



**NOAA
FISHERIES**

Gulf of Maine Planning Area NOAA Perspective

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**BOEM Gulf of Maine Task Force Meeting
May 19, 2022**



NOAA FISHERIES

Key Messages

- 1. Impacts of Floating Offshore Wind Highly Uncertain**
- 2. Need for ecosystem-based approach to planning, permitting, construction, and operations**
 - Major resource and human use conflicts in Gulf of Maine
 - Major planning level data gaps in the Gulf of Maine
- 3. Need to understand and address direct impacts on NOAA trust resources - Fisheries, Fishing Communities, Protected Resources, Habitat**
- 4. Need to understand and mitigate direct impacts on NOAA scientific assets and Stellwagen Bank National Marine Sanctuary**
- 5. We have time and capabilities to employ the best possible science**

NOAA Areas of Scientific Consideration and Concern

1. Impacts on Protected Species and Critical Habitat

- Gulf of Maine provides important habitat for a number of ESA-listed species and is designated critical habitat for North Atlantic right whales
- Number of major river systems that drain into the GOM are designated as critical habitat for Atlantic salmon and/or Atlantic sturgeon

2. Impacts on Fisheries and Fishing Communities

3. Impacts on Sensitive and Vulnerable Habitats

4. Impacts on NOAA Fisheries Federal Surveys

5. Ecosystem Considerations



Protected Species

ESA-listed species in the Gulf of Maine:

- North Atlantic right, fin, sei, blue, and sperm whales
- Leatherback and loggerhead sea turtles
- Shortnose sturgeon, Atlantic sturgeon, and Atlantic salmon

Designated Critical Habitat:

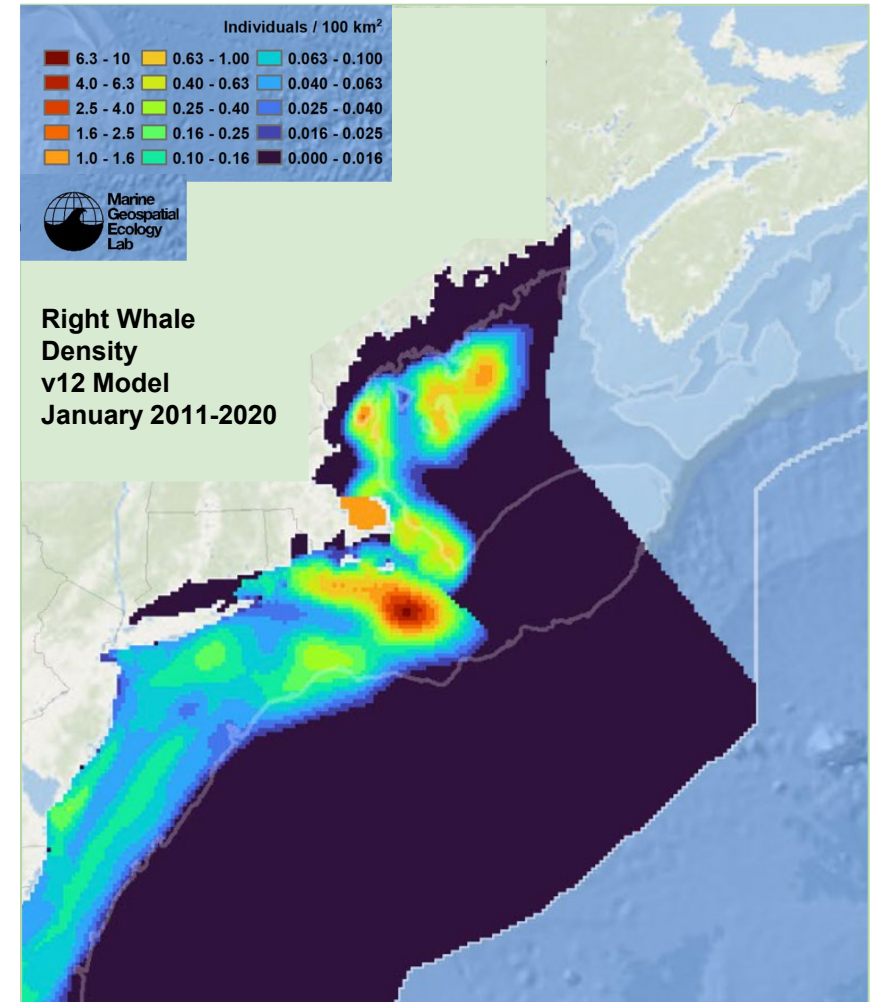
- NARW - entirety of the Gulf of Maine
- Atlantic salmon and Atlantic sturgeon - several rivers adjacent to the Gulf of Maine

Marine Mammals:

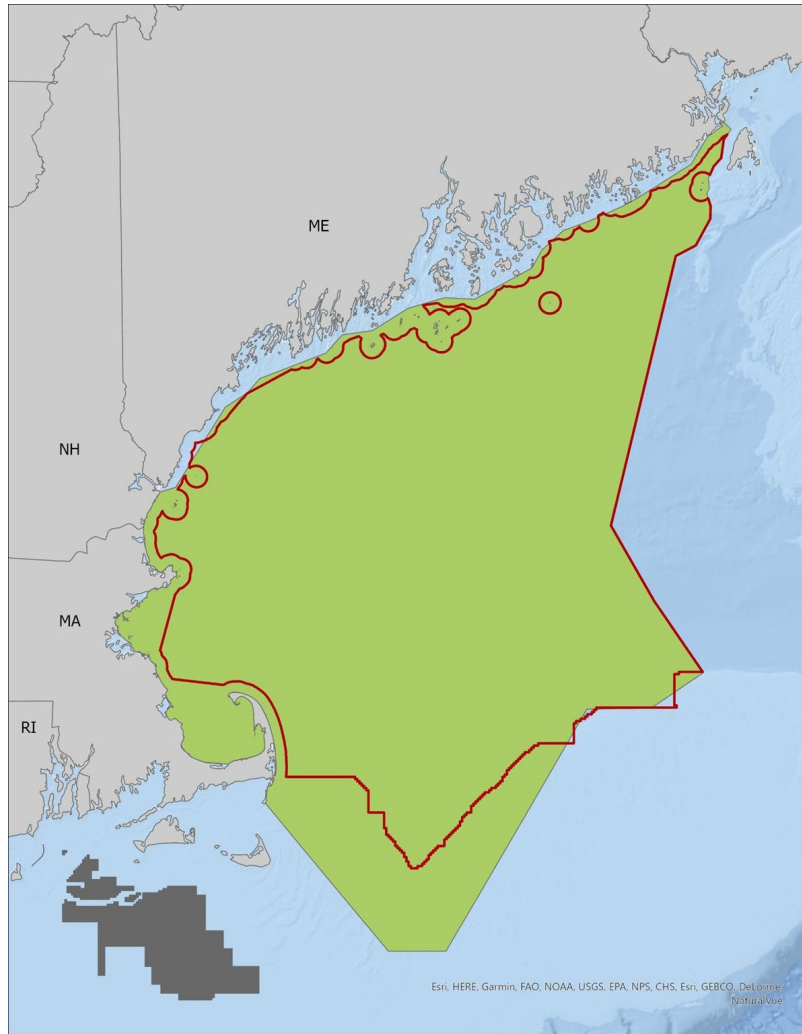
- Strategic Stocks under the MMPA: right, fin, sei, blue, sperm, and minke whales

Right Whales:

- Declining population (336 in 2020, 137 females)
- Increasing annual per capita deaths, and decreasing per capita births



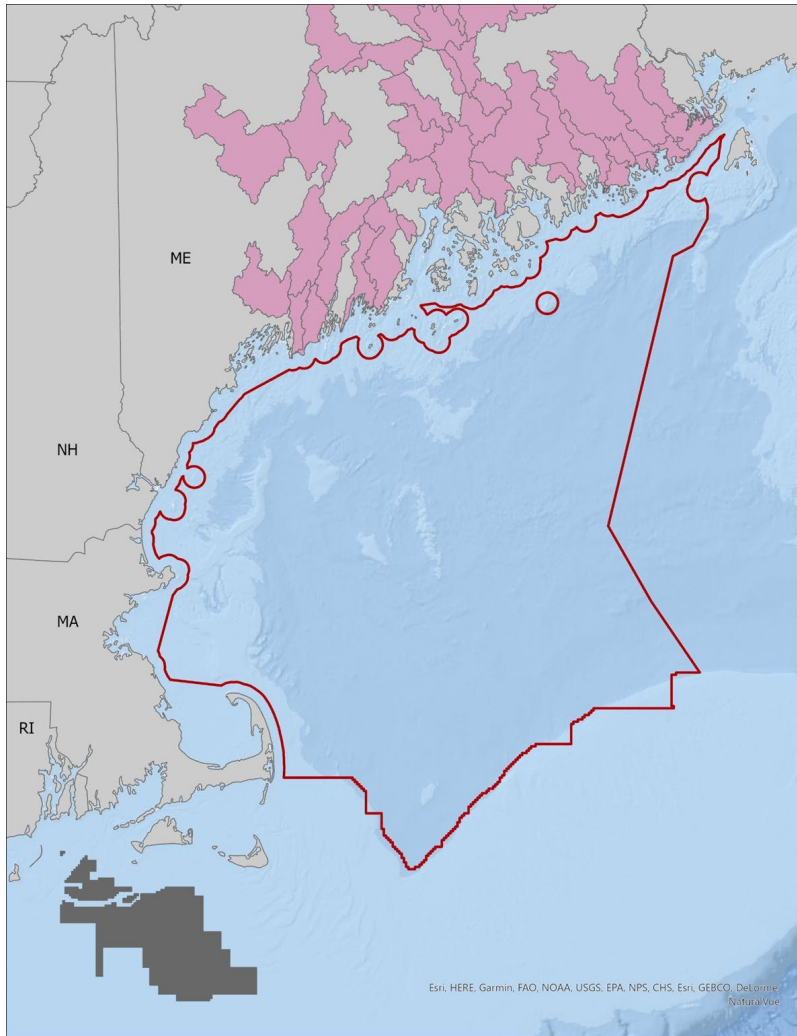
North Atlantic right whale critical habitat - Unit 1







Critical habitat denotes the physical and biological features essential to the conservation of the North Atlantic right whale

The physical oceanographic conditions and structures of the Gulf of Maine and Georges Bank region that combine to distribute and aggregate prey for right whales

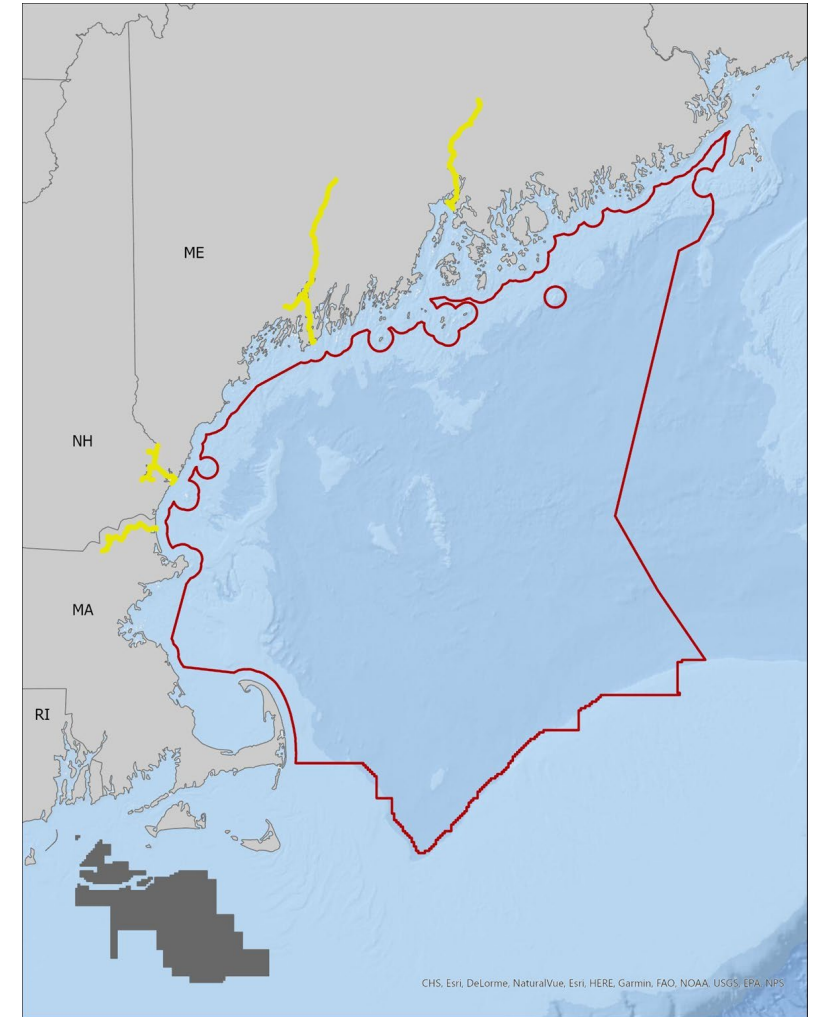
Critical Habitat for Atlantic Salmon and Atlantic Sturgeon



-  Gulf of Maine Planning Area
-  Lease Areas
-  A. Salmon Critical Habitat
-  A. Sturgeon Critical Habitat

Atlantic salmon and Atlantic sturgeon occur in portions of the Gulf of Maine

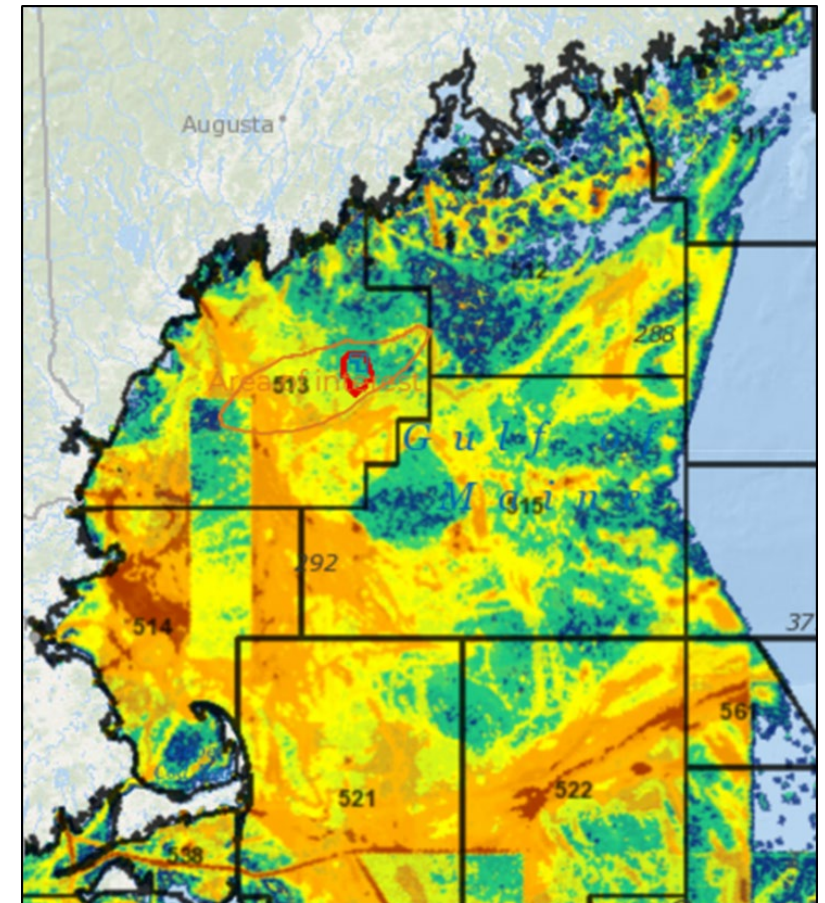
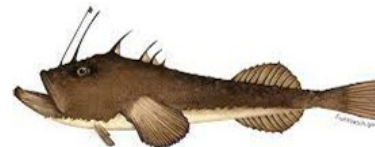
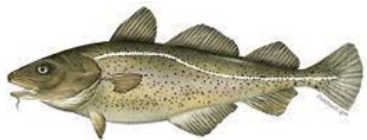
Location of Critical Habitat in rivers/estuaries adjacent to the Gulf of Maine highlights the importance of considering transmission routes and other shoreside infrastructure



Fisheries and Fishing Communities

Substantial overlap with important party/charter and commercial fisheries

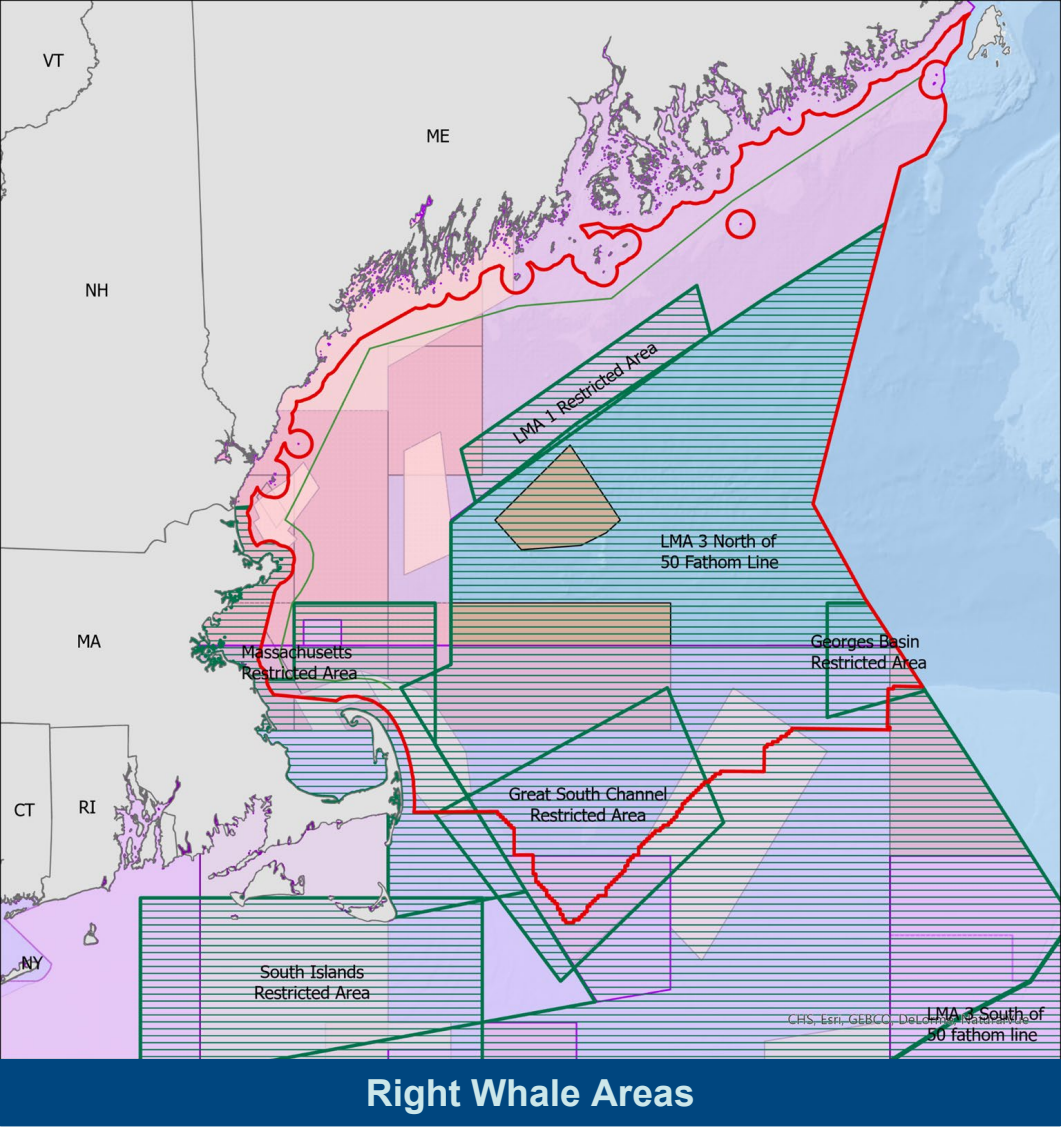
- Party/charter annual revenue: \$7 million avg.
- **Lobster operations:**
 - **133M lb. avg. annual landings**
 - **\$500M avg. annual revenue**
- Commercial fishing operations (non-lobster):
 - 129 million lb avg. annual landings
 - \$96 million avg. annual revenue
 - Avg. of 42,000 trips per year by 929 vessels, including vessels from ME - NC ports



2011-2016 VMS Data and Stat Areas

www.northeastoceandata.org

Fisheries Management and Conservation Areas



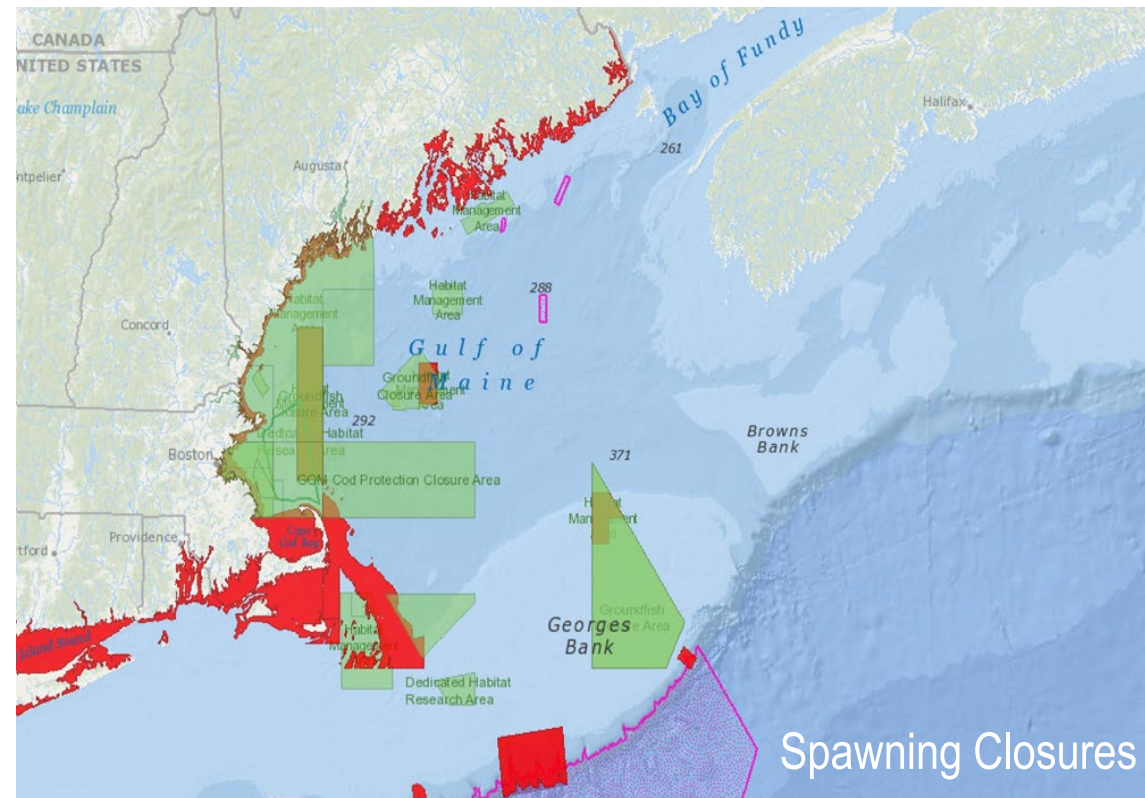
Sensitive and Vulnerable Habitat Areas

Areas designated for habitat protection, conservation, and research

- Habitat Management Areas (HMAs)
- Dedicated Habitat Research Areas
- Coral Protection Areas
- Northeast Canyons and Seamounts National Monument
- Habitat Areas of Particular Concern (HAPCs)
- Stellwagen Bank National Marine Sanctuary

Designations and closures for species and life history stages

- Groundfish Closures
- Spawning Closures



Sensitive and Vulnerable Habitat Types

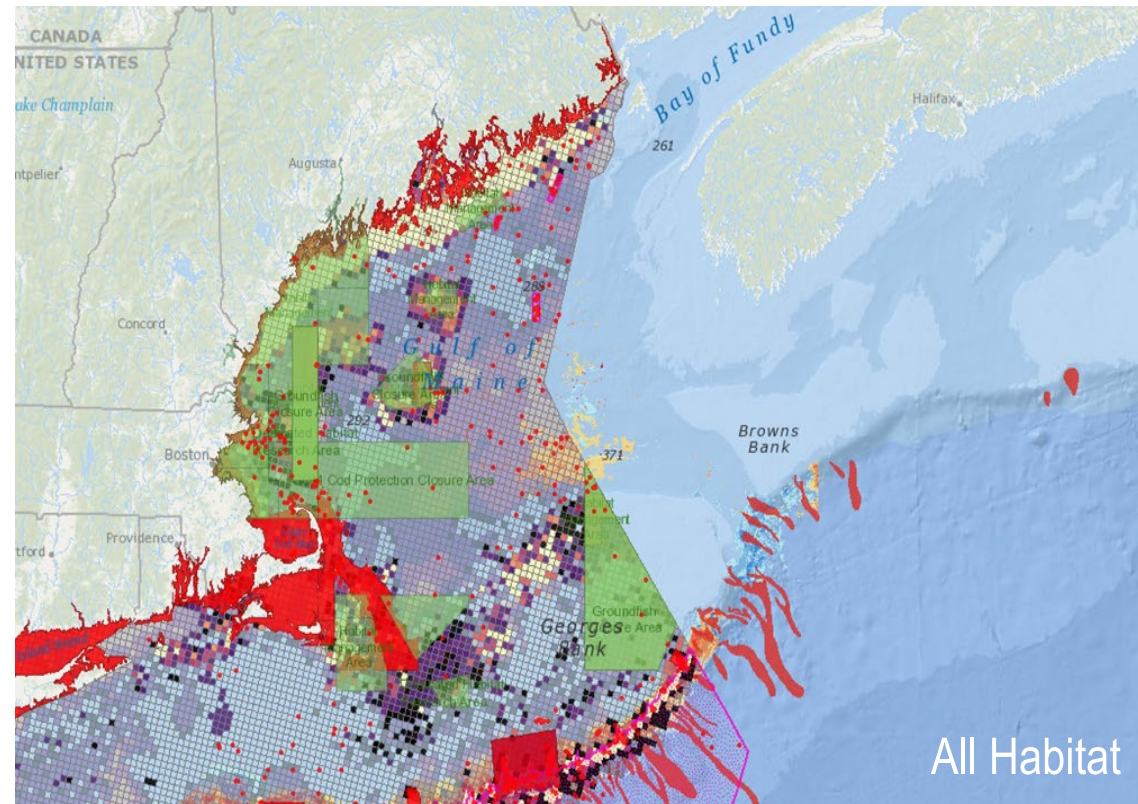
Vulnerable habitat types, areas, and closures

- Identified coral and sponge locations
- Coral suitability areas
- Submarine canyons
- Hard bottom - granule/pebble, cobble, boulder
- Structurally complex - steep and deep
- HAPCs and HMAs/protection areas







Limited sediment data available

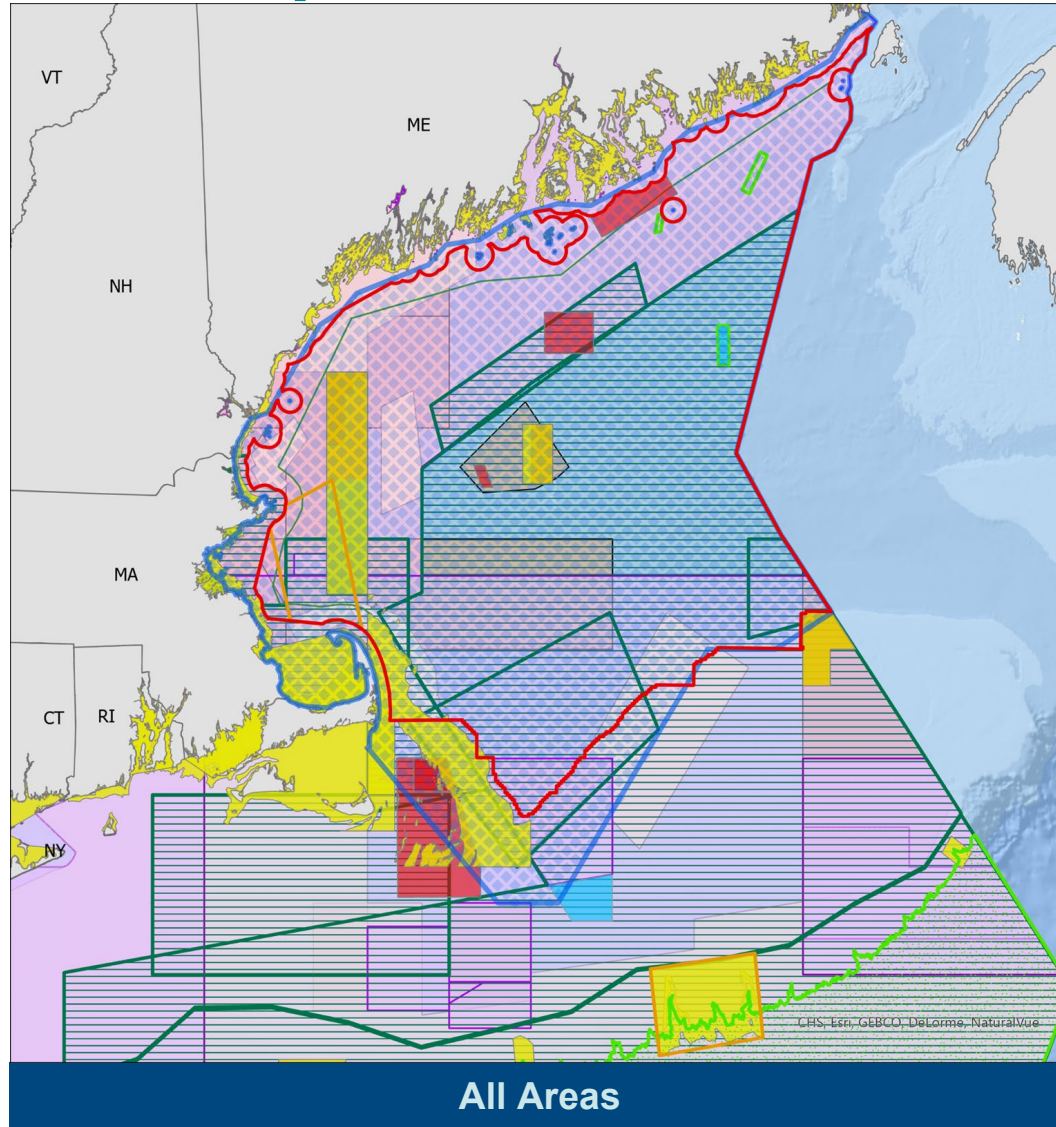
- usSEABED
- Sediment data density (includes usSEABED and other sources)

Even with the sparsity of available sediment and habitat data, combined with groundfish and life history stage closures, there are few areas that have not been identified for their importance to NOAA-trust resources and fisheries



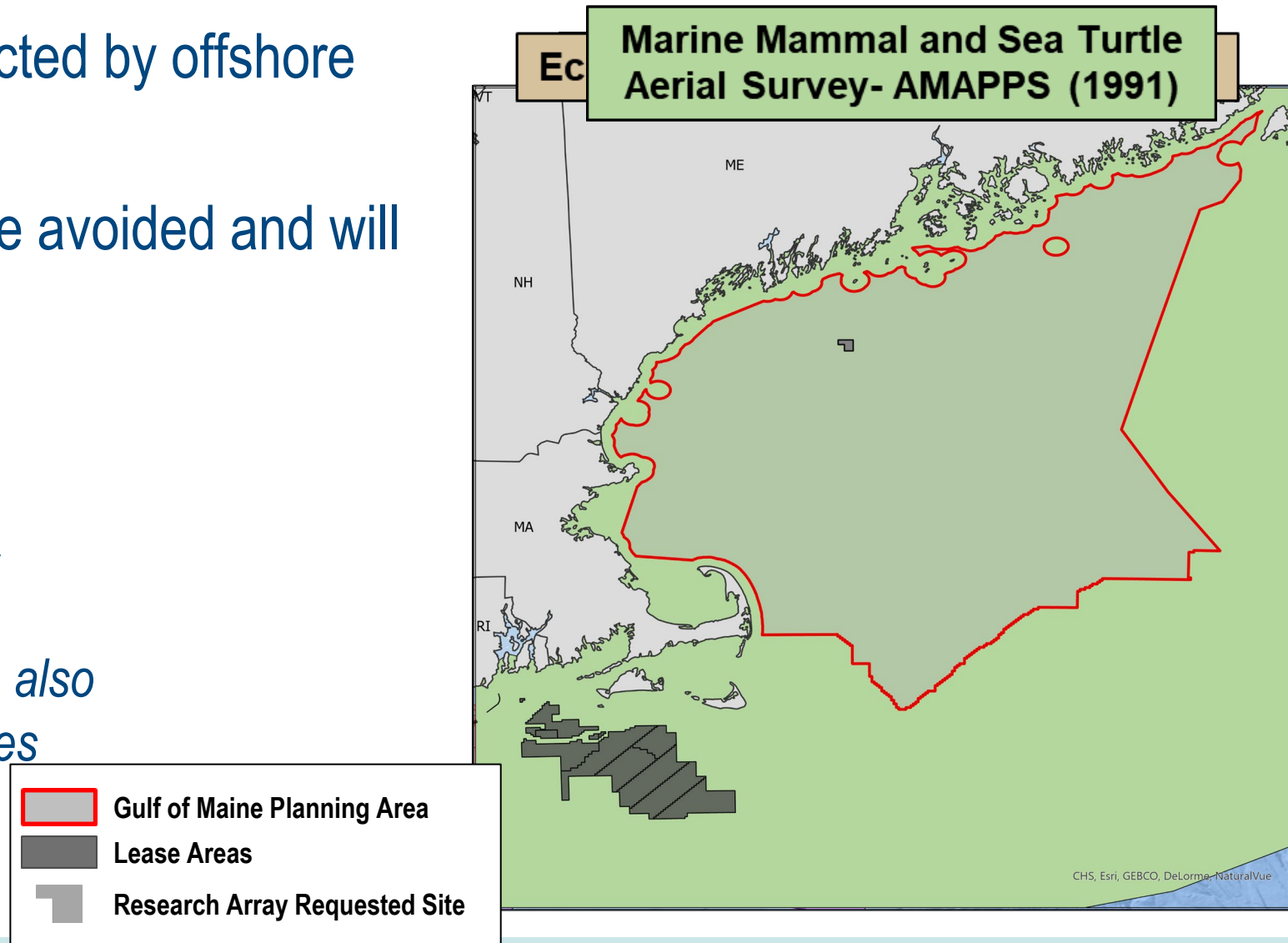
Summary of Resource/ Space Use Considerations

-  Gulf of Maine planning area outline
-  Stellwagen Bank National Marine Sanctuary
-  Northeast Canyons and Seamounts Marine National Monument
-  Coral Protection Areas
-  Dedicated Habitat Research Area
-  Habitat Management Areas
-  Habitat Areas of Particular Concern
-  North Atlantic Right Whale Critical Habitat
-  Georges Basin Restricted Area
-  LMA3 North of Canyons
-  LMA3 Canyons
-  Six Mile Line
-  Massachusetts Restricted Area- Extended
-  LMA 1 Restricted Area
-  South Island Restricted Area
-  Great South Channel Restricted Trap Pot Area
-  Sea Scallop Accountability Measure Areas
-  Atlantic Scallop Rotational Areas
-  Gulf of Maine (GOM) Scallop Dredge Exemption Area
-  GB SNE Scallop Dredge Exemption Area
-  Raised Footrope Trawl Whiting Fishery Exemption Areas
-  GOM Grate Raised Footrope Trawl Whiting Fishery Exemption Area
-  Small Mesh Areas 1 and 2
-  Cultivator Shoal Whiting Fishery Exemption Area
-  SNE Exemption Area
-  GB Spawning Groundfish Closures
-  GOM Spawning Groundfish Closures
-  Nantucket Lightship Closed Area Exemption Areas
-  GOM Cod Protection Closure Areas
-  Groundfish Closure Areas



Impacts on NOAA Scientific Assets: NMFS Surveys & Data Collections

- Scientific surveys will be impacted by offshore wind development
- Impacts on surveys may not be avoided and will need to be mitigated due to:
 - Preclusion,
 - Statistical design,
 - Habitat alteration, and
 - Loss of sampling efficiency
- *Impacts on fisheries dependent data also need to be considered due to fisheries displacement effects*



Impacts on NOAA Scientific Assets: Radar Capabilities

NEXRAD - National Weather Service

- National Weather Service has concerns over wind turbine interference with coastal NEXRAD locations, depending on how far they are to the radar and how high the turbines reach
- Greater impacts occur within 18 km of NEXRAD location

HF Radar - IOOS

- Collaboration is ongoing to develop mitigation for impacts of wind turbine interference on HF Radar.
- If unmitigated, interference can affect HF Radar surface current and wave measurements.
- HF Radar and derived products support: hurricane and weather forecasting; search-and-rescue planning; safe navigation; and port operations.



Ecosystem Considerations

Impact producing factors: Noise, EMF, Reef Effects, Benthic and Pelagic Habitat Modification, Invasive Species, Entanglement, Displaced Fishing Effort, Contaminants

Wind Wake & Hydrodynamic Effects

- Wake turbulence
- Lateral and vertical flow changes
- Stratification effects: Temperature, Salinity, Nutrients, Chlorophyll
- Larval distribution and recruitment effects

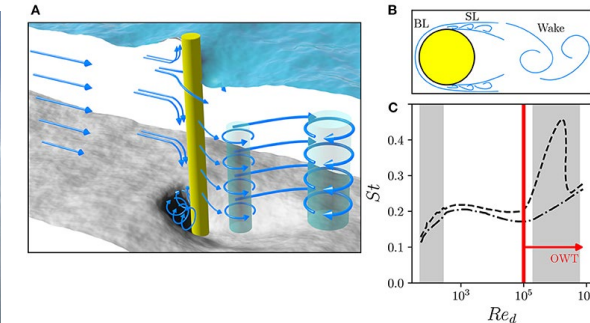
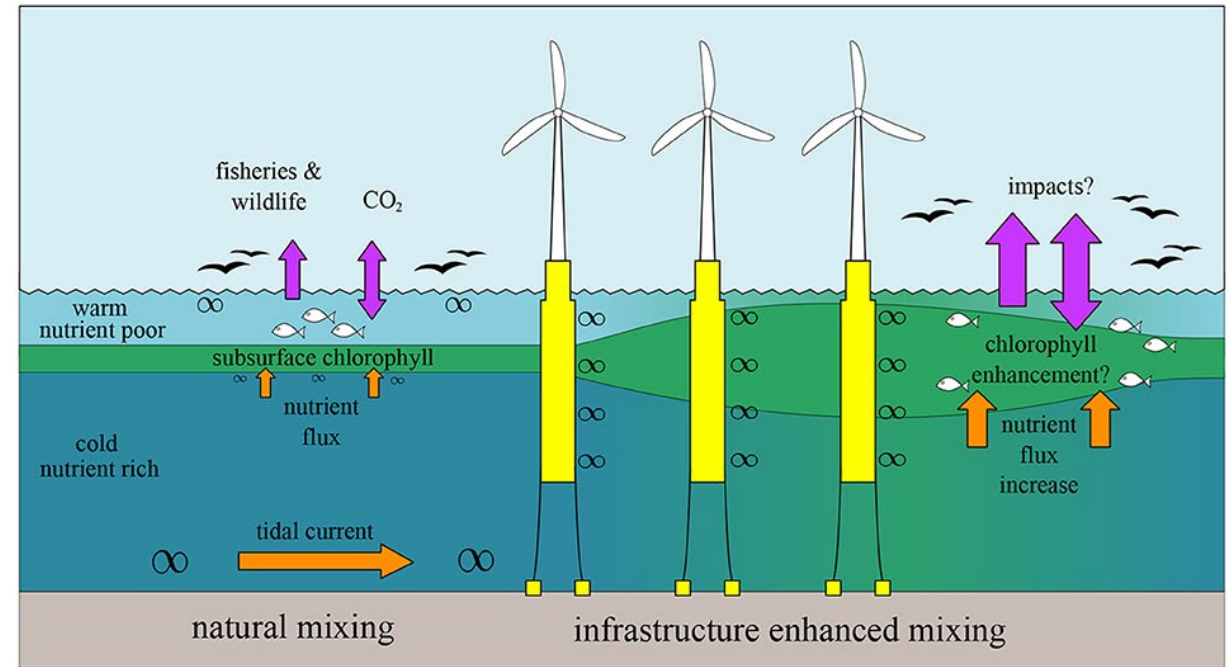
Cumulative Effects - Spatial and temporal aggregation and interaction

Spatial Scale - Beyond the footprint of development

Temporal Scale - Pre-Construction through Decommissioning

Existing ecosystem changes already occurring - Warming waters, Ocean acidification, Population changes

Very Limited Information on Ecosystem-Level Effects of Floating Wind Farms - Need to do research before commercial scale build out commences

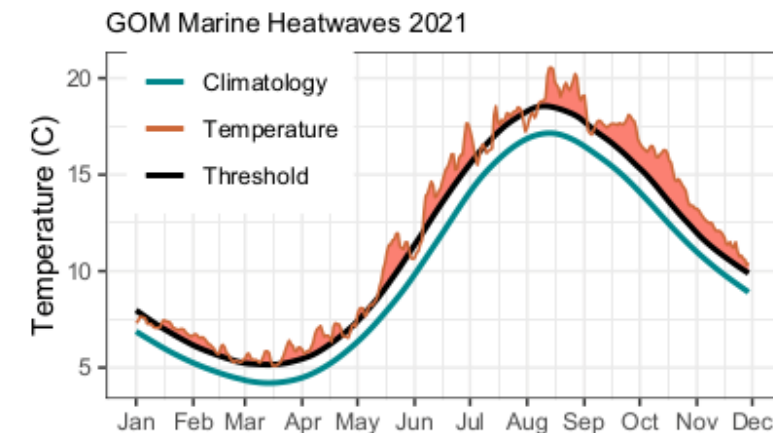
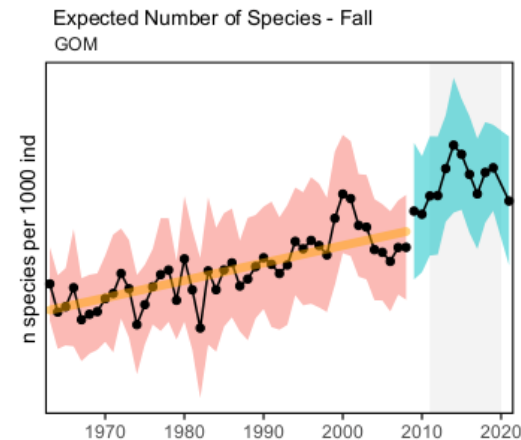
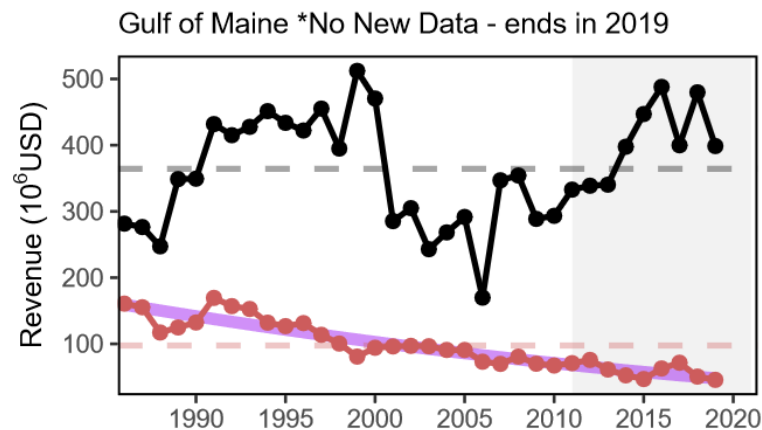
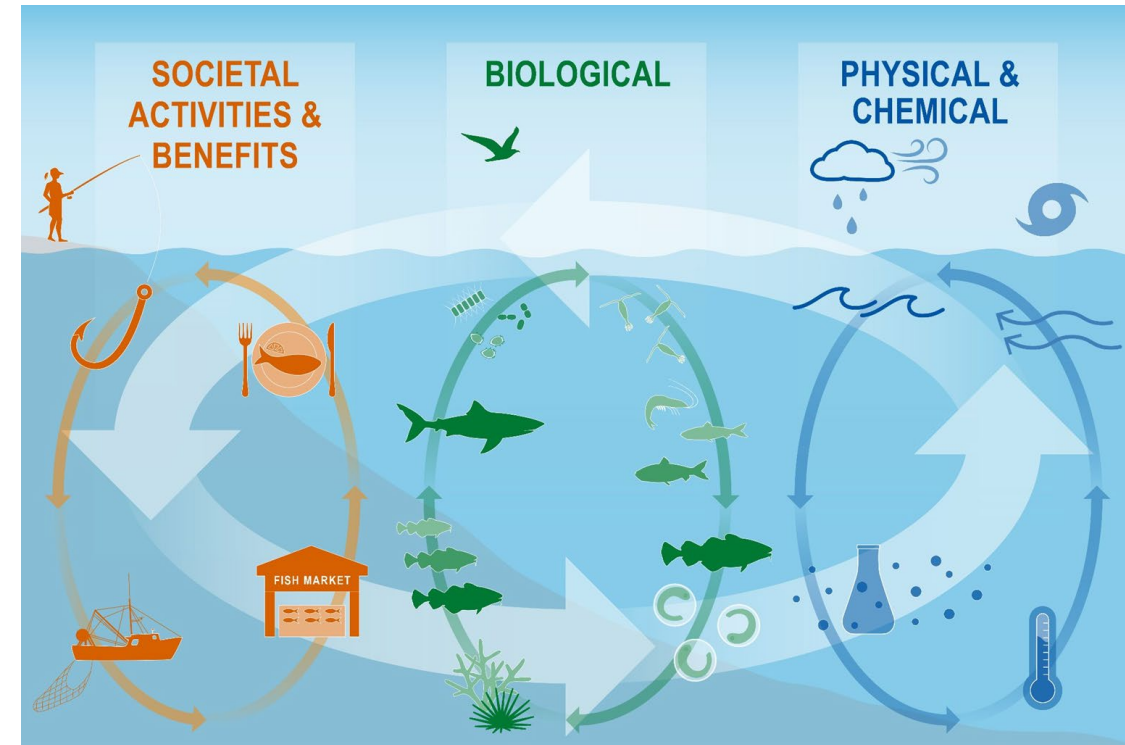


Dorrell, R. M., C. J. Lloyd, B. J. Lincoln, T. P. Rippeth, J. R. Taylor, C.-c. P. Caulfield, J. Sharples, J. A. Polton, B. D. Scannell, D. M. Greaves, R. A. Hall, and J. H. Simpson. 2022. Anthropogenic Mixing in Seasonally Stratified Shelf Seas by Offshore Wind Farm Infrastructure. *Front. Mar. Sci.*, 22 March 2022 | <https://doi.org/10.3389/fmars.2022.830927>.

Christiansen, N., U. Daewel, B. Djath, and C. Schrum. 2022. Emergence of Large-Scale Hydrodynamic Structures Due to Atmospheric Offshore Wind Farm Wakes. *Front. Mar. Sci.*, 03 February 2022 | <https://doi.org/10.3389/fmars.2022.818501>.

Ecosystem-based approach

- The Northeast Shelf is changing
- Multiple system drivers influence marine ecosystems through a variety of different pathways
- Impacts of floating offshore wind highly uncertain



Need to Fill Information Gaps

Lack understanding of **ecological risk** and **cumulative impacts** of floating wind on NOAA equities

- How to minimize/mitigate risks to North Atlantic right whales and critical habitat
- Improve knowledge of GOM commercial and recreational fisheries
- Habitat data is deficient-- habitat data collections are necessary
- Retool how to assess impacts from floating OSW on ESA species (e.g., North Atlantic right whale, leatherback sea turtle, Atlantic salmon, Atlantic sturgeon)
- Effectively mitigate impacts on NOAA radar operations and scientific surveys

Prior to area identification and leasing these key gaps in information, science, and planning, must be addressed

Scientific Recommendations

Scientific recommendations to fill information gaps and inform GOM planning process prior to leasing:

- Design and apply **ecosystem-based management and marine planning approaches** to considering wind development in GOM
- **Design and execute research and test performance of pilot-scale floating wind technologies**, such as from Maine Research Array to apply outcomes to commercial leasing process
- Establish and implement a **federal survey mitigation program & address radar interference**
- Establish and begin collecting **region-wide baseline monitoring**, including passive acoustic monitoring
- Establish **pre-construction, construction, & post-construction fisheries and wildlife monitoring requirements**
- Establish **standardized regional requirements for mitigating impacts** of offshore wind development

Understanding the effects and impacts on fisheries and protected species prior to large-scale leasing and development could reduce risk on resources and fishing communities; and increase certainty in our ability to address state, regional, and national climate change mitigation goals.

Additional NOAA Capabilities to Inform GOM Wind Planning

Examples of research, mapping, monitoring, and modeling information:

- Passive acoustic monitoring data in Gulf of Maine (Passive Acoustic Cetacean Map)
- NOAA spatial data, tools, and site suitability modeling to assist with screening and siting
- NOPP Marine Biodiversity Observation Network
- 303 years of total survey effort from GOM NMFS ecosystem/biological time series
- NOAA Gulf of Maine Seascape Project in partnership with ME, NH, MA CZM Programs
- DOE-Sea Grant-NMFS Socio-Economic Research Partnership

Operational:

- NOAA Weather Service and IOOS can provide BOEM/industry with observing and monitoring data and ocean climatology information to inform wind planning process
- IOOS can provide maximum winds/waves for a given buoy by month and historical plots
buoy climatology

THANK YOU!

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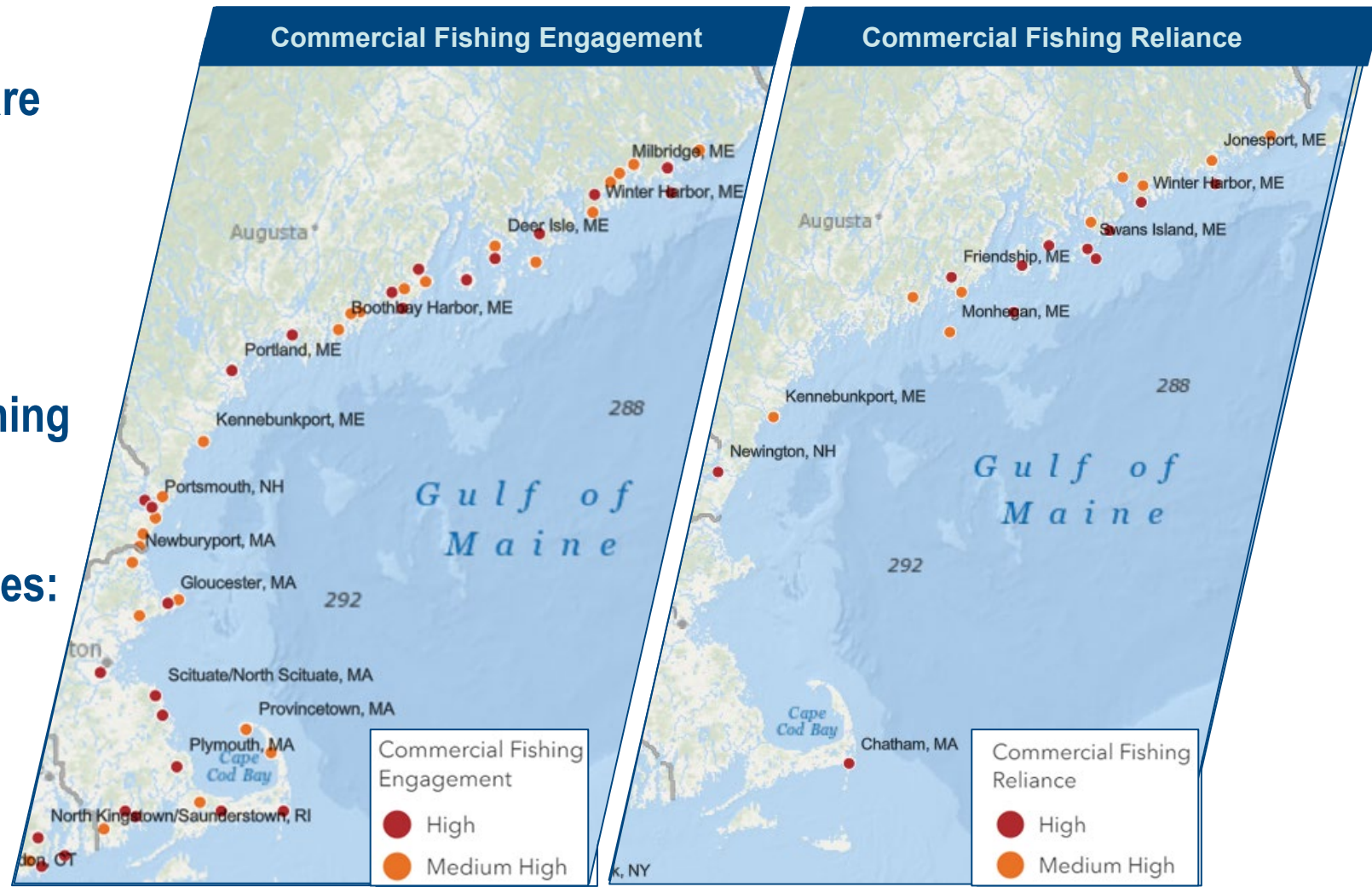
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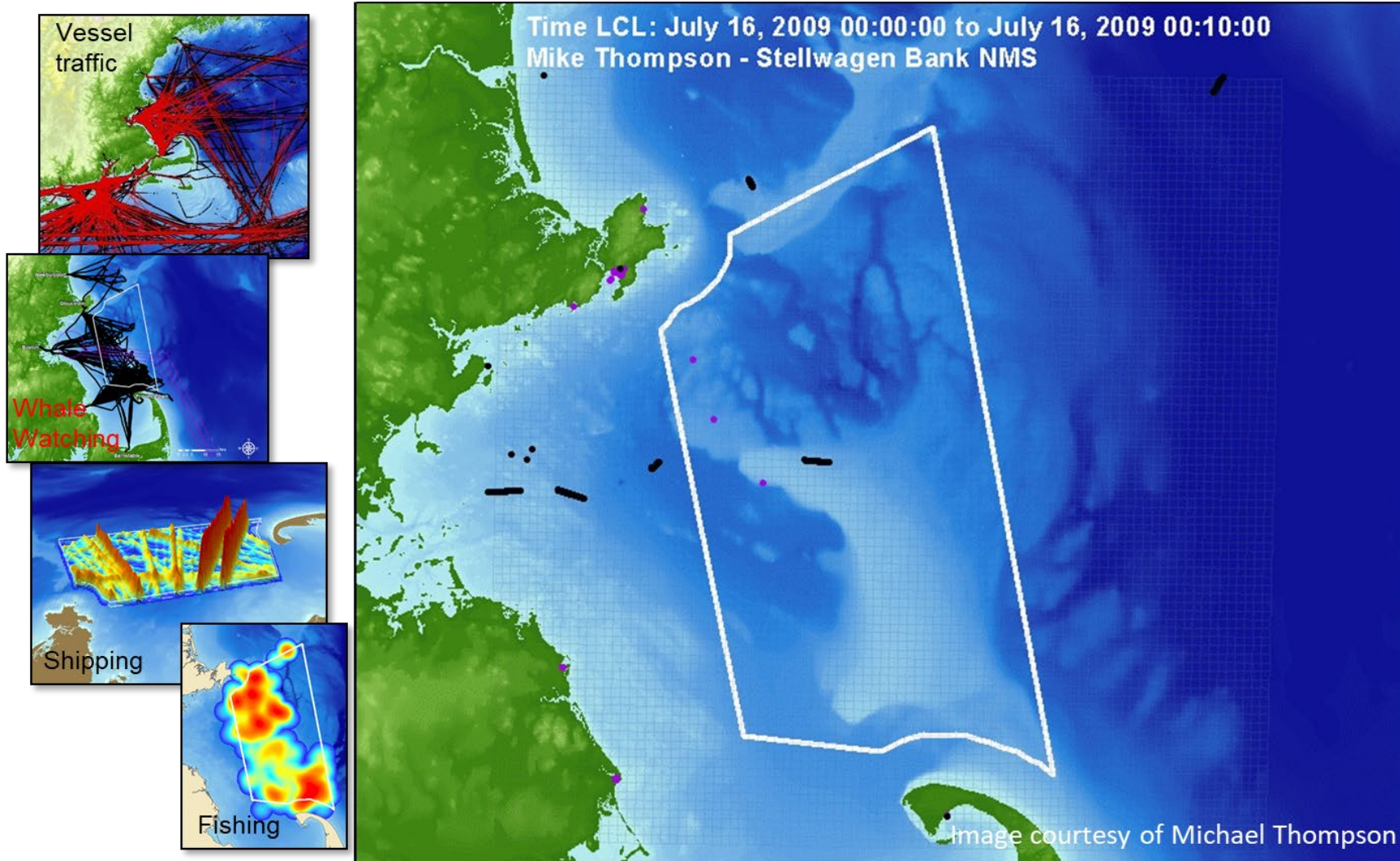
Additional resources provided in subsequent slides for reference:

Fishing Community Dependence

- Many communities in the GOM are highly dependent on fishing
- Northern GOM has the highest concentration of communities highly reliant on commercial fishing in the Northeast
- Existing community vulnerabilities: gentrification pressure and EJ concerns

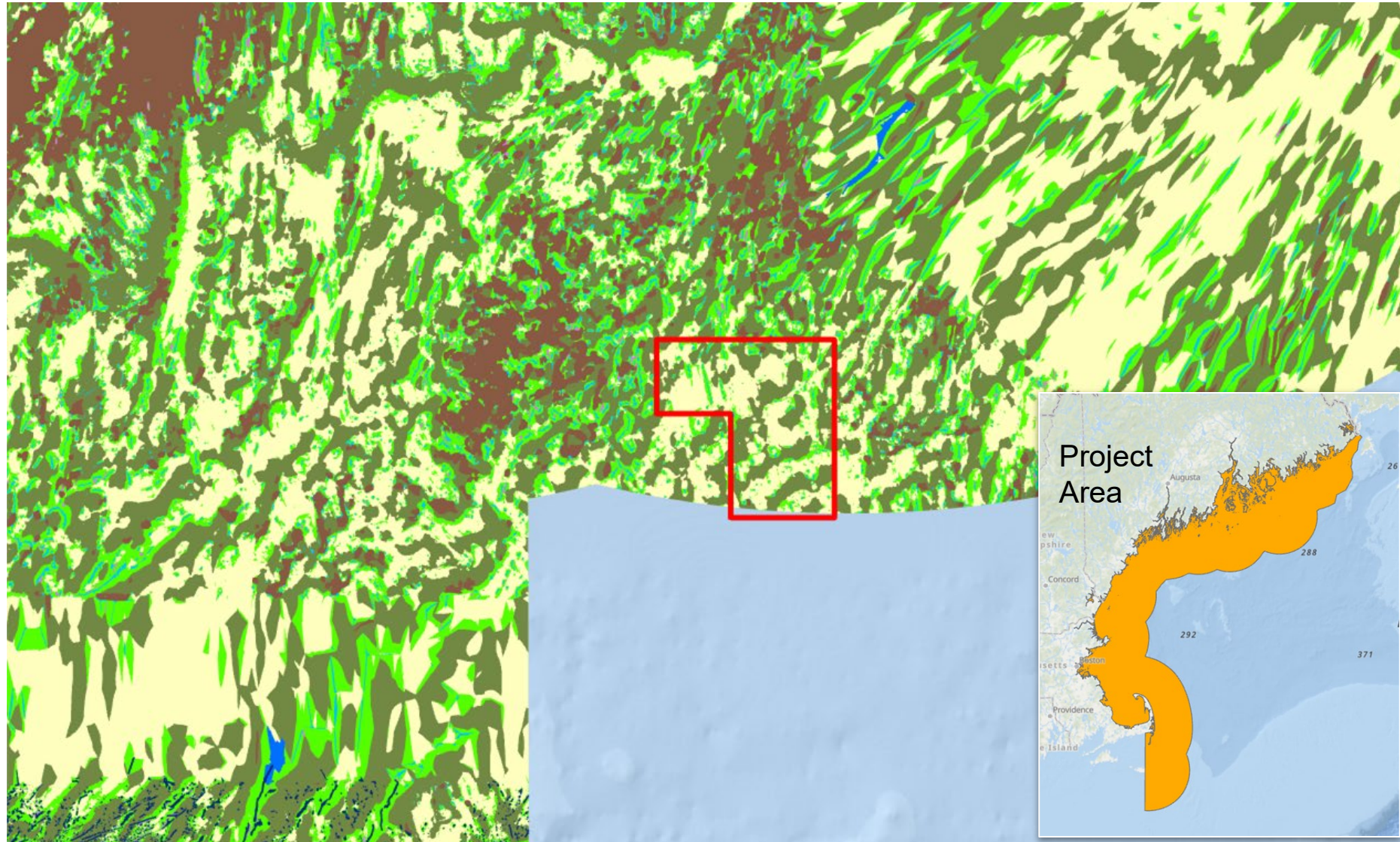


Stellwagen Bank NMS

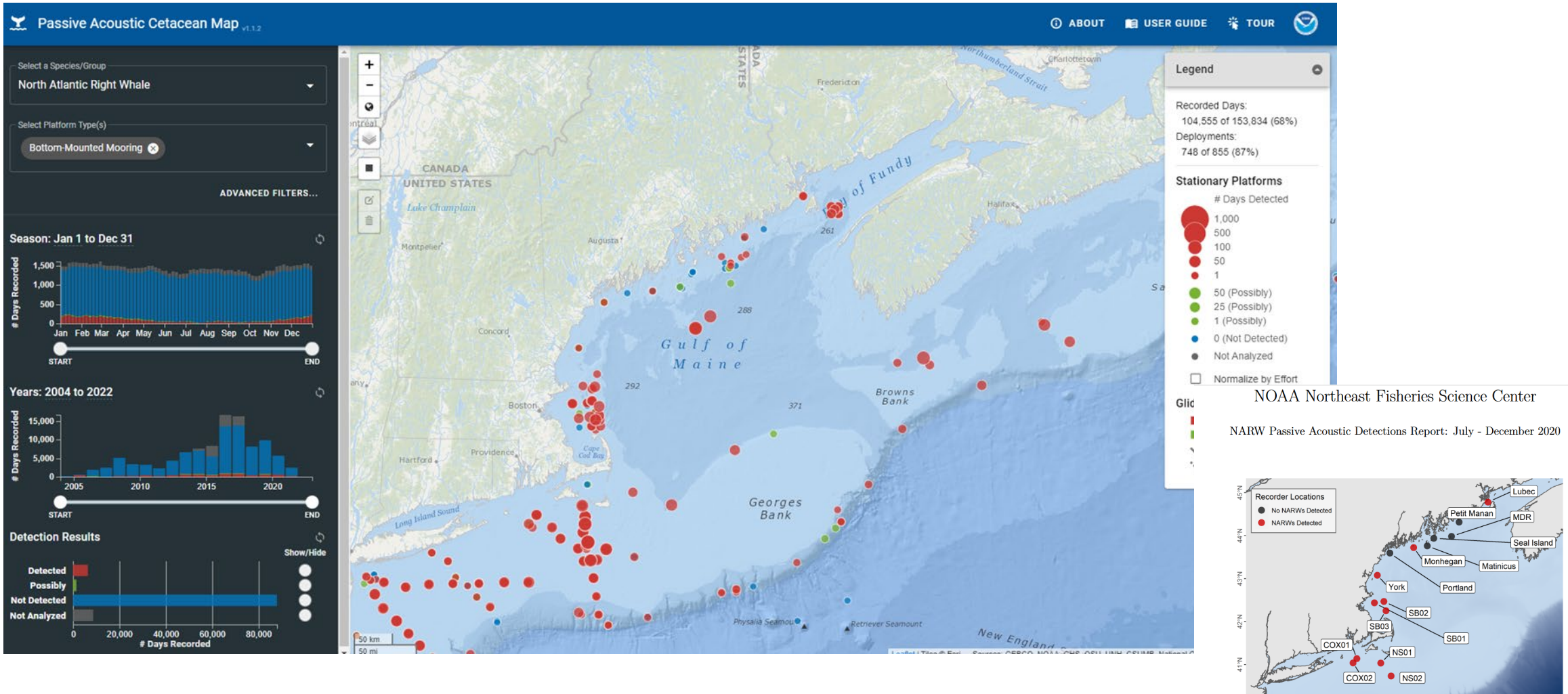


Gulf of Maine Seascapes Project

Benthic landscape information for reconnaissance level planning across the region

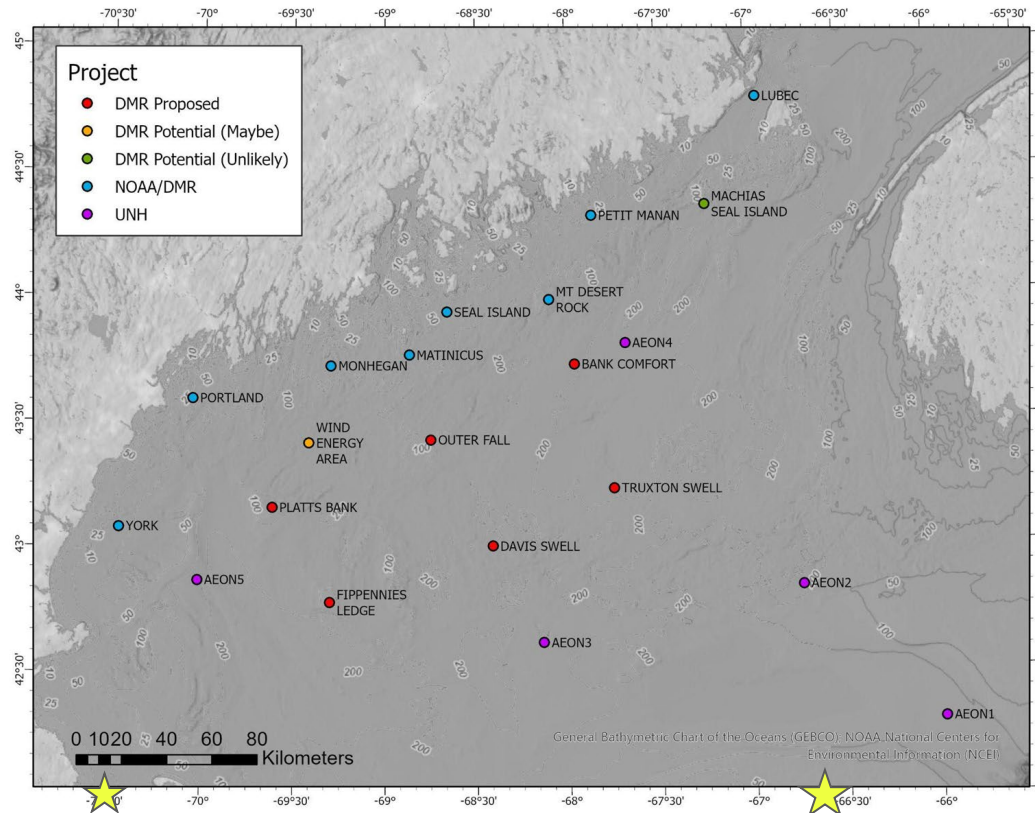


Passive Acoustic Monitoring Data in the Gulf of Maine



Access at: <https://apps-nefsc.fisheries.noaa.gov/pacm/>

Current and Planned Passive Acoustic Monitoring Stations

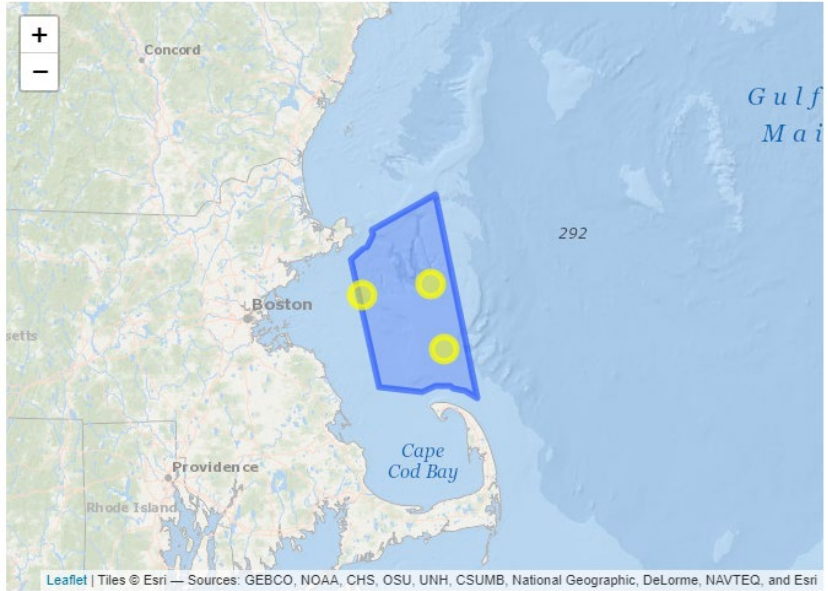
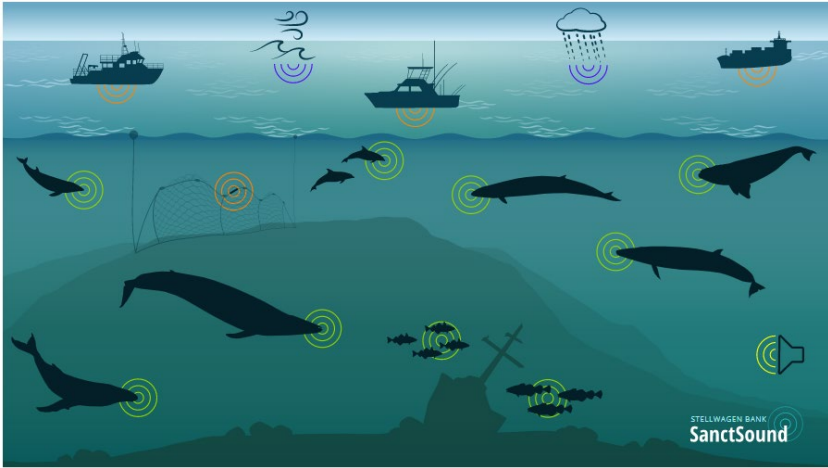


★ Additional infrastructure:

–10 NOAA-operated PAM recorders near Georges Bank (June 2022)

–4 long-term monitoring stations in Stellwagen Bank NMS (2014-present)

Managing Passive Acoustic Monitoring Data



National Centers for Environmental Information
NOAA / NESDIS / NCEI / Maps

Passive Acoustic Data

Layers

Passive Acoustic Data Deployments

- NRS ●
- ADEON ●
- SanctSound ●
- NMFS ●

Background
 Passive acoustic data are used by NOAA and other agencies and institutions to monitor living marine resources, monitor earthquake and geological activity, and assess impacts of anthropogenic noise on marine life.
Information on the archive is available on the [NCEI Passive Acoustic Data Archive](#) page.

Archived Projects

- [Ocean Noise Reference Station Network \(NRS\)](#) (?)
- [NOAA-Navy Sanctuary Soundscapes Monitoring Project \(SanctSound\)](#) (?)
- [Atlantic Driftwater Ecosystem Observing Network \(ADEON\)](#) (?)
- [NOAA National Marine Fisheries Service \(NMFS\) Ocean Acoustics Program](#) (?)

Fair Use Guidance
 Please review this [document](#) to identify appropriate and inappropriate applications of the archived data along with other guidance.
Information on the archive is available on the [NCEI Passive Acoustic Data Archive](#) page. Please contact pad.info@noaa.gov with any questions.

Online Resources:

- [Discovery of Sound in the Sea](#)
- [NCEI Passive Acoustic Story Map](#)
- [Ocean Biogeographic Information System](#)

Reference Layers

Access at: https://sanctsound.ioos.us/s_sbnms.html