NOAA Data Report ERL MESA-41

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UNITED STATES DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

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Richard A. Frank, Administrator

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Wilmot N. Hess, Director

MESA Report No.

Reconnaissance Survey of the Distribution and Abundance of Benthic Organisms in the New York Bight Apex, 5-14 June 1973*

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*These data were generated by personnel of the Division of Environmental Assessment, Northeast Fisheries Center, NMFS, with partial financial support from the NOAA/MESA/New York Bight Project. The data are being made available in the present form for timely assistance to user groups. The data are being further analyzed by staff members of the Northeast Fisheries Center and will form the basis for future publications.

CONTENTS

Introduction

Between 5 and 14 June 1973, personnel of the Division of Environmental Assessment (DEA), Northeast Fisheries Center, conducted a reconnaissance cruise to stations within the New York Bight apex. The overall purpose of the investigation was to provide a baseline to be used in assessing the impacts of contaminants from all sources, particularly ocean dumping, on the sediments in this area. The reconnaissance cruise was the first of four phases of our study of the New York Bight apex which include: 1) reconnaissance, 2) seasonal sampling (five quarterly cruises, August 1973 through September 1974 [Pearce et al., 1976a, 1976b, 1977a]), 3) intensive grid sampling in areas known to be affected by sewage sludge and dredge spoil disposal (Pearce et al., 1977b), and 4) monitoring of selected stations in the apex (Caracciolo et al., 1978).

This data report was prepared to provide machine listed data and certain statistical calculations, diversity and equitability (Shannon and Weaver 1963; Pielou, 1969), concerned with the distribution and abundance of benthic invertebrate organisms found in the New York Bight apex. Data from these samples, when compared with data collected at later dates, will provide a baseline against which seasonal and temporal changes in the Bight may be assessed.

Materials and Methods

Between 5 and 14 June 1973, a total of 265 0.1 m^2 Smith-McIntyre benthic grab samples were collected from the New York Bight apex. Twenty-nine stations were sampled, with 20 replicate grab samples collected at eight stations and five replicates collected at the remaining 21 stations (Fig. 1). Twenty replicate grab samples were collected at some stations in order that we might determine the number of grab samples required for statistically valid sampling of benthic macroinvertebrate populations (McNulty, in manuscript). At each station two sediment cores, 3.4 cm (inside diameter), were removed from each grab sample, one for standard geological analyses (percentage oxidizable organics and grain size distribution) and the other for heavy metals analyses. One 2.5 cm (inside diameter) sediment core was also removed from each grab for meiofauna studies. All cores were frozen before being analyzed.

Samples were collected from on board the R/V Atlantic Twin and station positions were located and maintained by LORAN-A.

The percentage of oxidizable organic material in sediments was calculated after digestion in hydrogen peroxide, and grain size distribution was determined by processing each sediment sample in a Rapid Sediment Analyzer. Grain size, expressed in

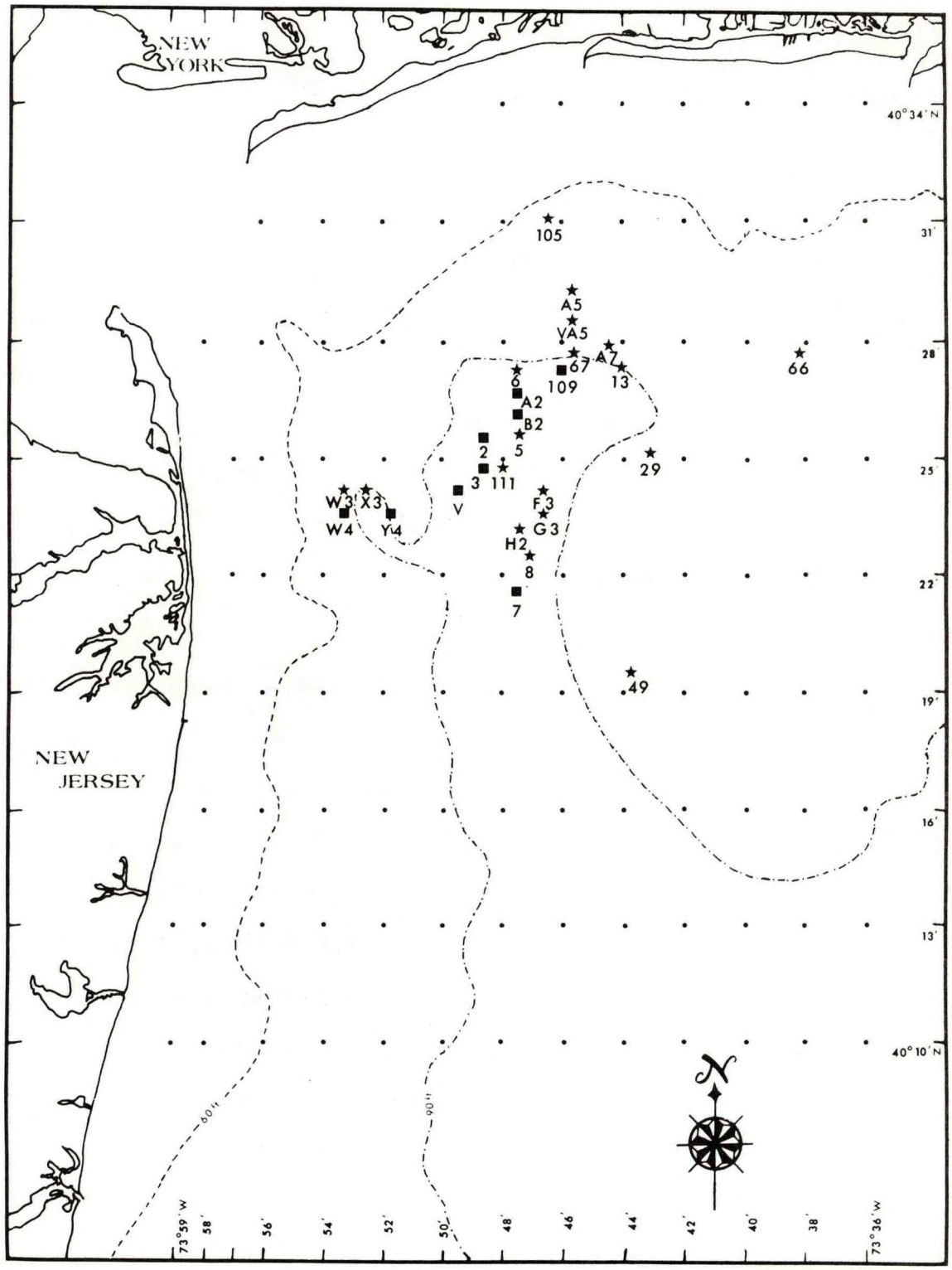

Figure 1. Reconnaissance cruise stations for which macrofauna and sediment data have been completed (★), and for which sediment data only are available (■). Standard MESA SYMAP station positions (●).

the Wentworth scale, is given in Ø units, where Ø = $-\log_2 d$, and d = particle diameter in millimeters (A. Cok, unpublished data[1]).

Analyses for sediment heavy metals were performed using an atomic absorption spectrophotometer. Details of methods are explained in the paper by Greig, Wenzloff, and Pearce (1976).

Meiofauna cores were sent to Dr. John Tietjen for analyses[2].

The remainder of each grab sample was washed through a series of standard geological sieves with a minimum 1.0 mm mesh size. All macrofauna collected in grab samples was fixed in 10% buffered formalin and later transferred to and preserved in 70% ethanol containing 5% glycerol.

At the Sandy Hook Laboratory, dissecting microscopes were used as an aid in sorting organisms from preserved macrofauna samples. Whenever possible, all organisms were identified to the species level, using standard keys and descriptions and, when necessary, consultations with recognized taxonomists.

Station positions are listed by station number, latitude, longitude, and depth. Counts of organisms per species in each grab were coded and machine listed and the community found at each station was analyzed for total number of individuals per grab (N), total number of species (S), equitability (J' = H'/H' max = H'/ln S), and diversity ($H' \cong -\sum \frac{n_i}{N} \ln \frac{n_i}{N}$ where n_i = the

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[2]Dr. John Tietjen is with the Dept. of Biology, City College of New York, New York, N.Y.

number in the i^{th} species).

Results

Machine listed species lists and counts, diversity and equitability calculations, and data obtained from sediment and heavy metals analyses for completed stations are presented as Appendix A.

Acknowledgments

Several other members of the staff of the Division of Environmental Assessment were involved in the field and laboratory procedures reported herein. Dr. James Thomas (Field Party Chief), Mr. Frank Steimle, and Mr. Newell Eisele collected the reconnaissance samples. Mrs. Martha Halsey and Mr. Newell Eisele aided in sorting and identification of benthic grab samples.

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APPENDIX A

Machine Listed Species Lists and Counts, Diversity and Equitability Calculations, and Data Obtained from Sediment and Heavy Metals Analysis for Reconnaissance Cruise Samples.

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