CENTRAL REGION INTEGRATED SCIENCE PARTNERSHIP FUNDS
Project Proposal

Project Title: Gulf of Mexico Coastal Ecosystems: An Integrated Database and Information Management System (DIMS)
Principal Investigators: Multiple Co-Principal Investigators from U.S. Geological Survey (USGS) Biology (James B. Johnston, Gary Brewer, and Paul Dresler), Geology (Jack Kindinger, Kim Yates, and David Ferderer), Geography (Pat O'Neil, Mike Crane, Jill Cress, and John List), Water (Joe Broadus and David Walters).
Partners/Collaborators and Affiliations: Federal and State agencies and academic institutions involved in the Gulf of Mexico region
Total Funding Requested: $150,000 (FY04 and FY05)
Proposal Submission Date: September 2003

Problem: The Gulf of Mexico region is defined by environmental and economic conditions that transcend state and country boundaries, representing a host of critical integrating and conflicting factors such as mineral resources, fisheries production, ecological habitats for marine life and waterfowl, and human demands with subsequent anthropologic impacts. As more research is being conducted in the region to help understand these conditions and factors, it becomes crucial to make research results, information, and data accessible to all. Understanding the gulf's ecosystems and its changes is dependent on the quality of documenting and modeling the interrelationships of physical, chemical, and biological parameters. From several workshops (Central region's 2000 Focus Areas and the USGS Integrated Database Tampa 2000), the need for a USGS clearinghouse for gulf information was the number one recommendation. With the four USGS disciplines working in the region and the repeatedly expressed need for an easily accessible information outlet, a holistic and integrated approach can be taken to achieve such a goal.

Objective: The goal of the DIMS for the Gulf of Mexico region is to provide a comprehensive collection of hydrologic, geologic, biologic, and spatial information for onshore and offshore ecosystems through a database driven Internet system. A similar and very successful system, created and maintained by the USGS National Wetlands Research Center and the Center for Coastal and Watershed Studies, is the USGS Gulf of Mexico Integrated Science website (http://gulfsci.usgs.gov). Although the existing site has specific geographic focus areas (Tampa Bay, Galveston Bay, and Coastal Louisiana), the proposed DIMS will enhance this system and expand into the offshore gulf regions.

Scope: To accomplish this goal of creating a data information management system for the Gulf of Mexico, several components for the system will be developed over a 2 year period. The design and implementation of a data driven website and relational database consisting of geological, ecological, biological, chemical information, and spatial data will be the primary task for this project. The integrated database will be searchable by keyword, data type, location, and other criteria as the data dictate.

Approach: The development and implementation of the DIMS is a 2 year phased project, beginning with the acquisition of data sets along with discovery of researchers' needs for a data management system. Input from researchers will only benefit the development of the DIMS's

archiving, indexing, and searching capabilities and will increase the usefulness of the system. Within the first year, standards will be developed for the storage of data sets to include the creation of metadata for all data sets. Federally compliant metadata will serve as a means of documenting data sets, which will be distributed online, and will be searchable, and of archiving those data sets that are sensitive in nature (not distributed). The DIMS will be paired with a relational database management system for storing data products developed from gulf research projects. The relational database will provide the back-end to the Web interface. External Network Attached Storage (NAS) will handle the large data sets, such as imagery, and an Arc Interactive Mapper Server (IMS) application will provide users with the geographic information system (GIS) functionality. Additionally, special projects for the DIMS will be developed by the various Disciplines to enhance and showcase specific science and technology datasets.

Benefits: The sharing of and accessibility to gulf-wide data will be beneficial to all researchers working in the region, to resource managers, to policy makers, and to the general public. This clearinghouse of information and data will encourage the development of a synthesis and interpretation phase for the Gulf of Mexico Integrated Science Project and simultaneously act as a foundation for an integrated ecosystem modeling component of the gulf region.

Outcome/Products: The DIMS will provide researchers, managers, and the public with:

- data and information management system (DIMS) for the various USGS disciplines, accessible through the USGS Integrated Science website;
- user-friendly means of communicating and distributing information on the Gulf of Mexico region, with emphasis on the USGS's Status and Trends Monitoring Programs. For BRD, the DIMS will promote and enable us to take the first step to: inventory major long-term biological monitoring activities and the methods and protocols utilized by them; identify major data sets of biological status and trend; and identify major data repositories of biological status and trend information.
- clearinghouse for study results, allowing for a comprehensive archive of data products related to Gulf of Mexico region and Outer Continental Shelf (OCS);
- the ability to view and manipulate spatial data from the desktop, or "GIS on the web", and;
- will provide a foundation for a multiphase synthesis and interpretation activities and future modeling efforts.

Budget: For the 2-year project, a total of $150,000 will be needed to design and implement the data information management system. The additional $150,000 will be sought from the Eastern Region DOI Landscape Funds. The following budget represents the FY04 funds ($75K) from CRISP. These funds will also only be used primarily for the Texas and Louisiana portion of the Gulf of Mexico.

FY04 Suggested Budget Breakdown by Discipline:

(1) Biological Resources Discipline - $45K
Funds will be used to canvass the USGS entities for Gulf of Mexico data and the development of DIMS.

(2) Water Resources Discipline (Louisiana and Texas) District and Subdistrict Offices - $20K

Funds will be used to organize WRD project data files and in design of an Interactive Map Server (IMS).

(3) Geology Discipline - $10K
Funds will be used to organize and make accessible energy data and the Geologic Framework studies with the IMS/DIMS.

For FY05, the $75K breakdown will probably duplicate FY04.

Timeline: For the first year, activities will include:

- location of and acquisition of USGS data sets;
- initial development and design of the relational database component, the Web based IMS system and the GIS component;
- discovery of researchers' data needs; and
- special Discipline projects for inclusion into the database.

For the second year, activities will include:

- beta testing and refinement of the database and GIS components;
- solicitation of user input of the system;
- additions and/or modifications of the database as data are discovered and acquired; and
- scoping session for the development of the synthesis and interpretation phase and the modeling component.

Funding Sources: DIMS component, design, and implementation: USGS Central Region, Integrated Partnership Funds ($150K) for FY04 and 05. USGS Eastern Region DOI Landscape Funds ($150K). DIMS component, subsequent years: Federal and State partners (including EPA Gulf of Mexico Program, NOAA, Gulf States, $150K/year total).

Subtasks Proposals

Geography Division Eastern Region Gulf of Mexico DIMS Project Proposal

Project Title: Gulf of Mexico Coastal Ecosystems: An integrated database and information management system (DIMS).
Task Title: Data Agreements and Data Acquisition
Task Principal Investigator: Co-Principal Investigators: Michael Crane and Julia Giller
Partners/Collaborators and Affiliations: Federal, state and local government agencies and academic institutions involved in the Gulf of Mexico region.

Total Funding Requested for Task: $20,000 for FY04 and $20,000 for FY05.

Introduction: The Gulf of Mexico region is characterized by environmental and economic issues that transcend traditional political boundaries and involve a host of critical integrated and conflicting factors such as mineral resources, fisheries production, ecological habitats for marine life and waterfowl, and urban growth and its attendant anthropogenic impacts. With increasing research being conducted in the region to help understand these conditions and factors, it becomes crucial to make research results, information, and data widely accessible. The ability to understand the Gulf's ecosystems and its changing character is dependent on accurately modeling and documenting the interrelationships of physical, chemical, and biological parameters. The four USGS disciplines will collaborate on creating an easily accessible outlet for information about the Gulf of Mexico and its environs.

Objective: The goal of the DIMS for the Gulf of Mexico region is to provide a comprehensive collection of consistent geological, biological, hydrological, geographical, and ecological spatial information through a database driven Internet Mapping System. This task will facilitate the establishment of the DIMS by determining data sources, establishing official agreements with data providers throughout the Gulf of Mexico region to ensure data availability, and acquiring geospatial data sets in support of the project.

Approach: Task members will contact Federal, State, and local government agencies and academic institutions regarding geospatial data sets and their accessibility. Where appropriate, official agreements will be established between the USGS and the data sources to ensure data access and sharing. When agreements are in place, geospatial data sets will be acquired and loaded onto the Internet map Server. Federally compliant metadata will serve as a means of documenting and searching for data sets that will be distributed online as well as those data sets that are sensitive in nature and not distributable. Task members will document the utility of the DIMS by the user community and provide feedback to the system designers.

Benefits: The sharing and accessibility of consistent Gulf-wide geospatial data sets will benefit researchers, resource managers, policy makers, and the general public. The clearinghouse will facilitate development of a variety of syntheses and interpretations, and serve as a foundation for integrated ecosystem modeling of parts of the Gulf of Mexico. In addition, the DIMS will contribute to *The National Map* effort of the USGS by providing access to both cartographically and scientifically relevant data.

Outcome/Products: This task will provide the project with:

- official agreements with Federal, State, and local government agencies and academic institutions for sharing data and information.
- geospatial data sets that are consistent in content, scale, resolution, date, and metadata.
- user feedback on the ease of use of the DIMS.

Budget: FY 2004

Michael Crane	$10,000
Julia Giller	$10,000
	$20,000

FY 2005

Michael Crane	$10,000
Julia Giller	$10,000
	$20,000
	Total = $40,000

Timeline: First year activities will include:

- determination of data sources
- development of agreements to access and share information

Second year activities will include:

- continued development of agreements
- data acquisition and metadata development

Central Energy Resources Team Proposed Work for the Gulf of Mexico Coastal Ecosystems Project

Project Title: Gulf of Mexico Coastal Ecosystems: An Integrated Database and Information Management System (DIMS)

Project Dates: October 2004 – September 30, 2006

Co-Principal Investigators: David A. Ferderer, Data Management Project Chief,
Curt Huffman, Gulf Coast Geologic Framework Studies Project Chief, USGS Central Energy Resources Team, Denver CO 80225

Funding Requested: $10,000.00 in FY 2004; $10,000.00 in FY 2005

Objective: To service geologically based, energy information needs of the Gulf of Mexico Coastal Ecosystems, Integrated Database and Information Management System (DIMS) through the contribution of selected geospatial information assets and services.

Approach: The approach taken by the Central Energy Resources Team (CERT) to meet this objective will focus on providing information assets and services in a variety of ways. The first approach will consist of the contribution of discrete data assets in a traditional, file based fashion. This may include the transfer of datasets in a variety of formats to a centrally managed system administered by DIMS project staff. The second approach will be to provide access to a variety of locally controlled and managed web services which can be easily integrated into the DIMS system in a distributed fashion using well documented, industry standard, web protocols and technologies including accepted OpenGIS specifications and vendor specific implementations including ArcIMS and ArcXML.

Tasks and Deliverable Products: Staff from the Data Management Project and Gulf Coast Framework Studies Project will identify, locate, organize, and document digital information holdings within CERT that coincide with the Gulf Coast Ecosystem research area of interest. These assets will include geospatial datasets and services associated with the following Projects:

- CERT's 1995 and 2000 National Oil and Gas Resource Assessment
- Energy Policy Conservation Act (EPCA) priority oil and gas assessments
- Gulf Coast Geologic Framework Studies (pending publication)

Specific tasks performed by CERT will include:

- Provide a detailed listing of potential applicable geospatial information assets and services.
- Provide expertise and utilize techniques, tools, and capabilities developed in the Central Energy Team Data Management Project and prototype NOGA Online interactive map (IMS) capability to support the development of an information clearinghouse.
- Organize and transfer specified geospatial datasets to DIMS system administrative staff.
- Provide access to a variety of web based distributed services for use within the DIMS system including Internet Mapping and Metadata Services.
- Provide additional energy commodity resource information such as coal and coalbed methane in the form a datasets and services as they become available.