F/V Alaskan Leader Cruise Report AL-02-01 Longline Survey of the Gulf of Alaska and Eastern Aleutian Islands June 3-September 5, 2002

Prepared by

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On September 5, 2002, the, Alaska Fisheries Science Center (AFSC), completed the twenty-second annual longline survey of Alaska sablefish (*Anoplopoma fimbria*) resources of the upper continental slope (Figure 1). The present NMFS survey was designed to continue the time series (1979-94) of the discontinued Japan-U.S. cooperative longline survey of the Gulf of Alaska. 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 2002.

OBJECTIVES

- 1. Determine the relative abundance and size composition of the commercially important species: sablefish, shortspine thornyhead (*Sebastolobus alascanus*), Greenland turbot (*Reinhardtius hippoglossoides*) 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: Pacific cod (*Gadus macrocephalus*), arrowtooth flounder (*Atheresthes stomias*), grenadiers (Macrouridae), and the relative abundance of Pacific halibut (*Hippoglossus stenolepis*).
- 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.
- 5. Conduct surface-gillnet sampling to examine distribution and abundance of young-of-the-year sablefish.
- 6. Implant sablefish with electronic tags that record water temperature, depth, and time.
- 7. Test the effect of hook spacing on sablefish catch rates.

VESSEL AND GEAR

Survey operations were conducted using the F/V *Alaskan Leader*, a chartered U.S. longline vessel. The 46 m (150 ft) vessel carried standard longline hauling gear and was equipped with radios, radars, GPS receivers, LORAN receivers, video and paper track plotters, a processing line, three sets of plate freezers, and refrigerated holds. Vessel personnel consisted of a captain, an engineer, a first mate, a cook, a quality-control technician, three fishermen, four baiters and three processors, two contract biologists, and one or two NMFS biologists .

Gear configuration was unchanged from that of the 1988-2001 surveys. 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 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. Each flag was followed sequentially by a 183-1,281 m (100-700 fm) long 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. 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. Two stations spaced 3.5-7 km (2-4 nmi) apart usually will be sampled each day in the gullies. Fewer skates are needed to sample a

 $^{^{\}rm 1}$ Citation of the above brand name does not constitute U.S. government endorsement.

gully compared to a slope station, 80 vs. 160, because of the narrower range of depths covered in gullies. Only Amatuli Gully station 87 consists of 160 skates because it was created during the Japan-U.S. cooperative longline survey, whereas all other gully stations were created during the domestic longline survey.

OPERATIONS

The charter began on June 3 at Unalaska, Alaska, and ended on September 5 in Unalaska. The charter period was divided into eight legs of 15, 11, 8, 15, 2, 12, 10 and 15 days with one-day port calls after the fourth, fifth, and seventh legs. A two-day port call in Seward occurred after leg 6 and a three-day port call in Ketchikan after leg 3. During leg 1, the stations along the upper continental slope of the eastern Aleutian Islands were sampled. During leg 2 the area in the Gulf of Alaska extending from the western end of Umnak Island and eastward to Sand Point was sampled. During leg 3 sea mount sampling was conducted while transiting to Ketchikan. Leg 4 began near Dixon Entrance and continued north and westward to Yakutat. During leg 5 the hook-spacing experiment was conducted in the Yakutat vicinity. During leg 6, the area between Yakutat and Seward was sampled, and during leg 7 the area from Seward to Kodiak was sampled. During leg 8, the area from Kodiak Island to the Sumagin Islands was sampled.

Annual survey periods have varied over time. 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 sablefish 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 trawl 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 completed the second leg and transited to Dixon Entrance during early July. Survey operations were resumed sampling in a westerly direction going from Dixon Entrance to Sand Point.

Hook-Spacing Experiment

A longline hook-spacing experiment was conducted near Yakutat during 25-26 July 2002. The purpose of the experiment was to test an assumption on how to interpret longline fishery catch rates. The fishery catch per skate is assumed to be an index of relative abundance, for example, a 10% difference in catch rate reflects a 10% difference in relative abundance. This assumption would be wrong if increasing the hook spacing increased the fishing power of each hook. Most (about 70%) sablefish longline fishermen currently use 1 meter hook spacing, but this spacing differs among vessels

and may change with time. In the hook-spacing experiment, circle hooks (size 13/0) baited with squid were used. Four hook spacings were tested, 0.5, 1, 2, and 4 m. Six sets were completed. Each set contained all hook spacings. For both this experiment and earlier hook spacing experiments conducted in 1986, 1999 and 2001, catch rate per hook increased as hook spacing increased to an asymptote at four meter spacing. Catch per hook for one-meter spacing, the most common spacing currently in the fishery, was about half that for the four-meter spacing. These results imply that analysis of fishery catch rates should be standardized by longline set to account for differences in hook spacing.

Survey Operations

A total of 87 stations was sampled during the 2002 survey. Fourteen stations were sampled along the upper continental slope of the eastern Aleutian Islands and 45 stations along the upper continental slope of the Gulf of Alaska 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 (Table 1). In addition, twenty-seven stations were sampled in gullies at the rate of one to 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 (42) was sampled on the continental shelf off Baranof Island.

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

A floating gillnet was fished at night to examine the distribution and abundance of young-of-the-year sablefish. The net was set at each station, weather permitting. The gillnet is 200 m long and 3 m deep with variable mesh sizes from 0.75" (1.91 mm) to 1.5" (3.81 mm). The gillnet was set about midnight and retrieved before the longline gear was set at 0630. All fish caught in the gillnet were counted and measured for length. Juvenile sablefish and salmon are frozen for additional studies back at the laboratory.

Data Collection

Catch data were recorded on a hand-held electronic data logger. During gear retrieval a scientist recorded the species of each hooked fish, the condition of each unoccupied hook (absent, broken, or tangled), and whether bait remained on the hook. Time of day was recorded constantly from an internal clock and depth was entered when the first and last skates came aboard, at the beginning of each fifth skate, and 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 frequency data were collected electronically with a bar code-based measuring board and a bar code reader/data storage device. Length was measured by depth interval for sablefish, Pacific cod, grenadiers, arrowtooth flounder, rockfish, and thornyheads. Lengths of sablefish and Pacific cod also 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 electronically backed up twice a day. As in the previous surveys, the charter vessel was allowed to retain sablefish and rockfish not tagged or retained for biological samples and after the scientific data were recorded.

RESULTS

One hundred-forty-eight longline hauls (sets) were completed (Table 1). Sablefish was the most frequently caught species, followed by giant grenadiers, Pacific cod, shortspine thornyhead, and other species (Table 2). A total of 87,141 sablefish, with an estimated total round weight of 292,139 kg (644,166 lb), was taken during the survey (Table 3).

The highest total sablefish catch was observed at station 74 in the eastern Gulf of Alaska (Table 2). Station 99 in northern southeast Alaska had the largest average length sablefish (Table 3).

A total of 4,423 sablefish, 588 shortspine thornyhead, and 26 Greenland turbot were tagged and released during the survey. Length-weight data and otoliths were collected from 2,409 sablefish. Twenty-one gillnet sets were completed. Electronic tags were implanted in 136 sablefish. No young-of-the-year sablefish were caught during the survey.

Killer whales preying on sablefish coming up on the gear were observed at stations 62, 63, 64, and 65 in the western Gulf of Alaska. Sperm whales preying on sablefish coming up on the gear were observed at stations 88 and 90 in the eastern Gulf of Alaska.

SCIENTIFIC PERSONNEL

Leg I (June 3 - June 17)
Larry Haaga, Field Party Chief, RACE
Suzanne Romain, Contract Biologist
Ken Orwig, Contract Biologist

<u>Leg II</u> (June 18- June 28)

Chris Lunsford, Field Party Chief, ABL Suzanne Romain, Contract Biologist Ken Orwig, Contract Biologist

<u>Leg III</u> (June 29 - July 6)

Nancy Maloney, Field Party Chief, ABL Suzanne Romain, Contract Biologist Ken Orwig, Contract Biologist

<u>Leg IV</u> (July 9 - July 23)

John Karinen, Field Party Chief, ABL Doris Alcorn, Contract Biologist Suzanne Romain, Contract Biologist Ken Orwig, Contract Biologist

<u>Leg V</u> (July 25 - July 26)

Chris Lunsford, Field Party Chief, ABL Suzanne Romain, Contract Biologist Ken Orwig, Contract Biologist

Leg VI (July 28- August 8)

Dave Clausen, Field Party Chief, ABL Lee Hulbert, Fisheries Biologist, ABL Suzanne Romain, Contract Biologist Ken Orwig, Contract Biologist

<u>Leg VII</u> (August 11 - August 20)

Dean Courtney, Field Party Chief, RACE Dave Clausen, Fisheries Biologist, ABL Suzanne Romain, Contract Biologist Ken Orwig, Contract Biologist

<u>Leg VIII</u> (August 22 - September 5)

Larry Haaga, Field Party Chief, RACE Suzanne Romain, Contract Biologist Ken Orwig, Contract Biologist

RACE - Resource Assessment and Conservation Engineering Division

For further information contact either

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Table 1.--Haul number (set), preassigned station number, and starting and ending positions and depths for the 2002 NMFS longline survey of the Eastern Aleutian Islands and Gulf of Alaska, June 3- September 5.

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.mm)	End latitude (ddmm.m)	End longitude (dddmm.mm)	Start depth (m)	End depth (m)
			East	ern Aleutian Islands	S		
1	35	5301.8	17005.71	5303.6	17011.35	170	182
2	35	5303.5	17011.40	5305.6	17016.37	175	639
3	37	5216.7	17329.61	5220.8	17329.83	154	619
4	37	5221.6	17329.51	5225.2	17330.25	635	777
5	38	5215.2	17450.80	5218.7	17447.11	174	487
6	38	5219.2	17446.16	5220.9	17440.50	480	825
7	39	5208.6	17536.26	5209.4	17542.22	138	538
8	39	5209.6	17542.53	5210.3	17548.92	529	740
9	40	5158.2	17627.12	5201.8	17626.04	109	587
10	40	5202.2	17624.45	5204.0	17619.38	645	864
11	42	5146.4	17857.88	5143.0	17854.01	172	496
12	42	5142.6	17853.00.	5139.6	17848.89	520	731
13	54	5145.8	17810.00	5144.3	17816.16	91	368
14	54	5144.0	17817.11	5143.6	17823.11	450	520
15	53	5124.2	17837.08	5121.0.	17834.38	177	608
16	53	5121.9	17827.67	5121.2	17834.33	558	564
17	55	5135.5	17736.98	5133.0	17742.44	171	309
18	55	5132.6	17743.2.0	5131.6	17749.05	567	945
19	57	5144.0	17559.96	5139.8	17600.67	187	354
20	57	5139.4	17601.19	5135.6	17604.29	380	722
21	58	5150.8	17508.38	5146.7	17508.67	180	358
22	58	5146.1	17507.32	5142.2	17508.03	393	867
23	59	5152.9	17420.14	5149.7	17423.97	122	383
24	59	5149.2	17425.14	5147.1	17431.34	332	805
25	60	5155.1	17329.94	5152.7	17335.96	108	263
26	60	5152.6	17336.88	5151.3	17343.41	301	720
27	61	5226.3	17018.93	5223.4	17024.62	248	540
28	61	5223.0	17025.20	5219.4	17029.18	551	713
			Gulf of	Alaska			
29	62	5239.9	16858.8	5237.1	16903.93	135	545
30	62	5237.0	16904.71	5234.7	16907.93	549	945
31	63	5257.6	16808.28	5254.5	16812.46	110	365
32	63	5254.2	16813.2.0	5250.5	16815.17	317	662
33	65	5334.9	16541.28	5330.6	16543.7.0	120	293
34	65	5326.2	16547.54	5329.5	16544.94	336	484
35	64	5311.6	16651.52	5307.4	16653.76	208	312
36	64	5307.0	16654.13	5303.3	16657.7	324	805
37	66	5344.1	16428.46	5340.8	16433.73	136	305
38	66	5340.2	16434.88	5337.2	16440.92	352	751

Table 1-Continued

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.m)	End latitude (ddmm.m)	End longtude (dddmm.m)	Start depth (m)	End depth (m)
39	67	5358.0	16315.86	5354.1	16319.68	119	410
40	67	5353.9	16320.72	5351.6	16327.41	546	793
41	68	5408.0	16138.41	5405.2	16143.44	122	377
42	68	5405.4	16144.42	5403.7	16150.07	271	858
43	69	5418.7	16103.73	5415.5	16109.08	183	413
44	69	5415.3	16110.38	5412.4	16115.17	435	819
45	70	5421.8	16014.4	5417.7	16018.28	143	710
46	70	5417.3	16018.95	5413.2	16020.86	725	319
47	71	5430.6	15915.74	5426.6	15919.47	338	642
48	71	5426.2	15920.31	5422.8	15924.53	139	271
49	148	5438.8	13250.29	5435.8	13255.55	280	683
50	149	5436.0	13301.17	5436.0	13308.00	146	379
51	108	5427.9	13355.03	5429.4	13400.93	306	648
52	108	5430.1	13401.26	5433.7	13404.41	522	929
53	107	5454.2	13427.07	5457.5	13420.77	219	549
54	107	5458.1	13421.90	5500.7	13427.00	412	919
55	106	5520.8	13444.41	5523.4	13449.94	406	619
56	106	5523.9	13450.06	5523.4	13457.17	458	819
57	105	5533.4	13457.95	5533.8	13502.90	245	658
58	105	5534.6	13502.79	5536.6	13507.92	496	919
59	144	5555.7	13454.54	5559.8	13455.42	175	362
60	145	5602.2	13456.11	5605.3	13501.7.0	344	382
61	104	5558.8	13526.71	5601.0	13531.81	374	622
62	104	5601.7	13532.25	5604.6	13536.85	606	838
63	103	5623.0	13521.04	5622.9	13528.74	156	187
64	103	5623.0	13529.31	5622.1	13536.75	188	245
65	102	5651.3	13600.00	5653.3	13605.22	216	690
66	102	5654.6	13605.74	5658.2	13607.05	583	938
67	101	5712.5	13614.31	5712.5	13620.45	219	654
68	101	5713.4	13621.58	5717.3	13623.44	793	1,035
69	100	5737.1	13632.18	5736.7	13638.81	218	815
70	100	5737.2	13640.30	5739.6	13646.19	664	945
71	142	5755.1	13700.51	5755.2	13708.52	395	444
72	143	5758.1	13704.64	5758.0	13712.78	236	419
73	99	5752.2	13723.17	5753.2	13730.45	200	720
74	99	5753.5	13731.32	5753.6	13738.57	548	845
75	98	5808.6	13844.03	5809.3	13851.79	205	851
76	98	5809.8	13852.58	5810.8	13858.48	512	830
77	97	5828.3	13928.19	5827.7	13935.86	193	506
78	97	5827.8	13937.00	5825.1	13942.22	419	948
79	138	5924.9	14056.68	5925.5	14104.80	229	293
80	139	5924.8	14110.25	5921.1	14115.26	320	325
81	96	5841.1	14039.13	5841.5	14047.21	275	522
82	96	5841.5	14047.63	5843.9	14054.36	643	753

Table 1.-Continued

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.m)	End latitude (ddmm.m)	End longtude (dddmm.m)	Start depth (m)	End depth (m)
83	95	5902.8	14121.00	5902.66	14129.75	300	590
84	95	5903.6	14130.75	5902.89	14138.27	588	890
85	94	5923.3	14210.24	5925.5	14218.00	235	445
86	94	5926.0	14210.00	5928.4	14224.10	396	910
87	93	5933.0	14234.45	5935.1	14240.87	131	610
88	93	5936.0	14247.78	5934.1	14248.50	570	656
89	137	5940.2	14323.60	5942.6	14329.77	293	312
90	136	5944.5	14335.67	5946.3	14343.53	155	293
91	92	5933.2	14339.90	5933.8	14348.20	175	780
92	92	5933.9	14349.70	5935.1	14357.60	600	930
93	91	5931.0	14443.25	5928.6	14450.73	180	567
94	91	5928.6	14451.73	5921.8	14459.12	496	888
95	90	5930.1	14532.60	5931.1	14540.70	158	895
96	90	5931.4	14541.34	5931.2	14549.90	374	748
97	89	5916.0	14651.60	5913.5	14657.20	190	550
98	89	5913.4	14658.20	5910.7	14704.10	565	750
99	88	5909.1	14736.96	5904.9	14737.40	232	496
100	88	5904.4	14737.92	5900.2	14738.26	503	935
101	134	5936.9	14658.60	5933.1	14703.49	209	213
102	135	5930.8	14709.22	5926.5	14708.88	209	217
103	87	5907.1	14838.25	5902.8	14838.37	160	218
104	87	5902.4	14838.82	5858.1	14838.05	227	249
105	132	5904.6	14924.30	5902.2	14931.07	187	226
106	133	5857.0	14931.03	5855.0	14937.80	239	242
107	130	5846.6	14903.18	5844.1	14910.81	183	225
108	131	5851.0	14855.02	5848.2	14901.81	235	255
109	86	5836.9	14819.97	5841.2	14820.09	280	440
110	86	5837.0	14820.57	5832.6	14819.65	420	987
111	85	5817.5	14837.28	5813.5	14839.18	235	500
112	85	5812.9	14839.22	5809.0	14841.85	545	836
113	84	5758.4.	14910.09	5754.9	14914.64	164	487
114	84	5754.6	14915.98	5751.5	14920.02	500	922
115	128	5800.1	14950.48	5758.6	14958.73	215	262
116	129	5805.0	14954.86	5803.6	15002.98	293	312
117	83	5738.2	14955.32	5734.0	14957.09	380	545
118	83	5733.8	14959.32	5729.4	14959.32	550	874
119	82	5723.9	15034.47	5719.6	15035.22	216	509
120	82	5719.4	15036.29	5714.9	15035.85	516	735
121	81	5703.2	15113.47	5703.2	15115.87	250	516
122	81	5702.3	15117.21	5657.9	15116.80	593	854
123	80	5629.0	1521300	5625.5	15217.47	138	475
124	80	5625.2	15218.27	5621.5	15220.56	477	800
125	79	5618.0	15305.20	5615.8	15311.01	251	509

-Continue	

	Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.m)	End latitude (ddmm.m)	End longtude (dddmm.m)	Start depth (m)	End depth (m)
1	126	79	5615.9	15312.22	5612.8	15316.60	535	806
1	127	78	5558.8	15402.08	5554.8	15402.15	261	538
1	128	78	5554.1	15402.85	5550.0	15405.20	590	877
1	129	77	5602.5	15434.10	5557.3	15434.00	238	535
1	130	77	5557.1	15434.63	5553.8	15434.84	564	883
1	131	76	5541.2	15511.27	5545.9	15508.60	155	317
1	132	76	5537.9	15516.38	5516.38	15512.41	372	572
1	133	75	5538.3	15551.07	5534.0	15551.97	146	213
1	134	75	5533.6	15552.07	5529.3	15550.04	210	217
1	135	122	5611.0	15557.79	5610.9	15604.96	191	238
1	136	123	5614.0	15607.79	5615.3	15615.00	247	267
1	137	127	5919.5	15523.07	5720.8	15515.29	246	257
1	138	126	5721.1	15510.48	5721.2	15502.48	241	242
1	139	124	5659.6	15503.96	5659.8	15512.20	177	235
1	140	125	5659.9	15518.25	5702.7	15524.18	253	264
1	141	120	5546.5	15604.77	5545.1	15611.27	202	240
1	142	121	5549.9	15612.42	5543.7	15619.93	242	248
1	143	74	5514.4	15640.34	5510.5	15643.93	158	351
1	144	74	5510.0	15644.51	5505.8	15645.72	342	800
1	145	73	5451.1	15744.64	5447.2	15748.66	180	400
1	146	73	5446.1	15749.86	5442.7	15752.26	367	630
1	147	72	5437.1	15835.13	5433.1	15838.42	125	390
1	148	72	5433.4	15839.65	5429.7	15843.04	374	867

Table 2.—Catch in number by species for the 2002 NMFS longline survey of the Eastern Aleutian Islands and the Gulf of Alaska June 3 - September 5. SF = sablefish, PC = Pacific cod, GR = giant grenadiers, PH = Pacific halibut, ATF = arrowtooth flounder, GT = Greenland Turbot, RF =

rougheye and shortraker rockfish, ST = thornyheads, SK = skate, OS = other species.

Eastern Aleutian Islands	rougheye and	shortraker	rockfish,	ST = thorn	nyheads,	SK = skate	OS = ot	her species.			
35	Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
37				Ea	astern A	leutian Isl	lands				
38 507 131 547 14 159 264 81 241 23 59 39 586 189 2,268 161 96 42 133 150 17 94 40 340 588 1,607 64 62 55 87 142 39 12 42 89 110 2,313 106 35 7 81 17 219 330 53 297 158 2,626 20 34 33 59 44 60 284 54 86 807 2,025 173 34 20 333 38 83 547 55 93 301 1,759 76 63 7 92 107 57 144 63 687 412 261 129 52 18 48 49 109 129 58 295 178 <td< td=""><td>35</td><td>42</td><td>2,212</td><td>85</td><td>696</td><td>213</td><td>11</td><td>77</td><td>1</td><td>365</td><td>195</td></td<>	35	42	2,212	85	696	213	11	77	1	365	195
39 586 189 2,268 161 96 42 133 150 17 94 40 340 588 1,607 64 62 55 87 142 39 121 42 89 110 2,313 106 35 7 81 17 219 330 53 297 158 2,626 20 34 33 59 44 60 284 54 86 807 2,025 173 34 20 333 38 83 547 55 93 301 1,759 76 63 7 92 107 57 146 57 244 206 1,261 129 52 18 48 49 109 129 58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105	37	647	113	1,105	37	161	189	12	15	129	45
40 340 588 1,607 64 62 55 87 142 39 121 42 89 110 2,313 106 35 7 81 17 219 330 53 297 158 2,626 20 34 33 59 44 60 224 54 86 807 2,025 173 34 20 333 38 83 547 55 93 301 1,759 76 63 7 92 107 57 146 57 244 206 1,261 129 52 18 48 49 109 129 58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 Gulf of Alaska 63 687 412 521 323 232 0 502 147 65 41 65 871 595 85 95 78 0 13 29 16 29 66 1,977 53 2,113 41 72 9 39 147 7 22 67 928 635 1,474 276 188 0 121 124 40 104 68 1,317 763 977 271 276 0 407 241 55 32 69 760 370 2,358 113 112 0 78 236 9 37 70 687 867 2,011 190 145 1 141 129 23 138 71 1,143 799 979 183 192 0 120 268 20 45 72 1,589 320 1,084 184 43 0 31 460 22 101 73 704 21 1,369 77 178 0 97 441 5 57 74 2,780 35 726 101 92 0 23 502 10 90 75 1,384 548 0 405 524 0 6 0 97 441 5 595 77 1,596 0 1,414 20 90 0 64 454 27 123 78 1,431 0 770 95 100 0 170 315 16 595 79 2,790 0 748 18 41 0 10 309 0 71 80 801 18 537 345 174 0 118 373 29 94 81 1,701 0 1,207 19 95 0 20 170 2 604 82 1,566 0 427 358 114 0 10 42 131 0 251 88 1,897 8 546 77 111 0 67 261 50 106 88 1,897 8 546 77 111 0 67 261 50 106 88 1,897 8 546 77 111 0 67 261 50 106 88 1,897 8 546 77 111 0 67 261 50 106 88 1,897 8 546 77 111 0 67 261 50 106 88 1,897 8 546 77 111 0 67 261 50 106 88 1,897 8 546 77 111 0 67 261 50 106 88 1,897 8 546 77 111 0 67 261 50 106 88 2,174 15 420 22 64 0 325 165 20 461 89 1,860 4 296 52 41 0 0 0 0 325 165 20 461	38	507	131	547	14	159	264	81	241	23	59
42 89 110 2,313 106 35 7 81 17 219 330 53 297 158 2,626 20 34 33 59 44 60 284 54 86 807 2,025 173 34 20 333 38 83 547 55 93 301 1,759 76 63 7 92 107 57 146 57 244 206 1,261 129 52 18 48 49 109 129 58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0	39	586	189	2,268	161	96	42	133	150	17	94
53 297 158 2,626 20 34 33 59 44 60 284 54 86 807 2,025 173 34 20 333 38 83 547 55 93 301 1,759 76 63 7 92 107 57 146 57 244 206 1,261 129 52 18 48 49 109 129 58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 61 127 53	40	340	588	1,607	64	62	55	87	142	39	121
54 86 807 2,025 173 34 20 333 38 83 547 55 93 301 1,759 76 63 7 92 107 57 146 57 244 206 1,261 129 52 18 48 49 109 129 58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 Gulf of Alaska Gulf of Alaska Gulf of Alaska 63 687 412 521 323 232 0 502 147 65 41 65 871 595 85 95	42	89	110	2,313	106	35	7	81	17	219	330
55 93 301 1,759 76 63 7 92 107 57 146 57 244 206 1,261 129 52 18 48 49 109 129 58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 Culf of Alaska Culf of Alaska 63 687 412 521 323 232 0 502 147 65 41 65 871 595 85 95 78 0 13 29	53	297	158	2,626	20	34	33	59	44	60	284
57 244 206 1,261 129 52 18 48 49 109 129 58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 Gulf of Alaska Gulf of Alaska Gold of Alaska Gold of Alaska Gold of Alaska 66 1,977 53 2,113 41 72 9 39 147 7 22 67 928 635 1,474 276 188 0 121 124 40 104 68 1,	54	86	807	2,025	173	34	20	333	38	83	547
58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 Gulf of Alaska 63 687 412 521 323 232 0 502 147 65 41 65 871 595 85 95 78 0 13 29 16 29 66 1,977 53 2,113 41 72 9 39 147 7 22 67 928 635 1,474 276 188 0 121 124 40 10 <td< td=""><td>55</td><td>93</td><td>301</td><td>1,759</td><td>76</td><td>63</td><td>7</td><td>92</td><td>107</td><td>57</td><td>146</td></td<>	55	93	301	1,759	76	63	7	92	107	57	146
58 209 154 1,489 103 46 13 147 161 102 83 59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 Gulf of Alaska 63 687 412 521 323 232 0 502 147 65 41 65 871 595 85 95 78 0 13 29 16 29 66 1,977 53 2,113 41 72 9 39 147 7 22 67 928 635 1,474 276 188 0 121 124 40 10 <td< td=""><td>57</td><td>244</td><td>206</td><td>1,261</td><td>129</td><td>52</td><td>18</td><td>48</td><td>49</td><td>109</td><td>129</td></td<>	57	244	206	1,261	129	52	18	48	49	109	129
59 289 242 1,287 170 113 0 371 121 39 185 60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 Gulf of Alaska 63 687 412 521 323 232 0 502 147 65 41 65 871 595 85 95 78 0 13 29 116 29 66 1,977 53 2,113 41 72 9 39 147 7 22 67 928 635 1,474 276 188 0 121 124 40 104 68 1,317 763 977 271 276 0 407 241 55 52 <t< td=""><td></td><td>209</td><td></td><td></td><td>103</td><td>46</td><td></td><td>147</td><td>161</td><td>102</td><td>83</td></t<>		209			103	46		147	161	102	83
60 191 715 1,185 84 34 3 638 31 21 271 61 147 0 205 145 18 18 52 149 278 105 Gulf of Alaska 63 687 412 521 323 232 0 502 147 65 41 65 871 595 85 95 78 0 13 29 16 29 66 1,977 53 2,113 41 72 9 39 147 7 22 67 928 635 1,474 276 188 0 121 124 40 104 68 1,317 763 977 271 276 0 407 241 55 52 69 760 370 2,358 113 112 0 78 236 9 37 70 687 867 2,011 190 145 1 141 129 23 138 71 1,143 799 979 183 192 0 120 268 20 45 72 1,589 320 1,084 184 43 0 31 460 22 101 73 704 21 1,369 77 178 0 97 441 5 57 74 2,780 35 726 101 92 0 23 502 10 96 75 1,384 548 0 405 524 0 6 0 0 94 71 76 944 71 568 221 210 0 69 123 134 495 77 1,596 0 1,414 20 90 0 64 454 27 123 78 1,431 0 770 95 100 0 170 315 16 595 79 2,790 0 748 18 41 0 10 309 0 71 80 801 18 537 345 174 0 118 373 29 94 81 1,701 0 1,207 19 95 0 20 170 2 604 82 1,566 0 427 358 114 0 42 131 0 251 83 1,869 0 1,407 0 2 0 1 249 1 166 84 1,782 101 628 234 134 1 5 1 51 85 1,897 8 546 77 111 0 67 261 50 106 86 1,545 0 519 214 59 0 198 252 25 133 87 1,807 25 0 295 186 0 10 80 325 165 20 461 88 2,174 15 420 22 64 0 325 165 20 461 89 1,860 4 296 52 41 0 20 20 209 36 121											
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89 1,860 4 296 52 41 0 20 209 36 121	87	1,807	25	0	295	186	0	10	80	196	90
	88	2,174	15	420	22	64	0	325	165	20	461
90 1.206 8 216 220 9 0 199 212 31 76	89	1,860	4	296	52	41	0	20	209	36	121
-,-30 0 210 220 / 0 1// 212 31 /0	90	1,206	8	216	220	9	0	199	212	31	76
91 1,841 1 266 58 27 0 169 210 12 104	91	1,841	1	266	58	27	0	169	210	12	104
92 1,158 1 162 1 11 1 17 240 2 145	92	1,158	1	162	1	11	1	17	240	2	145
93 1,944 0 138 71 8 0 27 263 13 28	93	1,944	0	138	71	8	0	27	263	13	28
		883	0	209	64	174	0	262	219	21	292

Т	Table 2con	tinued.								
Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
95	2,089	0	350	10	122	0	371	263	13	91
96	1,828	0	359	5	26	0	338	148	31	153
97	858	0	493	25	59	0	503	165	30	28
98	837	0	558	12	14	0	589	66	8	90
99	826	0	231	8	7	0	119	140	22	88
100	1,072	1	568	6	21	0	90	160	4	103
101	1,146	0	555	21	39	0	148	184	5	166
102	1,043	0	492	13	72	0	103	157	7	117
103	181	118	0	546	21	0	0	0	61	737
104	1,161	0	493	4	61	0	231	333	24	119
105	1,382	19	356	50	24	0	91	229	21	150
106	1,499	0	253	5	21	0	294	219	14	126
107	1,429	5	326	26	31	0	697	159	22	188
108	1,543	0	252	31	47	0	676	95	26	131
120	860	468	0	195	150	0	1	0	141	37
121	1,037	164	0	121	131	0	0	0	214	42
122	1,244	222	0	76	103	0	1	0	123	36
123	1,032	321	0	59	99	0	0	0	275	30
124	707	275	0	102	164	0	2	0	204	27
125	562	269	0	209	131	0	2	1	222	32
126	341	226	0	133	55	0	0	0	227	45
127	672	100	0	97	17	0	2	2	238	35
128	880	11	0	247	479	0	0	8	11	15
129	1,012	0	0	120	214	0	0	20	31	8
130	1,033	0	0	22	21	0	2	32	53	1
131	1,528	1	0	58	41	0	3	35	44	26
132	1,028	4	0	91	66	0	3	18	184	22
133	1,560	0	0	40	87	0	5	20	49	20
134	273	0	0	15	67	0	70	18	94	145
135	132	0	0	71	17	0	65	22	63	143
136	547	0	0	40	28	0	3	23	75	57
137	564	0	0	24	9	0	5	33	46	9
138	313	1	0	74	80	0	82	100	56	59
139	982	0	0	67	58	0	72	35	157	5
142	551	0	169	2	15	0	15	121	4	32
143	931	0	77	67	65	0	47	44	18	40
144	226	26	0	95	117	0	154	196	43	84
145	1,071	0	5	28	79	0	51	221	31	33
148	767	146	0	72	85	0	9	141	174	308
149	1,005	0	0	48	39	0	15	267	212	148
Total	87,141	13,973	49,474	9,556	7,884	692	10,487	12,111	5,835	11,535

Table 3.- -Mean length, round weight, mean dressed weight, number and estimated total round weight of sablefish by station, for the 2002 NMFS longline survey of the Eastern Aleutian Islands and the Gulf of Alaska, June 3 - September 5.

Station Number	Mean length (cm)	Mean round weight (kg) ²	Mean dressed weight (lb) ³	Number of sablefish	Estimated total round weight (kg) ⁴
		Fastarn A	leutian Islands		
35	68.42	3.56	4.94	42	149
37	62.15	2.53	3.52	647	1,638
38	67.1	3.28	4.55	507	1,66
39	65.45	3.01	4.18	586	1,76
40	67.74	3.4	4.72	340	1,15
42	70.51	4.04	5.61	89	360
53	66.95	3.27	4.54	297	972
54	71.39	4.2	5.84	86	361
55	65.1	2.98	4.14	93	277
57	64.86	2.93	4.07	244	715
58	63.68	2.84	3.95	209	594
59	68.26	3.51	4.88	289	1,01
60	70.36	4.19	5.83	191	801
61	66.14	3.16	4.38	147	464
		Gulf	of Alaska		
63	65.74	3.07	4.26	687	2,109
65	64.11	2.8	3.89	871	2,439
66	61.2	2.44	3.38	1,977	4,81
67	65.04	3.02	4.2	928	2,80
68	68.03	3.48	4.84	1,317	4,589
69	64.82	3.13	4.35	760	2,38
70	62.74	2.71	3.77	687	1,86
71	64.68	2.93	4.07	1,143	3,34
72	67.74	3.4	4.72	1,589	5,40
73	62.45	2.68	3.72	704	1,88
74	67.94	3.44	4.78	2,780	9,56
75	63.28	2.68	3.72	1,384	3,70
76	64.36	2.9	4.03	944	2,733

² Mean weight was estimated by applying a length-weight relationship to the length distribution from each station.

frequency

 $^{^{\}scriptscriptstyle 3}$ $\,$ Mean dressed weight was estimated using a recovery rate of 0.6 of round weight in pounds.

Estimated total round weight is the product of mean round weight and the number of sablefish that came to the surface, including a small percentage that was lost during landing.

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		Mean	Mean		Estimated total
Station	Mean	round	dressed	Number	round
Number	length	weight	weight	of	weight
- 1,000	(cm)	(kg)	(lb)	sablefish	(kg)
77	69	3.66	5.08	1,596	5,838
78	70.83	4.01	5.56	1,431	5,733
81	70.09	3.86	5.35	1,701	6,558
82	66.48	3.21	4.45	1,566	5,019
83	68.91	3.66	5.09	1,869	6,845
84	67.4	3.39	4.71	1,782	6,049
85	67.57	3.41	4.73	1,897	6,461
86	69.17	3.72	5.16	1,545	5,744
87	65.8	3.23	4.49	1,807	5,843
88	67.93	3.48	4.84	2,174	7,573
89	68.26	3.55	4.93	1,860	6,606
90	65.7	3.11	4.32	1,206	3,750
91	68.64	3.63	5.05	1,841	6,691
92	64.37	3	4.17	1,158	3,476
93	67.61	3.41	4.74	1,944	6,638
94	65.77	3.18	4.41	883	2,807
95	70.76	3.97	5.52	2,089	8,302
96	67.82	3.47	4.82	1,828	6,341
97	69.52	4.11	5.71	858	3,526
98	71.92	4.42	6.13	837	3,697
99	74.36	4.83	6.71	826	3,989
100	72.41	4.35	6.05	1,072	4,668
101	71.78	4.26	5.91	1,146	4,878
102	73.02	4.55	6.32	1,043	4,749
103	57.41	2.16	2.99	181	390
104	69.79	3.92	5.44	1,161	4,549
105	70.41	4.06	5.63	1,382	5,604
106	69.97	3.95	5.49	1,499	5,924
107	71.93	4.31	5.99	1,429	6,161
108	69.65	3.88	5.39	1,543	5,992
120	63.27	2.67	3.72	860	2,300
121	63.27	2.67	3.71	1,037	2,768
122	63.08	2.65	3.69	1,244	3,303
123	65.26	2.97	4.12	1,032	3,060
124	64.08	2.78	3.86	707	1,966
125	63.73	2.74	3.81	562	1,541
126	63.31	2.69	3.74	341	918
127	61.61	2.75	3.82	672	1,851
128	62.51	2.58	3.59	880	2,272
129	65.75	3.14	4.36	1,012	3,178
130	62.26	2.64	3.67	1,033	2,727
131	68.91	3.66	5.08	1,528	5,591

Table 3-continued

		Mean	Mean		Estimated total
Station	Mean	round	dressed	Number	round
Number	length	weight	weight	of	weight
	(cm)	(kg)	(lb)	sablefish	(kg)
132	62.16	2.63	3.65	1,028	2,703
133	57.25	2.02	2.8	1,560	3,149
134	61.99	2.66	3.69	273	726
135	60.22	2.60	3.77	132	310
136	62.14	2.69	3.89	547	1,489
137	62.31	2.76	3.83	564	1,556
138	61.28	2.73	3.79	313	855
139	60.59	2.46	3.42	982	2,415
142	69.11	3.76	5.23	551	2,074
143	64.54	3.04	4.22	931	2,827
144	70.23	4.25	5.91	226	961
145	69.57	4.02	5.59	1,071	4,307
148	61.43	2.55	3.55	767	1,959
149	62.09	2.56	3.56	1,005	2,574
Total				87,141	292,139

