

STUDY TITLE: EcoSpatial Information Database (ESID)

REPORT TITLE: EcoSpatial Information Database: U.S. Atlantic Region

CONTRACT NUMBER: M09PC00047

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREAS: North, Mid- and South Atlantic

FISCAL YEARS OF PROJECT FUNDING: 2009-2013

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COSTS: \$2,050,952

PROJECT MANAGER: Keld Madsen

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KEY WORDS: Ecospatial; Atlantic; OCS planning areas; ecology; database; geospatial; GIS; geology; water quality; pelagic ecology; benthic ecology; infauna; meiofauna; demersal fishes; coral; hardbottom; seagrass; Refworks; Reference Manager; ArcMarine; file storage; study footprint

BACKGROUND: Leasing and management of offshore bottomlands in Federal waters are the responsibilities of two sister agencies that formerly constituted the Minerals Management Service: the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE). The Offshore Energy Act of 2005 further charged BOEM and BSEE with the responsibility of leasing the Outer Continental Shelf (OCS) bottomlands for renewable energy activities. These responsibilities existed against a backdrop of presidential withdrawals and Congressional moratoria that prohibited oil and gas leasing. In July 2008, President George W. Bush lifted the withdrawals on oil and gas leases that had been put in place by previous presidents and in October 2008, the 26 year old Congressional moratorium on oil and gas leasing was allowed to expire. Shortly thereafter, BOEM issued a Request for Comments on a new 5-year leasing plan for the Atlantic Coast OCS covering the period from 2010 through 2015. BOEM immediately became responsible for ensuring that the appropriate environmental studies were performed in support of this leasing plan.

To support management and decision-making and to assist with National Environmental Policy Act (NEPA) assessments required for issuing permits for energy activities, BOEM needed access to relevant ecological information for the Atlantic OCS. Because it had

been a lengthy time since any leasing activities had taken place in the Atlantic OCS, the studies and research conducted in the intervening years would need to be identified and acquired. To avoid having to collect this data on an ad hoc basis for each new leasing action, BOEM personnel conceived of a comprehensive EcoSpatial Information Database (ESID, "ee-sid") that would support BOEM's efforts.

OBJECTIVES: 1) To conduct a comprehensive literature and dataset search of specifically identified scientific topics to collect ecological resources relevant to the project area, 2) to design a robust geospatial database to manage and store these ecological resources, and 3) to allow both public and authenticated BOEM users to access and query the database via advanced content and geographic search techniques.

DESCRIPTION: The project area extended from the U.S. East Coast to the Exclusive Economic Zone within BOEM's North Atlantic, Mid-Atlantic, and South Atlantic OCS planning areas; a subset of specified Areas of Interest were targeted for additional data extraction (Figure 1). Comprehensive protocols were developed and executed for all elements of the project, including: 1) Data Collection and Documentation, identification and evaluation of resources; 2) Geospatial Evaluation and Documentation, geographic characterization of the collected resources; and 3) Database Development, design and implementation of the geospatial database and associated applications. A rigorous quality assurance/quality control program was implemented on all levels of the project to validate the processes and results.

Data collection began by defining the type of information, or Resource Categories, to be included in the ESID. The Internal Science Review Team (ISRT) was responsible for creating keywords and developing criteria and relevance matrices to evaluate potential resources. A keyword-based search was performed, the resulting titles were evaluated, and abstracts were obtained and prioritized to determine which complete document resources would be acquired and converted into searchable PDF format for ultimate inclusion in the system. RefWorks® bibliographic database served as the primary repository for the bibliographic metadata for the document resources. Simultaneously, websites specified by the ISRT and BOEM were searched for relevant datasets. Results were tracked, evaluated, and prioritized and relevant data resources were acquired. All data collected for inclusion in the ESID underwent a final quality control and standardization process. Location information was extracted from the resource documents and used by the GIS team to digitize the resource boundaries as GIS Layers. The ArcMarine® data model served as the structure for all resource boundary layers.

The ESID Geodatabase was designed to integrate elements of the multiple databases that were used throughout the project for data management. The original contract scope called for development of the ESID user interface to be an ESRI® ArcMap® Desktop implementation. A subsequent contract modification changed this requirement to provide access to the ESID through a web map interface using ESRI® ArcGIS Server® 10 hosted in Amazon's EC2® virtual environment (the cloud).

SIGNIFICANT CONCLUSIONS: Although the ESID is one of a number of Coastal Marine Spatial Planning systems being introduced for ocean sustainability, it is unique in that it provides an application to search resources and display their spatial boundary on the map. As a cloud-hosted GIS web application, the ESID provides broad access to ecological data and supporting documents and will greatly improve the speed of the permitting process associated with renewable energy activities. The system is designed for future expansion to accommodate the integration of new data types and to incorporate additional geographic regions.

STUDY RESULTS: Over 27,000 scientific papers and environmental reports, as well as approximately 10,000 web links were identified and scientifically screened. During the prioritization process, it was determined that 2,707 documents and 394 web links were relevant to the ESID. Data from these resources were extracted, geospatially referenced, and incorporated into the system resulting in a comprehensive geodatabase of scientific literature and dataset resources for the project area. The user friendly web map interface allows users to interact with the database and perform advanced searches by content and location, apply filters to refine search parameters, view citations and abstracts, generate reports, view documents that are not subject to copyright restrictions, print map displays, identify mapped features, and upload additional resources.

STUDY PRODUCTS: Madsen, K., B. Zimmer, B. Fritze, L. Manzello, and K. Metzger. 2014. EcoSpatial information database: U.S. Atlantic Region. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, Louisiana. OCS Study BOEM 2014-058. 281 pp.

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ESID Web Application and populated Geodatabase: <http://esid.boem.gov/>

*P.I.'s affiliation may be different than that listed for Project Managers.

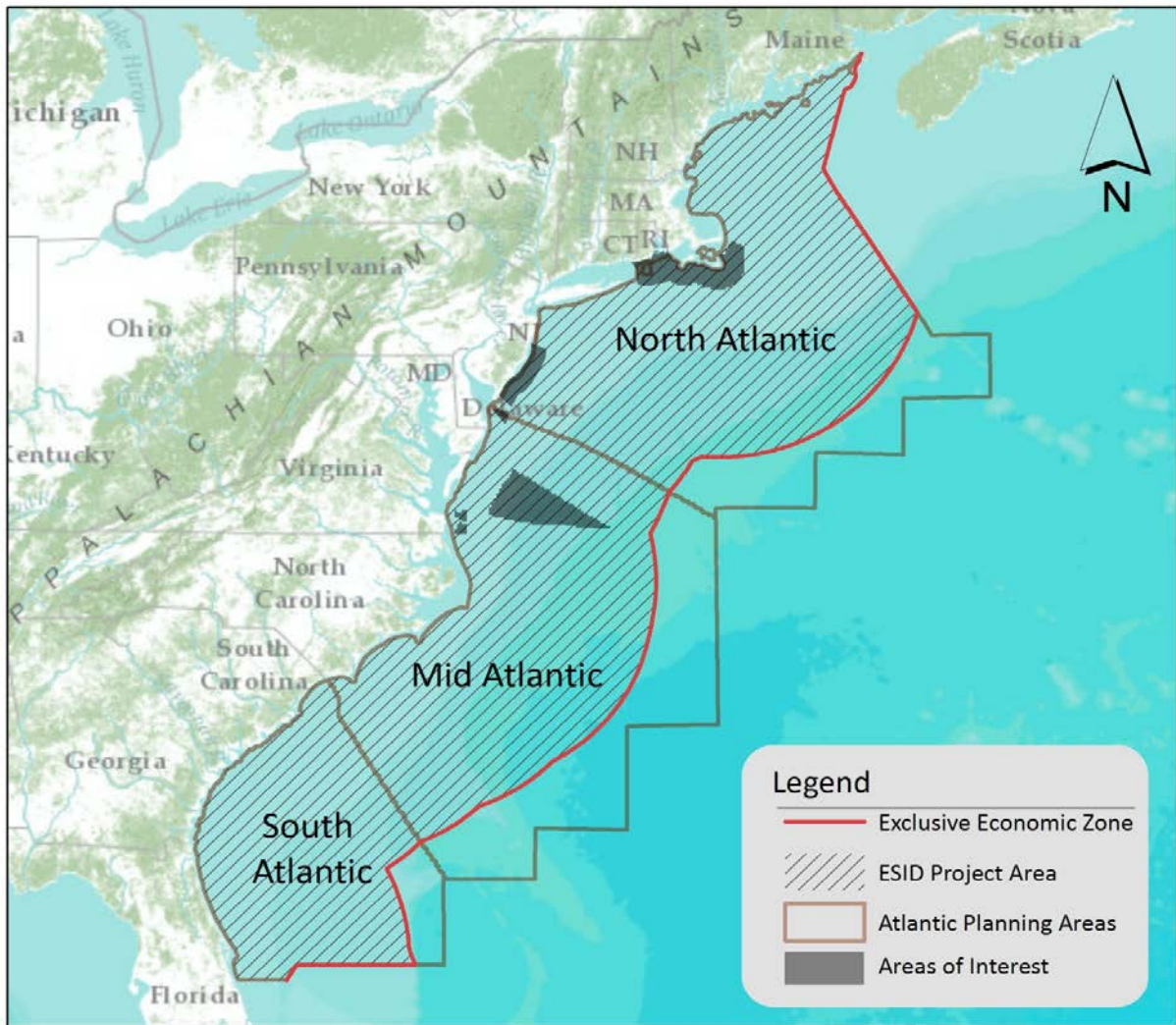


Figure 1. Project area for the EcoSpatial Information Database in the BOEM-BSEE North, Mid-, and South Atlantic OCS planning areas showing a subset of special areas of interest.

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