

Bukhala

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
KODIAK, ALASKA 99615

CRUISE RESULTS
CRUISE NO. OR-78-02 NOAA RV OREGON
CRUISE NO. P-78-01 FV PARAGON II

LATE
January, 1979

CRUISE PERIOD

RV OREGON - 15 May to 9 July, 1978; FV PARAGON II - 15 June to 18 August, 1978.

ITINERARY

The RV OREGON and the NMFS charter vessel PARAGON II completed a crab and groundfish resource assessment cruise in the eastern Bering Sea. The OREGON left Kodiak on 15 May, commenced fishing in the eastern Bering Sea on 20 May and finished Cruise OR-78-02 in Dutch Harbor on 9 July. Two scientific party changes occurred in Dutch Harbor 3-6 June and 25-29 June. The PARAGON II departed Kodiak on 15 June, commenced fishing in the eastern Bering Sea on 19 June, last fished on 16 August, and returned to Dutch Harbor on 18 August. Scientific party changes were made 9-12 July and 29-30 July.

AREA

The area of the eastern Bering Sea investigated was considerably larger than the area covered in 1977 and extended from Unimak Pass north to 61°00'N and from 178°15'W, east to inner Bristol Bay (Fig. 1). The purpose of expanding the survey area was to provide coverage of the large components of the pollock, Tanner crab, and other demersal populations that occupy the region north and northwest of the Pribilof Islands.

OBJECTIVES

1. Conduct a trawl survey, using established protocol, in the eastern Bering Sea in the area east of 179°00'W longitude and south of 61°00'N latitude from 15 May to 20 August, 1978.
2. Make approximately 20 tows on the western margin of the traditional survey area to determine the status of fishes and invertebrates on the upper continental slope.
3. Conduct side by side trawling between the two survey vessels in the vicinity of St. Paul Island on June 20 and June 24, and in the Amak Island area from July 1 to July 6 to provide fishing power comparisons for principal species.

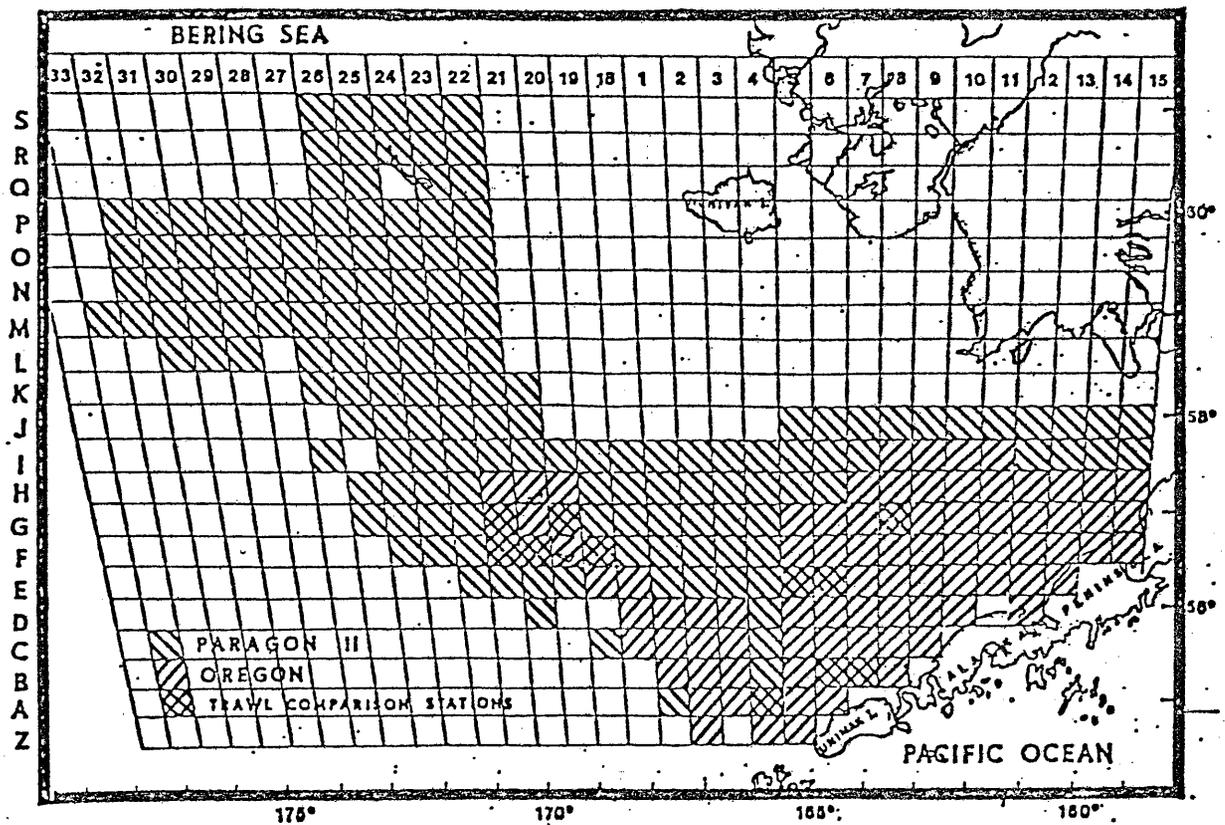


Figure 1.-- Area covered by the 1978 NMFS eastern Bering Sea crab and groundfish assessment cruises.

4. Secondary Projects

- a. Collection of morphometric and biological data on blue king crab (Paralithodes platypus) and hair crab (Erimacrus isenbeckii).
- b. Conduct experiments to assess the field performance of the Data Logger tape data storage system.
- c. Take photographs of fishes and invertebrates.
- d. Collect samples of four species of gastropods for stomach content analysis.
- e. Collection of fishes for NMFS Marine Mammal Division reference collection.
- f. Assess the Marinovich midwater trawl for sampling juvenile age 1 pollock.

GEAR

The trawl survey and comparative towing was conducted using a standard 400 mesh eastern otter trawl of 3 1/2 inch (89 mm) mesh, with a

1 1/4 inch (32 mm) mesh codend liner. The net was fished with 15 8-inch (203 mm) floats on the headrope, dandylines were 25 fathoms (45.5 m) including 10 fathom (18.2 m) bridles. Five foot by seven foot (1.5 m x 2.1 m) Astoria "V" doors were used. No chain was used on the footrope. Station sampling procedure included the collection of echosounder tapes (Ross 200A), and the daily release of XBT probes to obtain temperature profiles. In addition to the bottom trawling at standard grid stations, experimental midwater trawling was carried out intermittently to determine the feasibility of using midwater trawling techniques to index the abundance of juvenile age 1 pollock. The trawl used was a Marinovich trawl with a 30-foot headrope and footrope, 3-inch (76 mm) mesh in the dogears and square, 2 1/2-inch (64 mm) mesh in the belly, 2-inch (51 mm) mesh in the body, 1 1/2-inch (38 mm) mesh in the funnel, and 1 1/4-inch (32 mm) mesh in the intermediate and cod end with a 1/2-inch (13 mm) mesh liner in the intermediate and cod end. The trawl was rigged with 28 8-inch (203 mm) floats and 80 pounds (36 kg) of chain on each end of the footrope. Dandylines were 10 fathoms (18 m) and doors were the same as used with the 400 mesh eastern trawl.

METHODS

The Standard Survey

Survey design was based on the standard 20 x 20 nautical mile grid system. One-half hour tows were made at the center of each station throughout the survey area.

All king and Tanner crab were removed from the catch. Crabs were first sorted by species, then by sex. Crabs were sampled for length, width, shell condition, sex, egg condition, and fullness of egg clutch.

Groundfish were separated by species, numbers and weight, and subsamples of principal species were taken for biological information. Length-frequency information was taken from as many of the principal species as time permitted from each haul. Otolith samples, stratified by sex and centimeter size categories, were taken from most commercially important species.

RESULTS

The OREGON completed 114 trawl hauls and the PARAGON II completed 202 hauls in the course of the survey. Sampling occurred at 241 different stations in the standard crab-bottomfish survey.

The Standard Survey

King and Tanner crabs were sampled for length, width, shell condition, sex, egg condition, and fullness of egg clutch. Numbers of crabs sampled

of each species were as follows:

<u>Species</u>	<u>Number Sampled</u>
red king crab (<u>Paralithodes camtschatica</u>)	7,647
blue king crab (<u>P. platypus</u>)	866
bairdi Tanner crab (<u>Chionoecetes bairdi</u>)	12,289
opilio Tanner crab (<u>C. opilio</u>)	25,669
hybrid Tanner crab (<u>C. bairdi x C. opilio</u>)	301
Korean hair crab (<u>Erimacrus isenbeckii</u>)	254

Red king crab were distributed along the north side of the Alaska Peninsula from Unimak Pass to Point Heiden and this year were also found in small numbers around the Pribilof Islands. Blue kings were found in discrete patches around both St. Matthew and the Pribilofs. As in past years, largest concentrations of legal and pre-recruit bairdi Tanner crab occurred in the Amak Island and Pribilof Islands areas. Opilio Tanner crab were common throughout the area except for Bristol Bay, near the Alaska Peninsula, and near St. Matthew Island.

Weights and numbers of fish were determined for all species in each haul. Substantial numbers of length-frequency observations were taken for each of the commercially important species abundant in the survey area. Numbers of age structures obtained and the length range samples were as follows:

<u>Species</u>	<u>Number of age structures</u>	<u>Length-range sampled (cm)</u>
Pollock	1,121	11 - 75
Pacific cod	647	12 - 110
Pacific ocean perch	100	15 - 48
Blackcod	142	---
Yellowfin sole	256	11 - 38
Greenland turbot	498	10 - 90
Flathead sole	465	6 - 49
Rock sole	309	10 - 48
Arrowtooth flounder	263	7 - 46
Alaska plaice	137	22 - 50

These data, through comparisons with similar information from previous years, will provide the basis for examining the status of stocks of principal species in the eastern Bering Sea in 1978.

Principal species of demersal fish in the survey area, as shown by the frequency of catches exceeding 500 pounds per half hour tow (Table 2, Figure 2), were yellowfin sole and pollock. Figure 2 clearly illustrates the importance of the area northwest of the Pribilof Islands for pollock. Catches of pollock greater than 500 pounds south of the latitude of the Pribilof Islands (generally corresponding to the traditional crab-

Table 2.--Catches of fish and crabs exceeding 500 pounds per half hour tow during the 1978 crab-groundfish survey.

Map Symbol		Largest catch in pounds	Number stations with catches > 500 pounds	Depth range of catches > 500 pounds (fathoms)
P	Pollock (<u>Theragra Chalcogramma</u>)	9,357	57	34-97
Y	Yellowfin sole (<u>Limanda aspera</u>)	4,917	35	14-39
R	Rock sole (<u>Lepidopsetta bilineata</u>)	664	3	14-29
C	Pacific cod (<u>Gadus macrocephalus</u>)	6,905	3	14-66
AP	Alaska plaice (<u>Pleuronectes quadrituberculatus</u>)	1,779	2	28-35
AF	Arrowtooth flounder (<u>Atheresthes stomias</u>)	830	1	200
G	Greenland turbot (<u>Reinhardtius hippoglossoides</u>)	570	1	200
E	Eelpouts (<u>Lycodes sp.</u>)	941	2	33-44
S	Sculpin (<u>Cottidae</u>)	1,600	2	21
K	Red king crab (<u>Paralithodes camtschatica</u>)	882	7	31-46
TO	Tanner crab (<u>Chionoecetes opilio</u>)	1,102	7	36-54

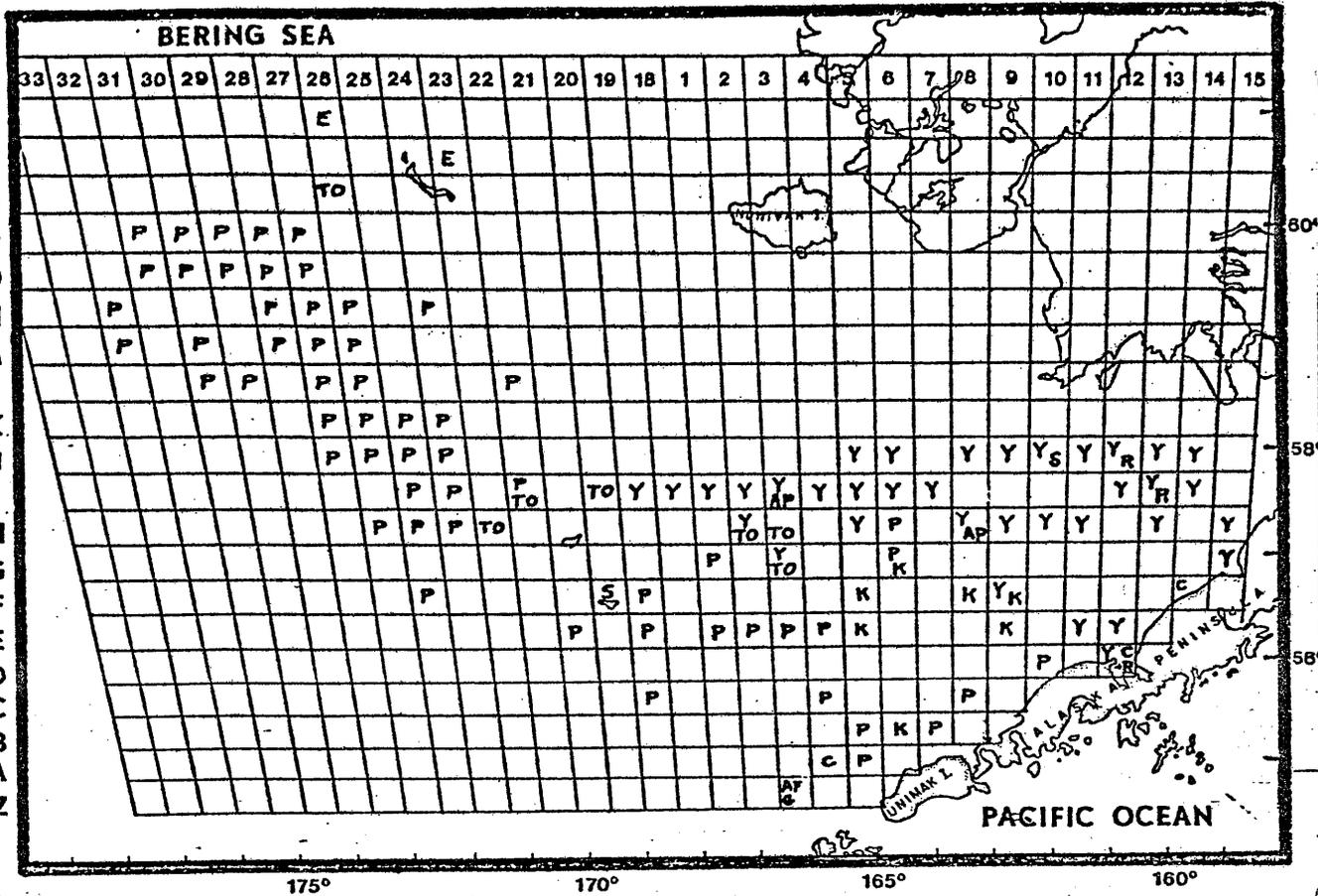


Figure 2.--Catches of fish and crabs exceeding 500 pounds per half hour tow during the 1978 crab-groundfish survey.

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|-------------------------|--|
| P- Pollock | G- Greenland turbot |
| Y- Yellowfin sole | E- Eelpouts |
| R- Rock sole | S- Sculpin |
| C- Pacific cod | K- Red king crab |
| AP- Alaska plaice | TO- Tanner crab (<u>Chionoecetes opilio</u>) |
| AF- Arrowtooth flounder | |

groundfish area) were relatively few and scattered compared to the numerous catches of this magnitude northwest of the Pribilofs.

Secondary Projects

1. Small computers (data loggers) were successfully used aboard both vessels to edit and record all of the groundfish survey information at sea. This produced a larger data volume, lower error rate, and enabled the groundfish results to be analyzed immediately upon return to Seattle.

2. Approximately 100 fish and cephalopod collections were made to support systematics studies at the University of Washington, Oregon State University, United States National Museum, and British Columbia Provincial Museum.

3. Approximately 50 pollock ovary samples were collected for studies of fecundity and egg production.

4. Approximately 10 demersal fish with pathological conditions were preserved for analyses by the Fish Pathology Unit, NWAFC.

5. Extensive echo sounding records were taken on the PARAGON II that enabled studies of the vertical and horizontal distributions of juvenile pollock and pink shrimp. A total of 13 Marinovich midwater trawl samples was taken to identify the composition of dense off-bottom layers that were observed along the outer continental shelf. Pollock were taken in 12 of the 13 midwater samples, of which five samples included pollock only three to five months old (sizes 30-80 mm F.L.).

6. A total of 28 comparative tows were completed between the OREGON and PARAGON II. The results provided comparative fishing power factors for all principal species by which catches from the two vessels could be standardized into a single data base.

7. As previously stated, 866 blue king crab were sampled. About 100 ovary samples were collected. One hundred fifty whole Erimacrus isenbeckii were collected.

8. About 80 color photographs of fishes and invertebrates were taken.

9. Six hundred snails of four species were collected.

10. Twenty species of fishes and invertebrates were collected for NMFS Marine Mammal Division in Seattle.

Vessel Schedule and Personnel Assignments

NOAA RV OREGON

<u>Date</u>	<u>Itinerary</u>	<u>Personnel</u>
5/15	Depart Kodiak	D. Kessler, Field Party Chief, Kodiak* G. Smith, Fishery Biologist, Seattle T. Hogan, Fishery Biologist, Kodiak R. Shimek, Univ. of Ak., Anchorage
5/20	Commence fishing in eastern Bering Sea	
6/3	Transit, in port, Dutch Harbor	
6/7	On Station for Leg II	R. Otto, Field Party Chief, Kodiak C. Niggol, Fishery Biologist, Seattle B. Patten, Fishery Biologist, Seattle T. Hogan, Fishery Biologist, Kodiak
6/25	Transit, in port, Dutch Harbor	
6/30	On station for Leg III	J. Bowerman, Field Party Chief, Kodiak B. Patton, Fishery Biologist, Seattle M. Patton, Fisheries Biologist, Seattle J. Key, Electronics Technician, Seattle
7/9	Transit, in port, Dutch Harbor, end of cruise	

FV PARAGON II

6/15	Depart Kodiak	D. Bakkala, Field Party Chief, Seattle S. Lazarus, Computer Specialist, Kodiak K. King, Fishery Biologist, Seattle W. Hirschberger, Fishery Biologist, Seattle T. Armetta, Fishery Biologist, Kodiak
6/19	Commence fishing in eastern Bering Sea	
7/9	Transit, in port, Dutch Harbor	
7/13	On station for Leg II	R. MacIntosh, Field Party Chief, Kodiak S. Mizrock, Fishery Biologist, Seattle M. Wilkins, Fishery Biologist, Seattle P. Raymore, Fishery Biologist, Seattle
7/29	Transit, in port, Dutch Harbor	
7/31	On station for Leg III	G. Smith, Field Party Chief, Seattle S. Lazarus, Computer Specialist, Kodiak K. King, Fishery Biologist, Seattle W. Hirschberger, Fishery Biologist, Seattle T. Armetta, Fishery Biologist, Kodiak
7/18	Transit, in port, Dutch Harbor end of charter	

*NMFS unless otherwise noted.