

March 10, 1998

CRUISE RESULTS

Chartered Vessel Cruise No. 97-1

F/V Dominator AND F/V Vesteraalen

1997 Triennial Groundfish Assessment Survey - Aleutian Islands Region

June 7 - August 15, 1997

The sixth comprehensive triennial bottom trawl survey of Aleutian region groundfish resources was conducted from June 7 through August 15, 1997, by the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC), in Seattle, Washington. This report summarizes the general sampling operations and preliminary results of the survey.

ITINERARY

Survey sampling was conducted aboard the chartered commercial trawlers Vesteraalen and Dominator. The 70-day survey period was divided into three legs of 23-24 days each. Sampling operations began on the north side of the Aleutian Islands between Unimak Pass (long. 1650W) and the Islands of Four Mountains (long. 1700W) and extended westward throughout the remainder of the Aleutian Archipelago to Stalemate Bank (long. 1700E). Sampling occurred at pre-selected stations, or nearby alternate stations, in depths of 22 m to 501 m (Figures 1 and 2). The cruise itinerary was as follows:

June 7 First day of charter. Load gear in Dutch Harbor, AK
June 8 Begin Leg 1 - Vessels sample westward from the southern Bering Sea region.
June 30 Arrive Dutch Harbor. Exchange of scientific personnel.
July 1 Begin Leg 2 - Vessels depart Dutch Harbor, resume survey westward.
July 24 Arrive Adak. Exchange of scientific personnel.
July 25 Begin Leg 3 - Vessels depart Adak, resume survey westward.
August 14-15 Arrive Dutch Harbor, unload vessels.

OBJECTIVES

The primary focus of these ongoing triennial groundfish surveys is to build a standardized time series of data designed to assess, describe, and monitor the distribution, abundance, and biological condition of various Aleutian groundfish stocks. Previous comprehensive AFSC surveys in the Aleutian region occurred in 1980, 1983, 1986, 1991, and 1994. Specific objectives of the 1997 triennial survey were to:

1. define the distribution and relative abundance of the principal groundfish and commercially important invertebrate species that inhabit the Aleutian region;

2. obtain data from which to estimate the absolute abundance of the principal groundfish species;
3. collect data to define various species-specific biological parameters i.e., age, sex, size, growth rates, length-weight relationships, feeding habits, and taxonomy;
4. collect integrated net configuration and position data for all trawl hauls to obtain precise area-swept estimates;
5. perform special collections as requested by cooperating research groups, and;
6. test the feasibility of using trawls equipped with specialized footropes (tire gear) to assess previously unsampled areas.

VESSELS AND GEAR

Both charter vessels are house-forward stern trawlers with stern ramps, forward and aft net storage reels (mounted aft over the stern ramp and forward of the working deck), telescoping deck cranes, propeller nozzles, and paired, controlled-tension hydraulic trawl winches with 1,280 m to 1,460 m of 2.54 cm diameter steel cable. The Vesteraalen is 38 m in overall length (LOA) and is powered by a single, 1,700 continuous horsepower (HP) main engine. The Dominator is also 38 m LOA with a 2,000 HP main engine. Electronic equipment on both vessels included Global Positioning Systems (GPS) and LORAN C receivers with video position plotters, at least two radars, single sideband and VHF transmitter-receivers, color video fish-finders, paper recorder depth sounders, and auto-pilots.

Captain Tim Cosgrove operated the Vesteraalen for the entire charter period, and Captains Craig Jenssen and Bill Klopp divided their duties aboard the Dominator into legs 1-2, and leg 3, respectively.

Standard RACE Division Poly-Nor'eastern high opening bottom trawls, rigged with roller gear, were utilized by both vessels. Gear specifications included: a 27.2 m headrope with twenty-one 30 cm diameter floats, and a 24.3 m, 1.3 cm diameter longlink alloy chain "fishing line" attached to a 24.9 m, 0.95 cm diameter 6 x 19 galvanized steel wire footrope. The roller gear was 24.2 m long and constructed of 1.9 cm diameter 6 x 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 cm and 20 cm rubber disks were used to span each lower flying wing section. The trawls were constructed of 12.7 cm stretched-mesh polyethylene web with a 3.2 cm stretched-mesh nylon liner in the codend. Net rigging consisted of triple 54.9 m, 1.6 cm diameter galvanized wire rope dandyines. Chain extensions to the dandyines were 46 cm and 23 cm at the headrope and side panel attachments, respectively. Steel V-doors with dimensions of 1.83 x 2.74 m, and weighing approximately 800 kg each were used to open the net.

One slightly reinforced Poly-Nor'eastern net was equipped with tire gear to test its ability to sample sites that were found to be too rugged for the standard sampling trawls.

SURVEY AREA

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 through the passes and across the shelf, sometimes making productive fishing operations difficult or impossible.

Commercially valuable roundfish such as Atka mackerel (*Pleurogrammus monopterygius*), Pacific cod (*Gadus macrocephalus*), walleye pollock (*Theragra chalcogramma*), sablefish (*Anoplopoma fimbria*); flatfish, most notably, Pacific halibut (*Hippoglossus stenolepis*) and Greenland turbot (*Reinhardtius hippoglossoides*); rockfish species including Pacific ocean perch (*Sebastes alutus*), rougheye and shortraker rockfishes (*S. aleutianus* and *S. borealis*); and invertebrates including golden king crab (*Lithodes aequispina*) and scallops (*Chlamys* spp) inhabit the area. The rough, rocky bottom conditions provide abundant substrate for many species of bryozoans, sponges and corals.

SURVEY DESIGN AND METHODS

The Aleutian survey region was divided into 4 major strata based on geographic features, and North Pacific Fishery Management Council (NPFMC) regulatory areas. Those strata were further divided into depth strata to 500 m depths. A Neyman optimum allocation strategy based on data from previous triennial surveys was used to develop a stratified random sampling distribution. As a result, proportionally more sampling effort was expended in the western Aleutian region this year.

Tow tracklines and start and end positions were recorded using GPS output. Standard trawl hauls were 15 minutes in actual on-bottom duration. Trawl time on bottom was determined using real-time net configuration data transmitted to the vessel by acoustic net mensuration equipment which could be verified posteriorly by time and depth recordings from a bathythermograph. The acoustic devices continuously measured wing spread and headrope height above the bottom. Efforts were made to maintain constant depth during a tow, but when depths changed trawl warp length was adjusted accordingly. At most stations, tilt sensors attached to the fishing line were used to record how well the net maintained contact with the bottom.

Catches were sorted to species, weighed and enumerated according to standard AFSC and RACE Division protocol. Extensive size composition data were collected with barcode based recording devices and downloaded to computer database files after each tow. A variety of biological data including age structures (otoliths), lengths, and weights of individual specimens were collected and entered in the computer database. Special collections included extensive stomach contents samples, muscle tissue samples, corals, sponges and other invertebrates, sculpin eggs, and many whole fish of various species.

Surface to bottom seawater temperature profiles were recorded at most sampling sites using a headrope-mounted bathythermograph. After each tow, temperature profile data were downloaded and stored in computer files, then integrated with net mensuration data to help verify actual time on bottom. Additional sea surface temperature observations were taken with bucket thermometers.

RESULTS

Time lost to bad weather and gear repair was generally small, but during periods of extreme tidal flow, heavy currents often caused work to be postponed. Sampling generally proceeded from east to west. There were three tiers of sampling priorities. Virtually all first priority stations were sampled. Priority two and three stations were sampled if bottom conditions permitted. Some pre-assigned stations were not sampled due to unsuitable bottom conditions. In cases where trawlable bottom could not be found at a given station, a pre-selected alternate location, or in some cases a newly found location was sampled. Successful tows were performed at 455 of 498 sites where tows were attempted. Four hundred-four of the 455 successful tows were survey tows used to estimate abundance, 41 were successful experimental tows which will be used to judge the effectiveness of the trawl equipped with tire gear to sample rough bottom habitat, and 10 were test tows using an underwater camera to view the performance of the experimental and survey nets. Stations ranged in depth from 22 to 501 m. Sea surface temperatures and successful bathythermograph recordings were collected at 482 stations.

Summarized total catch data indicate that Pacific ocean perch was, by far, the dominant species in survey trawl catches in all three NPFMC Aleutian regulatory areas. Atka mackerel ranked second in those areas, and first in the Bering I regulatory area. Walleye pollock was third overall in total catch followed by Pacific cod, northern rockfish (*Sebastes polyspinis*) and Pacific halibut.

Size-stratified otolith collections were taken from a number of species. Generally, samples were collected from species with high commercial value or those of special scientific interest. Length and weight measurements were recorded from individual fish of many species to update length-weight relationships used by AFSC scientists. Length measurements were the most common biological data collected (103,300). Over 3,200 stomach samples were collected from a wide variety of species with over 2,000 samples coming from four major predator species: Arrowtooth flounder, Pacific cod, Pacific halibut, and walleye pollock. Another 750 stomach samples came from the two major semi-pelagic species, Pacific ocean perch and Atka mackerel.

Heart tissue samples were collected from 120 shortspine thornyheads (*Sebastolobus alascanus*) and 120 northern rockfish as part of a coast-wide genetic analysis. Heart, liver, and muscle tissue samples were collected from 64 rougheyed rockfish, and preserved in liquid nitrogen. Two hundred and thirty-eight northern rock sole (*Lepidopsetta peracuated*) were scanned for gill parasites, resulting in 90 samples being collected. Researchers from the Natural History Museum at the University of Kansas collected and preserved 180 tissue samples from 87 species, for their archives. The Natural History Museum archives and supplies tissue samples to researchers for genetic comparison studies. Numerous whole fish, shellfish, and invertebrates were collected for diverse uses such as species identification and other taxonomic studies, aging studies, and observer training.

SCIENTIFIC STAFF AND AFFILIATIONS

ALEUTIAN ISLANDS TRIENNIAL TRAWL SURVEY, 1997
VESTERAALEN - LEG I

DATES: June 7 - June 30
PORTS: Dutch Harbor-Dutch Harbor, AK

FPC Bill Flerx AFSC
Harold Zenger AFSC
Larry Haaga AFSC
Ronald Payne AFSC Russ Nelson AFSC
Ron Erickson AFSC

VESTERAALEN - LEG II
DATES: July 1 - July 24
PORTS: Dutch Harbor-Adak, AK

FPC Michael Martin AFSC
Mark Zimmerman AFSC
Delsa Anderl AFSC Jim Stark AFSC
Jan Haaga AFSC
Teresa Turk IPHC

VESTERAALEN - LEG III
DATES: July 25 - August 15
PORTS: Adak-Dutch Harbor, AK

FPC Harold Zenger AFSC
Michael Martin AFSC
Jay Orr AFSC
Jim Stark AFSC
Teresa Turk IPHC
Kate Shaw UKAN

DOMINATOR - LEG I
DATES: June 7 - June 30
PORTS: Dutch Harbor-Dutch Harbor, AK

FPC Eric Brown AFSC
Robin Harrison AFSC
Ken Weinberg AFSC
Ben Page AFSC
Steve Syrjala AFSC
Mike MacEwan AFSC

DOMINATOR - LEG II
DATES: July 1 - July 24
PORTS: Dutch Harbor-Adak, AK

FPC Bill Flerx AFSC
Bob Lauth AFSC
Kirsten Rohrbach AFSC
Jerry Hardman AFSC
Richard Wiggins AFSC
Roger Clark AFSC

DOMINATOR - LEG III
DATES: July 25 - August 15
PORTS: Adak-Dutch Harbor, AK

FPC Robin Harrison AFSC
Kirsten Rohrbach AFSC
Chris Derrah AFSC
Roger Clark AFSC
Mike MacEwan AFSC
Peter Berendzen UKAN

Abbreviations

AFSC Alaska Fisheries Science Center
IPHC International Pacific Halibut Commission
UKAN Volunteer Scientist, University of Kansas
FPC Field Party Chief

For further information contact Dr. Gary Stauffer, Director, Resource Assessment and Conservation Engineering Division, Alaska Fisheries Science Center, National Marine Fisheries Service, 7600 Sand Point Way NE., Building 4, BIN C15700, Seattle, WA 98115-0070, Telephone (206) 526-4170, FAX (206) 526-6723, or E-mail at gary.stauffer@noaa.gov