Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:
National Status and Trends: Mussel Watch Program

1.2. Summary description of the data:
Mussel Watch is the longest running continuous chemical contaminant monitoring program in U.S. coastal and Great Lakes waters and was created in response to concerns over environmental quality of the Nation's coastal and estuarine ecosystems. The Program analyzes chemical and biological contaminant trends in sediment and bivalve tissue collected at over 300 coastal sites from 1986 to present. Parameters monitored include over 150 organic and inorganic contaminants, in sediment and bivalve tissue and bivalve histology; and Clostridium perfringens (pathogen) concentrations. Some of the chemicals regularly quantified include: PAHs, PCBs, chlorinated pesticides including DDT and its metabolites, TBT and its metabolites, major andtrace elements. In addition to the aforementioned legacy contaminants, new contaminants of Emerging Concern (CECs) such as flame retardant polybrominated biphnyl ethers (PBDEs) and pharmaceutics are being analyzed.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
Ongoing series of measurements

1.4. Actual or planned temporal coverage of the data:
1985-11-01 to Present

1.5. Actual or planned geographic coverage of the data:
W: -162.7207, E: -66.1813, N: 61.13283, S: 17.93917

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NCCOS Scientific Data Coordinator

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:
NCCOS.data@noaa.gov

2.5. Phone number:

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:
NCCOS Scientific Data Coordinator

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Process Steps:

- Data Acquisition: The sample collection methods used by NOAA and NOAA contractor field crews will be described here. Sampling Objective: Bivalve mollusks and sediments are collected for the analysis of trace element and organic chemical constituents. Bivalve Collection Methods summary: The Mussel Watch Program (MWP) collects a number of different species of mussels and oysters depending on the location: the American oyster (Crassostrea virginica, Gmelin, 1791) from Delaware Bay southward and throughout the Gulf of Mexico; the "blue mussel"; (Mytilus galloprovincialis, M. trossulus and M. californianus, Conrad 1837) along the West coast; blue mussel (Mytilus edulis Linnaeus 1758) along the northeastern coast from Maine to Cape May and Cape Halopen, NJ; and zebra mussels (Dreissena polymorpha, Pallas 1771 and D. bugensis) in the Great Lakes. The MWP has also established sites in Alaska, Hawaii and Puerto Rico where M. trossulus/M. californianus, Ostrea sandvicensis, and C. rhizophorae are collected, respectively. Mollusks are collected at marine sites in the months of November-March with each site visited within three weeks of a prescribed target date. In the Great Lakes, collections are made in late August or early September. Using non-powder nitril glove, bivalves are collected by hand at low tide in intertidal zones,by diving (SCUBA or snorkeling) or dredged at site located in the subtidal zones. The preferred size ranges are 5-8 cm for mussels, 7-10 cm for C. virginica, 2.5-5 cm for O. sandvicensis, and 2-4 cm for D. polymorpha and D. bugensis. Debris are removed and the samples are then packed on ice and shipped to the laboratory. Composite chemistry samples are prepared by homogenizing the soft parts of 30 mussels or 20 oysters. The small size of Dreissena spp. requires that composite samples from the Great Lake sites consisted of up to 100 or more individuals. When the core bivalve sites were first established three collections (stations) and subsequent analyses were performed for each site. From 1986 through 1992 three composites samples were analyzed per site and only one composite per site has been analyzed once a site has been established. Each composite sample is analyzed for organic, trace element, and gonadal index and histopathology. Approximately on a decadal basis sediment samples are collected from corresponding Mussel Watch bivalve sites. Likewise three sediment stations are established for each site. Sediment Collection Methods Summary: Multiple sediment grabs are collected from each site using a suitable grab sampler. The top two to three centimeter of the surface sediment is scooped from the grab sampler and retained for the chemical analyses. Multiple grabs are processed until sufficient sediments are collected. Any large debris encountered are removed, but otherwise the sample included resident organisms. Sediment samples are separated into two fractions for storage until analysis. One fraction is frozen and used in the chemical analysis, and the other is analyzed for the total organic carbon and percent moisture parameters. Sampling Platform: Samples are collected from gasoline powered boats. Sampling Equipment: Any stainless steel grab can be used. A 1/25 m2, stainless steel Young-modified Van Veen grab sampler or a hand held box corer is recommeded to collect sediment. From

1986 through 1992, three composite samples and one composite thereafter from each site are analyzed for organic analyses, trace element analyses, sediment grain size, total organic carbon and total inorganic carbon. Detailed MWP sample collection method, metal analytical methods and organic contamimants analytical methods are provided in Lauenstein and Cantillo (1993), Kimbrough and Lauenstein (2006 and 2007) respectively. Sediment ancillary methods are described in NOAA Tech Memo 28, while histopathology and gonadal index techniques are provided in Kim et al. (2006).
- Data Preparation and Sample Processing: Sample Processing Objective: Sediment and tissue samples are analyzed for metals, butyltins, PAHs, PCBs, PBDEs and organochlorine-pesticides. Methods Summary: All samples from the Gulf of Mexico Coast collected from 1986 to 1999 were analyzed by scientists from the Geochemical and Environmental Research Group or the Department of Oceanography at Texas AandM University (TAMU) in College Station, TX. For 1986-1988, samples from California and Hawaii were analyzed by Scientific Applications International Corporation in LaJolla, CA. For 1986-1994 all other West Coast samples and all East Coast samples were analyzed by scientists from the Battelle Laboratories in Duxbury, MA and Sequim, WA. For 1994-1999 all samples from all coasts were analyzed by the Geochemical and Environmental Research Group of the Department of Oceanography at Texas AandM University in College Station, TX. Since 2000, all samples have been analyzed by TDI-Brooks in College Station, TX. All laboratories, in all years, have used cold vapor atomic absorption for the analysis of Hg. TDI-Brooks International, Inc which has been performing the analyses since 2000 uses a modified version of EPA method 245.6. At Battelle, analyses for As, Cu, Se, and Zn have been made by X-ray fluorescence and those for Cd, Ni, and Pb by graphite furnace atomic absorption (GFAA). Beginning in 1992, inductively-coupled plasma with mass spectroscopy detection (ICP/MS) was used for Cd, Cr, Ni, and Pb. The analytical instruments used by SAIC and TAMU were GFAA for As, Cd, Ni, Pb, and Se; flame atomic absorption (FAA) for Zn; and both GFAA and FAA for Cu, depending on the concentration present. Since 2000 As and Se have been analyzed by atomic fluorescence spectrometry; As has also been analyzed by ICP-optical emission spectrometry (ICP/OEP). ICP/OEP is also used to determine Al,Cu, Ni and Zn while ICP/MS is used for Cd, Ni and Pb. Digestion procedures prior to elemental analysis varied to some extent among laboratories and years. Prior to 1990, Battelle used concentrated nitric and perchloric acids in aTeflon digestion bomb in a conventional oven. Since 1991, samples have been digested in nitric acid only, and heating has been by microwave irradiation. SAIC used conventional ovens and nitric acid. The Texas AandM Laboratory used nitric and perchloric acids with heating in a conventional oven. From 1991 to 1999, only nitric acid was used. The current analytical laboratory sequentially adds nitric acid and hydrogen peroxide to Teflon bombs to achieve sample dissolution of all but Hg samples. Organic chemical extractions were similar among laboratories. After addition of internal standards and anhydrous sodium sulfate, the tissue was extracted three times with dichloromethane using a tissumizer. After concentration by solvent evaporation

and exchange of dichloromethane with hexane, the tissue extract was fractionated by alumina:silica chromatography. The aromatic fraction eluted from the column with 1:1 pentane: dichloromethane was further purified by removing lipids through chromatography on a Sephadex column. Since 1988, this purification has been accomplished via an HPLC procedure. Organic sample extraction since 2000 remains similar to that of previous years but Hydromatrix is used to dry tissue samples and dichloromethane is the only solvent used in accelerated solvent extractor cells. Extracts are purified using alumina/silica gel chromatography followed by high performance liquid chromatography. Purified extracts were chromatographed on 30-m DB-5 fused silica capillary columns. Since 2000, a second column (DB-17HT) has also been used for chlorinated hydrocarbon confirmation. (continued)

- (continued from above) Chlorinated hydrocarbon concentrations were quantified using an electron capture detector (GC-ECD) by all laboratories in all years. For polycyclic aromatic hydrocarbons all analyses by SAIC in 1986-1988 (California and Hawaiian coasts) and those by Battelle in 1986 (East and Northwest Coasts) employed flame ionization detection (GC-FID). Battelle used mass spectrometry detection (GC-MSD) in full-scan mode in 1987. In all other cases the PAH analysis has been by GC-MSD in the selected ion mode (SIM). For butyltin analyses, anhydrous homogenized tissue was extracted with troplone and hexane (East and West Coast samples) or troplone and dichloromethane (Gulf Coast samples). Current methods use either hexane or dichloromethane. The extracts underwent Grignard reactions by addition of hexylmagnesium bromide (Gulf Coast samples) and n-pentyl magnesium bromide (East and West Coast samples). The Gulf Coast method is currently in use for samples from all coasts. Florisil/silica gel or silica alumina column chromatography were used to separate the analytes.Calibration:The analytical instruments were calibrated by standard laboratory procedures including: constructing calibration curves, running blank and spiked quality control samples, and analyzing reference materials.Quality Control:Each batch of sediment and tissue samples was accompanied by QC analyses consisting of method blanks, matrix spikes, matrix spike duplicates, and standard reference materials (SRMs). In total, approximately 5% of all analyses were QC analyses. Processing quality was considered acceptable if the following criteria were met: blanks were less than three times the minimum detection limit; accuracy, as determined by analysis of certified reference materials, was within 30% for organic analytes and within 20% for inorganic analytes; and precision, as determined by replicate analyses, was within 30% for organic analytes and within 20% for inorganic analytes. Additional specifications and guidelines are presented in Cantillo and Lauenstein (1998).All laboratories annually participate in annual intercalibration exercise where common samples are analyzed by them, by other laboratories, and by a lead laboratory for the exercise. The lead laboratory for trace element intercalibrations has been the National Research Council of Canada and that for trace organic analysis has been the National Institute of Standards and Technology. (end continuation)

- Project related references: Apeti, D.A., W.E. Johnson, G.G.Lauenstein and K. Kimbrough. 2009. National Status and Trends, Mussel Watch Program: Sampling Metods.NOAA Technical Memorandum NOS NCCOS Silver Spring, MD. Kimbrough, K.L., G.G. Lauenstein, and W.E. Johnson. 2007. Organic Contaminant Analytical Methods of the National Status and Trends Program: Update 2000-2006, NOAA Technical Memoranda,NOS NCCOS 30. 22 Apr. 2008 http://www.ccma.nos.noaa.gov/publications/organicsmethods.pdf. Kimbrough, K.L., and G.G. Lauenstein. 2007. Major and Trace Element Analytical Methods of the National Status and Trends Program: 2000-2006, NOAA Technical Memorandum, NOS NCCOS 29. 22Apr 2008. http://www.ccma.nos.noaa.gov/publications/nsandtmethods.pdf. 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: Update 2000-2006, NOAA Technical Memorandum, NOS NCCOS 28. 22Apr. 2008. http://www.ccma.nos.noaa.gov/documents/ancillarymethodsnsandt.pdf. Kim, Y.; K.A. Ashton-Alcox; E.N. Powell, 2006. Histological Techniques for Marine Bivalve Molluscs: Update. Silver Spring, MD. NOAA Technical Memorandum NOS NCCOS 27. 76 pp. Kimbrough, K.L.; Johnson, W.E., Lauenstein G.G., Christensen, J.D. and Apeti, A.D. 2008. Assessment of Two decades of Contaminant Monitoring in the Nation's Coastal Zone. Silver Spring, MD. NOAA Technical Memorandum NOS NCCOS 74. 105pp. Kimbrough, K.L.; Johnson, W.E., Lauenstein G.G., Christensen, J.D. and Apeti, A.D. 2009. Assessment of Polybrominated Diphenyl Ethers (PBDEs) in Sediment and Bivalves of the U.S. Coastal Zone. Silver Spring, MD. NOAA Technical Memorandum NOS NCCOS 94. 87pp. http://www.ccma.nos.noaa.gov/ Apeti, D.A., G.G. Lauenstein,and G.F. Riedel. 2009. Cadmium Distribution in Coastal Sediments and Molusks of the US. Marine Pollution Bulletin 58:1016-1024 O'Connor, T. P. and G. G. Lauenstein. 2006. Trends in Chemical Concentrations in Mussels and Oysters Collected along the U.S. Coast: Update to 2003. Marine Environmental Research 62:261-285. Kim, Y., K.A. Ashton-Alcox, and E.N. Powell. 2006. Histological Techniques for Marine Bivalve Molluscs: Update, NOAA Technical Memorandum, NOS NCCOS 27. 22 Apr. 2008 http://www.ccma.nos.noaa.gov/publications/histopathtechmemofinal.pdf. Cantillo, A. Y. and G. G. Lauenstein. 1998. Performance-based Quality Assurance - The NOAA National Status and Trends Program Experience. In: U.S. EPA Proceedings of the NWQMC National Conference - Monitoring: Critical Foundations to Protect Our Waters. Washington, DC. pp. III63-III73. Lauenstein, G. G. and A. Y. Cantillo. 1998. Analytical Methods of the National Status and Trends Program Mussel Watch Project: 1993 - 1997 Update. NOAA Technical Memorandum NOS ORCA 130, Silver Spring, MD. Lauenstein, G. G. and A. Y. Cantillo. 1997. Analytical evaluation of laboratories wishing to perform environmental characterization studies. Environ. Toxicol. and Chem. 16(7):1345-1350. Lauenstein, G. G., A. Y. Cantillo, S. Kokkinakis, J. Jobling, and R.Fay. 1997. Mussel Watch Project Site Descriptions, through 1997. NOAA Technical Memorandum NOS ORCA 112, Silver Spring, MD. Lauenstein, G.G., A. Y. Cantillo, B. J. Koster, M. M. Schantz, S. F. Stone, R. Zeisler, and S. A. Wise. 1996. National Status and Trends Program Specimen Bank: Sampling protocols, analytical methods, results, and archive samples. NOAA Technical Memorandum NOS ORCA 98. Silver

Spring, MD. (continued)
- (continued from above) Cantillo, A. Y., G. G. Lauenstein. 1995. Use of reference materials in coastal quality assurance. Fresenius J Anal Chem. 352:152-156. 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: Overview and summary of methods, Volume I NOAA Technical Memorandum NOS ORCA 71, Silver Spring, MD. Lauenstein, G. G. and A. Y. Cantillo (eds.). 1993. Sampling and analytical methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992: Comprehensive descriptions of complementary measurements, Volume II NOAA Technical Memorandum NOS ORCA 71, Silver Spring, MD. Lauenstein, G. G. and A. Y. Cantillo (eds.). 1993. Sampling and analytical methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992: Comprehensive descriptions of elemental analytical methods, Volume III NOAA Technical Memorandum NOS ORCA 71, Silver Spring, MD. Lauenstein, G. G. and A. Y. Cantillo (eds.) 1993. Sampling and analytical methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992: Comprehensive descriptions of trace organic analytical methods, Volume IV NOAA Technical Memorandum NOS ORCA 71, Silver Spring, MD. Cantillo, A. Y. and G. G. Lauenstein. 1993. Performance based quality assurance of the NOAA National Status and Trends Project. In: Quality Assurance for analytical laboratories (ed. M. Parkany). Royal Society of Chemistry, Cambridge, England. pp. 34-43. Lauenstein, G. G., M. R. Harmon, and B. Gottholm. 1993. National Status and Trends Program for Marine Environmental Quality: Benthic Surveillance and Mussel Watch Projects monitoring sites. NOAA Technical Memorandum NOS ORCA 70, Silver Spring, MD. 353 pp. Cantillo A. Y. and G. G. Lauenstein. 1992. NOAA National Status and Trends Program intercomparison exercise results. Marine Technology Society, pp. 216-222. Lauenstein, G. G., and N. Valette-Silver. 1991. Evolution of the National Status and Trends Program from 1984 to 1991. Sea Technology, August 1991, pp. 47-52. Shigenaka, G. and G. G. Lauenstein. 1988. National Status and Trends Program for Marine Environmental Quality: Benthic Surveillance and Mussel Watch Projects sampling protocols. NOAA Technical Memorandum NOS OMA 40, 30 pp. (end continuation)

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides

links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:
- 1.6. Type(s) of data
- 1.7. Data collection method(s)
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.2. Name of organization of facility providing data access
- 7.2.1. If data hosting service is needed, please indicate
- 7.3. Data access methods or services offered
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:

https://www.fisheries.noaa.gov/inport/item/39400

6.4. Process for producing and maintaining metadata

(describe or provide URL of description):

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access

NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides

information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
https://products.coastalscience.noaa.gov/collections/ltmonitoring/nsandt/default.aspx
https://products.coastalscience.noaa.gov/collections/ltmonitoring/nsandt/default.aspx

7.3. Data access methods or services offered:

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
National Centers for Coastal Ocean Science - Silver Spring, MD

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.