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# An Update of the Bureau of Ocean Energy Management's Hurricane Sandy Response Initiatives


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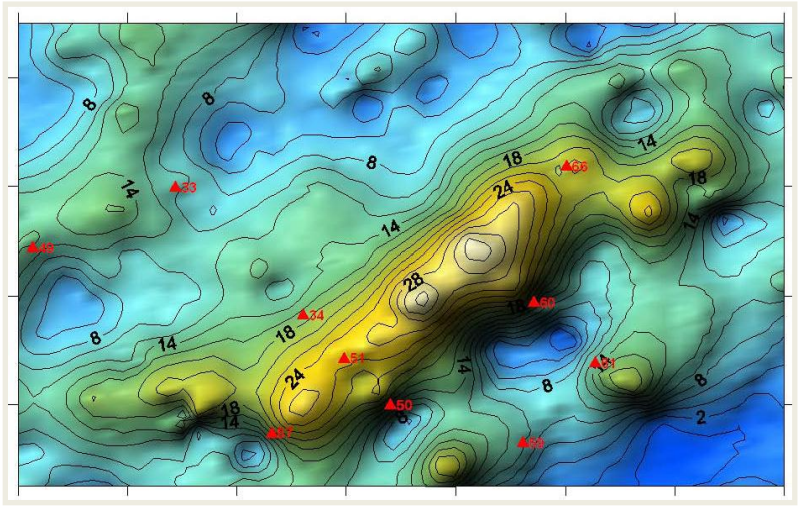
Bureau of Ocean Energy Management

Division of Environmental Assessment

Marine Minerals Program

# Marine Minerals Program (MMP) Responsibilities

- Manage “non-energy minerals” on OCS (primarily sand)
- Identify and evaluate potential OCS sand resources
- Respond to requests for OCS sand for coastal restoration through issuances of leases/agreements
- Conduct thorough environmental reviews of the use of sand borrow areas through NEPA and other environmental consultations
- Develop scientific studies to address data gaps in environmental reviews



# MMP Staff

- **Office of Strategic Resources/Leasing Division/Marine Minerals Branch**
  - Jeff Reidenauer, PhD (Biological Oceanography) - Branch Chief
  - Jeff Waldner, PG (MS, Geology/Engineering) - Marine Geologist
  - Lora Turner (MS, Physical Oceanography) - Physical Oceanographer
  - Paul Knorr, PhD (Geology) – Marine Geologist

- **Office of Environmental Programs/Division of Environmental Assessment**
  - Geoff Wikel (MS, Marine Science) – Branch Chief
  - Jennifer Culbertson, PhD (Biology) – Oceanographer
  - Doug Piatkowski,  (MS, Marine Biology) – Physical Scientist

- **Gulf of Mexico, Marine Minerals Program**
  - Mike Miner, PhD, P.G (Geology) – Environmental Scientist
  - Ken Ashworth, PhD (Archeology) – Environmental Scientist
  - Jessica Mallindine (MS, Marine Biology) – Environmental Scientist

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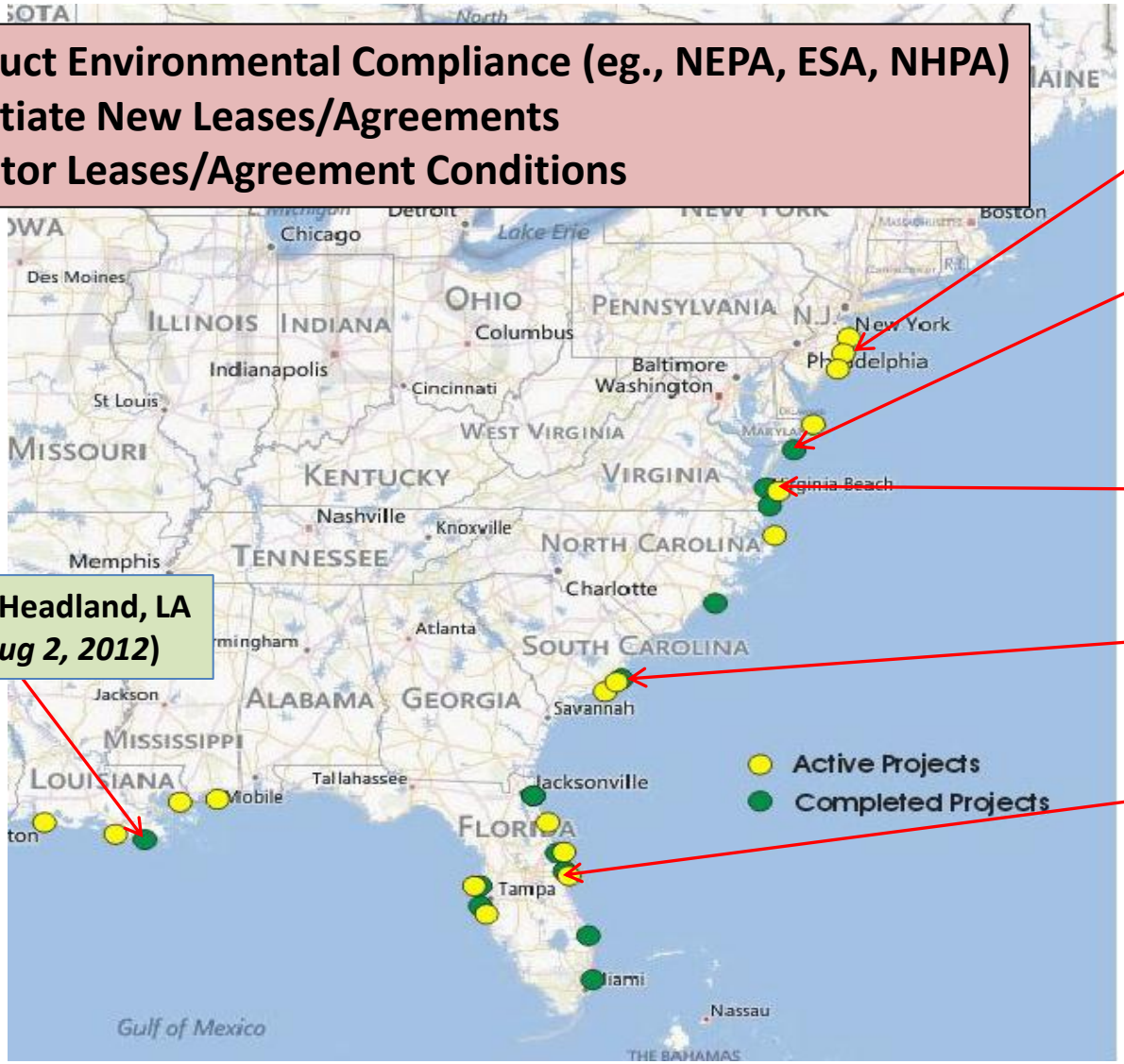
# Negotiated Agreements

- Conduct Environmental Compliance (eg., NEPA, ESA, NHPA)
- Negotiate New Leases/Agreements
- Monitor Leases/Agreement Conditions




## Example projects

**Long Beach Island, NJ**
**7 mcy (*July 1, 2014*)**

**NASA Wallops Island, VA**
**1 mcy (*Nov 14, 2013*)**

**Sandbridge, VA**
**2.2 mcy (*Oct 11, 2012*)**

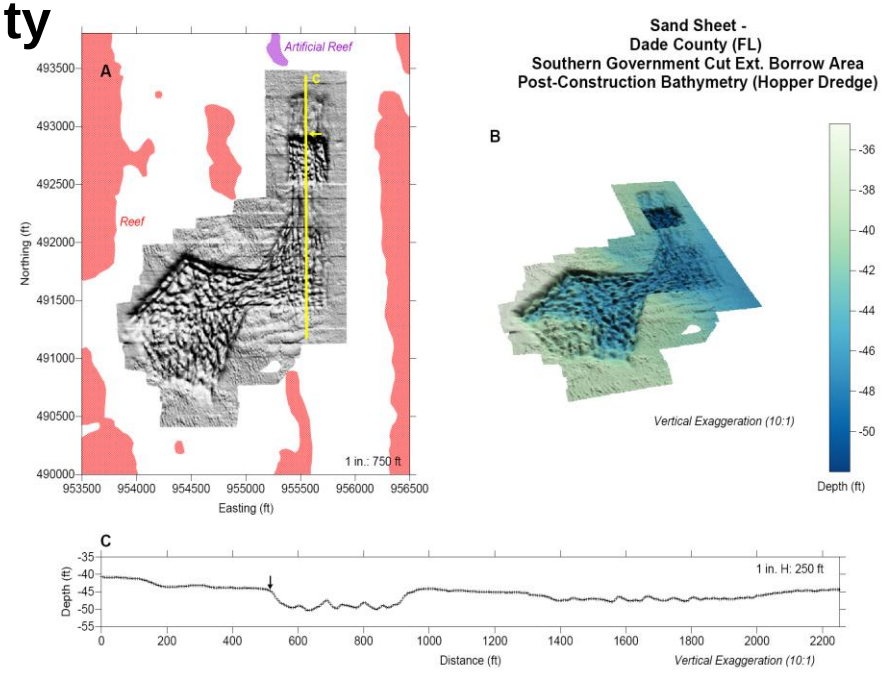
**Caminada Headland, LA**
**5.2 mcy (*Aug 2, 2012*)**

**Folly Beach, SC**
**850,000 cy (*Apr 1, 2014*)**

**Brevard County, FL**
**2.4 mcy (*July 12, 2013*)**

# Potential Dredging Impacts on the OCS

- Protected species
- **Substrate characteristics and bathymetry**
- Near-field currents and sediment transport
- Submerged historic resources
- **Benthic habitat and species diversity**
- **Essential Fish Habitat (EFH)**



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# Hurricane Sandy

- **Events of Hurricane Sandy increased the need to coordinate, assess, and manage sand resources along the Atlantic Coast**
- Renewed interest in the use of green or green/gray (hybrid) methods to coastal infrastructure projects
- Protection of public/federal infrastructure (electric, water, wastewater, evacuation routes, rocket launch sites etc.) from increased frequency/intensity of storm events.
- Increased concern to protect/recover coastal habitat areas including DOI holdings, from storms and sea level rise effects.
- Renewed concern to mitigate the effects of engineered coastal and port infrastructure on natural areas.

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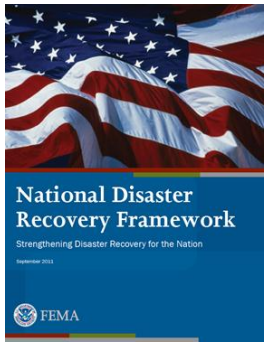
# Support of DOI and Interagency Hurricane Sandy Initiatives

- Dedicated personnel to FEMA's National Disaster Recovery Framework - Federal Disaster Recovery Coordination DOI Coordination
- Participation in DOI Sandy Regional Leadership Team – Hurricane Sandy Coastal Resiliency Competitive Grant Program and Resiliency assessment of DOI and grantee projects
- USACE North Atlantic Coast Comprehensive Study
- Interagency Sandy Regional Infrastructure Resilience Coordination (SRIRC)
- Interagency Sandy Regional Infrastructure Team for Federal Review and Permitting




National Fish and Wildlife Foundation

U.S. Department of the Interior
March 3, 1849

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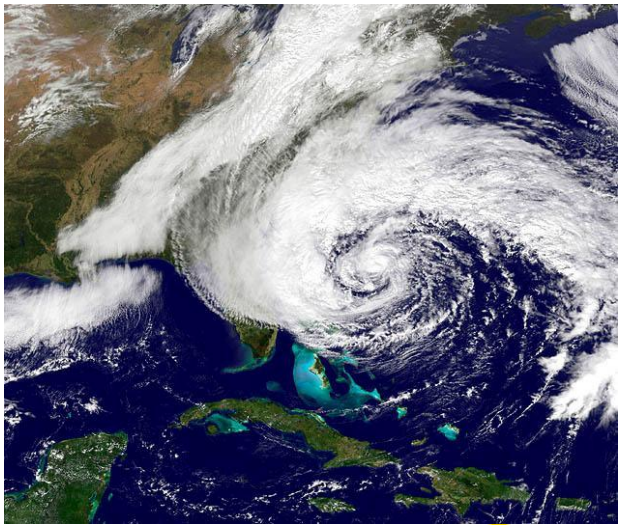
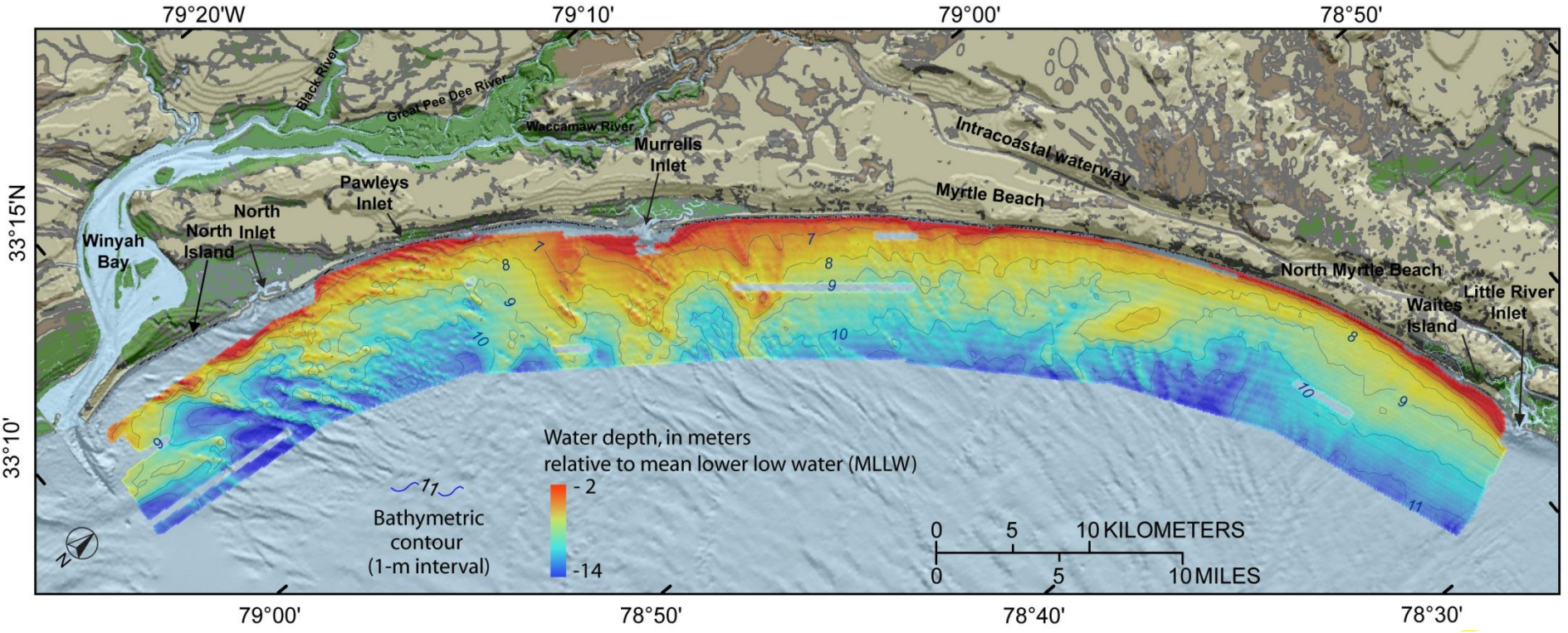
# Hurricane Sandy Support

- **$13.6 M Disaster Relief Appropriations Act**
- **Analysis Existing Sand Resource Data and Determination of Sand Needs**
  - ✓ Cooperative Agreements w/ 13 Atlantic States executed in 2014
  - ✓ $400K each to NY & NJ
  - ✓ $200K for remaining 11 states
- **Identification of New Atlantic OCS Sand Resources**
  - ✓ Contract awarded to CB&I September 2014
  - ✓ Approx. $5 million
  - ✓ Field work to begin Spring 2015
- **Environmental Monitoring**
  - ✓ Canaveral Shoals, FL and Acoustics Study
  - ✓ Approx. $3 million



# Cooperative Agreements

- Evaluate existing offshore data
- Identify data gaps/priority areas (work w/ CB&I)
- Assess future sand needs
- Facilitate public accessibility of data



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# Hurricane Sandy – Cooperative Agreements

## 4 Common Elements

- Develop a database of existing geologic and geophysical data
- Analyze existing sand resources data
- Determine sand needs
- Identify data gap areas to be filled

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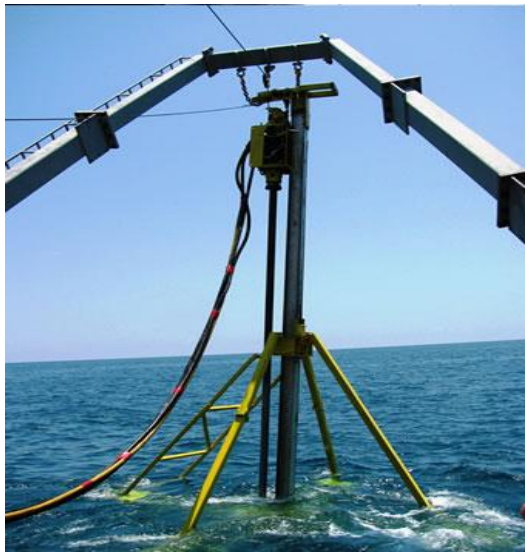
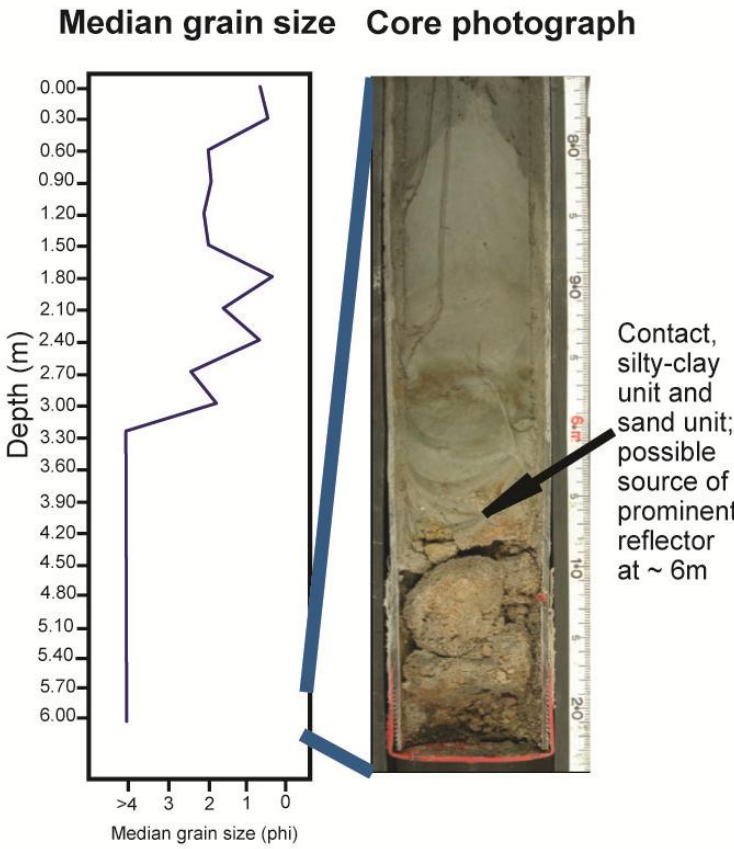
# New Sand Resource Identification

## Atlantic Sand Inventory Project

- Data Collection
- Geophysical  (surficial sediment)
- Geological (vibracores, grab samples)
- 3 – 8 nm offshore
- Maine to Miami, FL
- Reconnaissance and Site-Specific Level



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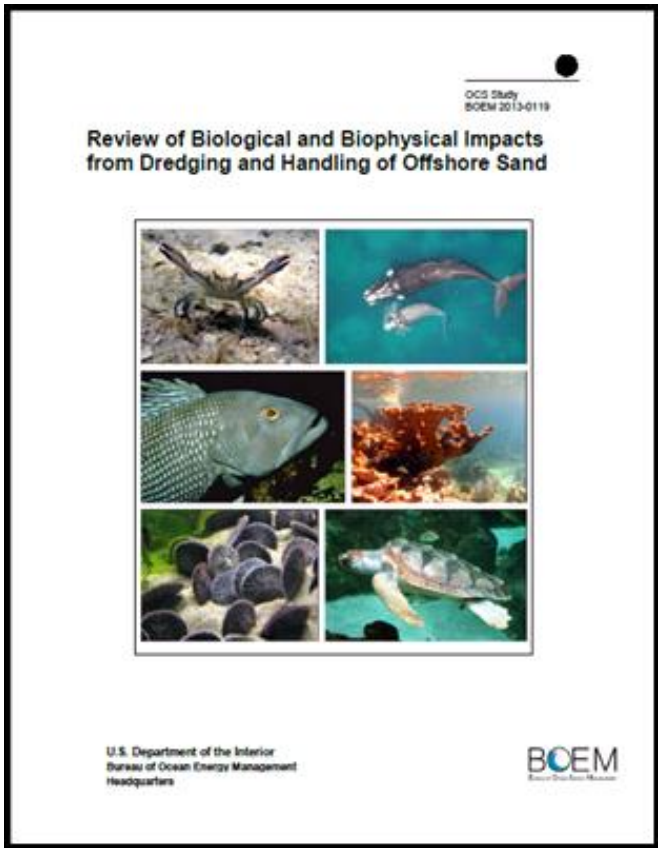
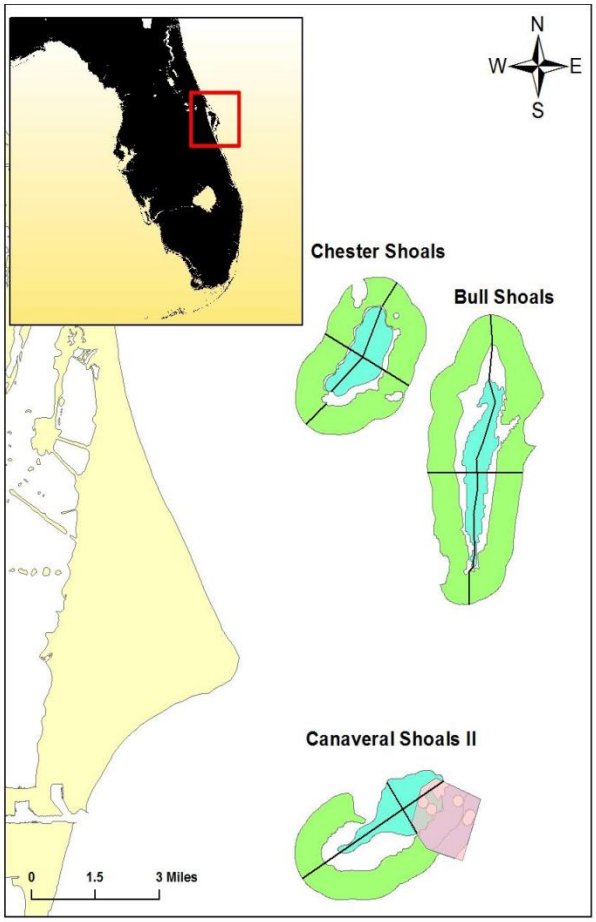
# MMP - Environmental Studies




- Provide the information needed to predict, assess, and manage impacts from offshore marine mineral exploration, development, and production activities on human, marine, and coastal environments
- $17+ million spent on MMP Environmental Studies
- Mitigation and minimization measures derived from research findings
- Provide information for consultations
- Identify critical data gaps for guiding future research needs
- http://www.boem.gov/Marine-Minerals-Research-and-Studies/

# Monitoring – University of Florida



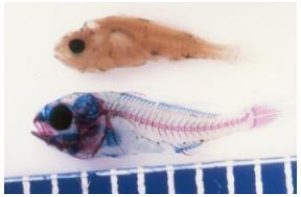

Our overall goals are to:

1. determine the unique functional ecosystem
2. discern functional, biological services that are potentially compromised by dredging
3. describe mechanisms of recovery
4. compare short-term versus long-term recovery trajectories for dredged areas.

In addition,

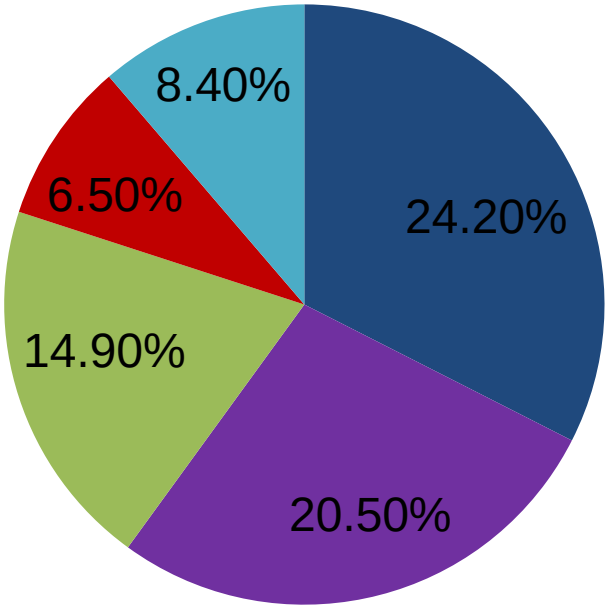
1. comparing the bathymetry and benthic habitat changes that occur on the sand shoals over time
2. determining the forcing events in seasonal sediment transport in the bottom boundary layer
3. Link temporal and seasonal changes in benthic habitat to benthic invertebrate assemblages

# Monitoring – University of Florida

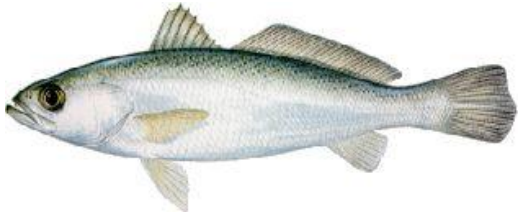


Winter Trawling Day time:

- ✓ 27 fish species from Canaveral Shoal II



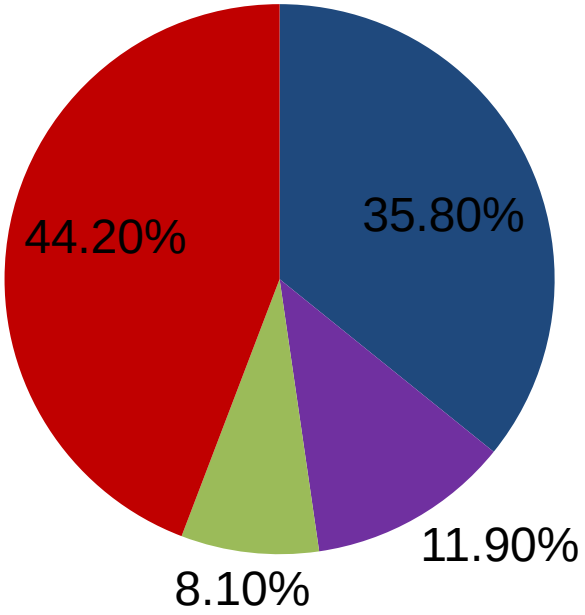

- larval sciaenids
- Atlantic croaker
- Silver seatrout
- Atlantic bumper
- Atlantic Moonfish



# Monitoring – University of Florida

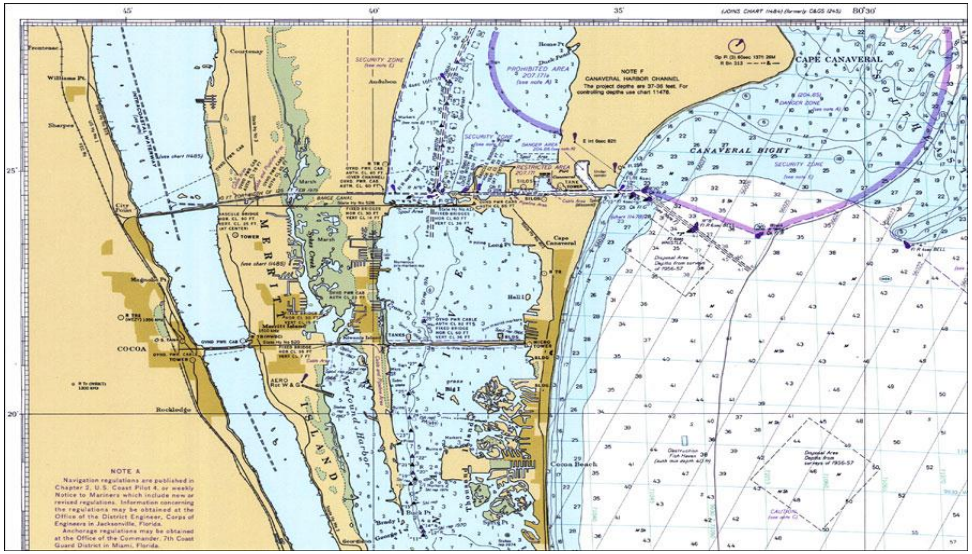
Winter Trawling Night time:

- ✓ 25 fish species from Canaveral Shoal II




# Monitoring – University of Florida

- Atlantic Bumper and Atlantic Moonfish were only reported from Canaveral Shoal II during the daytime
- Silver Seatrout were present during both the day and night trawling on the shoal but were more abundant on the shoal during the day
- Banded Drum, Atlantic Croaker, Inshore Lizardfish, cuskeels (Blotched, Striped, unidentified) and searobins (Northern, Striped, and Leopard) were all more abundant at night



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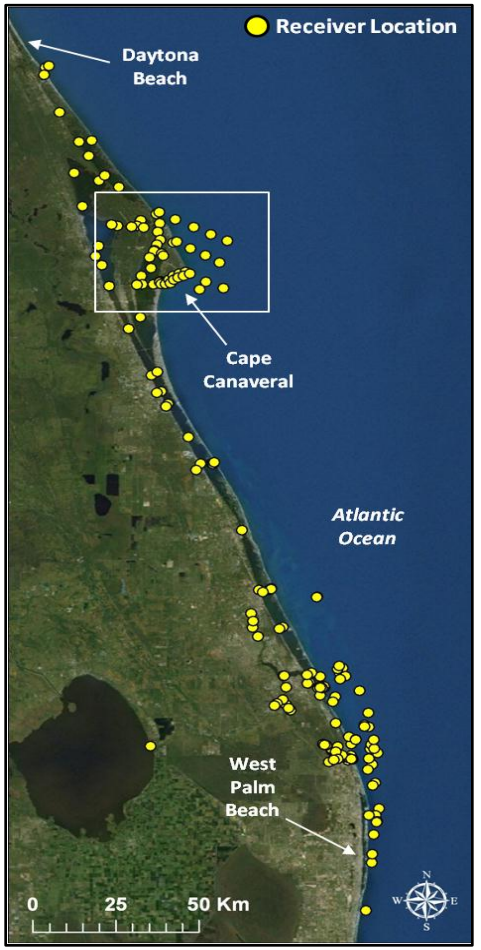
# Florida Atlantic Coast Telemetry (FACT) Array

- Cape Canaveral and northern Indian River Lagoon sections of FACT Array (>100 VEMCO acoustic receivers)
- Receivers are located in a variety of habitats including open estuary, coastal rivers, inlets, Port Canaveral, surf zone, and offshore shoals
- >500 fish and sea turtles (15 species) released at Cape Canaveral since 2008
- Some fish tracked for > 4 years
- Detections of > 200 tagged animals from other regions as far as S. FL, DE, MA, and NY



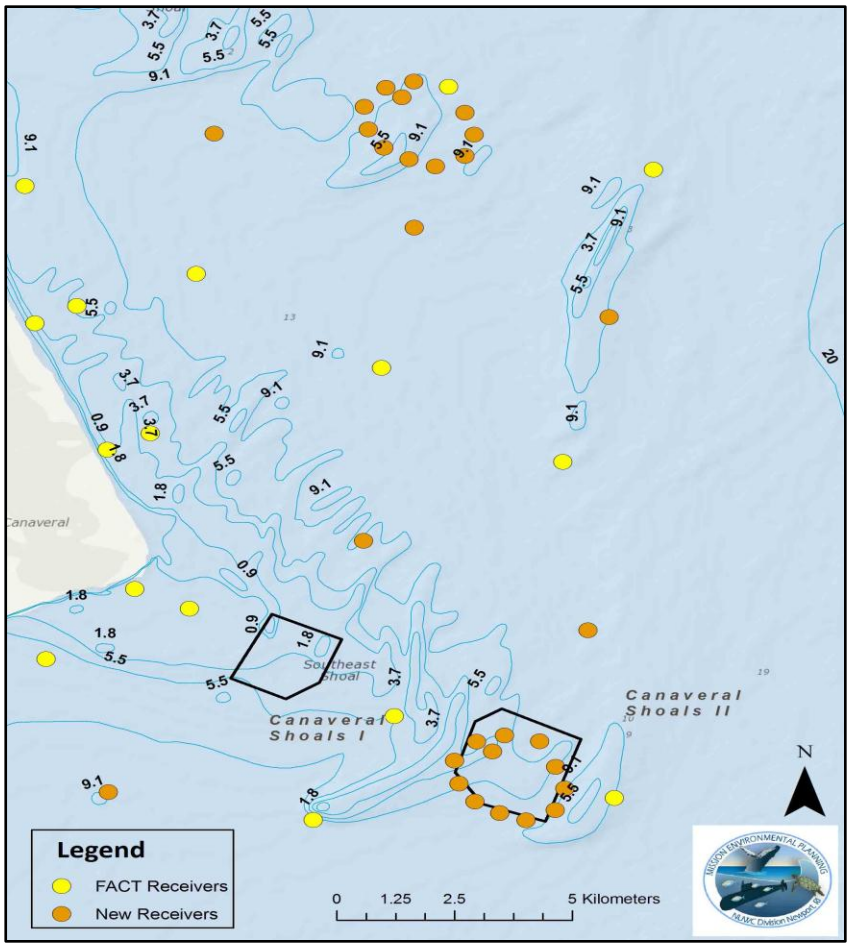
# Use of Telemetry to Monitor Fish Use

**Canaveral Offshore Shoal Habitat:**

- Essential Fish Habitat
- Prominent ridge-swale features and shoal complexes

**More info needed:**

- Small-bodied demersal and keystone pelagic fish species
- Movements on a local and regional scale
- Short-term and longer-term for coastal fish species
- Characterization and assessment of habitat value and function



# Monitoring - Navy

1. **Assessing Natural Habitat Associations and the Effects of Dredging on Fish at Canaveral Shoals, East-central Florida**
   - Finetooth shark (*Carcharhinus isodon*) (32)
   - Red drum (*Sciaenops ocellatus*) (41)
   - Scalloped hammerhead (*Sphyrna lewini*) – NASA (42)
   - Blacknose shark (*Carcharhinus arconotus*) (8)
   - Spanish mackeral (*Scomberomorus maculatus*)

2. **Finer-Scale Movements of Benthic Fish Species During a Sand Mining Event on the Canaveral Shoals**
   - Spot Croaker (*Leiostomus xanthurus*) (107)
   - Atlantic Croaker (*Micropogonias undulatus*)(139)

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# Monitoring - Navy

**Table 1. Individual fish detected March 2013 - September 2014 on the Florida Atlantic Coast Telemetry Array offshore Cape Canaveral, Florida.**

| Species | Common Name | Release Location | Tagging Agency[1] | Number of Individual Fish Detected: Canaveral Region | CSII Dredge Site | Control Site | Total Detections |
|---|---|---|---|---|---|---|---|
| BOEM Target Species | | | | | | | |
| *Micropogonias undulatus* | Atlantic Croaker | Cape Canaveral | NUWC/ KSC | 92 | 37 | 51 | 11,806 |
| *Leiostomus xanthurus* | Spot | Cape Canaveral | NUWC/ KSC | 61 | 28 | 31 | 2,930 |
| *Sciaenops ocellatus* | Red Drum | Cape Canaveral | NUWC/ KSC | 39 | 35 | 28 | 172,243 |
| *Carcharhinus isodon* | Finetooth Shark | Cape Canaveral | NUWC/ KSC | 32 | 13 | 6 | 43,170 |
| *Carcharhinus arconotus* | Blacknose Shark | Cape Canaveral | NUWC/ KSC | 7 | 3 | 4 | 11,543 |

# Monitoring - Navy

1. **Assessing Natural Habitat Associations and the Effects of Dredging on Fish at Canaveral Shoals, East-central Florida**
   - Red drum greater number of detections and more receiver stations visited than finetooth shark
     - Majority of detections for red drum came offshore Cape Canaveral
     - Number detected stable across seasons
     - Melbourne Beach, Ponce Inlet, and Indian River Lagoon (IRL) receivers (30 km south)
   - Finetooth sharks had fewer stations visited
     - Distance travelled was greater
     - Includes detections of at Melbourne Beach (30 km south), Sebastian Inlet (65 km south), Georgia and Charleston Harbor, South Carolina (480 km north).

Table 2. Number released, fork length (FL), number of detections, and receiver stations visit for tagged red drum and finetooth shark through September 2014.

| Species | Number Released | FL (mm; mean [SD]) | Number of Detections (mean [SD]) | Stations Visited (mean |
|---|---|---|---|---|
| Red Drum | 41 | 727 (437) | 577 (605) | 14 (9.9) |
| Finetooth shark | 32 | 1113 (147) | 212 (229) | 8 (7.8) |
| Blacknose shark | 8 | 969 (99) | 1491 (2107) | 11 (6.6) |
| Scalloped hammerhead shark | 42 | 321 (175) | 57 (82) | 4 (4.5) |

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# Monitoring - Navy

## 2. Finer-Scale Movements of Benthic Fish Species During a Sand Mining Event on the Canaveral Shoals

- High mobility and short residency time on one particular shoal
- Decline in presence in Fall

**Table 7. Number released, standard length (SL), number of detections, and receiver stations visit for tagged spot and croaker through April 2014.**

| Species | Number Released | SL (mm; mean [SD]) | Number of Detections (mean [SD]) | Receiver Stations Visited (mean [SD]) |
|---|---|---|---|---|
| Spot | 54 | 195 (28.9) | 28 (55.7) | 2 (2.0) |
| Croaker | 66 | 212 (44.1) | 16 (25.1) | 2 (2.2) |

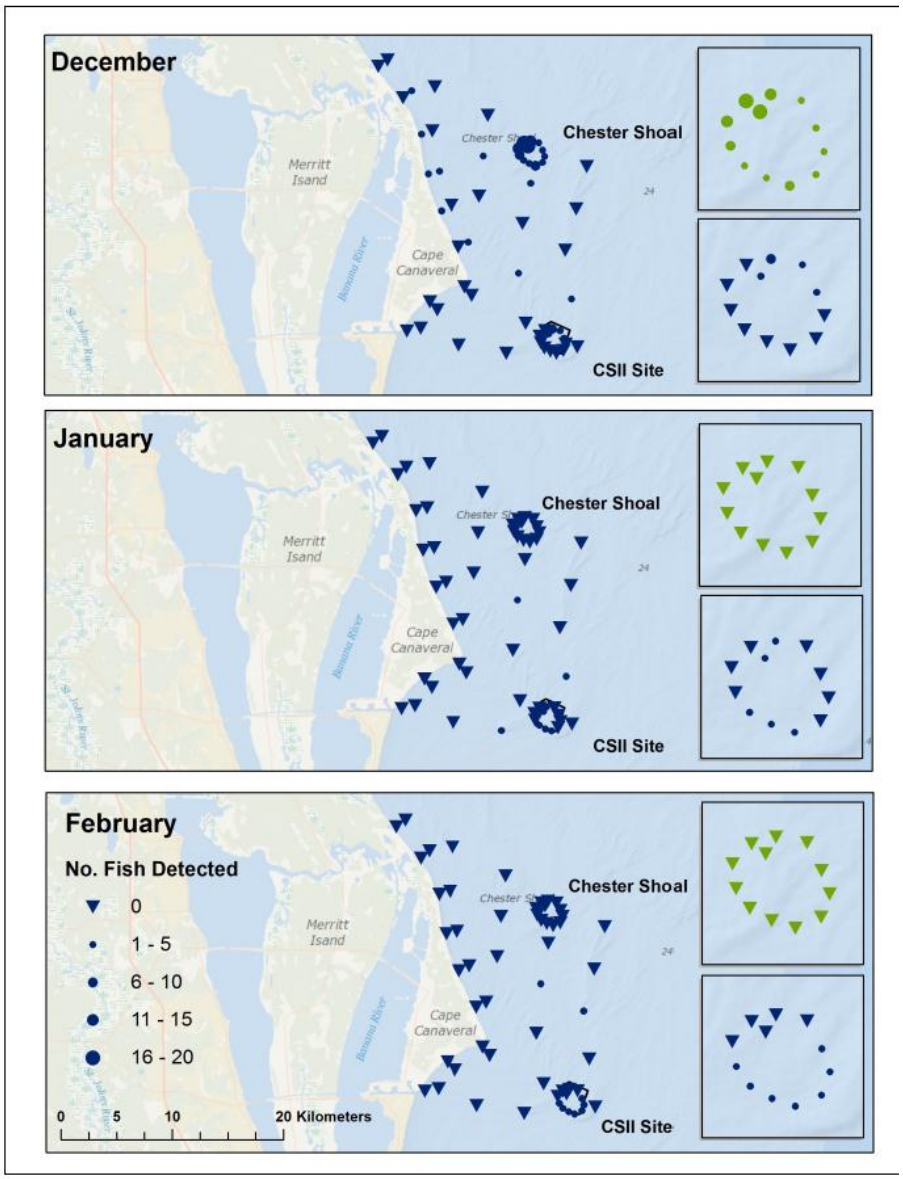


Figure 15. Number of unique croaker individuals detected subsequent to the first release

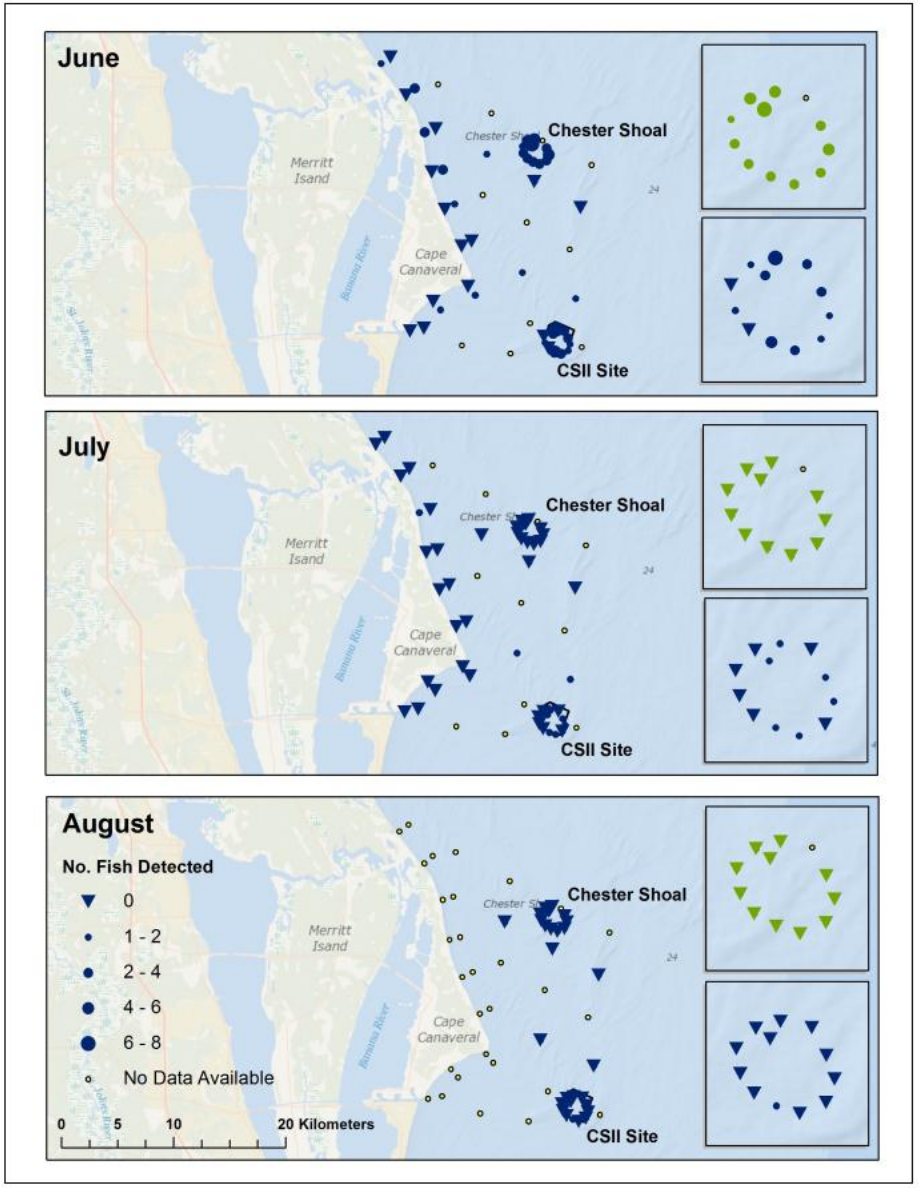


Figure 16. Number of unique croaker individuals detected subsequent to the second release

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# Future Research

*BOEM and USGS Partnership to study Source and Propagation Character of Electro-mechanical Geophysical Sources*

Three Steps:

1. Characterization of geophysical sources:
   - Partnership with the Navy (NAVSEA)
   - Characterize sources in acoustic tank
2. In-situ field measurement and verification of geophysical sources
3. Improvement of acoustic propagation models and/or their implementation

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