

F/V *Ocean Prowler*
Cruise Report OP-11-01
Longline Survey of the Gulf of Alaska and Eastern Bering Sea
May 26-August 28, 2011

Prepared by

Chris Lunsford and Cara Rodgveller

On August 28, 2011, the Alaska Fisheries Science Center (AFSC) completed the 33rd 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 roughey and shorttraker 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 (Rajidae), and spiny dogfish (*Squalus suckleyi*).
3. Tag and release sablefish, shortspine thornyhead, and Greenland turbot throughout the cruise to determine migration patterns.
4. Implant Greenland turbot, spiny dogfish, and lingcod (*Ophiodon elongates*) with electronic tags that record water temperature, depth, and time.
5. 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 Mustad¹ circle hooks. Hooks were attached to 38 cm (15 in) gangions that were secured to becket ties 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.

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

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.

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 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 Juniper Systems Allegro 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 Trimble Yuma computer. Length was measured by depth stratum for sablefish, Pacific cod, giant grenadier, Pacific grenadier, popeye 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 20th 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 2011 (Table 3). Sablefish was the most frequently caught species, followed by giant grenadier, Pacific cod, shortspine thornyhead, and arrowtooth flounder (Table 4). A total of 98,592 sablefish, with an estimated total round weight of 273,703 kg (603,411 lb), were caught during the survey (Table 5). These 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. The estimated total numbers of major species retained during the survey and two-day experiment 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 weights do include fish that were tagged and released or not landed.

A total of 4,352 sablefish, 910 shortspine thornyhead, and 39 Greenland turbot were tagged with external floy tags and released during the survey. Electronic archival tags were implanted in 29 Greenland turbot, 6 sablefish, and 32 lingcod. Length-weight data and otoliths were collected from 2,533 sablefish.

Killer whales depredating on the catch occurred at seven stations in the Bering Sea, five stations in the western Gulf of Alaska, and one station in the central Gulf of Alaska (Table 7). 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 27 stations in 2011 (Table 8). Sperm whales were observed depredating on the gear at one station in the central Gulf of Alaska, four stations in the West Yakutat region, and nine stations in the East Yakutat/Southeast region (Table 8). 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 2011 there were three recorded interactions between survey operations and fishing vessels. Interactions occurred at station numbers 80, 84, and 130 by longline vessels. In all three cases the vessels were contacted by the survey vessel and were encouraged to avoid survey stations.

Gear damage and loss occurs during survey operations and may have impacts on catch. In 2011 gear issues occurred at five stations. One skate was partially lost on the second set of station 63; the line parted on skate 158 of station 68 but all gear was retrieved; the line parted at the anchor of the second set of stations 33 but no gear was lost; partial segments of skates 159 and 160 were lost on station 97; station 20 was short two skates when gear was set; station 33 had one extra skate set.

Several special projects were conducted during the 2011 longline survey. Lingcod and Greenland turbot were tagged with archival temperature/depth tags in the West Yakutat and central Gulf of Alaska regions. Forty-three satellite pop-up tags were deployed on spiny dogfish throughout the Gulf of Alaska. Information from these tags will be used to investigate the movement patterns of spiny dogfish within and out of the Gulf of Alaska. 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. Finally, opportunistic photo identification of both sperm and killer whales were collected for use in whale identification projects.

For further information contact either

Dr. Phil Mundy, Director, Auke Bay Laboratories, National Marine Fisheries Service,
17109 Pt. Lena Loop Road, Juneau, AK 99801 Telephone (907) 789-6001

or

Mr. Russ Nelson, Director, Resource Assessment and Conservation Engineering
Division, National Marine Fisheries Service, 7600 Sand Point Way NE., Building 4, BIN
C15700, Seattle, WA 98115-0070 -- Telephone (206) 526-4170.

Table 1. Leg numbers, dates, and personnel for the 2011 NMFS longline survey.

Leg	Dates	Personnel	Affiliation
1	May 26 - June 14	Larry Haaga	RACE
		Rick Bush	Contractor
		Jason Wright	Contract Biologist
		Ken Orwig	Contract Biologist
2	June 14 - July 3	Katy Echave	ABL
		Megan Peterson	UAF
		Jason Wright	Contract Biologist
		Ken Orwig	Contract Biologist
3	July 5 - July 19	Cindy Tribuzio	ABL
		Pete Hulson	ABL
		Jason Wright	Contract Biologist
		Ken Orwig	Contract Biologist
4*	July 20 - July 22	Cindy Tribuzio	ABL
		Jason Wright	Contract Biologist
		Ken Orwig	Contract Biologist
		Chris Lunsford	ABL
5	July 23 - August 2	Pat Malecha	ABL
		Jason Wright	Contract Biologist
		Ken Orwig	Contract Biologist
		Dana Hanselman	ABL
6	August 4 - August 15	Jon Heifetz	ABL
		Jason Wright	Contract Biologist
		Ken Orwig	Contract Biologist
		Dave Clausen	ABL
7	August 16- August 29	James Murphy	ABL
		Jason Wright	Contract Biologist
		Ken Orwig	Contract Biologist

ABL - Auke Bay Laboratories, Alaska Fisheries Science Center

RACE - Resource Assessment and Conservation Engineering Division, Alaska Fisheries Science Center

UAF – University of Alaska Fairbanks

* Two-day experiment

Table 2. Stations fished in 2011 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

Station Number	Sablefish Management Area	Station Type	Abundance Calculations
82	Central Gulf of Alaska	Slope	Yes
83	Central Gulf of Alaska	Slope	Yes
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

Station Number	Sablefish Management Area	Station Type	Abundance Calculations
137	West Yakutat	Gully	No
138	West Yakutat	Gully	No
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 2011 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)
1	1	30-May	90	58.78	-177.59	58.80	-177.72	153	589
1	2	30-May	90	58.81	-177.73	58.85	-177.84	698	697
2	3	31-May	90	58.62	-176.64	58.58	-176.76	150	512
2	4	31-May	90	58.58	-176.77	58.56	-176.91	513	914
4	5	1-Jun	90	58.54	-175.67	58.50	-175.81	200	337
4	6	1-Jun	90	58.50	-175.82	58.51	-175.96	406	763
6	7	2-Jun	90	58.33	-174.31	58.40	-174.36	171	363
6	8	2-Jun	90	58.40	-174.36	58.38	-174.49	369	562
8	9	3-Jun	90	57.63	-174.16	57.70	-174.24	155	504
8	10	3-Jun	90	57.70	-174.24	57.78	-174.22	442	816
10	11	4-Jun	90	56.83	-173.38	56.90	-173.41	154	521
10	12	4-Jun	90	56.91	-173.41	56.98	-173.46	435	632
12	13	5-Jun	90	56.63	-172.36	56.57	-172.44	188	592
12	14	5-Jun	90	56.57	-172.44	56.50	-172.54	609	750
13	15	6-Jun	90	56.49	-171.44	56.47	-171.57	163	300
13	16	6-Jun	90	56.47	-171.57	56.45	-171.67	348	823
15	17	7-Jun	90	56.16	-170.67	56.13	-170.76	141	550
15	18	7-Jun	90	56.13	-170.77	56.16	-170.88	489	670
18	19	8-Jun	90	56.24	-169.17	56.18	-169.28	175	636
18	20	8-Jun	90	56.18	-169.28	56.13	-169.38	648	832
17	21	9-Jun	90	56.04	-169.61	56.00	-169.72	197	408
17	22	9-Jun	90	55.99	-169.72	55.98	-169.86	439	913
20	23	10-Jun	90	55.81	-168.80	55.84	-168.93	218	638
20	24	10-Jun	88	55.85	-168.94	55.91	-169.01	583	781
22	25	11-Jun	90	55.46	-168.01	55.42	-168.14	157	277
22	26	11-Jun	90	55.42	-168.16	55.39	-168.20	297	674
34	27	12-Jun	90	53.35	-168.99	53.29	-168.90	642	869
34	28	12-Jun	90	53.29	-168.90	53.28	-168.81	490	631
33	29	13-Jun	91	53.59	-168.33	53.61	-168.20	118	708
33	30	13-Jun	90	53.61	-168.20	53.62	-168.07	116	772
32	31	14-Jun	90	53.77	-167.33	53.72	-167.38	134	537
32	32	14-Jun	90	53.71	-167.39	53.69	-167.46	337	484
63	33	16-Jun	80	52.96	-168.14	52.91	-168.21	110	421
63	34	16-Jun	80	52.91	-168.21	52.85	-168.24	356	543
62	35	17-Jun	80	52.67	-168.99	52.62	-169.08	137	562
62	36	17-Jun	80	52.62	-169.09	52.57	-169.17	511	840
64	37	18-Jun	80	53.19	-166.85	53.13	-166.89	213	310
64	38	18-Jun	80	53.12	-166.89	53.06	-166.94	318	620

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	122	277
65	40	19-Jun	80	53.51	-165.73	53.44	-165.78	284	475
66	41	20-Jun	80	53.74	-164.47	53.68	-164.55	140	277
66	42	20-Jun	80	53.68	-164.54	53.63	-164.64	292	608
67	43	21-Jun	80	53.97	-163.26	53.91	-163.32	114	386
67	44	21-Jun	80	53.91	-163.33	53.87	-163.43	346	682
68	45	22-Jun	80	54.13	-161.63	54.09	-161.71	122	281
68	46	22-Jun	80	54.09	-161.72	54.07	-161.82	260	547
69	47	23-Jun	80	54.31	-161.06	54.26	-161.15	204	402
69	48	23-Jun	80	54.26	-161.16	54.21	-161.23	434	831
70	49	24-Jun	80	54.37	-160.25	54.30	-160.29	142	273
70	50	24-Jun	80	54.30	-160.29	54.23	-160.31	294	600
71	51	25-Jun	80	54.50	-159.26	54.44	-159.32	149	286
71	52	25-Jun	80	54.43	-159.32	54.38	-159.40	293	643
72	53	26-Jun	80	54.63	-158.57	54.57	-158.61	133	373
72	54	26-Jun	80	54.57	-158.65	54.50	-158.70	377	814
73	55	27-Jun	80	54.85	-157.74	54.79	-157.81	183	355
73	56	27-Jun	80	54.79	-157.81	54.73	-157.85	371	642
74	57	28-Jun	80	55.24	-156.67	55.18	-156.74	164	334
74	58	28-Jun	80	55.17	-156.74	55.10	-156.76	308	637
75	59	29-Jun	80	55.64	-155.85	55.57	-155.86	139	213
75	60	29-Jun	80	55.56	-155.86	55.49	-155.83	214	228
148	61	5-Jul	80	54.65	-132.84	54.60	-132.94	145	382
149	62	5-Jul	80	54.60	-133.02	54.60	-133.15	395	418
108	63	6-Jul	80	54.46	-133.92	54.49	-134.01	258	809
108	64	6-Jul	80	54.50	-134.01	54.55	-134.07	450	955
107	65	7-Jul	80	54.90	-134.29	54.96	-134.35	237	562
107	66	7-Jul	80	54.96	-134.35	55.01	-134.43	432	802
106	67	8-Jul	80	55.35	-134.73	55.40	-134.83	337	668
106	68	8-Jul	80	55.40	-134.84	55.39	-134.95	520	844
105	69	9-Jul	80	55.56	-134.97	55.58	-135.06	214	612
105	70	9-Jul	80	55.59	-135.06	55.63	-135.15	552	864
144	71	10-Jul	80	55.93	-134.90	56.01	-134.91	201	362
145	72	10-Jul	80	56.03	-134.93	56.08	-135.01	361	378
104	73	11-Jul	80	55.99	-135.45	56.03	-135.54	386	640
104	74	11-Jul	80	56.03	-135.54	56.09	-135.61	599	824
103	75	12-Jul	80	56.38	-135.35	56.38	-135.48	154	191
103	76	12-Jul	80	56.38	-135.49	56.37	-135.62	189	254
102	77	13-Jul	80	56.86	-136.00	56.90	-136.09	268	760
102	78	13-Jul	80	56.90	-136.09	56.96	-136.12	640	941

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	248	668
101	80	14-Jul	80	57.23	-136.34	57.29	-136.38	618	951
100	81	15-Jul	80	57.62	-136.54	57.62	-136.67	272	820
100	82	15-Jul	80	57.62	-136.68	57.67	-136.77	619	917
142	83	16-Jul	80	57.92	-137.02	57.92	-137.15	395	445
143	84	16-Jul	80	57.97	-137.08	57.97	-137.22	239	422
99	85	17-Jul	80	57.87	-137.38	57.89	-137.50	222	692
99	86	17-Jul	80	57.90	-137.51	57.88	-137.62	506	758
98	87	18-Jul	80	58.14	-138.74	58.16	-138.86	336	774
98	88	18-Jul	80	58.16	-138.86	58.18	-138.98	512	794
97	89	19-Jul	80	58.47	-139.47	58.46	-139.61	263	522
97	90	19-Jul	80	58.46	-139.62	58.42	-139.71	404	987
138	95	24-Jul	80	59.42	-140.93	59.43	-141.07	197	293
139	96	24-Jul	80	59.41	-141.17	59.36	-141.25	321	324
96	97	25-Jul	80	58.69	-140.64	58.69	-140.78	239	603
96	98	25-Jul	80	58.69	-140.79	58.74	-140.90	454	744
95	99	26-Jul	80	59.05	-141.34	59.05	-141.48	292	509
95	100	26-Jul	80	59.05	-141.49	59.05	-141.62	549	834
94	101	27-Jul	80	59.39	-142.17	59.42	-142.29	241	527
94	102	27-Jul	80	59.42	-142.30	59.47	-142.40	496	917
93	103	28-Jul	80	59.55	-142.58	59.59	-142.69	124	622
93	104	28-Jul	80	59.59	-142.69	59.57	-142.80	579	641
136	105	29-Jul	80	59.67	-143.39	59.72	-143.49	294	314
137	106	29-Jul	80	59.75	-143.59	59.77	-143.71	160	302
92	107	30-Jul	80	59.56	-143.66	59.57	-143.80	174	768
92	108	30-Jul	80	59.57	-143.81	59.59	-143.94	570	834
91	109	31-Jul	80	59.52	-144.72	59.48	-144.85	179	510
91	110	31-Jul	80	59.48	-144.85	59.45	-144.98	491	900
90	111	1-Aug	80	59.50	-145.54	59.52	-145.67	158	816
90	112	1-Aug	80	59.53	-145.68	59.53	-145.82	509	733
89	113	2-Aug	80	59.26	-146.86	59.22	-146.96	194	607
89	114	2-Aug	80	59.22	-146.96	59.18	-147.06	600	829
134	115	5-Aug	80	59.52	-146.96	59.56	-147.07	208	212
135	116	5-Aug	80	59.52	-147.15	59.44	-147.15	210	218
88	117	6-Aug	80	59.16	-147.60	59.08	-147.61	270	521
88	118	6-Aug	80	59.08	-147.61	59.01	-147.63	489	852
87	119	7-Aug	80	59.12	-148.65	59.06	-148.65	154	190
87	120	7-Aug	80	59.06	-148.65	58.99	-148.65	195	240
132	121	8-Aug	80	59.08	-149.40	59.04	-149.51	182	227
133	122	8-Aug	80	58.95	-149.50	58.92	-149.63	237	243

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	175	217
131	124	9-Aug	80	58.80	-149.04	58.84	-148.93	234	250
86	125	10-Aug	80	58.69	-148.32	58.61	-148.33	274	511
86	126	10-Aug	80	58.61	-148.33	58.54	-148.33	561	916
85	127	11-Aug	80	58.29	-148.62	58.22	-148.66	248	533
85	128	11-Aug	80	58.22	-148.67	58.14	-148.70	551	837
84	129	12-Aug	80	57.97	-149.17	57.91	-149.26	170	486
84	130	12-Aug	80	57.91	-149.26	57.85	-149.34	504	923
129	131	13-Aug	80	58.08	-149.90	58.07	-150.03	292	311
128	132	13-Aug	80	57.98	-149.97	58.00	-149.85	235	268
83	133	14-Aug	80	57.63	-149.91	57.56	-149.95	410	567
83	134	14-Aug	80	57.56	-149.95	57.48	-149.99	585	919
82	135	15-Aug	80	57.40	-150.57	57.33	-150.59	223	492
82	136	15-Aug	80	57.33	-150.59	57.25	-150.58	524	733
81	137	17-Aug	80	57.12	-151.21	57.05	-151.27	263	530
81	138	17-Aug	80	57.05	-151.27	56.98	-151.27	565	829
80	139	18-Aug	80	56.50	-152.23	56.42	-152.25	118	662
80	140	18-Aug	80	56.42	-152.31	56.34	-152.36	336	777
79	141	19-Aug	80	56.30	-153.08	56.26	-153.18	265	573
79	142	19-Aug	80	56.26	-153.19	56.22	-153.28	490	767
78	143	20-Aug	80	55.98	-154.02	55.91	-154.02	270	556
78	144	20-Aug	80	55.91	-154.03	55.85	-154.07	573	937
77	145	21-Aug	80	56.05	-154.58	55.98	-154.58	230	488
77	146	21-Aug	80	55.98	-154.58	55.91	-154.58	509	862
76	147	22-Aug	80	55.77	-155.14	55.70	-155.18	155	321
76	148	22-Aug	80	55.69	-155.18	55.64	-155.25	350	604
126	149	23-Aug	80	57.35	-155.04	57.35	-155.17	236	241
127	150	23-Aug	80	57.35	-155.24	57.33	-155.37	245	256
124	151	24-Aug	80	56.99	-155.07	57.00	-155.19	172	233
125	152	24-Aug	80	57.00	-155.31	57.05	-155.41	254	265
122	153	25-Aug	80	56.19	-155.97	56.19	-156.10	199	241
123	154	25-Aug	80	56.23	-156.13	56.26	-156.25	245	265
120	155	26-Aug	80	55.79	-156.08	55.76	-156.20	204	239
121	156	26-Aug	80	55.75	-156.20	55.73	-156.33	243	254

Table 4. Catch in number by species for the 2011 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.

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
1	39	499	2435	32	119	37	48	64	193	611
2	48	206	1789	113	296	92	14	18	102	417
4*	2	162	1273	31	71	3	95	29	142	542
6*	8	417	1219	298	207	15	61	5	267	216
8	100	132	1434	97	168	44	54	97	130	200
10*	6	89	2124	64	63	9	148	163	171	594
12*	94	452	2188	352	291	22	12	75	257	77
13*	2	1275	1600	36	46	2	109	102	181	274
15	110	1090	1154	197	281	31	133	355	123	339
17*	4	1077	1374	0	28	3	11	171	152	210
18	313	186	870	63	711	165	4	101	327	49
20 ⁺	340	348	286	231	865	247	3	201	119	22
22	52	997	116	179	1002	125	20	115	203	290
32	884	518	150	905	703	50	362	476	209	63
33	607	1467	434	310	462	93	131	425	114	128
34*	61	5	55	36	386	14	0	223	477	304
62*	130	229	2421	56	22	0	515	331	11	48
63* ⁺	793	489	1913	180	95	0	529	363	97	67
64*	563	34	1051	196	130	0	332	259	111	99
65*	336	405	1824	112	64	0	59	222	146	132
66	2094	294	1596	152	99	0	125	219	89	40
67	1501	435	832	272	126	0	488	309	57	101
68 ⁺	1787	466	151	590	183	0	618	161	188	99
69	1814	16	2826	43	87	0	37	180	24	18
70	1231	639	1802	250	187	0	53	94	141	82
71*	1933	446	1601	91	127	0	43	102	32	55
72	2388	467	1603	218	146	0	46	110	58	35
73*	1123	95	1280	13	48	0	57	177	52	158
74	2265	34	1194	123	245	0	80	526	32	71
75	1318	1148	0	620	265	0	5	17	124	265
76	1779	313	585	184	303	0	122	354	196	311
77	2258	88	1308	24	114	0	88	314	16	177
78	1453	1	1847	9	111	0	192	232	23	586
79	2553	4	1006	18	140	0	78	392	4	19
80	809	178	1329	139	144	0	224	274	12	64
81	2207	0	1472	13	155	0	72	194	14	302

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
82	2399	17	977	53	203	0	27	206	4	69
83	1508	0	2161	3	42	0	6	227	5	187
84	2114	475	1117	157	59	0	55	264	28	383
85	2434	25	776	34	337	0	24	389	32	48
86	1836	20	666	103	239	0	326	551	3	218
87	2687	261	0	373	91	0	6	57	123	79
88	2638	27	1238	17	134	0	294	351	8	113
89	2092	65	706	38	62	0	24	445	47	77
90	973	37	583	28	150	0	184	366	59	111
91	1974	42	639	55	87	0	269	223	36	133
92	1779	18	575	11	74	0	43	222	7	39
93	1606	1	728	71	29	0	17	674	1	56
94	1361	3	294	30	185	0	102	458	18	112
95	1366	0	493	11	52	0	668	716	36	103
96	1217	0	549	19	91	0	582	224	19	92
97 ⁺	797	2	347	12	137	0	698	365	44	100
98	778	0	540	11	23	0	410	101	7	51
99	1300	0	249	3	29	0	201	156	0	82
100	2064	8	460	3	34	0	62	263	6	40
101	2054	6	328	8	72	0	82	457	17	102
102	1325	2	384	10	40	0	42	338	9	80
103	193	444	0	443	81	0	2	43	62	1180
104	2392	0	257	4	9	0	237	545	13	94
105	2268	12	205	28	56	0	216	370	25	169
106	1913	1	143	1	39	0	454	440	8	92
107	1331	7	368	12	62	0	649	400	22	104
108	1432	12	381	10	52	0	332	298	23	136
120	561	821	0	101	156	0	0	3	145	97
121	725	306	1	62	304	0	2	39	323	80
122	389	621	0	62	347	0	0	0	410	87
123	317	203	0	27	389	0	2	1	514	50
124	364	432	0	76	276	0	1	1	161	107
125	448	142	0	64	257	0	0	0	464	41
126	229	183	0	21	110	0	0	0	247	50
127	392	341	0	42	187	0	2	0	705	84
128	1592	49	0	236	99	0	10	26	15	24
129	956	4	0	98	311	0	9	120	46	13
130	667	5	0	36	26	0	6	63	26	24
131	1662	12	0	48	62	0	33	170	50	48
132	678	34	0	24	84	0	3	82	129	51

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
133	1215	0	0	56	125	0	80	153	55	29
134	359	2	0	17	94	0	39	101	130	271
135	526	2	0	42	42	0	34	115	258	222
136	229	0	0	5	7	0	6	144	9	14
137	646	3	0	94	51	0	11	100	44	234
138	638	1	0	42	27	0	13	92	24	73
139	1132	0	0	20	16	0	22	71	62	7
142	1396	0	76	15	26	0	33	217	9	7
143	1705	0	17	83	155	0	18	106	44	25
144	301	47	0	102	124	0	461	343	73	153
145	1337	0	1	34	53	0	139	115	57	121
148	481	212	0	102	103	0	17	137	142	699
149	811	1	0	37	123	0	21	130	153	163
Total	98,592	19,607	61,401	9,341	14,513	952	11,942	18,928	9,551	13,889

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

+ Station catch was partially impacted by gear loss.

Table 5. Mean length, round weight, mean dressed weight, number, and estimated total round weight of sablefish by station for the 2011 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	66.03	3.07	4.26	39	120
2	65.90	3.09	4.30	48	148
4*	NA	NA	NA	2	6
6*	68.75	3.55	4.94	8	28
8	69.15	3.60	5.00	100	360
10*	69.89	3.67	5.1	6	22
12*	60.47	2.32	3.22	94	218
13*	NA	NA	NA	2	6
15	68.79	3.55	4.92	110	390
17*	45.50	1.74	2.42	4	7
18	63.50	2.73	3.79	313	854
20	63.17	2.68	3.72	340	911
22	61.35	2.44	3.39	52	127
32	61.41	2.51	3.49	884	2,218
33	61.43	2.56	3.56	607	1,554
34*	54.78	1.76	2.44	61	107
62*	55.27	1.77	2.46	130	230
63*	60.21	2.38	3.31	793	1,888
64*	52.08	1.41	1.96	563	795
65*	55.89	1.79	2.49	336	603
66	54.61	1.74	2.42	2,094	3,644
67	58.97	2.27	3.16	1,501	3,411
68	59.45	2.30	3.20	1,787	4,117
69	56.55	1.97	2.73	1,814	3,566
70	57.77	2.05	2.85	1,231	2,525
71*	57.42	2.00	2.78	1,933	3,867
72	35.70	1.62	2.25	2,388	3,873
73*	51.99	1.45	2.01	1,123	1,625
74	64.70	2.99	4.16	2,265	6,780
75	52.47	1.55	2.15	1,318	2,042
76	60.53	2.41	3.35	1,779	4,292
77	63.54	2.83	3.93	2,258	6,384
78	67.38	3.40	4.73	1,453	4,946
79	64.49	2.92	4.05	2,553	7,443
80	62.58	2.68	3.72	809	2,167
81	64.80	3.00	4.17	2,207	6,620

Station	Mean Length	Mean Round Weight(kg)¹	Mean Dressed Weight(lbs)²	Number of Sablefish	Est. Total Round Weight(kg)³
82	64.45	2.96	4.12	2,399	7,110
83	65.98	3.19	4.42	1,508	4,804
84	66.55	3.26	4.52	2,114	6,886
85	66.31	3.26	4.53	2,434	7,934
86	67.07	3.37	4.68	1,836	6,191
87	57.99	2.11	2.93	2,687	5,659
88	69.57	3.81	5.29	2,638	10,041
89	68.30	3.62	5.02	2,092	7,568
90	57.75	2.10	2.92	973	2,044
91	66.73	3.41	4.73	1,974	6,725
92	64.03	3.07	4.26	1,779	5,463
93	64.41	2.97	4.12	1,606	4,764
94	62.56	2.81	3.90	1,361	3,818
95	65.89	3.26	4.53	1,366	4,453
96	67.51	3.51	4.87	1,217	4,266
97	66.27	3.28	4.56	797	2,615
98	66.62	3.49	4.85	778	2,715
99	64.85	3.04	4.22	1,300	3,953
100	69.41	3.79	5.27	2,064	7,832
101	66.91	3.38	4.70	2,054	6,945
102	68.73	3.64	5.06	1,325	4,824
103	61.41	2.71	3.76	193	523
104	65.28	3.10	4.30	2,392	7,404
105	67.70	3.49	4.84	2,268	7,904
106	65.10	3.09	4.30	1,913	5,916
107	68.52	3.61	5.02	1,331	4,811
108	71.57	4.21	5.85	1,432	6,029
120	53.38	1.59	2.21	561	894
121	56.27	1.91	2.65	725	1,385
122	54.58	1.68	2.34	389	654
123	55.91	1.84	2.55	317	582
124	56.92	1.91	2.66	364	697
125	56.95	1.91	2.65	448	855
126	55.38	1.72	2.39	229	394
127	56.89	1.91	2.65	392	749
128	57.09	2.19	3.04	1,592	3,486
129	63.89	2.80	3.89	956	2,680
130	59.48	2.29	3.19	667	1,531

Station	Mean Length	Mean Round Weight(kg)¹	Mean Dressed Weight(lbs)²	Number of Sablefish	Est. Total Round Weight(kg)³
131	64.21	2.87	3.99	1,662	4,771
132	58.36	2.16	3.00	678	1,465
133	59.47	2.27	3.15	1,215	2,757
134	51.98	1.44	2.00	359	518
135	51.72	1.42	1.98	526	749
136	62.10	2.61	3.62	229	597
137	57.46	2.17	3.02	646	1,405
138	57.73	2.17	3.02	638	1,387
139	61.63	2.60	3.61	1,132	2,941
142	63.48	2.77	3.85	1,396	3,865
143	62.91	2.72	3.78	1,705	4,641
144	67.45	3.45	4.79	301	1,037
145	64.78	3.01	4.18	1,337	4,025
148	56.68	1.93	2.68	481	928
149	57.54	2.01	2.79	811	1,629

* 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 2011 NMFS longline survey. These estimates are for all fish landed including fish tagged and released.

Species/Complex	East					Total
	Bering Sea	Western GOA	Central GOA	West Yakutat	Yakutat Southeast	
Sablefish	2,670	12,182	44,849	15,013	23,878	98,592
Giant grenadier	18,501	16,017	18,560	4,567	3,756	61,401
Pacific cod	8,920	3,453	6,310	170	754	19,607
Shortspine thornyhead	2,620	2,240	5,509	3,735	4,824	18,928
Arrowtooth flounder	5,699	1,120	5,645	831	1,218	14,513
Pacific halibut	2,944	1,942	3,113	424	918	9,341
Rougeye rockfish	319	1,657	1,302	1,087	2,233	6,598
Shortraker rockfish	885	1,142	603	854	1,840	5,324
Walleye pollock	2,777	76	890	19	20	3,782
Aleut/Ber/AK Skate Complex	1,945	528	409	81	16	2,979
Spiny dogfish	0	16	533	252	1,292	2,093
Longnose skate	0	361	930	217	526	2,034
Pacific grenadier	26	4	1,360	153	96	1,639
Lips or Jaws - Whale Predation	745	230	130	34	24	1,163
Redbanded rockfish	0	30	226	124	595	975
Greenland turbot	952	0	0	0	0	952
Sea anemone unident.	81	83	198	94	373	829
whiteblotched skate	650	0	0	0	0	650
commander skate	413	3	2	0	22	440
Sea pen or Sea Whip	12	2	343	21	7	385
Yelloweye rockfish	0	45	18	36	257	356
Brittlestarfish	54	50	182	29	34	349
Dover sole	2	13	173	83	54	325
Flathead sole	147	4	48	2	0	201
Invertebrate unident.	37	63	31	10	14	155
Spotted ratfish	0	0	0	0	151	151
mud skate	137	0	5	0	0	142
Starfish unident.	17	6	36	19	48	126
Rosethorn rockfish	0	0	0	49	67	116
Eelpout, unidentified	107	0	0	0	0	107

Table 7. Total estimated catch in weight (kg) of major species (>100 kg) caught by management area in the 2011 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	Total
					Yakutat Southeast	
Sablefish	7,078	24,647	118,965	45,430	77,597	273,716
Giant grenadier	75,188	44,283	52,790	13,409	11,638	197,308
Pacific halibut	17,373	11,460	18,370	2,502	5,417	55,121
Pacific cod	23,553	7,478	17,378	448	1,766	50,623
Arrowtooth flounder	9,820	1,656	9,117	1,431	2,043	24,067
Longnose skate	0	2,691	6,933	1,618	3,921	15,164
Shortspine thornyhead	2,996	1,505	3,340	2,026	3,247	13,114
Rougheye rockfish	411	2,328	1,427	1,124	3,703	8,993
Shortraker rockfish	1,424	1,486	960	1,515	2,693	8,078
Walleye pollock	3,946	108	1,265	27	28	5,374
Spiny dogfish	0	37	1,093	488	1,900	3,518
whiteblotched skate	3,501	0	0	0	0	3,501
Greenland turbot	3,312	0	0	0	0	3,312
Redbanded rockfish	0	53	401	220	1,056	1,731
Pacific grenadier	32	4	1,160	142	83	1,420
commander skate	1,316	10	6	0	70	1,402
Yelloweye rockfish	0	130	52	104	741	1,027
Pacific sleeper shark	289	173	347	0	58	867
Spotted ratfish	0	0	0	0	550	550
Dover sole	3	19	257	123	80	483
mud skate	464	0	17	0	0	481
Skates unidentified	112	10	315	0	5	441
Lingcod	0	0	66	148	172	386
Sea anemone unident.	22	23	55	26	103	230
big skate	0	20	30	140	0	189
Giant wrymouth	0	0	150	0	0	150
Eelpout, unidentified	146	0	0	0	0	146
Flathead sole	105	3	34	1	0	144
Canary rockfish	0	0	0	0	121	121
Silvergray rockfish	0	0	0	5	105	110

Table 8. - Stations and skates at each station that were depredated upon by killer whales in the 2011 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
4	Bering Sea	1	180
6	Bering Sea	1	180
10	Bering Sea	1	180
12	Bering Sea	157	180
13	Bering Sea	1	180
17	Bering Sea	1	180
34	Bering Sea	1	180
62	Western Gulf of Alaska	18	160
63	Western Gulf of Alaska	70	160
64	Western Gulf of Alaska	1	160
65	Western Gulf of Alaska	35	160
71	Western Gulf of Alaska	81	160
73	Central Gulf of Alaska	1	160

Table 9. Stations that had sperm whales present during hauling operations in the 2011 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
66	Western Gulf of Alaska	No	20
67	Western Gulf of Alaska	No	1
68	Western Gulf of Alaska	No	2
71	Western Gulf of Alaska	No	2
72	Central Gulf of Alaska	No	1
84	Central Gulf of Alaska	Yes	2
85	Central Gulf of Alaska	No	1
86	Central Gulf of Alaska	No	2
90	West Yakutat	Yes	1
91	West Yakutat	Yes	1
93	West Yakutat	Yes	2
95	West Yakutat	No	1
96	West Yakutat	Yes	1
97	East Yakutat/Southeast	No	1
98	East Yakutat/Southeast	No	1
99	East Yakutat/Southeast	Yes	4
100	East Yakutat/Southeast	Yes	1
101	East Yakutat/Southeast	Yes	1
102	East Yakutat/Southeast	Yes	3
104	East Yakutat/Southeast	Yes	3
105	East Yakutat/Southeast	Yes	2
106	East Yakutat/Southeast	Yes	1
108	East Yakutat/Southeast	Yes	1
142	East Yakutat/Southeast	No	1
143	East Yakutat/Southeast	Yes	1
148	East Yakutat/Southeast	No	1
149	East Yakutat/Southeast	No	1

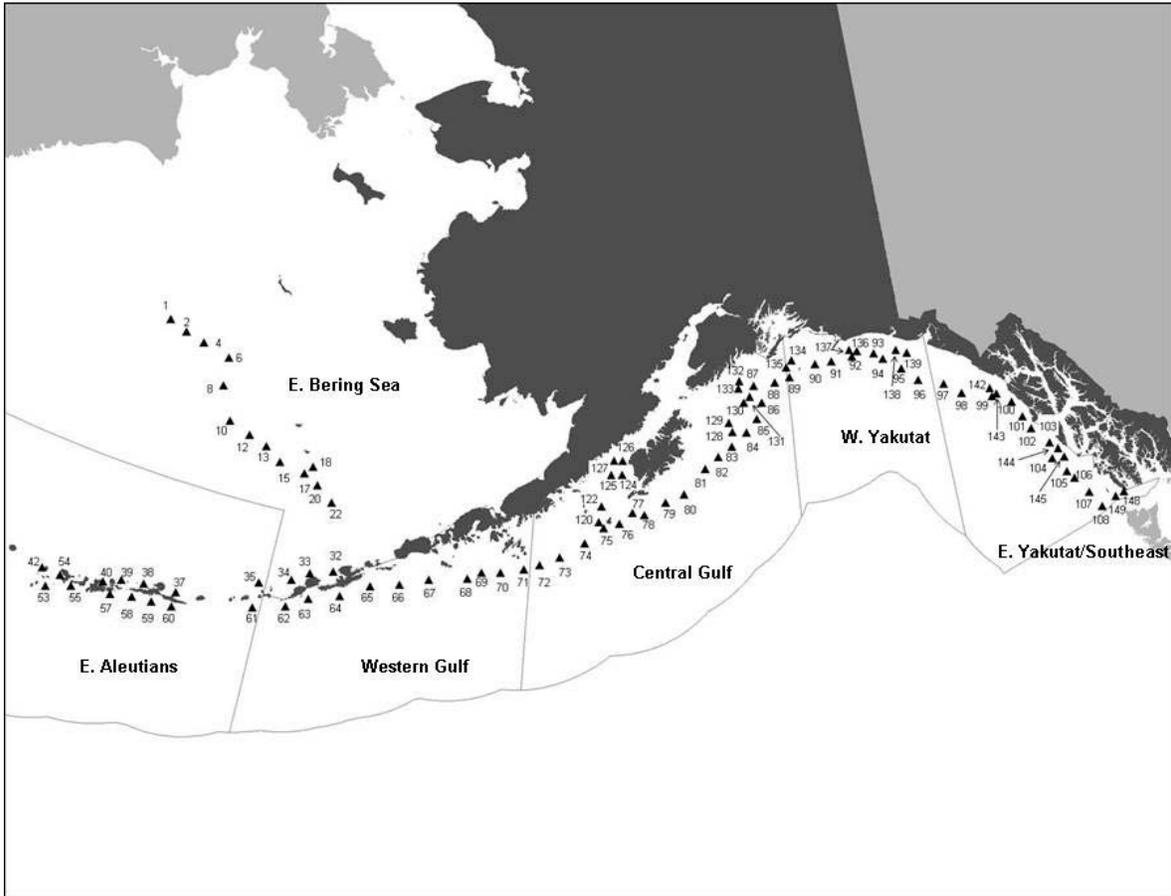


Figure 1. Map of NMFS longline survey station locations and corresponding management areas. Bering Sea stations are sampled in odd years; Aleutian Islands Region stations are sampled in even years; Gulf of Alaska stations are sampled every year.

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 2011 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	59.13	-141.66	59.17	-141.76	536	716
2	21-Jul	59.18	-141.79	59.22	-141.90	631	730
3	22-Jul	59.23	-141.92	59.25	-142.05	651	720
4	22-Jul	59.25	-142.09	59.30	-142.19	601	651