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CRUISE REPORT

MASSACHUSETTS COOPERATIVE

UNIBOOM SEISMIC

EASTERN NANTUCKET SOUND

RESEARCH VESSEL - ASTERIAS

CRUISE AST-7-77

July 22 - July 27, 1977

4 days at sea
4 sci party- all USGS

U.S. Geological Survey
Office of Marine Geology
Woods Hole, Massachusetts
02543

C. J. O'Hara

Introduction

A high-resolution subbottom seismic profiling survey was conducted in eastern Nantucket Sound, Massachusetts by the U.S. Geological Survey from July 22 through July 27, 1977. The offshore investigation represents part of a continuing marine geologic program, funded jointly by the Department of Public Works of the Commonwealth of Massachusetts and the U.S. Geological Survey, Office of Marine Geology, Woods Hole. The survey was carried out aboard the WHOI Research Vessel ASTERIAS under Captain Dick Colburn. Nantucket Boat Basin, Nantucket Island, served as port of operations in addition to Woods Hole.

Objectives

The cooperative marine geologic program provides the Commonwealth of Massachusetts an accounting and geological evaluation of the lands that lie submerged beneath its coastal waters. Principle objectives include detailed mapping of bottom and subbottom geological features, assessment of potential mineral resources, feasibility and environmental impact studies related to offshore mining of sand and gravel, and environmental considerations relative to offshore disposal of solid waste material.

The geophysical investigations provide a working base for planned programs of vibracoring and bottom sampling of shallow subsurface and bottom geologic features. Laboratory analysis of the sediment samples provide important baseline information, help to evaluate the economic significance of subsea natural resources and, coupled with the geophysical data, provide information on the geology and geologic history of the region.

Personnel

The following U.S.G.S. personnel participated during the investigation:

Charles J. O'Hara	Scientist-in-charge
Wayne M. Ferrebee	Geologist
Diane M. Eskenasy	Geological Field Assistant
Al Goodman	Electronic Technician

Shipboard Systems

The following systems were in operation during the survey:

EG&G Uniboom Catamaran with mounted transducer

EG&G Capacitor Bank

EPC Seismic Recorder (#159)

Krohn-Hite Band Pass Filter

EG&G Hydrophone (10 element streamer w/10 db preamp.)

Epsco Loran-C Receiver

Epsco Loran-C Repeator

Operational Procedures

All seismic track lines were pre-plotted along Loran-C navigation lines of position. This approach facilitates control of the survey vessel on the seismic tracks despite the course setting influence of wind and currents. Cape Race, Newfoundland and Dana, Indiana Loran-C slave transmitters were utilized as they are the most reliable and provide the best positional accuracy within the area. Positional data was logged at 15-minute intervals.

The hydrophone array and catamaran float with mounted transducer were towed abeam of each other about 15 meters astern of the survey vessel. This configuration, coupled with ship's speed over the bottom of about 4.8 knots, resulted in a sound source/receiver separation of approximately 10 meters. The transducer was triggered every 0.5 seconds and the sweep rate of the recorder was set at 0.25 seconds. Only incoming seismic signals within the 400 Hz-4kHz frequency range were fed to the recorder.

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Statistics

Scheduled ship time - 6 days

Working at sea - 4 days

Down-time

Inclement weather - 2 days

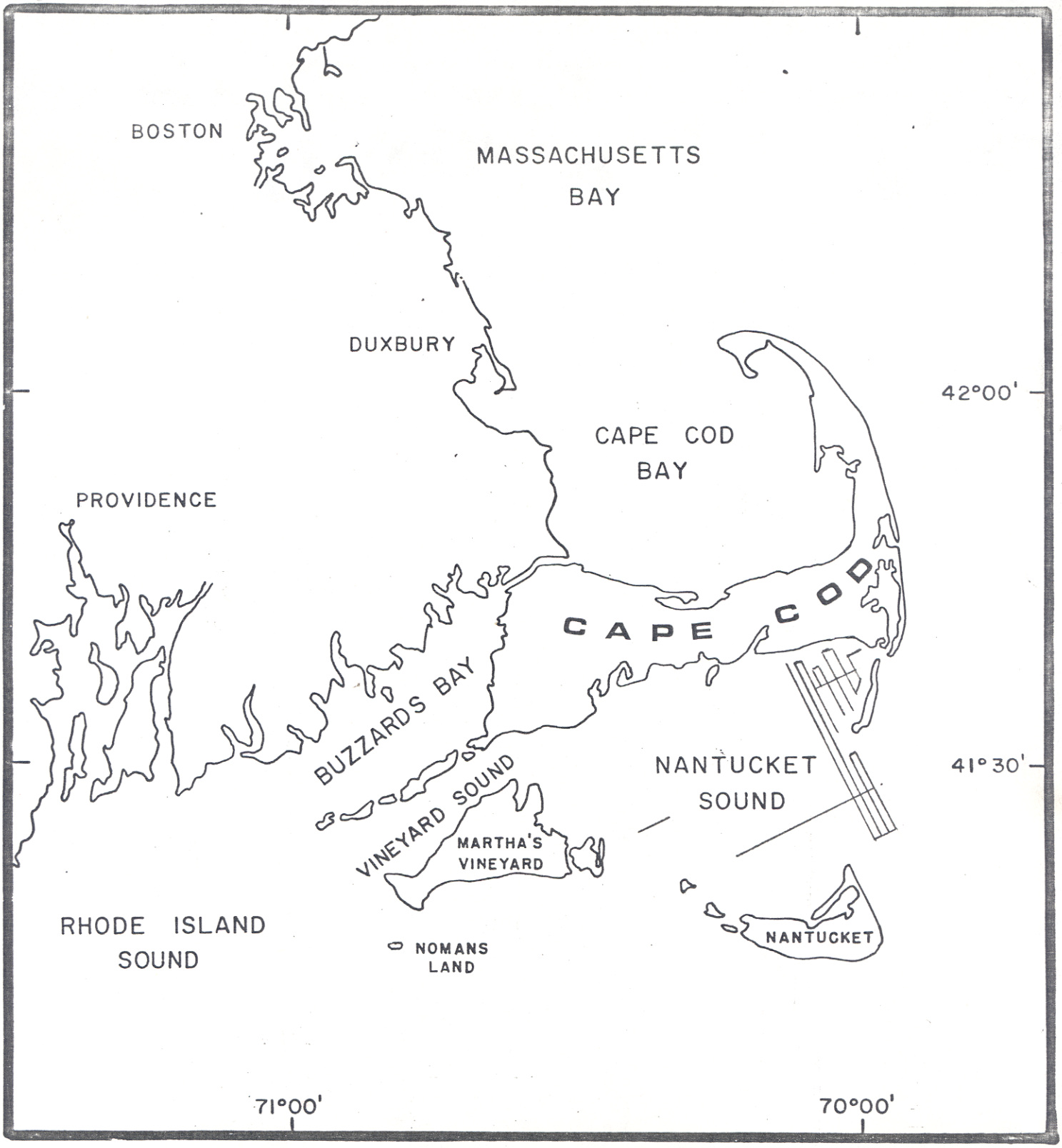
Equipment malfunction - 1 day

Actual survey time at sea - 2 days

Ship tracks - continuous seismic profiling

Eastern Nantucket Sound - 98 nm (181 km)

Figure 1 shows area of investigation and seismic coverage.



BASE FROM CHART
N.O. C0708

SCALE 1:810,000

0 5 10 15 20 NAUTICAL MILES

0 10 20 30 40 KILOMETERS

FIGURE 1