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Raritan Bay Macrobenthos Survey, 1957-1960

DAVID DEAN

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Robert M. White, Administrator

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Robert W. Schoning, Director

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Raritan Bay Macrobenthos Survey, 1957-1960[1,2]

DAVID DEAN[3]

ABSTRACT

This paper describes a quantitative and qualitative census of benthic macrofauna from Raritan Bay and Lower Bay during the summers of 1957 to 1960, prior to and following the operation of a sewer outfall at the head of Raritan Bay. A total of 193 stations were sampled yielding 127 taxa that were identified to genus or species. Polychaetes, molluscs, and crustaceans accounted for 86% of the taxa. Most prevalent species were the soft-shell clam, *Mya arenaria*, the polychaetes, *Nereis succinea* and *Polydora ligni*, the amphipod, *Ampelisca* sp., and the gastropod, *Nassarius obsoletus*. Three types of species distribution were found, viz., those found only in Raritan Bay, those only in Lower Bay, and those common to both bays. Of the 10 stations sampled in Raritan Bay for four consecutive years, by the summer of 1960 one had the same number of species in quantitative samples as in 1957, four stations averaged a 30% decrease, and six stations averaged a 96% increase.

INTRODUCTION

In 1957, Rutgers University initiated a series of studies designed 1) to determine the physical, chemical, and biological characteristics of the heavily polluted Raritan River—Raritan Bay estuarine system and 2) to follow changes that might be correlated with subsequent pollution abatement. Jeffries (1962a) reported on the physical and chemical characteristics, Patten (1962) on phytoplankton, Jeffries (1962b, c) on zooplankton, and Dean and Haskin (1964) on macrobenthos of the river portion of the estuarine system. The present paper concerns the macrobenthos of the remainder of the system.

The Raritan River, New Jersey's largest intrastate river system, has a drainage area of 2,862 km^2. It empties into the Raritan Bay at Perth Amboy and South Amboy, N.J. Raritan Bay and its more seaward extension, Lower Bay, form a triangular embayment with Staten Island, N.Y., on the north and New Jersey on the south. At its seaward end it is bounded the The Narrows of the New York shipping channel and by Sandy Hook. By 1957, the level of industrial and domestic pollution in this estuarine system was so great that no benthic organisms were found in the Raritan River farther than about 7 km above the river mouth (Dean and Haskin, 1964).

A major trunk sewer system, which began operation in the lower Raritan Valley in January 1958, gives primary treatment to both domestic and industrial wastes. Chlorinated liquid effluents are discharged into the head of the Bay (Fig. 1) while the removed solids are transported out to sea by barges.

METHODS

Samples were taken during the summers of 1957 through 1960. All sampling was done from a chartered 13-m (43-foot) boat, using Petersen or Van Veen grabs to obtain quantitative samples and a crab dredge for qualitative samples. In almost all instances quantitative and hydrographic samples were taken while the boat was at anchor. To anchor, the crab dredge was lowered and towed under power with the prevailing current until the boat was on station. With the power in neutral, the crab dredge acted as an anchor and held the vessel stationary. In 1960, only quantitative samples were taken. Stations were located by triangulation with sextants. The quantitative sample at each station consisted of three or six pooled grabs, depending upon the type of sediment, apparent number of organisms, and available time. The samples were washed through a graded series of screens, the finest mesh being 1.5 mm, and all macroscopic organisms were picked from the screens and preserved. Full strength Formalin was added to the seawater in the sample jars to give approximately a 10% mixture. Specimens were identified and counted later. On occasion, weather and lack of time prevented field separation of animals from sediment and debris remaining on the fine screen. In these cases, the material, or an aliquot, was preserved for later separation in the laboratory. Screens were scrubbed and washed between stations. About 0.5 liter of sediment from a separate grab at each point was saved for mechanical analysis of the sediments.

Qualitative benthic samples were obtained by towing the crab dredge in a circle about the quantitative sampling point. Representative fauna were saved for subsequent identification.

Surface and bottom salinity determinations and temperature measurements were made at each station.

[1]This survey was funded by U.S. Public Health Service grants RG-5278 and WP 261 to Professors H. H. Haskin and E. T. Moul of Rutgers University and by the Middlesex County Sewerage Authority.

[2]A contract to the author in 1973 from the Middle Atlantic Coastal Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce (Contract No. 41-USC 252 C(3)), enabled these data to be synthesized for publication.

[3]Ira C. Darling Center for Research, Teaching and Service, University of Maine at Orono, Walpole, ME 04573.

The Knudsen or Harvey methods were used to determine salinity. Beginning in 1958 dissolved oxygen content was determined. The unmodified Winkler method was used for the analysis of dissolved oxgyen. Hydrometer and screen analysis of sediments was modified from ASTM standard D422-51. Classification of sediment types followed that of Shepard (1954). For the purposes of this paper, Raritan Bay lies to the westward of a line drawn from Point Comfort in Keansburg, N.J. to Crookes Point at Great Kills, N.Y. Locations referred to as Lower Bay lie eastward of this line.

RESULTS

The coordinates of each station together with hydrographic and other general data are shown in Table 1. Station locations are also shown in Figures 2-5. A total of 193 stations were occupied seaward from the river mouth over the 4-yr period.

The lowest and highest bottom salinities recorded were 22.02 and 28.17°/₀₀ at station 283 at the mouth of the Raritan River and at the most seaward station, 171, respectively.

Isohalines have been plotted for the summers of 1957 and 1959 (Fig. 6). During the exceptionally dry summer of 1957, the head of the bay was much saltier than in years with more normal precipitation. Figure 6 also corroborates the work of Jeffries (1962a) and of earlier workers which shows that the seaward passage of river water tends to flow along the New Jersey shore while the saltier water tends to enter the bay around Sandy Hook and along the north shore. These isohalines also agree with the schematic representation of net current flow presented by Jeffries (1962a). Temperature differences between surface and bottom waters were greater during the summer of 1957 than during the remainder of the study.

Although dissolved oxygen (D.O.) was not determined on this project during the summer of 1957, Jeffries (1962a) reported on D.O. values in the bay during the period August 1957 to July 1958. He found a minimum value (presumably in bottom waters) at the mouth of the river in August 1957 of less than 2.5 ppm. He noted that there were relatively low oxygen concentrations at the head of the bay and that the oxygen content progressively increased along the southern shore as the river water became further diluted with bay water. He also found that when the Raritan Valley trunk sewer began operation in January 1958, oxygenation of the waters at the head of the bay was improved immediately and that surface oxygen values exceeded those of deeper waters.

During the benthic study of 1958, D.O. values were above 3 ppm at all stations except for two near the head of the bay (Table 1). In 1959, 12 stations had D.O. values less than 3 ppm. Stations with lowest D.O. values in bottom waters extended from the river mouth east and south along the New Jersey shore (Table 1, Fig. 4).

Figure 7 is a composite sediment map of the study area for samples analyzed during 1958 to 1960. Sandy, viz., coarser sediments, tend to be found along the north and south shore and in Lower Bay, while the finer silts and clays are distributed in the center of Raritan Bay and at its head. This sediment pattern agrees quite closely with the schematic current patterns presented by Jeffries (1962a), i.e., sandier sediments are associated with higher current velocities and the silts and clays are associated with gyres and eddies. During the course of the study, sediments in the entire central area and head of Raritan Bay decreased in average size while only in two smaller areas did sediment size increase. Whether these changes were related to operation of the sewer outfall or not remains unknown. Details of sediment analysis for each station are shown in Table 2.

Of the 193 benthic sampling stations, quantitative samples were taken at all but four. The quantitative samples at stations 163 and 236 were lost due to errors in preservation.

Table 3 lists the species collected on the survey. Of the 127 taxa identified to genus or species, 86% belonged to only three groups (47 polychaetes, 34 molluscs, and 28 crustaceans).

Table 4 lists the distribution and abundance of the 30 most prevalent species encountered during the survey. The list includes those species which occurred at 41 or more of the benthic sampling stations. All species were found in both Raritan and Lower Bays. Most prevalent were *Mya arenaria*, *Nereis succinea*, *Polydora ligni*, *Ampelisca* sp., and *Nassarius obsoletus*. Epifauna tended to be more effectively sampled by the crab dredge, while infauna tended to be more effectively sampled by grabs. Grabs, however, proved to be effective samplers of the ubiquitous mud snail, *Nassarius obsoletus*, and for juvenile, shallow-burrowing bivalves. The crab dredge, on the other hand, yielded the larger deeper burrowing adult clams.

Greater densities of the soft-shell clam, *Mya arenaria*, were found in 1959 and 1960 than in the previous 2 yr, due to very successful sets of young clams. The difference in densities between years cannot be ascribed to differences in sampling dates. The highest density recorded was 21,760 clams/m² at station 255. *Ampelisca* sp., on the other hand, was much more abundant in 1957 and 1960 than in 1958 and 1959. Its highest density was 13,200+/m² at station 25. It would seem that the density differences of *Mya* and *Ampelisca* between years are probably caused by factors, other than pollution levels, which favor reproductive success.

The distribution and abundance of the remaining taxa found during the survey are shown in Table 5. Their principal distribution has been subdivided into three categories as follows: 1) those recorded from Raritan Bay only, 2) those found in both Raritan and Lower Bays, and 3) those found only in Lower Bay. Additional comments about the distributions of some taxa are given in the remarks column. The highest density of any organism found during the survey was 63,520 living

Gemma gemma/m² at station 210. Sellmer (1967) reported densities of *Gemma gemma* from Raritan Bay of 200,000 or more/m².

One objective of the survey was to determine what effect, if any, the operation of the outfall had upon the macrobenthos of Raritan Bay (and Lower Bay after 1957). In an attempt to determine this, a series of stations were selected for sampling in successive years. The stations extended in a line from the sewer outfall seaward down midbay. Stations north and south of this line were also selected for repetitive sampling at the head, halfway, and the lower extent of Raritan Bay and at a point just west of Sandy Hook. Table 6 shows the number of species recorded in quantitative samples each year at these stations. When comparing data such as these, one must keep in mind annual variations in abundance, difficulties in returning to the exact sampling station, patchiness in distribution, etc. Nevertheless, the data in Table 6 show that only at the head of Raritan Bay in the mouth of the Arthur Kill and at the 'halfway' stations in Raritan Bay was the number of species in quantitative stations less in 1960 than in 1957 (average 30% decrease). One station east of the outfall had the same number of species. The other six stations averaged a 96% increase in number of species by 1960. It cannot be said with certainty that these changes are related to sewer outfall operation. If they are, it would appear that the 96% species increase (and thus an increase in diversity) at six stations would outweigh the 30% decrease at four stations. In any event, these data provide good baseline information against which subsequent surveys can be compared.

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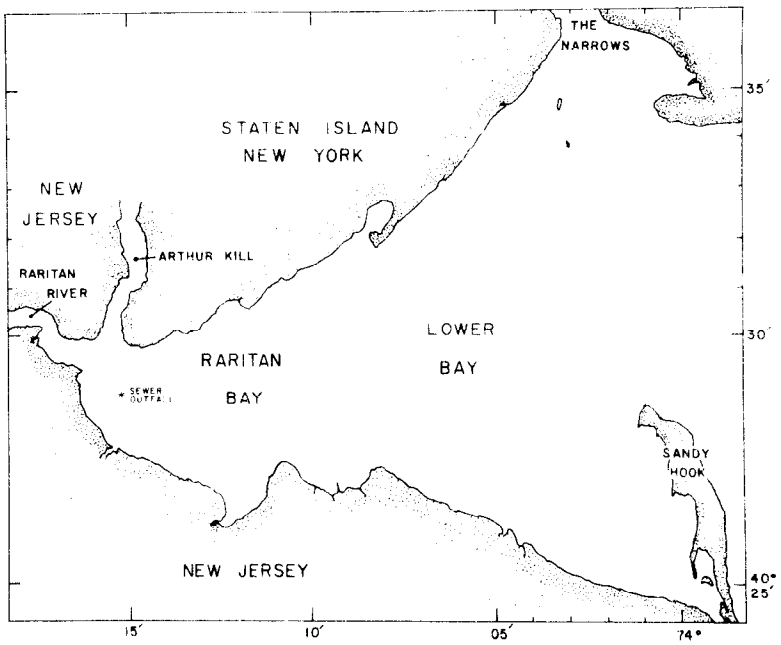

Figure 1.—The Raritan Bay-Lower Bay system showing the location of the outfall of the Middlesex County Sewerage Authority.

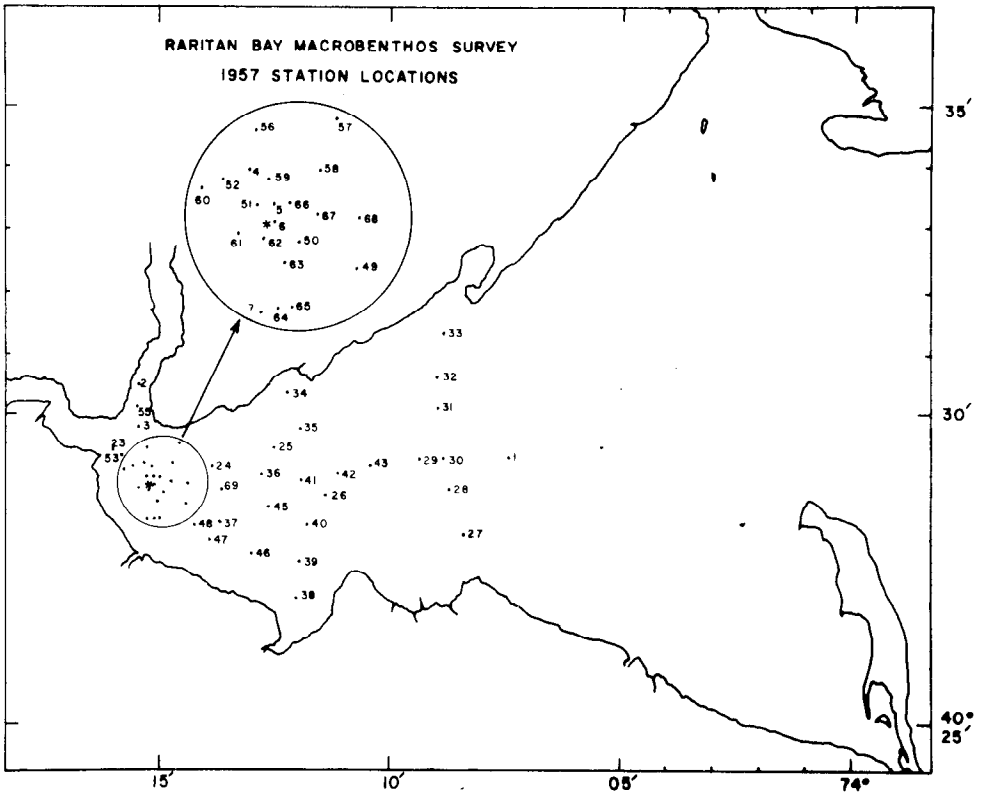

Figure 2.—Raritan Bay Macrobenthos Survey showing station locations for the summer of 1957.

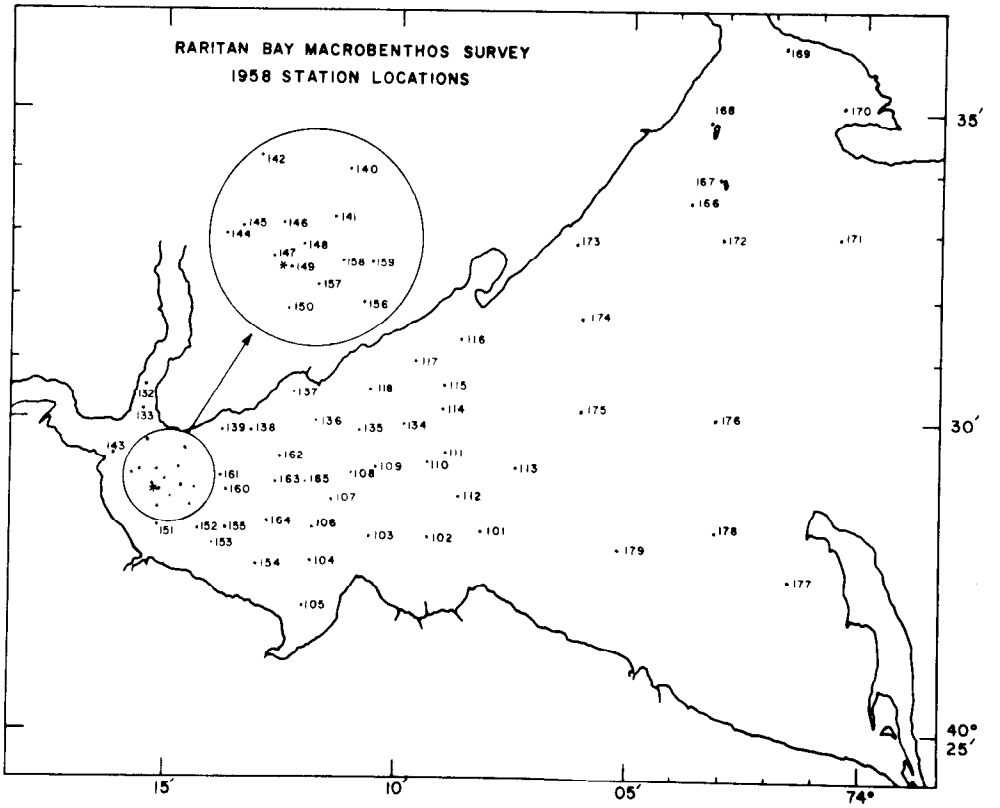

Figure 3.—Raritan Bay Macrobenthos Survey showing station locations for the summer of 1958.

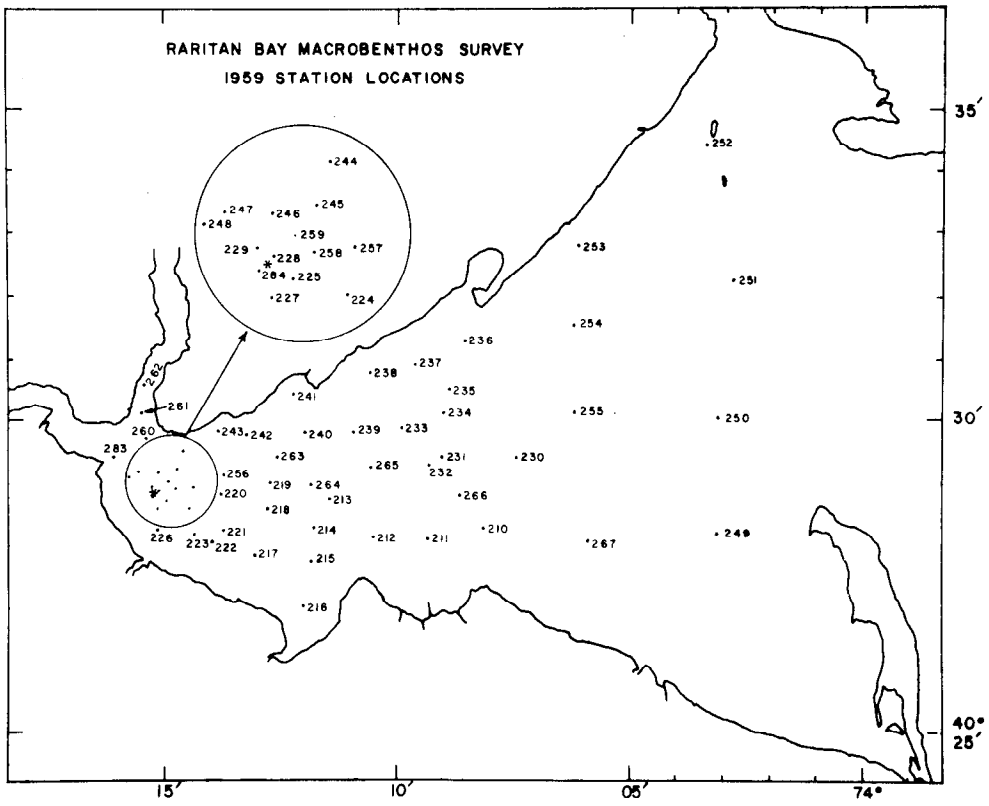

Figure 4.—Raritan Bay Macrobenthos Survey showing station locations for the summer of 1959.

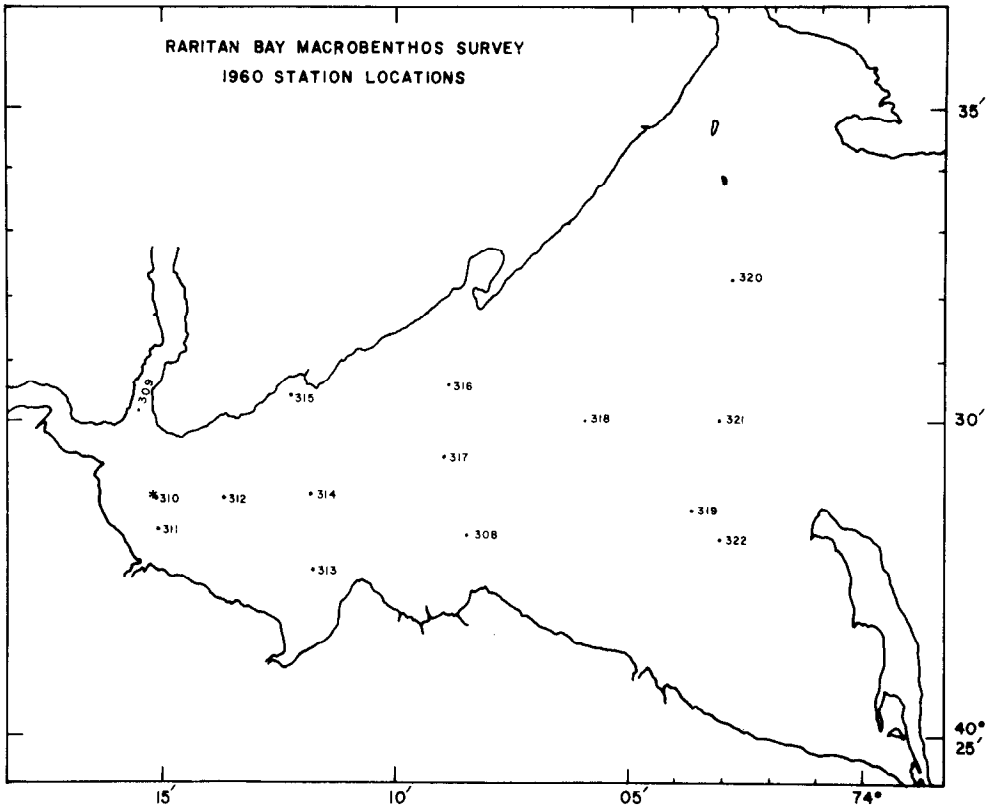

Figure 5.—Raritan Bay Macrobenthos Survey showing station locations for the summer of 1960.

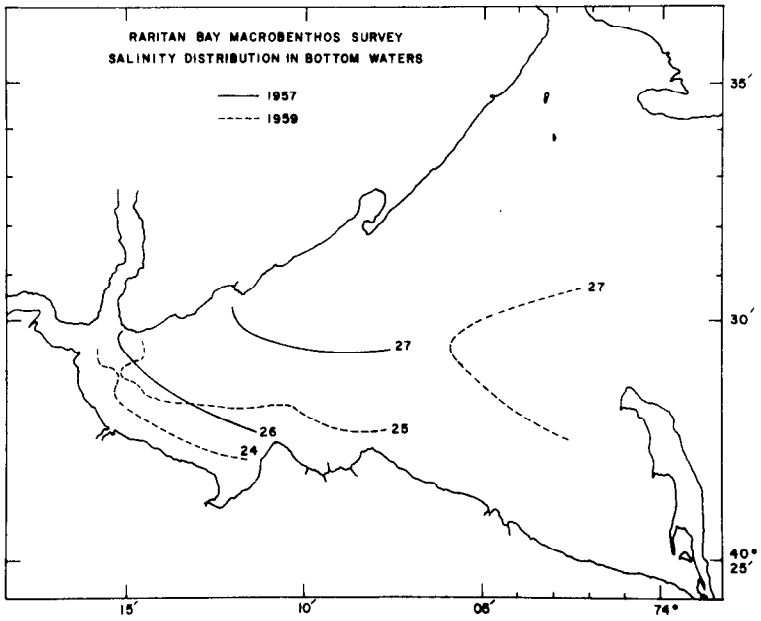

Figure 6.—Schematic representation of salinity distribution in bottom waters for the summers of 1957 and 1959 during the Raritan Bay Macrobenthos Survey.

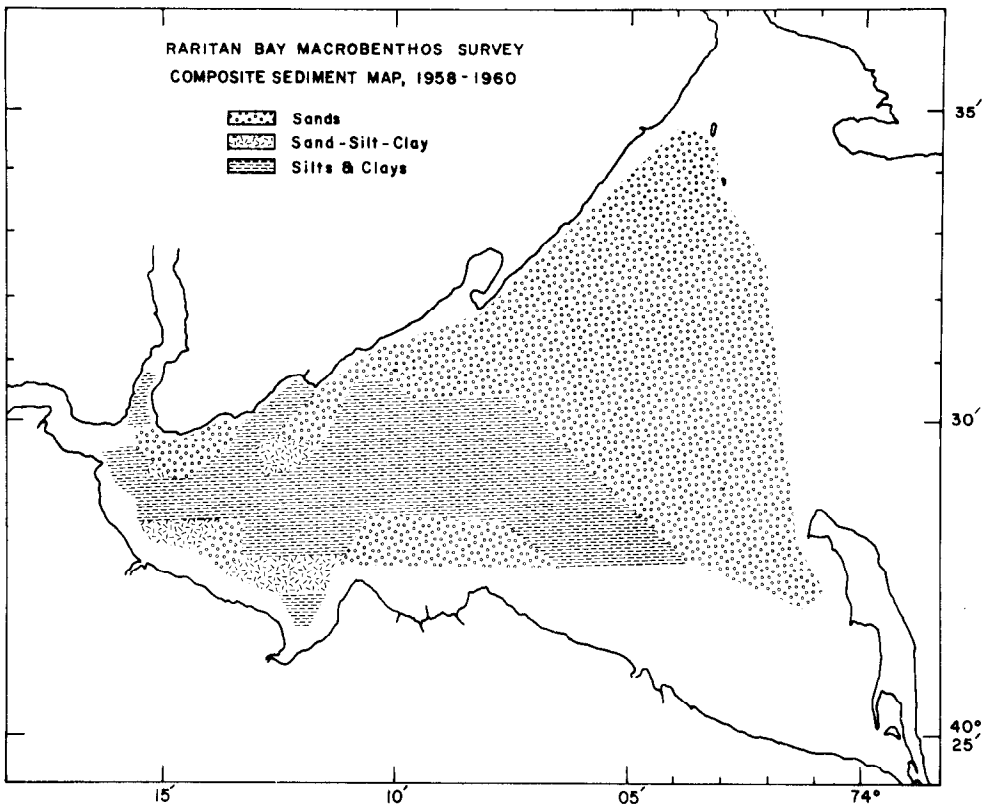

Figure 7.—Raritan Bay Macrobenthos Survey composite sediment map for the years, 1958-1960.

Table 1.—Station coordinates and general data, Raritan Bay Macrobenthos Survey, 1957-1960. S = Surface, B = Bottom, V = Van Veen grab, P = Petersen grab.

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/₀₀ S	Salinity °/₀₀ B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
19 VI 57	1	29'15"	07'23"	8.4	25.0	20.1	24.22	26.04	-	-	3	V
	2	30'30"	15'30"	13.7	26.0	24.5	23.53	25.48	-	-	3	V
	3	29'47"	15'30"	13.4	26.2	-	22.63	23.71	-	-	3	V
	4	29'13"	15'22"	4.3	26.4	22.6	22.85	24.90	-	-	3	V
	5	29'00"	15'10"	5.5	26.3	22.1	23.21	25.19	-	-	3	V
	6	28'52"	15'08"	3.7	26.2	22.9	23.30	24.47	-	-	3	V
	7	28'18"	15'17"	3.7	26.0	25.8	23.39	24.16	-	-	3	V
2 VII 57	23	29'25"	16'05"	4.3	24.0	22.8	28.89	24.65	-	-	3	V
	24	29'10"	13'50"	5.3	23.0	23.0	25.53	26.04	-	-	3	V
	25	29'25"	12'30"	4.4	23.0	22.4	25.61	25.50	-	-	3	V
	26	28'40"	11'22"	5.5	23.0	22.3	25.14	25.44	-	-	3	V
16 VII 57	27	28'03"	08'21"	2.4	23.8	23.6	26.42	26.20	-	-	3	V
	28	28'47"	08'40"	6.4	22.5	21.8	26.74	26.89	-	-	3	V
	29	29'18"	09'19"	7.3	22.5	21.6	26.74	26.91	-	-	3	V
	30	29'22"	08'53"	7.8	22.2	21.0	27.03	27.18	-	-	3	V
	31	30'08"	08'56"	8.5	21.0	20.3	27.09	27.12	-	-	3	V
	32	30'37"	08'57"	8.1	22.0	20.8	27.16	27.11	-	-	3	V
	33	31'21"	08'49"	3.8	23.2	22.0	27.18	27.12	-	-	2-1	V-P
	34	30'21"	12'14"	4.0	23.0	22.2	27.03	27.00	-	-	3	P
	35	29'45"	11'56"	4.1	24.0	22.2	26.94	27.01	-	-	3	P
	36	29'02"	12'45"	4.9	25.3	23.2	26.38	26.56	-	-	3	P
	37	38'16"	13'38"	3.8	25.0	23.6	25.79	25.61	-	-	3	P
	38	27'00"	12'00"	3.4	28.1	24.3	-	-	-	-	3	P
	39	27'37"	11'53"	3.8	25.8	24.0	-	-	-	-	3	P
	40	28'13"	11'46"	4.3	27.4	23.6	-	-	-	-	3	P
	41	28'55"	11'55"	5.5	25.5	23.2	-	-	-	-	3	P
	42	29'03"	11'06"	5.8	26.2	22.3	-	-	-	-	3	P
	43	29'10"	10'25"	6.1	28.0	22.2	-	-	-	-	3	P

Table 1.— (Continued)

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/oo S	Salinity °/oo B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
20 VIII 57	45	28'30"	12'37"	4.6	22.4	22.8	26.20	26.18	-	-	6	V
	46	27'45"	12'58"	3.1	22.4	22.8	26.08	26.11	-	-	6	P
	47	27'59"	13'55"	2.6	22.7	23.0	25.84	25.90	-	-	6	P
	48	28'14"	14'14"	2.7	23.4	23.3	25.50	26.09	-	-	6	P
	49	28'34"	14'26"	3.1	23.6	23.6	25.21	25.59	-	-	6	P
	50	28'44"	14'56"	2.7	-	23.6	25.17	25.84	-	-	6	P
	51	29'00"	15'18"	-	23.8	24.0	24.98	24.94	-	-	6	P
	52	29'09"	15'37"	2.7	24.0	23.8	24.65	25.75	-	-	6	P
	53	29'20"	15'56"	2.7	23.8	-	24.02	25.39	-	-	6	P
	55	30'07"	15'32"	9.1+	24.3	23.2	26.09	27.01	-	-	6	P
	56	29'28"	15'17"	9.1+	24.4	23.2	25.97	26.65	-	-	6	P
	57	29'29"	14'36"	4.0	23.6	23.2	26.78	26.80	-	-	6	P
	58	29'13"	14'43"	5.5	24.3	23.0	26.13	26.73	-	-	6	P
	59	29'10"	15'12"	5.5	25.6	23.0	25.35	27.09	-	-	6	P
	60	29'06"	15'49"	4.3	24.8	23.4	25.50	26.55	-	-	6	P
	61	28'49"	15'30"	3.1	24.6	23.6	25.77	25.81	-	-	6	P
	62	28'47"	15'15"	3.7	25.5	23.6	25.82	25.84	-	-	6	P
	63	28'36"	15'05"	3.7	24.1	23.9	25.91	25.97	-	-	6	P
	64	28'20"	15'09"	3.7	23.2	23.4	25.72	25.75	-	-	6	P
	65	28'20"	15'02"	3.7	24.0	23.4	25.86	26.04	-	-	6	P
	66	28'59"	15'01"	3.7	23.8	23.9	25.79	26.91	-	-	6	P
	67	28'54"	14'45"	4.0	24.3	22.9	25.79	26.92	-	-	6	P
	68	28'53"	14'22"	4.4	23.4	22.8	25.68	26.98	-	-	6	P
	69	28'48"	13'36"	4.6	23.2	22.8	25.82	26.18	-	-	6	P

Table 1.—(Continued)

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/oo S	Salinity °/oo B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
21 VII 58	101	28'11"	08'07"	2.1	22.31	22.39	24.31	24.29	-	7.63	6	P
	102	28'06"	09'22"	3.7	22.53	22.60	24.56	24.52	-	6.44	6	P
	103	28'05"	10'35"	2.3	22.98	22.98	23.51	23.51	-	8.06	6	P
	104	27'41"	11'52"	4.0	23.10	23.08	23.51	23.69	-	6.63	6	P
	105	26'59"	12'00"	3.5	23.29	23.17	23.24	23.28	-	7.30	6	P
	106	28'15"	11'47"	4.7	23.35	22.68	23.73	24.25	-	7.93	6	P
	107	28'40"	11'23"	6.1	22.30	22.06	25.59	25.48	-	7.04	6	P
	108	29'08"	10'57"	7.0	22.40	21.13	25.70	26.38	-	6.24	6	P
	109	29'11"	10'27"	7.3	23.43	21.00	24.78	26.64	-	6.43	6	P
	110	29'18"	09'20"	7.5	23.45	20.87	24.58	26.76	-	6.11	6	P
	111	29'27"	08'57"	7.9	23.39	20.83	25.10	26.80	-	6.80	6	P
	112	28'46"	08'39"	6.4	23.58	20.87	24.09	26.09	-	5.35	6	P
	113	29'17"	07'25"	11.0	23.80	20.20	24.81	27.07	-	6.44	6	P
	114	30'10"	09'00"	7.8	23.52	20.91	25.16	26.62	-	6.17	6	P
	115	30'33"	08'59"	5.5	23.28	21.43	25.57	26.22	-	7.29	6	P
	116	31'20"	08'37"	3.1	22.35	22.19	26.22	26.15	-	8.53	6	P
	117	30'57"	09'37"	4.4	22.81	21.70	25.84	26.15	-	-	6	P
	118	30'28"	10'36"	5.0	23.60	21.58	25.07	25.32	-	-	6	P
28 VII 58	132	30'30"	15'30"	9.1+	24.20	23.65	24.18	25.01	-	3.92	3	P
	133	30'07"	15'32"	9.1+	23.94	23.46	24.70	24.90	-	4.43	3	P
30 VII 58	134	29'54"	09'53"	7.9	22.85	22.35	26.13	26.22	-	4.91	3	P
	135	29'48"	10'53"	6.6	22.78	22.40	26.13	26.31	-	4.76	3	P
	136	29'45"	11'57"	7.0	23.20	23.00	25.82	26.06	-	5.04	6	P
	137	30'23"	12'14"	5.9	23.16	22.98	26.04	25.95	-	-	3	P
	138	29'48"	13'06"	5.8	23.43	23.23	25.88	25.59	-	5.10	3	P
	139	29'48"	13'45"	5.0	23.90	23.30	25.41	25.99	-	5.36	6	P
	140	29'31"	14'35"	2.7	24.26	23.81	24.07	24.42	-	4.48	6	P

Table 1.—(Continued)

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/oo S	Salinity °/oo B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
30 VII 58 (Con't)	141	29'13"	14'43"	7.0	24.55	23.60	23.50	25.95	-	5.00	6	P
	142	29'38"	15'23"	14.0	24.50	23.39	24.61	-	-	-	3	P
	143	29'25"	16'06"	4.3	25.00	24.20	21.67	24.92	-	1.82	3	P
	144	29'05"	15'46"	4.6	25.00	24.20	22.16	25.07	-	3.68	3	P
	145	29'10"	15'37"	3.5	25.00	24.00	22.94	25.07	-	2.89	3	P
	146	29'10"	15'10"	4.6	24.50	23.70	23.10	25.19	-	4.85	3	P
	147	28'57"	15'18"	3.1	25.00	24.00	22.61	25.05	-	3.80	3	P
	148	29'00"	15'01"	3.1	25.00	24.00	23.44	25.16	-	3.75	3	P
	149	28'51"	15'09"	5.0	24.75	23.95	22.90	23.51	-	4.27	3	P
	150	28'33"	15'10"	3.1	25.00	24.90	22.86	23.31	-	3.50	3	P
	151	28'16"	15'10"	2.0	25.04	24.36	23.98	24.63	-	6.62	3	P
	152	28'11"	14'15"	3.1	25.00	25.00	23.78	23.91	-	5.25	3	P
	153	27'58"	13'56"	2.4	25.00	25.00	24.76	24.65	-	5.81	3	P
	154	27'46"	13'00"	2.7	25.00	24.60	24.56	24.69	-	-	3	P
	155	28'14"	13'40"	2.7	25.00	24.99	23.96	23.98	-	-	3	P
	156	28'35"	14'26"	2.7	25.18	24.28	23.15	24.85	-	-	3	P
	157	28'43"	14'55"	2.7	25.00	24.35	23.10	24.88	-	-	3	P
	158	28'53"	14'46"	3.2	25.01	23.08	24.60	26.04	-	-	3	P
	159	28'53"	14'22"	4.0	25.00	24.45	24.69	24.88	-	-	3	P
	160	28'50"	13'38"	4.0	25.00	24.75	24.85	24.76	-	-	3	P
	161	29'06"	13'46"	5.5	24.80	21.21	24.81	25.28	-	-	3	P
	162	29'23"	12'31"	4.6	24.42	24.20	25.77	26.04	-	-	3	P
	163	28'57"	12'36"	5.0	24.25	24.03	25.66	25.61	-	-	3	P
	164	28'34"	12'44"	-	-	-	-	-	-	-	3	P
	165	28'59"	11'59"	-	-	-	-	-	-	-	3	P

Table 1.—(Continued)

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/₀₀ S	Salinity °/₀₀ B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
6 VIII 58	166	33'30"	03'42"	5.0	23.49	23.40	25.68	25.91	-	5.75	6	P
	167	33'52"	03'06"	-	-	-	-	-	-	-		Q
	168	34'47"	03'20"	-	-	-	-	-	-	-		Q
	169	36'02"	01'45"	14.0+	23.14	-	25.37	27.38	-	4.70		Q
	170	35'05"	00'32"	-	-	-	-	-	-	-		Q
	171	32'57"	00'30"	7.0	22.20	21.98	28.22	28.17	-	7.14	6	P
	172	32'54"	03'02"	7.0	24.55	22.35	25.93	27.29	-	6.07	3	P
	173	32'50"	06'11"	3.5	24.75	24.05	25.59	26.20	-	8.20	6	P
	174	31'37"	06'02"	5.9	24.18	23.60	25.79	26.31	-	6.04	3	P
	175	30'06"	06'02"	7.5	24.75	23.10	25.25	26.58	-	4.68	3	P
	176	30'00"	03'06"	7.5	23.80	22.75	26.78	26.96	-	5.22	6	P
	177	27'25"	01'30"	6.6	25.00	22.95	26.22	27.20	-	6.13	3	P
	178	28'12"	03'08"	8.5	25.00	22.20	26.26	27.59	-	6.50	3	P
	179	27'55"	05'12"	5.0	24.67	23.25	25.95	26.31	-	4.92	6	P
3 VII 59	210	28'15"	08'06"	1.8	25.0	24.8	-	25.45	3.47	1.19	6	P
	211	28'05"	09'20"	3.7	25.2	22.7	24.33	25.63	-	4.40	6	P
	212	28'05"	10'29"	2.7	24.5	24.2	23.91	24.80	1.35	3.55	6	P
	213	28'43"	11'25"	4.0	20.3	23.8	-	25.50	1.86	2.37	3	P
	214	28'15"	11'45"	3.4	23.5	27.0	24.46	25.63	2.79	1.69	3	P
	215	27'41"	11'52"	3.1	24.5	23.2	24.20	24.81	2.71	3.38	3	P
	216	27'00"	12'00"	2.4	26.1	25.3	23.80	23.92	3.98	-	3	P
	217	27'48"	13'02"	2.7	23.8	22.7	24.31	24.73	-	1.18	6	P
	218	28'35"	12'46"	3.4	23.3	22.2	25.06	25.08	2.28	2.12	6	P
	219	28'59"	12'41"	3.7	23.5	22.2	25.60	25.62	-	1.27	3	P
	220	28'48"	13'45"	3.7	24.0	22.9	25.00	25.28	-	2.46	6	P

Table 1.—(Continued)

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/oo S	Salinity °/oo B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
3 VII 59 (Con't)	221	28'13"	13'42"	2.9	23.6	22.7	24.62	24.60	2.62	1.62	6	P
	222	28'02"	13'57"	3.2	24.9	23.8	24.09	24.44	-	2.20	6	P
	223	28'10"	14'22"	4.0	25.8	23.8	23.74	24.09	-	4.14	3	P
	224	28'35"	14'29"	4.3	24.5	23.05	-	25.03	4.98	4.06	6	P
	225	28'43"	14'58"	4.0	25.9	23.35	-	24.64	-	4.13	6	P
	226	28'14"	15'09"	3.7	24.35	25.8	-	24.01	-	4.48	6	P
	227	28'34"	15'10"	4.0	25.9	23.5	-	24.96	5.75	4.40	3	P
	228	28'52"	15'08"	4.3	25.9	22.6	-	25.28	-	4.48	3	P
	229	28'56"	15'18"	4.3	25.9	23.4	-	25.19	-	-	6	P
7 VII 59	230	29'23"	07'25"	9.4	22.0	21.9	26.60	25.52	8.55	6.10	3	P
	231	29'23"	09'01"	7.6	22.8	22.3	25.70	25.95	7.96	6.53	6	P
	232	29'15"	09'18"	7.0	22.6	22.45	25.68	26.17	7.88	6.95	6	P
	233	29'51"	09'55"	7.0	22.8	21.98	25.58	26.37	9.33	5.85	6	P
	234	30'07"	08'59"	7.6	22.8	21.7	25.76	26.13	9.15	5.93	6	P
	235	30'32"	08'54"	6.1	22.0	21.83	25.80	25.88	7.65	6.10	6	P
	236	31'17"	08'33"	3.8	23.3	23.1	25.48	25.68	8.14	7.65	lost	lost
	237	30'55"	09'38"	4.4	23.7	23.2	25.58	25.86	11.42	7.54	6	P
	238	30'28"	10'33"	5.5	23.8	22.7	25.63	25.68	9.50	6.53	3	P
	239	29'48"	10'57"	4.9	23.9	23.78	25.32	25.60	-	6.87	3	P
	240	29'48"	11'58"	3.7	24.3	23.42	25.40	25.36	7.45	6.87	6	P
	241	30'23"	12'14"	4.3	24.0	23.98	25.68	25.70	8.39	-	3	P
	242	29'45"	13'13"	4.0	24.2	23.65	25.29	25.31	6.86	6.18	3	P
	243	29'49"	13'48"	2.3	24.5	24.48	24.47	25.59	7.20	6.27	6	P
	244	29'30"	14'36"	1.2	24.5	24.35	25.40	25.28	6.27	6.70	6	P
	245	29'13"	14'43"	4.9	25.0	24.35	24.38	24.91	5.34	-	6	P
	246	29'10"	15'10"	2.7	25.0	24.71	24.27	24.74	5.34	4.57	3	P
	247	29'10"	15'37"	1.8	25.3	25.1	-	24.49	2.12	0.93	3	P
	248	29'04"	29'49"	1.7	25.3	25.1	-	22.17	6.02	5.60	3	P

Table 1.—(Continued)

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/₀₀ S	Salinity °/₀₀ B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
13 VII 59	249	28'10"	03'07"	8.2	22.6	21.9	26.15	27.72	6.72	6.62	6	P
	250	30'00"	03'08"	7.0	22.8	21.21	26.42	27.03	7.28	5.46	6	P
	251	32'16"	02'49"	6.7	21.4	20.96	26.52	26.67	4.96	5.08	6	P
	252	34'25"	03'22"	4.0	21.7	21.21	25.01	25.59	-	3.42	6	P
	253	32'47"	06'08"	2.1	23.1	22.91	26.42	26.48	7.09	7.42	3	P
	254	31'32"	06'13"	5.8	22.9	22.50	26.61	26.74	11.68	6.25	6	P
	255	30'05"	06'11"	7.9	23.17	21.89	26.48	26.97	14.58	5.35	3	P
	256	29'05"	13'42"	5.5	24.8	23.48	25.54	25.69	8.12	3.78	3	P
	257	28'55"	14'21"	4.9	24.0	23.30	25.28	25.62	3.48	3.37	6	P
	258	28'54"	14'46"	4.1	24.4	23.40	25.19	26.01	-	4.20	3	P
	259	29'00"	14'58"	4.3	24.3	23.22	25.03	25.79	3.55	4.48	3	P
	260	29'41"	15'25"	12.2	24.7	23.59	25.19	26.14	4.40	4.57	3	P
	261	30'06"	15'33"	11.3+	23.8	22.79	25.31	26.15	4.62	4.37	3	P
	262	30'34"	15'29"	11.9+	25.0	23.97	25.11	25.82	4.85	4.62	3	P
	263	29'23"	12'34"	4.0	24.4	23.30	26.05	26.10	10.83	6.90	3	P
	264	28'57"	11'51"	6.4	24.1	23.21	25.62	26.18	5.36	6.38	3	P
	265	29'14"	10'34"	7.0	24.0	23.32	25.59	25.91	5.55	5.55	3	P
	266	28'45"	08'40"	5.8	24.3	22.00	25.43	25.73	-	9.41	3	P
	267	28'02"	05'55"	7.3	23.9	21.82	26.02	26.68	-	11.58	6	P
20 VII 59	283	29'25"	16'06"	3.1	25.5	25.40	21.02	22.02	2.51	1.58	3	P
	284	28'45"	15'17"	3.4	25.2	25.18	22.79	23.40	2.61	1.87	3	P

Table 1.—(Continued)

Sampling Date	Station Number	Location 40°N	Location 74°W	Depth (m)	Temperature °C S	Temperature °C B	Salinity °/oo S	Salinity °/oo B	Dissolved Oxygen S	Dissolved Oxygen B	Grabs No.	Grabs Type
11 VIII 60	308	28'12"	08'26"								3	P
	309	30'08"	15'32"								3	P
	310	28'48"	15'09"								3	P
	311	28'18"	15'07"								3	P
	312	28'47"	13'35"								3	P
	313	27'37"	11'44"								3	P
	314	28'52"	11'47"								3	P
	315	30'23"	12'14"								3	P
	316	30'35"	08'55"								3	P
	317	29'23"	08'58"								3	P
	318	30'00"	05'58"								3	P
	319	29'34"	03'40"								3	P
	320	32'16"	02'49"								3	P
	321	30'00"	03'08"								3	P
	322	28'10"	03'07"								3	P

Table 2.—Analyses of sediments from Raritan Bay and Lower Bay, 1958-1960. Size ranges are in microns and the values are in percent of dry weight.

Station Number	Sediment Type	2000	Sand					Silt				Clay		Medium Diameter	Sorting Coefficient	Percent (2000)		
			2000-1000	1000-500	500-250	250-125	125-62	62-31	31-16	16-8	8-4	4-2	2			Sand	Silt	Clay
101	Sa	.1	.1	7.9	79.5	10.0	.5	.5	0	0	0	0	1.4	420	1.23	98.0	.6	1.4
102	Sa	.6	.7	5.2	46.1	24.1	4.5	2.4	2.2	1.9	2.3	3.6	6.4	320	1.71	81.1	8.9	10.0
103	Sa	.4	.5	8.2	79.4	8.3	.4	.8	0	0	0	0	2.0	420	1.23	97.2	.8	2.0
104	C-Si	.7	.9	1.0	2.0	3.6	7.6	11.9	12.9	12.9	10.5	11.0	25.0	10	4.18	15.2	48.5	36.3
105	Si	.8	1.4	1.0	2.4	5.4	8.8	7.9	9.5	14.3	43.5	.6	4.4	8	3.33	19.2	75.8	5.0
106	C-Si	.4	.6	.9	.9	1.8	.1	3.1	8.0	18.2	34.0	7.2	24.8	5	1.41	4.3	63.6	32.1
107	Si	1.1	1.4	1.2	1.4	4.4	7.6	14.9	15.0	14.5	31.1	2.8	4.6	14	2.52	16.2	76.3	7.5
108	Si	.5	.7	2.2	5.8	3.5	4.8	6.0	9.5	16.0	43.4	3.6	4.0	8	3.73	17.1	75.3	7.6
109	C-Si	.2	.4	.3	.4	.6	.6	4.7	9.8	18.6	26.9	24.4	13.1	5	1.73	2.3	60.1	37.6
110	Si	.8	2.5	1.8	1.5	2.5	7.5	9.9	11.7	17.8	37.5	.6	5.9	10	2.42	15.9	77.5	6.6
111	C-Si	.5	1.9	1.0	.8	1.2	4.5	8.9	12.8	16.9	20.5	16.8	14.2	8	2.63	9.4	59.4	31.2
112	Sa-Si	2.9	6.4	2.8	6.7	10.2	.4	7.8	13.8	14.3	26.6	1.9	6.2	17	5.36	27.3	64.4	8.3
113	C-Si	2.1	3.0	2.0	2.0	2.9	.7	8.9	13.1	10.8	11.8	34.2	8.5	6	2.94	10.8	45.6	43.6
114	Sa-Si	1.7	3.9	3.7	2.9	4.2	17.1	8.5	3.0	6.8	33.8	9.3	5.1	9	4.19	32.3	53.1	14.6
115	Si-Sa	.8	1.6	6.3	13.0	12.4	30.9	9.1	4.1	4.8	6.0	4.2	6.8	90	2.67	64.7	24.2	11.1
116	Sa	5.5	9.5	18.4	26.8	19.4	7.3	4.7	2.1	.6	1.5	1.1	3.1	330	3.64	86.1	9.5	4.4
117	Si-Sa	.5	.3	.5	.6	4.7	44.0	18.4	7.5	3.0	8.5	4.5	7.5	63	1.98	50.1	37.9	12.0
118	Sa-Si	4.3	4.3	5.1	3.3	2.9	14.3	14.3	9.1	10.4	24.7	3.5	3.8	28	2.17	31.2	61.2	7.6
132	C-Si	.2	.1	.1	.2	1.3	3.8	7.0	9.9	15.7	17.8	15.7	28.2	5	1.75	5.5	50.5	44.0
133	C-Si	1.0	1.2	.6	.9	2.6	5.0	5.4	9.8	15.5	20.6	22.8	14.6	6	2.80	10.4	51.8	37.8
134	Si	3.2	3.7	2.5	1.4	1.8	10.8	11.4	10.6	12.5	38.1	0	4.0	12	3.47	20.9	75.0	4.1
135	C-Si	.4	1.6	1.0	.7	2.8	11.0	18.5	15.2	11.8	8.8	9.1	19.1	17	3.83	17.2	54.5	28.3
136	Sa	14.0	9.1	20.8	35.5	10.4	.9	.8	1.1	1.1	1.0	1.2	4.1	440	1.81	89.2	4.6	6.2
137	C-Si	.2	.3	.4	.9	1.8	4.4	10.9	14.4	14.7	13.3	12.1	26.6	7	3.48	7.8	53.4	38
138	C-Si	.7	1.1	.7	.6	1.6	9.2	12.5	15.4	11.1	12.5	12.5	22.1	9	3.76	13.3	51.9	34.8
139	Sa	5.1	2.5	14.0	48.5	17.9	2.0	3.3	.3	.5	1.6	.4	3.9	330	1.44	89.5	6.2	4.3
140	Sa	12.1	6.8	10.2	11.9	48.4	1.8	1.0	.8	1.0	1.0	.8	4.2	240	1.97	90.0	4.3	5.7

Table 2.—(Continued)

Station Number	Sediment Type	2000	Sand 2000-1000	Sand 1000-500	Sand 500-250	Sand 250-125	Sand 125-62	Silt 62-31	Silt 31-16	Silt 16-8	Silt 8-4	Clay 4-2	Clay 2	Medium Diameter	Sorting Coefficient	Percent (2000) Sand	Silt	Clay
141	Sa	1.2	4.6	13.4	50.2	25.8	1.2	0	0	0	.6	.3	2.7	310	1.35	96.4	.6	3.0
142	C-Sa	9.6	1.8	7.6	21.0	24.4	5.3	2.1	3.1	3.6	5.5	4.8	11.2	210	4.89	66.5	15.8	17.7
143	C-Si	.5	1.1	1.8	5.9	2.3	.1	2.8	7.5	13.8	19.7	13.1	31.4	5	3.16	11.3	44.0	44.7
144	C-Si	.1	.4	.8	4.0	4.7	7.9	9.9	10.2	11.8	11.6	12.1	26.5	8	4.66	17.8	43.6	38.6
145	C-Si	0	.2	.2	.3	.7	.3	4.7	9.9	20.0	30.9	14.6	18.2	6	2.19	1.7	65.5	32.8
146	Sa-Si-C	5.4	6.3	7.1	17.0	10.2	7.3	10.6	6.0	3.8	4.7	5.4	16.2	83	7.96	50.7	26.5	22.8
147	Si	.8	.2	.2	.3	.7	2.2	8.1	14.3	24.2	30.3	8.9	9.8	8	1.88	3.6	77.5	18.9
148	C-Si	.8	.3	.3	.4	1.1	.1	8.7	13.3	18.0	15.3	13.3	28.4	6	3.02	2.2	55.8	42.0
149	C-Si	.6	.4	.4	.7	1.3	2.6	7.7	12.0	16.3	20.2	18.4	19.4	6	2.53	5.4	56.6	38.0
150	Si-C	1.7	.5	1.0	2.2	2.5	.1	6.3	9.5	12.2	14.0	11.6	38.4	4	4.03	6.4	42.7	50.9
151	S-S-C	.9	1.2	2.5	8.1	16.9	1.6	18.2	8.4	4.9	7.3	8.4	21.6	30	27.43	30.6	39.1	30.3
152	S-S-C	1.1	2.8	5.5	8.9	10.3	3.9	6.0	7.6	9.1	8.7	9.1	27.0	12	10.15	31.7	31.8	36.5
153	Sa	3.6	2.4	5.0	73.6	10.7	.5	0	.1	.2	.8	.4	2.7	320	1.32	95.6	1.2	3.2
154	Sa-Si-C	1.1	2.3	4.5	8.4	9.5	4.4	8.8	9.2	8.7	14.8	18.7	9.6	14	6.12	29.4	42.0	28.6
155	C-Sa	6.2	1.3	3.1	44.1	10.8	1.6	.6	4.8	5.3	5.6	8.4	8.2	280	5.72	65.0	17.3	17.7
156	C-Si	.4	.5	.7	.8	1.9	6.2	17.2	16.0	15.3	9.6	8.9	22.5	12	3.93	10.1	58.4	31.5
157	C-Si	.2	.3	.5	.4	2.1	6.4	14.9	15.2	15.5	12.5	11.3	20.7	10	3.52	9.7	58.2	32.1
158	C-Si	0	.1	.2	.2	1.3	5.0	12.0	13.7	16.2	16.7	11.4	23.2	8	3.23	6.8	58.6	34.6
159	C-Si	.1	.1	.1	.2	1.3	3.8	10.1	12.6	16.9	18.8	17.7	18.3	7	2.60	5.5	58.5	36.0
160	C-Si	.1	.2	.2	.2	.7	.6	5.2	10.6	21.2	32.3	18.0	10.7	6	1.82	1.9	69.4	28.7
161	Si	.1	.4	.4	.3	.9	3.6	8.3	15.8	24.2	28.4	9.9	7.7	9	1.95	5.6	76.8	17.6
162	C-Si	.6	1.7	2.9	2.5	4.0	.1	6.2	11.5	18.0	14.5	14.0	24.0	7	3.08	11.3	50.5	38.2
163	C-Si	.4	1.1	1.7	1.8	3.9	7.8	15.0	12.6	11.4	12.3	10.8	21.2	12	4.02	16.4	51.5	32.1
164	C-Si	.3	.6	1.0	1.0	2.1	3.6	11.1	12.3	15.4	12.6	11.5	28.5	7	3.73	8.3	51.6	40.1
165	C-Si	.2	.6	1.0	1.1	2.6	4.2	8.9	11.4	13.5	15.5	13.9	27.1	6	3.41	9.5	49.4	41.1
166	Si-Sa	1.0	1.8	4.9	7.8	32.8	.9	44.1	1.3	.6	1.1	1.7	2.0	60	2.17	48.7	47.6	3.7
172	Si-Sa	1.0	1.1	1.4	2.2	15.3	35.0	17.3	6.7	4.6	4.2	4.5	6.7	71	2.06	55.6	33.1	11.3

Table 2.— (Continued)

Station Number	Sediment Type	2000	Sand					Silt				Clay		Medium Diameter	Sorting Coefficient	Percent (2000)		
			2000-1000	1000-500	500-250	250-125	125-62	62-31	31-16	16-8	8-4	4-2	2			Sand	Silt	Clay
173	Sa	24.6	4.7	10.2	32.4	20.8	0	3.5	.8	1.2	.9	.7	.2	370	2.94	90.3	8.5	1.2
174	Si-Sa	4.1	2.0	3.7	9.5	27.5	27.3	9.8	3.4	2.1	2.6	3.0	5.0	117	1.90	73.0	18.7	8.3
175	Si-Sa	.1	.9	2.8	12.2	53.0	1.0	13.7	8.8	1.3	2.0	1.9	2.3	180	2.23	69.9	25.9	4.2
176	Sa	1.0	.5	.5	19.6	71.4	0	3.7	0	1.1	1.2	.7	.3	220	1.15	92.9	6.1	1.0
177	Sa	.4	.5	5.2	55.3	23.3	7.8	1.9	.9	.4	.6	.4	3.3	310	1.51	92.5	3.8	3.7
178	C-Sa	.5	.4	.4	.8	34.8	20.0	0	4.4	4.7	10.0	8.9	15.1	90	3.64	56.7	19.2	24.1
179	Sa-Si	.3	.9	1.2	1.5	8.0	13.2	8.1	7.2	9.8	32.8	13.0	4.0	8	6.17	24.9	58.0	17.1
210	Sa	0	.6	5.4	76.1	13.3	0	0	0	.2	.6	.2	3.6	350	1.21	95.4	.8	3.8
211	Sa	6.7	1.2	7.8	46.8	20.7	4.3	.5	.3	1.1	1.4	1.0	8.2	300	1.53	86.7	3.4	9.9
212	Sa	.4	1.3	10.4	79.8	2.8	1.6	.4	0	0	0	0	3.3	440	1.08	96.3	.4	3.3
213	Si-C	1.8	.6	.4	.8	1.6	5.8	8.6	10.4	9.7	12.5	18.0	29.8	5	4.69	9.4	41.9	48.7
214	C-Si	1.1	1.8	1.3	1.3	1.6	.2	18.1	10.9	9.4	11.9	9.3	33.1	6	5.61	6.3	50.8	42.9
215	Sa-Si	4.4	2.7	2.7	5.0	9.5	5.9	5.5	8.9	8.0	27.7	4.4	15.3	13	4.64	27.0	52.4	20.6
216	C-Si	.6	.3	.1	.9	2.4	9.7	8.8	6.9	21.3	26.0	3.1	19.9	8	2.18	13.5	63.4	23.1
217	S-S-C	2.1	2.8	3.8	6.4	7.0	3.9	8.4	11.3	6.9	9.0	7.5	30.9	11	8.58	24.4	36.4	39.2
218	Si-C	5.6	3.7	4.3	4.2	4.7	0	1.7	8.8	10.5	11.0	8.9	36.6	5	7.62	17.9	33.9	48.2
219	C-Si	4.8	1.3	1.3	1.3	1.8	3.7	13.5	10.0	14.1	14.4	5.7	28.1	9	4.71	9.9	54.6	35.5
220	C-Si	2.2	.2	.2	.2	.2	0	9.0	10.0	16.2	16.4	8.4	37.0	5	1.49	.8	52.8	46.4
221	Sa	1.9	1.9	3.2	52.5	15.0	1.7	4.0	1.8	2.5	3.0	2.2	10.3	280	1.71	75.7	11.6	12.7
222	Sa	5.4	3.0	11.8	52.1	8.8	.9	.7	.3	2.2	2.8	2.5	9.5	360	1.45	81.0	6.3	12.7
223	C-Si	2.2	1.1	2.0	4.5	7.0	0	7.2	8.1	25.1	16.6	3.3	22.9	10	2.98	14.9	58.3	26.8
224	C-Si	.2	.4	.4	.4	.6	2.3	4.3	35.2	10.0	24.8	2.8	18.6	10	2.12	4.1	74.5	21.4
225	C-Si	.6	.5	.6	1.1	1.9	0	17.3	12.5	23.5	18.0	4.3	19.7	10	2.49	4.1	71.8	24.1
226	Sa-Si-C	1.1	.5	1.6	6.9	22.2	.1	23.6	8.6	5.6	6.5	5.3	18.0	36	6.12	31.6	44.9	23.5
227	C-Si	1.6	.3	.3	.5	3.7	2.2	7.4	11.0	23.5	21.5	2.8	25.2	8	3.00	7.1	64.4	28.5
228	Si	.2	1.0	1.0	.5	.6	1.3	7.9	10.1	19.4	41.3	2.6	14.1	7	1.61	4.4	78.9	16.7
229	C-Si	.2	.2	.2	.2	.4	1.7	2.5	12.2	27.6	26.0	4.8	24.0	7	2.26	2.7	68.5	28.8
230	S-S-C	16.3	6.7	7.4	6.7	4.3	3.4	3.9	5.6	5.7	9.7	6.5	23.8	26	9.33	34.1	29.7	36.2

Table 2.—(Continued)

Station Number	Sediment Type		Sand					Silt				Clay		Medium Diameter	Sorting Coefficient	Percent (2000)		
		2000	2000-1000	1000-500	500-250	250-125	125-62	62-31	31-16	16-8	8-4	4-2	2			Sand	Silt	Clay
231	Si	2.1	1.4	.8	.8	.9	.2	9.3	10.5	19.2	39.5	1.9	13.4	8	1.67	4.2	80.2	15.6
232	Si	1.4	1.2	.9	.7	1.0	.6	4.0	10.6	24.6	39.1	2.1	13.8	8	1.46	4.5	79.4	16.1
233	C-Si	.6	.3	.3	.3	.9	.2	19.4	12.5	13.2	23.3	5.2	23.8	8	3.03	2.0	68.8	29.2
234	C-Si	2.5	1.4	1.7	1.3	2.2	.1	39.3	2.5	7.5	17.7	5.2	18.6	17	3.14	6.9	68.7	24.4
235	Si-Sa	1.0	.4	.6	1.3	12.7	48.6	9.1	5.6	2.7	3.0	2.7	12.3	86	2.04	64.2	20.6	15.2
236	Sa	13.6	12.6	25.0	18.6	14.6	7.2	1.0	.8	1.2	1.0	.5	3.9	520	2.24	90.3	4.6	5.1
237	Si-Sa	1.7	.5	.5	.8	12.0	41.3	21.4	4.4	2.4	2.3	1.8	10.9	70	1.64	56.1	31.0	12.9
238	S-S-C	8.4	3.0	2.4	1.6	2.9	17.4	15.5	10.4	6.9	7.7	3.9	19.9	33	4.29	29.8	44.2	26.0
239	C-Si	9.1	1.6	1.5	1.1	1.3	7.3	9.1	12.0	18.0	21.6	3.3	14.1	11	2.86	14.2	66.7	19.1
240	Sa	27.5	9.5	20.5	32.8	3.8	0	0	0	.9	.7	.3	4.0	600	2.68	91.9	2.2	5.9
241	C-Si	.3	.4	.6	1.4	2.6	8.0	11.2	14.5	16.4	20.6	4.8	19.2	10	2.58	13.0	62.9	24.1
242	Si	1.7	.8	.9	.8	1.5	4.9	4.4	12.4	21.7	36.2	2.6	12.1	68	1.71	9.1	75.9	15.0
243	Sa	8.2	5.6	20.7	42.3	15.4	1.1	.7	.2	.2	.6	.9	4.1	370	1.58	92.7	1.9	5.4
244	Sa	25.6	4.9	5.4	10.7	42.4	5.1	.9	.2	.5	.3	.3	3.7	220	5.09	92.1	2.5	5.4
245	Sa	.6	.5	2.3	51.8	35.5	.3	.5	.5	1.3	.9	.7	5.1	260	1.36	90.9	3.3	5.8
246	C-Si	.2	.2	.2	.8	1.9	5.6	7.1	16.5	18.0	16.5	6.9	26.1	8	3.55	8.7	55.2	36.1
247	C-Si	1.8	.7	1.1	1.1	1.0	2.1	2.8	14.9	29.7	24.6	4.2	16.0	9	1.75	6.1	73.3	20.6
248	C-Si	.2	.2	.2	.2	1.5	4.1	7.1	15.8	15.7	15.0	8.2	31.8	7	4.30	6.2	53.8	40.0
249	S-S-C	.1	.1	.3	.8	33.6	.8	25.0	3.3	5.0	8.0	5.6	17.4	42	6.68	35.6	41.4	23.0
250	Sa	5.7	1.2	1.0	14.3	67.0	3.3	0	0	.1	.9	1.2	5.3	200	15.81	92.1	1.0	6.9
251	S-S-C	17.6	3.9	2.5	2.1	13.4	.3	16.4	5.1	6.1	13.9	2.9	15.8	38	6.45	26.9	50.4	22.7
252	Sa	.7	1.9	8.0	39.4	33.5	8.5	2.0	.6	.4	.4	.4	4.2	250	1.57	91.9	3.5	4.6
253	Sa	26.2	9.8	18.0	30.0	10.7	0	.7	.2	.2	.4	.1	3.7	530	2.72	92.8	2.1	5.1
254	Si-Sa	2.0	1.7	5.6	12.3	26.2	22.2	10.4	2.5	2.3	2.8	2.7	9.3	120	2.26	69.4	18.4	12.2
255	Si-Sa	6.8	2.5	7.4	22.7	21.2	14.9	9.5	1.4	1.5	2.3	1.9	7.9	180	2.39	73.7	15.8	10.5
256	C-Si	.2	.2	.2	.2	.2	1.0	3.9	10.0	23.4	24.7	6.9	29.1	6	3.52	1.8	62.1	36.1
257	C-Si	.4	.2	.2	.2	.2	3.4	6.4	11.0	19.0	20.3	7.6	31.1	6	3.74	4.2	56.9	38.9
258	C-Si	.4	.2	.2	.2	.3	1.7	2.6	12.7	24.7	31.0	3.4	22.6	7	1.95	2.6	71.3	26.1

Table 2.—(Continued)

Station Number	Sediment Type	2000	Sand					Silt				Clay		Medium Diameter	Sorting Coefficient	Percent (2000)		
			2000-1000	1000-500	500-250	250-125	125-62	62-31	31-16	16-8	8-4	4-2	2			Sand	Silt	Clay
259	Si-C	.8	.4	.7	2.6	4.3	4.6	4.9	13.3	12.8	12.2	7.4	36.0	6	4.94	12.7	43.5	43.8
260	S-S-C	5.3	4.2	12.4	19.2	9.1	2.0	3.7	5.2	7.3	8.9	3.8	18.9	130	9.21	49.5	27.0	23.5
261	Si-C	.2	.6	.6	1.1	4.4	7.0	7.5	8.5	11.8	14.3	10.0	34.0	5	5.11	13.7	42.3	44.0
262	Si-C	4.4	.6	1.6	6.7	3.6	1.8	1.9	7.2	8.7	10.5	12.1	40.9	3	4.77	15.0	29.6	55.4
263	S-S-C	7.7	2.7	3.4	3.4	4.7	6.7	15.1	8.5	13.1	11.5	1.8	21.4	20	3.89	22.6	52.3	25.1
264	C-Si	1.7	1.1	1.2	1.1	1.6	4.2	6.4	12.7	17.6	23.1	3.8	25.5	8	3.24	9.4	60.7	29.9
265	C-Si	1.6	.7	.5	.5	.9	2.2	3.3	14.6	18.7	21.9	4.8	30.3	7	4.72	4.9	59.4	35.7
266	S-S-C	1.4	.5	1.8	1.1	6.9	10.0	12.3	11.7	12.0	14.7	.7	26.9	12	6.60	20.6	51.4	28.0
267	C-Si	.6	.6	.4	.6	.6	1.4	7.0	10.1	27.0	22.7	4.2	24.8	8	2.10	3.6	67.2	29.2
283	C-Si	.3	.3	.5	.6	1.1	2.9	11.9	9.8	20.4	19.0	5.2	28.0	8	4.24	5.4	61.3	33.3
284	Si-C	.6	.1	.1	.1	.3	1.5	5.3	8.4	14.2	19.8	10.2	39.4	4	5.00	2.1	48.0	49.9
308	Sa	1.0	.5	11.5	66.0	10.5	1.5	4.0	1.0	0	1.0	1.0	2.0	345	1.34	90.9	6.1	3.0
309	C-Si	0	.5	.5	2.0	6.0	6.0	11.0	11.0	9.5	11.3	9.7	32.5	6	5.19	15.0	42.8	42.2
310	C-Si	0	0	.5	.5	1.0	3.0	10.5	15.0	13.0	12.0	11.0	33.5	5	4.18	5.0	50.5	44.5
311	Sa-Si-C	3.1	1.5	2.0	5.5	12.5	15.5	11.5	8.0	6.0	8.5	7.0	18.9	32	5.98	38.1	34.6	27.3
312	C-Si	0	.5	.5	.7	1.3	3.5	8.5	12.0	11.0	16.0	8.0	38.0	5	4.24	6.5	47.5	46.0
313	Sa-Si-C	14.4	4.6	5.0	8.0	9.5	8.7	4.8	6.5	5.5	6.0	5.5	21.5	63	12.31	41.9	26.6	31.5
314	C-Si	1.5	2.5	1.5	1.5	2.0	9.0	11.0	10.5	10.5	12.0	11.0	27.0	8	4.66	16.8	44.6	38.6
315	Sa-Si-C	1.5	1.0	1.5	7.5	6.0	7.5	16.0	10.0	8.0	9.0	7.0	25.0	12	5.57	23.9	43.6	32.5
316	Si-Sa	.5	.5	1.0	7.0	21.0	27.0	14.0	5.5	3.0	4.0	4.0	12.5	75	2.76	56.8	26.6	16.6
317	C-Si	4.0	2.0	1.5	1.5	2.0	5.0	11.5	11.5	10.0	10.5	12.0	28.5	7	4.68	12.5	45.3	42.2
318	Sa	6.0	2.5	1.5	7.0	36.0	25.0	6.5	1.5	1.5	2.5	3.0	7.0	132	1.69	76.6	12.8	10.6
319	Sa	5.5	.5	.5	1.0	35.5	43.5	5.5	1.5	.5	1.0	1.0	4.0	110	1.56	85.7	9.0	5.3
320	Si-Sa	9.0	3.0	2.5	2.5	20.0	28.5	9.5	2.7	3.1	3.2	6.0	10.0	91	2.45	62.1	20.3	17.6
321	Sa	8.5	1.0	3.5	15.5	53.0	13.5	1.5	0	0	.5	1.0	2.0	187	1.44	94.5	2.2	3.3
322	Sa-Si-C	.5	0	1.0	2.0	31.5	17.0	10.0	3.0	4.5	5.5	6.0	19.0	71	5.98	51.8	23.1	25.1

Table 3.—List of species collected on the Raritan Bay Macrobenthos Survey, 1957-1960.

Porifera:

Cliona sp.
Microciona prolifera (Ellis and Solander, 1786)
unidentified sp.

Cnidaria (Coelenterata):

Hydrozoa:
Hydractinia echinata (Fleming, 1828)
Tubularia sp.
unidentified sp.

Anthozoa:
Cerianthus sp.
Haliplanella luciae (Verrill, 1898)
Metridium senile (Linnaeus)
unidentified sp.

Platyhelminthes:

Turbellaria:
unidentified sp.

Nemertea (Rhynchocoela):

unidentified sp.

Annelida:

Oligochaeta:
unidentified sp.

Polychaeta:

Polynoidae:
Harmothoe extenuata (Grube, 1840)
Harmothoe imbricata (Linné, 1767)
Lepidonotus squamatus (Linné, 1758)
Lepidonotus sublevis Verrill, 1873

Table 3.—(cont'd)

Phyllodocidae:
Eteone heteropoda Hartman, 1951
Eteone lactea Claparède, 1868
Eulalia viridis (Linné, 1767)
Eumida sanguinea (Oersted, 1843)
Paranaitis speciosa (Webster, 1880)
Phyllodoce groenlandica Oersted, 1842

Hesionidae:
Podarke obscura Verrill, 1873

Syllidae:
Exogone dispar (Webster, 1879)
Antolytus cornutus Agassiz, 1863

Nereidae:
Nereis arenaceodentata Moore, 1903
Nereis succinea (Frey and Leuckart, 1847)
Nereis virens Sars, 1835

Nephtyidae:
Nephtys incisa Malmgren, 1865
Nephtys picta Ehlers, 1868

Glyceridae:
Glycera americana Leidy, 1855
Glycera dibranchiata Ehlers, 1868

Onuphidae:
Diopatra cuprea (Bosc, 1802)

Lumbrineridae:
Lumbrineris tenuis (Verrill, 1873)

Arabellidae:
Drilonereis longa Webster, 1879

Orbiniidae:
Scoloplos fragilis (Verrill, 1873)
Scoloplos armiger (O.F. Müller, 1776)

Spionidae:
Polydora ligni Webster, 1879
Spio setosa Verrill, 1873
Spio filicornis (O.F. Müller, 1776)
Spiophanes bombyx (Claparède, 1870)
Streblospio benedicti Webster, 1879
Scolelepis squamata (O.F. Müller, 1789)

Table 3.—(cont'd)

Eupleura caudata (Say)
Busycon canaliculatum (Linnaeus)
Busycon carica (Gmelin)
Nassarius obsoletus (Say)
Nassarius trivittatus (Say)
Retusa canaliculata (Say)
Retusa obtusa (Montagu)
Pyramidella fusca C.B. Adams
Odostomia trifida Totten
Odostomia sp.
Mitrella lunata (Say)

Opisthobranchia:
Adalaria proxima Alder and Hancock
Doridella obscura Verrill

Bivalvia:

Protobranchia:
Nucula proxima (Say)
Yoldia limatula (Say)

Lamellibranchia:
Modiolus demissus (Dillwyn)
Mytilus edulis (Linnaeus)
Anonia simplex Orbigny
Crassostrea virginica (Gmelin)
Mercenaria mercenaria (Linnaeus)
Gemma gemma (Totten)
Petricola pholadiformis Lamarck
Tellina agilis Stimpson
Macoma balthica (Linnaeus)
Ensis directus (Conrad)
Spisula solidissima (Dillwyn)
Mulinia lateralis (Say)
Mya arenaria Linnaeus

Arthropoda:

Crustacea:

Cirripedia:
Balanus crenatus Bruguiere, 1789
Balanus eburneus Gould, 1841
Balanus improvisus Darwin, 1854

Table 3.—(cont'd)

Isopoda:
Cyathura polita (Stimpson, 1855)
Edotea triloba (Say, 1818)

Amphipoda:
Ampeliscidae:
Ampelisca sp.

Haustoriidae:
Haustorius sp.

Phoxocephalidae:
Paraphoxus spinosus Holmes, 1903

Stenothoidae:
Stenothoe cypris Holmes, 1903
Stenothoe minuta Holmes, 1903
Stenothoe sp.

Gammaridae:
Carinogammarus mucronatus (Say, 1818)
Elasmopus laevis (Smith, 1873)

Corophiidae:
Corophium sp.
Unciola serrata Shoemaker

Ischyroceridae:
Jassa marmorata Holmes, 1903

Aoridae:
Microdentopus gryllotalpa Costa, 1853

unidentified sp.

Decapoda:
Caridea:
Crangon septemspinosus Say, 1818

Brachyura:
Callinectes sapidus Rathbun, 1895
Cancer irroratus Say, 1817
Carcinus maenas (Linnaeus)
Eurypanopeus depressus (Smith, 1869)
Hexapanopeus angustifrons
Neopanope texana sayi (Smith, 1869)
Panopeus herbsti Milne-Edwards, 1834
Rhithropanopeus harrissi (Gould, 1841)
Libinia sp.

Table 3.—(cont'd)

Anomura:
Pagurus longicarpus Say, 1817

Merostomata:
Limulus polyphemus (Linnaeus)

Ectoprocta:

Ctenostomata:
Alcyonidium polyoum (Hassall, 1841)
Amathia vidovici (Heller, 1867)
Bowerbankia gracilis Leidy, 1855

Cheilostomata:
Bugula sp.
Conopeum reticulum (Linnaeus, 1867)
Electra hastingsae Marcus, 1938
Membranipora tenuis Desor, 1848
Cryptosula pallasiana (Moll, 1803)
Schizoporella unicornis (Johnston, 1847)

unidentifed sp.

Echinodermata:

Asteroidea:
Asterias forbesi (Desor, 1848)

Echinoidea:
Arbacia punctulata (Lamarck, 1816)

Chordata:

Urochordata:
Molgula manhattensis (DeKay, 1843)

Table 4.—Distribution and abundance of the 30 most prevalent species encountered in the Raritan Bay Macrobenthos Survey, 1957-1960. Numbers given are the density per square meter; P = present in qualitative samples or species identified but not counted; t = tubes only; s = shell only; r = evidence of reproduction (egg cases, etc.).

Taxa	No. Sta. Where Found in Quant. Samples	Total No. Sta. Where Found	1957 Stations									
			1	2	3	4	5	6	7	23	24	25
Microciona prolifera	4	60					P		P			P
Haliplanella luciae	9	59										
Lepidonotus squamatus	4	41										P
Eteone lactea	25?	83		3				P	3	3		P
Eumida sanguinea	25	86				P					P	P
Nereis succinea	76	145	P	6	3		6		9	30	6	P
Nereis virens	28	42										
Glycera americana	57	59										3
Glycera dibranchiata	39	47				P				P		
Scoloplos fragilis	44	48	3									3
Polydora ligni	86	134	75			9		3		P		
Spio setosa	47	50					3					3
Streblospio benedicti	31	65										
Heteromastus filiformis	53	53	7									
Pectinaria gouldii	55	56	t		t				t			6
Crepidula fornicata	16	48	s									
Nassarius obsoletus	90	100	6r		r			r	r		r	P
Nassarius trivittatus	41	45										
Mercenaria mercenaria	40	64	6									6
Ensis directus	78	79	15						3			P
Mulinia lateralis	78	79	18	s	s		s		s		3	
Mya arenaria	157	180	30	s		6	3		6	9	210	P
Balanus improvisus	34	97			s	P	9	P	P	P		P
Ampelisca sp.	101	125	1,800	174	21	6			t	3	120	13,200+
Unicola serrata	44	56		P								3
Cyathura polita	51	54						3				30
Callinectes sapidus	2	53	P	P		P		P				P
Limulus polyphemus	3	74	P	P			P	P	P			
Conopeum reticulum	14	55						P				
Molgula manhattensis	17	53		P				P				3
No. of above spp. in quantitative samples												

Table 4.—(cont'd)

Taxa	1957 Stations														
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Micrococina prolifera					P	P	P	P	P			P			
Haliplanella luciae						P		P	15	P	P	P	P	10	P
Lepidonotus squamatus	P					P		P	P	P					P
Etaone lactea	3											P			
Eumida sanguinea	9	45	P		P	P	P	P	5	15					
Nereis succinea	P	78	P		5	P	P	10	40	5	P	10	P	5	P
Nereis virens															
Glycera americana	3			7	10	5	15	5		5			5		5
Glycera dibranchiata										5		5	5	10	P
Scoloplos fragilis	3		3	4			5					5		P	P
Polydora ligni	9	P			P							5	P	25+	P
Spio setosa		12												5	10
Streblospio benedicti													P	10	P
Heteromastus filiformis				4	5	10									10
Pectinaria gouldii	6		3		t	25	25			5	25	5	5		40
Crepidula fornicata			s							45r	5				
Nassarius obsoletus		r	6r	14r	r	20r	sr		r				r	r	r
Nassarius trivittatus							s								
Mercenaria mercenaria		s	3	P	10	s	5	s	s	s	5	5	P		P
Ensis directus	P		s		s				s						
Mulinia lateralis			12	84		250	5				5	20			
Mya arenaria	3	s	9	95	15	250	P		10	60	10	75	350	275	25
Balanus improvisus	P	321							445	215	10	30	5		
Ampelisca sp.	3		60	42+	20	30	700	80	15	60	5			5	30
Unciola serrata		519		3	P	3		45	50	350	10	5		5	
Cyathura polita	15	6		7			5	5		15	5			5	5
Gallineectes sapidus		P				P	P	P			P			P	P
Limulus polyphemus			P	P								P		5	P
Conopeum reticulum							P								
Molgula manhattensis	P	P	P						P	30	P	5		P	

Table 4.— (cont'd)

Taxa	1957 Stations														
	41	42	43	45	46	47	48	49	50	51	52	53	55	56	57
Microciona prolifera				P					P						
Haliplanella luciae	P			P	P		P		P		P	18			P
Lepidonotus squamatus	5					P									
Eteone lactea												5			5
Eumida sanguinea	5				P			P			8	8			13
Nereis succinea	P	P	P	2	P	P	13	28	15	8	10	145	13	P	15
Nereis virens							3	P	3	3	8				
Glycera americana	5	10													
Glycera dibranchiata	5				3	15	3				3	5			
Scoloplos fragilis		10		2											
Polydora ligni	5									3	55	8	P	P	
Spio setosa									3						P
Streblospio benedicti												3			P
Heteromastus filiformis															
Pectinaria gouldii	5	5		15	15	30	23	5	8	t	5			23	3
Crepidula fornicata							P						P		5
Nassarius obsoletus	15r	15	rs	P	P		s	3	rs				3	5	8
Nassarius trivittatus	5		P				s			3				8	
Mercenaria mercenaria	P	5	P	2	s								s		3
Ensis directus	5			s											
Mulinia lateralis	s	s	20	s	s	5		8	13	5	10	3	55		
Mya arenaria	25	P	5	2	s	3	43	45	93	100	175	28	48	P	s
Balanus improvisus	P		P	P	P	P	P					325			90
Ampelisca sp.	90	10,500	800	31	40	18	5	30	3	33		10	3	P	P
Unicola serrata						P									8
Cyathura polita		15													
Callinectes sapidus					P	P	P						P		
Limulus polyphemus	P	P	P		P		P	P					P		
Conopeum reticulum															
Molgula manhattensis	10			P	3	P	13	P	P	5	3	170	P	P	20

Table 4.—(cont'd)

Taxa	1957 Stations												1958 Stations		
	58	59	60	61	62	63	64	65	66	67	68	69	101	102	103
Microciona prolifera												P			
Haliplanella luciae	P						P	P	3						
Lepidonotus squamatus							P						P		
Eteone lactea															P
Eumida sanguinea	P					P	P					P	P		P
Nereis succinea	P	10	5	3	8	8	3	10		8	5	8	P	3	P
Nereis virens				8		3			8		5				
Glycera americana										3					
Glycera dibranchiata	8		P	P	3		P					P	5	8	8
Scoloplos fragilis				3	3										
Polydora ligni		P				P	P	P	3		3		5	3	P
Spio setosa			3										3	3	
Streblospio benedicti				3				5			P				
Heteromastus filiformis														3	
Pectinaria gouldii			t	10	10		20	40	13	5		30			t
Crepidula fornicata													s	s	s
Nassarius obsoletus	3	3	3			s		s	3			3	s	3r	rs
Nassarius trivittatus	s	s							3		5	8	s	s	
Mercenaria mercenaria	5				s								s	5	
Ensis directus	3			3							s		P	5	
Mulinia lateralis		3	25	5	10		P	3	50	40	45	10	s	s	3
Mya arenaria		5	38	153	138	25	15	148	135	90	45	25	73	10	100
Balanus improvisus		s			P	P		18				3	P	P	28
Ampelisca sp.	P		t	5	5	5	P	3	P		3	28		3	
Unicola serrata												P	8	5	3
Cyathura polita								3						40	
Callinectes sapidus					P	P			P		P	P		P	
Limulus polyphemus			P		P	P		3	P		P	P		P	
Conopeum reticulum													3	P	3
Molgula manhattensis	P			P	P	P	18	P			P	P			

Table 4.—(cont'd)

Taxa	1958 Stations														
	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Microciona prolifera	P		P		P	P	P	P		P	P	P	P	P	P
Haliplanella luciae		P	P												
Lepidonotus squamatus											P		3		
Eteone lactea					P			P			P	P	P	P	P
Fumida sanguinea	P		P					P		P		P	3	P	
Nereis succinea	10	3			P		P	P		5	P		5		P
Nereis virens															
Glycera americana			5	3			3			3	10	10		13	3
Glycera dibranchiata		3													
Scoloplos fragilis			3			3			5		3			10	
Polydora ligni	P	P	3	P	3	10	15	5	3	8	5	3	50+	5	25
Spio setosa				3											
Trebiospio benedicti								P		P	5	P	5	P	
Heteromastus filiformis	3	5	10	3		3		5	3		3	3		8	3
Cistenaria gouldii				t			3		t	t	5	18			
Capitella capitata				P	s				s	P	s	s	s		s
Clymenella torquata	5r	3	rs	10r	13r	rs	15r	10r	r	10r	35r	28r	18	25	15r
Praxillella praetermissa				s	3	3	s	8	3	s	s	10	s	s	
Scoloplos acmeceps	s	s	P	s	P	P	s	3	3	3	3	8	s	3	
Paraonis gracilis				3	8		¼	s	3	8	s	13	8	20	
Aricidea catherinae	3	3	s	3		5	s	s	s	3	s	5		3	
Aricidea jeffreysii	145	35	255	110	40	23	20	18	43	s	178	175	15	35	23
Paraonis fulgens	P		s	P	15	P			s	103	P		15	P	80
Amphiodia sp.	P	18+	5	13	3		8	3	10	t	5	30		75	5
Onuphis conchylega		P	P										18		
Onuphis opalina				15	10							15	3		
Diopatra cuprea		P													
Nephtys bucera		P			P				P						
Nephtys picta		P	P	P	P	P	P			P		P	3		P
Glycinde solitaria	P														

Table 4.—(cont'd)

Taxa	1958 Stations														
	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146
Microciona prolifera				P		P	P								
Haliplanella luciae				P	P	P	P		P	P					P
Lepidonotus squamatus				P	P	P	P	P							P
Eteone lactea				P	P	P	P	5	3	P		P			P
Eumida sanguinea			P	P	P	P	P	P	5	P					
Nereis succinea	5		P	P	5	P	P	3	3	P		10			35
Nereis virens														5	15
Glycera americana			5	15											
Glycera dibranchiata									15	3					
Scoloplos fragilis				5		5									
Polydora ligni	5		30	15	33+	10	40	75	58	P	5	P	10	P	15
Spio setosa	5		5		3			3	3	10	5	10	5		
Streblospio benedicti			P			P		10	P			P			
Heteromastus filiformis			5	5	3	5									
Pectinaria gouldii			15			5		t	t		t	t	t	t	t
Crepidula fornicata			s		83	P		3	50	P					
Nassarius obsoletus	15r		60r	30r	8r	Pr	s	5r	25r	5r	10r			r	130r
Nassarius trivittatus			20	5		15			8						
Mercenaria mercenaria			15	P		s	P	3		s					s
Ensis directus				5	18	10		5	3	30			5		
Mulinia lateralis		s	s			5		8	5	5			5		
Mya arenaria	20	5	70	10	53	50	90	168	483	55	15	70	1,120	755	70
Balanus improvisus	P				33	P	P	P	545	23	5	P	P	P	218
Ampelisca sp.			t	10	3	100	10	13	P		t	10	t	t	t
Unicola serrata				P	30	P		53	28						10
Cyathura polita					8	P		5		3			10		
Callinectes sapidus			P		P	P				P	P	P	P	P	P
Limulus polyphemus				P	P	P	P			P		P	P		P
Conopeum reticulum			P	P	3	P	P	3	3	P					
Molgula manhattensis					P			P			P				P

Table 4.—(cont'd)

Taxa	1958 Stations														
	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161
Microciona prolifera			P					P			P		P	P	
Haliplanella luciae				P	5			P							
Lepidonotus squamatus															
Eteone lactea	P			P		P	P	P							
Eumida sanguinea				P			P								
Nereis succinea	P			P	5	10	P	5	5					5	5
Nereis virens	5	10	10	15					5	20	40	P	5		P
Glycera americana								5							
Glycera dibranchiata						10	10				5				
Scoloplos fragilis					10					P				5	
Polydora ligni	25	5	t	20	5	P	5	P	P	P	P		5	15	
Spio setosa									5	20	5				
Streblospio benedicti			P				P		P						
Heteromastus filiformis							5	5							
Pectinaria gouldii	t	t		t	t		t	t				t		t	
Crepidula fornicata															
Nassarius obsoletus				70	105r	15	40	15r	20r	Pr			20r	20r	15r
Nassarius trivittatus						s	s	s							s
Mercenaria mercenaria							s								
Ensis directus	10	5	10	s	5	5	s		30	10	10			5	
Mulinia lateralis			10		s	s	s	s					s		5
Mya arenaria	265	570	320	225	665	80	45	160	80	840	1,640	100	220	15	50
Balanus improvisus				225	P	P	P	P	P		P		P		
Ampelisca sp.	t	5	t	t			5	10		5	P	t	P	t	t
Unicola serrata				5	5				P						
Cyathura polita					5										
Callinectes sapidus	P	P	P					P		P	P	P	P	P	
Limulus polyphemus	P	P	P	P				P			P				
Conopeum reticulum					5	P		P	P						
Molgula manhattensis	P			5	5		P								

Table 4.—(cont'd)

Taxa	1958 Stations														
	162	164	165	166	167	168	169	170	171	172	173	174	175	176	177
Microciona prolifera	P	P	5					P	P				P		P
Haliplanella luciae	P					P									
Lepidonotus squamatus	P				P	P		P	15	P	P	P	P	P	
Eteone lactea	P		P	13		P		P			3	20	P	3	P
Eumida sanguinea	P	P	P	P	P		P	P	5	P	3	10	P	3	
Nereis succinea	P	P	P		P	P	P	P	8	5	3	10	P	5	P
Nereis virens				P			P		15					P	
Glycera americana			5	18			P			40	5	20	30	3	
Glycera dibranchiata															
Scoloplos fragilis			5	8								5			
Polydora ligni	10	P	10	53	P	P	P	P	28	15	3	30+	P	5	P
Spio setosa	5			35							5	5			
Streblospio benedicti	P	5	P	305		P	P	P		P		10		P	P
Heteromastus filiformis			10	28					3				5		5
Pectinaria gouldii	t	5	t	20						5	t	t	t		5
Crepidula fornicata	P	P			P	P	P		5	P	P	5	P	P	
Nassarius obsoletus	15r	20r	25r				P		r				r		Pr
Nassarius trivittatus			5	3			P		5	10		5	20	10	5
Mercenaria mercenaria	P		5	s						s		s		s	P
Ensis directus		5	s	38	s				3	10	8	25	15	28	
Mulinia lateralis	s	5	s	330					5				20		370
Mya arenaria	25	60	45	53	P				5		3	15	80	3	5
Balanus improvisus	P	P	s	P	P	P	s	P	P	s	P	P	s	3	
Ampelisca sp.	5	5	P	t					t			10	55	3	5
Unicola serrata								P	3		25	30	P	3	
Cyathura polita	20	5	45							5	13	5	5		
Callinectes sapidus	P								18		3				P
Limulus polyphemus	P		P			P									P
Conopeum reticulum	P	P	5		P	P				P	3	P	P		
Molgula manhattensis									P	P				P	

Table 4.—(cont'd)

Taxa	1958 Stations 178	179	1959 Stations 210	211	212	213	214	215	216	217	218	219	220	221	222
Microciona prolifera						P	P	P	P	P	3	P			
Haliplanella luciae						P		P		P	P	P			
Lepidonotus squamatus															
Eteone lactea				P		P	P	5	P	P	P	10		3	P
Eumida sanguinea				P			P	P				P			P
Nereis succinea		5		3		P	P		5	P	15	P		8	3
Nereis virens				3							P				
Glycera americana	10					5	P				3	5			
Glycera dibranchiata			13	27	20				15					10	18
Scoloplos fragilis					3			5			3				
Polydora ligni		10		10		P	P	P	P		P	P			P
Spio setosa		3						5					3		13
Streblospio benedicti		3			3	P	P	55	P	5	10	30			3
Heteromastus filiformis	25	5				25	155		5	5					
Pectinaria gouldii	25	5		3	t	t		t	t		t	t			t
Crepidula fornicata	P	P	s	P	s							s		P	
Nassarius obsoletus			48r	5r	rs	rs	rs	15r	45r	rs	20r	10r		65	35r
Nassarius trivittatus		10	5	s		s	s		s			s			
Mercenaria mercenaria	P	13	5	5		5		s		s	P			s	s
Ensis directus		5	s	s							s		23	5	s
Mulinia lateralis	35	8	s	s		s	s	s		s	s	s	3	8	
Mya arenaria		5	93	3	85	20	5	75	75	10	1,120	1,440	453	13	85
Balanus improvisus				P	P	s	5	s	s	s	s	5	s	s	s
Ampelisca sp.	45	67	3	73	3	45	10	15	25		10	30	13	3	
Unicola serrata		15	8					P							
Cyathura polita				25		5	5		5			40			
Palinectes sapidus		P		P	P					P	P				
Limulus polyphemus	P	P	P		P	P	P	P						P	
Thyropeum reticulum		3			3										P
Polydora websteri															

Table 4.—(cont'd)

Taxa	1959 Stations														
	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237
Microciona prolifera	P									P		P	P	P	P
Haliplanella luciae				P						P				P	
Lepidonotus squamatus										P			P	P	P
Eteone lactea	P	P		P	P			P		P	P	P	P	P	P
Eumida sanguinea	P									P			P	P	P
Nereis succinea			3	P				P	P	P	P	P	P	P	P
Nereis virens		3	8	P	10		5	P							
Glycera americana										3	3	5	18		13
Glycera dibranchiata				3											3
Scoloplos fragilis			3							3		3	10		13
Polydora ligni	P			P	P			P	3	3	P	40	120	P	43
Spio setosa															5
Streblospio benedicti	P	3			P		3					40			5
Heteromastus filiformis										3	5	160	80		13
Pectinaria gouldii	t	3	3		P				t		t	8	3		
Crepidula fornicata				P				P				P	P		P
Nassarius obsoletus	35r	r	5r	10r	20r	r	s	5r	Pr	8r	18r	8r	33	r	75r
Nassarius trivittatus	s							s		3		3	3		5
Mercenaria mercenaria					s			P		P	8	3		P	3
Ensis directus	s	23	20	s	10	20	20	s	s		10	80	13		73
Mulinia lateralis			3	s		5	10	s	s	s	3	120			53
Mya arenaria	1440	1400	252	420	1840	560	790	P	P		5	1400	83		3
Balanus improvisus	P		P		P			P	P	P	P		P		
Ampelisca sp.		t	t			t		P	3	3	13	200	640	P	153
Unicola serrata														P	3
Cyathura polita						5									5
Callinectes sapidus										P					P
Limulus polyphemus	P		P		P	P			P	P	P	P			
Conopeum reticulum				P				P		P	P		P		
Molgula manhattensis															

Table 4.—(cont'd)

Taxa	1959 Stations														
	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252
Microciona prolifera			P	P											
Haliplanella luciae			5	P		3	P								
Lepidonotus squamatus	P		P			P							P	P	
Eteone lactea	5	P	3	P		10	3	3	P	P			8	P	50
Eumida sanguinea	5		3	P		P	P						P	P	P
Nereis succinea	5	P	P	P	P	3			P				P		
Nereis virens									P	20			P	P	
Glycera americana	20	5		5							5	18	20	40	3
Glycera dibranchiata			5			3	3	10							5
Scoloplos fragilis					5										
Polydora ligni	250	50+	15+	P	20	50+	5		P		10	5	33	30	358
Spio setosa				5	5			3					20		
Streblospio benedicti	10				15								8	P	13
Heteromastus filiformis		5						3				3			
Pectinaria gouldii	10			t						t		8			
Crepidula fornicata	P		18		P	s	P						5	5	
Nassarius obsoletus	150r	55r	35r	15r	20r	15r	5r	30	r	Pr		r	r	r	r
Nassarius trivittatus						s	3						8	s	5
Mercenaria mercenaria	10	10	5	10		s						P	3	P	5
Ensis directus	5		8			18		63	50	5	5	3	33	15	18
Mulinia lateralis				35	30	s		23	115	5		s	5	5	
Mya arenaria	70	P	168	1,440	1,300	205	10	400	300	455	495	P	55	35	105
Balanus improvisus			8			P	3	3	35				3	P	
Ampelisca sp.	160	P	35	110	40	3		3				5		t	
Unicola serrata	15		3			13	5	5					53	5	3
Cyathura polita	5		3											15	3
Gallinectes sapidus												P			
Limulus polyphemus				P	P		P	P	5			P	P		P
Sinopeum reticulum				P		3	3						P	5	
Melgula manhattensis														45	P

Table 4.—(cont'd)

Taxa	1959 Stations		1960 Stations										
	283	284	308	309	310	311	312	313	314	315	316	317	318
Microcionа prolifera		P											
Haliplanella luciae		5											
Lepidonotus squamatus													
Eteone lactea		P											
Rumida sanguinea		P	55								25		10
Nereis succinea	5		25			5		20	5	10		20	5
Nereis virens	25	30				20							
Glycera americana			10								35		15
Glycera dibranchiata			30			5		5			20		
Scoloplos fragilis					5	10	10	25			50		65
Polydora ligni	5	P			5		65		25			10	55
Spio setosa			40			5	20					5	35
Streblospio benedicti		5											5
Heteromastus filiformis							5		65		100		40
Pectinaria gouldii	5	15						30	20	15			
Crepidula fornicata			20							5	5		5
Nassarius obsoletus	5	5r	45		5	15	s	50	50	25	80		
Nassarius trivittatus					5						150		40
Mercenaria mercenaria					5				5	5	15		
Ensis directus			25	5		5	5		5	20		5	10
Mulinia lateralis	105	25					20						s
Mya arenaria	5,760	9,880	4,000	115	25	2,625	1,155	2,540	755	110	1,045	1,305	
Balanus improvisus		P	P	P		15	s						
Ampelisca sp.	t		10,450	10	65	195	300	685	4,895	570	7,985	30	150
Unicola serrata			1,835	5			5				60		
Cyathura polita	10		30			5		85			5		5
Callinectes sapidus													
Limulus polyphemus		P											
Conopeum reticulum													
Molgula manhattensis			P	P			5						

Table 4.–(cont'd)

Taxa	1960 Stations 319	320	321	322
Microciona prolifera				
Haliplanella luciae				
Lepidonotus squamatus		5		
Eteone lactea				
Eumida sanguinea		155	125	
Nereis succinea		10	10	10
Nereis virens				
Glycera americana		30	25	5
Glycera dibranchiata	10			
Scoloplos fragilis	80	15	25	90
Polydora ligni		315	150	50
Spio setosa	5	45	150	5
Streblospio benedicti			5	
Heteromastus filiformis	5	5	40	15
Pectinaria gouldii	20	15		
Crepidula fornicata			85	
Nassarius obsoletus	5			
Nassarius trivittatus		65	s	
Mercenaria mercenaria		10		
Ensis directus				
Mulinia lateralis				
Mya arenaria	20		10	10
Balanus improvisus				
Ampelisca sp.	5		35	45
Unicola serrata		5	15	
Cyathura polita		25	20	
Callinectes sapidus				
Limulus polyphemus				
Conopeum reticulum		P		
Molgula manhattensis				

Table 5.— Distribution and abundance of the less prevalent species encountered in the Raritan Bay Macrobenthos Survey, 1957-1960. In parentheses after each station number is the number of organisms per m^2 or their presence (P) in qualitative samples.

SPECIES FOUND PRINCIPALLY IN RARITAN BAY

Species	Station Nos. & Densities	Remarks
Cerianthus sp.	145(P)	
Lepidonotus sublevis	235(P)	
Eteone heteropoda	6(3), 213(P)	
Podarke obscura	47(P), 61(P), 63(P), 69(P), 141(P), 240(P)	upper RB only
Drilonereis longa	152(5), 154(5), 155(10), 157(5), 212(3), 213(15), 237(3)	
Scolelepis squamata	27(3)	sandy sediment
Scoloplos armiger	26(3), 40(10), 46(3), 65(3), 106(3), 111(3), 235(3)	
Pectinaria hyperborea	117(8), 237(18), 242(5), 246(P), 254(3), 257(5), 259(10), 261(15), 264(5), 266(5)	
Pectinaria sp.	53(5), 138(10), 152(5), 155(30), 316(20), 318(5)	extended into upper LB
Sabella microphthalma	25(P), 26(P), 34(P), 48(P), 49(P), 50(P), 58(P), 65(P), 104(P), 105(P), 106(P), 110(P), 137(P), 138(P), 140(P), 146(P), 150(P), 154(P), 162(P), 164(P), 225(P), 236(P), 264(P), 308(5)	extended into upper LB

Table 5.—(cont'd)

Species	Station Nos. & Densities	Remarks
Protula tubularia	137(P)	
Littorina littorea	28(P)	
Eupleura caudata	115(5), 137(P), 139(5), 155(5), 164(P), 235(P), 239(5)	
Busycon carica	164(P)	
Retusa obtusa	148(10), 152(5), 212(3), 216(15), 316(40)	
Pyramidella fusca	235(40), 308(20)	
Odostomia trifida	222(P), 265(P)	
Odostomia sp.	265(5)	
Turbonilla obscura	27(6), 101(P), 136(P), 139(5), 140(8), 150(P), 162(P), 164(P), 173(P), 217(P), 222(P), 243(P)	one finding in upper LB
Modiolus demissus	64(P), 151(P)	
Crassostrea virginica	152(P), 155(P), 168(P), 170(P), 221(P), 255(P)	one finding in upper LB
Petricola pholadiformis	103(P), 116(P), 117(P), 136(P), 237(P)	only in sandy sediment
Balanus eburneus	53(P), 62(P), 63(P), 64(P), 105(P), 146(P), 150(5), 152(P), 164(P), 222(P), 226(P), 227(P)	only in lowest saline portions

Table 5.—(cont'd)

Species	Station Nos. & Densities	Remarks
Stenothoe cypris	139(P), 146(P), 236(P), 240(P), 243(P)	
Stenothoe sp.	147(P)	
Carinogammarus mucronatus	47(P), 49(P), 53(3), 57(3), 61(P), 65(P), 101(P), 102(3), 103(P), 117(P), 132(P), 136(8), 137(P), 139(P), 140(3), 146(P), 150(P), 151(P), 153(P), 154(P), 165(P), 243(P), 253(P)	encroached into LB only on north side
Carcinus maenas	27(3)	
Eurypanopeus depressus	31(P)	
Hexapanopeus angustifrons	111(P), 118(3), 262(P), 263(P)	
Rhithropanopeus harrisi	263(P)	
Bugula sp.	32(P), 33(P), 46(P), 49(P), 64(P), 66(P), 68(P), 69(P), 106(P), 111(P), 113(P), 116(P), 142(P), 217(P), 233(P)	encroached only into upper LB
Amathia vidovici	26(P), 27(P), 42(P)	lower RB & 1957 only
	SPECIES COMMON TO RARITAN AND LOWER BAYS	
Cliona sp.	25(P), 32(P), 101(P), 118(P), 136(3), 137(P), 162(P), 170(P), 174(P), 179(P), 217(P), 236(P), 240(3), 263(P), 266(P)	
Hydractinia echinata	102(P), 252(P)	

Table 5.—(cont'd)

Species	Station Nos. & Densities	Remarks
Tubularia sp.	26(3), 102(3), 108(P), 109(P), 110(P), 113(P), 118(P) 136(P), 137(P), 139(P), 146(P), 147(P), 152(P), 162(P), 165(P), 171(P), 179(P), 211(3), 213(P), 233(P), 239(P), 242(P), 243(3), 255(P), 263(P), 266(P), 267(P), 308(P), 309(P)	
Metridium senile	28(P), 167(P), 261(P), 265(P), 266(P)	
Harmothoe extenuata	25(P), 30(P), 31(P), 33(P), 35(P), 106(P), 113(3), 136(3), 139(P), 168(P), 169(P), 170(P), 171(113), 172(P), 175(P), 176(P), 218(P), 230(P), 232(P), 234(P), 235(P), 236(P), 237(P), 240(P), 241(P), 250(8), 251(5), 252(3), 254(3), 255(P), 264(P), 266(P)	higher saline parts of RB only
Harmothoe imbricata	169(P), 171(10), 176(P), 213(P), 232(P), 235(P), 237(P), 250(3), 255(P)	only lower portions of RB
Paranaitis speciosa	115(P), 135(P), 165(P), 168(P), 170(P), 238(5), 250(P), 252(3)	only lower portions of RB
Exogone dispar	137(P), 138(P), 173(P), 253(P)	along north shore only
Autolytus cornutus	33(P), 136(10), 138(40), 168(P), 171(3), 236(P), 252(5), 254(3)	along north shore only
Nereis virens	48(3), 49(P), 50(3), 51(3), 52(8), 61(8), 63(3), 66(8), 68(5), 145(5), 146(15), 147(5), 148(10), 149(10), 150(15), 155(5), 156(20), 157(40), 158(P), 159(5), 161(P), 166(P), 169(P), 170(P), 171(15), 176(P), 211(3), 218(P), 224(3), 225(8), 226(P), 227(10), 229(5), 230(P), 246(P), 247(20), 250(P), 251(P), 256(P), 259(P), 283(25), 284(30), 311(20)	

Table 5 .—(cont'd)

Species	Station Nos. & Densities	Remarks
Nephtys incisa	26(3), 29(7), 34(5), 43(20), 45(2), 58(5), 107(3), 109(8), 110(5), 111(3), 112(5), 113(3), 138(5), 159(5), 177(10), 220(3), 232(5), 233(3), 265(10), 319(15)	
Spio filicornis	312(5), 318(5)	
Spiochaetopterus oculatus	47(3), 49(P), 61(3), 255(5)	empty tubes at many other stations
Tharyx sp.	29(4), 33(P), 40(5), 45(3), 46(3), 53(5), 61(P), 105(3), 149(P), 150(5), 151(5), 152(30), 154(5), 155(80), 165(5), 166(3), 171(3), 239(5), 250(3), 255(5), 257(3), 263(5)	
Pherusa affinis	41(5), 171(3), 176(3)	
Capitellid A*	29(4), 115(3), 117(3), 135(5), 137(P), 139(5), 162(P), 166(208), 170(P), 171(5), 174(10), 175(25), 177(P), 213(P), 217(5), 218(P), 219(5), 235(3), 237(8), 238(10), 242(5), 245(3), 250(3), 252(5), 263(5), 264(P), 321(5)	
Capitellid B**	166(18), 217(P), 240(8), 250(5)	in sediments with sands >24.3%
Sabellaria vulgaris	33(10), 34(15), 56(P), 58(P), 101(3), 103(P), 106(P), 115(P), 116(5), 136(5), 139(8), 140(5), 151(P), 155(P), 168(P), 170(P), 171(P), 172(5), 173(8), 174(5), 222(P), 236(P), 243(5), 244(10), 250(8), 251(90), 253(P), 318(5), 320(125), 321(30)	predominantly in sandy sediments
Asabellides oculata	102(3), 104(3), 108(3), 157(P), 166(225), 171(5), 175(5), 176(15), 178(5), 224(3), 250(3), 264(5)	

Table 5 .—(cont'd)

Species	Station Nos. & Densities	Remarks
Polycirrus eximius	27(48), 33(P), 34(15), 35(5), 101(P), 116(P), 136(P), 137(P), 138(P), 139(8), 173(5), 174(P), 179(5), 210(3), 243(5), 253(P), 254(P), 308(255)	in sandy sediments except for 3 sta.
Crepidula plana	45(P), 46(P), 57(P), 136(P), 141(3), 155(P), 162(5), 166(P), 167(P), 168(P), 169(P), 170(P), 171(3), 173(5), 174(P), 176(P), 240(P), 244(P), 250(P), 318(5), 320(10)	
Lunatia heros	1(P), 28(P), 42(P), 56(P), 113(P), 166(3), 167(P), 176(3), 235(P), 252(3), 254(3), 318(5)	
Urosalpinx cinerea	25(P), 26(P), 31(P), 45(2), 46(P), 109(P), 113(P), 114(P), 116(3), 117(P), 118(P), 136(18), 137(P), 139(3), 140(5), 162(P), 167(P), 168(P), 169(P), 174(10), 175(P), 176(3), 230(P), 234(3), 235(P), 240(3), 251(P), 255(P), 320(5)	egg cases deposited throughout range
Busycon canaliculatum	31(P), 114(P), 164(P), 177(P), 233(P)	
Retusa canaliculata	178(5), 179(3), 234(80), 235(80), 237(73), 249(5), 252(3), 258(5), 265(5), 267(3), 318(15)	
Nucula proxima	55(3), 250(3)	
Mytilis edulis	1(P), 2(P), 6(P), 25(P), 28(3), 30(P), 37(P), 43(P), 113(25), 155(P), 166(3), 167(P), 168(P), 169(P), 170(P), 171(2960+), 172(P), 176(P), 221(3), 236(P), 239(P), 242(P), 250(8), 251(5), 252(5), 253(5), 254(3), 255(P), 310(5), 318(70), 320(4,090), 321(670), 322(620)	
Gemma gemma	27(P), 101(1,308), 103(240), 117(P), 179(15), 210(63,520), 212(140), 253(62,000)	typically in sandy sediments; low populations found in 24.9% sand

Table 5 .—(cont'd)

Species	Station Nos. & Densities	Remarks
Macoma balthica	6(6), 7(57), 38(15), 49(3), 51(3), 62(3), 64(3), 65(5), 69(3), 105(48), 144(5), 151(5), 156(5), 216(10), 217(3), 221(3), 226(3), 308(25), 309(5), 310(20), 311(15), 314(15), 315(125), 316(85), 317(5), 322(10)	
Edotea triloba	37(5), 101(P), 104(P), 106(P), 139(P), 140(P), 151(P), 153(5), 154(P), 155(P), 165(P), 166(P), 168(P), 243(3), 261(5), 262(P), 308(165)	
Corophium sp.	33(P), 57(P), 115(P), 116(3), 118(P), 154(P), 174(P), 236(P), 321(230), 322(5)	in 29% sand or greater
Crangon septemspinosus	37(5), 46(P), 47(3), 48(P), 55(3), 65(P), 69(5), 104(3), 111(3), 115(P), 118(3), 133(5), 136(3), 142(5), 145(P), 152(10), 157(10), 167(P), 169(P), 179(5), 211(3), 234(5), 250(3), 261(5), 308(35), 309(5), 314(20), 316(20), 319(5), 320(10)	
Panopeus herbsti	25(P), 27(P), 28(P), 29(P), 34(P), 40(P), 41(5), 42(P), 43(P), 63(P), 102(P), 103(P), 108(P), 111(P), 113(3), 115(P), 115(P), 116(P), 117(P), 135(P), 136(P), 137(P), 164(P), 213(P), 217(P), 231(P), 237(P), 238(P), 241(5), 243(P), 263(5), 264(P), 320(45), 321(25)	
Bowerbankia gracilis	26(P), 27(P), 28(P), 32(5), 35(5), 43(P), 115(P), 136(3), 137(P), 138(5), 140(3), 147(P), 166(P), 168(P), 171(P), 172(5), 173(3), 174(P), 175(P), 176(P), 179(3), 226(P), 240(3), 251(5), 253(P), 254(P), 255(5), 263(P), 318(5), 320(P), 321(P)	

Table 5 .—(cont'd)

SPECIES FOUND PRINCIPALLY IN LOWER BAY

Species	Station Nos. & Densities	Remarks
Eulalia viridis	172(P)	
Phyllodoce groenlandica	171(5), 172(P)	
Nereis arenaceodentata	27(3), 171(23), 172(P), 173(P), 253(10)	only in sand
Nephtys picta	166(25), 171(3), 176(3), 210(3?), 250(10), 252(8), 319(5?), 321(5?), 322(5?)	48.7% sand or more
Diopatra cuprea	252(3), 254(3)	empty tubes at several other stations
Lumbrineris tenuis	33(5), 115(13), 117(10), 118(3), 166(5), 173(5), 174(50), 175(15), 176(3), 177(5), 235(120), 237(33), 250(3), 253(5), 254(18), 255(10), 316(130), 318(115), 321(20)	extended into NE corner of RB; in 31.2% sand or more
Spiophanes bombyx	166(15)	
Dodecaceria coralii	170(P)	found only near Coney Island
Hydroides dianthus	33(5), 116(5), 170(P), 173(P)	extended into NE tip of RB; found in sandy areas only
Polinices duplicatus	30(P), 43(P), 172(5), 177(10), 178(10), 236(P), 249(3), 251(5), 255(5), 308(5), 316(5), 321(5)	extended into lower RB only

Table 5 .—(cont'd)

Species	Station Nos. & Densities	Remarks
Mitrella lunata	171(158)	
Adalaria proxima	171(45), 251(P)	
Yoldia limatula	230(5), 231(3), 234(3), 249(5)	
Anomia simplex	251(P)	
Tellina agilis	166(510), 171(205), 172(15), 175(15), 176(18), 179(20), 234(40), 250(45), 252(P), 254(3)	
Spisula solidissima	116(3), 166(820), 171(1373), 172(15), 173(5), 175(5), 176(3)	extended into NE corner of RB
Balanus crenatus	169(P), 171(53), 172(P)	outer LB and the Narrows
Haustorius sp.	171(5)	
Paraphoxus spinosus	253(65)	
Stenothoe minuta	171(3)	
Elasmopis laevis	33(P), 170(P), 175(P), 176(5), 235(P), 236(P), 237(P), 252(P), 254(P)	extended into lower RB only
Microdeutopus gryllotalpa	168(P), 170(P), 171(10), 173(P), 174(5), 243(P), 318(5), 320(5), 321(30)	only one record from RB
Jassa marmorata	171(20)	

Table 5 .—(cont'd)

Species	Station Nos. & Densities	Remarks
Pagurus longicarpus	251(10), 255(5)	
Cancer irroratus	167(P), 171(18), 173(3)	
Libinia sp.	167(P), 174(5), 178(P), 249(P), 250(P), 253(P)	
Arbacia punctulata	171(P)	
Asterias forbesi	167(P), 168(P), 169(P), 171(3), 225(P), 251(P), 322(P)	
Electra hastingsae	176(3)	
Membranipora tenuis	172(P)	
Schizoporella unicornis	33(P), 116(3), 169(P), 170(P), 175(P), 176(P), 236(P), 250(P), 254(P), 255(P), 321(P)	extended to NE corner of RB
Cryptosula pallasiana	155(P), 168(P), 169(P), 172(P), 173(3), 174(P), 175(P), 176(P), 250(3), 251(P), 255(P), 318(5), 320(P), 321(P)	one record from RB
Alcyonidium polyoum	109(3), 116(P), 117(P), 169(P), 171(3), 172(P), 173(P), 174(P), 250(P), 251(P), 253(P), 255(P), 265(P)	extended into lower RB
	UNIDENTIFIED ORGANISMS	
Sponges	29(P), 34(3), 39(P), 41(5), 116(P), 117(3), 135(P), 136(P), 137(P), 142(5), 145(P), 248(5)	
Hydroids	24(P), 25(P), 26(P), 27(P), 30(P), 41(P), 68(P), 101(P), 110(P), 114(P), 116(P), 138(5), 140(3), 142(5), 145(5), 151(P), 162(5), 165(P), 167(P), 168(P), 169(P), 171(3), 172(P), 173(P), 174(5), 212(P), 216(P), 236(P), 250(3), 251(P), 252(P), 253(P), 254(P), 255(P), 267(P), 318(5)	

Table 5 .—(cont'd)

Species	Station Nos. & Densities	Remarks
Anthozoans	41(5), 104(P), 167(P), 172(P), 223(P), 237(P)	
Flatworms	23(P), 27(P), 36(P), 37(P), 46(P), 53(5), 62(P), 63(P), 108(P), 118(3), 136(P), 138(P), 139(10), 141(P), 142(P), 146(10), 151(P), 153(P), 171(P), 173(P), 212(P), 231(P), 235(P), 238(5), 246(P), 253(P), 259(P), 284(P)	
Nemerteans	102(P), 141(3), 155(5), 169(P), 171(3), 312(5)	
Polychaetes	1(pcs), 39(pc), 42(pcs) 49(pcs), 61(pcs), 109(P), 138(5), 166(5, 2 spp.), 171(3), 176(pcs), 212(pcs), 215(P), 217(pcs), 219(5), 225(pcs), 230(5), 234(pcs), 235(pcs), 261(pcs), 317(5), 320(175, 4 spp.), 321(15)	
Oligochaetes	116(3), 215(5), 252(3)	
Amphipods	64(P), 69(P), 171(P), 172(P), 176(P)	
Ectoprocts	115(P), 176(P, 2 spp.)	

*Capillary setae only on the first four seitgers· eyespots absent

**Capillary setae only on the first three setigers; two eyespots present worms very small; red dots of pigment on body.

Table 6.—Number of species found in quantitative samples at selected stations which were sampled in Raritan Bay and Lower Bay for three or four consecutive summers, 1957 to 1960.

		Raritan Bay														Lower Bay					
		Head								Halfway				Lower							
North	Station Number	55	133	261	309					34	137	241	315	32	115	235	316						
	Number Species	7	2	7	5					11	9	7	8	8	15	15	19						
Mid-Bay	Station Number	6	149	228	310	69	160	220	312	41	165	264	314	30	111	231	317	175	255	318	176	250	321
	Number Species	5	4	4	9	10	6	7	10	16	12	9	11	6	9	3	8	13	22	26	22	28	24
South	Station Number	64	151	226	311					39	104	215	313	27	101	210	308				178	249	322
	Number Species	5	13	4	14					12	7	7	8	12	9	10	18				8	9	12