76039

CRUISE REPORT

MASSACHUSETTS COOPERATIVE

UNIBOOM SEISMIC

EASTERN NANTUCKET SOUND

RESEARCH VESSEL - ASTERIAS

~~CRUISE AST-8-76~~ no #

OCTOBER 4 - OCTOBER 9, 1976

Rec'd 3 Dec 76

ROSCOP 3 Dec 76

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 October 4 through October 9, 1976. The offshore investigation is 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 and ports of operation, in addition to Woods HOle, included Nantucket Island and Hyannis, Mass.

Objectives

The cooperative marine program is intended to provide the Commonwealth of Massachusetts a detailed accounting and geological evaluation of the lands that lie submerged beneath its coastal waters. Principle objectives include detailed mapping of 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 geological features. Laboratory analysis of the vibracore and bottom grab samples will establish important baseline information, help to evaluate the economic significance of subsea mineral deposits 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
Robert Commeau	Geologist
Frank Jennings	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 (#154)

Siesmic Amplifier (U.S.G.S. model)

Krohn-Hite Band Pass Filter

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 tansmitters were utilized or 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 second and the sweep

rate of the recorder was set at 0.25 seconds. Only incoming seismic signals within the 400 Hz - 4 kHz frequency range were fed to the recorder.

Statistics

Scheduled ship time - 7 days

Working at sea - 4 days

Down-time

Inclement weather - 3 days

Equipment malfunction - 1 day

Actual survey time at sea - 3 days

Ship tracks - continuous seismic profiling

Eastern Nantucket Sound - 135 nm (250 km)

Figure 1 shows area of investigation and seismic coverage.

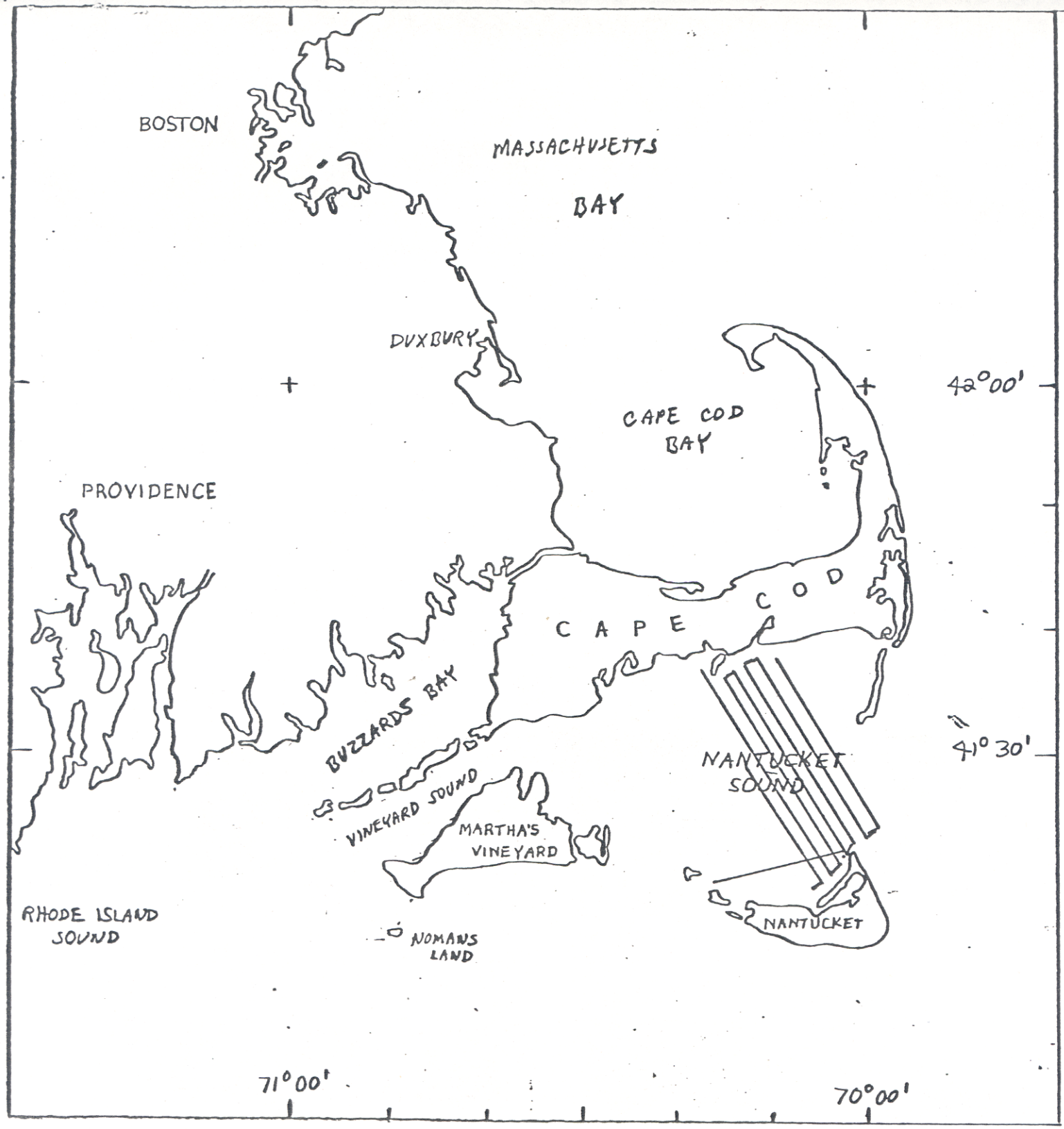
BOSTON
MASSACHUSETTS
BAY
DUXBURY
42°00'
CAPE COD
BAY
PROVIDENCE
CAPE COD
BUZZARDS BAY
41° 30'
NANTUCKET
SOUND
VINEYARD SOUND
MARTHA'S
VINEYARD
RHODE ISLAND
SOUND
NOMANS
LAND
NANTUCKET
71°00'
70°00'
NAUTICAL MILES
0 5 10 15 20
KILOMETERS
0 10 20 30 40

FIGURE 1