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:

A Biogeographic Assessment of the Stellwagen Bank National Marine Sanctuary - Kriged Predictive Map of Zooplankton Samples

1.2. Summary description of the data:

Zooplankton communities have been well studied in the northeast Atlantic (Sherman et al., 1983) and on Georges Bank within the Gulf of Maine (Bigelow, 1927; Davis, 1984; Backus, 1987; Kane, 1993; Pershing et al., 2004). Few studies have examined zooplankton spatial patterns within the Gulf of Maine. Twelve years (1977-1988) of zooplankton data from the National Marine Fisheries Service Northeast Fisheries Science Center (NEFSC) Marine Resources Monitoring Assessment and Prediction Program (MARMAP) were obtained to examine spatial and temporal patterns. A subset of the entire database was selected to include all zooplankton surveys in the Gulf of Maine during this time period (Figure 1.7.4). Overall, 6,864 samples were collected within this area; sampling methodology is described in Sibunka and Silverman (1989).

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

One-time data collection

1.4. Actual or planned temporal coverage of the data:

2006-09

1.5. Actual or planned geographic coverage of the data:

W: -74.8846, E: -62.2017, N: 46.307, S: 37.9393

1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
document

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:

- 2005-12-01 00:00:00 - To examine the spatial and temporal patterns of zooplankton abundance and distribution the data were divided into three-year seasonal bins. Yearly bins included 1977-79, 1980-82, 1983-85, 1986-88 and seasons include: spring-March, April, May; summer-June, July, August; fall-September, October, November; and, winter-December, January, February. These binned data were separately mapped in a GIS and interpolated to create a predictive surface of zooplankton abundance throughout the Gulf of Maine. Prior to interpolation, all data were tested for spatial autocorrelation. Spatial autocorrelation is frequently encountered in ecological data, and many ecological theories and models assume an underlying spatial pattern in the distributions of organisms and their environment (Legendre and Fortin, 1989). Typically, species abundance is positively autocorrelated, such that nearby points have similar values than distant points. Moran's I and Geary's C statistics were calculated for all the data to identify significant autocorrelation (Levine, 2002). Detrending was done to standardize estimates across the analysis extent, and is a prerequisite for the interpolation used here. Empirical variograms show the decrease in relatedness between pairs of points as a function of distance. Chapter 1 page 38A Biogeographic Assessment of the Stellwagen Bank National Marine Sanctuary AnalysisSample sizeLag SizeNumber of LagsCross Validation Prediction Map -r2Cross Validation Probability Map -r2Neighbors (total, minimum) spring 77-7936420120.020.035, 2spring 80-8235220120.020.025, 2spring 83-8539120120.580.265, 2spring 86-8832020120.270.265, 2spring all1,22320120.140.145, 2summer 77-7923120120.360.325, 2summer 80-8229820120.300.255, 2summer 83-8536720120.370.395, 2summer 86-8834630120.580.535, 2summer all1,02930120.360.325, 2fall 77-7944620120.360.235, 2fall 80-8232020120.390.315, 2fall 83-8540220120.580.505, 2fall 86-8846320120.550.475, 2fall all1,35220120.470.395, 2winter 77-7917530120.240.195, 2winter 80-8215220120.360.355, 2winter 83-8514720120.540.455, 2winter 86-8822530120.580.555, 2winter all44520120.450.405, 2Table 1.7.1. Summary statistics for NEFSC MARMAP zooplankton ordinary and indicator kriging. In order to calculate the empirical variogram, pairs of points must be binned by distance and an average value calculated for all pairs in a given bin. The size of the bin is called the lag size. A variogram model is fit to the empirical variogram and its parameters are later used in the interpolation. Empirical variograms were calculated using the default lag size and number of lags, as well as for 10, 15, 20 and 30 km lag sizes. The appropriate lag size and number of lags were chosen to optimize variogram coherence. The interpolation method used is termed ordinary kriging. Kriging is a linear interpretation method that allow predictions of unknown values of a random function from observations at known locations (Kaluzny et al., 1998). Ordinary kriging is the method generally used for interpolation of a single continuous variable of unknown mean. Kriging is a preferred method because weights are based on the data's spatial structure (the variogram) and has been shown to outperform other interpolation techniques, such as inverse distance weighting and triangulated irregular networking (Guan et al., 1999). (continued)

- 2005-12-01 00:00:00 - (continued from above) Trend analysis was conducted using JMP statistical software (SAS Institute), while detrending, variogram modeling, and kriging were conducted using ArcMap Geostatistical Analyst Extension (ESRI, Inc.). In addition to creating predictive maps, probability maps were developed using indicator kriging. Indicator kriging is a technique used to identify areas or values that exceed a certain threshold (Isaaks and Srivastava, 1989). Through indicator kriging, data values are transformed into binary indicator values (1 or 0), values which exceed a chosen threshold are coded 1, those below coded 0. These indicators are then analyzed to determine their spatial direction variability with a series of variograms. By inspection of these variograms, orientations of greatest and least spatial continuity are determined. Variogram models are fit to the experimental variograms corresponding to the directional continuity. Then the indicator data are kriged using the variogram models to determine the probability of exceeding the threshold value in a spatial extent. For this analysis, the spatial mean of the zooplankton data was used as the threshold to compare predicted estimates and to also identify areas of high zooplankton abundance.The kriging neighborhood was set to the nearest 5 neighbors with a minimum of 2 to capture small scale variability(NCCOS, 2002). Cross validation was conducted to assess model accuracy by regressing observed versus predicted values (See modeling statistics Table 1.7.1). Maps of the kriging standard error were also generated and used to exclude poorly interpolated areas within the analysis extent. The lowest 50% of standard error was clipped from the interpolated map to depict the areas of strongest interpolation. (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:
- 1.7. 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
- 7.4. 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/39623

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:

7.3. Data access methods or services offered:
Please contact the Stellwagen Banks NMS Research Coordinator for additional information on data access (david.wiley@noaa.gov);

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.