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The 2026 Longline Survey of the Bering Sea and Aleutian Islands on the FV Alaskan Leader: Cruise Report AL-26-01

K. Siwicke and P. Malecha

October 2026

U.S. DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
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Alaska Fisheries Science Center

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ABSTRACT

In 2026, the Alaska Fisheries Science Center completed a bottom longline survey of the Bering Sea and Aleutian Islands upper continental slope and shelf break. This survey provided stock assessment information related to sablefish (*Anoplopoma fimbria*) and several other groundfish species. The primary objectives of the survey were to determine 1) relative abundance of groundfish species through a standardized longline survey, 2) age composition of sablefish through otolith collection, and 3) movement patterns of selected groundfish species through a tag and recapture program. This report provides a summary of raw data and details of operations from the 2026 longline survey as well as trends observed on the survey over the last 20 years. Changes to the survey occurred in 2025 following a cancelled survey in 2024, and this report documents the first year that the domestic survey sampled the Bering Sea and the Aleutian Islands in the same year and did not sample the Gulf of Alaska.

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INTRODUCTION

On 3 July 2026, the Alaska Fisheries Science Center (AFSC) completed a bottom longline survey of Alaska sablefish (*Anoplopoma fimbria*) and other groundfish resources of the upper continental slope and shelf break (Fig. 1). This survey was designed to continue the time series (1979–1994) of the Gulf of Alaska (GOA) portion of the Japan-U.S. cooperative longline survey that was initiated in 1978 (the first year was experimental) and discontinued after 1994 (Sigler and Zenger 1989, Kimura and Zenger 1997). The National Marine Fisheries Service (NMFS) surveyed the GOA annually from 1988 to 2023, following a preliminary survey conducted in 1987 (Kimura and Zenger 1997). Beginning in 1996, the eastern and central Aleutian Islands (AI) were surveyed in even years and the eastern Bering Sea (BS) was surveyed in odd years (Rutecki et al. 2016). Since the survey's inception, the government contracted a freezer longliner on a zero-dollar cost-recovery basis, whereby the vessel contractor retained survey catches and sold them to cover their operating costs. Due to an anticipated financial loss to the vessel contractor related to declining sablefish prices, the survey was not conducted in 2024. A new contract structure was devised that shifted market risk from the contractor to the government and included a modified sampling plan (see Appendix A for more details). The 2026 longline survey sampled all stations used in index calculations in the BS and AI. The purpose of this document is to provide detailed survey operations, summarize raw survey data, and compare historical and current observations. Data generated from the longline survey are used for calculating relative population numbers and weights and used for assessing stock status of Alaska groundfish. Stock Assessment and Fishery Evaluation (SAFE) reports and historical catch data by management area and station for a subset of species are available online (SAFEs and interactive map).

METHODS

Survey Objectives

1. Collect relative abundance and size composition data of the most commercially important groundfish species: sablefish, shortspine thornyhead (*Sebastolobus alascanus*), Greenland turbot (*Reinhardtius hippoglossoides*), Pacific cod (*Gadus macrocephalus*), rougheye

rockfish (*Sebastes aleutianus*), blackspotted rockfish (*S. melanostictus*), and shortraker rockfish (*S. borealis*).

2. Collect relative abundance and size composition data of other groundfish species caught during the survey including arrowtooth flounder (*Atheresthes stomias*), Kamchatka flounder (*A. evermanni*), grenadiers (Macrouridae), skates (Rajidae), and spiny dogfish (*Squalus acanthias*).
3. Collect sablefish otoliths to study the age composition of the population.
4. Tag and release sablefish, shortspine thornyhead, and Greenland turbot for studying movement patterns.
5. Conduct special projects related to groundfish biology, stock assessment, and marine mammal interactions.

Vessel and Gear

Survey operations in 2026 were conducted using the FV *Alaskan Leader*, a chartered U.S. freezer longline vessel. The 46-m (150-ft) long vessel carried standard longline hauling gear and was equipped with radios, radars, GPS receivers, a processing line, plate freezers, and refrigerated holds. Vessel personnel generally consisted of a captain, mate, two engineers, cook, two scientists, two contract biologists, six deckhands, and five processors.

Gear configuration was standardized and has been consistent for all survey years starting in 1988 (Sigler and Zenger 1989). Each longline set consisted of a flag and buoy array at each end followed sequentially by varying lengths by depth of 9.5-mm diameter nylon buoy line, a 92-m (50-fm) section of 9.5-mm (0.375-in) polypropylene floating line, a 16-kg (35-lb) piece of chain (to dampen the effect of wave surge on the buoy line), 92 m (50 fm) of 9.5-mm nylon line, a 27-kg (60-lb) halibut anchor, and 366 m (200 fm) of 9.5-mm (0.375-in) nylon running line. Units of gear (hereafter referred to as skates) were 100-m (55-fm) long and contained 45 size 13/0 kirbed circle hooks. Hooks were attached to 38-cm (15-in) gangions that were secured to beckets tied into the groundline at 2-m (6.5-ft) intervals. Five meters (16 ft) of groundline were left bare at each skate end. Gangions were constructed of medium lay #60 thread nylon, becket material was medium lay #72 thread nylon, and groundline was medium lay 9.5-mm (0.375-in) diameter nylon. The groundline was weighted with 3.2-kg (7-lb) lead balls between each skate.

Hooks were hand baited with chopped squid (*Illex* sp.) at a rate of about 5.7 kg (12.5 lb) per 100 hooks. Squid eyes and tentacles were not used for bait. Additional details on AFSC longline survey gear are available online (survey protocols).

Operations

The longline survey has gone through changes throughout its history (Rutecki et al. 2016). From 1988 to 1990 the survey period was from 26 June to 12 September. The survey periods in 1991 through 1994 were about 18 days later than in 1988 through 1990. The 1991–1994 surveys were delayed to avoid the commercial trawl fishery that started 45 days later than in 1988 through 1990. Starting in 1995, the survey period was moved back to near the 1988–1990 period because of the extensive increase in length of the fishing season resulting from the implementation of the Individual Fishing Quota (IFQ) system in the sablefish and Pacific halibut (*Hippoglossus stenolepis*) longline fisheries. Beginning in 1998, the order in which the stations were sampled was changed to avoid conflict with an early July rockfish fishery in the CGOA. Instead of continuing to sample in an easterly direction from Sand Point to Dixon Entrance, the survey vessel transited to Dixon Entrance at the end of Leg 2 during early July and resumed sampling in a westerly direction going from Dixon Entrance to Sand Point. Station sampling order in the GOA remained the same from 1998 to 2023. From 2009 to 2023, the survey starting and ending dates were several days earlier than previous years. This was done to accommodate the vessel's schedule and to finish the survey prior to the start of the fall Pacific cod season. The 2024 longline survey was cancelled and beginning in 2025 several survey sampling modifications have been implemented that differ from previous operations (see Appendix A).

The 2026 charter was scheduled for June 1 through July 3, starting and ending in Dutch Harbor, Alaska. The charter period was divided into two legs (Table 1). The regions sampled during each leg were as follows: Leg 1, the Bering Sea and Leg 2, one station in the Bering Sea and the entire Aleutian Islands (Table 2, Fig. 1).

The gear was set from shallow to deep and was retrieved in the same order, except on occasions when the groundline parted or sea conditions dictated that it be pulled from the opposite direction. Setting began at about 0630 hours Alaska Daylight Time. Retrieval began at about 0930 hours (i.e., minimum soak time of 3 hours) and was generally completed by about

1730 hours. At each station along the upper continental slope, two baited groundlines were laid end-to-end; the total groundline set each day was 18 km (9.7 nautical miles [nmi]) long and contained up to 180 skates and 8,100 hooks (note that 160 skates [7,200 hooks] was the amount of gear fished in a typical day prior to 2020). Specific information regarding longline survey protocols is available online (survey protocols).

Data Collection

Catch data were recorded on hand-held ruggedized computers. During gear retrieval a biologist stationed at the vessel's rail recorded the species of each hooked fish and the condition of each unoccupied hook (baited or ineffective [i.e., absent, straightened, broken, or tangled]). Time of day was recorded as each hook was tabulated, and depth was entered at the beginning of the first, last, and every fifth skate, in addition to when crossing into a new depth stratum (0–100 m, 101–200 m, 201–300 m, 301–400 m, 401–600 m, 601–800 m, 801–1,000 m, and 1,001–1,200 m).

Length data were collected with a barcode-configured measuring board and barcode readers connected to ruggedized computers. Length was recorded by depth stratum for sablefish, Pacific cod, grenadiers, arrowtooth flounder, Kamchatka flounder, Greenland turbot, shortspine thornyhead, spiny dogfish, rougheye rockfish, blackspotted rockfish, shortraker rockfish, and multiple other rockfish species. Length and catch data for rougheye and blackspotted rockfish were combined, as these fish were not distinguished by species. Lengths of sablefish, giant grenadier (*Albatrossia pectoralis*), spiny dogfish, and Pacific cod were recorded by sex.

Sablefish, shortspine thornyhead, and Greenland turbot were randomly tagged at a rate of 4.4% of the gear by selecting these species caught on skates 10, 30, 50, and 70 of each set. Catch and length frequency data were transferred to a computer for quality control and storage in a database before being backed up on an external drive. As in previous surveys, the charter vessel was allowed to retain species of value (except prohibited species such as salmon, halibut, and crab) once the scientific data were recorded.

Sablefish otoliths were randomly collected throughout the survey to be used in determining age composition for the stock assessment. When a sablefish was caught on the first hook of a skate (~2.2%) its length, weight, and sex were determined. Otoliths were extracted and

stored in a glycerin-thymol solution. A random subsample is selected by the sablefish stock assessment scientist for ageing by the AFSC Age and Growth Program.

Trend Analysis

In an effort to understand annual longline survey data in the context of longer-term trends, several metrics are presented as a time series for up to 20 years. The proportion of skates that had killer whale depredation, sperm whale presence, and sperm whale depredation are shown for stations that are included in abundance indices. Subsurface temperature has been recorded on the AFSC longline survey since 2005, and a detailed analysis shows that there has been slight warming across all regions in recent years (Siwicke 2022). This information was updated with 2026 temperature data. To detect changes in sablefish catch rates, we used catch per unit effort (CPUE), or the number of sablefish caught divided by the number of effective hooks per skate. The mean and standard deviation were calculated across all depths within each region for stations that are included in abundance index calculations. To detect changes in the size of sablefish over time, the mean and standard deviation of male and female fork length are also calculated across all depths within each region for stations that are included in abundance index calculations. Sablefish data were raw observations and not scaled by the depth-stratified area sizes as is done for data used in stock assessments.

Trends in catch data, including the return of baited or empty hooks, at the regional and depth strata level were used to help understand how various species catches may interact with one another through time. We included stations that are used for abundance index calculations, skates that had 5 or fewer ineffective hooks, and skates that did not have killer whale depredation. For each region and depth strata combination, the mean and standard deviation of annual CPUE (i.e., annual proportion of effective hooks) are determined for sablefish, Pacific cod, Pacific halibut, rougheye/blackspotted/shortraker rockfish, shortspine thornyhead, giant grenadier, hooks with bait, empty hooks, and all other species combined into an "Other spp." category. These are then standardized in each region-depth strata combination as follows:

$$I_{i,y} = \frac{C_{i,y} - \mu_i}{\sigma_i},$$

where $C_{i,y}$ is the CPUE of species i in year y, μ_i is the 20-year mean CPUE of species i, σ_i is the 20-year CPUE standard deviation of species i, and $I_{i,y}$ is the standardized CPUE for species i in year y. The standardized data will each have a mean of 0 and a standard deviation of 1. If mean CPUE for a species in a region-depth stratum combination was less than 0.025 (i.e., < 2.5% catch rate), standardized CPUE was not included on the subsequent plot. The "Other spp." category was also not shown on the standardized CPUE plot as the numerous species in this group made it uninformative.

RESULTS AND DISCUSSION

In 2026, a total of 16 stations along the upper continental slope of the BS and 14 stations in the AI were sampled at a rate of one station per day (Fig. 1). Surveyed depths ranged from approximately 150 to 1,000 m, although at some stations depths less than 150 m or more than 1,000 m were sampled. Stations spanned multiple management areas and habitat types, and all were used in abundance index calculations for stock assessments.

Fifty-eight longline hauls were set during normal survey operations in 2026 (Table 3). Two planned hauls were not set due to weather. Sablefish was the most frequently caught species, followed by giant grenadier, Pacific cod, Pacific halibut, rougheye/blackspotted rockfish, and shortspine thornyhead (Table 4). Catch of the most abundant species by station is presented in Table 5. Sablefish was also the highest catch by estimated weight, followed by giant grenadier, Pacific cod, and Pacific halibut (Table 6). Length and sex were recorded by region and depth stratum for 19,396 sablefish with a greater proportion of females (67.9%) being measured (Fig. 2). Lengths were also recorded for 5,088 Pacific cod, 2,351 rougheye/blackspotted rockfish, 1,541 shortraker rockfish, 1,536 giant grenadier, and 1,354 shortspine thornyhead among others.

A total of 1,371 sablefish, 36 shortspine thornyhead, and 8 Greenland turbot were tagged with external numbered tags and released during the 2026 survey. Otoliths and length-weight data were collected from 1,149 sablefish. The survey caught 11 previously tagged sablefish (including 1 from Fisheries and Oceans Canada). Information on previously tagged fish is available online (tag map).

Killer whale (*Orcinus orca*) depredation on the catch occurred at 9 stations in the BS (Table 7). Since 1996, data from the portions of the gear affected by killer whale depredation during domestic longline surveys have been excluded from stock assessment abundance calculations. The proportion of skates excluded from abundance calculations due to killer whale depredation in the BS was down in 2026 from the last BS survey in 2023 and at the lower end of the range for the last 10 BS surveys (Fig. 3). For more details on how determinations of killer whale depredation are made see Appendix B.

Sperm whale (*Physeter macrocephalus*) observations have been recorded during the longline survey since 1998 (Hill et al. 1999). In 2026, sperm whales were present during survey operations at 1 station in the AI (Table 8). Sperm whale depredation is defined as sperm whales being present with the occurrence of damaged sablefish. Sperm whale depredation was not evident at the lone station where they were present. Sperm whale depredation is directly estimated using an Alaska-wide Generalized Linear Mixed Model (GLMM) with year, depth strata, station, management area, and total number of effective hooks as explanatory variables (Hanselman et al. 2018). Though 2026 did not have any sperm whale depredation, the sablefish stock assessment estimates a depredation coefficient to inflate sablefish catches at survey stations with sperm whale depredation evidence when it occurs. The proportion of skates that included this inflation factor was zero in 2026 (Fig. 3). For more details on how determinations of sperm whale depredation are made see Appendix B.

NMFS has requested the assistance of the fishing fleet to avoid annual longline survey stations since the inception of sablefish IFQ management in 1995. We request that fishermen stay at least 5 nm away from each survey station for 7 days before and 3 days after planned sampling dates (3 days allow for survey delays). Survey calendars were mailed to each IFQ holder before the beginning of each fishing season until 2020; since 2021, the survey calendar has been available online (survey schedule). While the survey is being conducted, the skipper of the vessel makes announcements on the radio detailing the planned set locations for the upcoming days. Vessels encountered near survey stations are contacted by the survey vessel captain and interviewed to determine potential effects on survey catches and these interactions are noted.

Fishermen cooperation, distribution of the survey schedule to IFQ permit holders, radio announcements from the survey vessel, and discussions of a regulatory rolling closure have had intermittent success at reducing the annual number of longline survey/fishery interactions. During the past several surveys, fishing vessels have been contacted by the survey vessel when they were spotted close to survey stations. Typically, vessels have been aware of the survey and have not been fishing close to survey locations. Vessels usually are willing to communicate where they had set and/or are willing to change their fishing locations to accommodate the survey. There are generally few interactions during the survey but even with communication, there are some instances where survey gear is fished nearby commercial fishing gear or where commercial fishing had recently occurred. In 2026, there were four instances of vessel interactions that may have impacted survey catch or required the survey vessel to move the day's sets from their originally intended locations (2 in the BS and 2 in the AI).

Gear damage and loss can occur during survey operations and may have impacts on catch. In 2026, the gear parted at 7 stations (1, 13, 33, 39, 40, 42, and 54). When gear parted, it was retrieved by hauling from the opposite end of the set. Gear loss included 1 skate at station 1 and 59 skates at station 33 (Table 3). Software issues caused some data loss in 2026, so despite successfully retrieving the gear, catch data from 33 skates at station 17 and 90 skates at station 37 were lost.

In 2026, temperature profiles were used to continue a time series starting in 2005 (Siwicke 2022), where the 246–255-m temperature index shows a slight decline from the most recent surveys, but both the AI and BS remain just above the mean (Fig. 4). Note that the change in survey timing in the AI (about two weeks later than previous observations) is not accounted for in this index. Temperatures represent what the survey experienced and comparison to previous years may be misleading.

Sablefish CPUEs in the BS and AI remain high compared to previous surveys (Fig. 5), with the AI at a time series high and slightly above the BS, which dropped from 2023. Mean observed sablefish lengths are increasing for males and females in both the BS and AI (Fig. 6). Catch trends vary by depth and region, with sablefish somewhat ubiquitous deeper than 200 m, Pacific cod dominating shallower depths with Pacific halibut prevalent as well, and giant grenadier particularly dominant at deeper depths (Figs. 7 and 8). The dominant longline survey

CPUE trends in recent years continue to show above average for sablefish with highs across depths in the AI but stable or slight declines in the BS (Figs. 7 and 8).

It is a desirable trait for a longline survey to have some bait returning on each skate, as this means the unit of gear is not saturated and the assumption that catch linearly relates to abundance is less likely to be violated. The rate of bait returning in 2026 in BSAI mostly increased or stayed relatively stable from the last surveys (Figs. 7 and 8). There is often an inverse relationship with baits and empty hooks, and this continued to be present in 2026 (Figs. 7 and 8). This can result from numerous causes that are difficult to identify and have different implications. For example, an increase in bait lost during setting or a high abundance of a small aggressive fish that quickly remove baits from hooks may preclude other fish from locating or competing for the baits. Alternatively, a high abundance of benthic invertebrates (e.g., crab or sea stars) could be consuming baits over several hours, thus, baited hooks would still be sufficiently available to capture fish over an extended period. While the former examples are problematic, the latter example may not be. As such, further investigations into gear saturation and hook competition will remain a topic of interest.

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TABLES

Table 1. -- Leg numbers, dates, and personnel for the 2026 AFSC longline survey.

Leg	Dates	Personnel	Affiliation
1	1 Jun–17 Jun	Ben Williams	AFSC – ABL
		Andrew Dimond	AFSC – ABL
		Jessica Miller	Contract Biologist
		Bailie Hampton	Contract Biologist
2	17 Jun–3 Jul	Katy Echave	AFSC – ABL
		Katie D'Amelio	AFSC – ABL
		Jessica Miller	Contract Biologist
		Bailie Hampton	Contract Biologist

AFSC – ABL: Alaska Fisheries Science Center – Auke Bay Laboratories

Table 2. -- Stations fished in 2026 AFSC longline survey. “Management area” refers to the North Pacific Fishery Management Council sablefish management areas, “Habitat” refers to the station habitat type (“Slope” = Upper continental slope), and “Abundance” indicates whether station data were used in stock assessment abundance index calculations.

Station	Management area	Habitat	Abundance
1	Bering Sea	Slope	Yes
2	Bering Sea	Slope	Yes
4	Bering Sea	Slope	Yes
6	Bering Sea	Slope	Yes
8	Bering Sea	Slope	Yes
10	Bering Sea	Slope	Yes
12	Bering Sea	Slope	Yes
13	Bering Sea	Slope	Yes
15	Bering Sea	Slope	Yes
17	Bering Sea	Slope	Yes
18	Bering Sea	Slope	Yes
20	Bering Sea	Slope	Yes
22	Bering Sea	Slope	Yes
32	Bering Sea	Slope	Yes
33	Bering Sea	Slope	Yes
34	Bering Sea	Slope	Yes
35	Aleutian Islands	Slope	Yes
36	Aleutian Islands	Slope	Yes
37	Aleutian Islands	Slope	Yes
38	Aleutian Islands	Slope	Yes
39	Aleutian Islands	Slope	Yes
40	Aleutian Islands	Slope	Yes
42	Aleutian Islands	Slope	Yes
53	Aleutian Islands	Slope	Yes
54	Aleutian Islands	Slope	Yes
55	Aleutian Islands	Slope	Yes
57	Aleutian Islands	Slope	Yes
58	Aleutian Islands	Slope	Yes
59	Aleutian Islands	Slope	Yes
60	Aleutian Islands	Slope	Yes
61	Aleutian Islands	Slope	Yes

Table 3. -- Set information by station and haul for the 2026 AFSC longline survey. Positions are in decimal degrees (DD) format and depths are in meters (m).

Station	Haul	Date	Skates retrieved	Start latitude	Start longitude	End latitude	End longitude	Start depth	End depth
33	1	06/02	31[b]	53.59	-168.32	53.60	-168.24	150	750
33[a]	2	06/02	90	53.61	-168.19	53.62	-168.06	113	361
32[a]	3	06/03	90	53.77	-167.33	53.71	-167.36	124	472
32[a]	4	06/03	90	53.71	-167.39	53.69	-167.47	500	500
22	5	06/04	90	55.46	-168.00	55.43	-168.13	156	259
22[a]	6	06/04	90	55.42	-168.14	55.39	-168.27	276	585
18	7	06/05	90	56.24	-169.17	56.19	-169.27	172	637
18	8	06/05	90	56.18	-169.29	56.12	-169.39	670	672
15	9	06/06	90	56.16	-170.67	56.13	-170.78	139	413
15	10	06/06	90	56.13	-170.78	56.16	-170.90	473	561
13	11	06/07	90	56.47	-171.49	56.46	-171.60	200	476
13	12	06/07	90	56.46	-171.61	56.45	-171.75	377	705
10	13	06/08	90	56.83	-173.38	56.90	-173.42	213	530
10[a]	14	06/08	90	56.91	-173.42	56.98	-173.48	471	690
6[a]	15	06/09	90	58.33	-174.31	58.40	-174.36	167	384
6[a]	16	06/09	90	58.40	-174.37	58.38	-174.50	520	561
4[a]	17	06/10	90	58.50	-175.67	58.48	-175.81	219	434
4[a]	18	06/10	90	58.48	-175.83	58.50	-175.96	438	800
1	19	06/11	90	58.78	-177.57	58.81	-177.71	162	297
1	20	06/11	89[b]	58.82	-177.72	58.86	-177.84	404	551
2	21	06/12	90	58.62	-176.64	58.57	-176.76	149	524
2	22	06/12	90	58.57	-176.77	58.55	-176.91	578	936
8[a]	23	06/13	90	57.63	-174.17	57.70	-174.24	153	389
8[a]	24	06/13	90	57.70	-174.24	57.77	-174.31	450	729
12[a]	25	06/14	90	56.50	-172.51	56.56	-172.45	728	689
12[a]	26	06/14	90	56.57	-172.43	56.63	-172.37	599	188
17	27	06/15	90	56.04	-169.62	55.99	-169.70	196	600
17	28	06/15	90[c]	55.99	-169.72	55.99	-169.87	513	426
20	29	06/16	90	55.81	-168.80	55.84	-168.92	218	609
20	30	06/16	88[d]	55.85	-168.94	55.91	-169.01	639	735
34[a]	31	06/18	90	53.28	-168.81	53.29	-168.89	411	632
34[a]	32	06/18	90	53.30	-168.90	53.35	-168.99	636	905
35	34	06/19	84[d]	53.06	-170.20	53.09	-170.29	182	633

37	35	06/20	90 [c]	52.28	-173.50	52.35	-173.49	151	628
37	36	06/20	90	52.36	-173.50	52.44	-173.51	640	794
38	37	06/21	90	52.25	-174.84	52.22	-174.96	178	171
38	38	06/21	90	52.23	-174.96	52.18	-175.07	488	400
39	39	06/22	90	52.13	-175.57	52.15	-175.69	109	347
39	40	06/22	90	52.15	-175.67	52.18	-175.80	572	365
40	41	06/23	90	51.97	-176.45	52.03	-176.42	110	504
40	42	06/23	90	52.04	-176.40	52.07	-176.30	612	882
54	43	06/24	90	51.76	-178.17	51.73	-178.28	90	388
54	44	06/24	90	51.74	-178.28	51.73	-178.41	552	1091
55	45	06/25	80	51.59	-177.62	51.55	-177.70	255	240
55	46	06/25	90	51.55	-177.72	51.53	-177.83	460	673
42	47	06/26	90	51.77	-178.96	51.71	-178.90	269	524
42	48	06/26	80	51.72	-178.89	51.66	-178.83	498	725
53	49	06/27	80	51.37	-178.45	51.35	-178.56	596	568
53	50	06/27	80	51.37	-178.57	51.41	-178.64	408	308
57	51	06/28	90	51.73	-175.99	51.65	-176.00	187	431
57	52	06/28	90	51.66	-176.02	51.58	-176.05	378	843
58	53	06/29	90	51.85	-175.13	51.77	-175.13	181	376
58	54	06/29	90	51.78	-175.10	51.70	-175.10	365	835
59	55	06/30	90	51.82	-174.41	51.77	-174.52	388	669
60	56	07/01	80	51.92	-173.50	51.88	-173.60	116	216
60	57	07/01	80	51.88	-173.62	51.87	-173.72	266	208
61	58	07/02	80	52.38	-170.30	52.38	-170.42	232	531
61	59	07/02	80	52.38	-170.44	52.38	-170.56	592	418

[a] Station catch was entirely or partially impacted by killer whale depredation.
[b] Some skates were lost resulting from separated gear.
[c] Skates were retrieved, but some catch data was lost due to software malfunction.
[d] Either too many or too few skates were set by mistake.

Table 4. -- Total catch in numbers of major species (>100 individuals) caught in the 2026 AFSC longline survey by management area: AI = Aleutian Islands and BS = Bering Sea.

Species common name	AI	BS	Total
Sablefish	27,893	22,488	50,381
Giant grenadier	6,158	6,566	12,724
Pacific cod	2,421	5,684	8,105
Pacific halibut	1,170	1,285	2,455
Rougheye/blackspotted rockfish	1,854	584	2,438
Shortspine thornyhead	666	916	1,582
Yellow Irish lord	1,180	270	1,450
Arrowtooth flounder	604	841	1,445
Shortraker rockfish	496	945	1,441
Aleutian/Bering/Alaska skate	543	790	1,333
Walleye pollock	16	987	1,003
Whiteblotched skate	436	535	971
Kamchatka flounder	423	367	790
Commander skate	228	510	738
Lips/jaws - depredation	24	503	527
Skates unidentified	168	211	379
Greenland turbot	41	316	357
Darkfin sculpin	145	35	180
Pacific ocean perch	31	133	164
Sea pen/whip	104	27	131
Flathead sole	0	103	103
Hydrocoral	100	2	102

Table 5. -- Catch in numbers by station for major species in the 2026 AFSC longline survey. SF = sablefish, PC = Pacific cod, GR = giant grenadier, PH = Pacific halibut, ATF = arrowtooth flounder, GT = Greenland turbot, RF = rougheye, blackspotted, and shortraker rockfish, ST = shortspine thornyhead, SK = skate, OS = Other Species.

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
1*	1,719	469	361	76	31	23	5	37	235	248
2	2,144	213	1,180	12	17	54	2	12	59	266
4*	1,017	57	629	87	50	13	11	12	60	356
6*	560	169	429	69	47	2	101	35	145	204
8*	685	223	484	22	14	9	155	34	44	198
10*	1,208	99	487	71	61	1	217	127	166	211
12*	127	183	468	1	5	3	11	53	27	179
13	2,469	186	1,399	240	108	18	183	171	46	116
15	2,180	560	415	151	92	27	63	83	17	462
17*	1,354	205	245	21	32	8	42	27	10	108
18	2,429	295	267	36	147	67	17	55	63	145
20*	3,532	240	98	96	38	16	23	25	66	117
22*	108	1,498	36	259	102	7	24	12	142	263
32*	283	410	0	86	90	8	589	199	110	322
33*	28	877	43	48	5	3	81	13	27	318
34*	2,645	0	25	10	2	57	5	21	60	86
35*	1,233	145	0	177	21	4	15	0	185	71
37*	1,685	0	411	0	0	15	0	6	52	42
38	3,137	170	530	38	4	5	136	22	20	28
39	2,671	193	545	315	223	2	66	23	22	289
40	2,379	144	584	99	237	14	61	56	40	266
42	2,142	68	499	46	8	0	169	32	145	175
53	2,990	0	306	27	3	0	156	102	2	97
54	2,472	438	62	188	29	1	477	13	94	871
55	2,151	191	725	39	15	0	25	108	48	252
57	1,500	98	793	20	16	0	76	43	22	186
58	1,824	210	335	113	37	0	309	125	19	206
59	1,167	66	655	5	1	0	102	47	12	24
60	1,258	673	152	90	8	0	713	11	82	432
61	1,284	25	561	13	2	0	45	78	102	33

*See Table 3, including footnotes, for impacts to sampling by station.

Table 6. -- Total estimated catch in weight (kg) of major species (>100 kg) caught in the 2026 AFSC longline survey by management area: AI = Aleutian Islands and BS = Bering Sea. Catch biomass was estimated by converting numbers caught to weight using species-specific length-weight relationships when length data were collected or proxy average weights from longline fisheries when survey length data were not available.

Species common name	AI	BS	Total
Sablefish	76,999	56,030	133,029
Giant grenadier	17,042	22,255	39,297
Pacific cod	7,469	17,792	25,261
Pacific halibut	6,904	7,583	14,487
Whiteblotched skate	2,348	2,882	5,230
Rougheye/blackspotted rockfish	1,881	848	2,729
Arrowtooth flounder	1,062	1,515	2,577
Shortraker rockfish	531	1,879	2,410
Commander skate	727	1,625	2,352
Shortspine thornyhead	792	1,264	2,056
Skates, unidentified	852	1,071	1,923
Kamchatka flounder	1,083	701	1,784
Walleye pollock	23	1,402	1,425
Greenland turbot	161	1,208	1,369
Yellow Irish lord	989	226	1,215
Pacific ocean perch	48	205	253
Darkfin sculpin	127	31	158
Octopus, unidentified	82	38	120
Pacific sleeper shark	0	116	116
Longnose skate	7	97	104

Table 7. -- Stations and skates depredated by killer whales during the 2026 AFSC longline survey. Number of skates affected refers to skates determined to be depredated and removed from abundance calculations.

Station	Region	Number of skates affected	Number of skates retrieved
4	Bering Sea	98	180
6	Bering Sea	98	180
8	Bering Sea	161	180
10	Bering Sea	89	180
12	Bering Sea	180	180
22	Bering Sea	86	180
32	Bering Sea	91	180
33	Bering Sea	79	121
34	Bering Sea	117	180

Table 8. -- Stations that had sperm whales present during hauling operations in the 2026 AFSC longline survey. Depredation is defined as sperm whales being present with the occurrence of damaged fish on the line.

Station	Region	Present	Depredation
39	Aleutian Islands	Yes	No

FIGURES

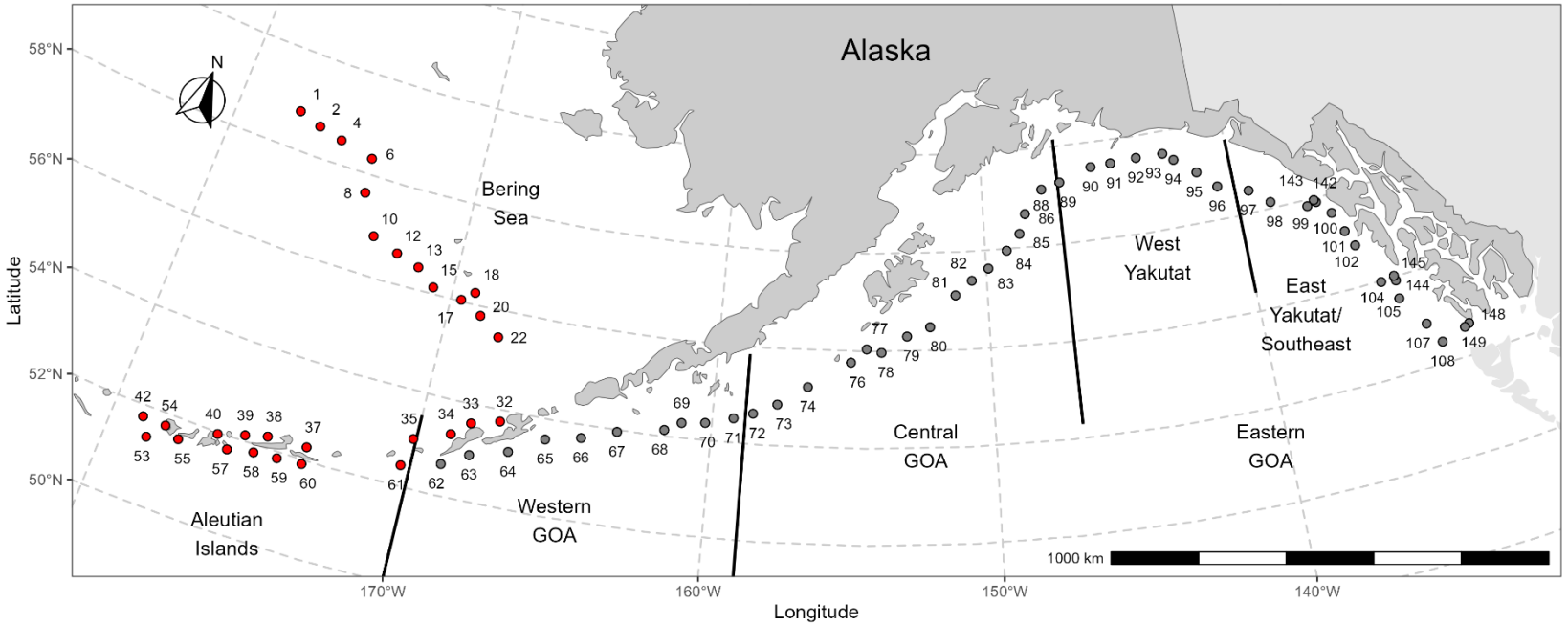


Figure 1. -- Map of NMFS-AFSC longline survey station locations for the 2025/2026 design. Bering Sea and Aleutian Islands stations (red) were sampled in 2026, and Gulf of Alaska (GOA) stations (grey) are sampled in odd years.

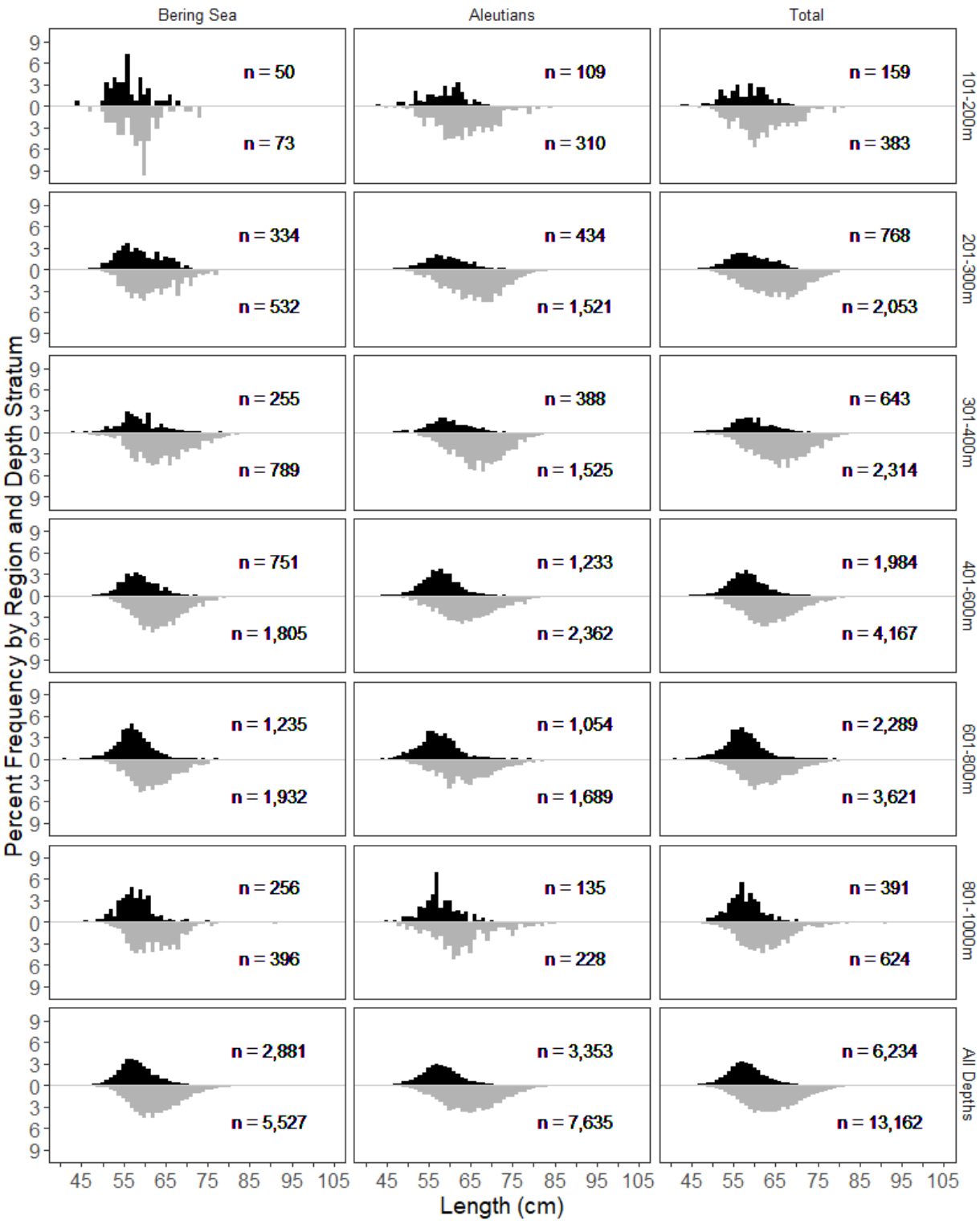


Figure 2. -- Size composition of sablefish measured during the 2026 AFSC longline survey by region and depth stratum. Males are shown in black and females are shown in grey below the x-axis.

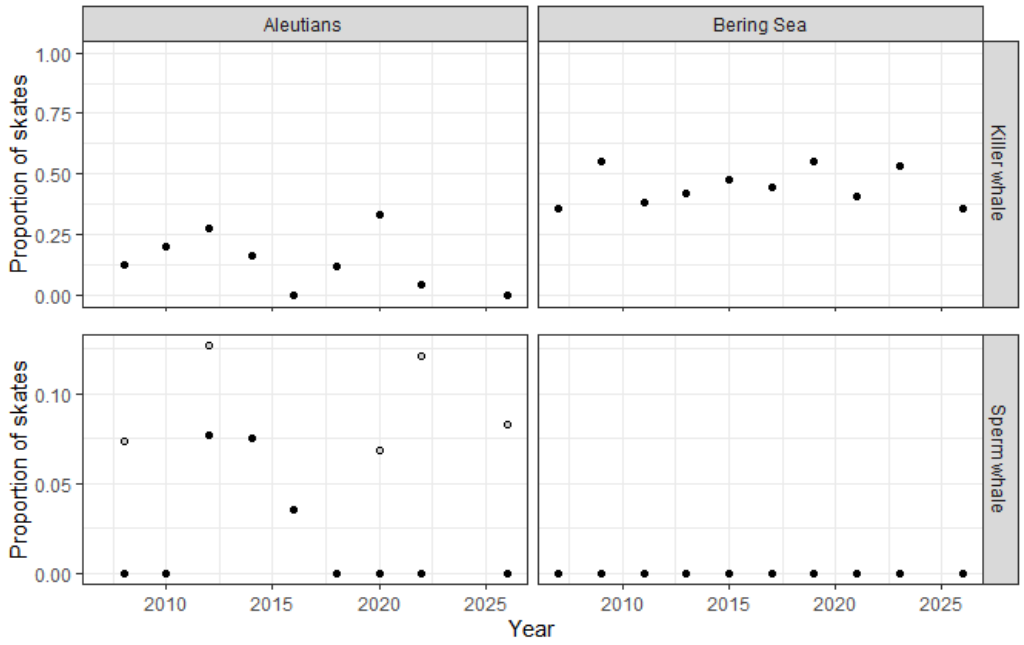


Figure 3. -- Trends in whale interactions on the AFSC longline survey, where the top row shows the proportion of skates with killer whale depredation which are removed from abundance calculations. The bottom row shows the proportion of skates with sperm whale presence (open circles) and depredation (solid circles); these data are used to inflate catch rates to account for sperm whale losses as described in Hanselman et al. (2018).

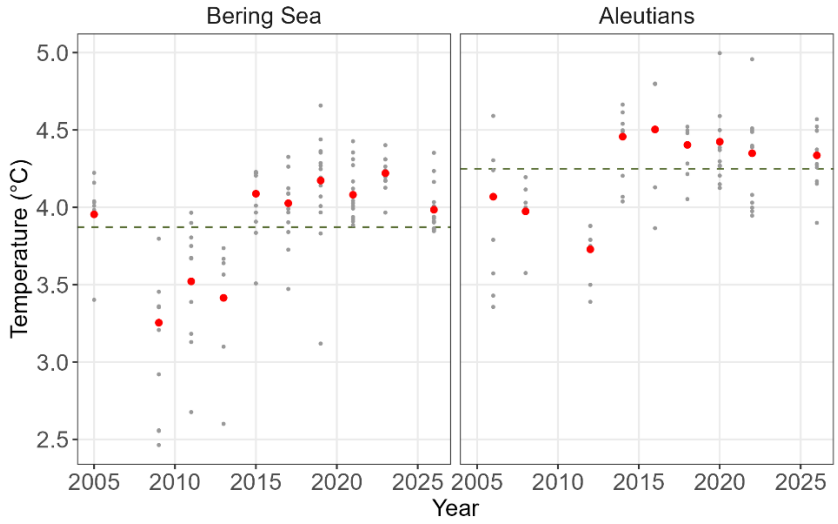


Figure 4. -- Regional subsurface temperature trends from the AFSC longline survey averaged from 1-m increments in the 246–255 m depth bin, where grey points are individual measurements and the red dots are area-weighted means. Horizontal dashed lines are regional time series means. For more details, see Siwicke (2022).

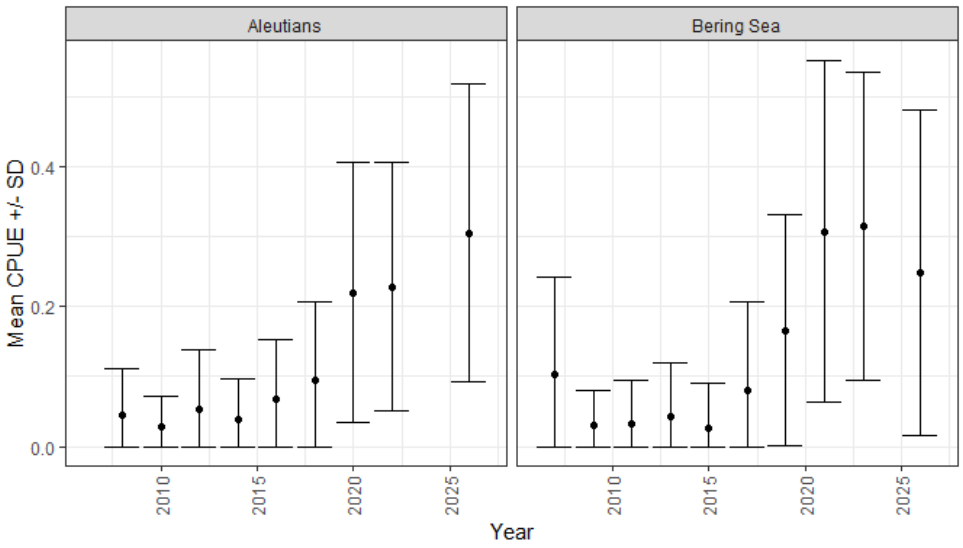


Figure 5. -- Trends in mean sablefish catch per unit effort (CPUE, number of sablefish per hook) from the AFSC longline survey by region. Error bars indicate +/- 1 standard deviation (SD).

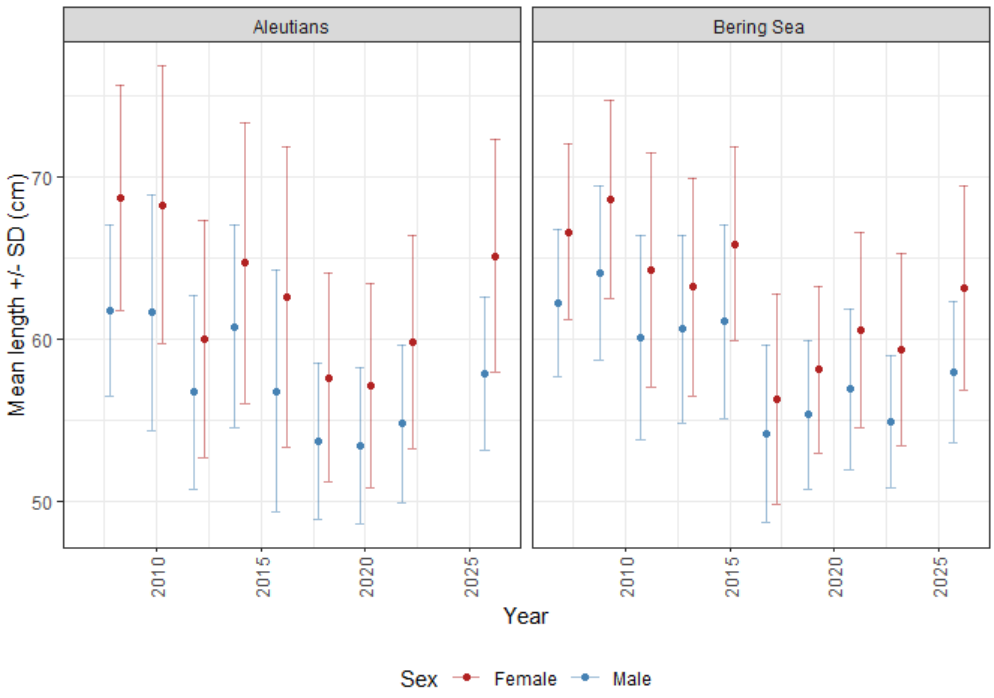


Figure 6. -- Trends in mean fork length of sablefish (female in red, male in blue) measured during the AFSC longline survey by region. Error bars indicate +/- 1 standard deviation (SD).

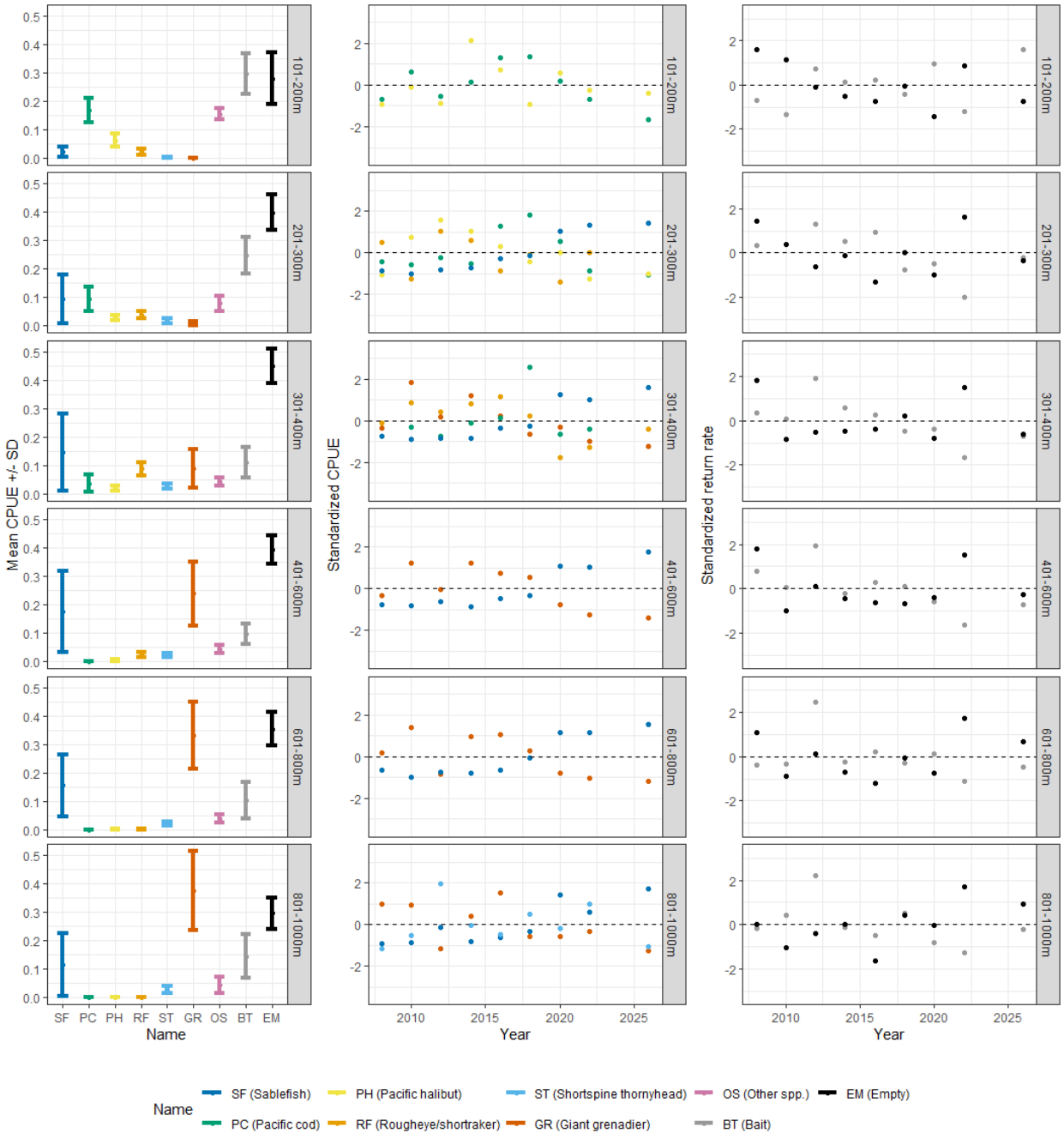


Figure 7. – Aleutian Islands catch trends by species and depth strata (2007–2026). The left column shows the mean catch per unit effort (CPUE) +/- 1 standard deviation (SD). The middle column shows the standardized (mean of 0, SD of 1) CPUE for species (except 'Other spp.') that had a mean CPUE > 0.025 (i.e., > 2.5% catch rate). The right column shows the standardized rate of hooks returning empty and with bait.

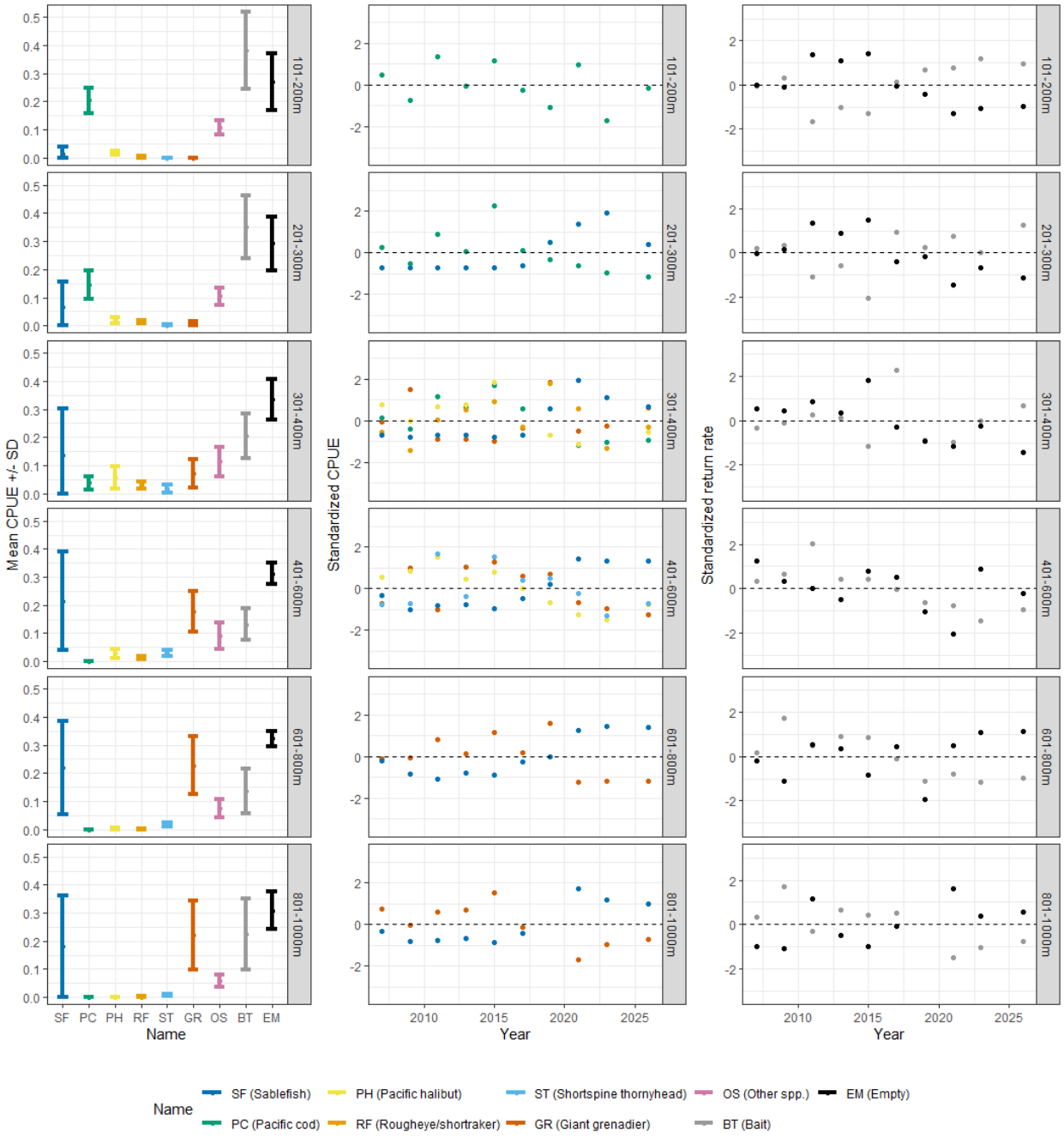


Figure 8. -- Bering Sea catch trends by species depth strata (2007–2026). The left column shows the mean catch per unit effort (CPUE) +/- 1 standard deviation (SD). The middle column shows the standardized (mean of 0, SD of 1) CPUE for species (except 'Other spp.') that had a mean CPUE > 0.025 (i.e., > 2.5% catch rate). The right column shows the standardized rate of hooks returning empty and with bait.

APPENDICES

Appendix A: Details on Recent Changes Made to the Alaska Fisheries Science Center Longline Survey

The domestic Alaska Fisheries Science Center (AFSC) Longline Survey has remained relatively unchanged over the last several decades. The survey sampled the Gulf of Alaska (GOA) annually, the Bering Sea (BS) in odd years, and the Aleutian Islands (AI) in even years. The government contracted a freezer longliner on a zero-dollar cost-recovery basis, whereby the vessel contractor retained survey catches and sold them to cover their operating costs. Due to an anticipated financial loss to the vessel contractor related to declining sablefish prices, the survey was not conducted in 2024. In the fall of 2024, a request for information (RFI) was carried out by the government to identify potentially interested vessel contractors and to determine revised contract terms that ensured vendor interest and successful completion of the longline survey going forward. The results of the RFI indicated that a daily rate that shifted market risk from the contractor to the government and a reduced number of contract days (from ~90 to ~50 days or less) were needed. As such, a new contract structure was created that included a daily rate (offset by the sale of the catch) and a modified sampling plan.

Beginning in 2025, the new sampling design was to sample the GOA only in odd years and BSAI in even years. For comparison, the number of sampling days in 2023 was 78, while the survey sampled 46 days in 2025 (GOA) and 30 days in 2026 (BSAI). All stations historically used in GOA index calculations, except stations 75 (CGOA index station) and 106 (EYSE index station), will be sampled going forward. The two index stations that will not be sampled were selected by considering the survey's historical sampling frequency by depth strata and region relative to their area sizes to minimize data loss. Shallow gully stations and experimental sampling days were also discontinued starting in 2025, as these were not directly used in index calculations. The progression of sampling also changed as stations were leap-frogged from west to east for the first half of the survey, then returning east to west for the second half; this was done to eliminate a multiday GOA transit and reduce the number of days at sea. All historically sampled index stations in the BS and AI will continue to be sampled. However, both regions are

now sampled in even years, though the timing of the AI is approximately 2 weeks later than previously.

Following the longline survey sampling changes, the sablefish stock assessment has had to change how the survey-derived indices are used in the stock assessment model. Sablefish is the only groundfish species managed by the North Pacific Fisheries Management Council as an Alaska-wide stock. The longline survey previously sampled the GOA every year and produced GOA sablefish indices annually. Indices for the BS and AI were also provided annually but because the survey alternated between sampling the BS and AI every other year, the index for whichever region was not sampled in a given year was estimated by multiplying the previous year's index for that region by the proportional GOA index change observed in the current year. Because the GOA is no longer sampled annually in the new design, this method for estimating indices in unsampled regions is no longer feasible. The proposed method for handling the change in survey design is to model the GOA, BS, and AI separately in a fleets-as-areas model that does not require estimates for unsampled regions (Appendix 3C from September 2026 Groundfish Plan Team Sablefish Stock Assessment).

The Japan-U.S. cooperative survey sampled both the eastern AI (EAI) and the western AI (WAI) beginning in 1980. The domestic survey began sampling the AI in 1996; however, this sampling was limited to the EAI and has never occurred in the WAI. To get WAI indices in the absence of sampling, EAI indices were multiplied by area-specific ratios calculated from the Japan-US survey indices. Ratios between the northeastern AI and northwestern AI and between the southeastern AI and southwestern AI were based on data from 1983–1995. While this may have been a reasonable approach for estimating an unsampled region in years shortly after the ratios were calculated, it is now over 30 years without having sampled the WAI. In that time, the survey area sizes, used for calculating indices, have been recalculated (Echave et al. 2013), while the east-west ratios were not updated. Currently, skates of gear with more than 5 ineffective hooks are removed from index calculations, but this was not practiced when the ratios were calculated. The ratios were also calculated at a geographic area level and did not account for index changes specific to depth strata, which can be misleading if geographic area sizes are not proportional by depth strata. Further, there is no uncertainty related to the ratios, but over the 1983–1995 period, the ratios were highly variable even within a given depth stratum. In the last

decade there have been several large sablefish year classes, and the proportion of biomass estimated for the BSAI is currently more than half of the entire stock. Without any recent sampling in the WAI, there is no data to support or refute that these large recruitment events have translated to increased biomass in the WAI. Therefore, because of the time elapsed since last sampling the WAI and the issues associated with the calculations of the east-west ratios, we have advised the stock assessment authors to use only the sampled EAI values for indexing the AI.

Appendix B: Details on Whale Depredation Determinations on the Alaska Fisheries Science Center Longline Survey

Whale depredation, when whales remove or damage fish caught in fisheries, has been widely documented in the sablefish fishery and the Alaska Fisheries Science Center (AFSC) longline survey. The removal of survey catch can directly influence the accuracy of survey estimates. The AFSC Longline Survey targets sablefish and makes efforts to identify whale depredation on survey catch. There are two species of whales that target this survey, killer whales and sperm whales. Killer whale depredation on survey catch is usually obvious because it often involves multiple individuals that drastically reduce catches and typically remain with the survey vessel from the onset of depredation throughout the day until all gear has been retrieved. Skates of gear that are impacted by killer whale depredation are not used in calculating abundance indices (i.e., those data are discarded). Sperm whale depredation on survey catch more often involves one or more individual whales occasionally diving to feed off the longline with long breaks in between. Stations that are impacted by sperm whale depredation have a correction factor applied to avoid an underestimate of survey catch. This appendix is provided to document how the survey team determines when killer and sperm whale depredation has occurred.

The protocols for the longline survey include the completion of a whale depredation tracking form that is filled out by the vessel operator, which is either the captain or first mate (Fig. B1). The wheelhouse provides an elevated platform that allows the vessel operator to see whales and whale spouts for miles around the vessel. When they see whales, they indicate the species, number, and time at which they first saw them. They also indicate on the whale form whether they are noticing evidence of depredation, such as damaged gear (e.g., bent hooks or broken gangions) or damaged fish (e.g., fish lips/heads, bitten fish, teeth marks on fish). While recording catch, the biologist at the rail may observe depredation-damaged fish that can be identified to species. For those observations, the biologist flags the electronic record as depredated. Also, the biologist recording catch records general depredation notes throughout each haul which are used to corroborate the vessel operator's observations.

The chief scientist is responsible for making the determination of whether depredation has occurred. While whale presence provides the most obvious indication of whale depredation, it is important to note that the presence of whales is not confirmation of depredation. In addition to whale presence, whale depredation can be inferred from hook condition and catch observations, including a combination of more empty hooks than usual, signs of depredation-damaged catch, and more ineffective hooks than usual. The chief scientist combines their own observations, as well as the observations mentioned above, with a close look at detailed catch data following haul back. Plots produced by the survey *whaledep* R package pull data from the at-sea database and assist the chief scientist in identifying and flagging potential skates that were depredated or performed poorly. This includes a skate-by-skate accounting of depth, sablefish catch per unit effort (CPUE), catch composition, and depredation flags entered by the biologist recording hook condition and catch (Fig. B2). These plots assist the chief scientist in making informed observations in the daily log, capturing salient information related to the day's catch data and whether a change in sablefish CPUE might be associated with depredation or other causes, such as a change in depth. Anomalies in catches can arise from non-whale related phenomena and can also be flagged for removal. For example, a sharp valley in the depths associated with a high incidence of returning baited hooks and few fish being caught might indicate 'clotheslined' gear that is not fishing on the bottom. When gear is lost or snagged, catches around these skates might be depressed because fish and hooks can be stripped from the gear when it interacts with the seafloor. For killer whales, the skate numbers being impacted must be determined (e.g., 55 to 180). For sperm whales, a determination of whether depredation is occurring must be made for each haul (i.e., skates 91–180 for the afternoon haul only or 1–180 for both hauls).

To illustrate an example of the identification of killer whale depredation, the following provides an interpretation of survey data from the *whaledep* package (Fig. B2) along with associated information provided by the vessel operator and biologists. The top panel of Fig. B2 shows the depth (or interpolated depth) of each skate, color coded by depth stratum. The middle panel shows sablefish CPUE (fish per hook, thus 0 to 1) with dashed lines showing the mean CPUEs where both are color coded by the depth stratum. The solid blue line shows a rolling 3-skate average of sablefish CPUE. Open circles indicate skates that had more than 5 ineffective hooks and thus are already removed from calculations. The bottom panel displays stacked

columns of catch, baited hooks, and ineffective hooks (broken, snarled, missing) for each skate. Each skate has 45 hooks when deployed; any column (skate) that does not reach 45 is due to empty (no fish or bait) hooks returning, which are not accounted for in the columns. Thus, the smaller columns mean more empty hooks were observed on the skate. White diamonds show the number of depredated/damaged fish on a skate recorded by the biologist at the rail.

In the example output, the first 65 skates are shallow, and many hooks are returning with bait, some Pacific cod, and a few other species mixed in. As the gear gets into deeper depths (skates 65 to 75), catches of sablefish begin to increase. The whale depredation tracking form indicated that the captain saw killer whales beginning around skate 85. The captain noted there were damaged fish and gear, and an estimated 20 whales were present by the end of the first set (skate 90). The plots support this narrative, but the data suggests that there was evidence of depredation starting at skate 83, where a damaged fish was observed on a hook. There was a drop in sablefish CPUE from skate 74 to 80 but substantial catches of other species (e.g., halibut, arrowtooth, and rockfish) on those skates indicate that the reduced catch of sablefish was at least partially due to a reduced number of hooks available to sablefish. In this example situation, 19 skates were fished in depth stratum 301–400 m, and whale depredation likely impacted some but not all those skates. At this station the determination was that depredation began at skate 83 and continued through skate 180. While depredation may have started a few skates earlier than this, that is the first skate with confirming physical evidence.

At the end of the survey, the survey coordinator reviews chief scientist depredation determinations from each leg to ensure consistency throughout. The survey coordinator consults with chief scientists when there are questions related to depredation interpretation. Once the survey is complete, the coordinator is also able to consider the context of sablefish CPUE for all stations rather than just those before a given station. This allows CPUEs from all stations that are to be combined for geographical area and depth stratum calculations to be compared, for a comprehensive view of the variability in CPUEs across stations with and without suspected depredation. Any changes made to whale depredation determinations occur before the data is finalized and used in index calculations.

Killer and Sperm Whale Depredation Tracking Form

Date_____ Station # _____

Whale Species Present: Killer or Sperm (Circle if present)

When did whales appear: Time _____
Comments:

Skate # (1-180)_____

Whales_____

When did whales disappear: Time _____
Comments:

Skate # (1-180) _____

Were whales depredating: Yes or No (Circle one)

Were whales feeding off of offal Yes or No (Circle one)

Entanglements or gear damage Yes or No (Circle one)
Explain:

Depredation Occurrence

Damaged sablefish Yes or No (Circle one)
How many _____

Damaged grenadier Yes or No (Circle one)
How many _____

Damaged other Yes or No (Circle one)
What? How many _____

Comments:

Figure B1. Whale depredation tracking form filled out by the vessel operator to aid in the determination of whale depredation.

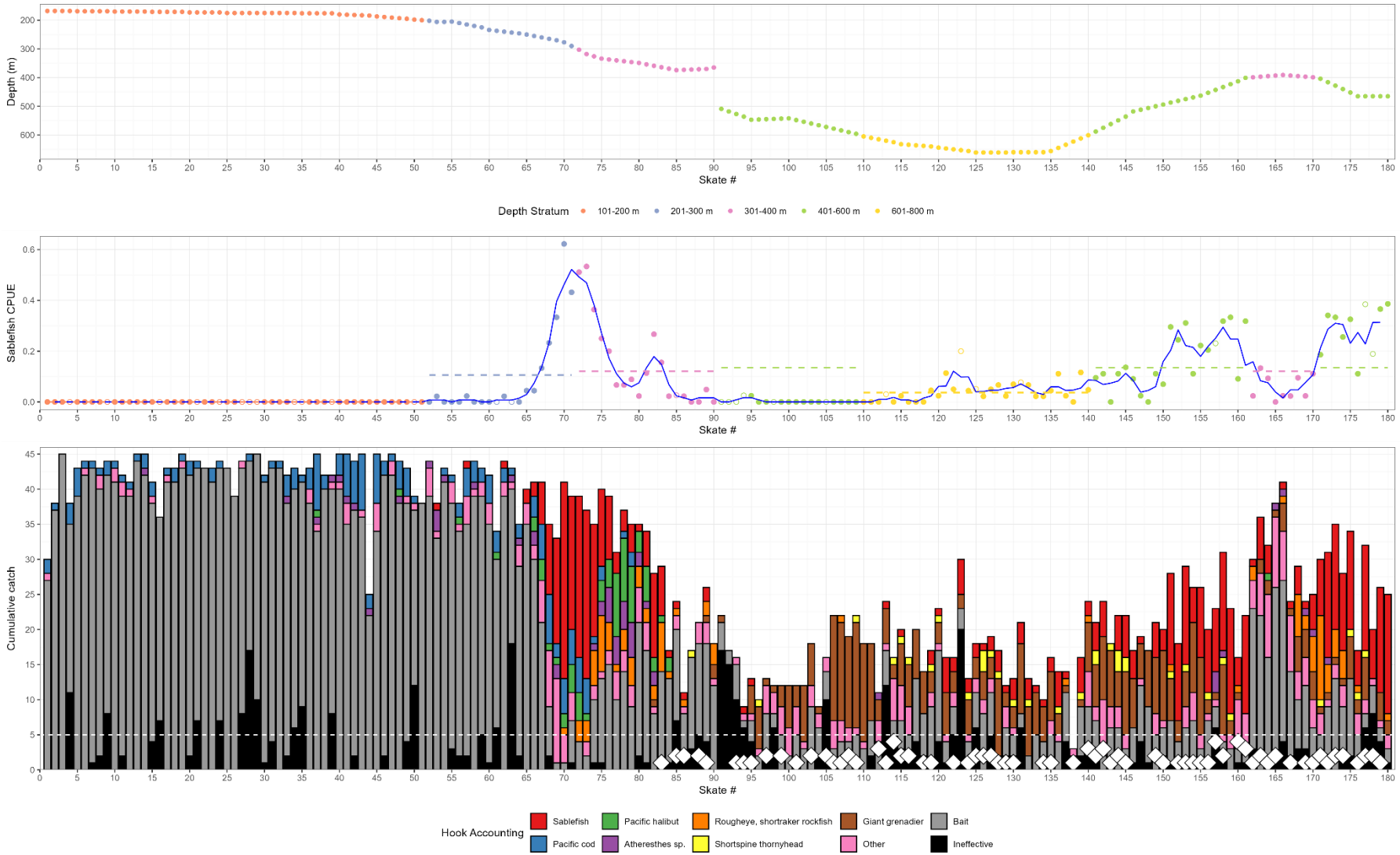


Figure B2. An example plot produced by the survey *whaledep* R package. Skate-by-skate depth and stratum (top), sablefish catch pre unit effort (CPUE, middle), catch composition with white diamonds indicating number of depredated catch observed (bottom).