

St. Lucie Estuary Benthic Community Assessment, 2001

SUBMITTED TO:

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Centers for Coastal Ocean Science
Center for Coastal Monitoring and Assessment
Silver Spring, Maryland 20910

PREPARED BY:

Barry A. Vittor & Associates, Inc.
8060 Cottage Hill Rd.
Mobile, Alabama 36695
(251) 633-6100

November 2002

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

METHODS

Sample Collection And Handling

Sediment Analysis

Macroinfaunal Sample Analysis

DATA ANALYSIS

Assemblage Structure

HABITAT CHARACTERISTICS

BENTHIC COMMUNITY CHARACTERIZATION

LITERATURE CITED

APPENDIX

LIST OF TABLES

Table 1. Summary of station locations, water quality and sediment data for the St. Lucie Estuary stations, May 2001.

Table 2. Summary of overall abundance of major benthic macroinfaunal taxonomic groups for the St. Lucie Estuary stations, May 2001.

Table 3. Summary of abundance of major benthic macroinfaunal taxonomic groups by station for the St. Lucie Estuary stations, May 2001.

Table 4. Distribution and abundance and of taxa for the St. Lucie Estuary stations, May 2001.

Table 5. Percentage abundance of dominant taxa for the St. Lucie Estuary stations, May 2001.

Table 6. Summary of benthic macroinfaunal data for the St. Lucie Estuary stations, May 2001.

LIST OF FIGURES

Figure 1. Station locations for the St. Lucie Estuary assessment, May 2001.

Figure 2. Salinity and sediment percent organic carbon (TOC) data for the St. Lucie Estuary stations, May 2001.

Figure 3. Sediment texture data for the St. Lucie Estuary stations, May 2001.

Figure 4. Distribution of major macroinvertebrate taxa for the St. Lucie Estuary stations, May 2001.

Figure 5. Taxa richness and taxa density data for the St. Lucie Estuary stations, May 2001.

Figure 6. Taxa diversity (H') and taxa evenness (J') data for the St. Lucie Estuary stations, May 2001.

INTRODUCTION

The St. Lucie Estuary was sampled during May, 2001. 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). Location data for the St. Lucie Estuary stations are given in Table 1 and Figure 1.

METHODS

Sample Collection And Handling

A Young-modified Van Veen grab (area = 0.04 m²) was used to collect bottom samples (three replicate samples) at each of the seven stations during May, 2001. 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 μ m 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 labeled glass vials containing 70% isopropanol. Each vial represented a major taxonomic group (e.g. Polychaeta, 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 St. Lucie 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 Quality Assurance and Quality Control reports for the St. Lucie samples are given in the Appendix.

Assemblage Structure

Several numerical indices were chosen for analysis and interpretation of the macroinfaunal data. 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 mean 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 Shannon-Weaver Index (Pielou, 1966), according to the following formula:

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

where, S = the number of taxa in the sample,

i = the i'th taxa in the sample, and

p_i = the number of individuals of the i 'th taxa divided by the total number of individuals in the sample.

Taxa diversity was calculated using \ln ; however, diversity may also be calculated using \log_2 . Both methods of calculating diversity are common in the scientific literature. The taxa diversity calculated in this report using \ln , can be converted to \log_2 diversity by multiplying the \ln taxa diversity by 1.4427. 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 the equitability in the fauna to the 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, $J' = H' / H'_{\max}$.

HABITAT CHARACTERISTICS

Water quality and sediment data for the 30 St. Lucie stations are given in Table 1 and Figures 2 and 3. Salinities varied from 17 ppt at Station 1 to 38.1 at Station 28. Sediment composition varied considerably and ranged from 98% sand at Station 24 to 87% silt+ clay at Station 18 (Table 1; Figure 3). The total organic carbon (TOC) fraction of the sediment was uniformly low and ranged from 0.07% at Station 23 to 4.79% at Station 29 (Table 1, Figure 2).

BENTHIC COMMUNITY CHARACTERIZATION

Microsoft TMExcel 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, 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.

A total of 7429 organisms, representing 148 taxa, were identified from the 30 St. Lucie stations (Table 2). Polychaetes were the most numerous organisms present representing 48.9% of the total assemblage, followed in abundance by bivalves (27.2%) and malacostracans (17.8%). Polychaetes represented 41.9% of the total number of taxa followed by malacostracans (25.0%) and bivalves (17.6%) (Table 2).

The abundance of major taxa by station are given in Table 3 and Figure 4. The number of taxa per station ranged from 3 at Station 18 to 54 at Station 27. The number of organisms per station ranged from 4 at Station 6 to 1224 at Station 29. In general, mollusks and arthropods dominated the assemblages at Stations 1 through 12, while annelids (primarily polychaetes) dominated at Stations 13 through 30.

The dominant taxa collected from the St. Lucie stations were the polychaete, *Sternaspis scutata*, the bivalve, *Mulinia lateralis*, the malacostracans, *Ampelisca abdita*, and the polychaete, *Mediomastus* (LPIL) representing 23.4%, 21.7%, 13.7%, and 10.8% of the total individuals collected (Table 4). The polychaete, *Glycinde solitaria* was the most widely distributed taxon being found at 83% of the stations (Table 4). The distribution of dominant taxa representing > 10% of the total assemblage at each station is given in Table 5. The dominance of *A. abdita* and *M. lateralis* at Stations 1-13 can be contrasted with the dominance of several polychaetes at Stations 14-30 (Table 5).

Mean station taxa richness and station density data are given in Table 6 and Figure 5. Taxa richness varied and ranged from 2.0 (\pm 1.0) at Station 17 to 53 (no SD) at

Station 30 (Table 6, Figure 5). Taxa richness was positively correlated with the percent gravel + sand in the sediments (Spearman's Rho = 0.748, $P > Rho = < 0.0001$) and inversely correlated with the percent silt + clay (Spearman's Rho = -0.746, $P > Rho = < 0.0001$) and salinity (Spearman's Rho = -0.382, $P > Rho = 0.0449$). Station mean densities exhibited considerable variation ranging from 66.7 organisms/m² (± 52.0) at Station 17 to 12275 organisms/m² (no SD) at Station 25 (Table 6, Figure 5). Densities were also positively correlated with the percent gravel + sand in the sediments (Spearman's Rho = 0.466, $P > Rho = 0.0095$) and inversely correlated with the percent silt + clay (Spearman's Rho = -0.462, $P > Rho = 0.0102$) and salinity (Spearman's Rho = -0.380, $P > Rho = 0.0458$).

Taxa diversity and evenness are given in Table 6 and Figure 6. Taxa diversity (H') ranged from 0.64 at Station 18 to 2.98 at Station 14 (Table 6, Figure 6). Taxa evenness (J') ranged from 0.33 at Stations 7 and 29 to 1.00 at Station 6 (Table 6, Figure 6).

LITERATURE CITED

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

Table 1. Summary of station locations, water quality and sediment data for St. Lucie Estuary stations, May 2001.

Station	Latitude	Longitude	Depth (m)	Sample Depth	Temp (°C)	Sal (ppt)	D.O. (mg/l)	% Moisture	% T.O.C.	% Gravel	% Sand	% Silt	% Clay	USACE Description	Median Particle Size (phi)	Sorting Coefficient
1	27° 14.468	80° 19.193	1.2	bottom	23.8	17.1	5.60	26.7	0.38	7.98	82.28	3.43	6.30	–	2.361	1.533
2	27° 14.251	80° 17.963	2.3	bottom	25.0	25.1	4.04	75.8	1.32	0.00	34.11	38.79	27.09	Clayey Silt	6.141	4.036
3	27° 14.094	80° 18.379	2.2	bottom	25.1	25.0	2.82	60.1	1.54	0.00	46.00	27.28	26.72	Clayey Sand	4.396	4.324
4	27° 13.660	80° 17.200	2.5	bottom	24.9	25.5	4.10	63.4	1.44	0.00	39.57	38.69	21.74	Clayey Silt	5.689	3.837
5	27° 13.040	80° 17.067	2.9	bottom	24.5	26.2	4.12	57.4	1.59	0.00	51.03	27.61	21.37	Clayey Sand	3.879	4.205
6	27° 12.820	80° 16.863	2.6	bottom	24.6	26.1	4.86	50.5	0.48	2.37	43.50	28.87	25.26	Clayey Sand	5.131	4.130
7	27° 10.703	80° 15.874	1.2	bottom	24.8	22.3	6.81	62.5	1.71	0.00	33.61	41.25	25.14	Clayey Silt	5.947	3.482
8	27° 10.671	80° 15.611	0.8	bottom	26.4	25.8	6.34	22.9	0.12	0.00	89.14	6.07	4.79	Sand	2.131	1.264
9	27° 10.364	80° 15.609	1.7	bottom	26.0	23.4	6.35	26.8	0.20	0.76	85.75	8.28	5.22	Sand	2.772	0.846
10	27° 10.166	80° 15.267	0.6	mid-column	28.2	20.7	ND	46.9	0.53	0.00	64.60	24.10	11.30	Silty Sand	3.697	1.784
11	27° 09.766	80° 15.181	0.6	mid-column	25.3	21.0	ND	67.0	1.66	0.00	22.39	50.48	27.13	Clayey Silt	6.534	3.013
12	27° 09.803	80° 15.391	0.6	mid-column	25.4	ND	ND	53.0	2.04	0.00	32.45	43.22	24.32	Clayey Silt	5.983	3.839
13	27° 12.716	80° 15.440	1.6	bottom	23.9	27.7	6.30	55.7	2.19	0.00	40.96	28.61	30.42	Sandy Clay	5.916	4.252
14	27° 12.536	80° 15.425	2.2	bottom	23.6	26.8	5.51	43.2	2.12	2.19	60.89	16.96	19.96	Silty Sand	2.554	4.129
15	27° 12.377	80° 15.896	2.9	bottom	24.6	27.0	5.62	57.8	2.20	0.00	36.81	32.06	31.13	Sandy Clay	6.266	4.240
16	27° 11.867	80° 15.697	3.5	bottom	24.3	27.9	5.70	63.3	2.85	0.00	15.55	42.53	41.91	Silty Clay	7.133	2.897
17	27° 11.414	80° 15.998	2.1	bottom	25.6	26.0	ND	66.2	2.72	0.00	21.15	34.43	44.42	Silty Clay	7.218	3.555
18	27° 11.194	80° 15.677	1.8	bottom	26.7	24.8	ND	65.0	3.20	0.00	13.07	47.62	39.31	Silty Clay	6.923	2.909
19	27° 12.955	80° 14.087	1.1	bottom	23.3	31.1	6.27	51.5	2.88	0.00	26.30	33.90	39.81	Silty Clay	6.911	3.587
20	27° 12.682	80° 12.852	3.0	bottom	24.6	32.8	5.83	51.3	2.28	0.00	42.91	34.31	22.78	Clayey Sand	4.615	4.114
21	27° 12.900	80° 13.840	2.1	bottom	24.6	31.4	6.11	55.9	2.12	0.00	32.46	44.93	22.61	Clayey Silt	5.224	3.574
22	27° 12.440	80° 12.760	3.3	bottom	24.1	33.4	5.91	46.3	0.93	6.07	52.91	21.01	20.01	–	3.135	4.613
23	27° 12.420	80° 14.060	2.0	bottom	24.2	30.7	5.93	51.4	0.07	0.00	24.64	39.27	36.08	Silty Clay	6.878	3.922
24	27° 12.225	80° 15.438	0.9	bottom	25.0	28.2	ND	19.3	–	1.96	97.93	–	–	Sand	1.448	0.442
25	27° 12.245	80° 12.404	2.2	bottom	23.7	35.2	ND	43.7	0.64	0.00	60.47	28.99	10.54	Silty Sand	3.494	2.232
26	27° 11.996	80° 12.697	1.5	bottom	23.4	37.4	ND	53.4	0.62	0.00	30.76	51.91	17.34	Sandy Silt	4.581	2.886
27	27° 11.846	80° 12.302	3.5	bottom	24.3	32.5	6.13	31.1	0.65	0.00	72.52	19.15	8.33	Silty Sand	3.617	1.211
28	27° 11.263	80° 12.523	1.6	bottom	23.8	38.1	ND	41.0	0.61	0.00	56.76	33.25	10.00	Silty Sand	3.343	2.410
29	27° 11.000	80° 12.191	2.8	bottom	23.2	36.5	9.30*	45.9	4.79	0.00	40.97	45.21	13.82	Sandy Silt	4.292	1.940
30	27° 11.040	80° 12.007	2.5	bottom	23.1	36.2	6.56	28.8	2.25	0.00	71.80	19.76	8.43	Silty Sand	3.632	1.229

ND No Data

* Dissolved Oxygen meter not operating properly, producing inaccurate readings

- Unable to calculate due to amount of Sample retained in the sieve

Table 2. Summary of overall abundance of major benthic macroinfaunal taxonomic groups for the St. Lucie Estuary stations, May 2001.

Taxa	Total No. Taxa	% of Total	Total No. Individuals	% of Total
Annelida				
Oligochaeta	2	1.4	122	1.6
Polychaeta	62	41.9	3,631	48.9
Arthropoda				
Malacostraca	37	25.0	1,319	17.8
Mollusca				
Bivalvia	26	17.6	2,024	27.2
Gastropoda	13	8.8	97	1.3
Other Taxa	8	5.4	236	3.2
Total	148		7,429	

Table 3. Summary of abundance of major benthic macroinfaunal taxonomic groups by station for the St. Lucie Estuary, May 2001.

Station	Phylum	No. of Taxa	% of Total	No. of Individuals	% of Total
1	Annelida	10	30.3	53	20.6
	Mollusca	11	33.3	86	33.5
	Arthropoda	8	24.2	106	41.2
	Other Taxa	4	12.1	12	4.7
	Total	33		257	
2	Annelida	7	50.0	36	10.5
	Mollusca	5	35.7	107	31.3
	Arthropoda	2	14.3	199	58.2
	Other Taxa	0	0.0	0	0.0
	Total	14		342	
3	Annelida	9	52.9	32	5.9
	Mollusca	6	35.3	283	52.2
	Arthropoda	2	11.8	227	41.9
	Other Taxa	0	0.0	0	0.0
	Total	17		542	
4	Annelida	8	50.0	9	15.8
	Mollusca	5	31.3	38	66.7
	Arthropoda	2	12.5	9	15.8
	Other Taxa	1	6.3	1	1.8
	Total	16		57	
5	Annelida	8	53.3	52	29.1
	Mollusca	5	33.3	109	60.9
	Arthropoda	2	13.3	18	10.1
	Other Taxa	0	0.0	0	0.0
	Total	15		179	
6	Annelida	2	50.0	2	50.0
	Mollusca	1	25.0	1	25.0
	Arthropoda	1	25.0	1	25.0
	Other Taxa	0	0.0	0	0.0
	Total	4		4	
7	Annelida	7	43.8	19	5.1
	Mollusca	6	37.5	295	79.9
	Arthropoda	3	18.8	55	14.9
	Other Taxa	0	0.0	0	0.0
	Total	16		369	

Table 3 continued:

Station	Phylum	No. of Taxa	% of Total	No. of Individuals	% of Total
8	Annelida	10	76.9	37	61.7
	Mollusca	1	7.7	20	33.3
	Arthropoda	1	7.7	1	1.7
	Other Taxa	1	7.7	2	3.3
	Total	13		60	
9	Annelida	21	50.0	102	11.1
	Mollusca	10	23.8	549	59.8
	Arthropoda	8	19.0	229	24.9
	Other Taxa	3	7.1	38	4.1
	Total	42		918	
10	Annelida	5	35.7	7	26.9
	Mollusca	6	42.9	16	61.5
	Arthropoda	2	14.3	2	7.7
	Other Taxa	1	7.1	1	3.8
	Total	14		26	
11	Annelida	1	11.1	9	8.9
	Mollusca	6	66.7	68	67.3
	Arthropoda	2	22.2	24	23.8
	Other Taxa	0	0.0	0	0.0
	Total	9		101	
12	Annelida	4	36.4	7	1.7
	Mollusca	5	45.5	111	27.7
	Arthropoda	2	18.2	283	70.6
	Other Taxa	0	0.0	0	0.0
	Total	11		401	
13	Annelida	7	58.3	12	57.1
	Mollusca	2	16.7	6	28.6
	Arthropoda	2	16.7	2	9.5
	Other Taxa	1	8.3	1	4.8
	Total	12		21	
14	Annelida	26	55.3	163	43.4
	Mollusca	10	21.3	26	6.9
	Arthropoda	9	19.1	52	13.8
	Other Taxa	2	4.3	135	35.9
	Total	47		376	

Table . Continued:

Station	Phylum	No. of Taxa	% of Total	No. of Individuals (per 0.04 m²)	% of Total
15	Annelida	5	62.5	6	54.5
	Mollusca	2	25.0	3	27.3
	Arthropoda	1	12.5	2	18.2
	Other Taxa	0	0.0	0	0.0
	Total	8		11	
16	Annelida	5	100.0	17	100.0
	Mollusca	0	0.0	0	0.0
	Arthropoda	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	5		17	
17	Annelida	3	75.0	6	75.0
	Mollusca	1	25.0	2	25.0
	Arthropoda	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	4		8	
18	Annelida	3	100.0	10	100.0
	Mollusca	0	0.0	0	0.0
	Arthropoda	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	3		10	
19	Annelida	13	56.5	69	75.0
	Mollusca	5	21.7	13	14.1
	Arthropoda	5	21.7	10	10.9
	Other Taxa	0	0.0	0	0.0
	Total	23		92	
20	Annelida	5	83.3	18	85.7
	Mollusca	1	16.7	3	14.3
	Arthropoda	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	6		21	
21	Annelida	8	66.7	141	70.9
	Mollusca	3	25.0	57	28.6
	Arthropoda	1	8.3	1	0.5
	Other Taxa	0	0.0	0	0.0
	Total	12		199	

Table 3 continued:

Station	Phylum	No. of Taxa	% of Total	No. of Individuals	% of Total
22	Annelida	15	57.7	443	86.4
	Mollusca	6	23.1	64	12.5
	Arthropoda	3	11.5	3	0.6
	Other Taxa	2	7.7	3	0.6
	Total	26		513	
23	Annelida	7	77.8	25	92.6
	Mollusca	2	22.2	2	7.4
	Arthropoda	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	9		27	
24	Annelida	7	58.3	10	40.0
	Mollusca	3	25.0	11	44.0
	Arthropoda	1	8.3	1	4.0
	Other Taxa	1	8.3	3	12.0
	Total	12		25	
25	Annelida	11	64.7	443	90.2
	Mollusca	3	17.6	39	7.9
	Arthropoda	2	11.8	8	1.6
	Other Taxa	1	5.9	1	0.2
	Total	17		491	
26	Annelida	12	80.0	109	97.3
	Mollusca	1	6.7	1	0.9
	Arthropoda	2	13.3	2	1.8
	Other Taxa	0	0.0	0	0.0
	Total	15		112	
27	Annelida	24	44.4	450	74.5
	Mollusca	12	22.2	106	17.5
	Arthropoda	14	25.9	30	5.0
	Other Taxa	4	7.4	18	3.0
	Total	54		604	
28	Annelida	6	54.5	45	88.2
	Mollusca	3	27.3	4	7.8
	Arthropoda	2	18.2	2	3.9
	Other Taxa	0	0.0	0	0.0
	Total	11		51	

Table 3 continued:

Station	Phylum	No. of Taxa	% of Total	No. of Individuals	% of Total
29	Annelida	21	56.8	1,171	95.7
	Mollusca	7	18.9	35	2.9
	Arthropoda	6	16.2	11	0.9
	Other Taxa	3	8.1	7	0.6
	Total	37		1,224	
30	Annelida	28	52.8	250	67.4
	Mollusca	10	18.9	66	17.8
	Arthropoda	11	20.8	41	11.1
	Other Taxa	4	7.5	14	3.8
	Total	53		371	

Table 4. Distribution and abundance and of taxa for the St. Lucie Estuary stations, May 2001.

Taxon Name	Phylum	Class	No. of Individuals	% of Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Sternaspis scutata</i>	Ann	Poly	1735	23.35	23.35	9	30
<i>Mulinia lateralis</i>	Mol	Biva	1615	21.74	45.09	20	67
<i>Ampelisca abdita</i>	Art	Mala	1015	13.66	58.76	21	70
<i>Mediomastus</i> (LPIL)	Ann	Poly	802	10.80	69.55	16	53
<i>Leitoscoloplos robustus</i>	Ann	Poly	158	2.13	71.68	22	73
<i>Glycinde solitaria</i>	Ann	Poly	148	1.99	73.67	25	83
<i>Grandidierella bonnieroides</i>	Art	Mala	114	1.53	75.21	7	23
<i>Leitoscoloplos</i> (LPIL)	Ann	Poly	110	1.48	76.69	15	50
Rhynchocoela (LPIL)	Rhy	–	108	1.45	78.14	13	43
<i>Paraprionospio pinnata</i>	Ann	Poly	106	1.43	79.57	19	63
Tubificidae (LPIL)	Ann	Olig	87	1.17	80.74	6	20
<i>Streblospio benedicti</i>	Ann	Poly	74	1.00	81.73	16	53
<i>Nereis succinea</i>	Ann	Poly	71	0.96	82.69	10	33
<i>Spiochaetopterus oculus</i>	Ann	Poly	68	0.92	83.60	13	43
Actiniaria (LPIL)	Cni	Anth	62	0.83	84.44	3	10
Mactridae (LPIL)	Mol	Biva	59	0.79	85.23	7	23
<i>Mytilopsis leucophaeata</i>	Mol	Biva	54	0.73	85.96	6	20
<i>Rangia cuneata</i>	Mol	Biva	48	0.65	86.61	1	3
<i>Sthenelais</i> sp. A	Ann	Poly	44	0.59	87.20	12	40
<i>Macoma mitchelli</i>	Mol	Biva	41	0.55	87.75	7	23
<i>Pectinaria gouldii</i>	Ann	Poly	40	0.54	88.29	7	23
<i>Photis pugnator</i>	Art	Mala	39	0.52	88.81	5	17
Sabellidae (LPIL)	Ann	Poly	37	0.50	89.31	3	10
<i>Tubificoides heterochaetus</i>	Ann	Olig	35	0.47	89.78	9	30
Bivalvia (LPIL)	Mol	Biva	33	0.44	90.23	10	33
Asciacea (LPIL)	Cho	Asci	31	0.42	90.64	3	10
<i>Tellina</i> (LPIL)	Mol	Biva	30	0.40	91.05	4	13
<i>Melita nitida</i>	Art	Mala	29	0.39	91.44	2	7
<i>Scoloplos texana</i>	Ann	Poly	28	0.38	91.82	6	20
<i>Mitrella lunata</i>	Mol	Gast	27	0.36	92.18	8	27
<i>Diopatra cuprea</i>	Ann	Poly	26	0.35	92.53	9	30
<i>Tagelus plebeius</i>	Mol	Biva	24	0.32	92.85	9	30
<i>Tubulanus</i> (LPIL)	Rhy	Anop	21	0.28	93.14	5	17
<i>Dipolydora socialis</i>	Ann	Poly	18	0.24	93.38	9	30
Tellinidae (LPIL)	Mol	Biva	17	0.23	93.61	6	20
<i>Ischadium recurvum</i>	Mol	Biva	16	0.22	93.82	2	7
<i>Leucon americanus</i>	Art	Mala	16	0.22	94.04	5	17
<i>Nereis</i> (LPIL)	Ann	Poly	16	0.22	94.25	7	23
<i>Cyathura polita</i>	Art	Mala	14	0.19	94.44	5	17
<i>Lucina multilineata</i>	Mol	Biva	14	0.19	94.63	3	10
<i>Acteocina canaliculata</i>	Mol	Gast	13	0.17	94.80	5	17
<i>Crepidula plana</i>	Mol	Gast	13	0.17	94.98	7	23
Hydrobiidae (LPIL)	Mol	Gast	13	0.17	95.15	2	7
<i>Mediomastus ambiseta</i>	Ann	Poly	13	0.17	95.33	5	17
<i>Sabellaria vulgaris</i>	Ann	Poly	13	0.17	95.50	1	3
<i>Polymesoda caroliniana</i>	Mol	Biva	12	0.16	95.67	3	10
<i>Pyrgophorus platyrachis</i>	Mol	Gast	12	0.16	95.83	2	7
<i>Tellina versicolor</i>	Mol	Biva	12	0.16	95.99	1	3
<i>Erichthonius brasiliensis</i>	Art	Mala	10	0.13	96.12	3	10
<i>Lyonsia hyalina</i>	Mol	Biva	10	0.13	96.26	1	3
<i>Oxyurostylis smithi</i>	Art	Mala	10	0.13	96.39	3	10
<i>Sphenia antillensis</i>	Mol	Biva	10	0.13	96.53	4	13
<i>Aglaophamus verrilli</i>	Ann	Poly	9	0.12	96.65	2	7
Hydrozoa (LPIL)	Cni	Hydr	9	0.12	96.77	1	3

Table 4 continued:

Taxon Name	Phylum	Class	No. of Individuals	% of Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Phyllodoce arenae</i>	Ann	Poly	9	0.12	96.89	4	13
<i>Scoletoma verrilli</i>	Ann	Poly	9	0.12	97.01	4	13
Terebellidae (LPIL)	Ann	Poly	9	0.12	97.13	4	13
Xanthidae (LPIL)	Art	Mala	9	0.12	97.25	3	10
<i>Ampelisca</i> (LPIL)	Art	Mala	8	0.11	97.36	2	7
<i>Geukensia demissa</i>	Mol	Biva	8	0.11	97.47	3	10
<i>Podarkeopsis levifuscina</i>	Ann	Poly	7	0.09	97.56	5	17
<i>Diplodonta semiaspera</i>	Mol	Biva	6	0.08	97.64	1	3
<i>Glycera americana</i>	Ann	Poly	6	0.08	97.73	5	17
<i>Ampelisca vadorum</i>	Art	Mala	5	0.07	97.79	2	7
<i>Capitella capitata</i>	Ann	Poly	5	0.07	97.86	3	10
<i>Macoma tenta</i>	Mol	Biva	5	0.07	97.93	1	3
<i>Odostomia impressa</i>	Mol	Gast	5	0.07	97.99	5	17
<i>Pseudopolydora</i> (LPIL)	Ann	Poly	5	0.07	98.06	2	7
<i>Xenanthura brevitelson</i>	Art	Mala	5	0.07	98.13	2	7
<i>Cossura soyeri</i>	Ann	Poly	4	0.05	98.18	1	3
<i>Demonax microphthalmus</i>	Ann	Poly	4	0.05	98.24	2	7
<i>Edotea triloba</i>	Art	Mala	4	0.05	98.29	2	7
Gastropoda (LPIL)	Mol	Gast	4	0.05	98.34	4	13
<i>Gitanopsis laguna</i>	Art	Mala	4	0.05	98.40	3	10
<i>Heteromastus filiformis</i>	Ann	Poly	4	0.05	98.45	3	10
<i>Monticellina dorsobranchialis</i>	Ann	Poly	4	0.05	98.51	2	7
<i>Nereiphylla fragilis</i>	Ann	Poly	4	0.05	98.56	2	7
<i>Rhithropanopeus harrisi</i>	Art	Mala	4	0.05	98.61	2	7
<i>Scoloplos</i> (LPIL)	Ann	Poly	4	0.05	98.67	3	10
Acteonidae (LPIL)	Mol	Gast	3	0.04	98.71	1	3
<i>Cyclaspis varians</i>	Art	Mala	3	0.04	98.75	2	7
<i>Eurypanopeus depressus</i>	Art	Mala	3	0.04	98.79	1	3
Hamineidae (LPIL)	Mol	Gast	3	0.04	98.83	2	7
<i>Oxyurostylis</i> (LPIL)	Art	Mala	3	0.04	98.87	3	10
<i>Phoronis</i> (LPIL)	Pho	-	3	0.04	98.91	1	3
<i>Podarke obscura</i>	Ann	Poly	3	0.04	98.95	2	7
<i>Autolytus</i> (LPIL)	Ann	Poly	2	0.03	98.98	2	7
<i>Batea catharinensis</i>	Art	Mala	2	0.03	99.00	1	3
<i>Branchiomma nigromaculata</i>	Ann	Poly	2	0.03	99.03	1	3
Capitellidae (LPIL)	Ann	Poly	2	0.03	99.06	1	3
<i>Corbula contracta</i>	Mol	Biva	2	0.03	99.08	2	7
<i>Glycera</i> (LPIL)	Ann	Poly	2	0.03	99.11	2	7
<i>Halmyrapseudes</i> sp. A	Art	Mala	2	0.03	99.14	1	3
<i>Mediomastus californiensis</i>	Ann	Poly	2	0.03	99.17	1	3
<i>Melinna maculata</i>	Ann	Poly	2	0.03	99.19	2	7
<i>Notomastus latericeus</i>	Ann	Poly	2	0.03	99.22	2	7
<i>Pinnixa</i> (LPIL)	Art	Mala	2	0.03	99.25	2	7
<i>Prionospio</i> (LPIL)	Ann	Poly	2	0.03	99.27	2	7
<i>Semele</i> (LPIL)	Mol	Biva	2	0.03	99.30	1	3
Sigalionidae (LPIL)	Ann	Poly	2	0.03	99.33	2	7
<i>Spelaeomyxis</i> sp. A	Art	Mala	2	0.03	99.35	1	3
<i>Westwoodilla</i> sp. A	Art	Mala	2	0.03	99.38	2	7
<i>Alpheus</i> (LPIL)	Art	Mala	1	0.01	99.39	1	3
<i>Americhelidium americanum</i>	Art	Mala	1	0.01	99.41	1	3
<i>Amygdalum papyria</i>	Mol	Biva	1	0.01	99.42	1	3
Anthuridae (LPIL)	Art	Mala	1	0.01	99.43	1	3
<i>Aricidea cerrutii</i>	Ann	Poly	1	0.01	99.45	1	3
<i>Callinectes sapidus</i>	Art	Mala	1	0.01	99.46	1	3
Calyptraeidae (LPIL)	Mol	Gast	1	0.01	99.48	1	3
<i>Caprella</i> (LPIL)	Art	Mala	1	0.01	99.49	1	3
<i>Carazziella hobsonae</i>	Ann	Poly	1	0.01	99.50	1	3

Table 4 continued:

Taxon Name	Phylum	Class	No. of Individuals	% of Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Cerapus benthophilus</i>	Art	Mala	1	0.01	99.52	1	3
Cirratulidae (LPIL)	Ann	Poly	1	0.01	99.53	1	3
<i>Cirriformia</i> sp. A	Ann	Poly	1	0.01	99.54	1	3
Cuspidariidae (LPIL)	Mol	Biva	1	0.01	99.56	1	3
<i>Deutella incerta</i>	Art	Mala	1	0.01	99.57	1	3
<i>Epitonium multistriatum</i>	Mol	Gast	1	0.01	99.58	1	3
<i>Glycera abbranchiata</i>	Ann	Poly	1	0.01	99.60	1	3
<i>Hargeria rapax</i>	Art	Mala	1	0.01	99.61	1	3
<i>Hemipodus roseus</i>	Ann	Poly	1	0.01	99.62	1	3
Hydroida (LPIL)	Cni	Hydr	1	0.01	99.64	1	3
<i>Kinbergonuphis simoni</i>	Ann	Poly	1	0.01	99.65	1	3
Lineidae (LPIL)	Rhy	Anop	1	0.01	99.66	1	3
Lucinidae (LPIL)	Mol	Biva	1	0.01	99.68	1	3
Lumbrineridae (LPIL)	Ann	Poly	1	0.01	99.69	1	3
<i>Lysianopsis alba</i>	Art	Mala	1	0.01	99.70	1	3
<i>Macoma</i> (LPIL)	Mol	Biva	1	0.01	99.72	1	3
<i>Melita</i> (LPIL)	Art	Mala	1	0.01	99.73	1	3
Melitidae (LPIL)	Art	Mala	1	0.01	99.74	1	3
Mytilidae (LPIL)	Mol	Biva	1	0.01	99.76	1	3
<i>Neritina usnea</i>	Mol	Gast	1	0.01	99.77	1	3
<i>Nucula aegeensis</i>	Mol	Biva	1	0.01	99.78	1	3
<i>Ogyrides alphaeostriis</i>	Art	Mala	1	0.01	99.80	1	3
<i>Okenia evelinae</i>	Mol	Gast	1	0.01	99.81	1	3
Onuphidae (LPIL)	Ann	Poly	1	0.01	99.83	1	3
<i>Palaemonetes</i> (LPIL)	Art	Mala	1	0.01	99.84	1	3
<i>Paracaprella tenuis</i>	Art	Mala	1	0.01	99.85	1	3
<i>Parahesione luteola</i>	Ann	Poly	1	0.01	99.87	1	3
<i>Paranaitis gardineri</i>	Ann	Poly	1	0.01	99.88	1	3
Phyllodocidae (LPIL)	Ann	Poly	1	0.01	99.89	1	3
<i>Piromis roberti</i>	Ann	Poly	1	0.01	99.91	1	3
<i>Sabaco americanus</i>	Ann	Poly	1	0.01	99.92	1	3
<i>Schistomeringos rudolphi</i>	Ann	Poly	1	0.01	99.93	1	3
<i>Scoletepis</i> (LPIL)	Ann	Poly	1	0.01	99.95	1	3
<i>Scoletepis texana</i>	Ann	Poly	1	0.01	99.96	1	3
<i>Scoloplos rubra</i>	Ann	Poly	1	0.01	99.97	1	3
Serpulidae (LPIL)	Ann	Poly	1	0.01	99.99	1	3
<i>Sigambra tentaculata</i>	Ann	Poly	1	0.01	100.00	1	3

Taxa Key

Ann = Annelida

Olig = Oligochaeta

Poly = Polychaeta

Art = Arthropoda

Mala = Malacostraca

Cho = Chordata

Asci = Ascidiacea

Cni = Cnidaria

Anth = Anthozoa

Hydr = Hydrozoa

Mol = Mollusca

Biva = Bivalvia

Gast = Gastropoda

Pho = Phoronida

Rhy = Rhynchocoela

Anop = Anopla

Table 5 continued:

Taxa	18	19	20	21	22	23	24	25	26	27	28	29	30
Annelida													
Oligochaeta													
<i>Tubificoides heterochaetus</i>	10.0												
Polychaeta													
<i>Glycinde solitaria</i>	10.0					11.1	12.0						
<i>Leitoscoloplos</i> (LPIL)		14.1		12.1									
<i>Leitoscoloplos robustus</i>		26.1		13.6									
<i>Mediomastus</i> (LPIL)			66.7	36.2	15.8	22.2			36.6	26.0	52.9	16.6	39.4
<i>Paraprionospio pinnata</i>						40.7							
<i>Sternaspis scutata</i>					58.9			69.9	45.5	25.5	17.6	68.5	
<i>Sthenelais</i> sp. A													
<i>Streblospio benedicti</i>	80.0												
Arthropoda													
Malacostraca													
<i>Ampelisca abdita</i>													
<i>Grandidierella bonnieroides</i>													
<i>Spelaeomysis</i> sp. A													
Cnidaria													
Anthozoa													
Actiniaria (LPIL)													
Mollusca													
Bivalvia													
Bivalvia (LPIL)													
<i>Mulinia lateralis</i>			14.3	27.1			36.0						
<i>Polymesoda caroliniana</i>													
<i>Rangia cuneata</i>													
Gastropoda													
<i>Mitrella lunata</i>													
Rhynchocoela													
Rhynchocoela (LPIL)							12.0						

Table 6. Summary of benthic macroinfaunal data for the St. Lucie Estuary stations, May 2001.

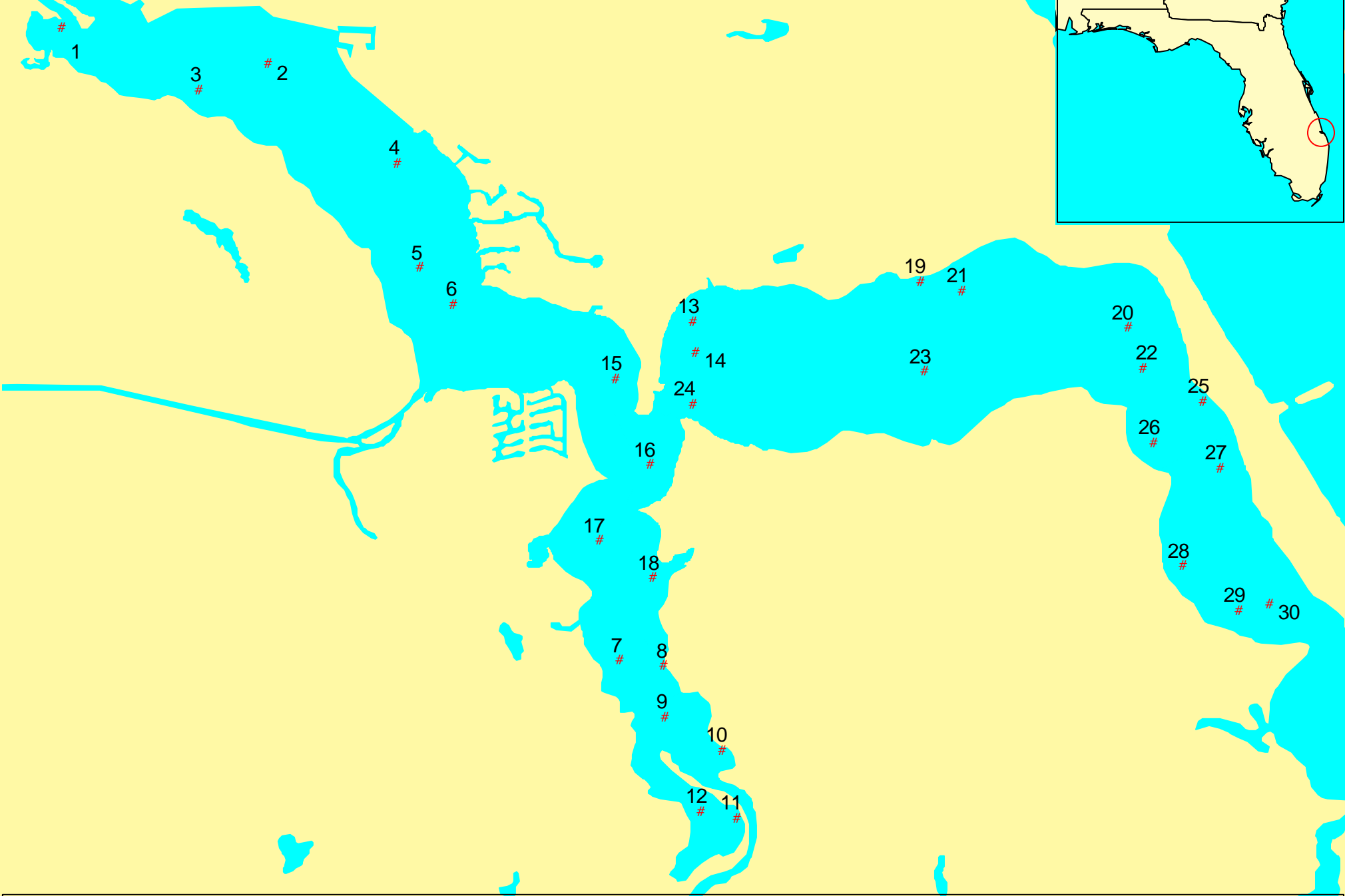
Station	Rep	Taxa	Indvs	Density	Mean No. Taxa	Taxa (SD)	Mean Density	Density (SD)	Total No. Taxa	Total No. Individuals	H' Diversity	J' Evenness
1	1	33	257	6425	33.0	N/A	6425.0	N/A	33	257	2.44	0.70
2	1	7	87	2175	7.7	3.1	2850.0	730.2	14	342	1.17	0.44
2	2	5	110	2750								
2	3	11	145	3625								
3	1	12	175	4375	11.3	4.0	4516.7	406.5	17	542	1.18	0.42
3	2	7	168	4200								
3	3	15	199	4975								
4	1	16	57	1425	16.0	N/A	1425.0	N/A	16	57	1.68	0.61
5	1	8	49	1225	9.7	2.1	1491.7	483.7	15	179	1.56	0.57
5	2	9	48	1200								
5	3	12	82	2050								
6	1	4	4	100	4.0	N/A	100.0	N/A	4	4	1.39	1.00
7	1	12	114	2850	9.0	3.6	3075.0	2320.7	16	369	0.93	0.33
7	2	5	220	5500								
7	3	10	35	875								
8	1	13	60	1500	13.0	N/A	1500.0	N/A	13	60	1.98	0.77
9	1	21	342	8550	23.3	2.1	7650.0	818.5	42	918	1.77	0.47
9	2	24	298	7450								
9	3	25	278	6950								
10	1	14	26	650	14.0	N/A	650.0	N/A	14	26	2.30	0.87
11	1	9	101	2525	9.0	N/A	2525.0	N/A	9	101	1.51	0.69
12	1	6	104	2600	7.0	2.6	3341.7	662.5	11	401	1.26	0.53
12	2	5	155	3875								
12	3	10	142	3550								
13	1	12	21	525	12.0	N/A	525.0	N/A	12	21	2.31	0.93
14	1	36	170	4250	29.7	6.5	3133.3	970.0	47	376	2.98	0.77
14	2	23	106	2650								
14	3	30	100	2500								
15	1	5	6	150	3.3	1.5	91.7	52.0	8	11	2.02	0.97
15	2	2	2	50								
15	3	3	3	75								
16	1	5	17	425	5.0	N/A	425.0	N/A	5	17	1.20	0.75
17	1	2	2	50	2.0	1.0	66.7	52.0	4	8	1.32	0.95
17	2	1	1	25								
17	3	3	5	125								
18	1	3	10	250	3.0	N/A	250.0	N/A	3	10	0.64	0.58
19	1	11	20	500	11.3	2.5	766.7	419.3	23	92	2.61	0.83
19	2	14	50	1250								
19	3	9	22	550								
20	1	6	21	525	6.0	N/A	525.0	N/A	6	21	1.13	0.63

Table 6 continued:

Station	Rep	Taxa	Indvs	Density	Mean No. Taxa	Taxa (SD)	Mean Density	Density (SD)	Total No. Taxa	Total No. Individuals	H' Diversity	J' Evenness
21	1	9	79	1975	8.3	0.6	1658.3	278.8	12	199	1.70	0.68
21	2	8	62	1550								
21	3	8	58	1450								
22	1	17	191	4775	14.3	2.3	4275.0	700.0	26	513	1.56	0.48
22	2	13	139	3475								
22	3	13	183	4575								
23	1	9	27	675	9.0	N/A	675.0	N/A	9	27	1.75	0.80
24	1	12	25	625	12.0	N/A	625.0	N/A	12	25	2.11	0.85
25	1	17	491	12275	17.0	N/A	12275.0	N/A	17	491	1.27	0.45
26	1	8	49	1225	7.0	2.6	933.3	527.0	15	112	1.48	0.55
26	2	9	50	1250								
26	3	4	13	325								
27	1	22	83	2075	29.3	6.4	5033.3	3227.3	54	604	2.68	0.67
27	2	33	182	4550								
27	3	34	339	8475								
28	1	11	51	1275	11.0	N/A	1275.0	N/A	11	51	1.61	0.67
29	1	17	288	7200	19.0	6.2	10200.0	4102.5	37	1224	1.21	0.33
29	2	14	341	8525								
29	3	26	595	14875								
30	1	53	371	9275	53.0	N/A	9275.0	N/A	53	371	2.67	0.67

N/A Not Applicable

Figure 1. Station locations for the St. Lucie stations, May 2001



0.6 0 0.6 1.2 Miles



Stations

Barry A. Vittor & Associates, Inc.
Environmental Research and Consulting



Figure 2. Salinity and sediment percent total organic carbon (TOC) for the St. Lucie Estuary stations, May 2001.

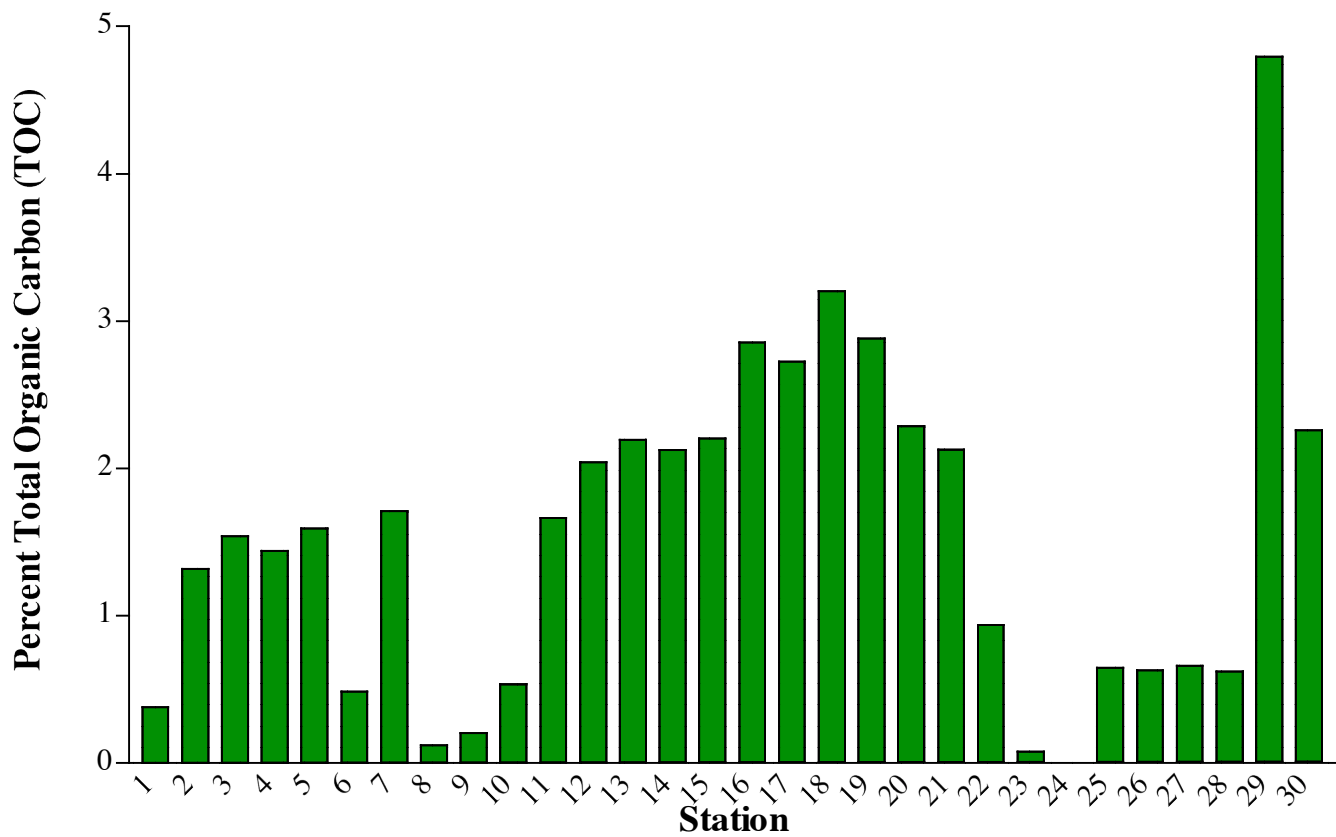
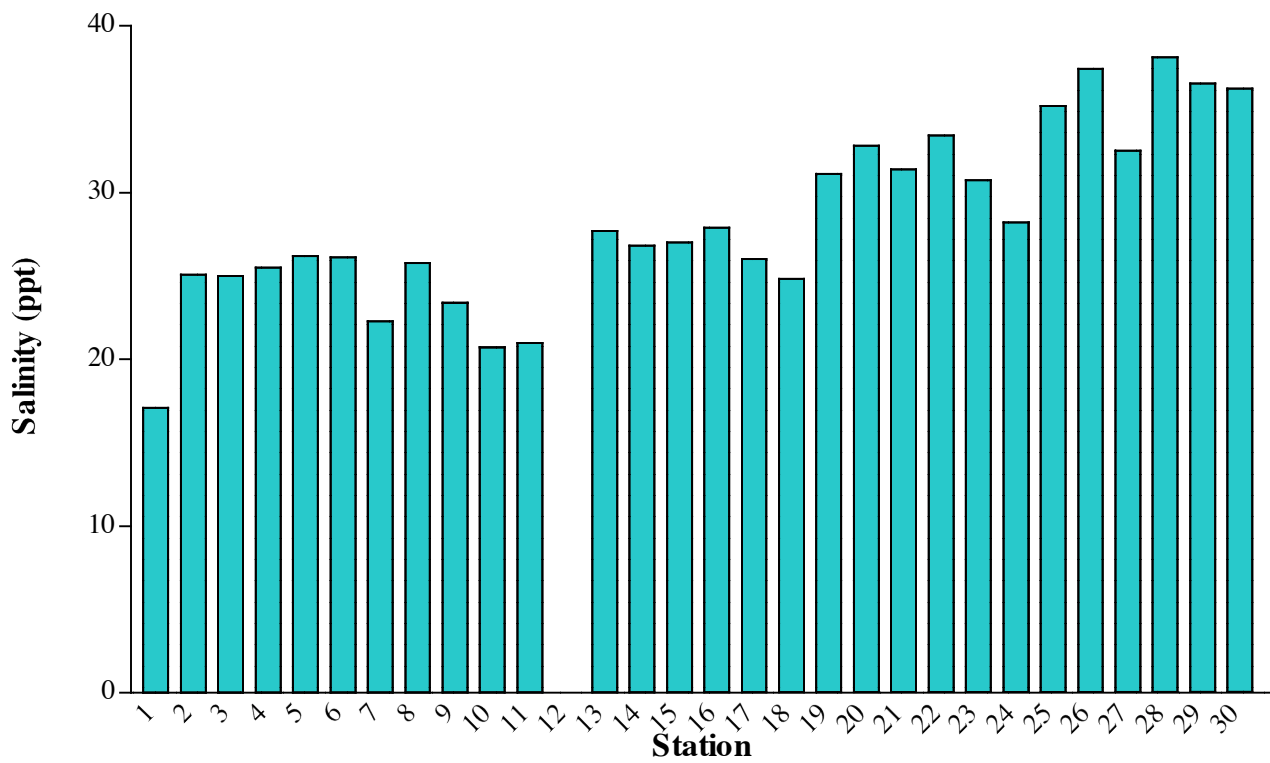


Figure 3. Sediment texture data for the St. Lucie Estuary stations, May 2001.

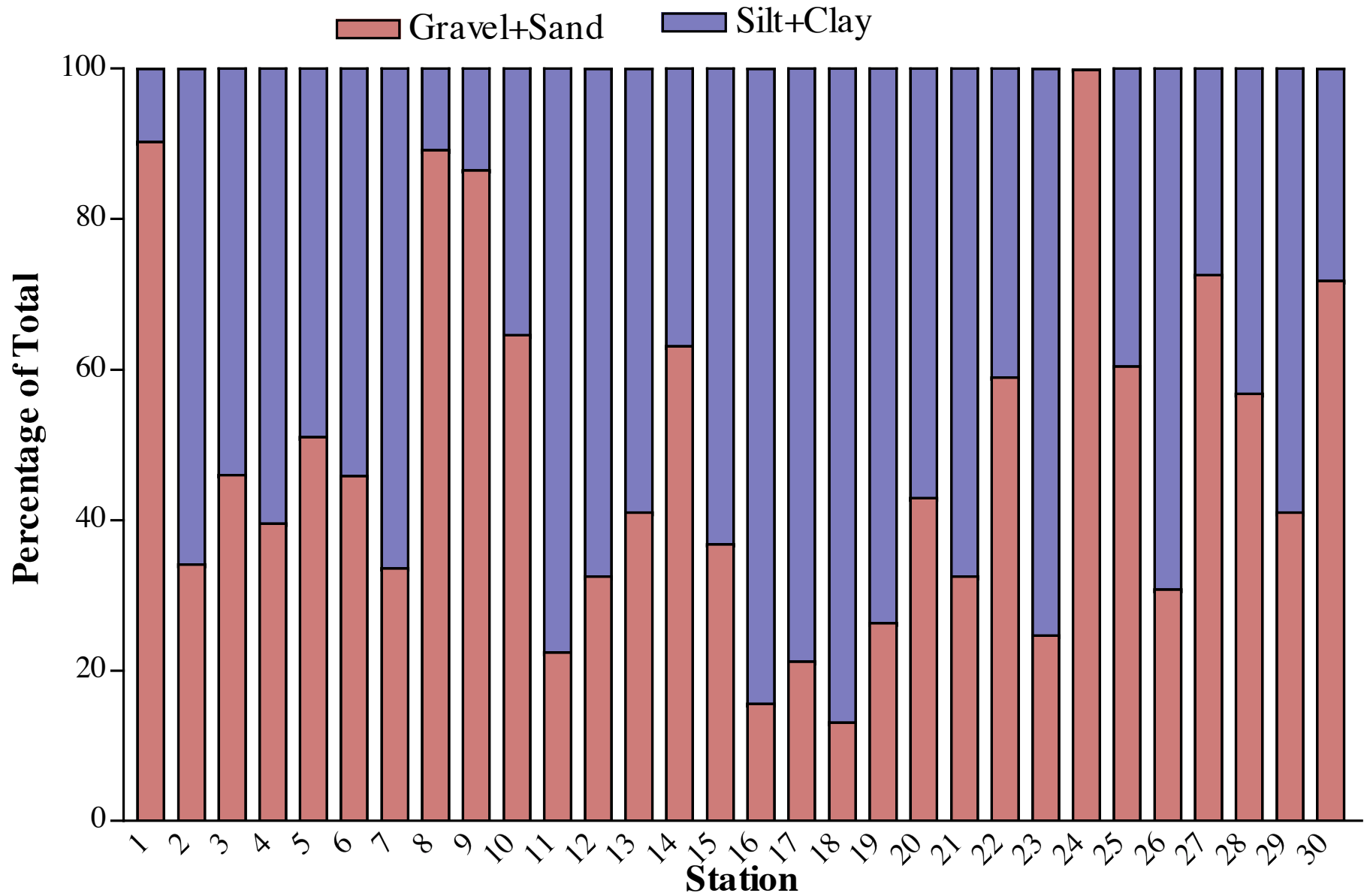


Figure 4. Distribution of major macroinvertebrate taxa for the St. Lucie Estuary stations, May 2001.

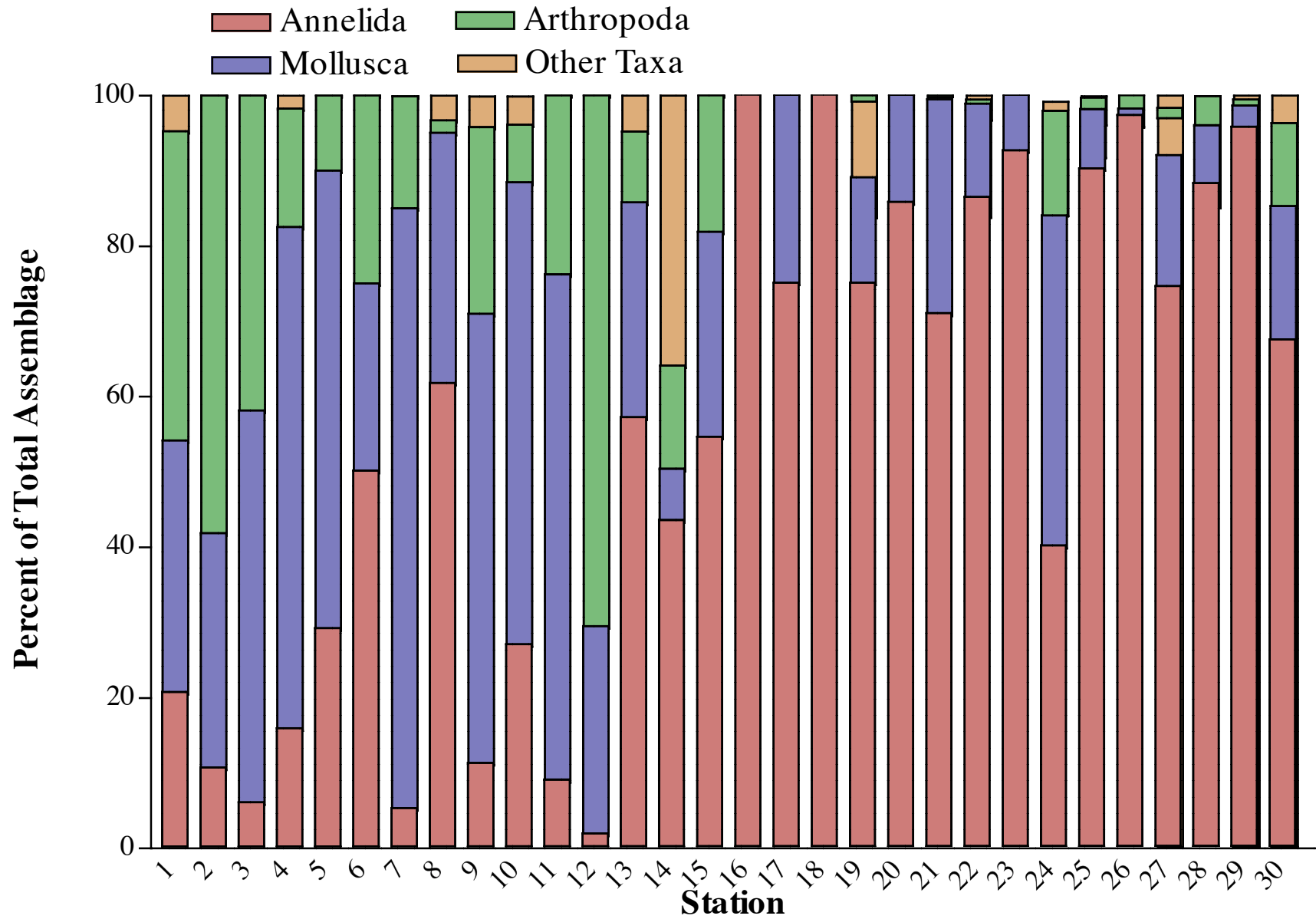


Figure 5. Taxa richness and taxa density data for the St. Lucie Estuary stations, May 2001.

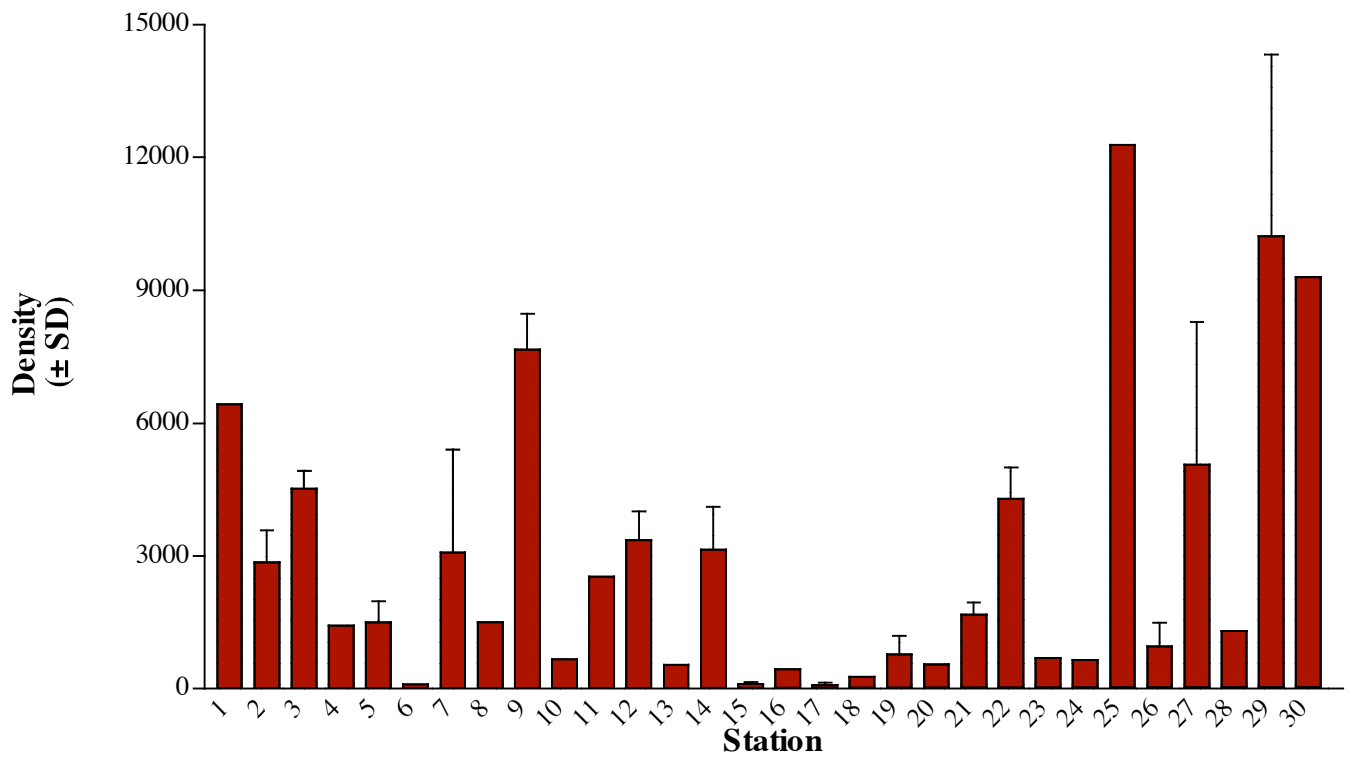
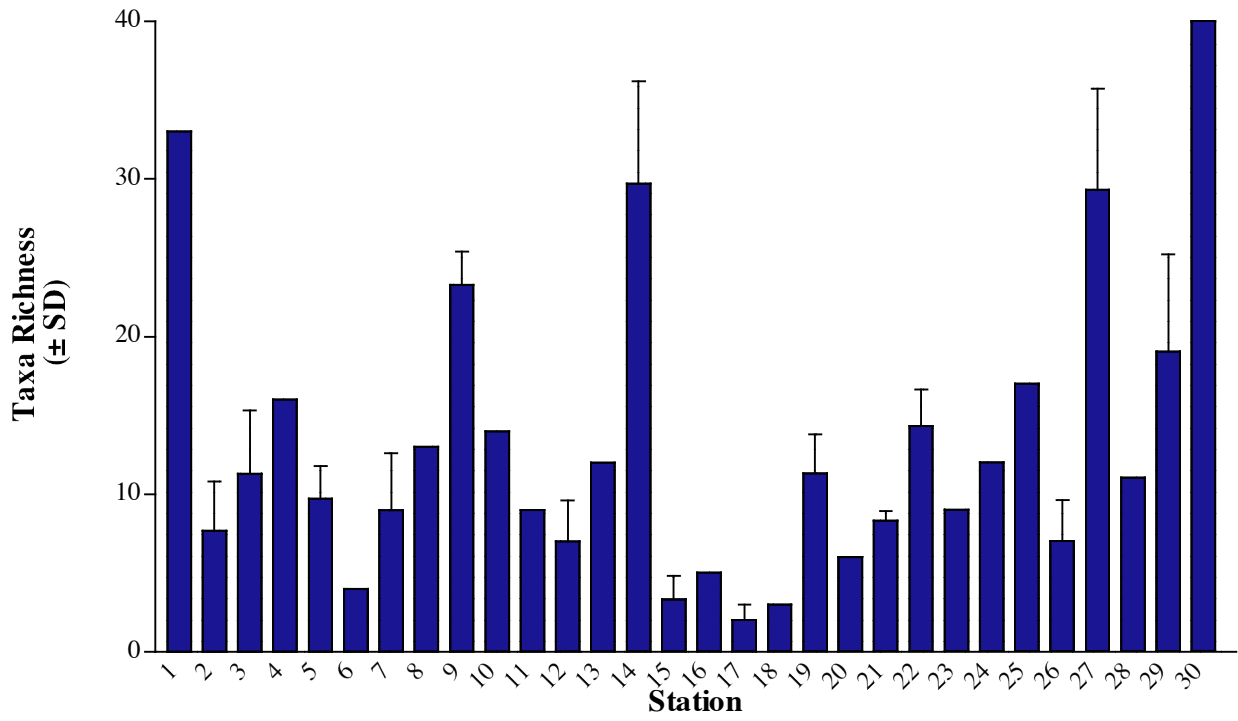
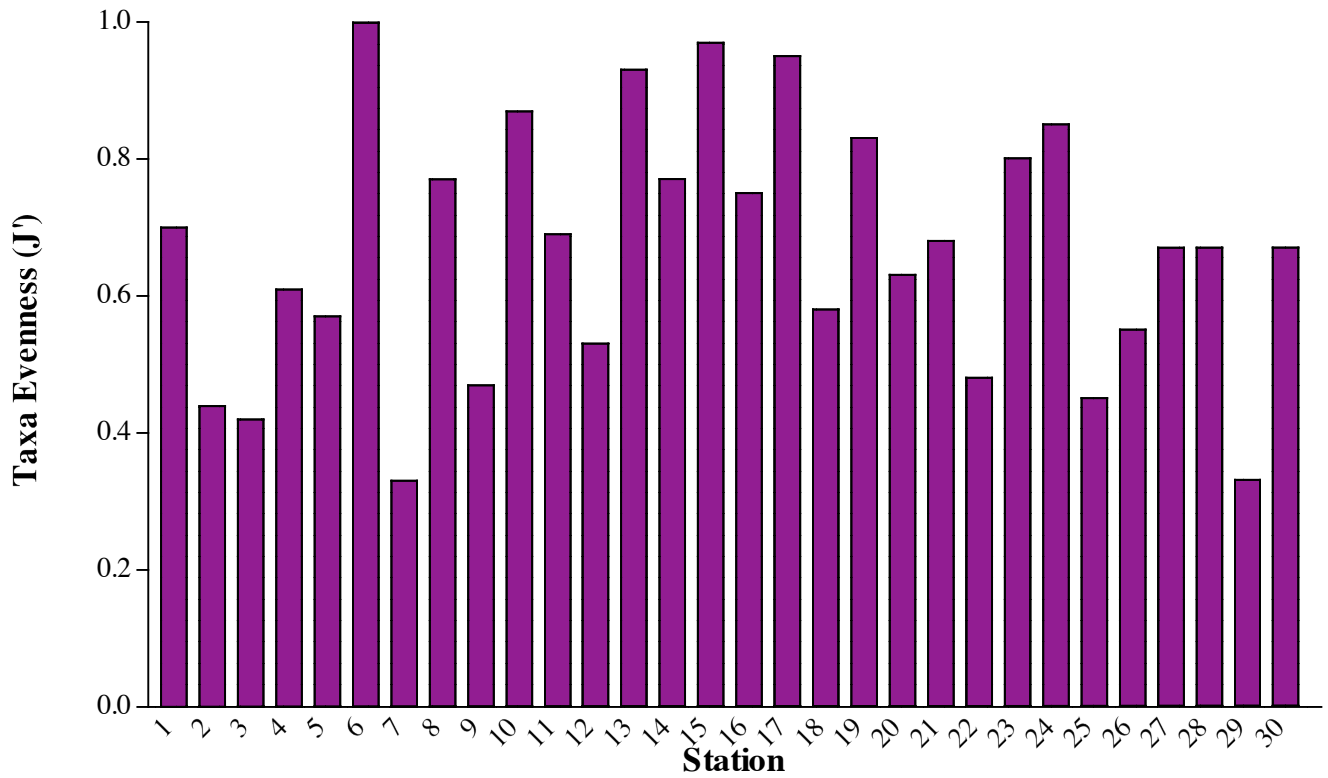
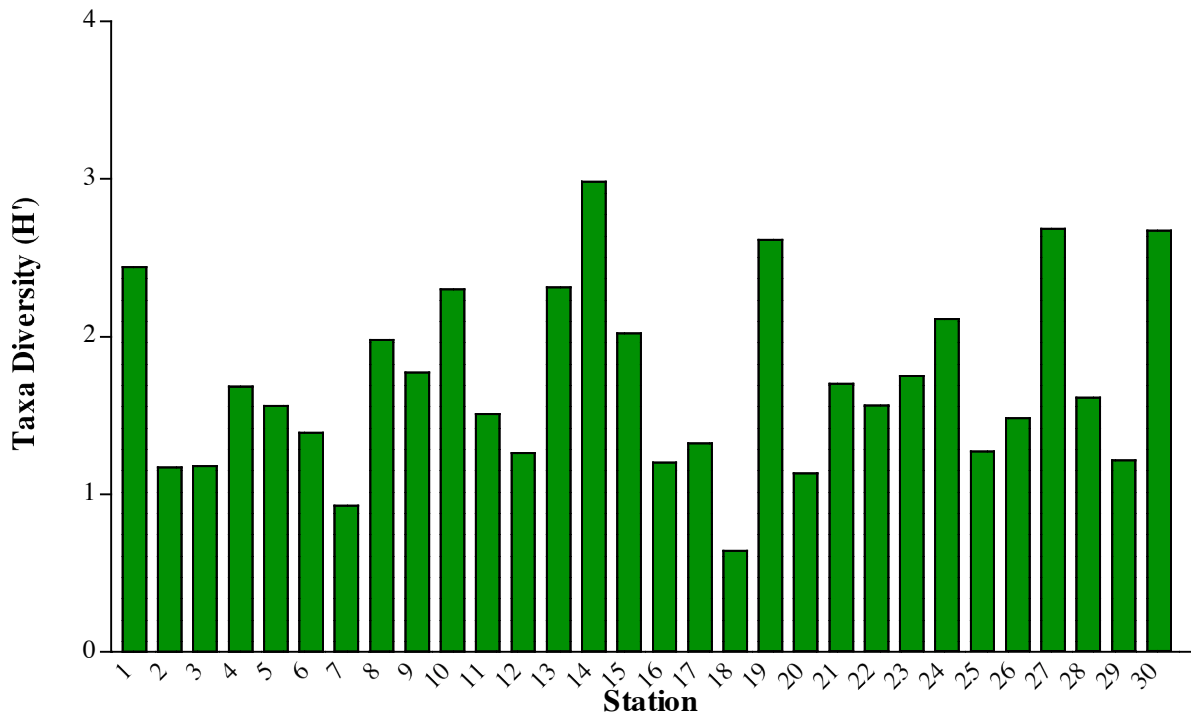


Figure 6. Taxa diversity (H') and Taxa Evenness (J') for the St. Lucie Estuary stations, May 2001.



APPENDICES

QUALITY ASSURANCE STATEMENT

Client/Project: NOAA

Work Assignment Title: St. Lucie 2001

Task Number: Opt 1-7

Description of Data Set or Deliverable: 60 Benthic macroinvertebrate samples collected
May, 2001; 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 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

Signature of QA Officer or Reviewer

Date

Signature of Project Manager

Date

QUALITY CONTROL REWORKS

Client/Project: NOAA-St. Lucie Estuary Estuary 2001
Task Number: DO Opt 1-8

Sorting Results:	Sample #	% Accuracy
	SLE 26-2	100%
	SLE 26-3	100%
	SLE 29-2	100%
	SLE 17-1	100%
	SLE 23-1	100%

Taxonomy Results:	Sample #	Taxa	% Accuracy
	SLE 7-2	Crust./Moll.	99%
	SLE 25-1	Crust./Moll.	98%
	SLE 5-3	Crust./Moll.	100%
	SLE 9-2	Crust./Moll.	98%
	SLE 27-2	Crust./Moll.	100%
	SLE 22-2	Crust./Moll.	100%
	SLE 29-3	Poly./Misc.	99%
	SLE 28-1	Poly./Misc.	98%
	SLE 4-1	Poly./Misc.	100%
	SLE 25R-1	Poly./Misc.	100%
	SLE 22-1	Poly./Misc.	100%
	SLE 13-1	Poly./Misc.	100%
	SLE 9-3	Poly./Misc.	97%

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

Signature of QA Officer or Reviewer

Date