8,366	1	3,571	3,012	4,188	3,571	3,012	4,188	0
W GULF	1989	6,540	5,501	7,575	6,248	5,734	7,006	1	3,172	2,652	3,710	3,172	2,652	3,710	0
W GULF	1990	6,300	5,416	7,303	6,341	5,879	7,037	1	2,813	2,371	3,301	2,627	2,291	3,044	1
W GULF	1991	6,216	5,313	7,175	6,310	5,893	6,947	1	2,504	2,101	2,940	2,378	2,089	2,720	1
W GULF	1992	6,226	5,379	7,159	5,889	5,707	6,418	1	2,255	1,903	2,635	2,154	1,840	2,502	1
W GULF	1993	6,270	5,419	7,168	6,270	5,419	7,168	0	2,047	1,722	2,377	2,082	1,781	2,391	1
W GULF	1994	6,265	5,432	7,149	6,641	6,305	7,188	1	1,884	1,610	2,196	1,880	1,749	2,067	1
W GULF	1995	6,201	5,396	7,032	6,201	5,396	7,032	0	1,761	1,510	2,029	1,761	1,510	2,029	0
W GULF	1996	6,165	5,349	6,962	6,231	5,968	6,670	1	1,676	1,438	1,927	1,744	1,552	1,944	1
W GULF	1997	6,048	5,249	6,844	6,411	6,267	6,790	1	1,622	1,398	1,847	1,622	1,398	1,847	0
W GULF	1998	5,842	5,120	6,648	6,362	6,099	6,790	1	1,599	1,392	1,815	1,690	1,603	1,782	1
W GULF	1999	5,616	4,914	6,402	5,616	4,914	6,402	0	1,603	1,395	1,811	1,603	1,395	1,811	0
W GULF	2000	5,443	4,743	6,220	4,876	4,750	5,196	1	1,633	1,441	1,838	1,663	1,539	1,795	1

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
W GULF	2001	5,352	4,670	6,118	5,352	4,670	6,118	0	1,681	1,473	1,875	1,561	1,532	1,593	1
W GULF	2002	5,376	4,675	6,137	5,332	5,210	5,610	1	1,750	1,539	1,950	1,889	1,790	1,999	1
W GULF	2003	5,534	4,791	6,248	5,534	4,791	6,248	0	1,832	1,629	2,059	1,589	1,483	1,701	1
W GULF	2004	5,744	5,008	6,525	6,224	6,107	6,466	1	1,929	1,709	2,148	1,941	1,813	2,072	1
W GULF	2005	6,069	5,314	6,863	5,569	5,145	6,050	1	2,027	1,805	2,257	2,012	2,005	2,021	1
W GULF	2006	6,460	5,702	7,341	6,581	6,186	7,024	1	2,131	1,904	2,380	2,131	1,904	2,380	0
W GULF	2007	6,890	6,053	7,752	6,933	6,812	7,131	1	2,245	2,003	2,490	2,245	2,003	2,490	0
W GULF	2008	7,268	6,375	8,151	6,981	6,879	7,162	1	2,344	2,087	2,584	2,344	2,087	2,584	0
W GULF	2009	7,607	6,688	8,523	7,383	6,831	7,990	1	2,430	2,171	2,689	2,489	2,484	2,495	1
W GULF	2010	7,883	6,954	8,864	7,850	6,917	8,822	1	2,505	2,240	2,773	2,505	2,240	2,773	0
W GULF	2011	8,087	7,160	9,103	8,644	8,469	8,860	1	2,573	2,308	2,844	2,668	2,667	2,670	1
W GULF	2012	8,236	7,324	9,219	8,236	7,324	9,219	0	2,625	2,362	2,910	2,625	2,362	2,910	0
W GULF	2013	8,332	7,412	9,331	8,492	8,315	8,688	1	2,668	2,395	2,951	2,741	2,740	2,743	1
W GULF	2014	8,399	7,475	9,374	8,124	7,910	8,342	1	2,705	2,433	2,999	2,525	2,504	2,546	1
W GULF	2015	8,452	7,529	9,399	8,440	7,519	9,382	1	2,742	2,460	3,029	2,749	2,469	3,038	1
W GULF	2016	8,486	7,560	9,458	8,301	8,176	8,430	1	2,765	2,471	3,046	2,796	2,785	2,807	1
W GULF	2017	8,537	7,612	9,548	8,590	7,856	9,276	1	2,797	2,513	3,086	2,770	2,600	2,949	1
W GULF	2018	8,575	7,593	9,546	8,617	7,829	9,489	1	2,826	2,548	3,126	2,726	2,506	2,964	1
W GULF	2019	8,597	7,619	9,574	8,732	8,483	9,012	1	2,854	2,576	3,148	3,056	3,054	3,059	1
W GULF	2020	8,589	7,637	9,603	8,589	7,637	9,603	0	2,888	2,588	3,184	2,888	2,588	3,184	0
W GULF	2021	8,608	7,591	9,589	8,101	7,555	8,709	1	2,916	2,631	3,237	2,787	2,767	2,808	1
W GULF	2022	8,669	7,625	9,671	8,643	7,653	9,665	1	2,944	2,635	3,282	2,944	2,633	3,281	1
W GULF	2023	8,758	7,681	9,871	8,758	7,681	9,871	0	2,964	2,642	3,289	2,964	2,642	3,289	0
W GULF	2024	8,841	7,702	10,011	8,951	8,836	9,140	1	2,978	2,651	3,306	3,024	3,022	3,028	1
C GULF	1973								21,156	18,494	24,040	21,156	18,494	24,040	0
C GULF	1974								20,665	18,245	23,344	20,665	18,245	23,344	0
C GULF	1975								20,198	17,989	22,675	20,198	17,989	22,675	0

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
C GULF	1976								19,779	17,547	21,972	19,779	17,547	21,972	0
C GULF	1977								19,391	17,315	21,428	19,391	17,315	21,428	0
C GULF	1978	47,254	37,016	60,341	47,420	37,378	60,085	1	18,991	17,202	21,039	18,111	17,871	18,663	1
C GULF	1979	45,603	36,920	57,154	47,485	38,873	58,465	1	18,239	16,439	19,954	18,652	17,068	20,191	1
C GULF	1980	42,917	35,879	51,325	42,917	35,879	51,325	0	17,182	15,630	18,808	17,182	15,630	18,808	0
C GULF	1981	40,750	35,113	47,156	40,750	35,113	47,156	0	16,213	14,799	17,755	16,213	14,799	17,755	0
C GULF	1982	39,084	34,197	44,123	39,084	34,197	44,123	0	15,326	13,919	16,730	15,326	13,919	16,730	0
C GULF	1983	36,399	32,097	40,507	36,399	32,097	40,507	0	14,178	12,921	15,516	14,178	12,921	15,516	0
C GULF	1984	32,728	29,108	36,309	32,728	29,108	36,309	0	13,133	11,870	14,338	13,631	12,532	14,677	1
C GULF	1985	28,389	25,512	31,548	29,323	27,547	31,595	1	11,873	10,676	12,981	11,873	10,676	12,981	0
C GULF	1986	23,915	21,551	26,468	26,596	24,513	28,617	1	10,456	9,440	11,475	11,198	10,592	11,854	1
C GULF	1987	19,676	17,656	21,767	19,676	17,656	21,767	0	9,003	8,136	9,902	9,003	8,136	9,902	0
C GULF	1988	16,065	14,359	17,816	16,177	14,786	17,728	1	7,757	6,994	8,538	7,757	6,994	8,538	0
C GULF	1989	13,091	11,660	14,663	12,287	11,644	13,341	1	6,686	6,005	7,394	6,604	6,446	6,871	1
C GULF	1990	10,802	9,515	12,191	10,282	9,668	11,221	1	5,709	5,094	6,314	5,267	4,889	5,672	1
C GULF	1991	9,087	8,023	10,342	8,868	8,385	9,731	1	4,848	4,304	5,371	4,749	4,340	5,174	1
C GULF	1992	7,896	6,872	8,961	8,361	7,934	9,159	1	4,104	3,632	4,594	3,914	3,573	4,285	1
C GULF	1993	7,085	6,137	8,127	7,085	6,137	8,127	0	3,495	3,045	3,921	3,307	2,958	3,661	1
C GULF	1994	6,580	5,684	7,512	7,328	6,989	7,980	1	3,009	2,615	3,411	2,996	2,889	3,154	1
C GULF	1995	6,246	5,386	7,121	6,246	5,386	7,121	0	2,630	2,278	3,009	2,630	2,278	3,009	0
C GULF	1996	5,947	5,114	6,797	6,120	5,966	6,656	1	2,337	2,003	2,678	2,306	2,001	2,615	1
C GULF	1997	5,733	4,932	6,556	5,402	5,253	5,926	1	2,126	1,807	2,457	2,278	2,050	2,530	1
C GULF	1998	5,567	4,769	6,351	5,364	5,223	5,849	1	1,973	1,685	2,291	2,018	1,948	2,152	1
C GULF	1999	5,423	4,667	6,216	5,423	4,667	6,216	0	1,868	1,580	2,157	1,868	1,580	2,157	0
C GULF	2000	5,307	4,572	6,090	5,146	5,009	5,589	1	1,808	1,533	2,096	2,015	1,833	2,235	1
C GULF	2001	5,190	4,501	5,980	5,190	4,501	5,980	0	1,777	1,503	2,049	1,651	1,611	1,773	1
C GULF	2002	5,101	4,403	5,831	5,127	4,977	5,524	1	1,780	1,509	2,061	1,786	1,603	1,991	1

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
C GULF	2003	5,027	4,358	5,712	5,027	4,358	5,712	0	1,798	1,519	2,077	1,811	1,645	2,005	1
C GULF	2004	4,994	4,328	5,676	4,641	4,486	5,004	1	1,837	1,560	2,121	1,754	1,569	1,965	1
C GULF	2005	5,018	4,367	5,672	5,549	5,064	6,081	1	1,890	1,612	2,176	1,795	1,760	1,889	1
C GULF	2006	5,097	4,442	5,769	5,219	4,744	5,717	1	1,957	1,688	2,252	1,957	1,688	2,252	0
C GULF	2007	5,203	4,522	5,848	5,322	5,152	5,628	1	2,024	1,743	2,313	1,958	1,710	2,231	1
C GULF	2008	5,356	4,720	6,015	4,882	4,754	5,157	1	2,096	1,793	2,381	2,096	1,793	2,381	0
C GULF	2009	5,572	4,914	6,232	5,535	5,231	5,912	1	2,163	1,877	2,468	1,977	1,950	2,047	1
C GULF	2010	5,863	5,211	6,543	4,863	4,732	5,108	1	2,234	1,930	2,527	2,225	1,942	2,522	1
C GULF	2011	6,225	5,530	6,940	6,398	6,040	6,805	1	2,294	2,001	2,611	2,287	2,262	2,348	1
C GULF	2012	6,638	5,934	7,366	6,638	5,934	7,366	0	2,355	2,040	2,675	2,355	2,040	2,675	0
C GULF	2013	7,100	6,404	7,920	7,285	7,164	7,483	1	2,409	2,101	2,751	2,578	2,554	2,631	1
C GULF	2014	7,552	6,795	8,349	7,552	6,795	8,349	0	2,458	2,138	2,786	2,458	2,138	2,786	0
C GULF	2015	7,943	7,174	8,737	7,955	7,845	8,125	1	2,498	2,179	2,833	2,727	2,703	2,774	1
C GULF	2016	8,277	7,476	9,063	8,277	7,476	9,063	0	2,524	2,212	2,863	2,524	2,212	2,863	0
C GULF	2017	8,503	7,717	9,400	9,071	8,966	9,207	1	2,559	2,242	2,892	2,259	2,235	2,299	1
C GULF	2018	8,607	7,704	9,427	8,706	7,847	9,518	1	2,585	2,253	2,908	2,571	2,230	2,886	1
C GULF	2019	8,577	7,756	9,437	7,530	7,490	7,588	1	2,610	2,277	2,942	2,717	2,692	2,750	1
C GULF	2020	8,453	7,618	9,316	8,453	7,618	9,316	0	2,633	2,303	2,985	2,633	2,303	2,985	0
C GULF	2021	8,291	7,448	9,144	8,436	8,355	8,547	1	2,664	2,325	3,023	2,792	2,792	2,792	1
C GULF	2022	8,173	7,331	9,091	8,173	7,331	9,091	0	2,685	2,340	3,057	2,685	2,340	3,057	0
C GULF	2023	8,100	7,237	9,101	8,100	7,237	9,101	0	2,713	2,332	3,082	2,713	2,332	3,082	0
C GULF	2024	8,083	7,099	9,006	8,137	8,137	8,137	1	2,721	2,354	3,106	2,577	2,577	2,577	1
E GULF	1973								708	396	1,224	708	396	1,224	0
E GULF	1974								715	420	1,211	715	420	1,211	0
E GULF	1975								725	438	1,212	725	438	1,212	0
E GULF	1976								736	457	1,204	736	457	1,204	0
E GULF	1977								748	456	1,191	748	456	1,191	0

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
E GULF	1978	13,824	6,074	26,104	13,750	5,976	25,986	1	759	478	1,190	734	589	1,141	1
E GULF	1979	13,456	6,267	24,507	13,768	6,722	24,927	1	779	510	1,195	779	510	1,195	0
E GULF	1980	12,994	6,660	22,459	12,994	6,660	22,459	0	806	548	1,197	806	548	1,197	0
E GULF	1981	12,844	7,138	21,307	12,844	7,138	21,307	0	838	589	1,218	838	589	1,218	0
E GULF	1982	12,851	7,410	20,452	12,851	7,410	20,452	0	876	620	1,232	876	620	1,232	0
E GULF	1983	12,914	7,759	19,954	12,914	7,759	19,954	0	921	660	1,265	921	660	1,265	0
E GULF	1984	12,816	8,086	19,013	12,816	8,086	19,013	0	976	708	1,333	976	708	1,333	0
E GULF	1985	12,385	8,222	17,551	12,385	8,222	17,551	0	1,027	746	1,368	1,027	746	1,368	0
E GULF	1986	11,684	8,065	15,707	11,684	8,065	15,707	0	1,073	788	1,412	1,073	788	1,412	0
E GULF	1987	10,667	7,864	13,966	10,667	7,864	13,966	0	1,101	817	1,417	1,101	817	1,417	0
E GULF	1988	9,566	7,348	12,296	9,566	7,348	12,296	0	1,135	844	1,450	1,135	844	1,450	0
E GULF	1989	8,423	6,636	10,838	9,099	7,920	11,195	1	1,176	893	1,502	1,104	856	1,391	1
E GULF	1990	7,339	5,765	9,480	7,152	6,114	9,083	1	1,191	919	1,498	1,156	929	1,439	1
E GULF	1991	6,334	4,829	8,308	6,233	5,306	8,064	1	1,177	916	1,448	1,246	1,012	1,479	1
E GULF	1992	5,486	4,093	7,227	5,364	4,626	6,976	1	1,132	901	1,372	1,132	901	1,372	0
E GULF	1993	4,813	3,603	6,487	4,813	3,603	6,487	0	1,066	865	1,271	1,203	1,124	1,313	1
E GULF	1994	4,288	3,102	5,780	4,917	4,232	6,270	1	993	818	1,181	1,021	952	1,110	1
E GULF	1995	3,924	2,843	5,394	3,924	2,843	5,394	0	917	763	1,083	917	763	1,083	0
E GULF	1996	3,616	2,618	5,044	3,414	2,819	4,671	1	855	707	1,005	690	641	745	1
E GULF	1997	3,438	2,452	4,801	3,468	2,444	4,779	1	802	661	940	804	708	890	1
E GULF	1998	3,350	2,361	4,680	3,026	2,481	4,207	1	762	625	890	782	750	818	1
E GULF	1999	3,337	2,399	4,629	3,337	2,399	4,629	0	738	610	865	738	610	865	0
E GULF	2000	3,393	2,429	4,602	2,954	2,461	3,986	1	728	599	854	728	618	839	1
E GULF	2001	3,489	2,518	4,674	3,489	2,518	4,674	0	728	605	854	720	663	784	1
E GULF	2002	3,582	2,636	4,754	3,771	3,322	4,689	1	741	616	868	742	614	866	1
E GULF	2003	3,699	2,733	4,792	3,699	2,733	4,792	0	762	628	887	794	774	817	1
E GULF	2004	3,845	2,870	4,932	3,804	3,332	4,642	1	793	659	925	767	750	784	1

REGION	YEAR	NON-PUP							PUP						
		PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S	PRED	-95% CI	95% CI	REAL	-95% CI	95% CI	S
E GULF	2005	3,992	3,029	5,070	4,103	3,225	5,187	1	828	698	977	788	771	807	1
E GULF	2006	4,187	3,243	5,317	4,199	3,798	4,931	1	871	724	1,006	871	724	1,006	0
E GULF	2007	4,409	3,437	5,520	4,195	3,791	4,877	1	913	770	1,060	913	770	1,060	0
E GULF	2008	4,661	3,644	5,782	5,417	4,975	6,099	1	955	808	1,107	955	808	1,107	0
E GULF	2009	4,939	3,981	6,095	4,821	4,253	5,558	1	997	850	1,158	1,027	1,025	1,032	1
E GULF	2010	5,277	4,273	6,364	4,524	4,100	5,135	1	1,035	877	1,191	963	959	968	1
E GULF	2011	5,581	4,547	6,742	5,756	5,271	6,368	1	1,065	912	1,231	1,102	1,099	1,106	1
E GULF	2012	5,829	4,780	6,980	5,829	4,780	6,980	0	1,090	932	1,260	1,090	932	1,260	0
E GULF	2013	5,980	4,909	7,074	5,947	5,597	6,402	1	1,107	946	1,279	1,238	1,235	1,242	1
E GULF	2014	6,034	5,011	7,197	6,034	5,011	7,197	0	1,115	949	1,281	1,115	949	1,281	0
E GULF	2015	5,958	4,872	7,031	6,420	6,269	6,625	1	1,119	963	1,292	1,195	1,194	1,196	1
E GULF	2016	5,764	4,762	6,881	5,764	4,762	6,881	0	1,115	950	1,285	1,115	950	1,285	0
E GULF	2017	5,513	4,502	6,573	5,427	5,313	5,565	1	1,106	941	1,269	798	795	802	1
E GULF	2018	5,203	4,232	6,224	5,203	4,232	6,224	0	1,096	940	1,263	1,096	940	1,263	0
E GULF	2019	4,862	3,961	5,832	4,302	4,283	4,349	1	1,089	932	1,244	1,157	1,154	1,160	1
E GULF	2020	4,595	3,726	5,501	4,595	3,726	5,501	0	1,079	916	1,236	1,079	916	1,236	0
E GULF	2021	4,408	3,615	5,282	4,576	4,503	4,661	1	1,072	914	1,239	1,128	1,128	1,128	1
E GULF	2022	4,338	3,495	5,175	4,338	3,495	5,175	0	1,071	906	1,236	1,071	906	1,236	0
E GULF	2023	4,349	3,456	5,188	4,349	3,456	5,188	0	1,068	902	1,243	1,068	902	1,243	0
E GULF	2024	4,373	3,513	5,296	4,163	4,163	4,163	1	1,069	896	1,236	1,087	1,087	1,087	1



U.S. Secretary of Commerce
Howard Lutnick

Acting Under Secretary of Commerce
for Oceans and Atmosphere
Nancy A. Hann

Acting Assistant Administrator,
National Marine Fisheries Service
Emily Menashes

February 2025

www.fisheries.noaa.gov

OFFICIAL BUSINESS

**National Marine
Fisheries Service**
Alaska Fisheries Science Center
7600 Sand Point Way N.E.
Seattle, WA 98115-6349