

# Data Documentation

## Dataset Information

### Dataset Title:

NCCOS Long-term Monitoring: Regional Ecological Assessments and National Benthic Inventory

### Description:

The NCCOS Regional Ecological Assessments (REA) and NOAA National Benthic Inventory (NBI) include observations of water quality, sediment quality, fish and shellfish tissue chemical contaminants, and benthic infaunal abundance obtained from studies conducted since 1991 by NOAA and partnering institutions in estuarine and coastal-ocean areas of the United States. Measured parameters include: location and date of the sampling event, measures of water quality (*e.g.*, temperature, salinity, dissolved oxygen, nutrients), sediment quality (*e.g.*, grain size, total organic carbon, chemical contaminant concentrations, toxicity), fish and shellfish tissue chemical contaminants (*e.g.*, concentrations of metals, PAHs, PCBs, PBDEs, organic pesticides), and infaunal assemblages (*e.g.*, taxon, abundance).

### Purpose:

NCCOS works in partnership with state, academic, and other federal agencies in performing a broad range of research and monitoring activities to assess the status and potential effects of human activities on the health of coastal ecosystems and to promote the use of this information in protecting and restoring the Nation's coastal resources. NCCOS has conducted a series of ecological assessments aimed at evaluating condition of living resources and ecosystem stressors in estuarine and coastal areas. Information from these studies provides a means to assess the current status of ecological condition and stressor impacts throughout these areas, and serves as a baseline for evaluating future changes due to natural or human-induced disturbances.

The NCCOS Regional Ecological Assessments (REA) website provides access to data generated from these studies, including measures of water quality, sediment quality, and fish and shellfish tissue chemical contaminants. Access to data on benthic infauna is provided through the NOAA National Benthic Inventory (NBI), which consists of a dynamic quantitative database on benthic species abundances, by taxon and location, obtained from studies conducted by NOAA and partnering institutions in estuarine and other coastal-ocean areas of the U.S. The NBI is also a data source for the Ocean Biogeographic Information System (OBIS), a gateway to global ocean biodiversity and biogeographic data and information.

NCCOS has conducted these ecological assessments in estuaries and coastal-ocean waters around the country, including National Estuarine Research Reserves (NERRS), National Marine Sanctuaries (NMS), and continental shelf regions in the northeast, Mid-Atlantic Bight, South-Atlantic Bight, Florida Shelf, and Gulf of Mexico. Partners include the U.S. Environmental Protection Agency (EPA), NOAA NERRS (North Carolina, Sapelo Island, Guana-Tolomato-Matanzas), NOAA NMS (Stellwagen Bank, Gray's Reef, Florida Keys), South Carolina Estuarine and Coastal Assessment Program (SCECAP), and the University of North Carolina.

## Methods:

Measures of water quality were obtained using a data sonde (Seabird CTD or YSI multiparameter sonde). Water samples for analysis of nutrients and chlorophyll were collected either by hand at the surface or at various depths using Niskin bottles. Samples of fish or shellfish for analysis of chemical contaminants in edible tissues were collected either by hand, by diver, or hook-and-line fishing. Sediments for analysis of grain size, chemical contaminants, toxicity, and enumeration of benthic infauna were collected using either a Young-modified Van Veen grab sampler (0.04 m<sup>2</sup>), a large Van Veen grab sampler (0.1 m<sup>2</sup>), a box corer (0.09 m<sup>2</sup>), a cylindrical, hand-operated push corer for diver-collected samples (0.0071 m<sup>2</sup>), or a vacuum suction sampler apparatus on Johnson Sea Link submersible (0.03 m<sup>2</sup>). Sediments collected for identification and enumeration of benthic infauna were prepared by gently washing the material through a 0.5-mm mesh sieve and rinsing the material retained on the sieve into a labeled container, followed by preservation with 10% buffered formalin and seawater mixed with rose bengal dye. In the laboratory, organisms were separated from the remaining debris, identified to the lowest practical taxonomic level (usually to species), and enumerated. Taxonomic identifications (i.e., scientific name) were carried out by the respective benthic contract lab; corresponding taxonomic serial number (TSN) from the Integrated Taxonomic Information System (ITIS) and AphiaID from the World Register of Marine Species (WoRMS) were assigned later by NCCOS staff.

Specific methods for analysis of infauna, water-column nutrients, sediment grain size and TOC, chemical contaminants, and toxicity can be found in Balthis *et al.* (2002, 2007, 2009, 2011, 2012, 2013, 2015a, 2015b, 2017a, 2017b, 2018), Cooksey *et al.* (2004, 2008, 2010, 2012, 2014, 2016), Fulton *et al.* (2007), and Hyland *et al.* (1998, 1999, 2000, 2003, 2004, 2006).

## People & Projects

### Principal Investigator:

- Len Balthis, [len.balthis@noaa.gov](mailto:len.balthis@noaa.gov), US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

### Additional Principal Investigators:

- NCCOS: Mike Fulton, [mike.fulton@noaa.gov](mailto:mike.fulton@noaa.gov), (retired); B. William Gottholm, [b.william.gottholm@noaa.gov](mailto:b.william.gottholm@noaa.gov); Jawed Hameedi, [jawed.hameedi@noaa.gov](mailto:jawed.hameedi@noaa.gov); Michelle Harmon, [michelle.harmon@noaa.gov](mailto:michelle.harmon@noaa.gov); Ian Hartwell, [ian.hartwell@noaa.gov](mailto:ian.hartwell@noaa.gov); Jeff Hyland, [jeff.l.hyland@noaa.gov](mailto:jeff.l.hyland@noaa.gov), (retired); W. Edward Johnson, [ed.johnson@noaa.gov](mailto:ed.johnson@noaa.gov); Kimani Kimbrough, [kimani.kimbrough@noaa.gov](mailto:kimani.kimbrough@noaa.gov); Gunnar Lauenstein, [gunnar.lauenstein@noaa.gov](mailto:gunnar.lauenstein@noaa.gov); Edward R. Long, [ed.long@noaa.gov](mailto:ed.long@noaa.gov), (retired); Geoff Scott, [geoff.scott@noaa.gov](mailto:geoff.scott@noaa.gov), (retired); Ed Wirth, [ed.wirth@noaa.gov](mailto:ed.wirth@noaa.gov); Cindy Cooksey, [cynthia.cooksey@noaa.gov](mailto:cynthia.cooksey@noaa.gov)
- South Carolina Department of Natural Resources, Marine Resources Research Institute: Fred Holland, [hollandf@dnr.sc.gov](mailto:hollandf@dnr.sc.gov), (retired); Denise Sanger, [sangerd@dnr.sc.gov](mailto:sangerd@dnr.sc.gov); Bob VanDolah, [vandolah@dnr.sc.gov](mailto:vandolah@dnr.sc.gov), (retired)
- University of North Carolina - Charlotte: Amy Ringwood, [ahringwo@uncc.edu](mailto:ahringwo@uncc.edu)

### Primary Point of Contact:

- Len Balthis, [len.balthis@noaa.gov](mailto:len.balthis@noaa.gov), NCCOS
- NCCOS Data Manager, [nccos.data@noaa.gov](mailto:nccos.data@noaa.gov), NCCOS

*Data Documentation*  
*NCCOS Regional Ecological Assessments and National Benthic Inventory*

**Dataset Authors:**

- Balthis, Len; Hyland, Jeff; Cooksey, Cindy; Fulton, Mike; Wirth, Ed; Hartwell, Ian; Johnson, Ed; Kimbrough, Kimani; Harmon, Michelle; Hameedi, Jawed; Gottholm, Bernie; Lauenstein, Gunnar; Long, Ed

**Collaborators:**

- South Carolina Department of Natural Resources: Charles Keppler
- US DOC; NOAA; Office of Marine and Aviation Operations (OMAO): Greg McFall
- US DOC; NOAA; NESDIS; National Centers for Environmental Information (NCEI): Scott Cross
- US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS): Katy Chung, James Daugomaugh, JD Dubick, Pete Key, Laura Kracker, Paul Pennington, Emily Pisarski, Lou Anne Reed, Brian Shaddrix, Joe Wade, Laura Webster, Blaine West, Dave Whittall

**Partners:**

- US DOC; NOAA; NOS; ONMS; Gray's Reef National Marine Sanctuary (GRNMS); Florida Keys National Marine Sanctuary (FKNMS); Stellwagen Bank National Marine Sanctuary (SBNMS)
- US DOC; NOAA; NOS; OCM; North Carolina National Estuarine Research Reserve (NCNERR); Sapelo Island National Estuarine Research Reserve (SINERR); Guana-Tolomato-Matanzas National Estuarine Research Reserve (GTMNERR)
- US Environmental Protection Agency (EPA)
- University of North Carolina; University of Maryland, Chesapeake Biological Laboratory; Texas A&M University, Geochemical and Environmental Research Group
- Barry A. Vittor and Associates, Inc., Mobile, AL; Alpha Scientific, Inc., Bedminster, NJ; Versar, Inc., Springfield, VA; Cove Corporation, Lusby, MD; Aquatic Research and Consulting, Duxbury, MA; Normandeau Associates, Inc., Bedford, NH; B&B Laboratories, College Station, TX; GPL Laboratories, Frederick, MD

**Funding:**

- US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)
- US EPA; ORD; Environmental Monitoring and Assessment Program

**Associated Online Resources:**

- NCCOS Regional Ecological Assessments, <https://products.coastalscience.noaa.gov/rea/>
- NOAA National Benthic Inventory, <https://products.coastalscience.noaa.gov/NBI/>
- NCCOS Project #139, "Coastal Ecological Assessments and Indicator Development," <https://coastalscience.noaa.gov/project/coastal-ecological-assessments-indicator-development/>
- National Centers for Coastal Ocean Science. 2019. NCCOS Long-term Monitoring Project: Regional Ecological Assessments and National Benthic Inventory. <https://inport.nmfs.noaa.gov/inport/item/57167>
- World Register of Marine Species (WoRMS), <http://www.marinespecies.org/>
- Integrated Taxonomic Information System (ITIS), <https://www.itis.gov/>

**Extents**

Northern Boundary: 49.0  
Southern Boundary: 23.1  
Western Boundary: -178.4  
Eastern Boundary: -68.6

*Data Documentation*  
*NCCOS Regional Ecological Assessments and National Benthic Inventory*

Start Date: 1991-03-18  
End Date: 2015-06-11

**Keywords**

**Sea Areas, Water Bodies, Marine Protected Areas:**

- Gray's Reef National Marine Sanctuary (GRNMS); Florida Keys National Marine Sanctuary (FKNMS); Stellwagen Bank National Marine Sanctuary (SBNMS)
- North Carolina National Estuarine Research Reserve (NCNERR); Sapelo Island National Estuarine Research Reserve (SINERR); Guana-Tolomato-Matanzas National Estuarine Research Reserve (GTMNERR)
- Ashtabula River; Biscayne Bay; Chesapeake Bay; Delaware Bay; Dry Tortugas; Florida Bay; Florida Keys; Galveston Bay; Great Lakes; Gulf of Mexico; Hudson River; Manatee Bay; Massachusetts Bay; Milwaukee Estuary; Neuse River; Northwest Hawaiian Islands; Puget Sound; Raritan Bay; Rookery Bay; Sabine Lake; San Francisco Bay; St. Johns River; St. Lucie River
- Gulf of Mexico Coastal Shelf Waters; Southeastern U.S. Estuaries; U.S. Atlantic Near-Coastal Shelf Waters

**NCCOS Keywords:**

- NCCOS Research Priority > Marine Spatial Ecology; Stressor Impacts and Mitigation; Coastal Change: Vulnerability, Mitigation, and Restoration
- NCCOS Research Topic > Ecological and Biogeographic Assessments; Biological Effects of Contaminants and Nutrients; Climate Impacts on Ecosystems
- NCCOS Research Location > Region > Atlantic Ocean; Great Lakes; Gulf of Mexico
- NCCOS Research Data Type > Field Observation; Long-term Monitoring

**GCMD Keywords:**

- Earth Science > Biological Classification > Animals/Invertebrates
- Earth Science > Biosphere > Ecological Dynamics > Community Dynamics > Community Structure
- Earth Science > Biosphere > Ecological Dynamics > Ecosystem Functions
- Earth Science > Biosphere > Ecological Dynamics > Ecotoxicology > Toxicity Levels
- Earth Science > Biosphere > Ecosystems > Marine Ecosystems > Benthic; Coastal; Estuary
- Earth Science > Oceans > Marine Sediments > Sediment Chemistry
- Earth Science > Oceans > Ocean Chemistry
- Earth Science > Oceans > Water Quality > Ocean Contaminants
- Continent > North America > United States Of America > Alabama; California; Delaware; Florida; Georgia; Great Lakes; Hawaii; Louisiana; Maryland; Massachusetts; Mississippi; New Jersey; New York; North Carolina; Ohio; Rhode Island; South Carolina; Texas; Virginia; Washington; Wisconsin
- Ocean > Atlantic Ocean > North Atlantic Ocean
- Ocean > Atlantic Ocean > North Atlantic Ocean > Gulf Of Mexico
- Ocean > Pacific Ocean > Central Pacific Ocean; Eastern Pacific Ocean
- In Situ/Laboratory Instruments > Profilers/Sounders > CTD > Conductivity, Temperature, Depth
- In Situ/Laboratory Instruments > Samplers > Bottles/Flasks/Jars > NISKIN BOTTLES
- In Situ/Laboratory Instruments > Samplers > Grabbers/Traps/Collectors > GRAB SAMPLERS
- In Situ/Laboratory Instruments > Corers > BOX CORE; SEDIMENT CORERS

**NOAA Ships, Other Ships, Platforms:**

- NOAA Ship Nancy Foster; NOAA Ship Pisces; R/V Joe Ferguson (GRNMS)

## File Information

Total File Size: 48 files in 4 folders, 156 MB (unzipped), 9.93 MB (zipped)

Data File Format(s): Tab-delimited text (.TXT)

Data File Compression: no compression

### Data Files:

- NCCOS-REA-NBI\_Data\_Infauna.TXT
- NCCOS-REA-NBI\_Data\_Sediment.TXT
- NCCOS-REA-NBI\_Data\_Tissue.TXT
- NCCOS-REA-NBI\_Data\_Water.TXT

### Documentation Files:

- NCCOS-REA-NBI\_BrowseGraphic.JPG
- NCCOS-REA-NBI\_PreviewGraphic\_Infauna\_barplot\_taxa\_fknms.JPG
- NCCOS-REA-NBI\_PreviewGraphic\_Sediment\_photo\_grab\_gtmnerr.JPG
- NCCOS-REA-NBI\_PreviewGraphic\_Tissue\_barplot\_organics\_fknms.JPG
- NCCOS-REA-NBI\_PreviewGraphic\_Water\_boxw\_oceano\_fknms.JPG
- NCCOS-REA-NBI\_DataDocumentation.PDF
- NCCOS-REA-NBI\_DataDictionary\_Infauna.TXT
- NCCOS-REA-NBI\_DataDictionary\_Sediment.TXT
- NCCOS-REA-NBI\_DataDictionary\_Tissue.TXT
- NCCOS-REA-NBI\_DataDictionary\_Water.TXT
- NCCOS-REA-NBI\_Taxa.TXT
- NCCOS-REA-NBI\_VoucherCollection.TXT
- Metadata (29 .XML files for individual datasets)

## Parameter Information

### Major parameters:

- BENTHIC SPECIES; WATER QUALITY; SEDIMENT QUALITY; TISSUE CHEMISTRY

### Parameter Descriptions:

*Parameter:* BENTHIC SPECIES

*Properties:* measured; count; in situ; visual observation

*Sampling and Analyzing Method:*

Sediment samples were collected using either a Young-modified Van Veen grab sampler (0.04 m<sup>2</sup>), a large Van Veen grab sampler (0.1 m<sup>2</sup>), a box corer (0.09 m<sup>2</sup>), a cylindrical, hand-operated push corer for diver-collected samples (0.0071 m<sup>2</sup>), or a vacuum suction sampler apparatus on Johnson Sea Link submersible (0.03 m<sup>2</sup>). Sediments collected for identification and enumeration of benthic infauna were prepared by gently washing the material through a 0.5-mm mesh sieve and rinsing the material retained on the sieve into a labeled container, fixed in 10% buffered formalin with rose bengal (to facilitate subsequent sorting), and transferred to the laboratory for further processing. Once in the laboratory, samples were transferred from formalin to 70% alcohol. Organisms were separated from sample debris under a dissecting microscope, identified to the lowest practical taxonomic level (usually species), and enumerated.

*Data Quality Method:*

A variety of QA/QC procedures were implemented during the processing of benthic infauna samples to ensure consistent production of high quality data. A minimum of 10% of all benthic infauna samples sorted by each technician were re-sorted by a different technician to monitor performance and provide feedback necessary to maintain acceptable standards. The minimum acceptable sorting efficiency was 90%. Approximately 10% of the samples were randomly selected and re-checked by an independent qualified taxonomist. The minimum acceptable taxonomic efficiency was 90%.

*Parameter:* WATER QUALITY

*Properties:* measured; varies; in situ; varies

*Sampling and Analyzing Method:*

Measures of water quality (temperature, salinity, depth, pH, dissolved oxygen) were obtained using a data sonde (Seabird CTD or YSI multiparameter sonde). Water samples were collected either by hand at the surface or at various depths using Niskin bottles. Samples for analysis of nutrients, chlorophyll, and TSS were analyzed following standard methods (U.S. EPA 1997; U.S. EPA 1995).

*Data Quality Method:*

Samples for analysis of nutrients, chlorophyll, and TSS were analyzed following standard methods (U.S. EPA 1997; U.S. EPA 1995).

*Parameter:* SEDIMENT QUALITY

*Properties:* measured; varies; in situ; varies

*Sampling and Analyzing Method:*

Sediment samples were collected using either a Young-modified Van Veen grab sampler (0.04 m<sup>2</sup>), a large Van Veen grab sampler (0.1 m<sup>2</sup>), a box corer (0.09 m<sup>2</sup>), a cylindrical, hand-operated push corer for diver-collected samples (0.0071 m<sup>2</sup>), or a vacuum suction sampler apparatus on Johnson Sea Link submersible (0.03 m<sup>2</sup>). Measures of sediment quality (grain size, total organic carbon, chemical contaminant concentrations, toxicity) were obtained following standard methods. Samples for grain size analysis were prepared by sieve separation followed by timed pipette extractions as described in Plumb (1981). TOC analysis followed USEPA Method 9060 (U.S. EPA 1992). Analysis of arsenic (As), chromium (Cr), iron (Fe), and antimony (Sb) was performed using either instrumental neutron activation analysis (INAA) or inductively-coupled mass spectrometry (ICP-MS). Analysis of aluminum (Al), manganese (Mn), and zinc (Zn) was carried out using either flame atomic absorption spectroscopy (FAA) or ICP-MS. Analysis of cadmium (Cd), copper (Cu), nickel (Ni), lead (Pb), selenium (Se), silver (Ag), and tin (Sn) was performed using either graphite furnace atomic absorption (GFAA) or ICP-MS. Mercury (Hg) was analyzed using either cold vapor atomic absorption (CVAA) or on a direct mercury analyzer (DMA). Other metals not listed above were analyzed using ICP-MS. Organic contaminants (polycyclic aromatic hydrocarbons, PAHs; polychlorinated biphenyls, PCBs; polybrominated diphenyl ethers, PBDEs; chlorinated pesticides) were analyzed using either gas chromatography - mass spectrometry (GC-MS) or gas chromatography with electron capture detection (GC-ECD). Sediment toxicity was assessed using one or several toxicity assays. Amphipod assays (*Ampelisca abdita*, *Ampelisca verrilli*, *Leptocheirus plumulosus*) are acute toxicity tests which measure the effect of sediment exposure on amphipod survival under static conditions. Procedures

followed the general guidelines provided in ASTM Protocol E1367-92 (ASTM 1993) and EMAP-E Laboratory Methods Manual (U.S. EPA 1995). The Microtox® solid-phase test with the photoluminescent bacterium *Vibrio fischeri* (also called *Allivibrio fischeri*) provides a sublethal measure of toxicity based on attenuation of light production by the bacterial cells due to exposure to the sediment sample (Bulich 1979, Ross *et al.* 1991, Microbics 1992 a and b). A 7-d sublethal test of the effects of sediment exposure on growth of juvenile *Mercenaria mercenaria* ("seed clams"), was developed by Ringwood *et al.* (1996) and Ringwood and Kepler (1998). A similar assay using juvenile clams used survival (rather than growth) as the endpoint (Fulton *et al.* 2007).

*Data Quality Method:*

A performance-based approach was employed, utilizing the following standard practices: 1) continuous laboratory evaluation through the use of Certified Reference Materials (CRMs), Laboratory Control Materials (LCMs), or Standard Reference Material (SRM); 2) laboratory spiked sample matrices; 3) laboratory reagent blanks; 4) calibration standards; 5) analytical surrogates; and 6) laboratory and field replicates.

*Parameter:* TISSUE CHEMISTRY  
*Properties:* measured; varies; in situ; varies

*Sampling and Analyzing Method:*

Samples of fish or shellfish for analysis of chemical contaminants in edible tissues were collected either by hand, by diver, or hook-and-line fishing. Concentrations of chemical contaminants were measured following standard methods. Analysis of arsenic (As), chromium (Cr), iron (Fe), and antimony (Sb) was performed using either instrumental neutron activation analysis (INAA) or inductively-coupled mass spectrometry (ICP-MS). Analysis of aluminum (Al), manganese (Mn), and zinc (Zn) was carried out using either flame atomic absorption spectroscopy (FAA) or ICP-MS. Analysis of cadmium (Cd), copper (Cu), nickel (Ni), lead (Pb), selenium (Se), silver (Ag), and tin (Sn) was performed using either graphite furnace atomic absorption (GFAA) or ICP-MS. Mercury (Hg) was analyzed using either cold vapor atomic absorption (CVAA) or on a direct mercury analyzer (DMA). Other metals not listed above were analyzed using ICP-MS. Organic contaminants (polycyclic aromatic hydrocarbons, PAHs; polychlorinated biphenyls, PCBs; polybrominated diphenyl ethers, PBDEs; chlorinated pesticides) were analyzed using either gas chromatography - mass spectrometry (GC-MS) or gas chromatography with electron capture detection (GC-ECD).

*Data Quality Method:*

A performance-based approach was employed, utilizing the following standard practices: 1) continuous laboratory evaluation through the use of Certified Reference Materials (CRMs), Laboratory Control Materials (LCMs), or Standard Reference Material (SRM); 2) laboratory spiked sample matrices; 3) laboratory reagent blanks; 4) calibration standards; 5) analytical surrogates; and 6) laboratory and field replicates.

**Cited Publications:**

- American Society for Testing and Materials [ASTM]. 1993. Guide for conducting 10-day static sediment toxicity tests with marine and estuarine amphipods. ASTM Standard Method E-1367-92, ASTM, Philadelphia, PA. 24 p.
- Balthis, W.L., C. Cooksey, M.H. Fulton, J.L. Hyland, L.A. May, E.F. Wirth, and C.M. Woodley. 2018. Assessment of Ecological Condition and Potential Stressor Impacts in Offshore Areas of Florida

- Keys National Marine Sanctuary. NOAA Technical Memorandum NOS NCCOS 254. Charleston, SC. 80 pp. <https://doi.org/10.25923/vtsz-v706>
- Balthis, W.L., C. Cooksey, J.L. Hyland, M.H. Fulton, and E. Wirth. 2017a. Integrated Assessment of Ecosystem Condition and Stressor Impacts in Submerged Habitats of the Guana Tolomato Matanzas (GTM) National Estuarine Research Reserve (NERR). NOAA Technical Memorandum NOS NCCOS 231. Charleston, SC. 52 pp. <http://doi.org/10.7289/V5/TM-NOS-NCCOS-231>
  - Balthis, W.L., J.L. Hyland, C. Cooksey, P.A. Montagna, J.G. Baguley, R.W. Ricker, and C. Lewis. 2017b. Sediment quality benchmarks for assessing oil-related impacts to the deep-sea benthos. *Integrated Environmental Assessment and Management*, 13(5):840-851. <https://doi.org/10.1002/ieam.1898>
  - Balthis, W.L., C. Cooksey, M.H. Fulton, J.L. Hyland, G.H.M. Riekerk, R.F. Van Dolah, and E.F. Wirth. 2015a. An integrated assessment of habitat quality of national estuarine research reserves in the southeastern United States. *Integrated Environmental Assessment and Management*, 11(2):266-275. <https://doi.org/10.1002/ieam.1601>
  - Balthis, W.L., J.L. Hyland, C. Cooksey, M.H. Fulton, and E.F. Wirth. 2015b. Long-term monitoring of ecological conditions in Gray's Reef National Marine Sanctuary: soft-bottom benthic assemblages and contaminant levels in sediments and biota (2000, 2005, and 2012/13). NOAA Technical Memorandum NOS NCCOS 206. Charleston, SC. 35 pp. <http://doi.org/10.7289/V5/TM-NOS-NCCOS-206>
  - Balthis, W.L., J.L. Hyland, C. Cooksey, M.H. Fulton, and E.F. Wirth. 2013. Ecological condition of coastal ocean waters of the western Gulf of Mexico: 2011. NOAA Technical Memorandum NOS NCCOS 171. Charleston, SC. 63 pp. <https://repository.library.noaa.gov/view/noaa/2709>
  - Balthis, L., J. Hyland, C. Cooksey, E. Wirth, M. Fulton, J. Moore, and D. Hurley. 2012. Support for Integrated Ecosystem Assessments of NOAA's National Estuarine Research Reserve System (NERRS): Assessment of Ecological Condition and Stressor Impacts in Subtidal Waters of the Sapelo Island National Estuarine Research Reserve. NOAA Technical Memorandum NOS NCCOS 150. Charleston, SC. 79 pp. <https://repository.library.noaa.gov/view/noaa/2614>
  - Balthis, W.L., J.L. Hyland, C. Cooksey, M.H. Fulton, E.F. Wirth, D. Cobb, and D.N. Wiley. 2011. Ecological condition of coastal ocean waters within Stellwagen Bank National Marine Sanctuary: 2008. NOAA Technical Memorandum NOS NCCOS 129. Charleston, SC. 59 pp. <https://repository.library.noaa.gov/view/noaa/2563>
  - Balthis, W.L., J.L. Hyland, M.H. Fulton, E.F. Wirth, J.A. Kiddon, and J. Macauley. 2009. Ecological condition of coastal ocean waters along the U.S. Mid-Atlantic Bight: 2006. NOAA Technical Memorandum NOS NCCOS 109 and EPA 600/R-09/159. Charleston, SC. 63 pp. <https://repository.library.noaa.gov/view/noaa/9296>
  - Balthis, W.L., J.L. Hyland, C. Cooksey, M.H. Fulton, and G. McFall. 2007. Long-term monitoring of ecological conditions in Gray's Reef National Marine Sanctuary: Comparison of soft-bottom benthic assemblages and contaminant levels in sediments and biota in spring 2000 and 2005. NOAA Technical Memorandum NOS NCCOS 68. Charleston, SC. 29 pp. <https://repository.library.noaa.gov/view/noaa/9288>
  - Balthis, W.L., J.L. Hyland, G.I. Scott, M.H. Fulton, D.W. Bearden, and M.D. Greene. 2002. Sediment quality of the Neuse River estuary, North Carolina: an integrated assessment of sediment contamination, toxicity, and condition of benthic fauna. *Journal of Aquatic Ecosystem Stress and Recovery*, 9:213-225. <https://doi.org/10.1023/A:1021234816293>
  - Bulich, A.A. 1979. Use of luminescent bacteria for determining toxicity in aquatic environments. In: L. L. Marking and R. A. Kimerle (eds.), *Aquatic Toxicology*, pp. 98-106. ASTM STP 667.



American Society for Testing and Materials, Philadelphia, PA.

<https://doi.org/10.1520/STP34880S>

- Cooksey, C.L. 2016. Assessment of ecological condition and stressor impacts within Great Lakes rivers and harbors: Milwaukee estuary, Wisconsin. NOAA Technical Memorandum NOS NCCOS 222. Charleston, SC. 64 pp. <https://repository.library.noaa.gov/view/noaa/12903>
- Cooksey, C., J. Hyland, M.H. Fulton., L. Balthis, E. Wirth, and T. Wade. 2014. Ecological condition of coastal ocean waters along the U.S. continental shelf of northeastern Gulf of Mexico: 2010. NOAA Technical Memorandum NOS NCCOS 188. Charleston, SC. 68 pp. <https://repository.library.noaa.gov/view/noaa/2723>
- Cooksey, C., J. Hyland, M.H. Fulton., E. Wirth, and L. Balthis. 2012. Ecological condition of coastal ocean waters of the U.S. continental shelf off south Florida: 2007. NOAA Technical Memorandum NOS NCCOS 159. Charleston, SC. 68 pp. <https://repository.library.noaa.gov/view/noaa/2715>
- Cooksey, C., J. Harvey, L. Harwell, J. Hyland, and J.K. Summers. 2010. Ecological condition of coastal ocean and estuarine waters of the U.S. South Atlantic Bight: 2000-2004. NOAA Technical Memorandum NOS NCCOS 114 and EPA 600/R-10/046. Charleston, SC. 88 pp. <https://repository.library.noaa.gov/view/noaa/9295>
- Cooksey, C., J. Hyland, E. Wirth, W.L. Balthis, M. Fulton, D. Whitall, and S. White. 2008. Support for Integrated Ecosystem Assessments of NOAA's National Estuarine Research Reserves System (NERRS), Volume II: Assessment of Ecological Condition and Stressor Impacts in Subtidal Waters of the North Carolina NERRS. NOAA Technical Memorandum NOS NCCOS 83. Charleston, SC. 65 pp. <https://repository.library.noaa.gov/view/noaa/17787>
- Cooksey, C., J. Hyland, W.L. Balthis, M. Fulton, G. Scott, and D. Bearden. 2004. Soft-Bottom Benthic Assemblages and Levels of Contaminants in Sediments and Biota at Gray's Reef National Marine Sanctuary and Nearby Shelf Waters off the Coast of Georgia (2000 and 2001). NOAA Technical Memorandum NOS NCCOS 6. Charleston, SC. 55 pp. <https://repository.library.noaa.gov/view/noaa/17764>
- Fulton, M.H., J.L. Hyland, P.B. Key, E.F. Wirth, L. Balthis, C. Cooksey, K. Chung, and A.K. Leight. 2007. Characterization of Toxic Impacts on Living Marine Resources in Tidal Rivers of the Chesapeake Bay. NOAA Technical Memorandum NOS NCCOS 64. Charleston, SC. 80 pp. <https://repository.library.noaa.gov/view/noaa/17778>
- Hyland, J., C. Cooksey, W.L. Balthis, M. Fulton, D. Bearden, G. McFall, M. Kendall. 2006. The soft-bottom macrobenthos of Gray's Reef National Marine Sanctuary and nearby shelf waters off the coast of Georgia, USA. *Journal of Experimental Marine Biology and Ecology*, 330(1):307-326. <https://doi.org/10.1016/j.jembe.2005.12.036>
- Hyland, J.L., W.L. Balthis, M. Posey, C.T. Hackney, T. Alphin. 2004. The soft-bottom macrobenthos of North Carolina estuaries. *Estuaries*, 27(3):501-514. <https://doi.org/10.1007/BF02803541>
- Hyland, J.L., W.L. Balthis, V.D. Engle, E.R. Long, J.F. Paul, J.K. Summers, R.F. Van Dolah. 2003. Incidence of stress in benthic communities along the U.S. Atlantic and Gulf of Mexico coasts within different ranges of sediment contamination from chemical mixtures. *Environmental Monitoring and Assessment*, 81(1-3):149-161. <https://doi.org/10.1023/A:1021325007660>
- Hyland, J.L., W.L. Balthis, C.T. Hackney, and M. Posey. 2000. Sediment quality of North Carolina estuaries: An integrative assessment of sediment contamination, toxicity, and condition of benthic fauna. *Journal of Aquatic Ecosystem Stress and Recovery*, 8:107-124. <https://doi.org/10.1023/A:1011464609142>

*Data Documentation*  
*NCCOS Regional Ecological Assessments and National Benthic Inventory*

- Hyland, J.L., R.F. Van Dolah, and T.R. Snoots. 1999. Predicting stress in benthic communities of southeastern U.S. estuaries in relation to chemical contamination of sediments. *Environmental Toxicology and Chemistry*, 18(11):2557-2564. <https://doi.org/10.1002/etc.5620181124>
- Hyland, J.L., L. Balthis, C.T. Hackney, G. McRae, A.H. Ringwood, T.R. Snoots, R.F. Van Dolah, and T.L. Wade. 1998. Environmental quality of estuaries of the Carolinian Province: 1995. NOAA Technical Memorandum NOS ORCA 123. Silver Spring, MD. 143 pp.
- Microbics Corporation. 1992a. Microtox Manual (5 volume set). Carlsbad, CA.
- Microbics Corporation. 1992b. Microtox Update Manual, 128 p. Carlsbad, CA.
- Plumb, R. H. 1981. Procedure for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee on Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experiment Station, Vicksburg, MS. Technical Report EPA/CE-81-1. 501 pp. <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockkey=91018G3V.txt>
- Ringwood, A.H., A.F. Holland, R. Kneib, and P. Ross. 1996. EMAP/NS&T pilot studies in the Carolinian Province: Indicator testing and evaluation in southeastern estuaries. Final Report under Grant NA90AAD-SG790 through S.C. Sea Grant College Program. S.C. Dept. of Natural Resources, Marine Resources Research Institute, Charleston, S.C. NOAA Technical Memorandum NOS ORCA 102. 113 p.
- Ringwood, A.H., and C.J. Keppler. 1998. Seed clam growth: an alternative sediment bioassay developed during emap in the carolinian province. *Environmental Monitoring and Assessment* , 51:247. <https://doi.org/10.1023/A:1005995521173>
- Ross, P.E., L.C. Burnett, C. Kermode, and M. Timme. 1991. Miniaturizing a toxicity test battery for screening contaminated sediments. *Can. Tec. Rep. Fish. Aquat. Sci.*, 1774:331-335.
- U.S. EPA. 1992. Test Methods for Evaluating Solid Waste, SW-846, 3rd ed. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.
- U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual - Estuaries, Volume 1: Biological and Physical Analyses. United States Environmental Protection Agency, Office of Research and Development, Narragansett, RI. EPA/620/R-95/008. 128 pp. <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockkey=P1002QX4.txt>
- U.S. EPA. 1997. Methods for the Determination of Chemical Substances in Marine and Estuarine Environmental Matrices - 2nd Edition. U.S. Environmental Protection Agency, Office of Research and Development, National Research Laboratory, Cincinnati, Ohio. EPA/600/R-97/072. 199 pp. <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockkey=30003K0S.txt>
- Van Dolah, R.F., J.L. Hyland, A.F. Holland, J.S. Rosen, and T.R. Snoots. 1999. A benthic index of biological integrity for assessing habitat quality in estuaries of the southeastern U.S.A. *Marine Environmental Research*, 48:269-283. [https://doi.org/10.1016/S0141-1136\(99\)00056-2](https://doi.org/10.1016/S0141-1136(99)00056-2)

## Document Information

Date: 2019-09-18

Resource Provider: NCCOS Data Manager, [nccos.data@noaa.gov](mailto:nccos.data@noaa.gov), US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

Comment: This data documentation describes data files archived as a NOAA NCEI data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.

Use Limitation: NOAA makes no warranty, expressed or implied, regarding these data, nor does the fact of distribution constitute such a warranty. NOAA cannot assume liability for any damages caused by any errors or omissions in these data.

## Appendix: List of Parameters by Data Type

Water Quality and Nutrients			
ParameterClass	ParameterCode	ParameterDescription	Units
Water Physical	conductivity	Specific Conductance	mS/cm
Water Physical	density	Density	kg/m3
Water Physical	doMgl	Dissolved oxygen (mg/L)	mg/L
Water Physical	fluorescence	Fluorescence	mg/m3 or ug/L
Water Physical	measurementDepth	Depth at which CTD/DS3 reading taken	m
Water Physical	pctDO	Percent dissolved oxygen	%
Water Physical	pH	pH (pH units)	unitless
Water Physical	profileNTU	Turbidity	ntu
Water Physical	salinity	Salinity	ppt or psu
Water Physical	sigmaT	Sigma-t density	kg/m3
Water Physical	temperature	Temperature	C
Water Physical	turbidity	Turbidity	FTU
Water Nutrients	chlorophyllaActiveugL	Chlorophyll a (active)	ug/L
Water Nutrients	chlorophyllaTotalugL	Chlorophyll a (total)	ug/L
Water Nutrients	chlorophyllaugL	Chlorophyll a	ug/L
Water Nutrients	dissAmmoniaNugL	Dissolved ammonia nitrogen	ug/L
Water Nutrients	dissAmmoniaNuM	Dissolved ammonia nitrogen	uM
Water Nutrients	dissNitrateNitriteNugL	Dissolved Nitrate+Nitrite	ug/L
Water Nutrients	dissNitrateNitriteNuM	Dissolved Nitrate+Nitrite	uM
Water Nutrients	dissNitrateNugL	Dissolved Nitrate	ug/L
Water Nutrients	dissNitrateNuM	Dissolved Nitrate	uM
Water Nutrients	dissNitriteNugL	Dissolved Nitrite	ug/L
Water Nutrients	dissNitriteNuM	Dissolved Nitrite	uM
Water Nutrients	dissOrthophosphatePugL	Dissolved Orthophosphate	ug/L
Water Nutrients	dissOrthophosphatePuM	Dissolved Orthophosphate	uM
Water Nutrients	dissSilicaSlugL	Dissolved Silica	ug/L
Water Nutrients	dissSilicaSluM	Dissolved Silica	uM
Water Nutrients	DOC	Dissolved organic carbon	mg/L
Water Nutrients	PC	Particulate carbon	mg/L

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Water Quality and Nutrients			
ParameterClass	ParameterCode	ParameterDescription	Units
Water Nutrients	phaeophytinugL	Phaeophytin	ug/L
Water Nutrients	PN	Particulate nitrogen	mg/L
Water Nutrients	SCL_VolumeFiltered	Surface water sample volume filtered for chlorophyll	ml
Water Nutrients	SSS_VolumeFiltered	Surface water sample volume filtered for TSS	ml
Water Nutrients	Surface_FilterNumber	Surface water sample filter number	unitless
Water Nutrients	Surface_Turbidity	Surface water sample turbidity	ntu
Water Nutrients	totalDissolvedNitrogenNugL	Total Dissolved Nitrogen	ug/L
Water Nutrients	totalDissolvedNitrogenNuM	Total Dissolved Nitrogen	uM
Water Nutrients	totalDissolvedPhosphorusPugL	Total Dissolved Phosphorus	ug/L
Water Nutrients	totalDissolvedPhosphorusPuM	Total Dissolved Phosphorus	uM
Water Nutrients	totalNitrogenNugL	Total Nitrogen	ug/L
Water Nutrients	totalNitrogenNuM	Total Nitrogen	uM
Water Nutrients	totalPhosphorusPugL	Total Phosphorus	ug/L
Water Nutrients	totalPhosphorusPuM	Total Phosphorus	uM
Water Nutrients	TPP	Total particulate phosphorus	uM
Water Nutrients	TSSmgL	Total Suspended Solids	mg/L
Water Nutrients	WC_SCL_VolumeFiltered	Volume Filtered for Chlorophyll	ml
Water Nutrients	WC_SSS_FilterNumber	Filter Number for TSS	unitless
Water Nutrients	WC_SSS_VolumeFiltered	Volume Filtered for TSS	ml
Water Nutrients	WC_Surface_HACH_NTU	Surface Turbidity (HACH meter)	ntu
Water Nutrients	WC_surfaceSalinity	Surface Salinity of Sample	psu

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
Sediment Physical	MedianPhi	Median grain size (phi)	unitless
Sediment Physical	pctClay	Clay content	%
Sediment Physical	pctGravel	Gravel content	%
Sediment Physical	pctSand	Sand content	%
Sediment Physical	pctSilt	Silt content	%
Sediment Physical	pctSiltClay	Silt+Clay content	%
Sediment Physical	sortingCoefficient	Grain size sorting coefficient	unitless

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
Sediment Physical	USACEDescription	Description of sediment appearance	unitless
TOC	pctTOC	Percent Total Organic Carbon	%
Chemistry - Other	AVS	Acid Volatile Sulfide	ug/g
Chemistry - Other	AVS	Acid Volatile Sulfide	umol/g
Chemistry - Other	C10_ALKA	C10-Alkane (n-Decane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C11_ALKA	C11-Alkane (n-Undecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C12_ALKA	C12-Alkane (n-Dodecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C13_ALKA	C13-Alkane (n-Tridecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C14_ALKA	C14-Alkane (n-Tetradecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C15_ALKA	C15-Alkane (n-Pentadecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C16_ALKA	C16-Alkane (n-Hexadecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C17_ALKA	C17-Alkane (n-Heptadecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C18_ALKA	C18-Alkane (n-Octadecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C19_ALKA	C19-Alkane (n-Nonadecane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C1CHRYSN	C1-Chrysenes	ng/g
Chemistry - Other	C1DIBENZ	C1-Dibenzothiophenes	ng/g
Chemistry - Other	C1FLUORA	C1-Fluoranthene + pyrene	ng/g
Chemistry - Other	C1FLUORE	C1-Fluorenes	ng/g
Chemistry - Other	C1NAPH	C1-Naphthalenes	ng/g
Chemistry - Other	C1PHENAN	C1-Phenanthrenes	ng/g
Chemistry - Other	C20_ALKA	C20-Alkane (n-Eicosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C21_ALKA	C21-Alkane (n-Heneicosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C22_ALKA	C22-Alkane (n-Docosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C23_ALKA	C23-Alkane (n-Tricosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C24_ALKA	C24-Alkane (n-Tetracosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C25_ALKA	C25-Alkane (n-Pentacosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C26_ALKA	C26-Alkane (n-Hexacosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C27_ALKA	C27-Alkane (n-Heptacosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C28_ALKA	C28-Alkane (n-Octacosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C29_ALKA	C29-Alkane (n-Nonacosane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C2CHRYSN	C2-Chrysenes	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
Chemistry - Other	C2DIBENZ	C2-Dibenzothiophenes	ng/g
Chemistry - Other	C2FLUORE	C2-Fluorenes	ng/g
Chemistry - Other	C2NAPH	C2-Naphthalenes	ng/g
Chemistry - Other	C2PHENAN	C2-Phenanthrenes	ng/g
Chemistry - Other	C30_ALKA	C30-Alkane (n-Triacontane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C31_ALKA	C31-Alkane (n-Hentriacontane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C32_ALKA	C32-Alkane (n-Dotriacontane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C33_ALKA	C33-Alkane (n-Tritriacontane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C34_ALKA	C34-Alkane (n-Tetratriacontane Aliphatic Hydrocarbon)	ng/g
Chemistry - Other	C3CHRYSN	C3-Chrysenes	ng/g
Chemistry - Other	C3DIBENZ	C3-Dibenzothiophenes	ng/g
Chemistry - Other	C3FLUORE	C3-Fluorenes	ng/g
Chemistry - Other	C3NAPH	C3-Naphthalenes	ng/g
Chemistry - Other	C3PHENAN	C3-Phenanthrenes	ng/g
Chemistry - Other	C4CHRYSN	C4-Chrysenes	ng/g
Chemistry - Other	C4NAPH	C4-Naphthalenes	ng/g
Chemistry - Other	C4PHENAN	C4-Phenanthrenes	ng/g
Chemistry - Other	DIBUTYLT	Dibutyltin	ng Sn/g
Chemistry - Other	MONOBUTY	Monobutyltin	ng Sn/g
Chemistry - Other	PHYTANE	Phytane	ng/g
Chemistry - Other	PRISTANE	Pristane	ng/g
Chemistry - Other	S	Sulfur	ug/g
Chemistry - Other	SEM_CD	SEM - Cadmium	ug/g
Chemistry - Other	SEM_CD	SEM - Cadmium	umol/g
Chemistry - Other	SEM_CU	SEM - Copper	ug/g
Chemistry - Other	SEM_CU	SEM - Copper	umol/g
Chemistry - Other	SEM_NI	SEM - Nickel	ug/g
Chemistry - Other	SEM_NI	SEM - Nickel	umol/g
Chemistry - Other	SEM_PB	SEM - Lead	ug/g
Chemistry - Other	SEM_PB	SEM - Lead	umol/g
Chemistry - Other	SEM_ZN	SEM - Zinc	ug/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
Chemistry - Other	SEM_ZN	SEM - Zinc	umol/g
Chemistry - Other	SI	Silicon	ug/g
Chemistry - Other	SR	Strontium	ug/g
Chemistry - Other	TETRABUT	Tetrabutyltin	ng Sn/g
Chemistry - Other	TOT_ALKA	Total Alkanes	ng/g
Chemistry - Other	TRIBUTYL	Tributyltin (TBT)	ng Sn/g
METALS	AG	Silver	ug/g
METALS	AL	Aluminum	ug/g or %
METALS	AS	Arsenic	ug/g
METALS	BA	Barium	ug/g
METALS	BE	Beryllium	ug/g
METALS	CA	Calcium	ug/g
METALS	CD	Cadmium	ug/g
METALS	CO	Cobalt	ug/g
METALS	CR	Chromium	ug/g
METALS	CU	Copper	ug/g
METALS	FE	Iron	ug/g or %
METALS	HG	Mercury	ug/g
METALS	LI	Lithium	ug/g
METALS	MG	Magnesium	ug/g
METALS	MN	Manganese	ug/g
METALS	NI	Nickel	ug/g
METALS	P	Phosphorus	ug/g
METALS	PB	Lead	ug/g
METALS	SB	Antimony	ug/g
METALS	SE	Selenium	ug/g
METALS	SN	Tin	ug/g
METALS	TL	Thallium	ug/g
METALS	U	Uranium	ug/g
METALS	V	Vanadium	ug/g
METALS	ZN	Zinc	ug/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PAHs	1,2,5,6-Tetramethylnaphthalene	1,2,5,6-Tetramethylnaphthalene	ng/g
PAHs	1,2,5-Trimethylnaphthalene	1,2,5-Trimethylnaphthalene	ng/g
PAHs	1,2-Dimethylnaphthalene	1,2-Dimethylnaphthalene	ng/g
PAHs	1,3+1,6-Dimethylnaphthalene	1,3+1,6-Dimethylnaphthalene	ng/g
PAHs	1,4,6- and 2,3,6-Trimethylnaphthalene	1,4,6- and 2,3,6-Trimethylnaphthalene	ng/g
PAHs	1,4,6,7-Tetramethylnaphthalene	1,4,6,7-Tetramethylnaphthalene	ng/g
PAHs	1,4-Dimethylnaphthalene	1,4-Dimethylnaphthalene	ng/g
PAHs	1,5-Dimethylnaphthalene	1,5-Dimethylnaphthalene	ng/g
PAHs	1,8-Dimethylnaphthalene	1,8-Dimethylnaphthalene	ng/g
PAHs	11H-Benzo(a)fluorene	11H-Benzo(a)fluorene	ng/g
PAHs	11H-Benzo(b)fluorene	11H-Benzo(b)fluorene	ng/g
PAHs	1-Methylantracene	1-Methylantracene	ng/g
PAHs	1-Methyldibenzothiophene	1-Methyldibenzothiophene	ng/g
PAHs	1-Methylfluorene	1-Methylfluorene	ng/g
PAHs	2,6+2,7-Dimethylnaphthalene	2,6+2,7-Dimethylnaphthalene	ng/g
PAHs	2-Methylantracene	2-Methylantracene	ng/g
PAHs	2-Methyldibenzothiophene	2-Methyldibenzothiophene	ng/g
PAHs	2-Methylphenanthrene	2-Methylphenanthrene	ng/g
PAHs	3-Methylcholanthrene	3-Methylcholanthrene	ng/g
PAHs	3-Methylphenanthrene	3-Methylphenanthrene	ng/g
PAHs	4H-Cyclopenta[def]phenanthrene	4H-Cyclopenta[def]phenanthrene	ng/g
PAHs	4-Methylchrysene	4-Methylchrysene	ng/g
PAHs	4-Methyldibenzothiophene	4-Methyldibenzothiophene	ng/g
PAHs	9,10-Dimethylantracene	9,10-Dimethylantracene	ng/g
PAHs	9-Methylantracene	9-Methylantracene	ng/g
PAHs	9-Methylphenanthrene	9-Methylphenanthrene	ng/g
PAHs	ACENTHE	Acenaphthene	ng/g
PAHs	ACENTHY	Acenaphthylene	ng/g
PAHs	Anthanthrene	Anthanthrene	ng/g
PAHs	ANTHRA	Anthracene	ng/g
PAHs	BENANTH	Benz[a]anthracene	ng/g



*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PAHs	BENAPY	Benzo[a]pyrene	ng/g
PAHs	BENEPY	Benzo[e]pyrene	ng/g
PAHs	Benzo[b]chrysene	Benzo[b]chrysene	ng/g
PAHs	Benzo[b]naphtho[2,1-d]thiophene	Benzo[b]naphtho[2,1-d]thiophene	ng/g
PAHs	Benzo[c]phenathrene	Benzo[c]phenathrene	ng/g
PAHs	Benzo[g,h,i]fluoranthene	Benzo[g,h,i]fluoranthene	ng/g
PAHs	BENZOAFI	Benzo[a]fluoranthene	ng/g
PAHs	BENZOBFI	Benzo[b]fluoranthene	ng/g
PAHs	BENZOBJK	Benzo[b+j+k]fluoranthene	ng/g
PAHs	BENZOFL	Benzo[b+k]fluoranthene	ng/g
PAHs	BENZOJFI	Benzo[j]fluoranthene	ng/g
PAHs	BENZOJKF	Benzo[j+k]fluoranthene	ng/g
PAHs	BENZOKFI	Benzo[k]fluoranthene	ng/g
PAHs	Benzothiophene	Benzothiophene	ng/g
PAHs	BGHIPERY	"Benzo[g,h,i]perylene"	ng/g
PAHs	BIPHENYL	Biphenyl	ng/g
PAHs	C1-Benzothiophenes	C1-Benzothiophenes	ng/g
PAHs	C1-Chrysenes/Benzanthracenes	C1-Chrysenes/Benzanthracenes	ng/g
PAHs	C1-Decalins	C1-Decalins	ng/g
PAHs	C1-Fluoranthrenes/Pyrenes	C1-Fluoranthrenes/Pyrenes	ng/g
PAHs	C1-Naphthobenzothiophenes	C1-Naphthobenzothiophenes	ng/g
PAHs	C2-Benzothiophenes	C2-Benzothiophenes	ng/g
PAHs	C2-Chrysenes/Benzanthracenes	C2-Chrysenes/Benzanthracenes	ng/g
PAHs	C2-Decalins	C2-Decalins	ng/g
PAHs	C2-Fluoranthrenes/Pyrenes	C2-Fluoranthrenes/Pyrenes	ng/g
PAHs	C2-Naphthobenzothiophenes	C2-Naphthobenzothiophenes	ng/g
PAHs	C3-Benzothiophenes	C3-Benzothiophenes	ng/g
PAHs	C3-Chrysenes/Benzanthracenes	C3-Chrysenes/Benzanthracenes	ng/g
PAHs	C3-Decalins	C3-Decalins	ng/g
PAHs	C3-Naphthobenzothiophenes	C3-Naphthobenzothiophenes	ng/g
PAHs	C4-Benzothiophenes	C4-Benzothiophenes	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PAHs	C4-Chrysenes/Benzanthracenes	C4-Chrysenes/Benzanthracenes	ng/g
PAHs	C4-Decalins	C4-Decalins	ng/g
PAHs	C4-Dibenzothiophenes	C4-Dibenzothiophenes	ng/g
PAHs	C4-Naphthobenzothiophenes	C4-Naphthobenzothiophenes	ng/g
PAHs	Carbazole	Carbazole	ng/g
PAHs	CHRYSENE	Chrysene	ng/g
PAHs	CHRYSTRI	Chrysene+Triphenylene	ng/g
PAHs	cis-Decalin	cis-Decalin	ng/g
PAHs	Coronene	Coronene	ng/g
PAHs	Dibenz[a,c]anthracene	Dibenz[a,c]anthracene	ng/g
PAHs	Dibenz[a,j]anthracene	Dibenz[a,j]anthracene	ng/g
PAHs	DIBENZA	Dibenz[a,h]anthracene	ng/g
PAHs	DIBENZO	Dibenzothiophene	ng/g
PAHs	Dibenzo[a,e]pyrene	Dibenzo[a,e]pyrene	ng/g
PAHs	Dibenzo[b,k]fluoranthene	Dibenzo[b,k]fluoranthene	ng/g
PAHs	Dibenzofuran	Dibenzofuran	ng/g
PAHs	DMETHN26	2,6-Dimethylnaphthalene	ng/g
PAHs	FLUORANT	Fluoranthene	ng/g
PAHs	FLUORENE	Fluorene	ng/g
PAHs	INDENO	Indeno[1,2,3-c,d]pyrene	ng/g
PAHs	METHYLN1	1-Methylnaphthalene	ng/g
PAHs	METHYLN2	2-Methylnaphthalene	ng/g
PAHs	METHYLP1	1-Methylphenanthrene	ng/g
PAHs	NAPH	Naphthalene	ng/g
PAHs	PERYLENE	Perylene	ng/g
PAHs	PHENANTH	Phenanthrene	ng/g
PAHs	Picene	Picene	ng/g
PAHs	PYRENE	Pyrene	ng/g
PAHs	PYRENE	Pyrene	ug/kg
PAHs	RETENE	Retene (7-Isopropyl-1-methylphenanthrene)	ng/g
PAHs	TMETN167	1,6,7-Trimethylnaphthalene	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PAHs	trans-Decalin	trans-Decalin	ng/g
PAHs	TRIMETH	2,3,5-Trimethylnaphthalene	ng/g
PBDEs	PBDE100	PBDE 100 (2,2',4,4',6-pentabromodiphenyl ether)	ng/g
PBDEs	PBDE138	PBDE 138 (2,2',3,4,4',5'-hexabromodiphenyl ether)	ng/g
PBDEs	PBDE153	PBDE 153 (2,2',4,4',5,5'-hexabromodiphenyl ether)	ng/g
PBDEs	PBDE154	PBDE 154 (2,2',4,4',5,6'-hexabromodiphenyl ether)	ng/g
PBDEs	PBDE17	PBDE 17 (2,2',4-tribromodiphenyl ether)	ng/g
PBDEs	PBDE183	PBDE 183 (2,2',3,4,4',5',6-heptabromodiphenyl ether)	ng/g
PBDEs	PBDE190	PBDE 190 (2,3,3',4,4',5,6-heptabromodiphenyl ether)	ng/g
PBDEs	PBDE209	Decabromodiphenyl ether	ng/g
PBDEs	PBDE28	PBDE 28 (2,4,4'-tribromodiphenyl ether)	ng/g
PBDEs	PBDE47	PBDE 47 (2,2',4,4'-tetrabromodiphenyl ether)	ng/g
PBDEs	PBDE66	PBDE 66 (2,3',4,4'-tetrabromodiphenyl ether)	ng/g
PBDEs	PBDE71	PBDE 71 (2,3',4',6-tetrabromodiphenyl ether)	ng/g
PBDEs	PBDE85	PBDE 85 (2,2',3,4,4'-pentabromodiphenyl ether)	ng/g
PBDEs	PBDE99	PBDE 99 (2,2',4,4',5-pentabromodiphenyl ether)	ng/g
PCBs	PCB 200 / IUPAC 201	PCB 200 (2,2',3,3',4,5',6,6'-Octachlorobiphenyl)	ng/g
PCBs	PCB 201 / IUPAC 199	PCB 201 (2,2',3,3',4',5,5',6-Octachlorobiphenyl)	ng/g
PCBs	PCB1	PCB 1 (2-Chlorobiphenyl)	ng/g
PCBs	PCB101	PCB 101 (2,2',4,5,5'-Pentachlorobiphenyl)	ng/g
PCBs	PCB101/90	PCB 101/90 Mixture	ng/g
PCBs	PCB101/90/89	PCB 101/90/89 Mixture	ng/g
PCBs	PCB103	PCB 103 (2,2',4,5',6-Pentachlorobiphenyl)	ng/g
PCBs	PCB104	PCB 104 (2,2',4,6,6'-Pentachlorobiphenyl)	ng/g
PCBs	PCB105	PCB 105 (2,3,3',4,4'-Pentachlorobiphenyl)	ng/g
PCBs	PCB106/118	PCB 106/118 Mixture	ng/g
PCBs	PCB107/108	PCB 107/108 Mixture	ng/g
PCBs	PCB108/107/123	PCB 108/107/123 Mixture	ng/g
PCBs	PCB110	PCB 110 (2,3,3',4',6-Pentachlorobiphenyl)	ng/g
PCBs	PCB114	PCB 114 (2,3,4,4',5-Pentachlorobiphenyl)	ng/g
PCBs	PCB118	PCB 118 (2,3',4,4',5-Pentachlorobiphenyl)	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PCBs	PCB119	PCB 119 (2,3',4,4',6-Pentachlorobiphenyl)	ng/g
PCBs	PCB12	PCB 12 (3,4-Dichlorobiphenyl)	ng/g
PCBs	PCB123	PCB 123 (2,3',4,4',5'-Pentachlorobiphenyl)	ng/g
PCBs	PCB126	PCB 126 (3,3',4,4',5-Pentachlorobiphenyl)	ng/g
PCBs	PCB128	PCB 128 (2,2',3,3',4,4'-Hexachlorobiphenyl)	ng/g
PCBs	PCB128/167	PCB 128/167 Mixture	ng/g
PCBs	PCB130	PCB 130 (2,2',3,3',4,5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB132	PCB 132 (2,2',3,3',4,6'-Hexachlorobiphenyl)	ng/g
PCBs	PCB132/153/168	PCB 132/153/168 Mixture	ng/g
PCBs	PCB132/168	PCB 132/168 Mixture	ng/g
PCBs	PCB138	PCB 138 (2,2',3,4,4',5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB138/158	PCB 138/158 Mixture	ng/g
PCBs	PCB138/160	PCB 138/160 Mixture	ng/g
PCBs	PCB138/163/164	PCB 138/163/164 Mixture	ng/g
PCBs	PCB141	PCB 141 (2,2',3,4,5,5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB146	PCB 146 (2,2',3,4',5,5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB149	PCB 149 (2,2',3,4',5',6-Hexachlorobiphenyl)	ng/g
PCBs	PCB15	PCB 15 (4,4'-Dichlorobiphenyl)	ng/g
PCBs	PCB151	PCB 151 (2,2',3,5,5',6-Hexachlorobiphenyl)	ng/g
PCBs	PCB153	PCB 153 (2,2',4,4',5,5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB153/132	PCB 153/132 Mixture	ng/g
PCBs	PCB153/168	PCB 153/168 Mixture	ng/g
PCBs	PCB154	PCB 154 (2,2',4,4',5,6'-Hexachlorobiphenyl)	ng/g
PCBs	PCB156	PCB 156 (2,3,3',4,4',5-Hexachlorobiphenyl)	ng/g
PCBs	PCB157	PCB 157 (2,3,3',4,4',5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB158	PCB 158 (2,3,3',4,4',6-Hexachlorobiphenyl)	ng/g
PCBs	PCB159	PCB 159 (2,3,3',4,5,5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB164/163	PCB 164/163 Mixture	ng/g
PCBs	PCB164/163/138	PCB 164/163/138 Mixture	ng/g
PCBs	PCB165	PCB 165 (2,3,3',5,5',6-Hexachlorobiphenyl)	ng/g
PCBs	PCB167	PCB 167 (2,3',4,4',5,5'-Hexachlorobiphenyl)	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PCBs	PCB169	PCB 169 (3,3',4,4',5,5'-Hexachlorobiphenyl)	ng/g
PCBs	PCB170	PCB 170 (2,2',3,3',4,4',5-Heptachlorobiphenyl)	ng/g
PCBs	PCB170/190	PCB 170/190 Mixture	ng/g
PCBs	PCB172	PCB 172 (2,2',3,3',4,5,5'-Heptachlorobiphenyl)	ng/g
PCBs	PCB174	PCB 174 (2,2',3,3',4,5,6'-Heptachlorobiphenyl)	ng/g
PCBs	PCB177	PCB 177 (2,2',3,3',4,5',6'-Heptachlorobiphenyl)	ng/g
PCBs	PCB18	PCB 18 (2,2',5-Trichlorobiphenyl)	ng/g
PCBs	PCB18/17	PCB 18/17 Mixture	ng/g
PCBs	PCB180	PCB 180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl)	ng/g
PCBs	PCB180/193	PCB 180/193 Mixture	ng/g
PCBs	PCB183	PCB 183 (2,2',3,4,4',5',6-Heptachlorobiphenyl)	ng/g
PCBs	PCB184	PCB 184 (2,2',3,4,4',6,6'-Heptachlorobiphenyl)	ng/g
PCBs	PCB187	PCB 187 (2,2',3,4',5,5',6-Heptachlorobiphenyl)	ng/g
PCBs	PCB188	PCB 188 (2,2',3,4',5,6,6'-Heptachlorobiphenyl)	ng/g
PCBs	PCB189	PCB 189 (2,3,3',4,4',5,5'-Heptachlorobiphenyl)	ng/g
PCBs	PCB193	PCB 193 (2,3,3',4',5,5',6-Heptachlorobiphenyl)	ng/g
PCBs	PCB194	PCB 194 (2,2',3,3',4,4',5,5'-Octachlorobiphenyl)	ng/g
PCBs	PCB195	PCB 195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl)	ng/g
PCBs	PCB195/208	PCB 195/208 Mixture	ng/g
PCBs	PCB196/203	PCB 196/203 Mixture	ng/g
PCBs	PCB198	PCB 198 (2,2',3,3',4,5,5',6-Octachlorobiphenyl)	ng/g
PCBs	PCB2	PCB 2 (3-Chlorobiphenyl)	ng/g
PCBs	PCB20	PCB 20 (2,3,3'-Trichlorobiphenyl)	ng/g
PCBs	PCB200	PCB 200 (2,2',3,3',4,5,6,6'-Octachlorobiphenyl)	ng/g
PCBs	PCB200/201	PCB 200/201 Mixture	ng/g
PCBs	PCB201	PCB 201 (2,2',3,3',4,5',6,6'-Octachlorobiphenyl)	ng/g
PCBs	PCB201/199	PCB 201/199 Mixture	ng/g
PCBs	PCB202	PCB 202 (2,2',3,3',5,5',6,6'-Octachlorobiphenyl)	ng/g
PCBs	PCB203/196	PCB 203/196 Mixture	ng/g
PCBs	PCB206	PCB 206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)	ng/g
PCBs	PCB207	PCB 207 (2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl)	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PCBs	PCB208	PCB 208 (2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl)	ng/g
PCBs	PCB209	PCB 209 (2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl)	ng/g
PCBs	PCB26	PCB 26 (2,3',5-Trichlorobiphenyl)	ng/g
PCBs	PCB28	PCB 28 (2,4,4'-Trichlorobiphenyl)	ng/g
PCBs	PCB28/31	PCB 28/31 Mixture	ng/g
PCBs	PCB29	PCB 29 (2,4,5-Trichlorobiphenyl)	ng/g
PCBs	PCB3	PCB 3 (4-Chlorobiphenyl)	ng/g
PCBs	PCB31	PCB 31 (2,4',5-Trichlorobiphenyl)	ng/g
PCBs	PCB37	PCB 37 (3,4,4'-Trichlorobiphenyl)	ng/g
PCBs	PCB44	PCB 44 (2,2',3,5'-Tetrachlorobiphenyl)	ng/g
PCBs	PCB45	PCB 45 (2,2',3,6-Tetrachlorobiphenyl)	ng/g
PCBs	PCB47/48	PCB 47/48 Mixture	ng/g
PCBs	PCB48	PCB 48 (2,2',4,5-Tetrachlorobiphenyl)	ng/g
PCBs	PCB49	PCB 49 (2,2',4,5'-Tetrachlorobiphenyl)	ng/g
PCBs	PCB5/8	PCB 5/8 Mixture	ng/g
PCBs	PCB50	PCB 50 (2,2',4,6-Tetrachlorobiphenyl)	ng/g
PCBs	PCB52	PCB 52 (2,2',5,5'-Tetrachlorobiphenyl)	ng/g
PCBs	PCB56	PCB 56 (2,3,3',4'-Tetrachlorobiphenyl)	ng/g
PCBs	PCB56/60	PCB 56/60 Mixture	ng/g
PCBs	PCB61	PCB 61 (2,3,4,5-Tetrachlorobiphenyl)	ng/g
PCBs	PCB61/74	PCB 61/74 Mixture	ng/g
PCBs	PCB63	PCB 63 (2,3,4',5-Tetrachlorobiphenyl)	ng/g
PCBs	PCB66	PCB 66 (2,3',4,4'-Tetrachlorobiphenyl)	ng/g
PCBs	PCB69	PCB 69 (2,3',4,6-Tetrachlorobiphenyl)	ng/g
PCBs	PCB70	PCB 70 (2,3',4',5-Tetrachlorobiphenyl )	ng/g
PCBs	PCB70/76	PCB 70/76 Mixture	ng/g
PCBs	PCB74	PCB 74 (2,4,4',5-Tetrachlorobiphenyl)	ng/g
PCBs	PCB74/61	PCB 74/61 Mixture	ng/g
PCBs	PCB76	PCB 76 (2,3',4',5'-Tetrachlorobiphenyl)	ng/g
PCBs	PCB77	PCB 77 (3,3',4,4'-Tetrachlorobiphenyl)	ng/g
PCBs	PCB8	PCB 8 (2,4'-Dichlorobiphenyl)	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PCBs	PCB8/5	PCB 8/5 Mixture	ng/g
PCBs	PCB81	PCB 81 (3,4,4',5-Tetrachlorobiphenyl)	ng/g
PCBs	PCB82	PCB 82 (2,2',3,3',4-Pentachlorobiphenyl)	ng/g
PCBs	PCB84	PCB 84 (2,2',3,3',6-Pentachlorobiphenyl)	ng/g
PCBs	PCB84/89/90/101	PCB 84/89/90/101 Mixture	ng/g
PCBs	PCB87	PCB 87 (2,2',3,4,5'-Pentachlorobiphenyl)	ng/g
PCBs	PCB87/115	PCB 87/115 Mixture	ng/g
PCBs	PCB88	PCB 88 (2,2',3,4,6-Pentachlorobiphenyl)	ng/g
PCBs	PCB89/90	PCB 89/90 Mixture	ng/g
PCBs	PCB89/90/101	PCB 89/90/101 Mixture	ng/g
PCBs	PCB9	PCB 9 (2,5-Dichlorobiphenyl)	ng/g
PCBs	PCB92	PCB 92 (2,2',3,5,5'-Pentachlorobiphenyl)	ng/g
PCBs	PCB95	PCB 95 (2,2',3,5',6-Pentachlorobiphenyl)	ng/g
PCBs	PCB99	PCB 99 (2,2',4,4',5-Pentachlorobiphenyl)	ng/g
PEST	ALDRIN	Aldrin	ng/g
PEST	ALPHABHC	alpha-Hexachlorocyclohexane (alpha-BHC)	ng/g
PEST	ALPHACHL	alpha-Chlordane	ng/g
PEST	ATRAZINE	Atrazine	ng/g
PEST	BETABHC	beta-Hexachlorocyclohexane (beta-BHC)	ng/g
PEST	CHLORDAN	Chlordane=ALPHACHL+GAMMACHL+OXYCHL	ng/g
PEST	CHLORPYR	Chlorpyrifos	ng/g
PEST	CISNONA	cis-Nonachlor	ng/g
PEST	DDD_24	2,4'-DDD (o,p'-DDD)	ng/g
PEST	DDD_44	4,4'-DDD (p,p'-DDD)	ng/g
PEST	DDE_24	2,4'-DDE (o,p'-DDE)	ng/g
PEST	DDE_44	4,4'-DDE (p,p'-DDE)	ng/g
PEST	DDT_24	2,4'-DDT (o,p'-DDT)	ng/g
PEST	DDT_44	4,4'-DDT (p,p'-DDT)	ng/g
PEST	DELTABHC	delta-Hexachlorocyclohexane (delta-BHC)	ng/g
PEST	DIELDRIN	Dieldrin	ng/g
PEST	ENDOSUL1	Endosulfan I	ng/g

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
PEST	ENDOSUL2	Endosulfan II (Beta-Endosulfan)	ng/g
PEST	ENDOSULE	Endosulfan ether	ng/g
PEST	ENDOSULF	Endosulfan	ng/g
PEST	ENDOSULL	Endosulfan lactone	ng/g
PEST	ENDRIN	Endrin	ng/g
PEST	ENDSUSFT	Endosulfan sulfate	ng/g
PEST	GAMMACHL	gamma-Chlordane	ng/g
PEST	HCB	Hexachlorobenzene (HCB)	ng/g
PEST	HEPTACHL	Heptachlor	ng/g
PEST	HEPTAEPO	Heptachlor epoxide	ng/g
PEST	LINDANE	gamma-Hexachlorocyclohexane (gamma-BHC = Lindane)	ng/g
PEST	MIREX	Mirex	ng/g
PEST	OXYCHL	Oxychlordane	ng/g
PEST	TOT_BHC	Total HCH (Total BHC)	ng/g
PEST	TOXAPHEN	Toxaphene	ng/g
PEST	TRANNONA	trans-Nonachlor	ng/g
Sediment Physical	Dry_Weight	Dry_Weight	g
Sediment Physical	pctSolid	pctSolid	%
Sediment Physical	RoughSiltClay	NULL	%
Sediment Physical	Wet_Weight	Wet_Weight	g
TOC	Total Carbon	Total Carbon	ug/kg
TOC	TOTAL ORGANIC CARBON	TOTAL ORGANIC CARBON	ug/kg
Alkanes	n-C10	n-C10	ng/g
Alkanes	n-C11	n-C11	ng/g
Alkanes	n-C12	n-C12	ng/g
Alkanes	n-C13	n-C13	ng/g
Alkanes	n-C14	n-C14	ng/g
Alkanes	n-C15	n-C15	ng/g
Alkanes	n-C16	n-C16	ng/g
Alkanes	n-C17	n-C17	ng/g
Alkanes	n-C18	n-C18	ng/g



*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
Alkanes	n-C19	n-C19	ng/g
Alkanes	n-C20	n-C20	ng/g
Alkanes	n-C21	n-C21	ng/g
Alkanes	n-C22	n-C22	ng/g
Alkanes	n-C23	n-C23	ng/g
Alkanes	n-C24	n-C24	ng/g
Alkanes	n-C25	n-C25	ng/g
Alkanes	n-C26	n-C26	ng/g
Alkanes	n-C27	n-C27	ng/g
Alkanes	n-C28	n-C28	ng/g
Alkanes	n-C29	n-C29	ng/g
Alkanes	n-C30	n-C30	ng/g
Alkanes	n-C31	n-C31	ng/g
Alkanes	n-C32	n-C32	ng/g
Alkanes	n-C33	n-C33	ng/g
Alkanes	n-C34	n-C34	ng/g
Alkanes	n-C35	n-C35	ng/g
Alkanes	Total Alkanes	Total Alkanes	ng/g
TPH	Total Resolved	Total Resolved	ug/g
TPH	Total TPH	Total TPH	ug/g
TPH	Total UCM	Total UCM	ug/g
Physical Properties	% Moisture	% Moisture	%
Semivolatile Organic Compounds (SOC)	1,1-BIPHENYL	1,1-BIPHENYL	ug/kg
SOC	17a(H)-diahopane	17a(H)-diahopane	ug/kg
SOC	A1-C20-TAS	A1-C20-TAS	ug/kg
SOC	A2-C21-TAS	A2-C21-TAS	ug/kg
SOC	A3-C26 TAS(20S)	A3-C26 TAS(20S)	ug/kg
SOC	A4-C26/C27-TAS	A4-C26/C27-TAS	ug/kg
SOC	A5-C27-TAS(20R)	A5-C27-TAS(20R)	ug/kg
SOC	A6-TAS(20S)	A6-TAS(20S)	ug/kg

Data Documentation  
NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
SOC	A7-TAS(20R)	A7-TAS(20R)	ug/kg
SOC	ACENAPHTHENE	ACENAPHTHENE	ug/kg
SOC	ACENAPHTHYLENE	ACENAPHTHYLENE	ug/kg
SOC	ANTHRACENE	ANTHRACENE	ug/kg
SOC	Aromatics; Total	Aromatics, Total	ug/kg
SOC	BENZO(A)ANTHRACENE	BENZO(A)ANTHRACENE	ug/kg
SOC	BENZO(A)PYRENE	BENZO(A)PYRENE	ug/kg
SOC	BENZO(B)FLUORANTHENE	BENZO(B)FLUORANTHENE	ug/kg
SOC	BENZO(E)PYRENE	BENZO(E)PYRENE	ug/kg
SOC	BENZO(G,H,I)PERYLENE	BENZO(G,H,I)PERYLENE	ug/kg
SOC	Benzo(k)fluoranthene	Benzo(k)fluoranthene	ug/kg
SOC	C1-Chrysenes	C1-Chrysenes	ug/kg
SOC	C1-Dibenzothiophenes	C1-Dibenzothiophenes	ng/g
SOC	C1-Dibenzothiophenes	C1-Dibenzothiophenes	ug/kg
SOC	C1-FLUORANTHENES/PYRENES	C1-FLUORANTHENES/PYRENES	ug/kg
SOC	C1-Fluorenes	C1-Fluorenes	ng/g
SOC	C1-Fluorenes	C1-Fluorenes	ug/kg
SOC	C1-Naphthalenes	C1-Naphthalenes	ng/g
SOC	C1-Naphthalenes	C1-Naphthalenes	ug/kg
SOC	C1-Naphthobenzothiophene	C1-Naphthobenzothiophene	ug/kg
SOC	C1-Phenanthrenes/Anthracenes	C1-Phenanthrenes/Anthracenes	ng/g
SOC	C1-Phenanthrenes/Anthracenes	C1-Phenanthrenes/Anthracenes	ug/kg
SOC	C2-Chrysenes	C2-Chrysenes	ug/kg
SOC	C2-Dibenzothiophenes	C2-Dibenzothiophenes	ng/g
SOC	C2-Dibenzothiophenes	C2-Dibenzothiophenes	ug/kg
SOC	C2-Fluoranthenes/Pyrenes	C2-Fluoranthenes/Pyrenes	ug/kg
SOC	C2-Fluorenes	C2-Fluorenes	ng/g
SOC	C2-Fluorenes	C2-Fluorenes	ug/kg
SOC	C2-Naphthalenes	C2-Naphthalenes	ng/g
SOC	C2-Naphthalenes	C2-Naphthalenes	ug/kg
SOC	C2-Naphthobenzothiophene	C2-Naphthobenzothiophene	ug/kg

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
SOC	C2-Phenanthrenes/Anthracenes	C2-Phenanthrenes/Anthracenes	ng/g
SOC	C2-Phenanthrenes/Anthracenes	C2-Phenanthrenes/Anthracenes	ug/kg
SOC	C3-Chrysenes	C3-Chrysenes	ug/kg
SOC	C3-Dibenzothiophenes	C3-Dibenzothiophenes	ng/g
SOC	C3-Dibenzothiophenes	C3-Dibenzothiophenes	ug/kg
SOC	C3-Fluoranthrenes/pyrenes	C3-Fluoranthrenes/pyrenes	ng/g
SOC	C3-Fluoranthrenes/pyrenes	C3-Fluoranthrenes/pyrenes	ug/kg
SOC	C3-Fluorenes	C3-Fluorenes	ng/g
SOC	C3-Fluorenes	C3-Fluorenes	ug/kg
SOC	C3-Naphthalenes	C3-Naphthalenes	ng/g
SOC	C3-Naphthalenes	C3-Naphthalenes	ug/kg
SOC	C3-Naphthobenzothiophene	C3-Naphthobenzothiophene	ug/kg
SOC	C3-Phenanthrenes/Anthracenes	C3-Phenanthrenes/Anthracenes	ng/g
SOC	C3-Phenanthrenes/Anthracenes	C3-Phenanthrenes/Anthracenes	ug/kg
SOC	C4-Chrysenes	C4-Chrysenes	ug/kg
SOC	C4-Fluoranthrenes/pyrenes	C4-Fluoranthrenes/pyrenes	ng/g
SOC	C4-Fluoranthrenes/pyrenes	C4-Fluoranthrenes/pyrenes	ug/kg
SOC	C4-Naphthalenes	C4-Naphthalenes	ng/g
SOC	C4-Naphthalenes	C4-Naphthalenes	ug/kg
SOC	C4-Phenanthrenes/Anthracenes	C4-Phenanthrenes/Anthracenes	ng/g
SOC	C4-Phenanthrenes/Anthracenes	C4-Phenanthrenes/Anthracenes	ug/kg
SOC	CHOLESTANE	CHOLESTANE	ug/kg
SOC	DI(PROPYLENE GLYCOL)BUTYLETHER	DI(PROPYLENE GLYCOL)BUTYLETHER	ug/kg
SOC	DIBENZ(A,H)ANTHRACENE	DIBENZ(A,H)ANTHRACENE	ug/kg
SOC	DIBENZOTHIOPHENE	DIBENZOTHIOPHENE	ug/kg
SOC	DPnB-Peak1	DPnB-Peak1	ug/kg
SOC	DPnB-Peak2	DPnB-Peak2	ug/kg
SOC	FLUORANTHENE	FLUORANTHENE	ug/kg
SOC	INDENO(1;2;3-CD)PYRENE	INDENO(1,2,3-CD)PYRENE	ug/kg
SOC	NAPHTHALENE	NAPHTHALENE	ug/kg
SOC	NAPHTHOBENZOTHIOPHENE	NAPHTHOBENZOTHIOPHENE	ug/kg

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
SOC	PHENANTHRENE	PHENANTHRENE	ug/kg
SOC	S10-Methyldiacholestane	S10-Methyldiacholestane	ug/kg
SOC	S11-Methyldiacholestane	S11-Methyldiacholestane	ug/kg
SOC	S12-Cholestane	S12-Cholestane	ug/kg
SOC	S14-CHOLESTANE (20R)	S14-CHOLESTANE (20R)	ug/kg
SOC	S15-Cholestane (20S)	S15-Cholestane (20S)	ug/kg
SOC	S18-Ethyldiacholestane	S18-Ethyldiacholestane	ug/kg
SOC	S19-Ethyldiacholestane	S19-Ethyldiacholestane	ug/kg
SOC	S20-Methylcholestane	S20-Methylcholestane	ug/kg
SOC	S22-Methylcholestane(20R)	S22-Methylcholestane(20R)	ug/kg
SOC	S23-Methylcholestane(20S)	S23-Methylcholestane(20S)	ug/kg
SOC	S24-MethylCholestane	S24-MethylCholestane	ug/kg
SOC	S25-EthylCholestane	S25-EthylCholestane	ug/kg
SOC	S26-Ethylcholestane(20R)	S26-Ethylcholestane(20R)	ug/kg
SOC	S27-Ethylcholestane(20S)	S27-Ethylcholestane(20S)	ug/kg
SOC	S28-Ethylcholestane	S28-Ethylcholestane	ug/kg
SOC	S4-Diacholestane	S4-Diacholestane	ug/kg
SOC	S5-Diacholestane	S5-Diacholestane	ug/kg
SOC	S6-Diacholestane	S6-Diacholestane	ug/kg
SOC	S7-Diacholestane	S7-Diacholestane	ug/kg
SOC	S8-Methyldiacholestane	S8-Methyldiacholestane	ug/kg
SOC	T10-C29Tricyclitriterpane(R)	T10-C29Tricyclitriterpane(R)	ug/kg
SOC	T11-Trisnorhopane(TS)	T11-Trisnorhopane(TS)	ug/kg
SOC	T12-Trisnorhopane(TM)	T12-Trisnorhopane(TM)	ug/kg
SOC	T13a-29;30-Bisnorhopane	T13a-29;30-Bisnorhopane	ug/kg
SOC	T13-Trisnorhopane	T13-Trisnorhopane	ug/kg
SOC	T14a-C28;C30Bisnorhopane	T14a-C28;C30Bisnorhopane	ug/kg
SOC	T14b-C29;C25Norhopane	T14b-C29;C25Norhopane	ug/kg
SOC	T14-Bisnorhopane	T14-Bisnorhopane	ug/kg
SOC	T15-C29-Norhopane	T15-C29-Norhopane	ug/kg
SOC	T16-Norneohopane	T16-Norneohopane	ug/kg

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
SOC	T17-C30-Normoretane	T17-C30-Normoretane	ug/kg
SOC	T18-C30-Oleanane	T18-C30-Oleanane	ug/kg
SOC	T19-C30 Hopane	T19-C30 Hopane	ug/kg
SOC	T20-Moretane	T20-Moretane	ug/kg
SOC	T21-C31-Homohopane(S)	T21-C31-Homohopane(S)	ug/kg
SOC	T22A-GAMMACERANE	T22A-GAMMACERANE	ug/kg
SOC	T22-C31-Homohopane(R)	T22-C31-Homohopane(R)	ug/kg
SOC	T23-HOMOHOPANE	T23-HOMOHOPANE	ug/kg
SOC	T24-Homomoretane	T24-Homomoretane	ug/kg
SOC	T25-Diploptene	T25-Diploptene	ug/kg
SOC	T26-C32-Bishomohopane(S)	T26-C32-Bishomohopane(S)	ug/kg
SOC	T27-C32-Bishomohopane(R)	T27-C32-Bishomohopane(R)	ug/kg
SOC	T28-Bishomomoretane	T28-Bishomomoretane	ug/kg
SOC	T29-Homohopane	T29-Homohopane	ug/kg
SOC	T30-C33-Trishomohopane(S)	T30-C33-Trishomohopane(S)	ug/kg
SOC	T31-C33-Trishomohopane(R)	T31-C33-Trishomohopane(R)	ug/kg
SOC	T32-Tetrakishomohopane(S)	T32-Tetrakishomohopane(S)	ug/kg
SOC	T33-Tetrakishomohopane(R)	T33-Tetrakishomohopane(R)	ug/kg
SOC	T34-Pentakishomohopane(S)	T34-Pentakishomohopane(S)	ug/kg
SOC	T35-Pentakishomohopane(R)	T35-Pentakishomohopane(R)	ug/kg
SOC	T4-C23Diterpane	T4-C23Diterpane	ug/kg
SOC	T5-C24Diterpane	T5-C24Diterpane	ug/kg
SOC	T6a-C24Tetracyclic Terpane	T6a-C24Tetracyclic Terpane	ug/kg
SOC	T6b-C26Tricyclic[S]	T6b-C26Tricyclic[S]	ug/kg
SOC	T6-C25Diterpane	T6-C25Diterpane	ug/kg
SOC	T6c-C26Tricyclic[R]	T6c-C26Tricyclic[R]	ug/kg
SOC	T7-C28Tricyclitriterpane[S]	T7-C28Tricyclitriterpane[S]	ug/kg
SOC	T8-C28Tricyclitriterpane[R]	T8-C28Tricyclitriterpane[R]	ug/kg
SOC	T9-C29Tricyclitriterpane(S)	T9-C29Tricyclitriterpane(S)	ug/kg
TIC	pctTIC	Percent Total Inorganic Carbon	%
TIC	Total Inorganic Carbon (TIC)	Total Inorganic Carbon (TIC)	ug/kg

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
TPH-GRO	Diesel Range Organics (C10-C28)	Diesel Range Organics (C10-C28)	ug/kg
TPH-GRO	DOCOSANE	DOCOSANE	ug/kg
TPH-GRO	EICOSANE	EICOSANE	ug/kg
TPH-GRO	HENEICOSANE	HENEICOSANE	ug/kg
TPH-GRO	HEPTACOSANE	HEPTACOSANE	ug/kg
TPH-GRO	HEPTADECANE	HEPTADECANE	ug/kg
TPH-GRO	HEXACOSANE	HEXACOSANE	ug/kg
TPH-GRO	Isoprenoid RRT 1380	Isoprenoid RRT 1380	ug/kg
TPH-GRO	Isoprenoid RRT 1470	Isoprenoid RRT 1470	ug/kg
TPH-GRO	nC-15 Pentadecane	nC-15 Pentadecane	ug/kg
TPH-GRO	nC-16 Octadecane	nC-16 Octadecane	ug/kg
TPH-GRO	N-DECANE	N-DECANE	ug/kg
TPH-GRO	N-DODECANE	N-DODECANE	ug/kg
TPH-GRO	N-DOTRIACONTANE	N-DOTRIACONTANE	ug/kg
TPH-GRO	N-HENTRIACONTANE	N-HENTRIACONTANE	ug/kg
TPH-GRO	N-HEPTATRIACONTANE	N-HEPTATRIACONTANE	ug/kg
TPH-GRO	N-HEXATRIACONTANE	N-HEXATRIACONTANE	ug/kg
TPH-GRO	N-NONACOSANE	N-NONACOSANE	ug/kg
TPH-GRO	N-NONANE	N-NONANE	ug/kg
TPH-GRO	N-NONATRIACONTANE	N-NONATRIACONTANE	ug/kg
TPH-GRO	N-OCTATRIACONTANE	N-OCTATRIACONTANE	ug/kg
TPH-GRO	NONADECANE	NONADECANE	ug/kg
TPH-GRO	Norpristane (1650)	Norpristane (1650)	ug/kg
TPH-GRO	N-PENTACOSANE	N-PENTACOSANE	ug/kg
TPH-GRO	N-PENTATRIACONTANE	N-PENTATRIACONTANE	ug/kg
TPH-GRO	N-TETRACONTANE	N-TETRACONTANE	ug/kg
TPH-GRO	N-TETRADECANE	N-TETRADECANE	ug/kg
TPH-GRO	N-TETRATRIACONTANE	N-TETRATRIACONTANE	ug/kg
TPH-GRO	N-TRIDECANE	N-TRIDECANE	ug/kg
TPH-GRO	N-TRITRIACONTANE	N-TRITRIACONTANE	ug/kg
TPH-GRO	N-UNDECANE	N-UNDECANE	ug/kg

Data Documentation  
NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory

Sediment Quality			
ParameterClass	ParameterCode	ParameterDescription	Units
TPH-GRO	OCTACOSANE	OCTACOSANE	ug/kg
TPH-GRO	OCTADECANE	OCTADECANE	ug/kg
TPH-GRO	TETRACOSANE	TETRACOSANE	ug/kg
TPH-GRO	Total Resolved SHC (C9-C40)	Total Resolved SHC (C9-C40)	ug/kg
TPH-GRO	Total SHC	Total SHC	ug/kg
TPH-GRO	TPH; Total (C9-C40)	TPH, Total (C9-C40)	ug/kg
TPH-GRO	TRIACONTANE	TRIACONTANE	ug/kg
TPH-GRO	TRICOSANE	TRICOSANE	ug/kg
Sediment Toxicity	EC50Dry <sup>1</sup>	EC50 (% dry weight)	%
Sediment Toxicity	meanCorrEC50pct <sup>1</sup>	Mean Corrected EC50 (% dry weight)	%
Sediment Toxicity	meanGrowthRelCtl <sup>2</sup>	Mean growth rate relative to control	%
Sediment Toxicity	meanPctSurvRelCtl <sup>3</sup>	Mean percent survival relative to control	%
Sediment Toxicity	pValue	Significance of comparison to control (p-value)	unitless

<sup>1</sup> Microtox® assay

<sup>2</sup> Juvenile “seed” clam (*Mercenaria mercenaria*) assay

<sup>3</sup> Amphipod (*Ampelisca abdita*, *Ampelisca verrilli*, or *Leptocheirus plumulosus*) and juvenile clam (*Mercenaria mercenaria*) assays

Benthic Infauna		
Parameter	Description	Units
AreaSampled	Surface area of sediment sampling device	m <sup>2</sup>
Depth	Water depth where sample was collected	M
Salinity	Water salinity where sample was collected	ppt or psu
Taxon	Scientific name of organism	
TSN	Taxonomic Serial Number (from ITIS)	
AphiaID	Taxonomic Identifier (from WoRMS)	
Abundance	Abundance (number per grab or core)	# per grab
CalculatedDensity	Density (number per square meter)	# / m <sup>2</sup>

*Data Documentation*  
*NCCOS Regional Ecological Assessments and NOAA National Benthic Inventory*

Tissue Chemistry			
There are 309 tissue chemistry parameters that are also in the sediment chemistry parameter list above, plus the following:			
ParameterClass	ParameterCode	ParameterDescription	Units
PCBs	PCB89	PCB 89 (2,2',3,4,6'-Pentachlorobiphenyl)	ng/g
PCBs	PCB97	PCB 97 (2,2',3,4',5'-Pentachlorobiphenyl)	ng/g
PEST	CHLD_FDA	Tot. Chlordane [FDA] (4 CPO of 9 FDA)	ng/g
PEST	DCPA	DCPA (dacthal)	ng/g
PEST	DDD_FDA	DDD [FDA] (sum of DDD_24 and DDD_44)	ng/g
PEST	DDE_FDA	DDE [FDA] (sum of DDE_24 and DDE_44)	ng/g
PEST	DDT_FDA	DDT [FDA] (sum of DDT_24 and DDT_44)	ng/g
PEST	DICOFOL	Dicofol	ng/g
PEST	ENDRINAL	Endrin Aldehyde	ng/g
PEST	ENDRINKE	Endrin Ketone	ng/g
PEST	GAMMABHC	BHC-gamma	ng/g
PEST	HEPT_FDA	Heptachlor + Heptachlor Epoxide [FDA]	ng/g
PEST	METHOXYC	Methoxychlor	ng/g
PEST	PERTHANE	Perthane	ng/g
PEST	TOT_PEST	Total Pesticides	ng/g
PEST	TOTCHLOR	Total Chlordane (Sum of 7 Analytes)	ng/g
METALS	MO	Molybdenum	ug/g
METALS	TI	Titanium	ug/g
PCBs	PCB106	PCB 106 (2,3,3',4,5-Pentachlorobiphenyl)	ng/g
PCBs	PCB107	PCB 107 (2,3,3',4',5-Pentachlorobiphenyl)	ng/g
PCBs	PCB168/132	PCB 168/132 Mixture	ng/g
PCBs	PCB33	PCB 33 (2,3',4'-Trichlorobiphenyl)	ng/g
PCBs	PCB5	PCB 5 (2,3-Dichlorobiphenyl)	ng/g