A National Outer Continental Shelf Sand / Sediment Inventory

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February 7, 2017

Restoring and Protecting Our Nation’s Coasts through Stewardship of OCS Resources
Agenda

MMPGIS Overview

Sand Resource Analysis Tool Prototype
  —How the tool works
  —Preliminary results

Collaboration
  —Partner data incorporated into the MMPGIS
  —Managing multiuse conflicts

Future
What problem are we trying to solve by developing a Marine Minerals Geodatabase?

The need to know where compatible sand / sediment resources in the OCS to support coastal restoration and marine spatial planning.

What questions will the MMPGIS support?

- Where are the OCS sand / sediment resources to inform management decisions within ocean planning and lease use?
- What is the extent of compatible sand / sediment resources in the OCS to support restoration?
- Where is the authoritative source data for sand resources?
- What vital marine mineral products and data on national, regional, and local scales do managers, planners, and scientists need?
- How do we improve sharing marine mineral datasets with our partners?

*MMPGIS will provide capability for a National OCS Sand / Sediment Inventory*
MMPGIS Overview

Developing a Marine Minerals Enterprise Geodatabase

Collect, Analyze, and Process

Transform

Bathymetry

Sub-bottom seismic

BOEM Line NY 107

Sidescan

BOEM Line NY 102 East Montauk

Vibracores

NY-BOEM-2015-VC09

0.0’-2.0’

Bathymetry & Backscatter

Environmental Data

Bottom Characteristics

Leasing / Planning/Construction

Lease Areas
Dredge Areas
Beach Placement Areas
Outer Continental Shelf Study Area
Beach Study Areas
Avoidance Areas
Sand Resources
MMPGIS Overview

MMP Historical and New Cooperative Agreement Data Development
(Leasing Projects, Studies, Cooperative Agreements)

- 5,764 files requiring manual data entry identified as of July 2016, files containing core logs/handwritten notes

16% of the data inventoried still requires manual extraction
MMPGIS Overview

Sand Resource Analysis Tool

SRAT to support the National OCS Sand / Sediment Inventory
Historical Data

New Jersey Sediment Resources

Sand Resources
- Proven
- Probable
- Potential
- Possible
- Unusable

Tracking Sand Resources through Time

- 2004, 12.4 mcy
- 2007, 17.9 mcy
- 2015, 31.3 mcy
Prototype Sand Resource Analysis Tool

Inputs
- Minimum Volume
- Min Grain Size
- Max Grain Size
- Munsell

Reconnaissance look at finding potential sediment resources for coastal restoration
Prototype

Sand Resource Analysis Tool
Sand Resource Analysis Tool

$X, Y, \text{ New } Z \rightarrow \text{ Bottom horizon surface raster}$

Coastal Relief Model – New Raster $\rightarrow$ Isopach raster
Prototype

Sand Resource Analysis Tool

Sand Resources
- Possible
- Potential
- Probable
- Proven
- Unavailable

SRAT Results
- > 1,000,000 y³
- < 1,000,000 y³
Prototype

Sand Resource Analysis Tool

- With only limited core samples, able to identify major resources
- Still in prototype
- Need to incorporate more data into MMPGIS
  - Additional core data
  - Manual data entry of current core data supporting documents
- Version 2
  - Input bathymetry raster
  - Additional criteria
  - Output report with summary statistics
Collaboration

Federal and State

Educational Institutions

- University of Delaware - Delaware Geological Survey
- Stony Brook University
- University of Rhode Island
- University of New Hampshire
- University of Massachusetts Amherst - Massachusetts Geological Survey
- College of Charleston
- Dept of Geological Sciences, East Carolina University & UNC Coastal Studies Institute
- Skidway Institute of Oceanography, University of Georgia
- University of Southern Mississippi
- Louisiana State University
- The University of Texas
- Texas A&M University

Industry

- Coastal Engineering Consulting Firms
- Geospatial Services
- Cloud Services
Collaboration
Developing a Marine Minerals Enterprise Geodatabase

Maryland Department of Natural Resources, Maryland Geological Survey
Baseline Acoustic Seafloor Classification of Offshore Borrow Area

New Jersey Geological and Water Survey
Department of Environmental Protection

Bottom Classification
Sand Resource Area Thickness

Organize
Bathymetry & Backscatter
Environmental Data
Bottom Characteristics
Leasing / Planning/Construction

Lease Areas
Dredge Areas
Beach Placement Areas
Outer Continental Shelf Study Areas
Beach Study Areas
Avoidance Areas
Sand Resources

Figure 1. Significant Sand Resource Areas in State and Federal Waters offshore Monmouth County, GMS 15-3, Plate 1.
Collaboration

Knowing where resources are allows for faster engagement with other OCS stakeholders.

Multi-Use Management – Marine Spatial Planning
Identification and Analysis of Sediment / Sand Resources

BoEM Environmental Studies Program

Marine Minerals Program Geospatial and Information System (MMPGIS)

Environmental Samples

- Grab Samples
- Core Samples
- Water Samples
- Camera Stations
- Endangered Species Impacts

Bathymetry & Backscatter

- Single Beam Survey Depth
- Single Beam Survey Backscatter
- Multibeam Sonar Survey Depth
- Multibeam Sonar Survey Backscatter
- LiDAR Survey Depth
- Magnetometer Surveys
- Side Scan Sonar

Environmental Data

- Grab Samples
- Core Samples
- Water Samples
- Camera Stations
- Endangered Species Impacts

Bottom Characteristics

- Faults
- Isopachs
- Contours
- Tracklines
- Seabed Features (geological/acoustic/magnetic)
- Primary and Secondary Sediments
- Seismic (anomalies/facies)
- Paleo Channels
- Acoustic Profiles

Collaboration

Marine Minerals Program Geospatial and Information System (MMPGIS)
## 2017 – 2018 Objectives

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<thead>
<tr>
<th>Objective</th>
<th>Success Measures</th>
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<tr>
<td>Integrate MMP and partner agency geospatial data and related non-geospatial information into a uniform data model that enables MMP to characterize and delineate sand resources on the Outer Continental Shelf (OCS) and support resource decisions</td>
<td>MMP Relational Geodatabase capability utilized by BOEM within 2 years</td>
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<td>Create an OCS sand resource inventory for MMP</td>
<td>Establish a national inventory in 2017 for the Gulf of Mexico and Atlantic</td>
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<td>Create custom reporting and analysis tools to facilitate use by scientists, managers, and planners</td>
<td>Applications realized within 3 years</td>
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<td>Establish data stewardship and data structure for the Marine Minerals Program (Leverage historic data by converting to a standardized, digital format)</td>
<td>85% of digital data structured and 10% of manual core data incorporated by 2017</td>
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<td>Sand Resource Area datasets (authoritative data) registered on Marine Cadastre / Data.gov</td>
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<tr>
<td>Support productive local, state, and Federal collaboration and geospatial information exchange across all levels of government</td>
<td>Data retrieveable by BOEM offices within 3 years and our Federal / State partners within 4 years</td>
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Thank you

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