

F/V *Alaskan Leader*
Cruise Report AL-12-01
Longline Survey of the Gulf of Alaska and Eastern Aleutian Islands
May 25-August 28, 2012

Prepared by

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On August 28, 2012, the Alaska Fisheries Science Center (AFSC) completed the thirty-fourth 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 Aleutian Islands were sampled in 2012.

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 (Rajidae), and spiny dogfish (*Squalus acanthias*).
3. Tag and release sablefish, shortspine thornyhead, and Greenland turbot throughout the cruise to determine migration patterns.
4. Externally tag sablefish and spiny dogfish with pop-up satellite tags that record water temperature, pressure, and location.
5. Collect sablefish otoliths to study the age composition of the population.

VESSEL AND GEAR

Survey operations were conducted using the F/V *Alaskan Leader*, a chartered U.S. 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, three sets of plate freezers, and refrigerated holds. Vessel personnel consisted of a captain, a mate, 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 becketts 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 28 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 Aleutian Islands 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. 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 started 45 days later than in 1988 through 1990. Starting in 1995, the survey period was moved back to near the 1988-1990 time periods 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 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. In 2009 to present the survey starting and ending dates were several days earlier than previous years. This was done to accommodate the vessel's schedule and desire to finish to the survey as early as possible.

Survey Operations

A total of 14 stations along the upper continental slope of the eastern Aleutian Islands 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 150 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. Not all stations are used in abundance index calculations reported for sablefish, notably gully stations on the continental shelf. However, these abundance calculations are performed for all species at all stations and are available at the station level.

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 about 0630 hours Alaska Daylight Time. Retrieval began about 0930 hours and was completed by about 1930 hours.

Data Collection

Catch data were recorded on a hand-held electronic data logger. 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/data storage device. Length was measured by depth stratum for sablefish, Pacific cod, giant grenadier (*Albatrossia pectoralis*), arrowtooth flounder, Greenland turbot, shortspine thornyhead, spiny dogfish, and multiple rockfish species. Lengths of sablefish, giant grenadier, spiny dogfish, and Pacific cod were recorded by sex. 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 2012 (Table 3). Sablefish was the most frequently caught species, followed by giant grenadier, Pacific cod, shortspine thornyhead, and Pacific halibut (Table 4). Catch of major species by station is presented in Table 5. Sablefish was the highest catch in weight, followed by giant grenadier, Pacific halibut, and Pacific cod (Table 6). Average length and weight of sablefish varied by station with smaller fish caught at gully stations compared to slope stations (Table 7).

A total of 2,998 sablefish, 748 shortspine thornyhead, and 6 Greenland turbot were tagged with external floy tags and released during the survey. Pop-off satellite tags were externally attached to 45 spiny dogfish and 43 sablefish. Length-weight data and otoliths were collected from 1,992 sablefish.

Killer whales depredating on the catch occurred at five stations in the eastern Aleutian Islands, and five stations in the western 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 2012. Sperm whales were observed depredating on the gear at 1 station in the Aleutian Islands, one station in the western Gulf of Alaska, two stations in the central Gulf of Alaska, five stations in the West Yakutat region, and three 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 sablefish. 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 2012 there were five recorded interactions between survey operations and fishing vessels. Interactions occurred at station numbers 40, 67, 69, 77, and 86 by five separate 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 2012 gear issues occurred at four stations. Thirteen skates (147-160), running line, and buoy line were lost on the second set of station 35 due to strong currents sinking the buoy and flags; the line parted on skate 143 of station 68 but all gear was retrieved (scientific data was not recorded because gear was not retrieved until over 12 hours after the set was made); the line parted on the second set of station 54 (skate 103) and 57 skates, running line, and buoy line were lost due to strong currents sinking the buoy and flags; two skates (144-145) were lost on the second set of station 99.

For further information contact:

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Table 1. Leg numbers, dates, and personnel for the 2012 NMFS longline survey.

Leg	Dates	Personnel	Affiliation
1	May 25 - June 14	Pat Malecha	ABL
		Kalei Shotwell	ABL
		Jason Wright	Contract Biologist
		Johanna Marsters	Contract Biologist
2	June 14 - July 3	Katy Echave	ABL
		Megan Peterson	UAF
		Jason Wright	Contract Biologist
		Johann Marsters	Contract Biologist
3	July 5 - July 19	Dave Csepp	ABL
		Lauren Wild	SEASWAP
		Jason Wright	Contract Biologist
		Johanna Marsters	Contract Biologist
4*	July 20 - July 22	Cindy Tribuzio	ABL
		Jason Wright	Contract Biologist
		Johanna Marsters	Contract Biologist
		Johanna Marsters	Contract Biologist
5	July 23 - Aug 2	Cindy Tribuzio	ABL
		Thomas Farrugia	UAF
		Jason Wright	Contract Biologist
		Johanna Marsters	Contract Biologist
6	Aug 4 - Aug 15	Katy Echave	ABL
		Pete Hulson	ABL
		Jason Wright	Contract Biologist
		Johanna Marsters	Contract Biologist
7	Aug 16- Aug 28	Dave Clausen	ABL
		Pete Hulson	ABL
		Jason Wright	Contract Biologist
		Johanna Marsters	Contract Biologist

ABL - Auke Bay Laboratories, Alaska Fisheries Science Center

SEASWAP - Southeast Alaska Sperm Whale Avoidance Project

UAF - University of Alaska Fairbanks

* 2-day experiment

Table 2. Stations fished in 2012 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
35	Aleutian Islands	Slope	Yes
37	Aleutian Islands	Slope	Yes
38	Aleutian Islands	Slope	Yes
39	Aleutian Islands	Slope	Yes
40	Aleutian Islands	Slope	Yes
54	Aleutian Islands	Slope	Yes
42	Aleutian Islands	Slope	Yes
53	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
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

Station Number	Sablefish Management Area	Station Type	Abundance Calculations
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
137	West Yakutat	Gully	No

Station Number	Sablefish Management Area	Station Type	Abundance Calculations
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 station and haul for the 2012 NMFS longline survey.
Positions in decimal degree (DD) format.

Station	Haul	Date	# Skates Retrieved	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth (m)	End Depth (m)
<u>Aleutian Islands</u>									
35	1	1-Jun	80	53.09	-170.29	53.05	-170.19	178	564
35	2	1-Jun	67	53.03	-170.09	53.06	-170.17	165	178
37	3	2-Jun	80	52.28	-173.49	52.33	-173.50	140	582
37	4	2-Jun	80	52.36	-173.51	52.41	-173.50	644	767
38	5	3-Jun	80	52.26	-174.85	52.31	-174.78	193	595
38	6	3-Jun	80	52.35	-174.67	52.32	-174.76	497	766
39	7	4-Jun	80	52.13	-175.57	52.15	-175.66	105	452
39	8	4-Jun	82	52.15	-175.67	52.18	-175.76	435	782
40	9	5-Jun	80	51.98	-176.45	52.03	-176.43	104	460
40	10	5-Jun	80	52.04	-176.41	52.06	-176.32	497	719
54	11	6-Jun	80	51.78	-178.95	51.72	-178.91	161	472
54	12	6-Jun	63	51.72	-178.87	51.65	-178.82	514	756
42	13	7-Jun	80	51.76	-178.16	51.75	-178.26	92	475
42	14	7-Jun	23	51.76	-178.29	51.75	-178.31	644	727
53	15	8-Jun	80	51.41	-178.63	51.36	-178.56	139	456
53	16	8-Jun	80	51.35	-178.55	51.37	-178.45	378	564
55	17	9-Jun	80	51.60	-177.61	51.55	-177.70	192	270
55	18	9-Jun	80	51.55	-177.72	51.53	-177.82	268	870
57	19	10-Jun	80	51.74	-175.99	51.67	-176.01	175	344
57	20	10-Jun	80	51.66	-176.01	51.60	-176.06	382	723
58	21	11-Jun	80	51.85	-175.14	51.78	-175.14	174	348
58	22	11-Jun	80	51.78	-175.11	51.71	-175.11	359	656
59	23	12-Jun	80	51.88	-174.33	51.83	-174.40	122	296
59	24	12-Jun	80	51.83	-174.42	51.78	-174.50	311	964
60	25	13-Jun	80	51.92	-173.50	51.88	-173.43	111	241
60	26	13-Jun	80	51.88	-173.60	51.87	-173.73	202	582
61	27	14-Jun	80	52.41	-170.42	52.36	-170.48	527	648
61	28	14-Jun	0	52.44	-170.31	52.40	-170.40	243	528
<u>Gulf of Alaska</u>									
65	29	16-Jun	82	53.58	-165.73	53.51	-165.73	123	286
65	30	16-Jun	80	53.51	-165.73	53.45	-165.79	302	457
62	31	17-Jun	80	52.66	-169.00	52.62	-169.09	134	640
62	32	17-Jun	80	52.61	-169.12	52.56	-169.20	361	727
63	33	18-Jun	80	52.97	-168.14	52.91	-168.20	109	415
63	34	18-Jun	80	52.91	-168.22	52.84	-168.24	381	736
64	35	19-Jun	80	53.19	-166.86	53.12	-166.89	218	315
64	36	19-Jun	80	53.11	-166.90	53.05	-166.95	330	890

Station	Haul	Date	# Skates Retrieved	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth (m)	End Depth (m)
66	37	20-Jun	80	53.74	-164.47	53.68	-164.56	137	304
66	38	20-Jun	80	53.68	-164.57	53.63	-164.66	350	667
67	39	21-Jun	80	53.96	-163.27	53.90	-163.34	133	412
67	40	21-Jun	80	53.89	-163.37	53.86	-163.45	400	754
68	41	22-Jun	80	54.13	-161.65	54.09	-161.73	133	376
68	42	22-Jun	80	54.09	-161.75	54.06	-161.85	327	933
69	43	23-Jun	80	54.31	-161.07	54.26	-161.15	201	410
69	44	23-Jun	80	54.26	-161.17	54.21	-161.23	428	836
70	45	24-Jun	80	54.36	-160.24	54.30	-160.29	143	337
70	46	24-Jun	80	54.29	-160.30	54.22	-160.33	345	648
71	47	25-Jun	80	54.51	-159.26	54.44	-159.31	140	274
71	48	25-Jun	80	54.44	-159.33	54.38	-159.39	278	707
72	49	26-Jun	80	54.63	-158.59	54.56	-158.64	134	407
72	50	26-Jun	80	54.56	-158.65	54.51	-158.70	348	773
73	51	27-Jun	80	54.85	-157.74	54.80	-157.81	187	350
73	52	27-Jun	80	54.79	-157.83	54.73	-157.85	344	582
74	53	28-Jun	80	55.24	-156.68	55.18	-156.74	182	345
74	54	28-Jun	80	55.17	-156.75	55.11	-156.76	293	773
75	55	29-Jun	80	55.64	-155.85	55.58	-155.86	147	212
75	56	29-Jun	80	55.56	-155.87	55.51	-155.82	214	232
148	57	5-Jul	80	54.65	-132.84	54.60	-132.93	138	382
149	58	5-Jul	80	54.60	-133.02	54.60	-133.13	411	418
108	59	6-Jul	80	54.47	-133.93	54.50	-134.02	252	552
108	60	6-Jul	80	54.50	-134.01	54.56	-134.07	453	778
107	61	7-Jul	80	54.90	-134.29	54.95	-134.34	226	567
107	62	7-Jul	80	54.96	-134.36	55.01	-134.42	393	692
106	63	8-Jul	80	55.35	-134.75	55.38	-134.83	396	652
106	64	8-Jul	80	55.40	-134.84	55.39	-134.94	489	789
105	65	9-Jul	80	55.56	-134.97	55.56	-135.05	211	704
105	66	9-Jul	80	55.58	-135.06	55.63	-135.13	547	856
144	67	10-Jul	80	55.93	-134.91	55.99	-134.91	201	348
145	68	10-Jul	80	56.04	-134.94	56.09	-135.02	367	345
104	69	11-Jul	80	55.92	-135.44	56.01	-135.52	331	615
104	70	11-Jul	80	56.03	-135.55	56.08	-135.61	641	830
103	71	12-Jul	80	56.38	-135.35	56.38	-135.48	144	186
103	72	12-Jul	80	56.38	-135.50	56.37	-135.62	190	239
102	73	13-Jul	80	56.85	-136.00	56.90	-136.10	229	621
102	74	13-Jul	80	56.91	-136.11	56.98	-136.11	745	804
101	75	14-Jul	80	57.19	-136.24	57.21	-136.33	223	604
101	76	14-Jul	80	57.21	-136.34	57.28	-136.39	666	979

Station	Haul	Date	# Skates Retrieved	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth (m)	End Depth (m)
100	77	15-Jul	80	57.62	-136.54	57.62	-136.66	205	730
100	78	15-Jul	80	57.62	-136.67	57.66	-136.77	672	906
142	79	16-Jul	80	57.92	-137.01	57.92	-137.15	385	441
143	80	16-Jul	80	57.97	-137.08	57.97	-137.22	211	415
99	81	17-Jul	78	57.88	-137.38	57.88	-137.50	190	722
99	82	17-Jul	80	57.88	-137.51	57.89	-137.64	583	783
98	83	18-Jul	80	58.14	-138.73	58.16	-138.87	223	715
98	84	18-Jul	80	58.16	-138.88	58.18	-139.00	467	952
97	85	19-Jul	80	58.47	-139.47	58.46	-139.61	194	493
97	86	19-Jul	80	58.46	-139.62	58.41	-139.70	440	1040
138	91	24-Jul	80	59.42	-140.95	59.43	-141.11	207	307
139	92	24-Jul	80	59.41	-141.17	59.36	-141.26	319	326
96	93	25-Jul	80	58.68	-140.64	58.68	-140.79	268	850
96	94	25-Jul	80	58.69	-140.79	58.73	-140.91	585	622
94	95	26-Jul	80	59.39	-142.17	59.42	-142.28	235	443
94	96	26-Jul	80	59.43	-142.29	59.48	-142.38	370	800
95	97	27-Jul	80	59.05	-141.34	59.05	-141.47	300	506
95	98	27-Jul	80	59.05	-141.48	59.05	-141.62	514	810
93	99	28-Jul	80	59.55	-142.57	59.59	-142.68	130	574
93	100	28-Jul	80	59.59	-142.68	59.58	-142.79	567	630
136	101	29-Jul	80	59.76	-143.70	59.75	-143.57	156	303
137	102	29-Jul	80	59.72	-143.51	59.68	-143.41	300	309
92	103	30-Jul	80	59.55	-143.67	59.56	-143.81	260	638
92	104	30-Jul	80	59.57	-143.81	59.59	-143.94	514	800
91	105	31-Jul	80	59.52	-144.70	59.48	-144.85	183	526
91	106	31-Jul	80	59.48	-144.85	59.45	-144.99	467	820
90	107	1-Aug	80	59.50	-145.53	59.51	-145.67	158	805
90	108	1-Aug	80	59.52	-145.67	59.52	-145.80	585	850
89	109	2-Aug	80	59.27	-146.85	59.22	-146.95	191	575
89	110	2-Aug	80	59.22	-146.98	59.17	-147.08	546	814
134	111	5-Aug	80	59.63	-146.99	59.55	-147.06	209	215
135	112	5-Aug	80	59.52	-147.15	59.45	-147.15	206	215
88	113	6-Aug	80	59.15	-147.61	59.08	-147.62	223	515
88	114	6-Aug	80	59.08	-147.62	59.00	-147.63	487	956
87	115	7-Aug	80	59.13	-148.65	59.05	-148.65	160	201
87	116	7-Aug	80	59.05	-148.64	58.99	-148.65	210	241
132	117	8-Aug	80	59.08	-149.41	59.03	-149.53	191	227
133	118	8-Aug	80	58.95	-149.51	58.92	-149.64	237	243
130	119	9-Aug	80	58.73	-149.19	58.77	-149.07	182	223
131	120	9-Aug	80	58.80	-149.04	58.84	-148.92	231	255

Station	Haul	Date	# Skates Retrieved	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth (m)	End Depth (m)
86	122	10-Aug	80	58.62	-148.34	58.62	-148.25	429	866
85	123	11-Aug	80	58.29	-148.62	58.22	-148.66	240	526
85	124	11-Aug	80	58.22	-148.66	58.15	-148.70	511	809
84	125	12-Aug	80	57.97	-149.17	57.91	-149.26	165	501
84	126	12-Aug	80	57.92	-149.26	57.85	-149.34	482	885
128	127	13-Aug	80	58.00	-149.84	57.98	-149.98	220	265
129	128	13-Aug	80	58.08	-149.90	58.07	-150.04	293	304
83	129	14-Aug	80	57.63	-149.92	57.56	-149.94	385	570
83	130	14-Aug	80	57.56	-149.96	57.49	-149.98	560	903
82	131	15-Aug	80	57.40	-150.58	57.32	-150.59	209	534
82	132	15-Aug	80	57.33	-150.60	57.25	-150.60	502	731
81	133	16-Aug	80	57.12	-151.22	57.05	-151.27	245	557
81	134	17-Aug	80	57.05	-151.28	56.97	-151.28	540	839
80	135	18-Aug	80	56.48	-152.21	56.42	-152.30	132	521
80	136	18-Aug	80	56.42	-152.30	56.35	-152.35	468	820
79	137	19-Aug	80	56.30	-153.08	56.26	-153.19	226	541
79	138	19-Aug	80	56.26	-153.20	56.21	-153.30	520	837
78	139	20-Aug	80	55.98	-154.03	55.91	-154.02	270	572
78	140	20-Aug	80	55.91	-154.03	55.84	-154.06	570	964
77	141	21-Aug	80	55.98	-154.85	55.95	-154.72	220	560
77	142	21-Aug	80	55.95	-154.73	55.89	-154.80	539	887
76	143	22-Aug	80	55.77	-155.14	55.70	-155.17	160	303
76	144	22-Aug	80	55.69	-155.18	55.64	-155.25	343	588
126	145	23-Aug	80	57.35	-155.04	57.35	-155.17	238	242
127	146	23-Aug	80	57.35	-155.25	57.33	-155.38	246	259
124	147	24-Aug	80	56.99	-155.07	57.00	-155.20	180	234
125	148	24-Aug	80	57.00	-155.30	57.04	-155.39	253	263
122	149	25-Aug	80	56.19	-155.97	56.18	-156.09	198	239
123	150	25-Aug	80	56.23	-156.13	56.25	-156.26	247	267
120	151	26-Aug	80	55.79	-156.08	55.76	-156.21	150	239
121	152	26-Aug	80	55.75	-156.20	55.77	-156.34	240	250

Table 4. Total estimated catch in numbers of major species (>100 individuals) caught in the 2012 NMFS longline survey by management area.

Species/Complex	Aleutian Islands	Western GOA	Central GOA	West Yakutat	East	Total
					Yakutat Southeast	
Sablefish	3,899	9,587	30,640	8,989	16,758	69,873
Giant grenadier	11,112	14,610	17,183	4,210	4,397	51,512
Pacific cod	5,584	4,364	5,445	134	631	16,158
Shortspine thornyhead	1,507	1,714	5,779	3,491	3,593	16,084
Pacific halibut	2,068	1,870	2,944	497	1,518	8,897
Rougheye rockfish	1,571	1,278	828	1,040	2,274	6,992
Arrowtooth flounder	800	534	2,436	610	548	4,928
Shorthead rockfish	791	529	616	819	1,252	4,006
Aleut/Bering/AK Skate Complex	759	289	2,122	119	180	3,469
Spiny dogfish	-	19	441	480	885	1,825
Longnose skate	2	297	576	360	525	1,760
Yellow Irish lord	1,525	5	-	-	-	1,530
Pacific grenadier	33	5	707	477	277	1,499
Redbanded rockfish	2	22	285	101	679	1,089
Sea anemone unident. whiteblotched skate	43	59	408	90	330	930
Walleye pollock	802	2	1	-	-	805
Sea pen or Sea Whip	111	120	541	18	5	795
Dover sole	12	15	656	17	22	722
Skates unidentified	-	7	382	89	124	602
Darkfin sculpin	251	21	156	15	36	479
Sponge, unidentified	412	3	1	-	-	416
Brittlestarfish	305	64	32	3	6	410
Yelloweye rockfish	26	25	249	55	44	399
commander skate	-	43	13	40	284	380
Gorgonian Coral unident.	310	16	-	-	7	333
Spotted ratfish	289	10	3	1	20	323
mud skate	-	-	-	-	307	307
Greenland turbot	206	3	51	10	2	272
Starfish unident.	154	-	-	-	-	154
hydrocoral unident.	31	6	35	22	57	151
Rosethorn rockfish	108	11	11	2	8	140
	-	-	-	33	68	101

Table 5. Catch in number by station for major species in the 2012 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 thornyhead, SK = skate, OS = Other Species.

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
Aleutian Islands										
35 ¹	8	1,393	195	94	35	0	47	1	656	255
37 ¹	203	114	1,256	112	45	9	3	26	208	193
38	646	147	1,432	94	195	64	79	278	65	24
39	360	555	1,818	458	53	7	22	56	62	497
40	367	240	1,262	111	73	47	26	179	48	186
42 ²	243	415	222	73	53	4	93	23	377	187
53	1,124	112	404	85	127	11	270	292	146	313
54 ²	56	803	148	111	40	7	72	9	122	485
55	285	336	853	158	31	1	91	178	157	279
57	122	148	998	113	40	1	63	48	168	32
58 ¹	153	161	679	196	44	2	219	250	218	65
59 ¹	136	403	1,262	241	50	0	260	62	90	572
60	125	757	157	222	12	0	1,118	28	33	468
61 ^{1,2}	71	0	426	0	2	1	0	77	36	15
Gulf of Alaska										
62 ¹	889	274	1,890	83	31	0	224	224	30	76
63	551	1,159	1,034	454	38	0	470	246	81	80
64 ¹	353	47	1,052	47	67	0	266	225	81	108
65 ¹	619	596	1,258	299	70	0	55	144	140	76
66	2,097	290	1,661	81	50	0	63	99	42	42
67	909	637	1,375	234	71	0	168	132	49	78
68 ¹	445	286	857	393	62	0	381	148	124	102
69 ¹	865	38	1,927	36	10	0	46	285	18	51
70	1,398	414	2,107	61	59	0	55	90	30	46
71	1,461	623	1,449	182	76	0	82	121	34	37
72	1,740	249	1,833	160	44	0	29	112	28	53
73	1,799	43	1,748	75	146	0	27	182	30	36
74	2,261	23	1,425	34	39	0	37	485	23	59
75 ¹	1,396	1,490	0	774	126	0	24	9	130	84
76	841	252	1,855	104	62	0	56	153	125	440
77	1,577	13	1,272	29	108	0	41	413	9	242
78	1,144	1	896	18	105	0	260	393	6	464
79	1,406	0	1,541	8	87	0	95	331	3	54
80	594	10	822	157	58	0	255	352	9	102
81	1,407	0	1,507	8	117	0	72	242	6	271
82	1,686	4	633	50	89	0	58	298	5	45

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
83	1,172	0	1,436	2	35	0	6	461	4	199
84	1,342	191	664	157	55	0	32	370	19	264
85	824	21	818	56	139	0	30	509	14	130
86	979	10	320	84	102	0	57	454	22	37
87	1,315	62	0	306	70	0	4	107	63	146
88	1,314	50	413	22	121	0	212	339	11	338
89	924	44	716	28	80	0	47	312	63	86
90	820	30	381	49	24	0	206	460	66	229
91	941	58	517	64	131	0	235	307	28	87
92	967	0	73	1	27	0	37	422	5	23
93	1,442	0	1,135	89	31	0	29	625	16	89
94	1,003	1	176	56	106	0	173	324	29	43
95	743	0	561	58	30	0	461	484	31	97
96	705	0	651	8	44	0	567	225	19	753
97	807	1	539	10	36	0	222	272	8	233
98	935	0	809	5	16	0	347	69	5	101
99 ²	864	4	455	32	18	0	43	151	27	282
100	1,103	36	358	9	10	0	19	207	5	163
101	1,031	33	558	15	31	0	41	222	18	75
102	1,085	16	323	47	45	0	82	208	18	92
103	62	244	0	610	21	0	0	13	84	831
104	962	0	411	6	6	0	505	375	21	115
105	2,119	34	252	45	17	0	45	342	23	220
106	1,571	0	133	2	31	0	124	335	9	67
107	1,273	15	209	45	65	0	471	317	38	128
108	574	7	202	16	23	0	1,241	110	14	80
120	449	1,037	0	75	52	0	0	2	165	81
121	1,002	199	0	36	43	0	0	15	115	90
122	165	269	0	36	67	0	0	1	160	83
123	373	107	0	39	69	0	0	3	244	22
124	84	409	0	92	160	0	17	1	211	79
125	203	117	0	113	106	0	0	0	321	34
126	235	344	0	90	77	0	0	0	372	115
127	300	483	0	127	78	0	0	0	408	53
128	783	37	0	53	65	0	11	68	12	39
129	482	1	0	21	39	0	30	56	19	6
130	881	3	0	50	27	0	3	38	24	9
131	1,095	6	0	62	38	0	41	156	37	101
132	578	7	0	25	50	0	0	31	66	40
133	491	2	0	26	20	0	5	121	31	39
134	264	3	0	9	26	0	38	59	135	163
135	458	2	0	46	16	0	15	18	87	145

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
136	446	1	0	49	43	0	3	72	33	32
137	316	0	0	11	12	0	22	101	18	20
138	278	0	0	50	37	0	39	93	57	101
139	404	0	0	34	45	0	40	66	143	39
142	905	0	95	47	26	0	26	149	11	103
143	1,143	0	53	128	91	0	28	46	17	166
144	155	61	0	170	20	0	75	266	53	121
145	609	0	0	71	37	0	245	272	126	218
148	580	177	0	199	42	0	13	139	137	362
149	980	3	0	61	13	0	6	100	149	130
Total	446	1	0	49	43	0	3	72	33	32

¹ Station catch was entirely or partially impacted by killer whale depredation.

² Station catch was partially impacted by gear loss.

Table 6. Total estimated catch in weight (kg) of major species (>100 kg) caught in the 2012 NMFS longline survey by management area. Weight derived from length-weight relationship when lengths available. For all others an average weight proxy was applied to numbers caught.

Species/Complex	Aleutian Islands	Western GOA	Central GOA	West Yakutat	East Yakutat Southeast	Total
Sablefish	8,484	19,086	81,867	32,998	60,994	203,429
Giant grenadier	42,626	46,644	54,935	14,164	15,137	173,506
Pacific halibut	12,203	11,035	17,373	2,933	8,958	52,501
Pacific cod	18,385	10,939	17,353	413	1,800	48,890
Longnose skate	15	2,214	4,294	2,684	3,914	13,121
Shortspine thornyhead	1,512	1,118	3,473	2,148	2,549	10,800
Rougheye rockfish	1,726	1,768	1,096	1,368	3,959	9,916
Arrowtooth flounder	2,037	833	4,432	1,167	982	9,451
Shortraker rockfish	689	725	992	1,559	2,078	6,043
Spiny dogfish	-	31	987	991	2,858	4,867
whiteblotched skate	4,320	11	5	-	-	4,336
Skates unidentified	1,274	107	792	76	183	2,431
Redbanded rockfish	4	39	506	179	1,205	1,933
Pacific grenadier	35	7	667	484	247	1,440
Yellow Irish lord	1,278	4	-	-	-	1,282
Walleye pollock	158	171	769	26	7	1,130
Spotted ratfish	-	-	-	-	1,118	1,118
Yelloweye rockfish	-	124	37	115	819	1,096
commander skate	988	51	-	-	22	1,061
mud skate	697	10	173	34	7	921
Dover sole	-	10	568	132	184	895
Greenland turbot	621	-	-	-	-	621
Pacific sleeper shark	-	116	463	-	-	578
Lingcod	-	-	25	263	164	452
Darkfin sculpin	361	3	1	-	-	364
Sea anemone unident.	12	16	113	25	91	258
Canary rockfish	-	-	-	-	153	153
Sea pen or Sea Whip	2	3	124	3	4	137
Octopus	57	50	19	-	6	132
Silvergray rockfish	-	-	-	33	95	128
whitebrow skate	111	3	-	-	6	120
big skate	-	-	80	30	10	120
Sponge, unidentified	87	18	9	1	2	118

Table 7. Mean length, round weight, mean dressed weight, number, and estimated total round weight of sablefish by station, for the 2012 NMFS longline survey.

Station	Mean Length	Mean Round Weight(kg) ^a	Mean Dressed Weight(lbs) ^b	Number of Sablefish	Est. Total Round Weight(kg) ^c
<u>Aleutian Islands</u>					
35 ¹	54.75	1.64	2.28	8	13
37 ¹	53.09	1.50	2.08	203	304
38	58.18	2.11	2.93	646	1,361
39	58.47	2.10	2.92	360	756
40	60.46	2.38	3.31	367	874
42 ²	61.81	2.63	3.66	243	639
53	58.60	2.13	2.95	1,124	2,391
54 ²	64.11	3.02	4.20	56	169
55	57.19	2.00	2.78	285	571
57	58.86	2.17	3.02	122	265
58 ¹	56.43	1.87	2.59	153	286
59 ¹	59.86	2.33	3.23	136	317
60	66.11	3.21	4.46	125	401
61 ^{1,2}	56.57	1.92	2.66	71	136
<u>Gulf of Alaska</u>					
62 ¹	55.66	1.79	2.49	889	1,593
63	59.53	2.41	3.35	551	1,328
64 ¹	52.22	1.43	1.99	353	505
65 ¹	58.03	2.03	2.82	619	1,255
66	55.35	1.76	2.45	2,097	3,693
67	60.34	2.39	3.32	909	2,172
68 ¹	61.74	2.59	3.60	445	1,153
69 ¹	54.42	1.65	2.29	865	1,426
70	57.84	2.05	2.85	1,398	2,865
71	58.46	2.12	2.94	1,461	3,095
72	61.67	2.58	3.58	1,740	4,486
73	59.77	2.32	3.22	1,799	4,176
74	63.31	2.78	3.86	2,261	6,286
75 ¹	54.24	1.62	2.25	1,396	2,265
76	58.69	2.18	3.03	841	1,833
77	63.12	2.83	3.93	1,577	4,462
78	65.44	3.12	4.34	1,144	3,572
79	65.70	3.16	4.39	1,406	4,448
80	65.03	3.01	4.19	594	1,790
81	64.50	2.97	4.13	1,407	4,182
82	61.94	2.61	3.63	1,686	4,408
62 ¹	66.50	3.28	4.56	1,172	3,850

Station	Mean Length	Mean Round Weight(kg) ^a	Mean Dressed Weight(lbs) ^b	Number of Sablefish	Est. Total Round Weight(kg) ^c
84	65.01	3.07	4.27	1,342	4,122
85	66.65	3.30	4.59	824	2,723
86	67.80	3.51	4.87	979	3,434
87	59.56	2.31	3.20	1,315	3,033
88	71.17	4.08	5.67	1,314	5,364
89	67.81	3.51	4.88	924	3,244
90	67.40	3.46	4.81	820	2,837
91	68.90	3.73	5.19	941	3,513
92	68.54	3.68	5.11	967	3,559
93	69.34	3.83	5.31	1,442	5,518
94	67.49	3.52	4.89	1,003	3,528
95	69.94	3.94	5.48	743	2,930
96	76.57	5.26	7.31	705	3,709
97	69.86	4.01	5.57	807	3,239
98	75.24	5.09	7.07	935	4,762
99 ²	71.60	4.19	5.82	864	3,622
100	70.31	3.96	5.49	1,103	4,362
101	70.14	3.99	5.54	1,031	4,111
102	71.13	4.14	5.75	1,085	4,490
103	55.38	1.90	2.64	62	118
104	63.63	2.82	3.92	962	2,714
105	69.32	3.82	5.31	2,119	8,099
106	67.44	3.53	4.90	1,571	5,546
107	69.36	3.79	5.26	1,273	4,819
108	68.23	3.62	5.02	574	2,075
120	57.87	2.02	2.81	449	908
121	56.33	1.87	2.59	1,002	1,872
122	58.16	2.10	2.92	165	347
123	59.18	2.17	3.01	373	808
124	63.18	2.72	3.78	84	229
125	59.70	2.21	3.08	203	449
126	59.12	2.13	2.95	235	500
127	59.46	2.18	3.03	300	655
128	58.82	2.19	3.04	783	1,712
129	64.10	2.83	3.92	482	1,362
130	61.09	2.47	3.43	881	2,176
131	64.75	2.96	4.12	1,095	3,244
132	58.06	2.08	2.89	578	1,203
133	58.93	2.19	3.05	491	1,077
134	50.41	1.30	1.81	264	344

Station	Mean Length	Mean Round Weight(kg) ^a	Mean Dressed Weight(lbs) ^b	Number of Sablefish	Est. Total Round Weight(kg) ^c
135	49.38	1.20	1.67	458	550
136	61.38	2.69	3.73	446	1,198
137	65.56	3.07	4.26	316	970
138	59.67	2.41	3.35	278	671
139	66.46	3.27	4.54	404	1,321
142	63.76	2.82	3.92	905	2,556
143	63.82	2.85	3.96	1,143	3,256
144	71.09	4.11	5.70	155	636
145	73.09	4.61	6.41	609	2,810
148	62.88	2.68	3.73	580	1,557
149	59.95	2.27	3.15	980	2,222

¹ Station catch was entirely or partially impacted by killer whale depredation.

² Station catch was partially impacted by gear loss.

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

^b Mean dressed weight was estimated using a recovery rate of 0.6 of round weight in pounds.

^c 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 8. - Stations and skates that were depredated upon by killer whales in the 2012 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
35	Aleutian Islands	1	160
37	Aleutian Islands	1	160
58	Aleutian Islands	120	160
59	Aleutian Islands	15	160
61	Aleutian Islands	1	160
65	Western Gulf of Alaska	81	160
62	Western Gulf of Alaska	10	160
64	Western Gulf of Alaska	15	160
68	Western Gulf of Alaska	115	160
69	Western Gulf of Alaska	14	160

Table 9. Stations that had sperm whales present during hauling operations in the 2012 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
40	Aleutian Islands	Yes	3
54	Aleutian Islands	No	2
67	Western Gulf of Alaska	Yes	4
69	Western Gulf of Alaska	No	1
76	Central Gulf of Alaska	No	2
77	Central Gulf of Alaska	No	2
82	Central Gulf of Alaska	Yes	2
84	Central Gulf of Alaska	Yes	2
89	West Yakutat	Yes	2
90	West Yakutat	Yes	3
91	West Yakutat	Yes	3
92	West Yakutat	Yes	2
95	West Yakutat	No	4
99	East Yakutat/Southeast	Yes	2
100	East Yakutat/Southeast	Yes	1
104	East Yakutat/Southeast	Yes	5
144	East Yakutat/Southeast	No	1
145	East Yakutat/Southeast	No	1

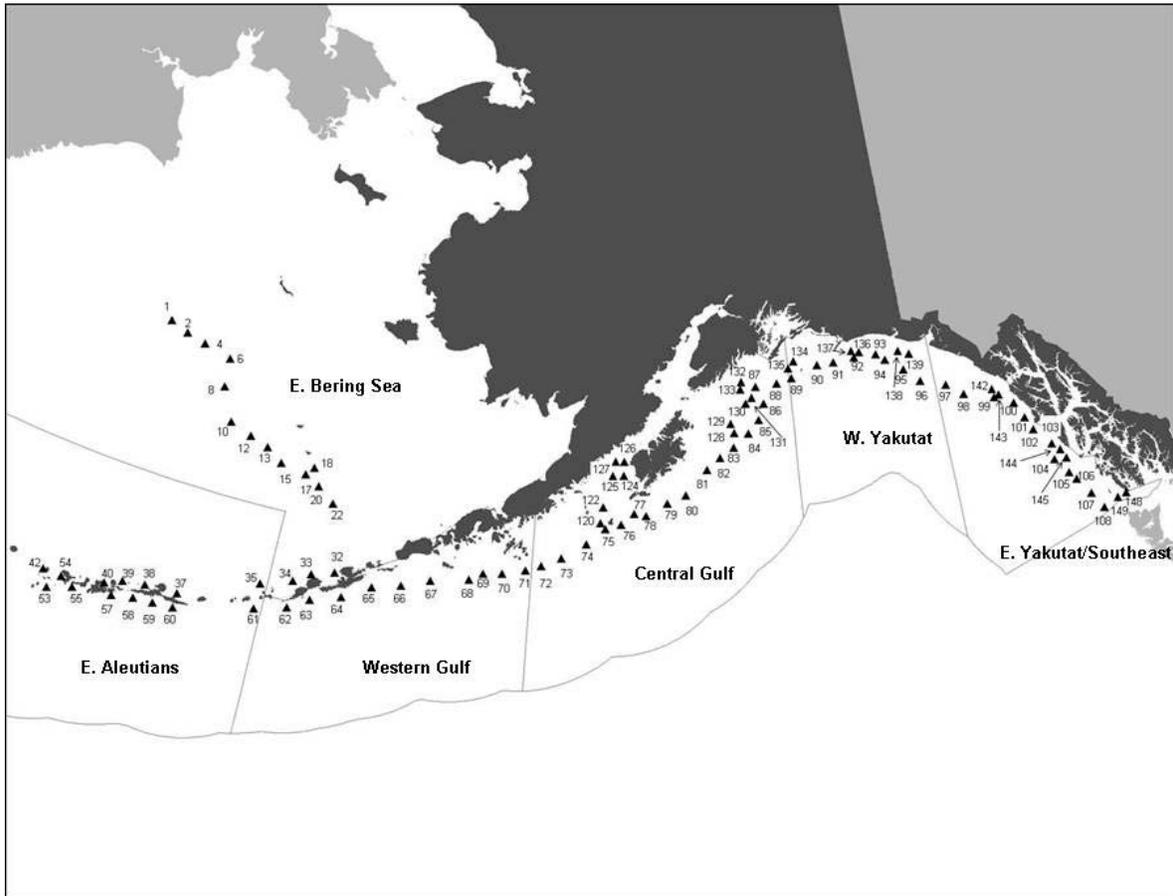


Figure 1. Map of NMFS longline survey station locations and corresponding management areas. Bering Sea stations are sampled in odd years; Aleutian Islands Region stations are sampled in even years; Gulf of Alaska stations are sampled every year.

APPENDIX A: Pollock Bait 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 walleye pollock...). This resulted in a total of 80 skates baited with squid and 80 skates baited with walleye pollock per set. Results will be tabulated and compared to data gathered during the 2011 longline survey.

During the two-day experiment four sets were completed (Table A1) and 2,696 sablefish were caught.

Table A1. Set information by station and haul for the 2012 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	58.79	-140.99	58.84	-141.05	650	824
2	21-Jul	58.86	-141.05	58.92	-141.08	689	770
3	22-Jul	58.93	-141.07	58.98	-141.18	671	856
4	22-Jul	58.98	-141.19	58.97	-141.31	739	829