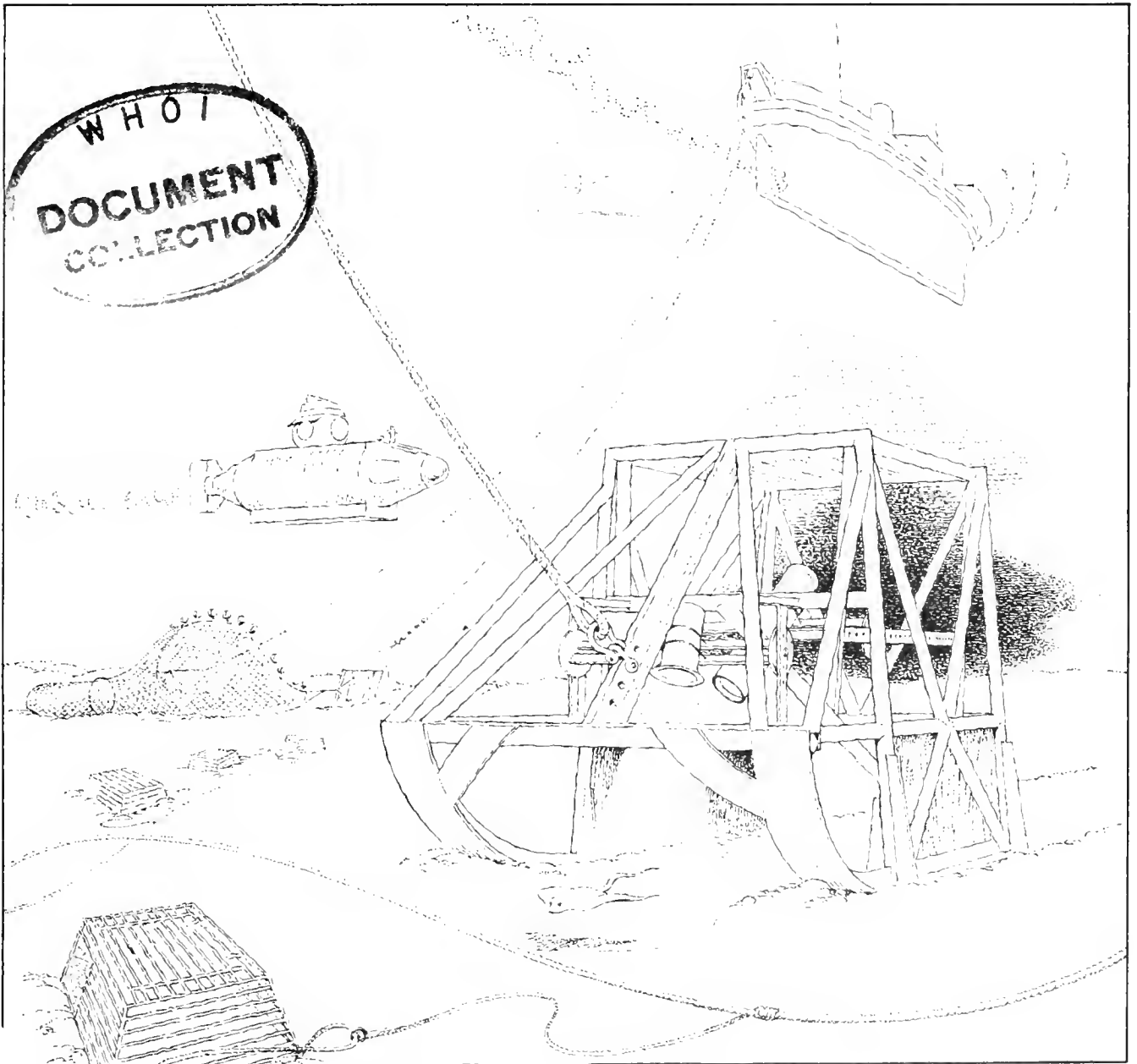


CRUISE 73-5
 OPERATIONAL CRUISE REPORT
MEGABENTHIC INVERTEBRATE SURVEY

MULTI-VESSEL EXPEDITION
 JUNE 4 TO 22



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U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL MARINE FISHERIES SERVICE • NORTHEAST FISHERIES CENTER
 WOODS HOLE, MASSACHUSETTS 02543

Cruise
Survey, multi-
report, 1973.
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The Megabenthic Invertebrate Cruise was a three-week, multi-ship expedition during June 1973 to the Veatch Canyon area off New England. The purpose of the cruise was to study the behavior and ecology of megabenthic invertebrates, such as lobsters, shrimp, and crabs, and also to evaluate the efficiency of various methods of determining the abundance and distribution of these species.

AREA OF OPERATION

The research was conducted in and around Veatch Canyon, a commercial lobstering area, located eighty miles south of Nantucket, Massachusetts (Figure 1). Samples were collected and observations were made at a series of stations arrayed according to a statistical plan along seven transects aligned perpendicular to the depth contours. The depth range was 73 to 329 meters. The bottom was mostly silty sand, except in the heart of the Canyon where it was mostly clay covered with a thin layer of sediment.

VESSELS

The following vessels participated in the cruise:

1. R.V. Delaware II, a 167-foot NOAA fisheries research vessel.
2. G. W. Pierce, a 160-foot research vessel chartered from the Tracor Corporation as the submersible tender.
3. DSRV Nekton, a two-man research submersible leased from General Oceanographic Incorporated.

4. F/V Mars, a 115-foot commercial lobster potting vessel, and

5. F/V Crystal-S, a 100-foot commercial lobster potting vessel. Both the Mars and Crystal-S are owned and operated by the Prelude Corporation.

OPERATIONS

The survey was conducted by the Northeast Fisheries Center in cooperation with the commercial lobster company, Prelude Corporation, of Westport, Massachusetts. Sampling consisted of 83 hauls with a Number 41 shrimp trawl; 4,500 pot-days of fishing with standard commercial (baited) lobster pots; 20,000 photographs of the sea bottom with a 70 mm underwater camera system, and a visual census of the fauna by experienced diver scientists from inside the submersible at 12 stations. Thus, the results consist of four separate and independent measures of the abundance and distribution of the megabenthic animals in this area, plus a vast amount of information on the ecology and behavior of these benthic animals. Additionally, numerous samples of bottom sediments, measures of water temperature, and dredge-collected samples of the smaller invertebrate animals were obtained to provide a broad picture of the environment.

SUBMERSIBLE OPERATIONS

Twenty-four submersible dives were accomplished during the cruise period. All dives were conducted during daylight hours with the submersible being tracked continuously from the G. W. Pierce with either sonic-locating

gear, a tether ball system (visual), or both. Additionally, voice communication with the submersible via acoustic telephone was maintained at all times. Launch and retrieval of the submersible was accomplished without difficulty in sea conditions ranging from sea state 1 to 5.

Navigation to the submersible station locations was accomplished with Loran C; a radar reflector buoy was placed at each appropriate location and the submersible location was tracked and plotted from radar ranges and relative bearings to the station buoy. Census of the megabenthic invertebrates consisted of 2 half-mile transects at constant depth during which time the scientific observer in the submersible visually counted and voice recorded on magnetic tape invertebrates and associated demersal fishes seen within a prescribed path between the keel of the submersible and a tickler chain suspended from a yardarm mounted on the bowplane of the submersible. Representative pictures of the bottom community were recorded on video tape. Color still-photographs further documented species composition and deployment.

LOBSTER POTTING OPERATIONS

The lobster-potting vessels, Mars and Crystal-S, operated in the Veatch Canyon area during the period June 4-11 (Mars) and June 13-19 (Crystal-S). Six trawl strings of about seventy lobster pots each were fished as a part of the survey; three strings were hauled each day thus giving a two-day soak time per string. The catch of lobsters, crabs, and fish were weighed, measured, and sexed.

Egg-bearing female lobsters and sub-legal size lobsters were tagged and released because these two categories may not be commercially landed. Two tagging methods were used. One type of tag was taped to the lobster claw to be used to identify short-term movements of the lobster during the period of the experiment. The second type of tag was the one normally used by NMFS to obtain information on long-term migratory behavior and population dynamics of the lobster stocks. The temporary tags were used on the Delaware II, the standard tags were used on the commercial lobster vessels.

Several traps, modified to catch juvenile-sized lobsters, were fished from the commercial lobster vessels. These traps were of plastic coated wire construction and were fished along with the commercial wooden pots on the trawls.

Four of the 24 submersible dives were made on pot strings that had been set for varying periods of time prior to the observation dive. Behavior of lobsters, crabs, and associated fishes in and about the pots was documented with color still photographs and video tape.

TOWED UNDERWATER BENTHIC SLED (TUBS)

A towed underwater benthic sled (TUBS), under development by the Northeast Fisheries Center for six months, carried a new camera system which took over 20,000 pictures of the ocean floor in the area of the cruise operation. This activity, alternating with conventional trawling, represented the major portion of work aboard the Delaware II.

The bottom contact sled, weighing over 2500 lbs and measuring 7 feet wide by 9 feet long and 6 feet high, kept the camera consistently focused at one meter. During the operation a number of test strips were developed to monitor camera performance, which appeared to be excellent.

OCEANOGRAPHIC MOORINGS

Two surface-buoyed moorings were constructed to which continuous bottom temperature recorders were attached. These recorders were modified FBK's (Fishnet Bathykymographs) that stored the data on magnetic tape.

The moorings were set in the area of Veatch Canyon; one at the head of the canyon in the canyon in 90 m and the other further down the slope at 180 m.

Data were retrieved successfully from each station, however, on the second haulback of the 90 m mooring the temperature recorder was lost. The cause of failure seemed to be chafing that subsequently lead to a termination pulling out at the bottom end of the mooring wire.

The data gathered in this experiment will be used to help develop design specifications for a Conshelf Temperature Recorder.

RESULTS

An analysis of the samples and collected data is presently in progress. A report describing the quantitative distribution of the American lobster and northern crab is in preparation and will be issued in late fall, 1973. A full report on all aspects of the cruise should be completed in early 1974.

Some important observations so far resulting from the cruise are:

1. Despite a scarcity of shelter, in the area around Veatch Canyon numerous lobsters, crabs, and fish were observed. The few isolated boulders and objects on the bottom usually had a number of lobsters, crabs, and fish associated with them.

2. No juvenile-sized lobsters (less than 2 years old) were observed or captured in the Veatch Canyon area. However, a submersible dive in Norfolk Canyon area observed lobsters that were considered young of the year.

3. Large tilefish (Lopholatilus chamaeleonticeps) estimated to weigh up to 100 pounds each were observed in Veatch Canyon in and around clay tunnels.

4. Lobsters were widely distributed over the area; many live in shallow excavations in the flat bottom and some in clay burrows.

5. Many of the communities of bottom-dwelling invertebrates seem to be distributed in belts parallel to the depth contours.

6. Several of the techniques used for censusing the larger bottom-living animals seem to be feasible methods for routine sampling of large areas of the sea bottom.

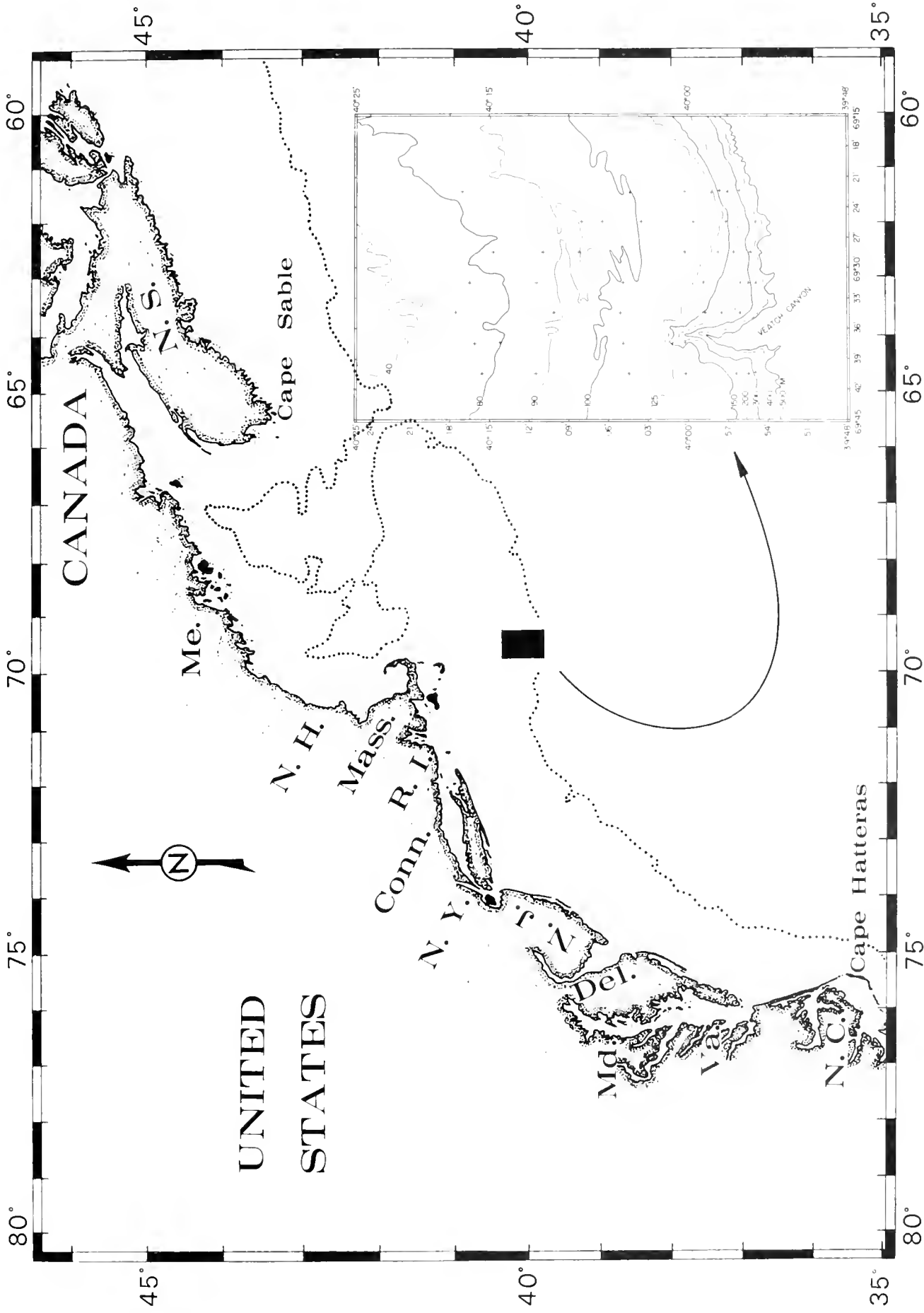


Figure 1: AREA OF OPERATION · MEGABENTHIC INVERTEBRATE SURVEY · JUNE 4 - 12, 1973

ACKNOWLEDGMENTS

A note of thanks to the Captains, crews, and scientific parties aboard all the vessels that participated in this cruise. A special thanks to the men on the commercial lobster boats for their much needed skills and generous cooperation.

In addition, a debt of gratitude is owed to the Woods Hole Oceanographic Institution Buoy Program and the Industrial Section of the Woods Hole Coast Guard Base, for, without their help, the surface-buoyed moorings used on this cruise would not have been possible.

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