Florida Bay Benthic Community Assessment

Submitted to

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
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Office of Ocean Resources Conservation and Assessment
Silver Spring, Maryland 20910

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INTRODUCTION

Florida Bay was sampled during the summer of 1996. One aspect of this evaluation was benthic community characterization, which was accomplished via sample collection by National Oceanic and Atmospheric Administration (NOAA) personnel and laboratory and data analysis by Barry A. Vittor & Associates, Inc. (BVA)

METHODS

Sample Collection And Handling

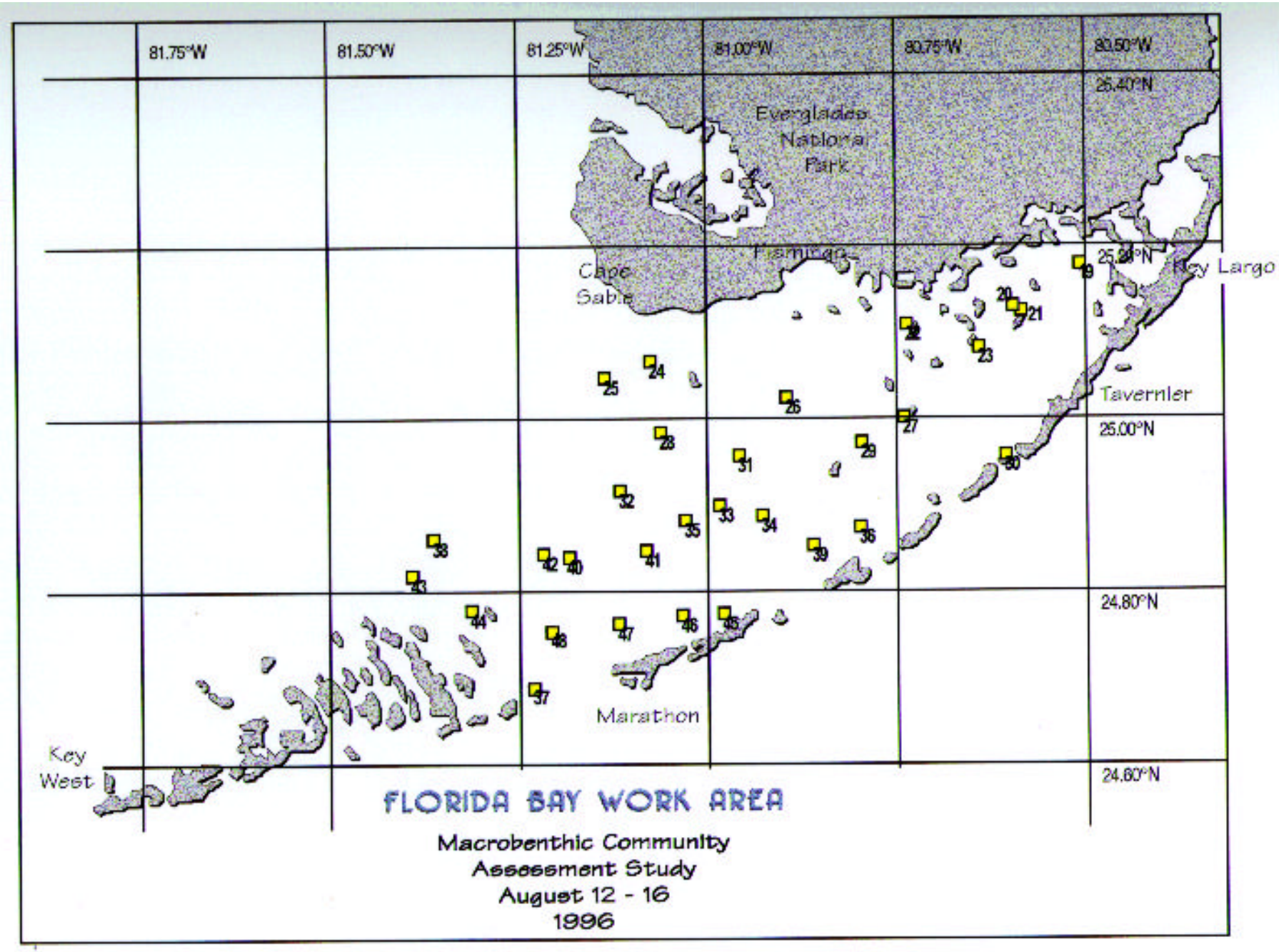
A Young dredge (area = 0.04 m^2) was used to collect replicate bottom samples at each of 26 stations in Florida Bay (Figure 1). Macroinfaunal samples were sieved through a 0.5–mm mesh screen and preserved with 10% formalin on ship. Macroinfaunal samples were transported to the BVA laboratory in Mobile, Alabama.

Sediment Analysis

Sediment texture was determined at half-phi intervals using the hydrometer technique for fractions smaller than 44 µm and nested sieves for larger particle fractions. Texture parameters that were computed included percent gravel, sand, and silt /clay. Total organic carbon (TOC) content was measured as ash-free dry weight expressed as a percentage.

Macroinfaunal Sample Analysis

In the laboratory of BVA, benthic samples were inventoried, rinsed gently through a 0.5 mm mesh sieve to remove preservatives and sediment, stained with Rose Bengal, and stored in 70% isopropanol solution until processing. Sample material (sediment, detritus, organisms) was placed in white enamel trays for sorting under Wild M-5A dissecting microscopes. All macroinvertebrates were carefully removed with forceps and placed in labelled glass vials containing 70% isopropanol. Each vial represented a major taxonomic group (e.g. Polychaeta,


81.75°W
81.50°W
81.25°W
81.00°W
80.75°W
80.50°W
25.40°N
25.20°N
25.00°N
24.80°N
24.60°N
Everglades National Park
Flamingo
Cape Sable
Key Largo
Tavernier
Marathon
Key West
FLORIDA BAY WORK AREA
Macrobenthic Community
Assessment Study
August 12 - 16
1996

Mollusca, Arthropoda). All sorted macroinvertebrates were identified to the lowest practical identification level (LPIL), which in most cases was to species level unless the specimen was a juvenile, damaged, or otherwise unidentifiable. The number of individuals of each taxon, excluding fragments, was recorded. A voucher collection was prepared, composed of representative individuals of each species not previously encountered in samples from the region.

DATA ANALYSIS

All data generated as a result of laboratory analysis of macroinfauna samples were first coded on data sheets. Enumeration data were entered for each species according to station and replicate. These data were reduced to a data summary report for each station, which included a taxonomic species list and benthic community parameters information. Archive data files of species identification and enumeration were prepared.

The QA/QC report for the Florida Bay samples is given in the Appendix.

The analytical methodologies utilized for this study were similar to those used in similar benthic community characterization reports prepared for other state and federal agency surveys. Macroinfaunal characterization involves an evaluation of several biological community structure parameters (e.g., species abundance, species composition and species diversity indices) during initial data reduction, followed by pattern and classification analysis for delineation of taxa assemblages. Since species are distributed along environmental gradients, there are generally no distinct boundaries between communities. However, the relationships between habitats and species assemblages often reflect the interactions of physical and biological factors and indicate major ecological trends.

Assemblage Structure

Several numerical indices were chosen for analysis and interpretation of the macroinfaunal data. Selection was based primarily on the ability of the index to provide a meaningful summary of data, as well as the applicability of the index to the characterization of the benthic community.

Infaunal abundance is reported as the total number of individuals per station and the total number of individuals per square meter (= density). Taxa richness is reported as the total number of taxa represented in a given station collection.

Taxa diversity, which is often related to the ecological stability and environmental "quality" of the benthos, was estimated by the Pielou's Index (Pielou, 1966), according to the following formula:

$$H' = -\sum_{i=1}^{s} p_i(ln\ p_i)$$

where, S = is the number of taxa in the sample,
i = is the i'th taxa in the sample, and
p_i = is the number of individuals of the i'th taxa divided by the total number of individuals in the sample.

Taxa diversity within a given community is dependent upon the number of taxa present (taxa richness) and the distribution of all individuals among those taxa (equitability or evenness). In order to quantify and compare faunal equitability to taxa diversity for a given area, Pielou's Index J' (Pielou, 1966) was calculated as $J' = H'/ln\ S$, where $ln\ S = H'_{max}$, or the maximum possible diversity, when all taxa are represented by the same number of individuals; thus, $J' = H'/H'_{max}$.

Macroinfaunal data were graphically and statistically analyzed to identify any differences in density between stations. Data for total density were variously transformed and tested for normality (Shapiro-Wilk W; SAS Institute, 1995). Data could not be normalized with standard transformations [e.g. ln(x+1), √(x+1)], so data were analyzed using non-parametric methods [e.g.Wilcoxon/Kruskal-Wallis chi-squared (χ^2) test; SAS Institute, 1995].

Faunal Similarities

Numerical classification analysis (Boesch 1977) was performed on the faunal data to examine within- and between- stations differences at the Florida Bay stations and to compare

faunal composition at each station within the site. Both normal and inverse classification analyses were used in this study. Normal analysis (sometimes called Q-analysis) treats samples as individual observations, each being composed of a number of attributes (i.e. the various taxa from a given sample). Normal analysis is instructive in helping to ascertain community structure and to infer specific ecological conditions between sampling stations from the relative distributions of species. Inverse classification (termed R-analysis) is based on taxa as individuals, each of which is characterized by its relative abundance in the various samples. This type of analysis is commonly used to identify species groupings with particular habitats or environmental conditions.

Classification analysis of both station collections (normal analysis) and taxa (inverse analysis) was performed using the Czekanowski quantitative index of faunal similarity (Field and MacFarlane 1968). This index is computationally equivalent to the Bray-Curtis similarity measure (Bray and Curtis 1957). The value of the similarity index is 1.0 when two samples are identical and 0 when no taxa are in common. Hierarchical clustering of similarity values is achieved using the group-average sorting strategy (Lance and Williams 1967) and displayed in the form of dendograms.

Both similarity classification and cluster analysis were performed using the microcomputer package, "Community Analysis System 5.0" (Bloom 1994), as modified for use in BVA's benthic data management program. Taxa used in these analyses were selected according to their percent abundance and percent frequency. Total densities for each of the selected taxa at a given station were log-transformed [x=ln(x+1)] for the analysis.

HABITAT CHARACTERISTICS

Sediment data for the 26 stations are given in Table 2 and Figures 2, 3 and 4. Sediment composition at the 26 stations varied considerably from predominantly clay at Stations 26, 40 and 43 to gravelly sand at Stations 24, 25, 29 and 38 (Table 2; Figures 2, 3). The total organic carbon

Table 1. Summary of sediment and benthic macroinfaunal data for the Florida Bay stations, August 1996.

Station	Total Taxa	Mean Taxa per Rep.	Total No. Inds.	Density		H'	J'		Bottom Salinity (ppt)	Bottom DO (mg/l)	% Gravel	% Sand	% Silt	% Clay	TOC	Textural Description
				Mean	Std. Dev.											
19	62	34.3	849	7075	4203	3.08	0.75		25.7	3.12	1.25	60.69	17.12	20.94	8.83	clayey sand
20	54	28.6	662	5517	775	2.26	0.57		21.6	6.35	3.25	78.55	4.52	13.68	11.55	sand
21	59	32.0	544	4533	1384	2.86	0.70		21.9	5.10	1.60	59.92	12.67	25.81	10.63	clayey sand
22	21	15.0	276	2300	614	2.23	0.73		35.3	4.08	0.44	7.92	46.15	45.59	11.30	silty clay
23	72	43.0	535	4458	1436	3.44	0.80		24.6	5.60	1.16	27.48	27.85	43.51	11.42	silty clay
24	147	79.7	1158	9650	5013	3.91	0.78		37.2	5.18	9.59	74.65	6.65	9.12	10.68	gravelly sand
25	167	90.7	1116	9300	3180	4.41	0.86		36.7	5.85	9.92	72.37	10.96	0.00	10.64	gravelly sand
26	57	30.6	432	3600	1400	2.89	0.71		39.8	2.97	0.00	9.16	30.01	60.83	4.39	clay
27	54	28.0	340	2833	1638	2.97	0.74		39.8	5.26	14.61	47.80	11.49	26.09	11.92	gravelly, muddy sand
28	165	89.0	1318	10983	4188	4.03	0.79		37.1	5.21	7.09	67.74	7.64	17.53	10.18	gravelly, muddy sand
29	92	47.7	565	4708	2892	3.79	0.84		40.0	4.48	6.72	92.09	0.00	0.00	11.52	gravelly sand
30	102	52.3	716	5967	4306	3.42	0.74		38.7	4.31	15.38	35.08	18.86	30.68	11.24	gravelly mud
31	86	40.7	670	5583	4692	3.30	0.74		38.0	4.33	5.08	46.88	24.68	23.36	6.76	gravelly mud
32	157	83.3	634	5283	927	4.45	0.88		37.2	6.05	6.51	79.89	4.18	9.42	10.76	gravelly muddy sand
33	68	32.0	230	1917	253	3.41	0.81		37.5	4.63	5.03	61.07	14.35	19.54	10.65	gravelly muddy sand
36	173	90.0	1387	11558	3832	4.12	0.80		38.7	6.26	6.60	73.80	7.55	12.05	10.90	gravelly muddy sand
37	139	70.0	525	4375	1859	4.26	0.86		38.1	4.24	6.12	61.52	15.67	16.68	4.67	gravelly muddy sand
38	112	62.3	1167	9725	3268	3.27	0.69		37.6	5.54	10.94	88.64	0.00	0.00	10.35	gravelly sand
39	206	115.4	1967	16392	11416	4.20	0.79		37.8	5.23	2.73	69.08	10.51	17.69	nd	silty sand
40	127	59.7	558	4650	1305	3.99	0.82		37.4	6.35	0.37	11.56	36.13	51.94	11.23	clay
42	160	80.3	858	7150	3053	4.27	0.84		37.4	6.25	3.83	36.39	21.78	38.00	10.13	sandy clay
43	98	50.7	432	3600	477	3.81	0.83		37.8	5.49	0.00	8.74	34.27	56.99	10.37	clay
44	120	61.0	588	4900	1830	3.90	0.81		37.7	4.16	1.97	29.58	19.83	48.61	11.33	sandy clay
45	131	70.0	808	6733	3615	4.00	0.82		38.3	4.67	2.98	63.70	9.32	24.00	11.25	clayey sand
46	163	85.3	1345	11208	6909	4.00	0.79		38.0	5.39	3.98	93.68	0.00	0.00	10.88	sand
48	165	92.3	1061	8842	881	4.27	0.84		37.5	4.35	8.95	70.55	10.65	9.85	11.29	gravelly muddy sand

nd = No Data

Figure 2. Sediment composition for the Florida Bay staions, August 1996.

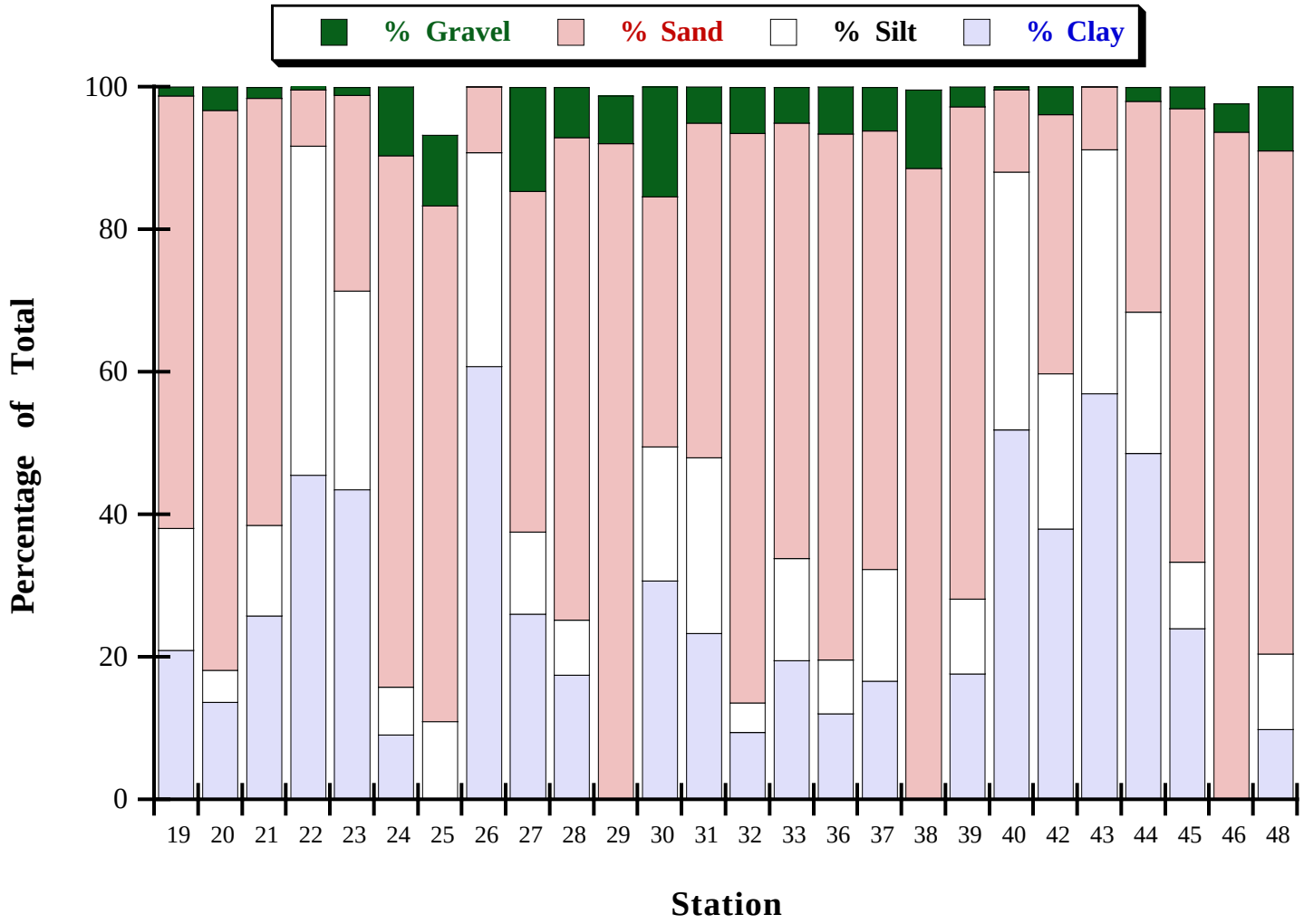


Figure 3. Percent gravel/sand and percent silt/clay content of sediments for the Florida Bay stations, August 1996.

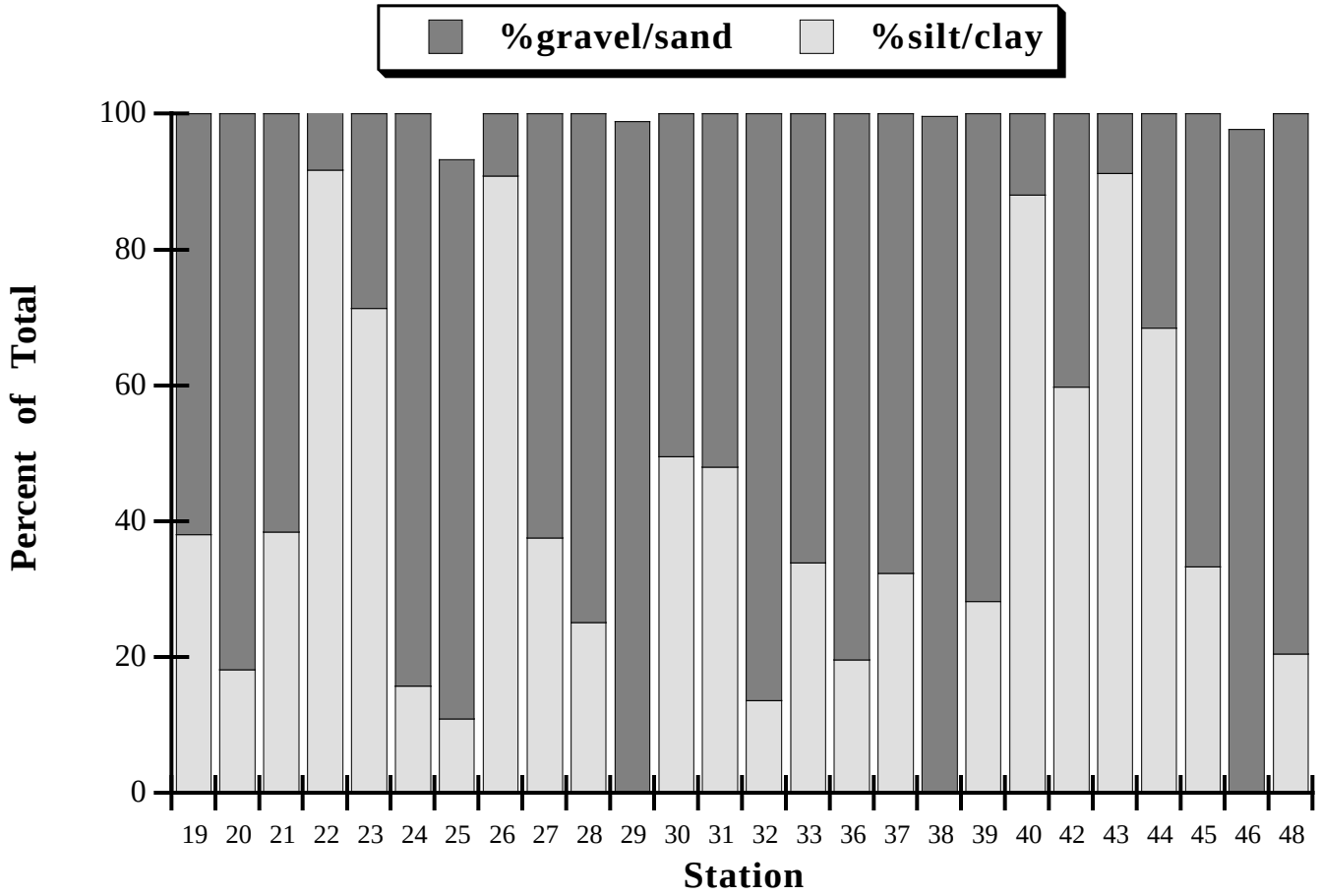
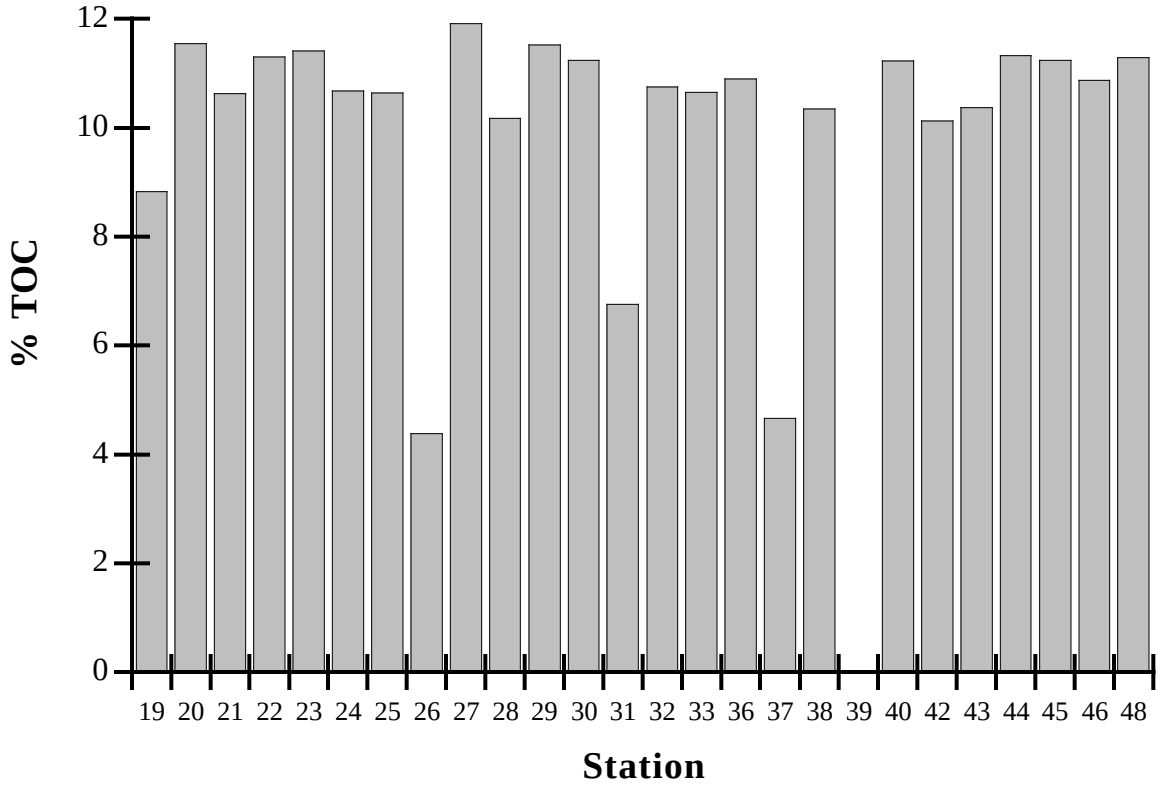


Figure 4. Percent total organic carbon (TOC) content of the sediments for the Florida Bay stations, August 1996.



(TOC) fraction of the sediment ranged from 4.4% to 11.9% at Stations 26 and 27, respectively (Table 2; Figure 4).

BENTHIC COMMUNITY CHARACTERIZATION

Faunal Composition, Abundance, And Community Structure

Table 1 provides a complete phylogenetic listing for all stations as well as data on taxa abundance and station occurrence. Four Microsoft ™Excel 5.0 (Macintosh version) spreadsheets are being provided separately to NOAA which include: raw data on taxa abundance and density by replicate, a complete taxonomic listing with station abundance and occurrence and additional QA/QC comments, a major taxa table with overall taxa abundance, and an assemblage parameter table including data on mean number of taxa, mean density, taxa diversity and taxa evenness by station and site.

A total of 20,741 organisms, representing 642 taxa, were identified from the 26 stations (Table 3). Polychaetes were the most numerous organisms present representing 44.1% of the total assemblage, followed in abundance by gastropods (10.8%), amphipods (10.7%) and tanaids (7.5%). Polychaetes represented 37.2% of the total number of taxa followed by gastropods (13.4%), other crustaceans (13.2%), amphipods (11.2%) and bivalves (9.2%)(Table 3). The percentage abundance of the major taxa at the 26 stations is given in Figure 5.

The dominant taxa collected from the samples were the tanaid, *Leptochelia* (LPIL), the gastropod, *Caecum pulchellum,* the annelid class Oligochaeta (LPIL) and the polychaete, *Fabricinuda trilobata* representing 6.4%, 5.3%, 5.0% and 4.3% of the total number of individuals, respectively (Table 1). Rhynchocoela (LPIL), Oligochaeta (LPIL) and the amphipod family, Aoridae (LPIL) were the most widely distributed taxa being found at 100%, 96.2% and 96.2% of the stations, respectively. Nine additional taxa were found at 80% of the stations (Table

Table 2. Abundance and distribution of taxa for the Florida Bay stations, August 1996.
Taxa above the shaded line of data were included in the classification analysis.

Taxon	Phylum	Class	No. Inds.	% Total	Cum %	Station Occur	% Station Occur	Comments
LEPTOCHELIA (LPIL)	C	Tana	1321	6.37	6.37	21	80.8	mature male necessary for species level identification.
CAECUM PULCHELLUM	M	Gast	1089	5.25	11.62	22	84.6	
OLIGOCHAETA (LPIL)	A	Olig	1031	4.97	16.59	25	96.2	marine and some estuarine specimens; only identified to class
FABRICINUDA TRILOBATA	A	Poly	899	4.33	20.93	23	88.5	
MEDIOMASTUS (LPIL)	A	Poly	514	2.48	23.4	21	80.8	anterior fragments only, pygidium needed for species ID; probably M. californiensis
EXOGONE ROLANI	A	Poly	482	2.32	25.73	15	57.7	
EXOGONE DISPAR	A	Poly	406	1.96	27.69	21	80.8	
PHASCOLION STROMBI	S		383	1.85	29.53	22	84.6	
SCOLETOMA VERRILLI	A	Poly	383	1.85	31.38	19	73.1	
EXOGONE LOUREI	A	Poly	381	1.84	33.22	17	65.4	
CIRROPHORUS (LPIL)	A	Poly	375	1.81	35.02	20	76.9	immature and/or fragmented portion only
CAPITELLIDAE (LPIL)	A	Poly	314	1.51	36.54	21	80.8	immature and/or anterior portion only
GRANDIDIERELLA BONNIEROIDES	C	Amph	298	1.44	37.97	17	65.4	
RHYNCHOCOELA (LPIL)	R		288	1.39	39.36	26	100	no identifiable characters
QUESTA CAUDICIRRI	A	Poly	287	1.38	40.75	4	15.4	
AORIDAE (LPIL)	C	Amph	258	1.24	41.99	25	96.2	lacking appendages
GONIADIDES CAROLINAE	A	Poly	258	1.24	43.23	10	38.5	
MALDANIDAE (LPIL)	A	Poly	246	1.19	44.42	14	53.8	fragmented portion, pygidium necessary for positive identification
GOLFINGIA (LPIL)	S		218	1.05	45.47	19	73.1	immature and/or damaged specimen
SCHISTOMERINGOS PECTINATA	A	Poly	199	0.96	46.43	19	73.1	
NUCULA AEGEENIS	M	Biva	179	0.86	47.29	14	53.8	
CAECUM NITIDIUM	M	Gast	174	0.84	48.13	10	38.5	
SYLLIS CORNUTA	A	Poly	173	0.83	48.97	23	88.5	
ACUMINODEUTOPUS NAGLEI	C	Amph	164	0.79	49.76	13	50	
ELASMOPUS (LPIL)	C	Amph	154	0.74	50.5	13	50	immature specimen
CHONE (LPIL)	A	Poly	150	0.72	51.22	13	50	genus is lowest possible identification level
NEREIDAE (LPIL)	A	Poly	149	0.72	51.94	21	80.8	missing identification characters and/or immature
ACTINIARIA (LPIL)	Cn	Acti	146	0.7	52.65	19	73.1	order is lowest identification level
MONTICELLINA DORSOBRANCHIALIS	A	Poly	146	0.7	53.35	15	57.7	
SYNASTEROPE SETISPARSA	C	Ostr	144	0.69	54.04	12	46.2	
SYLLIS BROOMENSIS	A	Poly	142	0.68	54.73	18	69.2	
SIPUNCULA (LPIL)	S		138	0.67	55.39	18	69.2	juvenile specimen
LEMBOS (LPIL)	C	Amph	136	0.66	56.05	16	61.5	adult male with all appendages necessary for identification
CIRRATULIDAE (LPIL)	A	Poly	131	0.63	56.68	18	69.2	anterior fragment, posterior needed for species ID
PARAEUPOLYMNIA SP.A	A	Poly	129	0.62	57.3	20	76.9	
CARPIAS (LPIL)	C	Isop	128	0.62	57.92	10	38.5	mature male necessary for species identification
SOLEMYA OCCIDENTALIS	M	Biva	128	0.62	58.54	7	26.9	
SPHAEROSYLLIS PIRIFEROPSIS	A	Poly	115	0.55	59.09	12	46.2	
LUCINIDAE (LPIL)	M	Pele	114	0.55	59.64	14	53.8	juvenile specimen
RUTIDERMA DARBYI	C	Ostr	114	0.55	60.19	14	53.8	
AMPELISCA SP.Y	C	Amph	113	0.54	60.74	11	42.3	
CERAPUS SP.B	C	Amph	113	0.54	61.28	9	34.6	
PODOCOPA FAMILY B	C	Ostr	113	0.54	61.83	11	42.3	no literature currently available for more complete identification of this taxa
TUBULANUS (LPIL)	R		106	0.51	62.34	20	76.9	genus is lowest identification level
MELITIDAE (LPIL)	C	Amph	103	0.5	62.83	17	65.4	specimen lacks third uropod necessary for identification
LUMBRINERIDAE (LPIL)	A	Poly	100	0.48	63.32	15	57.7	damaged and/or immature specimen
PELECYPODA (LPIL)	M	Biva	99	0.48	63.79	20	76.9	crushed and/or juvenile specimen
SYNAPTIDAE (LPIL)	E	Holo	98	0.47	64.26	6	23.1	immature specimen
TEREBELLIDES PARVUS	A	Poly	98	0.47	64.74	14	53.8	
AMPHIURIDAE (LPIL)	E	Ophi	95	0.46	65.2	18	69.2	immature specimen
ARICIDEA PHILBINAE	A	Poly	94	0.45	65.65	15	57.7	
BRANCHIOMMA NIGROMACULATA	A	Poly	94	0.45	66.1	14	53.8	
POLYPLACOPHORA (LPIL)	M	Polyp	91	0.44	66.54	13	50	immature specimen
SYLLIS (LPIL)	A	Poly	89	0.43	66.97	16	61.5	incomplete specimen, posterior portion necessary for species identification
AXIOTHELLA MUCOSA	A	Poly	88	0.42	67.39	6	23.1	
AMPELISCA (LPIL)	C	Amph	86	0.41	67.81	12	46.2	juvenile specimen
VAUNTHOMPSONIA SP.B	C	Cuma	85	0.41	68.22	8	30.8	
GASTROPODA (LPIL)	M	Gast	82	0.4	68.61	20	76.9	crushed and/or immature specimen
TELLINIDAE (LPIL)	M	Pele	78	0.38	68.99	17	65.4	crushed and/or juvenile specimen
CALYPTRAEA CENTRALIS	M	Gast	73	0.35	69.34	7	26.9	
CIRROPHORUS FURCATUS	A	Poly	73	0.35	69.69	9	34.6	
PETTIBONELLA MULTIUNCINATA	A	Poly	73	0.35	70.05	8	30.8	
ARICIDEA TAYLORI	A	Poly	72	0.35	70.39	20	76.9	
CUMELLA GARRITYI	C	Cuma	72	0.35	70.74	14	53.8	
ELASMOPUS POCILLIMANUS	C	Amph	72	0.35	71.09	5	19.2	
CAULLERIELLA CF. ALATA	A	Poly	71	0.34	71.43	10	38.5	
OPHIUROIDEA (LPIL)	E	Ophi	68	0.33	71.76	18	69.2	central disk missing characters necessary for identification
ERICHTHONIUS BRASILIENSIS	C	Amph	66	0.32	72.08	9	34.6	
CERATONEREIS VERSIPEDATA	A	Poly	64	0.31	72.38	8	30.8	
ARICIDEA SP.X	A	Poly	63	0.3	72.69	9	34.6	
SCHWARTZIELLA BRYEREA	M	Gast	61	0.29	72.98	1	3.8	
EHLERSIA FERRUGINA	A	Poly	60	0.29	73.27	6	23.1	
TEREBELLIDAE (LPIL)	A	Poly	59	0.28	73.56	17	65.4	
CAECUM FLORIDANUM	M	Gast	57	0.27	73.83	5	19.2	
SHOEMAKERELLA CUBENSIS	C	Amph	57	0.27	74.11	12	46.2	
PARASTEROPE MUELLERI	C	Ostr	56	0.27	74.38	3	11.5	
EUSARSIELLA (LPIL)	C	Ostr	54	0.26	74.64	12	46.2	
ISOLDA PULCHELLA	A	Poly	54	0.26	74.9	10	38.5	
EUSARSIELLA PANICULATA	C	Ostr	53	0.26	75.15	8	30.8	
DEUTELLA INCERTA	C	Amph	52	0.25	75.4	10	38.5	
DULICHIELLA SP.B	C	Amph	50	0.24	75.64	9	34.6	
ASPIDOSIPHON ALBUS	S		48	0.23	75.87	1	3.8	
EUSARSIELLA CORNUTA	C	Ostr	47	0.23	76.1	8	30.8	
FIMBRIOSTHENELAIS MINOR	A	Poly	47	0.23	76.33	15	57.7	
CIRROPHORUS LYRA	A	Poly	46	0.22	76.55	6	23.1	
PRIONOSPIO CRISTATA	A	Poly	45	0.22	76.77	13	50	
PSEUDOLEPTOCHELIA SP.A	C	Tana	45	0.22	76.98	6	23.1	
CERADOCUS SP.C	C	Amph	43	0.21	77.19	4	15.4	
SCOLOPLOS RUBRA	A	Poly	43	0.21	77.4	7	26.9	
AMAKUSANTHURA MAGNIFICA	C	Isop	42	0.2	77.6	12	46.2	
AMPHIPODA (LPIL)	C	Amph	42	0.2	77.8	13	50	

Table 2. Continued

Taxon	Phylum	Class	No. Inds.	% Total	Cum %	Station Occur	% Station Occur	Comments
GRUBEOSYLLIS RUGULOSA	A	Poly	42	0.2	78.01	8	30.8	
PLATYNEREIS DUMERILLI	A	Poly	42	0.2	78.21	11	42.3	
SABELLIDAE (LPIL)	A	Poly	42	0.2	78.41	16	61.5	
ACLIDIDAE (LPIL)	M	Gast	41	0.2	78.61	8	30.8	
NOTOMASTUS (LPIL)	A	Poly	41	0.2	78.81	11	42.3	
TELLINA (LPIL)	M	Biva	41	0.2	79	8	30.8	
ARMANDIA MACULATA	A	Poly	40	0.19	79.2	9	34.6	
NEAEROMYA FLORIDANA	M	Biva	39	0.19	79.38	8	30.8	
SABELLASTARTE SP.A	A	Poly	38	0.18	79.57	3	11.5	
OXYUROSTYLIS SP.J	C	Cuma	37	0.18	79.75	6	23.1	
NOTOMASTUS TENUIS	A	Poly	36	0.17	79.92	11	42.3	
TAYLORPHOLOE HIRSUTA	A	Poly	35	0.17	80.09	6	23.1	
BULLA STRIATA	M	Gast	34	0.16	80.25	8	30.8	
OXYUROSTYLIS (LPIL)	C	Cuma	33	0.16	80.41	9	34.6	
PRIONOSPIO (LPIL)	A	Poly	33	0.16	80.57	16	61.5	
CAECUM IMBRICATUM	M	Gast	32	0.15	80.73	5	19.2	
EXOGONE (LPIL)	A	Poly	32	0.15	80.88	9	34.6	
GONIADIDAE (LPIL)	A	Poly	32	0.15	81.03	4	15.4	
LEPTOCHELIA FORRESTI	C	Tana	32	0.15	81.19	5	19.2	
PETTIBONEIA DUOFURCA	A	Poly	32	0.15	81.34	6	23.1	
SCHWARTZIELLA CATESBYANA	M	Gast	32	0.15	81.5	5	19.2	
BRACHIDONTES EXUSTUS	M	Biva	31	0.15	81.65	5	19.2	
EUSARSIELLA RADIICOSTA	C	Ostr	31	0.15	81.8	10	38.5	
LUMBRINERIS SP.D	A	Poly	31	0.15	81.94	4	15.4	
ASTEROPELLA MONAMBON	C	Ostr	30	0.14	82.09	8	30.8	
AEGINELLIDAE (LPIL)	C	Amph	29	0.14	82.23	6	23.1	
CERITHIIDAE (LPIL)	M	Gast	29	0.14	82.37	8	30.8	
EUSARSIELLA NODIMARGINUS	C	Ostr	29	0.14	82.51	7	26.9	
HAPLOSYLLIS SPONGICOLA	A	Poly	29	0.14	82.65	5	19.2	
PARAMPHINOME SP.B	A	Poly	29	0.14	82.79	5	19.2	
KALLIAPSEUDES SP.C	C	Tana	28	0.13	82.92	5	19.2	
PHYLLODOCIDAE (LPIL)	A	Poly	28	0.13	83.06	11	42.3	
ASCIDIACEA (LPIL)	U	Asci	27	0.13	83.19	4	15.4	
ASTEROPTERYGION OCULITRISTIS	C	Ostr	27	0.13	83.32	7	26.9	
CYMADUSA COMPTA	C	Amph	27	0.13	83.45	7	26.9	
HAMINOEA SUCCINEA	M	Gast	27	0.13	83.58	5	19.2	
PARACERCEIS CAUDATA	C	Isop	27	0.13	83.71	13	50	
PROTODORVILLEA KEFERSTEINI	A	Poly	27	0.13	83.84	4	15.4	
TRICHOBRANCHUS GLACIALIS	A	Poly	27	0.13	83.97	10	38.5	
DASYBRANCHUS LUNULATUS	A	Poly	26	0.13	84.1	8	30.8	
EUSARSIELLA PILLIPOLLICIS	C	Ostr	26	0.13	84.22	8	30.8	
PAGURAPSEUDES LARGOENSIS	C	Tana	26	0.13	84.35	3	11.5	
PHASCOLION SP.B	S		26	0.13	84.47	2	7.7	
PODARKEOPSIS LEVIFUSCINA	A	Poly	26	0.13	84.6	11	42.3	
TELLINA SIMILIS	M	Biva	26	0.13	84.72	8	30.8	
CERITHIUM SP.A	M	Gast	25	0.12	84.84	5	19.2	
OSTRACODA (LPIL)	C	Ostr	25	0.12	84.96	10	38.5	
SYLLIS PROLIFERA	A	Poly	25	0.12	85.08	6	23.1	
ANTHURIDAE (LPIL)	C	Isop	24	0.12	85.2	13	50	
LINEIDAE (LPIL)	R		24	0.12	85.32	10	38.5	
MARGINELLA (LPIL)	M	Gast	24	0.12	85.43	10	38.5	
NEREIS ACUMINATA	A	Poly	24	0.12	85.55	4	15.4	
APSEUDES (LPIL)	C	Tana	23	0.11	85.66	4	15.4	
LUMBRINERIS LATREILLI	A	Poly	23	0.11	85.77	6	23.1	
NEREIS (LPIL)	A	Poly	23	0.11	85.88	7	26.9	
SPHAEROMATIDAE (LPIL)	C	Isop	23	0.11	85.99	8	30.8	
SYLLIDAE (LPIL)	A	Poly	23	0.11	86.1	11	42.3	
ARICIDEA (LPIL)	A	Poly	22	0.11	86.21	14	53.8	
BATEA CARINATA	C	Amph	22	0.11	86.31	9	34.6	
COROPHIUM (LPIL)	C	Amph	22	0.11	86.42	7	26.9	
EOBROLGUS SPINOSUS	C	Amph	22	0.11	86.53	3	11.5	
GOLFINGIA SP.HH	S		22	0.11	86.63	5	19.2	
LUMBRINERIS COCCINEA	A	Poly	22	0.11	86.74	3	11.5	
MACOMA TENTA	M	Biva	22	0.11	86.84	9	34.6	
MELINNA MACULATA	A	Poly	22	0.11	86.95	9	34.6	
ODONTOSYLLIS ENOPLA	A	Poly	22	0.11	87.06	9	34.6	
EDOTIA TRILOBA	C	Isop	21	0.1	87.16	4	15.4	
OLIVIDAE (LPIL)	M	Gast	21	0.1	87.26	10	38.5	
ATYS RIISEANA	M	Gast	20	0.1	87.35	3	11.5	
BRANCHIOSYLLIS EXILIS	A	Poly	20	0.1	87.45	10	38.5	
CARPIAS ALGICOLA	C	Isop	20	0.1	87.55	2	7.7	
CLYMENELLA TORQUATA	A	Poly	20	0.1	87.64	3	11.5	
CUMELLA (LPIL)	C	Cuma	20	0.1	87.74	9	34.6	
CYLINDROBULLA BEAUII	M	Gast	20	0.1	87.84	5	19.2	
EUNICIDAE (LPIL)	A	Poly	20	0.1	87.93	10	38.5	
SCOLETOMA CANDIDA	A	Poly	20	0.1	88.03	4	15.4	
TURBONILLA (LPIL)	M	Gast	20	0.1	88.13	8	30.8	
DORVILLEIDAE (LPIL)	A	Poly	19	0.09	88.22	7	26.9	
LYSIANASSIDAE (LPIL)	C	Amph	19	0.09	88.31	8	30.8	
NEOMEGAMPHOPUS (LPIL)	C	Amph	19	0.09	88.4	4	15.4	
NEREIS GRAYI	A	Poly	19	0.09	88.49	6	23.1	
ASPIDOSIPHON (LPIL)	S		18	0.09	88.58	2	7.7	
CAPITELLA CAPITATA	A	Poly	18	0.09	88.67	9	34.6	
CAULLERIELLA SP.E	A	Poly	18	0.09	88.75	6	23.1	
CERITHIUM (LPIL)	M	Gast	18	0.09	88.84	7	26.9	
MAERA (LPIL)	C	Amph	18	0.09	88.93	2	7.7	
MEDIOMASTUS CALIFORNIENSIS	A	Poly	18	0.09	89.01	10	38.5	
MEGALOMMA PIGMENTUM	A	Poly	18	0.09	89.1	5	19.2	
PRIONOSPIO HETEROBRANCHIA	A	Poly	18	0.09	89.19	10	38.5	
THARYX ACUTUS	A	Poly	18	0.09	89.27	8	30.8	
APSEUDES PROPINQUUS	C	Tana	17	0.08	89.36	7	26.9	
ASYCHIS ELONGATUS	A	Poly	17	0.08	89.44	4	15.4	
CAECUM (LPIL)	M	Gast	17	0.08	89.52	6	23.1	
NEREIS PANAMENSIS	A	Poly	17	0.08	89.6	4	15.4	

Table 2. Continued

Taxon	Phylum	Class	No. Inds.	% Total	Cum %	Station Occur	% Station Occur	Comments
PSEUDOPHILOMEDES AMBON	C	Ostr	17	0.08	89.68	4	15.4	
GLYCINDE SOLITARIA	A	Poly	16	0.08	89.76	8	30.8	
LEMBOS FORESTI	C	Amph	16	0.08	89.84	1	3.8	
MALMGRENIELLA SP.B	A	Poly	16	0.08	89.91	10	38.5	
NEMATONEREIS HEBES	A	Poly	16	0.08	89.99	8	30.8	
NEPHTYS PICTA	A	Poly	16	0.08	90.07	1	3.8	
PYRAMIDELLIDAE (LPIL)	M	Gast	16	0.08	90.15	6	23.1	
ACTINOSETA CHELISPARSA	C	Ostr	15	0.07	90.22	7	26.9	
CYCLASPIS (LPIL)	C	Cuma	15	0.07	90.29	5	19.2	
CYCLASPIS PUSTULATA	C	Cuma	15	0.07	90.36	4	15.4	
DIPLODONTA PUNCTATA	M	Biva	15	0.07	90.44	3	11.5	
GONIADA TERES	A	Poly	15	0.07	90.51	6	23.1	
KALLIAPSEUDES (LPIL)	C	Tana	15	0.07	90.58	4	15.4	
OLIVELLA FLORALIA	M	Gast	15	0.07	90.65	5	19.2	
OSTRACODA FAMILY P	C	Ostr	15	0.07	90.72	2	7.7	
SCOLETOMA (LPIL)	A	Poly	15	0.07	90.8	7	26.9	
BOGUEA SP.A	A	Poly	14	0.07	90.86	1	3.8	
CAULLERIELLA (LPIL)	A	Poly	14	0.07	90.93	6	23.1	
ERICHSONELLA FILIFORMIS	C	Isop	14	0.07	91	6	23.1	
GALATHOWENIA OCULATA	A	Poly	14	0.07	91.07	5	19.2	
GLYCYMERIS DECUSSATA	M	Biva	14	0.07	91.13	2	7.7	
INERMONEPHTYS INERMIS	A	Poly	14	0.07	91.2	3	11.5	
LAEONEREIS CULVERI	A	Poly	14	0.07	91.27	1	3.8	
LYSILLA SP.B	A	Poly	14	0.07	91.34	5	19.2	
MARGINELLA LAVALLEEANA	M	Gast	14	0.07	91.4	7	26.9	
NASSARIUS ALBUS	M	Gast	14	0.07	91.47	6	23.1	
PARATANAIDAE (LPIL)	C	Tana	14	0.07	91.54	6	23.1	
PILARGIS BERKELEYAE	A	Poly	14	0.07	91.61	6	23.1	
SCOLETOMA TENUIS	A	Poly	14	0.07	91.67	7	26.9	
TRICHOBRANCHIDAE (LPIL)	A	Poly	14	0.07	91.74	6	23.1	
ACTEOCINA LEPTA	M	Gast	13	0.06	91.8	1	3.8	
ASPIDOSIPHON MUELLERI	S		13	0.06	91.87	1	3.8	
CERATONEREIS MIRABILIS	A	Poly	13	0.06	91.93	7	26.9	
CHEVALIA CARPENTERI	C	Amph	13	0.06	91.99	4	15.4	
CREPIDULA MACULOSA	M	Gast	13	0.06	92.06	4	15.4	
HARBANSUS PAUCICHELATUS	C	Ostr	13	0.06	92.12	6	23.1	
LEUCOTHOE SPINICARPA	C	Amph	13	0.06	92.18	6	23.1	
LISTRIELLA SP.G	C	Amph	13	0.06	92.24	9	34.6	
PHOTIS PUGNATOR	C	Amph	13	0.06	92.31	2	7.7	
PISTA CRISTATA	A	Poly	13	0.06	92.37	7	26.9	
SCYPHOPROCTUS SP.A	A	Poly	13	0.06	92.43	6	23.1	
SPIO PETTIBONEAE	A	Poly	13	0.06	92.49	4	15.4	
AMPHARETIDAE (LPIL)	A	Poly	12	0.06	92.55	7	26.9	
APSEUDES SP.A	C	Tana	12	0.06	92.61	4	15.4	
EPITONIUM (LPIL)	M	Gast	12	0.06	92.67	3	11.5	
HAPLOCYTHERIDEA SETIPUNCTATA	C	Ostr	12	0.06	92.73	2	7.7	
HESIONIDAE (LPIL)	A	Poly	12	0.06	92.78	9	34.6	
PHOTIS (LPIL)	C	Amph	12	0.06	92.84	4	15.4	
PRIONOSPIO MULTIBRANCHIATA	A	Poly	12	0.06	92.9	5	19.2	
ASTEROPELLA MACLAUGHLINAE	C	Ostr	11	0.05	92.95	6	23.1	
CERAPUS (LPIL)	C	Amph	11	0.05	93.01	2	7.7	
CERITHIUM LUTOSUM	M	Gast	11	0.05	93.06	2	7.7	
CORBULA CONTRACTA	M	Biva	11	0.05	93.11	4	15.4	
DORVILLEA SOCIABLIS	A	Poly	11	0.05	93.16	4	15.4	
EULIMIDAE (LPIL)	M	Gast	11	0.05	93.22	7	26.9	
EUSARSIELLA ELOFSONI	C	Ostr	11	0.05	93.27	6	23.1	
GLYCYMERIDIDAE (LPIL)	M	Biva	11	0.05	93.32	3	11.5	
LYSILLA (LPIL)	A	Poly	11	0.05	93.38	4	15.4	
NUCULANA ACUTA	M	Biva	11	0.05	93.43	1	3.8	
OLIVELLA (LPIL)	M	Gast	11	0.05	93.48	4	15.4	
PINNIXA (LPIL)	C	Deca	11	0.05	93.54	6	23.1	
SYLLIS LUTEA	A	Poly	11	0.05	93.59	5	19.2	
ZEBINA BROWNIANA	M	Gast	11	0.05	93.64	5	19.2	
ANODONTIA ALBA	M	Biva	10	0.05	93.69	2	7.7	
CAPITELLA JONESI	A	Poly	10	0.05	93.74	4	15.4	
DIPOLYDORA SOCIALIS	A	Poly	10	0.05	93.79	3	11.5	
EXOGONE ATLANTICA	A	Poly	10	0.05	93.83	5	19.2	
LUCINA (LPIL)	M	Biva	10	0.05	93.88	5	19.2	
MARGINELLIDAE (LPIL)	M	Gast	10	0.05	93.93	5	19.2	
ODOSTOMIA (LPIL)	M	Gast	10	0.05	93.98	3	11.5	
OLIVA (LPIL)	M	Gast	10	0.05	94.03	2	7.7	
OPHIOSTIGMA ISACANTHUM	E	Ophi	10	0.05	94.08	5	19.2	
PARANEBALIA BELIZENSIS	C	Lept	10	0.05	94.12	2	7.7	
PATELLOIDA PUSTULATA	M	Gast	10	0.05	94.17	5	19.2	
PLAKOSYLLIS QUADRIOCULATA	A	Poly	10	0.05	94.22	4	15.4	
POLYCIRRUS SP.K	A	Poly	10	0.05	94.27	1	3.8	
SABELLASTARTE SP.B	A	Poly	10	0.05	94.32	4	15.4	
SERPULIDAE (LPIL)	A	Poly	10	0.05	94.36	4	15.4	
SKOGSBERGIA LERNERI	C	Ostr	10	0.05	94.41	4	15.4	
STREBLOSOMA HARTMANAE	A	Poly	10	0.05	94.46	5	19.2	
TAGELUS DIVISUS	M	Biva	10	0.05	94.51	2	7.7	
ACTEOCINA (LPIL)	M	Gast	9	0.04	94.55	4	15.4	
AMPELISCA SCHELLENBERGI	C	Amph	9	0.04	94.6	4	15.4	
EUNICE (LPIL)	A	Poly	9	0.04	94.64	6	23.1	
GLYCERA (LPIL)	A	Poly	9	0.04	94.68	4	15.4	
HARRIETA FAXONI	C	Isop	9	0.04	94.73	2	7.7	
LUCINA RADIANS	M	Biva	9	0.04	94.77	4	15.4	
NASSARIIDAE (LPIL)	M	Gast	9	0.04	94.81	4	15.4	
NEPHTYS INCISA	A	Poly	9	0.04	94.86	2	7.7	
PARACYPRIDINA FLORIDENSIS	C	Ostr	9	0.04	94.9	2	7.7	
SCOLOPLOS (LPIL)	A	Poly	9	0.04	94.94	2	7.7	
CALYPTRAEIDAE (LPIL)	M	Gast	8	0.04	94.98	3	11.5	
CUBANOCUMA SP.A	C	Cuma	8	0.04	95.02	3	11.5	

Table 2. Continued

Taxon	Phylum	Class	No. Inds.	% Total	Cum %	Station Occur	% Station Occur	Comments
GIBBEROSUS MYERSI	C	Amph	8	0.04	95.06	1	3.8	
GRANULINA OVULIFORMIS	M	Gast	8	0.04	95.1	5	19.2	
HYDROIDES SP.E	A	Poly	8	0.04	95.14	3	11.5	
ISCHNOCHITON PAPILLOSUS	M	Polyp	8	0.04	95.17	4	15.4	
MICRODEUTOPUS MYERSI	C	Amph	8	0.04	95.21	5	19.2	
PODOCERUS KLEIDUS	C	Amph	8	0.04	95.25	2	7.7	
RISSOIDAE (LPIL)	M	Gast	8	0.04	95.29	3	11.5	
SARSIELLIDAE (LPIL)	C	Ostr	8	0.04	95.33	3	11.5	
SCOLELEPIS TEXANA	A	Poly	8	0.04	95.37	4	15.4	
SIGALIONIDAE (LPIL)	A	Poly	8	0.04	95.41	4	15.4	
SYLLIS VARIEGATA	A	Poly	8	0.04	95.44	3	11.5	
TRIPTYCHUS NIVEUS	M	Gast	8	0.04	95.48	2	7.7	
VENERIDAE (LPIL)	M	Biva	8	0.04	95.52	5	19.2	
AMPHILOCHIDAE (LPIL)	C	Amph	7	0.03	95.56	6	23.1	
AMPITHOE (LPIL)	C	Amph	7	0.03	95.59	2	7.7	
CAECUM SP.A	M	Gast	7	0.03	95.62	1	3.8	
CERATONEREIS (LPIL)	A	Poly	7	0.03	95.66	6	23.1	
CREPIDULA (LPIL)	M	Gast	7	0.03	95.69	2	7.7	
DENTALIUM ANTILLARUM	M	Scap	7	0.03	95.72	4	15.4	
EDOTIA LYONSI	C	Isop	7	0.03	95.76	3	11.5	
EURYDICE CONVEXA	C	Isop	7	0.03	95.79	3	11.5	
EUSARSIELLA CHILDI	C	Ostr	7	0.03	95.83	2	7.7	
EUSARSIELLA ZOSTERICOLA	C	Ostr	7	0.03	95.86	2	7.7	
LAONICE CIRRATA	A	Poly	7	0.03	95.89	1	3.8	
MELITA (LPIL)	C	Amph	7	0.03	95.93	2	7.7	
NUCULA (LPIL)	M	Biva	7	0.03	95.96	2	7.7	
ORBINIIDAE (LPIL)	A	Poly	7	0.03	95.99	5	19.2	
PARAONIDAE (LPIL)	A	Poly	7	0.03	96.03	7	26.9	
PHILOMEDIDAE (LPIL)	C	Ostr	7	0.03	96.06	3	11.5	
PHOXOCEPHALIDAE (LPIL)	C	Amph	7	0.03	96.1	2	7.7	
POLYCIRRUS (LPIL)	A	Poly	7	0.03	96.13	2	7.7	
PSEUDOPOLYDORA (LPIL)	A	Poly	7	0.03	96.16	4	15.4	
SCYPHOPROCTUS (LPIL)	A	Poly	7	0.03	96.2	2	7.7	
SEROLIS MGRAYI	C	Isop	7	0.03	96.23	3	11.5	
SPIONIDAE (LPIL)	A	Poly	7	0.03	96.26	5	19.2	
TRICOLIA THALASSICOLA	M	Gast	7	0.03	96.3	2	7.7	
TYPOSYLLIS SP.B	A	Poly	7	0.03	96.33	4	15.4	
AMPITHOIDAE (LPIL)	C	Amph	6	0.03	96.36	3	11.5	
CHIONE CANCELLATA	M	Biva	6	0.03	96.39	2	7.7	
CYCLASPIS UNICORNIS	C	Cuma	6	0.03	96.42	2	7.7	
ERICHSONELLA ATTENUATA	C	Isop	6	0.03	96.45	3	11.5	
EUCLYMENE SP.B	A	Poly	6	0.03	96.48	3	11.5	
KINBERGONUPHIS SP.C	A	Poly	6	0.03	96.51	2	7.7	
MELITA SP.E	C	Amph	6	0.03	96.53	1	3.8	
PARAPIONOSYLLIS UEBELACKERAE	A	Poly	6	0.03	96.56	2	7.7	
PITAR FULMINATUS	M	Biva	6	0.03	96.59	5	19.2	
PSEUDOVERMILIA OCCIDENTALIS	A	Poly	6	0.03	96.62	1	3.8	
ACANTHOCHITONA PYGMAEA	M	Polyp	5	0.02	96.65	3	11.5	
APHELOCHAETA SP.A	A	Poly	5	0.02	96.67	4	15.4	
ARABELLA MUTANS	A	Poly	5	0.02	96.69	4	15.4	
ARICIDEA SP.E	A	Poly	5	0.02	96.72	4	15.4	
ASTEROPELLA (LPIL)	C	Ostr	5	0.02	96.74	2	7.7	
BATEA CATHARINENSIS	C	Amph	5	0.02	96.77	3	11.5	
CERATOCEPHALE OCULATA	A	Poly	5	0.02	96.79	4	15.4	
CUMACEA (LPIL)	C	Cuma	5	0.02	96.81	4	15.4	
CYCLASPIS SP.O	C	Cuma	5	0.02	96.84	1	3.8	
DIPLODONTA (LPIL)	M	Biva	5	0.02	96.86	3	11.5	
ELASMOPUS SP.C	C	Amph	5	0.02	96.89	3	11.5	
GLYCERA SP.E	A	Poly	5	0.02	96.91	1	3.8	
HOLOTHUROIDEA (LPIL)	E	Holo	5	0.02	96.93	3	11.5	
JASPIDELLA JASPIDEA	M	Gast	5	0.02	96.96	4	15.4	
KUPELLONURA SP.A	C	Isop	5	0.02	96.98	3	11.5	
LAEVICARDIUM MORTONI	M	Biva	5	0.02	97.01	3	11.5	
LYSIDICE SP.B	A	Poly	5	0.02	97.03	4	15.4	
LYSIDICE SP.E	A	Poly	5	0.02	97.06	2	7.7	
MARGINELLA APICINA	M	Gast	5	0.02	97.08	3	11.5	
MELANELLA (LPIL)	M	Gast	5	0.02	97.1	2	7.7	
MONTACUTIDAE (LPIL)	M	Biva	5	0.02	97.13	3	11.5	
NASSARIUS (LPIL)	M	Gast	5	0.02	97.15	4	15.4	
NOTOMASTUS AMERICANUS	A	Poly	5	0.02	97.18	2	7.7	
PAGURIDAE (LPIL)	C	Deca	5	0.02	97.2	2	7.7	
PAGURUS (LPIL)	C	Deca	5	0.02	97.22	4	15.4	
RICTAXIS PUNCTOSTRIATUS	M	Gast	5	0.02	97.25	2	7.7	
STROMBIFORMIS (LPIL)	M	Gast	5	0.02	97.27	3	11.5	
TURBONILLA STYLIFORMIS	M	Gast	5	0.02	97.3	2	7.7	
XANTHIDAE (LPIL)	C	Deca	5	0.02	97.32	3	11.5	
ACCALATHURA CRENULATA	C	Isop	4	0.02	97.34	2	7.7	
AMPHIODIA (LPIL)	E	Ophi	4	0.02	97.36	3	11.5	
ANACHIS FLORIDANA	M	Gast	4	0.02	97.38	2	7.7	
APSEUDIDAE (LPIL)	C	Tana	4	0.02	97.4	3	11.5	
BRANCHIOSYLLIS OCULATA	A	Poly	4	0.02	97.42	2	7.7	
CAMPYLASPIS SP.U	C	Cuma	4	0.02	97.44	4	15.4	
CERADOCUS (LPIL)	C	Amph	4	0.02	97.46	2	7.7	
CERATONEREIS SINGULARIS	A	Poly	4	0.02	97.47	4	15.4	
CYLINDROLEBERIDIDAE (LPIL)	C	Ostr	4	0.02	97.49	2	7.7	
DECAPODA NATANTIA (LPIL)	C	Deca	4	0.02	97.51	4	15.4	
DIODORA CAYENENSIS	M	Gast	4	0.02	97.53	1	3.8	
DIOGENIDAE(LPIL)	C	Deca	4	0.02	97.55	2	7.7	
DULICHIELLA (LPIL)	C	Amph	4	0.02	97.57	2	7.7	
EURYPYLUS (LPIL)	C	Ostr	4	0.02	97.59	1	3.8	
FALLOTRITELLA BISCAYNENSIS	C	Amph	4	0.02	97.61	2	7.7	
GRUBEOSYLLIS (LPIL)	A	Poly	4	0.02	97.63	1	3.8	
HETEROMYSIS (LPIL)	C	Mysi	4	0.02	97.65	1	3.8	
HETEROMYSIS NOUVELI	C	Mysi	4	0.02	97.67	1	3.8	

Table 2. Continued

Taxon	Phylum	Class	No. Inds.	% Total	Cum %	Station Occur	% Station Occur	Comments
LEITOSCOLOPLOS ROBUSTUS	A	Poly	4	0.02	97.69	3	11.5	
LEPTOCHELIA SP.D	C	Tana	4	0.02	97.71	3	11.5	
LIMNORIA (LPIL)	C	Isop	4	0.02	97.73	3	11.5	
LOIMIA MEDUSA	A	Poly	4	0.02	97.74	2	7.7	
LUCINA MURICATA	M	Biva	4	0.02	97.76	4	15.4	
LYONSIIDAE (LPIL)	M	Biva	4	0.02	97.78	1	3.8	
METAPROTELLA HUMMELINCKI	C	Amph	4	0.02	97.8	2	7.7	
NEPHTYIDAE (LPIL)	A	Poly	4	0.02	97.82	2	7.7	
NOTOMASTUS LATERICEUS	A	Poly	4	0.02	97.84	2	7.7	
NUDIBRANCHIA (LPIL)	M	Gast	4	0.02	97.86	2	7.7	
ONUPHIDAE (LPIL)	A	Poly	4	0.02	97.88	1	3.8	
PARANEBALIA (LPIL)	C	Lept	4	0.02	97.9	3	11.5	
PHORONIS (LPIL)	Ph		4	0.02	97.92	3	11.5	
PHOTIS SP.D	C	Amph	4	0.02	97.94	1	3.8	
POLYNOIDAE (LPIL)	A	Poly	4	0.02	97.96	4	15.4	
SCOLETOMA TESTUDINUM	A	Poly	4	0.02	97.98	1	3.8	
SPHAEROSYLLIS TAYLORI	A	Poly	4	0.02	98	2	7.7	
TEGULA (LPIL)	M	Gast	4	0.02	98.01	3	11.5	
THARYX KIRKEGAARDI	A	Poly	4	0.02	98.03	1	3.8	
TROCHIDAE (LPIL)	M	Gast	4	0.02	98.05	1	3.8	
UNGULINIDAE (LPIL)	M	Biva	4	0.02	98.07	4	15.4	
WESTHEIDEIA MINUTIMALA	A	Poly	4	0.02	98.09	2	7.7	
XENANTHURA BREVITELSON	C	Isop	4	0.02	98.11	3	11.5	
ACTINOSETA (LPIL)	C	Ostr	3	0.01	98.13	2	7.7	
AMPELISCA ABDITA	C	Amph	3	0.01	98.14	2	7.7	
AMPHIPHOLIS (LPIL)	E	Ophi	3	0.01	98.15	1	3.8	
ANAMIXIS CAVITURA	C	Amph	3	0.01	98.17	3	11.5	
DECAPODA REPTANTIA (LPIL)	C	Deca	3	0.01	98.18	2	7.7	
DEMONAX MICROPHTHALMUS	A	Poly	3	0.01	98.2	1	3.8	
EUNICE MULTICYLINDRI	A	Poly	3	0.01	98.21	1	3.8	
GLYCYMERIS PECTINATA	M	Biva	3	0.01	98.23	1	3.8	
LEMBOS UNIFASCIATUS	C	Amph	3	0.01	98.24	2	7.7	
LINGA AMIANTUS	M	Biva	3	0.01	98.26	2	7.7	
MITRELLA LUNATA	M	Gast	3	0.01	98.27	2	7.7	
MYTILIDAE (LPIL)	M	Biva	3	0.01	98.28	3	11.5	
NAINERIS SETOSA	A	Poly	3	0.01	98.3	2	7.7	
NEBALIIDAE (LPIL)	C	Lept	3	0.01	98.31	2	7.7	
NEREIS MICROMMA	A	Poly	3	0.01	98.33	2	7.7	
OPHIOSTIGMA (LPIL)	E	Ophi	3	0.01	98.34	1	3.8	
OPHRYOTROCHA (LPIL)	A	Poly	3	0.01	98.36	1	3.8	
PARANAITIS GARDINERI	A	Poly	3	0.01	98.37	3	11.5	
PECTINARIA GOULDII	A	Poly	3	0.01	98.39	1	3.8	
PERSICULA CATENATA	M	Gast	3	0.01	98.4	1	3.8	
PHYLLODOCE ARENAE	A	Poly	3	0.01	98.41	3	11.5	
PINNOTHERIDAE (LPIL)	C	Deca	3	0.01	98.43	2	7.7	
POLYCIRRUS PLUMOSUS	A	Poly	3	0.01	98.44	2	7.7	
PTERIA COLYMBUS	M	Biva	3	0.01	98.46	1	3.8	
SPIRORBIS (LPIL)	A	Poly	3	0.01	98.47	1	3.8	
STENOTHOE GALLENSIS	C	Amph	3	0.01	98.49	2	7.7	
TANAIDACEA (LPIL)	C	Tana	3	0.01	98.5	2	7.7	
TELLINA MERA	M	Biva	3	0.01	98.52	3	11.5	
TRACHYPENAEUS CONSTRICTUS	C	Deca	3	0.01	98.53	1	3.8	
TURRIDAE (LPIL)	M	Gast	3	0.01	98.54	3	11.5	
VAUNTHOMPSONIA (LPIL)	C	Cuma	3	0.01	98.56	2	7.7	
ACMAEIDAE (LPIL)	M	Gast	2	0.01	98.57	2	7.7	
AMAKUSANTHURA SIGNATA	C	Isop	2	0.01	98.58	1	3.8	
AMPELISCA SP.N	C	Amph	2	0.01	98.59	2	7.7	
AMPHIOPLUS ABDITUS	E	Ophi	2	0.01	98.6	2	7.7	
ANCISTROSYLLIS CAROLINENSIS	A	Poly	2	0.01	98.61	2	7.7	
ASTEROPELLA PAX	C	Ostr	2	0.01	98.62	2	7.7	
ATYIDAE (LPIL)	C	Deca	2	0.01	98.63	1	3.8	
AUTOLYTUS SP.A	A	Poly	2	0.01	98.64	2	7.7	
BALANOGLOSSUS (LPIL)	He		2	0.01	98.65	2	7.7	
BODOTRIIDAE (LPIL)	C	Cuma	2	0.01	98.66	2	7.7	
BRANCHIOSTOMA (LPIL)	Ce		2	0.01	98.67	1	3.8	
BRANIA WELLFLEETENSIS	A	Poly	2	0.01	98.68	1	3.8	
CALOZODION WADEI	C	Tana	2	0.01	98.68	1	3.8	
CAULLERIELLA SP.I	A	Poly	2	0.01	98.69	2	7.7	
CAULLERIELLA SP.K	A	Poly	2	0.01	98.7	2	7.7	
CAULLERIELLA SP.O	A	Poly	2	0.01	98.71	2	7.7	
CHEVALIA (LPIL)	C	Amph	2	0.01	98.72	2	7.7	
CLEANTIOIDES PLANICAUDA	C	Isop	2	0.01	98.73	2	7.7	
CONUS JASPIDEUS STEARNSI	M	Gast	2	0.01	98.74	2	7.7	
CRASSISPIRA TAMPAENSIS	M	Gast	2	0.01	98.75	1	3.8	
DEMONAX (LPIL)	A	Poly	2	0.01	98.76	2	7.7	
DENTALIIDAE (LPIL)	M	Scap	2	0.01	98.77	2	7.7	
DIOPATRA CUPREA	A	Poly	2	0.01	98.78	2	7.7	
DRILONEREIS SP.E	A	Poly	2	0.01	98.79	2	7.7	
ERICHSONELLA (LPIL)	C	Isop	2	0.01	98.8	2	7.7	
ERICHTHONIUS (LPIL)	C	Amph	2	0.01	98.81	1	3.8	
EUSARSIELLA GIGACANTHA	C	Ostr	2	0.01	98.82	1	3.8	
EUSARSIELLA SPINOSA	C	Ostr	2	0.01	98.83	2	7.7	
EUSARSIELLA UNCUS	C	Ostr	2	0.01	98.84	1	3.8	
GASTROPODA (OPISTHOBRANC) (LPIL)	M	Gast	2	0.01	98.85	1	3.8	
GENETYLLIS CASTANEA	A	Poly	2	0.01	98.86	1	3.8	
GLYCERA AMERICANA	A	Poly	2	0.01	98.87	2	7.7	
HEMIPHOLIS (LPIL)	E	Ophi	2	0.01	98.88	1	3.8	
HEMIPROTO WIGLEYI	C	Amph	2	0.01	98.89	1	3.8	
HYBOSCOLEX QUADRICINCTA	A	Poly	2	0.01	98.9	2	7.7	
HYSSURIDAE (LPIL)	C	Isop	2	0.01	98.91	2	7.7	
ISAEIDAE (LPIL)	C	Amph	2	0.01	98.92	2	7.7	
LAEVICARDIUM LAEVIGATUM	M	Biva	2	0.01	98.93	2	7.7	
LEIOCAPITELLA SP.B	A	Poly	2	0.01	98.94	1	3.8	
LEMBOS SP.H	C	Amph	2	0.01	98.95	1	3.8	

Table 2. Continued

Taxon	Phylum	Class	No. Inds.	% Total	Cum %	Station Occur	% Station Occur	Comments
LEPTONIDAE (LPIL)	M	Biva	2	0.01	98.95	1	3.8	
LEPTOSYNAPTA MULTIGRANULA	E	Holo	2	0.01	98.96	1	3.8	
LIMNORIA SIMULATA	C	Isop	2	0.01	98.97	2	7.7	
LISTRIELLA BARNARDI	C	Amph	2	0.01	98.98	1	3.8	
LITHADIA CADAVEROSA	C	Deca	2	0.01	98.99	1	3.8	
LYONSIA HYALINA FLORIDANA	M	Biva	2	0.01	99	2	7.7	
MAGELONA CF. *RIOJAI*	A	Poly	2	0.01	99.01	1	3.8	
MAGELONA PETTIBONEAE	A	Poly	2	0.01	99.02	2	7.7	
MAJIDAE (LPIL)	C	Deca	2	0.01	99.03	2	7.7	
MALACANTHURA CARIBBICA	C	Isop	2	0.01	99.04	1	3.8	
MARGINELLA AUREOCINCTA	M	Gast	2	0.01	99.05	1	3.8	
MARGINELLA EBURNEOLA	M	Gast	2	0.01	99.06	2	7.7	
MEGALOMMA (LPIL)	A	Poly	2	0.01	99.07	1	3.8	
MOOREONUPHIS PALLIDULA	A	Poly	2	0.01	99.08	2	7.7	
MYSTIDES BOREALIS	A	Poly	2	0.01	99.09	2	7.7	
NEODRILLIA CYDIA	M	Gast	2	0.01	99.1	2	7.7	
NEOMEGAMPHOPUS HIATUS	C	Amph	2	0.01	99.11	2	7.7	
NEREIPHYLLA FRAGILIS	A	Poly	2	0.01	99.12	2	7.7	
NEREIS FALSA	A	Poly	2	0.01	99.13	1	3.8	
OPHIOLEPIS ELEGANS	E	Ophi	2	0.01	99.14	1	3.8	
OPHIOPHRAGMUS (LPIL)	E	Ophi	2	0.01	99.15	1	3.8	
PARACERCEIS (LPIL)	C	Isop	2	0.01	99.16	1	3.8	
PERICLIMENES (LPIL)	C	Deca	2	0.01	99.17	2	7.7	
PIROMIS ROBERTI	A	Poly	2	0.01	99.18	1	3.8	
PISTA (LPIL)	A	Poly	2	0.01	99.19	2	7.7	
PODARKEOPSIS (LPIL)	A	Poly	2	0.01	99.2	1	3.8	
POTAMETHUS SP.A	A	Poly	2	0.01	99.21	1	3.8	
PROCESSIDAE (LPIL)	C	Deca	2	0.01	99.22	1	3.8	
PTERIIDAE (LPIL)	M	Biva	2	0.01	99.22	1	3.8	
PTILANTHURA TRICARINA	C	Isop	2	0.01	99.23	2	7.7	
SABELLARIA SP.A	A	Poly	2	0.01	99.24	2	7.7	
SCAPHANDRIDAE (LPIL)	M	Gast	2	0.01	99.25	2	7.7	
SCOLOPLOS ACMECEPS	A	Poly	2	0.01	99.26	1	3.8	
SICYONIA TYPICA	C	Deca	2	0.01	99.27	1	3.8	
SOLEMYA (LPIL)	M	Biva	2	0.01	99.28	1	3.8	
SPHAEROSYLLIS (LPIL)	A	Poly	2	0.01	99.29	1	3.8	
SPHAEROSYLLIS ACICULATA	A	Poly	2	0.01	99.3	1	3.8	
SYLLIDES BANSEI	A	Poly	2	0.01	99.31	1	3.8	
TANAIDAE (LPIL)	C	Tana	2	0.01	99.32	1	3.8	
TECTONATICA PUSILLA	M	Gast	2	0.01	99.33	2	7.7	
TEGULA LIVIDOMACULATA	M	Gast	2	0.01	99.34	2	7.7	
THALENESSA SP.C	A	Poly	2	0.01	99.35	1	3.8	
THOR (LPIL)	C	Deca	2	0.01	99.36	2	7.7	
ACROCIRRIDAE (LPIL)	A	Poly	1	0	99.36	1	3.8	
ACTEOCINA CANDEI	M	Gast	1	0	99.37	1	3.8	
ALPHEIDAE (LPIL)	C	Deca	1	0	99.37	1	3.8	
ALPHEUS BOUVIERI	C	Deca	1	0	99.38	1	3.8	
ALPHEUS FLORIDANUS	C	Deca	1	0	99.38	1	3.8	
AMAEANA SP.B	A	Poly	1	0	99.39	1	3.8	
AMERICARDIA MEDIA	M	Biva	1	0	99.39	1	3.8	
AMPELISCA BICARINATA	C	Amph	1	0	99.4	1	3.8	
AMPELISCA SP.A	C	Amph	1	0	99.4	1	3.8	
AMPHIDUROS SP.A	A	Poly	1	0	99.41	1	3.8	
AMPHIODIA TRYCHNA	E	Ophi	1	0	99.41	1	3.8	
ANACHIS (LPIL)	M	Gast	1	0	99.42	1	3.8	
ARABELLA (LPIL)	A	Poly	1	0	99.42	1	3.8	
ARCOPSIS ADAMSI	M	Biva	1	0	99.43	1	3.8	
ARENE TRICARINATA	M	Gast	1	0	99.43	1	3.8	
ARMANDIA (LPIL)	A	Poly	1	0	99.44	1	3.8	
ASCLEROCHEILUS MEXICANUS	A	Poly	1	0	99.44	1	3.8	
ASTRAEA PHOEBIA	M	Gast	1	0	99.45	1	3.8	
ASTROPECTEN DUPLICATUS	E	Aste	1	0	99.45	1	3.8	
AUTOLYTUS (LPIL)	A	Poly	1	0	99.46	1	3.8	
BATEA (LPIL)	C	Amph	1	0	99.46	1	3.8	
BOWMANIELLA (LPIL)	C	Mysi	1	0	99.47	1	3.8	
CALLIANASSIDAE (LPIL)	C	Deca	1	0	99.47	1	3.8	
CALLIOSTOMA ADELAE	M	Gast	1	0	99.48	1	3.8	
CAMPYLASPIS (LPIL)	C	Cuma	1	0	99.48	1	3.8	
CAPITELLA (LPIL)	A	Poly	1	0	99.49	1	3.8	
CARDITIDAE (LPIL)	M	Biva	1	0	99.49	1	3.8	
CERATONEREIS IRRITABILIS	A	Poly	1	0	99.49	1	3.8	
CHAETOPTERIDAE (LPIL)	A	Poly	1	0	99.5	1	3.8	
CHAETOZONE (LPIL)	A	Poly	1	0	99.5	1	3.8	
CNIDARIA (LPIL)	Cn		1	0	99.51	1	3.8	
CODAKIA ORBICULATA	M	Biva	1	0	99.51	1	3.8	
COLUMBELLIDAE (LPIL)	M	Gast	1	0	99.52	1	3.8	
CONIDAE (LPIL)	M	Gast	1	0	99.52	1	3.8	
CONUS (LPIL)	M	Gast	1	0	99.53	1	3.8	
CRASSINELLA LUNULATA	M	Biva	1	0	99.53	1	3.8	
CRASSISPIRA LEUCOCYMA	M	Gast	1	0	99.54	1	3.8	
CUBANOCUMA (LPIL)	C	Cuma	1	0	99.54	1	3.8	
CUCUMARIIDAE (LPIL)	E	Holo	1	0	99.55	1	3.8	
CYCLASPIS VARIANS	C	Cuma	1	0	99.55	1	3.8	
CYLINDROBULLA (LPIL)	M	Gast	1	0	99.56	1	3.8	
CYLINDROBULLIDAE (LPIL)	M	Gast	1	0	99.56	1	3.8	
DORVILLEA (LPIL)	A	Poly	1	0	99.57	1	3.8	
DORVILLEA CLAVATA	A	Poly	1	0	99.57	1	3.8	
DRILONEREIS LONGA	A	Poly	1	0	99.58	1	3.8	
EUCLYMENE SP.A	A	Poly	1	0	99.58	1	3.8	
EUNIPHYSA SP.A	A	Poly	1	0	99.59	1	3.8	
EUSARSIELLA CRESSEYI	C	Ostr	1	0	99.59	1	3.8	
EUSARSIELLA DISPARALIS	C	Ostr	1	0	99.6	1	3.8	
EUSARSIELLA SP.E	C	Ostr	1	0	99.6	1	3.8	
GONEPLACIDAE (LPIL)	C	Deca	1	0	99.61	1	3.8	

Table 2. Continued

Taxon	Phylum	Class	No. Inds.	% Total	Cum %	Station Occur	% Station Occur	Comments
HAMINOEA ELEGANS	M	Gast	1	0	99.61	1	3.8	
HARMOTHOE IMBRICATA	A	Poly	1	0	99.62	1	3.8	
HAUCHIELLA SP.A	A	Poly	1	0	99.62	1	3.8	
HIPPOLYTIDAE (LPIL)	C	Deca	1	0	99.62	1	3.8	
HOBSONIA FLORIDA	A	Poly	1	0	99.63	1	3.8	
HYALINA (LPIL)	M	Gast	1	0	99.63	1	3.8	
IDOTEIDAE (LPIL)	C	Isop	1	0	99.64	1	3.8	
ISCHNOCHITON PYGMAEA	M	Polyp	1	0	99.64	1	3.8	
LAEVICARDIUM SYBARITICUM	M	Biva	1	0	99.65	1	3.8	
LEITOSCOLOPLOS (LPIL)	A	Poly	1	0	99.65	1	3.8	
LEMBOS RECTANGULATUS	C	Amph	1	0	99.66	1	3.8	
LEMBOS SPINICARPUS SPINICARPUS	C	Amph	1	0	99.66	1	3.8	
LEMBOS UNIFASCIATUS REDUCTUS	C	Amph	1	0	99.67	1	3.8	
LEPIDASTHENIA VARIUS	A	Poly	1	0	99.67	1	3.8	
LEPTOCHELA (LPIL)	C	Deca	1	0	99.68	1	3.8	
LEPTOSYNAPTA (LPIL)	E	Holo	1	0	99.68	1	3.8	
LINGA (LPIL)	M	Biva	1	0	99.69	1	3.8	
LINGA PENSYLVANICA	M	Biva	1	0	99.69	1	3.8	
LISTRIELLA (LPIL)	C	Amph	1	0	99.7	1	3.8	
LITOCORSA ANTENNATA	A	Poly	1	0	99.7	1	3.8	
LUCINA SOMBRERENSIS	M	Biva	1	0	99.71	1	3.8	
LUMBRINERIS (LPIL)	A	Poly	1	0	99.71	1	3.8	
LYONSIA BEANA	M	Biva	1	0	99.72	1	3.8	
MACOMA (LPIL)	M	Biva	1	0	99.72	1	3.8	
MAGELONA (LPIL)	A	Poly	1	0	99.73	1	3.8	
MAGELONA SP.I	A	Poly	1	0	99.73	1	3.8	
MESANTHURA (LPIL)	C	Isop	1	0	99.74	1	3.8	
MITRIDAE (LPIL)	M	Gast	1	0	99.74	1	3.8	
MODIOLUS MODIOLUS SQUAMOSUS	M	Biva	1	0	99.75	1	3.8	
MONOCULODES SP.D	C	Amph	1	0	99.75	1	3.8	
MUSCULUS LATERALIS	M	Biva	1	0	99.76	1	3.8	
MYSIDAE (LPIL)	C	Mysi	1	0	99.76	1	3.8	
NANNASTACIDAE (LPIL)	C	Cuma	1	0	99.76	1	3.8	
NATICA CANRENA	M	Gast	1	0	99.77	1	3.8	
NEOPANOPE PACKARDII	C	Deca	1	0	99.77	1	3.8	
NEREIS PELAGICA	A	Poly	1	0	99.78	1	3.8	
NUCULANA (LPIL)	M	Biva	1	0	99.78	1	3.8	
OEDICEROTIDAE (LPIL)	C	Amph	1	0	99.79	1	3.8	
OPHIOCNIDA (LPIL)	E	Ophi	1	0	99.79	1	3.8	
OPHIOPHRAGMUS FILOGRANEUS	E	Ophi	1	0	99.8	1	3.8	
OPISTHODONTA SP.B	A	Poly	1	0	99.8	1	3.8	
OWENIA FUSIFORMIS	A	Poly	1	0	99.81	1	3.8	
PALAEMONIDAE (LPIL)	C	Deca	1	0	99.81	1	3.8	
PANOPEUS OCCIDENTALIS	C	Deca	1	0	99.82	1	3.8	
PARACAPRELLA (LPIL)	C	Amph	1	0	99.82	1	3.8	
PARASTEROPE (LPIL)	C	Ostr	1	0	99.83	1	3.8	
PENAEUS (LPIL)	C	Deca	1	0	99.83	1	3.8	
PENAEUS DUORARUM	C	Deca	1	0	99.84	1	3.8	
PERSEPHONA MEDITERRANEA	C	Deca	1	0	99.84	1	3.8	
PHASCOLION (LPIL)	S		1	0	99.85	1	3.8	
PHERUSA INFLATA	A	Poly	1	0	99.85	1	3.8	
PHOLOIDAE (LPIL)	A	Poly	1	0	99.86	1	3.8	
PHYLLODOCE (LPIL)	A	Poly	1	0	99.86	1	3.8	
PITAR (LPIL)	M	Biva	1	0	99.87	1	3.8	
PITAR SIMPSONI	M	Biva	1	0	99.87	1	3.8	
PITHO ANISODON	C	Deca	1	0	99.88	1	3.8	
PODARKE SP.D	A	Poly	1	0	99.88	1	3.8	
PODOCOPA (LPIL)	C	Ostr	1	0	99.89	1	3.8	
POLYDORA CORNUTA	A	Poly	1	0	99.89	1	3.8	
POLYGORDIUS (LPIL)	A	Poly	1	0	99.89	1	3.8	
POLYNOIDAE GENUS H	A	Poly	1	0	99.9	1	3.8	
PONTODORIDAE (LPIL)	A	Poly	1	0	99.9	1	3.8	
PROCESSA (LPIL)	C	Deca	1	0	99.91	1	3.8	
PTEROMERIS PERPLANA	M	Biva	1	0	99.91	1	3.8	
SCOLELEPIS SQUAMATA	A	Poly	1	0	99.92	1	3.8	
SCOLETOMA ERNESTI	A	Poly	1	0	99.92	1	3.8	
SEMELIDAE (LPIL)	M	Biva	1	0	99.93	1	3.8	
SICYONIA (LPIL)	C	Deca	1	0	99.93	1	3.8	
SINELOBUS STANFORDI	C	Tana	1	0	99.94	1	3.8	
SIPUNCULUS NUDUS	S		1	0	99.94	1	3.8	
STHENOLEPIS CF. *GRUBEI*	A	Poly	1	0	99.95	1	3.8	
STREBLOSOMA VERRILLI	A	Poly	1	0	99.95	1	3.8	
SYNCHELIDIUM AMERICANUM	C	Amph	1	0	99.96	1	3.8	
SYNOPIA ULTRAMARINA	C	Amph	1	0	99.96	1	3.8	
TELLINA VERSICOLOR	M	Biva	1	0	99.97	1	3.8	
THARYX (LPIL)	A	Poly	1	0	99.97	1	3.8	
THOR AMBOINENSIS	C	Deca	1	0	99.98	1	3.8	
TRACHYCARDIUM MURICATUM	M	Biva	1	0	99.98	1	3.8	
TRIVIA QUADRIPUNCTATA	M	Gast	1	0	99.99	1	3.8	
TURBONILLA CONRADI	M	Gast	1	0	99.99	1	3.8	
TRYPANOSYLLIS COELIACA	A	Poly	1	0	99.99	1	3.8	
VOLVULELLA (LPIL)	M	Gast	1	0	100	1	3.8	

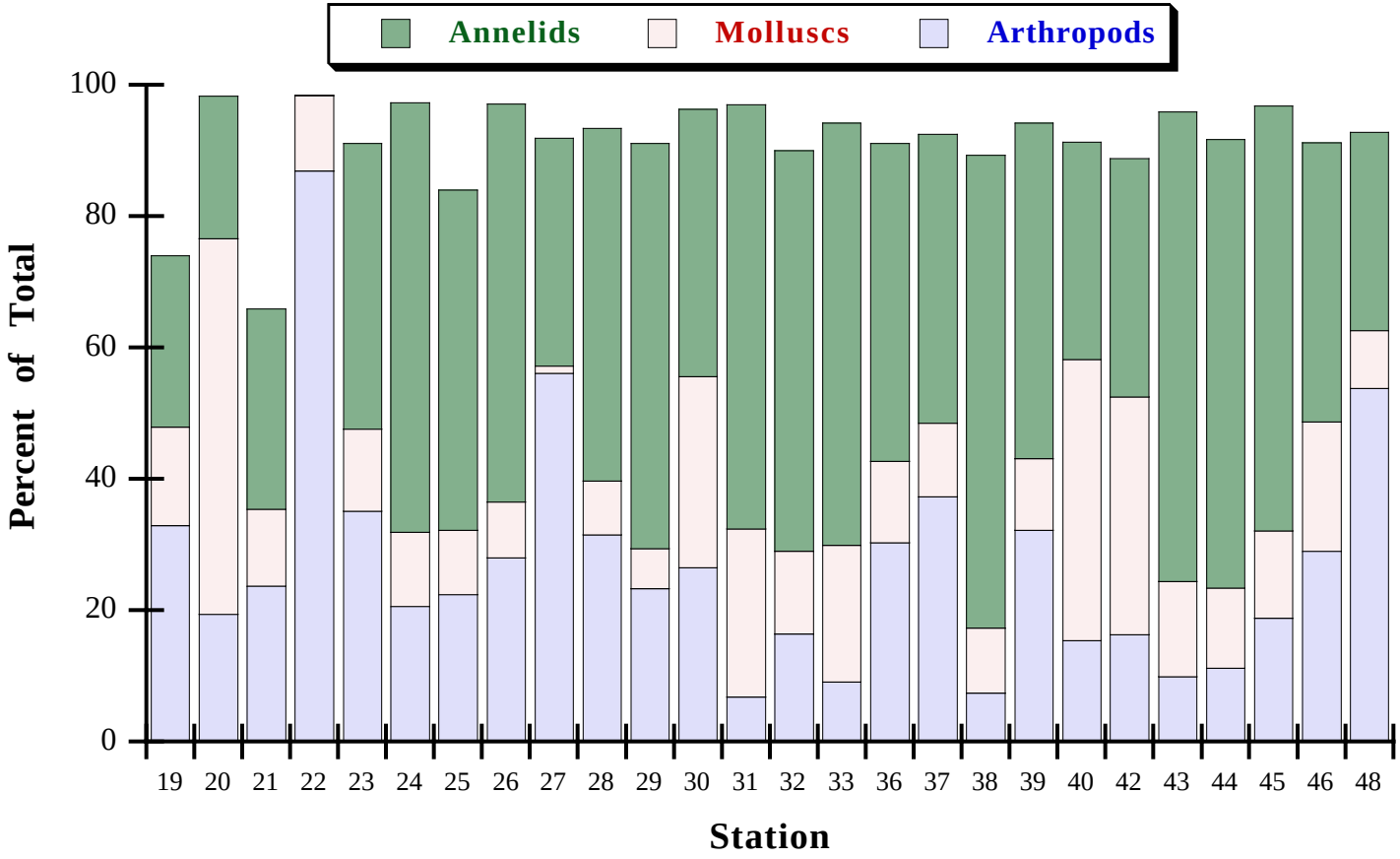
Taxa Key

Phylum / Class	Phylum / Class	Phylum / Class	Phylum / Class
A = Annelida	Gast = Gastropoda	Asci = Ascidiacea	Ostr = Ostracoda
Olig = Oligochaeta	Biva = Bivalvia	Aste = Asteroidea	Tana = Tanaidacea
Poly = Polychaeta	Polyp = Polyplacophora	Holo = Holothuroidea	Ce = Cephalochordata
C = Arthropoda (Crustacea)	Scap = Scaphopoda	Ophi = Ophiuroidea	Cn = Cnidaria
Amph = Amphipoda	Ph = Phoronida	He = Hemichordata	Acti = Actiniaria
Cuma = Cumacea	R = Rhynchocoela	Isop = Isopoda	E = Echinodermata
Deca = Decapoda	S = Sipuncula	Lept = Leptostraca	
M = Mollusca	U = Urochordata	Mysi = Mysidacea	

Table 3. Summary of abundance of major taxonomic groups for Florida Bay stations, August 1996.

Taxa	Total No. Inds.	% Total	Total No. Taxa	% Total
Annelida				
Polychaeta	9146	44.1	239	37.2
Oligochaeta	1031	5.0	1	0.2
Crustacea				
Amphipoda	2219	10.7	72	11.2
Tanaidacea	1549	7.5	16	2.5
Ostracoda	920	4.4	39	6.1
Other Crustacea	785	3.8	85	13.2
Mollusca				
Gastropoda	2248	10.8	86	13.4
Bivalvia	957	4.6	59	9.2
Other Mollusca	116	0.6	7	1.1
Sipuncula	868	4.2	10	1.6
Other Taxa	902	4.3	28	4.4
Totals	20741		642	

Figure 5. Percent abundance of major taxa for the Florida Bay stations, August 1996.



1). The distribution of dominant taxa representing >10% of the total assemblage at each station is given in Table 4.

Station mean density and mean number of taxa data are given in Table 2 and Figures 6 and 7. Mean densities ranged from 1,917 organisms·m^{-2} at Station 33 to 16,392 organisms·m^{-2} at Station 39 (Table 2; Figure 6). There were significant differences in densities between stations (χ^2 = 114.0, df = 25, Prob > χ^2 < 0.0001; Table 2; Figure 6). The mean number of taxa per replicate ranged from 15.0 at Station 22 to 115.4 at Station 39 (Table 2; Figure 7).

There was a significant positive correlation between station mean density data and the %sand/gravel in the sediment and a significant negative correlation between station densities and %silt/clay in the sediment (Table 5; Figure 8). There was no correlation between station densities and either bottom salinity (Figure 9) or bottom dissolved oxygen (Figure 10). There was also no correlation between stations densities and TOC. The only other relevant correlation among the data was a significant positive correlation between TOC and bottom dissolved oxygen concentrations (Table 5).

Taxa diversity and evenness are given in Table 2 and Figure 11. Taxa diversity (H') was uniformly high with 21 of 26 stations having diversity values > 3.0; values ranged from 2.23 at Station 22 to 4.45 at Station 32. Taxa evenness (J) was also high with 24 of 26 stations having evenness values > 0.7; values ranged from 0.57 at Station 20 to 0.88 at Station 32.

Numerical Classification Analysis

Normal (stations) and inverse (species) classification analyses were performed on the Carolinian Province data set and displayed as dendrograms (Figures 12 and 13). Selection of the species included in the analyses was based on a minimum representation of 0.33% of total individuals. Count data for the 67 taxa selected were included in a matrix of station and species groups (Table 6). These taxa accounted for 71.8% of the macroinfaunal assemblage collected.

Table 4. Percentage abundance of dominant taxa (> 10% of the total) for the Florida Bay stations, August 1996.

Taxa	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	36	37	38	39	40	42	43	44	45	46	48
Sipuncula																										
Phascolion strombi	11.4		30.3																							
Oligochaeta (LPIL)					14.8			11.6	17.7													13.0	12			
Polychaeta																										
Cirriphorus (LPIL)																							13			
Exogene dispar								26.4																		
Fabricinuda trilobata			12.5			20.4				16.3																
Goniadides carolinae																		17.7								
Mediomastus (LPIL)											13.1		22.5													
Questa caudicirri																		24.3								
Scoletoma verrilli																								10.0		
Bivalvia																										
Nucula aegeenis													13.4													
Gastropoda																										
Ceacum pulchellum		52.7										24.7								12.2						
Amphipoda																										
Ampelisca sp.Y				30.4																						
Ampelisca (LPIL)				22.5																						
Acuminodeutopus naglei									17.7																	
Tanaidacea																										
Leptochelidae (LPIL)								16.7																		
Leptochelia (LPIL)	14.4															14.1	13.5								14.0	13.0
Ostracoda																										
Parasterope muelleri				12.0																						

Figure 6. Mean macroinfaunal densities for the Florida Bay stations, August 1996.

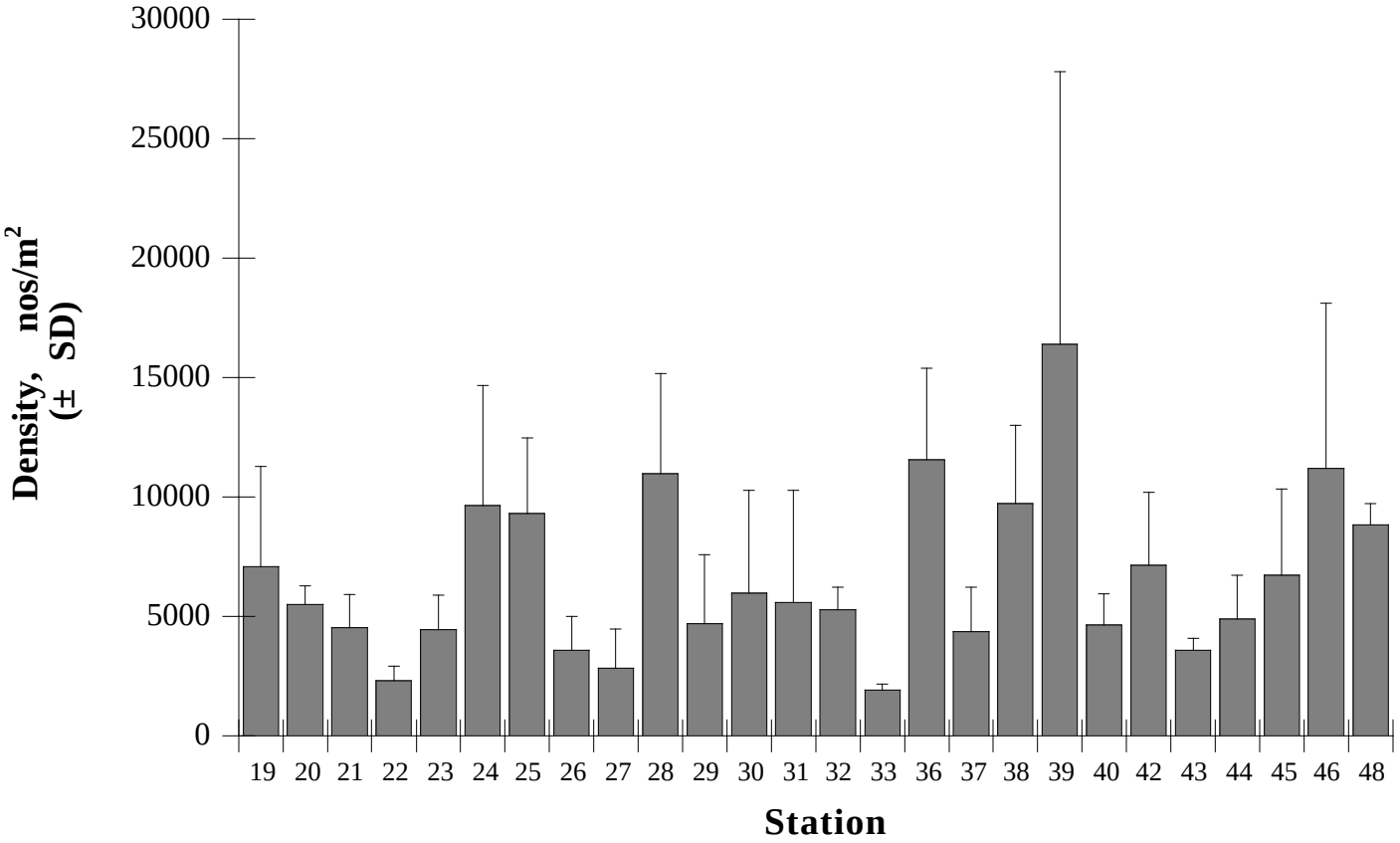


Figure 7. Mean number of macroinvertebrate taxa per replicate for the Florida Bay stations, August 1996.

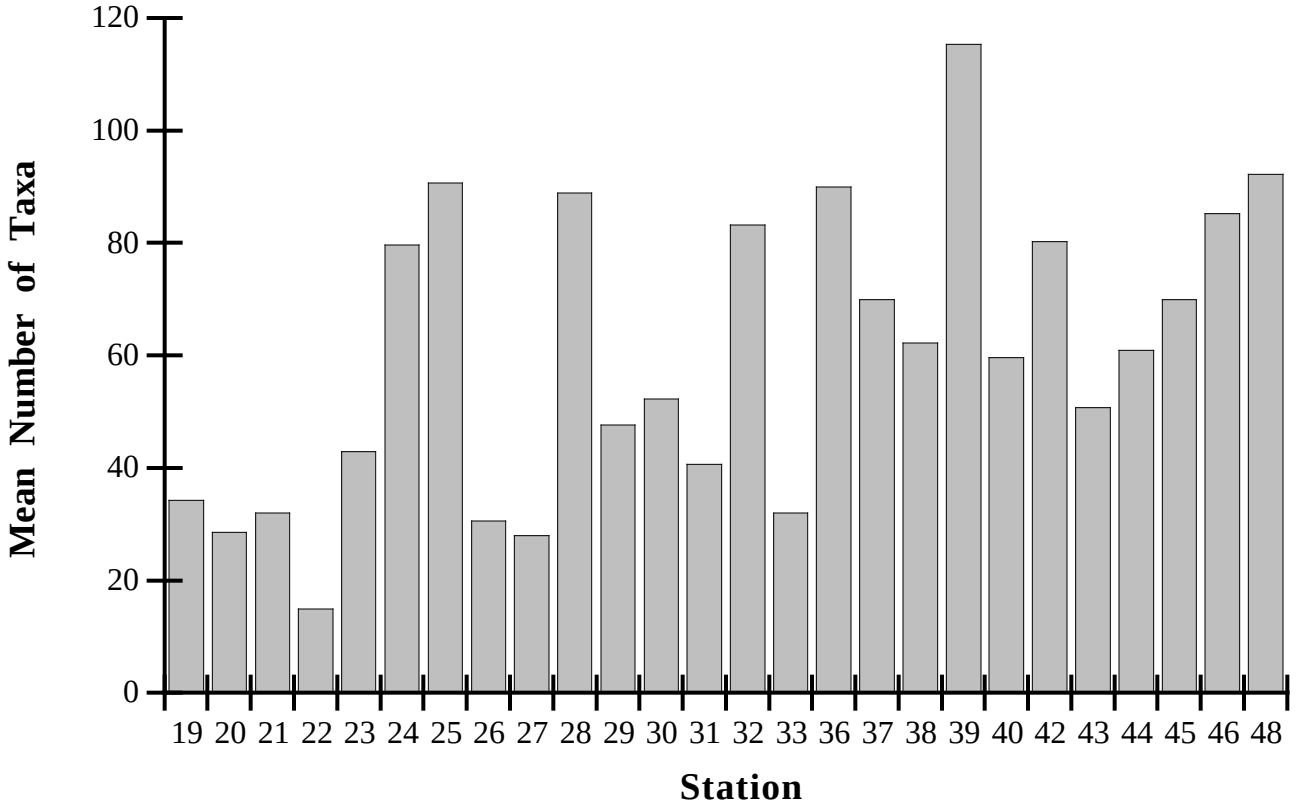


Table 5. Pearson product-moment correlation coefficients, Florida Bay stations, August, 1996.

Variable	by Variable	Correlation (Pearson's r)	n	Significance Probability
ln(density+1)	gravel/sand	0.5521	26	**0.0035**
ln(density+1)	silt/clay	-0.5557	26	**0.0032**
ln(density+1)	TOC	0.0941	25	0.6546
ln(density+1)	salinity	0.0771	26	0.7082
ln(density+1)	DO	0.286	26	0.1567
gravel/sand	silt/clay	-0.9990	26	**<0.0001**
gravel/sand	TOC	0.2025	25	0.3317
gravel/sand	salinity	0.0284	26	0.8904
gravel/sand	DO	0.2329	26	0.2521
silt/clay	TOC	-0.2036	25	0.3291
silt/clay	salinity	-0.0326	26	0.8743
silt/clay	DO	-0.2384	26	0.2408
TOC	salinity	-0.1463	25	0.4852
TOC	DO	0.5089	25	**0.0094**

Figure 8. Mean macroinfaunal densities versus sediment gravel/sand content for the Florida Bay stations, August 1996.

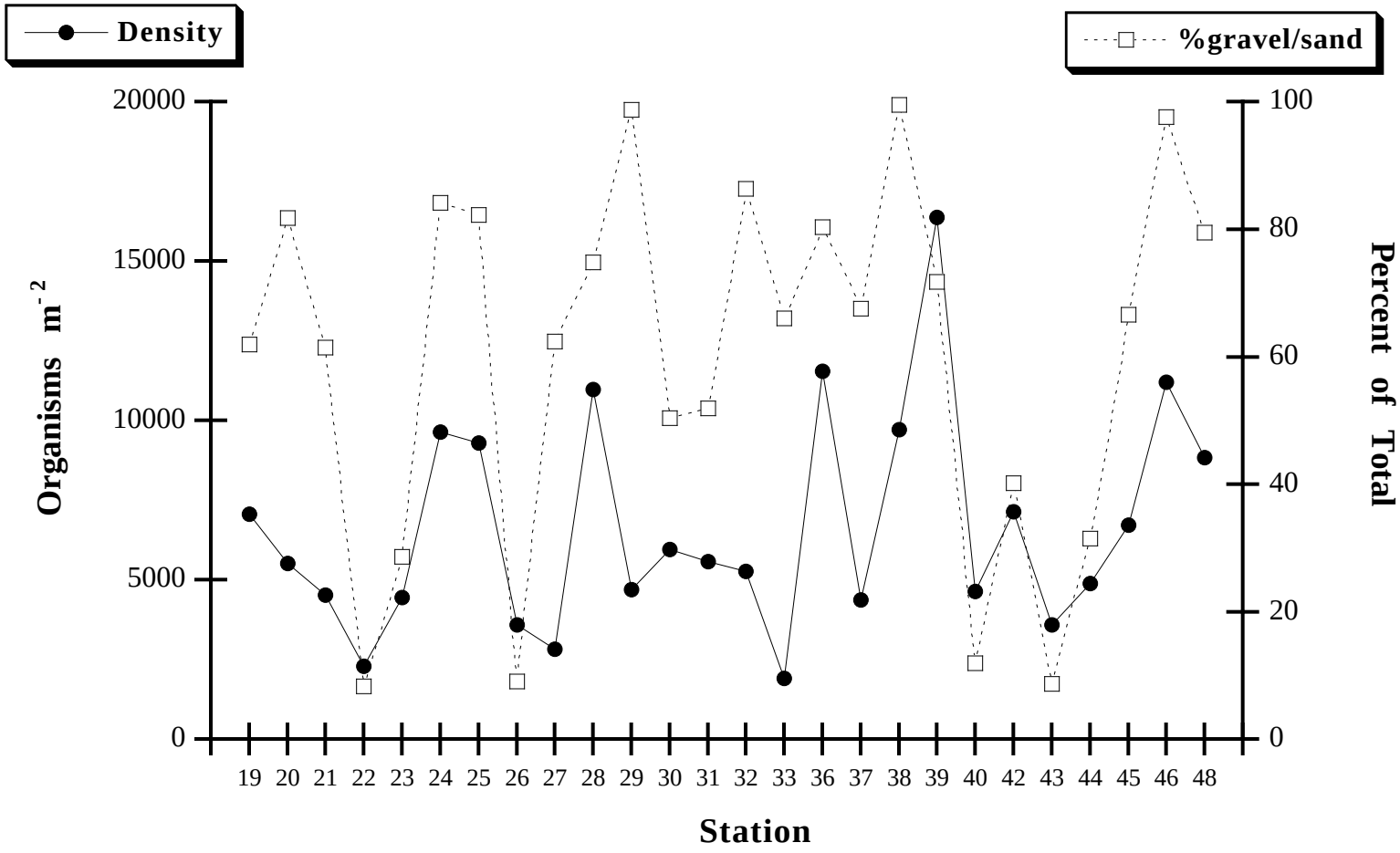


Figure 9. Mean macroinfaunal densities versus bottom salinity for the Florida Bay stations, August 1996.

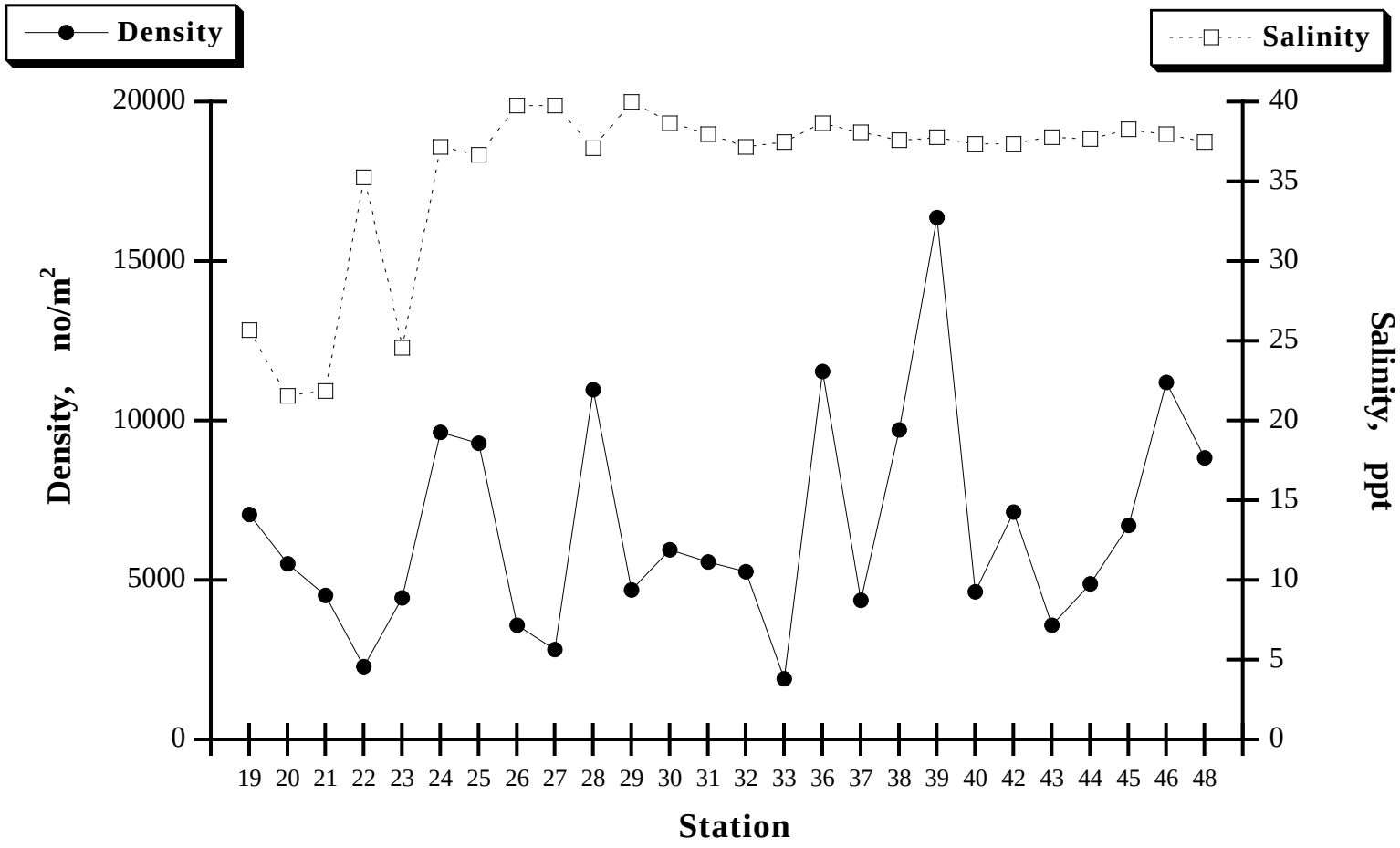


Figure 10. Mean macroinfaunal densities versus bottom dissolved oxygen concentration for the Florida Bay stations, August 1996.

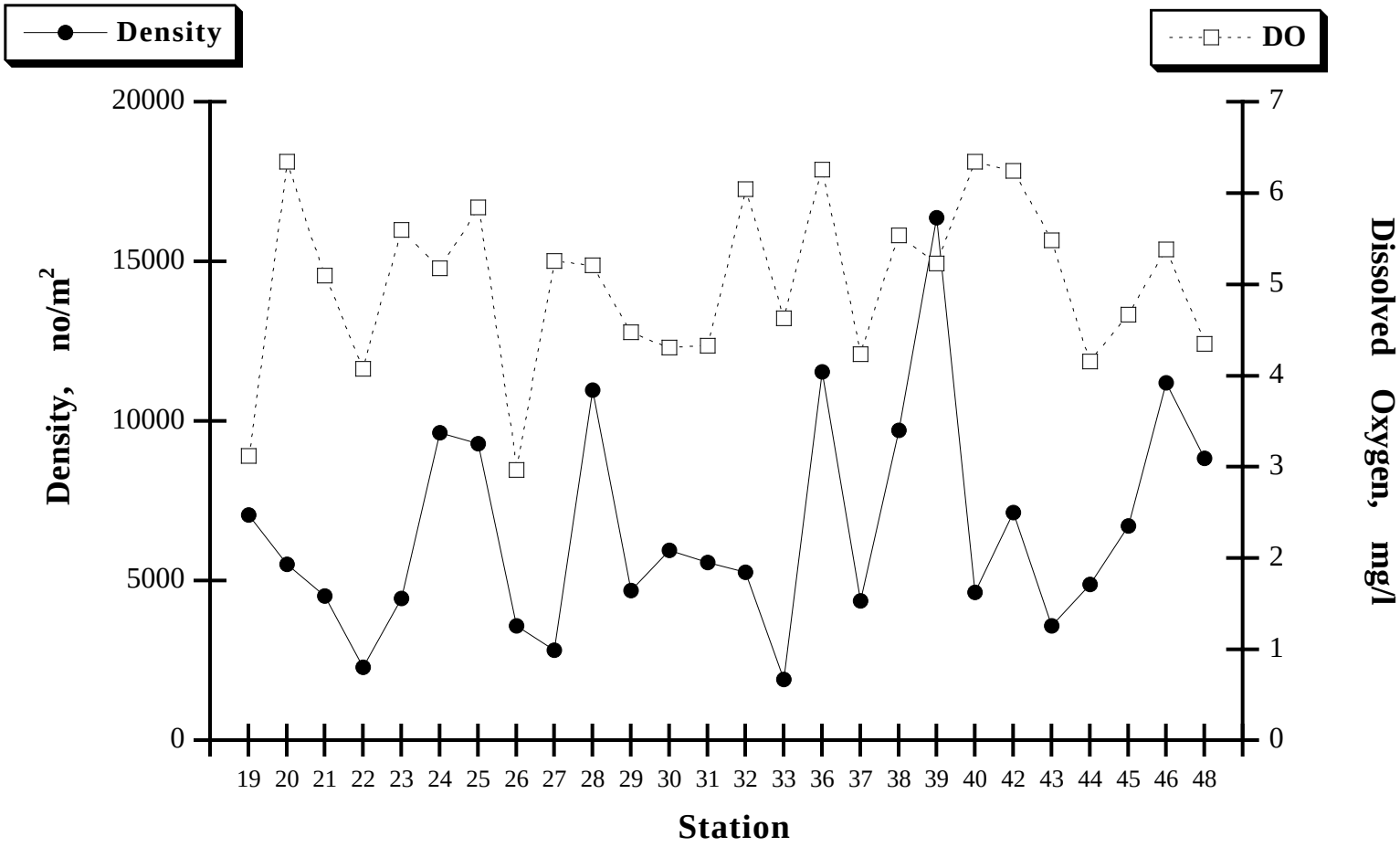
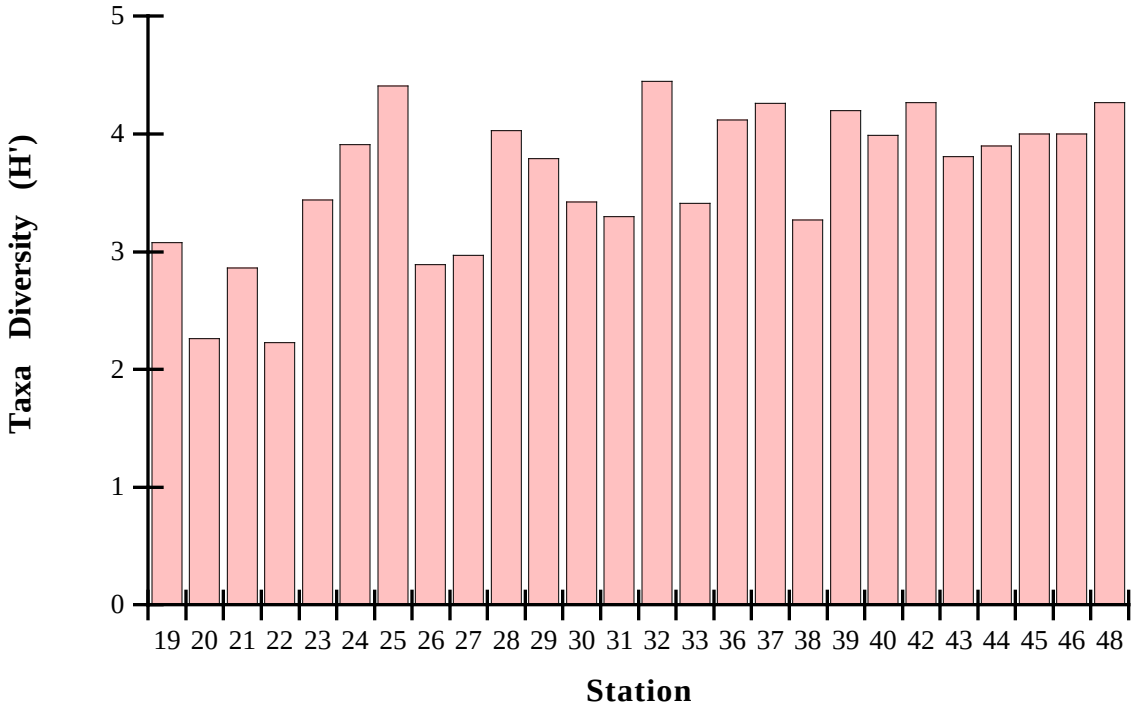
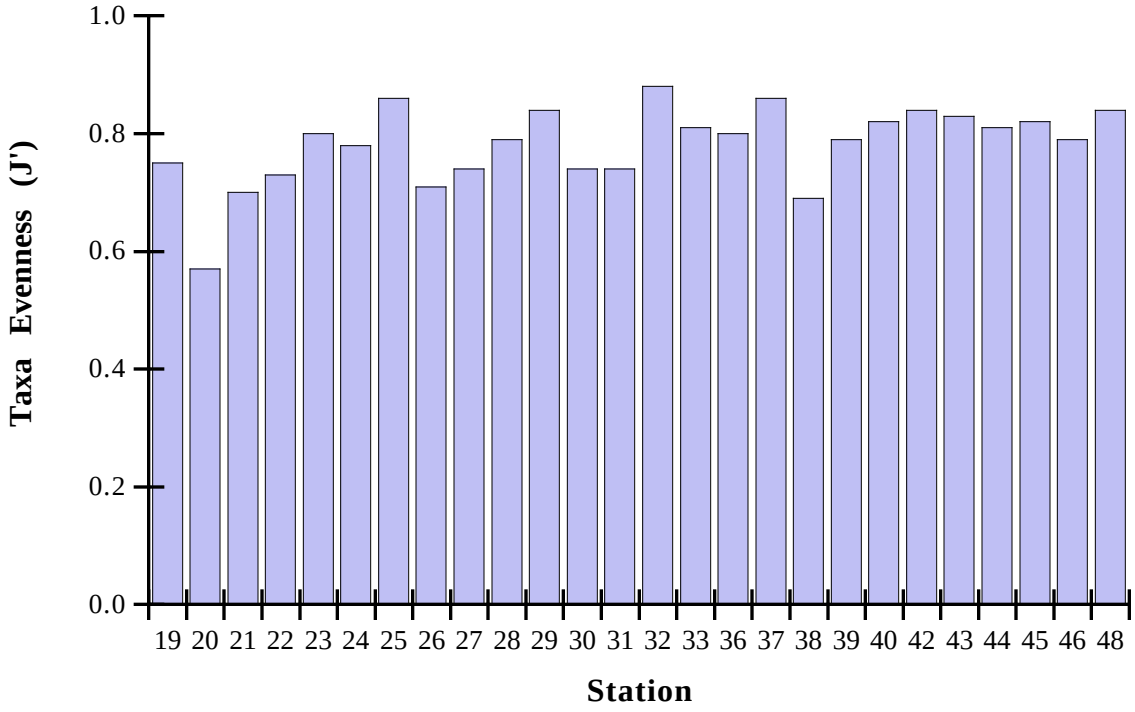


Figure 11. Taxa diversity (H') and taxa evenness (J') for the Florida Bay and Adjacent Waters stations, August 1996.





Numerical classification of the 26 stations can be interpreted at a five-group level (10–25% level of similarity). Group 1 contained only Station 22 with a macroinfaunal assemblage dominated by the amphipods, *Ampelisca* sp. Y and *Ampelisca* (LPIL) (Table 6; Figure 12). Group 2 contained Stations 19, 20, 21, 23, 26 and 27 with a macroinfaunal assemblage dominated by six polychaete taxa, 4 amphipod taxa and a sipunculid, gastropod, cnidarian, tanaid and an oligochaete taxon (Table 6; Figure 12). Group 3 contained Station 31 dominated by two taxa, the bivalve *Nucula aegeensis*, and the polychaete *Mediomastus* (LPIL) (Table 6; Figure 12). Group 4 contained Station 33 dominated by Oligochaeta (LPIL) and the gastropod, *Caecum pulchellum.* Group 5 contained the remaining stations with a diverse assemblage of macroivertebrate taxa (Table 6; Figure 12).

Classification of the 67 taxa at the 26 stations can interpreted at a four–group level (26 – 38% similarity; Table 6 and Figure 13). Group 1 included five taxa found in high densities at Station 18. Group 2 includes 11 taxa found in high at Stations 14 and 15. Group 3 included a diverse assemblage of taxa found at the remaining 19 stations. Group 4 contained the molluscs, Hydrobiidae (LPIL), *Texadina sphinctostoma*, *Ischadium recurvum*, *Rangia cuneata* and *Crassostrea virginica* and the polychaete, *Polydora cornuta* found in high densities at Stations 11 and 12 (Table 6; Figure 13).

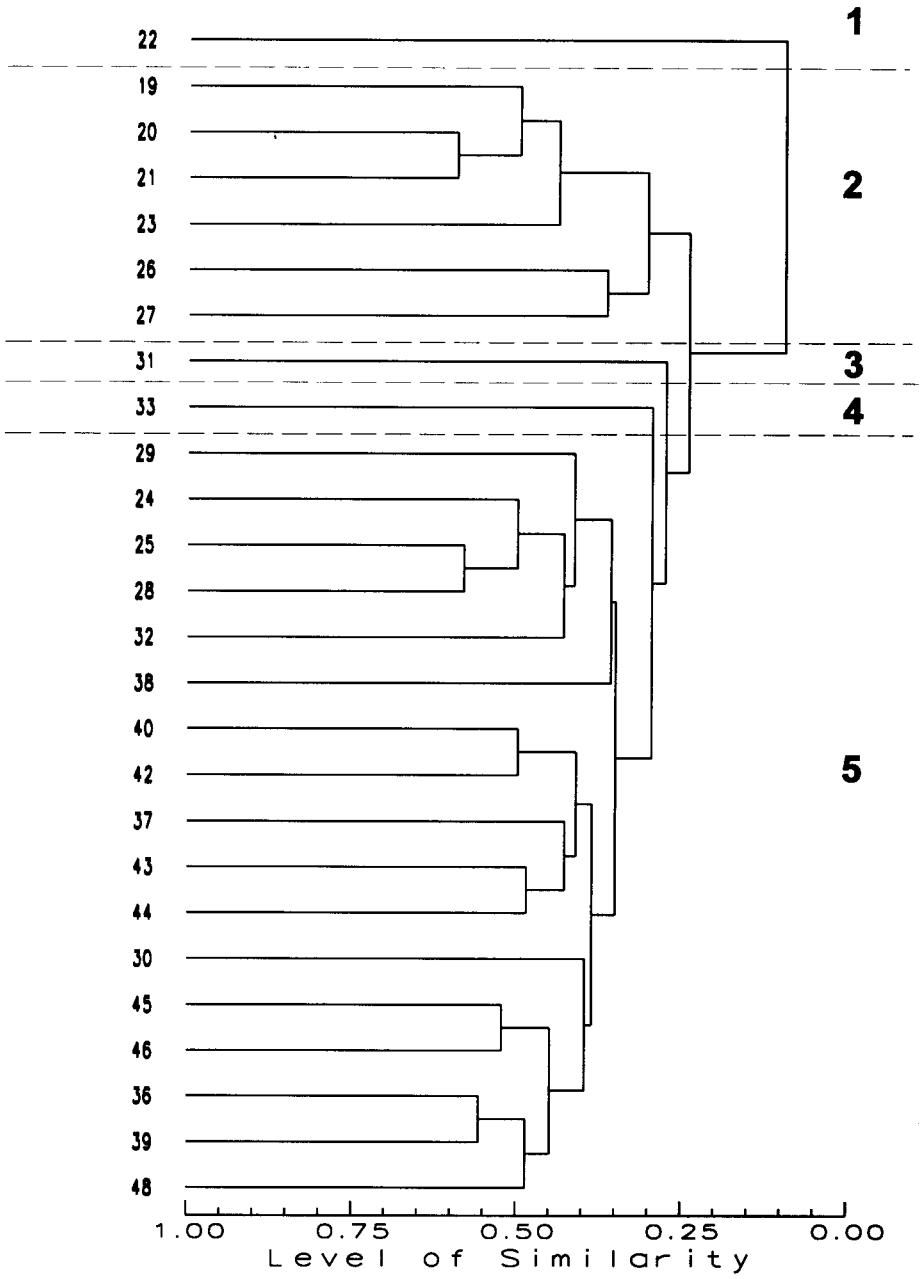


Figure 12. Normal (station) classification analysis for the Florida Bay stations, August 1996. Large, bolded numbers (1, 2, 3, 4) denote station groupings.

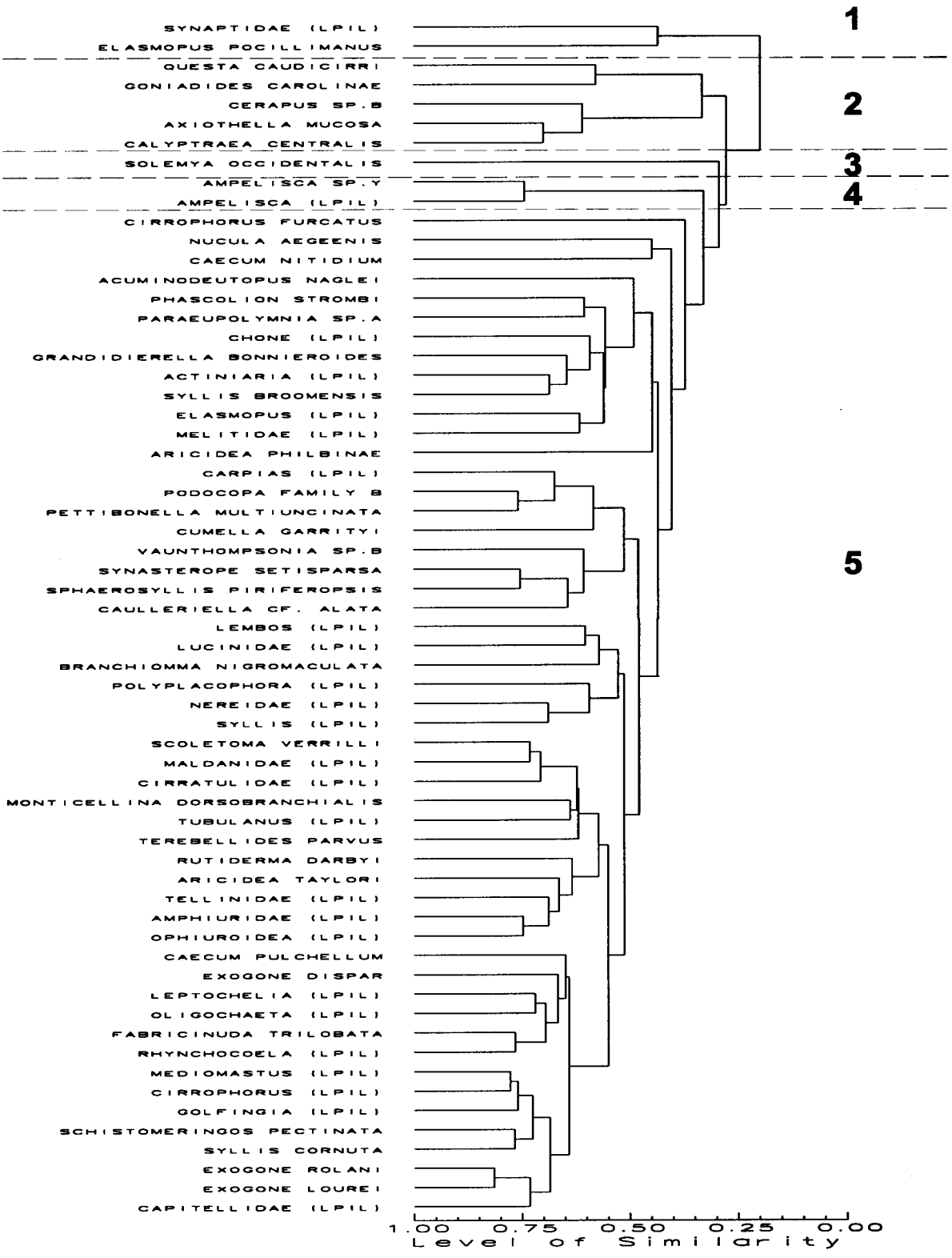


Figure 13. Inverse (taxa) classification analysis for the Florida Bay stations, August 1996. Large, bolded numbers (1, 2, 3, 4) denote taxa groupings.

Table 6. Data matrix of the Florida Bay station and taxa groups compiled from classification analysis dendrograms.

	22	19	20	21	23	26	27	31	33	29	24	25	28	32	38	40	42	37	43	44	30	45	46	36	39	48
Synaptidae (LPIL)		75	2	5											1										13	2
Elasmopus pocillimanus		25	1		42																		3			1
Questa caudicirri												1			283								1		2	
Goniadides carolinae				1						6	33	2	1		206	1						5	2		1	
Cerapus sp.B		1	6	5	6	2				3	21	34	35													
Axiothella mucosa										1	18	17	25		26								1			
Calyptraea centralis						3		2			26	13	26	1									2			
Solemya occidentalis									1					11	1	12	79			11						13
Ampelisca sp.Y	84		2		2						1	1	3	2		1								14	1	2
Ampelisca (LPIL)	62	1	1		2					2	2		1	4								1		4	2	4
Cirrophorus furcatus								3	5			33	2	8	1			2			8			11		
Nucula aegeenis								90	5	4	17	5	3	1		22	25			1		2	1	1	2	
Caecum nitidium						1				2			1			4	18				5	19	119	3	2	
Acuminodeutopus naglei			36	32	3		60			13	5	4	1	3	1									1	2	3
Phascolion strombi		97	1	165	25	2	5	2	1		2	1	1	10		12	18	4	1	2	1		7	21	1	4
Paraeupolymnia sp.A		10	1	2	42	2	1	2			2	2	28	8	8		1		1	1	1	1		3	11	2
Chone (LPIL)		64	26	4	8		2				27		2		1			1				7	5	1	2	
Grandidierella bonnieroides	12	122	12	15	25	1	1			7	34	10	24	6		2		6	1					10	10	
Actiniaria (LPIL)		42	5	7	2	2	6			2		27	15		2	1		6		1	1	2	5	11	4	5
Syllis broomensis		35	14	10	4				1	6	7	24	7		14		1	2	1	5	2	3		3	3	
Elasmopus (LPIL)		19	9		58		13		1		6	6	3	6		1							7		10	15
Melitidae (LPIL)		18		1	3	11	18		1	1	3	9	22	1				2	1		1	1	3		7	
Aricidea philbinae			1	2	2	4	17	5	1	21		3	12						3		3	1	1	18		
Carpias (LPIL)														4		1		5	1	1	13		2	33	41	27
Podocopa Family B															1		1	15	1	9	31	3	16	5	24	7
Pettibonella multiuncinata																		8	1	8	6	6	1		22	21
Cumella garrityi							2			9	1	2	1			1		3	4		4	13	2	2	23	5
Vaunthompsonia sp.B										2		20	19					1			5			18	13	7
Synasterope setisparsa												12	2	1			13	14		1	3	4	5	16	24	49
Sphaerosyllis piriferopsis												16	7	1	5		3	2		4		16	5	20	32	4
Caulleriella cf. Alata												29	13	2	2	1	8	3				3		5	5	
Lembos (LPIL)					2	6	2	1	3		1		27	2		1	7		3			3	9	9	17	43
Lucinidae (LPIL)									6	1	1			3		10	37	1	1	2		19	7	3	20	3
Branchiomma nigromaculata						4			1			2	1	5		3	3		24	9		2	1	30	7	2
Polyplacophora (LPIL)		1				4			1			22		2	26			5	10	6		4	3	1		6
Nereidae (LPIL)		8	3	4		21			9	1	4	5	5	2	6	2	6	12	4	18		6	1	9	13	10
Grubeosyllis (LPIL)		4																								
Scoletoma verrilli						1		21	1	8	41	28	63	34	17	2	1	2	2		16	81	25	24	8	8
Maldanidae (LPIL)					1			6		10	55	47	39	10	44		1	4					5	4	17	3
Cirratulidae (LPIL)			1					18	1		7	16	31	9	3	3	4	5		1	1	1	1	11	15	3
Monticellina dorsobranchialis					6			29	6		15	24	17	5		8	3	3		21	5			2	1	1
Tubulanus (LPIL)		1	1		1		4	4	1	11	7	16	12	18		1	4	5	3	2	6	4	2	3		
Terebellides parvus								15			10	1	28	1			7	2		1	10	11	3	3	1	5
Rutiderma darbyi		2	2							16	5	10	7	1	17		6	1				21	8		8	10
Aricidea taylori		5	3	4	4			1	3	4	5	3	6	4		4	2		7		2	3	6	1	3	2
Tellinidae (LPIL)		6			2				2	2	4	7	4		2	2	3	2		1		7	18	8	5	3
Amphiuridae (LPIL)		1			1			1	1	6	5	28	4	2		4	6	4	1	1			7	1	7	15
Ophiuroidea (LPIL)					1			3	1	4	1	11	8		1	8	2		1	4	1	2	4	1	6	9
Caecum pulchellum	1	104	349	37	1				13	2	39	7	27	12	31	68	48	2		4	177	3	14	48	86	16
Exogone dispar		14	23	68	21	114	1			13	9	3	3	5	6		2	6	6	3	18		18	30	38	5
Leptochelia (LPIL)	7	16				72	26		1	37		3	114	17	16	33	38	71	1	23	71	71	188	196	182	138
Oligochaeta (LPIL)		40	20	34	79	50	60	24	55	34	3	33	4	39	26	18	23	23	56	70	12	2	63	89	132	42
Fabricinuda trilobata		9	2	4	14	1	17	8		20	236	41	215	37	1		1	10	1	6	4	34	44	28	124	42
Rhynchocoela (LPIL)	3	3	1	3	14	8	6	2	3	12	8	38	31	7	16	2	7	15	9	16	3	12	17	20	17	15
Mediomastus (LPIL)						1	1	151	1	74	50	46	11	8	1	19	49	5	5	9	9	6	8	26	28	6
Cirrophorus (LPIL)		1	3					14	6	8	11	50	11	7		7	11	1	41	77	6	23	16	16	52	14
Golfingia (LPIL)							2	4	5	8	1	21	3	16	5	13	19	5		7	6	1	19	39	37	7
Schistomeringos pectinata						2	1		4	37	2	2	11	9	9	7	23	15	27	8	21		4	11	3	3
Syllis cornuta			2		2	1	1	3	2	14	9	2	7	12	26	4	15	1	12	10	3	2	15	5	23	2
Exogone rolani			2							2				7	6	8	17	7	26	32	37	18	108	71	116	25
Exogone lourei					7					5		10	11	2	22	9	9	8	9	9	52	37	58	59	57	17
Capitellidae (LPIL)		3			7	9	2	1	7	10		1		28	1	7	6	16	10	4	10	42	19	39	86	6

LITERATURE CITED

Bloom, S.A. 1994. The community analysis system. Version 5.0. Ecological Data Consultants, Archer, Florida.

Boesch, D.F. 1977. Application of Numerical Classification in Ecological Investigations of Water Pollution. USEPA Report 60/3-77-033, Corvallis, Oregon, 115 pp.

Bray, J.R. and J.T. Curtis. 1957. An ordination of upland forest communities of southern Wisconsin. Ecological Monographs 27: 325-349.

Field, J.G. and G. MacFarlane. 1968. Numerical methods in marine ecology. 1. A quantitative 'similarity' analysis of rocky shore samples in False Bay, South Africa. Zool. Africana 3: 119-137.

Lance, G.N. and W.T. Williams. 1967. A general theory of classificatory sorting strategies. I. Hierarchical systems. Aust. Comput. J. 9: 373-380.

Pielou, E.C. 1966. The measurement of diversity in different types of biological collections. Journal of Theoretical Biology 13:131-144.

SAS Institute. 1995. JMP Version 3.1 for the Macintosh. SAS Institute. Cary, NC.

APPENDIX

BARRY A. VITTOR & ASSOCIATES, INC.
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8060 Cottage Hill Road Mobile, Alabama 36695
Phone (334) 633-6100 Fax (334) 633-6738

QUALITY ASSURANCE STATEMENT

Client/Project NOAA

Work Assignment Title Florida Bay and Adjacent Waters 1996

Work Assignment Number FE - 96 - 12 - FB Task Number 4

Description of Data Set or Deliverable: 108 Benthic macroinvertebrate samples collected in August and September of 1996; Young Dredge grabs.

Description of audit and review activities: Judged accuracy rates were well above standard levels for sorting and taxonomy. Laboratory QC reports were completed. Copies of reports and QC results follow (see attachment.) All taxonomic data were entered into computer and printed. This list was checked for accuracy against original taxonomic data sheets.

Description of outstanding issues or deficiencies which may affect data quality: None

Carl Mahy 6/3/97

Signature of QA Officer or Reviewer Date

Barry A. Vittor 6-3-97

Signature of Project Manager Date

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QUALITY CONTROL REWORKS

Client/Project NOAA

Work Assignment Title Florida Bay and Adjacent Waters 1996

Work Assignment Number FE - 96 - 12 - FB Task Number 4

Sorting Results:

Sample #	% Accuracy
49-2	100%
14-1	99.46%
20-1	99.76%
47-2	100%
17-2	100%
17-3	100%
29-1	100%
31-1	100%
48-1	100%

Taxonomy Results:

Sample #	Taxa	% Accuracy
50-3	Crust./Moll.	100%
14-2	Crust./Moll.	95.8%
29-3	Crust./Moll.	96.6%
38-3	Crust./Moll.	96.5%
20-2	Crust./Moll.	95.3%
22-1	Crust./Moll.	95%
43-3	Crust./Moll.	99%
34-3	Crust./Moll.	95.3%
24-2	Crust./Moll.	95.3%
52-1	Crust./Moll.	96.9%
38-1	Crust./Moll.	97%
33-3	Poly./Misc.	98.2%
16-1	Poly./Misc.	99.4%
48-1	Poly./Misc.	100%
17-1	Poly./Misc.	99.6%
50-1	Poly./Misc.	100%
41-3	Poly./Misc.	98%
30-1	Poly./Misc.	98%
27-1	Poly./Misc.	98%
50-2	Poly./Misc.	96%
32-1	Poly./Misc.	97.6%
46-2	Poly./Misc.	99%

Description of outstanding issues or deficiencies which may affect data quality: None

Carl M Day 6/3/97

Signature of QA Officer or Reviewer Date

ADDITION QUALITY CONTROL REWORKS

Client/Project NOAA

Work Assignment Title Florida Bay 1996

Work Assignment Number FB96 Task Number 3

Dept.: Sorting

Personnel.: SDC

Reasons requiring reworks: Accuracy rate for sample 36-2 was below acceptable rate of 95%. All samples sorted by this technician were reworked.

Results of reworks:

Sample #	% Accuracy
37-1	98%
38-2	93%
33-1	91%
20-2	77%
24-3	94%
27-1	95%
28-2	96%
44-3	94%
48-3	95%

Description of outstanding issues or deficiencies which may affect data quality:
All individuals found in reworks were added to the data.
Due to the frequent failures of this sorter, retraining procedures were employed to pinpoint the problem area. This revealed that the enamel tray was being overloaded with debris and organisms. The reworks on another set of samples proved that corrective action was successful.
There are no deficiences that are outstanding. Data quality is assured.

Carl Mady 4/3/97

Signature of QA Officer or Reviewer Date