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Ser. No. 1947
Rev. No.

UNITED STATES RESEARCH SURVEYS CONDUCTED IN 1985 AND SURVEYS PLANNED FOR 1986 IN THE EASTERN BERING SEA

by

Gary E. Walters

Northwest and Alaska Fisheries Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
7600 Sand Point Way N.E.
BIN C15700
Seattle, Washington 98115

RECEIVED
OCT 23 1985
NOAA/NMFS
SEATTLE, WA

September 1985

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:
Walters, Gary E. 1985. United States research surveys conducted in 1985 and surveys planned for 1986 in the eastern Bering Sea. Unpubl. rep., 9 p. Northwest and Alaska Fish. Cent., Natl. Mar. Fish. Serv., NOAA, 7600 Sand Point Way NE, BIN C15700, Seattle, WA 98115. (Submitted to the International North Pacific Fisheries Commission in October 1985.)

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1. Research Activities in the Eastern Bering Sea during 1985.

The Resource Assessment and Conservation Engineering Division (RACE) of the Northwest and Alaska Fisheries Center (NWAFC) conducted three resource assessment surveys in the eastern Bering Sea during 1985. In addition, the RACE Division participated in cooperative surveys and field experiments with Japan and the USSR.

(a) Eastern Bering Sea Winter Crab-groundfish Survey

The eastern Bering Sea winter crab-groundfish survey was conducted during January-February 1985 following standard crab-groundfish survey methods. The primary objectives of this survey were to:

(1) Collect catch and biological data on principal species of crab and groundfish to determine winter distributions and provide information for management purposes, the fishing industry, and scientific studies and;

(2) Collect hydrographic and environmental data in the study area.

The study region included continental shelf waters northeast from Unimak Pass along the Alaskan Peninsula and north to approximately 58° N. (Fig. 1). Standard sampling sites were established on the basis of a 20 x 20 nmi grid.

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*National Marine Fisheries Service, Northwest and Alaska Fisheries Center, Seattle, Washington 98115

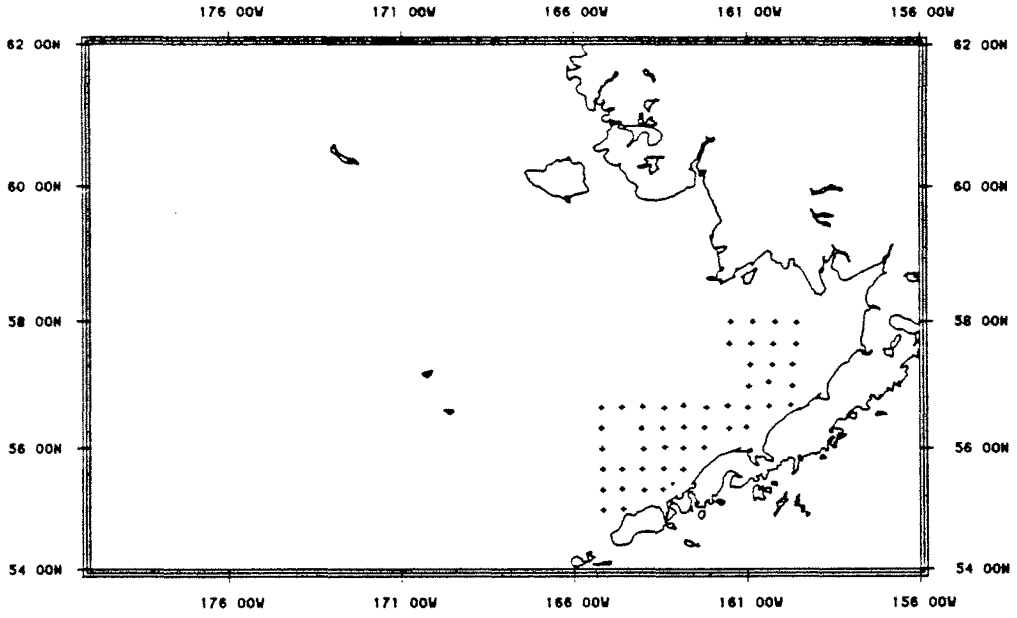

Figure 1.--Distribution of sampling effort during the 1985 eastern Bering Sea winter crab-groundfish survey.

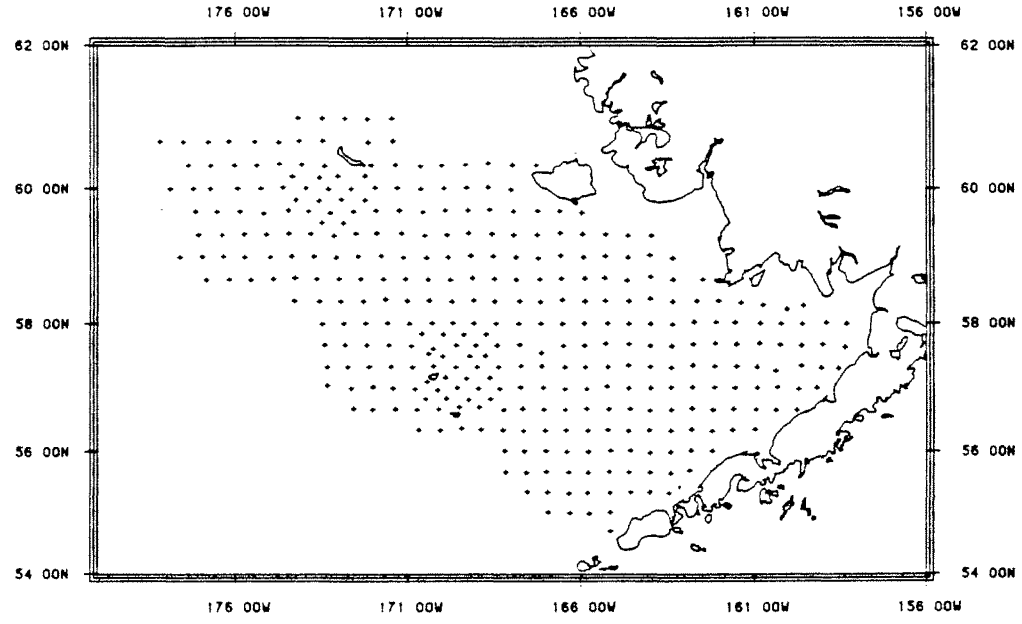

Figure 2.--Distribution of sampling effort during the 1985 eastern Bering Sea summer crab-groundfish survey.

The survey was carried out on board the NOAA research vessel Miller Freeman. Forty-seven stations were sampled during the survey.

The catch at each sampling site was sorted, weighed, and enumerated by species. Length/width measurements, shell condition, and clutch size were determined for major crab species. Nearly 20,000 length measurements were recorded by sex/centimeter category from the major fish species and approximately 1,100 age structures were collected. Stomachs were collected from 519 fish of 4 species to investigate winter feeding habits. Biological data collected from fish species are summarized in Table 1. In addition to the biological data, approximately 104 Pacific cod (Gadus macrocephalus) and 200 Pacific halibut (Hippoglossus stenolepis) were tagged and released to provide information on stock movement.

(b) Eastern Bering Sea Summer Crab-groundfish Survey

The eastern Bering Sea summer crab-groundfish survey was conducted during June-October 1985 following standard crab-groundfish survey methods. The 1985 survey was an expanded triennial year survey. The triennial surveys (1979, 1982, 1985) include a larger area to the north of the standard survey sites and incorporated sampling of continental slope waters by a cooperative Japanese vessel and sampling of midwater concentrations of walleye pollock (Theragra chalcogramma) by acoustic-midwater trawling techniques.

The standard survey region included continental shelf waters north from Unimak Pass, along the 200 meter depth contour to approximately 60° N and east to the Alaska mainland (Fig. 2). Standard sampling sites were established on a 20 x 20 nmi grid with more intensive sampling in the Pribilof and St. Matthew Island regions to collect additional data on blue king crab. Survey activities were coordinated between the chartered

Table 1. Collections of biological data and samples during the 1985 eastern Bering Sea winter survey.

Species	Length measurements	Stomachs	Maturity	Weight
Walleye pollock	3405		249	
Pacific cod	3514	191	346	38
Yellowfin sole	4282	148		
Rock sole	4980			
Flathead sole/ Bering flounder	1627	102		6
Pacific halibut	604			
Alaska plaice	503			
Arrowtooth flounder/ Kamchatka flounder	758	78		6
Butter sole	222			
Starry flounder	46			
Total	19941	519	595	50

University of Washington research vessel, Alaska, and the chartered fishing vessel Argosy. The two vessels sampled alternate rows of designated stations over part of the survey area to determine relative fishing powers between vessels through comparisons of catch rates.

The Alaska and Argosy sampled 353 stations in the standard survey area. In addition to the data taken on major crab species, approximately 147,000 length measurements were recorded by sex/centimeter category from the major fish species. Age structures were collected from 6531 fish and 2,784 stomachs were collected for feeding studies. A total of 945 Pacific cod were tagged and released to continue the study of stock movement. Biological data gathered during this survey is summarized in Table 2. Seawater temperature profiles were collected at each station using expendable bathythermograph (XBT) probes.

Catch data from alternate row station transects were compared to determine significant differences in fishing efficiencies between vessels. Results indicated that the Alaska was more effective for catching flathead sole (Hippoglossoides elassodon), and crabs other than tanner or king crab. The Argosy was more effective at catching eelpouts (zoarcids), the bairdi tanner crab (Chionoecetes bairdi), and bivalve molluscs. No significant differences were observed for other species.

As part of the triennial series of resource assessment surveys, additional stations to the north of the standard area were sampled during September-October 1985 by the vessel Argosy. The area between St. Matthew and St. Lawrence Islands was sampled with 20 stations based on a 40 x 40 nmi grid. Within Norton Sound, 69 stations were sampled based on a 10 x 10 nmi grid.

Table 2.--Collections of biological data and samples during the 1985 eastern Bering Sea summer crab-groundfish survey.

Species	Length measurements	Stomach scans	Age 1/ structures	Stomachs
Walleye pollock	44735	123	1902	100
Pacific cod	15502		1463	793
Sablefish	56			26
Yellowfin sole	34136		817	550
Rock sole	21006		583	
Flathead sole/ Bering Flounder	13366	4	751	602
Pacific halibut	873			176
Alaska plaice	10954		362	
Arrowtooth flounder/ Kamchatka flounder	4738	3	485	342
Greenland turbot	196		168	195
Rex sole	304			
Pacific herring	1069	3		
Pacific ocean perch	28			
Butter sole	151			
Longhead dab	35			
Misc. species	1	17		
Total	147150	150	6531	2784

1/ Dorsal spines were collected from Pacific cod. Otoliths were collected from all other species.

During August 1985, the vessels Argosy and Morning Star participated with the vessel Daikichi maru No. 32, chartered by the Far Seas Fisheries Research Laboratory, Fisheries Agency of Japan, in an experiment designed to examine the on-bottom versus off-bottom components of walleye pollock distributions as well as the diurnal variability of those distributions. Twenty-one trawls were performed by each of the vessels Argosy and Daikichi maru No. 32 during 2 twenty-four hour periods. During the same periods, the Morning Star conducted hydroacoustic transects in the same area and performed 5 midwater trawls.

After the preceding experiment, Daikichi maru No. 32 and Argosy conducted a gear comparison experiment on the continental slope northwest of Unimak Pass. This experiment was designed to compare the relative fishing efficiency of the standard U.S. shelf trawl with the standard Japanese slope trawl. Twenty-nine tows were made by each vessel in a side-by-side manner at depths of 250-500 m.

(c) Eastern Bering Sea Hydroacoustic Survey

Two consecutive hydroacoustic-midwater trawl surveys were conducted aboard the chartered fishing vessel Morning Star during 1985. The first survey, during June-July, had a primary objective of assessing the distribution, abundance, and biological characteristics of walleye pollock in the eastern Bering Sea. This survey covered most of the continental shelf region from Unimak Pass to approximately 62° N via 5,200 nmi of parallel north-south tracklines. Midwater trawls were made at 90 sites to identify acoustic sign and collect biological information. Nearly 20,000 pollock were measured for length, and almost 5,000 pollock were weighed and measured. Age structures were collected from 2,870 pollock and maturity

examinations were made on 4,540. In addition, stomach content scans were made on 662 pollock and 116 stomachs were collected for further examination.

During August, a second survey aimed at age 0 walleye pollock was conducted over the same area using 2,600 nmi of parallel trackline perpendicular to the continental slope. This survey was part of a continuing effort to determine the feasibility of monitoring the abundance of this age group. Nearly 14,000 fish were measured for length from 51 midwater trawl samples.

(d) Cooperative Aleutian Region Survey

During July-August, a U.S.- U.S.S.R. cooperative groundfish resource assessment survey was conducted aboard the Soviet research vessel Poseydon in the Aleutian region of the Bering Sea. The survey was conducted along the outer shelf and upper slope of the continental shelf to provide data on the distribution, abundance, and biology of principal species. Approximately 150 tows were made during this survey.

2. Research Activities Planned in the Bering Sea During 1986

(a) A standard eastern Bering Sea summer crab-groundfish survey will be conducted around May-August 1986. This survey will be a continuation of a series of eastern Bering Sea resource 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 1986 survey to the results of previous years; and

(2) Measure selected oceanographic parameters that may effect the abundance and distribution of these populations.

The survey area will extend from Unimak Pass and the Alaska Peninsula north to the latitude of St. Matthew Island and from nearshore

waters of the Alaska mainland to depths of 200 m at the continental shelf break. Approximately 355 stations will be sampled based on a 20 x 20 nmi grid. The United States plans to have two bottom trawl research vessels available for this survey.

(b) A special survey of trawl performance observations will be conducted using a remotely operated vehicle (ROV). This survey will take place in the yellowfin sole, joint venture fishery in Bristol Bay. It will examine the selectivity of trawls to yellowfin sole and the impact/damage to crabs encountered but not caught in the trawl. Additional observations will be made on fish behavior and crab behavior around trawls.

If time permits, the U.S. will conduct a study on the feasibility of using an ROV for assessment of yellowfin sole and crab.

(c) Two surveys are planned in the Aleutian area of the Bering Sea during 1986 - one that will be a triennial survey conducted by a U.S. chartered research vessel and a cooperative Japanese vessel, and the other a U.S.-U.S.S.R. cooperative survey.

(d) A survey is planned for the winter of 1986 to examine spawning populations of walleye pollock. This survey is designed to examine the linkages between off-shelf (Aleutian Basin) and on-shelf components of the resource. Hydroacoustic assessment as well as microzooplankton and ichthyoplankton sampling will be used.

No other surveys are planned at this time.