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UNITED STATES RESEARCH SURVEYS CONDUCTED IN 1989 AND
SURVEYS PLANNED FOR 1990 IN THE EASTERN BERING SEA

by

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1. Research Activities in the eastern Bering Sea during 1989.

The Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC) conducted 2 surveys in the eastern Bering Sea during 1989.

(a) Aleutian Basin - Eastern Bering Sea Shelf Winter Survey

The echo integration-midwater trawl survey of spawning walleye pollock in the Aleutian Basin region and eastern Bering Sea shelf was conducted during January-March, 1989. This was a cooperative survey between the AFSC and the Far Seas Fisheries Research Laboratory (FSFRL) of Japan. The primary objectives of this survey were to:

1. collect echo integrator and midwater trawl data to determine the distribution and biomass of spawning walleye pollock concentrations;
2. evaluate acoustic systems using standard calibration and calibration sphere techniques;
3. calibrate acoustic systems between U.S. and Japanese research vessels and;
4. collect biological data on walleye pollock.

The survey area included portions of the Aleutian Basin and extended into the southern corner of the International Zone,

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commonly referred to as the "donut hole", north to approximately 57° 30'N. The study region also encompassed the the area near Bogoslof Island and portions of the outer eastern Bering Sea shelf.

AFSC survey activities were conducted on a 24 hour per day basis aboard the NOAA Research Vessel Miller Freeman. Approximately 5,000 nm of acoustical transects were completed in the Aleutian Basin region and eastern Bering Sea shelf area (Figure 1). An additional 1,000 nm of trackline were completed in the Bogoslof Island area. Attempts to intercalibrate the acoustic systems of the Miller Freeman and FSFRL research vessel Kaiyo Maru were limited because of poor weather conditions and inadequate fish sign. However, approximately 17 hours of intercalibration data were collected between the two vessels. Three standard sphere calibrations were also conducted aboard the Miller Freeman. A total of 27 midwater trawls were made at selected sites to identify echo sign and to collect biological samples.

Walleye pollock densities were extremely low in the Aleutian Basin west of approximately 176° W. However, significant concentrations were encountered in the Bogoslof Island region. Pollock were encountered throughout the eastern Bering Sea shelf with highest concentrations located near St. George Island and northwest of Unimak Island.

In addition to stock density information, biological data including size composition by sex, weight, age, maturity, ovary weight, and stomach content were also recorded. Various tissue samples were collected and preserved for subsequent genetic and morphometric-meristic studies.

(b) Eastern Bering Sea Crab-Groundfish Survey

The eastern Bering Sea crab-groundfish survey was conducted during June-August 1989 utilizing standard crab-groundfish survey methods. The primary objectives of this survey were to;

1. collect catch and biological information on principal species of crab and groundfish using bottom trawl techniques to provide information for management purposes, the fishing industry, and for scientific studies and;
2. collect hydrographic and environmental data in the study area.

Secondary objectives were to;

1. examine crab and halibut by-catch rates in inshore trawling areas;

2. assess yellowfin sole abundance in inshore waters of Togiak Bay and Kuskokwim Bay and;
3. conduct comparative trawl experiments to evaluate otter door size on effective net width and also to assess differences in past and current standard sampling gear.

The standard survey area included continental shelf waters north from Unimak Pass, along the 200 meter depth contour to approximately 62° N and east to the Alaska mainland (Figure 2). Standard sampling sites were established on the basis of a 20 x 20 nmi grid pattern used during previous surveys although more intensive sampling was carried out in the Pribilof Islands and St. Matthew Island regions to collect additional data on crab populations. Stations were also established in the Togiak Bay and Kuskokwim Bay areas to collect data on spawning concentrations of yellowfin sole. Twelve sampling locations were scheduled between 160°-162° W in response to a request from the North Pacific Management Council to evaluate incidence of crab and halibut catches relative to the expansion of the inshore trawl fishery from 25 to 30 fm.

Survey activities in the standard area were coordinated between two U.S. vessels, the University of Washington research vessel Alaska and the chartered fishing vessel Ocean Hope 3, and the Soviet Union vessel Babuskina. The Babuskina began its portion of the survey in mid-May, several weeks earlier than the U.S. vessels, and sampled alternate rows of stations throughout the standard survey area sampled latter by the U.S. vessels. The Alaska and Ocean Hope 3 sampled all standard survey stations with the vessels fishing alternate rows of designated stations during June-August to facilitate the determination of relative fishing powers of the two vessels.

The Alaska and Ocean Hope 3 successfully completed 426 bottom hauls including 36 side-by-side comparative trawls to examine relative fishing efficiencies between vessels and sampling gear (Figure 2). The Ocean Hope 3 occupied an additional 12 sampling sites in the Port Moller region to collect information for crab and Pacific halibut by-catches. The Alaska also conducted 5 trawl sets to examine the effect of otter door size on effective net width. The Babuskina completed 169 standard trawl hauls and 15 side-by-side comparative hauls with the Alaska to assess trawling effectiveness between vessels.

The catch at each sampling site was sorted, weighed, and enumerated by species. Length and width measurements, shell condition, clutch size, and various tissue and organs were collected from major crab species. Red king crab were tagged and released to provide information for growth and movement studies. The two U.S. vessels recorded approximately 155,000 length

measurements by sex/centimeter category from the major fish species and about 3,500 age structures were collected and preserved. Biological data collected from fish species on the Alaska and Ocean Hope 3 are summarized in Table 1. About 7,500 stomachs were preserved from various taxa for feeding habit analysis. Nearly 300 Pacific cod were tagged and released to provide information on stock movements. Numerous whole specimens of various fish and invertebrate species were preserved for identification, training, and other purposes.

Sea water temperature profiles were collected at each station using expendable bathythermograph (XBT) probes. Net mensuration systems aboard both vessels provided gear configuration and performance data to be used in area swept calculations.

2. Research activities planned in the eastern Bering Sea during 1990.

(a) Eastern Bering Sea Crab-Groundfish Survey

The standard eastern Bering Sea bottom trawl survey will be conducted around May-August, 1990. This is a continuation of the series of eastern Bering Sea crab-groundfish assessment surveys. The primary objectives of this survey are to:

1. study annual and long-term changes in the demersal fish and invertebrate community of the eastern Bering Sea shelf by relating the results of the 1990 survey to the results of earlier surveys and;
2. measure selected oceanographic parameters which may affect the abundance and distribution of these populations.

The survey area will extend north from Unimak Pass along the 200 m depth contour to approximately 62° N and east to the Alaska mainland. It is anticipated that 2 vessels will participate in this survey.

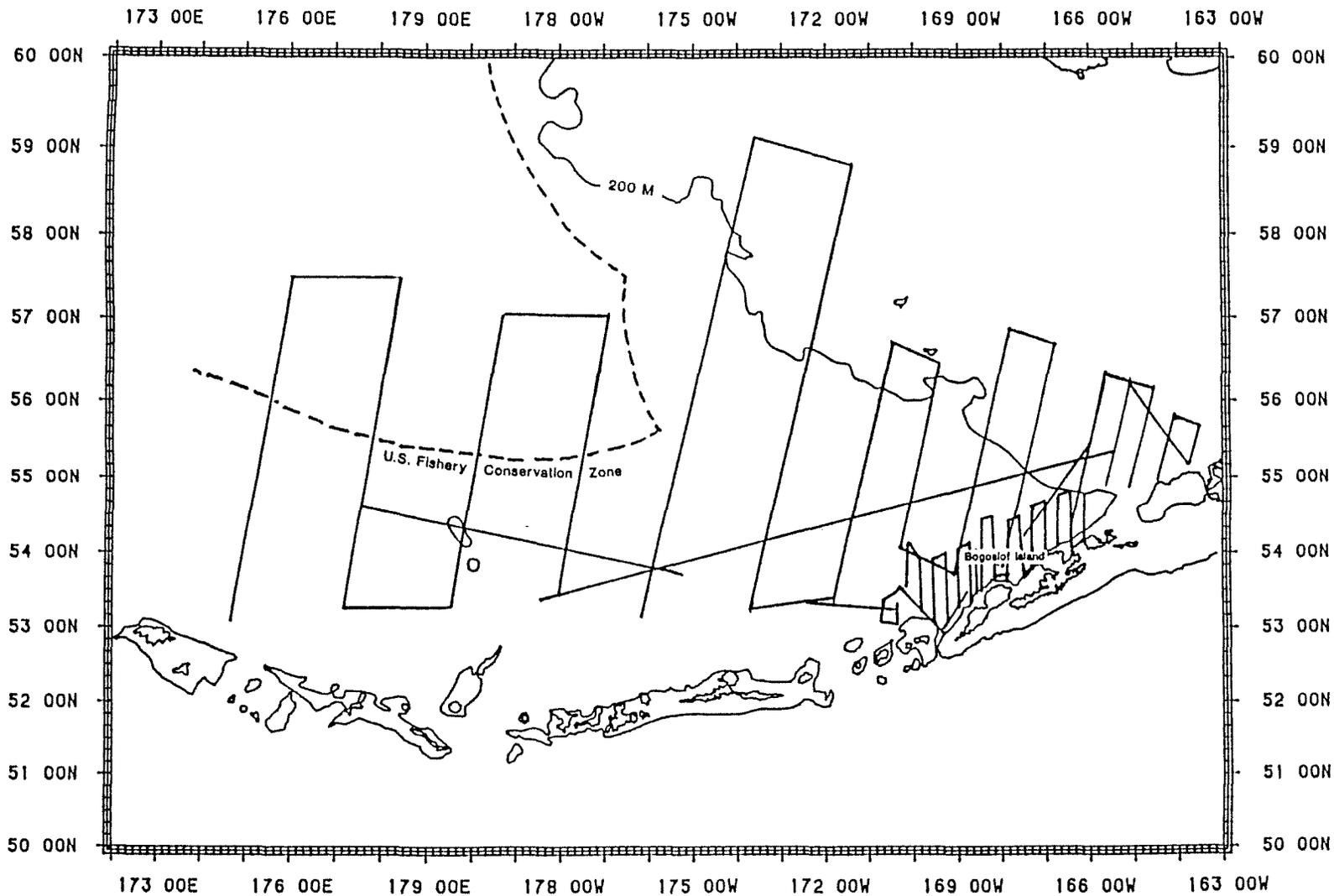


Figure 1.--Acoustical transects (solid, straight lines) completed during the 1989 Aleutian Basin - Eastern Bering Sea shelf winter survey by the NOAA R/V Miller Freeman.

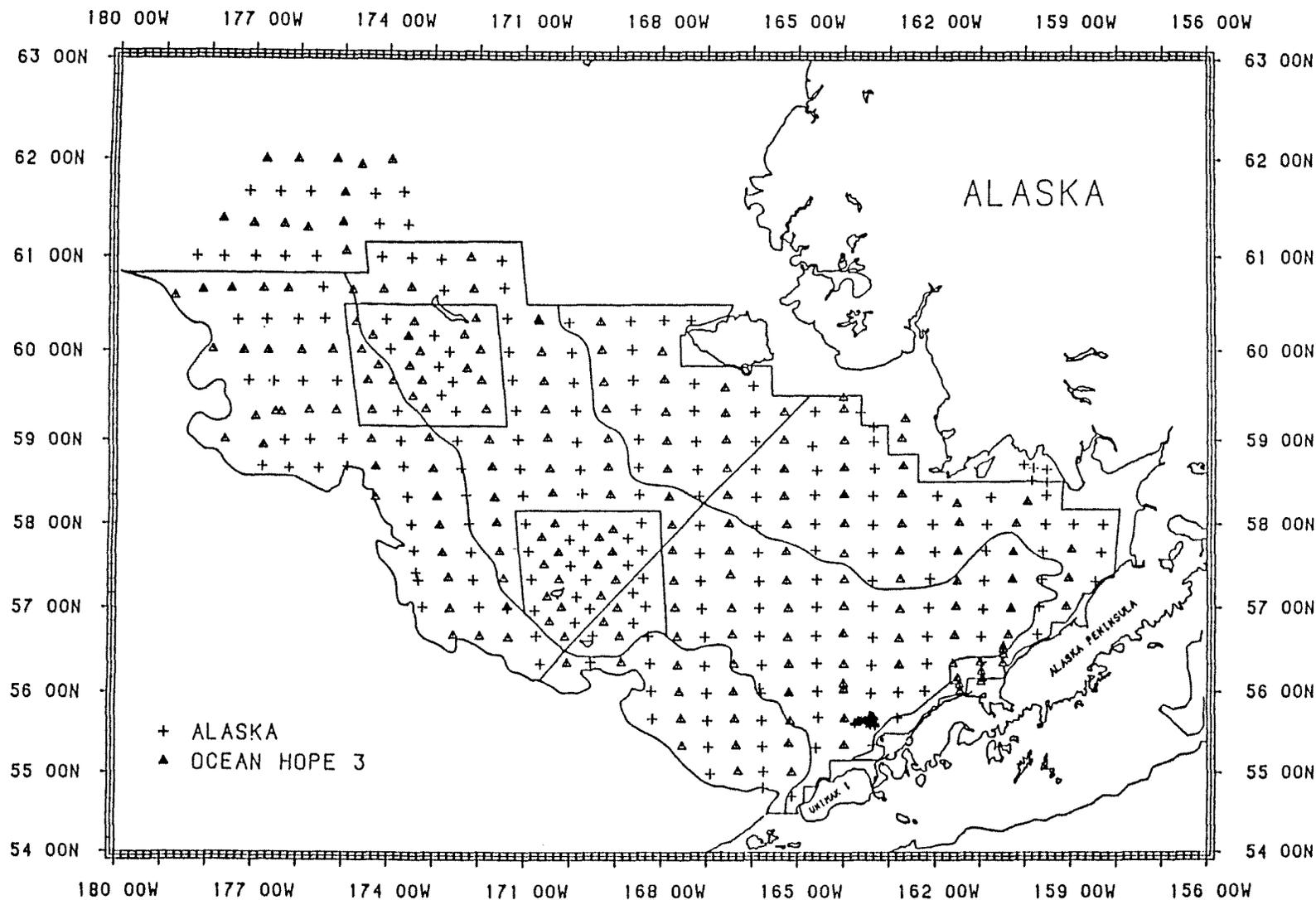


Figure 2.--Distribution of total sampling effort by the Alaska and Ocean Hope 3 during the 1989 eastern Bering Sea survey. The dense concentration of stations in the vicinity of 55°30' N and 163° W shows the location of the side-by-side comparative trawling by the two vessels.

Table 1.--Biological data collected by the Alaska and Ocean Hope 3 during the 1989 eastern Bering Sea crab-groundfish survey.

Species	Length measurements	Age structures ^{1/}	Stomach samples	Number tagged
Walleye pollock	38,926	1,262	2,379	--
Pacific cod	4,936	765	1,806	291
Yellowfin sole	35,019	748	1,005	--
Rock sole	30,676	688	334	--
Flathead sole/ Bering flounder	21,562	--	770	--
Pacific halibut	1,827	--	287	--
Alaska Plaice	8,647	--	258	--
Arrowtooth flounder/ Kamchatka flounder	11,264	--	458	--
Greenland turbot	432	--	173	--
Rex sole	398	--	--	--
Pacific herring	467	--	--	--
Pacific ocean perch	5	--	--	--
Northern rockfish	15	--	--	--
Saffron cod	250	--	--	--
Longhead dab	160	--	--	--
Misc. species	98	--	--	--
Total	154,682	3,463	7,470	291

^{1/} Scale scrape samples, in addition to otoliths, were collected from Pacific cod. Only otoliths were taken from all other species.