

BOTTOM TRAWL SURVEY OF GROUND FISH RESOURCES IN THE ALEUTIAN ISLANDS REGION

Prepared by Mark E. Wilkins

Cruise ID: 2006-01	Vessels: <i>Sea Storm</i>
Cruise Dates: June 1 – August 11, 2006	<i>Gladiator</i>

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Overview

The tenth in a series of comprehensive bottom trawl surveys of groundfish resources in the Aleutian Islands (AI) region was conducted from June 1 through August 11, 2006, by the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC), Seattle, Washington. Since 2000 this survey has been conducted biennially; earlier surveys were conducted on a mostly triennial schedule between 1980 and 2000. This report summarizes the sampling operations and preliminary results of the 2006 survey.

The Aleutian Islands region is an extensive archipelago of volcanic origin typified by a relatively narrow continental shelf that is crossed by numerous deep passes. Very strong currents flow north into the Bering Sea through the passes and across the shelf, sometimes making productive fishing operations difficult or impossible.

Commercially valuable species of flatfish (Pacific halibut and Greenland turbot), roundfish (Atka mackerel, Pacific cod, walleye pollock, and sablefish), rockfish (Pacific ocean perch and northern, roughey, and shortraker rockfishes), and invertebrates (golden king crab and scallops) inhabit the area. The rough, rocky bottom conditions provide abundant substrate for many species of bryozoans, hydroids, sponges and corals.

Objectives

The major goal of this survey is to continue the data time series begun in 1980 to monitor trends in distribution and abundance of important groundfish species and to describe and measure various biological and environmental parameters. Specific objectives of the 2006 survey include:

1. Define the current distribution of the principal groundfish and commercially important invertebrate species that inhabit the Aleutian archipelago;
2. Collect catch and effort data from which to estimate the abundance of the principal groundfish species;
3. Collect data to define selected biological parameters, *i.e.*, size, sex, age, growth, length-weight relationships, feeding habits, and spawning condition for selected species;
4. Monitor and collect trawl performance information; and
5. Collect biological samples and other data requested by other researchers or research groups.



Vessels and Gear

The *Sea Storm* and *Gladiator* are both house-forward trawlers with stern ramps, twin net storage reels (mounted forward of the working deck and/or aft over the stern ramp), telescoping deck cranes, propeller nozzles, and paired, controlled-tension hydraulic trawl winches with 1,830 m of 2.54 cm diameter steel cable. Both vessels are 37.8 m in overall length and powered by single 1,710 continuous HP main engines. Each vessel is equipped with a full suite of state-of-the-art navigational and fishing electronics including global positioning systems (GPS) with video position plotters, radars, color video fish-finders, and recording depth sounders. Each vessel's crew consisted of the captain, lead fisherman, engineer-fisherman, fisherman, and cook or cook-fisherman. Captains Jeff Boddington (leg 1) and Ed French (leg 2) skippered the *Gladiator*. Captains Jerry Ellefson (leg 1) and Steve Branstiter (legs 2 and 3) skippered the *Sea Storm*.

Stations were sampled with the RACE Division's standardized Poly Nor'Eastern high opening bottom trawls rigged with roller gear (Stauffer 2004). This trawl has a 27.2 m headrope with twenty-one 30 cm diameter floats and a 24.3 m long, 1/2-inch long-link alloy chain fishing line attached to a 24.9 m, 0.95 cm diameter 6×19 galvanized steel wire footrope. The roller gear is 24.2 m long and constructed of 1.9 cm diameter 6×19 galvanized steel wire rope and 36 cm rubber bobbins separated by a solid string of 10 cm rubber disks. In addition, 5.9 m wire rope extensions with 10- and 20-cm rubber disks were used to span each lower flying wing section. The trawls are constructed with 12.7 cm stretched-mesh polyethylene web with a 3.2 cm stretched-mesh nylon liner in the codend. Bridles consist of triple 54.9 m long, 1.6 cm diameter galvanized wire rope. Chain setback extensions to the headrope and side panel attachments are 46 and 23 cm long, respectively. Steel 1.83 × 2.74 m V-doors weighing approximately 800 kg each are used to spread the net. Fishing dimensions of the trawls were measured using Scanmar¹ acoustic net mensuration equipment and fishing performance was monitored with electronic bottom contact sensors (BCS) and Seabird SBE-39 micro-bathythermographs.

¹ Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.



Itinerary

June 1 – 4	Beginning of <i>Gladiator</i> charter - Loaded and set up vessel in Dutch Harbor
June 3 – 4	Beginning of <i>Sea Storm</i> charter - Loaded and set up vessel in Dutch Harbor
June 5 – 6	Begin Leg 1 - Measured and marked trawl warps, calibrated ES-60 sounders, began trawl survey sampling operations when preliminary work was completed
June 25	End of Leg 1 in Adak - Re provisioned vessels, exchanged personnel
June 26	Begin Leg 2 – Resumed survey
July 19 - 20	End of <i>Gladiator</i> charter – Arrived Dutch Harbor, offloaded sampling equipment and fishing gear
July 20	End of <i>Sea Storm</i> Leg 2 in Adak - Re provisioned vessel, exchanged personnel
July 21	Begin <i>Sea Storm</i> Leg 3 - Resumed survey
August 10 - 11	End of <i>Sea Storm</i> charter - Arrived Dutch Harbor, offloaded sampling equipment and fishing gear

Survey Area

The survey area extends along the north side of the Aleutian Islands from Akutan Pass (165° W long) to Stalemate Bank (170° E long), west of Attu Island and along the south side of the archipelago from the Islands of the Four Mountains (170° W long) to Stalemate Bank (Figure 1). The survey area includes waters ranging from nearshore to 500 m deep. Grounds within the survey area generally consist of a narrow continental shelf made up of rugged, rocky terrain. The island chain is crossed by narrow passes throughout its length, generating very strong currents which complicate trawl sampling operations in the areas near them. Prevailing currents run to the north through these passes, but tidal exchanges create flows in both directions. These strong currents result in well-mixed water masses in most of the areas sampled. Corals, sponges, and other sessile invertebrates abound on the reefs of this region.



Survey Design and Methods

The Aleutian survey area is composed of four of the North Pacific Fishery Management Council (NPFMC) statistical areas (Fig. 1): the southern district of the Bering Sea Subarea (518) and the Eastern, Central, and Western Districts of the Aleutian Subarea (541, 542, and 543, respectively). The survey area is divided into 45 area-depth sampling strata to improve the accuracy and precision of resulting estimates of abundance and size and age composition of target species. Normally we sample approximately 420 stations during the 140 charter days of the Aleutian survey. Due to funding cuts in 2006, the number of charter days was reduced to 120 days (approximately 15%), necessitating a cutback to 366 assigned stations. Initially, we reduced the effort allocation uniformly across all strata by the equivalent of 30 days of sampling (approximately 21%). A Neyman optimum allocation strategy drawing on relative species catch rates from previous surveys and current ex-vessel fish values was used to allocate sampling stations among the 45 strata. To mitigate unacceptable reductions in precision of rockfish abundance estimates by this cutback, which is already a concern with the full-scale survey, we replaced the equivalent of 10 sampling days, allocating those stations to strata most likely to contain shortraker, blackspotted, and rougheye rockfish. Nearly all station locations for this survey are fixed, though our 2006 allocations required adding nine new stations in four strata.

Standard trawl hauls at each station were 15 minutes in estimated on-bottom duration. The acoustic mensuration devices continuously measured wingspread and headrope height above the bottom. Efforts were made to maintain a constant depth during a tow, however when depths changed, trawl warp length was adjusted appropriately to maintain firm bottom contact. Surface-to-bottom water temperature profiles were recorded using the headrope-mounted bathythermograph during all successful tows except one. After each tow, temperature-depth profile data were downloaded to computer files and actual trawl time on bottom was determined by synchronizing the net configuration data, the time and depth recordings from the bathythermograph, and the tilt data from a bottom contact sensor. The position of the vessel was recorded during each entire tow trackline using GPS output, allowing us to calculate the duration and distance fished while the net was on bottom.

Catches of fish and invertebrates were sorted to species or species aggregate, weighed, and enumerated according to standard AFSC/RACE Division protocol. Extensive length composition data were collected from major fish species with barcode-based recording devices and downloaded to computer database files after each tow. Biological data including age structures (otoliths), lengths, and weights of individual specimens were collected and entered in the computer database. Special collections included additional samples and scans of fish stomach contents, tissues collected from various species for genetic and pathology studies, and ovaries collected from sculpins and Pacific ocean perch for maturity studies. Many whole fish and invertebrates of species of interest were retained (frozen) for studies of systematics and marine mammal prey energetics.

Results

Relatively little time was lost to bad weather but periods of extreme tidal flow sometimes caused work to be postponed until heavy currents subsided. Sampling proceeded from east to west from



the Islands of Four Mountains. For added safety of operations, the two vessels worked together to complete stations at the far western end of the survey area during the early part of the second leg and proceeded easterly from there during the remainder of the survey. When satisfactory bottom conditions could not be found at the primary station, a pre-selected alternate location or, in some cases, a newly located site within the proper area-depth stratum was sampled.

A total of 403 tows were attempted during this survey. Successful tows of ten minutes or longer duration were achieved at 362 of the 366 assigned stations or alternates, though 4 of these tows were eliminated during editing because they fell outside the depth range of their target stratum. Consequently, 358 successful tows, ranging in depth from 32 m to 484 m, qualified for calculations of abundance estimates. Sea surface temperatures were recorded during 399 attempted tows and successful surface-to-bottom bathythermograph recordings, including bottom temperatures, were made during 393 of those tows.

In total, Pacific ocean perch (POP) was, by far, the dominant species in successful survey trawl catches of the entire survey area, the Aleutian region as a whole, and in all survey subareas except the Eastern Aleutians and the Southern Bering Sea (Table 1). For the entire survey, POP abundance was followed by Atka mackerel, northern rockfish, arrowtooth flounder, walleye pollock, and giant grenadier. Atka mackerel, northern rockfish, giant grenadier, arrowtooth flounder, and walleye pollock, in that order, were the species with the next highest total catches in the Aleutian region. Only Atka mackerel was more abundant than POP in the Eastern Aleutian area catches. Arrowtooth flounder dominated the total catch in the Southern Bering Sea area, followed by POP, northern rockfish, walleye pollock, and Atka mackerel.

Length and individual weight measurements were recorded from almost 10,600 fish (50 species, Table 2). Over 7,800 pairs of otoliths were collected from twenty species of fish for age determination (Table 3); these were collected from size-stratified samples from each regulatory area, except for pollock, which were sampled randomly from each tow containing ten or more pollock. Generally, samples were collected from species with high commercial value or those of special scientific interest, such as the three species of sculpin included for the first time this year. Length measurements were the most common biological data collected; 96,110 observations were collected from 52 different species (Table 4).

Special studies collections made as adjunct activities during the survey included feeding habits of groundfish and delineation of stock structure. Collaborating scientists from other divisions within the AFSC, the University of Minnesota, and the California Academy of Sciences participated aboard various legs of the survey. Staff from the REFM Division's Resource Ecology and Ecosystem Modeling Program scanned the stomach contents of 1,402 fish of seven species, primarily arrowtooth flounder, walleye pollock, Pacific cod, Atka mackerel, and Pacific halibut. Another 971 stomachs were collected from 20 species for later laboratory analysis. Brief seabird census samples were taken at nearly all sampling stations. Hundreds of individual fish and invertebrates were frozen or preserved for later laboratory identification or other studies at the AFSC or other institutions. Weather observations were collected once or twice a day and sent via satellite email link to National Weather Service forecasters who included the information in forecasts of sea height and marine weather for the Gulf of Alaska, Bering Sea, and surrounding areas.



Scientific Personnel

Sea Storm

Leg 1

Michael Martin^a
Ned Laman^b
Paul von Szalay
Brian Knoth
Nancy Roberson
Mei-Sun Yang

Leg 2

Michael Martin^a
Brian Knoth^b
Jim Stark
Elaina Jorgensen
Peter Munro
Richard Hibpshman

Leg 3

Paul von Szalay^a
Frank Shaw^b
Christy Shavey
Mei-Sun Yang
Mike Bush^c
Dana Carrison-Stone^d

Gladiator

Leg 1

Nate Raring^a
Bill Flerx^b
Chris Rooper
Jay Orr
Jason Conner
Chris Johnston

Leg 2

Bill Flerx^a
Mark Zimmermann^b
Nancy Roberson
Barney Baker
Troy Buckley
Todd TenBrink

Personnel are from AFSC, RACE or REFM Divisions unless noted as follows:

^a Field Party Chief

^b Deck Boss

^c University of Minnesota

^d California Academy of Sciences

Citations

Stauffer, Gary (compiler). 2004. NOAA Protocols for Groundfish Bottom Trawl Surveys of the Nation's Fishery Resources. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-65, 205 p.

For further information, contact Mr. Russell Nelson, Director, Resource Assessment and Conservation Engineering Division, Alaska Fisheries Science Center, National Marine Fisheries Service, 7600 Sand Point Way NE, Seattle, WA 98115-6349. Telephone (206) 526-4170.



Table 1: Total catch estimates for the most abundant fish and invertebrate taxa occurring in 2006 Aleutian Islands bottom trawl survey catches, by North Pacific Fisheries Management Council regulatory area and aggregates thereof, ranked in order of relative abundance.

<i>Western Aleutian Area</i>			<i>Central Aleutian Area</i>		
<u>Name</u>	<u>Weight (kg)</u>	<u>Count</u>	<u>Name</u>	<u>Weight (kg)</u>	<u>Count</u>
Pacific ocean perch	80,333	141,230	Pacific ocean perch	56,705	69,816
Atka mackerel	23,006	53,929	Atka mackerel	42,213	70,060
Northern rockfish	21,391	55,557	Northern rockfish	13,332	26,213
Pacific cod	3,495	878	Walleye pollock	7,903	5,164
Arrowtooth flounder	2,547	1,933	Northern rock sole	5,902	14,587
Shortspine thornyhead	2,328	4,061	Giant grenadier	5,045	1,162
Sponge unident.	2,258	--	Pacific cod	4,319	1,231
Walleye pollock	1,610	1,426	Sponge unident.	3,805	--
Northern rock sole	1,497	4,217	Kamchatka flounder	2,484	1,407
Giant grenadier	1,267	339	Arrowtooth flounder	2,164	1,559
Kamchatka flounder	1,023	953	Sablefish	1,154	493
Rex sole	653	1,088	Shortraker rockfish	1,001	454
Pacific halibut	649	107	Pacific halibut	999	238
Shortraker rockfish	573	378	Blackspotted rockfish	990	630
Prowfish	534	326	Alaska skate	877	94
Flathead sole	466	1,764	Shortspine thornyhead	765	1,571
Alaska skate	460	58	Dusky rockfish	713	532
Cloud sponge	449	--	Aleutian skate	533	61
Whiteblotched skate	436	75	Yellow Irish lord	530	867
Clay pipe sponge	414	--	Tree sponge	514	--
Greenland turbot	353	90	Rex sole	508	762
Darkfin sculpin	297	3,841	Whiteblotched skate	350	75
Dark rockfish	259	285	Greenland turbot	240	39
Aleutian skate	226	21	<i>Chrysaora melanaster</i>	236	154
Shrimp unident.	191	2	Darkfin sculpin	222	1,743
Jellyfish unident.	184	1	Prowfish	199	70
Magistrate armhook squid	169	355	Jellyfish unident.	148	15
Giant octopus	133	44	Club sponge	141	--
Yellow Irish lord	132	218	Scapula sponge	135	--
Blackspotted rockfish	130	133	Mud skate	124	156
<i>Stylaster</i> sp.	120	--	Giant octopus	118	35
Puffball sponges	117	--	<i>Strongylocentrotus</i> sp.	116	5,328
Golden king crab	116	121	Great sculpin	97	26
<i>Halichondria</i> sp.	115	--	Dover sole	93	91



Table 1: Continued.

<i>Eastern Aleutian Area</i>			<i>Total Aleutian Area</i>		
<u>Name</u>	<u>Weight (kg)</u>	<u>Count</u>	<u>Name</u>	<u>Weight (kg)</u>	<u>Count</u>
Atka mackerel	31,186	40,047	Pacific ocean perch	162,783	246,743
Pacific ocean perch	25,745	35,697	Atka mackerel	96,405	164,036
Arrowtooth flounder	13,684	9,813	Northern rockfish	36,900	85,200
Giant grenadier	13,470	2,932	Giant grenadier	19,781	4,433
Walleye pollock	8,330	5,254	Arrowtooth flounder	18,395	13,305
Pacific cod	5,465	1,038	Walleye pollock	17,843	11,844
Sponge unident.	3,220	--	Pacific cod	13,279	3,147
Whiteblotched skate	2,687	562	Sponge unident.	9,283	--
Northern rockfish	2,177	3,430	Northern rock sole	8,503	21,325
Pacific halibut	1,735	391	Kamchatka flounder	5,161	4,039
Kamchatka flounder	1,654	1,679	Whiteblotched skate	3,473	712
Greenland turbot	1,382	354	Pacific halibut	3,383	736
Northern rock sole	1,104	2,521	Shortspine thornyhead	3,182	5,822
Scapula sponge	610	--	Greenland turbot	1,974	483
Sablefish	567	245	Shortraker rockfish	1,964	1,033
Blackspotted rockfish	552	438	Sablefish	1,788	755
Yellow Irish lord	442	721	Blackspotted rockfish	1,672	1,201
Shortraker rockfish	390	201	Alaska skate	1,495	177
Tree sponge	354	--	Rex sole	1,358	2,195
Basketstar	323	1,769	Yellow Irish lord	1,104	1,806
Barrel sponge	307	--	Aleutian skate	1,056	104
Aleutian skate	297	22	Tree sponge	955	--
<i>Chrysaora melanaster</i>	259	258	Scapula sponge	841	--
Darkfin sculpin	246	1,959	Prowfish	805	426
Mud skate	242	395	Darkfin sculpin	764	7,543
Clay pipe sponge	206	--	Dusky rockfish	753	564
Rex sole	197	345	Flathead sole	645	2,205
Alaska skate	158	25	Clay pipe sponge	639	--
Golden king crab	137	141	<i>Chrysaora melanaster</i>	597	510
Flathead sole	121	333	Cloud sponge	535	--
Giant octopus	111	35	Basketstar	428	2,599
Bigmouth sculpin	98	20	Jellyfish unident.	409	18
Shortspine thornyhead	90	190	Barrel sponge	389	--
<i>Strongylocentrotus</i> sp.	82	3,195	Mud skate	375	560



Table 1: Continued.

<i>Southern Bering Sea Area</i>			<i>Entire Survey Area</i>		
<u>Name</u>	<u>Weight (kg)</u>	<u>Count</u>	<u>Name</u>	<u>Weight (kg)</u>	<u>Count</u>
Arrowtooth flounder	6,931	7,145	Pacific ocean perch	167,261	252,449
Pacific ocean perch	4,478	5,706	Atka mackerel	98,611	165,799
Northern rockfish	4,206	5,962	Northern rockfish	41,106	91,162
walleye pollock	3,267	3,301	Arrowtooth flounder	25,326	20,450
Atka mackerel	2,206	1,763	Walleye pollock	21,110	15,145
Kamchatka flounder	1,986	1,125	Giant grenadier	19,781	4,433
Pacific cod	1,567	529	Pacific cod	14,845	3,676
Rex sole	1,359	2,362	Sponge unident.	9,913	--
Pacific halibut	1,293	495	Northern rock sole	9,186	22,744
Southern rock sole	859	1,441	Kamchatka flounder	7,146	5,164
Northern rock sole	683	1,419	Pacific halibut	4,676	1,231
Flathead sole	678	3,079	Whiteblotched skate	3,611	751
Sponge unident.	630	--	Shortspine thornyhead	3,394	6,474
Club sponge	548	--	Rex sole	2,717	4,557
Yellow Irish lord	360	460	Greenland turbot	2,193	539
Tree sponge	352	--	Shortraker rockfish	2,176	1,114
<i>Strongylocentrotus</i> sp.	304	6,861	Blackspotted rockfish	1,827	1,314
Greenland turbot	219	56	Sablefish	1,814	764
Shortraker rockfish	213	81	Alaska skate	1,603	194
Shortspine thornyhead	211	652	Yellow Irish lord	1,464	2,266
Blackspotted rockfish	155	113	Flathead sole	1,323	5,284
Dusky rockfish	144	118	Tree sponge	1,307	--
Whiteblotched skate	138	39	Aleutian skate	1,124	108
Dover sole	109	125	Southern rock sole	923	1,521
Alaska skate	109	17	Dusky rockfish	897	682
Darkfin sculpin	99	832	Scapula sponge	888	--
Kamchatka coral	83	--	Darkfin sculpin	863	8,375
Rougheye rockfish	81	76	Prowfish	830	432
Great sculpin	78	24	Club sponge	788	--
Aleutian skate	69	4	Clay pipe sponge	640	--
Oregon triton	67	1,454	<i>Chrysaora melanaster</i>	622	537
Barrel sponge	66	--	<i>Strongylocentrotus</i> sp.	545	16,934
Big skate	61	3	Cloud sponge	540	--
Golden king crab	59	96	Basketstar	486	2,900



Table 2: Length-weight data collected during the 2006 biennial trawl survey of the Aleutian Islands region, by species and North Pacific Fisheries Management Council regulatory area.

<i>Length-Weight Measurements</i>					
<u>Name</u>	<u>Western</u>	<u>Central</u>	<u>Eastern</u>	<u>S Bering</u>	<u>Total / Species</u>
Spiny dogfish	--	2	--	--	2
Big skate	--	--	--	2	2
Bering skate	--	1	--	5	6
Mud skate	2	146	188	9	345
Alaska skate	49	125	23	12	209
Aleutian skate	14	47	17	2	80
Commander skate	--	--	6	--	6
Whiteblotched skate	72	62	341	34	509
Butterfly skate	--	31	3	--	34
Arrowtooth flounder	148	53	165	202	568
Greenland turbot	55	37	88	42	222
Flathead sole	28		28	32	88
Dover sole	16	83	2	60	161
Rex sole	--	--	--	88	88
Northern rock sole	137	195	149	158	639
Southern rock sole	--	1	52	235	288
Butter sole	--	--	--	4	4
Sawback poacher	--	63	56	--	119
Sturgeon poacher	57	11	5	8	81
Pacific sand lance	30	--	--	--	30
Searcher	94	118	9	--	221
Giant grenadier	53	47	60	--	160
Sponge sculpin	8	--	4	--	12
Armorhead sculpin	40	71	2	--	113
Darkfin sculpin	--	--	--	36	36
Longfin Irish lord	1	35	45	--	81
Yellow Irish lord	87	162	132	58	439
Scissortail sculpin	--	14	10	--	24
Spectacled sculpin	--	--	62	--	62
Roughspine sculpin	--	6	--	--	6
Great sculpin	4	14	3	20	41
Bigmouth sculpin	6	5	14	6	31
Pacific cod	202	270	155	137	764
Walleye pollock	129	293	91	70	583
Atka mackerel	194	195	68	146	603
Kelp greenling	7	--	--	1	8
Salmon snailfish	2	39	4	--	45



Table 2: Continued.

<u>Name</u>	<u>Western</u>	<u>Central</u>	<u>Eastern</u>	<u>S Bering</u>	<u>Total / Species</u>
Eulachon	--	--	--	53	53
Prowfish	127	35	8	--	170
Ebony eelpout	3	47	16	--	66
Black eelpout	--	14	--	--	14
Shortspine thornyhead	295	183	56	104	638
Rougheye rockfish	--	23	8	38	69
Blackspotted rockfish	76	114	118	82	390
Pacific ocean perch	298	270	331	193	1,092
Dark rockfish	153	7	1	2	163
Dusky rockfish	11	82	19	66	178
Northern rockfish	197	149	114	79	539
Harlequin rockfish	2	9	4	3	18
Shortraker rockfish	177	169	89	45	480
Total / Region	2,774	3,228	2,546	2,032	10,580



Table 3: Otolith specimens collected during the 2006 biennial trawl survey of the Aleutian Islands region, by species and North Pacific Fisheries Management Council regulatory area.

<i>Otolith Specimens</i>					
<u>Name</u>	<u>Western</u>	<u>Central</u>	<u>Eastern</u>	<u>S Bering</u>	<u>Total / Species</u>
Arrowtooth flounder	148	53	165	202	568
Greenland turbot	55	37	88	42	222
Northern rock sole	137	195	149	158	639
Southern rock sole	--	1	52	235	288
Giant grenadier	53	47	60	--	160
Yellow Irish lord	87	162	132	58	439
Great sculpin	4	14	3	20	41
Bigmouth sculpin	6	5	14	6	31
Pacific cod	202	270	155	137	764
Walleye pollock	130	293	91	70	584
Atka mackerel	194	195	68	73	530
Shortspine thornyhead	295	183	56	104	638
Rougheye rockfish	--	23	8	38	69
Blackspotted rockfish	76	114	118	82	390
Pacific ocean perch	298	270	331	193	1,092
Dark rockfish	154	7	1	2	164
Dusky rockfish	11	82	19	66	178
Northern rockfish	197	149	114	79	539
Harlequin rockfish	2	9	4	3	18
Shortraker rockfish	177	169	89	45	480
Total / Region	2,226	2,278	1,717	1,613	7,834



Table 4: Length frequencies collected during the 2006 biennial trawl survey of the Aleutian Islands region, by species and North Pacific Fisheries Management Council regulatory area.

<i>Length Frequencies</i>					
<u>Name</u>	<u>Western</u>	<u>Central</u>	<u>Eastern</u>	<u>S Bering</u>	<u>Total / Species</u>
Spiny dogfish	--	4	--	--	4
Pacific sleeper shark	--	--	--	1	1
Big skate	--	--	--	3	3
Bering skate	--	1	--	8	9
Mud skate	9	137	310	5	461
Alaska skate	52	94	24	16	186
Aleutian skate	21	55	22	4	102
Commander skate	--	--	6	--	6
Whiteblotched skate	75	63	500	30	668
Butterfly skate	--	27	4	1	32
Arrowtooth flounder	1,841	1,409	2,956	3,426	9,632
Kamchatka flounder	870	948	1,102	365	3,285
Greenland turbot	90	39	248	55	432
Pacific halibut	107	238	384	495	1,224
Flathead sole	1,530	101	333	1,234	3,198
English sole	--	--	--	7	7
Dover sole	43	91	16	75	225
Rex sole	995	760	343	1,113	3,211
Starry flounder	--	--	--	1	1
Northern rock sole	2,921	5,889	1,747	1,230	11,787
Southern rock sole	3	3	73	1,196	1,275
Butter sole	--	--	--	4	4
Sawback poacher	--	1	1		2
Sablefish	17	365	241	8	631
Searcher	35	12	3	--	50
Giant grenadier	249	575	480	--	1,304
Armorhead sculpin	1	--	--	--	1
Yellow Irish lord	169	741	659	390	1,959
Great sculpin	7	26	10	24	67
Spinyhead sculpin	--	--	2	--	2
Bigmouth sculpin	12	5	18	6	41
Pacific cod	861	1,156	803	472	3,292
Walleye pollock	1,158	1,937	1,031	2,473	6,599
Atka mackerel	3,922	3,972	1,196	802	9,892
Kelp greenling	11	22	--	1	34
Pacific hake	--	1	--	--	1
Eulachon	--	--	--	117	117



Table 4: Continued.

<u>Name</u>	<u>Western</u>	<u>Central</u>	<u>Eastern</u>	<u>S Bering</u>	<u>Total / Species</u>
Capelin	--	--	--	108	108
Chum salmon	--	1	--	3	4
Prowfish	289	65	26	4	384
Ebony eelpout	--	11	--	--	11
Shortspine thornyhead	2,873	1,323	171	335	4,702
Broadfin thornyhead	2	--	--	--	2
Rougheye rockfish	--	31	7	69	107
Blackspotted rockfish	133	499	412	108	1,152
Pacific ocean perch	8,432	5,006	5,182	1,117	19,737
Dark rockfish	285	8	1	2	296
Dusky rockfish	11	207	21	110	349
Northern rockfish	4,843	2,130	1,179	252	8,404
Redbanded rockfish	1	--	1	--	2
Harlequin rockfish	2	10	4	3	19
Shortraker rockfish	378	445	199	66	1,088
Total / Region	32,248	28,408	19,715	15,739	96,110

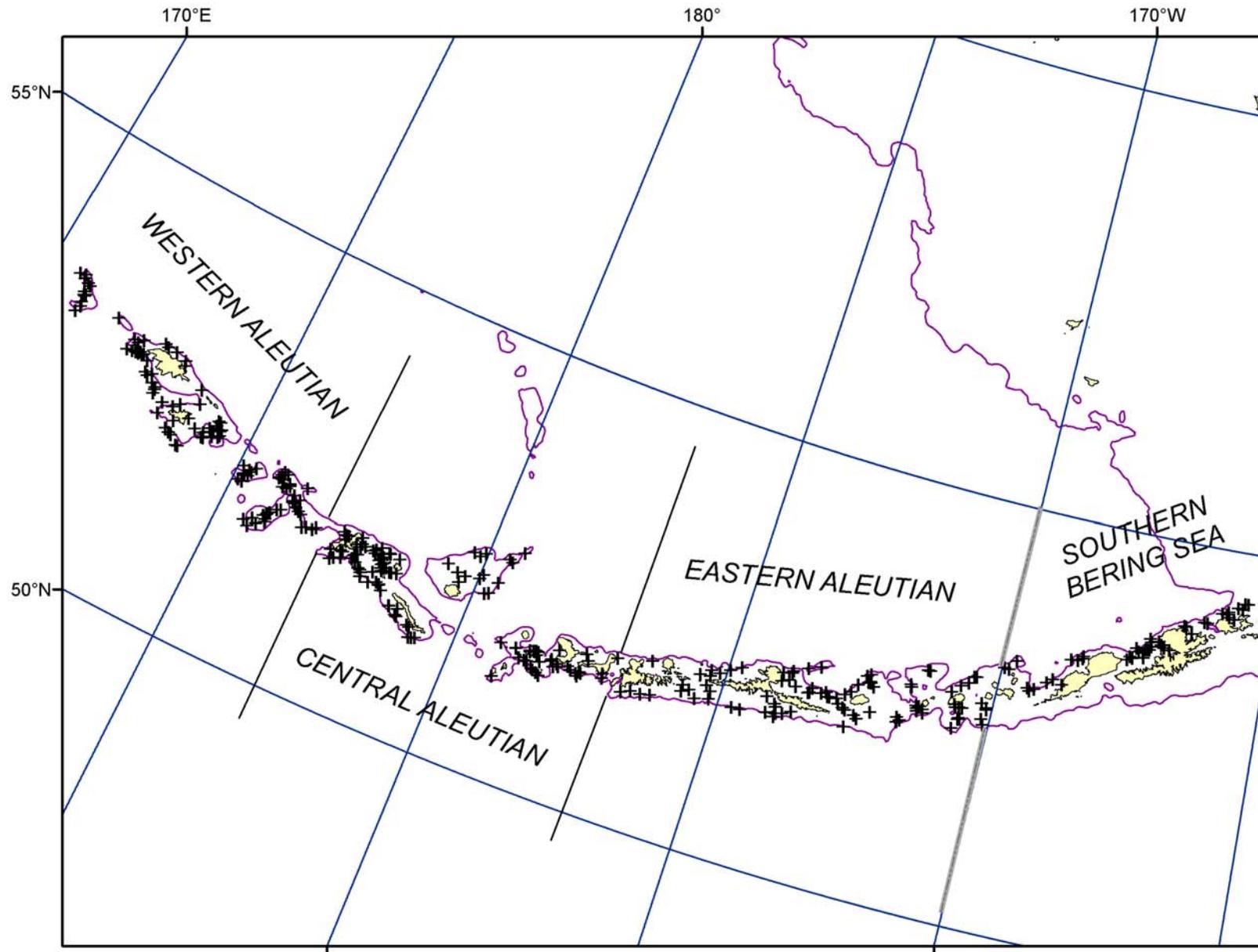


Figure 1.--Locations of successful tows made during the 2006 Bottom Trawl Survey of Groundfish and Invertebrate Resources in the Aleutian Islands Region. Management subareas and the 500 m depth contour are shown.