

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

Prepared by Mark E. Wilkins

Cruise ID: **2010-01**

Vessels: ***Sea Storm***

Cruise Dates: **June 6 – August 14, 2010**

Ocean Explorer

Alaska Fisheries Science Center
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Overview

The eleventh in a series of comprehensive bottom trawl surveys of groundfish resources in the Aleutian Islands (AI) region was conducted from June 6 through August 14, 2010, 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. Funding shortfalls cancelled plans for the 2008 iteration of this survey. This report summarizes the sampling operations and preliminary results of the 2010 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, blackspotted, 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 2010 survey included:

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 *Ocean Explorer* are both house-forward trawlers with stern ramps, twin net storage reels (mounted forward of the working deck 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. The *Sea Storm* is 37.8 m in overall length and powered by a single 1,710 continuous HP main engine. The *Ocean Explorer* is 47 m long overall and powered by a single 1,800 HP main engine. 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 Rick Loan (leg 1) and Darin Van Der Pol (legs 2 & 3) skippered the *Ocean Explorer*. Captain Steve Branstiter (legs 2 and 3) skippered the *Sea Storm* for the entire survey.

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 6 – 8	Beginning of charter - Loaded and set up vessels in Dutch Harbor. Measured and marked trawl warps, calibrated ES-60 sounders.
June 9	Begin Leg 1 - Began trawl survey sampling operations near Unimak Pass.
June 29	End of Leg 1 in Dutch Harbor - Re provisioned vessels, exchanged personnel
June 30	Begin Leg 2 – Resumed survey
July 22	End of Leg 2 in Adak - Re provisioned vessels, exchanged personnel
July 23	Begin Leg 3 - Resumed survey
August 13 - 14	End of 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. In 2010 we set out to sample 420 stations during the 140 charter days of the survey. 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. Although a stratified-random sampling scheme is used for the Aleutian Islands survey, practical considerations of finding trawlable bottom are such that nearly all station locations for this survey are fixed. However, our 2010 station allocations required adding thirteen new stations in four strata.

Standard trawl hauls at each station were 15 minutes in estimated on-bottom duration. 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 four. After each tow, temperature-depth profile data and tilt data from a bottom contact sensor 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 bottom contact sensor tilt data. 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 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 or preserved) 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. 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 436 tows were attempted during this survey. Successful tows were achieved at 418 of the 420 assigned stations or alternates. Samples from these 418 successful tows, ranging in depth from 28 to 480 m, qualified for use to analyze abundance, distribution, and biological characteristics of the fish and invertebrates collected. Successful surface-to-bottom bathythermograph recordings, including sea surface and bottom temperatures, were recorded during all but four of the tows attempted.



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 Southern Bering Sea (Table 1). For the entire survey, POP was followed in abundance by Atka mackerel, walleye pollock, northern rockfish, Pacific cod, and arrowtooth flounder. Atka mackerel, northern rockfish, walleye pollock, and Pacific cod, in that order, were the species with the next highest total catches in the Aleutian region. Only walleye pollock was more abundant than POP in the Southern Bering Sea catches. Atka mackerel, Pacific cod, and arrowtooth flounder followed POP in abundance in Southern Bering Sea area catches.

Length and individual weight measurements were recorded from over 8,600 fish (34 species, Table 2). Over 7,700 pairs of otoliths were collected from twenty species of fish for age determination (Table 3); these were collected from size-stratified samples, 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; 112,922 observations were collected from 56 different species (Table 4).

Special studies collections made as adjunct activities during the survey included feeding habits of groundfish, systematics and phylogeny of fishes and invertebrates, delineation of stock structure, and investigations of life history and biological characteristics. Collaborating scientists from other divisions within the AFSC, the University of Mississippi, and the University of Alaska Fairbanks participated aboard various legs of the survey. Staff from the REFM Division's Resource Ecology and Ecosystem Modeling Program scanned the stomach contents of 1,231 fish of 33 species, primarily arrowtooth flounder, walleye pollock, Pacific cod, and Atka mackerel. Another 3,176 stomachs were collected from 25 species for later laboratory analysis. Hundreds of individual fish and invertebrates were frozen or preserved for later laboratory identification or other studies at the AFSC or other institutions.



Scientific Personnel

Sea Storm

Leg 1

Michael Martin^a
Jay Orr^b
Robin Harrison
Nancy Roberson
Frank Shaw
Mei-Sun Yang

Leg 2

Nate Raring^a
Bill Flerx^b
Christina Conrath
Nancy Roberson
Larry Haaga
Richard Hibpshman

Leg 3

Michael Martin^a
Bill Flerx^b
Katherine Maslenikov
Clinton Leach
James Sims^c
Mei-Sun Yang

Ocean Explorer

Leg 1

Chris Rooper^a
Brian Knoth^b
Ned Laman
Beth Matta
Lorin Anderson
Todd TenBrink

Leg 2

Mark Zimmermann^a
Paul von Szalay^b
Michael Hellmair
Jon Short
Jackie Patt^d
Alison Vijgen

Leg 3

Mark Zimmermann^a
Jim Stark^b
Ned Laman
Chris Gburski
Ron Payne
Ivonne Ortiz

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

^a Field Party Chief

^b Deck Boss

^c University of Mississippi

^d University of Alaska Fairbanks

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 2010 Aleutian Islands bottom trawl survey catches, by North Pacific Fisheries Management Council regulatory area and aggregates thereof, ranked in order of relative abundance.

Western Aleutian Area			Central Aleutian Area		
Name	Weight (kg)	Count	Name	Weight (kg)	Count
Pacific ocean perch	86,139	136,937	Pacific ocean perch	57,825	77,706
Atka mackerel	44,426	83,946	Atka mackerel	44,700	86,898
Northern rockfish	32,496	78,303	Northern rockfish	12,094	27,444
Pacific cod	5,100	1,032	Walleye pollock	8,678	5,643
Arrowtooth flounder	3,079	2,531	Northern rock sole	4,898	11,271
Northern rock sole	2,242	5,978	Sponge unident.	2,908	---
Yellow Irish lord	2,164	1,209	Pacific cod	2,805	1,409
Sponge unident.	2,037	---	Arrowtooth flounder	1,930	1,555
Giant grenadier	1,674	465	Kamchatka flounder	1,779	1,191
Shortspine thornyhead	1,587	2,965	Giant grenadier	1,134	242
Leopard skate	1,498	165	Aleutian skate	841	68
Whiteblotched skate	1,475	274	Yellow Irish lord	804	1,178
Walleye pollock	1,461	4,158	Leopard skate	772	108
Flathead sole	700	2,624	Pacific halibut	769	142
Cloud sponge	698	---	Barrel sponge	673	---
Pacific halibut	616	55	Shorthead rockfish	592	300
Kamchatka flounder	590	621	Alaska skate	467	62
Shorthead rockfish	536	287	Sablefish	441	170
Aleutian skate	518	37	Shortspine thornyhead	394	944
Rex sole	488	960	Tree sponge	388	---
Prowfish	453	278	Blackspotted rockfish	387	267
Clay pipe sponge	321	---	Rex sole	326	491
Spud sponge	277	---	Green papillate	269	2
Darkfin sculpin	261	3,172	Whiteblotched skate	260	33
Blackspotted rockfish	261	331	Darkfin sculpin	188	965
Golden king crab	199	130	Basketstar	182	1,182
<i>Geodia mesotriaena</i>	173	13	Dover sole	180	201
Tree sponge	172	---	Giant octopus	176	67
Green papillate sponge	150	---	Spud sponge	121	---
Basketstar	145	832	Prowfish	120	56
Kamchatka coral	125	---	<i>Halichondria</i> sp.	118	---
Calcareous finger sponge	123	---	Greenland turbot	103	23
Dark rockfish	116	125	Mud skate	98	95
Greenland turbot	116	30	Green sea urchin	95	2,752



Table 1: Continued.

<i>Eastern Aleutian Area</i>			<i>Total Aleutian Area</i>		
Name	Weight (kg)	Count	Name	Weight (kg)	Count
Pacific ocean perch	54,618	79,885	Pacific ocean perch	198,581	294,528
Atka mackerel	35,302	26,097	Atka mackerel	124,428	196,941
Walleye pollock	24,823	14,888	Northern rockfish	50,267	116,231
Northern rockfish	5,677	10,484	Walleye pollock	34,962	24,689
Arrowtooth flounder	4,452	6,126	Pacific cod	12,039	4,202
Pacific cod	4,134	1,761	Arrowtooth flounder	9,461	10,212
Sponge unident.	3,753	---	Northern rock sole	8,956	20,603
Pacific halibut	2,351	514	Sponge unident.	8,698	---
Kamchatka flounder	2,298	2,117	Kamchatka flounder	4,668	3,929
Whiteblotched skate	2,246	332	Giant grenadier	4,198	1,022
Northern rock sole	1,816	3,354	Whiteblotched skate	3,982	639
Giant grenadier	1,389	315	Yellow Irish lord	3,747	3,496
Yellow Irish lord	779	1,109	Pacific halibut	3,735	711
Barrel sponge	515	---	Leopard skate	2,338	281
Flathead sole	505	2,055	Shortspine thornyhead	2,054	4,021
Clay pipe sponge	410	---	Aleutian skate	1,574	128
Rex sole	363	615	Shortraker rockfish	1,389	712
Tree sponge	337	---	Flathead sole	1,227	4,734
Blackspotted rockfish	302	343	Barrel sponge	1,226	---
Darkfin sculpin	301	2,902	Rex sole	1,177	2,066
Scapula sponge	299	---	Blackspotted rockfish	950	941
Shortraker rockfish	261	125	Tree sponge	896	---
Alaska skate	245	31	Clay pipe sponge	786	---
Greenland turbot	236	74	Alaska skate	778	99
Basketstar	217	1,407	Cloud sponge	761	---
Aleutian skate	215	23	Darkfin sculpin	751	7,039
Giant octopus	166	38	Prowfish	690	372
Southern rock sole	139	242	Sablefish	585	208
Prowfish	118	38	Basketstar	544	3,421
Golden king crab	115	97	Green papillate sponge	524	---
Green papillate sponge	105	---	Greenland turbot	455	127
Shortspine thornyhead	73	112	Spud sponge	435	---
Spectacled sculpin	72	848	Giant octopus	419	154
<i>Chlamys</i> spp.	69	1,444	Scapula sponge	404	---



Table 1: Continued.

<i>Southern Bering Sea Area</i>			<i>Entire Survey Area</i>		
Name	Weight (kg)	Count	Name	Weight (kg)	Count
Walleye pollock	27,063	22,862	Pacific ocean perch	217,915	317,498
Pacific ocean perch	19,334	22,970	Atka mackerel	140,289	207,858
Atka mackerel	15,861	10,917	Walleye pollock	62,024	47,551
Pacific cod	2,371	958	Northern rockfish	50,307	116,317
Arrowtooth flounder	1,926	3,129	Pacific cod	14,410	5,160
Pacific halibut	1,570	842	Arrowtooth flounder	11,386	13,341
Southern rock sole	1,256	2,522	Northern rock sole	9,958	22,670
Northern rock sole	1,002	2,067	Sponge unident.	8,846	---
Rex sole	710	1,358	Pacific halibut	5,305	1,553
Flathead sole	593	2,361	Kamchatka flounder	5,233	4,212
Yellow Irish lord	574	769	Yellow Irish lord	4,321	4,265
Kamchatka flounder	565	283	Giant grenadier	4,198	1,022
Aleutian skate	302	19	Whiteblotched skate	4,078	671
Tanner crab	165	516	Leopard skate	2,338	281
Sponge unident.	147	---	Shortspine thornyhead	2,181	4,327
Shortspine thornyhead	127	306	Rex sole	1,887	3,424
Whiteblotched skate	96	32	Aleutian skate	1,875	147
Magistrate armhook	86	238	Flathead sole	1,820	7,095
Greenland turbot	74	23	Southern rock sole	1,418	2,799
Darkfin sculpin	71	847	Shortraker rockfish	1,397	716
<i>Chlamys</i> spp.	66	1,677	Barrel sponge	1,229	---
<i>Strongylocentrotus</i> spp.	62	1,822	Blackspotted rockfish	1,002	978
Green sea urchin	58	2,137	Tree sponge	917	---
Giant octopus	54	8	Alaska skate	822	105
Blackspotted rockfish	52	37	Darkfin sculpin	822	7,886
Sea peach	49	272	Clay pipe sponge	790	---
Yellow papillate sponge	47	---	Cloud sponge	771	---
Alaska skate	44	6	Prowfish	702	376
Butter sole	43	88	Sablefish	612	216
Northern rockfish	40	86	Basketstar	564	3,529
Great sculpin	38	11	Green papillate sponge	530	---
English sole	37	102	Greenland turbot	530	150
Oregon triton	36	749	Giant octopus	473	162
Starry flounder	30	13	Spud sponge	435	---



Table 2: Length-weight data collected during the 2010 biennial trawl survey of the Aleutian Islands region, by species and North Pacific Fisheries Management Council regulatory area.

Name	Length-Weight Measurements				Total / Species
	Western	Central	Eastern	S Bering	
Big skate	--	--	1	--	1
Mud skate	4	40	48	1	93
Roughtail skate	--	1	--	--	1
Alaska skate	6	42	16	2	66
Aleutian skate	21	26	4	3	54
Commander skate	1	--	--	--	1
Leopard skate	78	59	--	--	137
Whiteblotched skate	149	18	170	8	345
Butterfly skate	--	4	--	--	4
Arrowtooth flounder	187	177	191	172	727
Kamchatka flounder	133	92	142	93	460
Greenland turbot	23	22	21	15	81
Northern rock sole	156	173	143	146	618
Southern rock sole	1	16	83	220	320
Pacific sand lance	57	--	--	--	57
Giant grenadier	52	44	57	--	153
Yellow Irish lord	65	133	130	86	414
Great sculpin	10	22	9	10	51
Bigmouth sculpin	5	2	4	3	14
Pacific cod	169	223	148	140	680
Walleye pollock	160	140	140	180	620
Atka mackerel	204	199	80	83	566
Salmon snailfish	--	3	--	--	3
Shortspine thornyhead	239	152	70	82	543
Rougheye rockfish	7	4	15	6	32
Blackspotted rockfish	122	140	176	21	459
Pacific ocean perch	246	262	304	141	953
Dusky rockfish	1	81	21	17	120
Northern rockfish	197	186	141	18	542
Harlequin rockfish	3	5	3	--	11
Shortraker rockfish	142	138	86	1	367
Octopus unident.	1	--	--	--	1
<i>Benthoctopus sibiricus</i>	--	1	--	--	1
Giant octopus	43	57	34	8	142
Total / Region	2,482	2,462	2,237	1,456	8,637



Table 3: Otolith specimens collected during the 2010 biennial trawl survey of the Aleutian Islands region, by species and North Pacific Fisheries Management Council regulatory area.

<i>Otolith Specimens</i>					
Name	Western	Central	Eastern	S Bering	Total / Species
Arrowtooth flounder	187	177	191	172	727
Kamchatka flounder	133	92	142	93	460
Greenland turbot	23	22	21	15	81
Northern rock sole	156	173	143	146	618
Southern rock sole	1	16	83	220	320
Giant grenadier	52	44	57	--	153
Yellow Irish lord	65	133	130	86	414
Great sculpin	10	22	9	10	51
Bigmouth sculpin	5	2	4	3	14
Pacific cod	169	223	148	140	680
Walleye pollock	160	140	140	180	620
Atka mackerel	204	199	80	83	566
Shortspine thornyhead	239	152	70	82	543
Rougheye rockfish	7	4	15	6	32
Blackspotted rockfish	122	140	176	21	459
Pacific ocean perch	246	262	304	141	953
Dusky rockfish	1	81	21	17	120
Northern rockfish	197	186	141	18	542
Harlequin rockfish	3	5	3	--	11
Shortraker rockfish	142	138	86	1	367
Total / Region	2,122	2,211	1,964	1,434	7,731



Table 4: Length frequencies collected during the 2010 biennial trawl survey of the Aleutian Islands region, by species and North Pacific Fisheries Management Council regulatory area.

Name	<i>Length Frequencies</i>				Total / Species
	Western	Central	Eastern	S Bering	
Pacific sleeper shark	--	--	--	1	1
Big skate	--	--	1	3	4
Bering skate	--	--	1	5	6
Mud skate	9	94	74	10	187
Alaska skate	6	61	30	6	103
Aleutian skate	33	68	22	17	140
Commander skate	1	--	--	--	1
Leopard skate	13	44	5	--	62
Whiteblotched skate	260	29	329	20	638
Butterfly skate	--	4	5	--	9
Arrowtooth flounder	2,370	1,480	3,570	2,714	10,134
Kamchatka flounder	621	932	1,186	239	2,978
Greenland turbot	30	23	73	21	147
Pacific halibut	54	141	510	817	1,522
Flathead sole	2,162	55	668	1,165	4,050
English sole	--	1	--	102	103
Dover sole	64	201	16	16	297
Rex sole	956	491	544	1,040	3,031
Yellowfin sole	--	--	--	86	86
Starry flounder	--	--	--	13	13
Northern rock sole	4,448	6,970	2,794	1,385	15,597
Southern rock sole	12	23	242	1,523	1,800
Butter sole	--	--	--	88	88
Alaska plaice	--	--	--	1	1
Sablefish	24	170	13	7	214
Giant grenadier	348	242	237	--	827
Popeye grenadier	1	--	--	--	1
Darkfin sculpin	--	13	--	--	13
Yellow Irish lord	268	990	1,033	584	2,875
Great sculpin	10	22	10	11	53
Bigmouth sculpin	5	2	5	3	15
Pacific cod	735	1,296	1,489	812	4,332
Walleye pollock	1,675	1,757	2,339	3,992	9,763
Atka mackerel	5,381	5,400	1,504	771	13,056
Kelp greenling	25	13	6	5	49
Capelin	--	--	3	--	3
Chinook salmon	--	--	1	--	1



Table 4: Continued.

Name	Western	Central	Eastern	S Bering	Total / Species
Chum salmon	2	--	2	--	4
Prowfish	266	56	37	4	363
Ebony eelpout	11	26	3	--	40
Bering eelpout	--	26	--	--	26
Shortspine thornyhead	1,993	772	112	302	3,179
Broadfin thornyhead	1	--	--	--	1
Rougheye rockfish	8	4	17	6	35
Blackspotted rockfish	325	265	340	21	951
Pacific ocean perch	8,617	6,028	6,690	1,390	22,725
Dark rockfish	124	33	1	1	159
Dusky rockfish	1	87	22	18	128
Black rockfish	--	--	1	--	1
Northern rockfish	6,097	4,275	1,339	85	11,796
Redbanded rockfish	--	1	--	--	1
Harlequin rockfish	3	5	3	--	11
Sharpchin rockfish	--	--	1	--	1
Shortraker rockfish	287	300	120	1	708
Giant octopus	--	--	2	--	2
Magistrate armhook	199	56	135	201	591
Total / Region	37,445	32,456	25,535	17,486	112,922

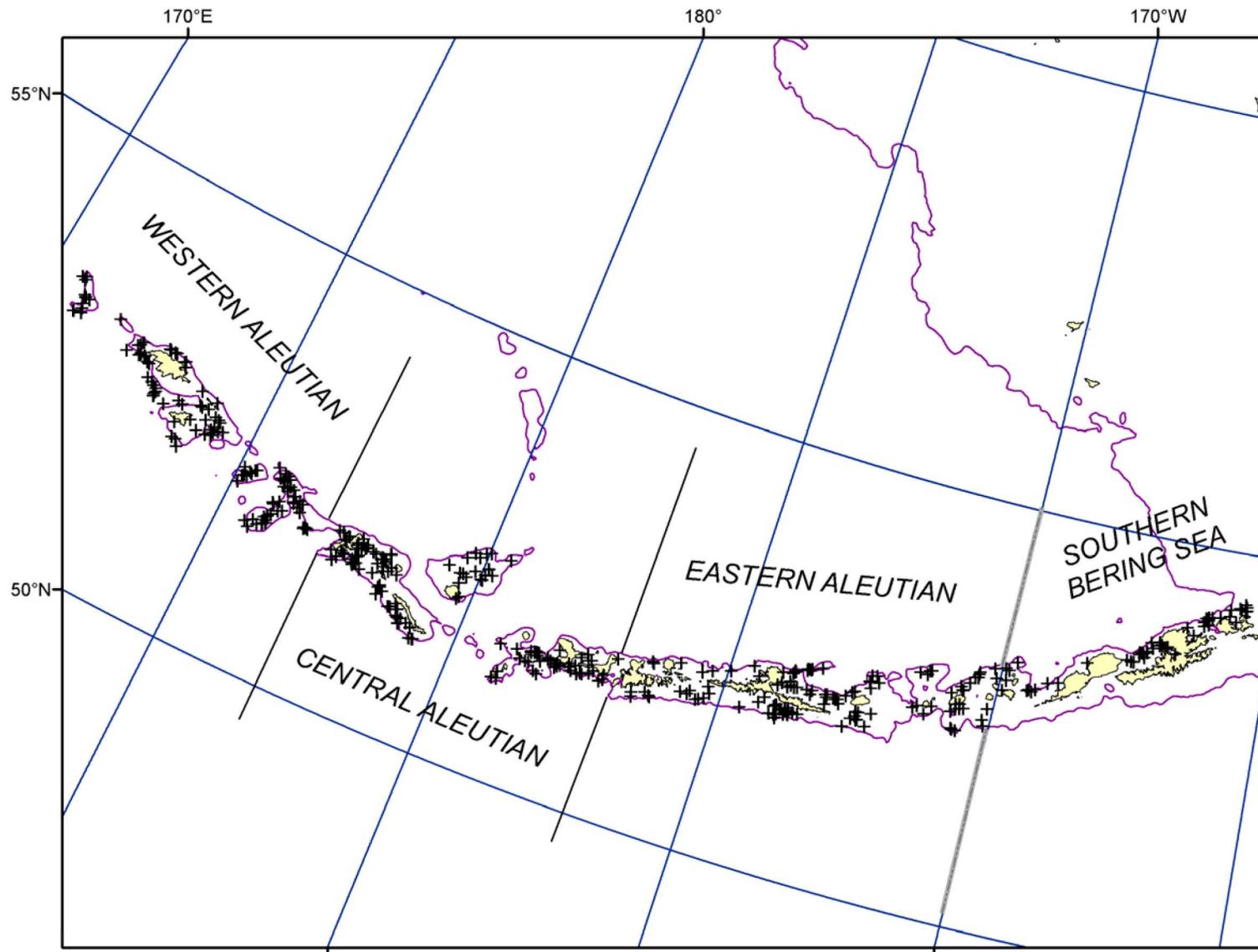


Figure 1.--Locations of successful tows made during the 2010 Bottom Trawl Survey of Groundfish and Invertebrate Resources in the Aleutian Islands Region. Management subareas and the 500 m depth contour are shown.