**F/V *Ocean Prowler***
**Cruise Report OP-13-01**
**Longline Survey of the Gulf of Alaska and Eastern Bering Sea**
**May 26-August 28, 2013**

**Prepared by**

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On August 28, 2013, the Alaska Fisheries Science Center (AFSC) completed the 35th annual longline survey of Alaska sablefish (*Anoplopoma fimbria*) and other groundfish resources of the upper continental slope (Figure 1). This survey was designed to continue the time series (1979-94) of the Gulf of Alaska portion of the Japan-U.S. cooperative longline survey that was discontinued after 1994. The National Marine Fisheries Service (NMFS) has surveyed the Gulf of Alaska annually since 1987, the eastern Aleutian Islands biennially since 1996, and the eastern Bering Sea biennially since 1997. The Gulf of Alaska and eastern Bering Sea were sampled in 2011.

## OBJECTIVES

1. Determine the relative abundance and size composition of the most commercially important species: sablefish, shortspine thornyhead (*Sebastolobus alascanus*), Greenland turbot (*Reinhardtius hippoglossoides*), Pacific cod (*Gadus macrocephalus*),and rougheye and shortraker rockfishes (*Sebastes aleutianus* and *S. borealis*).

2. Determine the relative abundance and size composition of other groundfish species caught during the survey: arrowtooth flounder (*Atheresthes stomias*), grenadiers (Macrouridae), skates (Rajadie), and spiny dogfish (*Squalus suckleyi*).

3. Tag and release sablefish, shortspine thornyhead, and Greenland turbot throughout the cruise to determine migration patterns.

4. Collect sablefish otoliths to study the age composition of the population.

## VESSEL AND GEAR

Survey operations were conducted using the F/V *Ocean Prowler*, a chartered U.S. longline vessel. The 47 m (155 ft) long vessel carried standard longline hauling gear and was equipped with radios, radars, GPS receivers, a processing line, three sets of plate freezers, and refrigerated holds. Vessel personnel consisted of a captain, an engineer, a

cook, a quality-control technician, two contract biologists, six fishermen and five processors.

Gear configuration is standardized and has been consistent for all survey years since 1988. Units of gear (skates) were 100 m (55 fm) long and contained 45 size 13/0 Mustad[1] 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 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 (3/8 in) diameter nylon.

A set of gear consisted of a flag and buoy array at each end followed sequentially by varying lengths by depth of 9.5 mm diameter nylon buoyline, a 92 m (50 fm) section of 9.5 mm polypropylene floating line, a 16 kg (35 lb) piece of chain (to dampen the effect of wave surge on the buoyline), 92 m of 9.5 mm nylon line, a 27 kg (60 lb) halibut anchor, and 366 m (200 fm) of 9.5 mm nylon line. The groundline was weighted with 3.2 kg (7 lb) lead balls at the end of each skate. Hooks were hand baited with chopped squid (*Illex*) at a rate of about 5.7 kg (12.5 lb) per 100 hooks. Squid heads and tentacles were not used for bait.

Total groundline set each day was 16 km (8.6 nmi) long and contained 160 skates and 7,200 hooks except in the eastern Bering Sea where 180 skates with 8,100 hooks were set. Additional effort is placed in this region due to the lower densities of sablefish. Two eighty-skate groundlines laid end to end were set at each station along the upper continental slope. A single groundline of eighty skates was set at each station in the gullies except Amatuli Gully station 87 that consists of 160 skates. Specific information regarding longline survey protocols and details of the survey gear can be found at: http://www.afsc.noaa.gov/ABL/MESA/pdf/LSprotocols.pdf

## OPERATIONS

The charter began on May 26 at Dutch Harbor, Alaska, and ended on August 28 at Dutch Harbor. The charter period was divided into seven legs (Table 1). During leg 1, the stations along the upper continental slope of the eastern Bering Sea were sampled (Figure 1). During leg 2 stations in the Gulf of Alaska were sampled near the western end of Umnak Island and extending eastward to Sand Point. At the conclusion of Leg 2, the vessel then transited the Gulf of Alaska to southeastern Alaska. Leg 3 began off Dixon Entrance near the U.S.-Canada boundary and continued north and westward to Yakutat. During leg 4, a two-day experiment was conducted in the Yakutat vicinity (See Appendix A). During leg 5, the area between Yakutat and Cordova was sampled, and during leg 6 the area from Cordova to Kodiak was sampled. During leg 7, the area from Kodiak to Sand Point was sampled.

[1] Citation of the above brand name does not constitute U.S. government endorsement.

From 1988 to 1990 the survey period was from June 26 to September 12, which avoided surveying the grounds when a commercial sablefish opener occurred. The survey periods in 1991 through 1994 were 2-1/2 weeks later than in 1988 through 1990. The 1991-1994 surveys were delayed to avoid the commercial trawl fishery that occurred in the Gulf beginning July 1. Starting in 1995, the survey period was moved back to near the 1988-1990 time periods because avoiding the sablefish fishery was impossible due to 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 longline fisheries. Beginning in 1998 the order in which the stations were sampled was changed to avoid conflicting with an early July rockfish fishery in the central Gulf of Alaska. Instead of continuing to sample in an easterly direction from Sand Point to Dixon Entrance the survey vessel transited to Dixon Entrance during early July and resumed sampling in a westerly direction going from Dixon Entrance to Sand Point. Sampling order has been the same since 1998. From 2009 to present the survey starting and ending dates were several days earlier than previous years. This was done to accommodate the vessel's scheduling needs to finish to the survey as early as possible.

Survey Operations

A total of 16 stations along the upper continental slope of the eastern Bering Sea and 45 stations along the upper continental slope of the Gulf of Alaska were sampled at a rate of one station per day (Figure 1). Surveyed depths ranged from approximately 200 to 1,000 m, although at some stations depths less than 200 m or more than 1,000 m were sampled. In addition, twenty-seven stations were sampled in gullies at the rate of one or two stations per day. The sampled gullies were Shelikof Trough, Amatuli Gully, W-grounds, Yakutat Valley, Spencer Gully, Ommaney Trench, and Dixon Entrance. One station (103) was sampled on the continental shelf off Baranof Island. A list of stations and which management areas they correspond to, what type of habitat type they represent, and whether or not they were used in abundance index calculations is found in Table 2.

The gear was set from shallow to deep and was retrieved in the same order, except on occasions when groundlines parted or sea conditions dictated that it be pulled from the opposite direction. Setting began at approximately 0630 hours Alaska Daylight Time. Retrieval began at approximately 0930 hours and was completed by about 1930 hours.

Data Collection

Catch data were recorded on a hand-held computer. During gear retrieval a scientist 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 when the first hook of each fifth skate was retrieved or when crossing into a new depth interval (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 bar code based measuring board and a bar code reader connected to a ruggedized computer. Length was measured by depth stratum for sablefish, Pacific cod, giant grenadier, arrowtooth flounder, spiny dogfish, multiple rockfish species, and shortspine thornyheads. Lengths of sablefish, giant grenadier, spiny dogfish, and Pacific cod were recorded by sex. Sablefish, shortspine thornyhead, and Greenland turbot were tagged on every 20$^{th}$ skate starting on skate 10 of every set. Pacific halibut were counted and released at the rail without measuring. Catch and length frequency data were transferred to a computer and electronic backup media twice a day. As in the previous surveys, the charter vessel was allowed to retain most of the catch once the scientific data were recorded.

## RESULTS

One hundred fifty-two longline hauls were completed in 2013 (Table 3). Several stations were sampled out of order for various reasons including scheduling, weather, and fishing vessel interactions. In 2013, stations 2, 8, 12, and 17 were sampled at the beginning of the survey to help accommodate a late departure by the survey vessel at the start of Leg 1. Giant grenadier was the most frequently caught species, followed by sablefish, shortspine thornyhead, Pacific cod, and arrowtooth flounder (Table 4). The estimated total round weight of sablefish by station ranged from 9 kg (20 lb) to 7,453 kg (16,431 lb) and the overall total round weight of sablefish caught in the survey was 178,198 kg (392,859 lb) (Table 5). The estimated total numbers of major species retained during the survey are presented in Table 6. The estimated total round weights of major species retained during the survey and two-day experiment are presented in Table 7. These estimated numbers and weights include a small number of fish lost at the rail and fish that were tagged and released. The targeted percentage of tagged fish released at the rail is 5% of total catch for those species.

A total of 2,589 sablefish, 1,125 shortspine thornyhead, and 17 Greenland turbot were tagged with external floy tags and released during the 2013 survey. Electronic archival tags were implanted in 36 Greenland turbot. Pop-up satellite tags (PSAT) were implanted in 27 sablefish, 6 spiny dogfish, and 4 lingcod. Length-weight data and otoliths were collected from 1,619 sablefish.

Killer whales depredating on the catch occurred at eleven stations in the Bering Sea, two stations in the western Gulf of Alaska, and two stations in the central Gulf of Alaska (Table 8). Since 1990, portions of the gear affected by killer whale depredation during domestic longline surveys have been excluded from the analysis of the survey data.

Sperm whale observations have been recorded during the longline survey since 1998. Sperm whales were observed during survey operations at 18 stations in 2013 (Table 9). Sperm whales were observed depredating on the gear at two stations in the central Gulf of Alaska, three stations in the West Yakutat region, and seven stations in the East Yakutat/Southeast region (Table 9). Apparent sperm whale depredation is defined as sperm whales being present with the occurrence of damaged fish. Longline survey catch rates and abundance indices are not adjusted for sperm whale depredation.

NMFS has requested the assistance of the fishing fleet to avoid the annual sablefish longline survey since the inception of sablefish IFQ management in 1995. We requested that fishermen stay at least five nautical miles away from each survey station for 7 days before and 3 days after the planned sampling date (3 days allow for survey delays). In 2013 there were five recorded interactions between survey operations and fishing vessels. Interactions occurred at station numbers 71, 74, 82, 79, and 99 by longline vessels. In four cases the vessels were contacted by the survey vessel and were encouraged to avoid survey stations. At station 79 the survey vessel observed buoy and flag arrays close to the station track but was not able to associate a vessel with the gear.

Gear damage and loss occurs during survey operations and may have impacts on catch. In 2013 gear issues occurred at six stations. No gear was lost during the 2013 survey. The gear parted at stations 76, 91, 98, 102, and 107 but all gear was successfully retrieved by hauling the gear in reverse order. At station 104 six extra skates of gear were mistakenly set.

Several special projects were conducted during the 2013 longline survey. Greenland turbot were tagged with archival temperature/depth tags in the Bering Sea and lingcod were tagged in the West Yakutat and central Gulf of Alaska regions. Satellite pop-up tags were deployed on spiny dogfish, sablefish, and lingcod throughout the Gulf of Alaska. Information from these tags will be used to investigate movement patterns within and out of the Gulf of Alaska and potentially help identify spawning areas for sablefish. Additionally, genetic tissue and otoliths of giant grenadier were sampled to see if geographic stock structure exists and to determine if three distinct otoliths shapes identified in previous work correspond to different subspecies or subpopulations. Bubblegum coral genetic and specimen samples were collected to elucidate patterns of genetic connectivity among Paragorgid populations in the Gulf of Alaska. Finally, opportunistic photo identification of both sperm and killer whales were collected for use in whale identification projects.

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For further information contact

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Table 1. Leg numbers, dates, and personnel for the 2013 NMFS longline survey.

| Leg | Dates | Personnel | Affiliation |
|---|---|---|---|
| 1 | May 26 - June 14 | Pete Hulson | ABL |
| | | Daniel Michrowski | UAF |
| | | Jason Wright | Contract Biologist |
| | | Johanna Marsters | Contract Biologist |
| 2 | June 14 - July 3 | Dave Csepp | ABL |
| | | Jason Wright | Contract Biologist |
| | | Johanna Marsters | Contract Biologist |
| 3 | July 5 - July 19 | Cindy Tribuzio | ABL |
| | | Megan Stachura | Contractor |
| | | Jason Wright | Contract Biologist |
| | | Johanna Marsters | Contract Biologist |
| 4* | July 20 - July 22 | Cindy Tribuzio | ABL |
| | | Megan Stachura | Contractor |
| | | Johanna Marsters | Contract Biologist |
| 5 | July 23 - August 2 | Chris Lunsford | ABL |
| | | Thomas Farrugia | UAF |
| | | Jason Wright | Contract Biologist |
| | | Johanna Marsters | Contract Biologist |
| 6 | August 4 - August 15 | Katy Echave | ABL |
| | | Kari Fenske | UAF |
| | | Jason Wright | Contract Biologist |
| | | Johanna Marsters | Contract Biologist |
| 7 | August 16- August 29 | Pat Malecha | ABL |
| | | Karson Coutre | UAF |
| | | Jason Wright | Contract Biologist |
| | | Johanna Marsters | Contract Biologist |

ABL - Auke Bay Laboratories, Alaska Fisheries Science Center
UAF – University of Alaska Fairbanks
* Two-day experiment

Table 2. Stations fished in 2013 NMFS longline survey. Sablefish management area refers to the North Pacific Fisheries Management Council areas, station type refers to station habitat type, and abundance calculations indicates whether or not station catches were used in abundance index calculations.

| Station Number | Sablefish Management Area | Station Type | Abundance Calculations |
|---|---|---|---|
| 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 |
| 62 | Western Gulf of Alaska | Slope | Yes |
| 63 | Western Gulf of Alaska | Slope | Yes |
| 64 | Western Gulf of Alaska | Slope | Yes |
| 65 | Western Gulf of Alaska | Slope | Yes |
| 66 | Western Gulf of Alaska | Slope | Yes |
| 67 | Western Gulf of Alaska | Slope | Yes |
| 68 | Western Gulf of Alaska | Slope | Yes |
| 69 | Western Gulf of Alaska | Slope | Yes |
| 70 | Western Gulf of Alaska | Slope | Yes |
| 71 | Western Gulf of Alaska | Slope | Yes |
| 72 | Central Gulf of Alaska | Slope | Yes |
| 73 | Central Gulf of Alaska | Slope | Yes |
| 74 | Central Gulf of Alaska | Slope | Yes |
| 75 | Central Gulf of Alaska | Slope | Yes |
| 76 | Central Gulf of Alaska | Slope | Yes |
| 77 | Central Gulf of Alaska | Slope | Yes |
| 78 | Central Gulf of Alaska | Slope | Yes |
| 79 | Central Gulf of Alaska | Slope | Yes |
| 80 | Central Gulf of Alaska | Slope | Yes |
| 81 | Central Gulf of Alaska | Slope | Yes |
| 82 | Central Gulf of Alaska | Slope | Yes |
| 83 | Central Gulf of Alaska | Slope | Yes |

| Station Number | Sablefish Management Area | Station Type | Abundance Calculations |
|---|---|---|---|
| 84 | Central Gulf of Alaska | Slope | Yes |
| 85 | Central Gulf of Alaska | Slope | Yes |
| 86 | Central Gulf of Alaska | Slope | Yes |
| 87 | Central Gulf of Alaska | Gully | No |
| 88 | Central Gulf of Alaska | Slope | Yes |
| 89 | West Yakutat | Slope | Yes |
| 90 | West Yakutat | Slope | Yes |
| 91 | West Yakutat | Slope | Yes |
| 92 | West Yakutat | Slope | Yes |
| 93 | West Yakutat | Slope | Yes |
| 94 | West Yakutat | Slope | Yes |
| 95 | West Yakutat | Slope | Yes |
| 96 | West Yakutat | Slope | Yes |
| 97 | East Yakutat/Southeast | Slope | Yes |
| 98 | East Yakutat/Southeast | Slope | Yes |
| 99 | East Yakutat/Southeast | Slope | Yes |
| 100 | East Yakutat/Southeast | Slope | Yes |
| 101 | East Yakutat/Southeast | Slope | Yes |
| 102 | East Yakutat/Southeast | Slope | Yes |
| 103 | East Yakutat/Southeast | Shelf | No |
| 104 | East Yakutat/Southeast | Slope | Yes |
| 105 | East Yakutat/Southeast | Slope | Yes |
| 106 | East Yakutat/Southeast | Slope | Yes |
| 107 | East Yakutat/Southeast | Slope | Yes |
| 108 | East Yakutat/Southeast | Slope | Yes |
| 120 | Central Gulf of Alaska | Gully | No |
| 121 | Central Gulf of Alaska | Gully | No |
| 122 | Central Gulf of Alaska | Gully | No |
| 123 | Central Gulf of Alaska | Gully | No |
| 124 | Central Gulf of Alaska | Gully | No |
| 125 | Central Gulf of Alaska | Gully | No |
| 126 | Central Gulf of Alaska | Gully | No |
| 127 | Central Gulf of Alaska | Gully | No |
| 128 | Central Gulf of Alaska | Gully | No |
| 129 | Central Gulf of Alaska | Gully | No |
| 130 | Central Gulf of Alaska | Gully | No |
| 131 | Central Gulf of Alaska | Gully | No |
| 132 | Central Gulf of Alaska | Gully | No |
| 133 | Central Gulf of Alaska | Gully | No |
| 134 | Central Gulf of Alaska | Gully | No |
| 135 | Central Gulf of Alaska | Gully | No |
| 136 | West Yakutat | Gully | No |
| 137 | West Yakutat | Gully | No |
| 138 | West Yakutat | Gully | No |

| Station Number | Sablefish Management Area | Station Type | Abundance Calculations |
|---|---|---|---|
| 139 | West Yakutat | Gully | No |
| 142 | East Yakutat/Southeast | Deep Gully | Yes |
| 143 | East Yakutat/Southeast | Deep Gully | Yes |
| 144 | East Yakutat/Southeast | Deep Gully | Yes |
| 145 | East Yakutat/Southeast | Deep Gully | Yes |
| 148 | East Yakutat/Southeast | Deep Gully | Yes |
| 149 | East Yakutat/Southeast | Deep Gully | Yes |

Table 3. Set information by set and haul for the 2013 NMFS longline survey. Positions are in decimal degree (DD) format.

| Station | Haul | Date | # Skates Retrieved | Start Latitude | Start Longitude | End Latitude | End Longitude | Start Depth (m) | End Depth (m) |
|---|---|---|---|---|---|---|---|---|---|
| 17 | 1 | 30-May | 90 | 56.04 | -169.62 | 55.99 | -169.73 | 189 | 406 |
| 17 | 2 | 30-May | 90 | 55.99 | -169.74 | 55.98 | -169.89 | 422 | 873 |
| 12 | 3 | 31-May | 90 | 56.63 | -172.36 | 56.57 | -172.44 | 191 | 592 |
| 12 | 4 | 31-May | 90 | 56.57 | -172.44 | 56.50 | -172.51 | 586 | 689 |
| 8 | 5 | 1-Jun | 90 | 57.63 | -174.16 | 57.70 | -174.24 | 136 | 452 |
| 8 | 6 | 1-Jun | 90 | 57.70 | -174.24 | 57.78 | -174.30 | 377 | 839 |
| 2 | 7 | 2-Jun | 90 | 58.62 | -176.64 | 58.58 | -176.76 | 148 | 504 |
| 2 | 8 | 2-Jun | 90 | 58.58 | -176.77 | 58.55 | -176.91 | 531 | 941 |
| 1 | 9 | 3-Jun | 90 | 58.78 | -177.58 | 58.81 | -177.71 | 153 | 411 |
| 1 | 10 | 3-Jun | 90 | 58.82 | -177.72 | 58.86 | -177.84 | 445 | 684 |
| 4 | 11 | 4-Jun | 90 | 58.50 | -175.65 | 58.48 | -175.79 | 220 | 440 |
| 4 | 12 | 4-Jun | 90 | 58.48 | -175.79 | 58.50 | -175.92 | 448 | 739 |
| 6 | 13 | 5-Jun | 90 | 58.33 | -174.31 | 58.40 | -174.37 | 167 | 493 |
| 6 | 14 | 5-Jun | 90 | 58.41 | -174.38 | 58.38 | -174.49 | 413 | 646 |
| 10 | 15 | 6-Jun | 90 | 56.83 | -173.38 | 56.90 | -173.41 | 206 | 487 |
| 10 | 16 | 6-Jun | 90 | 56.91 | -173.41 | 56.97 | -173.46 | 391 | 609 |
| 13 | 17 | 7-Jun | 90 | 56.49 | -171.45 | 56.47 | -171.57 | 169 | 409 |
| 13 | 18 | 7-Jun | 90 | 56.47 | -171.57 | 56.46 | -171.70 | 392 | 632 |
| 15 | 19 | 8-Jun | 90 | 56.16 | -170.67 | 56.13 | -170.77 | 139 | 409 |
| 15 | 20 | 8-Jun | 90 | 56.13 | -170.78 | 56.16 | -170.91 | 436 | 821 |
| 18 | 21 | 9-Jun | 90 | 56.24 | -169.18 | 56.18 | -169.28 | 175 | 655 |
| 18 | 22 | 9-Jun | 90 | 56.18 | -169.28 | 56.13 | -169.38 | 663 | 851 |
| 20 | 23 | 10-Jun | 90 | 55.81 | -168.80 | 55.85 | -168.93 | 202 | 623 |
| 20 | 24 | 10-Jun | 88 | 55.85 | -168.94 | 55.93 | -169.00 | 500 | 709 |
| 22 | 25 | 11-Jun | 90 | 55.46 | -168.01 | 55.43 | -168.14 | 157 | 269 |
| 22 | 26 | 11-Jun | 90 | 55.42 | -168.14 | 55.39 | -168.28 | 283 | 590 |
| 34 | 27 | 12-Jun | 90 | 53.35 | -168.98 | 53.30 | -168.89 | 629 | 802 |
| 34 | 28 | 12-Jun | 90 | 53.29 | -168.89 | 53.28 | -168.81 | 529 | 761 |
| 33 | 29 | 13-Jun | 91 | 53.59 | -168.33 | 53.61 | -168.20 | 118 | 823 |
| 33 | 30 | 13-Jun | 90 | 53.61 | -168.19 | 53.62 | -168.06 | 118 | 781 |
| 32 | 31 | 14-Jun | 90 | 53.77 | -167.33 | 53.72 | -167.38 | 117 | 436 |
| 32 | 32 | 14-Jun | 90 | 53.71 | -167.39 | 53.69 | -167.46 | 314 | 582 |
| 64 | 33 | 16-Jun | 80 | 53.19 | -166.85 | 53.12 | -166.89 | 214 | 314 |
| 64 | 34 | 16-Jun | 80 | 53.12 | -166.89 | 53.06 | -166.95 | 322 | 802 |
| 62 | 35 | 17-Jun | 80 | 52.66 | -168.99 | 52.62 | -169.08 | 134 | 568 |
| 62 | 36 | 17-Jun | 80 | 52.62 | -169.09 | 52.57 | -169.17 | 418 | 763 |
| 63 | 37 | 18-Jun | 80 | 52.97 | -168.14 | 52.91 | -168.21 | 109 | 432 |
| 63 | 38 | 18-Jun | 80 | 52.91 | -168.21 | 52.85 | -168.24 | 355 | 420 |

| Station | Haul | Date | # Skates Retrieved | Start Latitude | Start Longitude | End Latitude | End Longitude | Start Depth (m) | End Depth (m) |
|---|---|---|---|---|---|---|---|---|---|
| 65 | 39 | 19-Jun | 80 | 53.58 | -165.69 | 53.51 | -165.73 | 355 | 420 |
| 65 | 40 | 19-Jun | 80 | 53.51 | -165.73 | 53.44 | -165.78 | 124 | 300 |
| 66 | 41 | 20-Jun | 80 | 53.74 | -164.47 | 53.68 | -164.55 | 315 | 491 |
| 66 | 42 | 20-Jun | 80 | 53.68 | -164.54 | 53.63 | -164.64 | 137 | 278 |
| 67 | 43 | 21-Jun | 80 | 53.97 | -163.26 | 53.91 | -163.32 | 283 | 575 |
| 67 | 44 | 21-Jun | 80 | 53.91 | -163.33 | 53.87 | -163.43 | 116 | 358 |
| 68 | 45 | 22-Jun | 80 | 54.13 | -161.63 | 54.09 | -161.71 | 323 | 652 |
| 68 | 46 | 22-Jun | 80 | 54.09 | -161.72 | 54.07 | -161.82 | 137 | 357 |
| 69 | 47 | 23-Jun | 80 | 54.31 | -161.06 | 54.26 | -161.15 | 269 | 753 |
| 69 | 48 | 23-Jun | 80 | 54.26 | -161.16 | 54.21 | -161.23 | 176 | 375 |
| 70 | 49 | 24-Jun | 80 | 54.37 | -160.25 | 54.30 | -160.29 | 384 | 792 |
| 70 | 50 | 24-Jun | 80 | 54.30 | -160.29 | 54.23 | -160.31 | 149 | 285 |
| 71 | 51 | 25-Jun | 80 | 54.50 | -159.26 | 54.44 | -159.32 | 313 | 596 |
| 71 | 52 | 25-Jun | 80 | 54.43 | -159.32 | 54.38 | -159.40 | 148 | 271 |
| 72 | 53 | 26-Jun | 80 | 54.63 | -158.57 | 54.57 | -158.61 | 292 | 708 |
| 72 | 54 | 26-Jun | 80 | 54.57 | -158.65 | 54.50 | -158.70 | 137 | 362 |
| 73 | 55 | 27-Jun | 80 | 54.85 | -157.74 | 54.79 | -157.81 | 367 | 878 |
| 73 | 56 | 27-Jun | 80 | 54.79 | -157.81 | 54.73 | -157.85 | 193 | 368 |
| 74 | 57 | 28-Jun | 80 | 55.24 | -156.67 | 55.18 | -156.74 | 354 | 625 |
| 74 | 58 | 28-Jun | 80 | 55.17 | -156.74 | 55.10 | -156.76 | 185 | 335 |
| 75 | 59 | 29-Jun | 80 | 55.64 | -155.85 | 55.57 | -155.86 | 311 | 705 |
| 75 | 60 | 29-Jun | 80 | 55.56 | -155.86 | 55.49 | -155.83 | 143 | 211 |
| 148 | 61 | 5-Jul | 80 | 54.65 | -132.84 | 54.60 | -132.94 | 214 | 228 |
| 149 | 62 | 5-Jul | 80 | 54.60 | -133.02 | 54.60 | -133.15 | 145 | 378 |
| 108 | 63 | 6-Jul | 80 | 54.46 | -133.92 | 54.49 | -134.01 | 410 | 417 |
| 108 | 64 | 6-Jul | 80 | 54.50 | -134.01 | 54.55 | -134.07 | 255 | 668 |
| 107 | 65 | 7-Jul | 80 | 54.90 | -134.29 | 54.96 | -134.35 | 443 | 878 |
| 107 | 66 | 7-Jul | 80 | 54.96 | -134.35 | 55.01 | -134.43 | 221 | 623 |
| 106 | 67 | 8-Jul | 80 | 55.35 | -134.73 | 55.40 | -134.83 | 456 | 738 |
| 106 | 68 | 8-Jul | 80 | 55.40 | -134.84 | 55.39 | -134.95 | 380 | 626 |
| 105 | 69 | 9-Jul | 80 | 55.56 | -134.97 | 55.58 | -135.06 | 514 | 825 |
| 105 | 70 | 9-Jul | 80 | 55.59 | -135.06 | 55.63 | -135.15 | 215 | 607 |
| 144 | 71 | 10-Jul | 80 | 55.93 | -134.90 | 56.01 | -134.91 | 539 | 926 |
| 145 | 72 | 10-Jul | 80 | 56.03 | -134.93 | 56.08 | -135.01 | 201 | 362 |
| 104 | 73 | 11-Jul | 80 | 55.99 | -135.45 | 56.03 | -135.54 | 353 | 384 |
| 104 | 74 | 11-Jul | 80 | 56.03 | -135.54 | 56.09 | -135.61 | 369 | 639 |
| 103 | 75 | 12-Jul | 80 | 56.38 | -135.35 | 56.38 | -135.48 | 566 | 786 |
| 103 | 76 | 12-Jul | 80 | 56.38 | -135.49 | 56.37 | -135.62 | 145 | 186 |
| 102 | 77 | 13-Jul | 80 | 56.86 | -136.00 | 56.90 | -136.09 | 188 | 246 |
| 102 | 78 | 13-Jul | 80 | 56.90 | -136.09 | 56.96 | -136.12 | 283 | 846 |

| Station | Haul | Date | # Skates Retrieved | Start Latitude | Start Longitude | End Latitude | End Longitude | Start Depth (m) | End Depth (m) |
|---|---|---|---|---|---|---|---|---|---|
| 101 | 79 | 14-Jul | 80 | 57.19 | -136.24 | 57.22 | -136.34 | 241 | 727 |
| 101 | 80 | 14-Jul | 80 | 57.22 | -136.34 | 57.28 | -136.37 | 650 | 921 |
| 100 | 81 | 15-Jul | 80 | 57.62 | -136.54 | 57.62 | -136.67 | 273 | 712 |
| 100 | 82 | 15-Jul | 80 | 57.62 | -136.68 | 57.67 | -136.77 | 662 | 926 |
| 142 | 83 | 16-Jul | 80 | 57.92 | -137.01 | 57.92 | -137.14 | 394 | 446 |
| 143 | 84 | 16-Jul | 80 | 57.97 | -137.07 | 57.97 | -137.20 | 263 | 422 |
| 99 | 85 | 17-Jul | 80 | 57.88 | -137.38 | 57.89 | -137.49 | 212 | 729 |
| 99 | 86 | 17-Jul | 80 | 57.89 | -137.50 | 57.88 | -137.62 | 546 | 847 |
| 98 | 87 | 18-Jul | 80 | 58.14 | -138.73 | 58.16 | -138.86 | 231 | 819 |
| 98 | 88 | 18-Jul | 80 | 58.16 | -138.86 | 58.18 | -138.98 | 500 | 809 |
| 97 | 89 | 19-Jul | 80 | 58.47 | -139.47 | 58.46 | -139.61 | 189 | 552 |
| 97 | 90 | 19-Jul | 80 | 58.46 | -139.61 | 58.42 | -139.70 | 509 | 781 |
| 96 | 95 | 24-Jul | 80 | 58.68 | -140.64 | 58.69 | -140.79 | 273 | 634 |
| 96 | 96 | 24-Jul | 80 | 58.70 | -140.79 | 58.74 | -140.90 | 469 | 764 |
| 95 | 97 | 25-Jul | 80 | 59.06 | -141.34 | 59.05 | -141.48 | 291 | 509 |
| 95 | 98 | 25-Jul | 80 | 59.05 | -141.49 | 59.05 | -141.63 | 532 | 844 |
| 138 | 99 | 26-Jul | 80 | 59.42 | -140.92 | 59.43 | -141.08 | 201 | 294 |
| 139 | 100 | 26-Jul | 80 | 59.41 | -141.17 | 59.35 | -141.26 | 321 | 329 |
| 94 | 101 | 27-Jul | 80 | 59.39 | -142.18 | 59.42 | -142.30 | 245 | 558 |
| 94 | 102 | 27-Jul | 80 | 59.43 | -142.31 | 59.47 | -142.40 | 539 | 946 |
| 93 | 103 | 28-Jul | 80 | 59.55 | -142.57 | 59.59 | -142.69 | 129 | 609 |
| 93 | 104 | 28-Jul | 80 | 59.59 | -142.69 | 59.57 | -142.80 | 580 | 643 |
| 136 | 105 | 29-Jul | 80 | 59.68 | -143.38 | 59.72 | -143.49 | 297 | 313 |
| 137 | 106 | 29-Jul | 80 | 59.75 | -143.59 | 59.76 | -143.71 | 159 | 299 |
| 92 | 107 | 30-Jul | 80 | 59.56 | -143.66 | 59.56 | -143.80 | 207 | 798 |
| 92 | 108 | 30-Jul | 80 | 59.57 | -143.81 | 59.59 | -143.93 | 563 | 701 |
| 91 | 109 | 31-Jul | 80 | 59.52 | -144.72 | 59.48 | -144.85 | 184 | 472 |
| 91 | 110 | 31-Jul | 80 | 59.48 | -144.85 | 59.45 | -144.98 | 484 | 839 |
| 90 | 111 | 1-Aug | 80 | 59.50 | -145.54 | 59.53 | -145.68 | 160 | 803 |
| 90 | 112 | 1-Aug | 80 | 59.53 | -145.69 | 59.52 | -145.81 | 536 | 741 |
| 89 | 113 | 2-Aug | 80 | 59.26 | -146.86 | 59.22 | -146.97 | 196 | 615 |
| 89 | 114 | 2-Aug | 80 | 59.21 | -146.98 | 59.17 | -147.07 | 623 | 910 |
| 134 | 115 | 5-Aug | 80 | 59.51 | -146.97 | 59.56 | -147.07 | 209 | 215 |
| 135 | 116 | 5-Aug | 80 | 59.52 | -147.15 | 59.44 | -147.15 | 209 | 218 |
| 88 | 117 | 6-Aug | 80 | 59.16 | -147.60 | 59.10 | -147.62 | 247 | 495 |
| 88 | 118 | 6-Aug | 80 | 59.08 | -147.62 | 59.01 | -147.63 | 522 | 890 |
| 87 | 119 | 7-Aug | 80 | 59.13 | -148.65 | 59.06 | -148.65 | 154 | 192 |
| 87 | 120 | 7-Aug | 80 | 59.05 | -148.65 | 58.98 | -148.65 | 199 | 240 |
| 132 | 121 | 8-Aug | 80 | 59.08 | -149.40 | 59.04 | -149.51 | 182 | 227 |
| 133 | 122 | 8-Aug | 80 | 58.95 | -149.51 | 58.92 | -149.63 | 238 | 244 |

| Station | Haul | Date | # Skates Retrieved | Start Latitude | Start Longitude | End Latitude | End Longitude | Start Depth (m) | End Depth (m) |
|---|---|---|---|---|---|---|---|---|---|
| 130 | 123 | 9-Aug | 80 | 58.73 | -149.19 | 58.77 | -149.08 | 177 | 216 |
| 131 | 124 | 9-Aug | 80 | 58.80 | -149.04 | 58.84 | -148.92 | 236 | 253 |
| 86 | 125 | 10-Aug | 80 | 58.69 | -148.33 | 58.62 | -148.33 | 285 | 461 |
| 86 | 126 | 10-Aug | 80 | 58.62 | -148.33 | 58.56 | -148.34 | 464 | 818 |
| 85 | 127 | 11-Aug | 80 | 58.29 | -148.62 | 58.22 | -148.66 | 245 | 523 |
| 85 | 128 | 11-Aug | 80 | 58.22 | -148.66 | 58.14 | -148.70 | 545 | 847 |
| 84 | 129 | 12-Aug | 80 | 57.97 | -149.17 | 57.91 | -149.26 | 173 | 496 |
| 84 | 130 | 12-Aug | 80 | 57.91 | -149.26 | 57.85 | -149.34 | 517 | 958 |
| 128 | 131 | 13-Aug | 80 | 57.98 | -149.97 | 58.00 | -149.83 | 220 | 264 |
| 129 | 132 | 13-Aug | 80 | 58.08 | -149.91 | 58.07 | -150.03 | 295 | 307 |
| 83 | 133 | 14-Aug | 80 | 57.63 | -149.92 | 57.57 | -149.95 | 390 | 547 |
| 83 | 134 | 14-Aug | 80 | 57.56 | -149.95 | 57.50 | -149.98 | 557 | 839 |
| 82 | 135 | 15-Aug | 80 | 57.40 | -150.58 | 57.33 | -150.59 | 217 | 490 |
| 82 | 136 | 15-Aug | 80 | 57.34 | -150.49 | 57.28 | -150.57 | 535 | 717 |
| 81 | 137 | 17-Aug | 80 | 57.12 | -151.21 | 57.05 | -151.27 | 251 | 528 |
| 81 | 138 | 17-Aug | 80 | 57.05 | -151.28 | 56.97 | -151.28 | 564 | 837 |
| 80 | 139 | 18-Aug | 80 | 56.48 | -152.21 | 56.42 | -152.30 | 160 | 495 |
| 80 | 140 | 18-Aug | 80 | 56.42 | -152.31 | 56.34 | -152.36 | 450 | 612 |
| 79 | 141 | 19-Aug | 80 | 56.30 | -153.08 | 56.26 | -153.20 | 246 | 586 |
| 79 | 142 | 19-Aug | 80 | 56.26 | -153.21 | 56.21 | -153.29 | 571 | 854 |
| 78 | 143 | 20-Aug | 80 | 55.99 | -154.02 | 55.92 | -154.02 | 239 | 484 |
| 78 | 144 | 20-Aug | 80 | 55.92 | -154.02 | 55.85 | -154.05 | 520 | 870 |
| 77 | 145 | 21-Aug | 80 | 56.05 | -154.58 | 55.98 | -154.58 | 227 | 507 |
| 77 | 146 | 21-Aug | 80 | 55.97 | -154.58 | 55.90 | -154.58 | 546 | 884 |
| 76 | 147 | 22-Aug | 80 | 55.76 | -155.14 | 55.70 | -155.18 | 165 | 325 |
| 76 | 148 | 22-Aug | 80 | 55.69 | -155.18 | 55.64 | -155.25 | 365 | 577 |
| 126 | 149 | 23-Aug | 80 | 57.35 | -155.04 | 57.35 | -155.17 | 238 | 240 |
| 127 | 150 | 23-Aug | 80 | 57.35 | -155.25 | 57.33 | -155.38 | 246 | 259 |
| 124 | 151 | 24-Aug | 80 | 56.99 | -155.06 | 57.00 | -155.19 | 175 | 233 |
| 125 | 152 | 24-Aug | 80 | 57.00 | -155.31 | 57.04 | -155.41 | 253 | 266 |
| 122 | 153 | 25-Aug | 80 | 56.19 | -155.97 | 56.19 | -156.09 | 200 | 239 |
| 123 | 154 | 25-Aug | 80 | 56.23 | -156.13 | 56.25 | -156.24 | 247 | 266 |
| 120 | 155 | 26-Aug | 80 | 55.79 | -156.08 | 55.77 | -156.19 | 203 | 237 |
| 121 | 156 | 26-Aug | 80 | 55.75 | -156.20 | 55.73 | -156.33 | 243 | 252 |

Table 4. Catch in number by species for the 2013 NMFS longline survey. SF = sablefish, PC = Pacific cod, GR = giant grenadier, PH = Pacific halibut, ATF = arrowtooth flounder, GT = Greenland turbot, RF = rougheye and shortraker rockfish, ST = shortspine thornyheads, SK = skate, OS = other species.

| Station | SF | PC | GR | PH | ATF | GT | RF | ST | SK | OS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 127 | 74 | 2103 | 61 | 94 | 69 | 11 | 36 | 274 | 187 |
| 2* | 30 | 348 | 2767 | 168 | 209 | 35 | 9 | 6 | 254 | 333 |
| 4 | 107 | 103 | 2185 | 212 | 310 | 72 | 49 | 23 | 209 | 104 |
| 6* | 129 | 468 | 1809 | 263 | 265 | 55 | 97 | 29 | 420 | 278 |
| 8 | 116 | 519 | 1584 | 175 | 207 | 94 | 78 | 87 | 230 | 251 |
| 10* | 39 | 140 | 2268 | 20 | 105 | 0 | 96 | 159 | 240 | 290 |
| 12* | 7 | 427 | 2035 | 190 | 71 | 31 | 15 | 170 | 310 | 248 |
| 13* | 3 | 584 | 829 | 33 | 78 | 0 | 65 | 208 | 131 | 300 |
| 15* | 13 | 852 | 932 | 218 | 167 | 0 | 145 | 304 | 111 | 348 |
| 17* | 78 | 787 | 863 | 27 | 362 | 47 | 14 | 126 | 78 | 281 |
| 18* | 761 | 185 | 712 | 145 | 697 | 307 | 3 | 83 | 231 | 65 |
| 20* | 328 | 789 | 19 | 234 | 272 | 44 | 9 | 88 | 251 | 364 |
| 22* | 98 | 1278 | 25 | 210 | 631 | 41 | 4 | 55 | 156 | 616 |
| 32* | 372 | 776 | 23 | 425 | 281 | 8 | 383 | 660 | 206 | 186 |
| 33 | 563 | 960 | 288 | 334 | 190 | 64 | 154 | 241 | 136 | 280 |
| 34 | 827 | 0 | 137 | 43 | 244 | 317 | 4 | 152 | 348 | 80 |
| 62 | 1260 | 249 | 1781 | 36 | 34 | 0 | 550 | 363 | 24 | 48 |
| 63 | 451 | 483 | 1878 | 84 | 128 | 0 | 549 | 291 | 74 | 47 |
| 64* | 126 | 3 | 339 | 69 | 29 | 0 | 285 | 336 | 31 | 121 |
| 65* | 545 | 394 | 2034 | 100 | 97 | 0 | 37 | 204 | 96 | 49 |
| 66 | 1212 | 203 | 1694 | 73 | 63 | 0 | 84 | 209 | 42 | 27 |
| 67 | 657 | 251 | 1478 | 177 | 114 | 0 | 239 | 358 | 62 | 50 |
| 68 | 514 | 385 | 731 | 242 | 241 | 0 | 314 | 533 | 50 | 57 |
| 69 | 442 | 134 | 1961 | 89 | 51 | 0 | 22 | 221 | 19 | 37 |
| 70 | 486 | 212 | 1099 | 161 | 61 | 0 | 27 | 203 | 38 | 110 |
| 71* | 609 | 676 | 1398 | 174 | 95 | 0 | 15 | 279 | 33 | 56 |
| 72 | 1177 | 147 | 696 | 165 | 178 | 0 | 30 | 464 | 25 | 70 |
| 73* | 282 | 9 | 1878 | 43 | 174 | 0 | 64 | 251 | 18 | 91 |
| 74* | 981 | 30 | 1089 | 51 | 173 | 0 | 33 | 934 | 36 | 105 |
| 75 | 171 | 918 | 0 | 525 | 307 | 0 | 24 | 48 | 200 | 150 |
| 76 | 729 | 172 | 1000 | 124 | 143 | 0 | 39 | 130 | 177 | 772 |
| 77 | 1132 | 1 | 2304 | 6 | 27 | 0 | 9 | 313 | 3 | 242 |
| 78 | 707 | 1 | 1593 | 38 | 63 | 0 | 179 | 419 | 14 | 359 |
| 79+ | 946 | 0 | 1285 | 14 | 64 | 0 | 90 | 400 | 2 | 100 |
| 80 | 531 | 1 | 1344 | 95 | 87 | 0 | 187 | 363 | 11 | 82 |
| 81 | 1452 | 0 | 1340 | 35 | 125 | 0 | 54 | 247 | 4 | 188 |

| Station | SF | PC | GR | PH | ATF | GT | RF | ST | SK | OS |
|---|---|---|---|---|---|---|---|---|---|---|
| 82 | 1217 | 0 | 1056 | 165 | 115 | 0 | 45 | 402 | 5 | 26 |
| 83 | 1252 | 0 | 1515 | 1 | 17 | 0 | 4 | 372 | 2 | 108 |
| 84 | 1470 | 80 | 415 | 102 | 118 | 0 | 42 | 406 | 17 | 291 |
| 85 | 1140 | 5 | 706 | 50 | 51 | 0 | 25 | 521 | 30 | 92 |
| 86 | 1076 | 0 | 504 | 68 | 71 | 0 | 107 | 570 | 15 | 65 |
| 87 | 2070 | 49 | 0 | 147 | 96 | 0 | 4 | 102 | 82 | 122 |
| 88 | 1307 | 6 | 465 | 8 | 74 | 0 | 252 | 388 | 2 | 246 |
| 89 | 709 | 8 | 1116 | 26 | 32 | 0 | 24 | 458 | 1 | 135 |
| 90 | 722 | 13 | 638 | 24 | 22 | 0 | 129 | 429 | 13 | 105 |
| 91 | 697 | 7 | 598 | 47 | 77 | 0 | 187 | 373 | 11 | 95 |
| 92 | 829 | 1 | 368 | 5 | 40 | 0 | 27 | 411 | 2 | 32 |
| 93 | 639 | 1 | 1049 | 75 | 4 | 0 | 2 | 644 | 14 | 68 |
| 94 | 651 | 0 | 415 | 24 | 89 | 0 | 34 | 453 | 7 | 71 |
| 95 | 812 | 0 | 545 | 11 | 9 | 0 | 276 | 502 | 6 | 76 |
| 96 | 1527 | 0 | 365 | 4 | 41 | 0 | 319 | 333 | 18 | 69 |
| 97 | 972 | 1 | 327 | 1 | 57 | 0 | 99 | 268 | 16 | 50 |
| 98 | 561 | 0 | 722 | 5 | 8 | 0 | 373 | 69 | 2 | 47 |
| 99 | 669 | 0 | 212 | 8 | 9 | 0 | 97 | 144 | 13 | 226 |
| 100 | 1327 | 0 | 318 | 1 | 19 | 0 | 94 | 316 | 6 | 51 |
| 101 | 1041 | 3 | 331 | 1 | 26 | 0 | 86 | 404 | 9 | 102 |
| 102 | 931 | 1 | 443 | 1 | 33 | 0 | 65 | 387 | 7 | 74 |
| 103 | 185 | 225 | 0 | 417 | 36 | 0 | 0 | 28 | 47 | 800 |
| 104 | 1017 | 0 | 257 | 7 | 5 | 0 | 178 | 568 | 36 | 113 |
| 105 | 1542 | 5 | 266 | 28 | 21 | 0 | 109 | 358 | 30 | 169 |
| 106 | 1305 | 0 | 207 | 1 | 21 | 0 | 160 | 469 | 17 | 92 |
| 107 | 1317 | 2 | 247 | 7 | 13 | 0 | 141 | 372 | 12 | 224 |
| 108 | 1277 | 17 | 144 | 17 | 42 | 0 | 550 | 358 | 41 | 314 |
| 120 | 140 | 846 | 0 | 52 | 125 | 0 | 0 | 6 | 217 | 86 |
| 121 | 398 | 26 | 0 | 44 | 185 | 0 | 0 | 35 | 249 | 76 |
| 122 | 158 | 513 | 0 | 29 | 154 | 0 | 0 | 8 | 288 | 149 |
| 123 | 111 | 87 | 0 | 7 | 130 | 0 | 0 | 1 | 185 | 105 |
| 124 | 46 | 264 | 0 | 243 | 335 | 0 | 0 | 0 | 315 | 115 |
| 125 | 16 | 414 | 0 | 264 | 190 | 0 | 0 | 0 | 338 | 47 |
| 126 | 32 | 286 | 0 | 195 | 266 | 0 | 0 | 0 | 233 | 126 |
| 127 | 15 | 121 | 0 | 182 | 198 | 0 | 0 | 0 | 388 | 53 |
| 128 | 1017 | 51 | 0 | 186 | 38 | 0 | 9 | 70 | 37 | 63 |
| 129 | 809 | 0 | 0 | 27 | 8 | 0 | 3 | 98 | 35 | 12 |
| 130 | 101 | 2 | 0 | 12 | 40 | 0 | 1 | 250 | 41 | 20 |
| 131 | 815 | 1 | 0 | 22 | 52 | 0 | 11 | 257 | 35 | 60 |
| 132 | 801 | 1 | 0 | 12 | 42 | 0 | 0 | 56 | 68 | 39 |

| Station | SF | PC | GR | PH | ATF | GT | RF | ST | SK | OS |
|---|---|---|---|---|---|---|---|---|---|---|
| 133 | 428 | 0 | 0 | 10 | 38 | 0 | 2 | 348 | 48 | 91 |
| 134 | 838 | 0 | 0 | 20 | 38 | 0 | 69 | 73 | 79 | 142 |
| 135 | 260 | 0 | 0 | 133 | 76 | 0 | 8 | 60 | 61 | 102 |
| 136 | 406 | 0 | 0 | 11 | 4 | 0 | 5 | 179 | 10 | 9 |
| 137 | 235 | 4 | 0 | 62 | 11 | 0 | 1 | 97 | 8 | 33 |
| 138 | 71 | 0 | 0 | 43 | 27 | 0 | 36 | 209 | 16 | 54 |
| 139 | 317 | 0 | 0 | 20 | 51 | 0 | 35 | 101 | 31 | 11 |
| 142 | 775 | 0 | 61 | 6 | 14 | 0 | 8 | 398 | 10 | 21 |
| 143 | 962 | 0 | 106 | 17 | 92 | 0 | 25 | 186 | 23 | 38 |
| 144 | 160 | 34 | 0 | 249 | 99 | 0 | 71 | 424 | 72 | 161 |
| 145 | 651 | 0 | 0 | 33 | 28 | 0 | 96 | 286 | 66 | 130 |
| 148 | 375 | 166 | 0 | 98 | 38 | 0 | 23 | 127 | 138 | 347 |
| 149 | 762 | 1 | 0 | 45 | 8 | 0 | 10 | 148 | 127 | 102 |
| Total | 56,969 | 15,800 | 58,897 | 8,332 | 9,870 | 1,184 | 7,809 | 22,515 | 8,123 | 13,027 |

* Station catch was entirely or partially impacted by killer whale depredation.
\+ Station catch was partially impacted by gear loss or fishing vessel interactions.

Table 5. Mean length, round weight, mean dressed weight, number, and estimated total round weight of sablefish by station for the 2013 NMFS longline survey.

| Station | Mean Length | Mean Round Weight(kg)[1] | Mean Dressed Weight(lbs)[2] | Number of Sablefish | Est. Total Round Weight(kg)[3] |
|---|---|---|---|---|---|
| 1 | 63.84 | 2.77 | 3.85 | 127 | 352 |
| 2 | 59.64 | 2.43 | 3.38 | 30 | 73 |
| 4* | 66.13 | 3.13 | 4.34 | 107 | 335 |
| 6* | 64.24 | 3.11 | 4.32 | 129 | 401 |
| 8 | 67.29 | 3.32 | 4.61 | 116 | 385 |
| 10* | 67.19 | 3.3 | 4.59 | 39 | 129 |
| 12* | 61.5 | 2.44 | 3.39 | 7 | 17 |
| 13* | 66 | 3.06 | 4.26 | 3 | 9 |
| 15 | 67.01 | 3.27 | 4.54 | 13 | 42 |
| 17* | 60.62 | 2.35 | 3.27 | 78 | 184 |
| 18 | 61.68 | 2.48 | 3.44 | 761 | 1886 |
| 20 | 62.39 | 2.55 | 3.55 | 328 | 838 |
| 22 | 59.82 | 2.21 | 3.07 | 98 | 216 |
| 32 | 64.04 | 2.84 | 3.94 | 372 | 1056 |
| 33 | 60.52 | 2.39 | 3.32 | 563 | 1346 |
| 34* | 60.66 | 2.43 | 3.37 | 827 | 2009 |
| 62* | 57.98 | 2.05 | 2.85 | 1260 | 2587 |
| 63* | 62.47 | 2.69 | 3.74 | 451 | 1215 |
| 64* | 52.56 | 1.44 | 2 | 126 | 181 |
| 65* | 59.5 | 2.19 | 3.04 | 545 | 1193 |
| 66 | 58.23 | 2.05 | 2.85 | 1212 | 2489 |
| 67 | 65.51 | 3.08 | 4.28 | 657 | 2024 |
| 68 | 66.28 | 3.24 | 4.5 | 514 | 1665 |
| 69 | 58.57 | 2.18 | 3.03 | 442 | 965 |
| 70 | 58.62 | 2.15 | 2.98 | 486 | 1044 |
| 71* | 58.72 | 2.17 | 3.01 | 609 | 1321 |
| 72 | 62.11 | 2.62 | 3.64 | 1177 | 3086 |
| 73* | 54.6 | 1.66 | 2.31 | 282 | 468 |
| 74 | 63.55 | 2.8 | 3.89 | 981 | 2749 |
| 75 | 56.78 | 1.92 | 2.66 | 171 | 328 |
| 76 | 60.13 | 2.32 | 3.22 | 729 | 1688 |
| 77 | 63.6 | 2.85 | 3.95 | 1132 | 3221 |
| 78 | 65.54 | 3.1 | 4.31 | 707 | 2194 |
| 79 | 64.62 | 2.9 | 4.03 | 946 | 2744 |
| 80 | 65.74 | 3.09 | 4.29 | 531 | 1641 |
| 81 | 65.88 | 3.15 | 4.38 | 1452 | 4578 |

| Station | Mean Length | Mean Round Weight(kg)[1] | Mean Dressed Weight(lbs)[2] | Number of Sablefish | Est. Total Round Weight(kg)[3] |
|---|---|---|---|---|---|
| 82 | 64.66 | 3 | 4.16 | 1217 | 3648 |
| 83 | 68.39 | 3.62 | 5.03 | 1252 | 4538 |
| 84 | 66.62 | 3.28 | 4.55 | 1470 | 4815 |
| 85 | 68.19 | 3.59 | 4.99 | 1140 | 4094 |
| 86 | 68.15 | 3.51 | 4.88 | 1076 | 3781 |
| 87 | 62.61 | 2.62 | 3.64 | 2070 | 5419 |
| 88 | 70.15 | 3.88 | 5.38 | 1307 | 5066 |
| 89 | 69.16 | 3.68 | 5.12 | 709 | 2612 |
| 90 | 65.72 | 3.15 | 4.37 | 722 | 2272 |
| 91 | 68.59 | 3.69 | 5.12 | 697 | 2569 |
| 92 | 67.03 | 3.39 | 4.71 | 829 | 2810 |
| 93 | 67.74 | 3.47 | 4.82 | 639 | 2217 |
| 94 | 65.42 | 3.09 | 4.29 | 651 | 2013 |
| 95 | 73.29 | 4.54 | 6.31 | 812 | 3689 |
| 96 | 74.76 | 4.88 | 6.78 | 1527 | 7453 |
| 97 | 70.49 | 4.04 | 5.61 | 972 | 3923 |
| 98 | 72.19 | 4.55 | 6.33 | 561 | 2555 |
| 99 | 71.56 | 4.2 | 5.84 | 669 | 2813 |
| 100 | 72.0 | 4.29 | 5.95 | 1327 | 5688 |
| 101 | 69.5 | 3.87 | 5.37 | 1041 | 4025 |
| 102 | 69.54 | 3.9 | 5.42 | 931 | 3633 |
| 103 | 60.96 | 2.59 | 3.6 | 185 | 479 |
| 104 | 65.36 | 3.18 | 4.41 | 1017 | 3230 |
| 105 | 69.97 | 3.92 | 5.45 | 1542 | 6048 |
| 106 | 67.38 | 3.51 | 4.88 | 1305 | 4584 |
| 107 | 66.97 | 3.47 | 4.82 | 1317 | 4571 |
| 108 | 67.42 | 3.49 | 4.85 | 1277 | 4463 |
| 120 | 59.76 | 2.24 | 3.12 | 140 | 314 |
| 121 | 57.88 | 2.03 | 2.83 | 398 | 810 |
| 122 | 59.99 | 2.27 | 3.15 | 158 | 359 |
| 123 | 58.78 | 2.14 | 2.97 | 111 | 238 |
| 124 | 65.23 | 2.93 | 4.07 | 46 | 135 |
| 125 | 64.14 | 2.8 | 3.88 | 16 | 45 |
| 126 | 63.03 | 2.65 | 3.68 | 32 | 85 |
| 127 | 60.08 | 2.28 | 3.16 | 15 | 34 |
| 128 | 63.15 | 2.7 | 3.75 | 1017 | 2748 |
| 129 | 62.33 | 2.56 | 3.55 | 809 | 2068 |
| 130 | 61.01 | 2.43 | 3.38 | 101 | 246 |

| Station | Mean Length | Mean Round Weight(kg)[1] | Mean Dressed Weight(lbs)[2] | Number of Sablefish | Est. Total Round Weight(kg)[3] |
|---|---|---|---|---|---|
| 131 | 65.11 | 2.96 | 4.12 | 815 | 2416 |
| 132 | 59.08 | 2.14 | 2.98 | 801 | 1716 |
| 133 | 62.04 | 2.53 | 3.52 | 428 | 1084 |
| 134 | 55.41 | 1.72 | 2.39 | 838 | 1441 |
| 135 | 54.89 | 1.68 | 2.34 | 260 | 437 |
| 136 | 62.51 | 2.64 | 3.67 | 406 | 1072 |
| 137 | 59.96 | 2.43 | 3.37 | 235 | 571 |
| 138 | 57.55 | 2.09 | 2.9 | 71 | 148 |
| 139 | 58.69 | 2.16 | 3 | 317 | 685 |
| 142 | 64.23 | 2.93 | 4.06 | 775 | 2267 |
| 143 | 64.28 | 2.97 | 4.12 | 962 | 2853 |
| 144 | 70.79 | 4.03 | 5.6 | 160 | 645 |
| 145 | 74.77 | 4.9 | 6.8 | 651 | 3189 |
| 148 | 64.78 | 2.95 | 4.09 | 375 | 1106 |
| 149 | 61.02 | 2.39 | 3.32 | 762 | 1819 |

* Station catch was entirely or partially impacted by killer whale depredation.

[1] Mean weight was estimated by applying a length-weight relationship to the length frequency distribution from each station.

[2] Mean dressed weight was estimated using a recovery rate of 0.6 of round weight in pounds.

[3] Estimated total round weight is the product of mean round weight and the number of hooked sablefish that came to the surface including a small percentage that were lost during landing and fish tagged and released.

Table 6. Total estimated catch (numbers) of major species (> 100 individuals) caught in 2013 NMFS longline survey. These estimates are for all fish landed including fish tagged and released.

| Species/Complex | Bering Sea | Western GOA | Central GOA | West Yakutat | East Yakutat Southeast | Total |
|---|---|---|---|---|---|---|
| Giant grenadier | 18,579 | 17,190 | 3,641 | 5,094 | 14,393 | 58,897 |
| Sablefish | 3,598 | 23,625 | 15,829 | 7,615 | 6,302 | 56,969 |
| Shortspine thornyhead | 2,427 | 7,592 | 5,310 | 4,189 | 2,997 | 22,515 |
| Pacific cod | 8,290 | 4,031 | 455 | 34 | 2,990 | 15,800 |
| Arrowtooth flounder | 4,183 | 3,798 | 569 | 407 | 913 | 9,870 |
| Pacific halibut | 2,758 | 3,075 | 942 | 352 | 1,205 | 8,332 |
| Aleutian/Bering/Alaska Skate Complex | 1,794 | 2,720 | 152 | 43 | 253 | 4,962 |
| Rougheye rockfish | 408 | 834 | 1,253 | 416 | 1,451 | 4,363 |
| Shortraker rockfish | 718 | 457 | 931 | 659 | 670 | 3,434 |
| Walleye pollock | 1,630 | 970 | 7 | 24 | 33 | 2,664 |
| Lips or Jaws - Whale Predation | 1,413 | 35 | 25 | 17 | 102 | 1,592 |
| Sea anemone unident. | 70 | 611 | 398 | 89 | 93 | 1,261 |
| Longnose skate | 0 | 482 | 437 | 87 | 202 | 1,208 |
| Greenland turbot | 1,184 | 0 | 0 | 0 | 0 | 1,184 |
| Spiny dogfish | 2 | 259 | 713 | 8 | 25 | 1,007 |
| Redbanded rockfish | 0 | 143 | 696 | 142 | 21 | 1,002 |
| whiteblotched skate | 897 | 0 | 0 | 0 | 0 | 897 |
| Pacific grenadier | 6 | 634 | 83 | 141 | 4 | 868 |
| Sea pen or Sea Whip | 12 | 633 | 4 | 28 | 14 | 691 |
| commander skate | 619 | 4 | 14 | 0 | 9 | 646 |
| Dover sole | 1 | 326 | 170 | 96 | 27 | 620 |
| Brittlestarfish | 33 | 350 | 24 | 12 | 90 | 509 |
| Spotted ratfish | 0 | 0 | 286 | 0 | 0 | 286 |
| Yelloweye rockfish | 0 | 31 | 178 | 43 | 16 | 268 |
| Skates unidentified | 164 | 42 | 32 | 6 | 4 | 248 |
| Flathead sole | 149 | 65 | 0 | 1 | 13 | 228 |
| Yellow Irish lord | 222 | 0 | 0 | 0 | 3 | 225 |
| Sponge, unidentified | 47 | 38 | 16 | 7 | 71 | 179 |
| Starfish unident. | 12 | 53 | 55 | 28 | 3 | 151 |
| Longspine Thornyhead | 0 | 49 | 89 | 6 | 0 | 144 |
| Rosethorn rockfish | 0 | 1 | 69 | 35 | 0 | 105 |

Table 7. Total estimated catch in weight (kg) of major species (>100 kg) caught by management area in the 2013 NMFS longline survey. Weight is derived from length-weight relationship when lengths available. For all other species, an average weight was used to estimate total weight from catch in numbers. These estimates are for all fish landed including fish tagged and released.

| Species/Complex | Bering Sea | Western GOA | Central GOA | West Yakutat | East Yakutat Southeast | Total |
|---|---|---|---|---|---|---|
| Giant grenadier | 83,456 | 57,182 | 12,758 | 15,847 | 45,507 | 214,749 |
| Sablefish | 9,278 | 68,234 | 57,892 | 28,112 | 14,683 | 178,198 |
| Pacific cod | 26,981 | 13,218 | 1,264 | 132 | 8,120 | 49,715 |
| Pacific halibut | 16,275 | 18,146 | 5,559 | 2,077 | 7,111 | 49,167 |
| Arrowtooth flounder | 7,535 | 5,996 | 1,011 | 785 | 1,479 | 16,807 |
| Shortspine thornyhead | 2,928 | 4,596 | 3,677 | 2,452 | 1,876 | 15,529 |
| Longnose skate | 0 | 3,593 | 3,258 | 649 | 1,506 | 9,006 |
| Rougheye rockfish | 582 | 1,078 | 2,106 | 496 | 1,963 | 6,225 |
| Shortraker rockfish | 1,205 | 701 | 1,394 | 1,156 | 875 | 5,331 |
| Whiteblotched skate | 4,832 | 0 | 0 | 0 | 0 | 4,832 |
| Greenland turbot | 4,332 | 0 | 0 | 0 | 0 | 4,332 |
| Walleye pollock | 2,316 | 1,378 | 10 | 34 | 47 | 3,785 |
| Spiny dogfish | 6 | 583 | 1,486 | 18 | 68 | 2,161 |
| Commander skate | 1,973 | 13 | 45 | 0 | 29 | 2,059 |
| Redbanded rockfish | 0 | 254 | 1,236 | 252 | 37 | 1,779 |
| Skates unidentified | 832 | 213 | 162 | 30 | 20 | 1,258 |
| Spotted ratfish | 0 | 0 | 1,041 | 0 | 0 | 1,041 |
| Dover sole | 1 | 485 | 253 | 143 | 40 | 922 |
| Pacific grenadier | 7 | 578 | 68 | 140 | 3 | 796 |
| Yelloweye rockfish | 0 | 89 | 513 | 124 | 46 | 773 |
| Pacific sleeper shark | 173 | 289 | 58 | 0 | 58 | 578 |
| Sea anemone unident. | 19 | 169 | 110 | 25 | 26 | 349 |
| Yellow Irish lord | 186 | 0 | 0 | 0 | 3 | 189 |
| Whitebrow skate | 177 | 0 | 9 | 0 | 3 | 189 |
| Mud skate | 166 | 0 | 14 | 0 | 0 | 179 |
| Flathead sole | 107 | 46 | 0 | 1 | 9 | 163 |
| Eelpout, unidentified | 132 | 0 | 1 | 0 | 0 | 134 |
| Sea pen or Sea Whip | 2 | 120 | 1 | 5 | 3 | 131 |
| Coho salmon | 0 | 41 | 38 | 41 | 0 | 120 |
| Roughtail skate | 0 | 16 | 95 | 3 | 0 | 113 |
| Lingcod | 0 | 8 | 57 | 41 | 0 | 107 |

Table 8. - Stations and skates at each station that were depredated upon by killer whales in the 2013 NMFS longline survey. Start skate refers to skate where killer whales began affecting catch. End skate refers to the last skate that was affected.

| Station | Region | Start Skate | End Skate |
|---|---|---|---|
| 2 | Bering Sea | 92 | 180 |
| 6 | Bering Sea | 142 | 180 |
| 10 | Bering Sea | 7 | 180 |
| 12 | Bering Sea | 37 | 180 |
| 13 | Bering Sea | 1 | 180 |
| 15 | Bering Sea | 1 | 180 |
| 17 | Bering Sea | 4 | 180 |
| 18 | Bering Sea | 142 | 180 |
| 20 | Bering Sea | 91 | 180 |
| 22 | Bering Sea | 161 | 180 |
| 32 | Bering Sea | 1 | 71 |
| 64 | Western Gulf of Alaska | 1 | 160 |
| 65 | Western Gulf of Alaska | 81 | 160 |
| 73 | Central Gulf of Alaska | 1 | 160 |
| 74 | Central Gulf of Alaska | 80 | 160 |

Table 9. Stations that had sperm whales present during hauling operations in the 2013 NMFS longline survey. Depredation is defined as sperm whales being present with the occurrence of damaged fish on the line.

| Station | Region | Depredation | Number of Whales |
|---|---|---|---|
| 64 | Western Gulf of Alaska | No | 1 |
| 65 | Western Gulf of Alaska | No | 1 |
| 73 | Central Gulf of Alaska | No | 1 |
| 77 | Central Gulf of Alaska | Yes | 1 |
| 84 | Central Gulf of Alaska | No | 1 |
| 85 | Central Gulf of Alaska | Yes | 1 |
| 86 | Central Gulf of Alaska | No | 2 |
| 92 | West Yakutat | Yes | 1 |
| 93 | West Yakutat | Yes | 4 |
| 94 | West Yakutat | Yes | 2 |
| 98 | East Yakutat/Southeast | Yes | 1 |
| 99 | East Yakutat/Southeast | Yes | 1 |
| 100 | East Yakutat/Southeast | Yes | 1 |
| 101 | East Yakutat/Southeast | Yes | 2 |
| 102 | East Yakutat/Southeast | No | 2 |
| 104 | East Yakutat/Southeast | Yes | 2 |
| 106 | East Yakutat/Southeast | Yes | 1 |
| 107 | East Yakutat/Southeast | Yes | 1 |

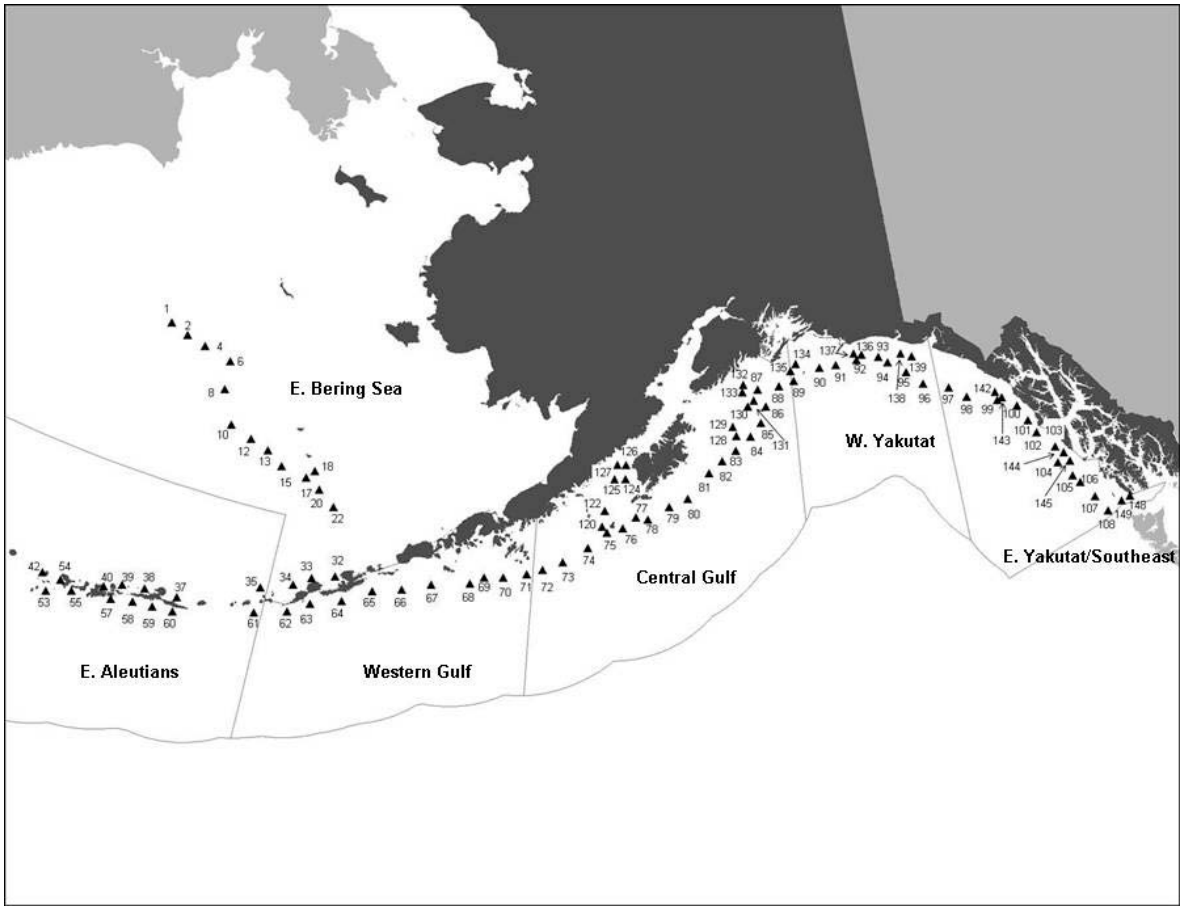


Figure 1. Map of NMFS longline survey station locations and corresponding management areas. Bering Sea stations are sampled in odd years; Aleutian Islands Region stations are sampled in even years; Gulf of Alaska stations are sampled every year.

## APPENDIX A: Electronic Data Collection and Hook Tension Device Experiment

A bait experiment was conducted near Yakutat from July 21-22 to test catching efficiency of walleye Pollock (*Theragra calcogramma*) compared to squid (*Illex sp)* bait. Four sets were made in the course of the two days consisting of 160 skates per set (Table A1). Each bait type was interspersed during a set in groupings of 10 skates each starting with squid (e.g., skates 1-10 squid; skates 11-20 pollock...). This resulted in a total of 80 skates baited with squid and 80 skates baited with pollock per set. Results will be tabulated and compared to data gathered during the 2012 longline survey.

During the two-day experiment four sets were completed (Table A1).

Table A1. Set information by station and haul for the 2013 NMFS longline survey 2-day experiment. Positions in decimal degree (DD) format.

| Haul | Date | Start Lat | Start Lon | End Lat | End Lon | Start Depth (m) | End Depth (m) |
|---|---|---|---|---|---|---|---|
| 1 | 21-Jul | 59.24 | -141.91 | 59.25 | -142.05 | 525 | 666 |
| 2 | 21-Jul | 59.25 | -142.07 | 59.29 | -142.19 | 581 | 700 |
| 3 | 22-Jul | 59.12 | -141.66 | 59.17 | -141.76 | 552 | 706 |
| 4 | 22-Jul | 59.19 | -141.80 | 59.24 | -141.91 | 576 | 721 |