

Ocean Observation Related to Dissolved Oxygen  
in the Middle Atlantic Bight, Interim Report: April-June, 1978

by

Frank Steimle and John Mahoney  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Northeast Fisheries Center  
Division of Environmental Assessment  
Sandy Hook Laboratory  
Highlands, New Jersey 07732

Introduction

Following the 1976 New York Bight anoxia event, the National Marine Fisheries Service's Sandy Hook Laboratory has been intensively monitoring the dissolved oxygen (D.O.) levels and other factors relative to oxygen depletion in the New York Bight. The monitoring surveys of 1977 indicated a relatively normal year with adequate bottom D.O. within most of the N. Y. Bight (Steimle, manuscript in prep.). This monitoring effort has continued during 1978, with a major expansion of offshore phytoplankton bloom monitoring. Also a new program, Ocean Pulse, developing within the Northeast Fisheries Center, has designated several areas in the anoxia impacted area for extensive long-term monitoring. The following is a summary of the preliminary results of the Sandy Hook Lab's monitoring for the first half of this year.

Report no. SHL 78-31 (July, 1978)

## Dissolved Oxygen Observations

NOAA's New York MESA Project has undertaken the responsibility this year for conducting monthly D.O. monitoring surveys of the Bight. D.O. data, however, has been routinely collected by NMFS on Ocean Pulse cruises, special short-term research cruises as well as other fishery resources assessment related cruises. Although the data is not as comprehensive<sup>VE</sup> as that collected by the MESA surveys, it does indicate that the general D.O. levels in the Bight have been relatively good, through June. An Ocean Pulse cruise in April sampled 10 stations in the Bight (Fig. 1), including both the 1976 anoxia area and the Bight apex and found bottom D.O. levels were above 6 ml/l (85% saturated). A transect, to 50 miles off Atlantic City was sampled in late May, with similar results. A short survey in the apex during mid-June found D.O. levels were slightly lower, but still above 5.1 ml/l. In 1976 they were estimated to be below 1.0 ml/l in this area during mid-June.

## Phytoplankton Bloom Observations

Recognizing the need for a survey for offshore phytoplankton blooms in the New York Bight, this laboratory initiated a sampling program in April. The program will complement New Jersey DEP, EPA and other near-shore survey efforts.

**PART II**

- Stat. # - 28 - Southern Gulf of Maine  
 27 - Jeffrey's Ledge  
 26 - Central Gulf  
 25 - Northern Edge of Georges Bank  
 24 - Northern Peak, Georges Bank  
 23 - Central Georges  
 22 - Southern Georges Bank  
 21a - Argo Merchant  
 21 - Argo Merchant Control  
 20 - Southern New England O.C.S.  
 19 - Southern N. E. Mid Shelf  
 18 - Block Island Sound

**PART I**

- Stat. # - 17 - N. J. anoxia area  
 16c - N. Y. Dredge Spoils Dump  
 16b - N. Y. Sewage Sludge Dump  
 16a - Sludge Dump  
 15a - N. Y. Bight Apex Control  
 15 - Industrial Acid Dump  
 14 - N. J. Anoxia Control  
 13 - Oil Drilling (ECT)  
 12 - Delaware OCS  
 11 - Delaware Mid Shelf  
 10 - Delaware Bay Mouth  
 9 - Delaware Dump Site  
 8 - Chesapeake OCS  
 7 - Chesapeake Mid Shelf  
 6 - Chesapeake Bay Plume  
 5 - Chesapeake Bay Mouth

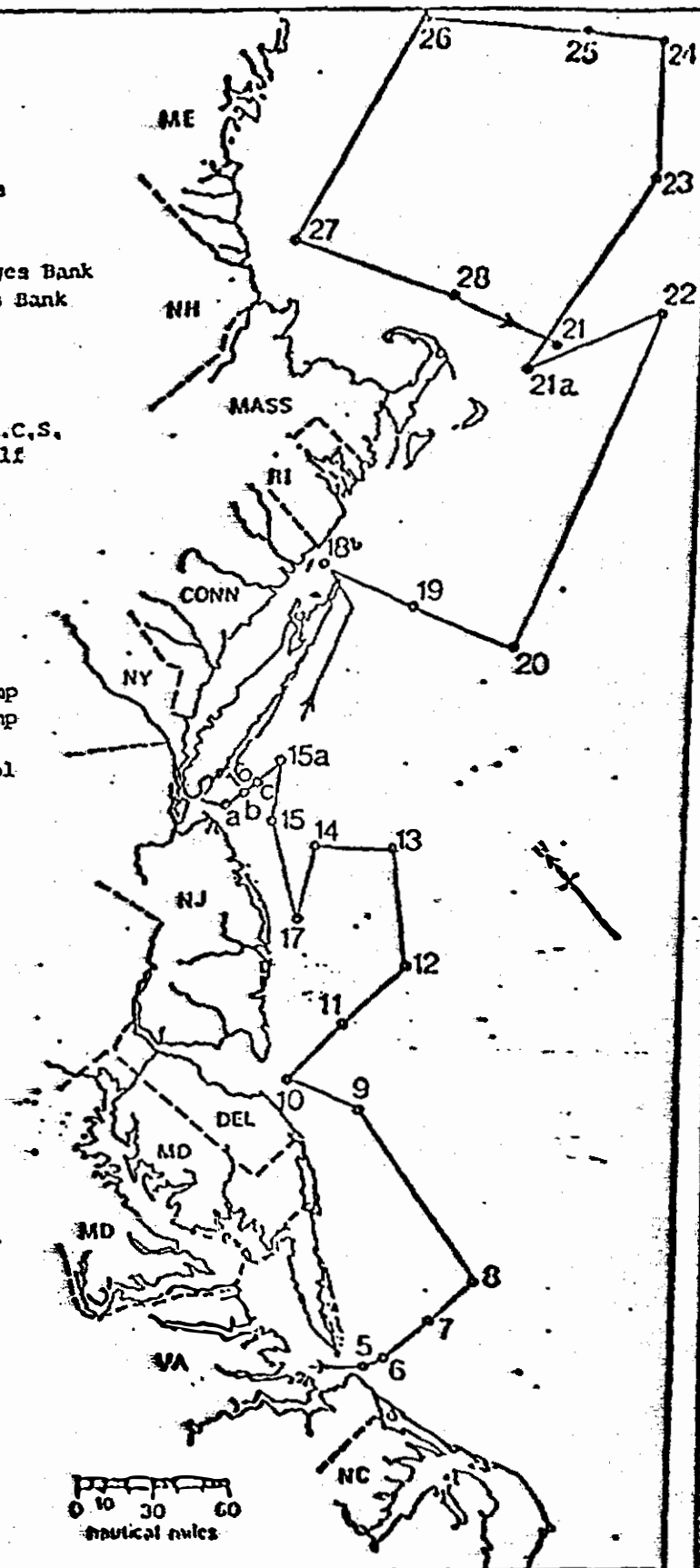


Figure 1. Cruise track and station locations, Ocean Pulse OTP Researcher cruise  
 OE-(PRC)-70-04/05, April 17-May 4, 1970.

The program relies heavily for sampling on scheduled NOAA cruises. Approximately monthly sampling is planned. The laboratory will supplement this by region-specific cruises. The major sampling scheme has 6 transects with 3 stations per transect, near-shore, mid-shelf and outer-shelf (Fig. 2). At each station, water samples are collected at 10 m intervals from the surface to the bottom. The program may be expanded in the future, but for the present, sampling will be adequate to detect, at least, blooms of the magnitude of the C. tripos bloom which contributed to the 1976 oxygen depletion.

The complete series of stations have been sampled on two cruises thus far, one conducted May 31 to June 8 by MESA and the other by an NMFS survey from June 27 to June 30, with the cooperation of the respective groups. In addition, phytoplankton samples were obtained along a transect out to 45 nm off Atlantic City, N. J. on May 26 and from two stations, 10 and 12 nme respectively, off Sandy Hook on June 20. A third series is currently being carried out on a second MESA cruise and on a NEEC Ocean Pulse cruise.

A Coscinodiscus sp. maxima was present in April in waters across the shelf from Virginia to Maine. It was particularly abundant off Chesapeake Bay. Ceratium spp. were secondary components of the phytoplankton. Thereafter, the Coscinodiscus sp. population declined and in May was replaced in dominance by the Ceratium spp., including mainly C. tripos, C. longipese and C. lineatum, and Dinophysis spp., especially D. acuta. Currently, the Ceratium spp. population is still present. Cell densities, in general, have not been as high as they were at the same time in 1976.

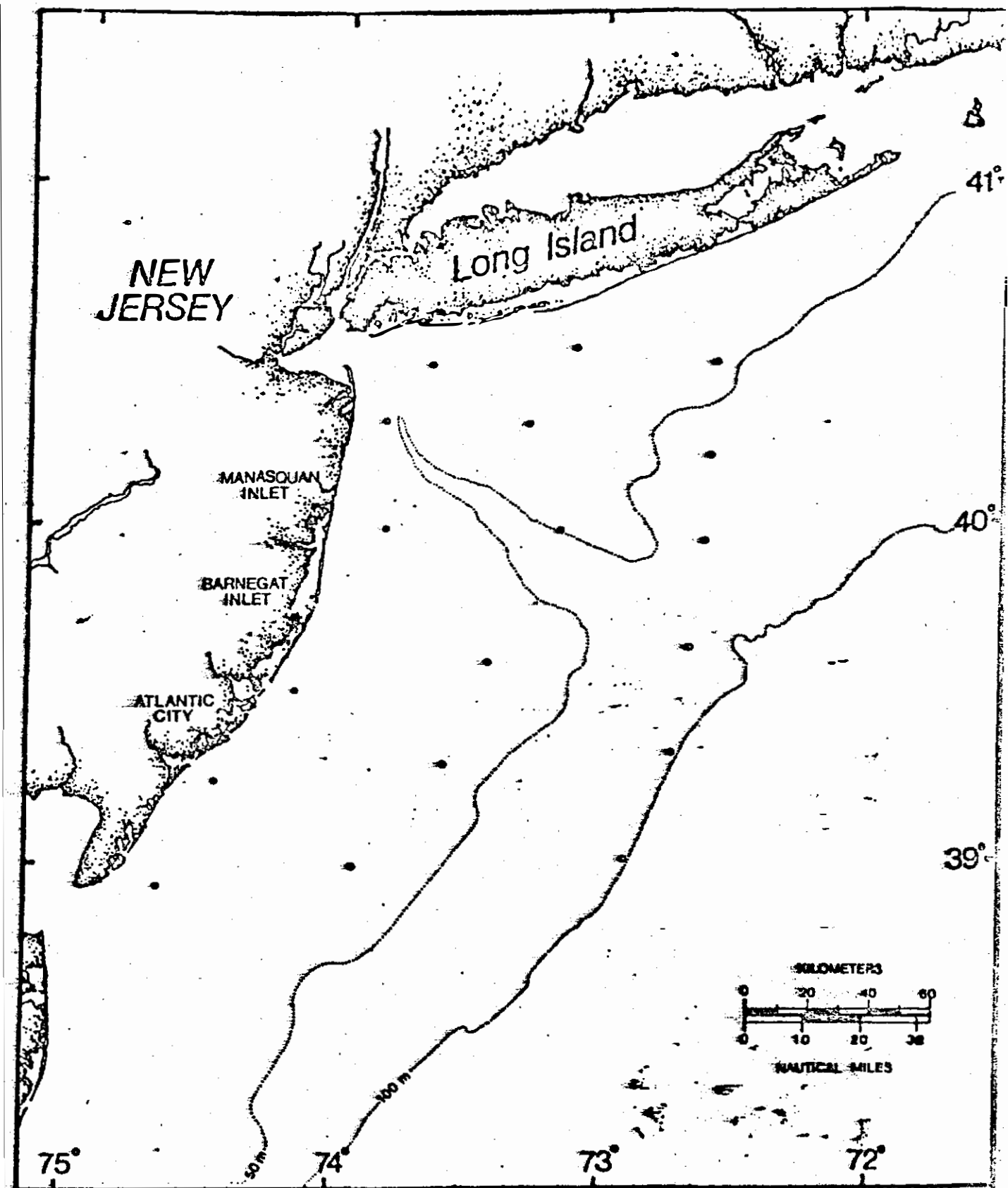


Figure 2. New York Bight sampling site for offshore phytoplankton bloom survey sampling.

A problem reported by commercial fishermen off Maryland, of a dark gelatinous material covering their nets and traps in early April, might be related to the presence of the Coscinodiscus sp. population. Dr. Thomas Jones, a microbiologist at the Salisbury State College in Maryland, reported Coscinodiscus sp. to be a major component of this gelatinous material. This diatom genus was associated with similar gelatinous material and fouling of fishing gear in English coastal waters last year. We are pursuing this matter and hope to have definitive information soon on the diatom bloom/fishing gear nuisance relationship.

During the remainder of 1978, phytoplankton samples are expected to be collected on the monthly NESA monitoring surveys through October, the Ocean Pulse cruises in July and September-October, and scheduled MARMAP cruises. The phytoplankton data from this fairly intensive offshore survey will supplement measurements of other parameters in evaluating the developments, if any, of an oxygen depletion this year as well as assist in our understanding of the role of Ceratium in the 1976 event.