

Chesapeake Bay Benthic Community Assessment, 2004

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INTRODUCTION

Chesapeake Bay was sampled during 2004. 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 Chesapeake Bay estuary stations are given in Table 1.

METHODS

Sample Collection And Handling

A Young-modified Van Veen grab (area = 0.04 m²) was used to collect 3 replicate bottom samples at each of the 22 stations during 2005. 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.

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 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 Chesapeake Bay 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 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 Shannon's 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 depth data are given for the 22 stations in Table 1 and depth, salinity and dissolved oxygen data are plotted in Figure 1. Depths ranged from ≤ 1 m at stations P01, P03, P11-P15, and P17. The deepest station sampled was P23 at 7 m. Salinities ranged from essentially freshwater at Stations P01-P04 and P16-P17 to estuarine at the remaining stations (Table 1, Figure 1). Dissolved oxygen concentrations ranged from an anoxic 0.69 mg/L at Station P15 to 8.41 mg/L at Station P01.

BENTHIC COMMUNITY CHARACTERIZATION

Microsoft TM Excel spreadsheets are being provided separately to NOAA which include: raw data on taxa abundance and density, 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 number of taxa, density, taxa diversity and taxa evenness by station.

A total of 29714 organisms, representing 86 taxa, were identified from the 22 Chesapeake Bay stations (Table 2). Malacostracans were the most numerous organisms present representing 66.7% of the total assemblage, followed in abundance by polychaetes (20.9%) and bivalves (6.0%). Malacostracans represented 24.4% of the total

number of taxa followed by bivalves (19.8%), polychaetes (17.4%), and insects (17.4%) (Table 2). The abundance of major taxa by station are given in Table 3 and Figure 2. Assemblage composition varied considerably between stations with polychaetes dominating at some stations (>70% of the total at the Stations P10, P15, P16, P17), arthropods dominating (>70% of the total) at Stations P04, P05, P06, P11, P22, P26, mollusks dominating at Station P07, and a mixed assemblage of polychaetes, mollusks and arthropods dominant at the majority of stations (Figure 2, Table 3).

The dominant taxon collected from the 22 Chesapeake Bay stations was the amphipod, *Apocorophium lacustre* which represented 46.4% of the total. The polychaete, *Marenzelleria viridis* and the malacostracans, *Gammarus tigrinus* and *Leptocheirus plumulosus* were also abundant and represented 15.6%, 7.8% and 7.2% of the total individuals collected (Table 4). Organisms in the oligochaete Family, Tubificidae were the most widely distributed taxa being found at 100% of the stations (Table 4). The distribution of dominant taxa representing > 10% of the total assemblage at each station is given in Table 5. Dominant taxa followed salinity gradients with freshwater taxa dominating at Stations P1-P4 and P16-P17 with more estuarine fauna dominating at the remaining stations (Table 5).

Station taxa richness data are given in Table 6 and Figure 3. Taxa richness varied considerably between stations and ranged from 2.3 (SD = 0.6) at Station P16 to 22.3 (SD = 0.6) at Station A08 (Figure 3). Station density data are given in Table 6 and Figure 4. Station densities also exhibited considerable variation ranging from 366.7 organisms/m² (SD = 187.6) at Station P17 to 106825.0 organisms/m² (SD = 29563.5) at Station P22.

Taxa diversity and evenness are given in Table 6 and Figures 5 and 6. Taxa diversity (H') ranged from 0.35 at Station P04 to 2.59 at Station P03 (Table 6, Figure 5). Taxa evenness (J') ranged from 0.14 at Station P04 to 0.80 at Station P03 (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. Location and water quality data for the NOAA Chesapeake Bay stations, 2004.

Station	Latitude	Longitude	Depth (m)	Temp. (°C)	Sal. (ppt)	D.O. (mg/l)	Conductivity (μS/cm)
P01	39.244	75.908	0.8	25.24	0.04	8.41	108.80
P02	39.243	75.908	1.7	25.49	0.05	8.18	126.50
P03	39.246	75.967	1.0	25.91	0.09	7.86	196.80
P04	39.241	75.986	2.2	25.71	0.19	5.93	375.60
P05	39.223	76.036	3.7	26.40	1.86	6.04	342.30
P06	39.219	76.041	3.4	26.19	1.54	6.31	2817.00
P07	39.169	76.039	3.7	27.04	3.62	6.76	6578.00
A08	39.130	76.084	2.3	27.41	6.48	6.81	11388.00
A09	39.105	76.131	2.3	26.98	7.49	5.90	13032.00
P10	39.115	76.105	1.9	26.49	7.23	5.37	12583.00
P11	39.130	76.150	1.0	28.33	7.16	7.53	12498.00
P12	39.092	76.184	1.0	27.63	7.67	7.47	13326.00
P13	39.061	76.187	1.0	26.29	9.42	4.99	16108.00
P14	39.012	76.168	1.0	26.61	9.01	7.22	15487.00
P15	39.000	76.189	1.0	25.77	11.51	0.69	19452.00
P16	38.633	75.617	1.9	28.15	0.05	4.94	117.90
P17	38.614	75.640	0.9	28.11	0.05	4.70	122.80
P22	38.464	75.816	4.4	27.15	2.77	5.25	5076.00
P23	38.421	75.844	7.0	26.95	6.52	5.54	11132.00
P24	38.414	75.845	3.5	26.96	6.37	5.59	11.23
P25	38.395	75.846	4.8	26.91	5.84	5.47	10298.00
P26	38.383	75.843	4.8	–	5.77	5.02	10189.00

Table 2. Summary of overall abundance of major benthic macroinfaunal taxonomic groups for the Chesapeake Bay stations, 2004

Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
Annelida				
Hirudinea	1	1.2	1	0.0
Oligochaeta	5	5.8	1,249	4.2
Polychaeta	15	17.4	6,224	20.9
Mollusca				
Bivalvia	17	19.8	1,777	6.0
Gastropoda	4	4.7	140	0.5
Arthropoda				
Insecta	15	17.4	399	1.3
Malacostraca	21	24.4	19,806	66.7
Ostracoda	4	4.7	55	0.2
Other Taxa	4	4.7	63	0.2
Total	86		29,714	

Table 3. Summary of abundance of major benthic macroinfaunal taxonomic groups by station for the Chesapeake Bay stations, 2004.

Station	Taxa	Total No.		Total No.	
		Taxa	% Total	Individuals	% Total
P01	Annelida	4	36.4	128	66.7
	Mollusca	3	27.3	27	14.1
	Arthropoda	4	36.4	37	19.3
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	11		192	
P02	Annelida	4	13.3	185	57.1
	Mollusca	8	26.7	36	11.1
	Arthropoda	18	60.0	103	31.8
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	30		324	
P03	Annelida	4	16.0	69	28.3
	Mollusca	8	32.0	87	35.7
	Arthropoda	13	52.0	88	36.1
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	25		244	
P04	Annelida	4	33.3	46	5.4
	Mollusca	3	25.0	7	0.8
	Arthropoda	5	41.7	800	93.8
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	12		853	
P05	Annelida	4	20.0	12	3.5
	Mollusca	3	15.0	30	8.8
	Arthropoda	13	65.0	297	87.6
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	20		339	
P06	Annelida	2	14.3	2	1.6
	Mollusca	4	28.6	18	14.1
	Arthropoda	8	57.1	108	84.4
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	14		128	

Table 3 continued:

Station	Taxa	Total No.		Total No.	
		Taxa	% Total	Individuals	% Total
P07	Annelida	4	22.2	86	17.6
	Mollusca	6	33.3	331	67.8
	Arthropoda	8	44.4	71	14.5
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	18		488	
A08	Annelida	12	35.3	387	54.4
	Mollusca	12	35.3	157	22.1
	Arthropoda	9	26.5	166	23.3
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	2.9	1	0.1
	Total	34		711	
A09	Annelida	5	26.3	113	55.7
	Mollusca	7	36.8	29	14.3
	Arthropoda	5	26.3	59	29.1
	Echinodermata	0	0.0	0	0.0
	Other Taxa	2	10.5	2	1.0
	Total	19		203	
P10	Annelida	7	31.8	343	77.4
	Mollusca	5	22.7	46	10.4
	Arthropoda	9	40.9	51	11.5
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	4.5	3	0.7
	Total	22		443	
P11	Annelida	4	25.0	9	6.8
	Mollusca	6	37.5	26	19.7
	Arthropoda	5	31.3	96	72.7
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	6.3	1	0.8
	Total	16		132	
P12	Annelida	12	46.2	424	43.9
	Mollusca	9	34.6	431	44.7
	Arthropoda	4	15.4	109	11.3
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	3.8	1	0.1
	Total	26		965	
P13	Annelida	10	40.0	114	22.1
	Mollusca	6	24.0	89	17.2
	Arthropoda	8	32.0	313	60.5
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	4.0	1	0.2
	Total	25		517	

Table 3 continued:

Station	Taxa	Total No.		Total No.	
		Taxa	% Total	Individuals	% Total
P14	Annelida	11	37.9	569	39.4
	Mollusca	9	31.0	501	34.7
	Arthropoda	6	20.7	338	23.4
	Echinodermata	0	0.0	0	0.0
	Other Taxa	3	10.3	35	2.4
	Total	29		1,443	
P15	Annelida	5	83.3	48	82.8
	Mollusca	0	0.0	0	0.0
	Arthropoda	1	16.7	10	17.2
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	6		58	
P16	Annelida	6	28.6	320	73.6
	Mollusca	5	23.8	61	14.0
	Arthropoda	10	47.6	54	12.4
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	21		435	
P17	Annelida	2	66.7	42	95.5
	Mollusca	0	0.0	0	0.0
	Arthropoda	1	33.3	2	4.5
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	3		44	
P22	Annelida	3	16.7	1,565	12.2
	Mollusca	4	22.2	30	0.2
	Arthropoda	10	55.6	11,222	87.5
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	5.6	2	0.0
	Total	18		12,819	
P23	Annelida	3	21.4	723	54.0
	Mollusca	2	14.3	3	0.2
	Arthropoda	9	64.3	613	45.8
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	14		1,339	
P24	Annelida	3	27.3	592	38.5
	Mollusca	0	0.0	0	0.0
	Arthropoda	7	63.6	946	61.5
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	9.1	1	0.1
	Total	11		1,539	

Table 3 continued:

Station	Taxa	Total No.		Total No.	
		Taxa	% Total	Individuals	% Total
P25	Annelida	3	25.0	766	55.2
	Mollusca	0	0.0	0	0.0
	Arthropoda	9	75.0	621	44.8
	Echinodermata	0	0.0	0	0.0
	Other Taxa	0	0.0	0	0.0
	Total	12		1,387	
P26	Annelida	3	23.1	931	18.2
	Mollusca	2	15.4	8	0.2
	Arthropoda	7	53.8	4,156	81.3
	Echinodermata	0	0.0	0	0.0
	Other Taxa	1	7.7	16	0.3
	Total	13		5,111	

Table 4. Distribution and abundance of benthic macroinfaunal taxa for the Chesapeake Bay stations, 2004.

Taxa	Phylum	Class	No. of Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Apocorophium lacustre</i>	Art	Mala	13797	46.433	46.433	7	32
<i>Marenzelleria viridis</i>	Ann	Poly	4650	15.649	62.082	19	86
<i>Gammarus tigrinus</i>	Art	Mala	2317	7.798	69.880	10	45
<i>Leptocheirus plumulosus</i>	Art	Mala	2133	7.178	77.058	18	82
Tubificidae (LPIL)	Ann	Olig	909	3.059	80.117	22	100
<i>Cyathura polita</i>	Art	Mala	857	2.884	83.001	18	82
<i>Marenzelleria jonesi</i>	Ann	Poly	767	2.581	85.583	12	55
<i>Rangia cuneata</i>	Mol	Biva	729	2.453	88.036	16	73
<i>Macoma balthica</i>	Mol	Biva	533	1.794	89.830	8	36
<i>Heteromastus filiformis</i>	Ann	Poly	452	1.521	91.351	8	36
<i>Melita nitida</i>	Art	Mala	441	1.484	92.835	6	27
<i>Limnodrilus hoffmeisteri</i>	Ann	Olig	183	0.616	93.451	6	27
<i>Coelotanypus</i> (LPIL)	Art	Inse	159	0.535	93.986	10	45
<i>Mytilopsis leucophaeata</i>	Mol	Biva	146	0.491	94.477	8	36
<i>Streblospio benedicti</i>	Ann	Poly	121	0.407	94.885	7	32
<i>Edotia triloba</i>	Art	Mala	116	0.390	95.275	12	55
<i>Tellina agilis</i>	Mol	Biva	105	0.353	95.628	7	32
<i>Polypedilum halterale</i> group	Art	Inse	102	0.343	95.972	6	27
<i>Littoridinops monroensis</i>	Mol	Gast	101	0.340	96.312	11	50
Oligochaeta (LPIL)	Ann	Olig	98	0.330	96.641	3	14
<i>Nereis succinea</i>	Ann	Poly	89	0.300	96.941	5	23
<i>Corbicula fluminea</i>	Mol	Biva	86	0.289	97.230	5	23
<i>Chiridotea tuftsi</i>	Art	Mala	73	0.246	97.476	11	50
Bivalvia (LPIL)	Mol	Biva	69	0.232	97.708	8	36
<i>Tubificoides heterochaetus</i>	Ann	Olig	55	0.185	97.893	4	18
<i>Haplocytheridea setipunctata</i>	Art	Ostr	45	0.151	98.045	5	23
Nereididae (LPIL)	Ann	Poly	42	0.141	98.186	4	18
Actiniaria (LPIL)	Cni	Anth	36	0.121	98.307	4	18
<i>Hypereteone heteropoda</i>	Ann	Poly	36	0.121	98.428	5	23
Chironomidae (LPIL)	Art	Inse	33	0.111	98.539	6	27
Hydrobiidae (LPIL)	Mol	Gast	31	0.104	98.644	8	36
<i>Mya arenaria</i>	Mol	Biva	31	0.104	98.748	4	18
Phyllodocidae (LPIL)	Ann	Poly	31	0.104	98.852	4	18
<i>Cryptochironomus</i> (LPIL)	Art	Inse	28	0.094	98.947	8	36
<i>Geukensia demissa</i>	Mol	Biva	22	0.074	99.021	2	9
<i>Procladius</i> (LPIL)	Art	Inse	17	0.057	99.078	7	32
<i>Tanytarsus</i> (LPIL)	Art	Inse	17	0.057	99.135	3	14
Turbellaria (LPIL)	Pla	Turb	17	0.057	99.192	2	9
Tellinidae (LPIL)	Mol	Biva	16	0.054	99.246	5	23
<i>Cladotanytarsus</i> (LPIL)	Art	Inse	15	0.050	99.297	3	14
<i>Nereis</i> (LPIL)	Ann	Poly	13	0.044	99.340	2	9
<i>Gammarus</i> (LPIL)	Art	Mala	12	0.040	99.381	2	9
<i>Pisidium</i> (LPIL)	Mol	Biva	12	0.040	99.421	2	9
<i>Almyracuma proximoculi</i>	Art	Mala	10	0.034	99.455	2	9
<i>Chironomus</i> (LPIL)	Art	Inse	10	0.034	99.488	1	5
<i>Mediomastus ambiseta</i>	Ann	Poly	10	0.034	99.522	4	18
<i>Monoculodes</i> (LPIL)	Art	Mala	10	0.034	99.556	5	23
<i>Monoculodes</i> sp. G	Art	Mala	9	0.030	99.586	5	23
Rhynchozoela (LPIL)	Rhy	-	9	0.030	99.616	6	27
<i>Sphaerium</i> (LPIL)	Mol	Biva	9	0.030	99.647	2	9
<i>Melita</i> (LPIL)	Art	Mala	8	0.027	99.674	1	5
Melitidae (LPIL)	Art	Mala	8	0.027	99.700	1	5
Gastropoda (LPIL)	Mol	Gast	7	0.024	99.724	4	18
<i>Candona</i> (LPIL)	Art	Ostr	6	0.020	99.744	1	5

Table 4 continued:

Taxa	Phylum	Class	No. of Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Sphaeriidae (LPIL)	Mol	Biva	6	0.020	99.764	3	14
Macoma (LPIL)	Mol	Biva	5	0.017	99.781	2	9
Oecetis (LPIL)	Art	Inse	5	0.017	99.798	1	5
Capitellidae (LPIL)	Ann	Poly	4	0.013	99.812	2	9
<i>Limnodrilus profundicola</i>	Ann	Olig	4	0.013	99.825	2	9
Mytilidae (LPIL)	Mol	Biva	4	0.013	99.838	2	9
<i>Polydora cornuta</i>	Ann	Poly	4	0.013	99.852	1	5
<i>Polypedilum</i> (LPIL)	Art	Inse	4	0.013	99.865	2	9
<i>Stempellina</i> (LPIL)	Art	Inse	4	0.013	99.879	2	9
Xanthidae (LPIL)	Art	Mala	4	0.013	99.892	3	14
<i>Elasmopus levis</i>	Art	Mala	3	0.010	99.902	1	5
<i>Haplocytheridea</i> (LPIL)	Art	Ostr	3	0.010	99.912	1	5
<i>Hobsonia florida</i>	Ann	Poly	3	0.010	99.923	2	9
<i>Rhithropanopeus harrisi</i>	Art	Mala	3	0.010	99.933	1	5
<i>Stictochironomus</i> (LPIL)	Art	Inse	2	0.007	99.939	1	5
<i>Tellina</i> (LPIL)	Mol	Biva	2	0.007	99.946	2	9
<i>Acteocina canaliculata</i>	Mol	Gast	1	0.003	99.950	1	5
<i>Ameroculodes edwardsi</i>	Art	Mala	1	0.003	99.953	1	5
<i>Ampelisca</i> (LPIL)	Art	Mala	1	0.003	99.956	1	5
Ceratopogonidae (LPIL)	Art	Inse	1	0.003	99.960	1	5
<i>Chaoborus</i> (LPIL)	Art	Inse	1	0.003	99.963	1	5
<i>Corophium</i> (LPIL)	Art	Mala	1	0.003	99.966	1	5
<i>Dipolydora socialis</i>	Ann	Poly	1	0.003	99.970	1	5
<i>Hargeria rapax</i>	Art	Mala	1	0.003	99.973	1	5
Hirudinea (LPIL)	Ann	Hiru	1	0.003	99.976	1	5
<i>Leptocheirus</i> (LPIL)	Art	Mala	1	0.003	99.980	1	5
Lineidae (LPIL)	Rhy	Anop	1	0.003	99.983	1	5
Mactridae (LPIL)	Mol	Biva	1	0.003	99.987	1	5
<i>Mulinia lateralis</i>	Mol	Biva	1	0.003	99.990	1	5
Podocopida (LPIL)	Art	Ostr	1	0.003	99.993	1	5
Spionidae (LPIL)	Ann	Poly	1	0.003	99.997	1	5
<i>Tanytus</i> (LPIL)	Art	Inse	1	0.003	100.000	1	5

Taxa Key

Ann=Annelida

Hiru=Hirudinea

Olig=Oligochaeta

Poly=Polychaeta

Art=Arthropoda

Inse=Insecta

Mala=Malacostraca

Ostr=Ostracoda

Cni=Cnidaria

Anth=Anthozoa

Mol=Mollusca

Biva=Bivalvia

Gast=Gastropoda

Pla=Platyhelminthes

Turb=Turbellaria

Rhy=Rhynchocoela

Anop=Anopla

Table 5. Percentage abundance of dominant benthic macroinfaunal taxa (>10% of the total) for the Chesapeake Bay stations, 2004.

Taxa	P01	P02	P03	P04	P05	P06	P07	A08
Annelida								
Oligochaeta								
<i>Limnodrilus hoffmeisteri</i>	10.4	19.4						
Oligochaeta (LPIL)								
Tubificidae (LPIL)	55.2	34.6	16.0					
Polychaeta								
<i>Heteromastus filiformis</i>								
<i>Marenzelleria jonesi</i>								11.3
<i>Marenzelleria viridis</i>							10.9	31.2
<i>Streblospio benedicti</i>								
Arthropoda								
Insecta								
<i>Coelotanypus</i> (LPIL)	14.6		20.5					
Malacostraca								
<i>Apocorophium lacustre</i>								
<i>Cyathura polita</i>								14.8
<i>Gammarus tigrinus</i>				93.3	38.1	55.5		
<i>Leptocheirus plumulosus</i>					38.6	16.4		
<i>Melita nitida</i>								
Mollusca								
Bivalvia								
<i>Corbicula fluminea</i>								
<i>Macoma balthica</i>								
<i>Rangia cuneata</i>							60.2	12.7
Gastropoda								
<i>Littoridinops monroensis</i>	12.0							

Table 5 continued:

Taxa	P17	P22	P23	P24	P25	P26
Annelida						
Oligochaeta						
<i>Limnodrilus hoffmeisteri</i>	15.9					
Oligochaeta (LPIL)						
Tubificidae (LPIL)	79.5					
Polychaeta						
<i>Heteromastus filiformis</i>						
<i>Marenzelleria jonesi</i>						
<i>Marenzelleria viridis</i>			43.9	32.6	44.8	17.6
<i>Streblospio benedicti</i>						
Arthropoda						
Insecta						
<i>Coelotanypus</i> (LPIL)						
Malacostraca						
<i>Apocorophium lacustre</i>		79.2				70.3
<i>Cyathura polita</i>						
<i>Gammarus tigrinus</i>			12.8			
<i>Leptocheirus plumulosus</i>			30.2	40.4	26.5	
<i>Melita nitida</i>				10.5		
Mollusca						
Bivalvia						
<i>Corbicula fluminea</i>						
<i>Macoma balthica</i>						
<i>Rangia cuneata</i>						
Gastropoda						
<i>Littoridinops monroensis</i>						

Table 6. Summary of the benthic macroinfaunal data for the Chesapeake Bay stations, 2004.

Station	Rep	No. of Taxa	No. of Indvs	Density (nos/m ²)	Mean No. Taxa	Taxa (SD)	Mean Density	Density (SD)	Total No. Taxa	Total No. Individuals	H' Diversity	J' Evenness
P01	A	6	60	1500	7.3	1.5	1600.0	173.2	11	192	1.44	0.60
	B	9	72	1800								
	C	7	60	1500								
P02	A	19	124	3100	18.3	4.0	2700.0	377.5	30	324	2.37	0.70
	B	22	106	2650								
	C	14	94	2350								
P03	A	22	170	4250	14.0	7.0	2033.3	1919.7	25	244	2.59	0.80
	B	11	37	925								
	C	9	37	925								
P04	A	5	350	8750	6.0	2.6	7108.3	5523.6	12	853	0.35	0.14
	B	9	465	11625								
	C	4	38	950								
P05	A	8	55	1375	13.0	4.4	2825.0	1325.7	20	339	1.64	0.55
	B	15	159	3975								
	C	16	125	3125								
P06	A	8	63	1575	8.3	0.6	1066.7	525.8	14	128	1.61	0.61
	B	8	21	525								
	C	9	44	1100								
P07	A	13	123	3075	13.7	2.1	4066.7	1013.1	18	488	1.59	0.55
	B	16	204	5100								
	C	12	161	4025								
A08	A	22	214	5350	22.3	0.6	5925.0	1173.4	34	711	2.30	0.65
	B	23	206	5150								
	C	22	291	7275								
A09	A	15	76	1900	13.7	1.5	1691.7	200.5	19	203	2.05	0.70
	B	14	67	1675								
	C	12	60	1500								
P10	A	18	186	4650	16.3	2.1	3691.7	886.8	22	443	2.09	0.68
	B	17	116	2900								
	C	14	141	3525								
P11	A	13	72	1800	9.7	2.9	1100.0	606.7	16	132	2.07	0.75
	B	8	29	725								
	C	8	31	775								
P12	A	17	248	6200	19.3	2.1	8041.7	1825.2	26	965	2.43	0.75
	B	21	323	8075								
	C	20	394	9850								
P13	A	18	190	4750	17.3	1.2	4308.3	581.1	25	517	1.83	0.57
	B	16	181	4525								
	C	18	146	3650								
P14	A	20	417	10425	21.0	1.7	12025.0	1638.8	29	1443	2.50	0.74
	B	23	548	13700								
	C	20	478	11950								
P15	A	3	16	400	4.0	1.7	483.3	212.6	6	58	1.10	0.62
	B	6	29	725								
	C	3	13	325								
P16	A	14	150	3750	13.3	2.1	3625.0	523.8	21	435	1.58	0.52
	B	11	122	3050								
	C	15	163	4075								
P17	A	2	19	475	2.3	0.6	366.7	187.6	3	44	0.61	0.56
	B	2	6	150								
	C	3	19	475								
P22	A	15	5626	140650	13.0	2.6	106825.0	29563.5	18	12819	0.82	0.28
	B	14	3437	85925								
	C	10	3756	93900								
P23	A	12	810	20250	9.0	2.6	11158.3	8096.7	14	1339	1.39	0.53
	B	7	189	4725								
	C	8	340	8500								
P24	A	9	594	14850	9.3	0.6	12825.0	4539.9	11	1539	1.52	0.63
	B	10	640	16000								
	C	9	305	7625								
P25	A	10	489	12225	10.0	1.0	11558.3	2810.0	12	1387	1.58	0.64
	B	9	339	8475								
	C	11	559	13975								
P26	A	11	1100	27500	10.0	1.0	42591.7	20399.3	13	5111	0.99	0.39
	B	9	2632	65800								
	C	10	1379	34475								

Figure 1. Water depth, salinity and dissolved oxygen concentration for the Chesapeake Bay stations, 2004.

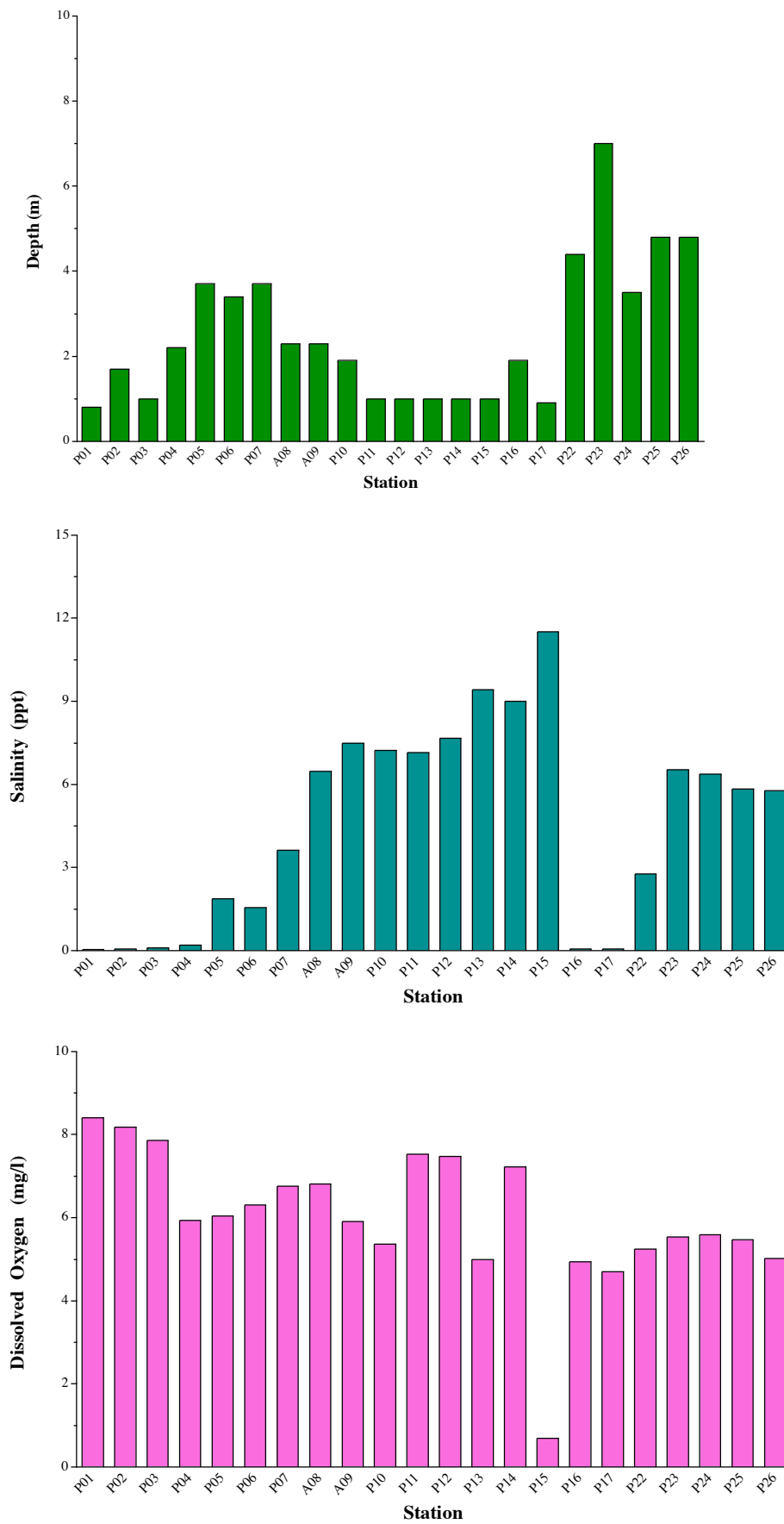


Figure 2. Distribution of major macroinvertebrate taxa for the Chesapeake Bay stations, 2004.

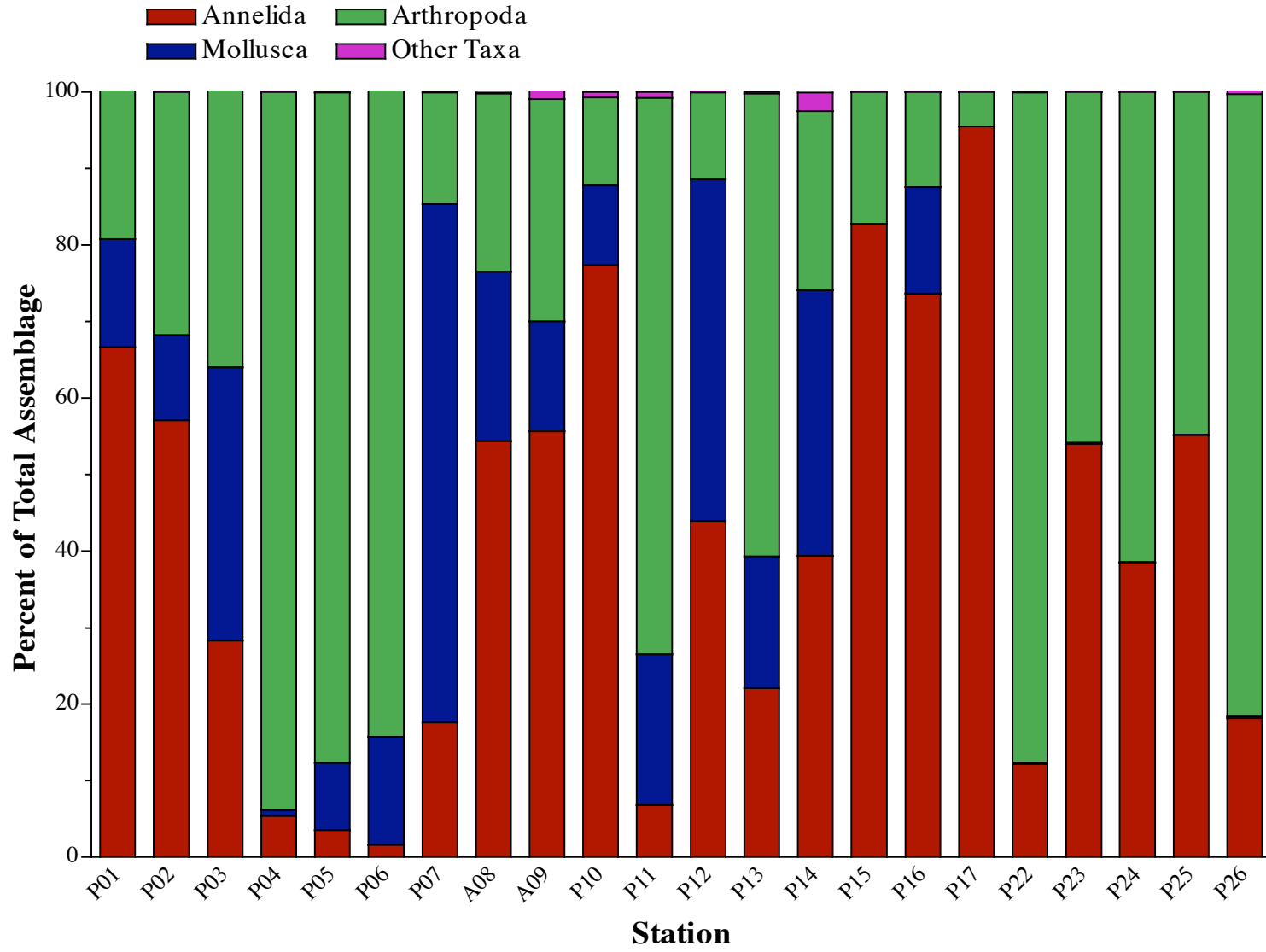


Figure 3. Taxa richness data for the Chesapeake Bay stations, 2004.

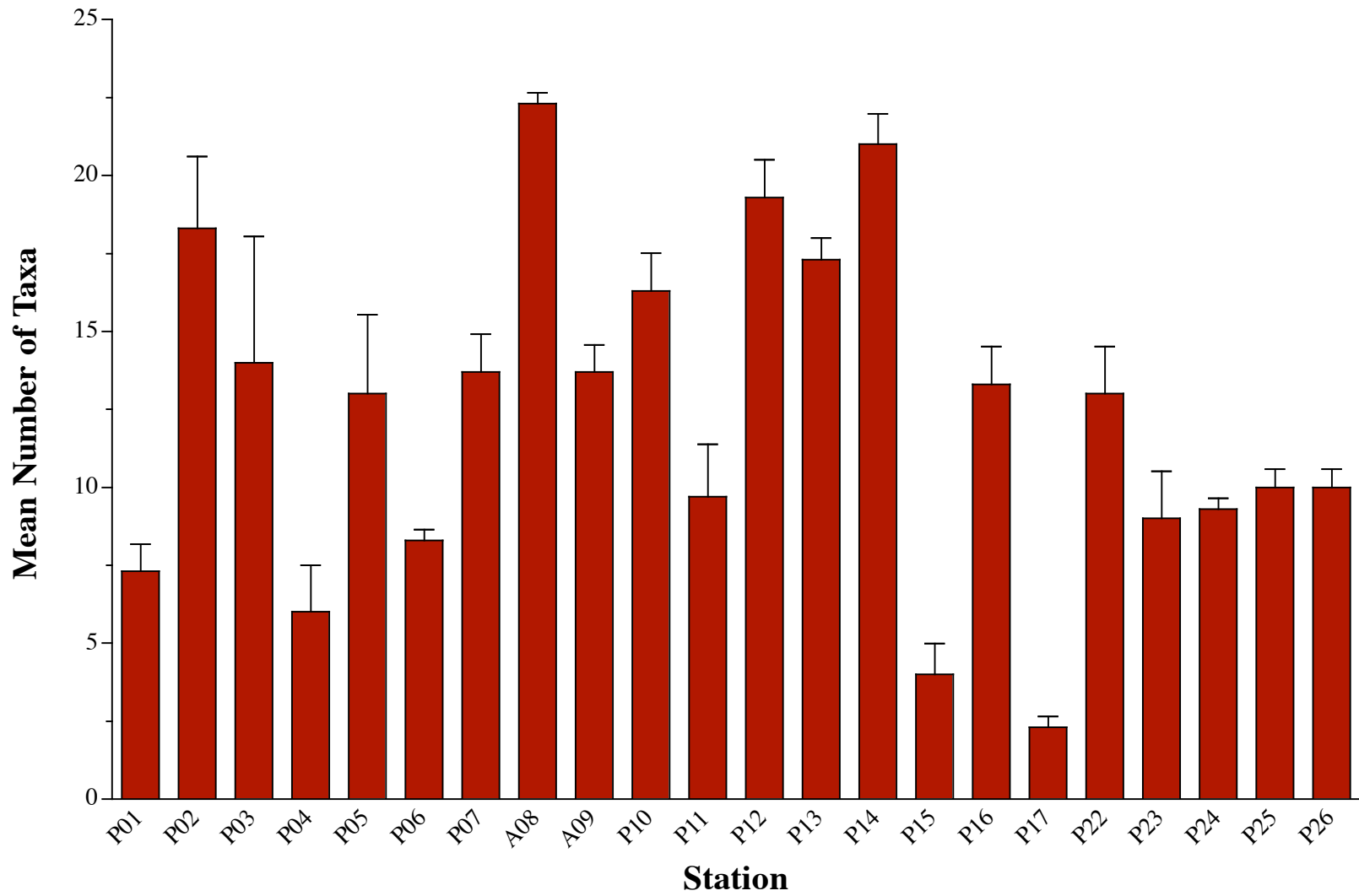


Figure 4. Taxa density data for the Chesapeake Bay stations, 2004.

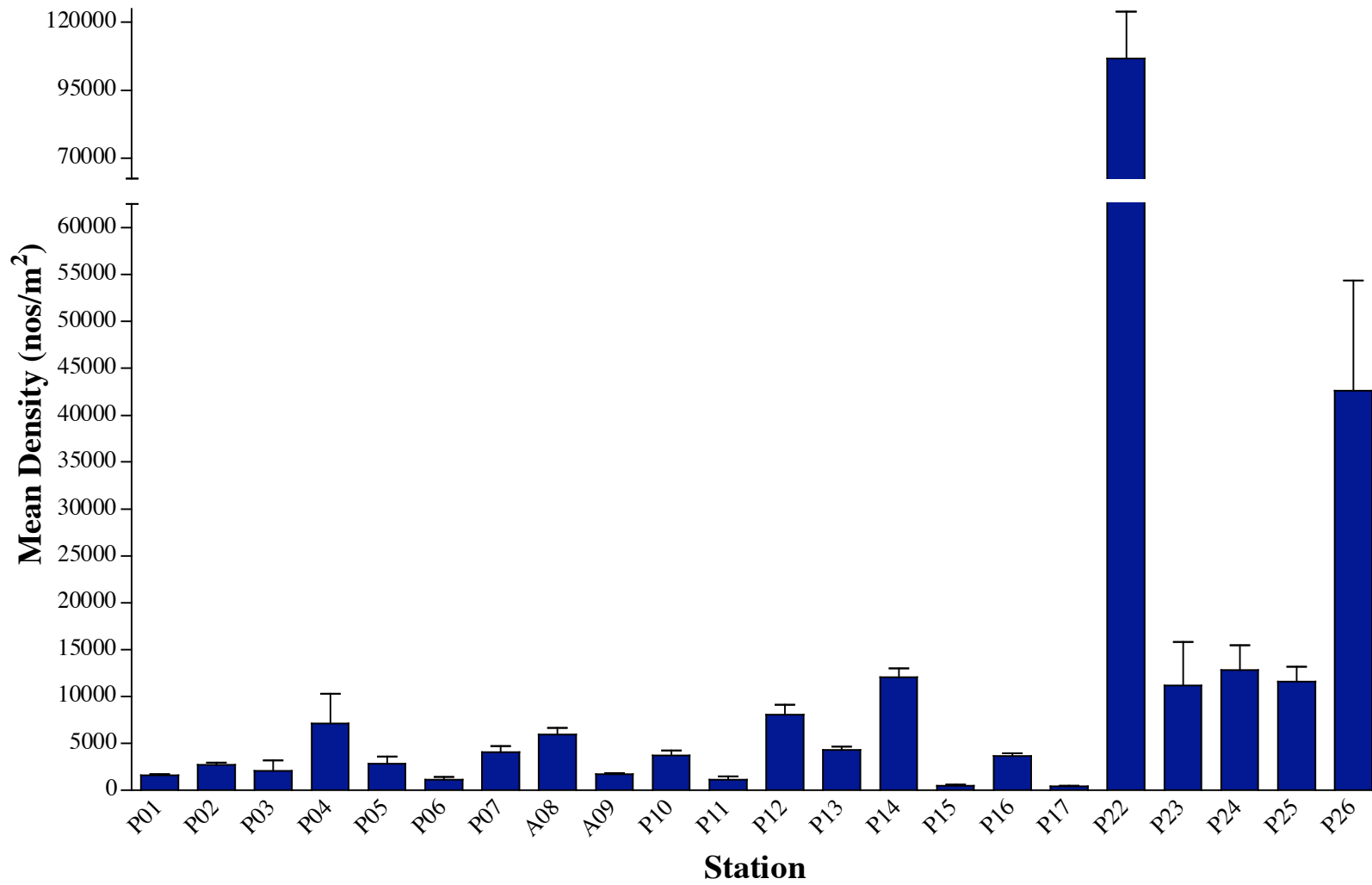


Figure 5. Taxa diversity (H') data for the Chesapeake Bay stations, 2004.

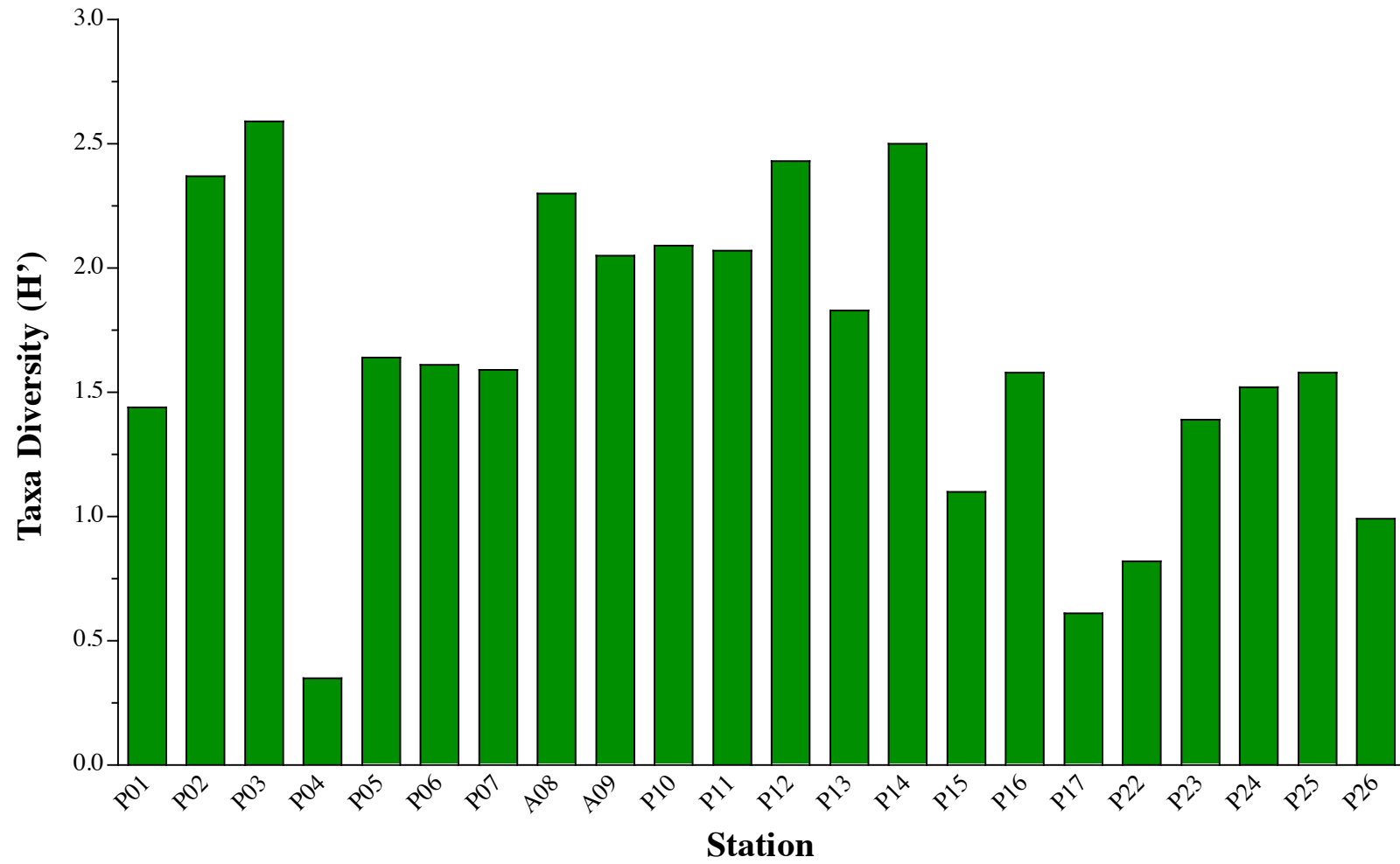
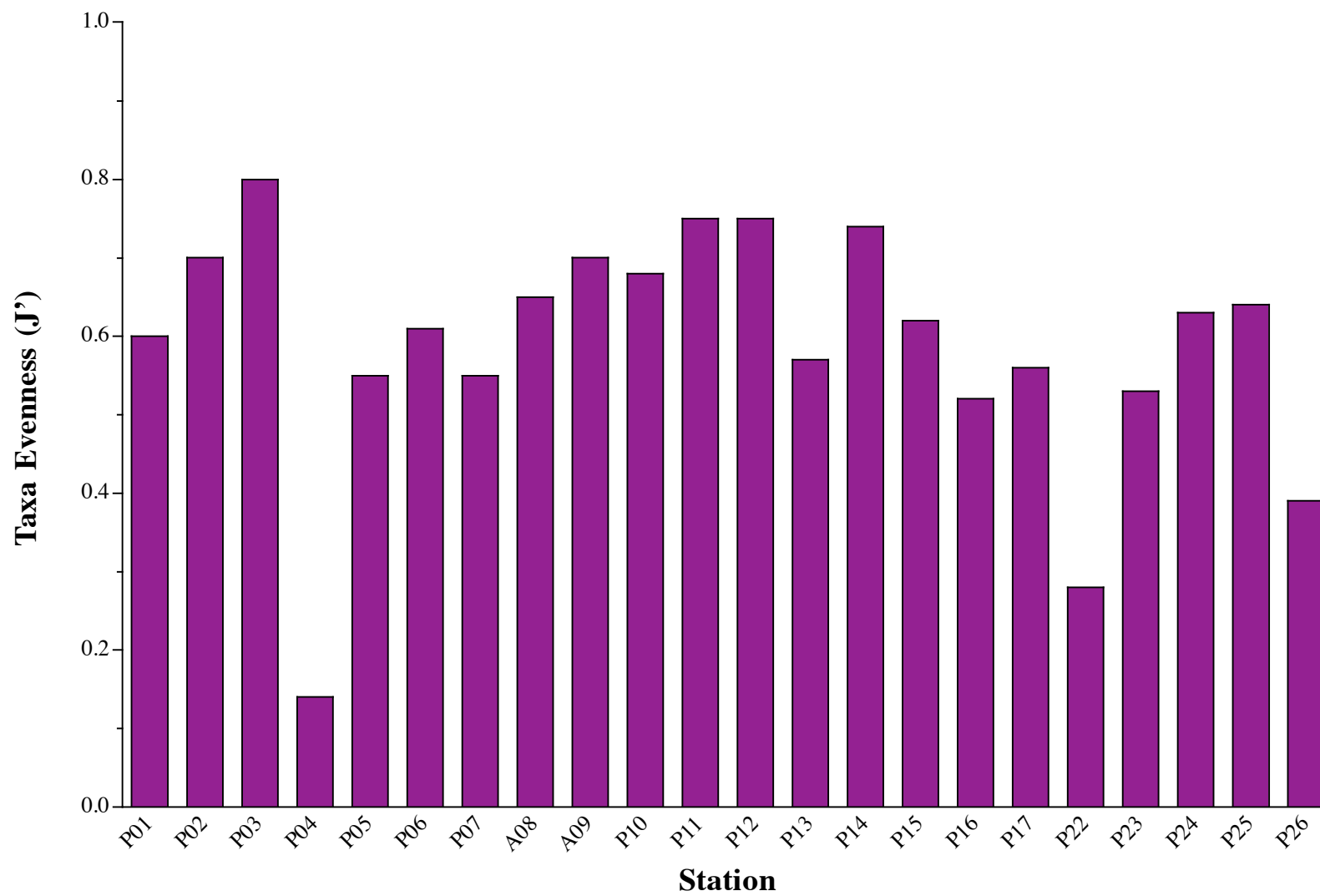


Figure 6. Taxa evenness (J') data for the Chesapeake Bay stations, 2004.



APPENDICES

QUALITY ASSURANCE STATEMENT

Client/Project: NOAA

Work Assignment Title: Chesapeake Bay-2004

Task Number: 001

Description of Data Set or Deliverable: 66 Benthic macroinvertebrate samples collected in 2004; 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 - Task Order 1- Chesapeake Bay
Task Number: 1

Sorting Results:	Sample #	% Accuracy
	CB04-P13-2	100%
	CB04-P01-1	100%
	CB04-P15-1	100%
	CB04-P11-1	100%
	CB04-A09-2	100%
	CB04-P23-3	100%

Taxonomy Results:	Sample #	Taxa	% Accuracy
	CB04-24-1	Crust./Moll.	95%
	CB04-P13-1	Crust./Moll.	97%
	CB04-P16-3	Crust./Moll.	95%
	CB04-P11-3	Crust./Moll.	100%
	CB04-P07-2	Crust./Moll.	99%
	CB04-P02-1	Crust./Moll.	95%
	CB04-P23-3	Crust./Moll.	99%
	CB04-903-2	Annelida	100%
	CB04-910-2	Annelida	100%
	CB04-911-1	Annelida	100%
	CB04-912-3	Annelida	99%
	CB04-916-3	Annelida	100%
	CB04-P25-1	Annelida	99%
	CB04-A09-2	Annelida	97%

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

Signature of QA Officer or Reviewer

Date