



**BOEM** Bureau of  
Ocean Energy Management

# **MMIS** MARINE MINERALS INFORMATION SYSTEM

Integrating and disseminating marine minerals information  
products at the national scale to support resilient communities

February 3, 2022

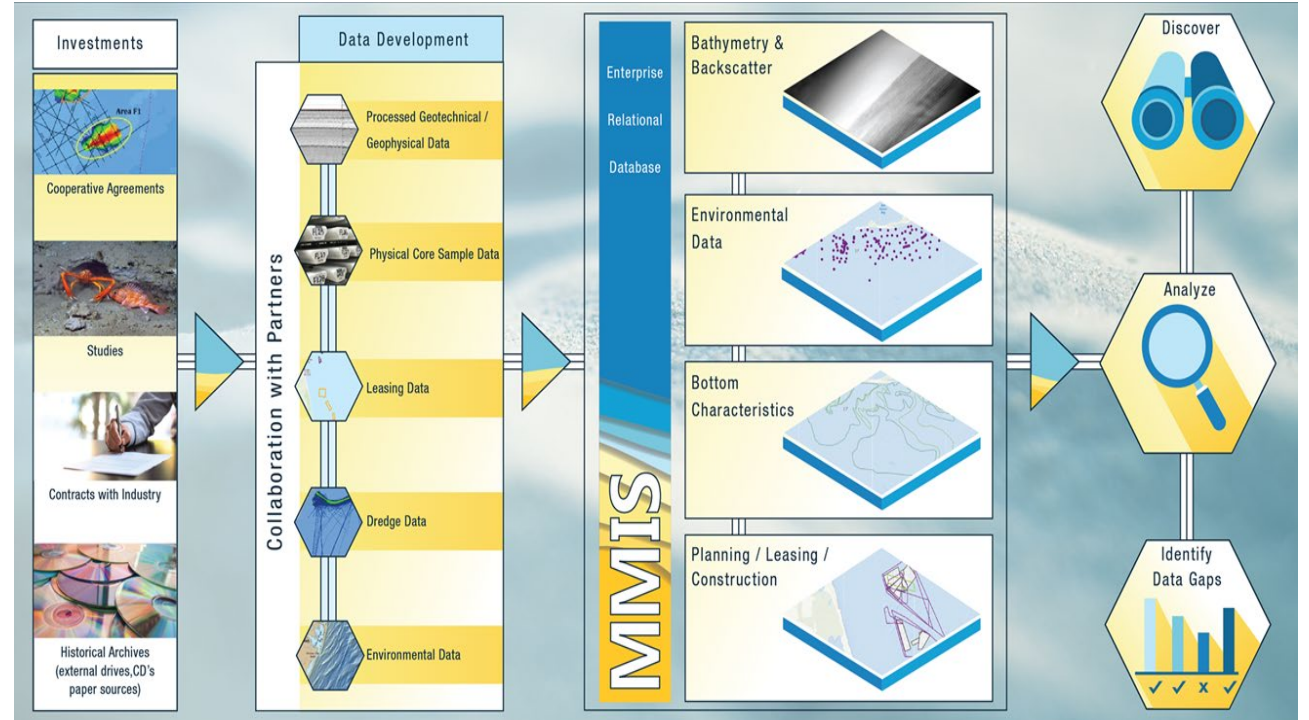
Lora Turner, Kerby Dobbs, Ariel Kay, Alexa Ramirez | FSBPA



# Agenda

## MMIS Focus Areas

- Coastal Resilience
- National Offshore Sand Inventory
- Data and Services
- Multiple Ocean Use
- MMIS / MMP Next Steps



*Characterized sand / sediment resources*  
<https://mmis.doi.gov/boemmmis>





# Coastal Resilience – BOEM Leasing

Total Executed Leases  
1995 to Present

# 64

Last update: a minute ago

Total Sand Allocated  
1995 to Present

# 178,229,300 cu yd

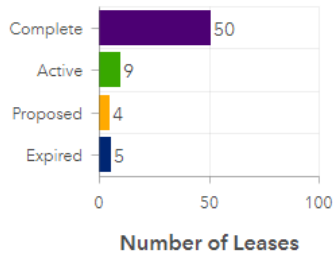
Last update: a minute ago

Miles of Coastline Restored  
1995 to Present

# 444

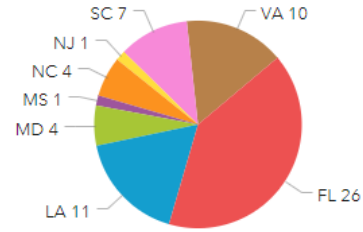
Last update: a minute ago

Lease Status  
1995 to present



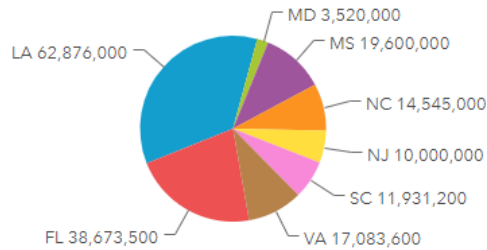
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Number of Projects by State



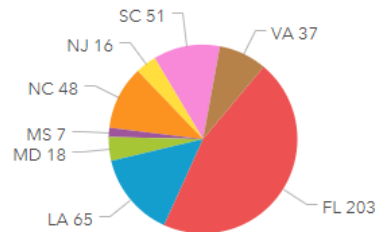
Last update: a minute ago

Sand in Cubic Yards Allocated Per State



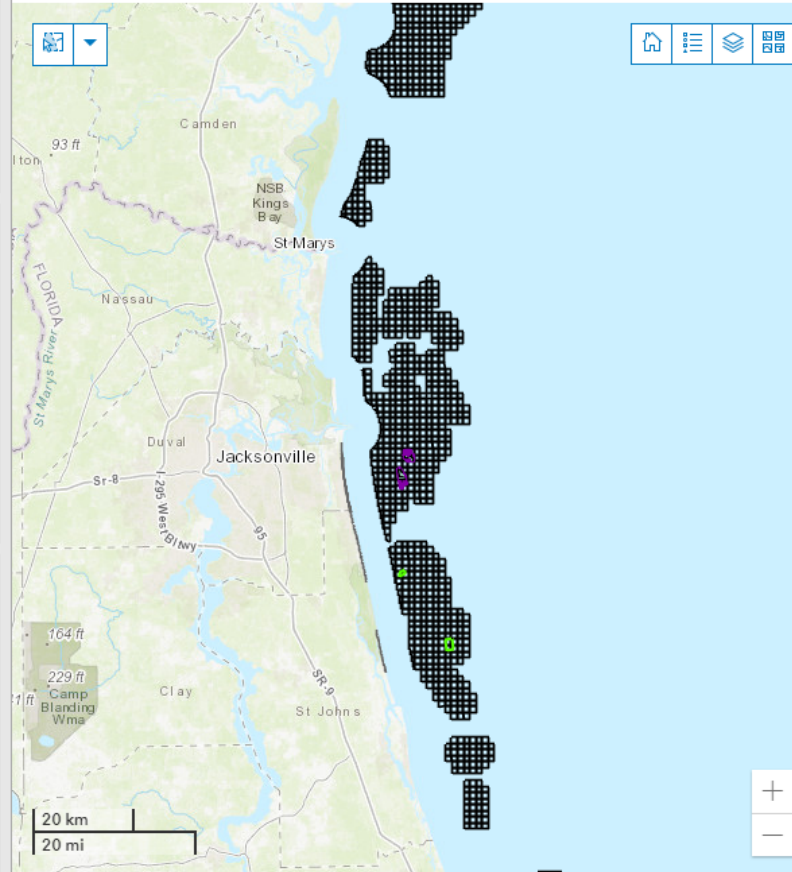
Last update: a minute ago

Miles of Shoreline Restored



Last update: a minute ago

Marine Minerals Information System  
Leasing Dashboard - Interactive Map  
Zoom Out for Full View  
1995 to Present



Esri, HERE, Garmin, FAO, USGS, NGA, EPA, NPS | Bureau of Ocean Energy Management... Powered by Esri

Shore Placement Areas



Dredge Areas



Marine Minerals Lease Areas

Status

- Complete
- Active
- Proposed
- Expired

Atlantic OCS Aliquots with Sand Resources



Gulf of Mexico OCS Blocks with Significant Sediment Resources



Source Data Last Updated: Dec 5,





# Coastal Resilience – BOEM Leasing

## Construction Status

### Not Started

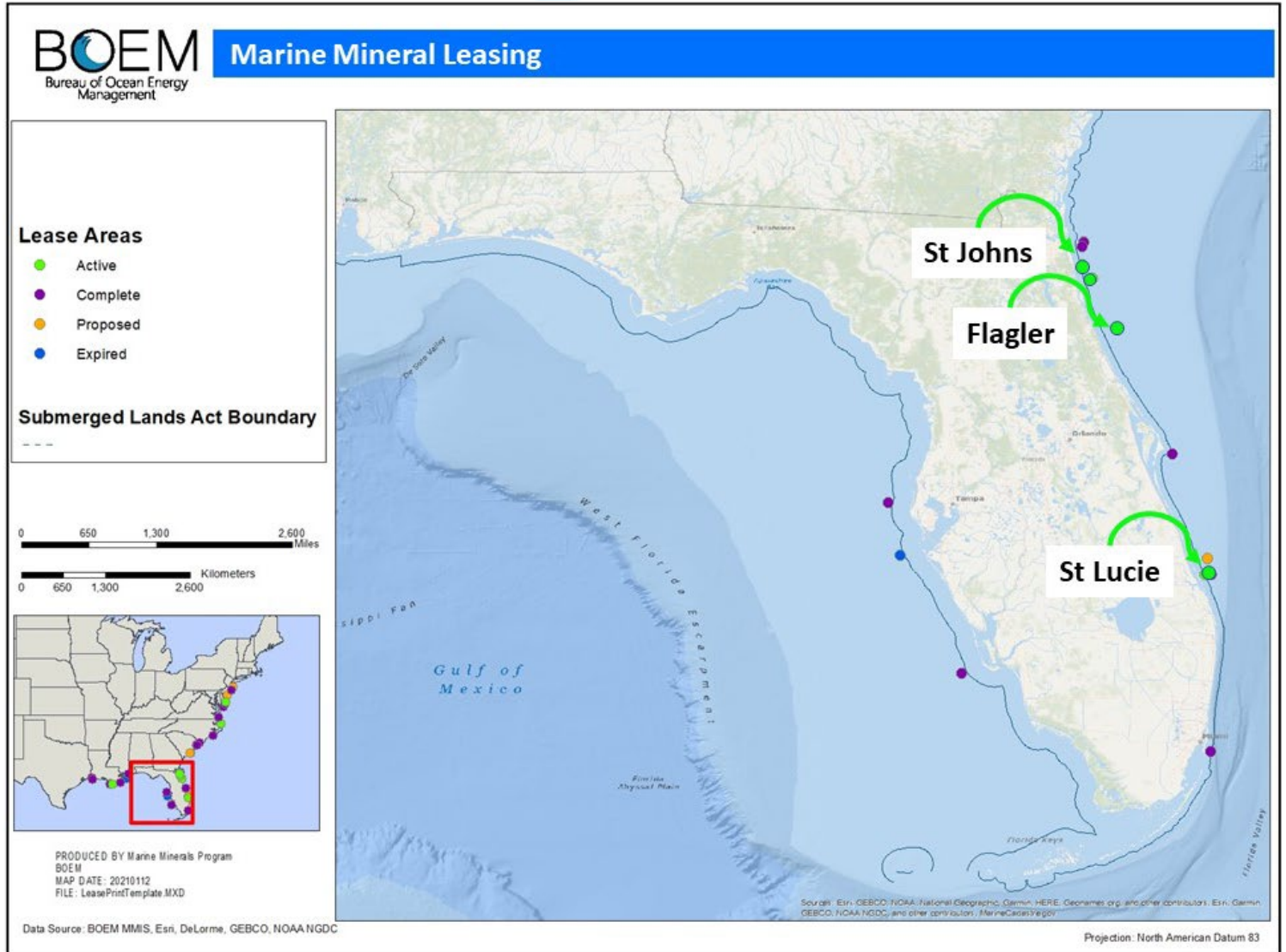
Lease No	ProjectID	Total Sand Allocated	ExpirationDate
OCS-A-0528	Flagler County Federal 2020	700,000	3/23/2023
OCS-A-0531	Flagler County NonFederal 2020	1,800,000	8/11/2023
OCS-A-0533	St Johns County South Ponte Vedra 2021	1,100,000	4/9/2024
OCS-A-0548	St Lucie County 2021	800,000	7/8/2024
OCS-A-0535	StJohnsCounty_NorthPonteVedraBeach_2021	2,200,000	9/30/2024

Active Florida Leases

### Completed

LeaseNo	ProjectID	Total Sand Allocated
OCS-A-0527	Patrick Air Force Base 2019	600,000
OCS-A-0526	BrevardCounty 2019	2,020,000
OCS-A-0516	Brevard County 2018	1,700,000
OCS-A-0515	Martin County 2017	1,000,000
OCS-A-0511	Duval County 2016	2,400,000
OCS-A-0493	Brevard County 2013	2,400,000
OCS-A-0484	Martin County 2012	1,000,000
OCS-A-0481	Miami-Dade County 2011	474,000
OCS-G-34021	Pinellas County 2011	1,800,000
OCS-A-0479	Duval County 2011	1,200,000
OCS-A-00476	Brevard County 2009	1,300,000
OCS-G-23707	Collier County 2006	673,000
OCS-FL-2005	Patrick Air Force Base 2005	350,000
OCS-A-0461	Brevard County 2005	2,000,000
OCS-A-0460	Duval County 2005	1,500,000
OCS-FL-2000	Patrick Air Force Base 2001	600,000
OCS-A-0454	Brevard County 2000	7,300,000
OCS-A-0451	Duval County 1995	1,240,000

Completed Florida Leases





# National Offshore Sand Inventory

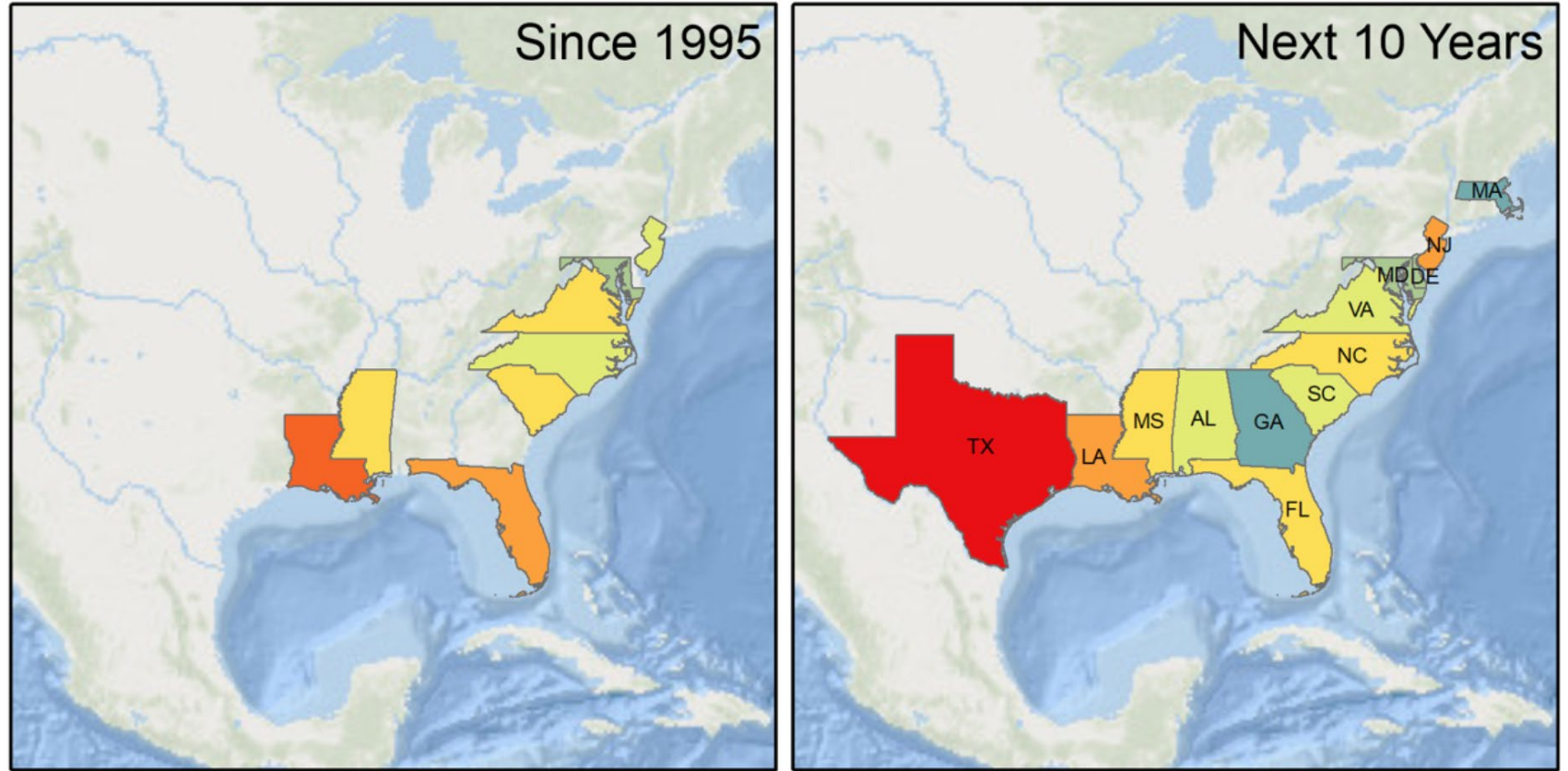
MMIS is just one of the mechanisms to support National Offshore Sand Inventory (NOSI) and foster access to the Nations offshore mineral resources

BOEM, other Federal agencies, and State partners collaborate on shared sediment data and inventory initiatives

- Share data
- Identify location and character of OCS sand resources
- Respond quickly to emergencies
- Coordinate with local and federal partners to fill data gaps
- Support stewardship role and coastal resilience

**Investments** in NOSI **protect billions** in national resources and **reduce** emergency response time.

Map source data derived from 2018 Baird report "Projected OCS Sand Resource Needs and Effort"



## OCS Sand Volume



million cubic yards





# National Offshore Sand Inventory

## MMIS home to Characterized OCS Marine Minerals Resources

National Sand Resource Areas - Evaluation Stage (Atlantic Ocean, Gulf of Mexico, and Pacific Ocean)



**Proven**

Resource areas whose thickness and lateral extent have been fully determined through design-level geotechnical and seismic coverage. (Generally an area that has been authorized by a lease.)



**Potential**

Resource areas whose existence has been verified through sufficient geotechnical and geophysical data. Thickness and/or lateral extent has not been fully determined. All areas have some combination of geotechnical and geophysical datasets (vibrocure, bathymetry, sidescan, and seismic).



**Unverified**

Resource areas hypothesized to exist on the basis of indirect evidence (seismic profiles, bathymetry, or sidescan). Inferred sediment types, unit thickness and lateral extents have not been confirmed through direct sampling method



**Unusable**

Resource areas that as a result of additional surveys, prior to dredging activity, or infrastructure development are not (or no longer) suitable for future dredging.

### BOEM National Offshore Sand Inventory (NOSI)

#### BOEM National Offshore Sand - Sediment Resources

- Proven
- Potential
- Unverified
- Unusable

#### BOEM Wind Planning and Lease Areas



#### BOEM New York Bight Proposed Wind Energy Areas for 2021 Lease Sale



#### NOSI Focus Areas (water depths less than 30m)

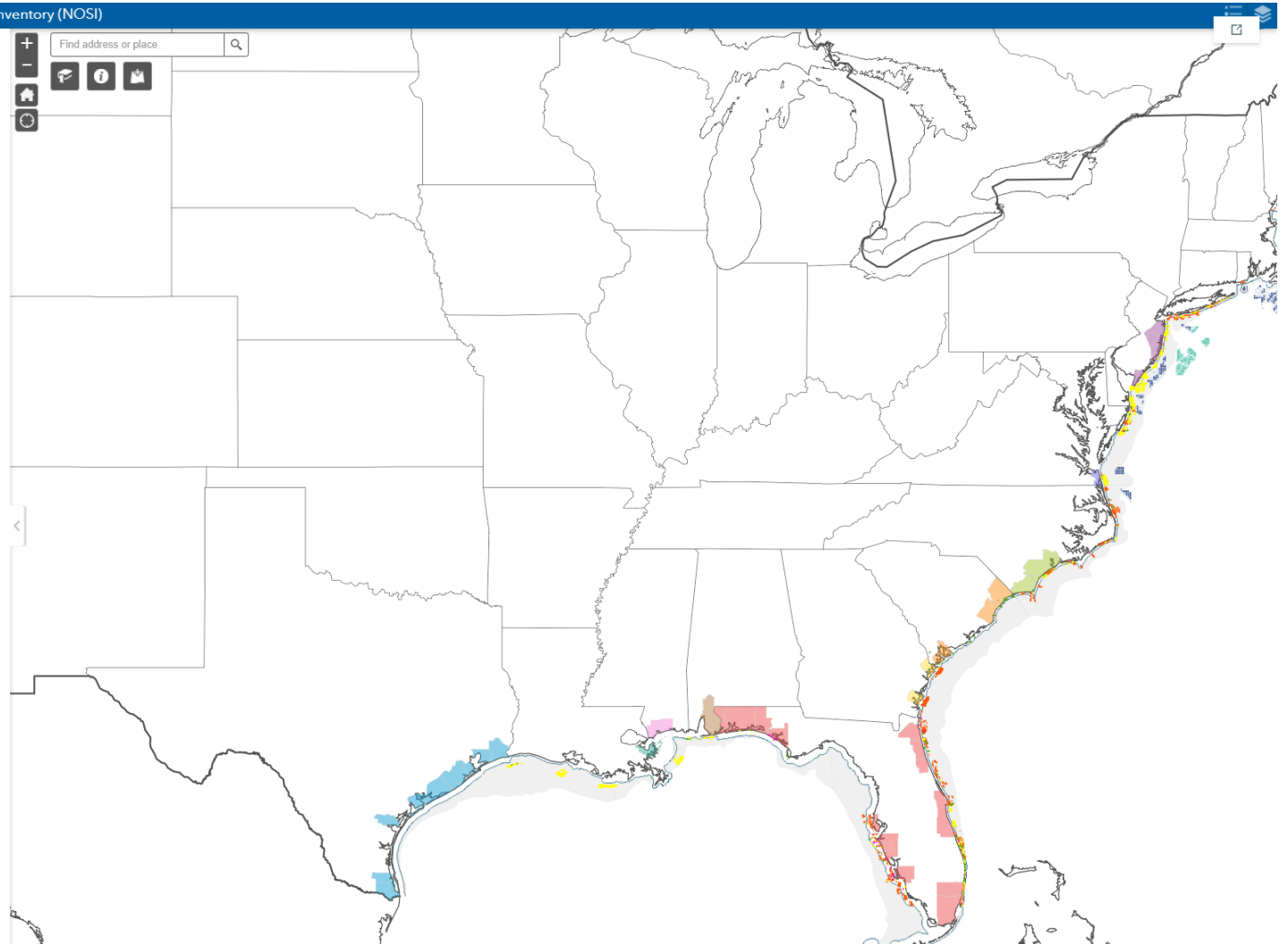


#### State Priority Areas (by county)

- FL
- TX
- NC
- NJ
- SC
- GA
- MS
- AL
- LA
- VA

#### Marine Cadastre Layers

Submerged Lands Act Boundary









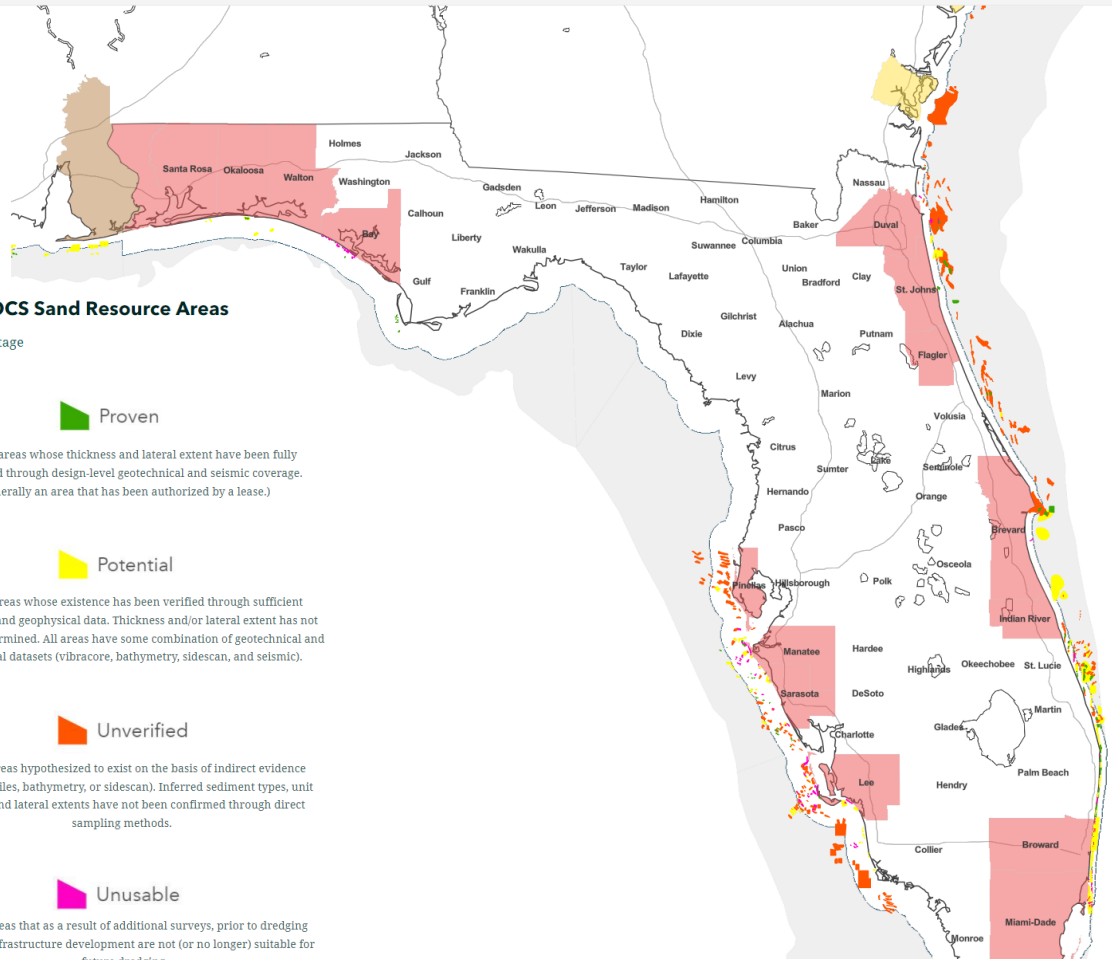
# National Offshore Sand Inventory

## U.S. Army Corps of Engineers South Atlantic Division Sand Availability and Needs Determination Sand Source Categories and Confidence Levels - Borrow Areas

### Florida OCS Sand Resource Areas

Evaluation Stage

-  **Proven**  
 Resource areas whose thickness and lateral extent have been fully determined through design-level geotechnical and seismic coverage. (Generally an area that has been authorized by a lease.)
-  **Potential**  
 Resource areas whose existence has been verified through sufficient geotechnical and geophysical data. Thickness and/or lateral extent has not been fully determined. All areas have some combination of geotechnical and geophysical datasets (vibracore, bathymetry, sidescan, and seismic).
-  **Unverified**  
 Resource areas hypothesized to exist on the basis of indirect evidence (seismic profiles, bathymetry, or sidescan). Inferred sediment types, unit thickness and lateral extents have not been confirmed through direct sampling methods.
-  **Unusable**  
 Resource areas that as a result of additional surveys, prior to dredging activity, or infrastructure development are not (or no longer) suitable for future dredging.



Category <sup>1</sup>	Confidence	Description
<b>Proven</b>	90%	Resource areas with beach-quality sand whose thickness and lateral extent have been fully determined through design-level geotechnical data and in most cases are permitted.
<b>Potential</b>	70%	Resource areas with beach-quality sand whose existence has been verified through preliminary geotechnical and geophysical data (with vibracores approximately one mile apart). Thickness and/or lateral extent has been preliminarily determined.
<b>Unverified Plus</b>	can vary from 5% - 30% <sup>2</sup>	Resource areas hypothesized to exist on the basis of geophysical evidence (seismic profiles, bathymetry, or side scan sonar) and at least one geotechnical core or surficial samples verifying beach-quality sand.
<b>Unverified</b>	0%	Resource areas hypothesized to exist on the basis of indirect evidence for the presence of beach-quality sand.
<b>Unusable</b>	0%	Unusable for one or more of the following reasons: 1. All beach-compatible material has been removed from the area prior to the SAND Study, 2. The sand source is inaccessible due to current conditions. 3. Area was investigated and the presence of non-beach quality material throughout the area was verified.

<sup>1</sup> Sand source categories modified from BOEM's *Marine Minerals Information System (2020)*, *FDEP's Regional Offshore Sand Source Inventory (2020c)*, and *Southwest Florida Borrow Area Update (2017)*.

<sup>2</sup> Confidence level for Unverified Plus sand sources varies based on the density of the available geophysical and geotechnical data. This study provides the estimated volumes of Unverified Plus sand sources but considers them as non-volume contributing for the summary tables.

Source: U.S. Army Corps South Atlantic Division Sand Availability and Needs Determination Summary Report (army.mil)





## MMIS MARINE MINERALS INFORMATION SYSTEM

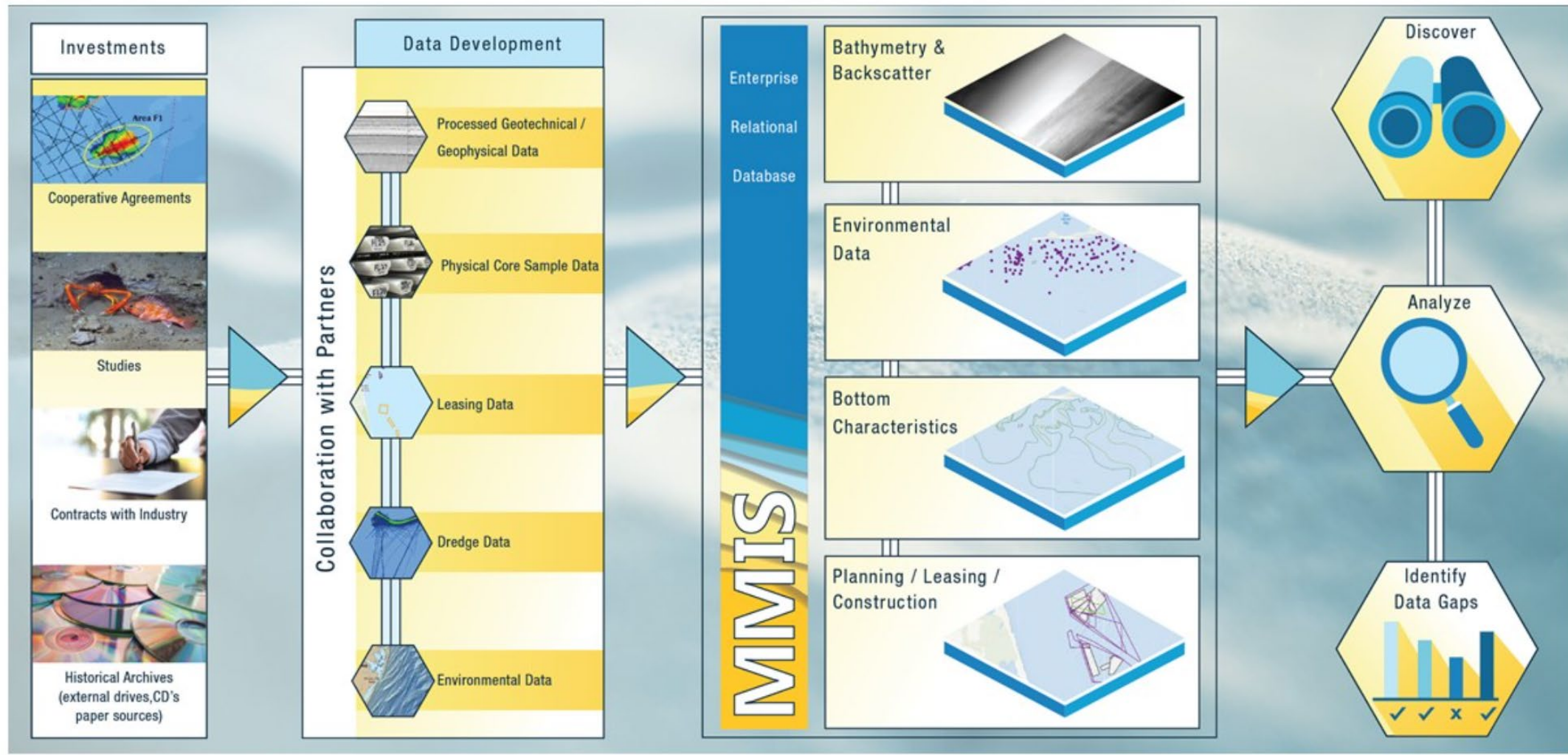
Home to usable, accessible, and trusted ***characterized marine mineral resource information*** that is accessible to all who need it







# Data and Services

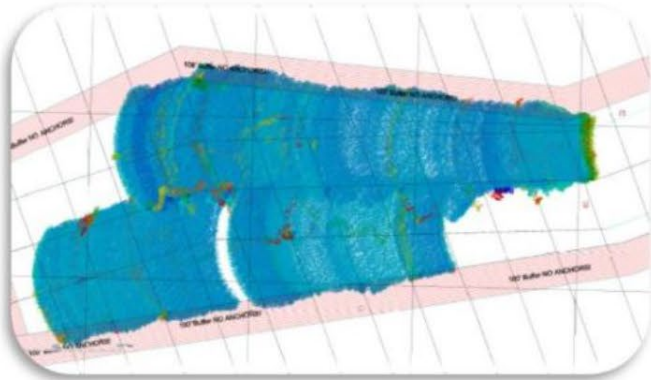




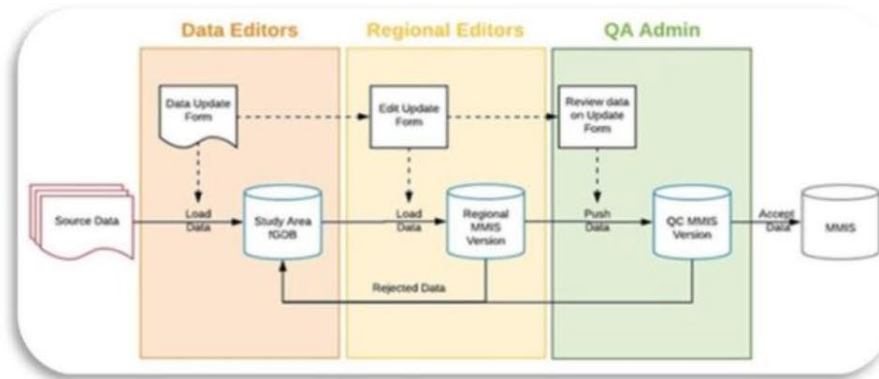
# Data and Services

Data Management

## Data Intake



## QAQC



## Public Access





# Data and Services

## Data Accessibility

<https://mmis.doi.gov/boemmmis/>

**MMIS MARINE MINERALS INFORMATION SYSTEM**

Help Partners Feedback BOEM

Layers Download

Identify

- Administrative & Planning
  - Marine Minerals Offshore Study Areas
  - Marine Minerals Lease Areas
  - Dredge Areas
  - Shore Placement Areas
  - Marine Minerals Shore Study Areas
  - Sand Resources
  - Atlantic OCS Alliquots with Sand Resources
  - Gulf of Mexico OCS Blocks with Significant Sediment Resources
- > Samples
- > Geological
- > Geophysical
  - > Backscatter/Sidescan Sonar
  - > Bathymetry
- > Maritime Industries: Energy, Transport, Infrastructure
- > Boundaries
- > Louisiana Sand/Sediment Resources Database (LASARD)
- > Florida Department of Environmental Protection (FDEP) ROSSI

The map displays the North Pacific and North Atlantic Oceans, highlighting various basins and study areas. Key features include the Beaufort Sea, Amundsen Gulf, Foxe Basin, Hudson Bay, Labrador Sea, and the North Atlantic Ocean. The map also shows the Gulf of Alaska, Gulf of Mexico, and the Atlantic Ocean. The interface includes a navigation toolbar on the left and a list of layers on the right.





# Data and Services

## MMIS Data Downloads

For the non-GIS user, download is available in csv format and links to pdf reports can be discovered

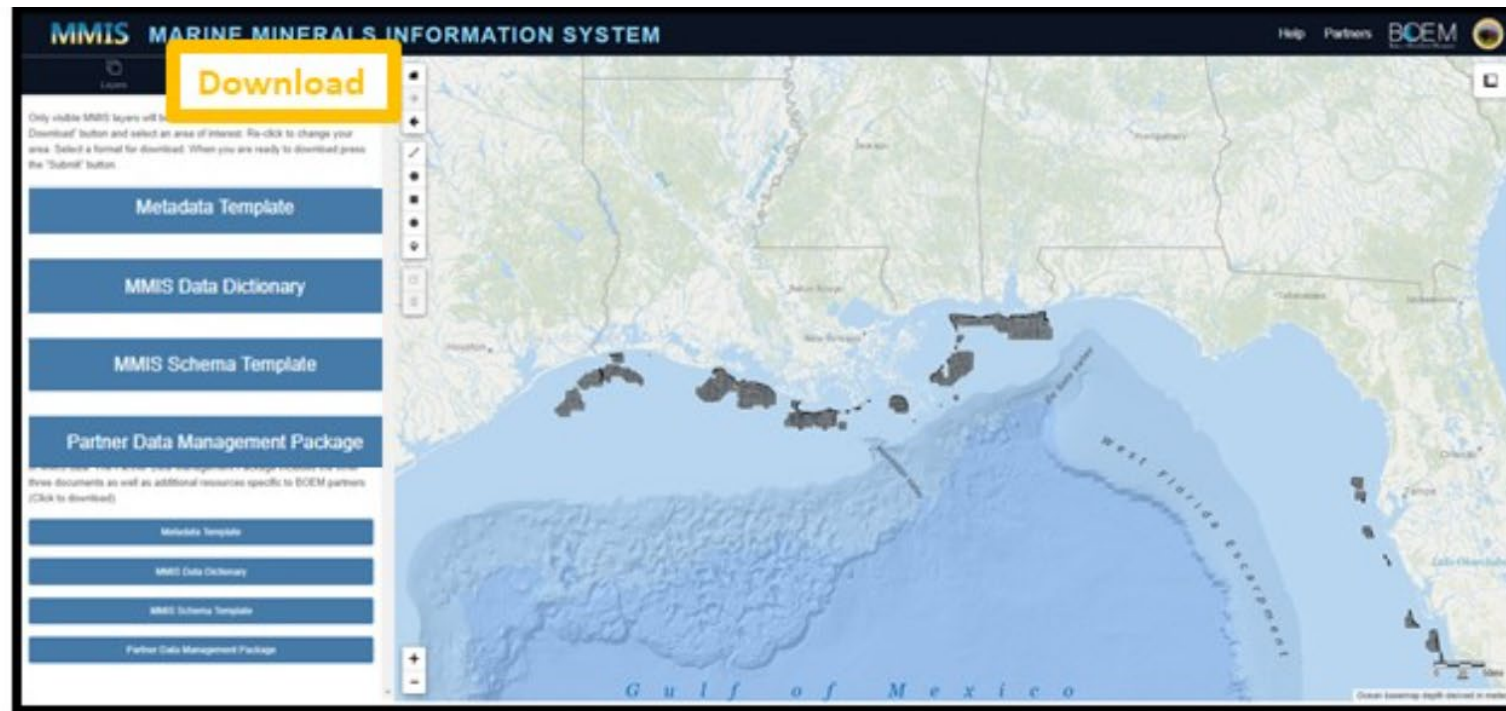
<https://mmis.doi.gov/boemmmis/>

## Accessible Reports

[Marine Mineral Resource Evaluation Research](#) | Bureau of Ocean Energy Management ([boem.gov](http://boem.gov))

[Marine Mineral Studies](#) | Bureau of Ocean Energy Management ([boem.gov](http://boem.gov))

[ESPIS](#) | Environmental Studies Search Tool ([marinecadastre.gov](http://marinecadastre.gov))





# Data and Services

## MMIS Rest Services

For the GIS user, enabled services so that information layers can be used directly

<https://mmis.doi.gov/arcgis/rest/services/MMIS/>

<https://mmis.doi.gov/arcgis/rest/services/MMIS/>

General

Server URL: <https://mmis.doi.gov/arcgis/rest/services/MMIS/>  
ArcGIS Server: http://gisserver.domain.com:6080/arcgis

Authentication (Optional)

User Name:

Password:

Save Username/Password

[About ArcGIS Server connections](#)

GIS Servers

- + Add ArcGIS Server
- + Add ArcIMS Server
- + Add WCS Server
- + Add WFS Server
- + Add WMS Server
- + Add WMTS Server
- arcgis on cimsgeo3.coastal.louisiana.gov (user)
- arcgis on coast.noaa.gov (user)
- arcgis on ais.boem.aov (user)
- + arcgis on mmis.doi.gov (user)
- arcgis2 on gis.aecomonline.net (user)



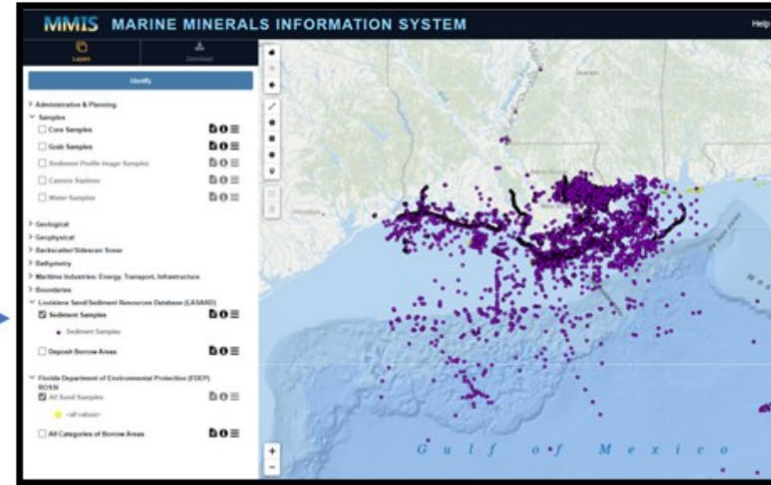


# Data and Services

Partners - Interoperability | Discoverability

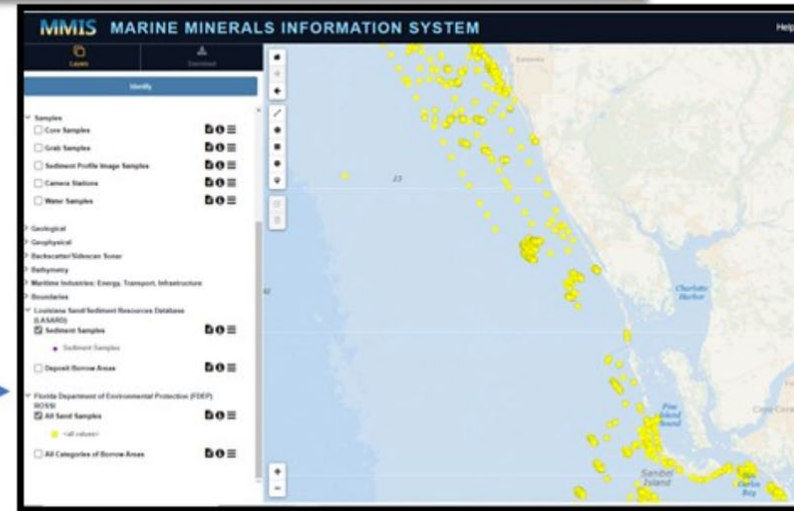


Coastal Protection and Restoration Authority  
Louisiana Sand Resource Database (LASARD)



Florida Department of Environmental Protection  
Regional Offshore Sand Inventory (ROSSI)

**AECOM**



**MMIS** MARINE MINERALS INFORMATION SYSTEM





# Data and Services

Partners - Interoperability | Discoverability



- **USACE Jacksonville**
  - SW Florida data products in MMIS

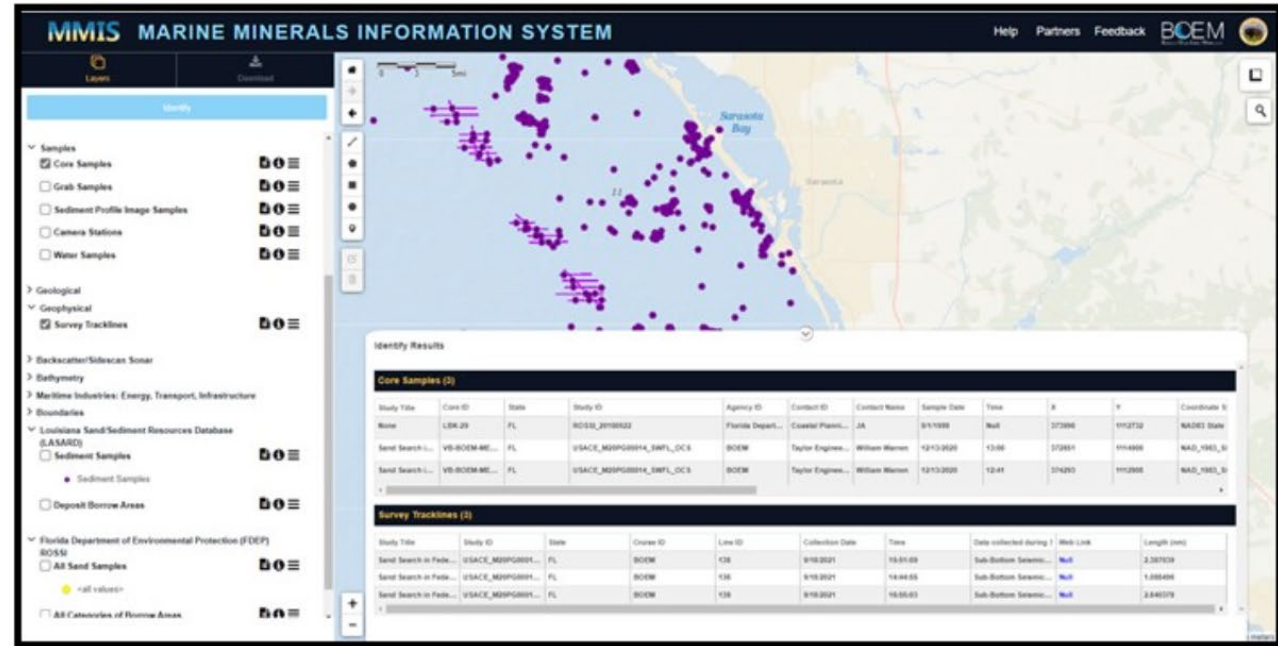


- **USACE Mobile and USGS**
  - Project planning phase



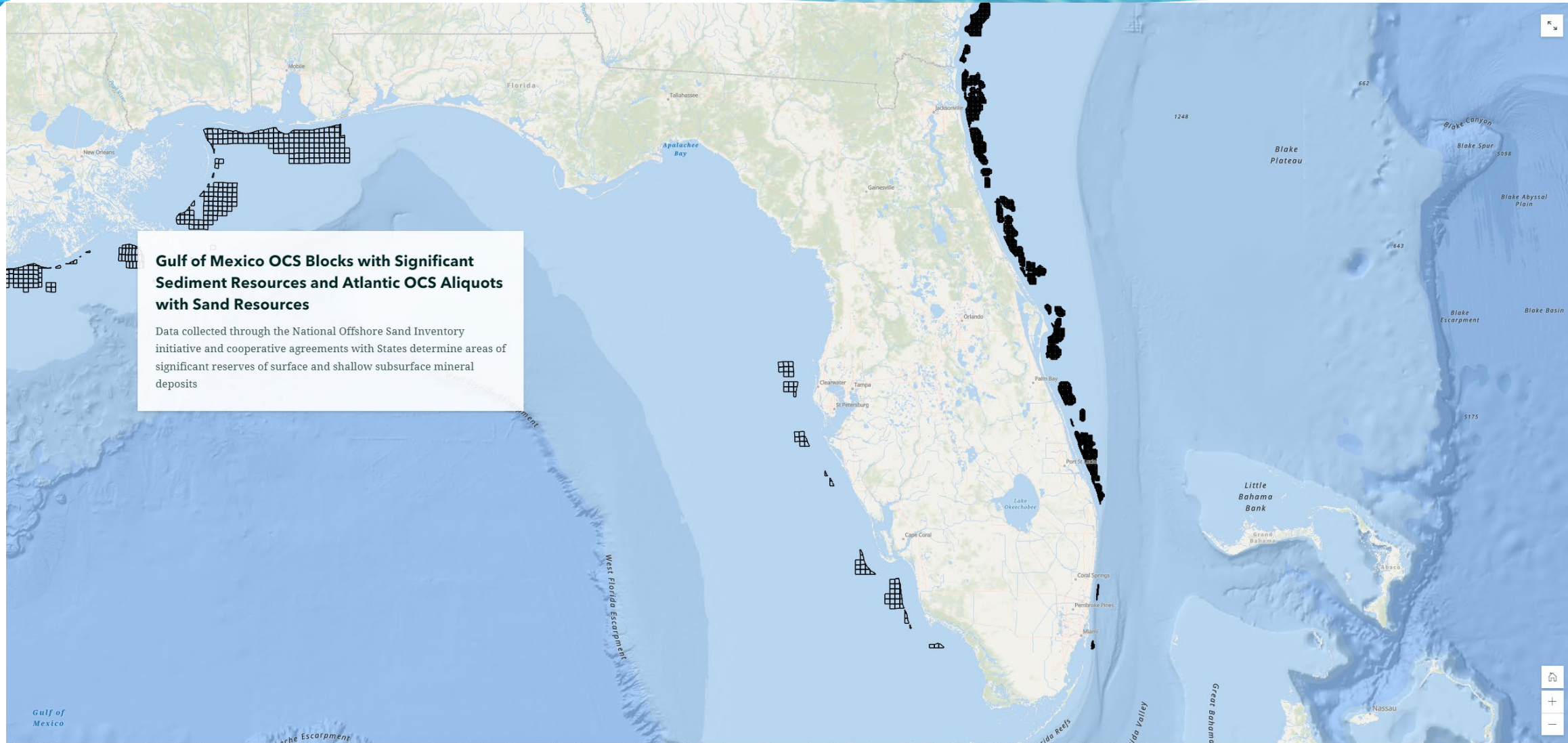
National Centers for Environmental Information

- **NOAA NCEI**
  - NOAA – BOEM geophysical data submission agreement





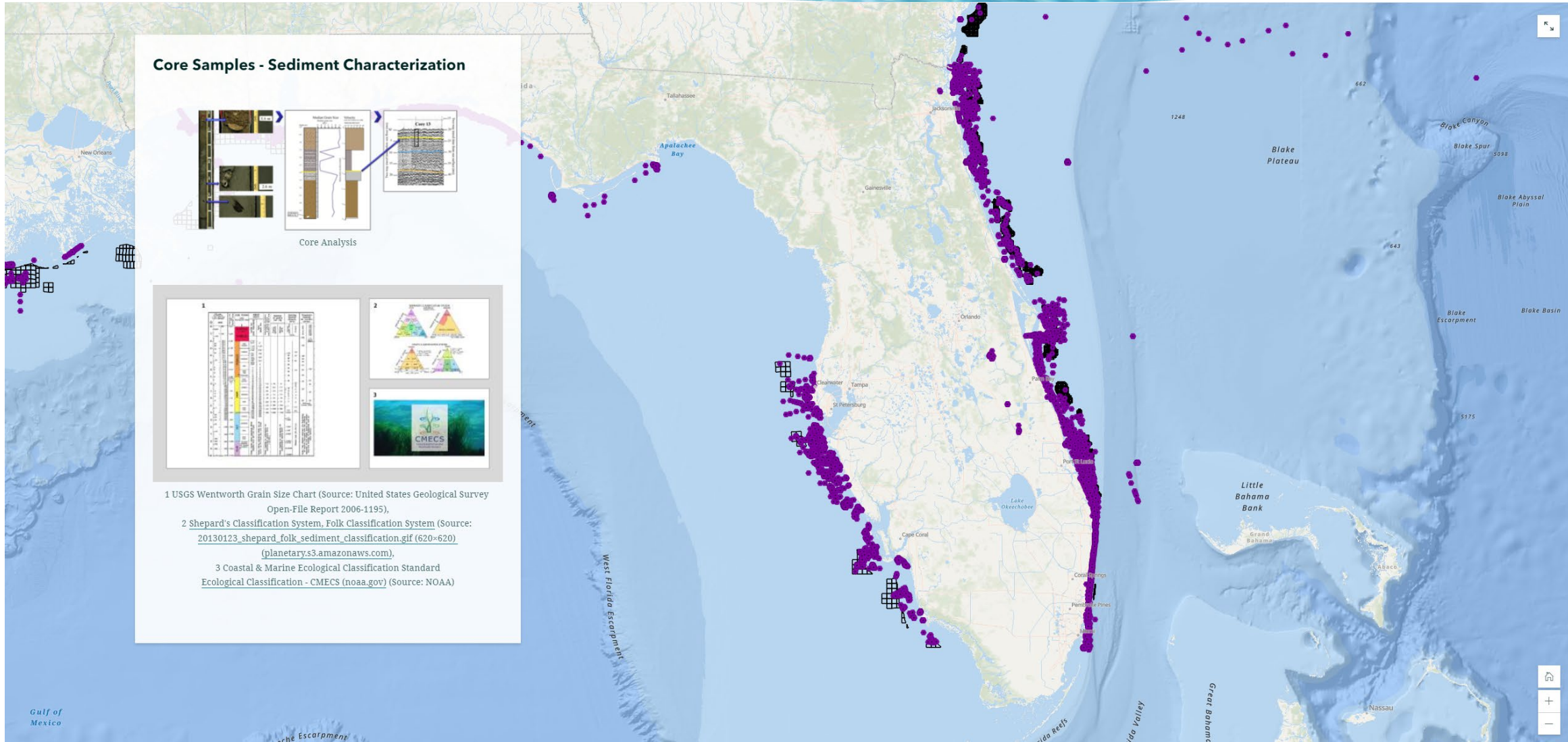
# Data and Services





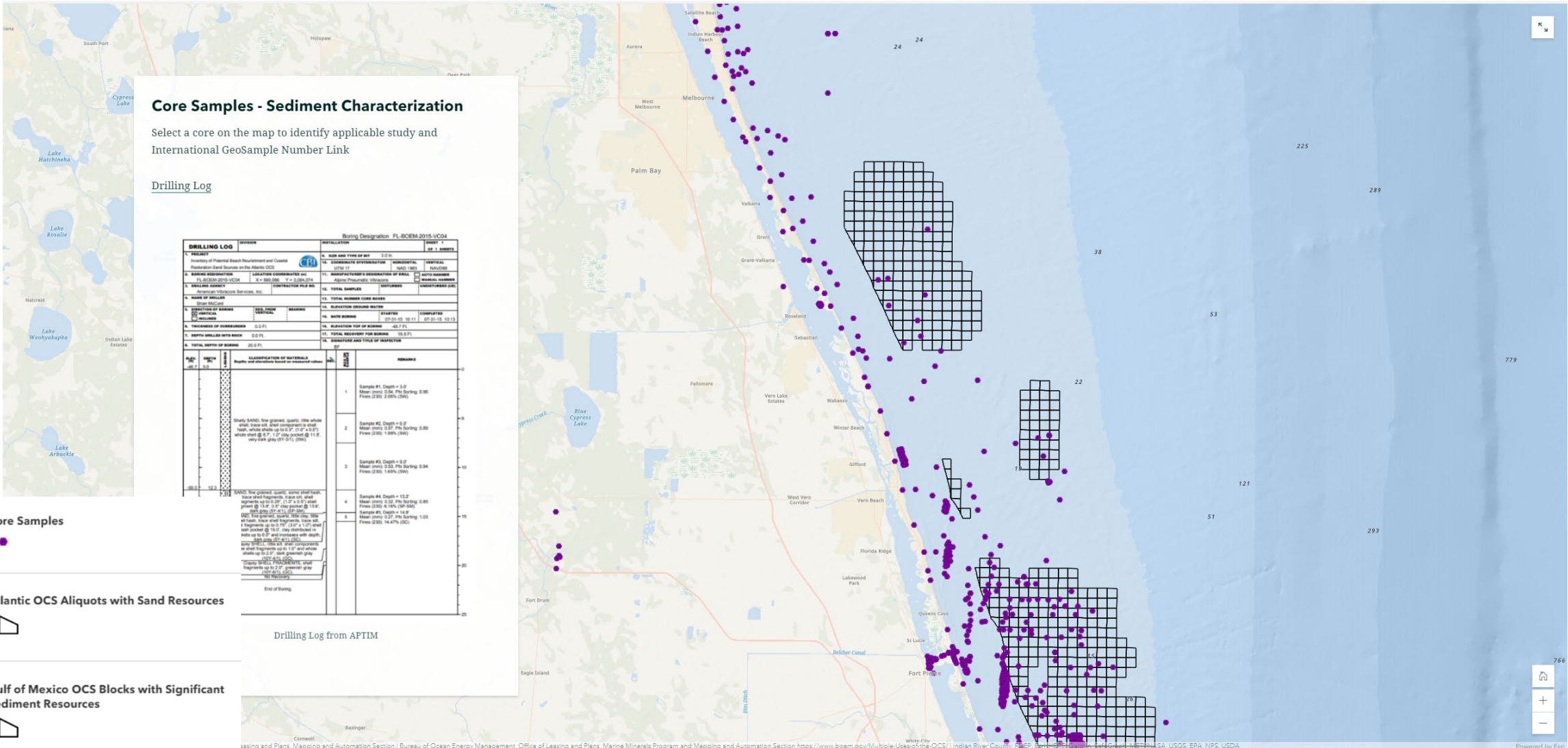


# Data and Services





# Data and Services



## Core Samples - Sediment Characterization

Select a core on the map to identify applicable study and International GeoSample Number Link

### Drilling Log

Drilling Designation: FL-BOEM-2015-V04

DRILLING LOG		INSTALLATION		SHEET 1	
PROJECT		NO. AND TYPE OF BIT		OF 1 SHEETS	
Inventory of Potential Beach Nourishment and Coastal Restoration Sand Sources in the Atlantic OCS		3.00			
10. COORDINATE REPRESENTATION: HORIZONTAL: UTM; VERTICAL: NAVD83		11. MANUFACTURER'S DESIGNATION OF BIT		12. BIT NUMBER	
13. BORING DESIGNATION: LOCATION COORDINATES (U): 19 200 000 000; (V): 2 000 000		14. BIT NUMBER		15. BIT NUMBER	
16. DRILLING AGENCY: American Vibration Services, Inc.		17. TOTAL NUMBER LOG SHEETS		18. DATE BORING: 02-23-15 10:11; 02-23-15 10:13	
19. NAME OF WELL: DUNE MOUND		20. ELEVATION DRIVING WATER		21. COMPLETION	
22. DEPTH OF WATER: 0.0 FT		23. DATE BORING		24. DATE BORING	
25. THICKNESS OF OVERBURDEN: 0.0 FT		26. REPERFORATION TOP OF BORING: 40.7 FT		27. TOTAL DEPTH OF BORING: 15.0 FT	
28. DEPTH TO BOTTOM OF WELL: 0.0 FT		29. SANDWICH AND TITLE OF INSPECTOR		30.	
31. VERTICAL REFERENCE SYSTEM: 2011 NAD		32.		33.	
DEPTH (FT)	LOG	DEPTH (FT)	LOG	DEPTH (FT)	LOG
0.0		0.0		0.0	
1.0		1.0		1.0	
2.0		2.0		2.0	
3.0		3.0		3.0	
4.0		4.0		4.0	
5.0		5.0		5.0	
6.0		6.0		6.0	
7.0		7.0		7.0	
8.0		8.0		8.0	
9.0		9.0		9.0	
10.0		10.0		10.0	
11.0		11.0		11.0	
12.0		12.0		12.0	
13.0		13.0		13.0	
14.0		14.0		14.0	
15.0		15.0		15.0	
16.0		16.0		16.0	
17.0		17.0		17.0	
18.0		18.0		18.0	
19.0		19.0		19.0	
20.0		20.0		20.0	
21.0		21.0		21.0	
22.0		22.0		22.0	
23.0		23.0		23.0	
24.0		24.0		24.0	
25.0		25.0		25.0	

### Core Samples



### Atlantic OCS Aliquots with Sand Resources



Drilling Log from APTIM

### Gulf of Mexico OCS Blocks with Significant Sediment Resources



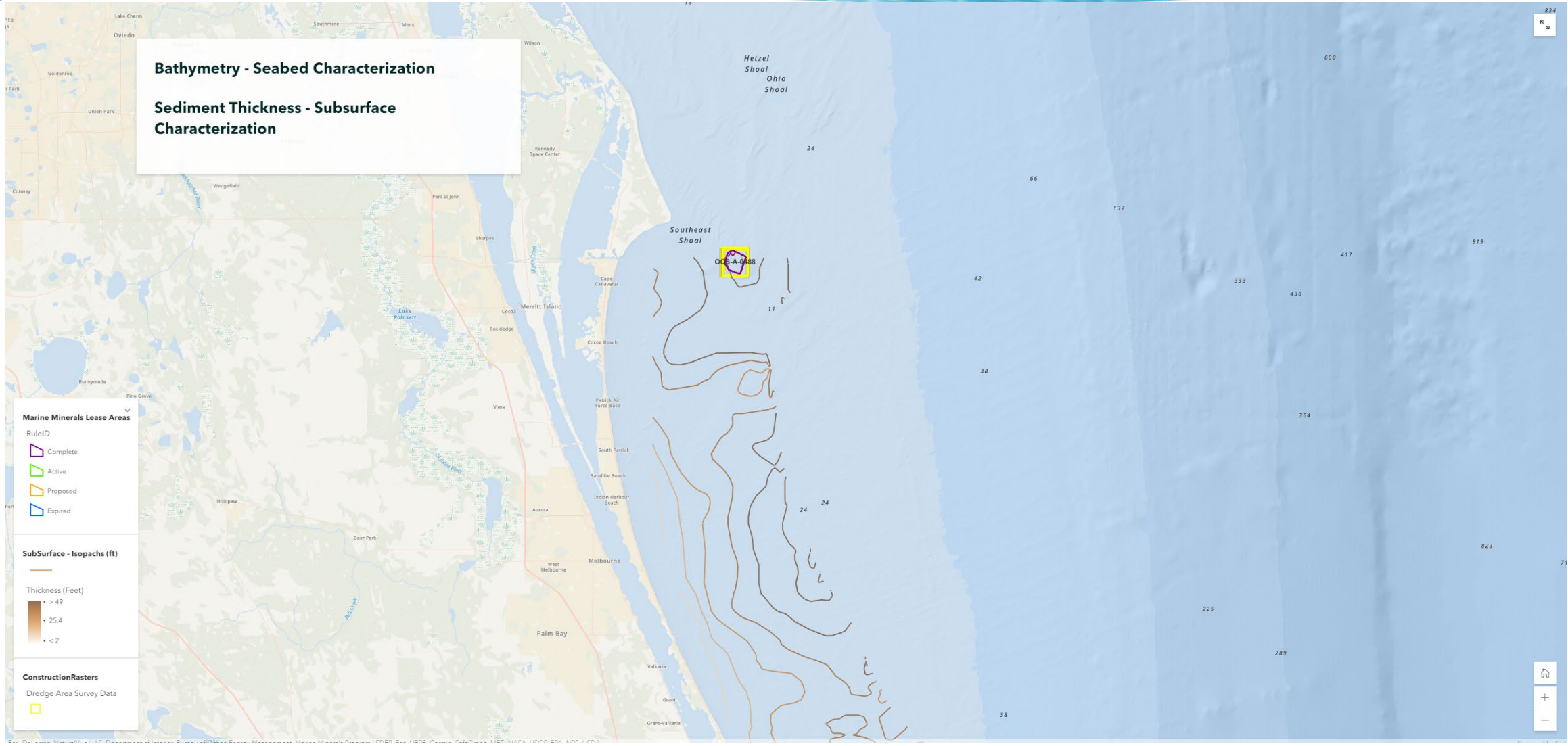
Mapping and Plans, Mapping and Automation Section | Bureau of Ocean Energy Management, Office of Leasing and Plans, Marine Minerals Program and Mapping and Automation Section <https://www.boem.gov/Multiple-Uses-of-the-OCS/> | Indian River County, FL DEP, Benthic Habitat, Florida Fish and Wildlife Conservation Commission, USGS, EPA, NPS, USDA

Powered by Esri





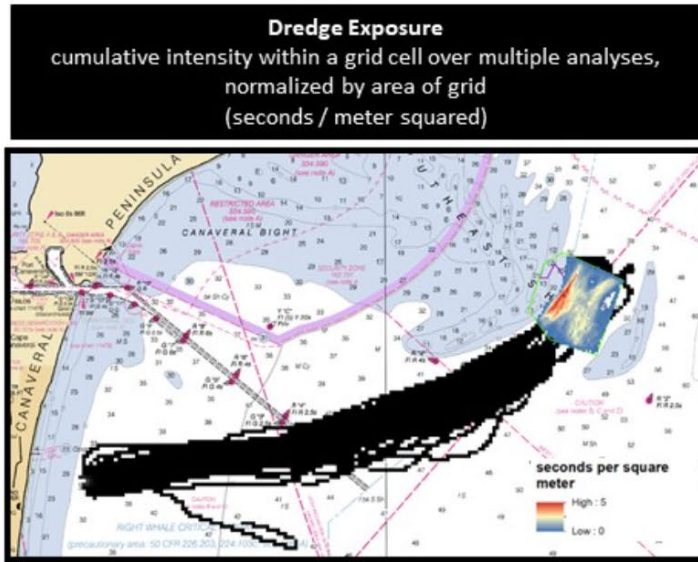
# Data and Services





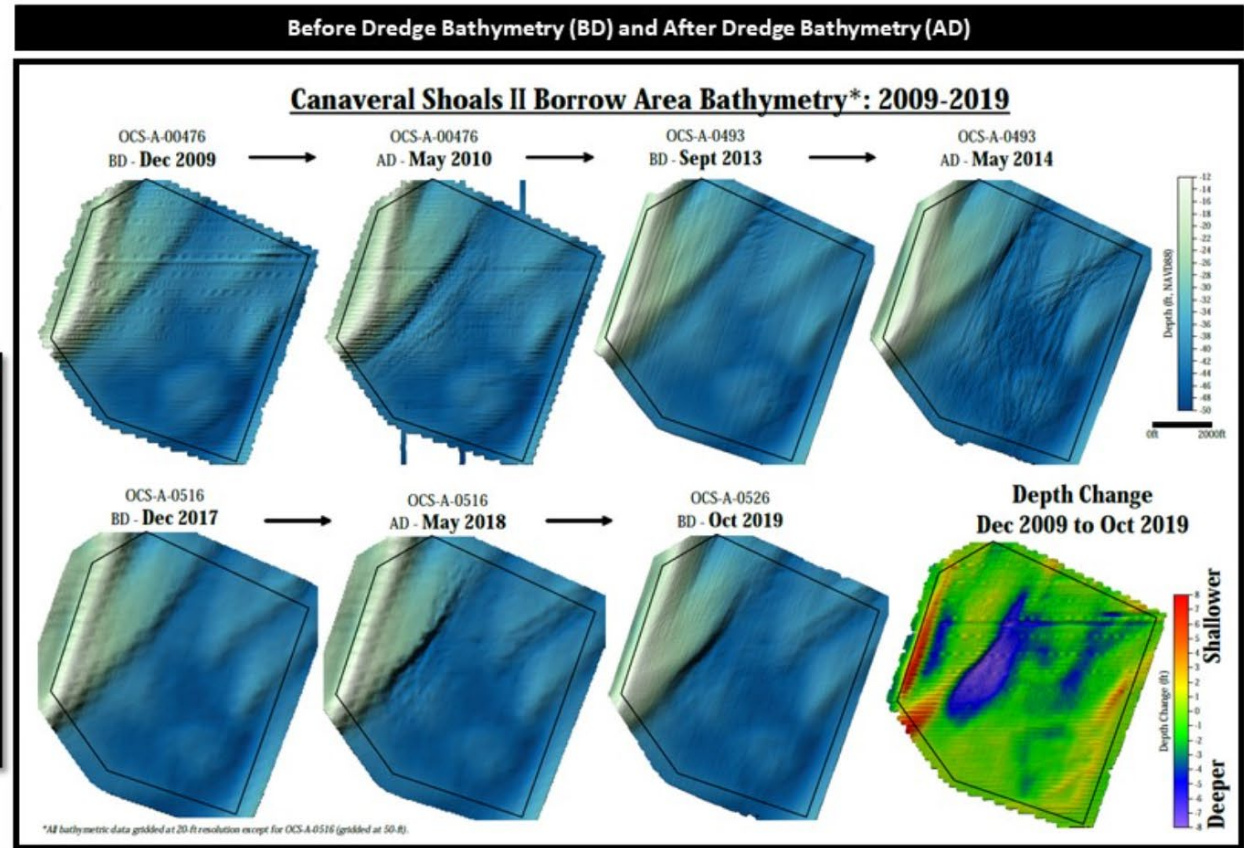
# Data and Services

Brevard County | Patrick Airforce Base - Florida  
 ■ Dredge Activity: 2009 - 2020



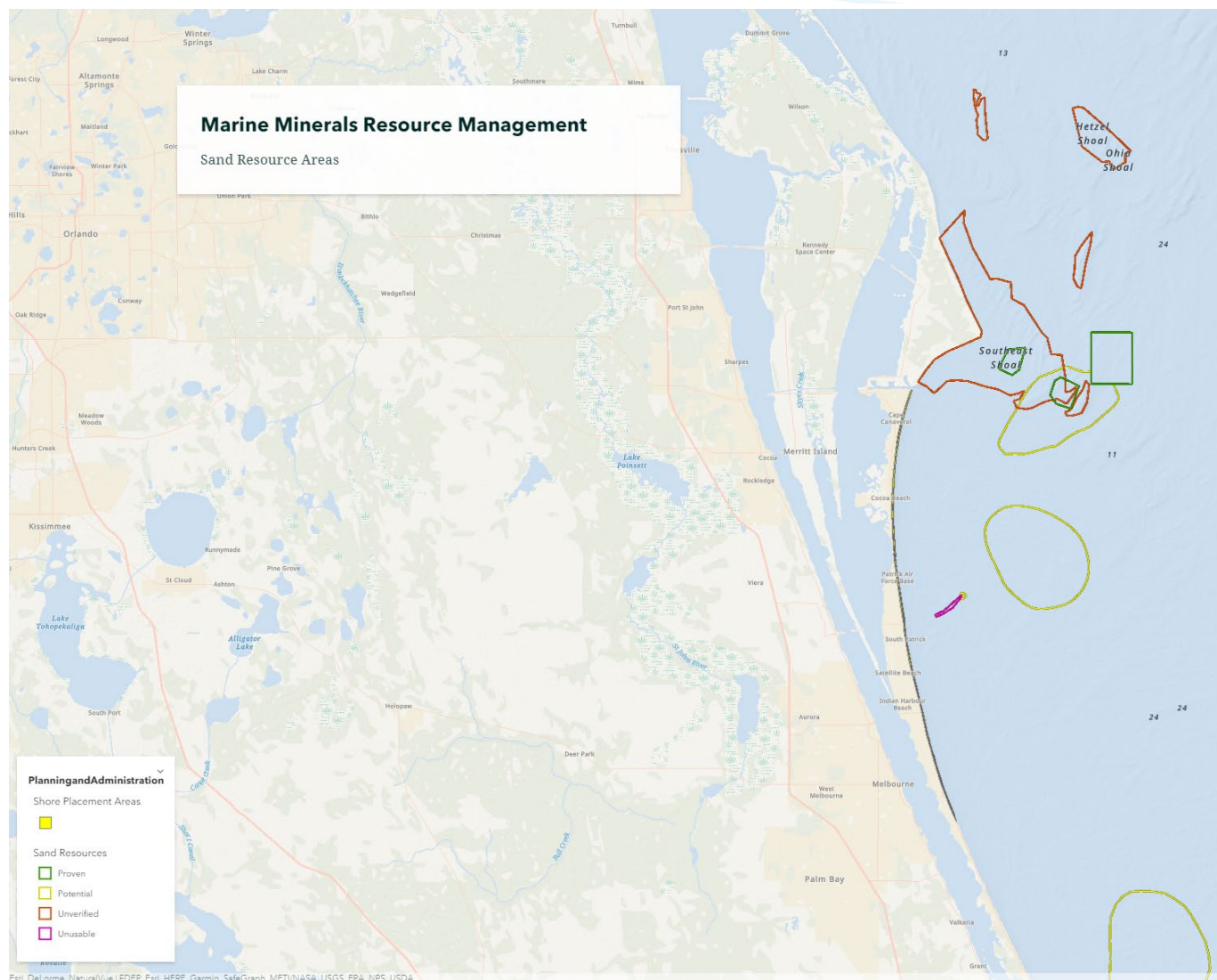
### Offshore Florida Canaveral Shoals Lease Area

Lease No	ProjectID	Total Sand Allocated (cubic yards)	Lease Signed	Calculated Dredge Volume (cubic yards)
<b>Borrow Area Monitoring</b>	Patrick Air Force Base	2019		
OCS-A-0526	Brevard County 2019	600,000	8/29/2019	811,943
OCS-A-0516	Brevard County 2018	2,020,000	8/29/2019	1,634,826
OCS-A-0493	Brevard County 2013	1,700,000	10/11/2017	932,359
OCS-A-0488	Patrick Air Force Base 2013	2,400,000	7/12/2013	2,664,582
OCS-A-0476	Brevard County 2009	350,000	1/16/2013	Expired Lease
OCS-A-0461   OCS-FL-2005	Brevard County 2005   Patrick Air Force Base 2005	1,300,000	9/11/2009	675,353
OCS-A-0454   OCS-FL-2000	Brevard County 2000   Patrick Air Force Base 2001	2,000,000   350,000	1/14/2005   1/28/2005	2,576,802
		7,300,000   600,000	7/11/2000   12/7/2000	2,195,013





# Data and Services



Eri: DeLorme, NaturalVue | FDEP, Eri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA



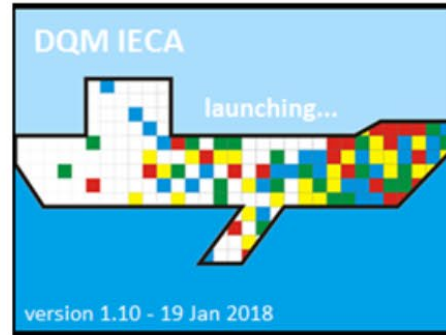


# Data and Services

## Inform Environmental and Mitigation Analysis

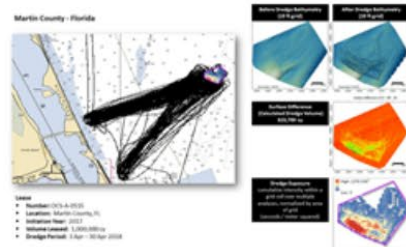
- Decision support tools utilizing Marine Minerals Information System and data to support environmental assessments

### Intensity and Exposure Characterization Algorithms (IECA)



*measured cumulative use  
impact of dredging activities depicted  
in a lease area*

### Seafloor Analysis



### Shoal Map Assessment Tool for EFH



*improved assessments of the  
potential impacts of  
dredging on Essential Fish  
Habitat*

### Analyzing Sea Turtle Entrainment Risk

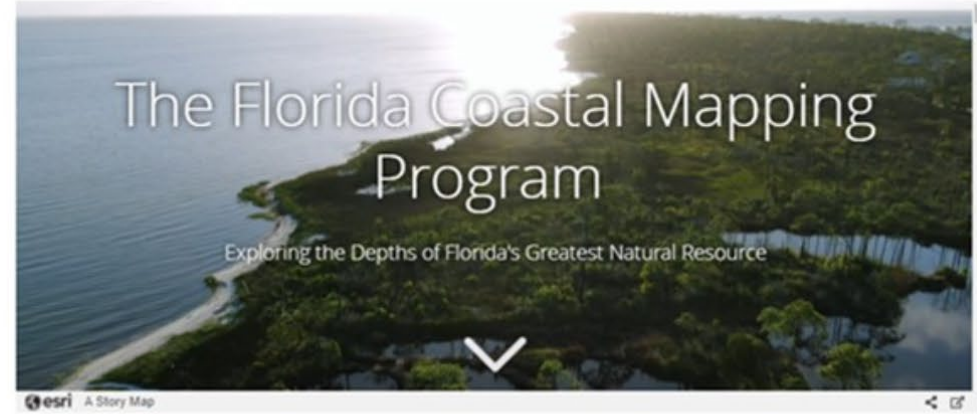


*informed decisions to  
minimize dredging impacts  
to sea turtles*





# Multiple Ocean Use



**Florida Coastal Mapping Program  
Science and Technical Advisory Committee**

**Chair:** Cheryl Hapke, University of South Florida St Petersburg College of Marine Science  
**Co-Chair:** Rene Baumstark, FL Fish and Wildlife Conservation Commission - Fish & Wildlife Institute  
**Co-Chair:** Ashley Chappell, NOAA Office of Integrated Ocean and Coastal Mapping

**State Agency Members**

Florida Institute of Oceanography Monty Graham	Florida Department of Environmental Protection TBD	Florida Fish & Wildlife Research Institute Rene Baumstark
Florida Department of Transportation Brett Wood		Florida Division of Emergency Management Jason Ray

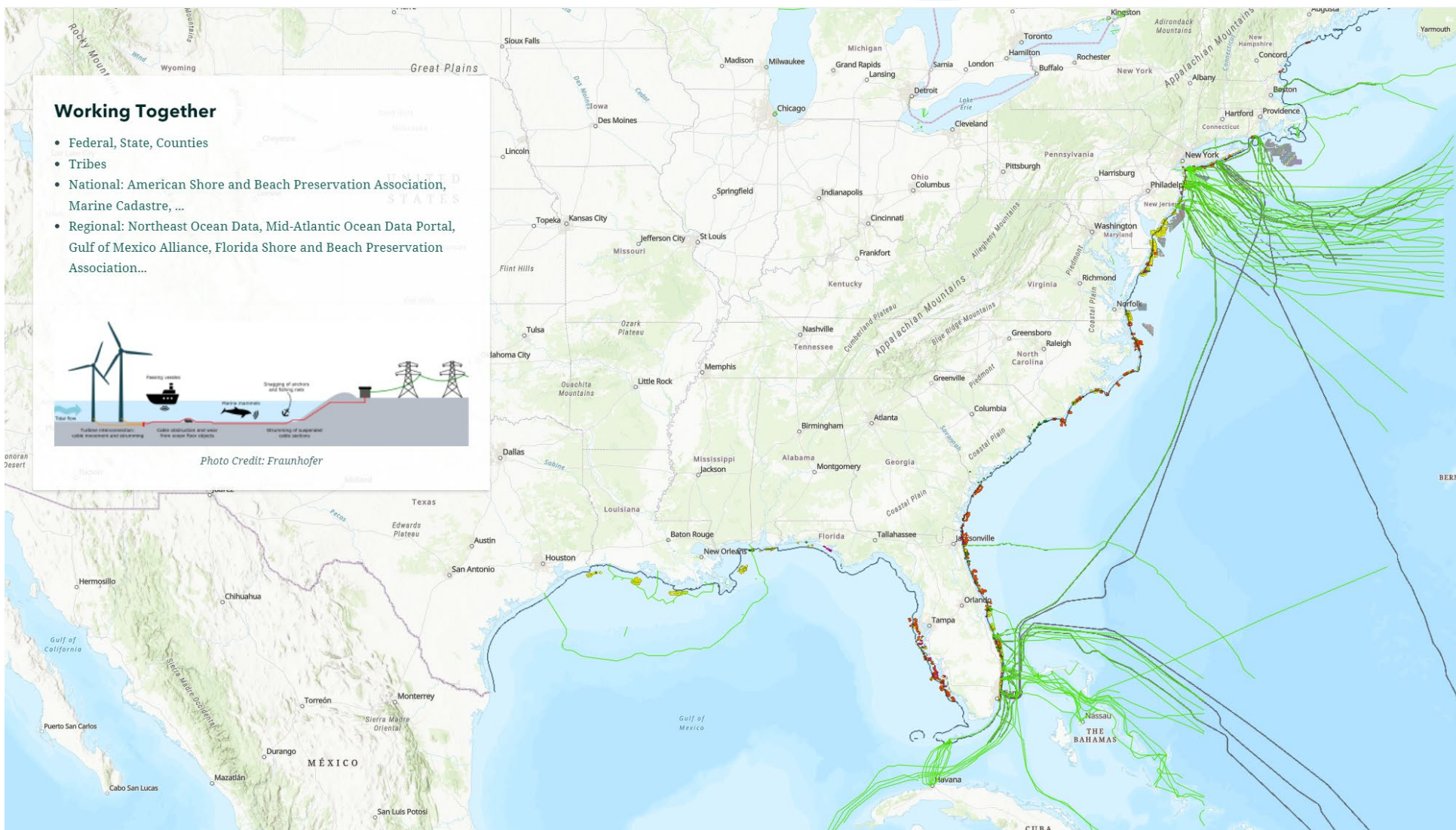
**Federal Agency Members**

U.S. Army Corps of Engineers Jennifer Wozencraft Clay McCoy	National Oceanic and Atmospheric Administration Ashley Chappell Paul Turner
U.S. Geological Survey Xan Fredericks	U.S. Bureau of Ocean Energy Management Jeff Reidenauer





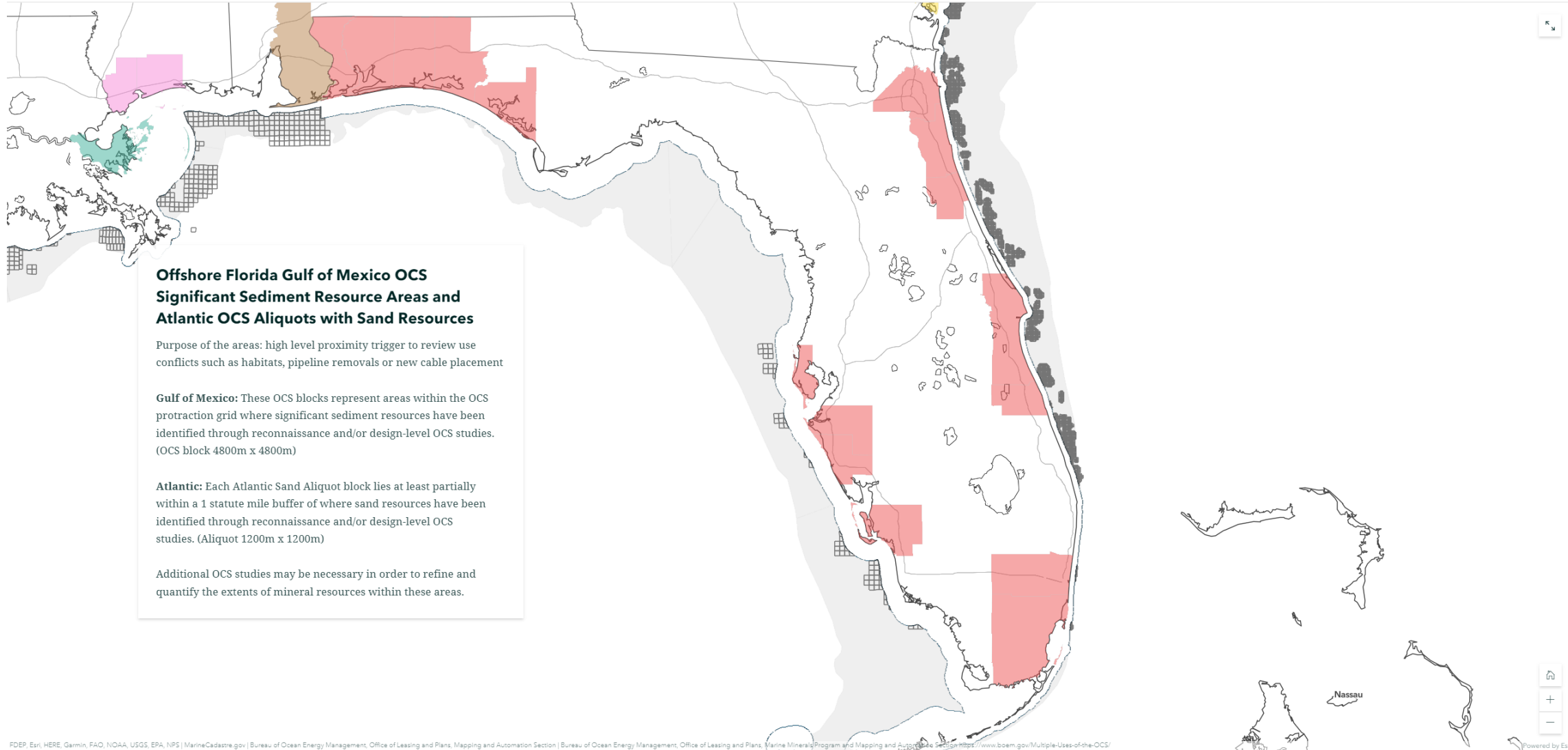
# Multiple Ocean Use







# Multiple Ocean Use

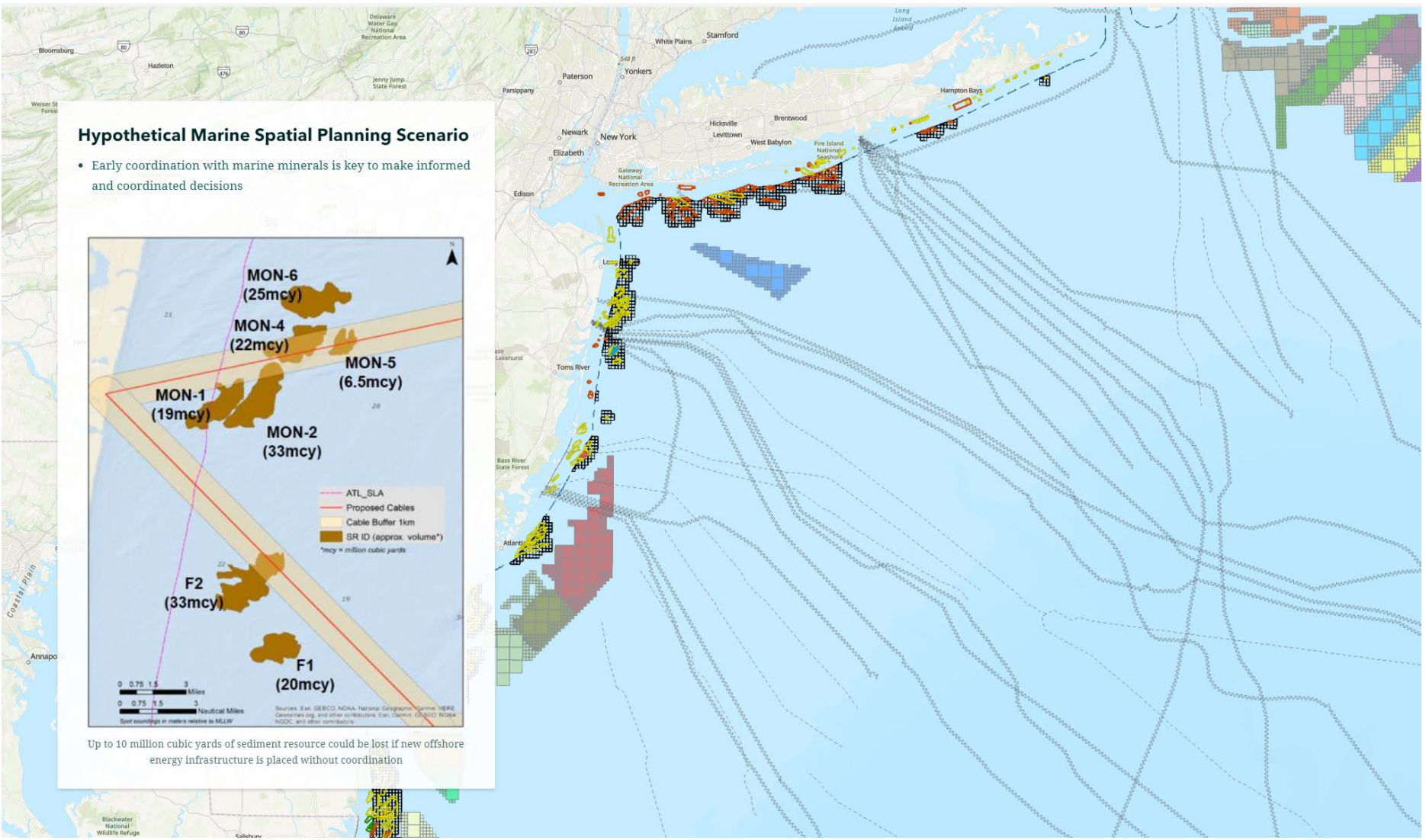


FDEP, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | MarineCadastre.gov | Bureau of Ocean Energy Management, Office of Leasing and Plans, Mapping and Automation Section | Bureau of Ocean Energy Management, Office of Leasing and Plans, Marine Minerals Program and Mapping and Automation Section | [www.boem.gov/Multiple-Uses-of-the-OCS/](http://www.boem.gov/Multiple-Uses-of-the-OCS/)





# Multiple Ocean Use





## Next Steps

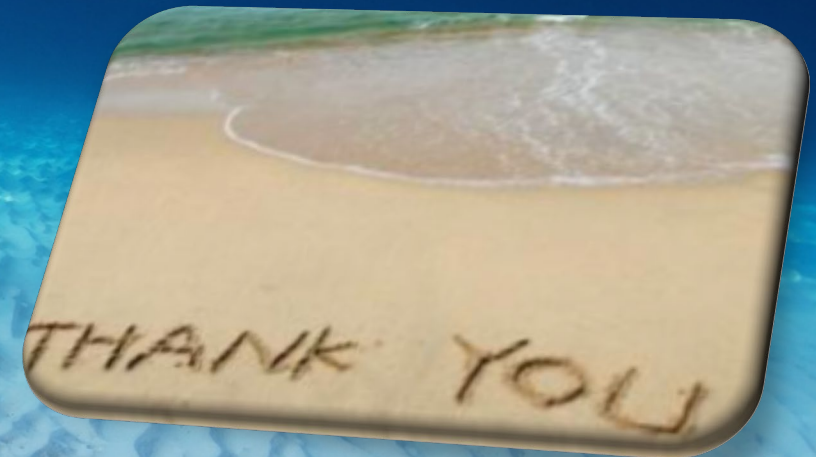
- Continue to advance and maintain a repository of applicable offshore marine mineral data of BOEM's investments of historic and current project data
- Continue to work with our partners to improve meaningful data to support planning and operational needs, data discovery and accessibility, and partner usability



# BOEM

Bureau of Ocean Energy  
Management

BOEM.gov



Lora Turner | [marineminerals@boem.gov](mailto:marineminerals@boem.gov) | <https://mmis.doi.gov/boemmmis>