BOEM

Bureau of Ocean Energy Management

Filling in the Data Holes at Frying Pan Shoals– An Update on BOEM's Ecosystem Dynamics Study

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BOEM's Mission Responsibilities

Oil & Gas

Marine Minerals

Renewable Energy

- As of June 2022: 64 total leases (8 active)
- Total Vol Allocated ~180 MCY*
- Avg lease area ~1000 acres
- Avg lease vol ~2.8 MCY*

*MCY = million cubic yards

**OREP = Office of Renewable Energy Programs

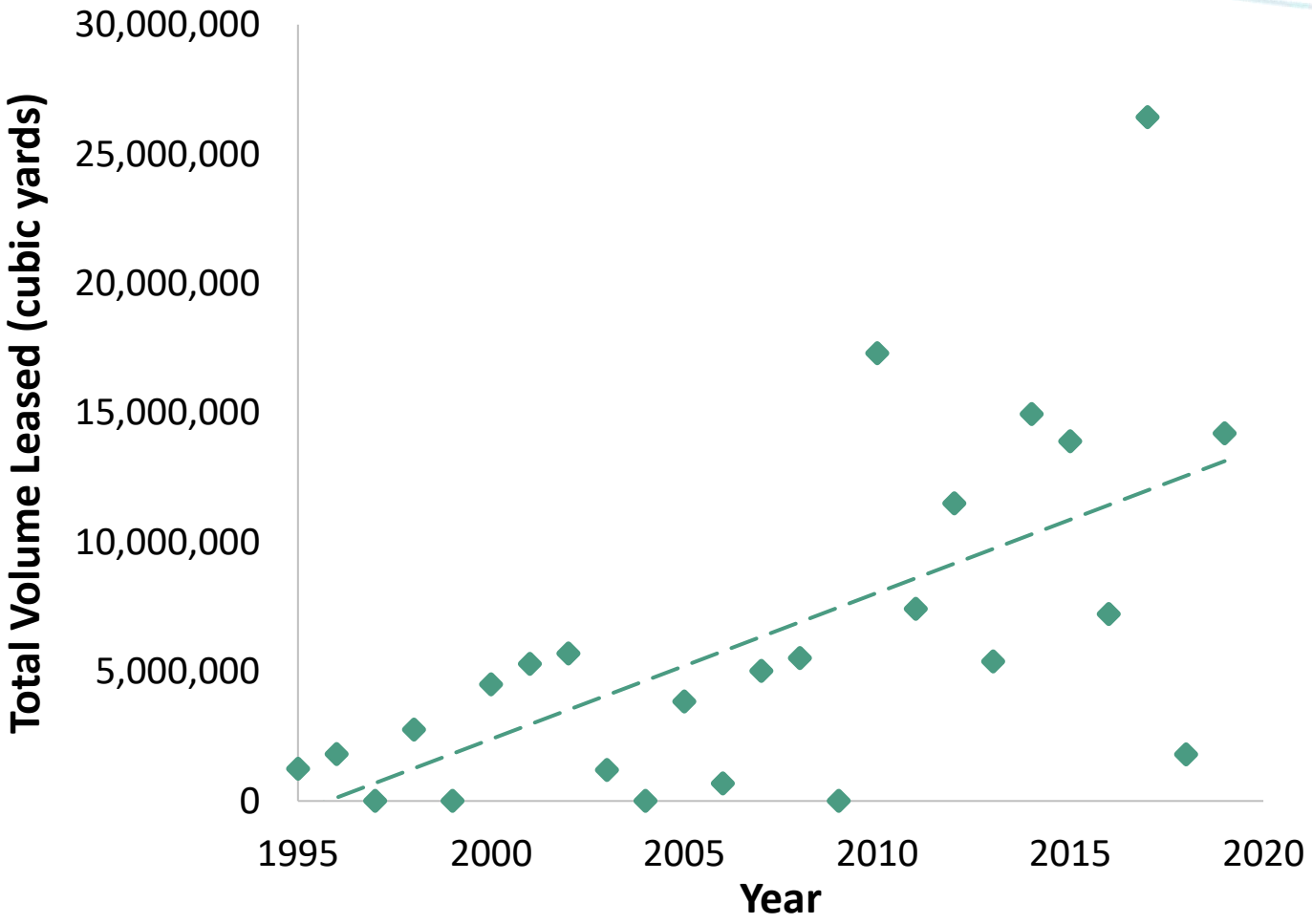
BOEM Marine Minerals Program

MISSION

Facilitate access to and manage the Nation's Outer Continental Shelf (OCS) non-energy marine minerals through environmentally responsible stewardship, prudent exploration and leasing activities, coordination with government partners, stakeholder engagement, and mission-focused research to improve decision-making and risk management.

- **Outer Continental Shelf (OCS) sand resources**
  - Replenish beaches
  - Fortify barrier islands and shorelines
  - Restore wetlands
- **Critical Minerals**

Increasing Demand for OCS Sand

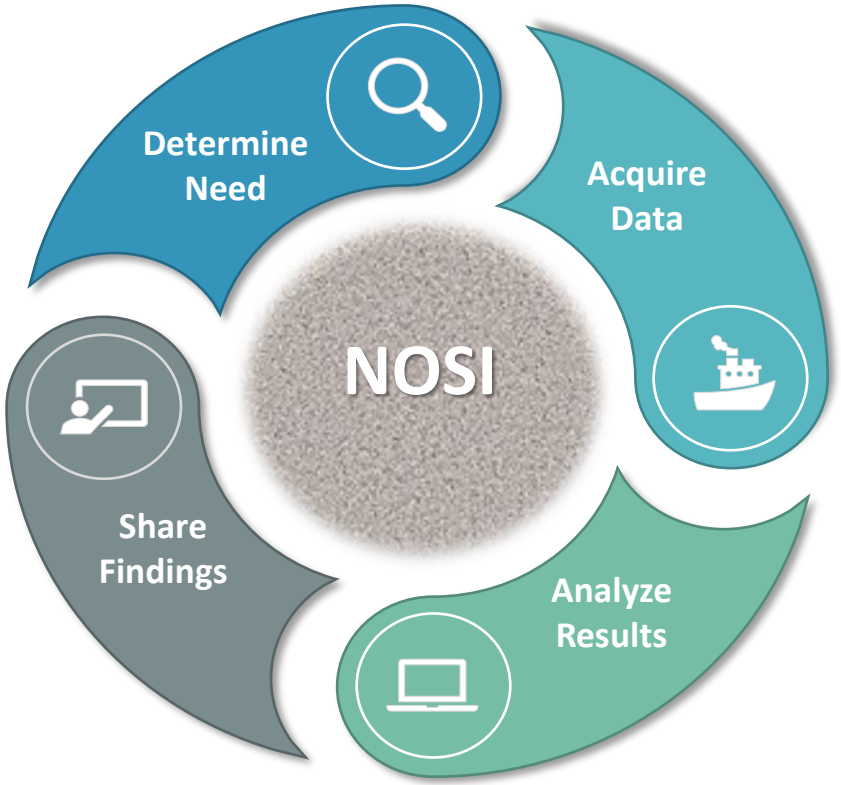


- Storm activity and coastal erosion increasing
- Diminishing resources in state waters
- Adds to nearshore sediment budget

Facing the Future

- **Efficient and responsible use of OCS sand resources** to meet increasing demand
- **Manage current and future resources** with the National Offshore Sand Inventory
  - Coastal Resilience
  - Emergency Preparedness
- **Partnership and Collaboration**

National Offshore Sand Inventory (NOSI)



- **Provides data and analysis for:**
  - Long-term coastal resilience and adaptation
  - Offshore environmental and resource stewardship

- **Comprised of four major components**
  - **Supply and Demand**
  - **Resource Evaluation**
  - **Borrow Area Optimization**
  - **Risk Mitigation**

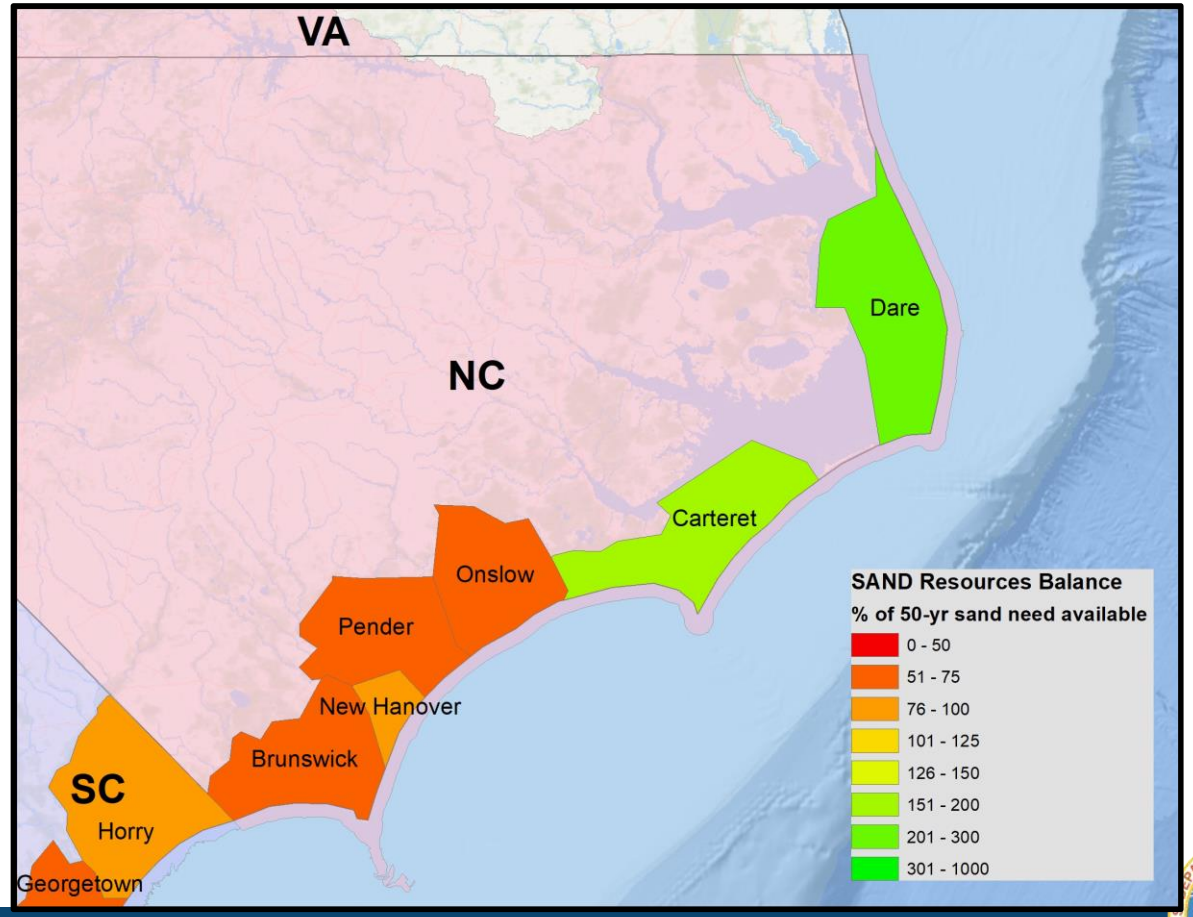
Supply and Demand - SACS SAND

SOUTH ATLANTIC COASTAL STUDY (SACS)

SAND: NORTH CAROLINA

RESULTS

- Significant 50-year sand needs deficits in SE NC
  - Onslow: 60% (of 50-yr needs)
  - Pender: 72%
  - **New Hanover: 78%**
  - **Brunswick: 70%**



Supply and Demand – FPS Study Importance

- **Erosion** continues and **demand** for beach compatible sand resources is increasing
- **No significant sand resources identified** in recent G&G efforts other than FPS
- **Multiple projects** considering state and federal sand resources at FPS
- FPS is a **unique and highly productive** shoal system
- **Data gaps and dredging concerns** currently constrain future use of FPS
- BOEM identified the need for **proactive research** at FPS to inform pending decisions

FPS Importance - Habitat Value

- FPS is currently designated by the National Marine Fisheries Service (NMFS) as an **Essential Fish Habitat** (EFH) and a **Habitat Area of Particular Concern** (HAPC)
- Dredging is considered a **potential threat** to EFH and HAPCs
- NMFS has expressed concern that long-term and repeated dredging operations could **impact the habitat value** that supports several important commercial and recreational fisheries
- Focus of current field work to improve **borrow area management and mitigation measures**

Risk Mitigation

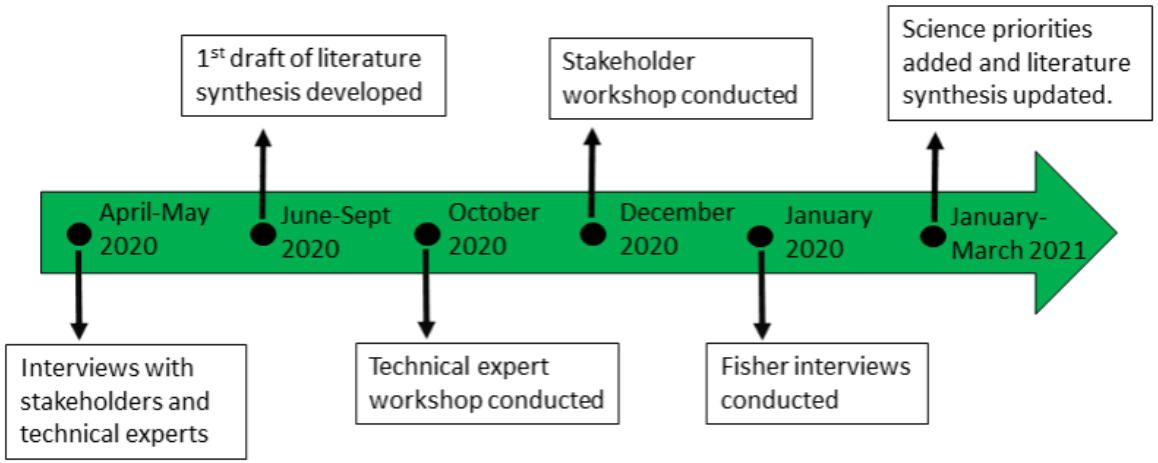
Frying Pan Shoals Ecosystem Dynamics

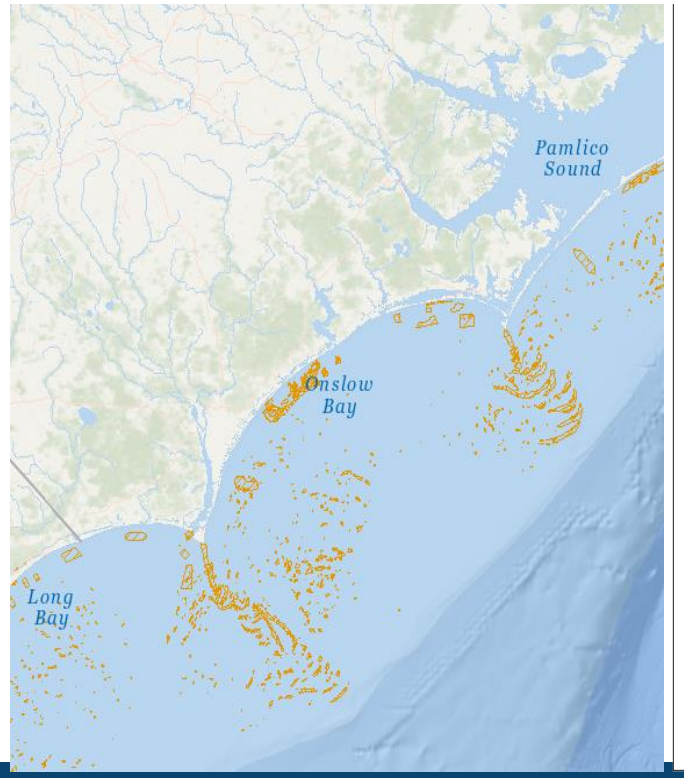
1) Workshops:

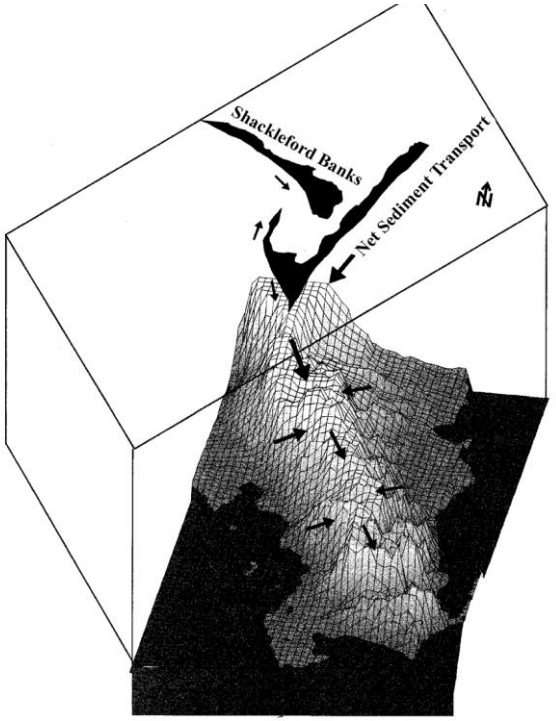
- Summarized the physical and biological characteristics
- Potential dredging implications/concerns
- Identified data gaps and research needs

2) Field Study:

- Examine habitat and spatial distribution of key species
- Determine the baseline variability of benthic community
- Examine sediment transport pathways and rates
- Influence of the Cape Fear River







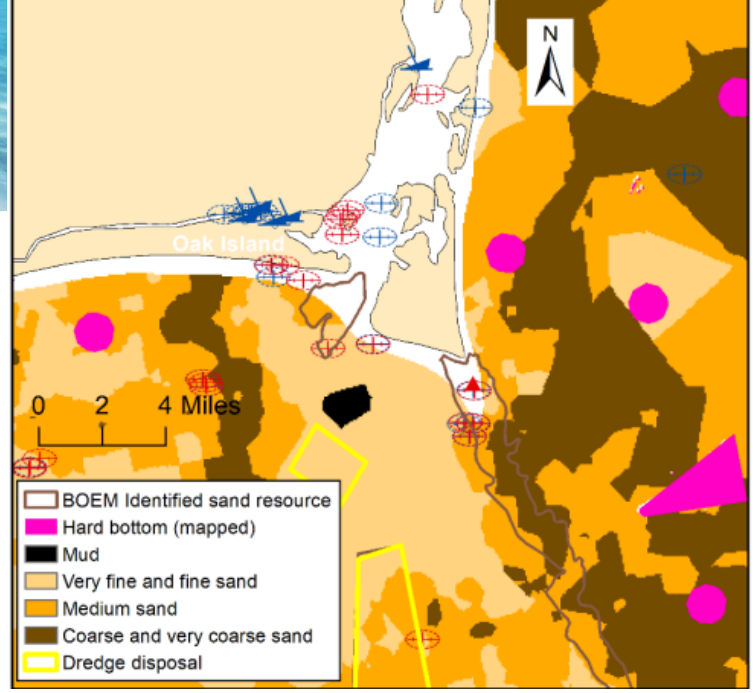
McNich and Wells 1999

Workshop Conclusions

- **Literature review - BOEM_2021-028.pdf**

- Gathered information and concerns from **stakeholders**

- Identified **major knowledge gaps** and **research priorities**
  - Examples:
    - influence of Cape Fear River plume on FPS
    - post-dredging sediment recharge and infilling rates
    - identify areas that are important for estuary-ocean connectivity for larvae and anadromous fish

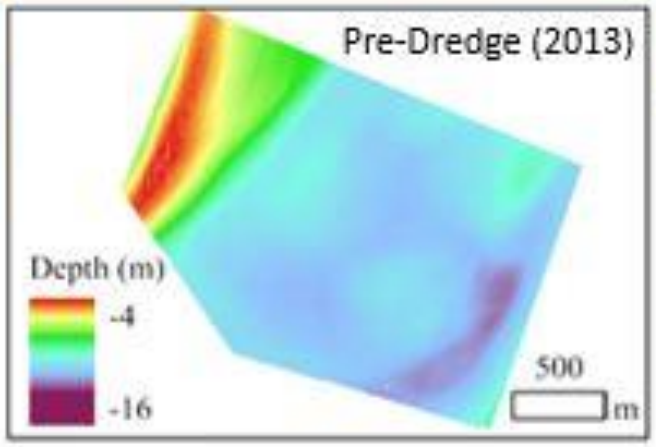


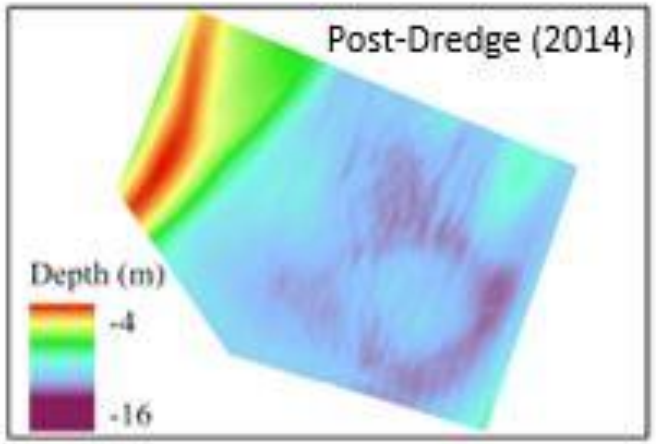
- Identified **potential mitigation measures**; summarized measures previously proposed

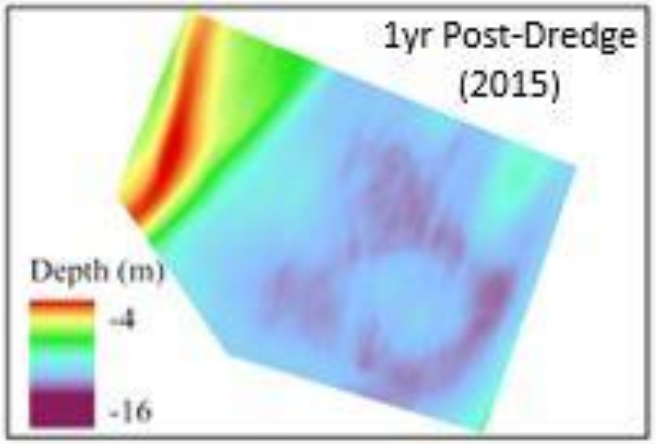
- Utilized the data gaps and research priorities to develop the **statement of work**

Field Study Goals

- Address knowledge and data gaps
- Examine spatial and temporal (seasonal-interannual) variability
- Collect baseline data
- Provide actionable data and modeling for future examination of impacts from potential dredging on FPS







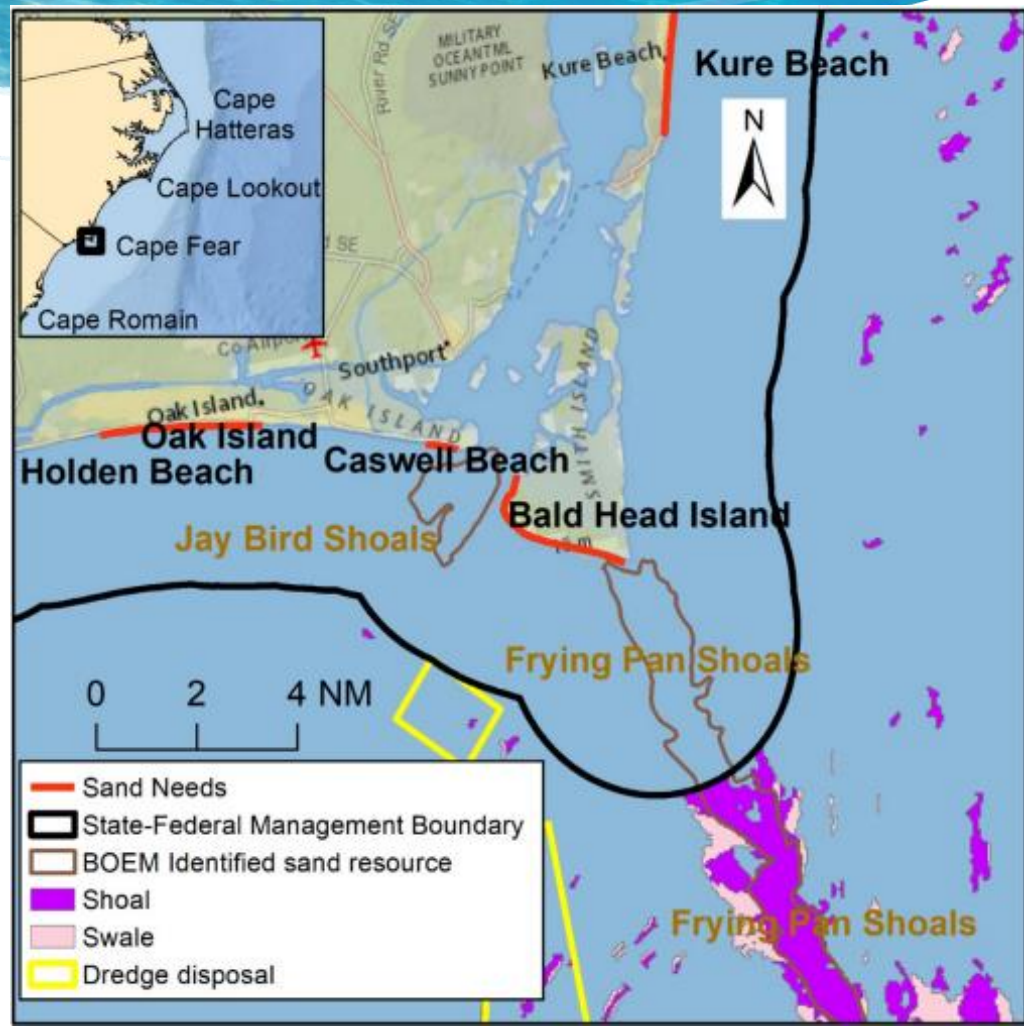
Study Team

- Project team is comprised of a multidisciplinary team from the University of North Carolina Wilmington (UNCW) Center for Marine Science (CMS)

Personnel	Role
Dr. Joseph Long	Hydrodynamic and morphological modeling, assist with physical oceanographic observations, project management and coordination
Dr. Fred Scharf	Fish sampling, acoustic tagging, life stage analysis, stable isotope analysis, project management and coordination
Dr. Christian Briseño-Avena	Zooplankton net tows, emergence trap deployment/recovery, LISST-Holo2 surveys and data analysis.
Dr. Martin Posey	Benthic sampling, analysis of benthic data, blue crab and shrimp sample analysis
Dr. Sutara Suanda	Offshore physical oceanographic mooring instrumentation and data processing. Shipboard physical surveys and numerical modeling.
Dr. Derek Grimes	Coordinate design, construct, and deployment of physical oceanographic moorings and instrumentation. Physical oceanographic data processing, model development and analysis
Dr. Shannon Klotsko	Geophysical mapping and analysis. Assist with stratigraphic coring and sediment sampling and analysis.
Dr. Andrea Hawkes	Stratigraphic coring and seasonal sediment sampling and analysis (grain size, mineralogy, and pollution, radiocarbon, and OSL dating techniques). Assist with geophysical mapping.
Dr. Lynn Leonard	Research and operations coordination at the CMS; CORMP data management; assessment of sediment transport pathways
Troy Alphin	Benthic sampling, identifications of benthic organisms, analysis of benthic data
Chris LaClair	Mooring design, ship operations, diving, instrument deployment/recovery
David Wells	
Landis Bullock	

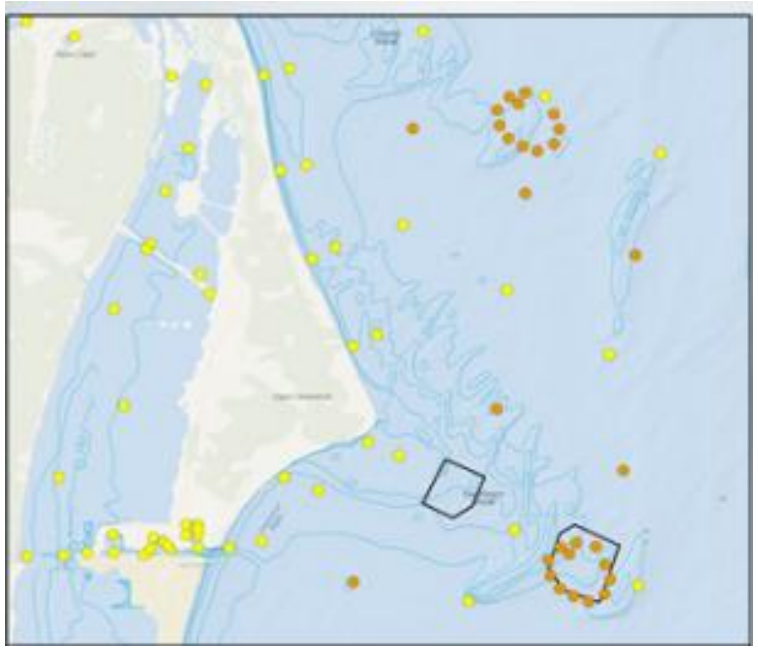
Sampling

- **UNCW and BOEM work together to develop sampling plan (first 6 mo)**
- Data collection to begin after approved sampling plan
- Will extend for **at least 2 years**
- **Coordination and engagement with regional stakeholders will continue**
- Data collection will span both state and **federal waters**
- If dredging activities occur will consider modification of sampling plan to areas of interest



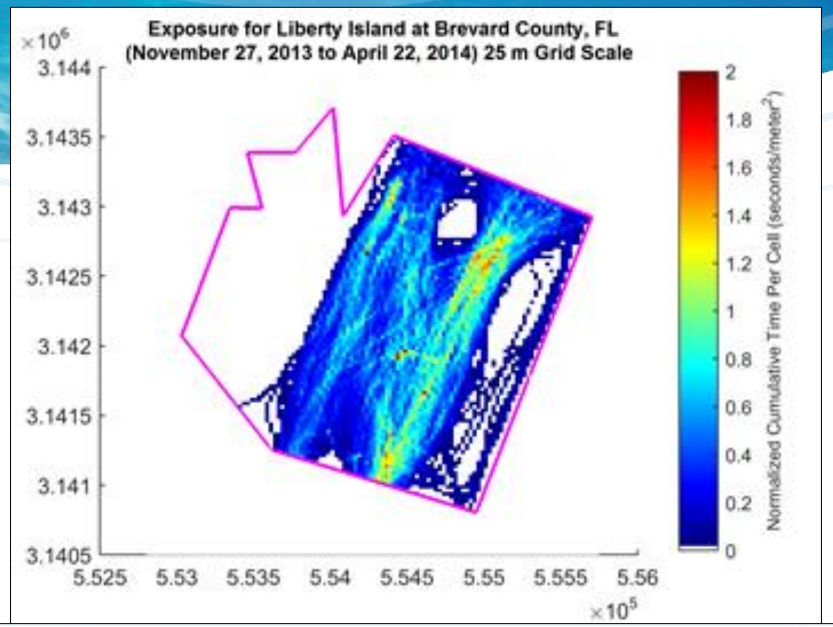
Sampling

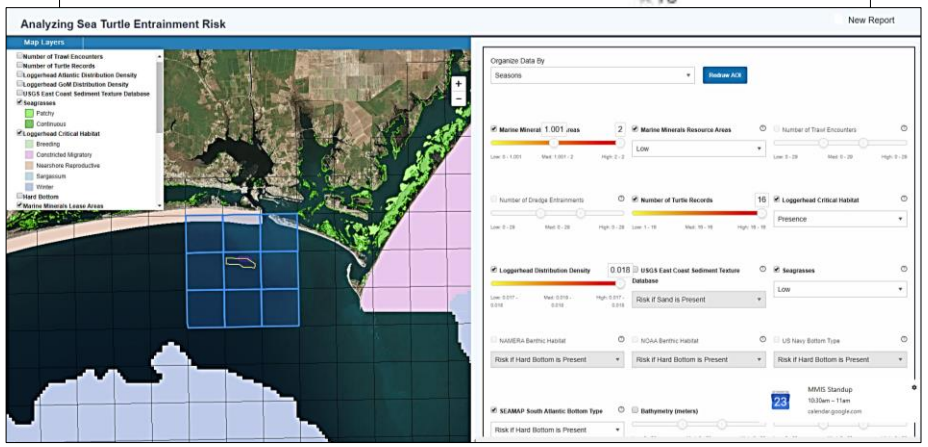
- Proposed sampling methods:
  - Long-line (large adult fishes)
  - Sidescan sonar, chirp sub-bottom profiler
  - Grab samples and cores
  - Fixed instrument arrays for to sample water column currents, waves, acoustic and optical properties
  - Net tows (ichthyoplankton, zooplankton)
  - LISST-Holo2 in-situ imaging system
  - ADCPs
  - Wave buoys
  - Drifters
  - Trawls
  - Benthic grabs
  - Isotopes
  - Acoustic tags
  - Modeling



Outcomes

- **Final report** at the end of the 4-year period of performance
- The **modeling component** is expected to provide information about sediment transport rates and pathways to different parts of the shoal
- All the data will be utilized for a **potential impacts analysis** for the use of FPS as a borrow source
- The data will be useful for determining **borrow area optimization** and refining **potential minimization and mitigation strategies**
- Deliverables includes **recommendations for post-dredging monitoring methods**





Conclusions

- Risk mitigation is a strategy to prepare for and lessen effects of resource use
- The outcome of risk mitigation feeds into borrow area optimization
- Studies examining impacts are needed to:
  - Develop mitigation strategies
  - Determine environmental baseline
  - Analyze potential impacts
- **Advanced planning and research is critical to meet the growing demand for coastal resilience projects**

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