NOAA-Fisheries Science Priorities for Offshore Wind in the Gulf of Mexico

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Southeast Fisheries Science Center

Southeast Fisheries Science Center
Miami, FL

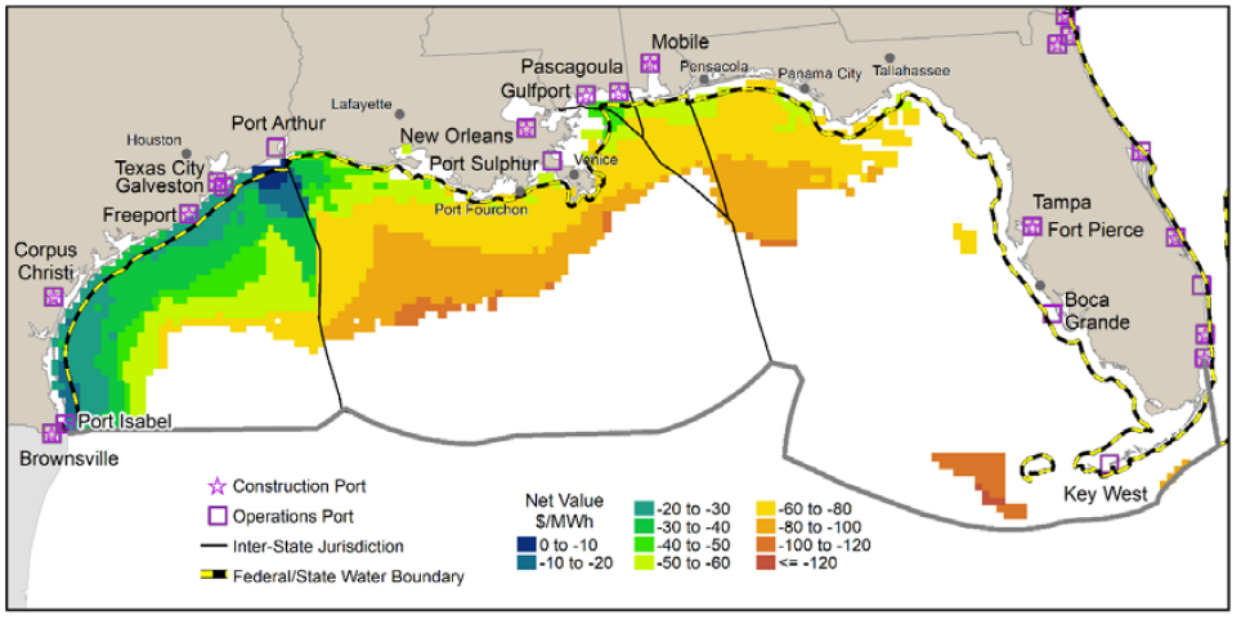
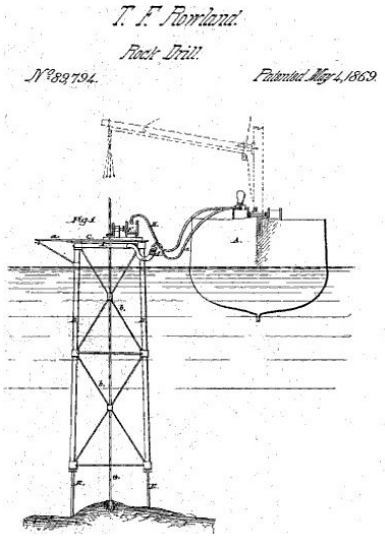


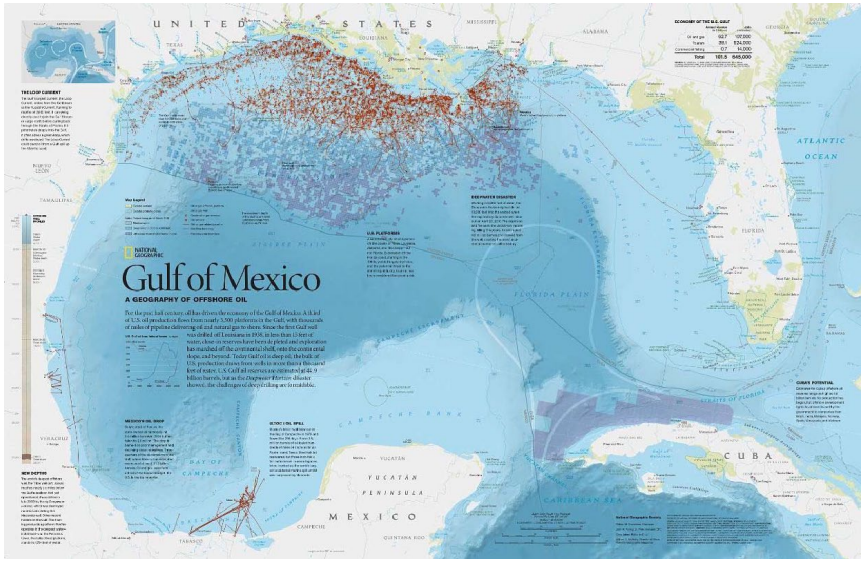
Figure 22. Estimated net value for Gulf of Mexico (2030 COD).
Note: 2030 data were extrapolated from modeled data for 2015, 2022, and 2027 in Beiter et al. (2017).

Offshore Energy in the Gulf of Mexico: Humble beginnings to an altered seascape

Offshore Rig Patent 1869



Kermac Rig No. 16, in 1947 became the first offshore rig in the Gulf of Mexico that was out of sight of land. .



www.nationalgeographic.org/hires/gulf-mexico-geography-offshore-oil/

Citation Information "Offshore Rig Patent of 1869." Authors: B.A. Wells and K.L. Wells. Website Name: American Oil & Gas Historical Society. URL: https://aoghs.org/offshore-history/offshore-rig-patent. Last Updated: May 3, 2021. Original Published Date: April 28, 2014. https://aoghs.org/offshore-oil-history/#:~:text=In%20the%20Gulf%20of%20Mexico,out%20of%20sight%20of%20land. www.nationalgeographic.org/hires/gulf-mexico-geography-offshore-oil/

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Four Science "Buckets"

The first wind farm south of the Mason-Dixon Line off of Virginia
https://www.dominionenergy.com/projects-and-facilities/wind-power-facilities-and-projects/coastal-virginia-offshore-wind

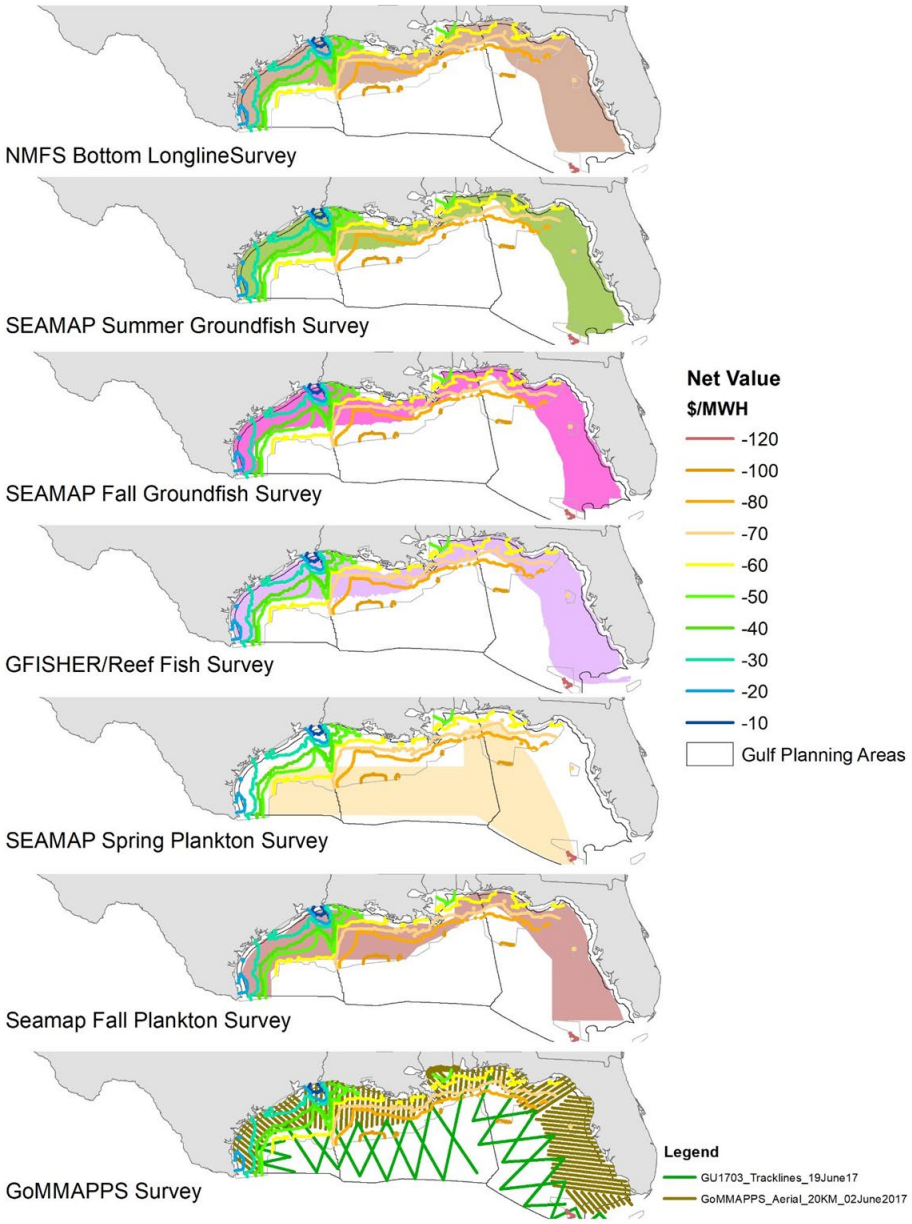
1. Regulatory support (SERO)

1. Science support for the regulatory process

1. Address impacts of wind on Federal Surveys & Scientific Advice

1. Understanding Interactions with NOAA Trust Resources

Gulf of Mexico Surveys



Current SEFSC Surveys in the Gulf of Mexico

Survey	Year Started	Design	Major Applications
Bottom Longline Survey	1995	Stratified Random Design - TX to FL	Abundance, distribution, length, weight, sex, age, tagging, maturity,hydrological modeling
SEAMAP Summer Groundfish Survey	1982	Stratified Random Design - TX to FL	Abundance, distribution, length, weight, sex, age, hypoxia and hydrological modeling
SEAMAP Fall Groundfish Survey	1985	Stratified Random Design - TX to FL	Abundance, distribution, length, weight, sex, age, hydrological modeling
Reef Fish Video Survey	1992	Stratified Random Design - TX to FL	Abundance, distribution, length, hydrological modeling
SEAMAP Spring plankton Survey	1982	Systematic Grid - Gulf of Mexico slope and open ocean	Abundance, distribution, length, hydrological modeling
SEAMAP Fall plankton Survey	1986	Systematic Grid - TX to FL Keys, FL	Abundance, distribution, length, hydrological modeling
Marine mammal and sea turtle ship-based and aerial surveys	1983	Line transects for ship and aerial surveys, oceanography	Abundance, distribution or marine mammals, sea turtles and sea birds

Trust Resources: Fisheries

Commercial

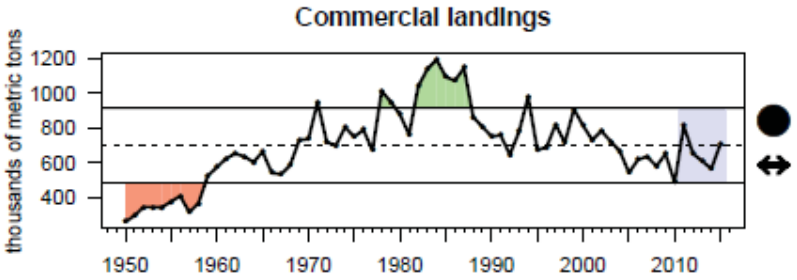


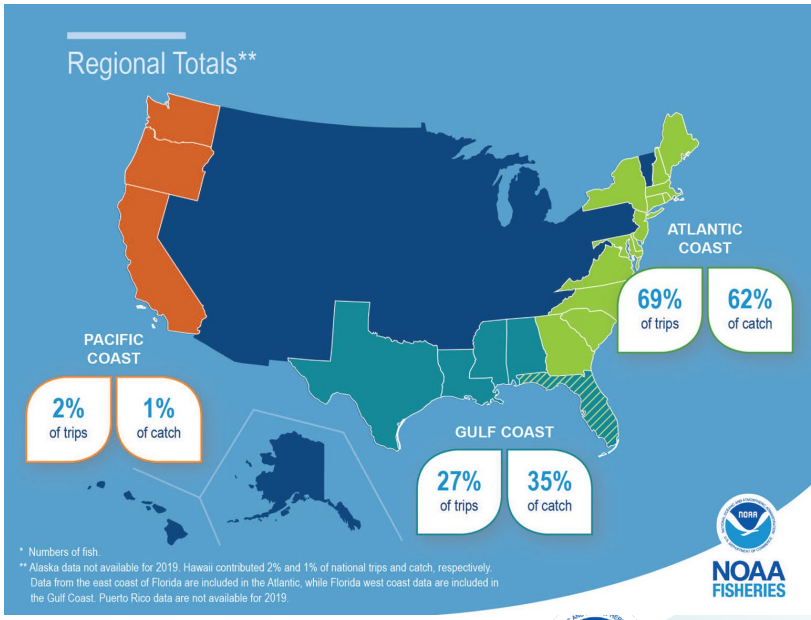
Figure 10.8. Yearly commercial landings for the Gulf of Mexico (top) and the associated inflation-adjusted commercial revenues (bottom).

Southeast supports more recreational angling trips than the rest of nation combined and more jobs and sales than any other region (Fisheries Economics of United States, 2016).

Gulf is 15% of total US in value ($825 million) and 15% of landings (1.4 billion lbs) in 2018

Shrimp top in value ($420 million)
Menhaden top in volume in 2018

Recreational



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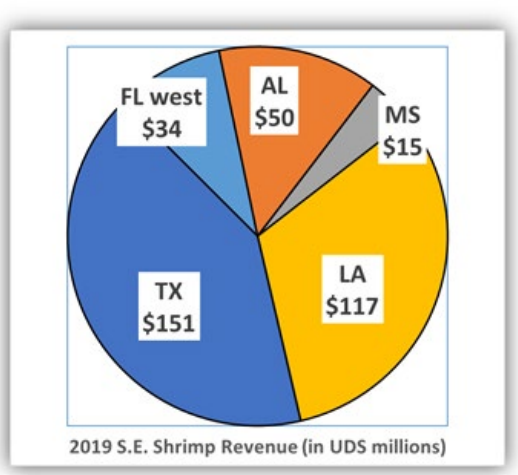
Human Dimensions: Commercial Fisheries

Gulf of Mexico Shrimp Fishery Cellular Electronic Logbook Program

Shrimp Trawl Effort

Shrimp value 2019



Net Value 2015-2019 Tow hrs / sq km

$/MWH	
-120	0.001 - 9.975
-100	9.976 - 28.429
-80	28.430 - 53.368
-70	53.369 - 127.185
-60	Gulf Planning Areas
-50	
-40	
-30	
-20	
-10	

Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

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Human Dimensions:
Economic Impacts of Recreational Fisheries

TEXAS	LOUISIANA	MISSISSIPPI	ALABAMA	W FLORIDA
Fishing Trip and Durable Goods Expenditures: **$1.56B** Total Sales Impacts:**$1.72B**	Fishing Trip and Durable Goods Expenditures: **$1.87B** Total Sales Impacts:**$1.90B**	Fishing Trip and Durable Goods Expenditures: **$624.97B** Total Sales Impacts:**$504.78M**	Fishing Trip and Durable Goods Expenditures: **$2.36B** Total Sales Impacts:$**2.21B**	Fishing Trip and Durable Goods Expenditures: **$7.07B** Total Sales Impacts:**$9.14B**
Total Jobs: **13,583** - Impacts from Fishing Trips Sales: **$376.77M** Jobs: **2,973**	Total Jobs: **16,853** - Impacts from Fishing Trips Sales: **$622.36M** Jobs: **5,802**	Total Jobs: **5,162** - Impacts from Fishing Trips Sales: **$132.8M** Jobs: **1,582**	Total Jobs: **23,721** - Impacts from Fishing Trips Sales: **$910.77M** Jobs: **9,676**	Total Jobs: **79,498** - Impacts from Fishing Trips Sales: **$2.64B** Jobs: **25,480**

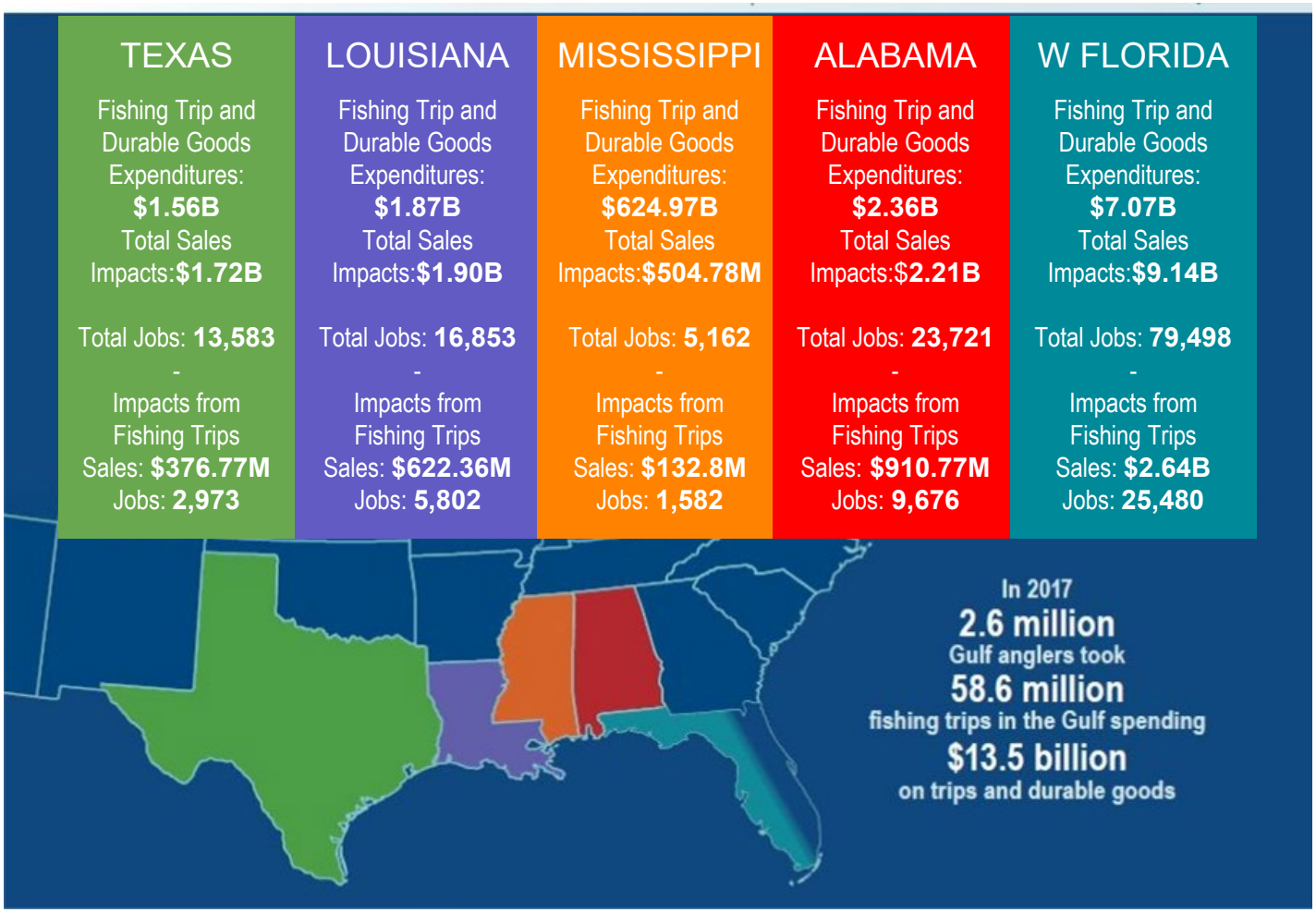

FIGURE 7. Fishing activity in and around the Block Island Wind Farm off of Rhode Island, USA. *Courtesy of Ørsted*

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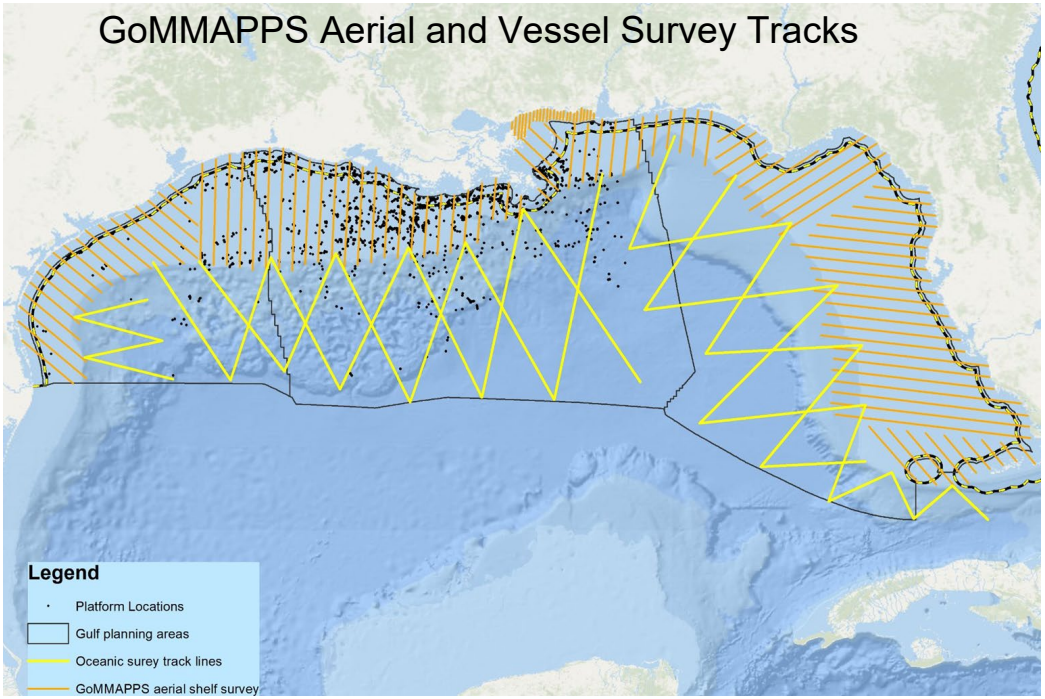
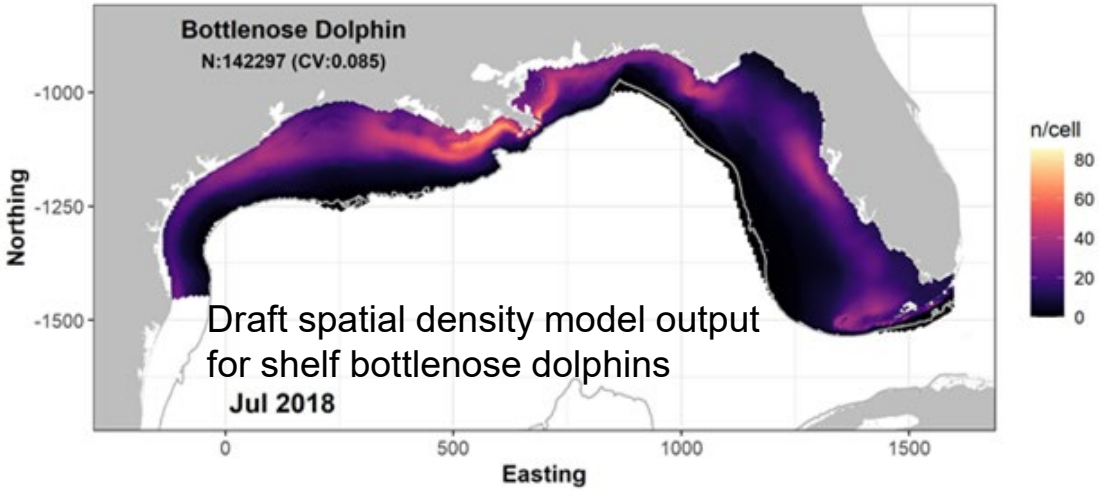
Trust Resources: Marine Mammals and Sea Turtles





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Trust Resources: Identifying Areas of Highest Concern

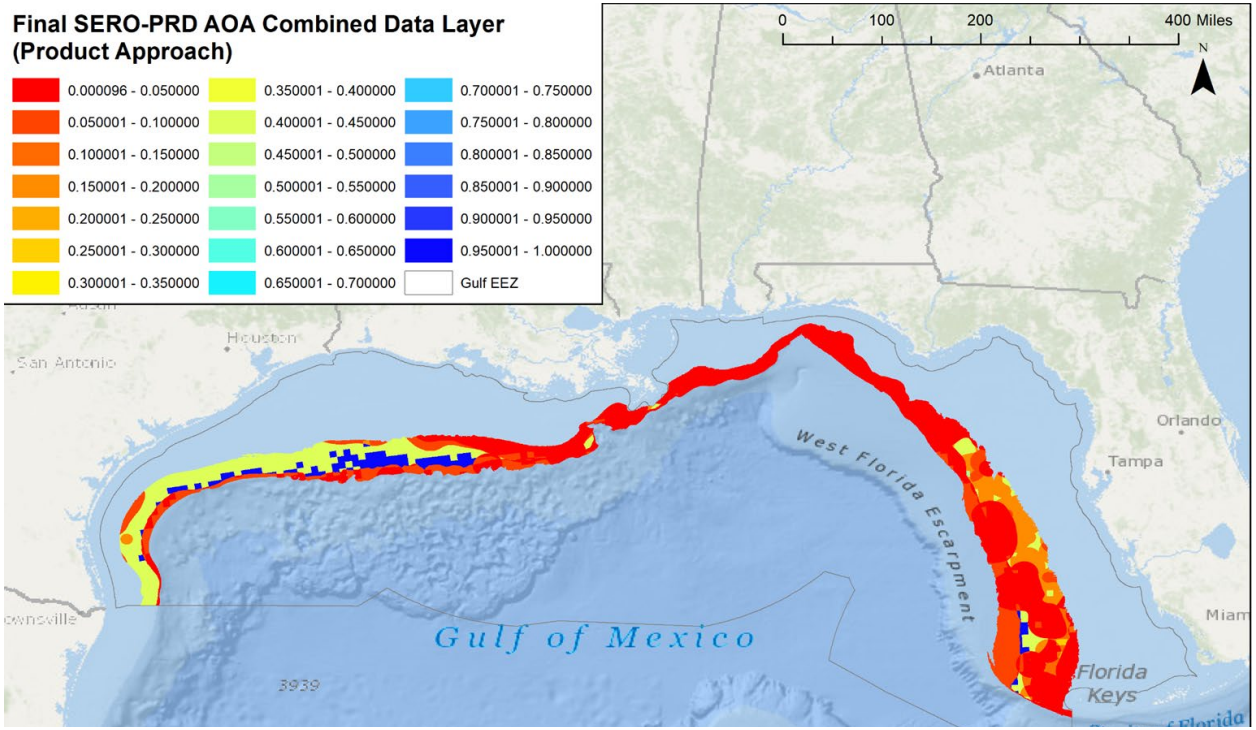


Figure 14. SERO-PRD final combined recommended Gulf of Mexico Atlas data layer, generated by combining layers for Gulf of Mexico Bryde's Whale, five Sea Turtles, Smalltooth Sawfish, and Giant Manta Ray using the Product method. Note that warmer colored areas are of relatively higher concern with regards to species status, population size, and trajectory. Source: *Memo to OAQ & NCCOS - SERO and WCR Protected Resources Division (PRD) Data Layers and Scoring for NCCOS Aquaculture Opportunity Atlas (Atlas)*

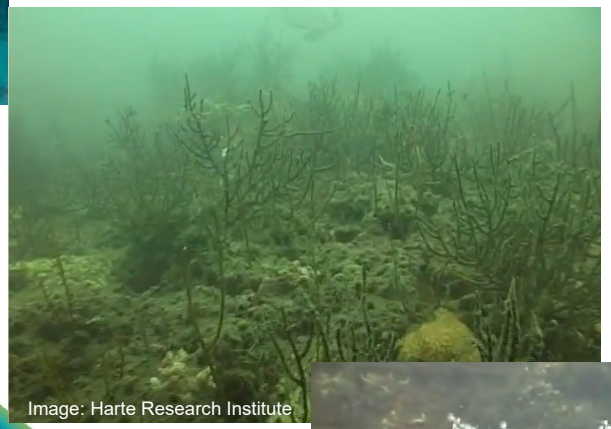
Table 1. AOA model scoring system for protected species data layers.

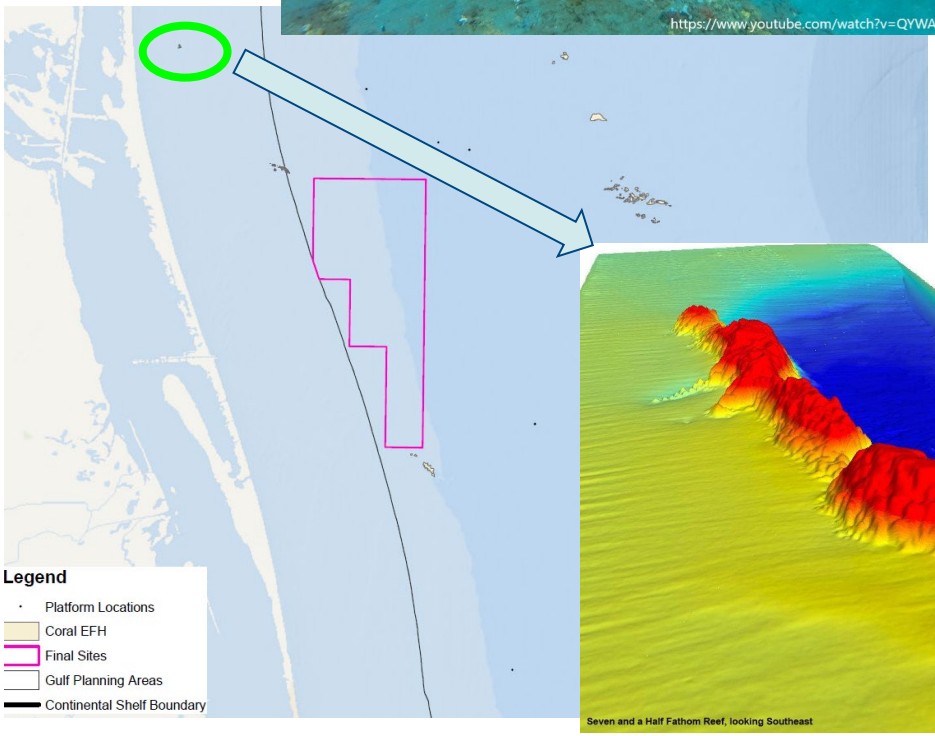
Status	Trend	Score
Endangered	declining, small population* or both	0.10
Endangered	stable or unknown	0.20
Endangered	increasing	0.30
Threatened	declining or unknown	0.40
Threatened	stable or increasing	0.50
MMPA Strategic	declining or unknown	0.60
MMPA listed	small population	0.70
MMPA listed	large population	0.80

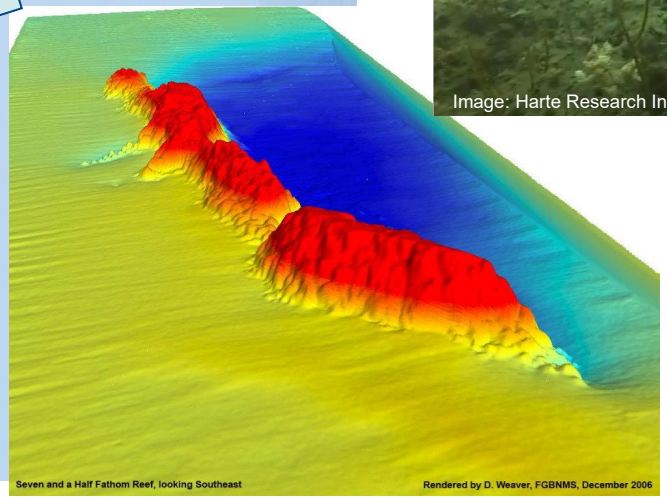
**Small population equates to populations of 500 individuals or less (Franklin 1980).*

SERO-PRD & SEFSC could apply similar methods to extend this approach to entire Gulf of Mexico, inclusive of marine mammal distributions where available. This will require time and resources.

Trust Resources: Coral and Habitat off SW Texas Coast







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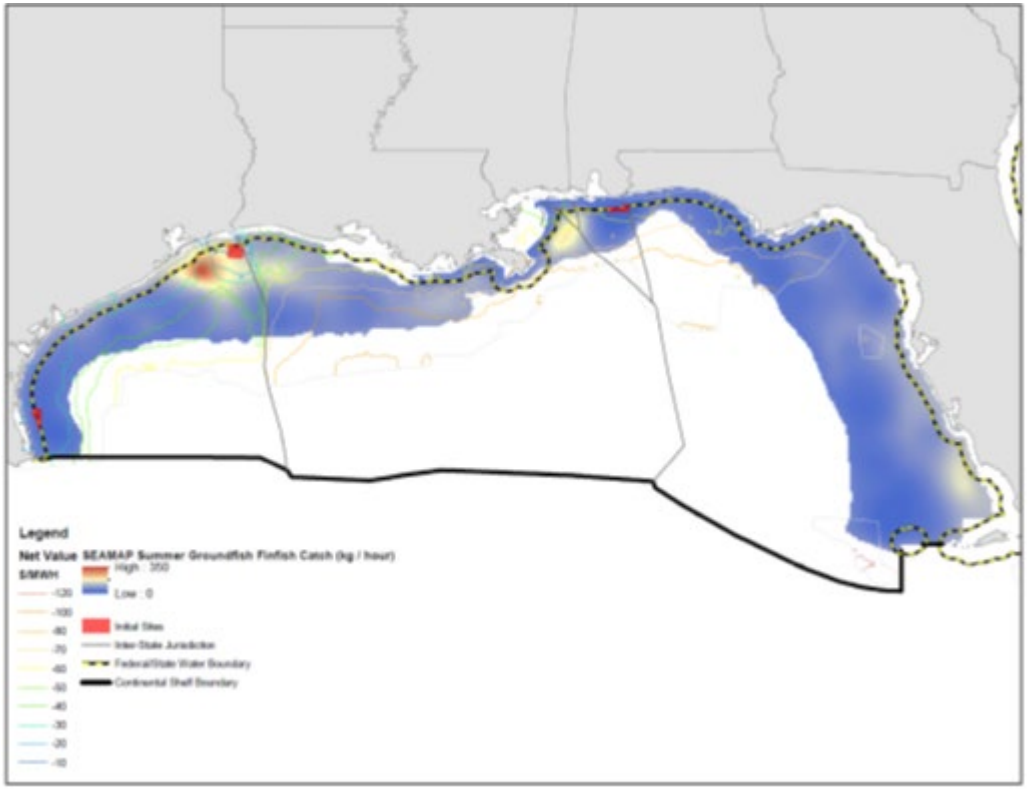
Trust Resources: Fish and Invertebrates

Summer groundfish survey fish biomass



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Trust Resources: Ecosystem

Figure 3.1. The socio-ecological conceptual framework used to guide indicator development for the Gulf of Mexico

https://www.aoml.noaa.gov/ocd/ocdweb/ESR_GOMIEA/

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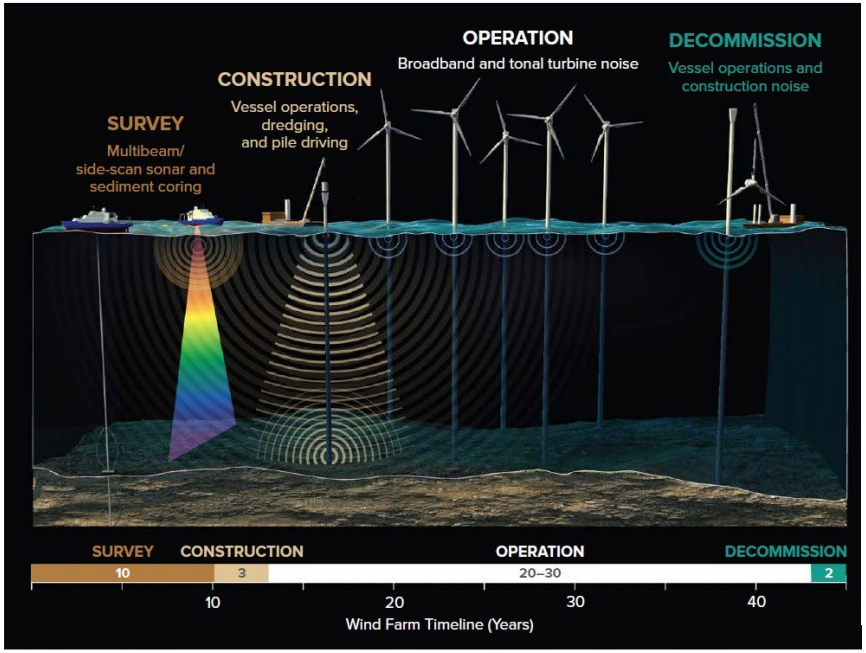
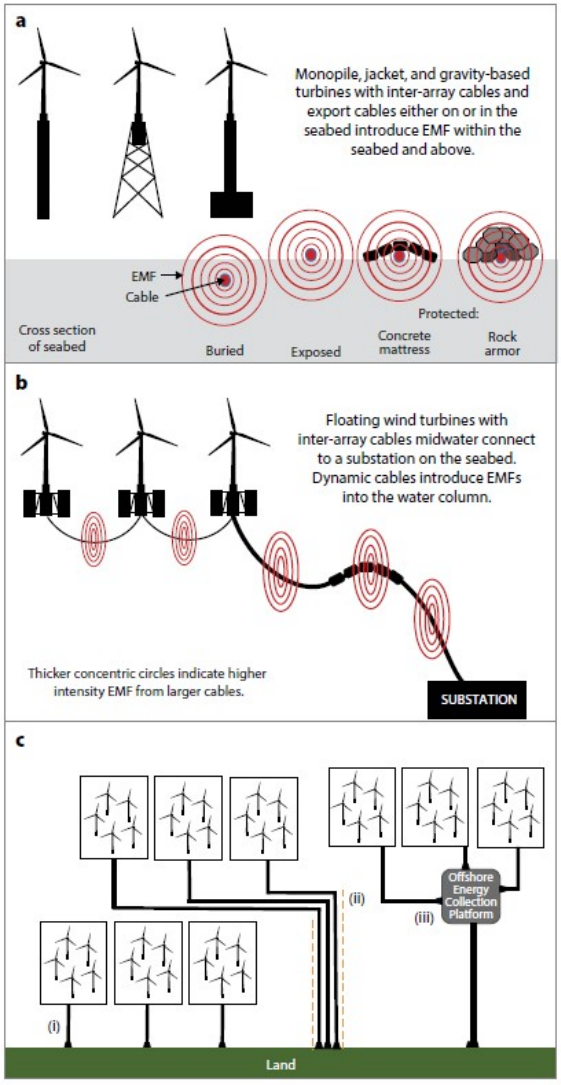
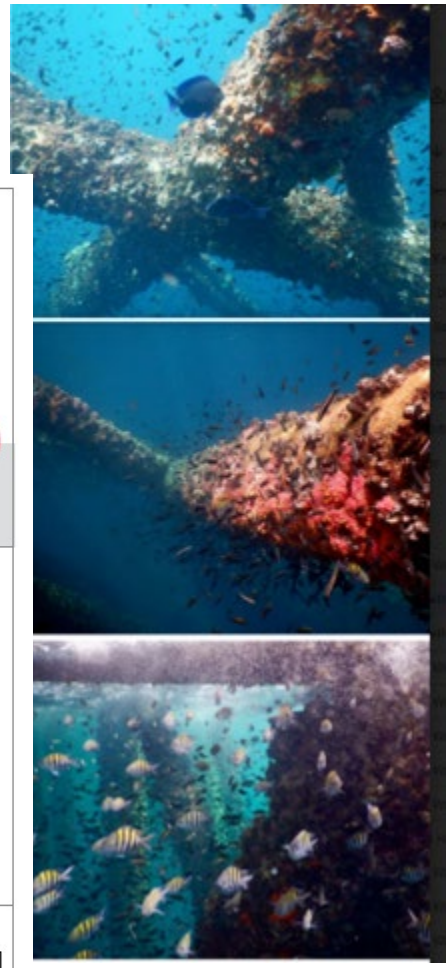
Understanding Interactions of Offshore Wind with NOAA Trust Resources

- Effects of Altered Hydrodynamics
- Sound during lifecycle of OWF
- Increased/Modified Vessel activity
- Electromagnetic Fields (EMFs)
- Artificial Reef Effect







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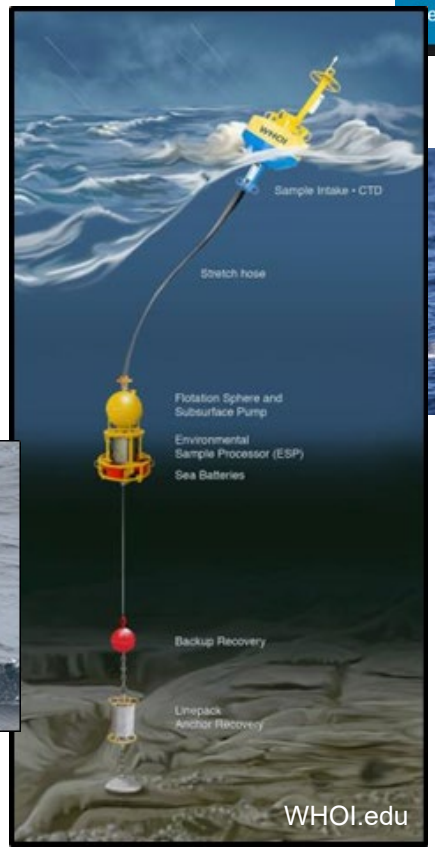
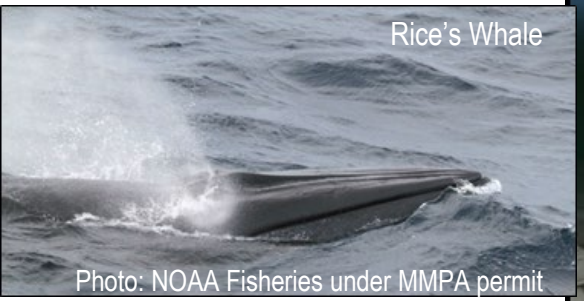
Opportunities

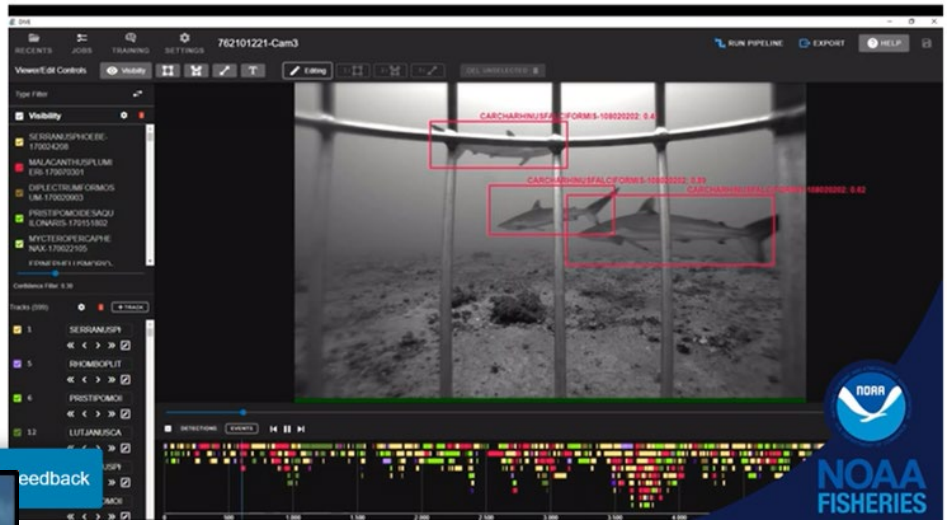
Advanced technology
- Artificial Intelligence
- Remote operated vehicles
- environmental DNA
- Passive acoustic monitoring

Automated water sampler mooring (ESP) can collect environmental DNA samples





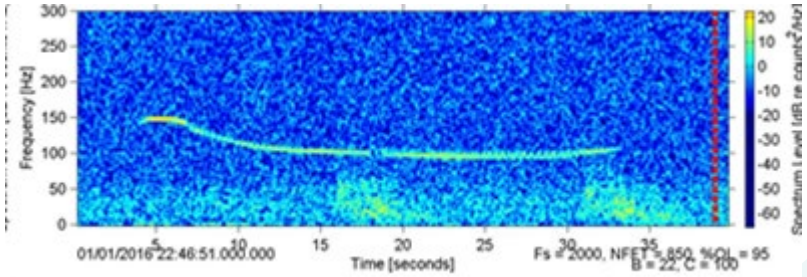
Video Image Analytics for the Marine Environment (1:24)



https://www.fisheries.noaa.gov/feature-story/science-snapper


Rice's whale. Photo: NOAA Fisheries under MMPA permit

Moored acoustic instruments record whale sounds



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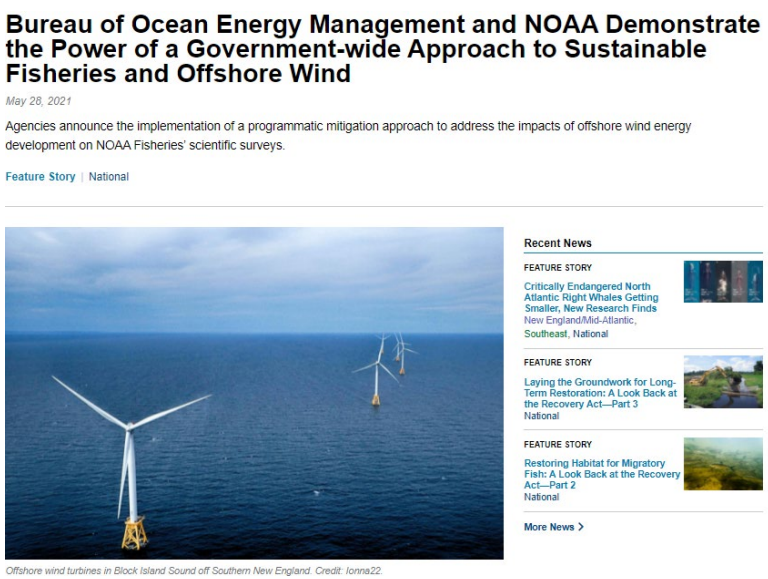
Opportunities

Long history of Inter-agency scientific support for offshore energy and Gulf of Mexico Science (BOEM-NOAA), strengthened through recent MOU.

Strong partnerships with States through SEAMAP surveys

Similar spatial planning exercise recently conducted for Aquaculture Opportunity Areas



Offshore wind turbines in Block Island Sound off Southern New England. Credit: Ionna22.

https://www.fisheries.noaa.gov/feature-story/bureau-ocean-energy-management-and-noaa-demonstrate-power-government-wide-approach

Southeast Area Monitoring and Assessment Program (SEAMAP)

Gulf of Mexico Marine Assessment Program for Protected Species (GoMMAPPS)

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Thanks

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