COUNTRY (/USA)

Report on Groundfish Activities by AFSC in 2025

April 2026

Prepared for the
Canada-United States Groundfish Technical Committee

Edited by Susanne McDermott, Katy Echave and Cindy Tribuzio
With contributions by :
Grant Adams, Diana Baetscher, Katy Echave, Dan Goethel, Pat Malecha, Cole Monnahan, Patrick Ressler, Lauren Rogers, Kalei Shotwell, Duane Stevenson, Sandy Parker-Stetter, Cindy Tribuzio, Ned Laman, Margaret Siple
Agency Name (Alaska Fisheries Science Center, NOAA Fisheries)
Address (7600 Sandpoint way N.E., Seattle, WA 98115)

Executive Summary (1 - 2 paragraphs)

Groundfish research at the Alaska Fisheries Science Center (AFSC) is conducted within the following Divisions: Resource Assessment and Conservation Engineering (RACE), Resource Ecology and Fisheries Management (REFM), Fisheries Monitoring and Analysis (FMA), and the Auke Bay Laboratories (ABL). All Divisions work closely together to accomplish the mission of the Alaska Fisheries Science Center.

In 2024, our activities were guided by our Alaska Strategic Science Plan 2024-27 with annual priorities specified in the AFSC Annual Guidance Memorandum for 2023. A review of pertinent work by these groups during the past year is presented below. A list of publications relevant to groundfish and groundfish issues is included in Appendix I. Lists of publications, posters and reports produced by AFSC scientists are also available on the AFSC Publications Center website, where you will also find a link to the searchable AFSC Publications Database.

Surveys and Monitoring (1 - 2 paragraphs for each program/survey)

2025 Eastern Bering Sea Continental Shelf Bottom Trawl Survey – RACE GAP

The 43rd in a series of standardized annual bottom trawl surveys of the eastern Bering Sea (EBS) continental shelf, and the 7th in a series of trawl surveys of the northern Bering Sea (NBS) were completed in 2025 aboard the AFSC chartered fishing vessels *Northwest Explorer* and *Alaska Knight*, which together bottom trawled at 350 stations over a survey area of 492,990 km^2 in the EBS and 137 stations covering 198,867 km^2 in the NBS. Researchers processed and recorded the data from each trawl catch by identifying, sorting, and weighing all the different crab and groundfish species and then measuring samples of each species. Supplementary biological and oceanographic data were also collected during the bottom trawl survey to improve the understanding of groundfish and crab life histories and the ecological and physical factors affecting their distribution and abundance.

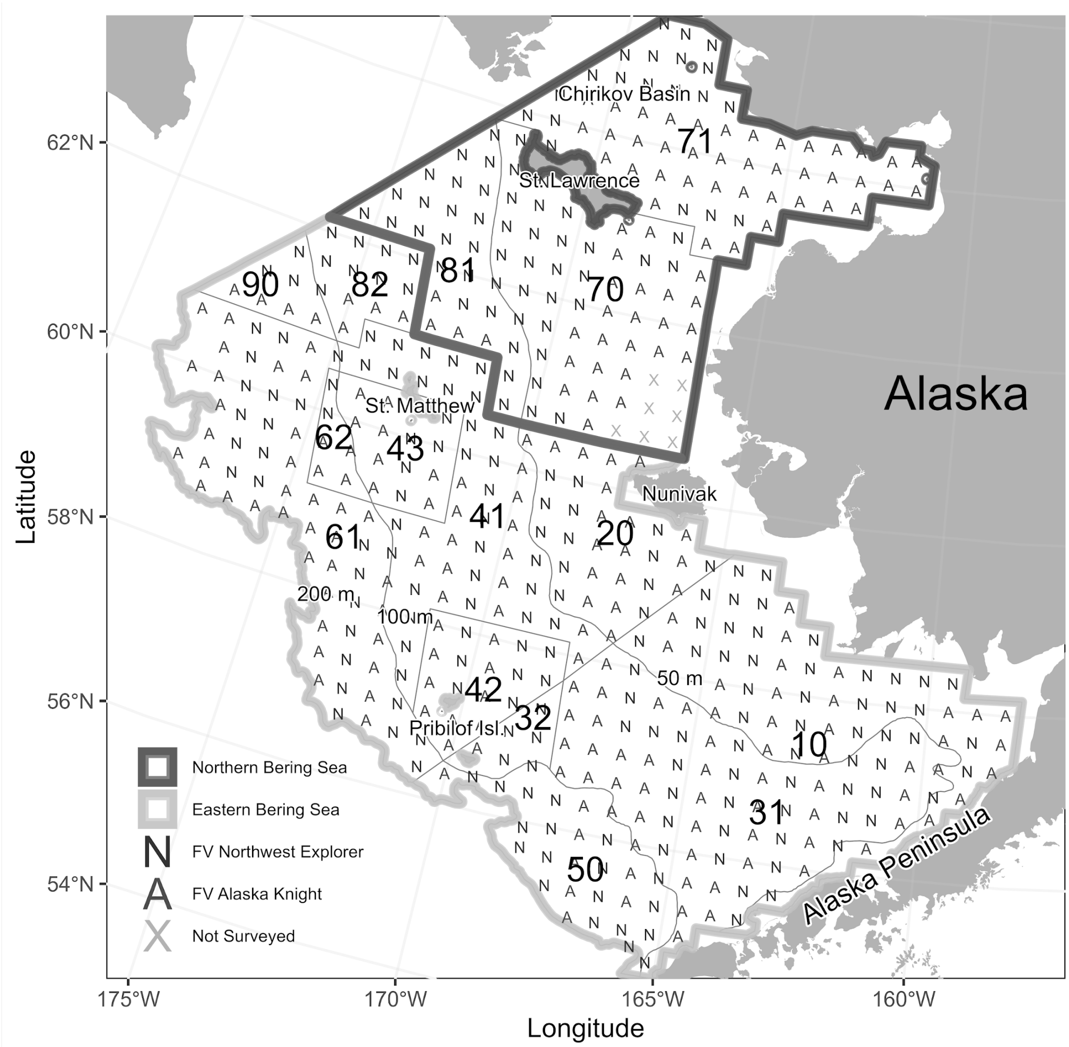

Fig. 1. Map showing survey stations sampled during the 2025 eastern and northern Bering Sea shelf bottom trawl survey.

The total estimated biomass in the eastern Bering Sea decreased from 26.8 million t in 2024 to 13.8 million t in 2025. Survey estimates of total biomass in the EBS in 2025 were 3.8 million metric tons (mt) for walleye pollock, 571 thousand mt for Pacific cod, 1.5 million mt for yellowfin sole, 1.5 million mt for northern rock sole, 5.6 thousand mt for Greenland turbot, and 133 thousand mt for Pacific halibut. Several of the commercially important fish species showed modest increases in estimated survey biomass compared to 2024. Bering flounder biomass increased 19%, Kamchatka flounder 17%, Greenland turbot 14%, Pacific halibut 7%, northern rock sole 4%, and yellowfin sole 3%. Walleye pollock biomass decreased 30%, arrowtooth flounder 15%, Pacific cod 10%, Alaska plaice 3%, and flathead sole 1%.

The total estimated biomass in the northern Bering Sea decreased from 2.8 million t in 2023 to 2.4 million t in 2025. Among commercial species, increases in northern Bering Sea biomass were observed for walleye pollock (51%), saffron cod (44%), and Bering flounder (32%). Decreases in biomass were observed for Pacific cod (-36%), Alaska plaice (-33%), yellowfin sole (-21%), and northern rock sole (-8%).

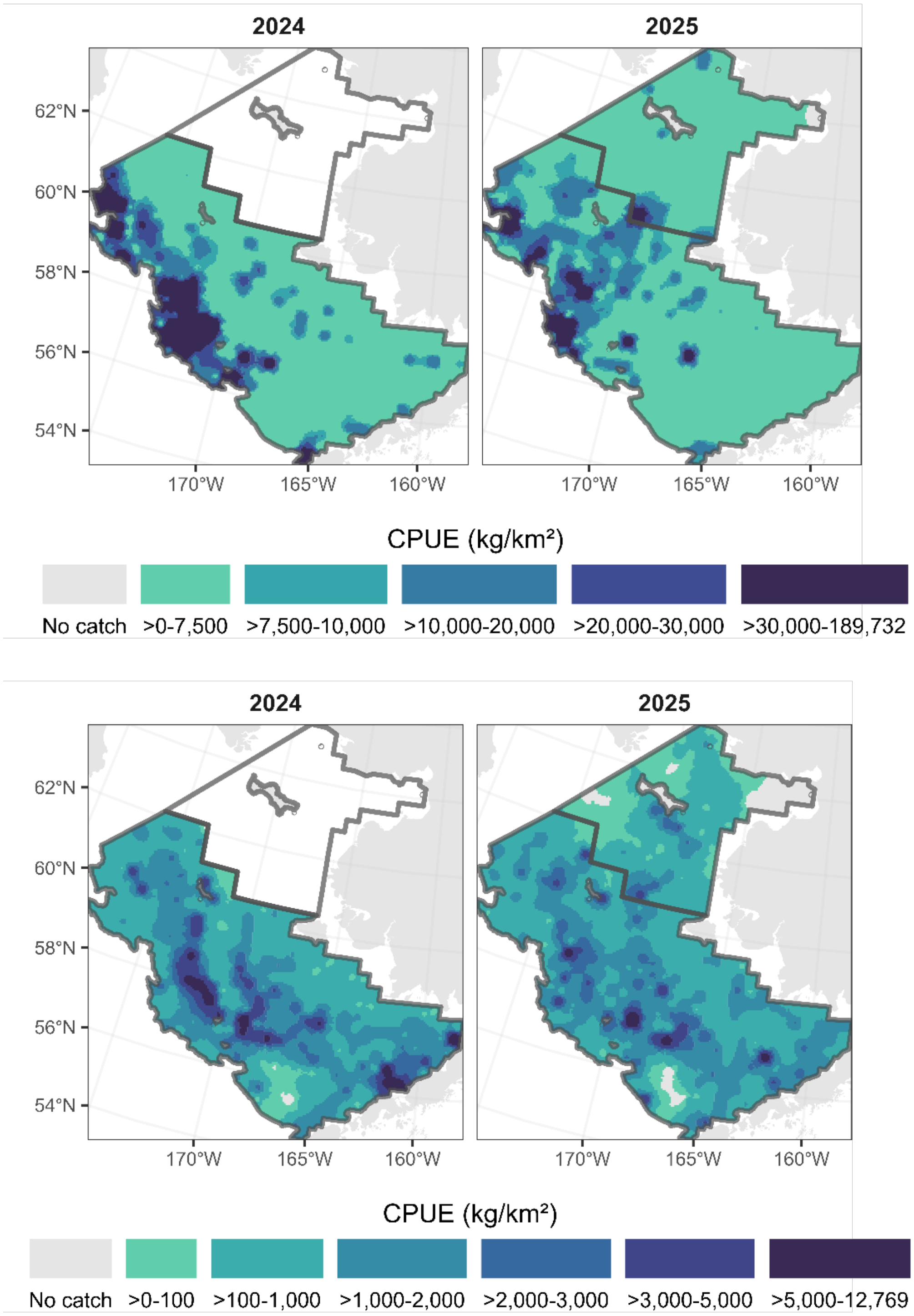

Fig. 2. Spatial distribution of large gadids, in terms of mean CPUE (kg/ha), observed during the 2024 and 2025 bottom trawl surveys of the EBS and NBS: Top panel is walleye pollock; bottom panel is Pacific cod.

In recent years, distributions of walleye pollock and Pacific cod have been completely different than those observed in the previous cold stanza of 2006-2013. During the cold stanza, pollock were mostly concentrated on the outer shelf at depths of 70–200 m north of 56°N. Pollock biomass was consistently low on the inner and middle shelf, and pollock were almost completely absent from the northern Bering Sea survey area. In 2017-2019, pollock biomass in the EBS was concentrated mostly on the middle shelf, and there were large concentrations of pollock in the northern Bering Sea. In 2021-2025, pollock distribution has been more similar to historical distribution patterns, with aggregations in the EBS in the middle and outer domains, particularly along the northern shelf edge, and to the north and west of the Pribilof Islands (Fig. 2). For the most recent comprehensive survey years (2021-2025), walleye pollock have been relatively rare throughout the northern Bering Sea survey area.

During the 2006-2013 cold stanza, Pacific cod biomass in the EBS was concentrated in Bristol Bay, on the middle and outer shelf from the Pribilof Islands north to St. Matthew, and cod biomass was low in the northern Bering Sea. In contrast, the 2017-2019 surveys revealed high densities of Pacific cod in the northern Bering Sea, and cod were concentrated in only a few areas of the EBS. In the most recent comprehensive survey years (2021-2025), Pacific cod distribution has moved south again, with the largest concentrations located near St. Matthew Island and to the south of St. Lawrence Island, although moderate densities have also been recorded throughout the EBS shelf (Fig. 2). In 2025, high densities of cod were encountered along the middle domain to the north and west of the Pribilof Islands. In all survey years, Pacific cod were concentrated in areas with bottom temperatures >0°C.

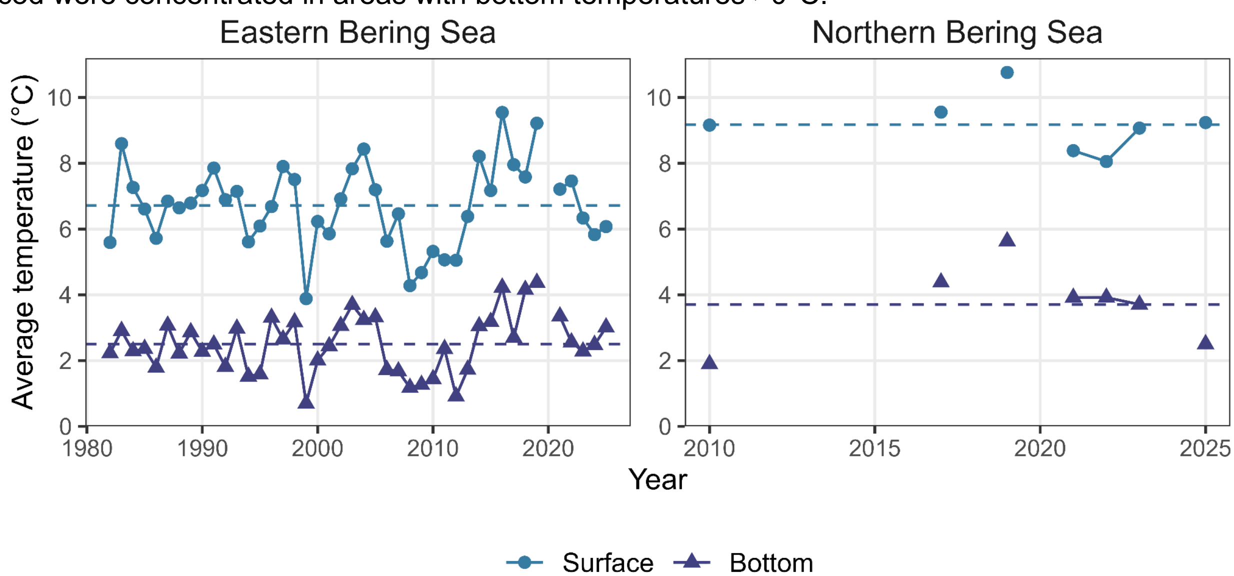

Figure 3: Average annual surface and bottom temperature during the survey period for the eastern and northern Bering Sea shelf surveys with the survey mean temperature (1982-2025).

The surface and bottom temperature means for the 2025 eastern Bering Sea shelf were similar to 2024 estimates, and similar to the long-term time-series means (Fig. 3). The 2025 mean surface temperature was 6.1°C, which was warmer than 2024 (5.8°C), but colder than the time-series mean (6.7°C). The mean bottom temperature was 3.0°C in 2025, which was warmer than 2024 (2.5°C), and warmer than the time-series mean (2.5°C). The 'cold pool', defined as the area with bottom temperatures ≤2°C, covered 23.0% of the eastern Bering Sea shelf in 2025, which is slightly smaller than in 2024 (Fig. 4). The cold pool was 27.7% (43,425 km^2) smaller than in 2024, and 36.6% smaller than the time series mean (179,000 km^2).. The extent of isotherms for bottom temperatures ≤0°C (and ≤-1°C (6,650 km^2) were similar to those in 2015 and 2017. During the 42-year time series, the cold pool area has ranged from 1.2% to 78.2% of the total EBS shelf area (Fig. 5).

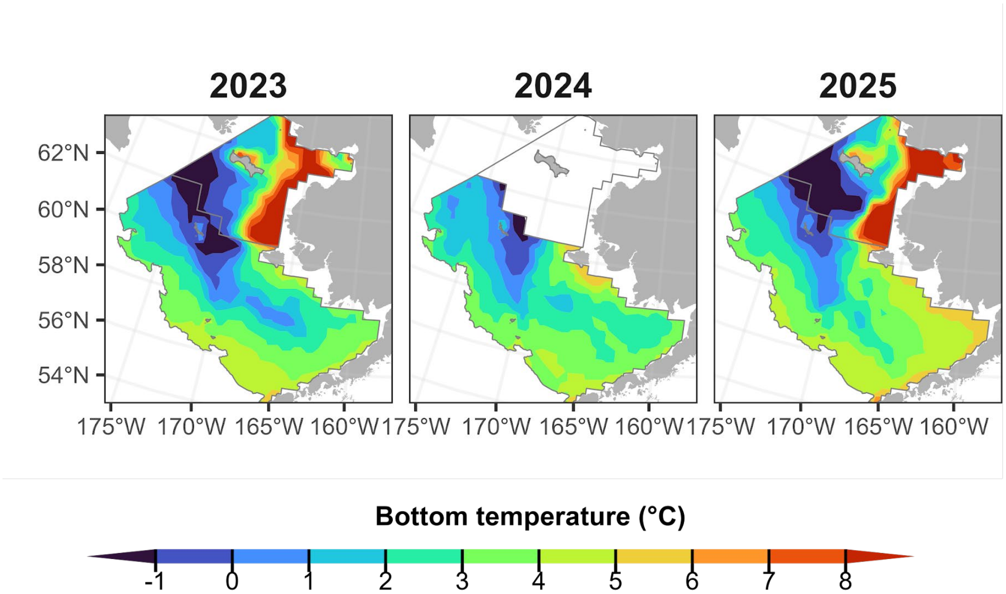

Figure 4: Distribution of survey bottom temperatures for recent survey years (2023-2025).

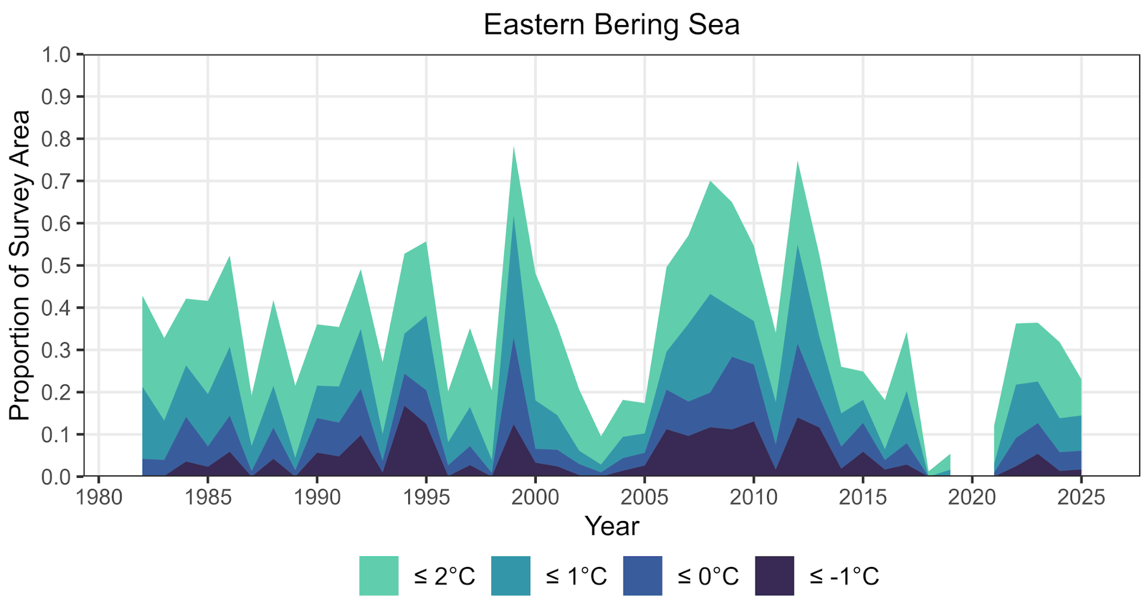

Figure 5: Areal extent of the summer cold pool on the eastern Bering Sea shelf, based on observations from the eastern Bering Sea bottom trawl surveys (1982-2025), shown as a percentage of the total EBS survey area.

For more information, contact Duane Stevenson (duane.stevenson@noaas.gov)

2025 Gulf of Alaska Bottom Trawl Survey – RACE-GAP

The AFSC RACE Groundfish Assessment Program (RACE-GAP) chartered the fishing vessels *Ocean Explorer* and *Alaska Provider* for 75 days each to conduct the 2025 Gulf of Alaska (GOA) Biennial Bottom Trawl Survey of groundfish resources in the region. This was the nineteenth survey in the standardized time series dating back to 1990. This summer's cruise began in Dutch Harbor, Alaska in June and concluded in Juneau in August. The 2025 GOA survey area included the portion of the continental shelf from the Islands of Four Mountains eastward approximately 2,800 km to Dixon Entrance and from nearshore waters (minimum depth approximately 15 m) to a depth of 700 m (Fig. 1). The total 2025 survey area was 301,175 km².

A wide variety of data were collected on our survey platform during the summer. Oceanographic and environmental parameters were collected along with identified and enumerated collections of ecologically important species from the trawl catches. Among the 2025 objectives were defining the distribution and estimating the relative abundance of principal groundfishes and important invertebrate species that inhabit the GOA, measuring biological parameters for selected species, and collecting age structures along with other requested samples.

In 2025, the GOA bottom trawl survey was conducted under a new stratified random design based on development and simulation testing by Oyafuso et al. (2022). Depth-defined strata were optimized within each NMFS management area using a genetic algorithm (Barcaroli et al. 2014) and the Bethel algorithm (Bethel 1989) was used to allocate effort across strata such that precisions are maximized across a subset of representative GOA FMP groundfish taxa for a given level of total survey effort (Oyafuso et al., 2022). This new design differs from the pre-2025 GOA and current Aleutian Islands survey design in three aspects. First, strata are aligned with NMFS statistical areas (610, 620, 630, 640, and 650) instead of historical INPFC areas. Second, depth ranges that define stratum boundaries are specific to each NMFS statistical area following methods from (Oyafuso et al. 2022). Lastly, allocation of effort across strata was calculated using the Bethel algorithm instead of a modified, multi-species Neyman allocation that used ex-vessel price across a subset of representative species as weighting factors. As before, once stratum allocations were determined, stations were randomly selected within strata from the full set of 'available' stations. Available stations were defined as those not previously determined to be untrawlable with our survey gear.

The survey deployed the RACE Division's standard four-seam, high-opening Poly Nor'Eastern survey trawl equipped with rubber bobbin roller gear. This standardized trawl has been in use on RACE-GAP GOA resource assessment surveys since 1990. Charter vessels conducted 15-minute trawls at the pre-assigned stations and catches of all live animals were identified to the lowest possible taxon. Biological samples (length, age structures, individual weights, stomach contents) were collected for selected groundfish species. Specimens and data for special studies (e.g., maturity observations, tissue samples, photo vouchers) were also collected as requested by AFSC researchers and other cooperating agencies and institutions. Specimens of uncommon fishes or invertebrates were collected on an opportunistic basis and logged into the AFSC voucher system.

In 2025, a total of 450 stations were selected for sampling and 431 stations were successfully sampled (Figure 1). The GOA bottom trawl survey encountered high species diversity over a complex mosaic of habitats and collected extensive data on the populations of this region. Total catches across the survey area included 129 fish species from 33 families, and 227 invertebrate species or taxa from 10 phyla. The total fish catch from the survey was approximately 224 metric tons (mt); total invertebrate catch was approximately 5 mt. We measured >136,000 fish lengths and collected 8,694 otolith pairs. There were >28 scientific collection requests supported which ranged from fisheries acoustics and environmental monitoring for harmful algal blooms to Pacific ocean perch genetics, visual maturity, and elasmobranch stress physiology. Perennial collections were also conducted for the International Pacific Halibut Commission and the AFSC Feeding Habits group. Validated data were finalized and released to users on 1 September, 2025. A summary of the survey activities generated from these data was delivered to the Joint Groundfish Plan Team of the North Pacific Fisheries Management Council (NPFMC) at their September meeting. Data from the survey were made available at that time on the Pacific States Marine Fisheries Commission's Alaska Fisheries Information Network (AKFIN) as well as in NMFS' Fisheries One-Stop Shop (FOSS).

Surface and bottom temperatures have been collected throughout the time series of the GOA bottom trawl surveys (Figure 2). Temperatures were collected using a wide variety of methods (see von Szalay and Raring 2018 for methods) and have not been intercalibrated among collection methods or adjusted for tidal flux. Surface and bottom temperatures this year were warmer than in 2023, but were still below the 20 year average for surface temperature and below the 10 year average for bottom temperature. This reversed the cooling trend that began in 2019 to 2023 with slightly warmer conditions in 2025.

Species composition of the more abundant fishes in 2025 and total estimated groundfish biomass was similar to that seen in recent years. Total Biomass of the entire region was estimated to be ca. 6 million mt (Figure 3). Arrowtooth flounder, Walleye pollock and Pacific ocean perch (POP) reflected the highest survey biomass estimates this year. Walleye pollock and Pacific cod biomass estimates both increased by more than 30%. Arrowtooth flounder, increased by ca. 20% and POP, decreased by more than 40%.

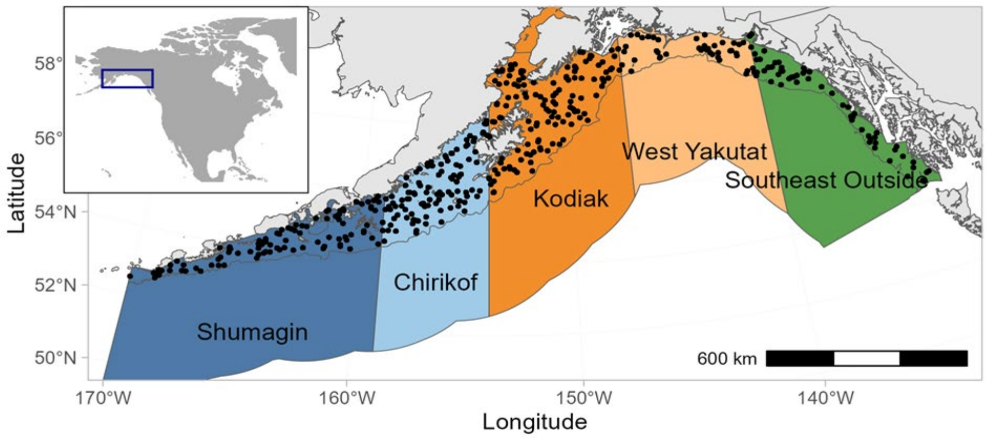

Figure 1. Map of the GOA NMFS statistical areas with the GOA survey area footprint outlined in gray and containing the stations sampled (black points) in 2025. Note that the GOA survey area does not extend to the northernmost part of Cook inlet in the Kodiak Statistical area.

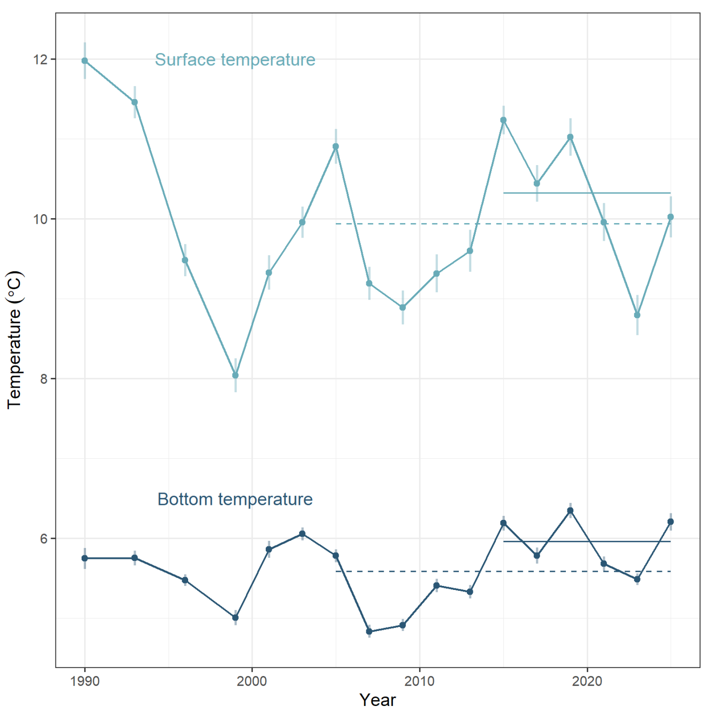

Figure 2. Surface and bottom (gear) temperatures from survey tows. Bottom temperature is measured at the headrope of the trawl. Horizontal lines show the mean of each time series over the past 10 (solid) and 20 (dashed) years. Vertical lines indicate 95% confidence intervals.

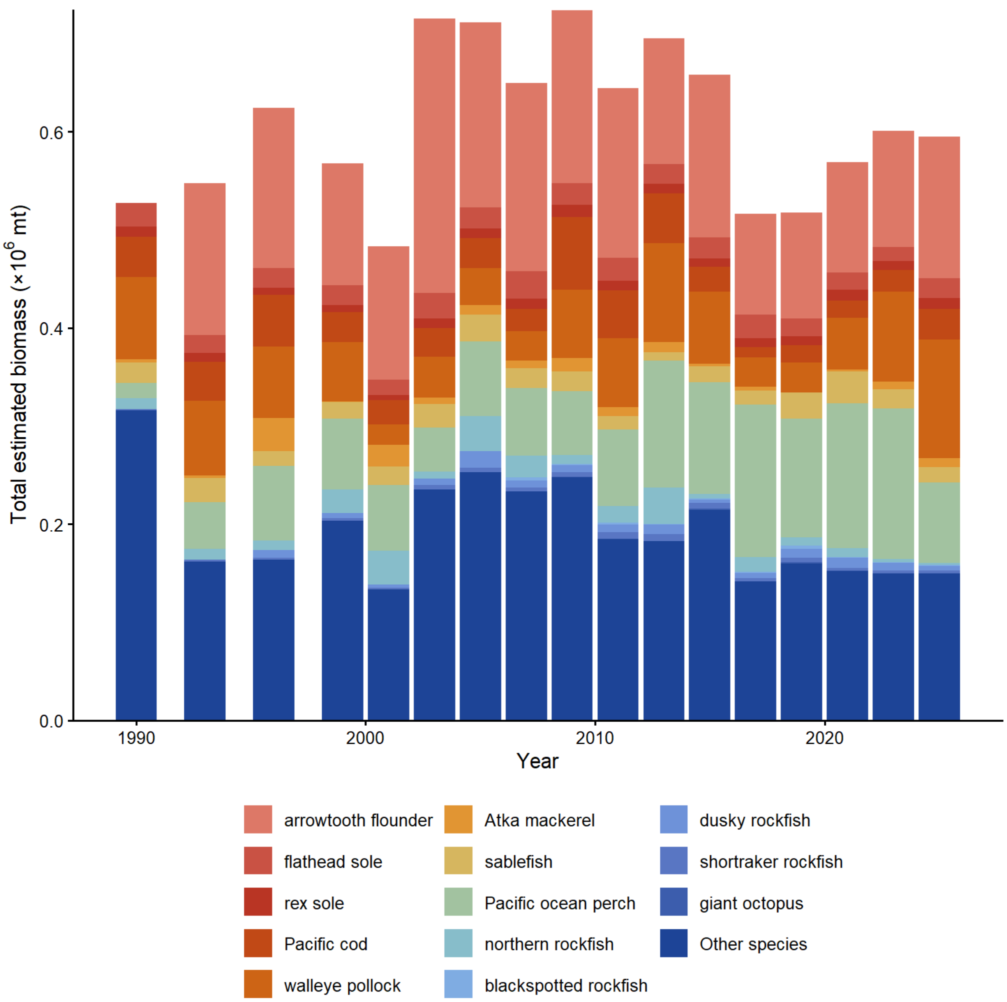

Figure 3: Stacked bar graph of the total estimated biomass for the entire Gulf of Alaska from the 2025 bottom trawl survey data featuring the most commercially important species, all other species are represented in the 'other' category.

Contributors: Susanne McDermott, Ned Laman, Margaret Siple

For further information, please contact Gulf of Alaska Bottom Trawl Team Leader:
Ned Laman, (ned.laman@NOAA.gov)

References:

Von Szalay, P. G., and N. W. Raring. 2018. Data Report: 2017 Gulf of Alaska bottom trawl survey. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-374, 260 p.

Barcaroli, G. 2014. SamplingStrata: An R Package for the Optimization of Stratified Sampling. J. Stat. Softw. 61(4):1–24. doi: https://www.jstatsoft.org/article/view/v061i04.

Bethel, J. 1989. Sample allocation in multivariate surveys. Survey Methodology, 15: 47–57.

2025 AFSC Longline Survey – ABL-MESA

From the outset (1987), the Alaska Fisheries Science Center's (AFSC) Longline Survey vessel contract was funded solely on a cost-recovery basis, whereby the vessel contractor retained and sold the fish caught on the survey to offset the vessel's operational costs and provide a nominal profit. In 2023, as fish prices slumped and operational costs exceeded revenues, the vessel contractor reported a financial loss. In 2024, the AFSC and the vessel contractor negotiated contract terms, but a satisfactory arrangement could not be found due to financial uncertainty from a weak economic outlook for sablefish and there was no AFSC Longline Survey. After 2024, a new vessel contract was solicited that provided a daily rate to ensure coverage of operational costs but still included a cost-recovery aspect that reduced what the government ultimately paid for the charter. In addition to financial modifications in the vessel contract, a few survey sampling changes were implemented to lessen the required number of days at sea while still providing adequate data for calculating abundance indices. Specifically, the once annual GOA survey will now sample the GOA only in odd-numbered years and the BS and AI in even-numbered years (Figure 1). Furthermore, a number of survey stations that were historically sampled in the GOA, such as gullies and experimental stations, were omitted from future sampling. Of those dropped stations, only two were used for abundance index calculations. The dropped index stations were identified as less informative, when considering historical sampling frequency by depth and region relative to area sizes; their omission had minimal effect on retrospective abundance index calculations. In total, the number of survey sampling days has been reduced by about 50% over a two-year time period, noting that the GOA is now sampled every other year instead of annually but the frequency of sampling in the BS and AI is unchanged from historic rates.

The AFSC Longline Survey was back in action sampling the GOA in 2025. Sampling began about a month later than usual due to governmental delays in awarding the vessel contract and was executed off the FV *Alaskan Leader*. The survey started and ended in Dutch Harbor on 15 July and 2 September, respectively. Sampling occurred from the western end of Umnak Island in the western GOA, through the central GOA and down to Dixon Entrance in the eastern GOA. On each day of sampling, two 9-km longline sets were made, each with 4,050 hooks. The gear was set from shallow to deep and usually covered depths from about 150 m to 1,000 m. A census of each hook was recorded at the rail and length data was recorded for several species, including sablefish, Pacific cod, and rockfish. Otoliths were collected from a subsample of sablefish for age determinations. Lastly, a subset of sablefish and shortspine thornyhead were tagged and released.

Catches of sablefish on the 2025 survey were robust. Over 46 days of sampling, a total of 126,299 sablefish were caught on 92 longline sets. The combined GOA Relative Population Number (RPN) for sablefish, which is the survey's primary index of abundance, was about 4% higher than the previous survey's estimate in 2023 (Figure 2). Survey biologists recorded over 93,000 sablefish lengths in 2025. Length distributions suggest a slight shift to larger fish for most areas of the GOA when compared to 2023 (Figure 3). Otoliths were collected from 2,869 sablefish and a subsample of those will be processed and aged by the AFSC Age and Growth Unit. Data from otoliths collected in 2025 will be available in time for the 2026 sablefish stock assessment. Almost 4,000 sablefish and 197 shortspine thornyhead were tagged and released; 19 tagged sablefish and one tagged thornyhead were recaptured.

Additional details about the 2025 AFSC Longline Survey can be found at the following link:

https://repository.library.noaa.gov/view/noaa/72413

In 2026, the AFSC Longline Survey is scheduled to sample in the eastern Bering Sea and eastern and central Aleutian Islands area (Figure 1). The survey will once again be executed off of the FV *Alaskan Leader*. The plan is to begin around 1 June in the BS, have a mid-survey port day in Dutch Harbor, then complete sampling in the AI, finishing up around 5 July. Once the dates are finalized, a survey calendar will be made available at the link below.

https://www.fisheries.noaa.gov/resource/document/alaska-sablefish-longline-survey-station-schedule

For more information, contact Pat Malecha (pat.malecha@noaa.gov).

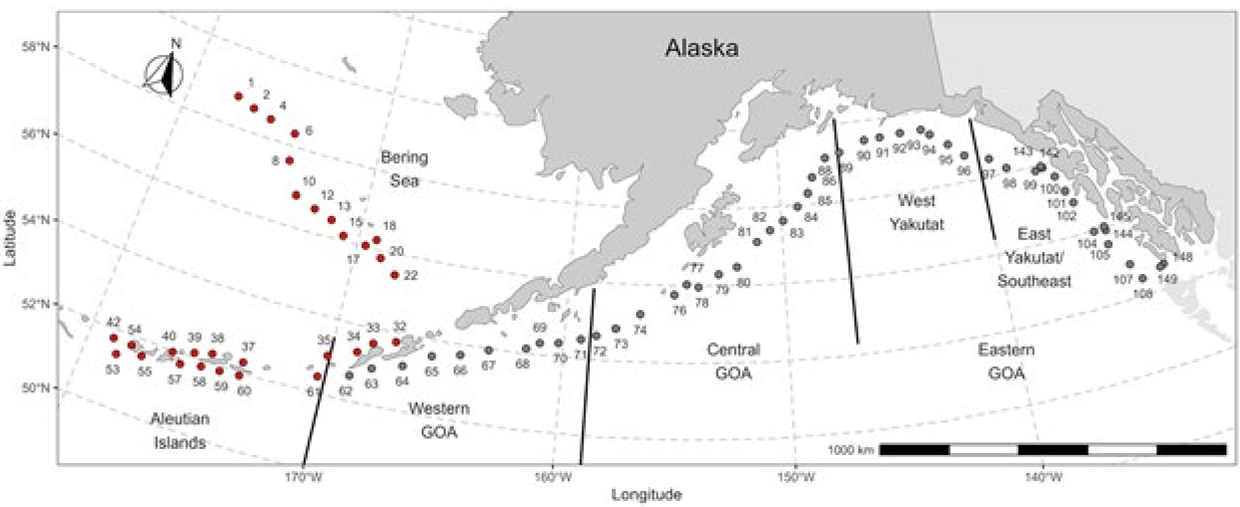

Figure 1. Map of AFSC Longline Survey station locations. Gray dots indicate stations sampled in odd-numbered years beginning in 2025; red dots indicate stations sampled in even-numbered years beginning in 2026.

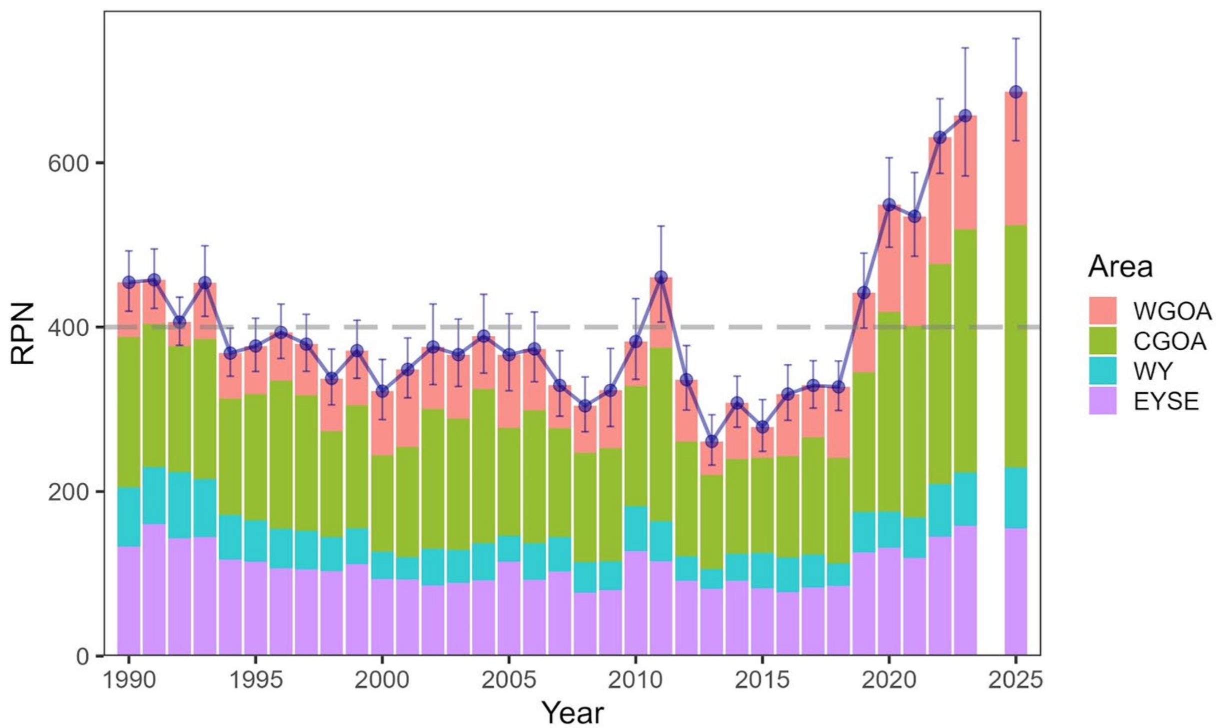

Figure 2. AFSC Longline Survey Relative Population Numbers (RPN) for sablefish by area and year for the Gulf of Alaska (GOA). WGOA is the western GOA, CGOA is the central GOA, WY is the west Yakutat area and EYSE is the east Yakutat and southeast area.

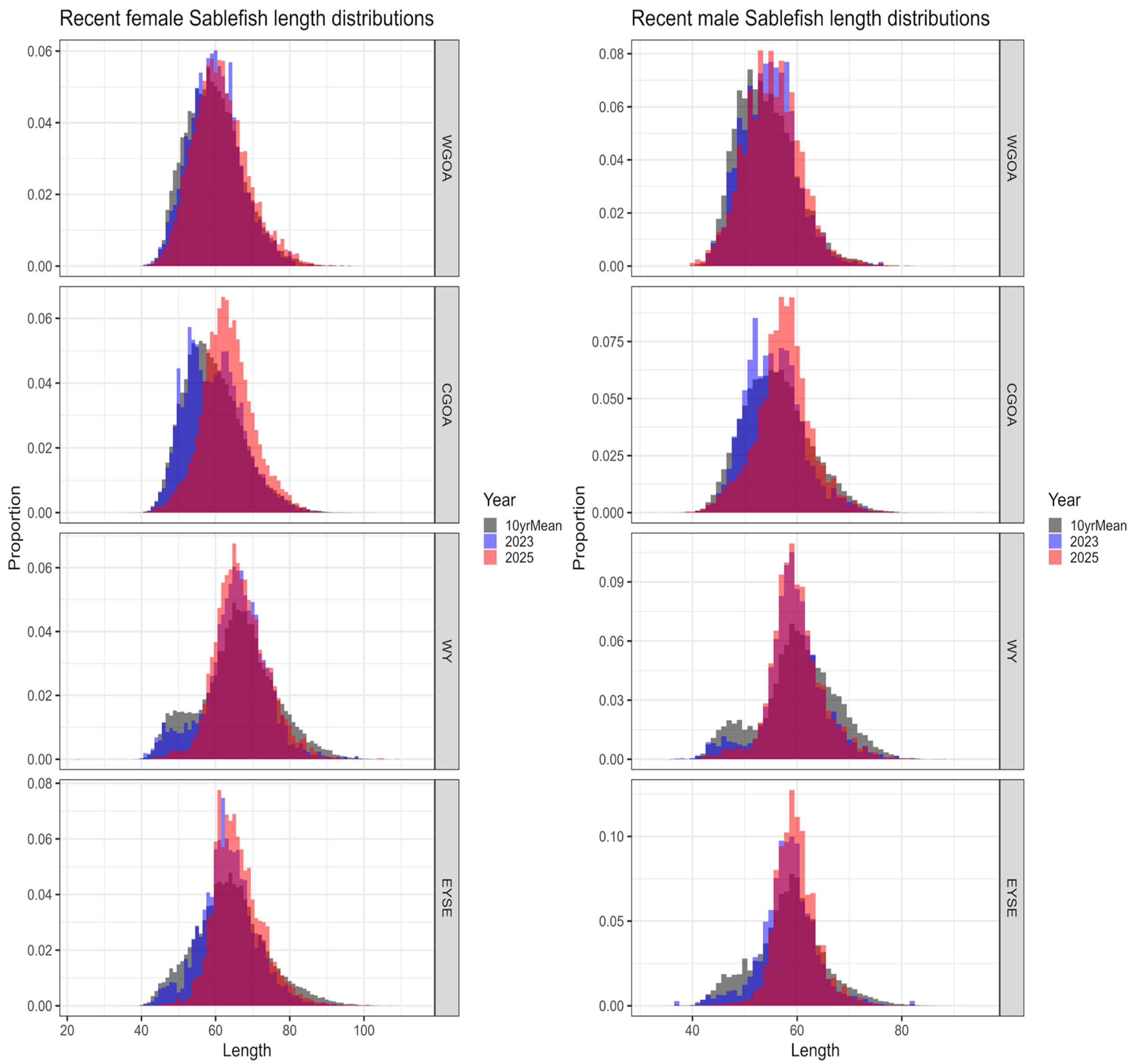

Figure 3. Fork length distributions of female and male sablefish by area and year in the Gulf of Alaska for 2023, 2025, and the 10-year mean. WGOA is the western GOA, CGOA is the central GOA, WY is the west Yakutat area and EYSE is the east Yakutat and southeast area.

NOAA Fisheries, Alaska Fisheries Science Center (AFSC), RACE Division, Midwater Assessment and Conservation Engineering (MACE) Program

GULF OF ALASKA

Winter acoustic-trawl surveys of pre-spawning walleye pollock in the Gulf of Alaska

Scientists from the Alaska Fisheries Science Center conducted acoustic-trawl surveys in the Gulf of Alaska during winter 2025 to estimate the distribution and abundance of walleye pollock (*Gadus chalcogrammus*; hereafter pollock) at several of their main spawning grounds. These pre-spawning pollock surveys covered the Shelikof Strait, Chirikof Shelfbreak, and Marmot Bay regions. The Shelikof Strait area was surveyed from March 17 to March 25, the Chirikof Shelfbreak area was surveyed from March 25 to March 28, and the Marmot Bay area was surveyed from March 28 to March 30.

All activities were conducted aboard the NOAA Ship *Oscar Dyson*, a 64-m stern trawler equipped for fisheries and oceanographic research. Backscatter data were collected at 5 frequencies (18-, 38-, 70-, 120-, and 200-kHz). Midwater and near-bottom acoustic backscatter at 38 kHz was sampled primarily using an LFS1421 trawl. The trawl hauls included a CamTrawl stereo camera attached to the net forward of the codend. The CamTrawl was used to capture stereo images for species identification, fish length measurements, and depth as fishes passed through the net toward the codend. Abundance estimates were based on an analysis where 38 kHz backscatter was attributed to all trawl-captured species and size classes using the biological length-frequency data from the nearest trawl locations. Abundance estimates also included a correction for escapement of fishes and other catch from the survey trawl (i.e., net selectivity).

Shelikof Strait

In the Shelikof Strait region, the average SST measured by the SBE 39 at all haul locations was 4.8°C, which was 1.6°C warmer than the mean SST in 2024 and 1.2°C warmer than the long-term 1989-2024 historical mean. The average temperature at 100 m depth, used as an indicator of thermal conditions at depth, was 5.4°C, which was 1.4°C warmer than the mean temperature at 100 m depth in 2024 and 1.2°C warmer than the long-term 1989-2024 historical mean.

In the Shelikof Strait region, the amount of pollock was estimated to be 903.2 million fish weighing 323,423.8 t. The majority of the pollock population was composed of age-7 and age-5 pollock, which comprised 37.8% and 24.4% of the total pollock biomass, respectively. Even though only ~2.4% of the total biomass, age-1 (9-16 cm FL) pollock comprised approximately 62% of the number of pollock seen in the survey. The 2025 biomass estimate increased 12% since the previous survey estimate in 2024 (288,237.7 t).

Chirikof Shelfbreak

In the Chirikof Shelfbreak region, the average SST measured by the SBE 39 at all haul locations was 5.7°C, which was 1.2°C warmer than the mean SST in 2024 and 1.3°C warmer than the long-term 1989-2024 historical mean. The average temperature at 100 m depth, used as an indicator of thermal conditions at depth, was 5.7°C, which was 0.7°C warmer than the mean temperature at 100 m depth in 2024 and 1°C warmer than the long-term 1989-2024 historical mean.

The amount of pollock was estimated to be 113.3 million fish weighing 95,232.5 t. Pollock were primarily observed at 47 cm FL modal length, consistent with age-4+ pollock. The 2025 biomass estimate decreased 18% since the previous survey estimate in 2024 (116,740.3 t).

Marmot Bay

In the Marmot Bay region, the average SST measured by the SBE 39 at all haul locations was 5.6°C, which was 1.6°C warmer than the mean SST in 2023 and 1.6°C warmer than the long-term 1989-2023 historical mean. The average temperature at 100 m depth, used as an indicator of thermal conditions at depth, was 5.6°C, which was 1.5°C warmer than the mean temperature at 100 m depth in 2023 and 1.4°C warmer than the long-term 1989-2023 historical mean.

The amount of pollock was estimated to be 74.6 million fish weighing 2,256.1 t. Pollock were primarily observed at 13 cm FL modal length, consistent with age-1 pollock. The 2025 biomass estimate decreased 73% since the previous survey estimate in 2023 (8,389.6 t).

Other areas

Acoustic-trawl midwater surveys of the following areas were planned but not conducted in 2025: Shumagin Islands area, Kenai Peninsula-Prince William Sound area in winter, and Gulf of Alaska shelf and slope in summer.

BERING SEA

Summer acoustic vessel of opportunity (AVO) index for midwater Bering Sea walleye pollock

Acoustic backscatter data (Simrad ES60, 38 kHz) were collected aboard two fishing vessels chartered for the AFSC summer 2025 EBS bottom trawl surveys (F/V Alaska Knight, F/V NW Explorer). These Acoustic Vessel of Opportunity (AVO) data were processed according to Lauffenburger et al. (2025) by manually classifying midwater pollock (*Gadus chalcogrammus*) in a systematic 10% subsample (Levine and De Robertis, 2019) of the entire EBS acoustic-trawl (AT) survey footprint. Based on the AVO time series, the 2025 index increased 24% from 2024, was very close to the 2023 estimate (1% less than 2023) and was down 14% from the 2022 AVO index value. The percentage of pollock backscatter east of the Pribilof Islands was 39%, which was the second highest in the time series, only lower than 41% in 2015. The correlation between the AVO index and the biomass in biennial summer EBS acoustic-trawl surveys for years when both have been conducted is strong ($r^2 = 0.9$, n = 8 surveys); no new data was added to this relationship in 2025, as the summer EBS acoustic-trawl survey is normally done in even years.

Literature Cited:

Lauffenburger, N., T. Honkalehto, S. C. Stienessen, and D. Stevenson. 2025. Acoustic Vessel-of-Opportunity (AVO) index for midwater Bering Sea walleye pollock: A reanalysis and new results for 2022-2023. AFSC Processed Rep. 2025-09, 20 p.

Levine, M. and A. De Robertis. 2019. Don't work too hard: Subsampling leads to efficient analysis of large acoustic datasets. 10.1016/j.fishres.2019.105323.

(Contribution by Patrick Ressler)

For more information, contact MACE Program Manager, Sandra Parker-Stetter, sandy.parker-stetter@noaa.gov.

• Research (1 paragraph for each project)

GOA Arrowtooth stock assessment and ecosystem and socioeconomic profile (ESP):

The Gulf of Alaska (GOA) Groundfish Plan Team and the Scientific and Statistical Committee (SSC) approved the bridging exercise brought forward in 2024 for GOA arrowtooth flounder (ATF). This bridging moves the stock assessment from a model using Automatic Differentiation Model Builder (ADMB) software to a single-species CEATTLE (Climate-Enhanced, Age-based model with Temperature-specific Trophic Linkages and Energetics) model run in Template Model Builder (TMB). The GOA Groundfish Plan Team recommended the TMB version of the single species model be used in 2025 and brought forward for the September meeting. The SSC supported the GOA Groundfish Plan Team recommendation and stated that the bridging exercise was sufficient to use for the operational model in 2025. In response to these recommendations, we provided a data review of information through 2024 and results from the 2024 alternative models using the CEATTLE TMB platform at the September 2025 GOA Plan Team meeting (Shotwell et al., 2025). Data updates included updated catch through 2025, new and updated fishery length compositions through 2024, new and updated trawl survey biomass estimates through 2023, new and updated trawl survey age compositions, removal of all non-standardized or low confidence identification for arrowtooth survey biomass estimates and age compositions, removal of all fishery length compositions prior to the Observer Program (pre-1991) and years with fewer than 300 samples, changed fishery length composition bins to match observed length distribution, updated the length-at-age transition matrices with new bin structure and data through 2024, updated the weight-at-age vectors with data through 2024, and updated the aging error matrix with all available age precision information (through 2021).

We provided a bridging of these data improvements with a comparison of total biomass, spawning biomass, recruitment (age-1), and survey biomass trajectories across the sequential addition of new data, cleaning, and updates of the transition and error matrices. Trajectories and terminal estimates were similar across all models with the exception of the beginning of the time series when there was reduction of fishery length compositions that occurred before the Observer Program. Model alternatives proposed were 1) Model 25.0 which is the single-species CEATTLE model with the previously mentioned data improvements and fixed sex-specific natural mortality and 2) Model 25.1 which is Model 25.0 but estimating sex-specific natural mortality instead of fixing it. A research cannibalism-enhanced single-species model was also presented and will be included in the newly developed ecosystem and socioeconomic profile (ESP). A draft full ESP was presented following the data review and included the full suite of indicators identified for this stock, however, some were not updated because data were not available at the time of the report. The ESP also included an externally estimated dynamic structural equation model (DSEM) to explain age-1 GOA ATF recruitment. Indicators were categorized into contextual, predictive and monitoring following the approved structure that was proposed for the crab ESPs in May 2025 and the groundfish ESPs in September 2025. The GOA Groundfish Plan Team and the SSC recommended the two alternative models from this 2025 data review and the ESP with DSEM be presented for the full operational assessment that was scheduled in November 2025. The GOA Groundfish Plan Team and the SSC also recommended that the AFSC expert group on causal models develop guidance for evaluating DSEM fits within the context of interpreting ESPs as well as guidance on a framework for how causal models can be used to inform management decisions. This stock assessment and ESP was delayed due to the government shutdown and was rescheduled for September 2026.

For more information, please contact Kalei Shotwell (kalei.shotwell@noaa.gov) and Grant Adams (grant.adams@noaa.gov).

References:

Shotwell, S.K., Adams, G. and Hanselman, D. 2025. Assessment of the arrowtooth flounder stock in the Gulf of Alaska - Data Review. North Pacific Fishery Management Council, Anchorage, AK. Available from https://meetings.npfmc.org/Meeting/Details/3099.

Ecosystem and Socioeconomic Profile (ESP) Update:

The Ecosystem and Socioeconomic Profile (ESP) addresses the critical need to consistently include additional information on changing environmental, population, and socioeconomic systems within our stock assessment process (Shotwell et al., 2023). The ESP fills the information gap between our large scale ecosystem or economic assessments and our stock-specific assessments and fishery evaluations (SAFEs). ESPs are both a process and a product. Important indicators are evaluated at the stock level using four general steps and then a supplemental report synthesizes the results of the evaluation and communicates drivers of stock dynamics to multiple users. The information in an ESP can feed into several decision pathways of our fisheries science and management system including directly through the stock assessment model and indirectly through research track assessments that inform the risk table. The ESPs and the large-scale ecosystem or economic status reports create a two-pronged system for tracking and communicating ecosystem based fisheries management (EBFM) activities across the nation.

Sixteen ESPs have been recommended by the North Pacific Fishery Management Council (NPFMC) for priority stocks in the Alaska groundfish and crab fishery management plans

(NPFMC, 2024) since they were initiated in 2017. As of September 2025, we have completed eight full ESPs for groundfish and crab stocks (sablefish, eastern Bering Sea (EBS) Pacific cod, Gulf of Alaska (GOA) Pacific cod, and GOA pollock, EBS snow crab, EBS Tanner crab, and Bristol Bay red king crab). We also completed two draft full ESPs for Bering Sea and Aleutian Island (BSAI) atka mackerel and GOA arrowtooth flounder that were reviewed by the Plan Teams in September 2025. Finally, a Greenland turbot ESPs has been initiated in spring 2026 and is scheduled for review in fall 2026 alongside the stock assessment evaluation.

A new categorization of indicators was formally accepted by the NPFMC review bodies in September 2025 to characterize indicators as predictive, contextual, or monitoring. This organization is intended to help with evaluating how to use the indicators for informing different parts of the fishery management decision process. A variety of statistical analyses can be used to determine if an indicator is predictive and these methods can be used on any population process of interest. At this time we have used Bayesian Adaptive Sampling (BAS) and Dynamic Structural Equation Models (DSEM) in the Alaska ESPs to determine which indicators are predictive. Moving forward, we are developing an ESP-DSEM pathway to evaluate indicators within the ESP framework. We are also coordinating with the Alaska representatives of the National Ecosystem Assessment Program (NEAP) to connect developments in the hydrographic ocean models (e.g., MOM6) to create indicators for evaluation in the ESP-DSEM pathway that could ultimately be used for forecasting and incorporated into decisions.

Please contact Kalei Shotwell (kalei.shotwell@noaa.gov) with any questions.

References:

Shotwell, S. K., Blackhart, K., Cunningham, C., Fedewa, E., Hanselman, D., Aydin, K., Doyle, M., Fissel, B., Lynch, P., Ormseth, O., Spencer, P., & Zador, S. (2023). Introducing the Ecosystem and Socioeconomic Profile, a proving ground for next generation stock assessments. Coastal Management, 1-34. https://doi.org/10.1080/08920753.2023.2291858

North Pacific Fishery Management Council. (2024). C1/C2 Social and Economic Information to Inform Groundfish TAC-setting. North Pacific Fishery Management Council, Anchorage, AK. Available from NPFMC eagenda at https://meetings.npfmc.org/CommentReview/DownloadFile?p=b1da33cd-d431-4c19-82fa-abe04ee8cb56.pdf&fileName=C1C2%20Social%20Econ%20Info%20for%20TACsetting.pdf.

Widespread phenological shifts with temperature in Alaska's marine fishes

Changes in the timing of fish spawning and early life stage development can affect the temporal match or mismatch of larvae with production of preferred prey as well as their availability to predators, with potential consequences for recruitment success, food-web dynamics, and fisheries. Using >370,000 observations from over four decades of NOAA AFSC EcoFOCI spring ichthyoplankton surveys in the Gulf of Alaska and Bering Sea, we investigated long-term changes in the phenology of 29 fish species, including commercially important taxa such as Pacific cod, walleye pollock, and Pacific halibut. Larval size on a standardized date (size-at-date) was used as a proxy for larval developmental timing in spring, and reflects a combination of hatch timing (larval age), growth, and mortality. Spatiotemporal generalized linear mixed models were used to account for variable sampling effort in space and time in order to isolate long-term trends and thermal effects on larval size. For a majority of species, interannual variation in mean size-at-date was significantly and positively related to temperature, demonstrating widespread thermal effects on the phenology of fish early life stages. Despite the wide diversity of life history traits exhibited by the 29 species examined, patterns in size-at-date over time were similar across most species within each ecosystem, reflecting the common effect of temperature on phenology. While temperature affected size-at-date, there was little evidence of long-term trends, likely due to the lack of a linear trend in winter-spring temperatures observed in recent decades. We demonstrate a novel analytical method to assess changes in phenology from larval size observations sampled at variable locations and times, and detect phenological shifts that were not necessarily identifiable from larval abundance data alone. Our results suggest that earlier spring phenology due to warming will be a common response among fishes to projected future climate change in high-latitude ecosystems.

For more information, please contact Lauren Rogers (lauren.rogers@noaa.gov).

References:

Rogers, L.A., K.E. Axler, J.S. Bigman. 2026. Widespread phenological shifts with temperature in Alaska's marine fishes. Global Change Biology. 32:e70708. https://doi.org/10.1111/gcb.70708.

Causal models as a scientific framework for next-generation ecosystem and climate-linked stock assessments.

The development of climate-linked fisheries stock assessments is a high priority for the AFSC and NPFMC. Here, we hypothesize that a new statistical framework, dynamic structural equation models (DSEM), can provide an improved framework to implement them because it allows for authors to directly incorporate expert system knowledge and existing data sets into assessments via causal relationships. To test this hypothesis, we built a research model by integrating DSEM into the GOA pollock assessment, and used recruitment as an example by linking a curated set of stock-specific indicators from the Ecosystem and Socioeconomic Profile (ESP) to log-recruitment deviations. Initial results are very promising: it was able to outperform the operational assessment from 2023 (model 23) in several important metrics such as 71% reduction in unexplained recruitment variance, improved marginal AIC (18 units), and better 1-year projections of recruitment. Research is ongoing on this case study, but early indications suggest this DSEM-linked model may be a useful framework for incorporating climate and ecosystem changes into stock assessments in Alaska. We anticipate proposing this model for operational use for review by the PT and SSC in 2025, and to explore applying it to other population processes of pollock, and processes in other AFSC stocks in the coming years.

For more information, please contact Cole Monnahan (cole.monnahan@noaa.gov).

Reference:

Champagnat, J., CC. Monnahan, J.Y. Sullivan, J.T. Thorson, S.K. Shotwell, L. Rogers, A.E. Punt (In revision). Causal models as a scientific framework for next-generation ecosystem and climate-linked stock assessments. Fish and Fisheries. A preprint of this work is available online here.

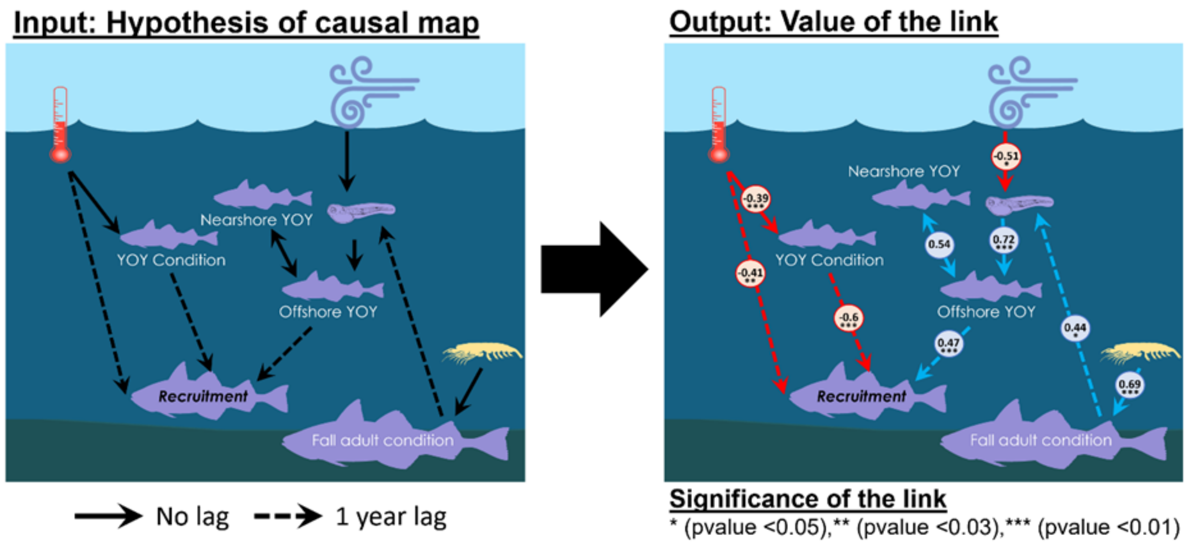

Figure 1. The assumed causal map (left) and the estimated effect sizes and their statistical significance using standard Wald tests. Recruitment represents deviations from mean recruitment in log space.

Machine learning tools for Electronic Monitoring in Alaska Groundfish Fisheries

Groundfish vessels in Alaska have been moving towards using electronic monitoring (EM) in lieu of on-board observers, creating challenges due to changing data-streams as well as providing opportunities for research and improvements to the data streams. The development of machine learning (ML) tools can offset some of the challenges of the changing data streams and leverage the EM platforms for expanded analytics or new data types. The goals of this project are to develop production environment tools to review fixed-gear longline EM videos, create critical metadata for feedback to the EM programs, provide outputs for stock assessments and eventually integrate the ML video review data into the total catch accounting workflow. Staff at ABL have been working with the AFSC Fishery Monitoring and Assessment Division, the NMFS Alaska Regional Office, Alaska Pacific University, and the Pacific States Marine Fisheries Commission on this project. The research and development phase wrapped up in 2024, and 2025 focused on moving this project into a production environment. The production environment is built within PSMFC and all solving data sharing and file transfer challenges. Downstream outputs have been built and preliminarily tested, but the models and environment still require further testing and refinement. Development of the production environment paused due to a lapse in funding. The research team leveraged resources at APU to continue building the training data library and a number of undergraduate students have been fine tuning rapid annotation while testing metadata questions for their Capstone projects. The results of this effort inform project development and planning for when funding begins in September of 2026.

For more information, please contact Cindy Tribuzio (cindy.tribuzio@noaa.gov)

Github links
[Detection-Tracking-for-NOAA]
[NOAA-UDA]
[Hierarchical-Classification]

Shark_data_managment

Groundfish Tag Program - ABL

The ABL MESA Tag Program continued the processing of groundfish tag recoveries and administration of the tag reward program and Groundfish Tag Database during 2025. While sablefish is the primary species tagged, tags from shortspine thornyheads (SST), Greenland turbot, Pacific sleeper sharks, lingcod, spiny dogfish, Pacific cod, Pacific ocean perch, and rougheye rockfish are also maintained in the database. Total tag recoveries for the year were ~284 sablefish, 1 SST, and 9 Pacific cod. Of these recovered sablefish tags, approximately 4 percent were recovered by trawl gear, 46% by pot gear, 32% by hook and line, and 1% on sport gear. Eleven percent of the recovered sablefish tags in 2025 were at liberty for over 10 years. About 33% of the total 2025 recoveries were recovered within 100 nautical miles (nm; great circle distance) from their release location, 38% within 100 – 500 nm, 14% within 500 – 1,000 nm, and 16% over 1,000 nm from their release location. The tag at liberty the longest was for approximately 36 years, and the greatest distance traveled of a 2025 recovered sablefish tag was 1,649 nautical miles from a fish tagged in the NE Aleutian Islands and recovered off the Washington Coast approximately 5 years later.

Releases in 2025 on the AFSC groundfish longline survey totaled 3,998 adult sablefish and 197 shortspine thornyhead.

Juvenile (age-1) sablefish tagging studies have been conducted by the Auke Bay Laboratories in Alaska since 1984 and were continued in 2025. Thirteen juvenile sablefish were tagged in St. John Baptist Bay near Sitka, AK during three days (August 27, 28, and 29) of sampling. The average length of fish was 360 mm.

For more information, please contact Katy Echave at katy.echave@noaa.gov.

Results from an Ongoing, Research-Oriented Sablefish Management Strategy Evaluation

Sablefish in Alaska federal waters are assessed and managed as a single, panmictic population. As with other components of sablefish along the Pacific coast, cyclic and spasmodic recruitment patterns result in extreme population swings. During periods of high recruitment, as is currently being experienced in Alaska, the influx of small, lower value sablefish can lead to market saturation and poor economic conditions (Goethel et al., 2025). Moreover, the long-lived nature of sablefish and observed age truncation in the Alaska population have raised concerns about whether the existing North Pacific Fisheries Management Council's harvest control rule (HCR), which is based on $B_{40\%}$, provides robust harvest recommendations that meet the objectives of fishery participants while also ensuring sustainability. Thus, a research-oriented management strategy evaluation (MSE) tool for sablefish was developed and has been refined through stakeholder input during two industry meetings over the last two years. MSE is a simulation modeling tool for analyzing and comparing management options, including tradeoffs in conservation and fishery performance metrics, before they are implemented for management advice.

The Alaska sablefish MSE was constructed as a single region operating model (OM) and a single region assessment model, which matched the spatial and population structure of the operational stock assessment. The performance of the NPFMC $B_{40\%}$ HCR was compared with various alternate HCRs (e.g., including quota stability constraints and harvest caps). Management options were compared across a variety of future climate-recruitment scenarios to ensure that a given HCR was robust to uncertain and varying future dynamics. Basic economic performance metrics (e.g., relative gross revenue) were integrated to ensure HCRs could achieve relative economic metrics that reflect stakeholder concerns related to market saturation and declining prices as catch has rapidly increased in recent years, but further work is needed to advance the economic sub-model in the future. Results indicated that the NPFMC $B_{40\%}$ HCR was robust to extreme recruitment variability, and that adoption of alternative (e.g., higher $B_{50\%}$) reference point levels would provide minimal improvements (Zahner et al., 2025). However, adoption of maximum annual catch levels (e.g., a harvest cap) was shown to improve average annual economic performance, catch stability, spawning stock biomass, and population age structure.

A spatially explicit version of the MSE framework, which was informed by the outputs of a spatial stock assessment model for sablefish (Cheng et al., 2025), is currently in the final stages of development. The spatial OM explicitly models the five sablefish management regions in Alaska with interactions across units due to spatially heterogeneous recruitment, movement, management, and fishery dynamics, whereas the assessment model retains a single region structure matching the operational assessment. In addition to alternative future recruitment conditions, the spatial MSE tool compares HCR performance under alternative hypotheses regarding future sablefish movement patterns (e.g., status quo and a poleward redistribution scenario). The spatial version of the sablefish MSE tool was developed to explicitly address stakeholder feedback that the single region model was unlikely to adequately account for spatially varying differences in management (e.g., trawl vs. fixed gear quota apportionment), fish size, and harvest. Preliminary results support the findings of the single region MSE, indicating that the NPFMC $B_{40\%}$ HCR is robust to future variability in both recruitment and movement, though the adoption of harvest caps could still improve performance across a number of metrics. Additional analyses with the spatial MSE tool are ongoing and will be presented to stakeholders in 2026.

For more information, please contact Daniel Goethel (dan.goethel@noaa.gov).

Alaska Sablefish Spatial Modeling and Stock Assessment Updates

Alaska sablefish are assessed using a single-region, panmictic stock assessment model, despite complex spatial heterogeneity in population dynamics, management, and fishing activity. Leveraging a long-term tagging dataset (~400,00 releases, ~30,000 recaptures), a research-oriented spatial stock assessment model was developed using the Stochastic Population over Regional Components (SPoRC; https://github.com/chengmatt/SPoRC) model. Results of the five-region spatial model demonstrated strong ontogenetic movement patterns and important regional differences in recruitment. For instance, large age-2 recruitment events often occur in the Bering Sea, Aleutian Islands, and Central Gulf of Alaska, whereas the Central and Eastern Gulf of Alaska maintain the highest spawning stock biomass. The spatial disconnect between regions of high spawning stock biomass and subsequent recruitment likely reflects pre-recruitment dispersal that is intertwined with estimated juvenile and adult ontogenetic movement patterns. Movement estimates from the spatial model closely matched historical migration hypotheses, whereby younger fish tend to reside in more western regions and move eastward as they mature. Although comparisons with the operational single-region model suggest that both approaches yield broadly similar conclusions regarding overall stock status and management advice, the single-region model does not capture these management-relevant regional population dynamics. The spatial model will serve as a companion to the single-region operational model, with periodic updates (e.g., every 2-3 years), which can provide important management context and inference on regional processes.

In Alaska, sablefish are assessed and managed on an annual basis, but no assessment was conducted in 2025 due to the US government shutdown in October. The 2024 sablefish assessment (the last full assessment) indicated that sablefish in Alaska continue to demonstrate above average recruitment, with the 2016 year class being the largest ever observed. Due to this extended period of elevated recruitment, the population biomass has rebounded quickly to levels near those observed in the 1960s and 1970s. Moreover, spawning stock biomass has rebounded from time series lows in the late 2010s to be well above the $B_{40\%}$ target reference point in 2024. Ongoing improvements to the operational assessment include porting the model into the R-TMB based SPoRC assessment package in 2025. To implicitly address underlying spatial dynamics and better handle longline survey design changes (i.e., large-scale changes to the timing and extent of the survey), a fleets-as-areas model is also being explored for 2026. The sablefish assessment is undergoing an external peer review in 2026 by the Center for Independent Experts (CIE), and the typical annual assessment, review, and harvest specification process is expected to occur from September through December.

For more information, please contact Daniel Goethel (dan.goethel@noaa.gov).

Pacific Cod Satellite and Acoustic Tagging studies

Conventional tagging studies (e.g., Shimada and Kimura 1994) have found that Pacific cod migrate both within and between the EBS, AI, and GOA outside of their winter (January – April) spawning season. In 2021, a cooperative tagging study between the Alaska Fisheries Science Center (AFSC) and the Aleutians East Borough (AEB) was initiated to examine the seasonal movements of Pacific cod captured in the western GOA during the winter spawning season using pop-up satellite tags. Pathways between release and pop-up locations can be reconstructed from archived depth, temperature, and light data recorded by the tags using a hidden Markov model. Satellite tags were released on Pacific cod in the western GOA in March 2021 and April 2022; cod were tagged in summer foraging locations in GOA and EBS in April 2022 as well. In 2023, 2024 and 2025, the study was expanded to the central GOA to improve understanding of seasonal migration patterns for western and central GOA fish. During the expanded winter study, satellite tags were deployed at 10 release locations ranging from Sanak Island in the west to the entrance of Prince William Sound in the east. Winter release tags were programmed to pop up after either 6 months (80% of tags) or 15 months (20% of tags). In 2023 and 2024, satellite tags were also released during the summer in the GOA and the EBS to better understand annual movement patterns and movement from summer foraging to winter spawning areas. To date, 373 satellite tags have been deployed in the GOA from 2021 to 2024 (Figure 2.2A). Pop-up locations for satellite tags deployed in the GOA to date (Figure 2.2B) indicate that seasonal connectivity exists between the western GOA (Shumagin Islands and westward), EBS, northern Bering Sea, western Bering Sea (Russia), and Chukchi Sea. Approximately 50% of cod tagged in the western GOA during the winter moved to summer foraging locations in the Bering Sea across all four years of tagging. However, fish tagged in the central GOA have not been observed to move into the EBS or AI. While some fish tagged within the central GOA displayed considerable movement, they largely remained within the central GOA statistical areas (NMFS areas 620 and 630). Partial migration (i.e., only part of the population undertakes seasonal migration) was evident in reconstructed pathways, as some fish remained in the vicinity of their release location year-round, while others undertook large movements between statistical areas. Analyses to quantify and characterize movement between statistical areas within the GOA and between the GOA and the Bering Sea are on-going.

In 2025 the satellite tagging team was awarded an NPRB grant for a study titled: “Pilot study for an acoustic telemetry array to monitor migration of Pacific cod through Unimak Pass”. As detailed above, recent satellite tagging results of Pacific cod in the western GOA suggests that approximately 50% of tagged Pacific cod move from spawning grounds in the western GOA to summer foraging areas in the Bering Sea. This seasonal movement between management areas is a concern for stock delineation and stock assessment. Currently, management strategy evaluations are underway to determine the most appropriate course of action to incorporate this movement information into management of the fishery in the Bering Sea and the GOA. Satellite telemetry studies have provided detailed information about post-spawning migration pathways. However, challenges such as low sample sizes due to satellite tag costs and difficulty detecting return migrations to the GOA in winter suggest that alternative methods to quantify movement between the Bering Sea and the GOA would be valuable. An acoustic telemetry array at Unimak Pass would provide information on connectivity at time scales greater than one year and lower-cost tags would allow larger sample sizes. Thus, it would improve the ability to estimate the proportion of Pacific cod that move seasonally between the GOA and Bering Sea management areas. The funded pilot study will estimate the in situ detection range of acoustic receivers in the area along with the effect of tidal currents, vessel noise, and oceanographic conditions. The results of this study are necessary for designing a larger scale acoustic array that could detect Pacific cod movement between the GOA and Bering Sea. Establishing a long-term acoustic array in Unimak Pass would also facilitate monitoring of transregional migration for many other ecologically and commercially valuable migratory species such as salmon, sharks, pollock and sablefish.

In October 2025 six moored acoustic receivers and 30 stationary acoustic transmitters were deployed in Unimak Pass. Additionally, 20 Pacific cod were tagged with acoustic transmitters, and 10 of those 20 were also tagged with PSAT. A research trip is scheduled for May 2026 to retrieve the acoustic receivers.

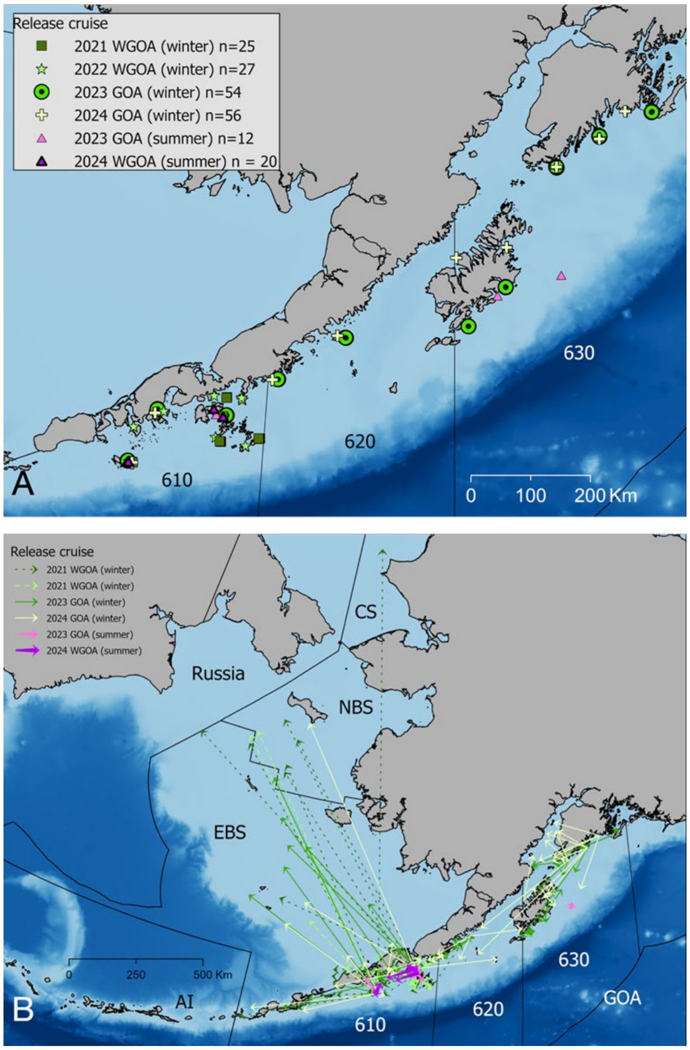

Figure 2.2 Pacific cod satellite tag A) release locations in Gulf of Alaska (GOA) management areas 610, 620, and 630 from 2021 – 2024 and B) pop-up locations from GOA satellite tag releases by region (AI = Aleutian Islands, EBS = Eastern Bering Sea, NBS = Northern Bering Sea, CS = Chukchi Sea).

For more information please contact Bianca Prohaska (bianca.prohaska@noaa.gov) and Susanne McDermott (susanne.mcdermott@noaa.gov)

Modernizing Fisheries-Independent groundfish surveys in Alaska

Fisheries-independent groundfish surveys (hereafter surveys) support management of more than 50 fish stocks in Alaska. The primary role of these surveys is to provide consistent time series data for use in stock and ecosystem assessments. To assure this consistency, surveys generally focus on standardization of survey methodology. However, standardization is becoming more difficult because of changes in fishing and monitoring technologies, regulations, and in the environment. For example, old trawls are becoming obsolete, new sampling tools are becoming available (e.g., new fishing gear, cameras, acoustics, and eDNA), and fish stock distributions are changing. All of these factors combine to create a need to modernize and adapt surveys to new circumstances while assuring consistency of survey time-series and data products. This is a considerable challenge that can only be addressed with a broad spectrum of actions. The planned actions for Alaska surveys include revising sampling designs, designing and testing new survey trawls, modernizing survey protocols, establishing survey calibration factors, and planning for transition from old to new survey methods. In 2025, we implemented a redesigned Gulf of Alaska survey that will be more efficient and more robust to shifting survey effort and that maintains continuity in the survey time-series. In the Bering Sea, we are currently developing a new sampling design that will increase sampling efficiency and merge 3 historical surveys (eastern Bering Sea shelf, Bering Sea Slope, and Northern Bering Sea) into a single survey. To counter obsolescence in our trawling technology, we are working alongside stakeholders to modernize our survey trawls and fishing methods while preparing for future surveys with the new gear by developing survey calibration factors. The end goal of these efforts is to create more efficient and robust sampling designs and sampling techniques so that our annual surveys can adapt to the changing environment, technology, and data needs. In January of 2026, a third ICES workshop on Unavoidable Survey Effort Reduction (WKUSER3) was held in Copenhagen, Denmark and a second round of flume tank testing to identify the new prototype trawl design was completed.

Contributor: Stan Kotwicki, Ned Laman

For more information contact Stan Kotwicki, (Stan.kotwicki@noaa.gov).

• Stock Assessments and Management

Due to representative constraints, we are directing the reader to the North Pacific Management Council (NPFMC) stock assessment reports available on the NPFMC website, including hyperlinks to detailed stock assessments and management documents. No groundfish stocks were overfished nor experiencing overfishing. Due to the government shutdown in October and November of 2025, no annual stock assessments were produced for the 2025 calendar year.

For more information contact Melissa Haltuch (melissa.haltuch@noaa.gov)

• Reserves (1 – 3 paragraphs)

Not applicable

• Data Management (1- 3 paragraphs)

No major changes were reported.

● Upcoming Work, Emerging Needs, and Challenges (3 paragraphs)

Upcoming Work

- Pacific cod Tagging studies are focusing on a new telemetry study with a pilot project completed in Seguam pass and integrating results of previous years into a movement estimation for stock assessment purposes.
- Pacific Cod researchers are undertaking genetic and modeling research to investigate spatio-temporal dynamics that may impact assessment methods and recommendations.
- Due to high staff turnover in the age and growth program, many stocks are using less age-read data than in previous years. The effort to implement FT-NIRS to automate age reading recently underwent a CIE review and scientists are hopeful this will streamline data generation.
- Data limited working group: exploring alternative approaches to the typical Tier 6 catch scalar assessment methods. The WG is planning to present case studies for two stocks to the 2025 September Plan Team and October SSC.
- Due to the government shutdown in October of 2025, no stock assessments were produced for 2025.
- Surveys: Survey modernization for the RACE groundfish survey are underway. ICES Workshop on Unavoidable Survey Effort Reduction (WKUSER3) was held in Copenhagen Jan 12-16, 2026. Flume tank testing in Newfgoundland was completed Jan 2026.
- Acoustic-trawl midwater surveys of the following areas were planned but not conducted in 2025: Shumagin Islands area, Kenai Peninsula-Prince William Sound area, and Gulf of Alaska shelf and slope.

Challenges:

- Uncertainty in staffing and budgets to support research activities.

● Other Publications (list)

Here are some recent publications:

Chamberlin, D. W., Siders, Z. A., Potts, J. C., Rogers, W. D., Taylor, M. A., & Patterson, W. F. 2025. Bayesian estimation of von Bertalanffy growth parameters for gray triggerfish, Balistes capriscus, incorporating multiple readers and ageing structures. Canadian Journal of Fisheries and Aquatic Sciences, 82, 1-12.

Chinn, S. M., Mahoney, P. J., Jaime, E., and Melin, S. R. 2025. Abundance and distribution of northern elephant seals in California. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-504, 24 p.

Conn, P. B. 2025. Simulation-based inference for close-kin mark-recapture: Implications for small populations and nonrandom mating. Environmetrics, 36(8), e70049. 1

Correa, G. M., Monnahan, C. C., Miller, T. J., and Sullivan, J. Y. 2025. Performance of age-only state-space assessment models under diverse somatic growth scenarios. Canadian Journal of Fisheries and Aquatic Sciences, 82, 1-17.

DeFilippo, L. B., Larson, W. A., Barry, P. D., Cunningham, C. J., Langan, J. A., Garcia, S., Howard, K. G., Ianelli, J. N., and Stram, D. L. 2025. Drivers and dynamics of salmon bycatch in the eastern Bering Sea pollock fishery. Fish and Fisheries, 26(6), 1107-1121.

Ferguson, M. C., Conn, P. B., and Thorson, J. T. 2025. Spatially explicit models of density improve estimates of Eastern Bering Sea beluga (Delphinapterus leucas) abundance and distribution from line-transect surveys. PeerJ 13:e20077

Goldstein, E. D., Matta, M. E., Waters, C. D., Fulton-Bennett, H. K., Hsieh, B. C., Kastelle, C. R., Vollenweider, J. J., Sliwinski, J. T., and Helser, T. E. 2025. Advancing fish early life-history research: daily age determination of walleye pollock (Gadus chalcogrammus) with Fourier transform–near-infrared spectroscopy. Marine & Freshwater Research, 76(10), MF25053.

Grüss, A., Allyn, A. J., Thorson, J. T., Mills, K. E., Yasumiishi, E., Pinkerton, M. H., Parsons, D. M., and Sibanda, N. 2025. Probabilistic forecasts of fish abundances With spatio-temporal models to support fisheries management. Fish and Fisheries, 26(6), 1180-1197.

Kearney, K. A., Cheng, W., and Hermann, A. J. 2025. A biogeochemical model intercomparison for the eastern Bering Sea shelf. Journal of Geophysical Research: Oceans, 130(12), e2025JC022634.

Kwan, G. T., Walsh, K. A., Thompson, A. R., Ben-Aderet, N. J., Fennie, H. W., Semmens, B. X., & Swalethorp, R. 2025. Trophic level influences larval shortbelly rockfish development. Marine and Coastal Fisheries, 16(6). https://doi.org/10.1002/mcf2.103191

Ledger, K. J., Everett, M., Nichols, K. M., Larson, W. A., and Baetscher, D. S. 2025. Development and validation of an eDNA primer set for rockfishes in the Alaska Current provides a new tool for fisheries management. Environmental DNA, 7(4), e70176.

Lemagie, E., Farley, E., Langan, J. A., amd Stabeno, P. J. 2025. Mapping suitable thermal migration corridors for western Alaska chum salmon in the North Pacific. Deep Sea Research Part I: Oceanographic Research Papers, 222, 104531.

Peñaherrera-Palma, C., McClintock, B. T., Dudgeon, C. L., Frusher, S., Hearn, A. R., Hobday, A. J., Espinoza, E., and Semmens, J. 2025. Short-term fluctuations in hammerhead shark numbers at an aggregation site based on visual census and telemetry data. Environmental Biology of Fishes, 108(11), 1873-1890.

Porter, S. M. 2025. Condition of larval walleye pollock (Gadus chalcogrammus) in the southeastern Bering Sea in relation to their environment and size. Fishery Bulletin, U.S. 123(4): 207-220.

Punt, A. E., Dalton, M. G., Long, W. C., Cheng, W., Hermann, A. J., and Holsman, K. K. 2025. Identifying and reducing climate uncertainty in fisheries management reference points. Fisheries Research, 291, 107523.

Singh, W., Trochta, J. T., Murphy, H. M., McGowan, D. W., Adamack, A. T., Arimitsu, M. L., Barðarson, B., Björnsson, H., Bogstad, B., Boudreau, M., Chambers, C., Gjøsæter, H., Jansen, T., Jónsson, S. Þ., Kvamsdal, S., Lewis, R. S., Mikkelsen, N., Pedersen, T., Olafsdottir, A. H.,…Subbey, S. 2025. Small fish, big implications: considerations for an ecosystem approach to capelin fisheries management. Reviews in Fish Biology and Fisheries, 35(4), 1899-1934.

Slesinger, E., Thuesen, E. V., and Hurst, T. P. 2025. Ontogenetic and environmental responses in metabolic enzyme activity of Pacific Arctic larval gadids. Conservation Physiology, 13(1).

Spencer, L. H., Slesinger, E., Spies, I., Laurel, B. J., and Hurst, T. P. 2025. Molecular indicators of warming and other climate stressors in larval Pacific cod. Canadian Journal of Fisheries and Aquatic Sciences, Early Online.

Stevenson, D. E., Kotwicki, S., Norcross, B., and Majewski, A. 2025. Implications of gear selection for monitoring benthic fish communities in the Beaufort Sea. Deep Sea Research Part II: Topical Studies in Oceanography, 224, 105561.

Stone, S. E., Wise, S., Harte, M., Holsman, K., and Ciannelli, L. 2025. Socioeconomic risk of coastal Alaskan fishing communities to climate-driven changes in Pacific cod distributions. ICES Journal of Marine Science, 82(7).

Szymkowiak, M., and Steinkruger, A. 2025. Gulf of Alaska fishermen trapped in a maladaptive system under climate change. ICES Journal of Marine Science, 82(6).

Tenbrink, T. T. 2025. Reproductive biology and age at maturity of shortspine thornyhead (Sebastolobus alascanus) in Alaska. Fishery Bulletin, U.S. 123(4): 235-250.

Thorson, J. T., Aydin, K. Y., Cheng, M. L. H., Dias, B. S., Kimmel, D. G., and Kristensen, K. 2025. Bottom-up interactions in state-space age-structured models using mass-balance dynamics. Fish and Fisheries, 26(6), 1048-1064.

Warlick, A. J., Fadely, B. S., Mahoney, P., Melin, S. R., Gelatt, T., Raum-Suryan, K., and Converse, S. J. 2025. Evaluating mark–resight survey design performance using simulation: A case study of endangered Steller sea lions. Ecosphere, 16(6), e70269.

• Agency Contact List (1-2 pages)

AFSC organization chart is located HERE