



CASS Technical Report

Site Suitability Analysis: Blue Water Fisheries LLC, Northeastern Federal Waters

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BACKGROUND

Planning and siting for marine aquaculture operations require thorough synthesis and spatial analyses of critical environmental and ocean space use conflicts (Kapetsky et al. 2013). Implementing spatial planning strategies into the process allows compatibility to be assessed and works towards environmental and economically sustainable aquaculture operations. This process also allows for collaboration and data sharing with regional agencies, improving the accuracy and inclusion of essential considerations during the planning process. The National Marine Fisheries Service (NMFS) Northeast Regional Aquaculture Coordinator, Kevin Madley, provided critical assistance with interagency coordination of meetings with Blue Water Fisheries, LLC and facilitated data exchange for the Northeast region.

Blue Water Fisheries, LLC (hereafter ‘Blue Water’) seeks to permit a commercial-scale fish farm in the federal waters off the coasts of Maine (ME), New Hampshire (NH), or Massachusetts (MA), USA. This technical report covers the National Oceanic and Atmospheric Administration (NOAA) Coastal Aquaculture Siting and Sustainability (CASS) Program’s alternative site suitability analysis for the proposed Steelhead Trout (*Oncorhynchus mykiss*) farm. Farm parameters were requested from Blue Water by the CASS spatial team to account for economic and operational constraints. Blue Water provided the CASS team with an estimated maximum operating distance from four preferred ports located in NH and MA. Additional parameters provided include gear type, desired operational depth, the size of the farm footprint, seawater temperature needs, farm orientation (i.e., perpendicular to prevailing current direction), and desired significant wave height thresholds (Table 1). The information provided was used to identify an Area of Interest (AOI) and identify locations suitable for a Steelhead Trout offshore aquaculture operation.

The **Coastal Aquaculture Siting and Sustainability (CASS)** program supports works to provide science-based decision support tools to local, state, and federal coastal managers supporting sustainable aquaculture development. The CASS program is located within the Marine Spatial Ecology Division of the National Centers for Coastal Ocean Science, National Ocean Service, NOAA.

To learn more about CASS and how we are growing sustainable marine aquaculture practices visit <https://coastalscience.noaa.gov/research/marine-spatial-ecology/aquaculture/> or contact Dr. James Morris at James.Morris@noaa.gov.

The purpose of this report is to provide a relative suitability analysis that will aid in project development, including farm design, project feasibility assessments, and the permitting process. The target audience for this report includes all members of the regulatory community and Blue Water Fisheries, LLC. The NOAA NCCOS CASS alternative site suitability workflow is used to identify the most suitable areas for the proposed finfish farm, relative to surrounding ocean areas given the parameters and data considered (Figure 1). Initially a thorough review of the ocean ‘neighborhood’ is presented, a first step for new potential farm operations. Review of spatial data sets that represent potential environmental and ocean space use conflicts may indicate constraint or conditional constraints for an area. Next, a Multi-Criteria Decision Analysis (MCDA), commonly used for marine aquaculture siting, is performed (Longdill et al. 2008, Radiarta et al. 2008, Gimpel et al. 2015, Bwadi 2019). This analysis evaluates numerous spatial data sets to identify suitable locations by providing a relative comparison of how suitable locations within an area are for aquaculture, in this case marine finfish. Potential sites are identified in the most suitable locations and then characterized, which includes information regarding protected species, habitat descriptions, various fishing activities, management areas, oceanographic conditions, and other relevant information (Figure 1).

NOAA NCCOS has technically reviewed this report. Information within this report is intended for site characterization and does not equate to work needed concerning biological consultations, Section 7 review, or other necessary consultations that may occur in the pre-permitting or permitting process. NOAA NCCOS makes no warranties to the accuracy or completeness of the data presented here, and NOAA will not be responsible for any adverse result based upon users’ reliance on the application or the data presented. This report provides a “first look” at information available in a geographic area of interest. Users are advised to exercise due diligence and independently confirm the accuracy and correctness of the data provided. Approval does not signify that the contents necessarily reflect the views and policies of NOAA, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Table 1. Blue Water Fisheries, LLC responses to CASS Spatial Team request for project requirement information.

CASS Request	Farm Response
Preferred Ports (from N to S)	NH (Portsmouth, Rye Harbor, Hampton Harbor); MA (Newburyport)
Selected culture species	Steelhead Trout (<i>Oncorhynchus mykiss</i>)
Maximum distance from port(s)	≤ 12 nautical miles from shore
Gear depth requirements	≥ 52 and ≤ 90 m
Farm Footprint Size	265 acres (107 ha)
Federal/State waters	Federal
Needed Seawater temperature	10 to 16 °C at 15-20 m depth
Significant wave height	< 5 m
Farm Orientation	Perpendicular to prevailing currents

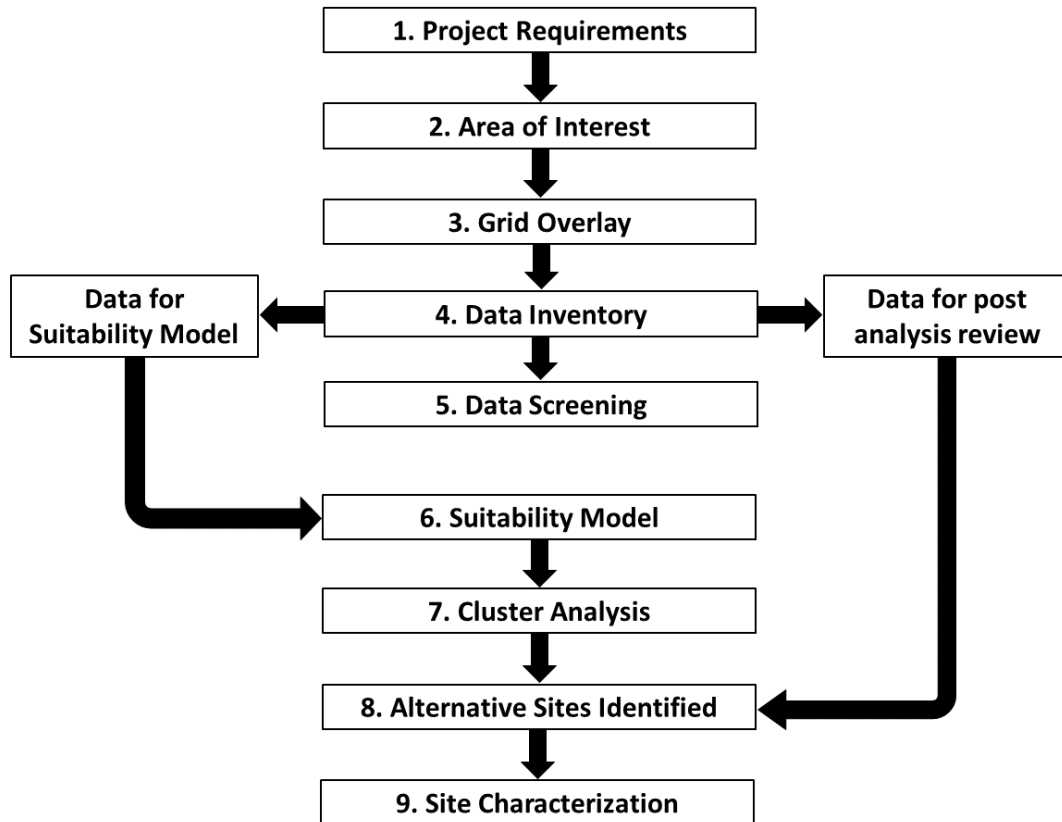


Figure 1. Overview of CASS Spatial Team workflow for ocean neighborhood characterization and alternative site suitability analysis.

Area of Interest

The Area of Interest (AOI) was delineated with the provided farm operational constraints. First, the federal waters within 12-nm from the preferred ports were identified. The distance to port is based on economic and logistical needs. For example, the port is where hatchery assets exist, workers transport to and from the farm, feed for cultured species is shipped in and transported to the farm site, stationing and repair of equipment occurs, and potentially where the harvested product will come to shore and be processed. Second, the depth requirement of ≥ 52 meters and ≤ 90 meters further refined the area (Figure 3A). The minimum depth of 52-m was determined by engineering experts who took the Innovasea Sea Station™ cage design and calculated the maximum wave height during 50 and 100-year storm events to determine the depth the cage system would need to be sunk to, should such a sizeable episodic storm event occur. The maximum depth of 90-m was a result of economic constraints and mooring line length. The final AOI is 165.92 km² (16,592 ha) (Figure 2).

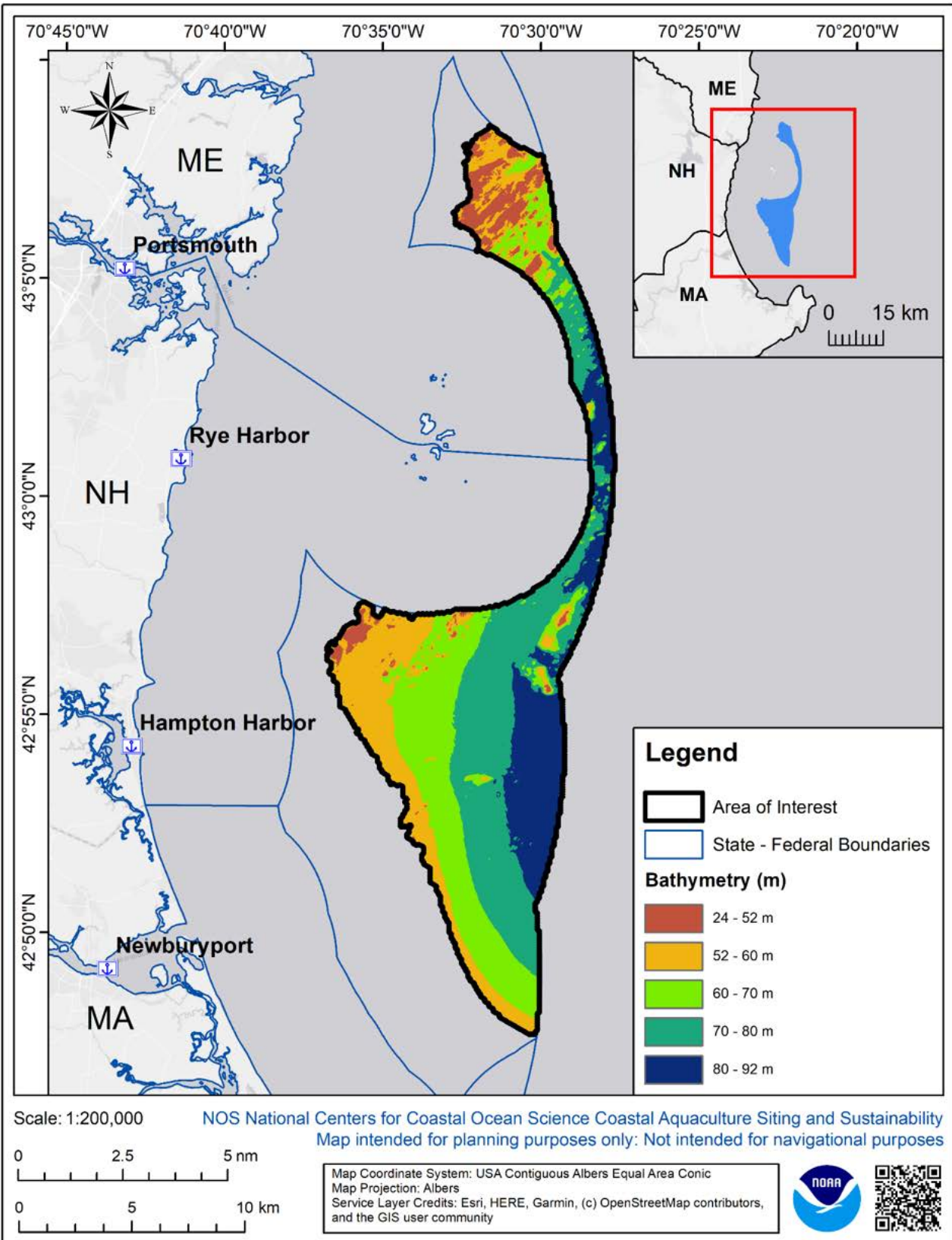


Figure 2. Bathymetric data within the AOI (165.92 km²), which was delineated using the distance from the four ports and taking into account depths from 52 - 90 m.

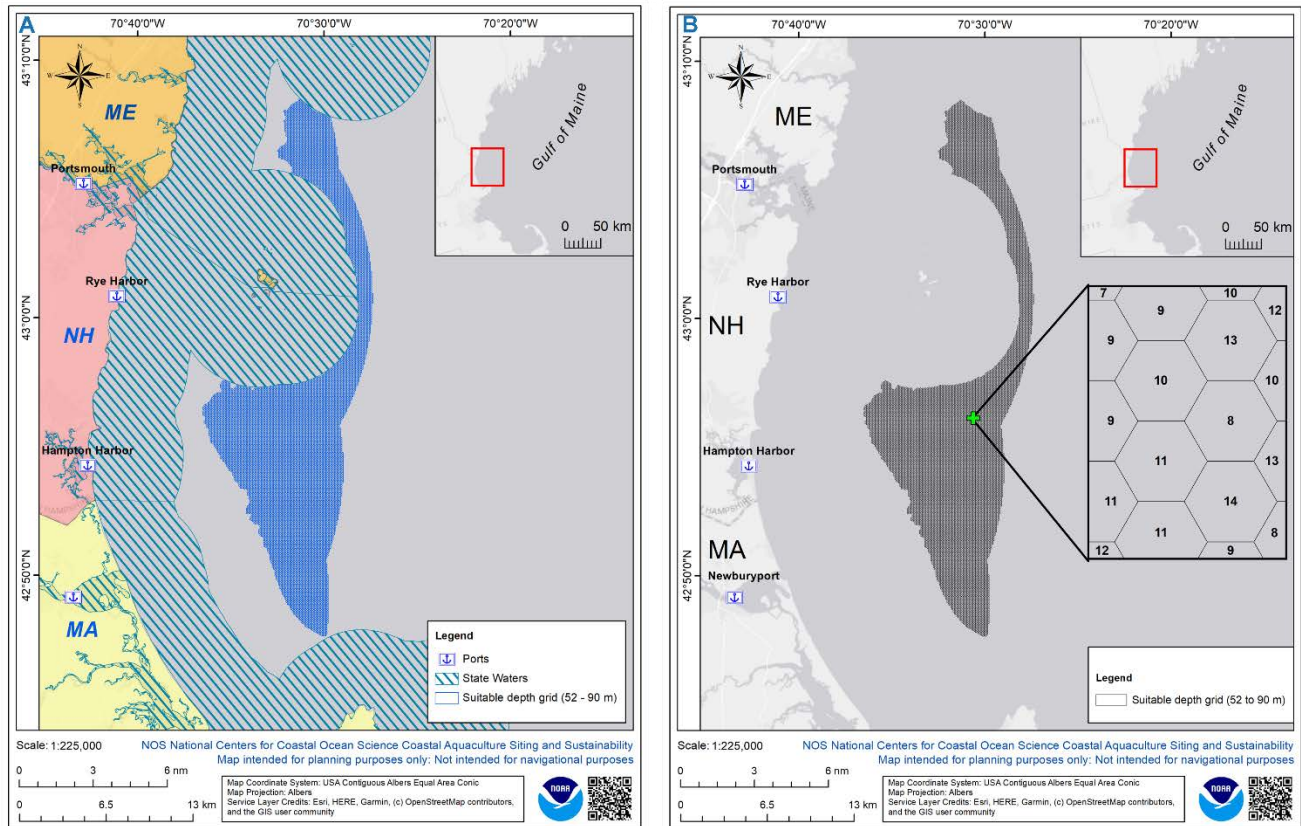


Figure 3. (A) State and federal waters off the coastal states of Maine, New Hampshire, and Massachusetts in the Northeastern US, with the Area of Interest (AOI) in blue. (B) Final AOI with a one-hectare hexagonal grid and zoom inset illustrating how values are attributed to each grid cell.

METHODS

Data Inventory

The CASS team continuously searches for updated or new data holdings in the Northeast, and organizes the data in the ‘Aqua Data Catalog’, a comprehensive spatial database containing data pertinent for siting marine aquaculture. This includes data layers such as, administrative boundaries or governance, national security (i.e., military), navigation, transportation, energy industry infrastructure, commercial fishing, natural resources, recreation, culture, and oceanography. The data holdings are made possible by a broad suite of federal and state agencies (e.g., NOAA NMFS (specifically the Greater Atlantic Regional Fisheries Office (GARFO) and the Northeast Fisheries Science Center (NEFSC)), US Department of Defense, Bureau of Ocean Energy Management, US Geological Survey, NOAA Office for Coastal Management, Northeast Regional Ocean Council and academic institutions (e.g., Stony Brook University, University of New Hampshire, Rutgers University, University of Massachusetts, Dartmouth, School for Marine Science and Technology (SMAST)). Data are checked for completeness and quality, and the most authoritative, up-to-date sources were used when possible. For this analysis, data were projected in USA Contiguous Albers Equal Area Conic. See Appendix A for a complete aquaculture siting data inventory generated for this analysis and the Northeast region (Table A-1).

Data Processing Steps

Many data sets require some form of processing to be utilized in the suitability model or for the site characterization. Below are the methods that the CASS team used to generate, process, and format the following data sets. See provided links and metadata for more information regarding the source data.

Bathymetry and Slope

Numerous NOAA National Ocean Service Hydrographic Surveys were downloaded, and combined to create a uniform bathymetric surface for the analysis.¹ The coarsest resolution, 16-meter cell size, was used to combine all surveys into a single surface. The slope was calculated, in degrees, across the final bathymetry raster surface. The mean bathymetry and slope value was calculated for each grid cell, for use in the suitability model.

Vessel Traffic

Automatic Identification System (AIS) vessel traffic data from the most recent year available at the start of the analysis (project start date: 10/2019 when only 2017 AIS data were available; 2018/2019 AIS data available as of 06/2020), was downloaded and processed for the AOI.² The cleaned and processed data, in text files, were made into spatial point data, and tracklines were created for several vessel categories (Cargo, Tanker, Tug and Tow, Fishing, Passenger, Pleasure/sailing, and other).³ The count of vessel transiting through each grid cell was calculated over the course of the entire year.

Commercial Fishing

Vessel Monitoring System (VMS) data provided by NMFS Office of Law Enforcement (OLE) for 2009 to 2019 were examined for the AOI. The text files were made into spatial point data, with tracklines being generated. The count of vessel transits per grid cell (one ha in size) were calculated for each year, and then a mean was calculated and used in the model. The ‘Communities at Sea’ data (i.e., the Commercial Fishing – VTR data from 2010 – 2015 (St. Martin and Olsen, 2017)) were requested multiple times from the author and the NMFS GARFO, but were never received by NOAA NCCOS. Therefore, these data were not used in the model, and only visually assessed for AOI overlap. The Communities at Sea data set was developed by linking Federal Vessel Trip Report (VTR) data to vessel permit data allowing fishing communities to be categorized based on port and fishing gear combinations as a function of port or major gear type. Maps were created by using trip location point data as input to create density polygons representing visitation frequency⁴

Oceanographic Conditions

Hourly water temperature and current speed values at 17-meters depth were extracted from the FVCOM model for January 2017 to December 2018 (Chen et al., 2011).⁵ The 17-m depth was assessed as this is likely where the operational gear and culture species will reside in the water column. Significant wave height (H_s) from the FVCOM model were downloaded at hourly intervals for the time

¹ <https://maps.ngdc.noaa.gov/viewers/bathymetry/>

² <https://marinecadastre.gov/ais/>

³ <https://coast.noaa.gov/data/marinecadastre/ais/VesselTypeCodes2018.pdf>

⁴ <https://www.northeastoceandata.org/explore-connections-between-fishing-communities-and-their-fishing-grounds-on-new-maps/>

⁵ <http://fvcom.smast.umassd.edu/>

period January 2017 to July 2019. H_s is the average of the highest one-third (33%) of waves (measured from trough to crest) that occur in a given period. H_s is used because the larger waves are usually more significant than the smaller waves, as the larger waves can cause navigational challenges for mariners (NWS 2020) and operational downtime for aquaculture farms. Point data were created and projected in USA Contiguous Albers Equal Area Conic. Inverse Distance Weighting (IDW) was used to create a smooth surface from the point data. Input parameters to the IDW tool include a cell size 100-m, a power of 2, and a search of 6 points. The oceanographic data is not included in the site suitability analysis, but rather is used for the final site characterizations (See Figures 20-28). This is computationally less intensive and the oceanographic conditions within the AOI are relatively similar due to the small geographic area examined and their close proximity to one another.

Suitability Analysis

A relative suitability analysis, a variant of the MCDA for aquaculture siting, was performed to determine the most suitable areas for aquaculture operations. A grid-based design using a 1-ha hexagonal grid was created within the AOI (Figure 2B). The data inventory was examined and spatial data layers containing known potential space-use conflicts with marine aquaculture operations, such as active military areas, maritime navigation, ocean industries, and natural resource management were collated and assigned a score ranging from 0 (low suitability) to 1 (high suitability) determined by its compatibility with aquaculture (Table 2). Data sets not present in the AOI or having an unknown interaction with aquaculture were not including in the suitability analysis, however if relevant, set aside for further review to characterize the ocean neighborhood or individual farm sites.

For discrete data, each grid cell was evaluated to determine if a feature was present or absent in each grid cell, with that features' corresponding score assigned if present (Table 2). For continuous data, such as bathymetry, slope, and sediment grain size, scoring breaks were created based on operational constraints (Table 3). In the case of the vessel traffic and commercial fishing traffic data, a value of transits per grid cell were calculated and scores were assigned based on the 25%, 50%, and 75% quartiles (Tables 4-6).

The scores for each data set were integrated by summing all individual values for grid cells across all data sets and dividing by the total number of data sets, providing a proportion from 0 to 1, with 0 representing 'low suitability' and 1 representing 'high suitability' relative to the other grid cells. Therefore, the final proportion calculation provides the relative suitability of that cell to the other grid cells. Any grid cell that contained a data layer with a score of 0 was considered to be unsuitable for aquaculture regardless of the other scores, as this indicates complete incompatibility with aquaculture.

A Local Index of Spatial Association (LISA) analysis, which identifies statistically significant clusters and outliers within a grid, was performed on the final results of the relative suitability analysis (Anselin, 1995). EsriTM ArcGIS Pro's 'Cluster and Outlier Analysis' tool was used to calculate the LISA values (Esri, 2020). The inverse distance spatial conceptualization was utilized within this analysis as it allows the inclusion of all grid cells; however, proximal cells have more influence than distant cells. The function inputs were a 200-m search distance and 999 iterations with row standardization and a false discovery rate correction applied to allow for more conservative and robust results. Statistically significant clusters of the highest suitable scores were identified with any clusters

smaller than 265 acres (107 ha) being removed, as this was the minimum farm size required. Within the highest suitable clusters sites were identified based on suitability scores, bathymetric features, and prevailing current directions. A full characterization is then performed for the final sites.

Table 2. Discrete spatial data layers included in the relative suitability analysis with scores ranging from 0 (low suitability) to 1 (high suitability).

Parameter / Data Layer	Present in cell score	Absent in cell score	Data Source*
Aids to Navigation	0	1	NOAA OCM
Aquaculture	0	1	NROC
Atlantic Link Cable	0	1	Northeast Regional Planning Body (RPB)
Military Operating Area	0.5	1	USN
ENC Obstructions	0	1	NOAA OCS
Ocean Disposal Sites	0	1	NOAA OCM
ENC and AWOIS Shipwrecks	0	1	NOAA OCS
Submarine Cable Areas	0.5	1	NOAA OCM
Submarine Transit Lanes	0.1	1	USN
Unexploded Ordnance	0.5	1	NOAA OCM
Unexploded Ordnance FUDS**	0.5	1	NOAA OCM

* Bureau of Ocean Energy Management (BOEM), National Oceanic and Atmospheric Administration (NOAA), Office for Coastal Management (OCM), Office of Coast Survey (OCS), US Navy (USN)
 **Formerly Used Defense Sites (FUDS)

Table 3. Continuous spatial data layers included in the relative suitability analysis with scores ranging from 0 (low suitability) to 1 (high suitability).

Parameter	Value	Score	Source
Mean Bathymetry (m)	< 52	0	NOAA
	≥ 52 and ≤ 90	1	
	> 90	0.5	
Slope (°)	< 0.27	1	NOAA
	≥ 0.27 and < 0.39	0.7	
	≥ 0.39 and < 1.43	0.4	
	≥ 1.43	0.1	
Sediment Grain Size (mm)	≤ 2	1	TNC*
	> 2	0.5	

*The Nature Conservancy

Table 4. Commercial fishing effort from Vessel Monitoring System (VMS) categories and scoring schema ranging from 0 (low suitability) to 1 (high suitability).

Mean VMS vessel transits 2009 - 2019	Score
0	1
<15.45	0.7
≥ 15.45 and < 24.27	0.5
≥ 24.27 and < 43.27	0.3
≥ 43.27	0

Table 5. Automatic Information System (AIS) ‘vessel counts by vessel type’ categories, is the count of the vessels that passed through a grid cell over the course of 2017 with the corresponding scores ranging from 0 (low suitability) to 1 (high suitability).

Vessel Count Categories by Type				Score
Fishing	Passenger	Pleasure	Other	
0	0	0	0	1
1	1-2	1-2	1	0.8
3	3-4	3	2	0.6
4-5	5-7	4-6	3-4	0.4
> 5	> 7	> 6	> 4	0.2

Table 6. Larger vessels with limited maneuverability associated with established shipping lanes from the Automatic Information System (AIS) 2017. With scores ranging from 0 (low suitability) to 1 (high suitability).

Vessel Count Categories by Type			Score
Cargo	Tanker	Tug/Tow	
0	0	0	1
-	-	-	0.7
-	1	1	0.5
1	2	3	0.3
> 1	> 2	> 3	0.1

RESULTS

Ocean Neighborhood Characterization

National Security Considerations

Military operational areas and areas of national security interest were reviewed in the AOI (Figure 4). A large area marked as unexploded ordnance containing jet assisted takeoff racks and associated debris extends from coastal New Hampshire and southern Maine seaward where it intersects the center section of the AOI. A Formerly Used Defense Site (FUDS) with unexploded ordnance also intersects the AOI. Homeland security and training interactions include a submarine transit lane and a military operating area. Other military areas that do not intersect the AOI include warning areas, military special use airspace, and danger/restricted zones. The southern portion of the AOI has the largest area with no classified national or homeland security use.

Navigational Considerations

Data were gathered to determine relative interference with navigation and navigational routes. Automated Identification System (AIS) data (OCM, 2018) were analyzed to determine the relative vessel count (i.e., vessel traffic) of each vessel type (i.e., tanker, cargo, passenger, tug and tow, pleasure and sailing, and other vessels – e.g., first responders) within the AOI (Figure 5). AIS data from 2017, the most recent year available from the NOAA Office for Coastal Management at the start of this project, were used for the analysis. For the AOI, vessel density is relatively low for all vessel types. The majority of vessel traffic that transits through the AOI were passenger, fishing, and pleasure/sailing craft (Figure 5). The highest vessel counts within the AOI were from fishing vessels (Figure 5). Furthermore, passenger vessel and pleasure craft have multiple transits through southern portions of the AOI. Cargo, tanker, and tug & tow vessels had similar traffic patterns, with vessel traffic either heading south by southeast from Rye Harbor or Portsmouth port areas, or heading north by northeast through the northern portion of the AOI. Local authorities and the U.S. Coast Guard are aware of regattas or other events when heavy recreational boating traffic occurs in the region. To view each of the AIS maps individually, please refer to Appendix A, Figure A-1 (A – F).

Additional navigation conflicts were also evaluated including shipping fairways, separation zones, areas to be avoided, pilot boarding areas, active anchorage areas, regulated navigational space, navigable waterways, ferry routes, shipwrecks and obstructions, polluting wrecks, and artificial reefs (Figure 6). There is one RULET wreck located to the east of the AOI, and three shipwrecks (i.e., two ENC and one AWOIS wreck) are located within the AOI (Figure 6).

Industry and Infrastructure Considerations

Industrial activities in the Northeast US considered herein included pipeline outfall structures, cable and pipeline areas, wind energy planning and lease areas, an ocean energy demonstration project, ocean disposal sites, and submarine cables. Aside from the Atlantic Link Cable, there is little indication that other industry or infrastructure is present within the AOI (Figure 7).

Social and Recreation Considerations

Social activities were examined as empirical data exists for recreational ocean-based activities in the region (NEOD, 2020). Recreational boater routes, recreational fishing areas, paddleboard events, boat launches, commercial whale watching areas, distance sailing races, national historical places, SCUBA diving areas, water trails, and individual ocean uses (i.e., a survey conducted by SeaPlan, Surfrider Foundation, and Point 97 under the direction of the Northeast Regional Planning Body – see Longley-Wood, 2015) were all considered. These layers helped in characterizing areas the public uses regularly for ocean-based activities. The recreational activities overlapping the planning area are SCUBA diving and a general use and transit area for commercial whale watching (Figure 8A - B). General use commercial whale watching areas reflect the full footprint of whale watching activity in the last 3 – 5 years (2010 – 2014) regardless of frequency or intensity. Areas of ‘Dominant’ commercial whale watching are routinely used in accordance with seasonal patterns. Commercial whale watching transit routes include areas used for transit to and from general or dominant use areas; and supplemental areas depict areas used for activities closely related to whale watching and infrequent specialty trips.

Commercial Fishing Considerations

Many important fisheries activities are tracked by the NMFS Office of Law Enforcement (OLE) through the use of Vessel Monitoring System (VMS) data. NMFS uses the VMS system as a satellite surveillance system for monitoring the location and movement of commercial fishing vessels in the U.S. EEZ (Fontenault, 2018). VMS uses satellite-based information from on-board transceivers, required for vessels operating in certain federally managed fisheries (Fontenault, 2018). Some important fisheries species data did not exist through VMS, so each species is also described for the final AOIs through literature and information from NMFS GARFO and the NEFSC. Please refer to Appendix A-2 to read the full species description and contacts for these, and other, fisheries species.⁶ Mean VMS patterns are displayed from 2009 - 2019 in the planning area (Figure 9). For this analysis, the mean VMS vessel density over the 11-year time period was calculated. The center and southwest portion of the AOI exhibit higher mean VMS vessel transits than the other parts of the AOI. These data were categorized using a histogram approach and are included in the suitability analysis. This scoring method is similar to other scoring methods, which score data on a 0 to 1 scale with 0 being unsuitable and 1 being suitable (Vincenzi et al. 2006, Silva et al. 2011, Theuerkauf et al. 2019). Since there is no known threshold for incompatibility with aquaculture, the decision to zero out the top 25% of the data was chosen to avoid the areas of highest fishing effort. Further analysis of the VMS fishing interaction is performed in the site characterization.

While not at as high of spatial or temporal resolution as the VMS transit density data from the NMFS OLE, other commercial fishing data came from NEOD’s (2020) generalized VMS data summaries categorized by fishery, as well as Vessel Trip Report (VTR) data categorized by gear type (St. Martin and Olsen, 2017) (Figure 10A – F, Figure 11A – F). To view each of the maps in Figures 10 and 11 individually, please refer to Appendix A, Figure A-2 (A – F), and Figure A-3 (A – F). For more

⁶ <https://www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/resources-fishing-greater-atlantic-region>, <https://www.nefmc.org/>, https://www.fisheries.noaa.gov/resources/maps?title=&field_management_area_value%5BNew%20England%5D=New%20England&field_management_area_value%5BMid-Atlantic%5D=Mid-Atlantic&field_species_vocab_target_id=&sort_by=created

information on how these data sets were created please see the data set documentation.⁷ In addition, the Mid-Atlantic Ocean Data Portal also has future projections for many important fisheries species in the region relative to thermal shifts that also may be of use from a screening-level planning perspective (Morley et al., 2018).⁸

To further characterize the ocean neighborhood the generalized VMS data (Figure 10A – Figure 10E) from 2011 – 2016 were overlaid with the AOI for relative comparison of fishing efforts in the AOI. Most notably is the high overlap with the Herring and multi-species effort (including the Herring, Monkfish, and Mackerel fisheries), and sea scallop efforts in the southern portion of the AOI (Figure 10A and 10E). The data showed low effort for the surf clam fishery and squid fishing (Figure 10D) throughout the AOI. Monkfish effort is moderately low in the AOI, with efforts largely seen in the northern and most southern portion of the AOI (Figure 10B). Pelagic species (Herring/Mackerel/Squid) were moderately high in the northern and mid portions of the planning area (Figure 10F). For more information on many of these fisheries, please refer to Table A-2 and Table A-3, which list the species distribution and fisheries management areas in and around the AOI, respectively.

Spatial characterizations derived from gear-related (i.e., Communities at Sea) data from 2011 to 2015 indicate bottom trawls (both vessels under and over 65 feet) occur most frequently in the southwestern portion of the AOI (Figure 11A and 11B). Sea scallop dredging is highest in the southwestern portion of the AOI (Figure 11C). Low longline (Figure 11D) and low pots and traps effort (Figure 11F) are seen within the AOI. Gillnet usage appears the highest in the central part of the AOI, (Figure 13E). Low effort for pots and trap gear in the AOI appeared in the data from 2011 to 2015 for the AOI (Figure 11E). For larger maps of generalized VMS activity, please refer to Appendix A, Figures A-2 (A – F), and for larger maps of the VTR data, please see Figures A-3 (A – F).

Limitations of VMS data include, only providing positional data, declarations, and does not necessarily translate to landings or accurate species information. VTR reports can supplement this information, and the NEFSC Social Science Branch has the VTR-Observer model and other tools using landings and revenue data over time and space, offering possibly a better characterization of fisheries effort. However, inclusion of the model within this analysis is outside the scope of this pre-permitting document and is anticipated to be incorporated as part of the National Environmental Policy Act (NEPA) analysis during permitting. In the interim, by visiting the NEFSC’s Fishing Footprints⁹ website for revenue and landings in the Northeast, users can visualize data overtime time and space and obtain a general sense of potential economic impacts to capture fisheries if displaced by new ocean-based operations.

Fisheries Management Area Considerations

Numerous Fisheries Management Plans (FMPs) are in place based on empirical data trends for economically important fish populations in the Northeast region of the US (see Appendix A, Table A-3 for more information). Generally, fisheries management areas aim to protect fisheries species over time, the habitats they occupy throughout their lives, and add seasonal or gear-restricted areas to

⁷ Generalized VMS: <https://www.northeastoceandata.org/files/metadata/Themes/CommercialFishing/VMSCommercialFishingDensity.pdf>; Vessel Trip Report:

http://portal.midatlanticocean.org/static/data_manager/metadata/html/CASMetadata.html

⁸ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0196127>

⁹ <https://fish.nefsc.noaa.gov/read/socialsci/fishing-footprints.php>

protect endangered and managed species, continuing or re-building stocks for economic growth and food security. Each NMFS designated fisheries management area in the region was checked for overlap or intersection with the final identified locations. Overall, 130 fisheries management areas – some general and some very specific - were checked for overlap with the AOI.

Protected Resource & Essential Fish Habitat (EFH) Considerations

Protected species considered in the AOI include cetaceans (small delphinoids, large delphinoids, large whales (e.g., Fin whale, North Atlantic Right whale), and small whales (e.g., Long-finned Pilot whale, Cuvier’s Beaked whale)), seabirds (e.g., Gannet spp., Tern spp.), sea turtles (e.g., Green, Loggerhead, Leatherback, and Kemp’s Ridley Sea Turtles), seal species (e.g., Harbor Seal, Gray Seal), and fish species (e.g., Atlantic Sturgeon and Shortnose Sturgeon).¹⁰ The purpose of the Endangered Species Act (ESA), and Section 7 consultation, is to safeguard endangered and threatened species along with the ecosystems on which they depend (e.g., North Atlantic Right Whale, Atlantic Sturgeon) (NMFS, 2020a). Only those protected species that meet the specification as an ESA listing are protected under the ESA. The Marine Mammal Protection Act (MMPA) pertains to all mammals (whales, dolphins, porpoises, seals, and sea lions) and prohibits the taking (i.e., harassment, feeding, hunting, capture, killing, or importation of marine mammals or derivative products) to prevent diminishing stocks beyond significant functioning portion of the ecosystem (NMFS, 2020b, USFWS 2020a).^{11,12} Notably, this report only assesses overlap with protected species. It is up to the action agency to determine if a project needs ESA or MMPA consultation. If the action agency (e.g., NMFS) determines that there is "no effect" to pertinent species and habitats, a consultation may not be required. If there may be an “effect” of the action, consultation is required and an effects determination is then submitted.

Protected species considerations were not included in the spatial analysis, but rather characterized to visualize potential overlaps that may occur in the region. The majority of known data sources are at a resolution too coarse for precision siting of aquaculture (e.g., one to two 10 x 10 km grid cell may cover the entire AOI), and therefore need regional expertise and further consultation beyond this technical siting report. The Migratory Bird Treaty Act (MBTA) protects migratory birds, their nests, and eggs from hunting, taking, capturing, killing, or attempting to do so (USFWS, 2020b).¹³ Bird species characterization is beyond the scope of this report, although there are data available for many species.¹⁴ As uncertainty exists in type and number of interactions with seabirds and finfish operations, an independent, site-specific characterization is anticipated to be completed during the NEPA process, and expert review of potential interactions will occur at that time.

For cetacean characterization purposes, NOAA NEFSC and MDAT (Curtice et al. 2019) provides cetacean density estimates based on season for the Northeastern U.S. with the NEFSC’s AMAPPS

¹⁰ <https://www.nefsc.noaa.gov/ecosys/ecosystem-ecology/pinnipeds.html>

¹¹ <https://www.fisheries.noaa.gov/node/1211#:~:text=The%20primary%20objectives%20of%20the,to%20their%20optimum%20sustainable%20populations.>

¹² <https://www.fws.gov/international/animals/marine-mammals.html>

¹³ <https://www.federalregister.gov/documents/2020/02/03/2020-01771/regulations-governing-take-of-migratory-birds>

¹⁴ <https://portal.midatlanticocean.org/data-catalog/conservation/>

Marine Mammal Model viewer¹⁵ and Duke University-hosted OBIS-SEAMAP data¹⁶, models¹⁷, and technical reports.¹⁸ These density estimates are at a relatively coarse spatial resolution (100 km²) for precision siting of aquaculture, but provide valuable insights into the distribution of protected species at the regional scale.¹⁹ Statistical estimates from the data are also available including calculations of average density, 95% confidence interval, 5% confidence interval, coefficient of variation, and standard deviation (NEOD, 2020). For screening and characterization purposes, MDAT cetacean abundance data were overlaid with the AOI and were considered low or moderately average density relative to surrounding areas in the region (Figure 12). North Atlantic Right Whales (NARW) and Fin Whales Section 7 Consultation areas overlap with the AOI, but are outside of the NARW Feeding BIA (Figure A-4). The AOI does overlap with the NARW critical habitat area that spans throughout the northeastern US waters. Oleson et al. (2020)²⁰ recently released the NARW monitoring and surveillance report with the NMFS Expert Working Group recommendations, further specifying protection measures and monitoring for NARW. Other important whale species in the area are listed in Table 8. Importantly, NOAA Fisheries also publishes Marine Mammal Stock Assessment Reports by Species/Stock (SARS)²¹ for cetaceans and pinniped species offering temporal and spatial information and data for improved overall characterization. Individual maps of cetacean species abundance overlap can be seen in Appendix A, Figure A-5 (A – Z).

The NOAA Fisheries Atlantic Large Whale Take Reduction Team has also developed the Right Whale Risk Reduction Decision Support Tool.²² Under an independent panel of non-NOAA scientists, panelists concluded the decision support tool provides a transparent way for industry and resource agencies to compare relative changes in entanglement risk for North Atlantic Right Whales under various fishing scenarios (NOAA 2020). At present, it is beyond the scope of this technical report to add in additional modeling efforts, but see it as a valuable component to regional decision-making regarding two at-risk cetacean species. We anticipate NEPA analysis and environmental documentation completed during permit review will include species-specific model assessment from the Risk Reduction Tool.

Overlap with the anadromous Atlantic Sturgeon (*Acipenser oxyrinchus*) and Shortnose Sturgeon (*Acipenser brevirostum*) Section 7 areas completely or partially overlap the AOI.

NEFSC sea turtle data, provided as Sightings per Unit Effort (SPUE) in 10 minute grid cells, were used to characterize which seasons had the highest relative presence (and overlap) of sea turtles in the AOI,

¹⁵ <https://apps-nefsc.fisheries.noaa.gov/AMAPPSviewer/>

¹⁶ <http://seamap.env.duke.edu/>

¹⁷ <http://seamap.env.duke.edu/models/>

¹⁸ <http://seamap.env.duke.edu/models/mdat/MDAT-Technical-Report.pdf>

¹⁹ We also considered information from the following sites:

<https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-species-critical-habitat-information-maps-greater>; & <https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/protecting-marine-life-new-england-mid-atlantic>

²⁰ <https://www.fisheries.noaa.gov/resource/document/north-atlantic-right-whale-monitoring-and-surveillance-report-and-recommendations>

²¹ <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#cetaceans--small-whales>

²² <https://www.fisheries.noaa.gov/feature-story/decision-support-tool-helpful-those-finding-ways-reduce-whale-entanglement-fishing>

with relatively low SPUE seen for all species and seasons occurring in the AOI (MARCO 2020)²³. The SPUE of sea turtle observations were used as an approximation for sea turtles during different seasons and annually, respectively. Section 7 consultation areas overlap the AOI for Green sea turtle, Loggerhead sea turtle, Leatherback sea turtle, and Kemp's Ridley sea turtle species. The NEFSC SPUE data are at a resolution that is too coarse to make any precision-level siting decisions, and therefore were characterized, as with mammalian species, to describe generalized movements within and around the AOI. Consultation with protected resources biologists will be imperative in permitting and final siting, in conjunction with EFH biological assessment, if needed.

EFH covers waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1802(10)).²⁴ EFH species data were compiled from NOAA's Guide to Essential Fish Habitat Designations in the Northeastern United States (NOAA 2014). This guide summarizes EFH designated by species and life stage for that species (i.e., eggs, larvae, juveniles, and adults). EFH within the AOI has been designated for 20 managed species (i.e., species with active Fishery Management Plans - FMPs), with four highly migratory species (Table 7). Highly migratory species of fish and sharks include the Bluefin Tuna, Blue shark, Porbeagle shark, White shark, and Basking Shark.

Examples of parameters considered as sensitive habitats in this study include submerged aquatic vegetation, hard bottom areas, deep-sea coral observations, protected areas, designated areas such as restoration project areas, and designated fisheries management areas. Species associated with those habitat areas were also characterized (e.g., Longfin Squid habitat, Surf clams) in and around the AOI (Table A-2). Benthic and sensitive habitats will be further characterized during the NEPA analysis process and will provide the needed regional expertise for such information to be accurate at the precision siting level. For general descriptions of the benthic habitat, the CMECS Crosswalk model (2014) can be utilized during the permitting of NEPA process to characterize biota associated with land forms (Weaver et al. 2013).²⁵ Consultation with the protected resources biologist will be imperative in permitting and final siting along with EFH assessment(s).²⁶

²³ https://portal.midatlanticocean.org/static/data_manager/metadata/html/MigratoryPortfolio.html

²⁴ <https://www.law.cornell.edu/uscode/text/16/1802>

²⁵ <https://www.sciencebase.gov/catalog/item/53c4331fe4b03bbfc4d54598>

²⁶ <https://www.nefmc.org/management-plans/habitat>

Table 7. Essential Fish Habitat (EFH) species within the Area of Interest (2018). Each species common name is listed in the table. Next to the name, in parentheses, are the species life stage(s) (i.e., E = egg, L= larvae, J = juveniles, A = adult) present in the AOI. In some instances, data indicated all life stages were present for a species. In these instances, ‘All’ is in the parentheses if the species is found within the AOI.

EFH Species in the AOI		
American Plaice (All)	Atlantic Wolffish (All)	Pollock (All)
Acadian Redfish (All)	Haddock (All)	Thorny Skate (All)
Atlantic Cod (All)	White Hake (All)	Windowpane Flounder (All)
Atlantic Herring (All)	Winter Flounder (All)	Yellowtail Flounder (All)
Sea scallop (All)	Silver Hake (All)	Blue Shark (All)
Red Hake (All)	Little Skate (All)	Porbeagle Shark (All)
Witch Flounder (All)	Monkfish (All)	White Shark (All)
Winter Skate (All)	Ocean Pout (All)	Basking Shark (All)
		Bluefin Tuna (A J)

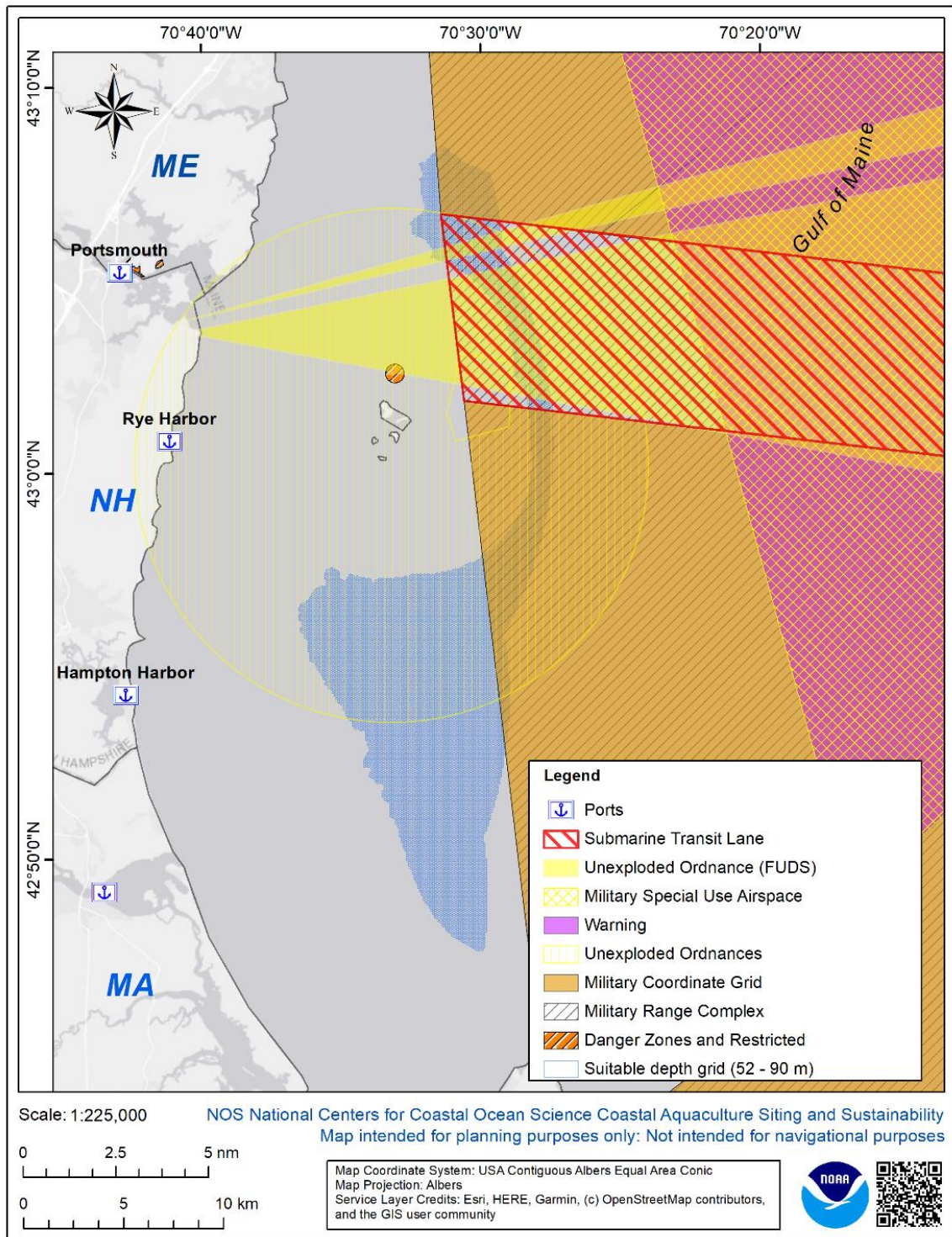


Figure 4. The AOI intersects a marked Submarine Transit Lane, the Military Range Complex, a large unexploded ordnance area covering the northern New Hampshire waters and waters of southern Maine, and unexploded ordnance (Formerly Used Defense Sites - FUDS) area, which also overlaps with the submarine transit lane. Other military areas that do not intersect the AOI include Warning Areas, Military Special Use Airspace, and danger and restricted areas. The southern portion of the AOI has the most area not marked for military use.

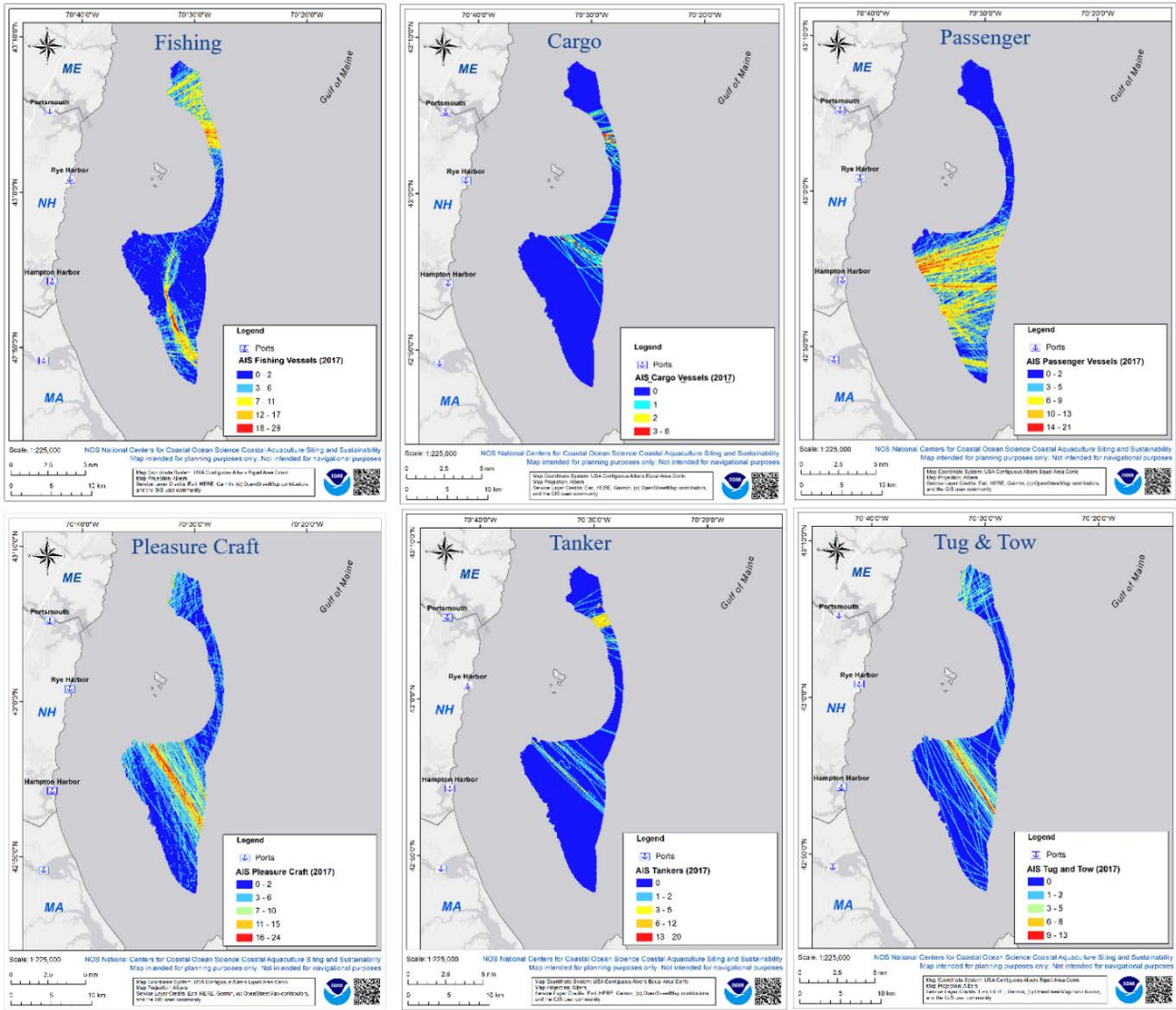


Figure 5. Automated Identification System (AIS) vessel transit density, shown as number of vessel transit/vessel type/grid cell/year for the AOI. All vessel density is considered relatively low to the many surrounding areas, but fishing vessels had the highest number of transits through the AOI in 2017. The type of fishing is unknown from the AIS data, and represents only those vessels required to carry AIS transponders.

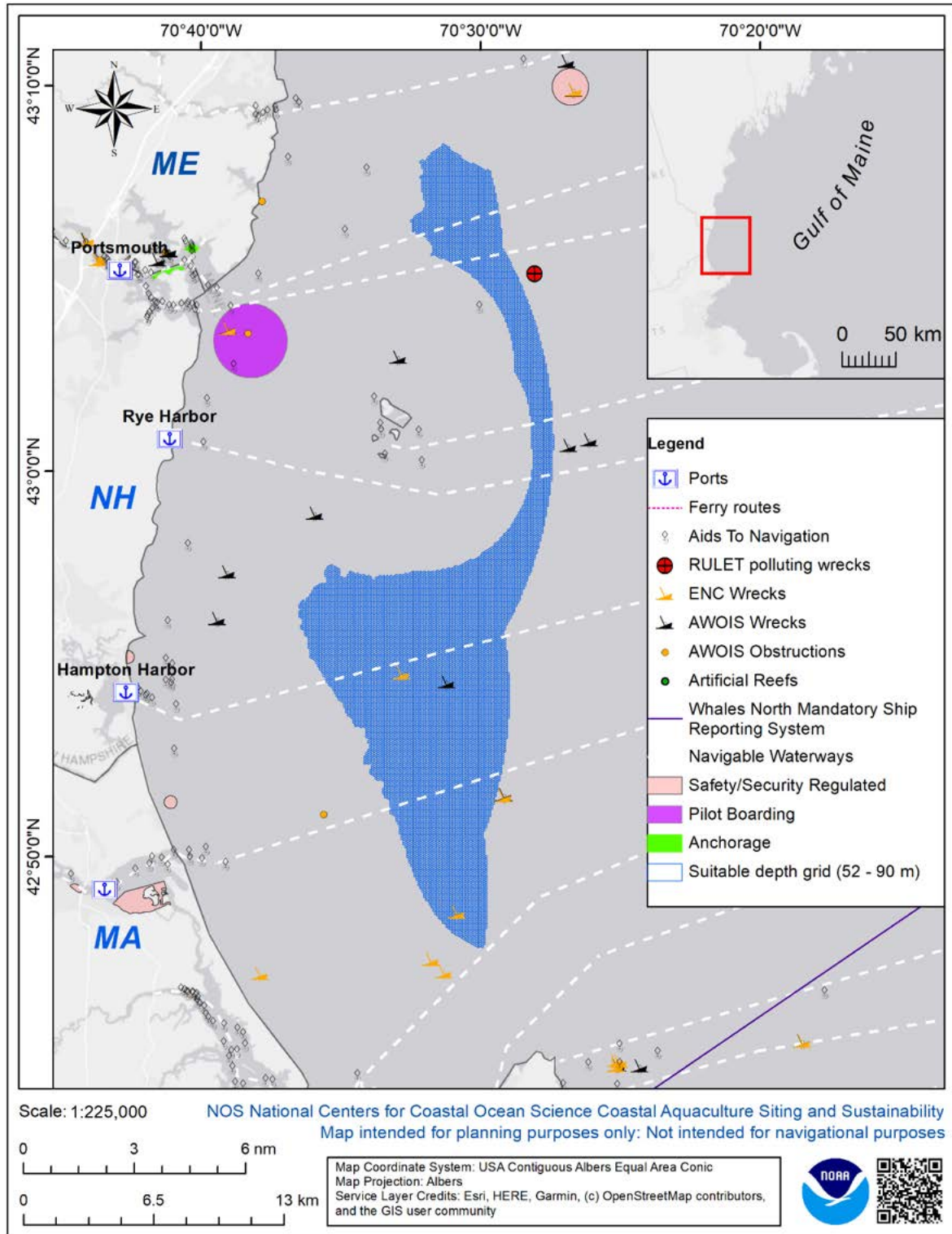


Figure 6. Navigation and transportation considerations within the ocean neighborhood of the AOI. Shipwrecks, shipping routes, areas to be avoided, speed restriction zone for North Atlantic Right Whales, mandatory Whale reporting areas, artificial reefs, anchorage areas, precautionary areas, traffic separation schemes, navigable waterways, ferry routes, ports of interest, safety zones, and wrecks and obstructions, pilot boarding areas, RULET wrecks, and aids to navigation were considered for the AOI.

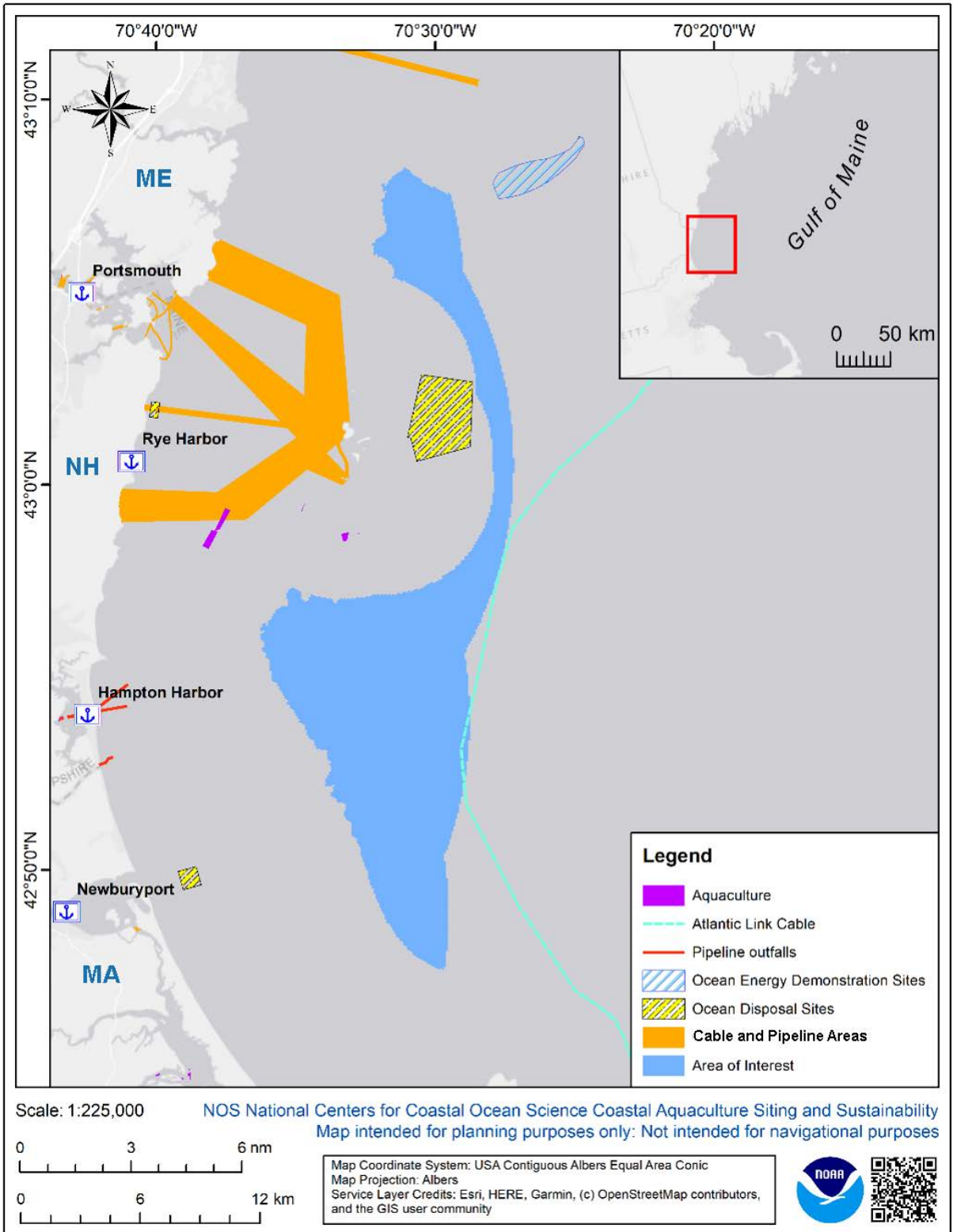


Figure 7. Characterization of industrial and energy infrastructure in and around the AOI. Pipeline outfall structures, cable and pipeline areas, wind energy planning and lease areas, an ocean-energy demonstration project, existing aquaculture, ocean disposal sites, and submarine cables were all considered. The Atlantic Link Cable route intersects with a small portion of the AOI.

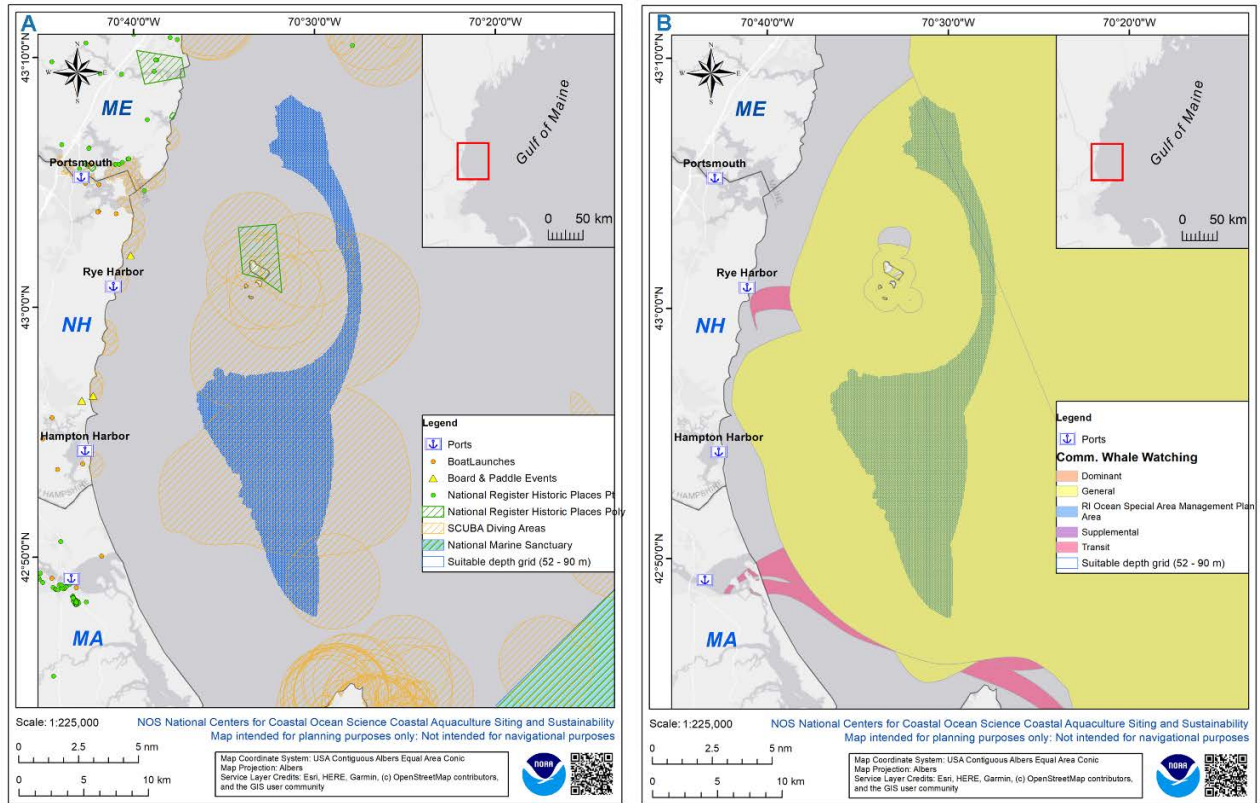


Figure 8. (A) Recreational activities considered in the AOI ocean neighborhood characterization. Based on the data, the AOI intersects with SCUBA diving activities. (B) Commercial whale watching activities also occur within the AOI ocean neighborhood.

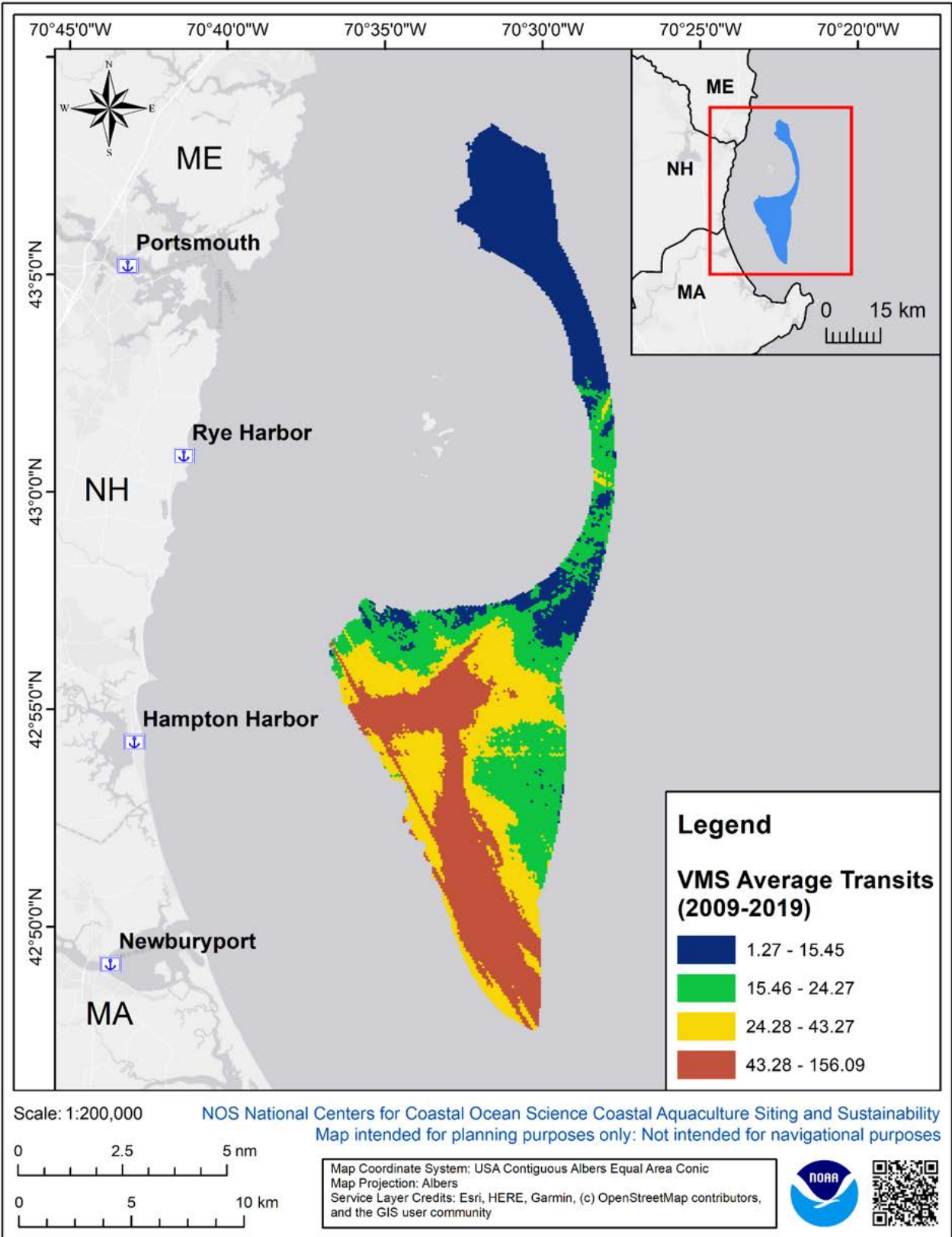


Figure 9. Mean Vessel Monitoring System (VMS) fishing vessel transits for the eleven year period from 2009 – 2019. Categories classified by the 25%, 50%, and 75% quartiles in the data.

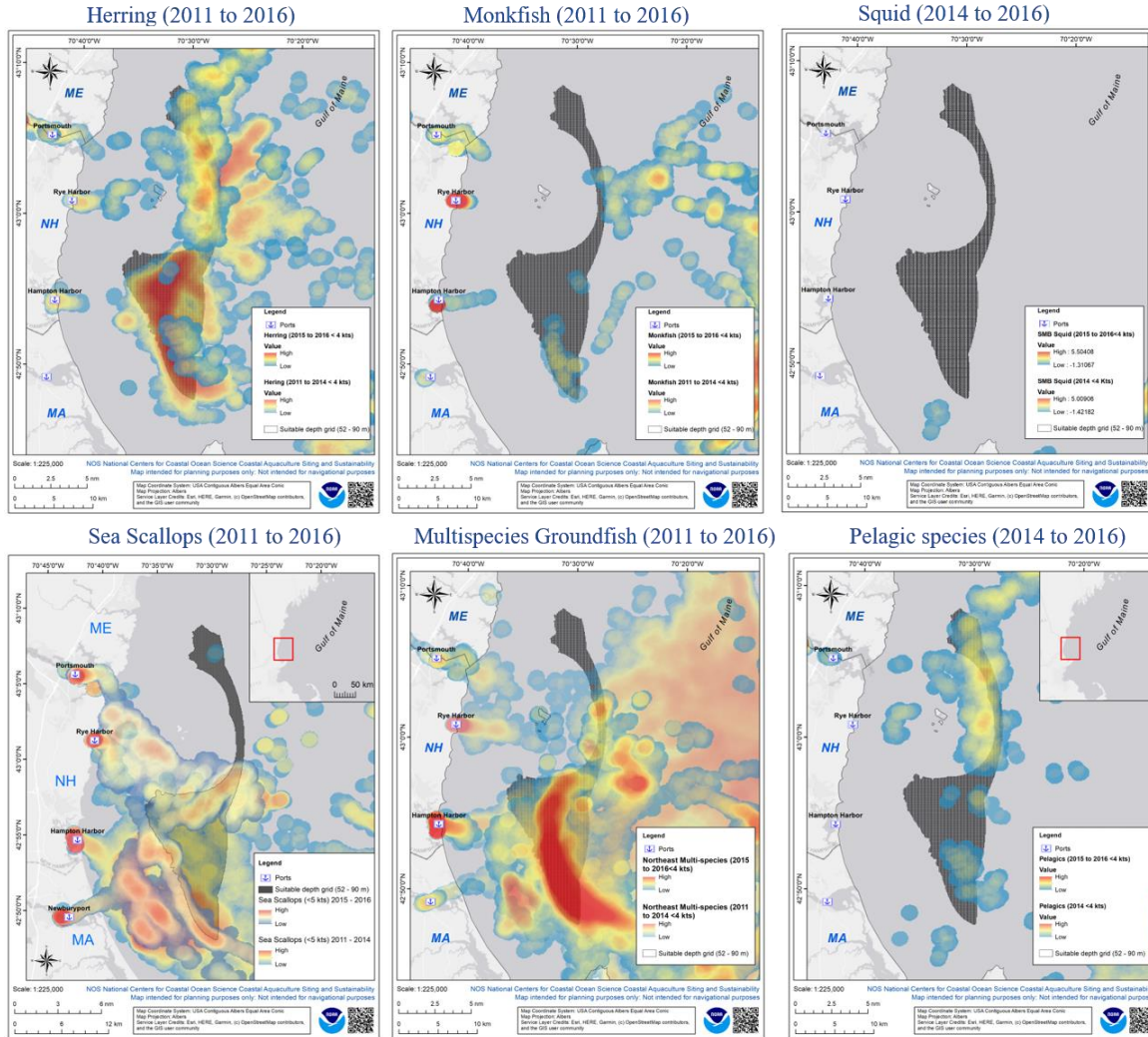


Figure 10 (A - F). Generalized Vessel Monitoring System (VMS) data (NEOD 2018) for Herring (2011 – 2016), Monkfish (2011-2016), squid from the Squid-Mackerel- Butterfish complex, Sea Scallops (2011- 2016), and pelagic species (2014- 2016). Data indicated low surf clam fishing in the area based on the data examined. The absence of data does not indicate this type of fishing does not occur here, but rather data may not have been available for examination, or that that type of activity was not attributed to the AOI during the temporal period assessed.

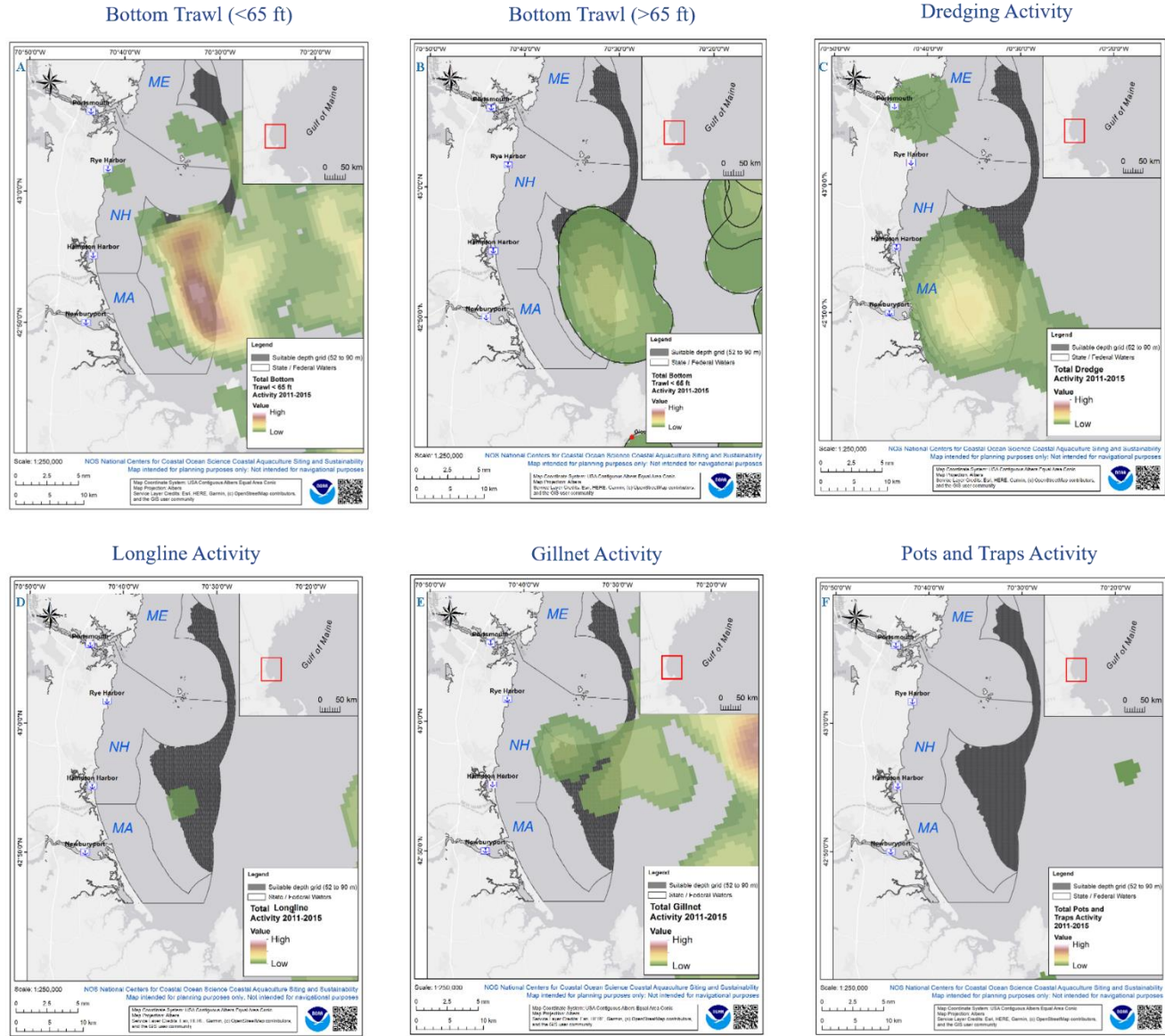


Figure 11 (A - F). Generalized data using Vessel Trip Reports (VTR) to show different fishing gear types and effort over time.²⁷ These heat maps indicating effort (green is lower effort, while red is higher effort) were then overlaid (using the web service from Northeast Ocean Data) with the AOI to determine where the largest areas of usage for these gears occurred within the AOI. The absence of data does not indicate this type of fishing does not occur here, but rather data may not have been available for examination, or that that type of gear was not attributed to the AOI during the temporal period assessed.

²⁷ See https://s3.amazonaws.com/nefmc.org/eVTR_Fwk_document_Final_3_4_2020.pdf for more information

Table 8. Cetacean abundance estimates (10 km x 10 km grid cells) and relative overlap with the AOI.

Cetacean Species with Density data (10 km x 10 km grid)	Relative Overlap of species density with AOI
Atlantic Spotted Dolphin	low
Atlantic white-sided Dolphin	low
Beaked Whale	low
Blue Whale	low
False Killer Whale	low
Clymene Dolphin	low
Bottlenose Dolphin	low
Bryde's Whale	low
Fin whales	low to moderately low
Fraser's Dolphin	low
Harbor Porpoise	low to moderate
Humpback Whale	low to moderately low
Killer Whale	low
Kogia Whale	low
Melon-headed Whale	low
Minke Whale	low to moderately low
North Atlantic Right Whale	low
Pantropical Spotted Dolphin	low
Northern Bottlenose Whale	low
Pilot Whale	low
Risso's Dolphin	low
Short-beaked Common Dolphin	low
Rough-toothed Dolphin	low
Sei Whale	low
Sperm Whale	low
Spinner Dolphin	low
Striped Dolphin	low
White-beaked Dolphin	low

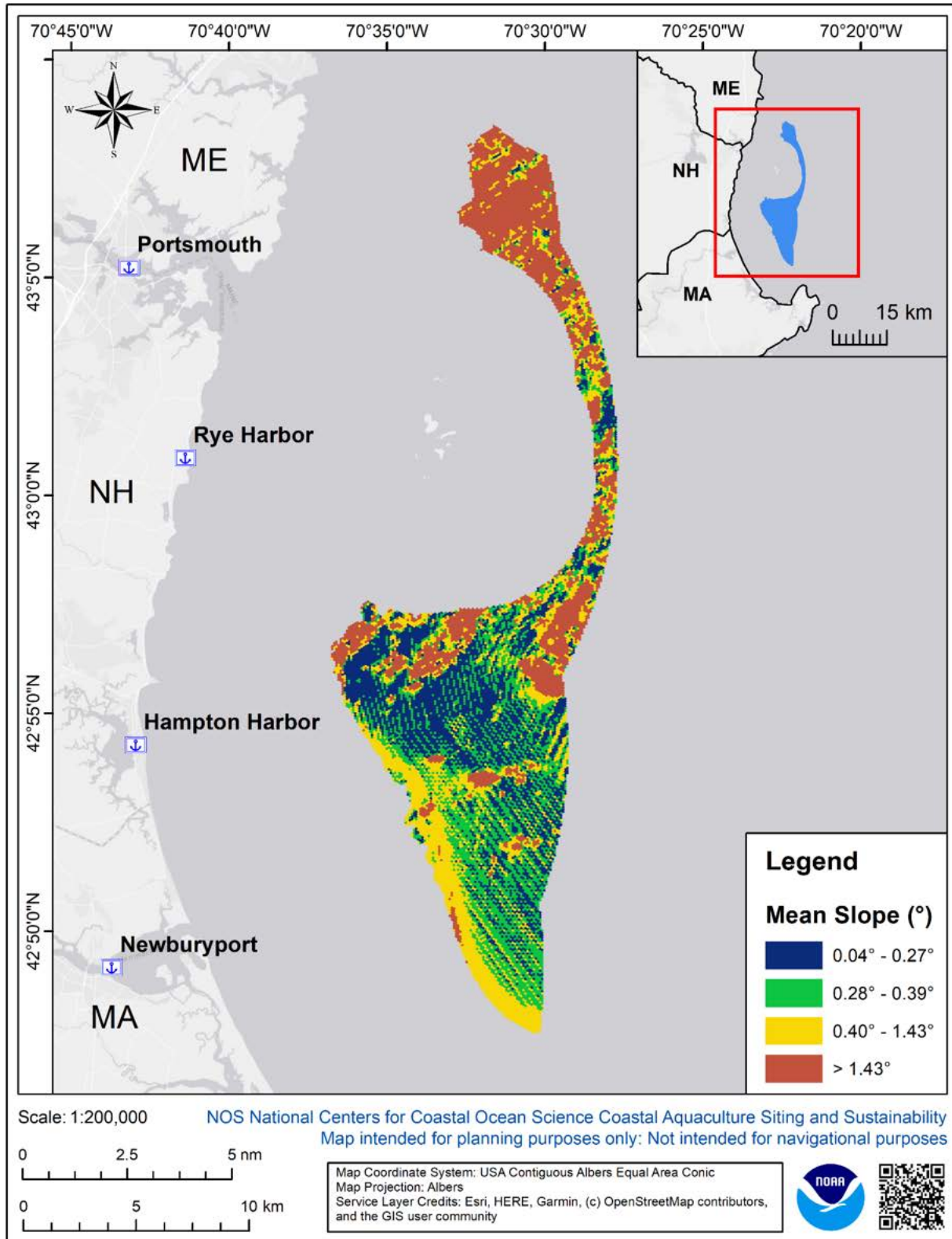


Figure 12. Mean slope (°) of each 1-ha grid cell, with categorical breakdown based on the 25%, 50% and 75% quartiles.

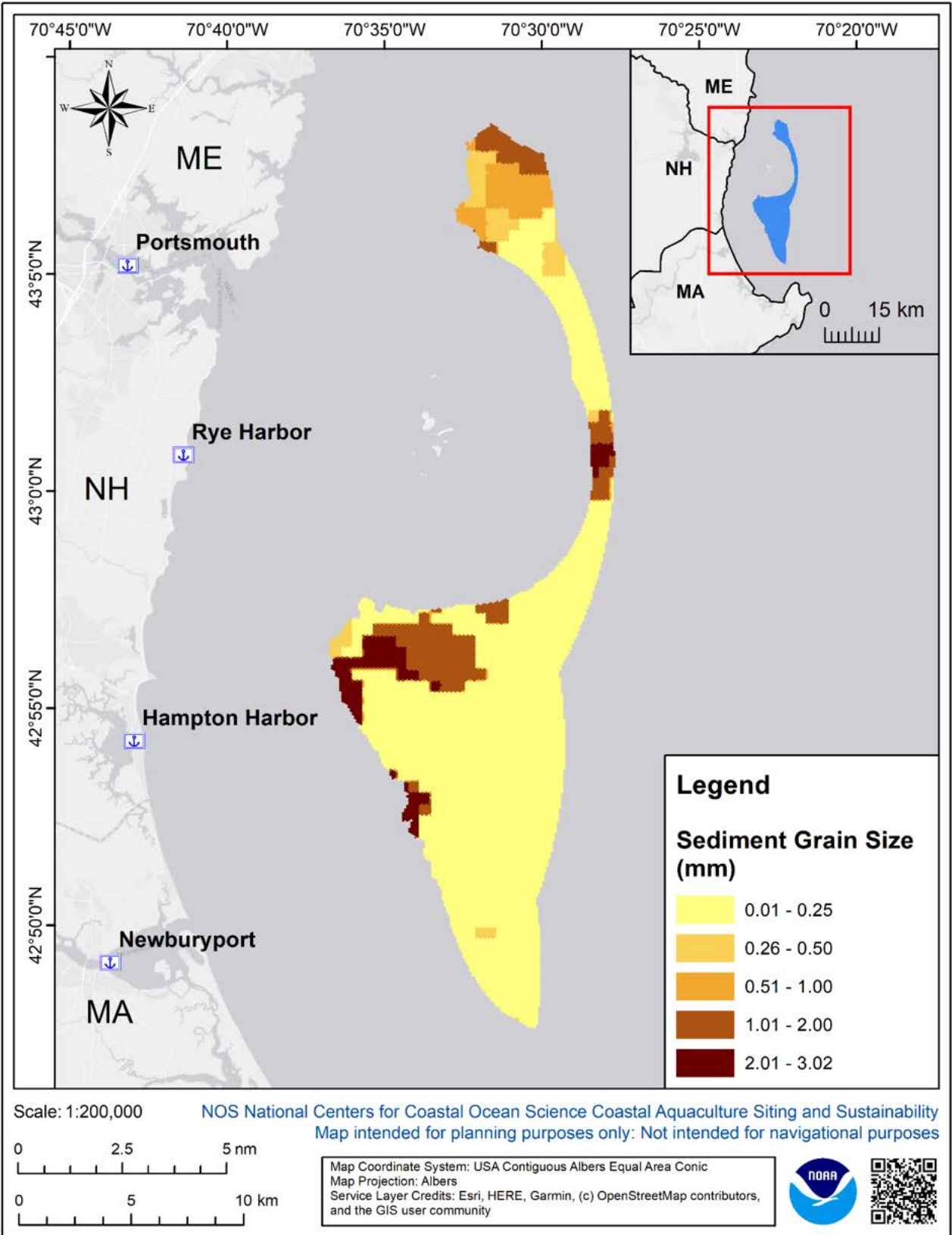


Figure 13. Mean sediment grain size (mm) for each 1-ha cell within the Area of Interest.

Relative Suitability Results

The relative suitability analysis LISA analysis identified the Center to Southern parts of the AOI as having locations with the highest suitability for aquaculture (Figure 14A). The Northern Section of the AOI contained some areas shallower than 52-m, numerous areas of high slope, and increased AIS fishing vessel transits reflecting in lower suitability scores. A large section in the center and Southwest area of the AOI were also considered unsuitable because of high VMS activity. The cluster analysis identified four sections with continuous clusters greater than 265 acres of High-High clusters (i.e. Areas where high suitability scores were located next other high suitability scores) to investigate (Figure 14B). Examination of each section using the 16-m resolution bathymetry and slope allowed for identification of locations for further evaluation. Six 265-acre locations were identified, and orientated with current speed using an approximated farm footprint provided by Innovasea, who also assisted with the orientation of the farms (Figure 15).

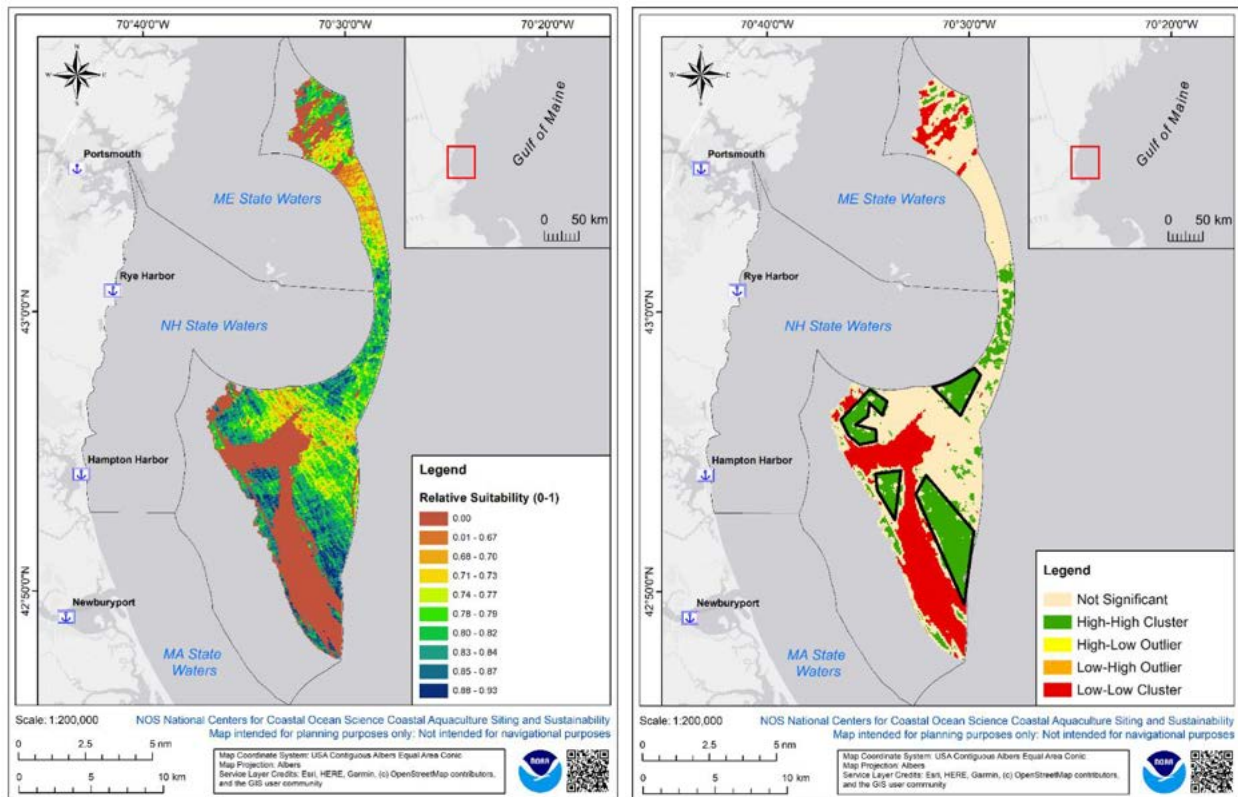


Figure 14. (A) Final site suitability output for the AOI. (B) Localized Index of Spatial Association (LISA) analysis of the relative suitability scores identified significantly high (green) and low clusters (red) of values, as well as outliers (yellow, orange).

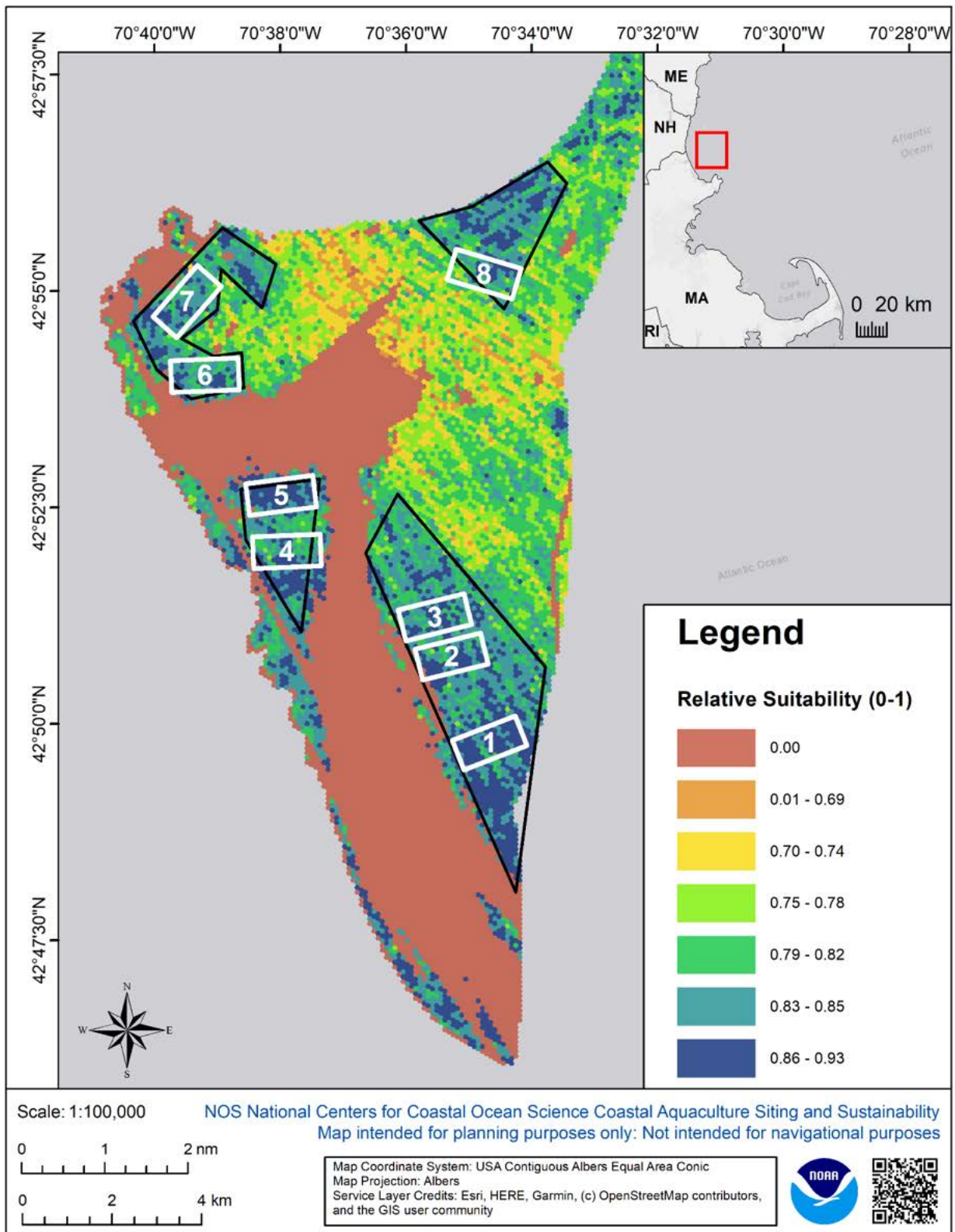


Figure 15. High-high cluster areas (black polygons) overlaying the final suitability analysis output. Within each high-high area, slope, sediment type, depth, and general oceanography were assessed to further refine the clustered areas. Eight alternative locations were determined using the aforementioned factors (white polygons).

Alternative Location Descriptions

Eight alternative areas were developed from the high-high cluster output, but due to orientation needed to the prevailing current and needed size for the proposed farm some areas do not completely overlap with the highest suitability clusters. Site-specific data and regional expertise will improve insights into potential conflicts and ensure interactions with aquaculture infrastructure are minimized. The eight alternative locations identified were compared and characterized. All meet the needs of the farm and have low conflict relative to the other locations in the AOI. All locations have depths deeper than 52 m and shallower than 90 m, and all are within 12 nm of at least one of the preferred ports. Alternative locations 4, 5, 6, and 7 are a few nautical miles closer than locations 1, 2, 3, and 8 (Table 9, Figures 16-19).

Benthic Characterization

Alternative Location 1, 2, 3, and 8 had deeper depths than the other four areas. All locations had relatively low slopes, with 4, 6, and 8 having slightly elevated slopes. Additionally, site 7 had a larger sediment grain sizes than the other sites. On site surveys should be performed to verify bathymetry, slope, and benthic sediment grain size (Table 9, Figures 16-19).

Oceanographic Conditions

The water temperature at a depth of 17 m was consistent at the eight locations, with little variation among the areas (Table 9, Figure 20-22). The maximum current speed and current speeds over 0.3 m/s varied little amongst the areas as well. However alternative 1, 2, 3, and 8 (the deeper sites) generally had a higher percent of current speeds above 0.1 m/s, indicating more water movement across these locations (Table 9, Figures 23-25). The significant wave height was consistent across all of the alternative locations, with no location having an advantage over the others. Out of 942 days examined most areas had the same number of days less than 5 m waves, while areas 1, 2, 3, and 8 had slightly less days than the nearshore sites. However, the roughest site, alternative area 8, still had 800 days out of 942 with significant wave heights less than 2 m (Table 9, Figures 26-28).

Commercial Fishing

Examining VMS transits from 2017, 2018, and part of 2019, indicates alternative 4, 5, 6, and 7 as having higher vessel transits than alternative 1, 2, 3, and 8. Overall area 8 had the least amount of transits when compared to the other areas. Additional discussions with the commercial fishing industry and fishery management groups will assist in determining locations that will have minimum conflict with the fishing industry.

AIS Vessel Traffic

Passenger and Pleasure craft / Sailing vessels, made up the majority of the traffic across all eight locations. With some fishing and other vessel transits present at all locations. Cargo and tanker traffic was almost non-existent (Table 9).

Protected Resources & EFH

All eight alternative areas are in the Section 7 consultation area for the North Atlantic Right whale and Fin whale, as well as for Green, Loggerhead, Kemp's Ridley, and Leatherback sea turtles (Table 10). Additionally, all locations are in the areas for Atlantic Sturgeon, with only alternative location 7 being in the Shortnose Sturgeon area. Consultations and inquiries should be made with regional NMFS Protected Resource and Essential Fish Habitat biologists.

Fishery Management Areas

Areas 1 and 4 had 37 interactions intersections with fisheries management areas, while, areas 2, 3, 5, 6, 7, and 8 had 38, including the Gulf of Maine Cod Spawning Protection Area (April 1 – June 30), commonly known as 'Whaleback.' Areas 1 and 4 are completely outside the 'Whaleback' protection area. Areas 1 – 4 had 93 instances where there were no interactions, and areas 2, 3, 5, 6, 7, and 8 had 94 interactions with fisheries management areas. Importantly, each management area has different implications based on the type of management area (i.e., it may not be the number of management areas, but the management measures in each area). See Appendix A, Table A-3 for a complete listing of Fishery Management Areas (FMA) – some general and some specific - in the Northeast and Mid-Atlantic and if alternative areas 1 - 8 are present in a FMA. Consultations and inquiries should be made with regional NMFS biologists to learn more about each management area and if consultation is needed. Please refer to Appendix A-6 (A) for maps of the Whaleback area and alternative areas, as well as other overlap with other management areas A-6 (B-D).

Table 9. Summary of relative metrics among the eight alternative area (1 – 8).

Parameter	Alternative Area							
	1	2	3	4	5	6	7	8
Area (Acres)	265	265	265	265	265	265	265	265
Bathymetry Range (m)	76 - 84	75 - 82	74 – 81	53 – 68	60 – 67	55 – 62	54 – 56	73 – 80
Slope Range (°)	0 – 0.9°	0 – 1°	0 – 0.8°	0 – 1.3°	0 – 0.6°	0 – 1.2°	0 – 0.8°	0 – 2.7°
Mean Sediment grain size TNC (mm)	0.06	0.04	0.04	0.11	0.13	0.22	1.79	0.06
Temperature (°C) at 17 m Range (2017-2018)	3.8-16.5	3.7-16.5	3.7-16.5	3.6-16.6	3.6-16.6	3.6-16.5	3.6-16.3	3.6-16.4
Temperature at 17 m (% of hours 2017-2018 between 10-16 °C)	37.4%	37.3%	37.3%	36.9%	36.9%	36.6%	36.2%	35.9%
Current Speed at 17 m Max (m/s)	0.47	0.47	0.46	0.42	0.43	0.43	0.42	0.44
Current Speed at 17 m (% of hours 2017-2018 >0.3 m/s)	0.6%	0.7%	0.6%	0.5%	0.6%	0.7%	0.6%	0.8%
Current Speed at 17 m (% of hours 2017-2018 >0.1 m/s)	40.9%	40.8%	39.5%	35.3%	35.8%	32.9%	30.8%	39.8%
Max Significant Wave Height (m)	7.5	7.5	7.4	7.3	7.3	7.0	6.9	7.5
Significant Wave Height # of days 20170101-20190731 < 5m (Out of a possible 942 days)	925	925	925	926	926	928	930	925
Significant Wave Height # of days 20170101-20190731 < 2m (Out of a possible 942 days)	806	806	807	819	818	823	822	800
VMS Traffic Transits (2016)	149	123	128	90	99	111	69	147
VMS Traffic Transits (2017)	699	656	628	1361	1226	1280	1241	296
VMS Traffic Transits (2018)	1601	1521	1411	2132	1620	1444	1848	668
VMS Traffic Transits (Jan-July 2019)	786	719	677	2071	1804	1735	1720	247
AIS 2017 Other vessel transits	22	26	31	17	19	26	31	24
AIS 2017 Tug/Tow vessel transits	7	10	9	6	4	6	6	1
AIS 2017 Tanker transits	0	0	0	0	0	0	2	1
AIS 2017 Pleasure/Sailing transits	57	66	73	20	25	27	39	68
AIS 2017 Passenger transits	44	40	48	65	52	96	24	77
AIS 2017 Cargo transits	0	0	0	0	0	0	0	3
AIS 2017 Fishing transits	15	22	16	8	5	16	11	12
Unexploded Ordnance (JATO racks and associated debris)	No	No	No	Yes	Yes	Yes	Yes	Yes
Distance to Hampton Harbor (nm)	9.8	9.1	8.8	6.9	6.8	6.1	6.2	9.7
Distance to Rye Harbor (nm)	12.8	11.7	11.2	9.5	8.9	7.2	6.4	9.2
Cod Spawning Whaleback	No	Yes	Yes	No	Yes	Yes	Yes	Yes

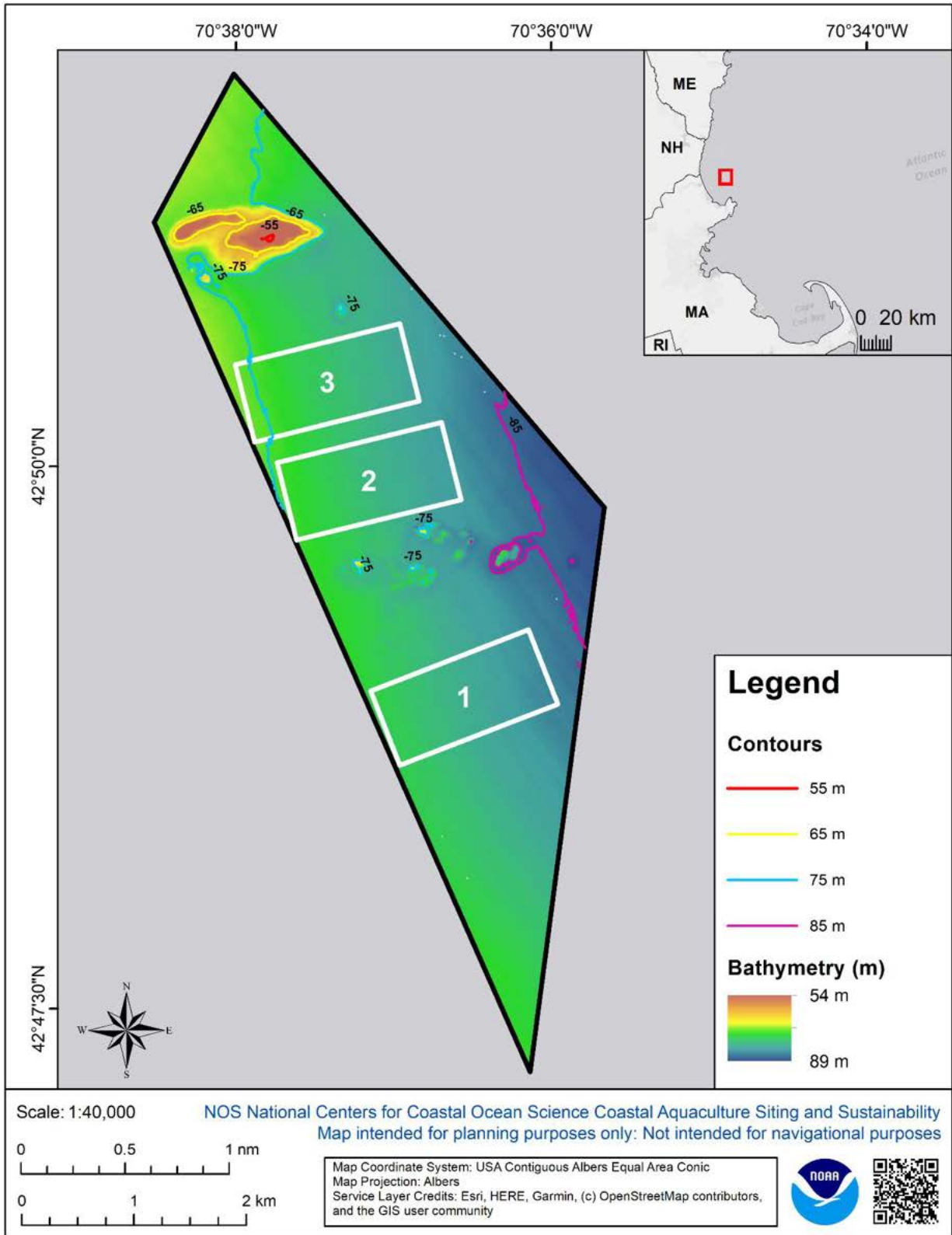


Figure 16. Alternative areas 1, 2, and 3 are located in relatively flat areas ranging in depth from 74 to 84 m depth.

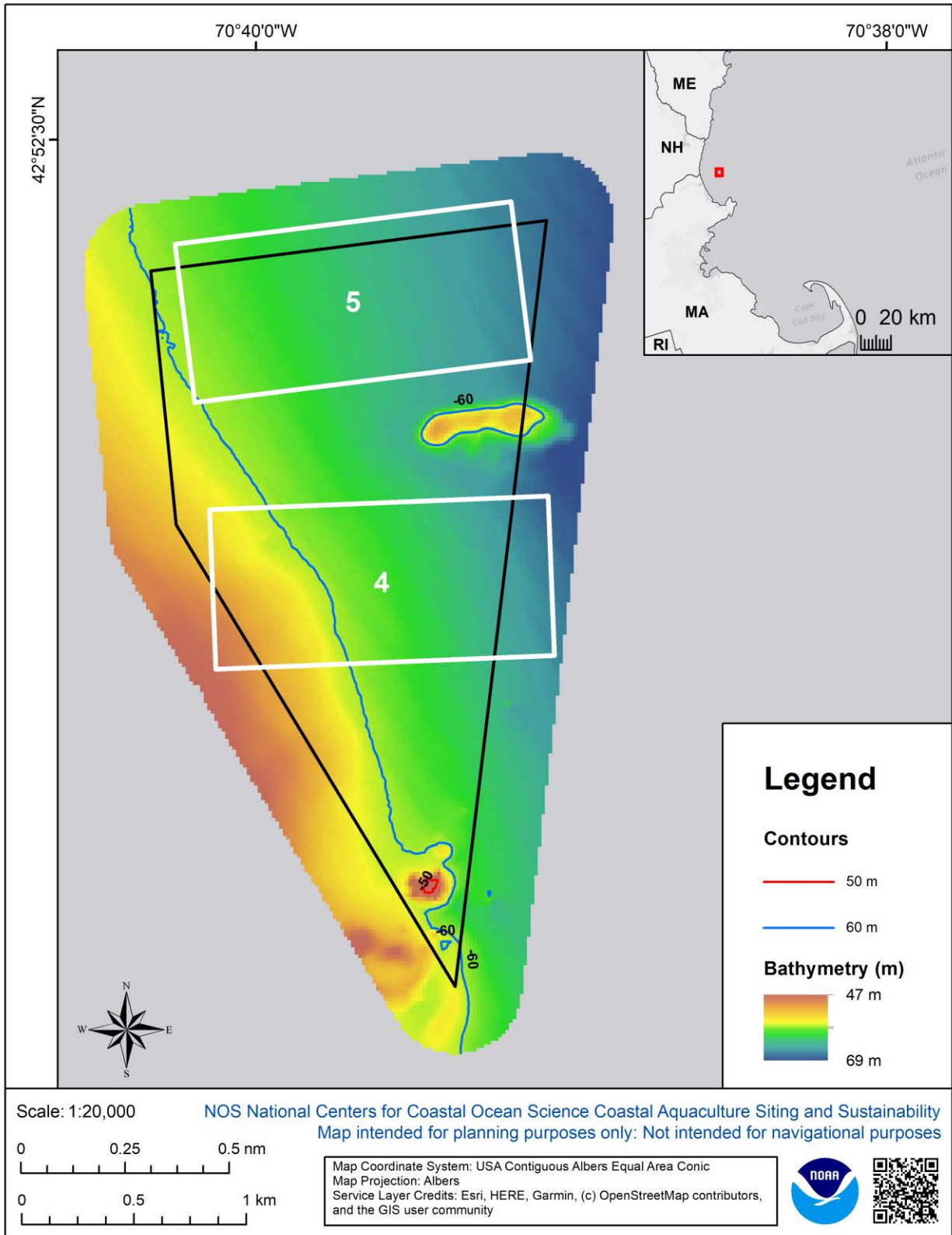


Figure 17. Alternative area 4 has a more dramatic depths ranging from 53 m to the west and 68 m to the east, while alternative area 5 has more consistent depth range from 60 to 67 m.

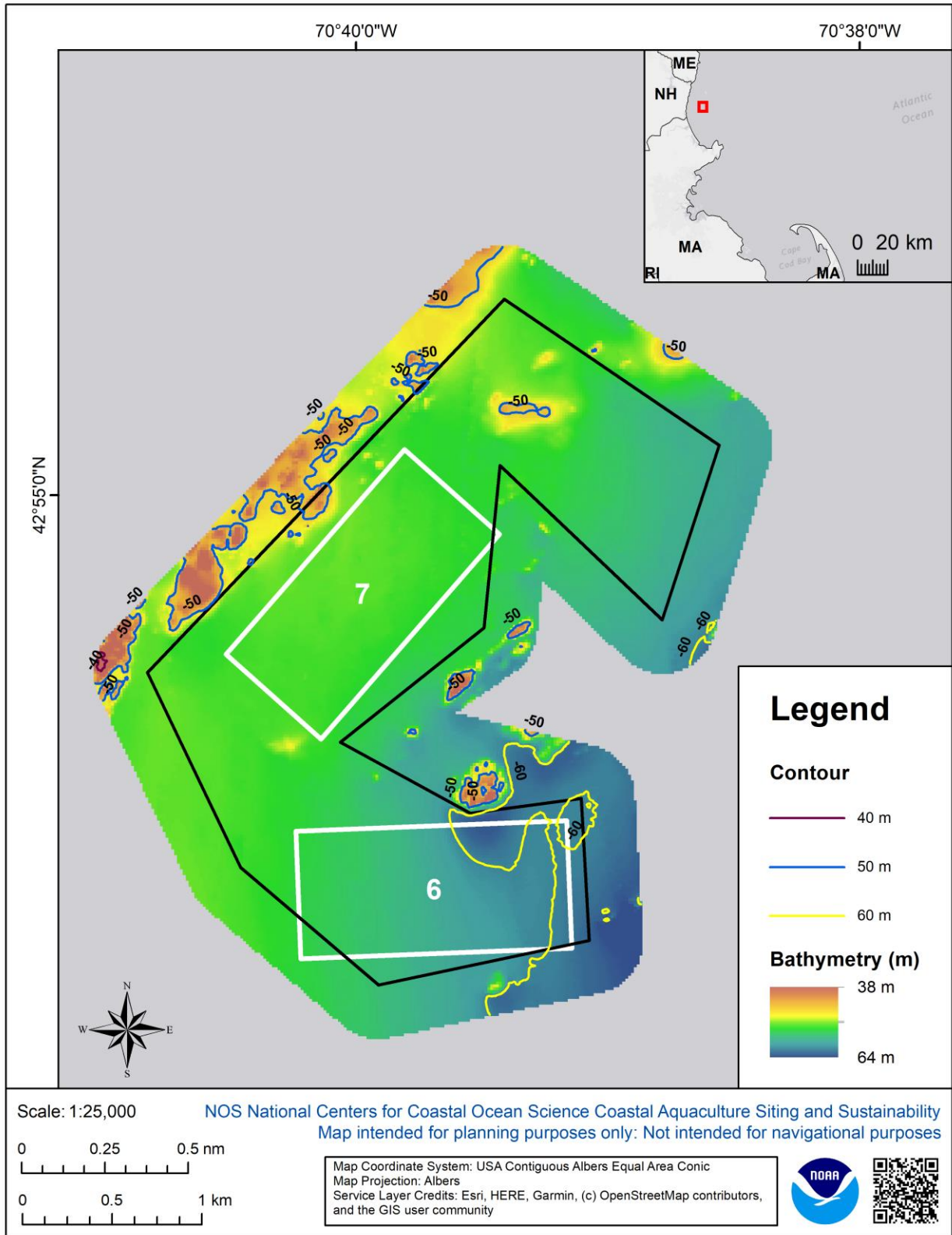


Figure 18. Alternative area 6 and 7 are located between potential hardbottom features, with area 7 having a level depth ranging from 54 to 56 m and area 6 having a greater depth range from 55 to 62 m.

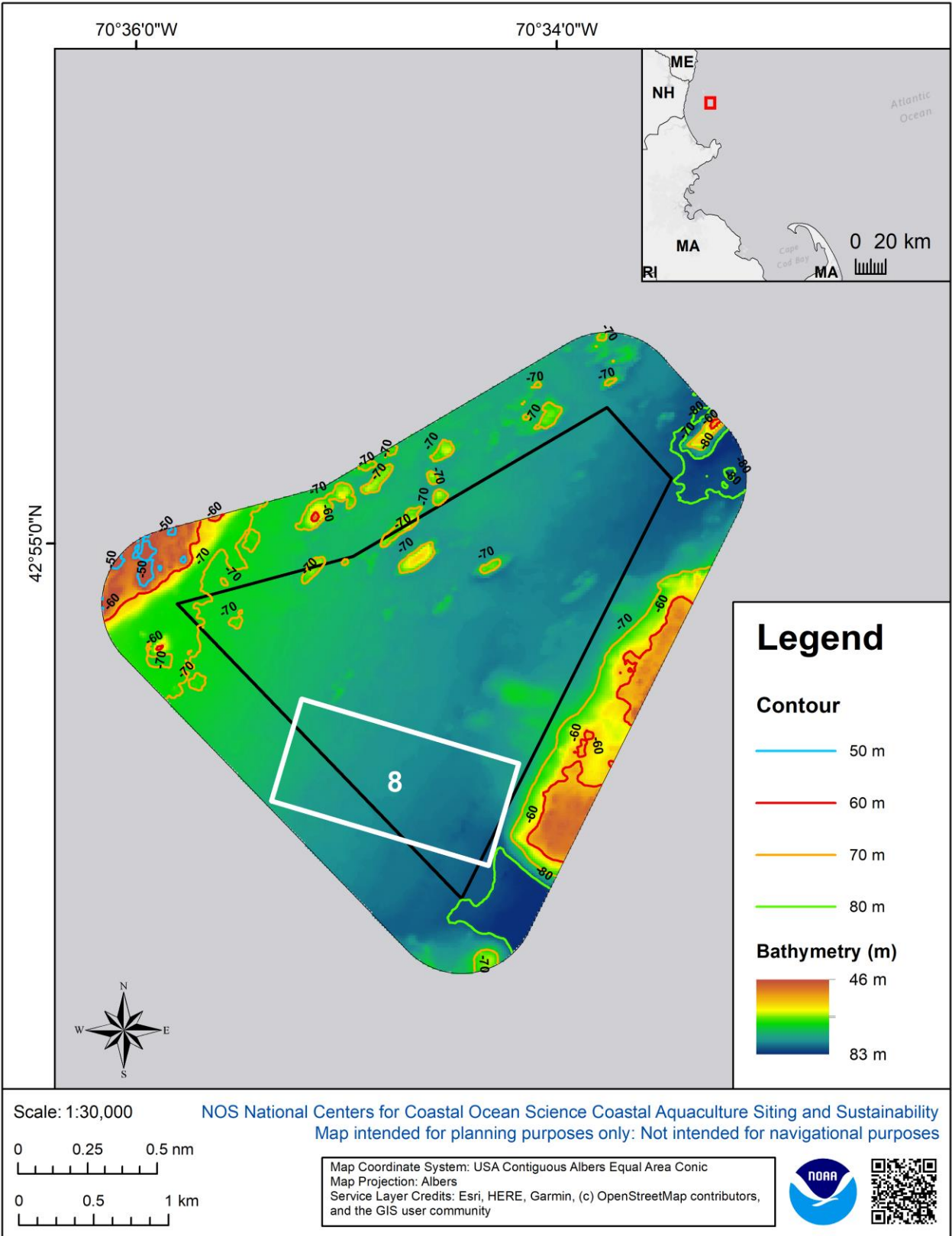


Figure 19. Alternative area 8 is located in a deeper waters ranging from 73 to 80 m.

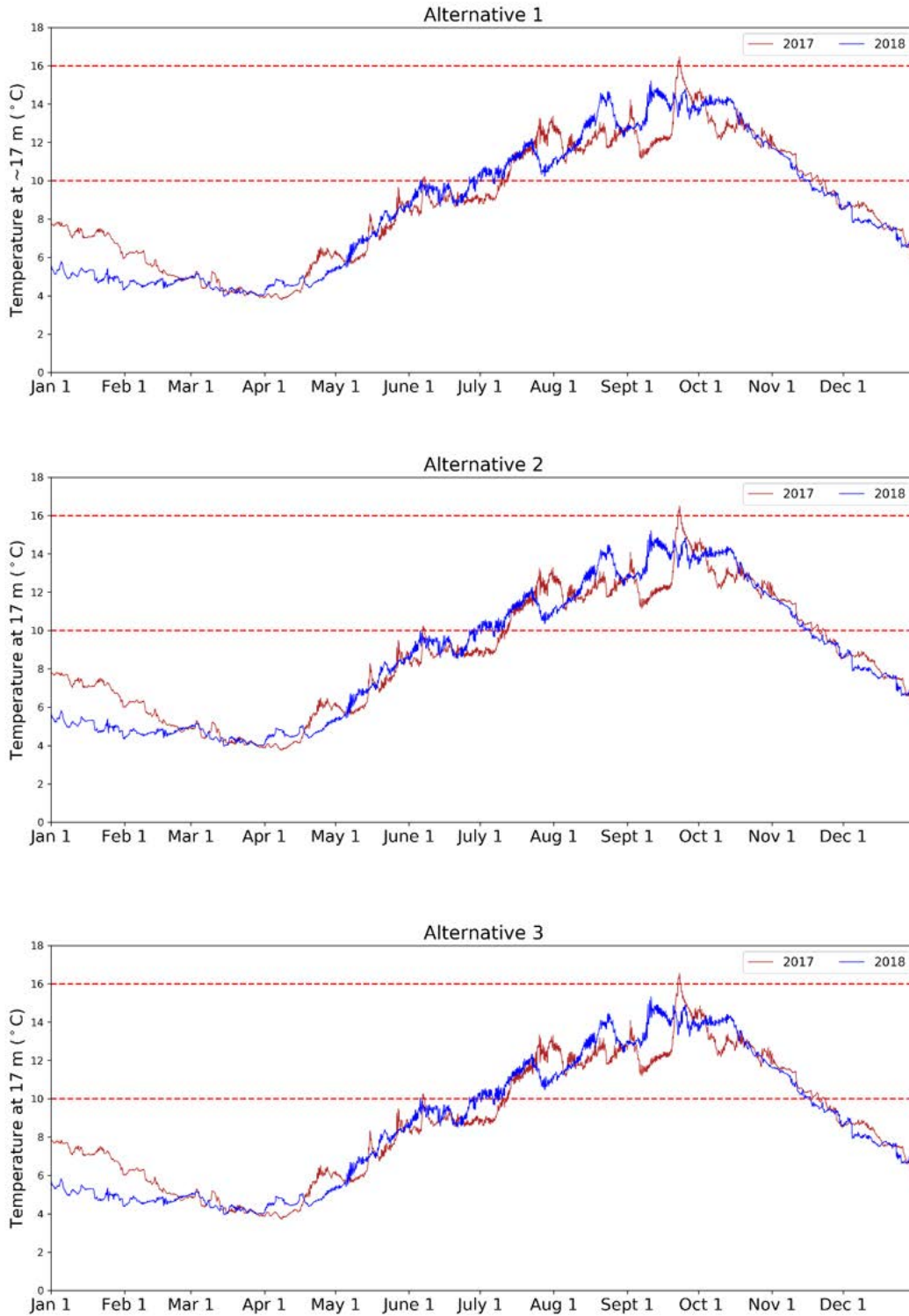


Figure 20. Hourly water temperature at 17 m for alternative area 1, 2, and 3 for 2017-2018. Red dotted lines indicate ideal temperature range.

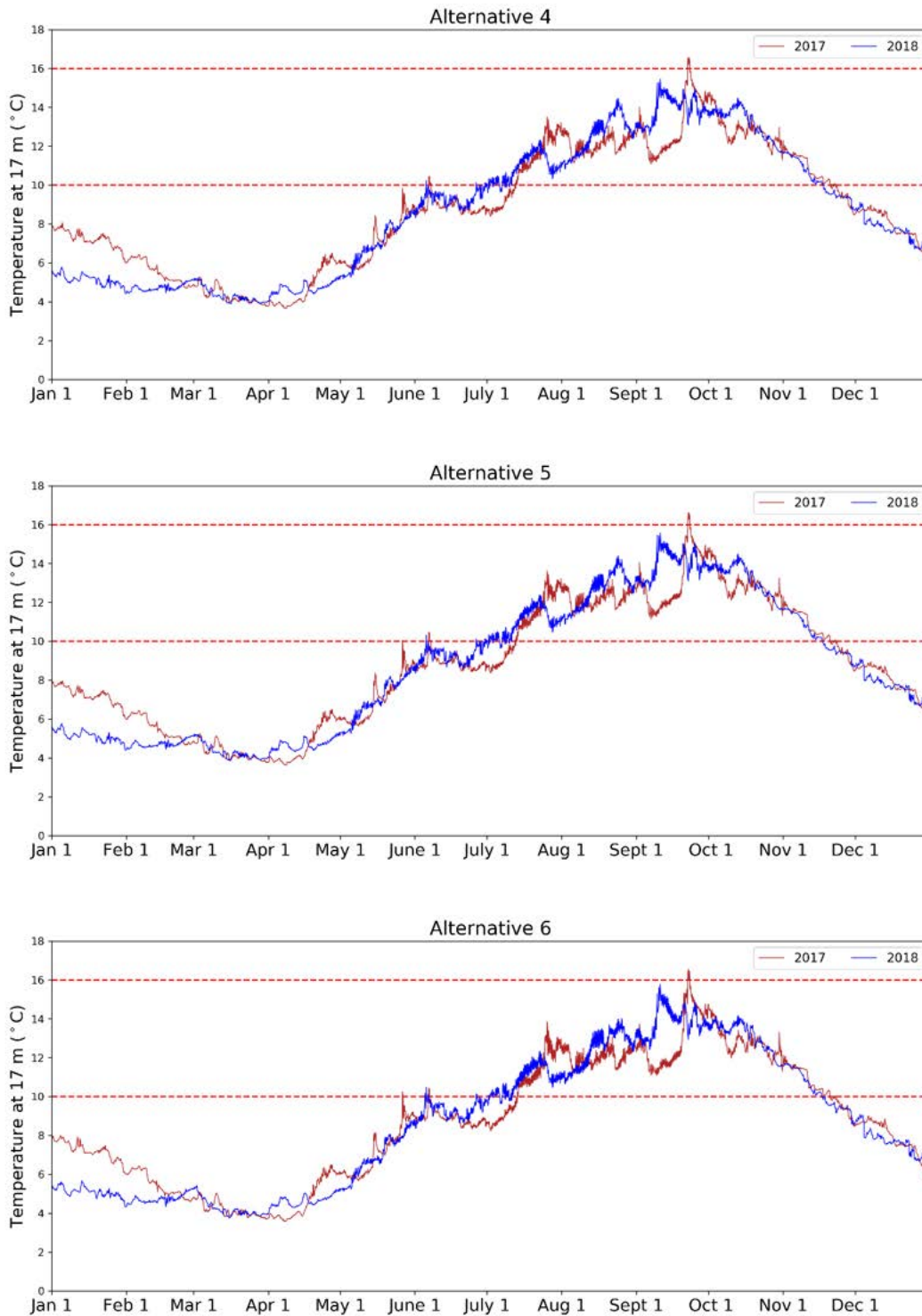


Figure 21. Hourly water temperature at 17 m for alternative area 4, 5, and 6 for 2017-2018. Red dotted lines indicate ideal temperature range.

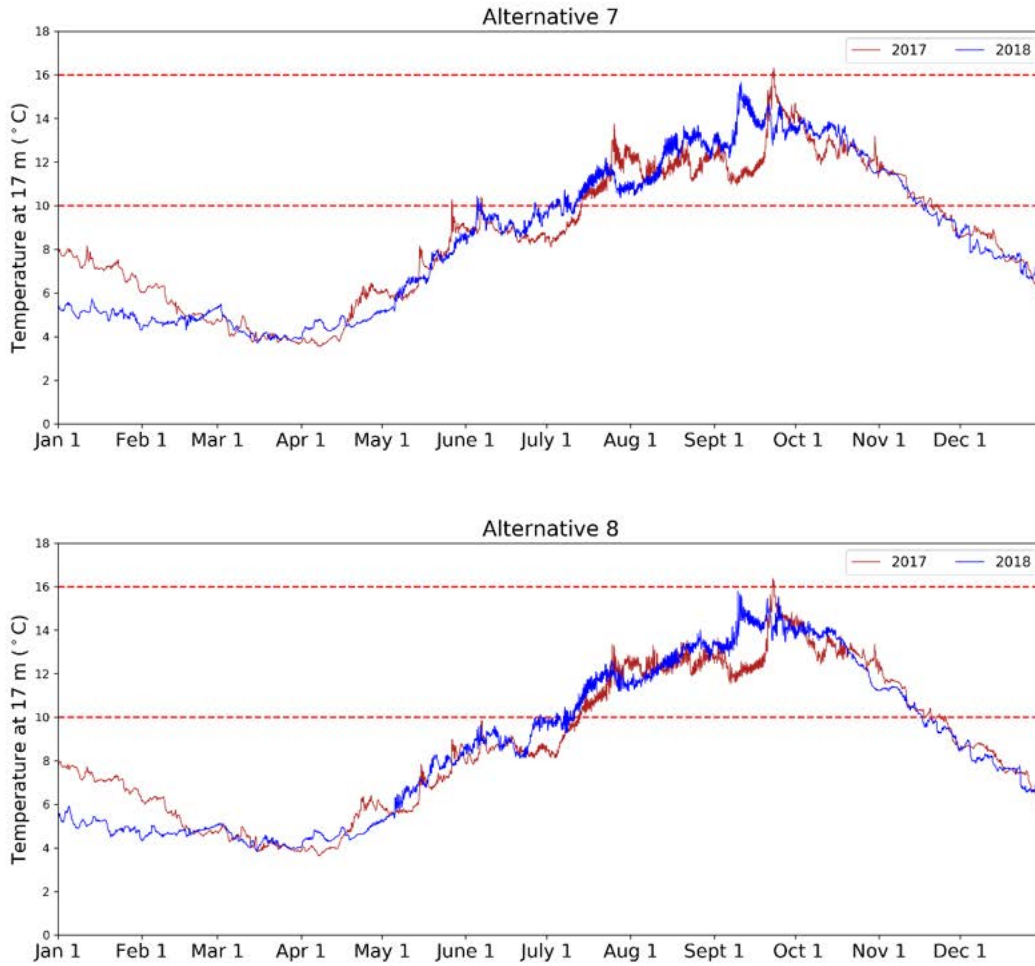


Figure 22. Hourly water temperature at 17 m for alternative area 7 and 8 for 2017-2018. Red dotted lines indicate ideal temperature range.

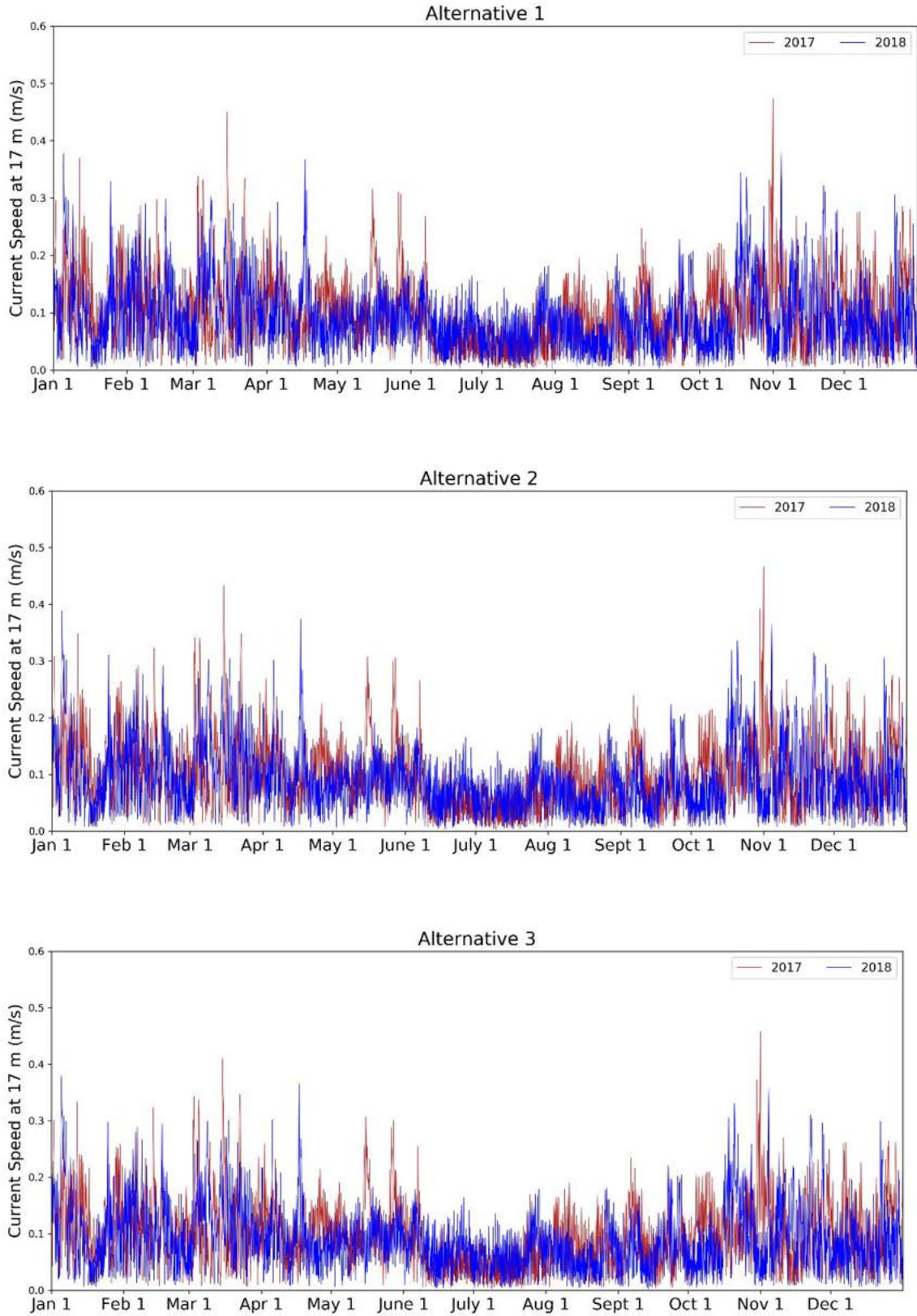


Figure 23. Hourly current speeds at 17 m for alternative area 1, 2, and 3 for 2017-2018.

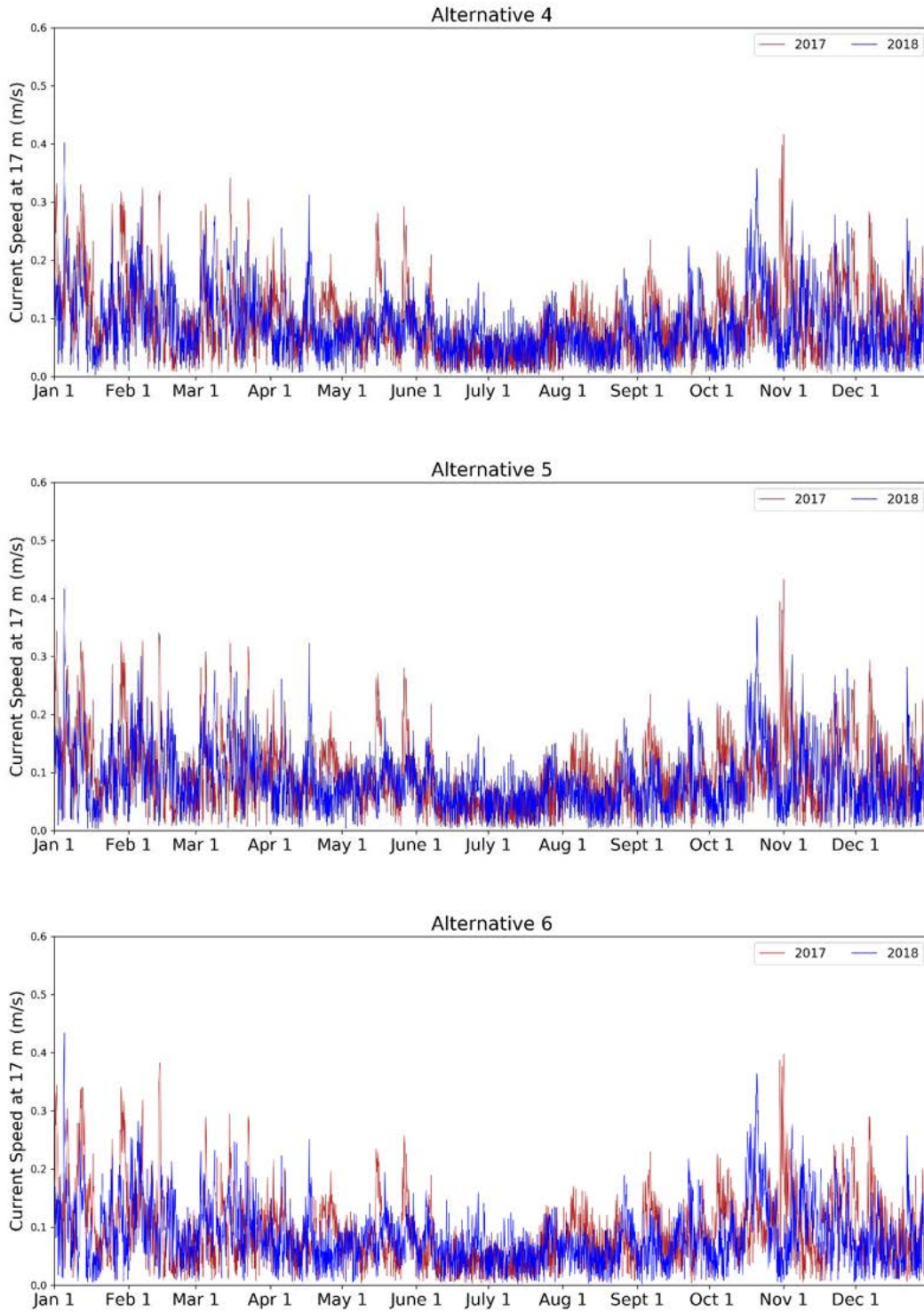


Figure 24. Hourly current speeds at 17 m for alternative area 4, 5, and 6 for 2017-2018.

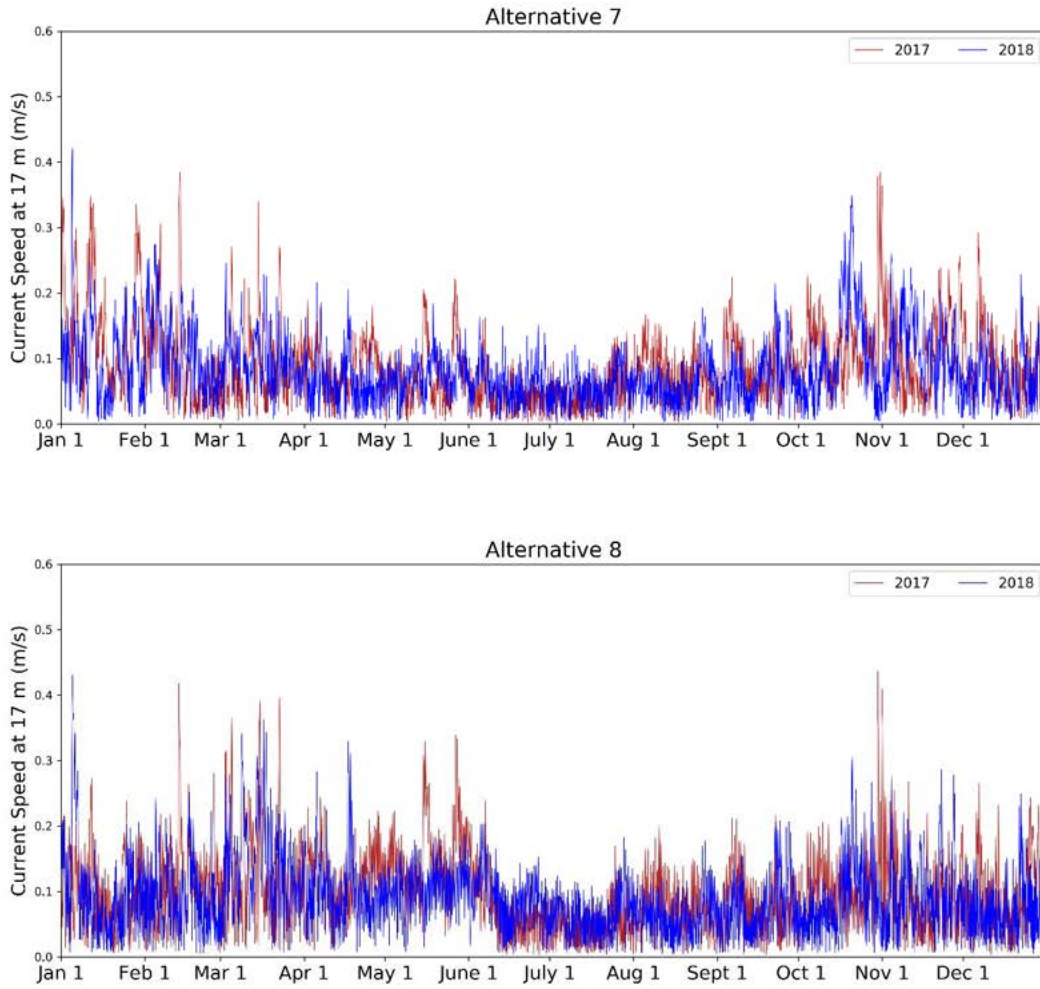


Figure 25. Hourly current speeds at 17 m for alternative area 7 and 8 for 2017-2018.

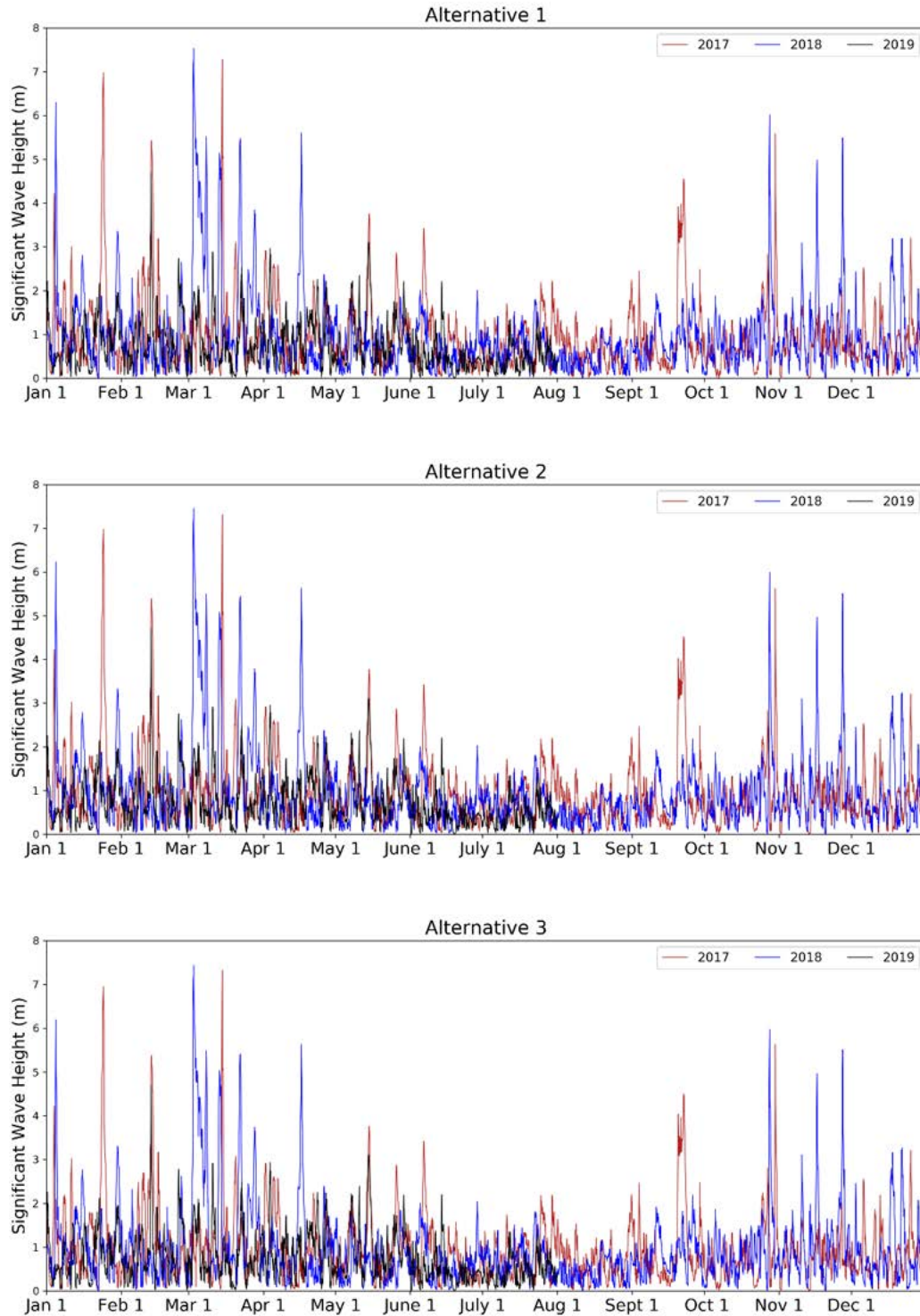


Figure 26. Hourly significant wave height (m) for alternative area 1, 2, and 3 for 2017-2018.

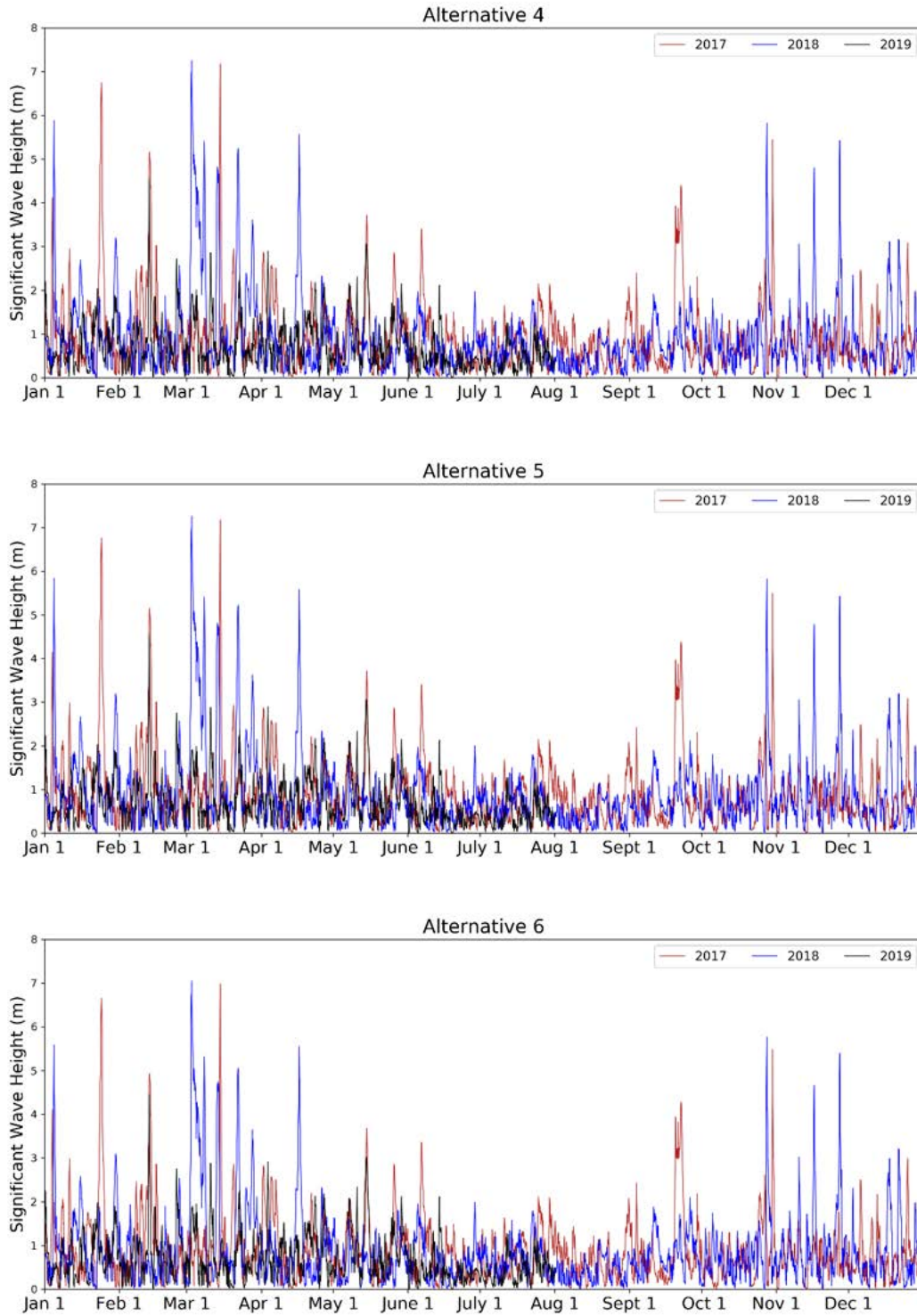


Figure 27. Hourly significant wave height (m) for alternative area 4, 5, and 6 for 2017-2018.

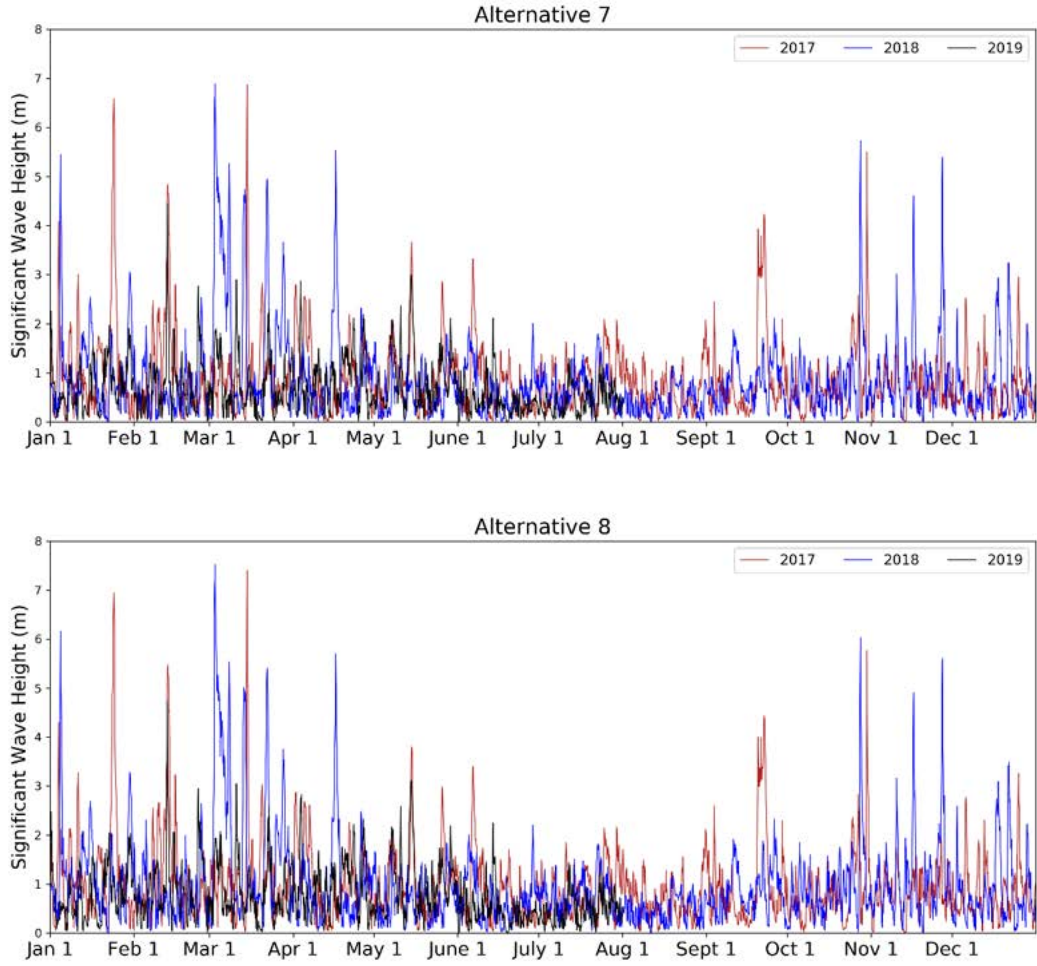


Figure 28. Hourly significant wave height (m) for alternative area 7 and 8 for 2017-2018.

Table 10. Section 7 Consultation Areas intersecting alternative locations 1-8. Section 7 Consultation area data were obtained from the NMFS Section 7 Mapper.²⁸

Section 7 Areas	Alternative Area							
	1	2	3	4	5	6	7	8
Atlantic Large Whales								
North Atlantic Right Whale	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fin Whale	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sei Whale	No	No	No	No	No	No	No	No
Sperm Whale	No	No	No	No	No	No	No	No
Blue Whale	No	No	No	No	No	No	No	No
Sea Turtles								
Green Sea Turtle	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loggerhead Sea Turtle	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kemp's Ridley Sea Turtle	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Leatherback Sea Turtle	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ESA Fisheries Species								
Atlantic Sturgeon	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shortnose Sturgeon (coast to 50 m)	No	No	No	No	No	No	Yes	No
Offshore Atlantic Salmon	No	No	No	No	No	No	No	No

Conclusions

This analysis identified a number of considerations for siting marine aquaculture in the AOI. Two of the major considerations within this ocean neighborhood that need to be explored further are the commercial fishing industry (e.g., Atlantic Herring, multispecies groundfish fisheries), fisheries management areas and managed EFH species (e.g., Cod Spawning Protection Area –Whaleback), and the protected resource community, regarding marine mammals (e.g., North Atlantic Right Whale), sea turtle species (e.g., Loggerhead Sea Turtle), and ESA listed fish species (e.g., Atlantic Sturgeon). The eight alternative locations meet the general requirements for the farm design, with further evaluation and in site validation performed to ensure a location's compatibility with marine aquaculture.

²⁸ <https://www.fisheries.noaa.gov/resource/map/greater-atlantic-region-esa-section-7-mapper>

Table 11. Corner points of all eight alternate areas in decimal degrees.

Area	Longitude	Latitude
1	-70.618226	42.804568
1	-70.636675	42.803195
1	-70.637603	42.809520
1	-70.619152	42.810894
2	-70.622537	42.822296
2	-70.641075	42.822661
2	-70.640895	42.829019
2	-70.622355	42.828655
3	-70.642478	42.837425
3	-70.623907	42.837124
3	-70.624102	42.830772
3	-70.642672	42.831073
4	-70.659635	42.849975
4	-70.677733	42.852995
4	-70.675762	42.859190
4	-70.657663	42.856169
5	-70.656621	42.861581
5	-70.675002	42.863469
5	-70.673751	42.869763
5	-70.655369	42.867874
6	-70.668600	42.888183
6	-70.686713	42.891230
6	-70.684743	42.897421
6	-70.666629	42.894374
7	-70.665915	42.909023
7	-70.681425	42.901521
7	-70.686181	42.906840
7	-70.670670	42.914341
8	-70.589806	42.891305
8	-70.605591	42.898447
8	-70.600971	42.903842
8	-70.585186	42.896700

Data Availability: All spatial data sets used in this analysis are available upon request. The exception being the VMS data set as this data is sensitive and not publically available.

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Appendix A: Further references for data and species in the Northeast United States

Table A-1: All data layers used for planning in the Northeast and Mid-Atlantic

Category	Dataset	Source	Source/link	Metadata link
Industry	Atlantic Link Cable	Northeast Regional Planning Body (RPB) Restoration Subcommittee	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/AtlanticLinkCable.pdf
Industry	Cobscook Bay OCGEN Power Project	NOAA OCM/BOEM	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/MarineHydrokineticProjects.pdf
Industry	Muskeget Channel Tidal Energy		http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/MarineHydrokineticProjects.pdf
Industry	Block Island Renewable Energy Zone	URI; http://seagrant.gso.uri.edu/oceansamp/	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/RenewableEnergyZone
Industry	Block Island Transmission cables	TetraTech	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/BlockIslandTransmissionCables.pdf
Industry	Block Island Turbines	Rhode Island Coastal Resources Management Council	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/BlockIslandWindFarmTurbineLocations.pdf
Industry	BOEM NY Draft WEA	BOEM	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.boem.gov/renewable-energy/state-activities/intergovernmental-renewable-energy-task-force-meeting-new-york-0
Industry	LNG pipelines	Massachusetts Office for Coastal Zone Management (CZM)	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/LNGPipelines.pdf
Industry	LNG sites	US Coast Guard Local Notice to Mariners	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/LNGsites
Industry	MA Wind Energy Areas	Massachusetts Office of Coastal Zone Management	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/moris_om_wind_energy_areas_poly

Industry	Prelim Permitted Marine Hydrokinetic Projects	BOEM	https://www.northeastoceandata.org/data-download/	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/MarineHydrokineticProjects.pdf
Industry	New England Electrical Transmission lines	NOAA Coastal Services Center	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/NewEnglandElectricalTransmissionLines.pdf
Industry	New England Electrical transmission substations	NOAA Coastal Services Center	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/NewEnglandElectricalTransmissionSubstations.pdf
Industry	ME Ocean Energy Demonstration Sites - state designated	Maine Coastal Program	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/OceanEnergyDemonstrationSites.pdf
Industry	Offshore Wind Energy Leases	BOEM	http://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure.zip	https://metadata.boem.gov/geospatial/BOEM_Wind_Planning_Areas.xml
Industry	Uni. Maine Aqua Ventus Project Proposed Turbine Locations	University of Maine	https://geo.nyu.edu/catalog/stanford-tm731mw2390	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/MaineAquaVentusProjectProposedTurbineLocations.pdf
Industry	Offshore Wind Technology Depths Zones	BOEM	https://www.arcgis.com/home/webmap/viewer.html?url=https://coast.noaa.gov/arcgis/rest/services/MarineCadastre/OceanEnergy/MapServer/3&extent=-100,40&level=4	https://coast.noaa.gov/arcgis/rest/services/MarineCadastre/OceanEnergy/MapServer/3
Industry	Proposed turbine locations (NY)	BOEM	https://www.boem.gov/renewable-energy/state-activities/intergovernmental-renewable-energy-task-force-meeting-new-york-0	https://www.boem.gov/renewable-energy/state-activities/intergovernmental-renewable-energy-task-force-meeting-new-york-0
Industry	Shellfish Management Areas (closed, approved, conditionally approved)	Connecticut Department of Agriculture Bureau of Aquaculture (CT DA/BA), Connecticut Department of Environmental Protection (CT DEP), Massachusetts Division of Marine Fisheries (MA DMF), Massachusetts Office of Geographic Information (MassGIS), Maine Department of Marine Resources (MEDMR),	https://www.northeastoceandata.org/data-download/?data=Aquaculture	http://www.northeastoceandata.org/files/metadata/Themes/Aquaculture/ShellfishManagementAreas.pdf

		Maine Office of Geographic Information Systems (MEGIS), New Hampshire Department of Environmental Services (NHDES), New York State Department of Environmental Conservation (NYSDEC) Bureau of Marine Resources, Rhode Island Department of Environmental Management (RIDEM), Rhode Island Geographic Information Database (RIGIS), US Food and Drug Administration National Shellfish Sanitation Program (NSSP), US Census		
Industry	Wind Planning Areas*	BOEM	https://www.boem.gov/BOEM-Renewable-Energy-Shapefiles.zip	https://metadata.boem.gov/geospatial/BOEM_Wind_Planning_Areas.xml
Industry	Renewable Energy Leases	BOEM	https://www.boem.gov/BOEM-Renewable-Energy-Shapefiles.zip	https://www.boem.gov/sites/default/files/renewable-energy-program/Mapping-and-Data/BOEM_Lease_Areas_12_15_2016_metadata.pdf
Industry	Aquaculture	Maine Department of Marine Resources Aquaculture Lease Records <ul style="list-style-type: none"> ▪ New Hampshire Department of Environmental Services Coastal Resources Program ▪ New Hampshire Department of Environmental Services Shellfish Program ▪ New Hampshire Fish and Game Department ▪ Massachusetts Division of Marine Fisheries ▪ Connecticut Department of Agriculture Bureau of Aquaculture and Laboratory Services ▪ Connecticut Department of Energy and Environmental Protection 	https://www.northeastoceandata.org/data-download/?data=Aquaculture	https://www.northeastoceandata.org/files/metadata/Themes/Aquaculture/Aquaculture.pdf

		<ul style="list-style-type: none"> ▪ Connecticut SeaGrant ▪ Suffolk County (NY) Department of Economic Development and Planning ▪ Rhode Island Coastal Resources Management Council ▪ Rhode Island Department of Environmental Management Division of Fish and Wildlife, Marine Fisheries Section ▪ Northeastern Massachusetts Aquaculture Center (NEMAC) at Cat Cove Marine Laboratory, Salem State University 		
Industry	cable and pipeline areas	NOAA	https://www.northeastoceandata.org/data-download/?data=Energy%20and%20Infrastructure	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/CableAndPipelineAreas
Industry	Ocean Disposal Sites (Active and inactive)	EPA	ftp://ftp.coast.noaa.gov/pub/MSP/OceanDisposalSites.zip	https://inport.nmfs.noaa.gov/inport/item/54193
Industry	Pipelines (active and inactive)	BSEE	https://www.data.bsee.gov/Mapping/Files/ppl_arcs.zip ; https://www.boem.gov/PC-pipe.zip	https://metadata.boem.gov/geospatial/OC_Spipelines-GOMR-NAD27.xml ; https://metadata.boem.gov/geospatial/pc_pipe.xml
Industry or navigation	Principal Ports	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/PrincipalPorts.zip	https://inport.nmfs.noaa.gov/inport/item/56124
Industry	submarine cables* (active & inactive)	NOAA Coastal Services Center	https://www.northeastoceandata.org/data-download/?data=Energy%20and%20Infrastructure	https://www.northeastoceandata.org/files/metadata/Themes/EnergyAndInfrastructure/SubmarineCables
Industry	NASCA submarine cables	NOAA Coastal Services Center	https://www.northeastoceandata.org/data/data-download/?data=Energy+and%20Infrastructure	https://coast.noaa.gov/arcgis/rest/services/MarineCadastre/NASCASubmarineCables/MapServer/undefined
Industry	South Fork Wind Farm	BOEM	https://www.northeastoceandata.org/data-download/?data=Energy%20and%20Infrastructure	https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NY/SFWF_COP_2019-05-24.pdf
Industry	South Fork Wind Farm Proposed Project Envelope	BOEM	https://www.northeastoceandata.org/data-download/?data=Energy%20and%20Infrastructure	https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NY/SFWF_COP_2019-05-24.pdf

Industry	South Fork Wind Farm Proposed Cable route	BOEM	https://www.northeastoceandata.org/data-download/?data=Energy%20and%20Infrastructure	https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NY/SFWF_COP_2019-05-24.pdf
Industry	Vineyard Wind Farm Project Envelope	BOEM	https://www.northeastoceandata.org/data/data-download/?data=Energy+and%20Infrastructure	https://www.boem.gov/renewable-energy/state-activities/vineyard-wind-construction-and-operations-plan-cop-volume-i
Industry	Vineyard Wind Farm Proposed cable route	BOEM	https://www.northeastoceandata.org/data/data-download/?data=Energy+and%20Infrastructure	https://www.boem.gov/renewable-energy/state-activities/vineyard-wind-construction-and-operations-plan-cop-volume-i
Industry	Isle of Shoals Disposal Site North (Proposed)	USEPA	https://www.northeastoceandata.org/data-download/?data=Marine%20Transportation	https://www.epa.gov/sites/production/files/2019-09/documents/epar01ow20190521_iosn_odmnds_draft_ea_with_appendices_final_8.29.19.pdf
Industry	wind energy areas	BOEM	https://www.boem.gov/BOEM-Renewable-Energy-Geodatabase.zip	https://metadata.boem.gov/geospatial/BOEM_Wind_Planning_Areas.xml
Industry	Substations	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/Substations.zip	https://inport.nmfs.noaa.gov/inport/item/54404
Industry	Oil and Gas Platforms (active/inactive)	BOEM	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/OilandGasPlatforms.zip	https://inport.nmfs.noaa.gov/inport/item/54390
Industry	Oil and Gas Wells	BOEM	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/OilandGasWells.zip	https://inport.nmfs.noaa.gov/inport/item/54392
Industry	Oil Spills	NOAA	https://incidentnews.noaa.gov/raw/index	https://www.ncei.noaa.gov/maps/gulf-data-atlas/Metadata/ISO/ORR_OilSpills_IncidentNews.html
Industry	wastewater treatment outfalls*	EPA	Talk to DANIEL MARTIN	https://edg.epa.gov/metadata/catalog/search/resource/details.page?uuid=%7B0A2C3F02-3D68-4556-8A87-B288C318E0EE%7D
Industry	BOEM Active Lease Blocks	BOEM	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-and-Data/Alaska/AKUpdate.aspx ; gis.boem.gov/arcgis/rest/services/BOEM_BSE/POC_Layers/MapServer/7/ ;	https://metadata.boem.gov/geospatial/GOM_Active_OG_Leases.xml ; https://metadata.boem.gov/geospatial/pac_lease.xml ; https://metadata.boem.gov/geospatial/OC_S_Alaska_Current_OilGas_Leases.xml

			https://www.data.boem.gov/Mapping/Files/actlease.zip	
Industry	BOEM OCS Lease Blocks (5, 7 and 10 year blocks)	BOEM	https://www.northeastoceandata.org/data/data-download/?data=Administrative+Boundaries	https://metadata.boem.gov/geospatial/OCS_LeaseBlocks_Atlantic_NAD83.xml
Industry	Deepwater Ports	BOEM	ftp://ftp.coast.noaa.gov/pub/MSP/DeepwaterPorts.zip	https://inport.nmfs.noaa.gov/inport/item/54192
Industry	Beach Nourishment	ASBPA;WCU	biannually	https://gim2.aptim.com/ASBPANationwideRenourishment/; http://beachnourishment.wcu.edu/
Industry	Federal sand and gravel borrow areas	BOEM	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-and-Data/Federal-Sand-n-Gravel-Lease-Borrow-Areas_gdb.aspx	https://mmis.doi.gov/boemmmis/metadata/PlanningAndAdministration/LeaseAreas.xml
Industry	Sand Resource Blocks	BOEM	biannually	http://www.boem.gov/GOMR-Lease-Block-GIS/; download from MC.com
Military	Cape Cod TORPEX	US Navy Fleet Training and Testing (AFTT)	https://www.northeastoceandata.org/data/data-download/?data=National+Security	https://www.northeastoceandata.org/files/metadata/Themes/Security/NECapeCodTORPEX.pdf
Military	Military Range Complex	Navy EIMS	https://www.northeastoceandata.org/data-download/?data=National%20Security	https://www.northeastoceandata.org/files/metadata/Themes/Security/NEMilitaryRangeComplex.pdf
Military	Naval undersea warfare center	Navy EIMS	https://www.northeastoceandata.org/data-download/?data=National%20Security	https://www.northeastoceandata.org/files/metadata/Themes/Security/NENUWCDI_VNPTTestingRangeBoundary.pdf
Military	Warning areas	Navy EIMS	https://www.northeastoceandata.org/data-download/?data=National%20Security	https://www.northeastoceandata.org/files/metadata/Themes/Security/NEWarningAreas.pdf
Military	Danger and Restricted Zones	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/DangerZonesAndRestrictedAreas.zip	https://inport.nmfs.noaa.gov/inport/item/48876
Military	Special Use Airspace	Navy EIMS	ftp://ftp.coast.noaa.gov/pub/MSP/MilitaryAreas.zip	https://inport.nmfs.noaa.gov/inport/item/48898
Military	Unexploded Ordnance points	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/UnexplodedOrdnance.zip	https://inport.nmfs.noaa.gov/inport/item/54407
Military	Unexploded Ordnance polygon	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/UnexplodedOrdnance.zip	https://inport.nmfs.noaa.gov/inport/item/54407
Military	Unexploded Ordnance FUDs	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/UnexplodedOrdnance_FUDS.zip	https://inport.nmfs.noaa.gov/inport/item/54409

Military	Submarine Transit Lanes	Navy EIMS	ftp://ftp.coast.noaa.gov/pub/MSP/MilitaryAreas.zip	https://inport.nmfs.noaa.gov/inport/item/48898
Military	Military Operating Areas	Navy EIMS	ftp://ftp.coast.noaa.gov/pub/MSP/MilitaryAreas.zip	https://inport.nmfs.noaa.gov/inport/item/48898
Military	Regulated Airspace	Navy EIMS	ftp://ftp.coast.noaa.gov/pub/MSP/MilitaryAreas.zip	https://inport.nmfs.noaa.gov/inport/item/48898
Natural Resources	North Atlantic Right Whale Critical Habitat Area (foraging area Unit 1 & 2)	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/NorthAtlanticRightWhaleCriticalHabitat/NorthAtlanticRightWhaleCriticalHabitat_METADATA.pdf
Natural Resources	Long Island Sound Ecological Assessment	TNC	https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/marine/data/Pages/default.aspx	embedded in gdb layers
Natural Resources	Offshore Video Survey and Oceanographic Analysis: Georges Bank to the Chesapeake (SMAST)	Uni.of Mass, Dartmouth SMAST	https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/marine/data/Pages/default.aspx	embedded in gdb layers
Natural Resources	EFH Fish Species Biomass, core biomass area, species richness (fall) (summary product)	MDAT	http://seamap.env.duke.edu/models/mdat/	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	Forage Fish: species richness, core biomass area, biomass (fall - species richness, spring, all three)	MDAT	http://seamap.env.duke.edu/models/mdat/	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	HMS: Biomass, Core Biomass Area, Species richness (fall)	MDAT	http://seamap.env.duke.edu/models/mdat/	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	MAFMC FMPs (Core Biomass Area, Abundance, Species Richness) fall	MDAT	http://seamap.env.duke.edu/models/mdat/	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	All cetacean abundance, core abundance area, species richness	MDAT	http://portal.midatlanticocean.org/data-catalog/conservation/#layer-info-efh-species-biomass-fall3231	http://seamap.env.duke.edu/models/mdat/Mammal/MDAT_Mammal_Summary_Products_Metadata.pdf

Natural Resources	Marine Mammal Abundance, Marine mammal 5 percentile, Marine mammal 95 percentile, marine mammal coefficient of variation, marine mammal standard error)	NEFMC, MDAT	http://portal.midatlanticocean.org/data-catalog/conservation/#layer-info-efh-species-biomass-fall3232	http://seamap.env.duke.edu/models/mdat/Mammal/MDAT_Mammal_Summary_Products_Metadata.pdf
Natural Resources	Baleen Whale mid-Atlantic scale (Core Biomass Area, Abundance, Species Richness)	MDAT	http://portal.midatlanticocean.org/data-catalog/conservation/#layer-info-efh-species-biomass-fall3231	http://seamap.env.duke.edu/models/mdat/Mammal/MDAT_Mammal_Summary_Products_Metadata.pdf
Natural Resources	Sperm and Beaked Whale (Core Biomass Area, Abundance, Species Richness)	MDAT	http://portal.midatlanticocean.org/data-catalog/conservation/#layer-info-efh-species-biomass-fall3232	http://seamap.env.duke.edu/models/mdat/Mammal/MDAT_Mammal_Summary_Products_Metadata.pdf
Natural Resources	Species of Concern: (Core Biomass Area, Abundance, Species Richness)	MDAT	http://portal.midatlanticocean.org/data-catalog/conservation/#layer-info-efh-species-biomass-fall3232	http://seamap.env.duke.edu/models/mdat/Mammal/MDAT_Mammal_Summary_Products_Metadata.pdf
Natural Resources	Stellwagen Bank NMS	NOAA NMS	https://sanctuaries.noaa.gov/library/imast_gis.html ; https://www.northeastoceandata.org/data/data-download/?data=Administrative+Boundaries	http://www.northeastoceandata.org/files/metadata/Themes/Recreation/NationalMarineSanctuary
Natural Resources	NE Canyons and Seamounts Marine National Monument	NOAA NMFS GARFO	https://www.northeastoceandata.org/data/data-download/?data=Administrative+Boundaries ; http://www.greateratlantic.fisheries.noaa.gov/gis	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Northeast_Canyons_and_Seamounts_Marine_National_Monument/METADATA.pdf
Natural Resources	Right Whale Seasonal Management Area	NOAA NMFS GARFO	https://www.fisheries.noaa.gov/tags/southeast-and-new-england-mid-atlantic-north-atlantic-right-whale-management-areas-map	https://www.northeastoceandata.org/files/metadata/Themes/MarineTransportation/right_whale_SMA_all_In.htm
Natural Resources	Lobster Management Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Lobster_Management_Areas/Lobster_Management_Areas_METADATA.pdf
Natural Resources	Dedicated Habitat Research Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Dedicated_Habitat_Research_Area/Dedicated_Habitat_Research_Area_METADATA.pdf
Natural Resources	Frank R. Lautenberg Deep-sea coral protection area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Fr

				Frank R Lautenberg Deep Sea Coral Protection Area/Frank R Lautenberg Deep Sea Coral Protection Area METADATA.pdf
Natural Resources	GOM Cod Spawning Protection Closure Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM_Cod_Protection_Closure_Areas/GOM_Cod_Protection_Closure_Areas_METADATA.pdf
Natural Resources	Groundfish closure areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Groundfish_Closure_Areas/Groundfish_Closure_Areas_METADATA.pdf
Natural Resources	GOM & GB Spawning Groundfish closures	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GB_Spawning_Groundfish_Closures/GB_Spawning_Groundfish_Closures_METADATA.pdf ; https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM_Spawning_Groundfish_Closures/GOM_Spawning_Groundfish_Closures_METADATA.pdf
Natural Resources	Habitat Management Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Habitat_Management_Areas/Habitat_Management_Areas_METADATA.pdf
Natural Resources	Herring Management Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Herring_Management_Areas/Herring_Management_Areas_METADATA.pdf
Natural Resources	Sea scallop rotational Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Sea_Scallop_Rotational_Areas/Sea_Scallop_Rotational_Areas_METADATA.pdf
Natural Resources	Surfclam environmental degradation closures	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Environmental_Degradation_Closures/Envir

				onmental Degradation Closures META DATA.pdf
Natural Resources	Section 7 consultation areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Section_7_Consultation_Areas/S7_Consultation_Areas_Metadata_20180301.pdf
Natural Resources	280 fathom contour	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/280_Fathom_Contour/280_Fathom_Contour_METADATA.pdf
Natural Resources	ALWTRP Regulated and Exempted Waters (Atlantic Large Whale Take Reduction Plan Regulated Waters; Atlantic Large Whale Take Reduction Plan Exempted Waters)	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/ALWTRP_Regulated_and_Exempted_Waters/ALWTRP_Regulated_and_Exempted_Waters_METADATA.pdf
Natural Resources	Atlantic Coast Weakfish Flynet Fishing Prohibition Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Atlantic_Coast_Weakfish_Flynet_Fishing_Prohibition_Area/Atlantic_Coast_Weakfish_Flynet_Fishing_Prohibition_Area_METADATA.pdf
Natural Resources	Atlantic Halibut trawl gear accountability measures (AM) Area; Atlantic Halibut Gillnet Gear AM area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Atlantic_Halibut_Accountability_Measure_Areas/Atlantic_Halibut_Accountability_Measure_Areas_METADATA.pdf
Natural Resources	Atlantic Red Drum fishery harvest or possession prohibition area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Atlantic_Red_Drum_Fishery_Harvest_or_Possession_Prohibition_Area/Atlantic_Red_Drum_Fishery_Harvest_or_Possession_Prohibition_Area_METADATA.pdf
Natural Resources	Atlantic Salmon Critical Habitat (Gulf of ME DPS)	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	No metadata available
Natural Resources	Atlantic Striped Bass possession area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Atlantic_Striped_Bass_Possession_Area/Atlantic_Striped_Bass_Possession_Area_METADATA.pdf

				antic Striped Bass Possession Area METADATA.pdf
Natural Resources	Atlantic Sturgeon Critical Habitat River lengths (all DPSs)	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Atlantic Sturgeon Critical Habitat River Lengths/Atlantic Sturgeon Critical Habitat River Lengths METADATA.pdf
Natural Resources	Atlantic Wolffish Accountability Measure Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Atlantic Wolffish Accountability Measure Areas/Atlantic Wolffish Accountability Measure Areas METADATA.pdf
Natural Resources	Block Island Sound Lighthouses	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Block Island Sound Lighthouses/Block Island Sound Lighthouses METADATA.pdf
Natural Resources	CA I Hook Gear Haddock SAP area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/CA I Hook Gear Haddock SAP Area/CA I Hook Gear Haddock SAP Area METADATA.pdf
Natural Resources	Cape Cod Bay Restricted Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Cape Cod Bay Restricted Area/Cape Cod Bay Restricted Area METADATA.pdf
Natural Resources	Cape Cod South Closure Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Cape Cod South Closure Area/Cape Cod South Closure Area METADATA.pdf
Natural Resources	Cape Cod Spiny Dogfish Exemption Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Cape Cod Spiny Dogfish Exemption Areas/Cape Cod Spiny Dogfish Exemption Areas METADATA.pdf
Natural Resources	Cashes Ledge Closure Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Cashes Ledge Closure Area/Cashes Ledge Closure Area METADATA.pdf

Natural Resources	Chain Mat-modified Scallop Dredge Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Chain_Mat-Modified_Scallop_Dredge_Area/Chain_Mat-Modified_Scallop_Dredge_Area META DATA.pdf
Natural Resources	Closure Area II Yellowtail Flounder/Haddock SAP Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Closed_Area_II_Yellowtail_Flounder-Haddock_SAP_Area/Closed_Area_II_Yellowtail_Flounder-Haddock_SAP_Area METADATA.pdf
Natural Resources	Cultivator Shoal Whiting Fishery Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Cultivator_Shoal_Whiting_Fishery_Exemption_Area/Cultivator_Shoal_Whiting_Fishery_Exemption_Area METADATA.pdf
Natural Resources	Differential DAS Counting Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Differential_DAS_Counting_Areas/Differential_DAS_Counting_Areas METADATA.pdf
Natural Resources	Delaware Special Management Zone Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Delaware_Special_Management_Zone_Areas/Delaware_Special_Management_Zone_Areas METADATA.pdf
Natural Resources	Eastern US/Canada Haddock SAP Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Eastern_US-Canada_Haddock_SAP_Area/Eastern_US-Canada_Haddock_SAP_Area METADATA.pdf
Natural Resources	Environmental Degradation Closures	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Environmental_Degradation_Closures/Environmental_Degradation_Closures METADATA.pdf

Natural Resources	Exempted Waters for Maine State American Lobster Permits (ME Pocket Waters)	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Exempted Waters for Maine State American Lobster Permits/Exempted Waters for Maine State American Lobster Permits_METADATA.pdf
Natural Resources	Fippennies Ledge Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Fippennies Ledge Area/Fippennies Ledge Area_METADATA.pdf
Natural Resources	GOM Grate Raised Footrope Trawl Whiting Fishery Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM Grate Raised Footrope Trawl Whiting Fishery Exemption Area/GOM Grate Raised Footrope Trawl Whiting Fishery Exemption Area_METADATA.pdf
Natural Resources	GOM Scallop Dredge Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM Scallop Dredge Exemption Area/GOM Scallop Dredge Exemption Area_METADATA.pdf
Natural Resources	GOM-GB Dogfish and Monkfish Gillnet Fishery Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM-GB Dogfish and Monkfish Gillnet Fishery Exemption Area/GOM-GB Dogfish and Monkfish Gillnet Fishery Exemption Area_METADATA.pdf
Natural Resources	GOM-GB Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM-GB Exemption Area/GOM-GB Exemption Area_METADATA.pdf
Natural Resources	GOM-GB Inshore Restricted Roller Gear Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM-GB Inshore Restricted Roller Gear Areas/GOM-GB Inshore Restricted Roller Gear Areas_METADATA.pdf

Natural Resources	GOM-GB Regulated Mesh Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/GOM-GB Regulated Mesh Areas/GOM-GB Regulated Mesh Areas METADATA.pdf
Natural Resources	Great South Channel Restricted Gillnet Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Great South Channel Restricted Gillnet Areas/Great South Channel Restricted Gillnet Areas METADATA.pdf
Natural Resources	Great South Channel Restricted Trap-Pot Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Great South Channel Restricted Trap-Pot Area/Great South Channel Restricted Trap-Pot Area METADATA.pdf
Natural Resources	Great South Channel Scallop Dredge Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Great South Channel Scallop Dredge Exemption Area/Great South Channel Scallop Dredge Exemption Area METADATA.pdf
Natural Resources	Herring Haddock Accountability Measure Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Herring Haddock Accountability Measure Areas/Herring Haddock Accountability Measure Areas METADATA.pdf
Natural Resources	HRTRP Mid-Atlantic Regulated and Exempted waters	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/HRTRP Mid-Atlantic Regulated and Exempted Waters/HRTRP Mid-Atlantic Regulated and Exempted Waters METADATA.pdf
Natural Resources	Illex Fishery Mesh Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Illex Fishery Mesh Exemption Area/Illex Fishery Mesh Exemption Area METADATA.pdf

Natural Resources	Jan-Feb River Herring Monitoring-Avoidance Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/January-February_River_Herring_Monitoring-Avoidance_Areas/January-February_River_Herring_Monitoring-Avoidance_Areas_METADATA.pdf
Natural Resources	Jeffery's Ledge Restricted Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Jeffreys_Ledge_Restricted_Area/Jeffreys_Ledge_Restricted_Area_METADATA.pdf
Natural Resources	Jordon Basin Restricted Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Jordan_Basin_Restricted_Area/Jordan_Basin_Restricted_Area_METADATA.pdf
Natural Resources	July-August River Herring Monitoring-Avoidance Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/July-August_River_Herring_Monitoring-Avoidance_Areas/July-August_River_Herring_Monitoring-Avoidance_Areas_METADATA.pdf
Natural Resources	Large Mesh Gillnet Restricted Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Large_Mesh_Gillnet_Restricted_Area/Large_Mesh_Gillnet_Restricted_Area_METADATA.pdf
Natural Resources	Lobster Gear Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Lobster_Gear_Areas/Lobster_Gear_Areas_METADATA.pdf
Natural Resources	Lobster Restricted Gear Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Lobster_Restricted_Gear_Areas/Lobster_Restricted_Gear_Areas_METADATA.pdf
Natural Resources	Mid-Atlantic Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/MA_Exemption_Area/MA_Exemption_Area_METADATA.pdf

Natural Resources	Mid-Atlantic Regulated Mesh Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Mid-Atlantic_Regulated_Mesh_Area/MA_Regulated_Mesh_Area_METADATA.pdf
Natural Resources	Maine Mahogany Quahog	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Maine_Mahogany_Quahog_Zone/Maine_Mahogany_Quahog_Zone_METADATA.pdf
Natural Resources	Management Units Summer Flounder-Scup-Black Sea Bass	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Management_Units_SF-Scup-BSB/Management_Units_SF-Scup-BSB_METADATA.pdf
Natural Resources	March-April River Herring Monitoring-Avoidance Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/March-April_River_Herring_Monitoring-Avoidance_Areas/March-April_River_Herring_Monitoring-Avoidance_Areas_METADATA.pdf
Natural Resources	Massachusetts Bay Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Massachusetts_Bay_Management_Area/Massachusetts_Bay_Management_Area_METADATA.pdf
Natural Resources	Massachusetts Restricted Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Massachusetts_Restricted_Area/Massachusetts_Restricted_Area_METADATA.pdf
Natural Resources	May-June River Herring Monitoring-Avoidance Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/May-June_River_Herring_Monitoring-Avoidance_Areas/May-June_River_Herring_Monitoring-Avoidance_Areas_METADATA.pdf
Natural Resources	Mid-Atlantic Forage Species Management Unit	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Mid-Atlantic_Forage_Species_Management_Unit

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Natural Resources	Mid-Coast Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Mid-Coast Management Area METADATA.pdf
Natural Resources	Mid-South Atlantic Gillnet Waters	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Mid-South Atlantic Gillnet Waters METADATA.pdf
Natural Resources	Modified Haddock Stock Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Modified Haddock Stock Areas/Modified Haddock Stock Areas METADATA.pdf
Natural Resources	Monkfish Canyon Closed Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Monkfish Canyon Closed Areas/Monkfish Canyon Closed Areas METADATA.pdf
Natural Resources	Monkfish Fishery Management Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Monkfish Fishery Management Areas/Monkfish Fishery Management Areas METADATA.pdf
Natural Resources	MSB (Atlantic Mackerel, Squid, Butterfish) Bottom Trawling Restricted Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/MSB Bottom Trawling Restricted Areas/MSB Bottom Trawling Restricted Areas METADATA.pdf
Natural Resources	Mudhole North Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Mudhole North Management Area/Mudhole North Management Area METADATA.pdf
Natural Resources	Mudhole South Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/M

				udhole South Management Area/Mudhole South Management Area METADATA.pdf
Natural Resources	Nantucket Lightship Closed Area Exemption Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Nantucket Lightship Closed Area Exemption Areas/Nantucket Lightship Closed Area Exemption Areas METADATA.pdf
Natural Resources	Nantucket Shoals Dogfish Fishery Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Nantucket Shoals Dogfish Fishery Exemption Area/Nantucket Shoals Dogfish Fishery Exemption Area METADATA.pdf
Natural Resources	Nantucket Shoals Mussel and Sea Urchin Dredge Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Nantucket Shoals Mussel and Sea Urchin Dredge Exemption Area/Nantucket Shoals Mussel and Sea Urchin Dredge Exemption Area METADATA.pdf
Natural Resources	NE Multispecies Broad Stock Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/NE Multispecies Broad Stock Areas/NE Multispecies Broad Stock Areas METADATA.pdf
Natural Resources	New Jersey Special Management Zone Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/New Jersey Special Management Zone Areas/New Jersey Special Management Zone Areas METADATA.pdf
Natural Resources	NGOM Scallop Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/NGOM Scallop Management Area/NGOM Scallop Management Area METADATA.pdf
Natural Resources	Northeast Canyons and Seamounts Marine National Monument	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	

				s and Seamounts Marine National Monument METADATA.pdf
Natural Resources	Northeast Closure Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Northeast_Closure_Area/Northeast_Closure_Area_METADATA.pdf
Natural Resources	Northern Inshore State Trap-Pot Waters Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Northern_Inshore_State_Trap-Pot_Waters_Area/Northern_Inshore_State_Trap-Pot_Waters_Area_METADATA.pdf
Natural Resources	Northern Nearshore Trap-Pot Waters Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Northern_Nearshore_Trap-Pot_Waters_Area/Northern_Nearshore_Trap-Pot_Waters_Area_METADATA.pdf
Natural Resources	November-December River Herring Monitoring-Avoidance Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/November-December_River_Herring_Monitoring-Avoidance_Areas/November-December_River_Herring_Monitoring-Avoidance_Areas_METADATA.pdf
Natural Resources	Offshore Fishery Program Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Offshore_Fishery_Program_Area/Offshore_Fishery_Program_Area_METADATA.pdf
Natural Resources	Offshore Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Offshore_Management_Area/Offshore_Management_Area_METADATA.pdf
Natural Resources	Offshore Trap-Pot Waters Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Offshore_Trap-Pot_Waters_Area/Offshore_Trap-Pot_Waters_Area_METADATA.pdf

Natural Resources	Other Northeast Gillnet Waters Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Other_Northeast_Gillnet_Waters_Area/Other_Northeast_Gillnet_Waters_Area_METADATA.pdf
Natural Resources	Other Southeast Gillnet Waters	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Other_Southeast_Gillnet_Waters/Other_Southeast_Gillnet_Waters_METADATA.pdf
Natural Resources	Pocket Waters	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Pocket_Waters/Pocket_Waters_METADATA.pdf
Natural Resources	Pound Net Regulated Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Pound_Net_Regulated_Areas/Pound_Net_Regulated_Areas_METADATA.pdf
Natural Resources	Raised Footrope Trawl Whiting Fishery Exemption Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Raised_Footrope_Trawl_Whiting_Fishery_Exemption_Areas/Raised_Footrope_Trawl_Whiting_Fishery_Exemption_Areas_METADATA.pdf
Natural Resources	Red Crab Management Unit	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Red_Crab_Management_Unit/Red_Crab_Management_Unit_METADATA.pdf
Natural Resources	Red Crab Trap-Pot Fishery	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Red_Crab_Trap-Pot_Fishery/Red_Crab_Trap-Pot_Fishery_METADATA.pdf
Natural Resources	Red Hake Stock Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Red_Hake_Stock_Areas/Red_Hake_Stock_Areas_METADATA.pdf
Natural Resources	Redfish Exemption Area and Cod Closure	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Redfish_Exemption_Area_and_Cod_Closure

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Natural Resources	Restricted Gear Areas Mults	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Restricted_Gear_Areas/Restricted_Gear_Areas_METADATA.pdf
Natural Resources	River Herring and Shad Catch Cap Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/River_Herring_and_Shad_Catch_Cap_Areas/River_Herring_and_Shad_Catch_Cap_Areas_METADATA.pdf
Natural Resources	River Herring and Shad Catch Cap Closure Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/River_Herring_and_Shad_Catch_Cap_Closure_Areas/River_Herring_and_Shad_Catch_Cap_Closure_Areas_METADATA.pdf
Natural Resources	Scallop Days-at-Sea (DAS) Change to Declare Out of Fishery (DOF) Transit with Product On Board Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Scallop_DAS_Change_to_DOF_Transit_w_Product_On_Board_Area/Scallop_DAS_Change_to_DOF_Transit_w_Product_On_Board_Area_METADATA.pdf
Natural Resources	Scup Gear Restricted Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Scup_Gear_Restricted_Areas/Scup_Gear_Restricted_Areas_METADATA.pdf
Natural Resources	Scup Transfer-at-Sea	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Scup_Transfer-at-Sea/Scup_Transfer-at-Sea_METADATA.pdf
Natural Resources	Sea Scallop Accountability Measure Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Sea_Scallop_Accountability_Measure_Areas/Sea_Scallop_Accountability_Measure_Areas_METADATA.pdf
Natural Resources	Sector Small-Mesh Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Sector_Small-Mesh_Exemption_Area/Sector_Small-Mesh_Exemption_Area_METADATA.pdf

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Natural Resources	Sector Stock Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Sector_Stock_Areas/Sector_Stock_Areas_METADATA.pdf
Natural Resources	September-October River Herring Monitoring-Avoidance Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/September-October_River_Herring_Monitoring-Avoidance_Areas/September-October_River_Herring_Monitoring-Avoidance_Areas_METADATA.pdf
Natural Resources	Silver Hake Stock Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Silver_Hake_Stock_Areas/Silver_Hake_Stock_Areas_METADATA.pdf
Natural Resources	Six Mile Line	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Six_Mile_Line/Six_Mile_Line_METADATA.pdf
Natural Resources	Skate Management Unit	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Skate_Management_Unit/Skate_Management_Unit_METADATA.pdf
Natural Resources	Small Mesh Areas 1 and 2	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Small_Mesh_Areas_1_and_2/Small_Mesh_Areas_1_and_2_METADATA.pdf
Natural Resources	SNE Dogfish Gillnet Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE_Monkfish_and_Skate_Gillnet_Exemption_Area/SNE_Monkfish_and_Skate_Gillnet_Exemption_Area_METADATA.pdf
Natural Resources	SNE Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE_Exemption_Area/SNE_Exemption_Area_METADATA.pdf

Natural Resources	SNE Little Tunny Gillnet Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE Little Tunny Gillnet Exemption Area/SNE Little Tunny Gillnet Exemption Area METADATA.pdf
Natural Resources	SNE Monkfish and Skate Gillnet Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE Monkfish and Skate Gillnet Exemption Area/SNE Monkfish and Skate Gillnet Exemption Area METADATA.pdf
Natural Resources	SNE Monkfish and Skate Trawl Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE Monkfish and Skate Trawl Exemption Area/SNE Monkfish and Skate Trawl Exemption Area METADATA.pdf
Natural Resources	SNE Regulated Mesh Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE Regulated Mesh Area/SNE Regulated Mesh Area METADATA.pdf
Natural Resources	SNE Scallop Dredge Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE Scallop Dredge Exemption Area/SNE Scallop Dredge Exemption Area METADATA.pdf
Natural Resources	SNE Skate Bait Trawl Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE Skate Bait Trawl Exemption Area/SNE Skate Bait Trawl Exemption Area METADATA.pdf
Natural Resources	SNE-MA Winter Flounder Trawl Gear Accountability Measure Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/SNE-MA Winter Flounder Trawl Gear Accountability Measure Areas/SNE-MA Winter Flounder Trawl Gear Accountability Measure Areas METADATA.pdf
Natural Resources	Southeast US Monitoring Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/So

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Natural Resources	Southeast US Restricted Area N; Southeast US Restricted Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Southeast US Restricted Area/Southeast US Restricted Area METADATA.pdf
Natural Resources	Southern Mid-Atlantic Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Southern Mid-Atlantic Management Area/Southern Mid-Atlantic Management Area METADATA.pdf
Natural Resources	Southern Nearshore Trap-Pot Waters Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Southern Nearshore Trap-Pot Waters Area/Southern Nearshore Trap-Pot Waters Area METADATA.pdf
Natural Resources	Southern New England Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Southern New England Management Area/Southern New England Management Area METADATA.pdf
Natural Resources	Stellwagen Bank Management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Stellwagen Bank Management Area/Stellwagen Bank Management Area METADATA.pdf
Natural Resources	Stellwagen Bank-Jeffreys Ledge Restricted Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Stellwagen Bank-Jeffreys Ledge Restricted Area/Stellwagen Bank-Jeffreys Ledge Restricted Area METADATA.pdf
Natural Resources	Stellwagen Shipwreck Sites	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Stellwagen Shipwreck Sites/Stellwagen Shipwreck Sites METADATA.pdf

Natural Resources	Stock Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Stock_Areas/Stock_Areas_METADATA.pdf
Natural Resources	Summer Flounder Fishery-Sea Turtle Protection Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Summer_Flounder_Fishery-Sea_Turtle_Protection_Area/Summer_Flounder_Fishery-Sea_Turtle_Protection_Area_METADATA.pdf
Natural Resources	Summer Flounder Small-Mesh Exemption Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Summer_Flounder_Small-Mesh_Exemption_Area/Summer_Flounder_Small-Mesh_Exemption_Area_METADATA.pdf
Natural Resources	Tilefish Gear Restricted Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Tilefish_Gear_Restricted_Areas/Tilefish_Gear_Restricted_Areas_METADATA.pdf
Natural Resources	Tilefish Management Unit	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Tilefish_Management_Unit/Tilefish_Management_Unit_METADATA.pdf
Natural Resources	Trimester TAC Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Trimester_TAC_Areas/Trimester_TAC_Areas_METADATA.pdf
Natural Resources	Turtle Deflector Dredge Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Turtle_Deflector_Dredge_Area/Turtle_Deflector_Dredge_Area_METADATA.pdf
Natural Resources	US-Canada Management Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/US-Canada_Management_Areas/US-Canada_Management_Areas_METADATA.pdf

Natural Resources	VMS Demarcation Line	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/VMS_Demarcation_Line/VMS_Demarcation_Line_METADATA.pdf
Natural Resources	Waters Exempt from Minimum Traps per Trawl Requirement	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Waters_Exempt_from_Minimum_Traps_per_Trawl_Requirement/Waters_Exempt_from_Minimum_Traps_per_Trawl_Requirement_METADATA.pdf
Natural Resources	Waters Off New Jersey management Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/Waters_Off_New_Jersey_Management_Area/Waters_Off_New_Jersey_Management_Area_METADATA.pdf
Natural Resources	West of Cutler Set-Aside Area	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/shapefiles/West_of_Cutler_Set-Aside_Area/West_of_Cutler_Set-Aside_Area_METADATA.pdf
Natural Resources	Windowpane Flounder and Ocean Pout Accountability Measure Areas	NOAA NMFS GARFO	https://archive.fisheries.noaa.gov/garfo/educational_resources/gis/data/	404 error
Natural Resources	Marine mammal habitat	NOAA MDAT	http://seamap.env.duke.edu/models/mdat/	Curtice C., Cleary J., Shumchenia E., Halpin P.N. 2019. Marine-life Data and Analysis Team (MDAT) technical report on the methods and development of marine-life data to support regional ocean planning and management. Roberts et al. (2016, 2017, 2018) and Curtice et al. (2019)
Natural Resources	Benthic habitats	TNC	http://portal.midatlanticocean.org/static/data_manager/data-download/Zip_Files/Marine_Life/Benthic_Habitats.zip	http://portal.midatlanticocean.org/static/data_manager/metadata/html/benthic_habitats.html
Natural Resources	Log density of tagged sea turtles	NOAA NEFSC	https://inport.nmfs.noaa.gov/inport/item/27337/rubric/data-set-completion	https://inport.nmfs.noaa.gov/inport/item/51655 ; https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/U

				nitedStates/edc/reportsdata/marine/namera/Pages/default.aspx
Natural Resources	sea scallop biomass, meat weight (kg) - draft	NEFSC and Virginia Institute of Marine Science (VIMS), School of Marine Science and Technology (SMAST) at University of Massachusetts Dartmouth	https://www.northeastoceandata.org/data-download/?data=Fish	https://www.northeastoceandata.org/files/metadata/Themes/Fish/ScallopBiomass.pdf
Natural Resources	sea scallop average abundance	School of Marine Science and Technology (SMAST) at University of Massachusetts Dartmouth	https://www.northeastoceandata.org/data-download/?data=Fish	https://easterndivision.s3.amazonaws.com/Marine/MooreGrant/AveragePresenceAbundanceSMAST.pdf
Natural Resources	Individual fish species (MARCO and MDAT) - Dogfish, Monkfish, Bluefish, butterfish	Northeast Fisheries Science Center (NEFSC/NMFS/NOAA), Massachusetts Division of Marine Fisheries (MDMF), North East Area Monitoring and Assessment Program (NEAMAP), and Maine & New Hampshire state trawls (ME/NH).	https://www.northeastoceandata.org/data-download/?data=Fish	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_Fish_Biomass_Metadata.pdf
Natural Resources	NEFMC Small Mesh multispecies FMP (Total Biomass and Species Richness) Spring/Fall	NEFMC (summary product)	https://www.northeastoceandata.org/data-download/?data=Fish	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	Species vulnerable to climate change (core species biomass area, biomass, species richness)	NEFMC (summary product)	https://www.northeastoceandata.org/data-download/?data=Fish	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	Diadromous species: Species Richness (Spring)	NEFMC (summary product)	https://www.northeastoceandata.org/data-download/?data=Fish	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	NEFMC Skates: Biomass, Core Biomass Area, Species Richness) - Spring	NEFMC (summary product)	https://www.northeastoceandata.org/data-download/?data=Fish	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	Birds (individual species; important bird polygons; movement information, modeled distribution), (Avian 90% Abundance Confidence Interval Range, Avian Abundance, Avian Abundance	NEFMC/MDAT	https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:0176682#	https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:0176682;view=iso

	Coefficient of Variation (MARCO))			
Natural Resources	NEFMC Multispecies (Biomass, core biomass area, species richness)	NEFMC/MDAT	http://seamap.env.duke.edu/models/mdat/	http://seamap.env.duke.edu/models/mdat/Fish/MDAT_NEFSC_Fish_Summary_Products_Metadata.pdf
Natural Resources	NEFSC Trawl Extent	NOAA NEFSC	https://www.northeastoceandata.org/data-download/?data=Fish	https://easterndivision.s3.amazonaws.com/Marine/MooreGrant/AveragePresenceAbundanceSMAST.pdf
Natural Resources	NEFSC Trawl Strata	NOAA NEFSC	https://www.northeastoceandata.org/data-download/?data=Fish	https://easterndivision.s3.amazonaws.com/Marine/MooreGrant/AveragePresenceAbundanceSMAST.pdf
Natural Resources	shellfish habitat	TNC	https://www.northeastoceandata.org/data-download/?data=Habitat	https://www.northeastoceandata.org/files/metadata/Themes/Habitat/ShellfishHabitat.pdf
natural resources	hardbottom points	NOAA NCCOS	CASS NE AMA gdb	NMFS 2014 and NOAA BioGeo (2018)
natural resources	hardbottom predicted area	NOAA NCCOS	CASS NE AMA gdb	NMFS 2014 and NOAA BioGeo (2018)
Natural Resources	Artificial Reefs	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ArtificialReefs.zip	https://inport.nmfs.noaa.gov/inport/item/54191
Natural Resources	Audubon IBAs	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/CoastalAudobonIBAs.zip	https://inport.nmfs.noaa.gov/inport/item/54363
Natural Resources	Cetacean BIAs	NOAA NMFS	http://cetsound.noaa.gov/Assets/cetsound/data/CetMap_BIA_WGS84.zip	https://inport.nmfs.noaa.gov/inport/item/23643
Natural Resources	Coastal Barrier Island Resource System	FWS	https://www.fws.gov/ecological-services/habitat-conservation/cbra/Maps/a/CBRS_Polygons.zip	http://www.fws.gov/ecological-services/habitat-conservation/cbra/maps/CBRS-Metadata.xml
Natural Resources	Coastal Critical Habitat Designation	NOAA	https://inport.nmfs.noaa.gov/inport/item/54209	ftp://ftp.coast.noaa.gov/pub/MSP/CoastalCriticalHabitatDesignations.zip
Natural Resources	coastal wetlands inventory	NWI	https://www.northeastoceandata.org/data-download/?data=Habitat	https://www.northeastoceandata.org/files/metadata/Themes/Restoration/CoastalWetlands.pdf
Natural Resources	zooplankton	TNC	https://www.northeastoceandata.org/data-download/?data=Habitat	http://easterndivision.s3.amazonaws.com/Marine/MooreGrant/CalanusfinmarchicusAbundance.pdf
Natural Resources	Deep Sea Coral and Sponge Observations	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/DeepSeaCoralObservations.zip	https://inport.nmfs.noaa.gov/inport/item/54377

Natural Resources	primary production	NEFMC (from NOAA Ocean Color) by season	https://www.northeastoceandata.org/data-download/?data=Habitat https://www.northeastoceandata.org/data-download/?data=HabitatTNV	https://www.northeastoceandata.org/files/metadata/Themes/Habitat/NEFSC_spatial_metadata.pdf
Natural Resources	groundfish and shellfish EFH	NOAA	https://www.northeastoceandata.org/data-download/?data=Fish	http://portal.midatlanticocean.org/static/data_manager/metadata/html/efh_overlay_update.htm
Natural Resources	Loggerhead Turtle Sargassum CH	NOAA NMFS	https://www.fisheries.noaa.gov/resource/map/loggerhead-turtle-northwest-atlantic-ocean-dps-critical-habitat-map	https://www.fisheries.noaa.gov/resource/map/loggerhead-turtle-northwest-atlantic-ocean-dps-critical-habitat-map
Natural Resources	SAV (eelgrass)	NEOD Portal Working Group	https://www.northeastoceandata.org/data-download/?data=Habitat https://www.northeastoceandata.org/data-download/?data=HabitatTNV	This data was compiled by SeaPlan using datasets from the Maine Department of Marine Resources, Bureau of Resource Management, Maine Office of GIS, University of New Hampshire, New Hampshire Department of Environmental Services, NH GRANIT (New Hampshire Geographically Referenced Analysis and Information Transfer System), Massachusetts Department of Environmental Protection, MassGIS, Rhode Island Eelgrass Task Force, Virginia Tech University/US Fish and Wildlife Inventory, National Wetlands Inventory Program, Connecticut Department of Energy and Environmental Protection
Natural Resources	Greater Atlantic Region NOAA Statistical Areas	NOAA NMFS	ftp://ftp.nefsc.noaa.gov/pub/gis/	https://www.fisheries.noaa.gov/region/new-england-mid-atlantic
Natural Resources	EFH Layers	NOAA	https://www.habitat.noaa.gov/protection/efh/newInv/index.html	https://www.habitat.noaa.gov/protection/efh/newInv/index.html
Natural Resources	HAPCs	NOAA	https://www.habitat.noaa.gov/protection/efh/newInv/index.html	https://www.habitat.noaa.gov/protection/efh/newInv/index.html
Natural Resources	EFH Highly Migratory Spp	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/EFH_HighlyMigratorySpecies.zip	https://catalog.data.gov/harvest/object/bdc4f60-d14d-4558-992e-a72e054e90f1/html
Natural Resources	Other benthic fauna (sand dollars, copepod <i>Calanus finmarchicus</i> , Euphausiids (a	SMAST	https://www.northeastoceandata.org/data-download/?data=Habitat https://www.northeastoceandata.org/data-download/?data=HabitatTNV	http://easterndivision.s3.amazonaws.com/Marine/MooreGrant/AveragePresenceAbundanceSMAST.pdf

	group of zooplankton), Gammarid amphipods (a group of zooplankton) , , mysid shrimp (fall and spring), hermit crab, moon snail, seastar, Bryozoans or Hydrozoans, sponges		oceandata.org/data-download/?data=HabitatTNV	
Natural Resources	MPAs	NOAA	https://marineprotectedareas.noaa.gov/media/data/MPAI2017gdb.zip	https://nmsmarineprotectedareas.blob.core.windows.net/marineprotectedareas-prod/media/data/MPAI_2017_metadata.pdf
Natural Resources	HMS	NOAA	https://catalog.data.gov/dataset/highly-migratory-species	https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species
Natural Resources	NERRs	NOAA NERRs	http://cdmo.baruch.sc.edu/get/gis.cfm	
Natural Resources	Restoration Project areas	GRID-Arendal, Geoscience Australia, Conservation International	https://www.northeastoceandata.org/data/data-download/?data=Habitat	https://www.northeastoceandata.org/files/metadata/Themes/Restoration/PotentialRestorationProjects.pdf
Natural Resources	Protected Areas	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/ProtectedAreas.gdb.zip	https://inport.nmfs.noaa.gov/inport/item/54398
Natural Resources	NY aerial survey sea turtle and whale data	NYSDEC Whale Monitoring Aerial Survey Report (Meghan Rickard)		Reports monthly -
Natural Resources	Communities at Sea*	Total bottom trawl; total dredge activity; total gillnet activity; total longline activity; total pots and traps, lobster, shrimp, boats>65', boats<65' activity over time; Original data provided by NOAA NMFS Northeast Fisheries Science Center; data processed by the Grant F. Walton Center for Remote Sensing and Spatial Analysis (CRSSA), Rutgers, the State University of New Jersey	Spoke with Kevin St. Martin; followed up with Kevin Madley and James Morris to reach out to coordinate data transfer; he will be back in office first week in Jan	http://portal.midatlanticocean.org/static/data_manager/metadata/html/CASMetadata.html
Natural Resources	VMS Heat Maps	VMS NROC Heat Maps (Multispecies, Squid, Herring, Mackerel, Scallops, Clams, Monkfish, Pelagics)	CASS gdb	(Northeast Regional Ocean Council (NROC) - Northeast Ocean Data Working Group

Natural Resources	VMS (south of Long Island) 2009 - 2019; NH state/fed	NOAA OLE	CASS gdb	NMFS OLE - Dennis Trager and Kelley Spalding
Navigation	Pilot Boarding Stations	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/PilotBoarding.zip	https://inport.nmfs.noaa.gov/inport/item/54394
Navigation	Coastal Maintained Channels	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/CoastalMaintainedChannels.zip	https://inport.nmfs.noaa.gov/inport/item/54372
Navigation	Pilot Boarding Areas	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/PilotBoarding.zip	https://inport.nmfs.noaa.gov/inport/item/54393
Navigation	Aids to Navigation	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/AidsToNavigation.zip	https://inport.nmfs.noaa.gov/inport/item/56120
Navigation	Anchorage Areas	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/AnchorageAreas.zip	https://inport.nmfs.noaa.gov/inport/item/48849
Navigation	RULET wrecks (Polluting)	National Marine Sanctuaries	https://sanctuaries.noaa.gov/protect/ppw/	Data available by request
Navigation	AWOIS wrecks	NOAA	https://nauticalcharts.noaa.gov/data/wrecks-and-obstructions.html	
Navigation	AWOIS obstructions	NOAA	https://nauticalcharts.noaa.gov/data/wrecks-and-obstructions.html	
Navigation	ENC wrecks	NOAA	https://www.northeastoceandata.org/data/data-download/?data=Marine+Transportation	https://www.nauticalcharts.noaa.gov
Navigation/Transportation	Shipping Fairways, Traffic Separation Zones	NOAA	http://encdirect.noaa.gov/theme_layers/data/shipping_lanes/shippinglanes.zip	https://inport.nmfs.noaa.gov/inport/item/39986
Navigation	Areas to be avoided	NOAA Office of General Council (MPAs)	https://www.northeastoceandata.org/data/data-download/?data=Marine+Transportation	https://www.gc.noaa.gov/gcil_mpa-aa.html
Navigation	Recommended Route	NOAA (whale avoidance)	https://www.northeastoceandata.org/data/data-download/?data=Marine+Transportation	https://inport.nmfs.noaa.gov/inport/item/48921
Navigation	Safety, Security, and Regulated Zone	USCG	https://www.northeastoceandata.org/data/data-download/?data=Marine+Transportation	https://www.northeastoceandata.org/files/metadata/Themes/MarineTransportation/safetySecurityRegulatedAreas.pdf
Navigation	Restricted Speed Areas (North Atlantic Right Whale)	NOAA (whale avoidance)	https://www.northeastoceandata.org/data/data-download/?data=Marine+Transportation	https://www.northeastoceandata.org/files/metadata/Themes/MarineTransportation/right_whale_SMA_all_In.htm
Navigation	Precautionary Areas	USCG	https://www.northeastoceandata.org/data/data-download/?data=Marine+Transportation	https://www.northeastoceandata.org/data-download/?data=Marine%20Transportation

Navigation	Navigable Waters	US Department of Transportation (USDOT)/Bureau of Transportation Statistics (BTS's) National Transportation Atlas Database (NTAD)	https://hifld-geoplatform.opendata.arcgis.com/datasets/navigable-waterway-network-lines	https://hifld-geoplatform.opendata.arcgis.com/datasets/navigable-waterway-network-lines
Navigation	Ferry Routes	National Atlas of the US	https://geo.nyu.edu/catalog/stanford-gd729dg1947	https://www.lib.ncsu.edu/gis/search/datainfo.php?datasetid=520_NTAD&rk=1&s=d&e=
Navigation	AIS Data (2017) Zones 18-19	NOAA/USCG	marinecadastre.gov; Daniel Martin	Office for Coastal Management, 2018: 2014 United States Automatic Identification System Database, https://inport.nmfs.noaa.gov/inport/item/48845
Navigation	No discharge zones	GRID-Arendal, Geoscience Australia, Conservation International	http://www.northeastoceandata.org/files/metadata/Themes/WaterQuality.zip	http://www.northeastoceandata.org/files/metadata/Themes/WaterQuality/NoDischargeZones.pdf
Oceanographic	Bathymetry	NOAA - 2013 (CRM), 2015 (GEBCO)	https://www.ngdc.noaa.gov/mgg/coastal/crm.html ; https://www.gebco.net/data_and_products/historical_data_sets/	
Oceanographic	Submarine canyons	GRID-Arendal, Geoscience Australia, Conservation International	https://www.northeastoceandata.org/data-download/?data=Habitat	https://www.northeastoceandata.org/files/metadata/Themes/PhysicalOceanography/Metadata/SubmarineCanyons.xml
Oceanographic	Environmental Sensors and Buoys	Northeastern Regional Association of Coastal Ocean Observing Systems	https://www.northeastoceandata.org/data-download/?data=Physical%20Oceanography	Northeastern Regional Association of Coastal Ocean Observing Systems (2017)
Oceanographic	Current Speed & Direction (FVCOM)	SMAST	https://www.northeastoceandata.org/data-download/?data=Habitat https://www.northeastoceandata.org/data-download/?data=HabitatTNV	University of Massachusetts-Dartmouth School for Marine Science and Technology (SMAST), Woods Hole Oceanographic Institution (WHOI), RPS Applied Science Associates (RPS ASA)
Oceanographic	Sig Wave Height and Direction (FVCOM)	SMAST	https://www.northeastoceandata.org/data-download/?data=Habitat https://www.northeastoceandata.org/data-download/?data=HabitatTNV	University of Massachusetts-Dartmouth School for Marine Science and Technology (SMAST), Woods Hole Oceanographic Institution (WHOI), RPS Applied Science Associates (RPS ASA); Buoy data can be used as well
Oceanographic	Water Temperature (FVCOM)	SMAST	https://www.northeastoceandata.org/data-download/?data=Habitat https://www.northeastoceandata.org/data-download/?data=HabitatTNV	Water temperature from the FVCOM model

			oceandata.org/data-download/?data=HabitatTNV	
Oceanographic	Salinity (FVCOM)	SMAST	https://www.northeastoceandata.org/data-download/?data=Habitat https://www.northeastoceandata.org/data-download/?data=HabitatTNV	University of Massachusetts-Dartmouth School for Marine Science and Technology (SMAST), Woods Hole Oceanographic Institution (WHOI), RPS Applied Science Associates (RPS ASA)
Oceanographic	Aragonite saturation state	NOAA NCEI	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/SurfaceAragonite.zip	https://inport.nmfs.noaa.gov/inport/item/54405
Oceanographic	% Light Transmissivity Kd (par)	NOAA	ftp://ftp.star.nesdis.noaa.gov/pub/socd1/mech/coastwatch/viirs/science/L3/global/kd/monthly/WW00/	
Oceanographic	Kd (490)	NOAA	ftp://ftp.star.nesdis.noaa.gov/pub/socd1/mech/coastwatch/viirs/science/L3/global/kd/monthly/WW00/	
Oceanographic	Nutrients at Depth (Silicate, Phosphate, Nitrate)	BioOracle	as new data becomes available	http://bio-oracle.org/downloads-to-email.php
Oceanographic	Dissolved Oxygen	BioOracle	http://bio-oracle.org/downloads-to-email.php	http://bio-oracle.org/downloads-to-email.php
Oceanographic	Iron Concentration	BioOracle	http://bio-oracle.org/downloads-to-email.php	http://bio-oracle.org/downloads-to-email.php
Oceanographic	Sediment thickness	NOAA	https://www.ngdc.noaa.gov/mgg/sedthick/index.html	https://www.ngdc.noaa.gov/mgg/sedthick/sedthick.html
Oceanographic	Sediment - Seabed Forms	TNC (includes SMAST, TNC) - based on usSEABED and USGS sediment texture database	https://www.northeastoceandata.org/data-download/?data=Habitat	Anderson, M. G., Greene, J., Morse, D., Shumway, D. and Clark, M (2010) Benthic Habitats of the Northwest Atlantic in Greene, J.K., M.G. Anderson, J. Odell, and N. Steinberg, eds. The Northwest Atlantic Marine Ecoregional Assessment: Species, Habitats and Ecosystems. Phase One. The Nature Conservancy, Eastern US Division, Boston, MA.
Oceanographic	Sediment - Stability SMAST	TNC (includes SMAST, TNC) - based on usSEABED and USGS sediment texture database	https://www.northeastoceandata.org/data-download/?data=Habitat	

Oceanographic	Sediment - Soft Sediment Grain Size	TNC (includes SMAST, TNC) - based on usSEABED and USGS sediment texture database	https://www.northeastoceandata.org/data-download/?data=Habitat	
Oceanographic	Chlorophyll a concentration (NASA)	NASA OceanColor L3 SMI Product	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/Chlorophyll_a.zip ; https://oceandata.sci.gsfc.nasa.gov/MODIS-Aqua/Binned/Monthly/	https://inport.nmfs.noaa.gov/inport/item/54369
Social/cultural	Paddle Board Events	The Board and Paddle Events layer depicts event point locations as mapped by participants in Northeast Coastal and Marine Recreational Use Characterization Study, which was conducted by SeaPlan, Surfrider Foundation, and Point 97 under the direction of the Northeast Regional Planning Body (NE RPB).	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/CompetitiveBoardAndPaddleEvents.pdf
Social/cultural	Boat launches	Northeast Regional Ocean Council (Data from States)	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/BoatLaunches.pdf
Social/cultural	Commercial Whale watching areas	The Commercial Whale Watching Areas layer depicts event point locations as mapped by participants in Northeast Coastal and Marine Recreational Use Characterization Study, which was conducted by SeaPlan, Surfrider Foundation, and Point 97 under the direction of the Northeast Regional Planning Body (NE RPB).	https://www.northeastoceandata.org/data-download/?data=Culture	SeaPlan, Surfrider, and Point 97
Social/cultural	Distance sailing races	The Distance Sailing Races layer depicts activity areas mapped by participants in the Northeast Coastal and Marine Recreational Use Characterization Study, which was conducted by SeaPlan, Surfrider Foundation, and Point 97 under the direction of the Northeast	https://www.northeastoceandata.org/data-download/?data=Culture	http://www.northeastoceandata.org/files/metadata/Themes/Recreation/DistanceSailingRaces.pdf

		Regional Planning Body (NE RPB).		
Social/cultural	Secured Lands	TNC	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Culture/SecuredLands.pdf
Social/cultural	Federally recognized tribes	EPA	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Culture/FedRecTribalLocations.pdf
Social/cultural	Individual Ocean Uses	The Individual Ocean Uses layer depicts activity areas mapped by participants in the Northeast Coastal and Marine Recreational Use Characterization Study, which was conducted by Surfrider Foundation, SeaPlan, and Point 97 under the direction of the Northeast Regional Planning Body (NE RPB).	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/IndividualOceanUses.pdf
Social/cultural	National Register of Historic Places (pts and poly)	Maine Historic Preservation Commission, Massachusetts Historical Commission Preservation Planning Division, New York State Office of Parks Recreation and Historic Preservation: State Historic Preservation Office, and Rhode Island Historic Preservation Commission	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Culture/NationalRegisterHistoricPlacesPoints.pdf
Social/cultural	National Register of Historic Places (pts and poly)	Maine Historic Preservation Commission, Massachusetts Historical Commission Preservation Planning Division, New York State Office of Parks Recreation and Historic Preservation: State Historic Preservation Office, and Rhode Island Historic Preservation Commission	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Culture/NationalRegisterHistoricPlacesPoints.pdf

Social/cultural	Recreational fishing areas	GARFO	http://portal.midatlanticocean.org/data-catalog/fishing/#layer-info-management-areas292	http://opdgig.dos.ny.gov/geoportal/catalog/search/resource/detailsnoheader.page?uuiid={3B5083DA-2060-4F5D-8416-201A0A2B962B}
Social/cultural	Rec Boater activities	The Northeast Recreational Boater Activities Layer depicts activity points plotted by participants in the 2012 Northeast Recreational Boater Survey, which was conducted by SeaPlan, the Northeast Regional Ocean Council (NROC), states' coastal agencies, marine trade associations composed of many private industry representatives, and the First Coast Guard District	https://www.northeastoceandata.org/data-download/?data=Culture	http://www.northeastoceandata.org/files/metadata/Themes/Recreation/RecreationalBoaterActivities.pdf
Social/cultural	Rec Boater routes	The Northeast Recreational Boater Routes displays recreational boater routes that were mapped by participants in the 2012 Northeast Recreational Boater Survey, which was conducted by SeaPlan, the Northeast Regional Ocean Council (NROC), states' coastal agencies, marine trade associations composed of many private industry representatives, and the First Coast Guard District.	https://www.northeastoceandata.org/data-download/?data=Culture	http://www.northeastoceandata.org/files/metadata/Themes/Recreation/RecreationalBoaterRoutes.pdf
Social/cultural	Scuba Diving Areas	The Recreational SCUBA Diving Areas layer depicts activity areas mapped by participants in the Northeast Coastal and Marine Recreational Use Characterization Study, which was conducted by SeaPlan, Surfrider Foundation, and Point 97 under the direction of the Northeast Regional Planning Body (NE RPB)	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/RecreationalSCUBADivingAreas.pdf

Social/cultural	Water Trails	Northeast Regional Ocean Council	https://www.northeastoceandata.org/data-download/?data=Culture	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/WaterTrails.pdf
Administrative boundaries	EPA Regional Boundaries	EPA	https://www.epa.gov/frs/epa-regional-kml-download	https://www.epa.gov/ceam/metadata-epa-regional-boundaries
Administrative boundaries	National Parks	National Park Service	https://irma.nps.gov/DataStore/Reference/Profile/2225713	https://www.arcgis.com/sharing/rest/content/items/b1598d3df2c047ef88251016af5b0f1e/info/metadata/metadata.xml?format=default&output=html
Administrative boundaries	Federal Consistency Location Descriptions	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/GeographicLocationDescriptions.zip	https://inport.nmfs.noaa.gov/inport/item/51544
Administrative boundaries	US Coast Guard Districts	USCG	https://www.northeastoceandata.org/data-download/?data=Administrative%20Boundaries	https://services.northeastoceandata.org/arcgis1/rest/services/Administrative/MapServer/5
Administrative boundaries	USACE Districts	USACE	https://www.northeastoceandata.org/data-download/?data=Administrative%20Boundaries	https://www.arcgis.com/sharing/rest/content/items/70805e1a8fd74e42b0a9585088d6d151/info/metadata/metadata.xml?format=default&output=html
Administrative boundaries	Federal/State Boundary (Submerged Lands Act)	NOAA	https://coast.noaa.gov/data/Documents/OceanLawSearch/Summary%20of%20Law%20-%20Submerged%20Lands%20Act.pdf	https://data.noaa.gov/waf/NOAA/NESDIS/ncei/
Administrative boundaries	EEZ	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/CoastalCounties.zip	https://inport.nmfs.noaa.gov/inport/item/54383
Administrative boundaries	Coastal State Legislative Districts House	NOAA NMFS	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/CoastalStateLegislativeDistricts.zip	https://inport.nmfs.noaa.gov/inport/item/54373
Administrative boundaries	Coastal State Legislative Districts Senate	NOAA NMFS	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/CoastalStateLegislativeDistricts.zip	https://inport.nmfs.noaa.gov/inport/item/54374
Administrative boundaries	Coastal Counties	US Census Bureau	http://www2.census.gov/geo/tiger/TIGER2017/COUNTY/tl_2017_us_county.zip	https://inport.nmfs.noaa.gov/inport/item/54371
Administrative boundaries	Coastal States	NOAA	ftp://ftp.coast.noaa.gov/pub/MSP/ORT/CoastalStates.zip	https://inport.nmfs.noaa.gov/inport/item/54375
Administrative boundaries	COLREGS Demarcation line	USCG	https://www.northeastoceandata.org/data-download/?data=Marine%20Transportation	https://inport.nmfs.noaa.gov/inport/item/56121

Table A-2: Characterization of fisheries species, regional distribution, and regional contacts from the NMFS GARFO Sustainable Fisheries Division. Spatial Distributions are from modeled data.²⁹ Contact information for specific species leads can be located at the GARFO contacts page.³⁰ Due to the overlap of the AOI with the Northeast and Mid-Atlantic regions, species descriptions, spatial distribution, or fisheries management plans (FMPs) may come from either region. Importantly, not all species described herein have a spatial distribution model available or a specific FMP in place.

- 1) **Atlantic Herring:**
 - a. FMP: <https://www.fisheries.noaa.gov/management-plan/atlantic-herring-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/pelagic/atlantic-herring.html>
 - c. Contact at NMFS Sustainable Fisheries Division: Carrie Nordeen
- 2) **Longfin Squid:**
 - a. <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/invertebrate/longfin-squid.html>
 - b. Contact at NMFS Sustainable Fisheries Division: Doug Christel
- 3) **Shortfin Squid:**
 - a. FMP: <https://www.fisheries.noaa.gov/management-plan/atlantic-mackerel-squid-and-butterfish-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/invertebrate/shortfin-squid.html>
 - c. Contact at NMFS Sustainable Fisheries Division: Doug Christel
- 4) **Butterfish:**
 - a. FMP: <https://www.fisheries.noaa.gov/management-plan/atlantic-mackerel-squid-and-butterfish-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/pelagic/butterfish.html>
 - c. Contact at NMFS Sustainable Fisheries Division: Doug Christel
- 5) **Atlantic Mackerel**
 - a. FMP: <https://www.fisheries.noaa.gov/management-plan/atlantic-mackerel-squid-and-butterfish-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/pelagic/atlantic-mackerel.html>
 - c. Contact at NMFS Sustainable Fisheries Division: Doug Christel
- 6) **Scup:**
 - a. FMP: <https://www.fisheries.noaa.gov/management-plan/summer-flounder-scup-and-black-sea-bass-management-plan>
 - b. <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/other/scup.html>
 - c. Contact at NMFS Sustainable Fisheries Division: Emily Keiley
- 7) **Tilefish:**
 - a. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/other/tilefish.html>
 - b. Contact at NMFS Sustainable Fisheries Division: Doug Potts
- 8) **Summer Flounder (Fluke):**
 - a. FMP: <https://www.fisheries.noaa.gov/management-plan/summer-flounder-scup-and-black-sea-bass-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/flatfish/summer-flounder.html>
 - c. Contact at NMFS Sustainable Fisheries Division: Emily Keiley

²⁹ Please see <https://www.nefsc.noaa.gov/ecosys/modeling/> for more information.

³⁰ Contacts list: <https://www.fisheries.noaa.gov/contact/greater-atlantic-region-sustainable-fisheries-office>

9) **Atlantic Sea Scallop:**

- a. Original FMP: http://s3.amazonaws.com/nefmc.org/scallop_fmp.pdf
- b. FMP most recent amendments: <https://www.fisheries.noaa.gov/management-plan/atlantic-sea-scallop-management-plan>
- c. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/invertebrate/sea-scallop.html>
- d. Contact at NMFS Sustainable Fisheries Division: Shannah Jaburek and Travis Ford

10) **Black Sea Bass:**

- a. FMP: <https://www.fisheries.noaa.gov/management-plan/summer-flounder-scup-and-black-sea-bass-management-plan>
- b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/other/black-sea-bass.html>
- c. Contact at NMFS Sustainable Fisheries Division: Emily Keiley

11) **Red Hake:**

- a. Northeast Multispecies FMP: <https://www.fisheries.noaa.gov/management-plan/northeast-multispecies-management-plan>
- b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/gadoid/red-hake.html>
- c. Contact at NMFS Sustainable Fisheries Division: Michael Ruccio
- d. Other species in the Northeast Multispecies FMP: Atlantic Cod, Winter Flounder, Atlantic Halibut, Witch Flounder, Haddock, Yellowtail Flounder, Wolffish, Windowpane Flounder, Atlantic Pollock, White Hake, Ocean Pout, Acadian Redfish, Silver Hake, and the American Plaice. Some spatial distributions for these species are located at: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/flatfish.html>; <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/demersal/ocean-pout.html>; <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/gadoid.html>

12) **Lobster:**

- a. States and NOAA Fisheries cooperatively manage the American Lobster resource and fishery under the framework of the Atlantic States Marine Fisheries Commission (ASMFC). More information can be found at: <https://www.fisheries.noaa.gov/species/american-lobster>; the interstate FMP can be found at: <http://www.asmfc.org/species/american-lobster>; https://www.asmfc.org/uploads/file//5a0f06afLobsterDraftAddXXVI_JonahDraftAddIII_PublicComment.pdf
- b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/invertebrate/american-lobster.html>
- c. Published literature includes: <https://web.northeastern.edu/grabowskilab/wp-content/uploads/2012/04/Chang-et-al-2010-MEPS.pdf>; <http://www.asmfc.org/uploads/file/5bdb531a2018AmLobsterFMPReview.pdf>; https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Renewable-Energy/BOEM-final-report-formatted_12072016.pdf ; <https://seagrant.noaa.gov/News/Article/ArtMID/1660/ArticleID/2753/Sea-Grant-awards-2-million-to-advance-understanding-of-American-lobster-support-industry>
- d. Contact at NMFS Sustainable Fisheries Division: Allison Murphy, Laura Hansen

13) **Surf Clams/ Ocean Quahogs:**

- a. FMP: <https://www.fisheries.noaa.gov/management-plan/atlantic-surfclam-and-ocean-quahog-management-plan>
- b. Spatial Distribution: Model not found
- c. Contact at NMFS Sustainable Fisheries Division: Doug Potts

14) **Red Crab:**

- a. FMP: <https://www.nefmc.org/management-plans/red-crab>
- b. Spatial Distribution: Unavailable

- c. Contacts at NMFS Sustainable Fisheries Division: Michael Ruccio and Allison Murphy
- 15) **Monkfish:**
- a. FMP: <https://www.fisheries.noaa.gov/management-plan/monkfish-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/demersal/monkfish.html>
 - c. Contacts at NMFS Sustainable Fisheries Division: Peter Christopher, Mark Grant, Liz Sullivan
 - d. Other demersal fishes include the Longfin Sculpin, Northern Puffer, Northern Sea Robin, Sea Raven, and Stripped Sea Robin. Spatial distributions for these species are located at: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/demersal.html>
- 16) **Northern Skate Complex** (Winter Skate, Thorny Skate, Barndoor Skate, Rosette Skate, Little Skate, Smooth Skate, Clearnose skate)
- a. FMP: <https://www.fisheries.noaa.gov/management-plan/northeast-skate-complex-management-plan>
 - b. Spatial Distributions: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/elasmobranch.html>
 - c. Contact at NMFS Sustainable Fisheries Division: Michael Ruccio
- 17) **Jonah Crab:**
- a. FMP: <https://www.fisheries.noaa.gov/action/jonah-crab-fishery-interstate-fishery-management-plan-jonah-crab>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/invertebrate/jonah-crab.html>
 - c. Contacts at NMFS Sustainable Fisheries Division: Allison Murphy
- 18) **Bluefish:**
- a. FMP: <https://www.fisheries.noaa.gov/management-plan/bluefish-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/pelagic/bluefish.html>
 - c. Contacts at NMFS Sustainable Fisheries Division: unknown
 - d. Other pelagic fish: Alewife (anadromous), American Eel (catadromous), American Shad (anadromous), Atlantic Sturgeon (anadromous and ESA listed), Blueback Herring (anadromous), and the Northern Kingfish. Spatial distributions for these species are located at: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/pelagic.html>
- 19) **Spiny Dogfish:**
- a. FMP: <https://www.fisheries.noaa.gov/management-plan/spiny-dogfish-management-plan>
 - b. Spatial Distribution: <https://www.nefsc.noaa.gov/ecosys/spatial-analyses/elasmobranch/spiny-dogfish.html>
 - c. Contacts at NMFS Sustainable Fisheries Division: unknown
- 20) **Atlantic Salmon (protected)**
- a. FMP: <https://www.fisheries.noaa.gov/species/atlantic-salmon-protected>
 - b. Spatial Distribution: model not available (anadromous species)
 - c. Contacts at NMFS Sustainable Fisheries Division: unknown

Other Southeast Gillnet Waters Area - Southeastern US Atlantic Shark Gillnet Fishery North of 29°N (Nov 15 - Apr 15)	No	No	No	No	No	No	No	No
Maine Pocket Waters separating state/federal waters	No	No	No	No	No	No	No	No
Raised Footrope Trawl Whiting Fishery Exemption Area (Sept 1 - Nov 20)	No	No	No	No	No	No	No	No
Redfish Exemption Area and Cod Closure	No	No	No	No	No	No	No	No
Scallop Days-at-Sea Change to Declare Out of Fishery Transit with Product On Board Area	No	No	No	No	No	No	No	No
Restricted Gear Areas	No	No	No	No	No	No	No	No
Scallop Rotational Areas	No	No	No	No	No	No	No	No
Sector Small-Mesh Fishery Exemption Area	No	No	No	No	No	No	No	No
SNE/MA Winter Flounder Trawl Gear AM Areas	No	No	No	No	No	No	No	No
SNE Little Tunny Gillnet Exemption Area	No	No	No	No	No	No	No	No
SNE Monkfish and Skate Trawl Exemption Area	No	No	No	No	No	No	No	No
SNE Skate Bait Trawl Exemption Area	No	No	No	No	No	No	No	No
Southern Mid-Atlantic Management Area	No	No	No	No	No	No	No	No
Stellwagen Bank Management Area	No	No	No	No	No	No	No	No
Summer Flounder Fishery - Sea Turtle Protection Area	No	No	No	No	No	No	No	No
Tilefish Gear Restricted Areas	No	No	No	No	No	No	No	No
Waters Exempted from Minimum Traps per Trawl Requirement	No	No	No	No	No	No	No	No
Southern Windowpane and Ocean pout AM Area	No	No	No	No	No	No	No	No
Southern Nearshore Trap-Pot Waters Area	No	No	No	No	No	No	No	No

*Only a relatively small portion of site 5 overlaps with the cod spawning area

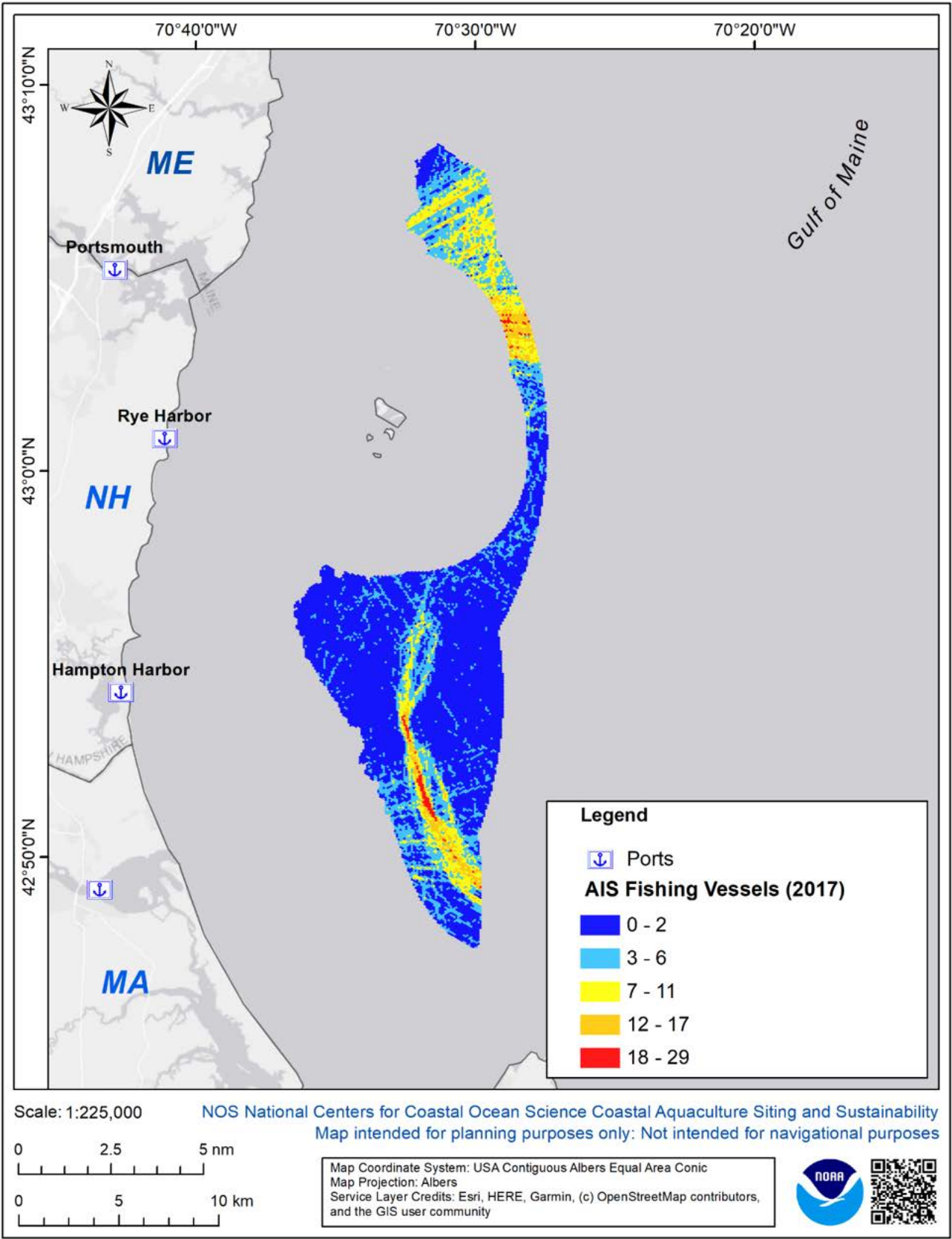


Figure A-1 (A): AIS fishing vessel transits/grid cell (2017) within the AOI.

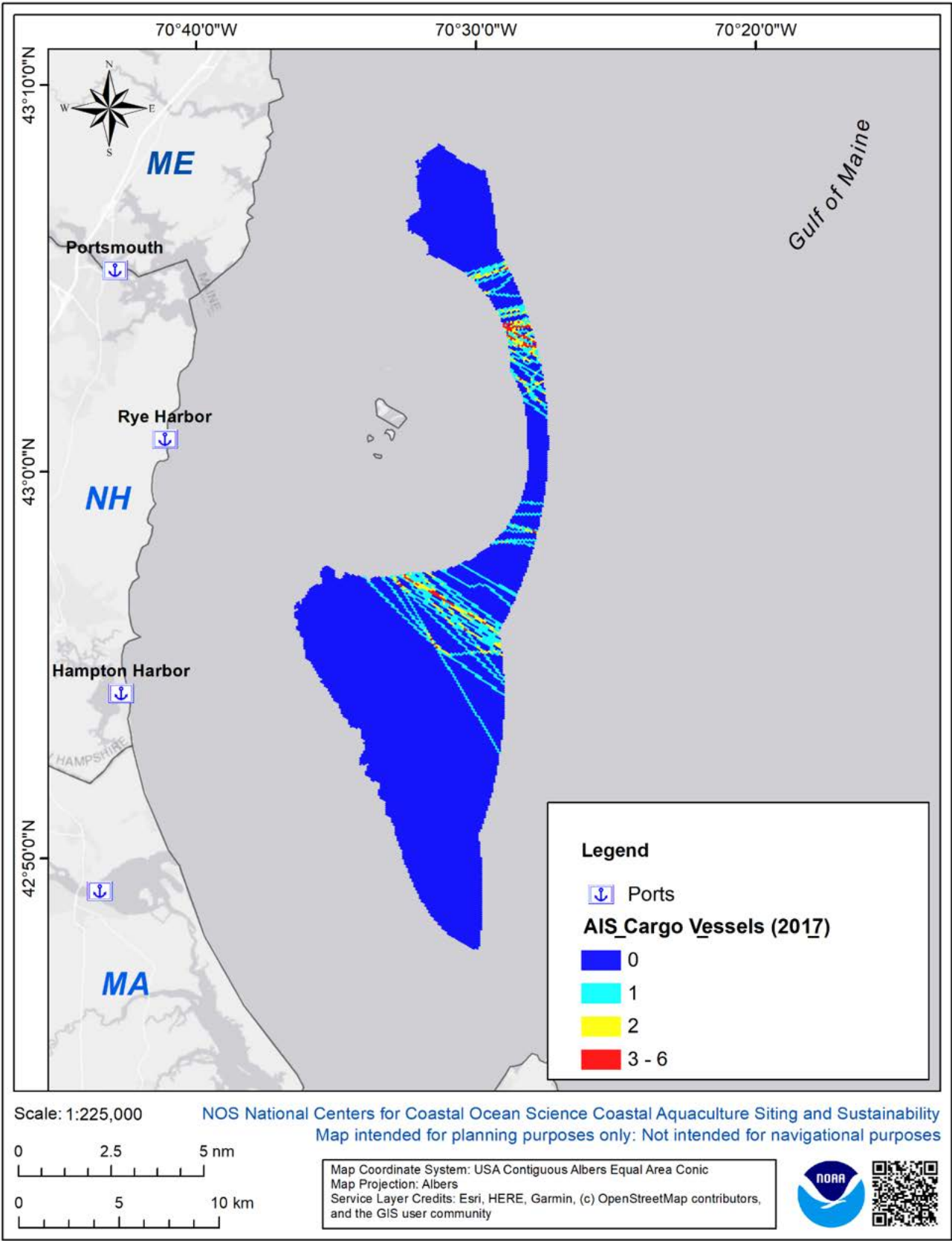


Figure A-1 (B): AIS cargo vessel transits/grid cell (2017) within the AOI.

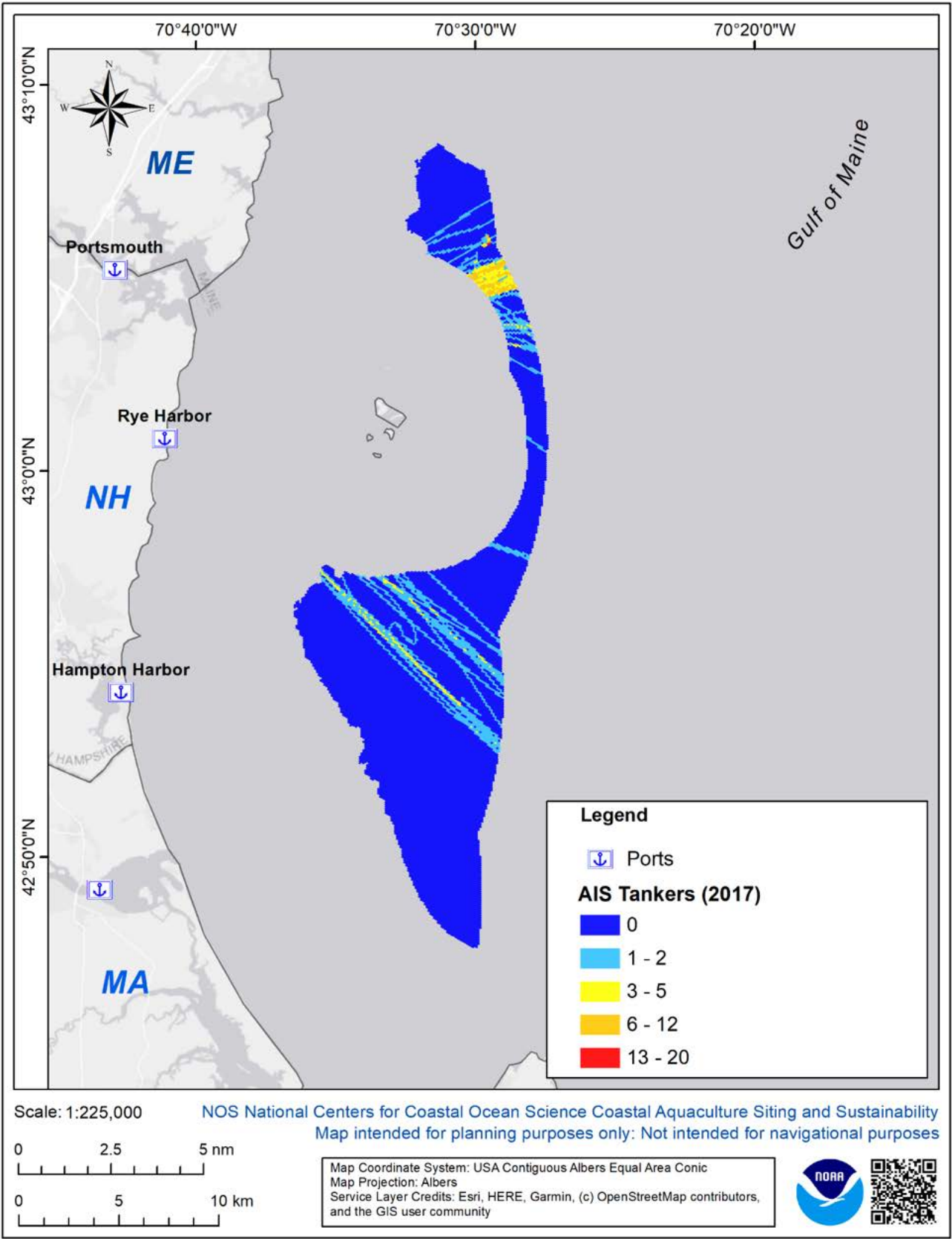


Figure A-1 (C): AIS tanker vessel transits/grid cell (2017) within the AOI.

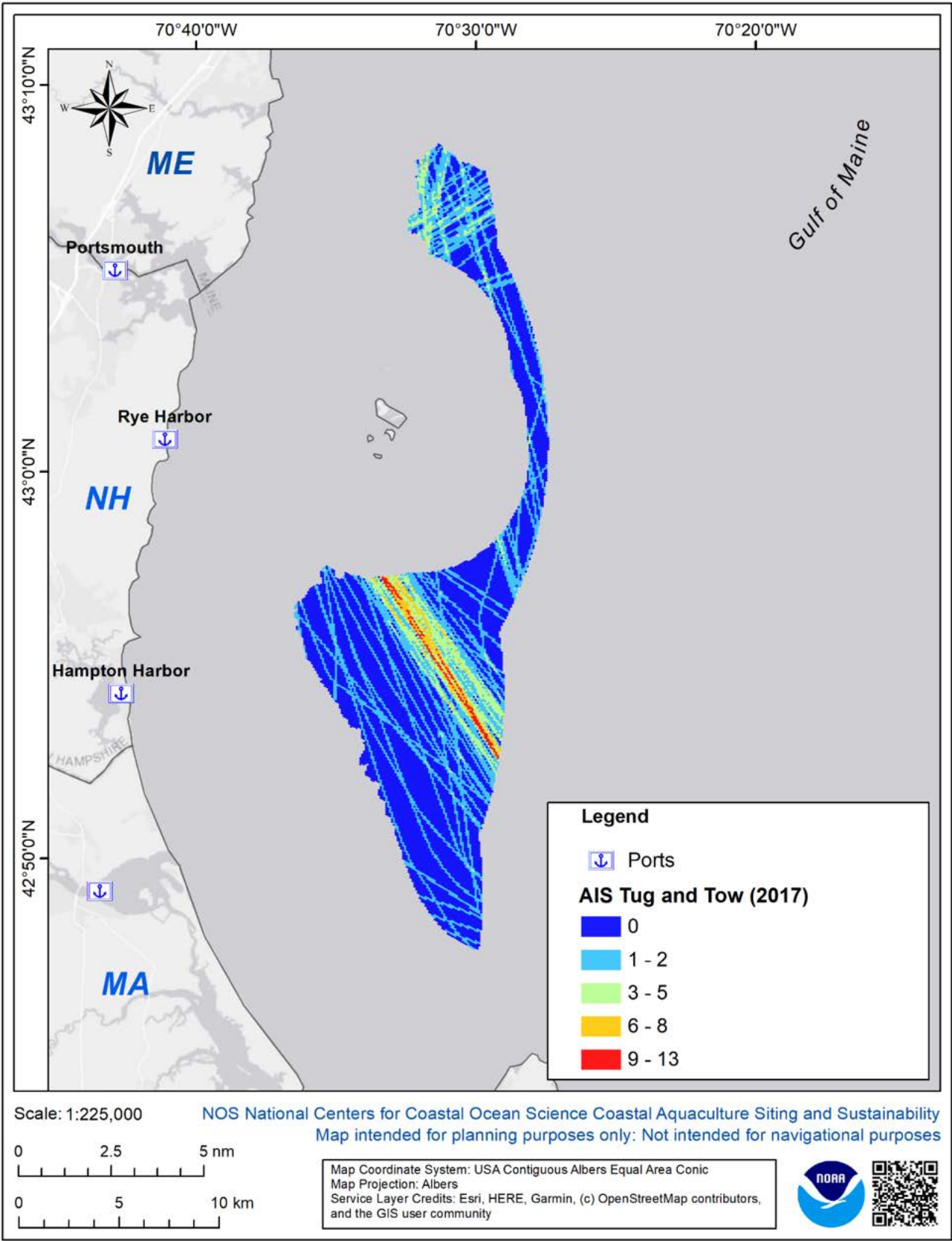


Figure A-1 (D): AIS tug and tow vessel transits/grid cell (2017) within the AOI.

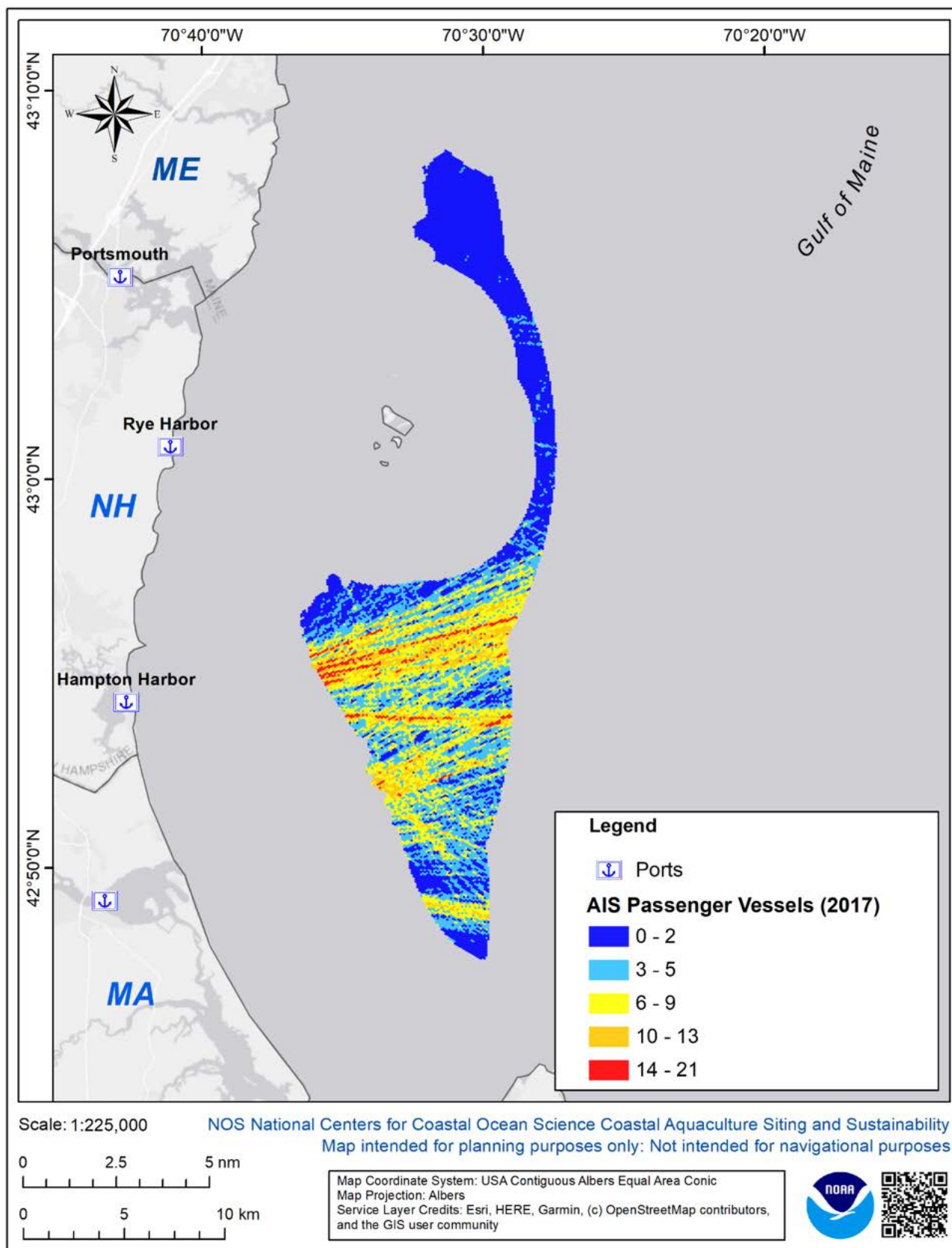


Figure A-1 (E): AIS passenger vessel transits/grid cell (2017) within the AOI.

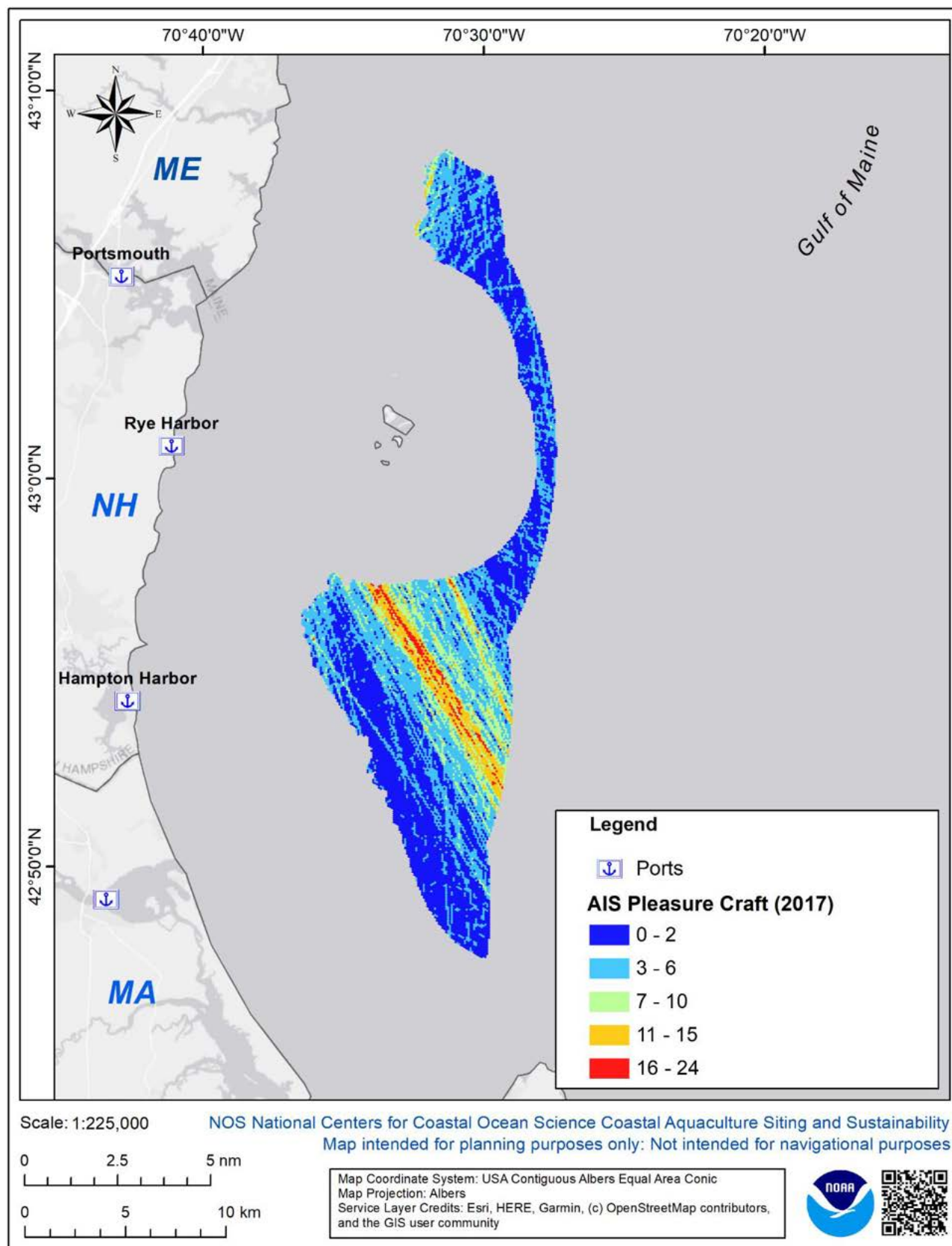


Figure A-1 (F): AIS pleasure craft/sailing vessel transits/grid cell (2017) within the AOI.

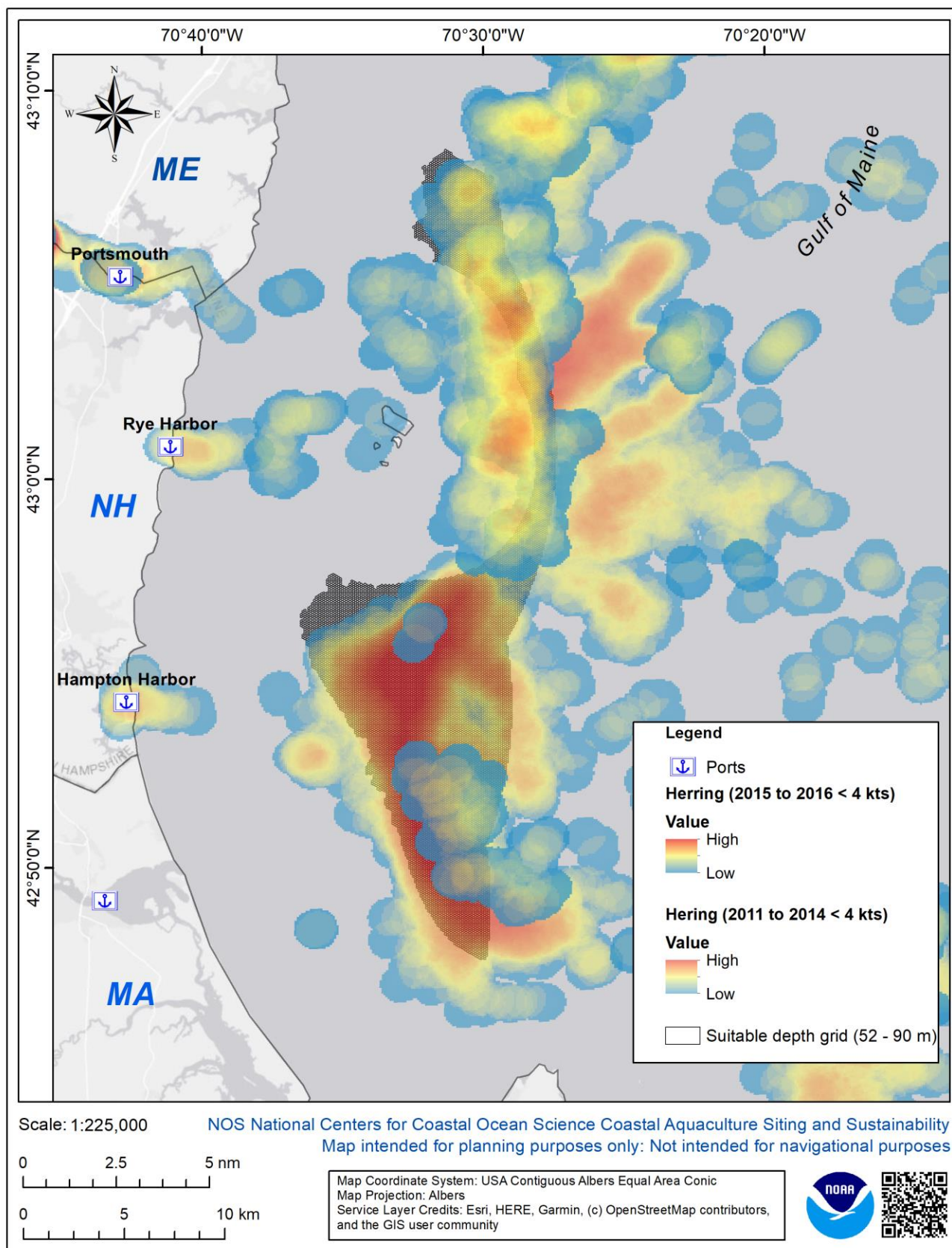


Figure A-2 (A). Generalized Vessel Monitoring System (VMS) data (NEOD 2018) for Atlantic Herring (2011 – 2016).

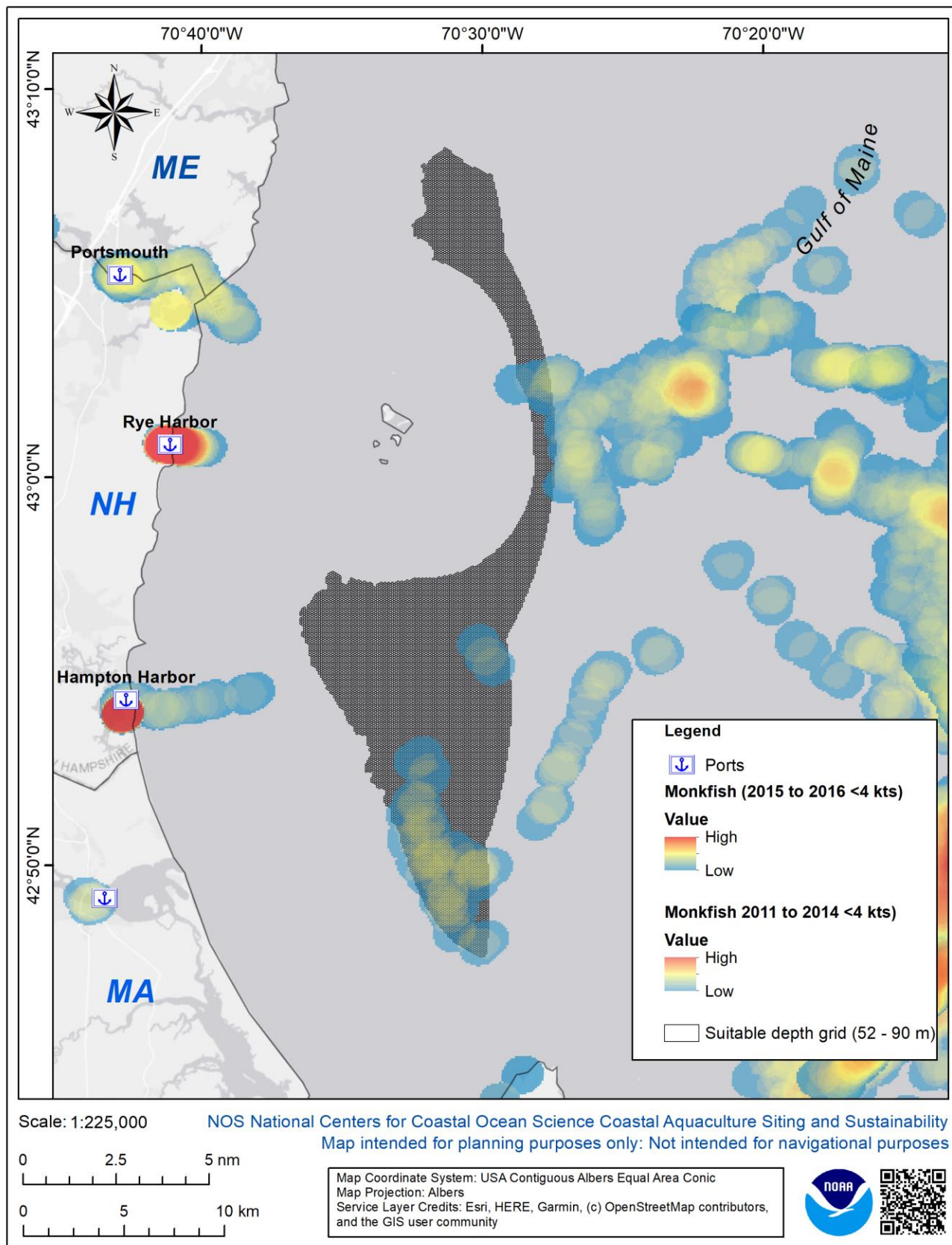


Figure A-2 (B). Generalized Vessel Monitoring System (VMS) data (NEOD 2018) for Monkfish (2011 – 2016).

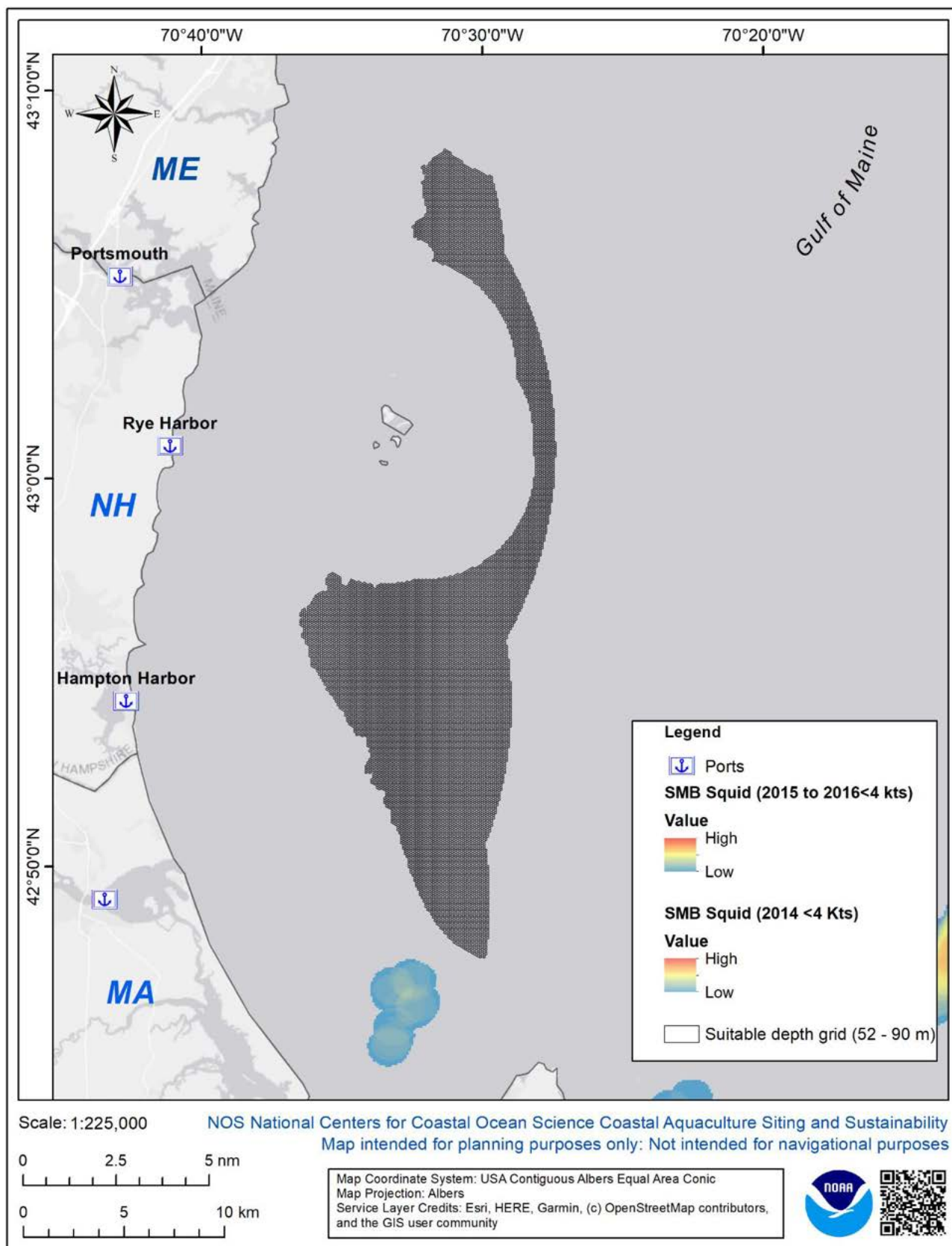


Figure A-2 (C). Generalized Vessel Monitoring System (VMS) data (NEOD 2018) for squid species in the Squid-Mackerel-Butterfish Complex (2011 – 2016).

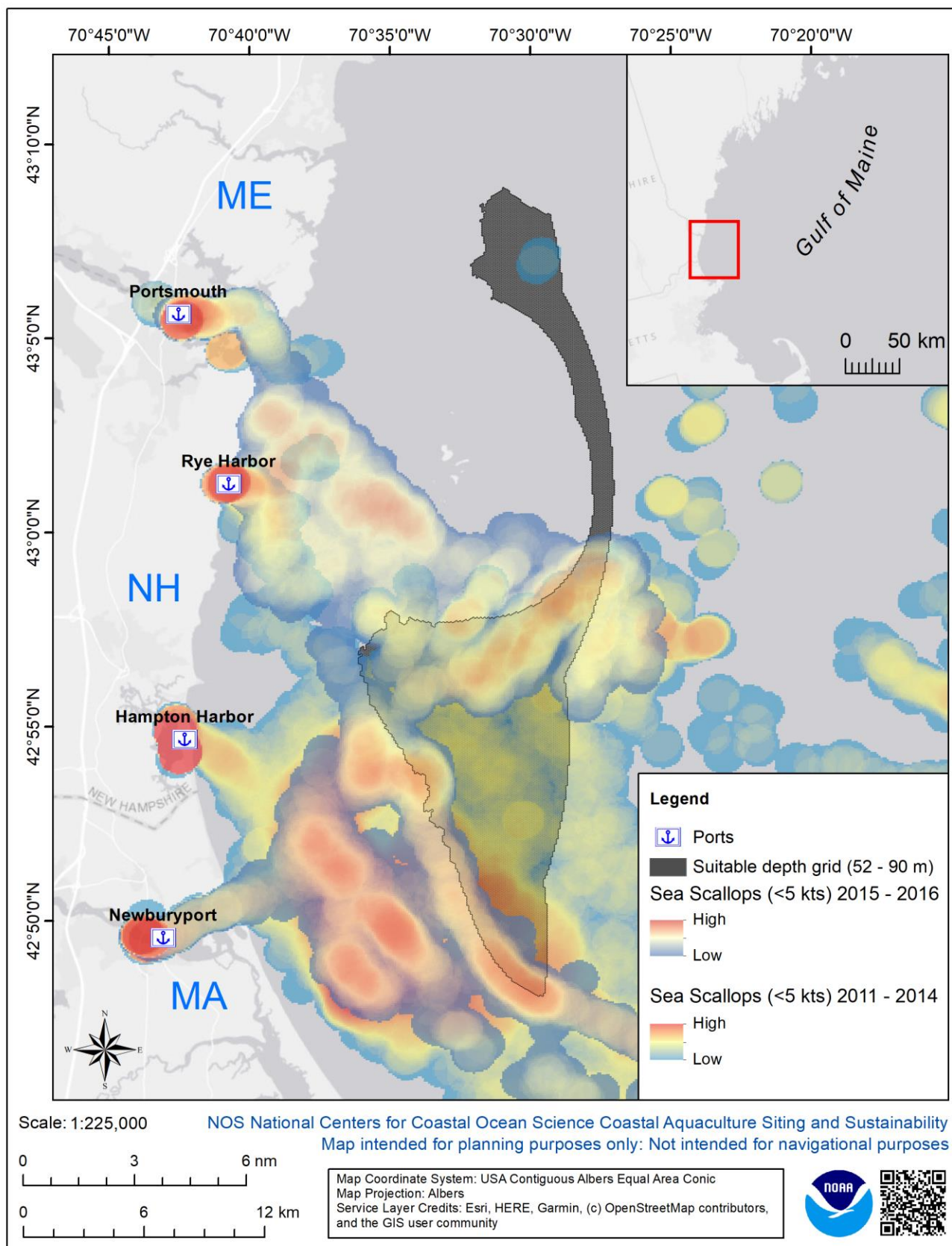


Figure A-2 (D). Generalized Vessel Monitoring System (VMS) data (NEOD 2018) for sea scallops. The VMS fishing data (2011 – 2016) indicated moderate to moderately high presence of this activity within the AOI.

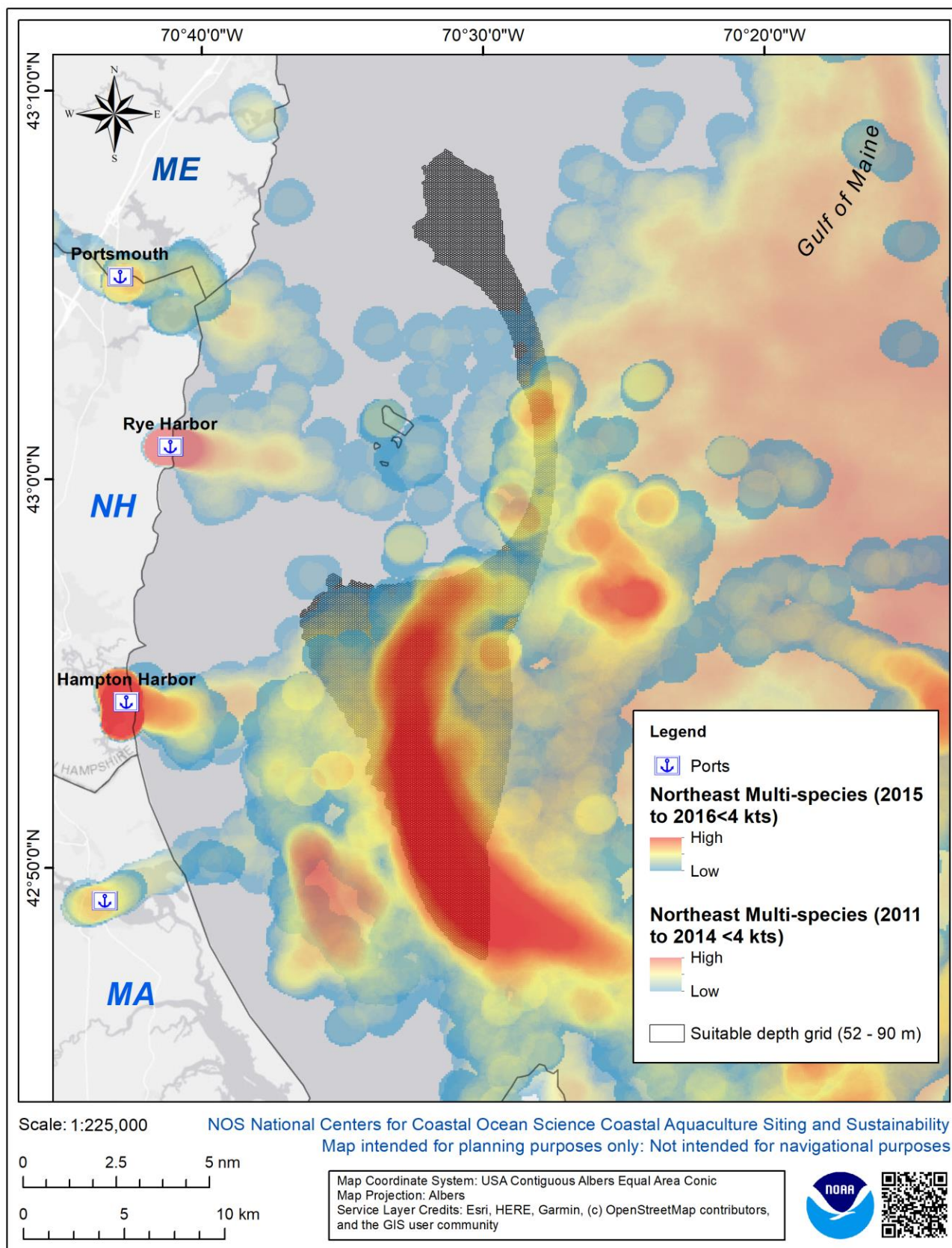


Figure A-2 (E). Generalized Vessel Monitoring System (VMS) data (NEOD 2018) for multispecies groundfish (i.e., Cod, Haddock, American Plaice, Witch Flounder, Winter Flounder, Yellowtail Flounder, Redfish, Pollock and White Hake) (2011 – 2016).

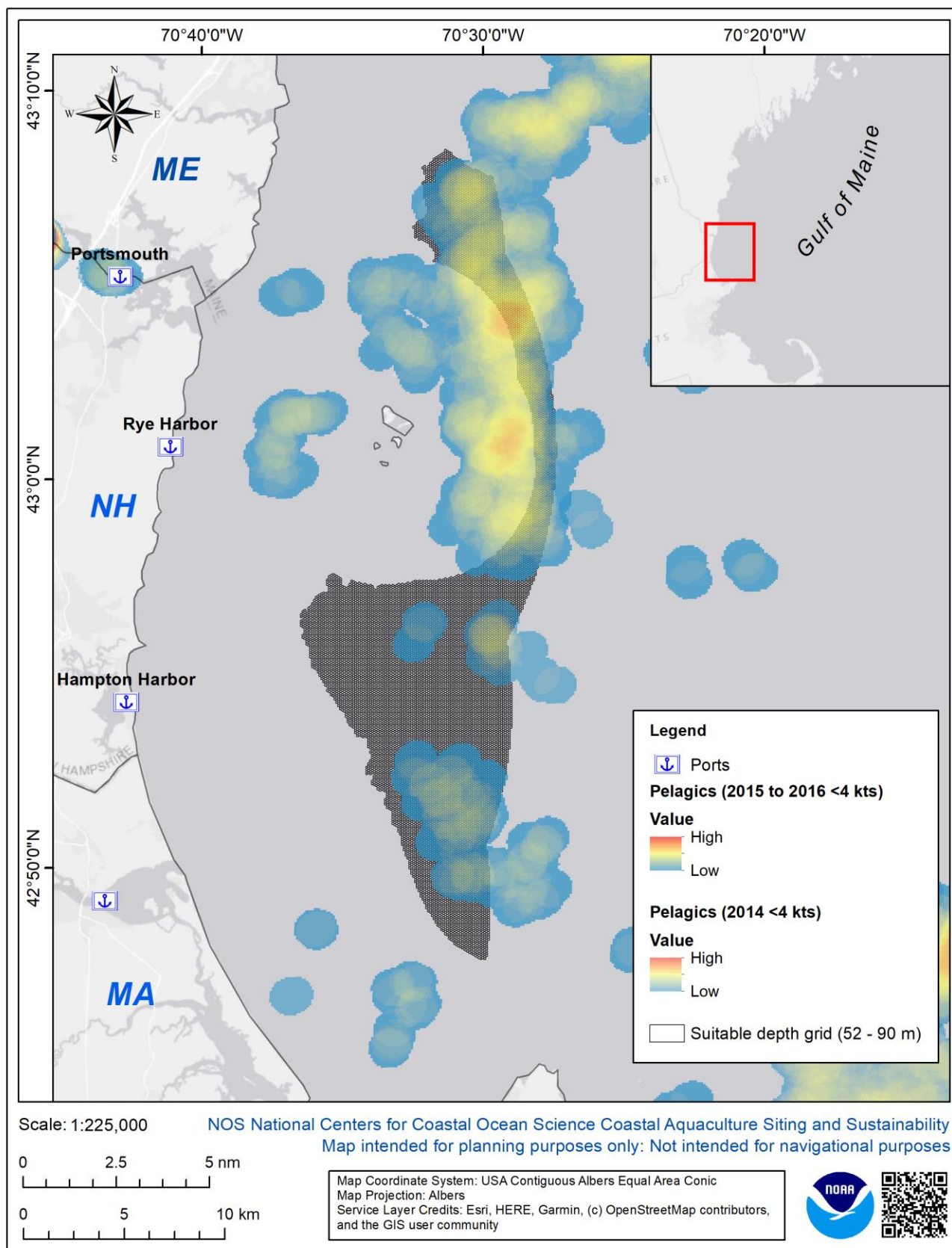


Figure A-2 (F). Generalized Vessel Monitoring System (VMS) data (NEOD 2018) for pelagic species (Herring-Squid-Mackerel) (2011 – 2016).

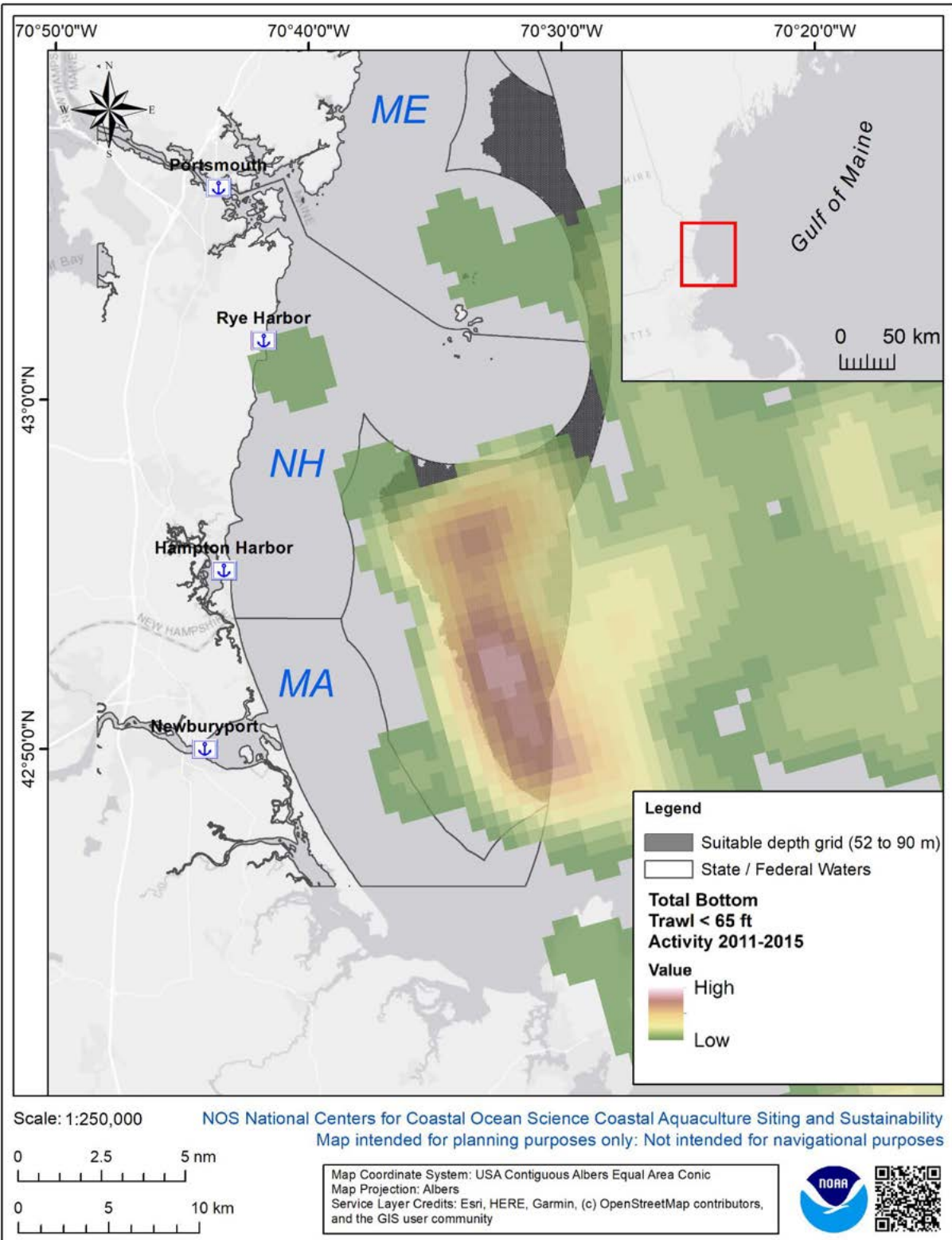


Figure A-3 (A). Generalized data using Vessel Trip Reports (VTR) to show different fishing gear types and effort over time. Total bottom trawls (vessels < 65' from 2011 – 2015) are illustrated here. These heat maps indicating effort (green is lower effort, while red is higher effort) were then overlaid (using the web service from Northeast Ocean Data) with the AOI to determine where the largest areas of usage for these gears occurred within the AOI.

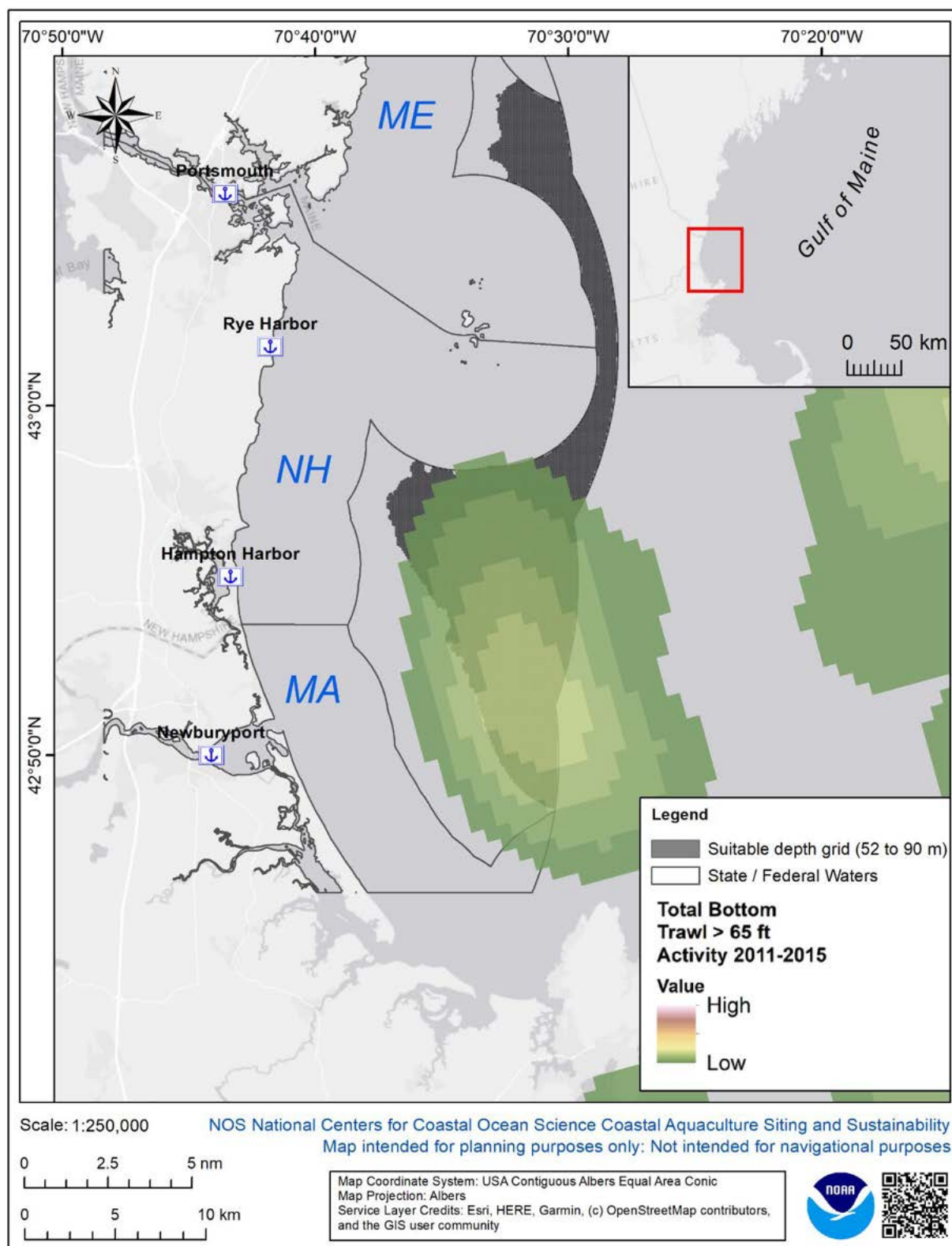


Figure A-3 (B). Generalized data using Vessel Trip Reports (VTR) to show different fishing gear types and effort over time. Total bottom trawls (vessels > 65' from 2011 – 2015) are illustrated here. These heat maps indicating effort (green is lower effort, while red is higher effort) were then overlaid (using the web service from Northeast Ocean Data) with the AOI to determine where the largest areas of usage for these gears occurred within the AOI.

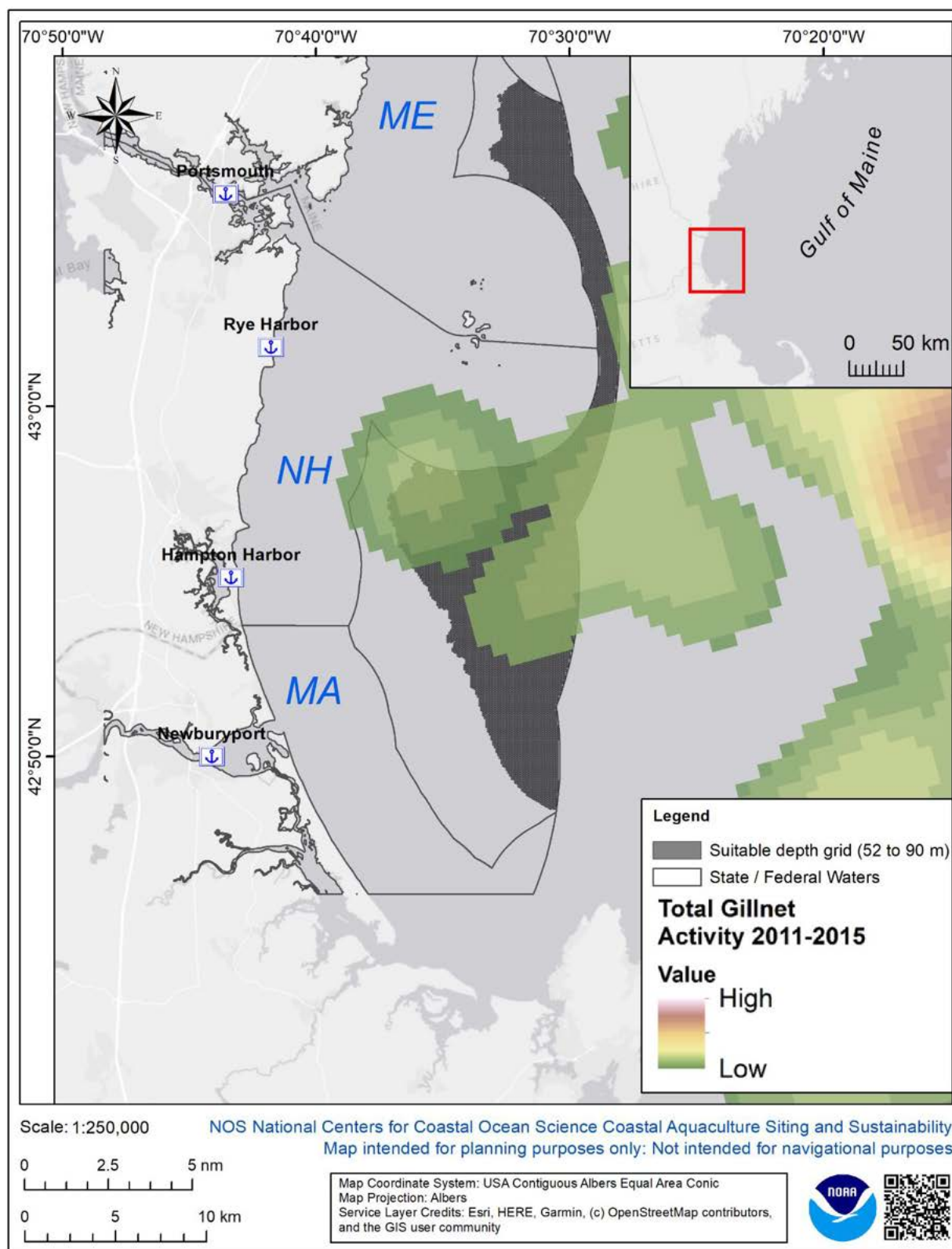


Figure A-3 (C). Generalized data using Vessel Trip Reports (VTR) to show different fishing gear types and effort over time. Total gillnet activity between 2011 and 2015 is illustrated here. These heat maps indicating effort (green is lower effort, while red is higher effort) were then overlaid (using the web service from Northeast Ocean Data) with the AOI to determine where the largest areas of usage for these gears occurred within the AOI.

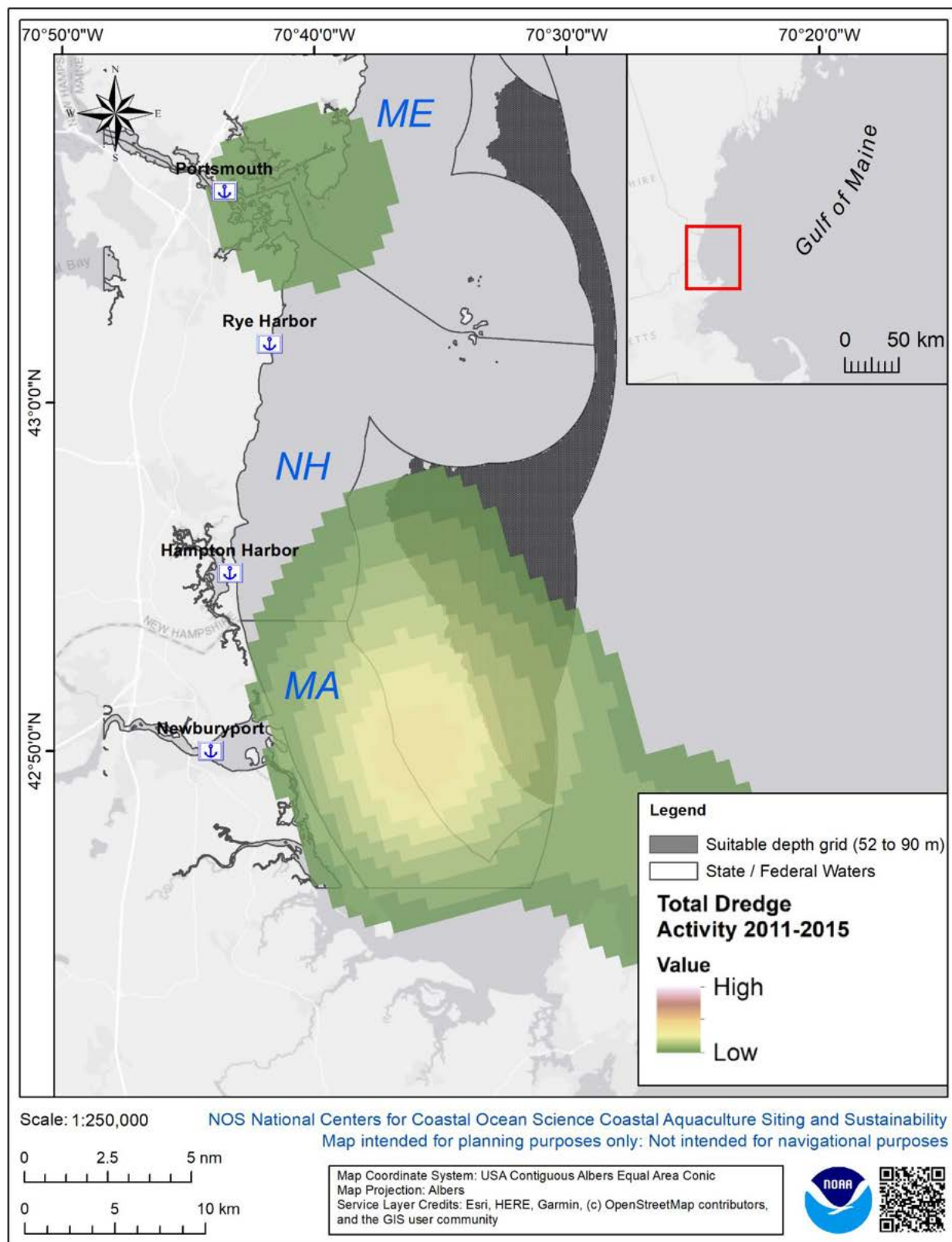


Figure A-3 (D). Generalized data using Vessel Trip Reports (VTR) to show different fishing gear types and effort over time. Total scallop dredge activity between 2011 and 2015 is illustrated here. These heat maps indicating effort (green is lower effort, while red is higher effort) were then overlaid (using the web service from Northeast Ocean Data) with the AOI to determine where the largest areas of usage for these gears occurred within the AOI.

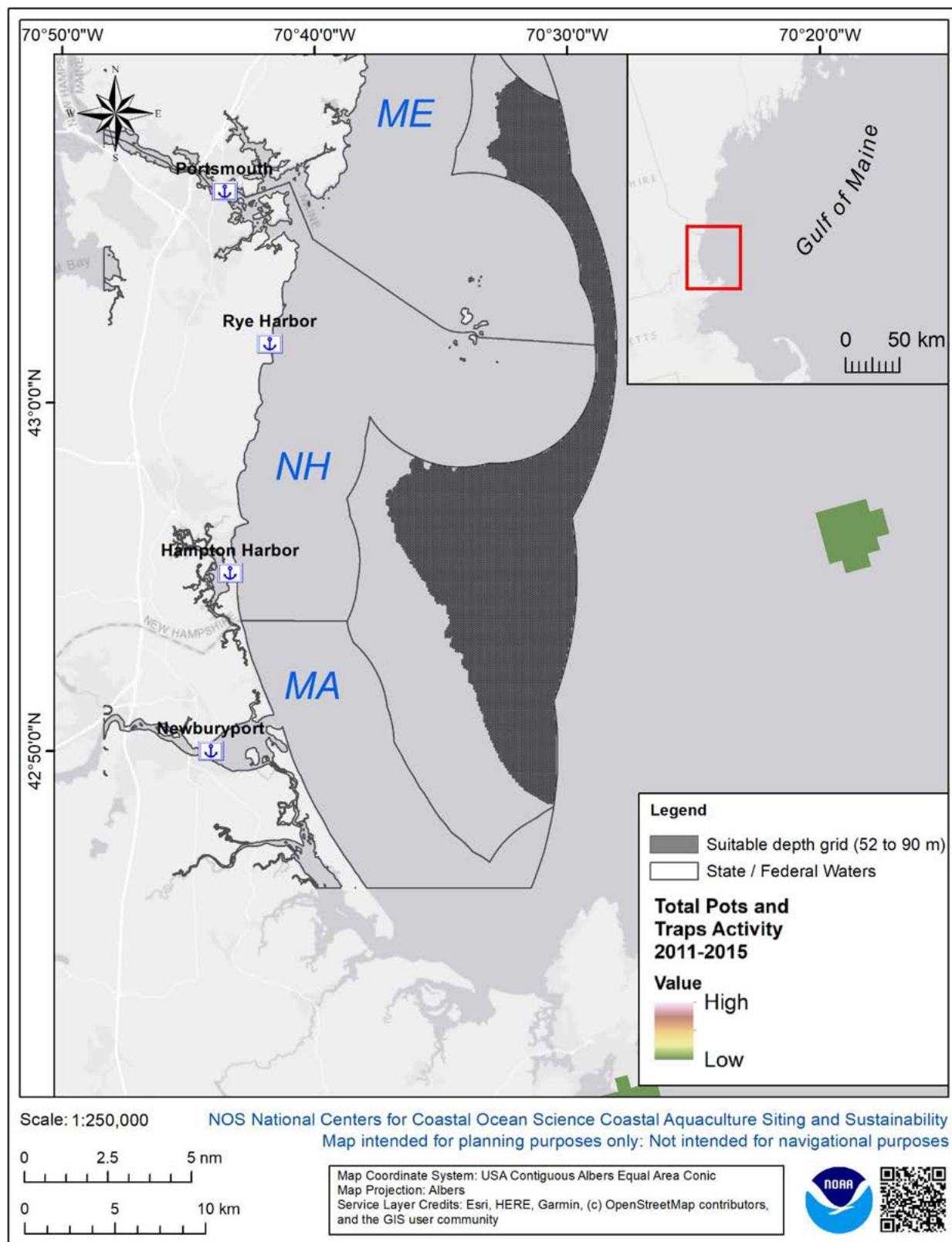


Figure A-3 (E). Generalized data using Vessel Trip Reports (VTR) to show different fishing gear types and effort over time. Total pots and traps activity between 2011 and 2015 is illustrated here. These heat maps indicating effort (green is lower effort, while red is higher effort) were then overlaid (using the web service from Northeast Ocean Data) with the AOI to determine where the largest areas of usage for these gears occurred within the AOI.

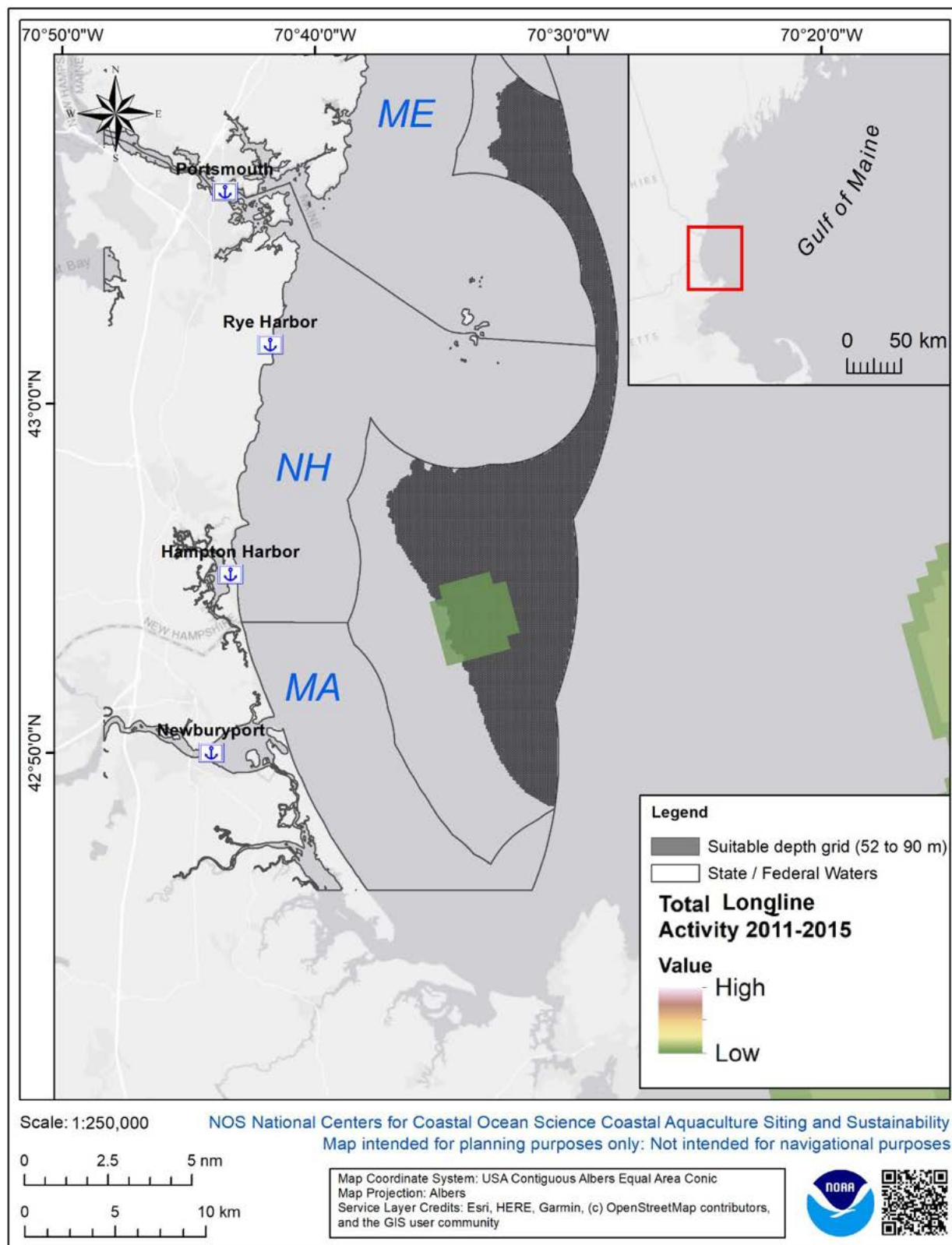


Figure A-3 (F). Generalized data using Vessel Trip Reports (VTR) to show different fishing gear types and effort over time. Total longline activity between 2011 and 2015 is illustrated here. These heat maps indicating effort (green is lower effort, while red is higher effort) were then overlaid (using the web service from Northeast Ocean Data) with the AOI to determine where the largest areas of usage for these gears occurred within the AOI.

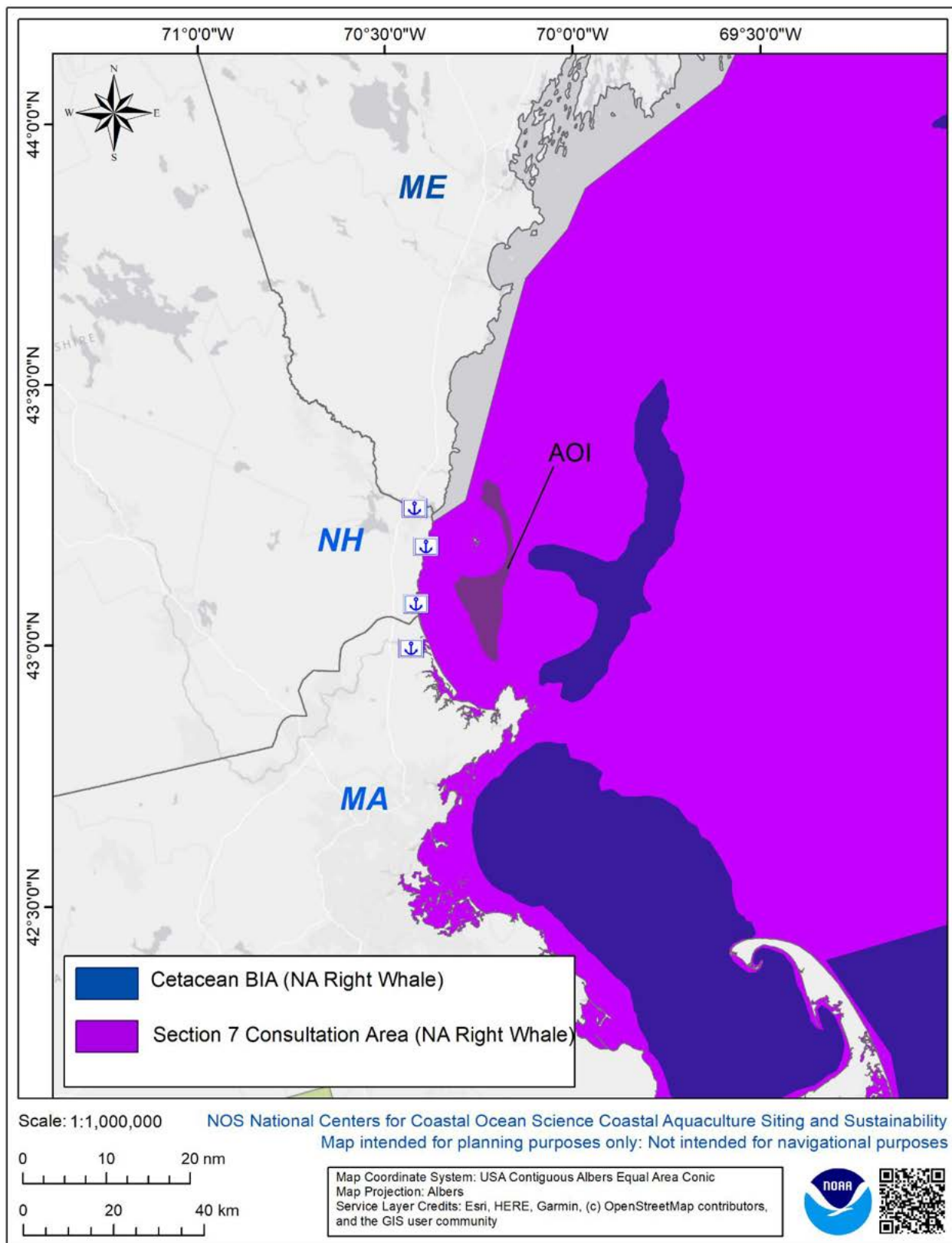


Figure A-4: North Atlantic Right Whale (NARW) Section 7 area and the NARW cetacean BIA for feeding, and relative overlap with the AOI.

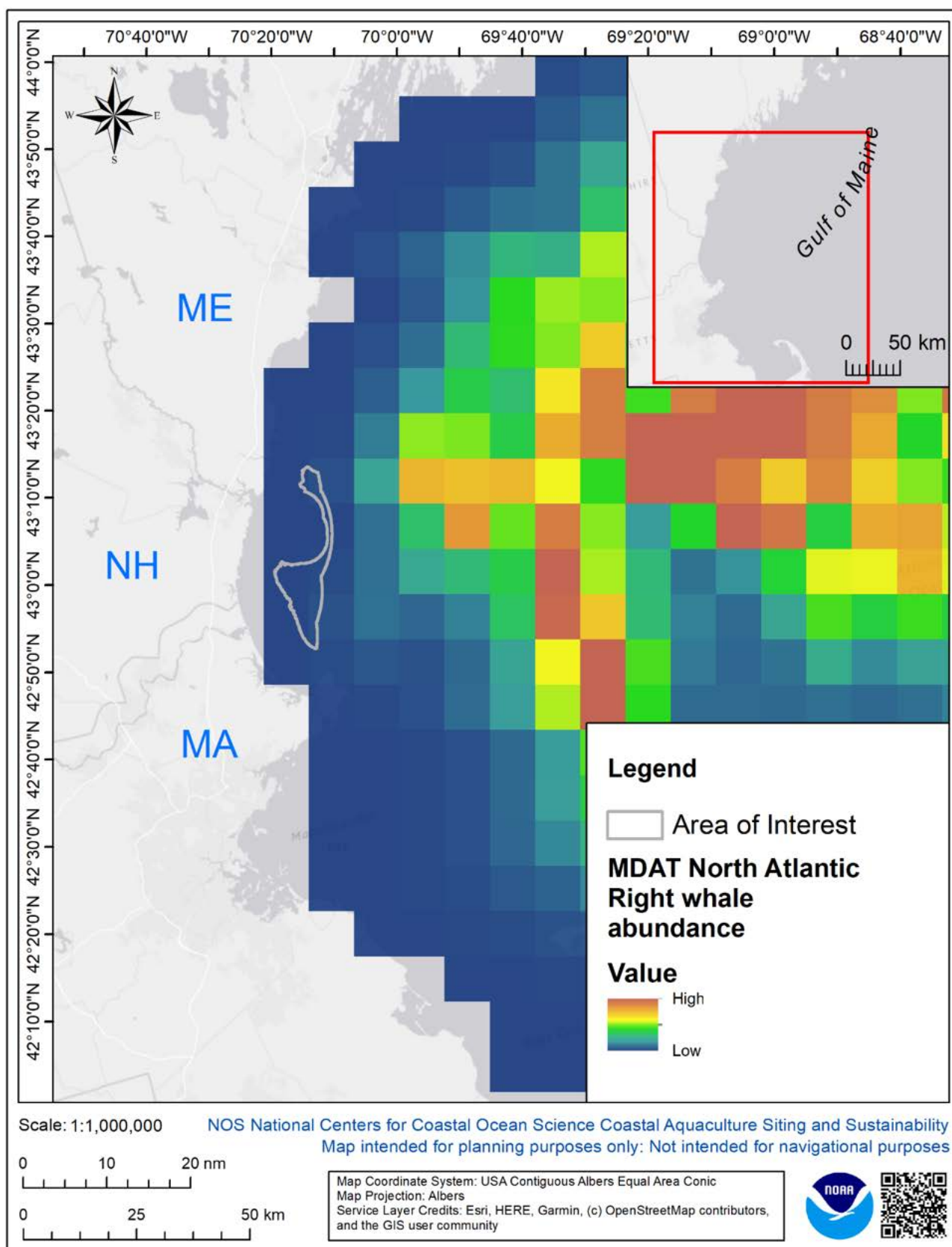


Figure A-5 (A). Annual mean abundance of North Atlantic Right Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

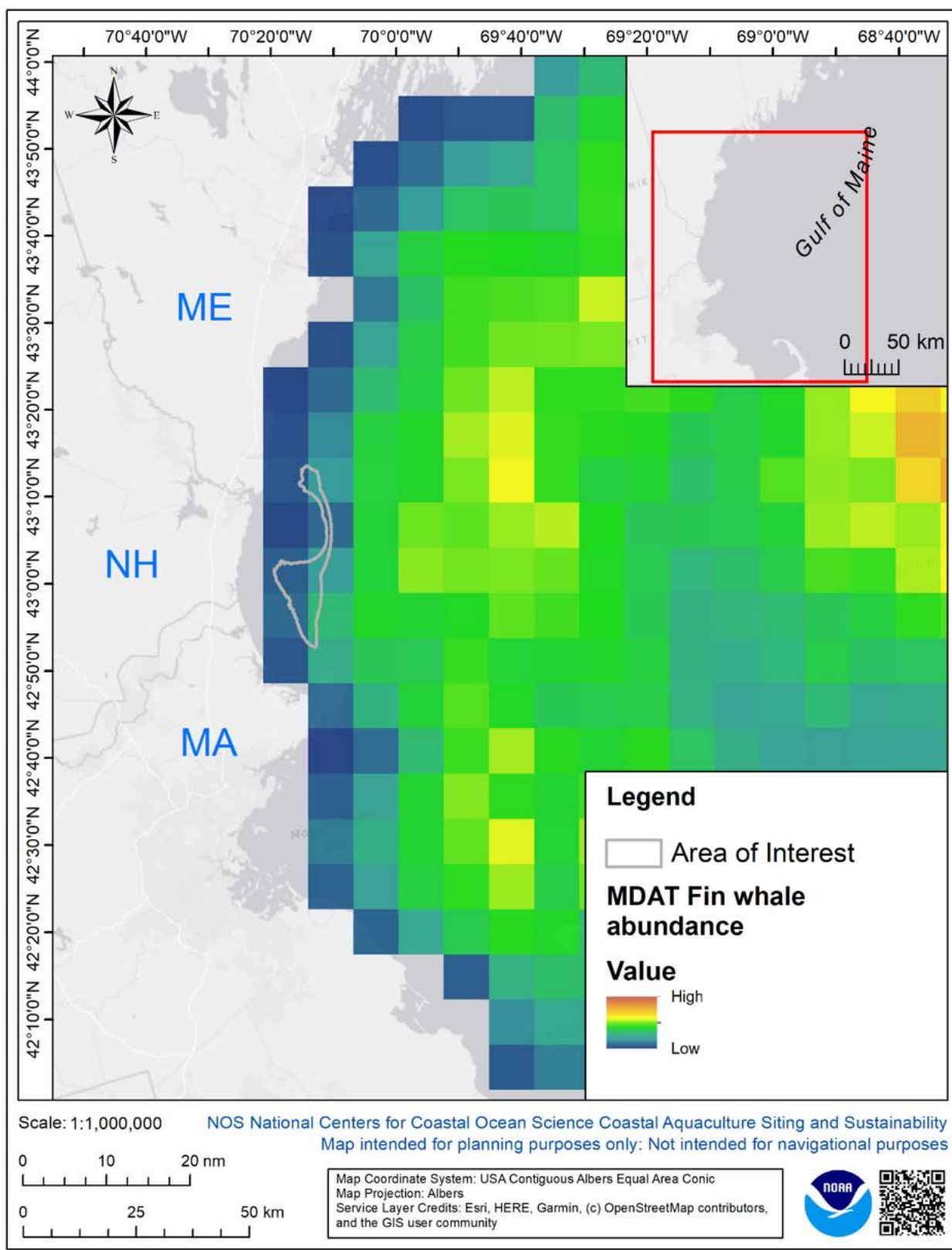


Figure A-5 (B). Annual mean abundance of Fin Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

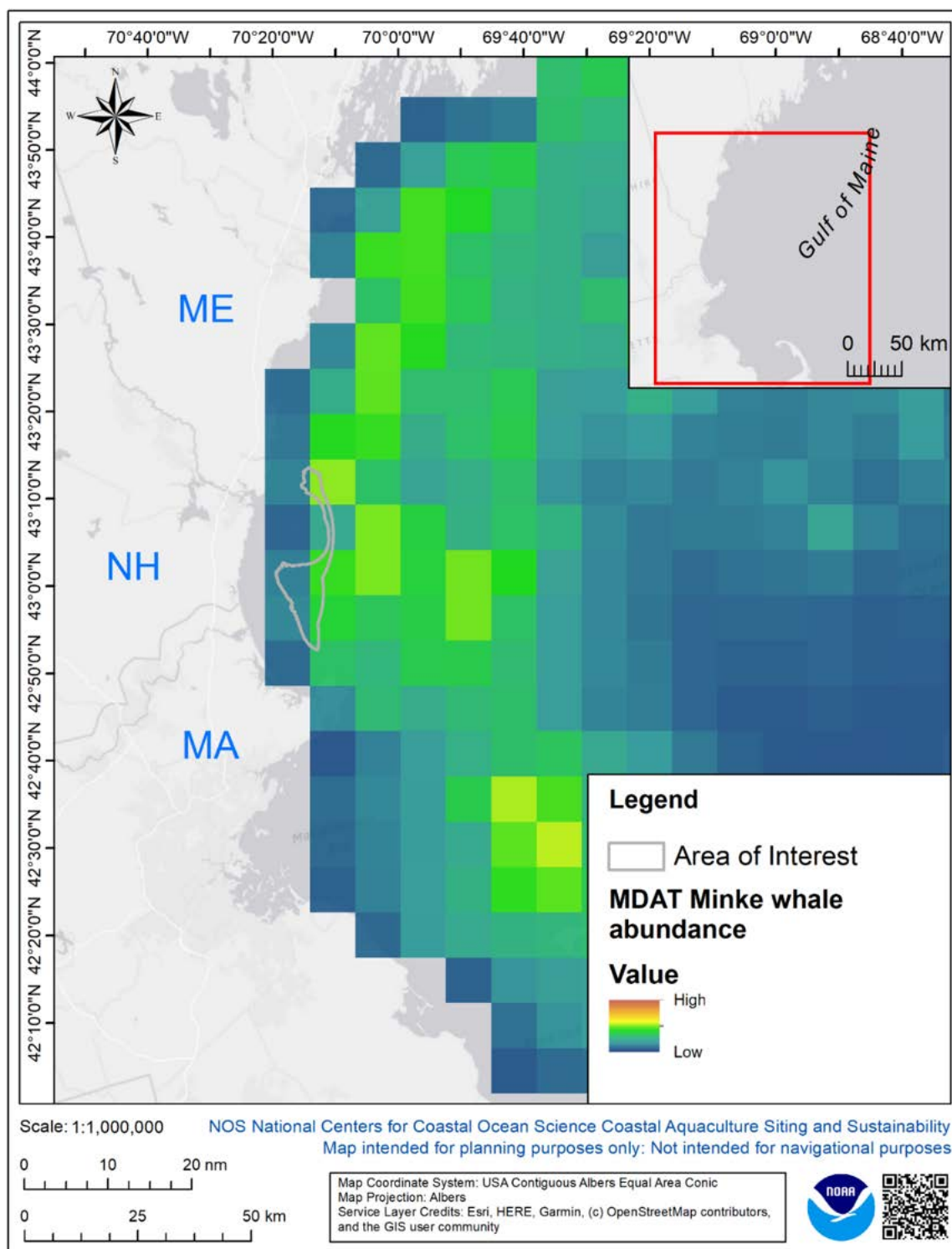


Figure A-5 (C). Annual mean abundance of Minke Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

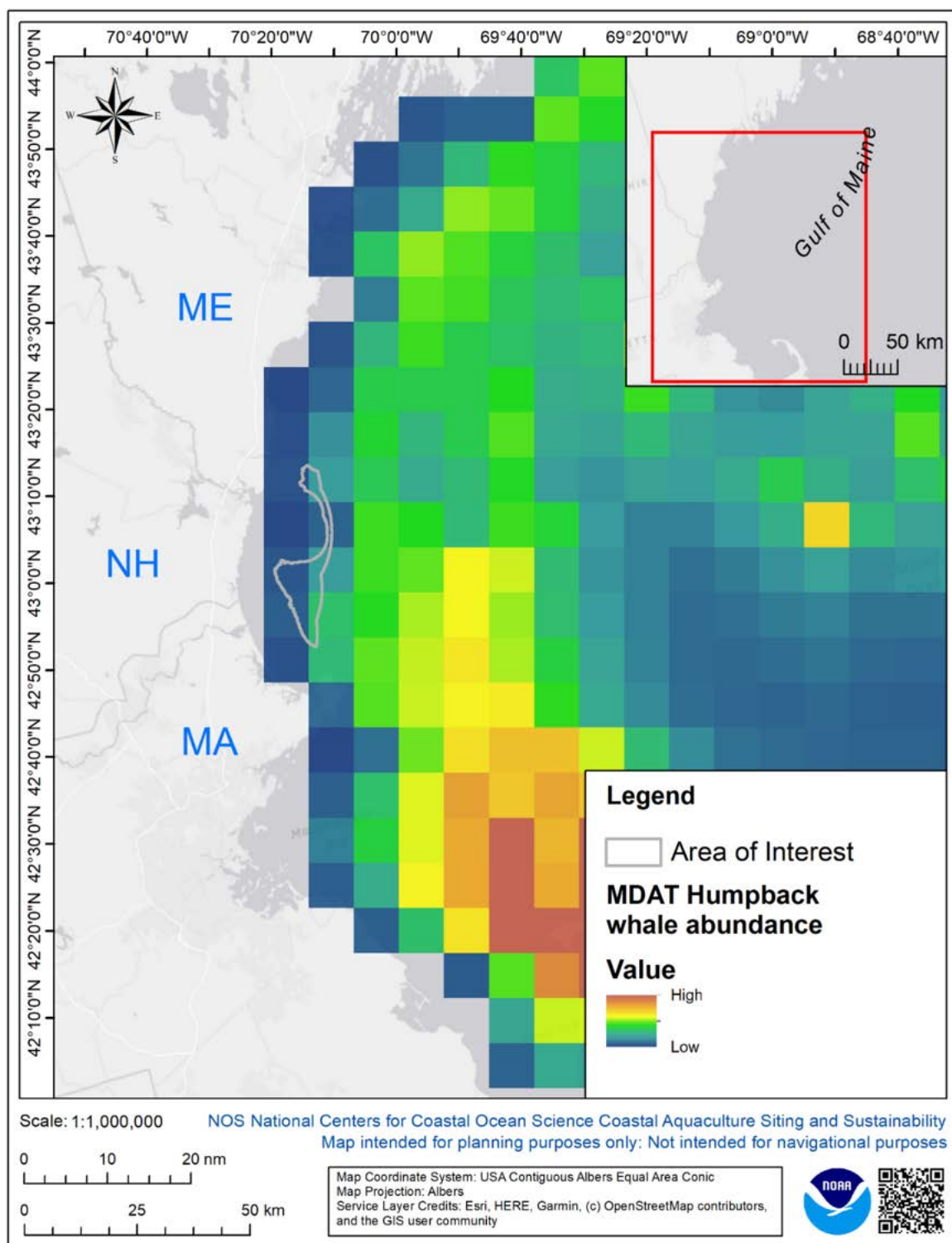


Figure A-5 (D). Annual mean abundance of Humpback Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

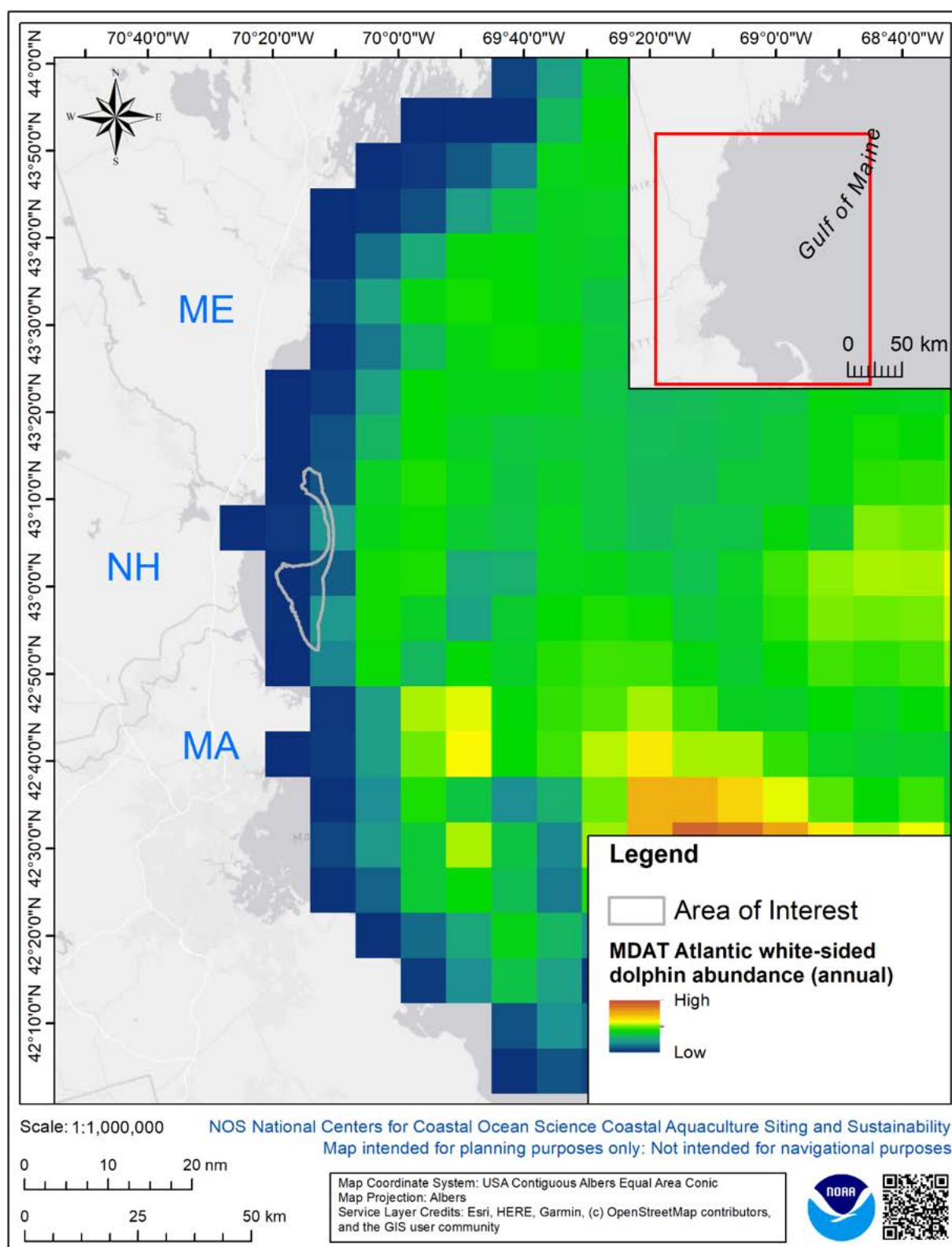


Figure A-5 (E). Annual mean abundance of Atlantic White-sided dolphin and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

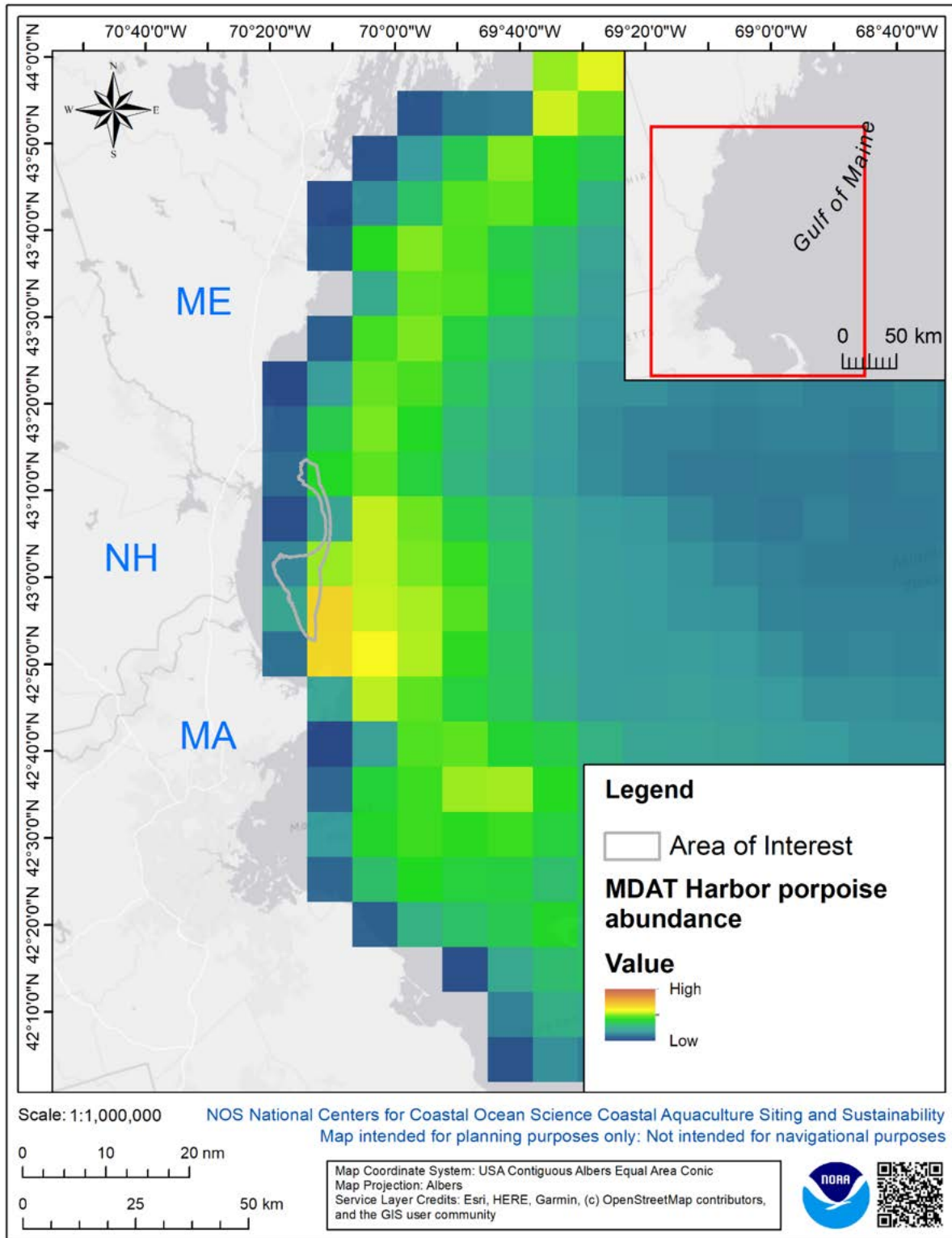


Figure A-5 (F). Annual mean abundance of Harbor Porpoise and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

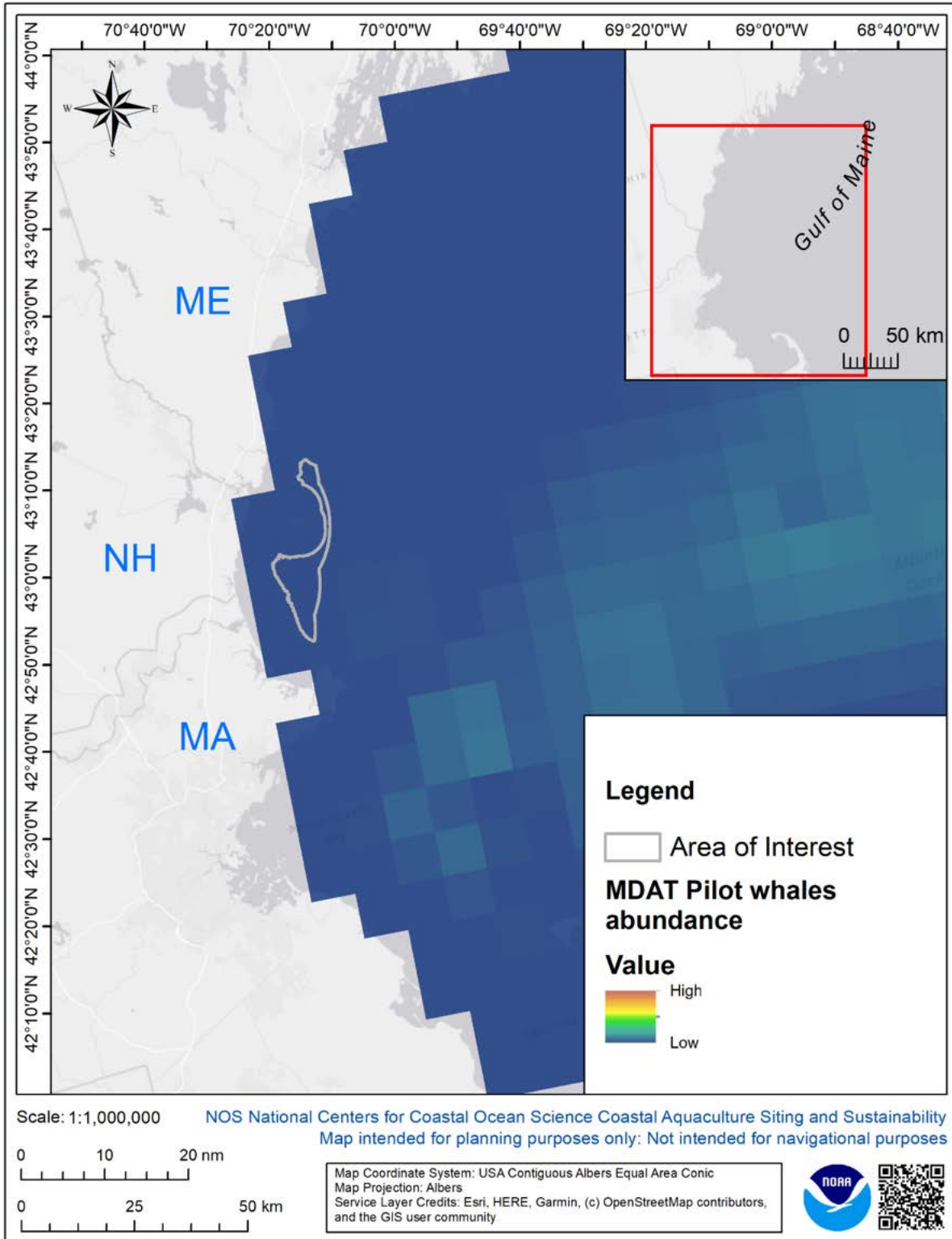


Figure A-5 (G). Annual mean abundance of Pilot Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

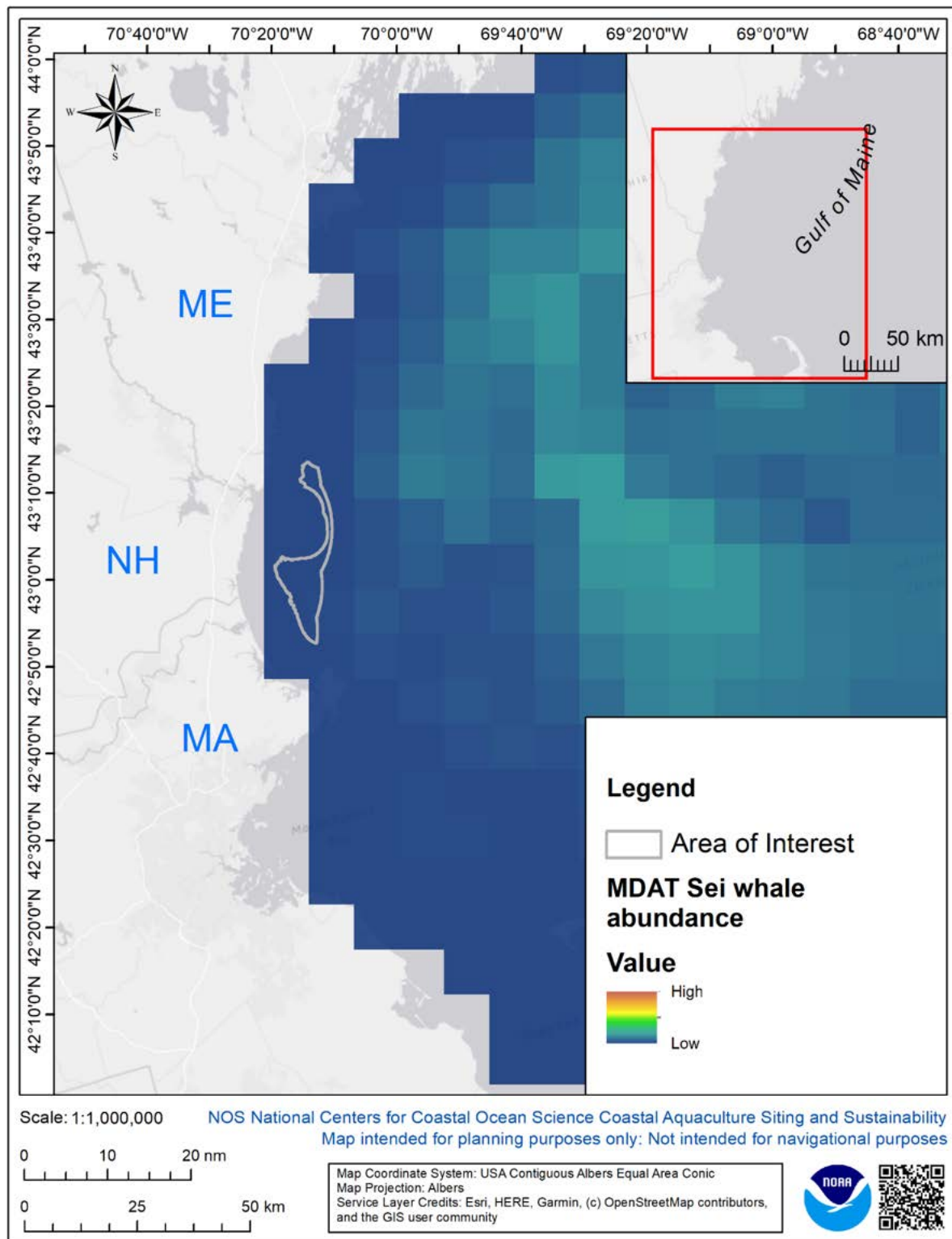


Figure A-5 (H). Annual mean abundance of Pilot Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

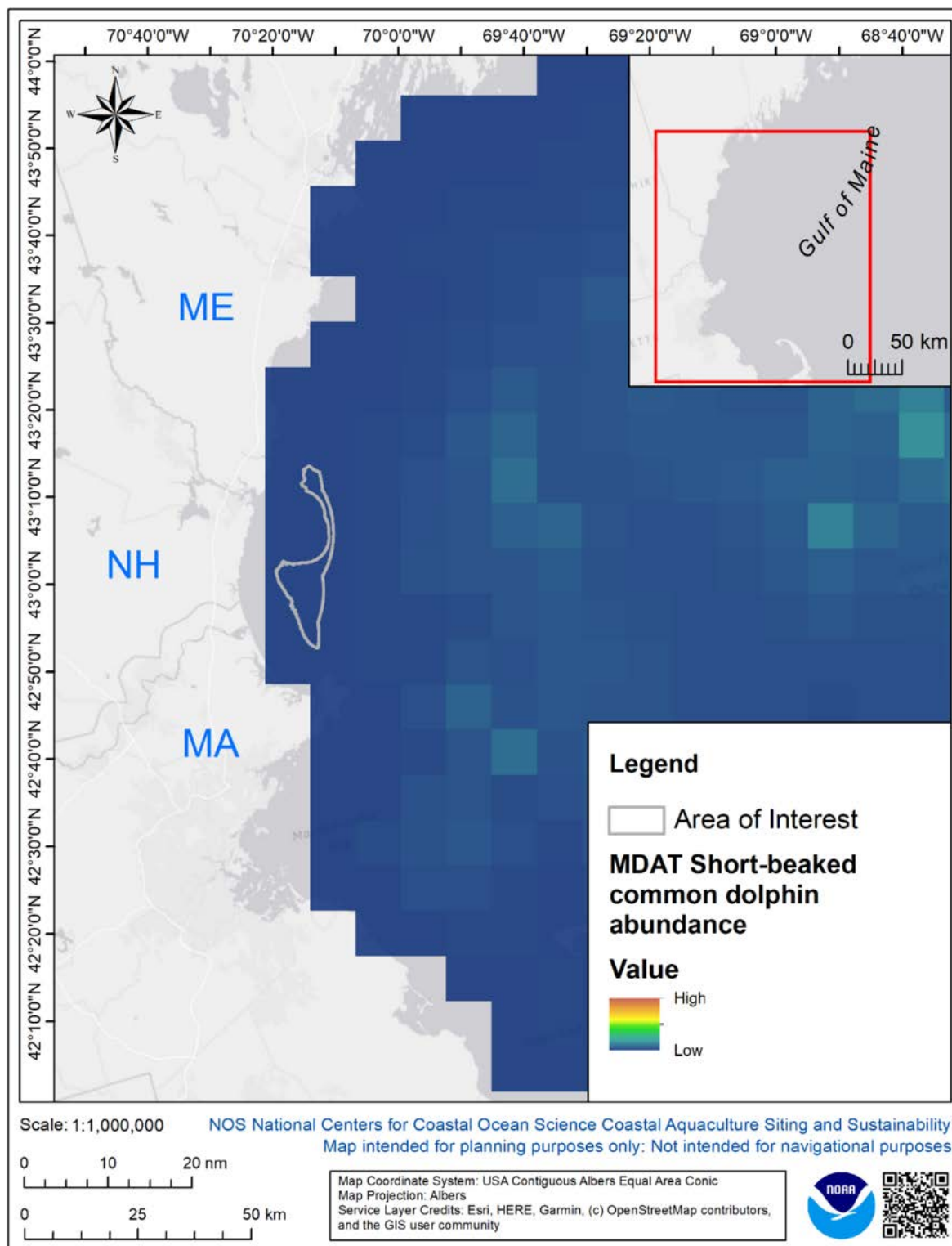


Figure A-5 (I). Annual mean abundance of Pilot Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

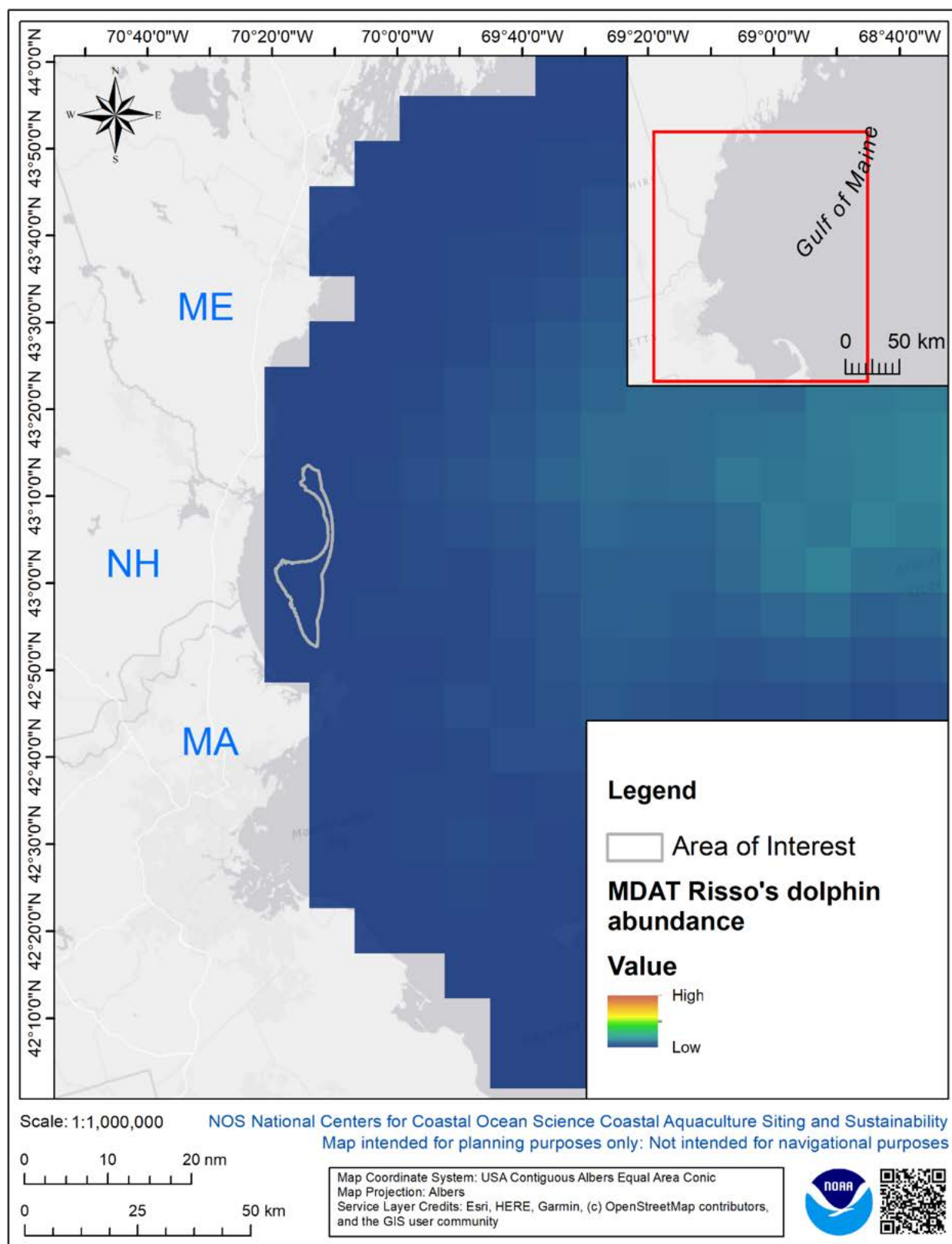


Figure A-5 (J). Annual mean abundance of Risso's dolphin and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

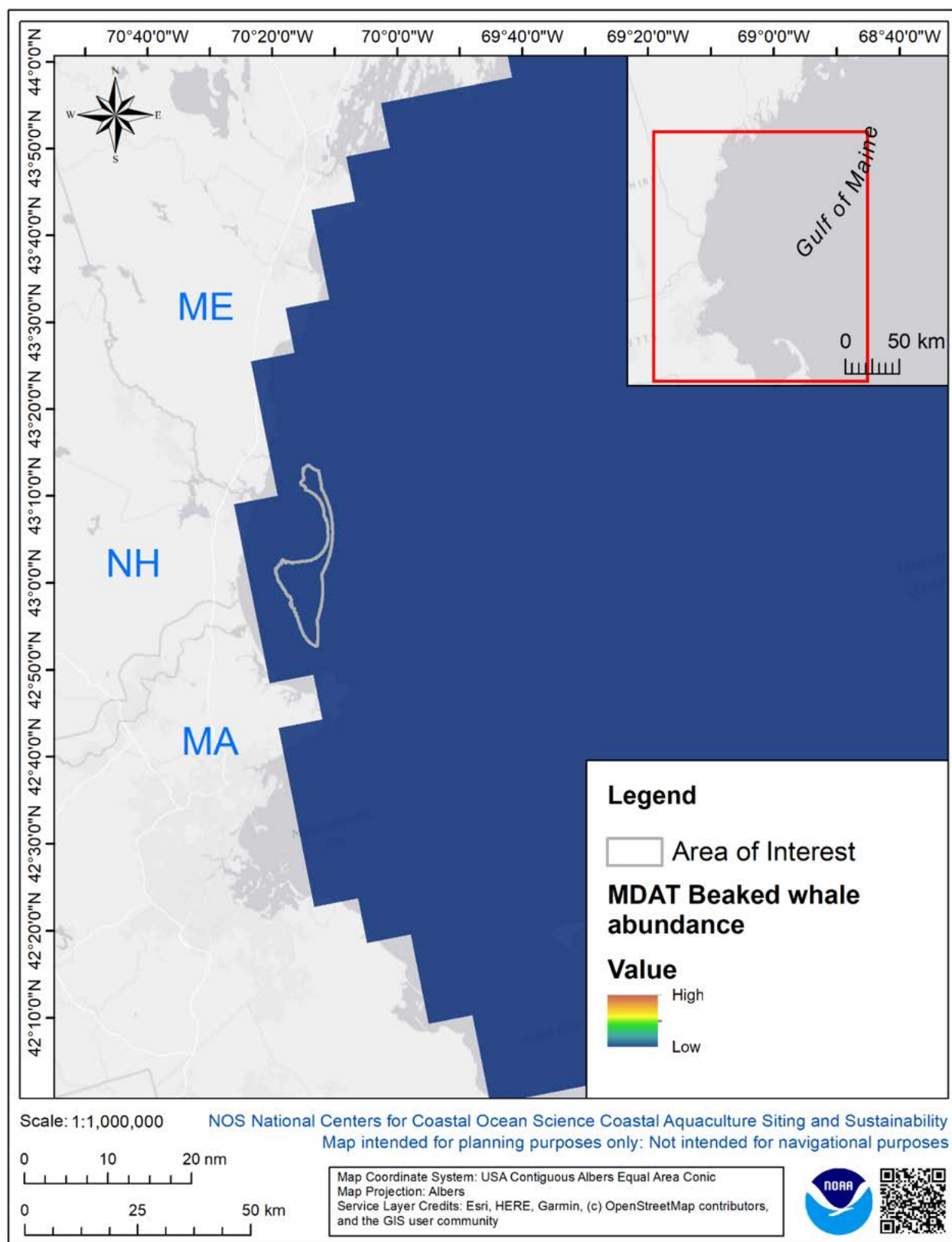


Figure A-5 (J). Annual mean abundance of Beaked whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

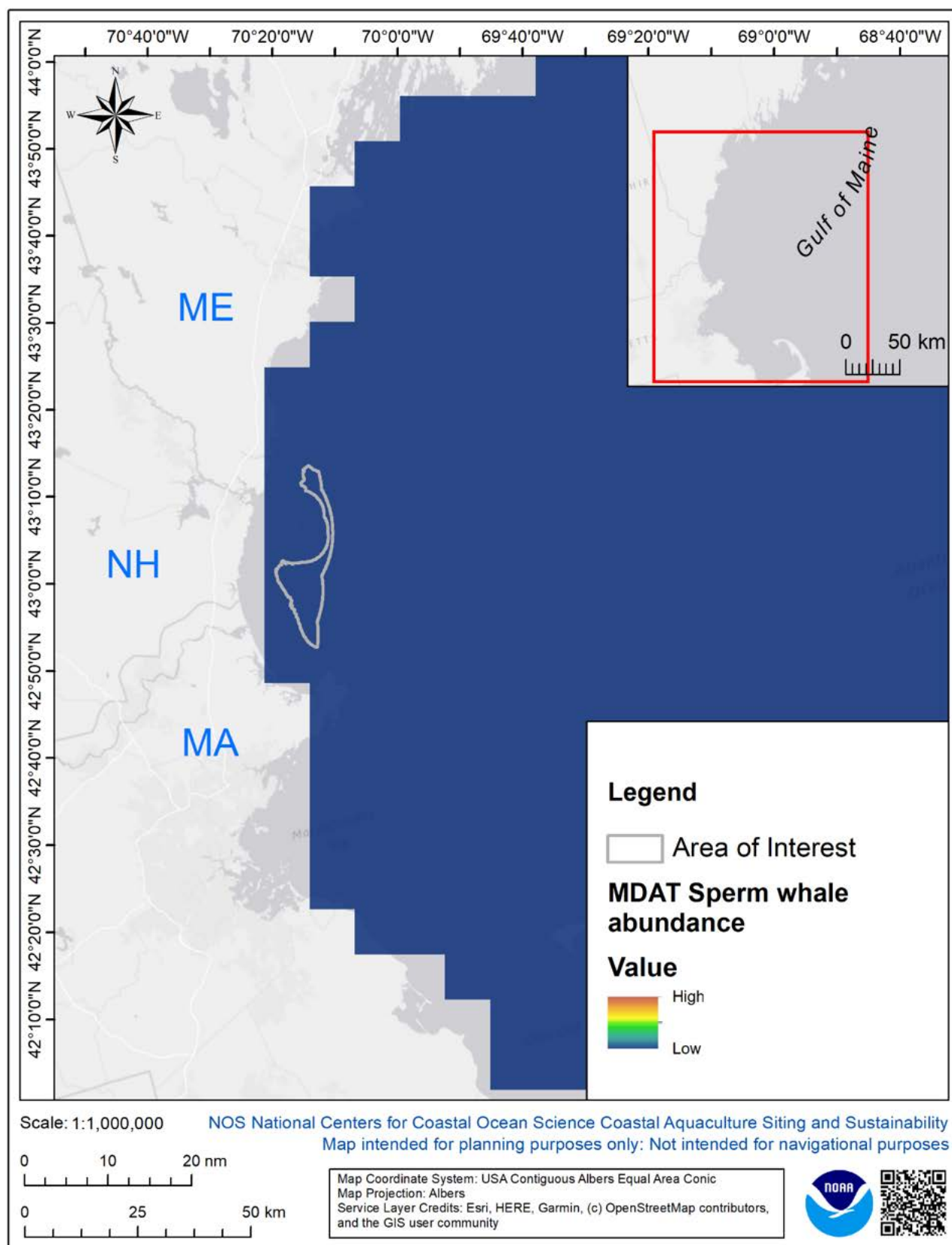


Figure A-5 (K). Annual mean abundance of Sperm Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

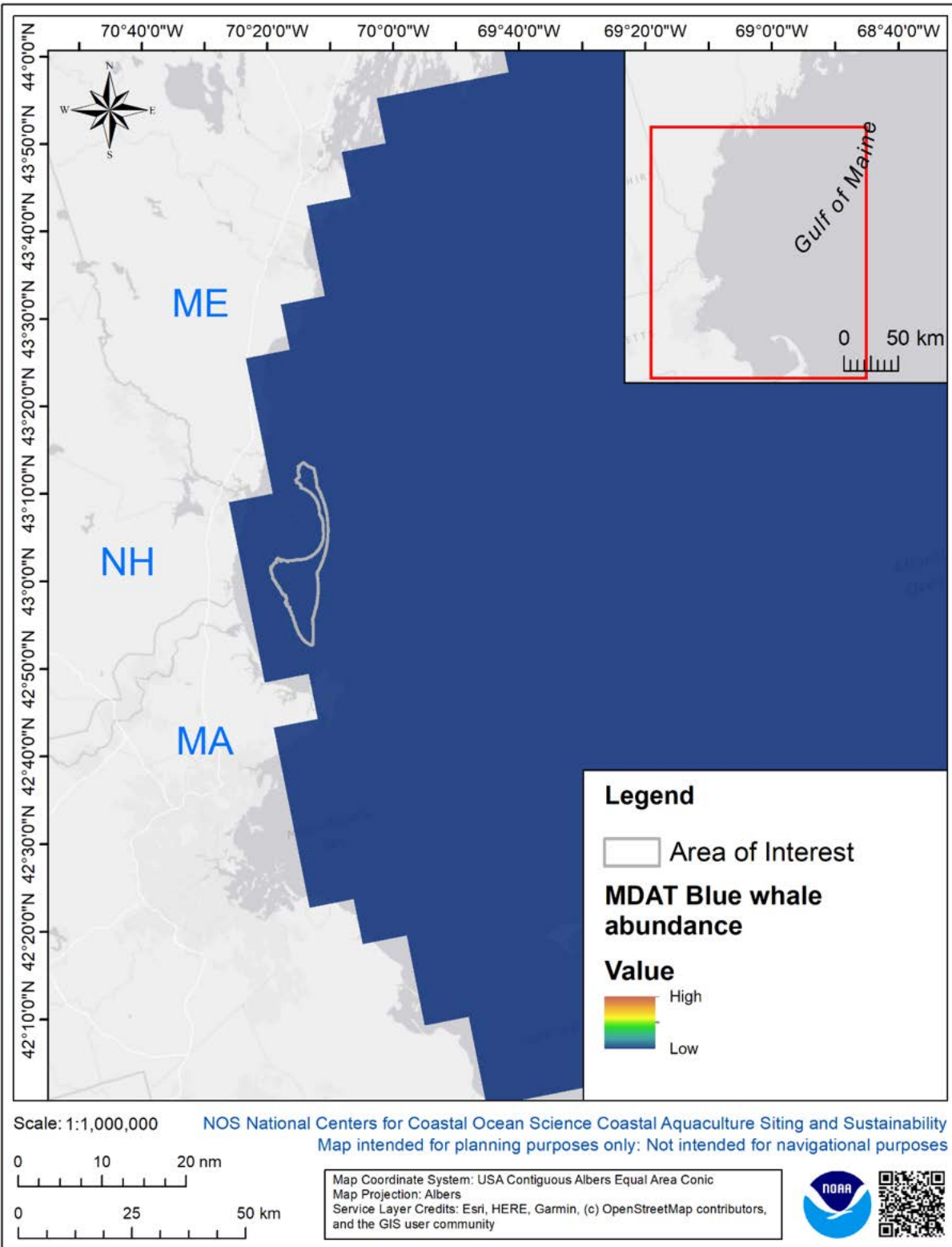


Figure A-5 (L). Annual mean abundance of Blue Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

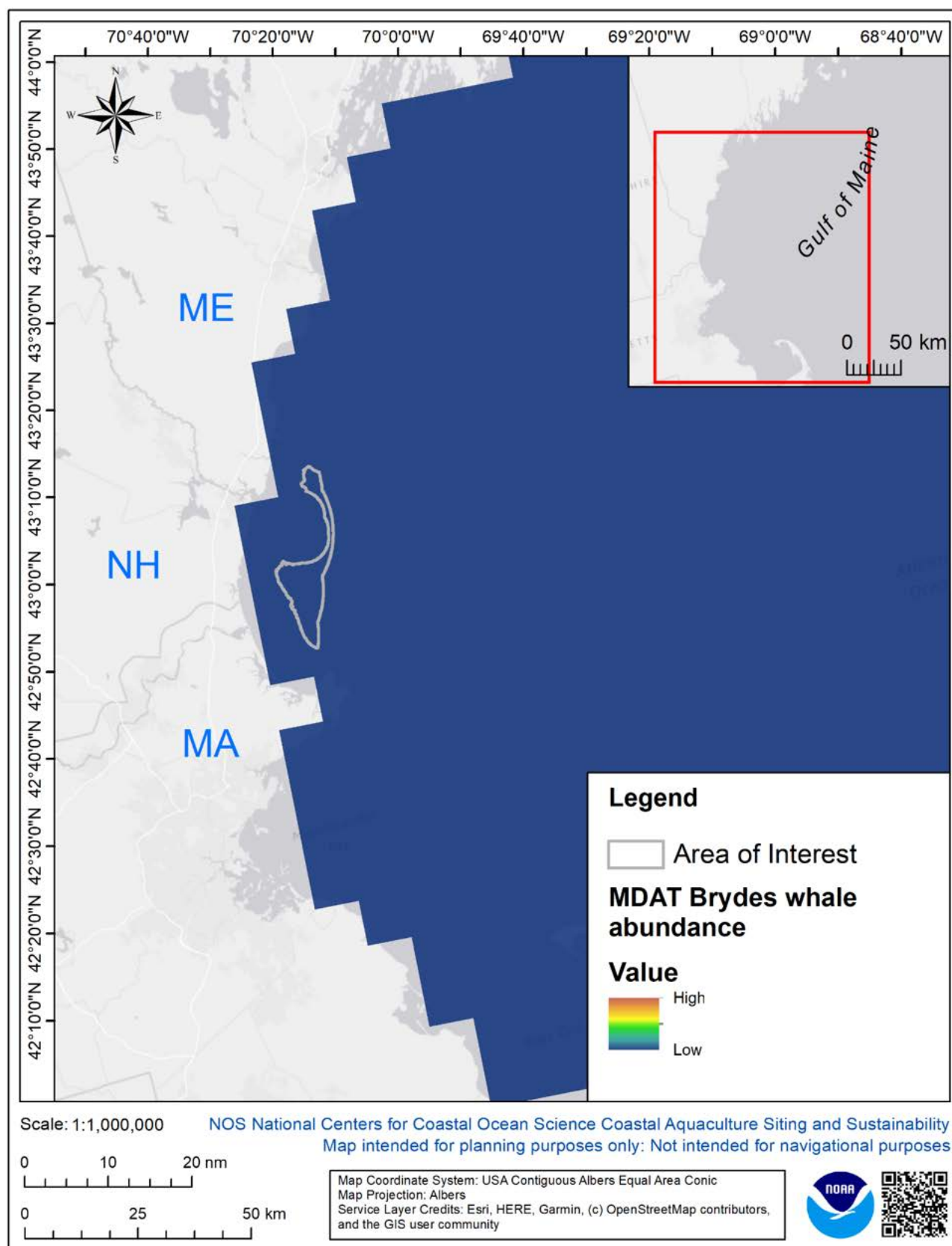


Figure A-5 (M). Annual mean abundance of Bryde's Whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

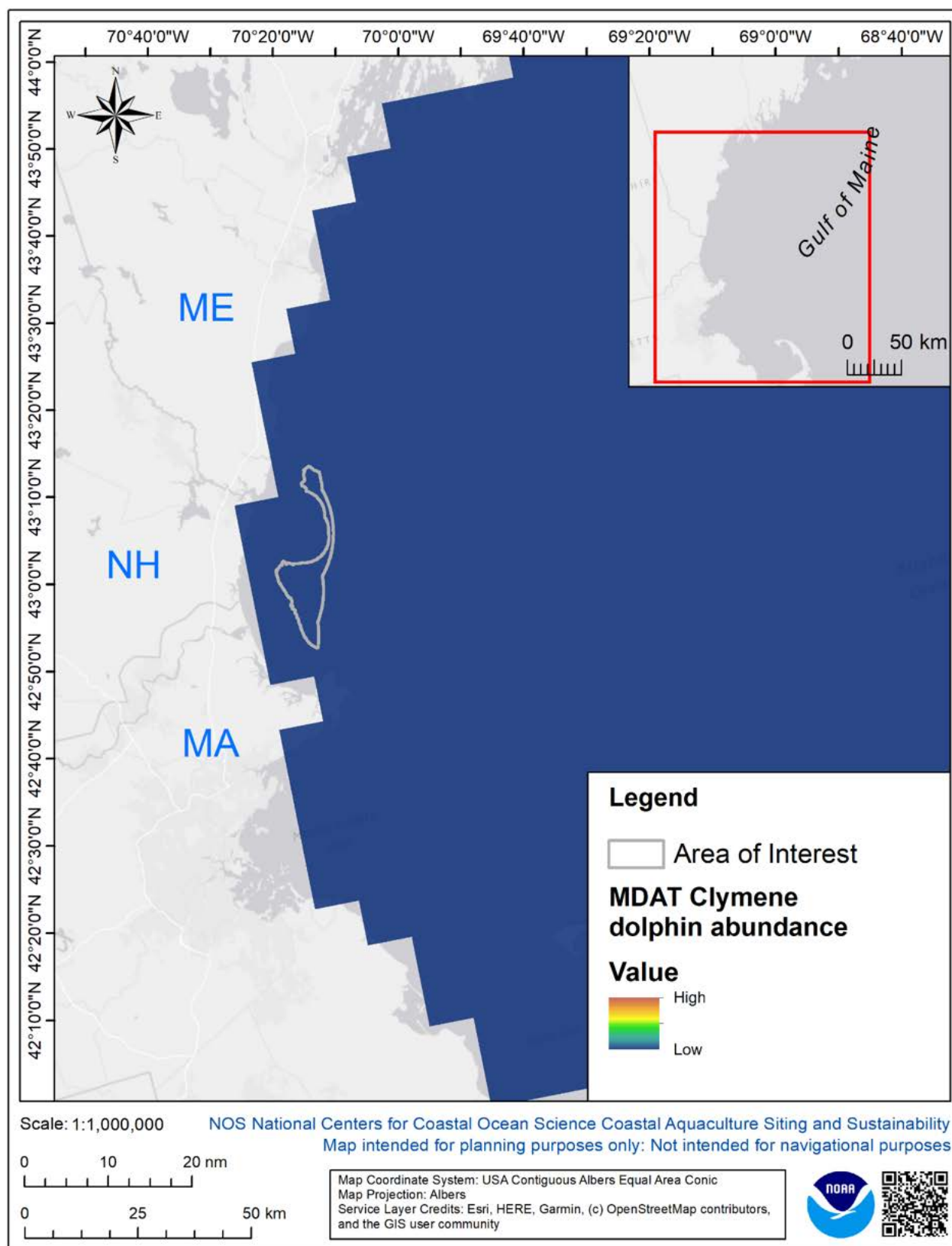


Figure A-5 (N). Annual mean abundance of Clymene dolphins and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

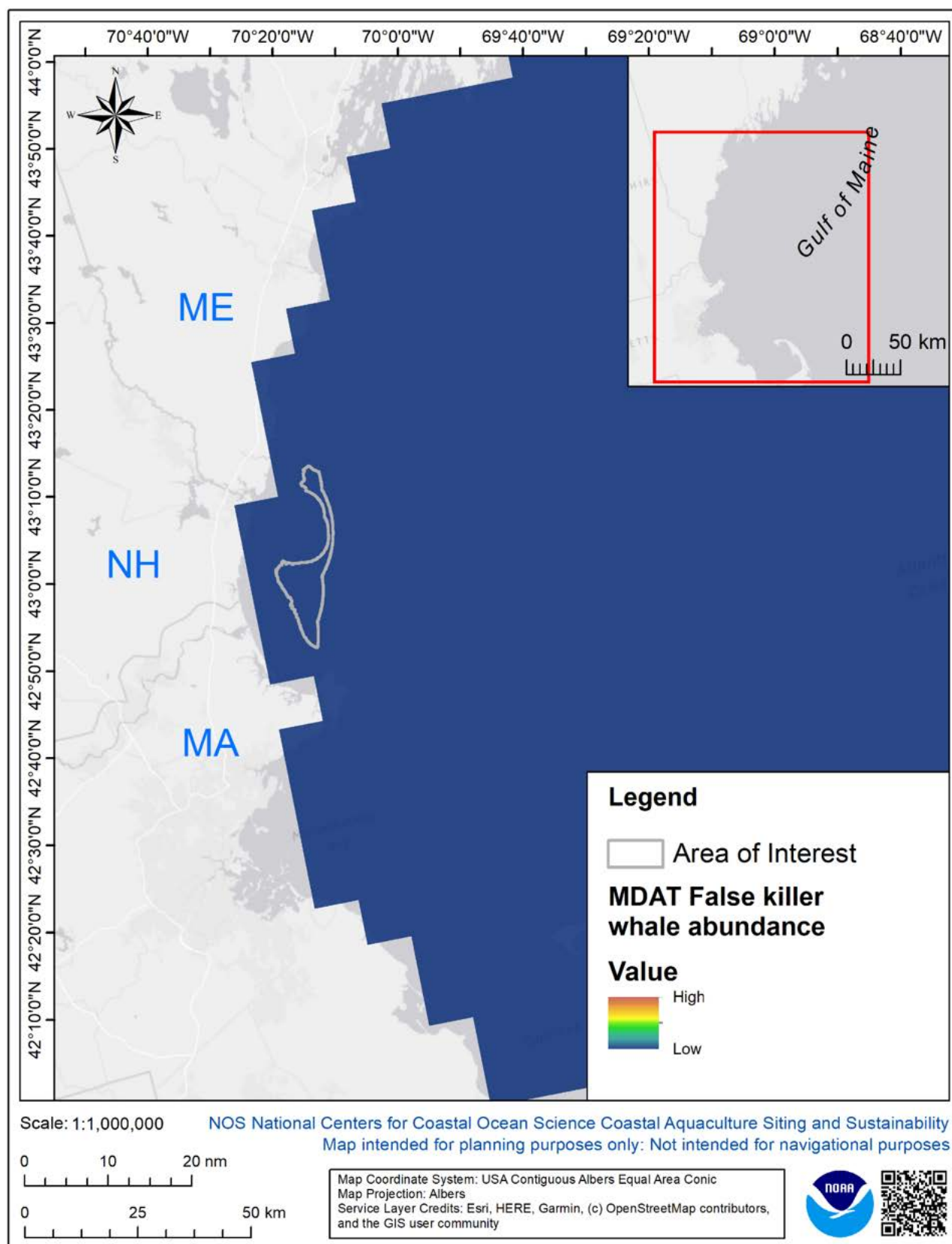


Figure A-5 (O). Annual mean abundance of False Killer whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

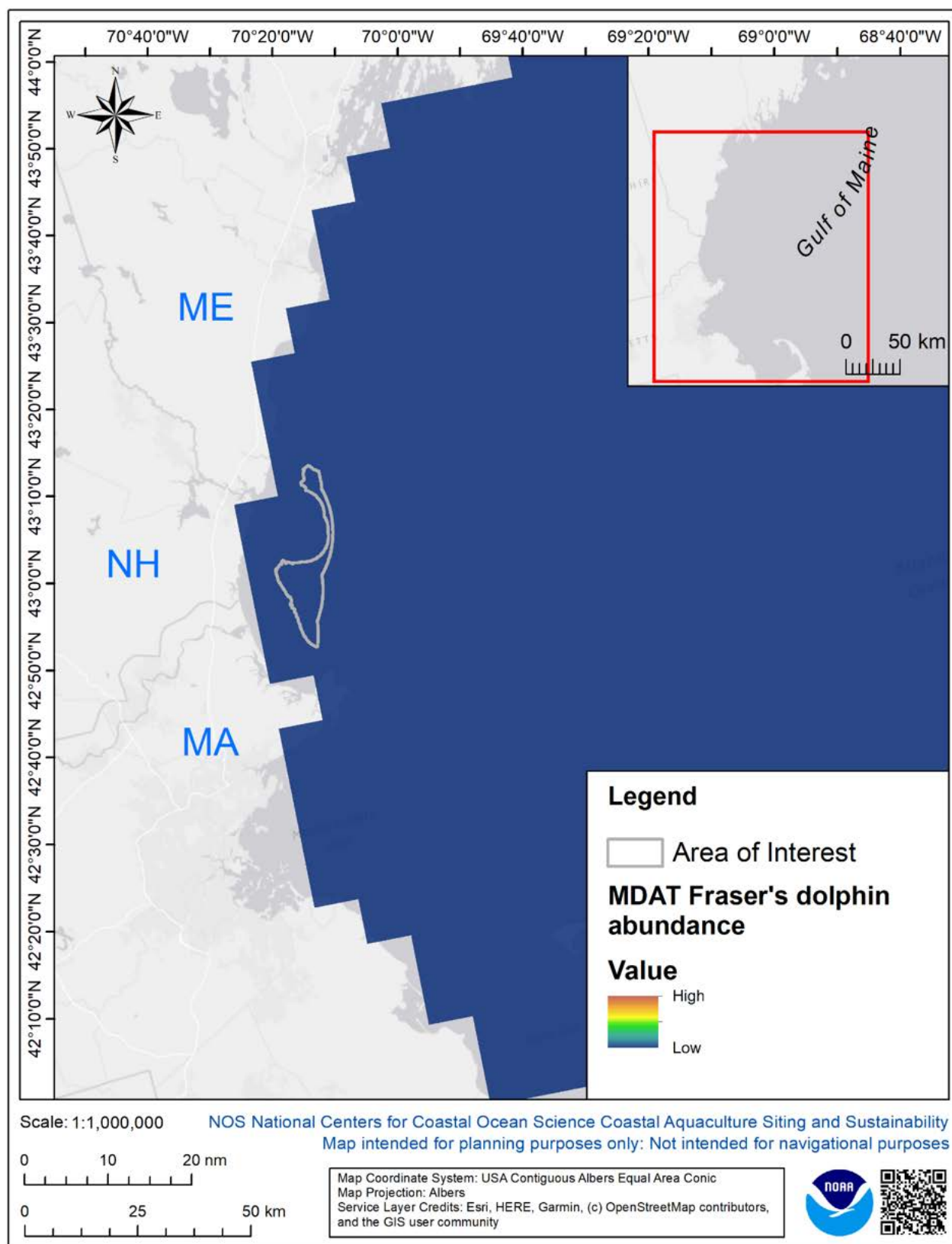


Figure A-5 (P). Annual mean abundance of Fraser's dolphin and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

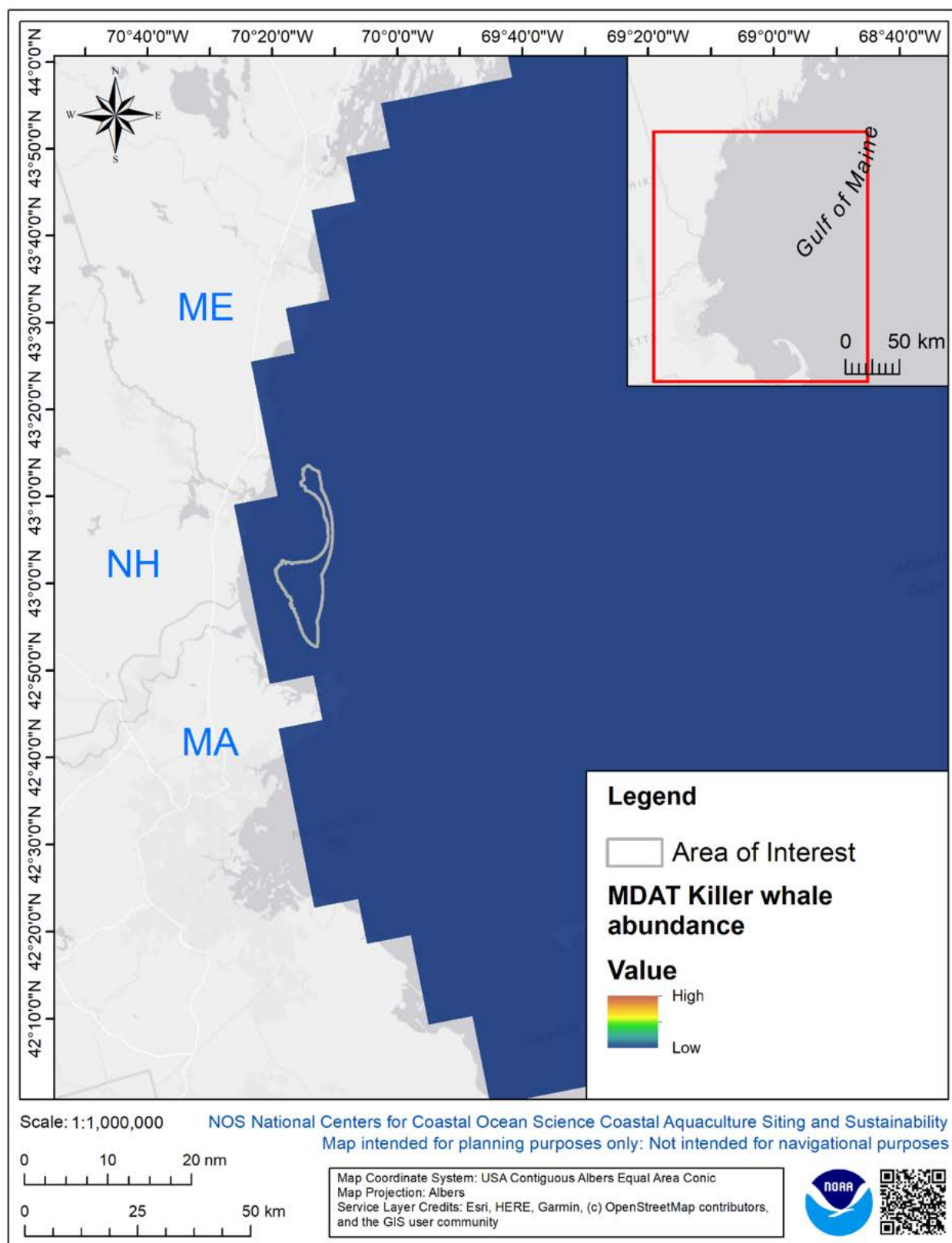


Figure A-5 (Q). Annual mean abundance of Killer whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

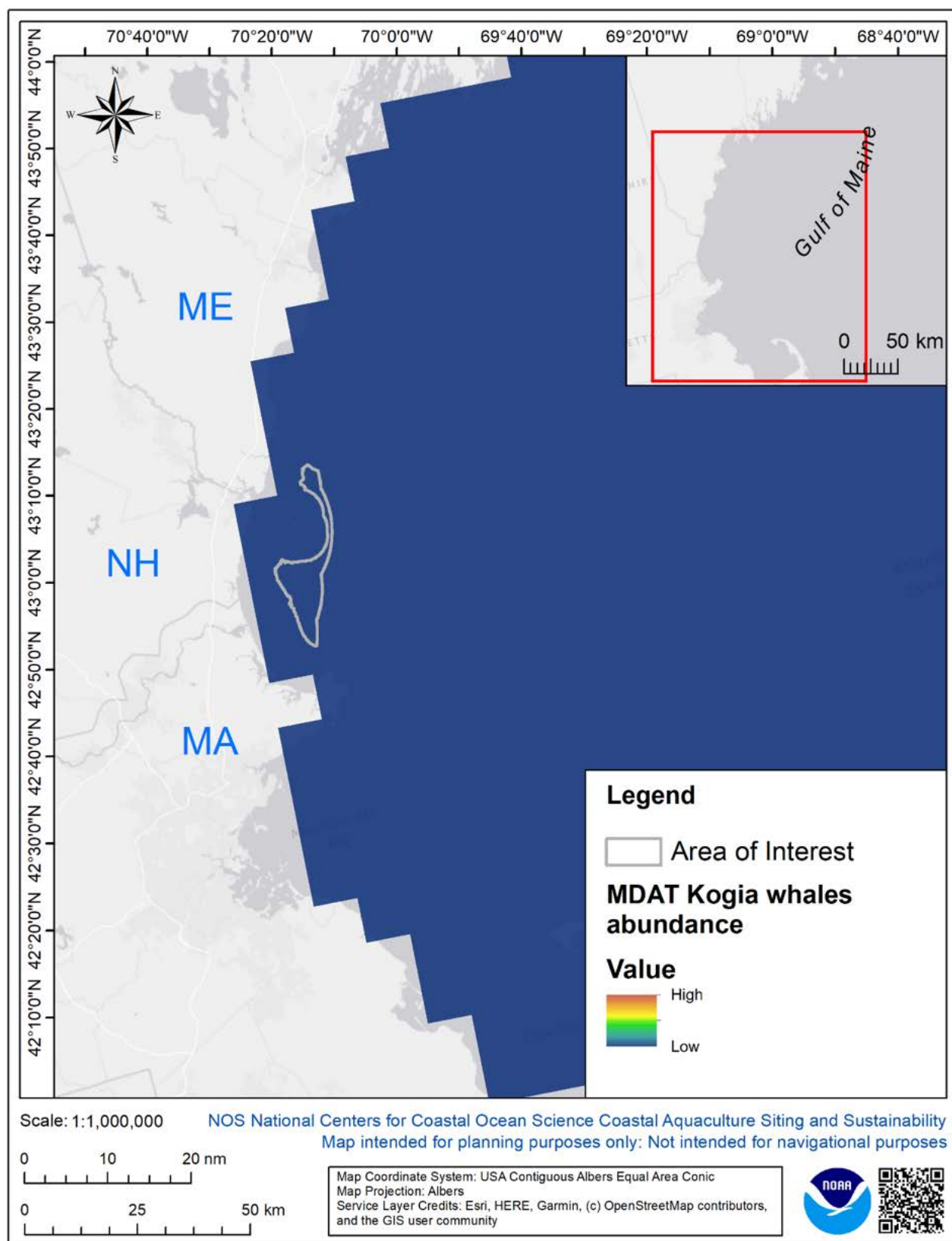


Figure A-5 (R). Annual mean abundance of Kogia whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

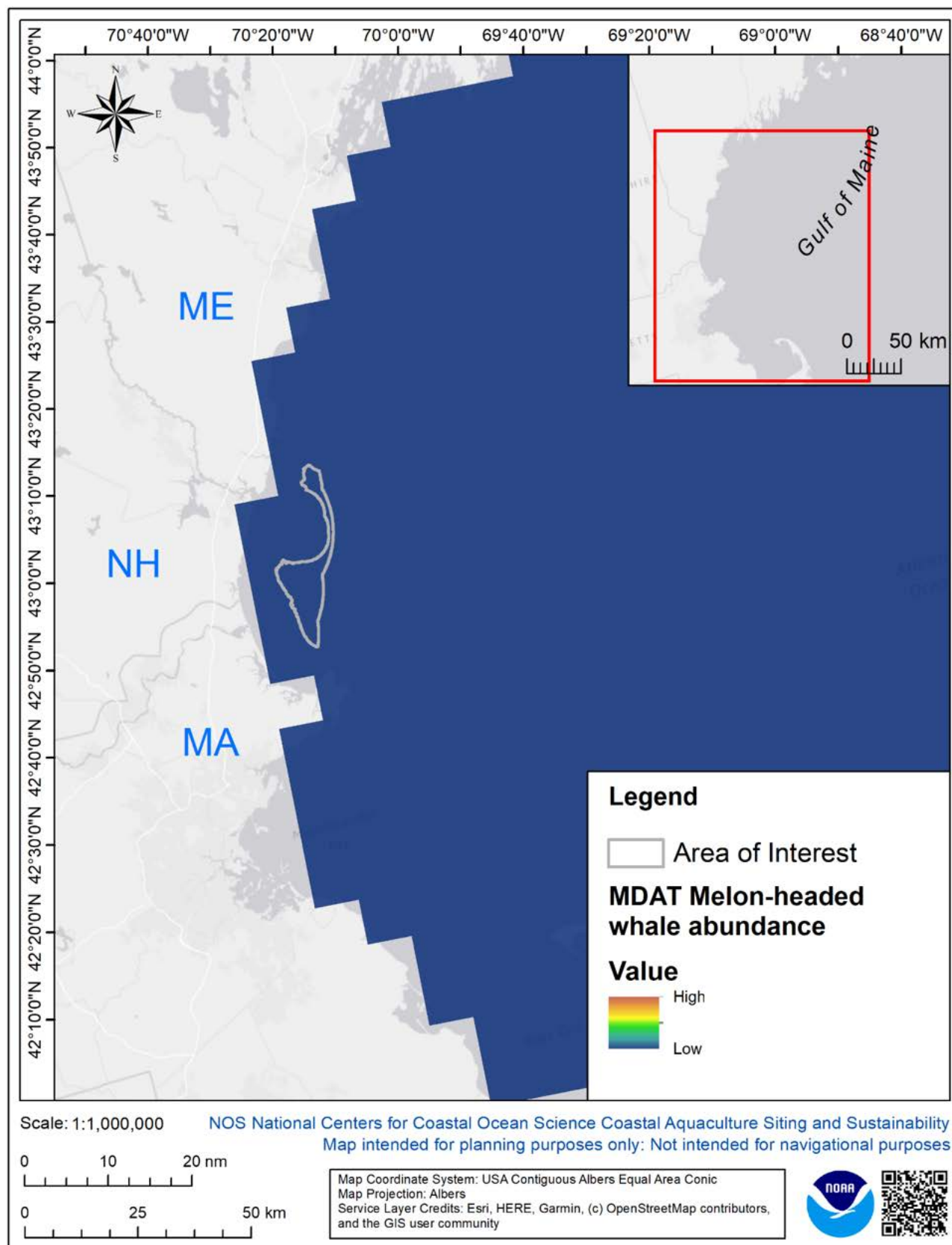


Figure A-5 (S). Annual mean abundance of Melon-headed whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

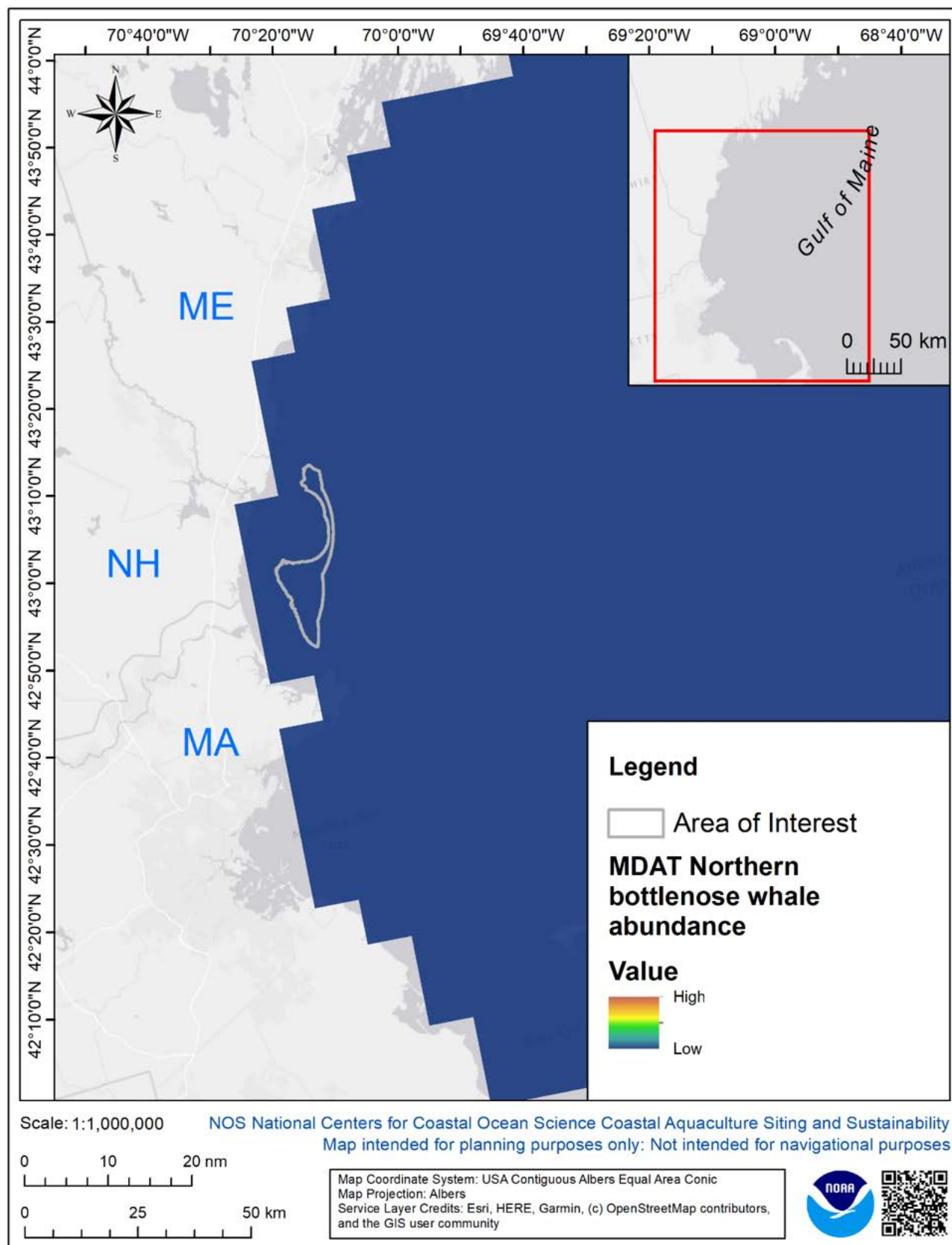


Figure A-5 (T). Annual mean abundance of Northern Bottlenose whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

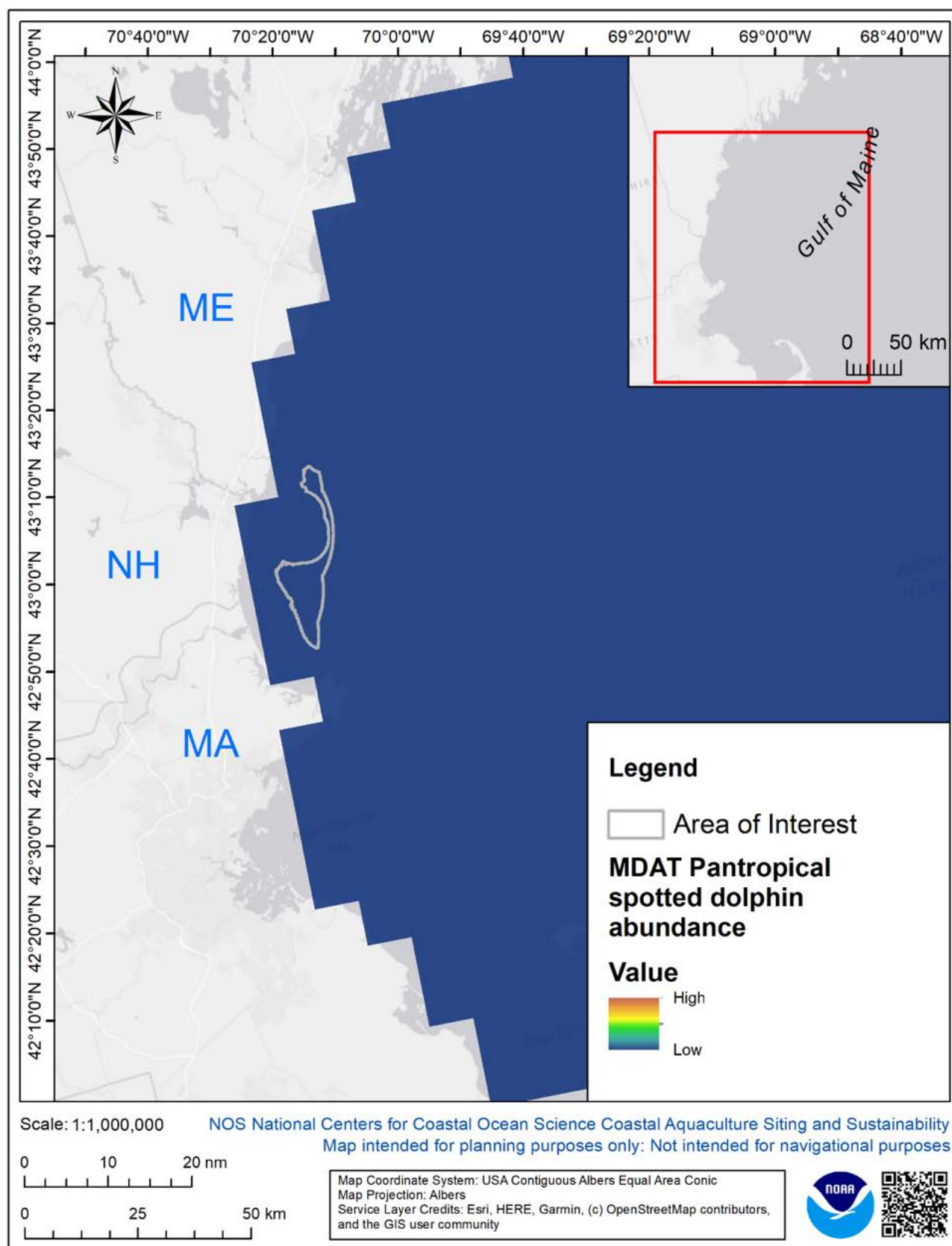


Figure A-5 (U). Annual mean abundance of Pan-tropical Spotted dolphin and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

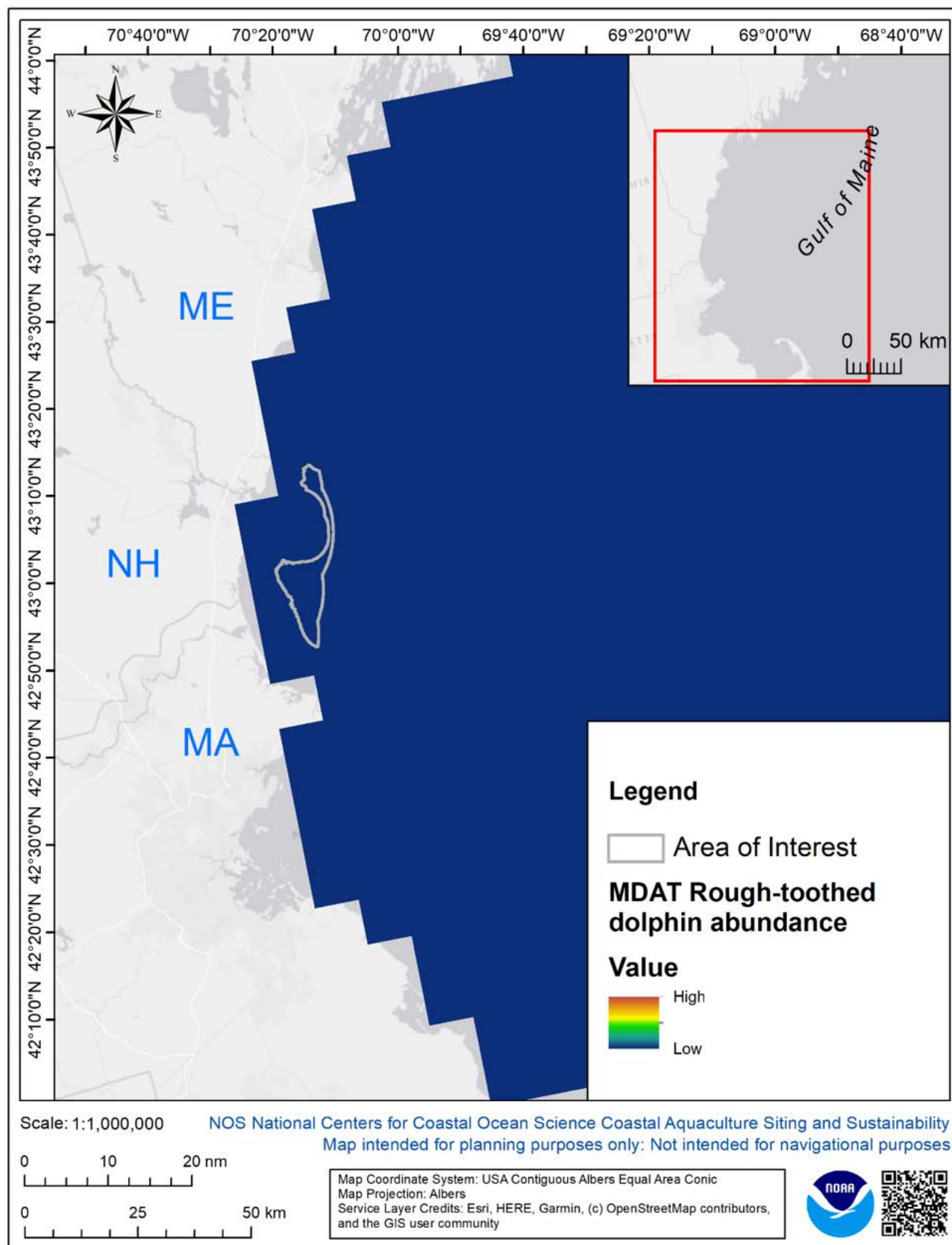


Figure A-5 (V). Annual mean abundance of Rough-toothed dolphins and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

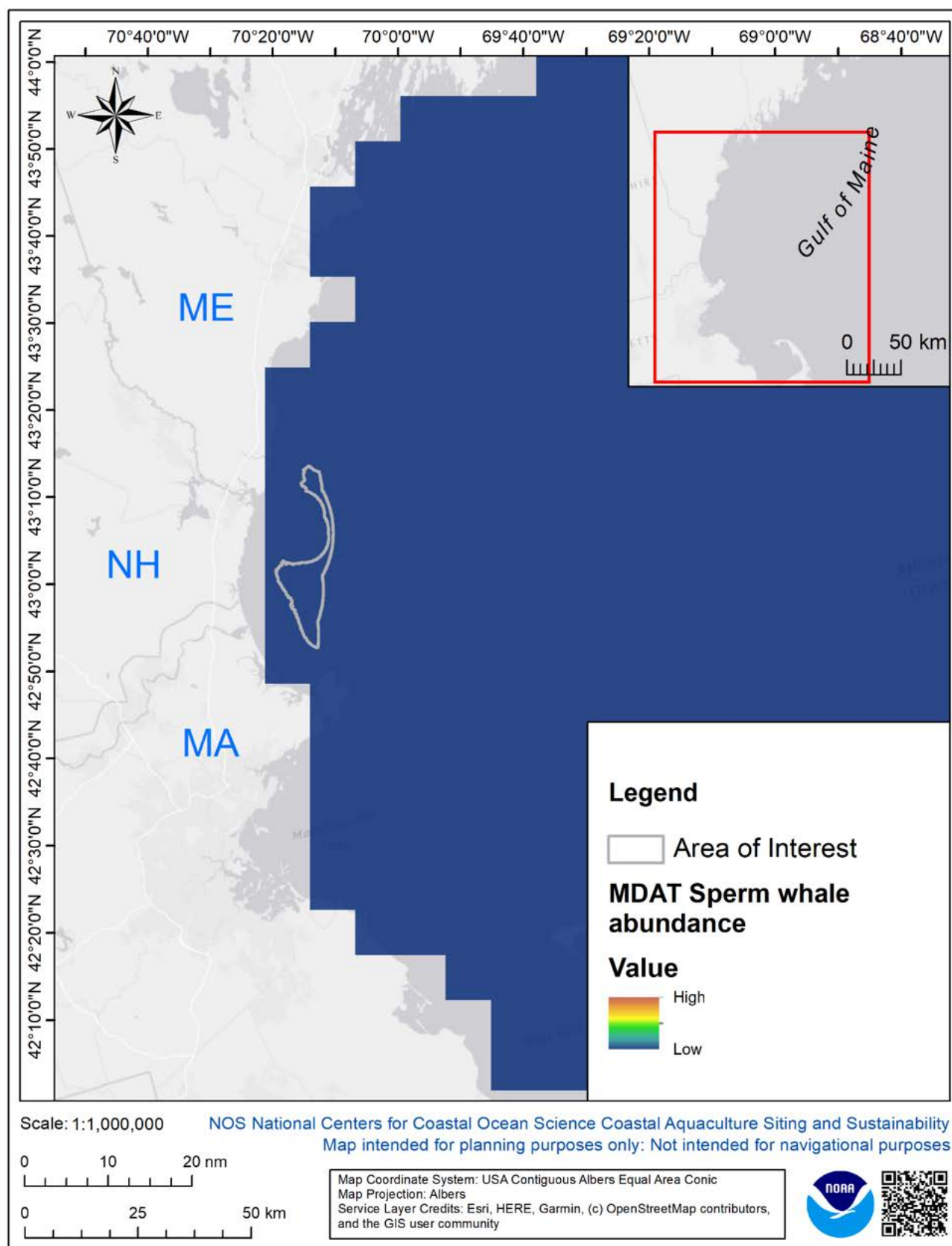


Figure A-5 (W). Annual mean abundance of Sperm whales and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

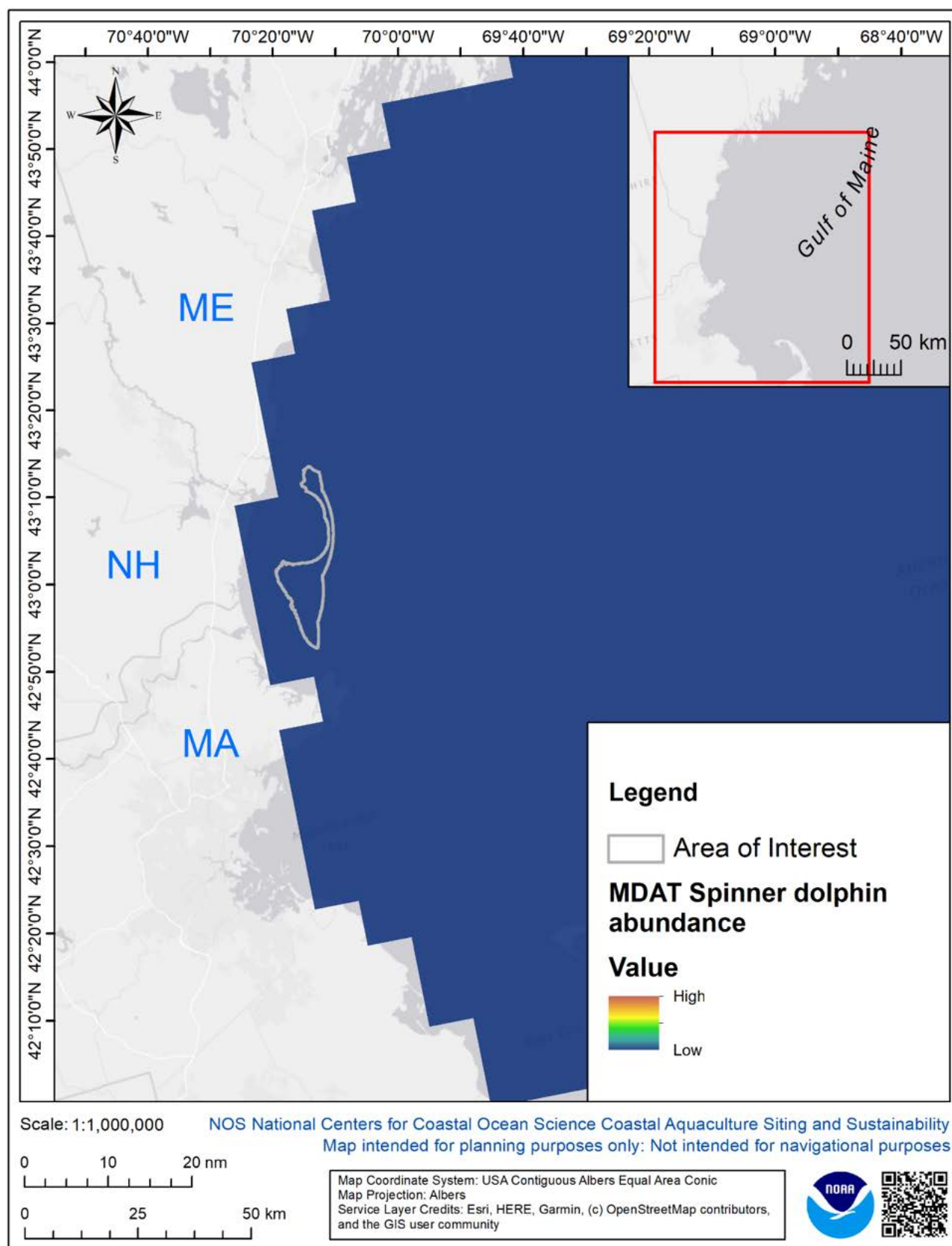


Figure A-5 (X). Annual mean abundance of Spinner dolphins and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

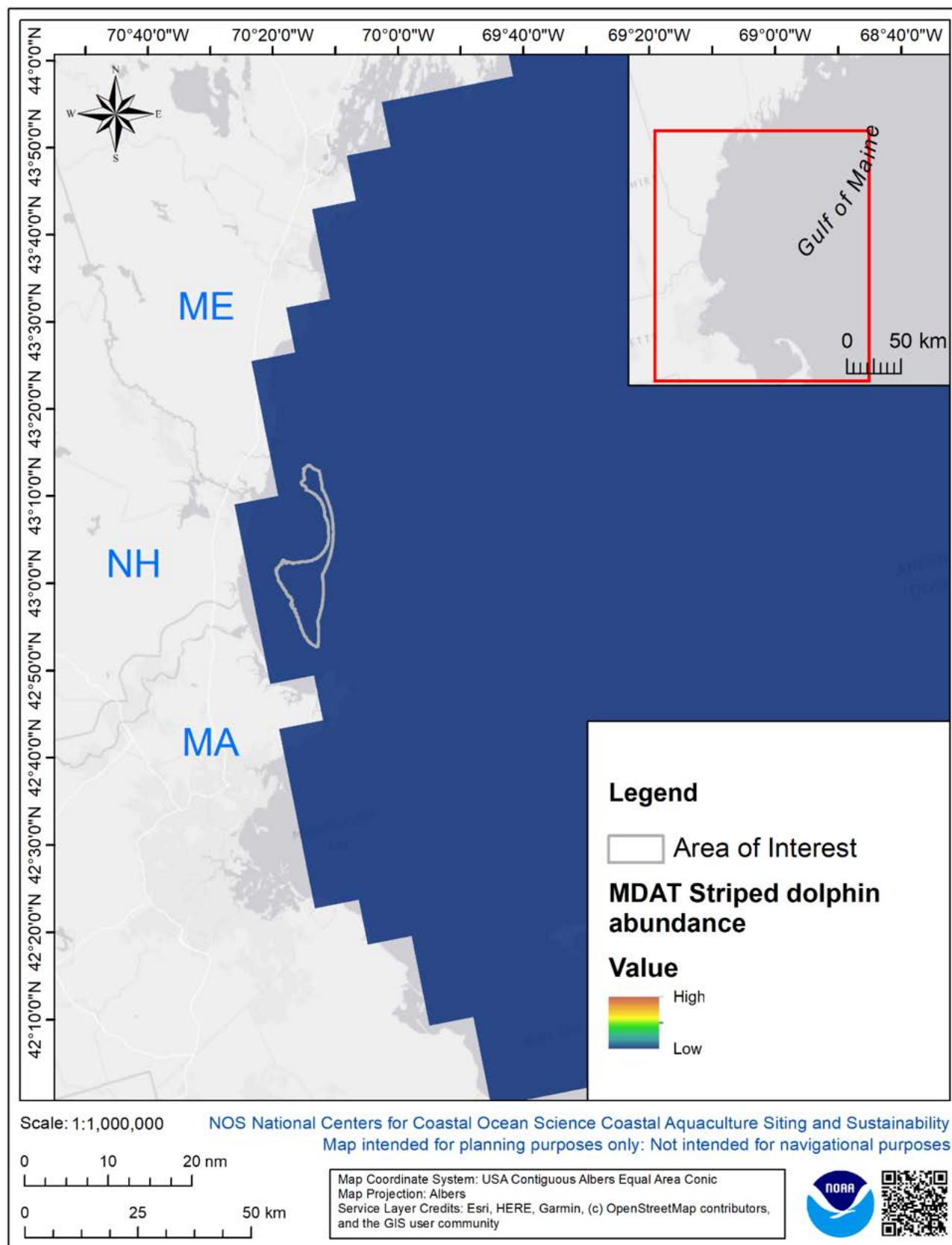


Figure A-5 (Y). Annual mean abundance of Striped dolphin and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

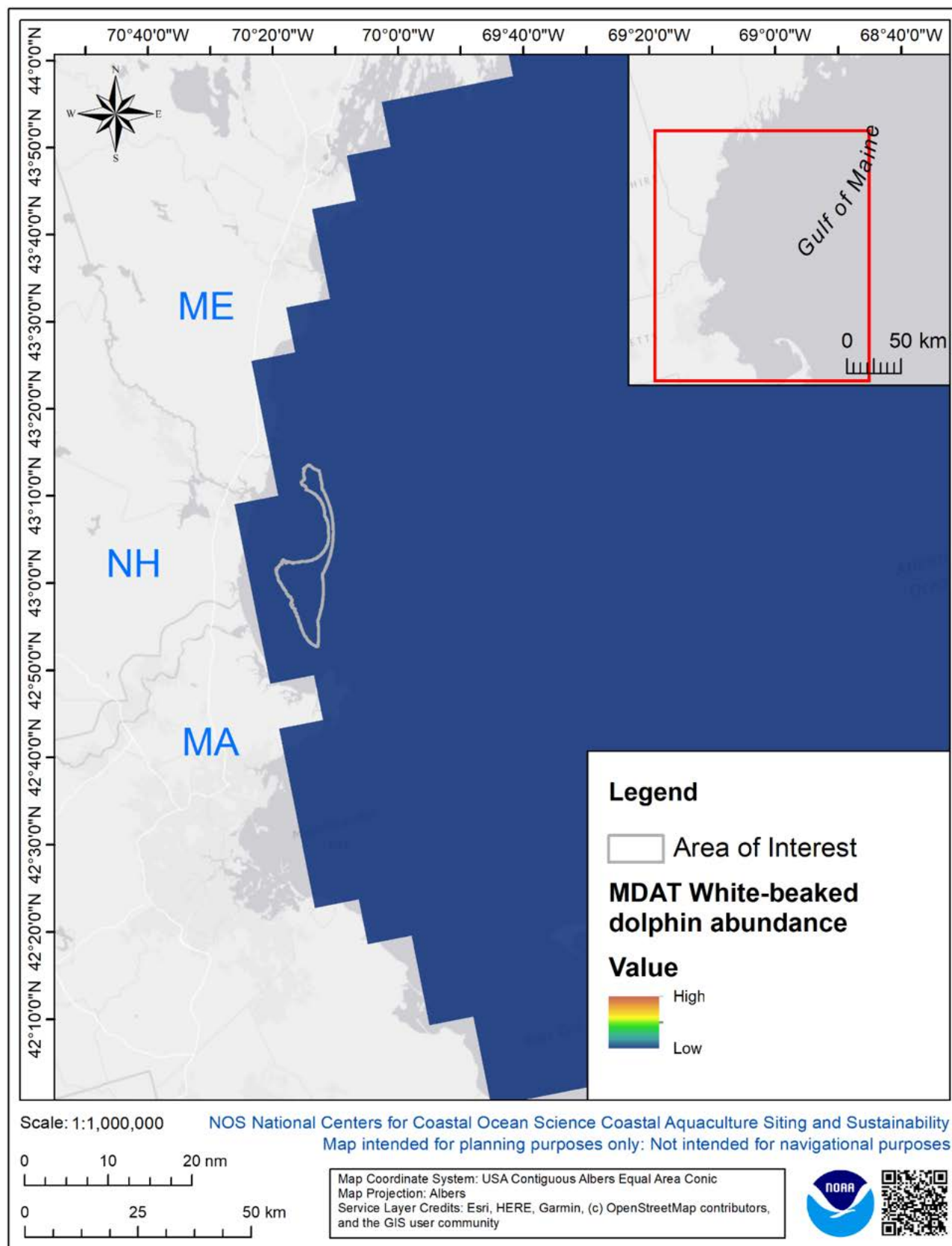


Figure A-5 (Z). Annual mean abundance of White-beaked dolphin and relative overlap with the AOI. Lower values are indicated by blue to green colors, moderately high value are indicated by yellow and orange colors, and higher values are in dark orange and red color tones.

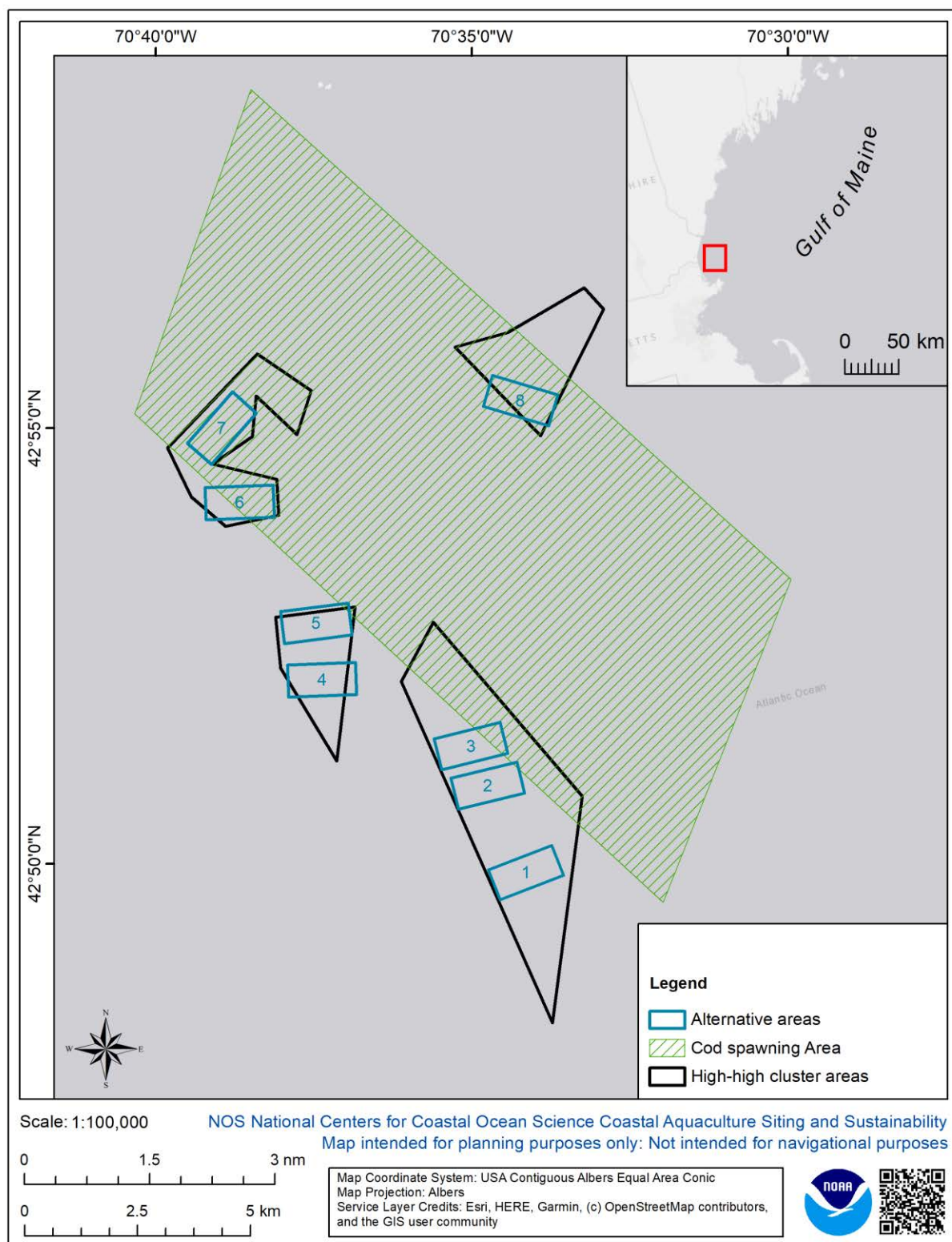


Figure A-6 (A). Overlap of the final eight alternatives with the Cod Spawning Area (also known as Whaleback). Alternative areas 1, 2, and 4 are completely out of the Whaleback area. Areas 2, 3, and 6 are partially in the Whaleback area, and alternatives 5 and 7 are both completely in the Whaleback area.

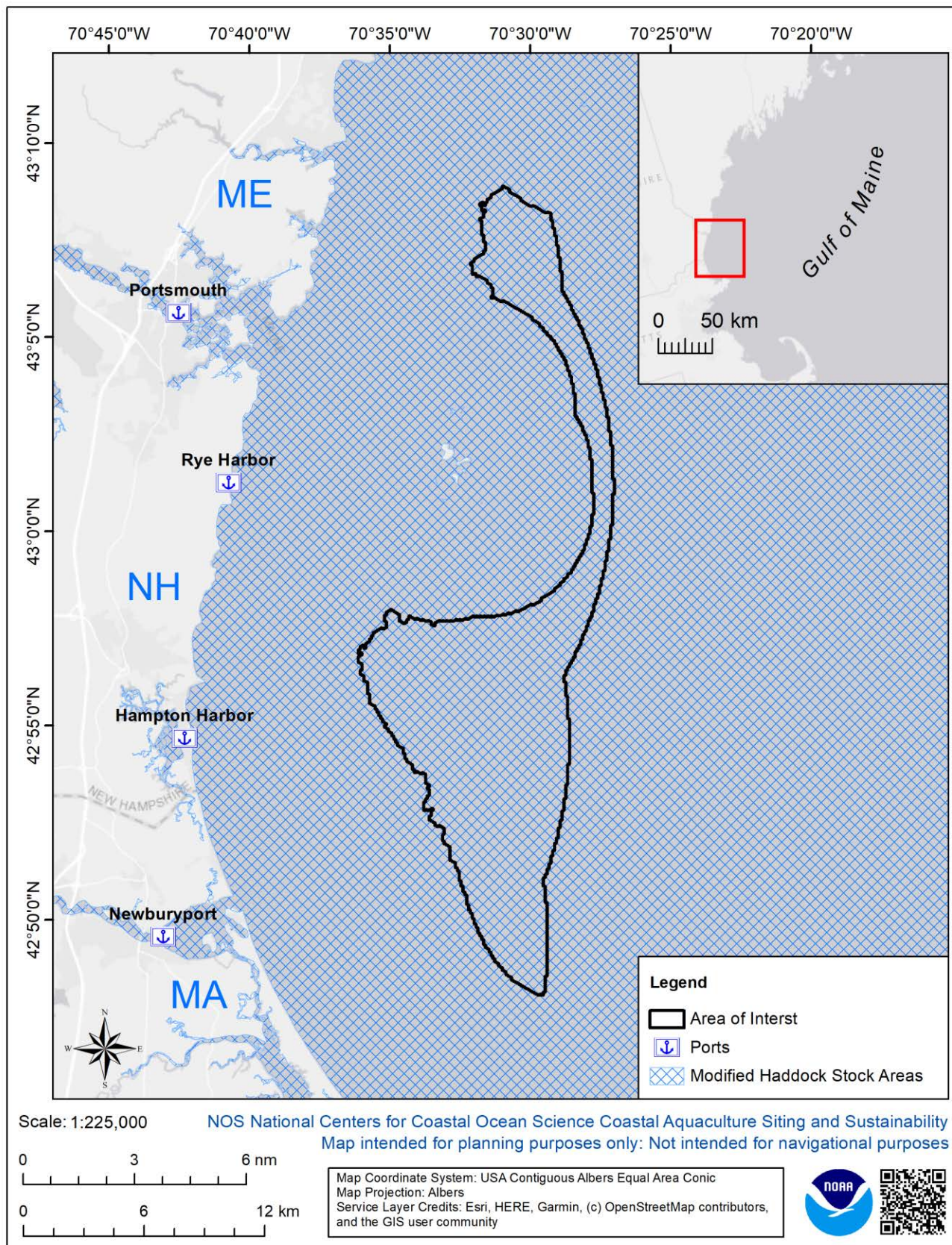


Figure A-6 (B). Overlap of the AOI with the Modified Haddock Stock Areas Management Areas.

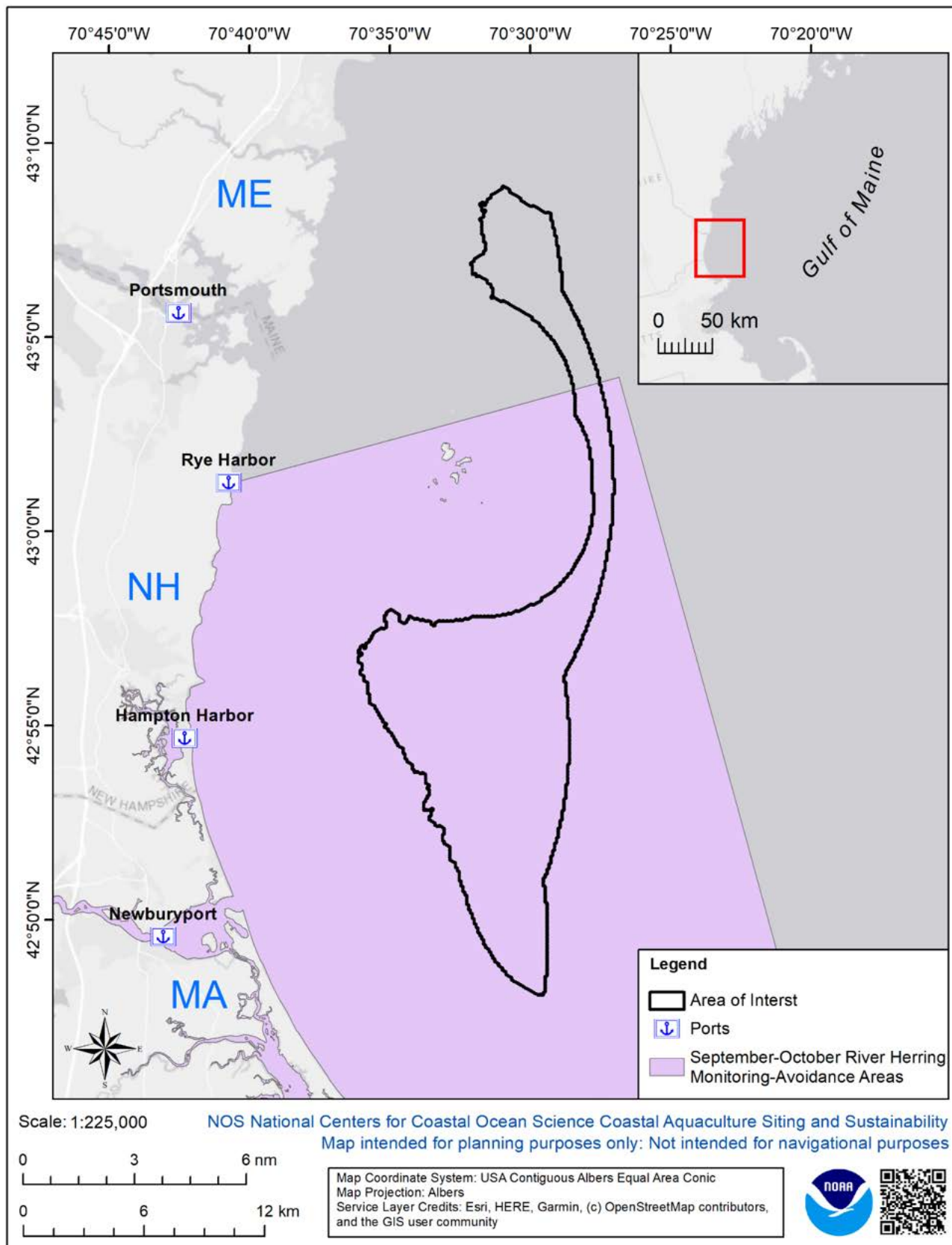


Figure A-6 (C). Overlap of the AOI with the September-October River Herring Monitoring-Avoidance Management Areas.

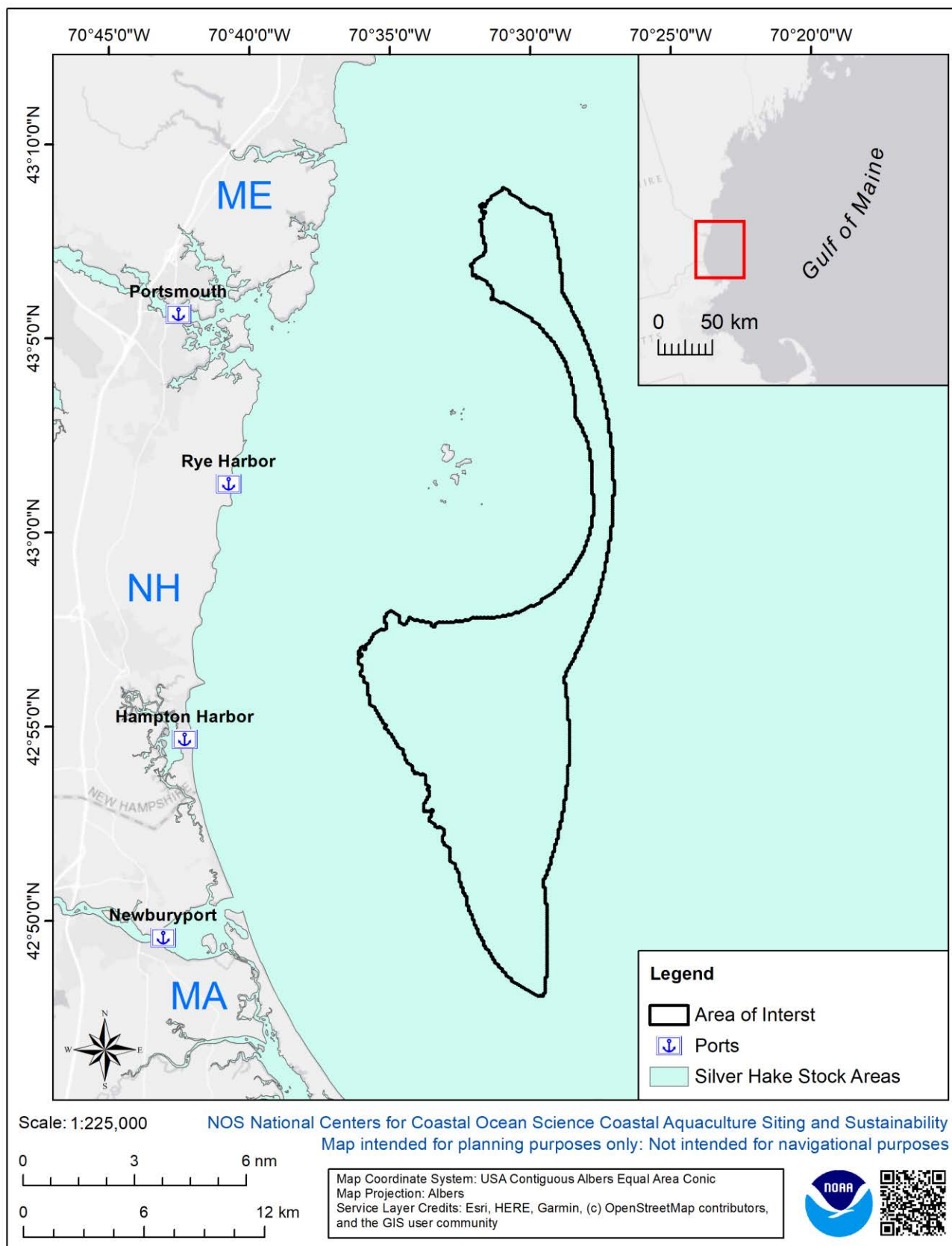


Figure A-6 (D). Overlap of the AOI with the September-October River Herring Monitoring-Avoidance Management Areas.