

Appendix C - Long Term Trends in Phytoplankton Indicators

Appendix C - Section I. James River and Elizabeth River - Long-term trends in the phytoplankton index of biotic integrity (IBI) and selected indicators for the period of 1985 through 2013. "N.E." in the Percent Change column indicates "No Estimate" was made for the percent change due to a zero baseline value.

Station	Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
TF5.5	Phytoplankton IBI	0.3068	0.000	1.33	0.00	0.00	No Trend	0.4963
TF5.5	Total Abundance	0.4027	115594	21151551	3236632	15.30	No Trend	0.0640
TF5.5	Total Biomass	0.0000	0.0296	0.3088	0.8286	268.34	Increasing	0.8496
TF5.5	Margalef Diversity Index	0.3950	0.0035	2.22	0.10	4.48	No Trend	0.8748
TF5.5	Diatom Biomass	0.0004	0.0066	0.1224	0.1843	150.55	Improving	0.6663
TF5.5	Dinoflagellate Biomass	0.8948	0.0000	0.0007	0.0000	0.00	No Trend	0.6533
TF5.5	Cyanobacteria Biomass	0.0033	0.0005	0.0162	0.0131	80.57	Degrading	0.1246
TF5.5	Chlorophyte Biomass	0.0000	0.0094	0.0137	0.2645	1934.12	Improving	0.6266
TF5.5	Picoplankton Biomass	0.0003	-0.0011	0.0768	-0.0283	-36.87	Improving	0.0247
TF5.5	Cryptophyte Biomass	0.0537	-0.0002	0.0103	-0.0070	-67.92	No Trend	0.0116
TF5.5	Cyanobacteria Abundance	0.0002	66718	4511922	1868091	41.40	Degrading	0.4603
TF5.5	Number of Species per Replicate	0.3053	0.06	37.50	1.60	4.27	No Trend	0.9503
TF5.5	Pielou's Evenness	0.0000	0.0059	0.48	0.17	34.43	Improving	0.3270
TF5.5	Shannon Weiner Diversity Index	0.0000	0.0332	2.38	0.93	39.08	Improving	0.6080
TF5.5	Diatom Abundance	0.9344	-2646	8262116	-74083	-0.90	No Trend	0.0041
TF5.5	Dinoflagellate Abundance	0.5305	0	1664	0	0.00	No Trend	0.2613
TF5.5	Chlorophyte Abundance	0.0000	84753	772436	2373077	307.22	Improving	0.9428
TF5.5	Cryptophyte Abundance	0.0008	24861	427586	696117	162.80	Increasing	0.6316
TF5.5	Number of Genera per replicate	0.2584	-0.05	31.00	-1.37	-4.41	No Trend	0.2900
TF5.5	Coccolithophore Abundance	0.0249	0	0	0	N.E.	No Trend	0.9561
RET5.2	Phytoplankton IBI	0.1207	0.003	3.50	0.09	2.67	No Trend	0.7514
RET5.2	Total Abundance	0.0052	-275341	7317548	-7709542	-105.36	Decreasing	0.0010
RET5.2	Total Biomass	0.3284	0.0021	0.1272	0.0588	46.25	No Trend	0.0011
RET5.2	Margalef Diversity Index	0.0121	-0.0105	1.60	-0.29	-18.44	No Trend	0.1432
RET5.2	Diatom Biomass	0.8605	-0.0002	0.0685	-0.0051	-7.40	No Trend	0.0011
RET5.2	Dinoflagellate Biomass	0.9594	0.0000	0.0005	0.0000	0.00	No Trend	0.4765
RET5.2	Cyanobacteria Biomass	0.0263	-0.0002	0.0036	-0.0057	-159.11	No Trend	0.3262
RET5.2	Chlorophyte Biomass	0.1379	0.0003	0.0018	0.0071	401.85	No Trend	0.0013
RET5.2	Picoplankton Biomass	0.0000	-0.0020	0.1136	-0.0511	-45.00	Improving	0.7559
RET5.2	Cryptophyte Biomass	0.0125	-0.0003	0.0144	-0.0093	-64.50	No Trend	0.2018
RET5.2	Cyanobacteria Abundance	0.0298	-38128	714837	-1067597	-149.35	No Trend	0.0972
RET5.2	Number of Species per Replicate	0.0016	-0.24	27.50	-6.67	-24.24	Degrading	0.0660
RET5.2	Pielou's Evenness	0.0003	0.0029	0.55	0.08	14.75	Improving	0.5824
RET5.2	Shannon Weiner Diversity Index	0.0320	0.0091	2.59	0.26	9.89	No Trend	0.1653
RET5.2	Diatom Abundance	0.0028	-117637	5520722	-3293839	-59.66	Degrading	0.0083
RET5.2	Dinoflagellate Abundance	0.3514	0	704	0	0.00	No Trend	0.4129
RET5.2	Chlorophyte Abundance	0.7570	1447	103808	40521	39.03	No Trend	0.0010
RET5.2	Cryptophyte Abundance	0.0532	15232	599143	426495	71.18	No Trend	0.4648
RET5.2	Number of Genera per replicate	0.0000	-0.26	23.00	-7.30	-31.76	Degrading	0.0190
RET5.2	Coccolithophore Abundance	0.3814	0	0	0	N.E.	No Trend	0.4308

Appendix C - Section I. James River and Elizabeth River - Continued.

Station	Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
LE5.5	Phytoplankton IBI	0.0017	0.019	2.29	0.54	23.50	Improving	0.6169
LE5.5	Total Abundance	0.9908	430	4899463	12478	0.25	No Trend	0.6892
LE5.5	Total Biomass	0.1184	-0.0016	0.2052	-0.0466	-22.74	No Trend	0.2033
LE5.5	Margalef Diversity Index	0.0042	-0.0093	2.44	-0.27	-11.03	Degrading	0.6176
LE5.5	Diatom Biomass	0.4084	-0.0006	0.1416	-0.0166	-11.76	No Trend	0.1788
LE5.5	Dinoflagellate Biomass	0.9086	0.0000	0.0208	0.0008	4.09	No Trend	0.4879
LE5.5	Cyanobacteria Biomass	0.0001	0.0000	0.0000	0.0001	24430.73	Degrading	0.2038
LE5.5	Chlorophyte Biomass	0.0597	0.0000	0.0000	0.0000	0.00	No Trend	0.6482
LE5.5	Picoplankton Biomass	0.1976	-0.0001	0.0689	-0.0031	-4.47	No Trend	0.1701
LE5.5	Cryptophyte Biomass	0.0000	-0.0004	0.0202	-0.0128	-63.51	Decreasing	0.1160
LE5.5	Cyanobacteria Abundance	0.0000	5504	14288	159616	1117.11	Degrading	0.5203
LE5.5	Number of Species per Replicate	0.0013	-0.17	38.25	-4.83	-12.64	Degrading	0.4765
LE5.5	Pielou's Evenness	0.0000	0.0057	0.42	0.17	39.94	Improving	0.2380
LE5.5	Shannon Weiner Diversity Index	0.0000	0.0256	2.18	0.74	33.98	Improving	0.2427
LE5.5	Diatom Abundance	0.6053	-8124	3607950	-235590	-6.53	No Trend	0.0748
LE5.5	Dinoflagellate Abundance	0.2149	982	94013	28464	30.28	No Trend	0.9131
LE5.5	Chlorophyte Abundance	0.0632	0	160	0	0.00	No Trend	0.7366
LE5.5	Cryptophyte Abundance	0.1079	7227	879606	209588	23.83	No Trend	0.3509
LE5.5	Number of Genera per replicate	0.0000	-0.19	31.00	-5.64	-18.19	Degrading	0.7486
LE5.5	Coccolithophore Abundance	0.0308	0	0	0	N.E.	No Trend	0.5617
SBE5	Phytoplankton IBI	0.0123	-0.022	1.80	-0.56	-30.86	Degrading	0.2381
SBE5	Total Abundance	0.0023	-63774	2101342	-1594350	-75.87	Decreasing	0.5122
SBE5	Total Biomass	0.0241	-0.0014	0.0617	-0.0347	-56.28	No Trend	0.5421
SBE5	Margalef Diversity Index	0.2459	-0.0054	2.22	-0.13	-6.03	No Trend	0.9638
SBE5	Diatom Biomass	0.0010	-0.0009	0.0292	-0.0236	-80.79	Degrading	0.0536
SBE5	Dinoflagellate Biomass	0.9418	0.0000	0.0087	0.0000	0.49	No Trend	0.5013
SBE5	Cyanobacteria Biomass	0.2693	0.0000	0.0001	0.0000	18.54	No Trend	0.6567
SBE5	Chlorophyte Biomass	0.0029	0.0000	0.0003	-0.0001	-52.96	Degrading	0.3058
SBE5	Picoplankton Biomass	0.0230	0.0002	0.0269	0.0038	14.04	No Trend	0.0305
SBE5	Cryptophyte Biomass	0.0000	-0.0004	0.0137	-0.0101	-73.48	Decreasing	0.7118
SBE5	Cyanobacteria Abundance	0.0192	2932	7868	73291	931.56	No Trend	0.1048
SBE5	Number of Species per Replicate	0.0349	-0.11	32.50	-2.78	-8.55	No Trend	0.9598
SBE5	Pielou's Evenness	0.0947	0.0013	0.55	0.03	5.79	No Trend	0.4478
SBE5	Shannon Weiner Diversity Index	0.5642	0.0035	2.78	0.09	3.12	No Trend	0.3629
SBE5	Diatom Abundance	0.0001	-45228	1436175	-1130692	-78.73	Degrading	0.2269
SBE5	Dinoflagellate Abundance	0.5642	-231	90532	-5763	-6.37	No Trend	0.9902
SBE5	Chlorophyte Abundance	0.0656	-49	10390	-1223	-11.77	No Trend	0.5907
SBE5	Cryptophyte Abundance	0.0786	8623	572582	215574	37.65	No Trend	0.9068
SBE5	Number of Genera per replicate	0.0000	-0.25	30.50	-6.25	-20.49	Degrading	0.9649
SBE5	Coccolithophore Abundance	0.0382	0	0	0	N.E.	No Trend	0.2766

Appendix C - Section II. York River and Mobjack Bay - Long-term trends in phytoplankton index of biotic integrity (IBI) and selected indicators for the period of 1985 through 2013. An "N.E." in the Percent Change column indicates "No Estimate" was made for the percent change due to a zero baseline value.

Station	Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
TF4.2	Phytoplankton IBI	0.2722	0.000	3.00	0.00	0.00	No Trend	0.6708
TF4.2	Total Abundance	0.2390	29488	1972396	796164	40.37	No Trend	0.9207
TF4.2	Total Biomass	0.0000	0.0026	0.0274	0.0710	258.90	Increasing	0.9850
TF4.2	Margalef Diversity Index	0.0005	0.0141	1.70	0.38	22.42	Improving	0.4305
TF4.2	Diatom Biomass	0.0000	0.0014	0.0148	0.0373	252.51	Improving	0.9391
TF4.2	Dinoflagellate Biomass	0.8219	0.0000	0.0002	0.0000	0.00	No Trend	0.9773
TF4.2	Cyanobacteria Biomass	0.0029	0.0000	0.0004	0.0011	313.23	Degrading	0.0800
TF4.2	Chlorophyte Biomass	0.0000	0.0002	0.0009	0.0050	577.49	Improving	0.5874
TF4.2	Picoplankton Biomass	0.8212	0.0000	0.0384	-0.0006	-1.46	No Trend	0.9442
TF4.2	Cryptophyte Biomass	0.0304	-0.0001	0.0085	-0.0031	-36.44	No Trend	0.0712
TF4.2	Cyanobacteria Abundance	0.0102	8788	58370	237274	406.50	No Trend	0.0439
TF4.2	Number of Species per Replicate	0.0004	0.20	27.00	5.40	20.00	Improving	0.6004
TF4.2	Pielou's Evenness	0.0004	0.0036	0.55	0.10	17.55	Improving	0.2803
TF4.2	Shannon Weiner Diversity Index	0.0000	0.0241	2.61	0.65	24.90	Improving	0.3954
TF4.2	Diatom Abundance	0.4799	6154	1376256	166160	12.07	No Trend	0.9752
TF4.2	Dinoflagellate Abundance	0.9700	0	640	0	0.00	No Trend	0.9431
TF4.2	Chlorophyte Abundance	0.0000	5717	38855	154359	397.27	Improving	0.9774
TF4.2	Cryptophyte Abundance	0.0168	10050	370240	271343	73.29	No Trend	0.9263
TF4.2	Number of Genera per replicate	0.2278	0.04	23.00	1.13	4.89	No Trend	0.6759
TF4.2	Coccolithophore Abundance	0.0229	0	0	0	N.E.	No Trend	0.9044
RET4.3	Phytoplankton IBI	0.0036	-0.013	2.00	-0.36	-17.95	Degrading	0.5900
RET4.3	Total Abundance	0.7122	9640	7855528	269919	3.44	No Trend	0.1868
RET4.3	Total Biomass	0.1254	0.0021	0.2613	0.0601	23.01	No Trend	0.5983
RET4.3	Margalef Diversity Index	0.7016	0.0011	1.53	0.03	1.97	No Trend	0.5624
RET4.3	Diatom Biomass	0.0241	0.0018	0.1276	0.0492	38.58	No Trend	0.0458
RET4.3	Dinoflagellate Biomass	0.5001	0.0000	0.0199	0.0013	6.41	No Trend	0.7922
RET4.3	Cyanobacteria Biomass	0.5001	0.0000	0.0009	0.0002	26.32	No Trend	0.1161
RET4.3	Chlorophyte Biomass	0.0686	0.0000	0.0000	0.0005	33427.41	No Trend	0.0429
RET4.3	Picoplankton Biomass	0.1957	-0.0003	0.0425	-0.0077	-18.13	No Trend	0.0118
RET4.3	Cryptophyte Biomass	0.0104	-0.0004	0.0193	-0.0116	-60.02	No Trend	0.0016
RET4.3	Cyanobacteria Abundance	0.0001	18530	194361	518830	266.94	Degrading	0.3846
RET4.3	Number of Species per Replicate	0.5305	0.00	26.00	0.00	0.00	No Trend	0.4688
RET4.3	Pielou's Evenness	0.0321	0.0021	0.52	0.06	11.22	No Trend	0.2267
RET4.3	Shannon Weiner Diversity Index	0.0357	0.0097	2.40	0.27	11.30	No Trend	0.5975
RET4.3	Diatom Abundance	0.9660	3703	4502231	103681	2.30	No Trend	0.1635
RET4.3	Dinoflagellate Abundance	0.1118	-2122	149995	-59404	-39.60	No Trend	0.9353
RET4.3	Chlorophyte Abundance	0.0001	5851	128	163816	127981.09	Improving	0.0488
RET4.3	Cryptophyte Abundance	0.0299	18560	805833	519679	64.49	No Trend	0.1359
RET4.3	Number of Genera per replicate	0.0261	-0.10	23.50	-2.67	-11.35	No Trend	0.4639
RET4.3	Coccolithophore Abundance	0.7180	0	0	0	N.E.	No Trend	0.1720

Appendix C - Section II. York River and Mobjack Bay - Continued .

Station	Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
WE4.2	Phytoplankton IBI	0.6439	0.000	2.70	0.00	0.00	No Trend	0.5077
WE4.2	Total Abundance	0.2978	-24403	5796962	-707687	-12.21	No Trend	0.6952
WE4.2	Total Biomass	0.0001	-0.0046	0.3460	-0.1346	-38.90	Decreasing	0.6461
WE4.2	Margalef Diversity Index	0.0000	-0.0173	2.55	-0.50	-19.65	Degrading	0.4126
WE4.2	Diatom Biomass	0.0342	-0.0011	0.1414	-0.0322	-22.75	No Trend	0.2000
WE4.2	Dinoflagellate Biomass	0.1514	-0.0004	0.0518	-0.0103	-19.88	No Trend	0.0783
WE4.2	Cyanobacteria Biomass	0.0000	0.0000	0.0000	0.0006	N.E.	Degrading	0.4491
WE4.2	Chlorophyte Biomass	0.8390	0.0000	0.0001	0.0000	0.00	No Trend	0.3015
WE4.2	Picoplankton Biomass	0.4689	-0.0001	0.0569	-0.0032	-5.54	No Trend	0.0300
WE4.2	Cryptophyte Biomass	0.0000	-0.0007	0.0233	-0.0198	-84.88	Decreasing	0.6119
WE4.2	Cyanobacteria Abundance	0.0000	14168	1536	410881	26750.06	Degrading	0.4535
WE4.2	Number of Species per Replicate	0.0000	-0.28	39.75	-8.09	-20.35	Degrading	0.1990
WE4.2	Pielou's Evenness	0.0000	0.0058	0.43	0.17	39.12	Improving	0.2798
WE4.2	Shannon Weiner Diversity Index	0.0000	0.0225	2.33	0.65	27.92	Improving	0.4691
WE4.2	Diatom Abundance	0.2569	-13696	3615200	-397193	-10.99	No Trend	0.1237
WE4.2	Dinoflagellate Abundance	0.4049	-877	255405	-25437	-9.96	No Trend	0.8958
WE4.2	Chlorophyte Abundance	0.0161	0	3142	0	0.00	No Trend	0.5570
WE4.2	Cryptophyte Abundance	0.9125	-595	969615	-17253	-1.78	No Trend	0.2836
WE4.2	Number of Genera per replicate	0.0000	-0.26	31.75	-7.63	-24.04	Degrading	0.1539
WE4.2	Coccolithophore Abundance	0.7079	0	0	0	N.E.	No Trend	0.7379

Appendix C - Section III. Rappahannock River - Long-term trends in phytoplankton index of biotic integrity (IBI) and selected indicators for the period of 1985 through 2013. An “N.E.” in the Percent Change column indicates “No Estimate” was made for the percent change due to a zero baseline value.

Station	Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
TF3.3	Phytoplankton IBI	0.0050	0.000	2.83	0.00	0.00	No Change	0.8207
TF3.3	Total Abundance	0.0000	635366	4516659	17790239	393.88	Increasing	0.8137
TF3.3	Total Biomass	0.0000	0.0180	0.0559	0.5036	900.83	Increasing	0.4499
TF3.3	Margalef Diversity Index	0.3908	0.0035	1.46	0.10	6.75	No Trend	0.6339
TF3.3	Diatom Biomass	0.0000	0.0075	0.0242	0.2113	873.37	Improving	0.6349
TF3.3	Dinoflagellate Biomass	0.0595	0.0000	0.0009	0.0001	13.26	No Trend	0.8404
TF3.3	Cyanobacteria Biomass	0.0000	0.0011	0.0014	0.0313	2300.75	Degrading	0.5834
TF3.3	Chlorophyte Biomass	0.0000	0.0032	0.0017	0.0898	5129.36	Improving	0.8523
TF3.3	Picoplankton Biomass	0.5517	-0.0002	0.0717	-0.0053	-7.35	No Trend	0.4347
TF3.3	Cryptophyte Biomass	0.0071	-0.0003	0.0124	-0.0087	-69.92	Decreasing	0.0445
TF3.3	Cyanobacteria Abundance	0.0000	333417	171100	9335684	5456.29	Degrading	0.6284
TF3.3	Number of Species per Replicate	0.0385	0.13	23.00	3.65	15.88	No Trend	0.6579
TF3.3	Pielou's Evenness	0.0026	0.0028	0.57	0.08	13.67	Improving	0.5773
TF3.3	Shannon Weiner Diversity Index	0.0002	0.0182	2.54	0.51	20.09	Improving	0.6667
TF3.3	Diatom Abundance	0.0000	244968	2414815	6859105	284.04	Improving	0.6534
TF3.3	Dinoflagellate Abundance	0.7924	0	15059	0	0.00	No Trend	0.8819
TF3.3	Chlorophyte Abundance	0.0000	55991	165415	1567755	947.77	Improving	0.5000
TF3.3	Cryptophyte Abundance	0.0109	20225	559466	566287	101.22	No Trend	0.4817
TF3.3	Number of Genera per replicate	0.8988	0.00	21.50	0.00	0.00	No Trend	0.6023
TF3.3	Coccolithophore Abundance	0.2328	0	0	0	N.E.	No Trend	
RET3.1	Phytoplankton IBI	0.0001	-0.043	3.00	-1.20	-40.00	Degrading	0.0838
RET3.1	Total Abundance	0.0002	301162	6178668	8432523	136.48	Increasing	0.8637
RET3.1	Total Biomass	0.0015	0.0074	0.1596	0.2085	130.69	Increasing	0.9255
RET3.1	Margalef Diversity Index	0.9330	0.0003	1.70	0.01	0.43	No Trend	0.4000
RET3.1	Diatom Biomass	0.0050	0.0027	0.0682	0.0763	111.80	Improving	0.8756
RET3.1	Dinoflagellate Biomass	0.2188	0.0000	0.0208	-0.0013	-6.27	No Trend	0.7046
RET3.1	Cyanobacteria Biomass	0.0000	0.0005	0.0019	0.0150	774.95	Degrading	0.5459
RET3.1	Chlorophyte Biomass	0.0000	0.0005	0.0015	0.0130	870.38	Improving	0.7499
RET3.1	Picoplankton Biomass	0.0062	-0.0010	0.1197	-0.0241	-20.11	Improving	0.2451
RET3.1	Cryptophyte Biomass	0.0164	-0.0003	0.0214	-0.0093	-43.45	No Trend	0.2208
RET3.1	Cyanobacteria Abundance	0.0000	123412	169424	3455526	2039.57	Degrading	0.4372
RET3.1	Number of Species per Replicate	0.3943	0.00	28.00	0.00	0.00	No Trend	0.4085
RET3.1	Pielou's Evenness	0.0000	0.0035	0.55	0.10	17.67	Improving	0.1800
RET3.1	Shannon Weiner Diversity Index	0.0000	0.0201	2.66	0.56	21.09	Improving	0.1953
RET3.1	Diatom Abundance	0.0136	100184	3266161	2805166	85.89	No Trend	0.9461
RET3.1	Dinoflagellate Abundance	0.0082	-1727	434952	-48354	-11.12	Improving	0.7576
RET3.1	Chlorophyte Abundance	0.0000	28952	87358	810656	927.97	Improving	0.4797
RET3.1	Cryptophyte Abundance	0.0114	23049	891648	645384	72.38	No Trend	0.3700
RET3.1	Number of Genera per replicate	0.2203	-0.05	26.00	-1.47	-5.67	No Trend	0.3341
RET3.1	Coccolithophore Abundance	0.8353	0	0	0	N.E.	No Trend	0.1031

Appendix C - Section III. Rappahannock River - Continued.

Station	Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
LE3.6	Phytoplankton IBI	0.0311	0.012	2.70	0.35	13.02	No Trend	0.3401
LE3.6	Total Abundance	0.8237	-8116	4596799	-235352	-5.12	No Trend	0.3221
LE3.6	Total Biomass	0.0079	-0.0037	0.3540	-0.1060	-29.95	Decreasing	0.8482
LE3.6	Margalef Diversity Index	0.0002	-0.0110	2.13	-0.32	-14.94	Degrading	0.7637
LE3.6	Diatom Biomass	0.1716	-0.0011	0.2020	-0.0325	-16.07	No Trend	0.5614
LE3.6	Dinoflagellate Biomass	0.8614	0.0000	0.0232	0.0013	5.40	No Trend	0.0206
LE3.6	Cyanobacteria Biomass	0.0000	0.0001	0.0000	0.0016	248660.33	Degrading	0.6914
LE3.6	Chlorophyte Biomass	0.6495	0.0000	0.0002	0.0000	0.00	No Trend	0.4797
LE3.6	Picoplankton Biomass	0.0000	-0.0009	0.1065	-0.0236	-22.17	Improving	0.1738
LE3.6	Cryptophyte Biomass	0.0000	-0.0006	0.0272	-0.0178	-65.30	Decreasing	0.0939
LE3.6	Cyanobacteria Abundance	0.0000	29768	256	863282	337219.57	Degrading	0.7269
LE3.6	Number of Species per Replicate	0.0004	-0.18	34.00	-5.08	-14.93	Degrading	0.7462
LE3.6	Pielou's Evenness	0.0000	0.0054	0.45	0.16	35.27	Improving	0.8158
LE3.6	Shannon Weiner Diversity Index	0.0000	0.0240	2.24	0.70	31.14	Improving	0.6135
LE3.6	Diatom Abundance	0.6602	-7229	2631037	-209648	-7.97	No Trend	0.3292
LE3.6	Dinoflagellate Abundance	0.2500	1479	183042	42905	23.44	No Trend	0.1333
LE3.6	Chlorophyte Abundance	0.0016	12	8294	337	4.07	Improving	0.5822
LE3.6	Cryptophyte Abundance	0.5754	3270	1133862	94818	8.36	No Trend	0.0512
LE3.6	Number of Genera per replicate	0.0000	-0.19	28.50	-5.52	-19.38	Degrading	0.8053
LE3.6	Coccolithophore Abundance	0.0004	0	0	0	N.E. No Change		0.7443

Appendix C - Section IV. Virginia Mainstem Chesapeake Bay - Long-term trends in phytoplankton index of biotic integrity (IBI) and selected indicators for the period of 1985 through 2013. An "N.E." in the Percent Change column indicates "No Estimate" was made for the percent change due to a zero baseline value.

Station	Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
CB6.1	Phytoplankton IBI	0.0149	0.016	3.07	0.46	14.99	No Trend	0.8088
CB6.1	Total Abundance	0.4588	16071	4748803	466050	9.81	No Trend	0.8374
CB6.1	Total Biomass	0.0009	-0.0048	0.4139	-0.1378	-33.29	Degrading	0.0149
CB6.1	Margalef Diversity Index	0.0011	-0.0113	2.26	-0.33	-14.51	Degrading	0.4210
CB6.1	Diatom Biomass	0.1105	-0.0010	0.2199	-0.0283	-12.85	No Trend	0.1730
CB6.1	Dinoflagellate Biomass	0.6172	-0.0001	0.0321	-0.0043	-13.40	No Trend	0.0289
CB6.1	Cyanobacteria Biomass	0.0000	0.0000	0.0000	0.0014	213197.39	Degrading	0.6969
CB6.1	Chlorophyte Biomass	0.9702	0.0000	0.0001	0.0000	0.00	No Trend	0.3082
CB6.1	Picoplankton Biomass	0.0002	-0.0010	0.0820	-0.0245	-29.83	Improving	0.1628
CB6.1	Cryptophyte Biomass	0.0000	-0.0007	0.0257	-0.0195	-75.66	Degrading	0.6531
CB6.1	Cyanobacteria Abundance	0.0000	25563	9978	741340	7429.56	Degrading	0.5602
CB6.1	Number of Species per Replicate	0.0016	-0.16	36.25	-4.64	-12.80	Degrading	0.3648
CB6.1	Pielou's Evenness	0.0000	0.0046	0.49	0.13	27.16	Improving	0.8684
CB6.1	Shannon Weiner Diversity Index	0.0000	0.0183	2.37	0.53	22.42	Improving	0.9726
CB6.1	Diatom Abundance	0.8143	2310	2974351	67002	2.25	No Trend	0.6707
CB6.1	Dinoflagellate Abundance	0.0259	3186	184108	92381	50.18	No Trend	0.1019
CB6.1	Chlorophyte Abundance	0.0020	16	6229	464	7.45	Improving	0.3877
CB6.1	Cryptophyte Abundance	0.1306	8377	1133883	242935	21.43	No Trend	0.6901
CB6.1	Number of Genera per replicate	0.0000	-0.16	29.00	-4.58	-15.79	Degrading	0.2165
CB6.1	Coccolithophore Abundance	0.0260	0	0	0	N.E.	No Trend	0.7789
CB6.4	Phytoplankton IBI	0.2370	0.004	2.79	0.12	4.27	No Trend	0.8170
CB6.4	Total Abundance	0.1006	43192	3469502	1252580	36.10	No Trend	0.7326
CB6.4	Total Biomass	0.0319	-0.0026	0.2170	-0.0760	-35.04	No Trend	0.1239
CB6.4	Margalef Diversity Index	0.0000	-0.0177	2.14	-0.51	-24.02	Degrading	0.0645
CB6.4	Diatom Biomass	0.1081	-0.0010	0.1559	-0.0288	-18.46	No Trend	0.1905
CB6.4	Dinoflagellate Biomass	0.7338	-0.0001	0.0319	-0.0016	-5.08	No Trend	0.1088
CB6.4	Cyanobacteria Biomass	0.0000	0.0000	0.0000	0.0008	N.E.	Degrading	0.9807
CB6.4	Chlorophyte Biomass	0.7837	0.0000	0.0001	0.0000	0.00	No Trend	0.0931
CB6.4	Picoplankton Biomass	0.0004	-0.0007	0.0925	-0.0164	-17.72	Improving	0.4453
CB6.4	Cryptophyte Biomass	0.0000	-0.0005	0.0168	-0.0139	-82.72	Degrading	0.0765
CB6.4	Cyanobacteria Abundance	0.0000	16230	0	470660	N.E.	Degrading	0.7626
CB6.4	Number of Species per Replicate	0.0000	-0.27	32.00	-7.81	-24.40	Degrading	0.0454
CB6.4	Pielou's Evenness	0.0000	0.0059	0.45	0.17	38.07	Improving	0.7385
CB6.4	Shannon Weiner Diversity Index	0.0000	0.0236	2.31	0.68	29.62	Improving	0.3882
CB6.4	Diatom Abundance	0.1664	20822	2189987	603832	27.57	No Trend	0.0956
CB6.4	Dinoflagellate Abundance	0.1216	1596	109288	46276	42.34	No Trend	0.0605
CB6.4	Chlorophyte Abundance	0.0285	0	3661	0	0.00	No Trend	0.1328
CB6.4	Cryptophyte Abundance	0.0095	13229	699648	383649	54.83	Increasing	0.0045
CB6.4	Number of Genera per replicate	0.0000	-0.27	27.50	-7.91	-28.76	Degrading	0.2087
CB6.4	Coccolithophore Abundance	0.0859	0	0	0	N.E.	No Trend	0.9343

Appendix C - Section IV. Virginia Mainstem Chesapeake Bay - Continued.

Station Parameter	Trend Test P Value	Slope	Baseline Median	Absolute Change	% Change	Trend Direction	Homogen. Test P value
CB7.3E Phytoplankton IBI	0.1460	0.007	2.97	0.20	6.64	No Trend	0.8130
CB7.3E Total Abundance	0.9486	-1249	3139422	-36229	-1.15	No Trend	0.8682
CB7.3E Total Biomass	0.0034	-0.0034	0.2891	-0.0993	-34.35	Decreasing	0.5238
CB7.3E Margalef Diversity Index	0.0000	-0.0175	2.36	-0.51	-21.49	Degrading	0.8804
CB7.3E Diatom Biomass	0.0242	-0.0014	0.1861	-0.0394	-21.15	No Trend	0.7806
CB7.3E Dinoflagellate Biomass	0.1800	-0.0003	0.0314	-0.0090	-28.53	No Trend	0.1006
CB7.3E Cyanobacteria Biomass	0.0000	0.0000	0.0000	0.0004	4619.90	Degrading	0.9912
CB7.3E Chlorophyte Biomass	0.9805	0.0000	0.0000	0.0000	0.00	No Trend	0.4792
CB7.3E Picoplankton Biomass	0.2154	-0.0002	0.0831	-0.0056	-6.77	No Trend	0.6014
CB7.3E Cryptophyte Biomass	0.0000	-0.0005	0.0180	-0.0132	-73.21	Decreasing	0.7751
CB7.3E Cyanobacteria Abundance	0.0000	10510	8294	304790	3674.71	Degrading	0.9921
CB7.3E Number of Species per Replicate	0.0000	-0.25	38.75	-7.25	-18.71	Degrading	0.6836
CB7.3E Pielou's Evenness	0.0000	0.0054	0.47	0.16	33.49	Improving	0.3750
CB7.3E Shannon Weiner Diversity Index	0.0000	0.0213	2.47	0.62	25.00	Improving	0.4487
CB7.3E Diatom Abundance	0.4158	-7662	2088360	-222190	-10.64	No Trend	0.5012
CB7.3E Dinoflagellate Abundance	0.2416	956	118259	27724	23.44	No Trend	0.5977
CB7.3E Chlorophyte Abundance	0.0077	0	56	0	0.00	No Change	0.9475
CB7.3E Cryptophyte Abundance	0.6734	1638	750374	47514	6.33	No Trend	0.5813
CB7.3E Number of Genera per replicate	0.0000	-0.27	32.00	-7.91	-24.72	Degrading	0.5869
CB7.3E Coccolithophore Abundance	0.0816	0	0	0	N.E.	No Trend	0.9271
CB7.4 Phytoplankton IBI	0.3355	0.001	2.87	0.04	1.48	No Trend	0.5734
CB7.4 Total Abundance	0.0399	30310	2415823	879002	36.39	No Trend	0.7788
CB7.4 Total Biomass	0.5310	-0.0007	0.1411	-0.0190	-13.46	No Trend	0.5797
CB7.4 Margalef Diversity Index	0.0000	-0.0325	2.77	-0.94	-34.04	Degrading	0.8581
CB7.4 Diatom Biomass	0.8194	-0.0002	0.1103	-0.0051	-4.60	No Trend	0.5160
CB7.4 Dinoflagellate Biomass	0.7298	0.0000	0.0182	0.0014	7.65	No Trend	0.4185
CB7.4 Cyanobacteria Biomass	0.0000	0.0000	0.0000	0.0002	N.E.	Degrading	0.9546
CB7.4 Chlorophyte Biomass	0.7206	0.0000	0.0000	0.0000	0.00	No Trend	0.0759
CB7.4 Picoplankton Biomass	0.8250	0.0000	0.0978	-0.0009	-0.89	No Trend	0.7695
CB7.4 Cryptophyte Biomass	0.0001	-0.0002	0.0078	-0.0069	-88.85	Decreasing	0.2609
CB7.4 Cyanobacteria Abundance	0.0000	9997	240	289908	120795	Degrading	0.6719
CB7.4 Number of Species per Replicate	0.0000	-0.44	42.25	-12.69	-30.03	Degrading	0.7557
CB7.4 Pielou's Evenness	0.0000	0.0050	0.45	0.15	32.35	Improving	0.9753
CB7.4 Shannon Weiner Diversity Index	0.0000	0.0166	2.39	0.48	20.14	Improving	0.9858
CB7.4 Diatom Abundance	0.4362	8932	1932798	259026	13.40	No Trend	0.2912
CB7.4 Dinoflagellate Abundance	0.0086	2147	61164	62269	101.81	Degrading	0.6244
CB7.4 Chlorophyte Abundance	0.0141	0	1165	0	0.00	No Trend	0.3185
CB7.4 Cryptophyte Abundance	0.0031	11832	325091	343142	105.55	Increasing	0.1242
CB7.4 Number of Genera per replicate	0.0000	-0.38	33.50	-11.15	-33.30	Degrading	0.6771
CB7.4 Coccolithophore Abundance	0.3036	0	0	0	N.E.	No Trend	0.0824