NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION COASTAL OCEAN ASSESSMENTS, STATUS, AND TRENDS BIOEFFECTS ASSESSMENT PROGRAM CHESAPEAKE BAY – SPECIAL BENTHIC SURVEY DATA DICTIONARY

NOAA-COAST-Bioeffects Assessment Program: Chesapeake Bay- Special Benthic Survey

- Taxonomic Data Dictionary
- Biomass Data Dictionary
- Sediment Data Dictionary
- Water Quality Data Dictionary
- Event and Biota Event Data Dictionary
- Benthic Index of Biotic Integrity Data Dictionary

NOTE THIS DICTIONARY WAS REVISED ON 29 JUNE 2012 AND SUPERSEDES ALL OTHER CBP DICTIONARIES FOR THE NOAA-COAST Chesapeake Bay- Special Benthic Survey

The Bioeffects program is a nationwide program of environmental assessment and related research designed to describe the current status of environmental quality in our Nation's estuarine and coastal areas. Over thirty multidisciplinary project studies have been carried out since 1991 in close cooperation or in partnership with coastal states or regional organizations. Field studies examine the distribution and concentration of over 100 chemical contaminants in sediments, measure sediment toxicity, and assess the condition of bottom-dwelling biological communities. This information is integrated into a comprehensive assessment of the health of the marine habitat.

NAMES AND DESCRIPTIONS OF ASSOCIATED DATA DICTIONARY FILE
2012 User's Guide to Chesapeake Bay Program Biological Data

#PROJECT TITLE:
NOAA-COAST-Bioeffects Assessment Program: Chesapeake Bay- Special Benthic Survey

CURRENT PRINCIPAL INVESTIGATORS:
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#PROJECT FUNDING AGENCIES:
NOAA/National Status and Trends Program
U.S. Environmental Protection Agency Chesapeake Bay Program

#PROJECT COST
Not Available

#CURRENT QA/QC OFFICER: Not Available

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#LOCATION OF STUDY
Chesapeake Bay and its tidal tributaries

#DATE INTERVALS
8/24/1998- 9/19/2001

#ABSTRACT

In 1998, 1999, and 2001, NOAA National Status & Trends Program (NS&T) conducted a study to assess the environmental condition of Chesapeake Bay. A total of 210 randomly located stations was sampled during the month of September. The upper Maryland portion of the Bay was sampled in the first year of the study, and the lower Maryland and Virginia portions of the Bay were sampled in the second and third years of the study, respectively. The NS&T program collects synoptic measures of (1) general habitat condition (depth, physical properties of water, sediment grain size, organic carbon content), (2) pollution exposure (sediment contaminant concentrations, sediment toxicity, low dissolved oxygen in the water column), and (3) biotic conditions (diversity and abundance of macroinfauna). The data collected by NOAA in Chesapeake Bay were shared with the Toxics Subcommittee of the Chesapeake Bay Program. The Toxics Subcommittee uses contaminant concentrations and the Chesapeake Bay Benthic Index of Biotic Integrity (B-IBI) to report the status of chemical contaminant impacts on the tidal rivers and mainstem of the Chesapeake Bay.

STATION NAMES AND DESCRIPTIONS

NOAA uses a stratified-random design for selection of sampling sites to determine the spatial extent of sediment toxicity in US coastal waters. One of the design principles is to apply the same suite of tests synoptically to all areas so that comparisons can be made without the confounding interference of using different methods in different areas. Thus, comparison of spatial extent of impact between areas is possible even if the areas are not contiguous. Chesapeake Bay was divided into sixty-five strata. Strata boundaries were developed in conjunction with regional scientists and resource mangers, and were intended to enclose relatively uniform habitats within each stratum. Strata boundaries were established based on bathymetric, hydrographic, regional environmental considerations, and previous studies detailing geochemical reservoirs, sediment grain size distribution, hydrographic model results, organic carbon maps, distribution patterns of benthic fauna, occurrence of seasonally anoxic conditions, and regional contamination databases indicating potential problem areas. Based on background data, large strata were established in the open waters of the bay where topographic features and oceanographic conditions were relatively uniform and toxicant concentrations were expected to be low. In contrast, smaller strata were established in tributaries and specific areas near suspected sources of contamination or where environmental conditions were expected to be heterogeneous or transitional, especially channels. The larger western tributaries were sampled well up into the sub-estuaries, but smaller tributaries were not thoroughly sampled beyond the embayments into which they empty. The focus of the sampling design was the larger open expanses of the Bay system.

A minimum of three sampling sites were selected on a random basis within each stratum. This sampling strategy allows some control of spacing of samples in the study area and combines the strengths of a stratified design with the random-probabilistic selection of sampling locations. Two alternate sites were also selected for each primary sampling site. In instances where the primary site could not be sampled due to accessibility or an unsuitable substratum, the next sequential alternate site was sampled. Examples of reasons for not sampling the primary sites included the site being too shallow, manmade obstructions, hard bottom, or there was no dredging or anchoring allowed in the area.

STATION NAMES AND POSITIONS

Due to the size of the Chesapeake Bay system and the large number of requisite sample sites, sampling was conducted in three phases. The northern (63 sites, Fig. 2) and middle (69 sites, Fig. 3) portions of the system were sampled during August and September of 1998 and 1999 respectively. Seventy nine sites in the southern reaches were sampled in September of 2001 (Fig. 4). Sampling was conducted during the late summer period when much of the benthic fauna are at the peak of seasonal development, and inter-annual variability is likely to be low. No sites were sampled in more than one year of the project.

>Final Site Positions. Sampling station list for survey done from 1989-2002. Longitude, (decimal degrees), Latitude (decimal degrees) in data sets are WGS84 Coordinates.

NST_Site	General Location	Lat_DD	Lon_DD
CHB_001	Upper Chesapeake Bay- Strata 1	39.4897	-76.1235
CHB_002	Upper Chesapeake Bay- Strata 1	39.5267	-76.0065
CHB_003	Upper Chesapeake Bay- Strata 1	39.4645	-76.0527
CHB_004	Upper Chesapeake Bay- Strata 2	39.5814	-75.953
CHB_005	Upper Chesapeake Bay- Strata 2	39.4638	-76.0214
CHB_006	Upper Chesapeake Bay- Strata 2	39.3986	-76.1411
CHB_007	Upper Chesapeake Bay- Strata 3	39.5541	-75.8709
CHB_008	Upper Chesapeake Bay- Strata 3	39.5074	-75.9014
CHB_009	Upper Chesapeake Bay- Strata 3	39.4727	-75.9757
CHB_010	Upper Chesapeake Bay- Strata 4	39.38	-76.057
CHB_011	Upper Chesapeake Bay- Strata 4	39.38	-75.995
CHB_012	Upper Chesapeake Bay- Strata 4	39.373	-76.082
CHB_013	Upper Chesapeake Bay- Strata 5	39.4167	-76.0265
CHB_014	Upper Chesapeake Bay- Strata 5	39.3739	-76.1316
CHB_015	Upper Chesapeake Bay- Strata 5	39.2926	-76.2201
CHB_016	Upper Chesapeake Bay- Strata 5	39.3733	-76.0391
CHB_017	Upper Chesapeake Bay- Strata 5	39.3151	-76.2025

NST_Site	General Location	Lat_DD	Lon_DD
CHB_018	Upper Chesapeake Bay- Strata 6	39.3038	-76.3684
CHB_019	Upper Chesapeake Bay- Strata 6	39.2901	-76.3876
CHB_020	Upper Chesapeake Bay- Strata 6	39.2082	-76.3951
CHB_021A1	Upper Chesapeake Bay- Strata 6	39.1266	-76.3293
CHB_022	Upper Chesapeake Bay- Strata 6	39.1029	-76.3587
CHB_023A1	Upper Chesapeake Bay- Strata 7	39.2324	-76.5355
CHB_024A1	Upper Chesapeake Bay- Strata 7	39.2287	-76.5605
CHB_025	Upper Chesapeake Bay- Strata 7	39.1701	-76.4894
CHB_026	Upper Chesapeake Bay- Strata 7	39.17	-76.5168
CHB_027	Upper Chesapeake Bay- Strata 8	39.1098	-76.3878
CHB_028	Upper Chesapeake Bay- Strata 8	39.0695	-76.4699
CHB_029	Upper Chesapeake Bay- Strata 8	39.0913	-76.4013
CHB_030	Upper Chesapeake Bay- Strata 8	39.0077	-76.3287
CHB_031	Upper Chesapeake Bay- Strata 9	39.1088	-76.1784
CHB_032	Upper Chesapeake Bay- Strata 9	39.048	-76.2532
CHB_033	Upper Chesapeake Bay- Strata 9	39.0471	-76.2673
CHB_034A2	Upper Chesapeake Bay- Strata 9	38.9853	-76.1879

NST_Site	General Location	Lat_DD	Lon_DD
CHB_035	Upper Chesapeake Bay- Strata 10	38.9846	-76.4023
CHB_036	Upper Chesapeake Bay- Strata 10	38.9503	-76.4639
CHB_037	Upper Chesapeake Bay- Strata 10	38.9015	-76.4481
CHB_038	Upper Chesapeake Bay- Strata 10	38.8344	-76.4786
CHB_039	Upper Chesapeake Bay- Strata 11	39.0057	-76.349
CHB_040	Upper Chesapeake Bay- Strata 11	38.9841	-76.3752
CHB_041	Upper Chesapeake Bay- Strata 11	38.8773	-76.4026
CHB_042	Upper Chesapeake Bay- Strata 12	38.8852	-76.2025
CHB_043A2	Upper Chesapeake Bay- Strata 12	38.9002	-76.2416
CHB_044	Upper Chesapeake Bay- Strata 12	38.8289	-76.2135
CHB_045	Upper Chesapeake Bay- Strata 12	38.8205	-76.3859
CHB_046	Upper Chesapeake Bay- Strata 13	38.7931	-76.5215
CHB_047A2	Upper Chesapeake Bay- Strata 13	38.7159	-76.5271
CHB_048	Upper Chesapeake Bay- Strata 13	38.6363	-76.5001
CHB_049	Upper Chesapeake Bay- Strata 13	38.5829	-76.5036
CHB_050	Upper Chesapeake Bay- Strata 14	38.8367	-76.4273
CHB_051	Upper Chesapeake Bay- Strata 14	38.7512	-76.471
CHB_052	Upper Chesapeake Bay- Strata 14	38.6414	-76.4716
CHB_053A2	Upper Chesapeake Bay- Strata 15	38.7871	-76.3934
CHB_054	Upper Chesapeake Bay- Strata 15	38.6784	-76.4257
CHB_055	Upper Chesapeake Bay- Strata 15	38.5997	-76.3403
CHB_056	Upper Chesapeake Bay- Strata 16	38.8389	-76.3112
CHB_057	Upper Chesapeake Bay- Strata 16	38.7708	-76.3618
CHB_058	Upper Chesapeake Bay- Strata 16	38.6674	-76.3301
CHB_059	Upper Chesapeake Bay- Strata 17	38.7305	-76.2512
CHB_060	Upper Chesapeake Bay- Strata 17	38.6862	-76.1741
CHB_062	Upper Chesapeake Bay- Strata 17	38.6634	-76.2312
CHB_063	Upper Chesapeake Bay- Strata 17	38.5983	-76.1258
CHB_064	Central Chesapeake Bay- Strata 18	38.5229	-76.504
CHB_065A1	Central Chesapeake Bay- Strata 18	38.2892	-76.3605
CHB_066A1	Central Chesapeake Bay- Strata 18	38.0436	-76.312
CHB_067	Central Chesapeake Bay- Strata 19	38.5658	-76.449
CHB_068	Central Chesapeake Bay- Strata 19	38.476	-76.3995
CHB_069	Central Chesapeake Bay- Strata 19	38.2817	-76.3538
CHB_070	Central Chesapeake Bay- Strata 20	38.5459	-76.3117
CHB_071	Central Chesapeake Bay- Strata 20	38.4479	-76.3528
CHB_072	Central Chesapeake Bay- Strata 20	38.3653	-76.307
CHB_073	Central Chesapeake Bay- Strata 21	38.4982	-76.6668
CHB_074	Central Chesapeake Bay- Strata 21	38.4334	-76.607
CHB_075	Central Chesapeake Bay- Strata 21	38.4922	-76.5881
CHB_076	Central Chesapeake Bay- Strata 22	38.3972	-76.5493
CHB_077	Central Chesapeake Bay- Strata 22	38.3634	-76.5013
CHB_078	Central Chesapeake Bay- Strata 22	38.3533	-76.4985
CHB_079	Central Chesapeake Bay- Strata 23	38.3249	-76.4521
CHB_080	Central Chesapeake Bay- Strata 23	38.3178	-76.4753
CHB_081	Central Chesapeake Bay- Strata 23	38.2887	-76.4503
CHB_082	Central Chesapeake Bay- Strata 24	38.2844	-76.9158
CHB_083A1	Central Chesapeake Bay- Strata 24	38.206	-76.796
CHB_084	Central Chesapeake Bay- Strata 24	38.2286	-76.8474
CHB_085	Central Chesapeake Bay- Strata 25	38.3352	-77.0017
CHB_086	Central Chesapeake Bay- Strata 25	38.1721	-76.7542
CHB_087	Central Chesapeake Bay- Strata 25	38.1689	-76.771
CHB_088	Central Chesapeake Bay- Strata 26	38.1548	-76.5597
CHB_089	Central Chesapeake Bay- Strata 26	38.1127	-76.4099
CHB_090	Central Chesapeake Bay- Strata 26	38.0582	-76.3613
CHB_091	Central Chesapeake Bay- Strata 27	38.1741	-76.6155
CHB_092	Central Chesapeake Bay- Strata 27	37.9953	-76.3395
CHB_093	Central Chesapeake Bay- Strata 27	38.0218	-76.4174
CHB_094A2	Central Chesapeake Bay- Strata 28	38.1504	-76.6464
CHB_095A1	Central Chesapeake Bay- Strata 28	38.1305	-76.6419
CHB_096	Central Chesapeake Bay- Strata 28	38.0026	-76.4369
CHB_097	Central Chesapeake Bay- Strata 29	37.9647	-76.4117
CHB_098	Central Chesapeake Bay- Strata 29	37.7268	-76.0633
CHB_099	Central Chesapeake Bay- Strata 29	37.6859	-76.1736
CHB_100	Central Chesapeake Bay- Strata 30	38.1258	-76.1027
CHB_101	Central Chesapeake Bay- Strata 30	38.0412	-76.0621
CHB_102	Central Chesapeake Bay- Strata 30	37.8155	-76.074
CHB_103	Central Chesapeake Bay- Strata 31	37.9169	-76.139
CHB_104	Central Chesapeake Bay- Strata 31	37.7971	-76.157
CHB_105	Central Chesapeake Bay- Strata 31	37.7416	-76.1241
CHB_106	Central Chesapeake Bay- Strata 32	37.8938	-76.2154
CHB_107	Central Chesapeake Bay- Strata 32	37.8067	-76.2701
CHB_108	Central Chesapeake Bay- Strata 32	37.7083	-76.2485
CHB_109	Central Chesapeake Bay- Strata 33	38.256	-76.1486
CHB_110A1	Central Chesapeake Bay- Strata 33	37.8983	-75.9701
CHB_111	Central Chesapeake Bay- Strata 33	37.8713	-75.9595
CHB_112	Central Chesapeake Bay- Strata 34	37.9423	-75.941
CHB_113	Central Chesapeake Bay- Strata 34	37.9051	-75.9356
CHB_114	Central Chesapeake Bay- Strata 34	37.8534	-75.9233
CHB_115	Central Chesapeake Bay- Strata 35	38.1677	-75.9605
CHB_116	Central Chesapeake Bay- Strata 35	38.0585	-75.9262
CHB_117	Central Chesapeake Bay- Strata 35	37.8486	-75.9025
CHB_118	Central Chesapeake Bay- Strata 36	38.3328	-75.9029
CHB_119A2	Central Chesapeake Bay- Strata 36	38.279	-75.9306

NST_Site	General Location	Lat_DD	Lon_DD
CHB_120	Central Chesapeake Bay- Strata 36	38.2733	-75.9259
CHB_121	Central Chesapeake Bay- Strata 37	38.2255	-75.8858
CHB_122	Central Chesapeake Bay- Strata 37	38.2228	-75.8402
CHB_123	Central Chesapeake Bay- Strata 37	38.2083	-75.8606
CHB_124	Central Chesapeake Bay- Strata 38	38.137	-75.8185
CHB_125	Central Chesapeake Bay- Strata 38	38.1288	-75.904
CHB_126	Central Chesapeake Bay- Strata 38	38.1176	-75.9291
CHB_127	Central Chesapeake Bay- Strata 39	38.0612	-75.8065
CHB_128	Central Chesapeake Bay- Strata 39	38.0426	-75.8484
CHB_129	Central Chesapeake Bay- Strata 39	38.0301	-75.8429
CHB_130	Central Chesapeake Bay- Strata 40	37.9507	-75.7206
CHB_131A1	Central Chesapeake Bay- Strata 40	37.9589	-75.7409
CHB_132	Central Chesapeake Bay- Strata 40	37.8425	-75.8106
CHB_133	Lower Chesapeake Bay- Strata 41	37.746	-75.939
CHB_134	Lower Chesapeake Bay- Strata 41	37.7426	-75.9879
CHB_135	Lower Chesapeake Bay- Strata 41	37.6943	-76.0317
CHB_136	Lower Chesapeake Bay- Strata 42	37.6649	-76.3268
CHB_137	Lower Chesapeake Bay- Strata 42	37.6099	-76.2158
CHB_138	Lower Chesapeake Bay- Strata 42	37.543	-76.3059
CHB_139	Lower Chesapeake Bay- Strata 42	37.3327	-76.2254
CHB_140	Lower Chesapeake Bay- Strata 43	37.7243	-75.9399
CHB_141	Lower Chesapeake Bay- Strata 43	37.6158	-76.1026
CHB_142	Lower Chesapeake Bay- Strata 43	37.5658	-76.1945
CHB_143	Lower Chesapeake Bay- Strata 43	37.4635	-76.1054
CHB_144	Lower Chesapeake Bay- Strata 43	37.2248	-76.0857
CHB_145A1	Lower Chesapeake Bay- Strata 44	37.7218	-75.7899
CHB_146	Lower Chesapeake Bay- Strata 44	37.6361	-75.9253
CHB_147	Lower Chesapeake Bay- Strata 44	37.4011	-76.0406
CHB_148	Lower Chesapeake Bay- Strata 44	37.2243	-76.0356
CHB_149	Lower Chesapeake Bay- Strata 45	37.17	-76.0131
CHB_150	Lower Chesapeake Bay- Strata 45	37.0838	-76.08
CHB_151	Lower Chesapeake Bay- Strata 45	37.0356	-75.9742
CHB_152	Lower Chesapeake Bay- Strata 46	37.2153	-76.2709
CHB_153	Lower Chesapeake Bay- Strata 46	37.0829	-76.1592
CHB_154	Lower Chesapeake Bay- Strata 46	36.9591	-76.0082
CHB_155A1	Lower Chesapeake Bay- Strata 47	37.1116	-76.2705
CHB_156	Lower Chesapeake Bay- Strata 47	36.9711	-76.0582
CHB_157	Lower Chesapeake Bay- Strata 47	37.02	-76.2588
CHB_158	Lower Chesapeake Bay- Strata 48	36.9781	-76.3734
CHB_159	Lower Chesapeake Bay- Strata 48	36.9785	-76.3868
CHB_160	Lower Chesapeake Bay- Strata 48	36.9611	-76.4029
CHB_161	Lower Chesapeake Bay- Strata 49	36.9986	-76.2522

NST_Site	General Location	Lat_DD	Lon_DD
CHB_162	Lower Chesapeake Bay- Strata 49	36.9814	-76.3132
CHB_163	Lower Chesapeake Bay- Strata 49	36.9567	-76.0986
CHB_164	Lower Chesapeake Bay- Strata 50	36.9336	-76.1913
CHB_166	Lower Chesapeake Bay- Strata 50	36.8612	-75.9994
CHB_167	Lower Chesapeake Bay- Strata 51	36.9318	-76.3624
CHB_168	Lower Chesapeake Bay- Strata 51	36.9242	-76.4372
CHB_169	Lower Chesapeake Bay- Strata 51	36.9049	-76.4197
CHB_170	Lower Chesapeake Bay- Strata 52	37.7412	-76.5176
CHB_171	Lower Chesapeake Bay- Strata 52	37.6298	-76.4555
CHB_172	Lower Chesapeake Bay- Strata 52	37.6043	-76.3679
CHB_173	Lower Chesapeake Bay- Strata 53	37.7919	-76.6463
CHB_174	Lower Chesapeake Bay- Strata 53	37.7098	-76.5602
CHB_175	Lower Chesapeake Bay- Strata 53	37.6672	-76.5545
CHB_176	Lower Chesapeake Bay- Strata 54	37.8927	-76.7804
CHB_177	Lower Chesapeake Bay- Strata 54	37.8731	-76.7701
CHB_178	Lower Chesapeake Bay- Strata 54	37.844	-76.752
CHB_179	Lower Chesapeake Bay- Strata 55	37.9163	-76.8345
CHB_180	Lower Chesapeake Bay- Strata 55	37.8394	-76.7548
CHB_181	Lower Chesapeake Bay- Strata 55	37.8	-76.713
CHB_182	Lower Chesapeake Bay- Strata 56	37.4103	-76.6741
CHB_183	Lower Chesapeake Bay- Strata 56	37.3369	-76.6057
CHB_184A2	Lower Chesapeake Bay- Strata 56	37.3084	-76.5656
CHB_185	Lower Chesapeake Bay- Strata 57	37.358	-76.6338
CHB_186	Lower Chesapeake Bay- Strata 57	37.302	-76.5768
CHB_187	Lower Chesapeake Bay- Strata 57	37.2619	-76.5349
CHB_188	Lower Chesapeake Bay- Strata 58	37.3411	-76.6375
CHB_189	Lower Chesapeake Bay- Strata 58	37.3067	-76.6113
CHB_190	Lower Chesapeake Bay- Strata 58	37.3022	-76.577
CHB_192A1	Lower Chesapeake Bay- Strata 59	37.0587	-76.5436
CHB_193A1	Lower Chesapeake Bay- Strata 59	37.052	-76.5115
CHB_194	Lower Chesapeake Bay- Strata 60	37.0891	-76.6457
CHB_195	Lower Chesapeake Bay- Strata 60	37.064	-76.6594
CHB_196	Lower Chesapeake Bay- Strata 60	37.0446	-76.6342
CHB_197	Lower Chesapeake Bay- Strata 61	37.0078	-76.5603
CHB_198	Lower Chesapeake Bay- Strata 61	36.9905	-76.5281
CHB_199	Lower Chesapeake Bay- Strata 61	36.9387	-76.4937
CHB_200	Lower Chesapeake Bay- Strata 62	36.9126	-76.34
CHB_201	Lower Chesapeake Bay- Strata 62	36.8975	-76.3383
CHB_202	Lower Chesapeake Bay- Strata 62	36.8592	-76.3223
CHB_203	Lower Chesapeake Bay- Strata 63	36.8382	-76.2384
CHB_204	Lower Chesapeake Bay- Strata 63	36.8359	-76.255
CHB_205	Lower Chesapeake Bay- Strata 63	36.8343	-76.2185

NST_Site	General Location	Lat_DD	Lon_DD
CHB_206	Lower Chesapeake Bay- Strata 64	36.8226	-76.2914
CHB_207	Lower Chesapeake Bay- Strata 64	36.7905	-76.3056
CHB_208	Lower Chesapeake Bay- Strata 64	36.7443	-76.2971

NST_Site	General Location	Lat_DD	Lon_DD
CHB_209	Lower Chesapeake Bay- Strata 65	37.385	-76.4005
CHB_210	Lower Chesapeake Bay- Strata 65	37.3184	-76.3604
CHB_211A1	Lower Chesapeake Bay- Strata 65	37.2921	-76.392

Please note as of 20 June 2012 that there is no current GIS coverage or positional information available describing the sampling strata. Only description and images of sampling strata were taken from the following report:

Hartwell, S.I. and J Hameedi. 2007 Magnitude and Extent of Contaminated Sediment and Toxicity in Chesapeake Bay. NOAA Technical Memorandum NOS NCCOS 47. 234 pp.

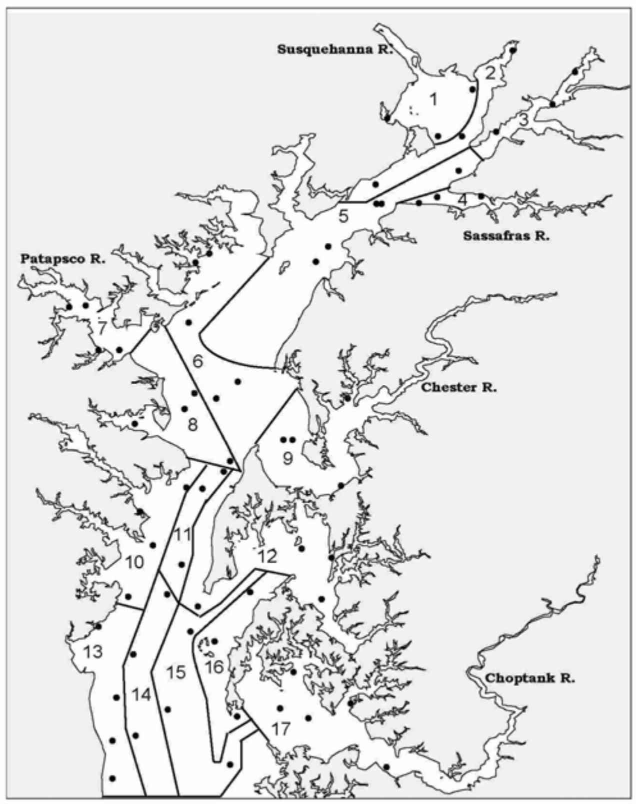

Figure 2. Map of upper Chesapeake Bay showing strata boundaries and sampling sites

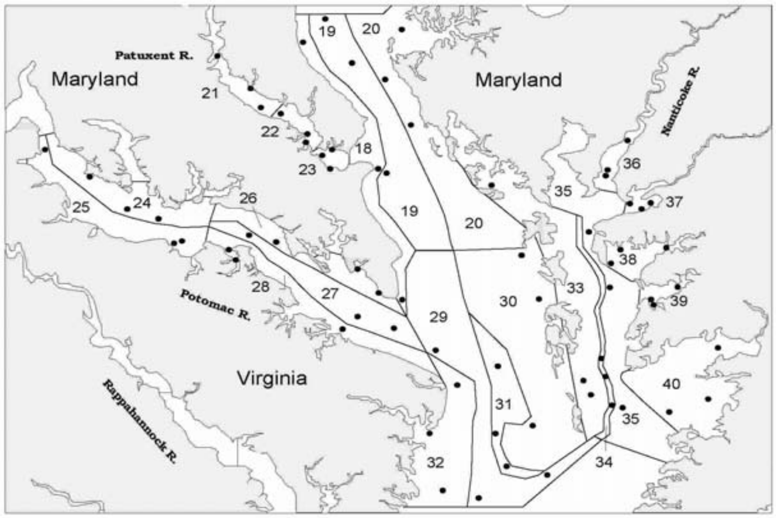

Figure 3. Map of central Chesapeake Bay showing strata boundaries and sample sites.

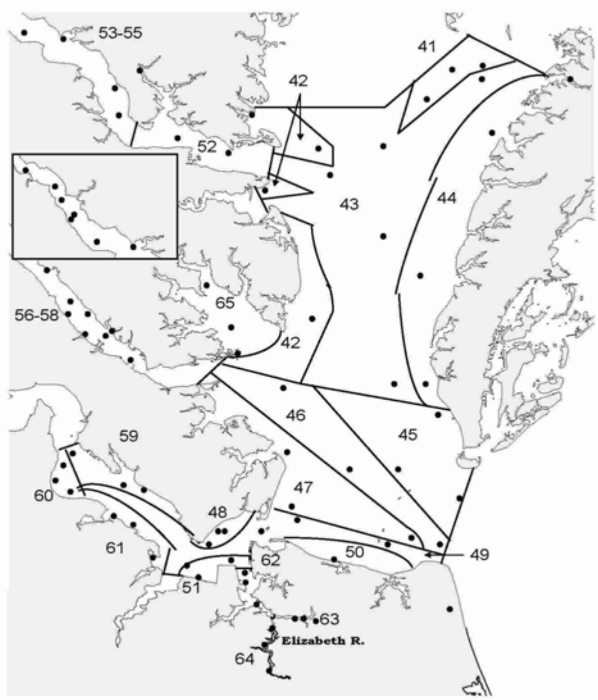

Figure 4. Map of lower Chesapeake Bay showing strata boundaries and sampling sites. Strata 53-55 were the south, channel, and north areas of the Rappahannock R respectively (inset). Strata 56-58 were the north, channel, and south areas of the York R. respectively.

METHODOLOGY DESCRIBING FIELD COLLECTION OF SAMPLES
Two sediment samples were taken at each site in addition to salinity, temperature, and oxygen readings at the surface and bottom of the water column. Samples were collected on board the NOAA ship FERREL or from her launch in shallow water. A total of 210 sites were sampled. Site #165 and all its alternates were inaccessible.

Toxicity and chemistry samples were collected with a Kynar-coated 0.1m2 Young-modified Van Veen grab sampler. Sampling gear was initially washed with soap, rinsed with deionized water, rinsed with acetone, followed by an acid wash with 10% hydrochloric acid and again rinsed with deionized water. At each site, the sampler was rinsed with acetone and deionized water immediately prior to sampling. Only the upper 2-3 cm of the sediment was used in order to assure collection of recently deposited materials. A sediment sample was discarded if the jaws of the grab were open, the sample was partly washed out, or if the sediment sample in the grab was less than 5 cm deep. Sediments were removed with a scoop made of high-impact styrene. Sediment was composited in an acetone rinsed, high-density polyethylene (HDPE) bucket.

For a collaborative effort with the EPA Chesapeake Bay Program, a replicate benthos sample was also taken. The entire contents of an acceptable sample (at least 5 cm deep) were sieved on site through 0.5mm mesh. All organisms were retained in 500/2500 ml plastic Nalgene bottles and preserved in diluted 10% neutral buffered formalin containing Rose Bengal. This sample was delivered to the Bay Program contract lab for analysis and application of the CBP benthic Index of Biotic Integrity (B_IBI), (Llanso, 2002). Included in the B_IBI analysis is a measure of biomass as ash-free dry weight, which requires destruction of the samples after species enumeration.

Between each deployment of the sampler, the bucket was covered with an HDPE lid to minimize sample oxidation and exposure to atmospheric contamination. Additional grab samples were taken and the top layer of sediment was collected and composited until sufficient volume (7-8 L) of sediment for all the toxicity bioassays and chemical analyses was collected. The material was thoroughly homogenized in the field with an acetone-rinsed, stainless steel mixer attachment on an electric drill. This composite sample was subdivided for distribution to various testing laboratories. Sampling procedures in the smaller launch were exactly the same except a smaller PONAR sampler (0.04 m2 surface area grab) was deployed by hand. All subsamples were either stored on ice or frozen, as appropriate, prior to shipment to laboratories ashore.

METHODOLOGY DESCRIBING CHAIN OF CUSTODY FOR BIOLOGICAL LAB SAMPLES

Details involving the chain of custody for biological, sediment and water quality samples are unavailable as of 06/20/2012.

BIOLOGICAL ENUMERATION TECHNIQUES
In the lab all samples were sieved through either a 0.5 mm screen using an elutriative process. Organisms were sorted from detritus under a dissecting microscope and identified to the lowest practical taxonomic level and counted. Oligochaetes and chironomids were mounted on slides and examined under a compound microscope for genus and species identification. Any taxa requiring slide mounting for identification are excluded from biomass measurements. Approximately 10 % of samples are reprocessed as a QA/QC check. Species identifications are verified by comparison to voucher specimens

#FORMULAS AND CALCULATIONS FOR BIOLOGICAL DATA
>Taxonomic Abundance and biomass Data
Multiplication of organism count per size class by gear conversion factor will give concentration of organisms per area value.

#INDEX OF BIOTIC INTEGRETY CALCULATIONS

All Chesapeake Bay Index of Biotic Integrity Data has been calculated using the protocol described in

Alden, R. W., III, D. M. Dauer, J. A. Ranasinghe, L. C. Scott, and R. J. Llansó. 2002. Statistical verification of the Chesapeake Bay Benthic Index of Biotic Integrity. Environmetrics, 13:473-498.

Further details can be found at http://www.esm.versar.com/Vcb/Benthos/docs/ChesBayBIBI.PDF

BIOLOGICAL VARIABLES QA/QC PLAN FOR PROJECT

All sorting and identifying operations were conducted, QA/QC checked in accordance with the Versar ESM Operations Benthic Laboratory Operations Manual. All variables were checked for accuracy and admissibility by computer program.

#BIOLOGOCAL VARIABLE NAMES, MEASUREMENT UNITS AND DESCRIPTIONS

>PARAMETER: AFDW (taxon ash free dry weight in grams)
-COLLECTION METHODS: Hydraulic Grab, Ponar Grab or Post Hole Digger, [starting in 1989 a WildCo Box Corer was also used for sampling] followed by field sieving through a 0.5 mm sieve. Organisms and detritus retained in sieve were transferred into labeled jars and preserved in 10% buffeted formalin with rose Bengal. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either a Ponar grab or a WildCo box corer.
-SAMPLE PRESERVATIVES: 10% buffered formalin with rose bengal transferred to
70% propanol
-SAMPLE STORAGE ENVIRONMENT: Plastic bottles
-TIME IN STORAGE: Until commencement of processing
-LABORATORY TECHNIQUES WITH REFERENCES: For data collected in 1984, actual biomass determinations were made by the groupings of mollusks, crustacean, worm and miscellaneous. Actual determination of ash free dry weight by group was done by drying samples at 60 degree. C to a constant weight, ashing in a muffle
furnace, and weighed.

Ash-free dry weight biomass is measured directly for each species (with the exceptions listed below) by drying the organisms to a constant weight at 60 C and ashing in a muffle furnace at 500 C for four hours and re-weighing (ash weight). The difference between dry weight and ash weight is the ash free weight. Because oligochaetes and chironomids require slide mounting for identification, species-specific biomass for Oligochaeta and Chironomidae is not provided except for Tubificoides spp., Branchiura sowerbyi, and Coelotanypus spp., which do not require slide mounting for identification. Bivalves
are crushed to open the shells and expose the animal to drying and ashing (shells included).

>DATA ENTRY METHOD: Direct planimeter to computer link
>DATA VERIFICATION: Checked by computer programs

>PARAMETER: COUNT (# of a benthic taxon per sample)
-COLLECTION METHODS: Hydraulic Grab, Ponar Grab or Post Hole Digger [starting in 1989 a WildCo Box Corer was also used for sampling] followed by field sieving through a 0.5mm sieve and preserved in the field. Organisms and detritus retained in sieve were transferred into labeled jars and preserved in 10% buffeted formalin with rose bengal. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.
-SAMPLE PRESERVATIVES: 10% buffered formalin with Rose Bengal transferred to 70% ethanol after sorting.
-SAMPLE STORAGE ENVIRONMENT: Plastic (Nalgene) Bottles
-TIME IN STORAGE: Until commencement of processing
-LAB TECHNIQUES WITH REFERENCES: Laboratory Technique: Most organisms are separated from the detritus in gridded Pettri dishes and sorted into major taxa using binocular dissecting microscopes. After

sorting, the organisms are stored in 70% ethanol and subsequently identified to the lowest possible taxonomic level (usually species) and counted. Fragments without heads are eliminated from the counts but included in biomass determinations. Oligochaetes and chironomids are mounted on microscope slides, examined under a compound microscope, and identified to genus and species following procedures based upon currently accepted practices in benthic ecology. If the number of oligochaetes or chironomids in a sample is between 20 and 300 individuals, the sample is split and approximately 50% of the specimens are mounted. The remaining portion is saved and used in biomass determinations. Evenly spreading the specimens in a gridded tray and selecting half of the total number of grids at random split the sample. If the number of individuals is greater than 300, grids are selected randomly until 150 specimens are mounted. Total taxonomic counts for each oligochaete and chironomid species are adjusted by the proportion of the total number of specimens mounted in the sample.

>DATA ENTRY METHOD: Double key punch to disk. Data is then entered to SAS data sets for management and storage.

>DATA VERIFICATION: Visually verified twice and then checked by computer programs.

SPECIES INHOUSE CODES AND SCIENTIFIC NAMES

Note inhouse species codes found in this data set are not the standard inhouse codes used by Versar Inc. These appear to be some variant on NOAA NODC CODES. Versar normally employed Maryland Power Plant species codes for taxonomic identification.

> IN HOUSE SPECIES LIST

The in-house species codes and Latin Names found in this data set are as follows:

SPEC_CODE	PI_LBL
648933000021	Chironomidae pupae
5001600101	Capitella capitata complex
61693799	Ameroculodes species complex
6489603618	Polypedilum halterale group
5009029899	Tubificidae imm. with capilliform chaetae
5009029999	Tubificidae imm. without capilliform chaetae
50012102	Microphthalmus spp.
50012501	Nephtys spp.
50012701	Glycera spp.
50014005	Orbinia spp.
50014016	Leitoscoloplos spp.
50014304	Polydora spp.
50014320	Scolelepis spp.
50014401	Magelona spp.
50014901	Chaetopterus spp.
50015804	Travisia spp.
50016003	Notomastus spp.
50016808	Polycirrus spp.
50090209	Tubificoides spp.
50090308	Nais spp.
51035001	Epitonium spp.
51050801	Nassarius spp.

SPEC_CODE	PI_LBL
51080101	Odostomia spp.
51080102	Turbonilla spp.
61690201	Ampelisca spp.
61691507	Unciola spp.
61692110	Melita spp.
61693303	Listriella spp.
61830602	Pagurus spp.
64181204	Oecetis spp.
64892501	Culicoides spp.
64893902	Coelotanypus spp.
64894502	Procladius spp.
64894601	Tanypus spp.
64896006	Chironomus spp.
64896008	Cryptochironomus spp.
64896013	Dicrotendipes spp.
64896020	Harnischia spp.
64896209	Rheotanytarsus spp.
64896213	Tanytarsus spp.
77000102	Phoronis spp.
0000000000	No Organisms Present
3740	Anthozoa
3759010101	Edwardsia elegans

SPEC_CODE	PI_LBL
3901	Turbellaria
3906030101	Stylochus ellipticus
43	Nemertina
500102	Polynoidae
5001021806	Lepidametria commensalis
5001080302	Bhawania heteroseta
5001100301	Pseudeurythoe paucibranchiata
500113	Phyllodocidae
5001130207	Eteone heteropoda
5001130211	Eteone foliosa
5001131410	Phyllodoce arenae
5001210701	Parahesione luteola
5001211502	Podarke obscura
5001211999	Podarkeopsis levifuscina
5001220102	Ancistrosyllis hartmanae
5001220201	Sigambra tentaculata
5001220401	Cabira incerta
500123	Syllidae
5001230701	Exogone dispar
5001231701	Parapionosyllis longicirrata
500124	Nereididae
5001240305	Neanthes arenaceodentata

SPEC_CODE	PI_LBL
5001240309	Neanthes succinea
5001240801	Laeonereis culveri
500125	Nephtyidae
5001250114	Nephtys bucera
5001250115	Nephtys incisa
5001250117	Nephtys picta
5001250303	Aglaophamus verrilli
5001270104	Glycera americana
5001270105	Glycera dibranchiata
5001270201	Hemipodus roseus
5001280104	Glycinde solitaria
5001290201	Diopatra cuprea
500140	Orbiniidae
5001400307	Scoloplos rubra
5001401699	Leitoscoloplos robustus
5001410302	Paraonis fulgens
500143	Spionidae
5001430448	Polydora cornuta
5001430506	Prionospio steenstrupi
5001430517	Prionospio perkinsi
5001430602	Marenzelleria viridis
5001431001	Spiophanes bombyx
5001431701	Paraprionospio pinnata
5001431801	Streblospio benedicti
5001432006	Scolelepis texana
5001433599	Apoprionospio pygmaea
5001490101	Chaetopterus variopedatus
5001490302	Spiochaetopterus costarum
500150	Cirratulidae
5001500399	Tharyx sp. A Morris
5001600201	Heteromastus filiformis
5001600399	Notomastus sp. A Ewing
5001600401	Mediomastus ambiseta
5001601399	Amastigos caperatus
500163	Maldanidae
5001630103	Sabaco elongatus
5001630202	Clymenella torquata
5001632101	Macroclymene zonalis
5001640102	Owenia fusiformis
5001660302	Pectinaria gouldii
5001670309	Hobsonia florida
5001670802	Asabellides oculata

SPEC_CODE	PI_LBL
5001682001	Loimia medusa
500170	Sabellidae
5001701502	Manayunkia aestuarina
5009020304	Branchiura sowerbyi
5009020501	Limnodrilus hoffmeisteri
5009020507	Limnodrilus claparedianus
5009020801	Aulodrilus pigueti
5009021305	Monopylephorus rubroniveus
51	Gastropoda
510313	Hydrobiidae
5103130501	Littoridinops tenuipes
5103500108	Epitonium rupicola
5103760204	Natica pusilla
510503	Columbellidae
5105080102	Nassarius vibex
5105080103	Nassarius trivittatus
5108010136	Odostomia engonia
5108010209	Turbonilla interrupta
5110010403	Rictaxis punctostriatus
5110040103	Acteocina canaliculata
5110120102	Haminoea solitaria
5127	Nudibranchia
55	Bivalvia
5502020204	Nucula proxima
5502040511	Yoldia limatula
550601	Arcidae
5507010101	Mytilus edulis
5515010102	Parvilucina crenella
5515250102	Spisula solidissima
5515250301	Mulinia lateralis
5515250401	Rangia cuneata
5515290301	Ensis directus
551531	Tellinidae
5515310116	Macoma balthica
5515310119	Macoma mitchelli
5515310205	Tellina agilis
5515330201	Tagelus plebeius
5515330202	Tagelus divisus
5515370201	Mytilopsis leucophaeata
5515450201	Corbicula fluminea
551546	Sphaeriidae
5515471301	Gemma gemma

SPEC_CODE	PI_LBL
5517010201	Mya arenaria
5520020107	Pandora gouldiana
5520050206	Lyonsia hyalina
60	Pycnogonida
6134020114	Balanus improvisus
615301	Mysidae
6153011508	Neomysis americana
6153019998	Americamysis almyra
6154040110	Leucon americanus
6154050801	Oxyurostylis smithi
6154080201	Almyracuma proximoculi
6154090202	Cyclaspis varians
6157150202	Leptochelia dubia
6157159999	Hargeria rapax
6160010201	Cyathura polita
6160010202	Cyathura burbancki
6160010301	Ptilanthura tenuis
6161020601	Ancinus depressus
6161020702	Sphaeroma quadridentatum
6162020215	Synidotea laticauda
6162020601	Erichsonella attenuata
6162020703	Edotea triloba
6162030101	Chiridotea almyra
6162030103	Chiridotea caeca
6169020108	Ampelisca abdita
6169020109	Ampelisca vadorum
6169020110	Ampelisca verrilli
6169060701	Leptocheirus plumulosus
6169100101	Batea catharinensis
616915	Corophiidae
6169150102	Cerapus tubularis
6169150703	Unciola irrorata
6169159798	Apocorophium lacustre
6169159998	Monocorophium acherusicum
6169210301	Elasmopus laevis
6169210705	Gammarus daiberi
6169211006	Melita nitida
6169220602	Acanthohaustorius millsi
6169220901	Lepidactylus dytiscus
6169330301	Listriella barnardi
6169330302	Listriella clymenellae
6169379899	Americhelidium americanum

SPEC_CODE	PI_LBL
6169421502	Rhepoxynius hudsoni
6171010727	Caprella penantis
6171010901	Paracaprella tenuis
6179150101	Ogyrides alphaerostris
6183120301	Euceramus praelongus
6184	Brachyura

SPEC_CODE	PI_LBL
6189020901	Rhithropanopeus harrisii
618906	Pinnotheridae
6489050209	Chaoborus punctipennis
8120	Ophiuroidea
8178010202	Leptosynapta tenuis
8201010302	Saccoglossus kowalevskii

SPEC_CODE	PI_LBL
8401	Ascidiacea
840603	Molgulidae
8406030108	Molgula manhattensis
8500010101	Branchiostoma caribaeum

METHODOLOGY DESCRIBING CHAIN OF CUSTODY FOR WATER QUALITY AND SAMPLES
Details involving the chain of custody for biological, sediment and water quality samples are unavailable as of 06/20/2012.

WATER QUALITY AND SEDIMENT ANALYSIS TECHNIQUES

>PARAMETER: TOTAL_DEPTH(Total Station Depth, Meters)
-COLLECTION METHODS: Ships fathometer
-SAMPLE PRESERVATIVES: None
-SAMPLE STORAGE ENVIRONMENT: None
-TIME IN STORAGE: None
-LAB TECHNIQUES WITH REFERENCES:
Lauenstein G. G. and A. Y. Cantillo. (1993) Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992 Volume II Comprehensive Descriptions of Complementary Measurements. Silver Spring, MD NOAA Technical Memorandum NOS ORCA 71 102 pp.

>PARAMETER: Latitude and Longitude (Degrees, decimal minutes and seconds)
-COLLECTION METHODS: Global Positioning System (GPS)
-SAMPLE PRESERVATIVES: None
-SAMPLE STORAGE ENVIRONMENT: None
-TIME IN STORAGE: None
-LAB TECHNIQUES WITH REFERENCES:
Station latitudes and longitudes are determined by GPS using WGS84 coordinates.

>PARAMETER: SAMPLE_DEPTH (Sampling Depth, Meters)
-COLLECTION METHODS: Assorted model YSI CTDS
SAMPLE PRESERVATIVES: N/A
-SAMPLE STORAGE ENVIRONMENT: N/A
-TIME IN STORAGE: N/A
-LAB TECHNIQUES WITH REFERENCES:
Lauenstein G. G. and A. Y. Cantillo. (1993) Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992 Volume II Comprehensive Descriptions of Complementary Measurements. Silver Spring, MD NOAA Technical Memorandum NOS ORCA 71 102 pp.

>PARAMETER: WTEMP (Water Temperature, Centigrade)
-COLLECTION METHODS: Thermistor attached to Assorted model YSI CTDS
-SAMPLE PRESERVATIVES: N/A
-SAMPLE STORAGE ENVIRONMENT: N/A
-TIME IN STORAGE: N/A
-LAB TECHNIQUES WITH REFERENCES:

Lauenstein G. G. and A. Y. Cantillo. (1993) Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992 Volume II Comprehensive Descriptions of Complementary Measurements. Silver Spring, MD NOAA Technical Memorandum NOS ORCA 71 102 pp.

>PARAMETER: SPCOND (Conductivity,umHo/cm)
-COLLECTION METHODS: Conductivity probes attached to Assorted model YSI CTDS
-SAMPLE PRESERVATIVES: N/A
-SAMPLE STORAGE ENVIRONMENT: N/A
-TIME IN STORAGE: N/A
-LAB TECHNIQUES WITH REFERENCES:
Lauenstein G. G. and A. Y. Cantillo. (1993) Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992 Volume II Comprehensive Descriptions of Complementary Measurements. Silver Spring, MD NOAA Technical Memorandum NOS ORCA 71 102 pp.

>PARAMETER: DO (Dissolved Oxygen, mg\l)
-COLLECTION METHODS: Oxygen probes attached to Assorted model YSI CTDS
-SAMPLE PRESERVATIVES: N/A
-SAMPLE STORAGE ENVIRONMENT: N/A
-TIME IN STORAGE: N/A
-LAB TECHNIQUES WITH REFERENCES:
Lauenstein G. G. and A. Y. Cantillo. (1993) Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992 Volume II Comprehensive Descriptions of Complementary Measurements. Silver Spring, MD NOAA Technical Memorandum NOS ORCA 71 102 pp.

>PARAMETER: SALINITY (Salinity, psu)
-COLLECTION METHODS: Values calculated from temperature and conductivity probes on assorted model YSI CTDS
-SAMPLE PRESERVATIVES: N/A
-SAMPLE STORAGE ENVIRONMENT: N/A
-TIME IN STORAGE: N/A
-LAB TECHNIQUES WITH REFERENCES: N/A
Lauenstein G. G. and A. Y. Cantillo. (1993) Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992 Volume II Comprehensive Descriptions of Complementary Measurements. Silver Spring, MD NOAA Technical Memorandum NOS ORCA 71 102 pp.

>PARAMETER:SAND (Sand Content, %), CLAY (Clay Content, %), Silt(Silt Content, %)
-COLLECTION METHODS:
Toxicity and chemistry samples were collected with a Kynar-coated 0.1m2 Young-modified Van Veen grab sampler. Sampling gear was initially washed with soap, rinsed with deionized water, rinsed with acetone, followed by an acid wash with 10% hydrochloric acid and again rinsed with deionized water. At each site, the sampler was rinsed with acetone and deionized water immediately prior to sampling. Only the upper 2-3 cm of the sediment was used in order to assure collection of recently deposited materials. A sediment sample was discarded if the jaws of the grab were open, the sample was partly washed out, or if the sediment sample in the grab was less than 5 cm deep. Sediments were removed with a scoop made of high-impact styrene. Sediment was composited in an acetone rinsed, high-density polyethylene (HDPE) bucket. Between each deployment of the sampler, the bucket was covered with an HDPE lid to minimize sample oxidation and exposure to atmospheric contamination. Additional grab samples were taken and the top layer of sediment was collected and composited until sufficient volume (7-8 L) of sediment for all the toxicity bioassays and chemical analyses was collected. The material was thoroughly homogenized in the field with

an acetone-rinsed, stainless steel mixer attachment on an electric drill. This composite sample was subdivided for distribution to various testing laboratories. Sampling procedures in the smaller launch were exactly the same except a smaller PONAR sampler (0.04 m2 surface area grab) was deployed by hand. All subsamples were either stored on ice or frozen, as appropriate, prior to shipment to laboratories ashore.
-SAMPLE PRESERVATIVES: None
-SAMPLE STORAGE ENVIRONMENT: Refrigerated until analysis
-TIME IN STORAGE: Holding Time Unknown
-LAB TECHNIQUES WITH REFERENCES: Particle size distribution is determined in marine sediments on the basis of the Wentworth scale method. The major size classes determined are: gravel (-2 phi to -5 phi), sand (+4 phi to -1 phi), silt (+5 phi to +7 phi), and clay (+8 phi and smaller). Determining particle size in sediments is important due to potential correlations with contaminant levels. Sediments are pre-treated with hydrogen peroxide to remove organic matter prior to particle size determination.

McDonald, S. J., D. S. Frank, J. A. Ramirez, B. Wang, and J. M. Brooks. 2006. Ancillary Methods of the National Status and Trends Program: 2000-2006 Update. Silver Springs, MD. NOAA Technical Memorandums NOS NCCOS 28. 17 pp.

>PARAMETER: TOC (Total organic carbon content in percent), TIC (Total Inorganic Carbon Content: CHN Analyzer, %)
-COLLECTION METHODS: Toxicity and chemistry samples were collected with a Kynar-coated 0.1m2 Young-modified Van Veen grab sampler. Sampling gear was initially washed with soap, rinsed with deionized water, rinsed with acetone, followed by an acid wash with 10% hydrochloric acid and again rinsed with deionized water. At each site, the sampler was rinsed with acetone and deionized water immediately prior to sampling. Only the upper 2-3 cm of the sediment was used in order to assure collection of recently deposited materials. A sediment sample was discarded if the jaws of the grab were open, the sample was partly washed out, or if the sediment sample in the grab was less than 5 cm deep. Sediments were removed with a scoop made of high-impact styrene. Sediment was composited in an acetone rinsed, high-density polyethylene (HDPE) bucket. Between each deployment of the sampler, the bucket was covered with an HDPE lid to minimize sample oxidation and exposure to atmospheric contamination. Additional grab samples were taken and the top layer of sediment was collected and composited until sufficient volume (7-8 L) of sediment for all the toxicity bioassays and chemical analyses was collected. The material was thoroughly homogenized in the field with an acetone-rinsed, stainless steel mixer attachment on an electric drill. This composite sample was subdivided for distribution to various testing laboratories. Sampling procedures in the smaller launch were exactly the same except a smaller PONAR sampler (0.04 m2 surface area grab) was deployed by hand. All subsamples were either stored on ice or frozen, as appropriate, prior to shipment to laboratories ashore.

-SAMPLE PRESERVATIVES: Frozen
-SAMPLE STORAGE ENVIRONMENT: Frozen until analysis
-TIME IN STORAGE: Holding time unknown.
-LAB TECHNIQUES WITH REFERENCES: Total carbon content is determined in dried sediments and total organic carbon is determined in dried and acidified sediments using a LECO CR-412 Carbon Analyzer. Sediment is combusted in an oxygen atmosphere and any carbon present is converted to CO_2. The sample gas flows into a non-dispersive infrared (NDIR) detection cell. The NDIR detection cells measures the mass of CO_2 present and the mass of the CO_2 is measured relative to a calibration curve. The mass is converted to percent carbon based on the dry sample weight. The total organic carbon content is subtracted from the total carbon content to determine the total inorganic carbon content of a given sample.

McDonald, S. J., D. S. Frank, J. A. Ramirez, B. Wang, and J. M. Brooks. 2006. Ancillary Methods of the National Status and Trends Program: 2000-2006 Update. Silver Springs, MD. NOAA Technical Memorandums NOS NCCOS 28. 17 pp.

VARIABLES NAMES AND DESCRIPTIONS FOR DATA FILES
Structures for data files on http://www.chesapeakebay.net
> BENTHIC SURVEY EVENT DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Text	8	Sampling Date (MM/DD/YYYY)
LATITUDE	Number	8.5	Latitude (Decimal Degrees- NAD83)
LONGITUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
R_DATE	Text	8	Data Version Date (MM/DD/YYYY)
SITETYPE	Text	4	Sampling Site Type
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_TIME	Text	5	Sample Collection Time (HHMM)

> BENTHIC WATER QUALITY SURVEYS

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	2	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Text	8	Sampling Date (MM/DD/YYYY)
SAMPLE_DEPTH	Number	8.1	Sampling Depth
SAMPLE_NUMBER	Number	8.0	Sample Number
REPORTED_PARAMETER	Text	15	Sampling Parameter
REPORTED_VALUE	Number	8.4	Sampling Parameter Value
REPORTED_UNITS	Text	15	Reporting Units of Value
WQ_METHOD	Text	8	Chesapeake Bay Program Parameter Analysis Code
R_DATE	Text	8	Data Version Date (MM/DD/YYYY)

>BENTHIC SEDIMENT SURVEY DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	2	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Text	8	Sampling Date (MM/DD/YYYY)
TOTAL_DEPTH	Number	8.1	Total Station Depth
SAMPLE_NUMBER	Number	8.0	Sample Number
REPORTED_PARAMETER	Text	15	Sampling Parameter
REPORTED_VALUE	Number	8.4	Sampling Parameter Value
REPORTED_UNITS	Text	15	Reporting Units of Value
R_DATE	Text	8	Data Version Date (MM/DD/YYYY)

> BENTHIC SURVEY BIOTA EVENT DATA

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
LATITUDE	Number	8.5	Latitude (Decimal Degrees-NAD83)
LONGITUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
PENETR	Number	8.4	Sampling Gear Penetration Depth (cm)
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)
SAMPLE_NUMBER	Number	8.0	Sample Number
SITE_TYPE	Text	10	Sampling Site Type
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)

>BENTHIC TAXONOMIC SURVEY DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	7	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_NUMBER	Number	8.0	Sample Number
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
CONVFACT	Number	8.2	Conversion Factor (# Individual/Sample to # Individuals/Meter Squared)
NET_MESH	Number	8.2	Screen Mesh Width (Millimeters)
TSN	Text	7	ITIS Taxon Serial Number
LIFE_STAGE	Text	45	Species Life Stage
LATIN_NAME	Text	45	Species Latin Name
REPORTING_VALUE			
	Number	12	Total Count of Given Taxa in Sample
REPORTING_UNITS	Text	15	Reporting Units of Value
NODCCODE	Text	12	National Oceanographic Data Center Species Code
SPEC_CODE	Text	14	Agency Species Code
SER_NUM	Text	12	Sample Serial Number
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)

>BENTHIC BIOMASS SURVEY DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	7	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_NUMBER	Number	8.0	Sample Number
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
CONVFACT	Number	8.2	Conversion Factor (# Individual/Sample to # Individuals/Meter Squared)
NET_MESH	Number	8.2	Screen Mesh Width (Millimeter)
TSN	Text	7	ITIS Taxon Serial Number
LIFESTAGE	Text	45	Organisms Life Stage
LATIN_NAME	Text	45	Species Latin Name
VALUE_TYPE	Text	10	Actual or Estimated Parameter Value
REPORTING_VALUE	Number	8.4	Taxon Biomass
REPORTING_UNITS	Text	15	Sampling Parameter Reporting Units
NODCCODE	Text	12	National Oceanographic Data Center Species Code
SPEC_CODE	Text	14	Agency Species Code
SER_NUM	Text	12	Agency Sample Serial Number
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)

>BENTHIC INDEX OF BIOTIC INTEGRITY DATA

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
LATITUDE	Number	8.5	Latitude (Decimal Degrees-NAD83)
LONGITUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)
SITE_TYPE	Text	10	Sampling Site Type
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)
IBI_PARAMETER	Text	15	IBI Parameter
IBI_VALUE	Number	8.4	Parameter Value
IBI_SCORE	Number	8.0	Value Reporting Units

> The following fields may also appear in a downloaded data set:

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

#VARIABLE NAMES AND DESCRIPTIONS FOR SPECIES KEY
These tables cross references Versar species codes and spellings with current Integrated Taxonomic Information System (ITIS) and National Oceanographic Data Center taxonomic codes and spellings. Web address: http://www.chesapeakebay.net/

Name	Type	Width	Description
SPECCODE	Text	14	Data provider Species Code
SOURCE_LBL	Text	45	Source Species Latin Name
LBL	Text	45	ITIS Latin Name
NODC_LBL	Text	45	National Oceanographic Data Center Latin Name
NODCCODE	Text	12	National Oceanographic Data Center Species Code
TSN	Text	7	ITIS Taxon Serial Number
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)

REFERENCE CODES IN DATA FILES AND TAXONOMIC KEY
See The 2000 Guide to Biological and Living Resources Data for full listing.

> DATA_TYPE: Data Type

BE	Benthic
FL	Fluorescence
MI	Microzooplankton
MZ	Mesozooplankton
PD	Primary Production
PH	Phytoplankton
PP	Picoplankton

>A/EAFDW: Actual or Estimated Ash Free Dry Weight
A or ACTUAL - Actual Determination of Ash Free Dry Weight
E or ESTIMATE - Estimated Ash Free Dry Weight

>SOURCE : Data Collection Agency
VERSAR- Versar Incorporated

>COLTYPE: Collection Type
D or DISCRETE - Discrete Sample
C or COMPOSITE- Composite Sample

>BASIN - Sampling Station Tributary or Mainstem Designation

TRIB_COD	BASIN
BAY	CHESAPEAKE BAY
CHS	CHESTER RIVER
CHP	CHOPTANK RIVER
ELZ	ELIZABETH RIVER
JAM	JAMES RIVER
PAT	PATAPSCO RIVER
PAX	PATUXNET RIVER
POT	POTOMAC RIVER
RAP	RAPPAHANOCK RIVER
YRK	YORK RIVER

>GMETHOD- Sampling Gear Codes
16-Post-Hole Digger (250 square centimeters)
20-Wildco Box Core Grab(220 square centimeters)
96-Hydrolic Van Veen Grab(1000 square centimeters)
97-Young Modified Van Veen Grab (440 square centimeters)
98-Petite Ponar Grab (250 square centimeters)

>TSN: Interagency Taxonomic Identification System, Taxon Serial Numbers Note for current listing of Chesapeake Bay Program Species and their codes . Organisms without current serial numbers have ALL been assigned TSN of BAYXXXX.

>LIFE STAGE
Life stages are any addional descriptors of a species in addition to
The scientific name see IN HOUSE SPECIES LIST for details

>LATIN_NAME
See for IN HOUSE SPECIES LIST for details

>NODCCODE: National Oceanographic Data Center Species Code
NOTE: For current listing of Chesapeake Bay species and their codes,
see 1998 Chesapeake Bay Basin Species List.

>STATION- Station Names-Please See Station Names and
Positions for details on name designation.

>SKIP- THE SKIP VARIABLE OF THE BENTHIC TAXONOMIC AND ABUNDANCE DATA RECORD: In counting the number of taxa present in a sample, general taxonomic designations at the generic, familial, and higher taxonomic levels are dropped if there is one valid lower level designation for that group. For example, if both *Leitoscoloplos* sp. And *Leitoscoloplos fragilis* have been identified in one sample, *Leitoscoloplos* sp. is skipped when counting the number of taxa. Skip codes are used to track these general taxonomic designations.

>SITETYPE- Sampling Station Site Type
F or FIXED - Fixed Sampling Site
R or RANDOM- Randomly Selected Site within a habitat area

>TSN: Interagency Taxonomic Identification System taxon serial numbers
NOTE: For current listing of Chesapeake Bay species and their codes,
see the 2007 Bay Basin Species List for details.

>PARAMETERS-

PARAMETER	DESCRIPTION
CLAY	CLAY CONTENT,PERCENT
DO	DISSOLVED OXYGEN
PENETR	GEAR PENETRATION DEPTH
SALINITY	SALINITY
SAND	SAND CONTENT, PERCENT
SILT	SILT CONTENT, PERCENT
SPCOND	SPECIFIC CONDUCTIVITY
SECCHI	SECCHI DEPTH

PARAMETER	DESCRIPTION
TIC	CARBONTATE CONTENT
TOC	TOTAL ORGAINIC CARBON
WTEMP	WATER TEMPERATURE, CENTEGRAGE

> HUC8: USGS Hydrologic Unit Codes

HUC8	CATALOGING_UNIT_DESCRIPTION
02050306	LOWER SUSQUEHANNA
02060001	UPPER CHESAPEAKE BAY
02060002	CHESTER-SASSAFRAS
02060003	GUNPOWDER-PATAPSCO
02060004	SEVERN
02060005	CHOPTANK
02060006	PATUXENT
02060007	BLACKWATER-WICOMICO
02060008	NANTICOKE
02060009	POCOMOKE
02070010	MIDDLE POTOMAC-ANACOSTIA-OCCOQUAN
02070011	LOWER POTOMAC

>FIPS: Federal Information Processing Codes

FIPS	NAME
24003	ANNE ARUNDEL
24005	BALTIMORE
24009	CALVERT
24011	CAROLINE
24015	CECIL
24017	CHARLES
24019	DORCHESTER
24025	HARFORD
24029	KENT
24033	PRINCE GEORGES
24035	QUEEN ANNES

FIPS	NAME
24037	SAINT MARYS
24039	SOMERSET
24041	TALBOT
24045	WICOMICO
24510	BALTIMORE CITY
51001	ACCOMACK
51059	FAIRFAX
51099	KING GEORGE
51153	PRINCE WILLIAM
51179	STAFFORD
51193	WESTMORELAND

> CBSEG_2003: Chesapeake Bay Program Monitoring Segment

CBSEG_2003	DESCRIPTION
BACOH	BACK RIVER-OLIGOHALINE REGION
BIGMH	BIG ANNEMESSEX RIVER-MESOHALINE REGION
BOHOH	BOHEMIA RIVER-OLIGOHALINE REGION
BSHOH	BUSH RIVER-OLIGOHALINE REGION
CB1TF	CHESAPEAKE BAY-TIDAL FRESH REGION
CB2OH	CHESAPEAKE BAY-OLIGOHALINE REGION
CB3MH	CHESAPEAKE BAY-MESOHALINE REGION
CB4MH	CHESAPEAKE BAY-MESOHALINE REGION
CB5MH	CHESAPEAKE BAY-MESOHALINE REGION
CHOMH1	CHOPTANK RIVER-MESOHALINE REGION 1
CHOMH2	CHOPTANK RIVER-MESOHALINE REGION 2
CHOOH	CHOPTANK RIVER-OLIGOHALINE REGION

CBSEG_2003	DESCRIPTION
CHOTF	CHOPTANK RIVER-TIDAL FRESH REGION
CHSMH	CHESTER RIVER-MESOHALINE REGION
CHSOH	CHESTER RIVER-OLIGOHALINE REGION
CHSTF	CHESTER RIVER-TIDAL FRESH REGION
EASMH	EASTERN BAY-MESOHALINE REGION
ELKOH	ELK RIVER-OLIGOHALINE REGION
FSBMH	FISHING BAY-MESOHALINE REGION
GUNOH	GUNPOWDER RIVER-OLIGOHALINE REGION
HNGMH	HONGA RIVER-MESOHALINE REGION
LCHMH	LITTLE CHOPTANK RIVER-MESOHALINE REGION
MAGMH	MAGOTHY RIVER-MESOHALINE REGION
MANMH	MANOKIN RIVER-MESOHALINE REGION
MATTF	MATTAWOMAN CREEK-TIDAL FRESH REGION
MIDOH	MIDDLE RIVER-OLIGOHALINE REGION
NANMH	NANTICOKE RIVER-MESOHALINE REGION
NANOH	NANTICOKE RIVER-OLIGOHALINE REGION
NORTF	NORTHEAST RIVER-TIDAL FRESH REGION
PATMH	PATAPSCO RIVER-MESOHALINE REGION
PAXMH	PATUXENT RIVER-MESOHALINE REGION
PAXOH	PATUXENT RIVER-OLIGOHALINE REGION
PAXTF	PATUXENT RIVER-TIDAL FRESH REGION
POCMH	POCOMOKE RIVER-MESOHALINE REGION
POCOH	POCOMOKE RIVER-OLIGOHALINE REGION
POTMH	POTOMAC RIVER-MESOHALINE REGION
POTOH	POTOMAC RIVER-OLIGOHALINE REGION
POTTF	POTOMAC RIVER-TIDAL FRESH REGION
RHDMH	RHODE RIVER-MESOHALINE REGION
SASOH	SASSAFRAS RIVER-OLIGOHALINE REGION
SEVMH	SEVERN RIVER-MESOHALINE REGION
SOUMH	SOUTH RIVER-MESOHALINE REGION
TANMH	TANGIER SOUND-MESOHALINE REGION
WICMH	WICOMICO RIVER-MESOHALINE REGION
WSTMH	WEST RIVER-MESOHALINE REGION

>PROGRAM- Chesapeake Bay Program Monitoring Program Designation

PROGRAM	DESCRIPTION
EPA\NCAS	EPA EMAP NATIONAL COASTAL ASSESSMENT PROGRAM
HISTORIC	PRE-CHESAPEAKE BAY MONITORING PROGRAM
WQMP	CHESAPEAKE BAY MAINSTEM AND TIDAL TRIBUTARY WATER QUALITY MONITORING PROGRAM

> PROJECT - Chesapeake Bay Program Monitoring Project Designation

PROJECT	DESCRIPTION
MAIN/TRIB	LONG-TERM BENTHIC MONITORING PROGRAM
VA/CBAY	VIRGINIA COASTAL BAY MONITORING
VA/HIST	VIRGINIA HISTORIC DATA RECOVERY

>PARAMETER and UNIT: Measured Parameter and reporting units.

PARAMETER	UNITS
AFDW_TAX	GRAMS/SAMPLE
CLAY	PERCENT
COUNT	NUMBER/SAMPLE

DO	MG/L
KURTOSIS	FOLK METHOD
MEANDIAM	PHI
MEDDIAM	PHI
SALINITY	PPT
SAND	PERCENT
SILT	PERCENT
SILTCLAY	PERCENT
SKEWNESS	FOLK METHOD
SORT	FOLK METHOD
VOLORG	PERCENT
WTEMP	DEG C

>IBI_PARAMETER	DESCRIPTION
GRAND_SCORE	FIXED STATION REPLICATE AVERAGED TOTAL IBI SCORE
PCT_BIO_DP05	PERCENT TOTAL BIOMASS FOUNDGREATER THAN 5 CM BELOW SEDIMENT WATER INTERFACE
PCT_CARN_OMN	PERCENT CARNIVORES AND OMNIVORES
PCT_DEPO	PERCENT DEEP DEPOSIT FEEDERS
PCT_PI_ABUND	PERCENT POLLUTION INDICATIVE SPECIES ABUNDANCE
PCT_PI_BIO	PERCENT POLLUTION INDICATIVE SPECIES BIOMASS
PCT_PI_F_ABUND	PERCENT POLLUTION INDICATIVE SPECIES ABUNDANCE-FRESH WATER
PCT_PI_F_BIO	PERCENT POLLUTION INDICATIVE SPECIES BIOMASS-FRESH WATER
PCT_PI_O_ABUND	PERCENT POLLUTION INDICATIVE SPECIES ABUNDANCE-OLIGOHALINE WATER
PCT_PI_O_BIO	PERCENT POLLUTION INDICATIVE SPECIES BIOMASS- OLIGOHALINE WATER
PCT_PS_ABUND	PERCENT POLLUTION SENSITIVE SPECIES ABUNDANCE
PCT_PS_BIO	PERCENT POLLUTION SENSITIVE SPECIES BIOMASS
PCT_PS_O_ABUND	PERCENT POLLUTION SENSITIVE SPECIES ABUNDANCE- OLIGOHALINE WATER
PCT_PS_O_BIO	PERCENT POLLUTION SENSITIVE SPECIES BIOMASS- OLIGOHALINE WATER
PCT_TANYPODINI	PERCENT TANYPODINAE TO CHIRONOMIDAE
SW	SHANNON-WEINER SPECIES DIVERSITY INDEX
TOLARANCE	POLLUTION TOLARACE INDEX
TOT_ABUND	TOTAL SPECIES ABUNDANCE (NUMBER PER METER SQUARED)
TOT_BIOMASS	TOTAL SPECIES BIOMASS IN (GRAMS PER METER SQUARED)
TOT_TXA_DP05	SPECIES ABUNDANCE FOUND GREATER THAN 5 CM BELOW SEDIMENT WATER INTERFACE
TOTAL_SCORE	TOTAL BENTHIC IBI SCORE FOR SINGLE SAMPLE

NUMERIC WARNING AND ERROR BOUNDS

Variable	Valid Ranges
AFDW	0- 999.9999
TIC	0 - 100 PERCENT
TOC	0 - 100 PERCENT
COUNT	0-99999999
SPCOND	0 - 50000 uVHOS
DO	0- 15.0 PPT
PENETR	0-30.0
SALINITY	0 - 32.0 PPT
SAMPLE_DEPTH	1-100 METERS
SAMPLE_NUMBER	1-25
SAMPLE_TIME	0000-2400 missing time denoted as 00:00
SAND	0-100 PERCENT
SILT	0-100 PERCENT
CLAY	0-100 PERCENT
TOTAL_DEPTH	0.1-100 METERS
WTEMP	0- 35 DEGREES CELSIUS

#IMPORTANT DATA REVISIONS

THE LIVING RESOURCES DATA MANAGER RECOMMENDS THAT ALL DATA ANALYSIS BE ERFORMED WITH THE MOST RECENT DATA SETS VERSIONS AVAILABLE. HOWEVER IF YOU HAVE BEEN WORKING WITH OLDER DATA SETS THE FOLLOWING ARE IMPORTANT CHANGES TO BE AWARE OF.

06/20/2012- LBL all Latin Names and spelling for names have been corrected InteragencyTaxonomic Identification System accepted spelling.

06/20/2012- NODCCODES all Species have been given their assigned National Oceanographic Data Center Version 8.0 Species Codes where possible. This Hiracrchial Code provides taxonomic information about a given species. If A code number is not available, a partial code based on available taxonomic Information ending with alphabetic characters has been provided.

06/20/2012- TSN all Species have been given their assigned InteragencyTaxonomic Identification System taxon serial number. The taxon serial number is a permanent number assigned to a species and does not change with changes in taxonomic classification. Species without assigned coded have been assigned temporary BAYXXXX serial numbers. Permanent ITIS serial numbers have been applied for.

06/20/2012- Samples analyzed for biological content and found to contain no organisms are recorded in the data base with an empty count record and a TSN of BAY0229.

06/20/2012- The time of sampling was not recorded in this data set. All sample times set to 00:00:00

6/20/2012-There is additional toxicity data associated with the benthic sampling events in this study. That data is available from the NOAA NCCOS NS&T Data portal at
http://egisws02.nos.noaa.gov/nsandt/index.html#

#KEY WORDS (EXCLUDING VARIABLE NAMES)

Benthic Taxon Counts
Benthic Organism densities
Benthic Biomass
Benthic Organism Biomass
Benthic sediments
Sediment characterization
Water Quality Measurement
Hydrographic Profiles
Benthic Sampling Event
Benthic Monitoring Surveys

THIS IS THE END OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
COASTAL OCEAN ASSESSMENTS, STATUS, AND TRENDS
BIOEFFECTS ASSESSMENT PROGRAM
CHESAPEAKE BAY – SPECIAL BENTHIC SURVEY
DATA DICTIONARY
