

WORK PLAN

Geographic Information Systems and Data Management Support for the Deep-Sea Coral Research and Technology Program (FY10)



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By

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A Cooperative Investigation by NOS' Center for Coastal Monitoring and Assessment
Biogeography Branch and the Coral Reef Conservation Program

GIS and Data Management Support for Deep-Sea Coral Research and Technology Program (FY10)

GOAL

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) includes a requirement to establish the “Deep Sea Coral Research and Technology Program.” (DSCRT) Section 408 (b) of the reauthorized Act tasked NOAA with submitting, in consultation with the Fishery Management Councils, “biennial reports to Congress and the public on steps taken by the Secretary to identify, monitor, and protect deep sea coral areas, including summaries of the results of mapping, research and data collection performed under the program.” This work plan addresses several of the primary goals of the DSCRT. The highest priority for DSCRT in every region of the U.S. is to locate, map, characterize, and conduct a baseline assessment of deep coral habitats. This plan will address the needs for mapping the locations of deep-sea coral and sponge ecosystems, conducting geospatial analysis, and developing a data management approach for the program. The project will evaluate existing geospatial information and determine priorities for future data collection.

OBJECTIVES

1. Collect and integrate available information on the status and distribution of deep-sea coral and sponge ecosystems.
2. Develop approaches and tools to analyze and display information on the activities that may impact deep-sea coral ecosystems. Primary focus will be on interactions with commercial fisheries.
3. Initiate the development of a DSCRT data management plan to be integrated and implemented within the Coral Reef Conservation Program Data Management Plan.
4. Produce maps and conduct spatial analysis and predictive modeling to support the DSCRT program.
5. Maintain coordination and consistency for GIS and data management matters associated with field activities on the Southeast and West coasts.

BACKGROUND

NOAA is the lead federal agency mandated to conserve and manage the nation’s marine resources, including deep-sea coral and sponge ecosystems. NOAA’s Coral Reef Conservation Program (CRCP) was established in 2000 to help fulfill NOAA’s responsibilities under the Coral Reef Conservation Act (CRCA) and Presidential Executive Order 13089 on Coral Reef Protection. The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) includes a requirement to establish the “Deep Sea Coral Research and Technology Program.” Section 408 (b) of the reauthorized Act tasked NOAA with submitting, in consultation with the Fishery Management Councils, “biennial reports to Congress and the public on steps taken by the Secretary to identify, monitor, and protect deep sea coral areas, including summaries of the results of mapping, research and data collection performed under the program.”

Mandates for deep-sea coral and sponge data management define a starting point for planning the management of data generated both inside and external to the Program. Under Section 408 *Deep-Sea Coral Research and Technology Program* of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), a subset of the mandates that established the program define the minimum requirements for data management:

(a) IN GENERAL - The Secretary, in consultation with appropriate regional fishery management Councils and in coordination with other federal agencies and educational institutions, shall, subject to the availability of appropriations, establish a program -

- (1) To identify existing research on, and known locations of, deep-sea corals and submit such information to the appropriate Councils;
- (2) To locate and map locations of deep-sea corals and submit such information to the Councils;
- (3) To monitor activity in locations where deep-sea corals are known or likely to occur, based on best scientific information available, including through underwater or remote sensing technologies and submit such information to the appropriate Councils:

The *NOAA Deep-Sea Coral and Sponge Research and Management Strategic Plan* further defines the need for data management and reporting as follows:

Appropriate research and development is needed to maximize the quality and efficiency with which NOAA acquires, manages and distributes its data and associated products and services to ensure they are accurate, reliable, secure, understandable, timely, appropriate and readily accessible. To ensure that information from NOAA's exploration and research on deep-sea coral and sponge communities is available to the research and management communities, NOAA will take the following steps:

- Provide access to NOAA deep-sea coral and sponge data and information, including metadata, links to online data (i.e. regional map servers), products and publications. Addresses Deep Sea Coral Research and Technology Program requirement (Appendix A: MSA Sec. 408(a)1).
- Prepare mandated biennial reports to Congress and the public on steps taken by NOAA to identify, monitor, and protect deep-sea coral areas, including summaries of the results of mapping, research, and data collection performed under the program. Addresses Deep Sea Coral Research and Technology Program requirement (Appendix A: MSA Sec. 408(b)).
- Develop and produce a quadrennial report on the State of Deep-sea Coral and Sponge Ecosystems of the United States.

The Biogeography Branch has extensive experience in addressing the objectives for this project. BB has supported DSCRTP with the integration of information and the development of cartographic products to support reporting requirements for the program. BB has extensive experience developing geospatial information on the abundance and

distribution of coral reef ecosystems. BB had the lead role in developing a comprehensive atlas of US shallow-water coral reef ecosystems and is best positioned to develop the deep-sea coral ecosystem inventory in a format and approach which will be compatible with other coral reef conservation efforts. BB's background in mapping coral reef ecosystems has also provided the program with extensive experience address product utility and user's needs.

Additionally, BB has extensive experience collecting deep-sea ecosystem information, including the collection, processing, and analysis of sonar data. This experience will be directly relevant to addressing objective 4, particularly the predictive modeling to identify potential deep-sea coral ecosystems.

Recently, BB and the National Marine Fisheries Service (NMFS) collaborated on the EcoGIS project. This project focused on four priority areas: Fishing catch and effort analysis, Area Characterization, Bycatch Analysis, and Habitat Interactions. This experience, and the development of the EcoGIS tools will directly support the second objective of the project and leverage past investment in these capabilities.

PROJECT OVERVIEW

GIS and data management support will be critical to meeting the objectives of the DSC program. There is a clear need for GIS technical expertise, data management, and coordination between internal and external partners for both GIS and data management in order to meet the program's objectives. Additionally, there is a need to develop an approach to predictive modeling which will support the continued inventory and research for deep-sea coral and sponge ecosystems. This project will also address the need to maintain consistency and compatibility between data management efforts for DSC ecosystems and shallow-water coral reef ecosystems. It will address the need for GIS and data management coordination with field activities on the Southeast and West coasts. The project will include the collection of records on the locations of DSC ecosystems, the analysis of DSC locations with respect to fisheries interactions, and the development of cartographic products to support the second report to Congress from the DSCP.

This project will address the primary needs for GIS and data management to support the activities of the DSCP.

PROJECT TASKS

Task 1. Collect existing data on the locations and distribution of Deep-Sea Corals

(Estimated completion date: ongoing)

One requirement of the DSCRT is to locate and characterize deep-sea corals and to provide this information to the Fishery Management Councils and the public. NOAA has identified that it plans to expand these efforts to include sponge dominated habitats. There are already several deep-sea coral location databases. Some are held by academic institutions, some by government agencies, some by international bodies, and others held by individuals. The current set of known U.S. deep-sea coral and sponge locations has not previously been brought together to enable a current inventory of the status of the resources. We will collect available data on the locations of deep-sea corals and sponges. During the development of the DSCP & CRCP integrated data management plans, the inventory of deep-sea coral locations will be held and managed

locally within the Biogeography Branch. The development of this database will be a collaborative process involving internal and external partners. Following the development of a formal data management structure, this information will be integrated and managed through the established procedures.

Task 1. Products:

- Initial list of targeted datasets and their managers
- Maps produced for the 2nd biennial report to Congress
- Integrated inventory of deep ecosystem locations to be held at BB pending development of data management system for DSCP.

Task1. Milestones:

- Initial collection of deep ecosystem locations in support of the second biennial report to Congress. (potential completion dependant on successful data collection, December, 2009)
- Year-end inventory status database. (September 2010)

Task 2. Tracking and analyzing human impacts

(Estimated completion date: on-going)

Develop collaborations with Fisheries Science Centers to characterize fishing locations and intensity. Address variations in gear and respective potential impacts on deep-sea resources with a primary focus on bottom-contact gear.

Develop maps and analysis indicating the spatial relationship between fishing and deep-sea coral habitats. This component will be supported in part by leveraging the EcoGIS tool developed by NMFS and BB to support this type of analysis.

Secondarily: Develop approaches to identify and analyze information on other activities that may affect deep-sea ecosystems, such as oil, gas, and mineral exploration and submarine cable and pipeline deployment.

Task 2 Products:

- Maps of fishing intensity (when possible including gear types)
- Analysis of fishing in relation to deep-sea coral habitats and potential impacts.
- Analysis of the spatial distribution of other human activities that may impact deep-sea coral reef habitats, beyond fishing interactions.

Task 2 Milestones:

- Maps of fishing locations, intensity, and interactions with deep-sea coral reef ecosystems in support of the second biennial report to Congress. (potential completion dependant on successful data gathering, Early December, 2009)
- Identification of initial human impacts to be included in future analysis (September, 2010)

Task 3. Data Management

(Estimated completion date: on-going)

In consultation with line offices, the deep-sea coral team, the deep-sea coral working group, NOAA internal data managers, and external partners, develop and implement a plan for data management to serve the needs of the Deep-Sea Coral program. The data management plan will ensure that information concerning deep-sea coral and sponge

communities is collected, preserved and made available in a useful format to research and management communities.

Initial steps in the development of the data management plan will include:

- Identification of key data repositories both internal and external
- Identification of key partners associated with DSC data management
- Identification of key users and their needs
- Identification of resources which are available for and can support DSC data management

Following an initial review of the current status of DSC data management, data, data managers, and data users, initial concepts will be developed for discussion. After key partners both internal and external have been identified, a Deep-Sea Coral Data workshop will be planned and executed. Following the workshop, an initial plan for deep-sea coral data management will be drafted. Once a data management plan has been developed and approved, the plan will be implemented. Implementation of the data management plan is expected in FY11.

Task 3 Products:

- Initial list of data sources, available information, key partners in data management, and key users.
- Results from Data Management workshop.
- Draft plan for DSC data management.

Task 3 Milestones:

- Initial list of data sources, available information, key partners in data management, and key users (April, 2010)
- Data Management workshop (June, 2010)
- Draft plan for DSC data management (September, 2010)

Task 4. Represent Deep-Sea Coral Program in the development of the CRCP Data Framework and the development of a CRCP Data Management Plan

(Estimated completion date: on-going)

Participate in the CRCP Data Management Working Group and serve as representative for the needs of the DSCP. Develop consistencies across shallow and deep water programs. Leverage the efforts of the CRCP and the larger organization to assist in serving the data management needs of the DSCP.

Task 4 Milestones:

- CRCP Data Management Plan (on-going)

Task 5. Predicting Deep-Sea Ecosystem distributions

(Estimated completion date: on-going)

Most of the potential areas where deep-sea ecosystems may be located have yet to be surveyed. Deep-sea surveying is expensive, time-consuming, and considerably limited by the need for substantial technical resources, such as ship time, ROVs, AUVs, and other requirements for deep-sea surveying and research. To support the continued identification of locations of deep-sea ecosystems, the DSCP will work in collaboration with internal and external partners to develop a robust approach to predictive modeling for deep-sea ecosystems. Several programs throughout the globe have begun efforts to

develop predictive models for deep-sea ecosystems. We will plan to develop our efforts in collaboration with existing efforts. Initial contacts and collaborations will be developed during FY10 with development of predictive models expected to begin in FY11.

Task 5 Products:

- Initial contacts and discussion for collaborations

Task 5 Milestones:

- A plan for developing predictive models will be drafted (September, 2010)

Task 6. Regional Coordination

(Estimated completion date: on-going)

Field activities are already underway in the Southeast region. In FY10 activities will also be initiated on the west coast. Information generated from these activities will need to be retained, analyzed, and managed for future use. There will also be a need to insure consistent communication between regions and with the national program to insure that objectives are met in a consistent fashion to enable cross regional and national analysis. BB will coordinate with regional efforts to enable consistency across regions and to track regional activities and the information they generate.

Task 6 Milestones:

- South Atlantic Regional mapping and research (initiated FY09)
- West Coast mapping and research (initiated FY10)

PROJECT PERIOD

October, 2009 through September, 2010

PROJECT TEAM

The CCMA Biogeography Branch of the National Centers for Coastal Ocean Science (NCCOS) will lead this collaborative effort in partnership with the Coral Reef Conservation Program – Deep-Sea Coral Group.

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