

CRUISE RESULTS

CHARTERED VESSEL CRUISE NO. 2000-01
F/V DOMINATOR AND F/V VESTERAALEN
2000 GROUND FISH ASSESSMENT SURVEY, ALEUTIAN ISLANDS REGION
MAY 17 - JULY 25, 2000

The seventh comprehensive bottom trawl survey of Aleutian region groundfish resources was conducted from May 17 through July 25, 2000, by the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC), in Seattle, Washington. Future surveys will be conducted on a biennial basis. 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 (165°W long.) and the Islands of Four Mountains (170°W long.) and extended westward throughout the remainder of the Aleutian Archipelago to Stalemate Bank (170°E long.). Sampling occurred at pre-selected stations, or nearby alternate stations, in depths of 20 m to 471 m (Figure 1).

OBJECTIVES

The primary focus of these ongoing groundfish surveys is to build a standardized time series of data that are 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, 1994, and 1997. Specific objectives of the 2000 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 catch and effort 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, spawning condition, and taxonomy;
4. collect integrated net configuration and position data for all trawl hauls to obtain precise area-swept estimates, and;
5. perform special collections as requested by other researchers or research groups.

VESSELS AND GEAR

Both charter vessels are house-forward stern trawlers with stern ramps, aft net storage reels (mounted over the stern ramp), 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) 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.

Captains Tim Cosgrove and Craig Jenssen operated the *Vesteraalen* and the *Dominator*, respectively, during legs 1 and 2, and Captains Brad Lougheed and Bill Klopp operated the *Vesteraalen* and *Dominator*, respectively during leg 3.

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 dandy lines. Chain extensions to the dandy lines 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.

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*), northern rockfish (*S. polyspinis*), 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, hydroids, sponges and corals.

SURVEY DESIGN AND METHODS

The Aleutian survey region is divided into 4 major sections based on geographic features, and North Pacific Fishery Management Council (NPFMC) regulatory areas. Those sections are further divided into 45 area-depth strata to a depth of 500 m. A Neyman optimum allocation strategy based on data from previous surveys was used to develop a stratified random sampling distribution among the 45 strata. As a result, proportionally more sampling effort was expended in the eastern, central and western Aleutian areas this year (Figure 1).

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 were verified posteriorly by time and depth recordings from a bathythermograph and a bottom contact sensor (tilt sensor). 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 of fish and some invertebrates 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 sexual maturity indices for Pacific ocean perch, extensive stomach contents samples, heart 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. 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 within the proper area-depth stratum was sampled. Successful tows were performed at 428 of 456 assigned assessment sites. One special tow was performed to collect deepwater skates. Stations ranged in depth from 20 m to 471 m. Sea surface temperatures and successful bathythermograph recordings were collected at 441 stations.

Total catch figures indicate that Pacific ocean perch was, by far, the dominant species in survey trawl catches in the Aleutian region as a whole, but Atka mackerel was the predominant species in the Central regulatory area (Table 1). Atka mackerel ranked second in overall total catch in the Aleutian region. Northern rockfish was third overall in total catch followed by walleye pollock. In the southern Bering Sea area walleye pollock dominated the total catch.

Size-stratified otolith collections were taken from a number of species (Table 2). 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 (101,112). Over 3,600 stomach samples were collected from a wide variety of species

with over 1,900 samples coming from four major predator species: Arrowtooth flounder (*Atheresthes stomias*), Pacific cod, Pacific halibut, and walleye pollock. Another 785 stomach samples came from the two major semi-pelagic species, Pacific ocean perch and Atka mackerel (Table 2). Small flatfish such as northern rock sole (*Lepidopsetta polyxystra*), flathead sole (*Hippoglossoides elassodon*), rex sole (*Glyptocephalus zachirus*), and various species of skates (*Bathyraja* spp) formed the majority of the remaining stomach collections.

Heart tissue samples were collected from 150 Pacific ocean perch and 50 northern rockfish as part of a genetic stock identification analysis. Extensive samples of invertebrate fauna were collected by researchers from the California Academy of Sciences in San Francisco. AFSC has contracted the Academy to identify and catalog invertebrates which will allow AFSC to collect more accurate catch data records in the future. Numerous whole fish were collected for later identification. At least one probable new species of snailfish was collected. Other special collections included external parasites of rock sole, Greenland turbot ovaries, and bigmouth sculpin egg clutches.

ITINERARY

| | |
|---------|--|
| May 17 | First day of charter. Load gear in Dutch Harbor. |
| May 19 | Begin Leg 1 - Vessels sample westward from the southern Bering Sea region. |
| June 8 | Arrive Dutch Harbor. Exchange of scientific personnel. |
| June 9 | Begin Leg 2 - Vessels depart Dutch Harbor, resume survey westward. |
| July 2 | Arrive Adak. |
| July 3 | Exchange of scientific personnel. Begin Leg 3. |
| July 24 | Arrive Dutch Harbor, unload vessels. |
| July 25 | Finish unloading vessels. Last day of charter. |

**SCIENTIFIC STAFF AND AFFILIATIONS
ALEUTIAN ISLANDS TRAWL SURVEY, 2000**

VESTERAALEN - LEG I

DATES: May 17 - June 8
PORTS: Dutch Harbor-Dutch Harbor, AK

| | | | |
|-----|-----------------|------|------|
| FPC | Harold Zenger | | AFSC |
| | Bill Flerx | AFSC | |
| | George Cronin | | AFSC |
| | Russ Nelson | AFSC | |
| | Alisa Abookire | | AFSC |
| | Hilary Emberton | IPHC | |

DOMINATOR - LEG I

DATES: May 17 - June 8
PORTS: Dutch Harbor-Dutch Harbor, AK

| | | | |
|-----|----------------|--|------|
| FPC | Jay Orr | | AFSC |
| | Robin Harrison | | AFSC |
| | Michael Martin | | AFSC |
| | Nate Raring | | AFSC |
| | Liz Chilton | | AFSC |
| | Geana Tyler | | AFSC |

VESTERAALEN - LEG II

DATES: June 9 - July 2
PORTS: Dutch Harbor-Adak, AK

| | | | |
|-----|-----------------|------|------|
| FPC | Nate Raring | | AFSC |
| | Bill Flerx | | AFSC |
| | Jim Stark | | AFSC |
| | Sheryl Corey | | AFSC |
| | Bob Lauth* | | AFSC |
| | Hilary Emberton | IPHC | |
| | Elizabeth Kools | | CAS |

DOMINATOR - LEG II

DATES: June 9 - July 2
PORTS: Dutch Harbor-Adak, AK

| | | | |
|-----|-------------------|--|------|
| FPC | Paul Von Szalay | | AFSC |
| | Michael Martin | | AFSC |
| | Katherine Pearson | | AFSC |
| | Liz Chilton | | AFSC |
| | Troy Buckley | | AFSC |
| | Destry Wion | | AFSC |

VESTERAALEN - LEG III

DATES: July 3 - July 25
PORTS: Adak-Dutch Harbor, AK

| | | | |
|-----|-------------------|------|------|
| FPC | Lyle Britt | | AFSC |
| | Eric Brown | | AFSC |
| | Sarah Gaichas | | AFSC |
| | Richard MacIntosh | | AFSC |
| | Hilary Emberton | IPHC | |
| | Marie Airey | | CAS |

DOMINATOR - LEG III

DATES: July 3 - July 25
PORTS: Adak-Dutch Harbor, AK

| | | | |
|-----|-------------------|--|------|
| FPC | Paul Von Szalay | | AFSC |
| | Robin Harrison | | AFSC |
| | Steve Syrjala | | AFSC |
| | Jim Stark | | AFSC |
| | Katherine Pearson | | AFSC |
| | John McEachran | | TAMU |

* Disembarked vessel in Adak, 6/15/2000

Abbreviations:

| | |
|------|--|
| AFSC | Alaska Fisheries Science Center |
| IPHC | International Pacific Halibut Commission |
| CAS | California Academy of Sciences |
| TAMU | Texas A&M University |
| FPC | Field Party Chief |

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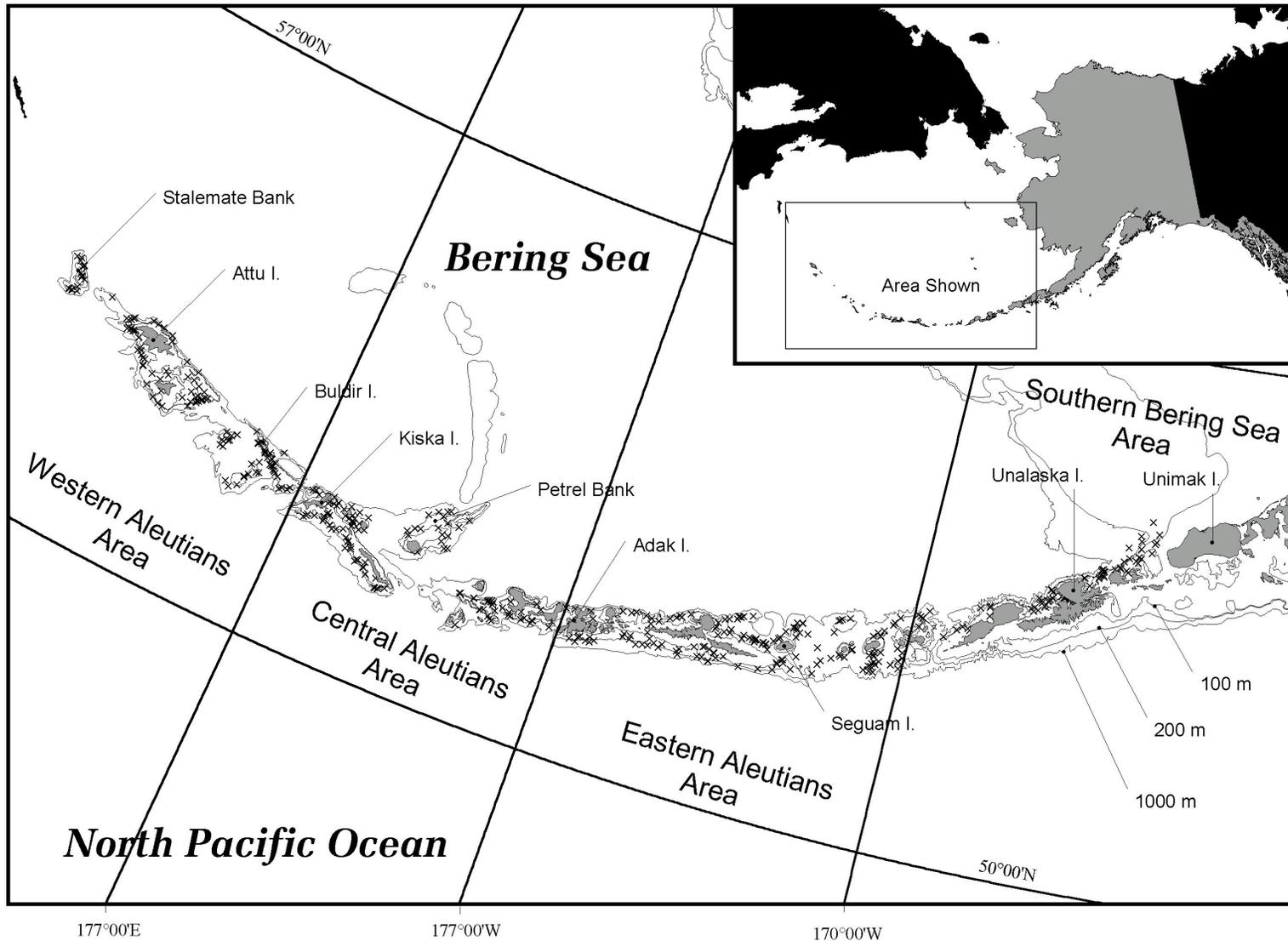


Figure 1: Tows (marked X) completed during the 2000 Aleutian Islands bottom trawl survey.

