Using Geospatial Information to Make More Persuasive Effects Arguments

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Outline

- The CZMA Effects Test
- Using the Northeast Regional Planning Body Data Portal
- Questions and Discussion

The CZMA Effects Test:

- Whether state CZMA review authority applies to a federal action depends on whether there are –
  - Reasonably foreseeable effects to coastal uses or resources of the state
- Not all impacts to coastal uses or resources result in a coastal effect
- Making persuasive effects arguments can be difficult

Establishing Effects

1. Identify the affected uses and resources
   - Resources (fish, marine mammals, reptiles, birds, landmarks)
   - Uses (commercial and recreational fishing, boating, tourism, shipping, energy facilities)
2. Show where they are and in what densities
   - Put into context (e.g., seasonal information, vulnerabilities)

Establishing Effects

3. Show how the state has a specific interest in the resource or use
   - Be specific in showing their connection to the coastal zone of the state
   - Put numbers on the state's interest (e.g., economic values, harvest amounts, critical habitat)
4. Show where the proposed activity overlaps with these resources, uses and values
5. Identify impacts to the resources or uses from the proposed activity

Establishing Effects

6. Make the causal connection from the proposed activity*
   - describe how any impacts result in reasonable foreseeable effects from the activity on the uses and resources.
7. If mitigation is proposed, describe why the mitigation may be inadequate.*

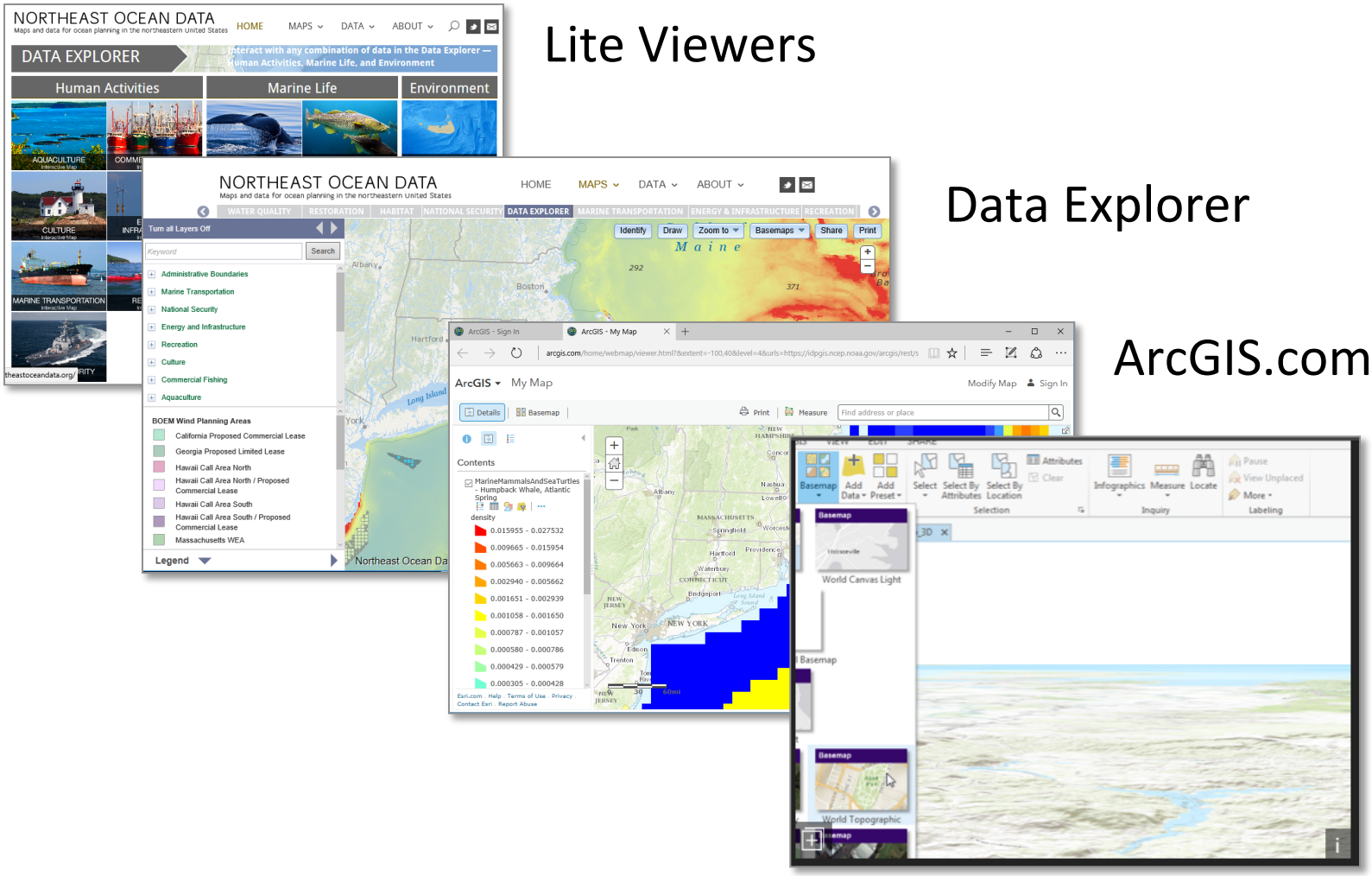
**The usefulness of the Data Portal may be limited for items 6 and 7.*

Using Data to Show Causal Connections

State analyses of coastal effects should be supported by empirical data and information that –

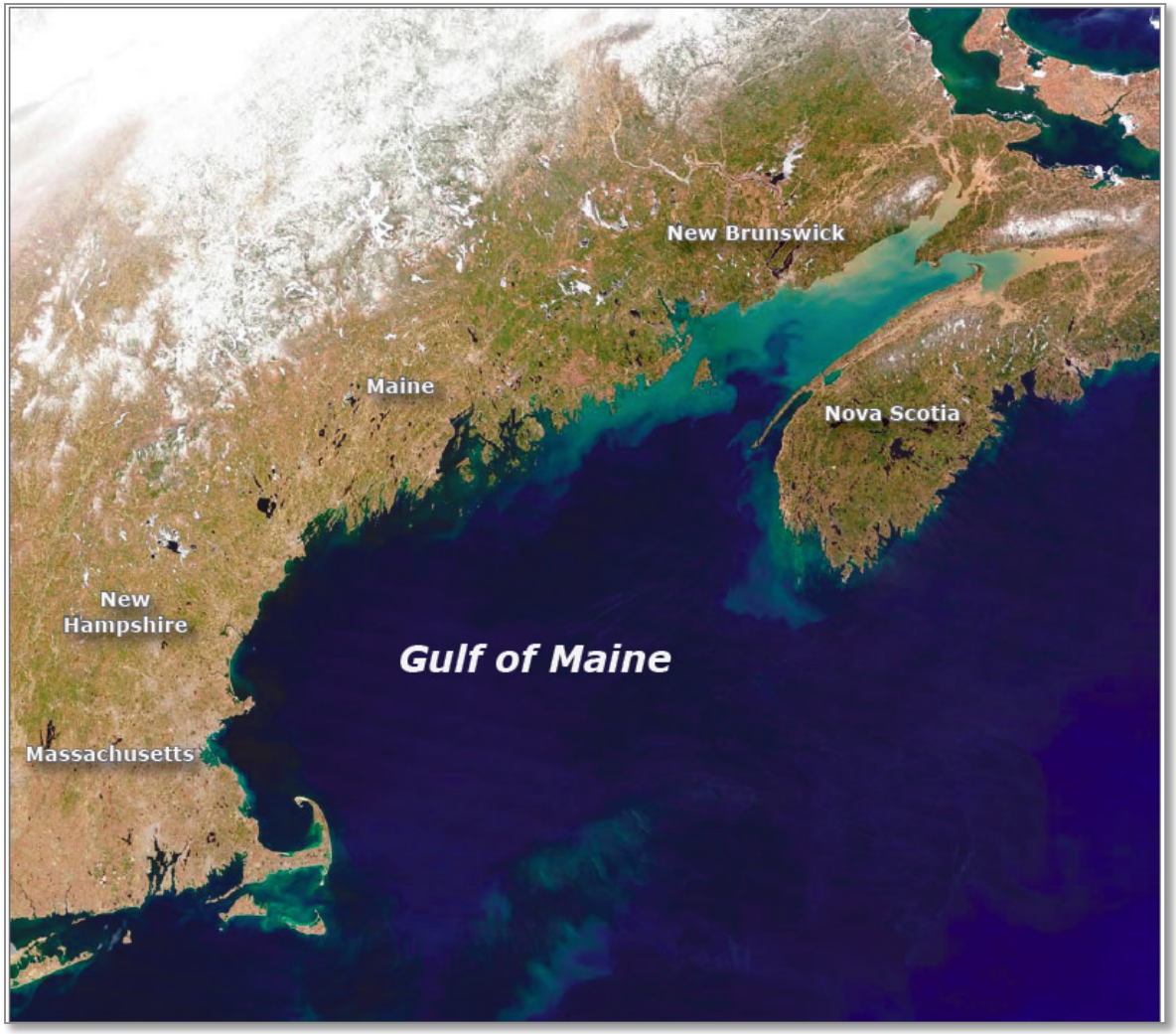
- Can be shown to be reliable
- Visualizes the affected area, resources and uses with maps
- Shows values, trends and vulnerabilities

The Tool "Ecosystem"



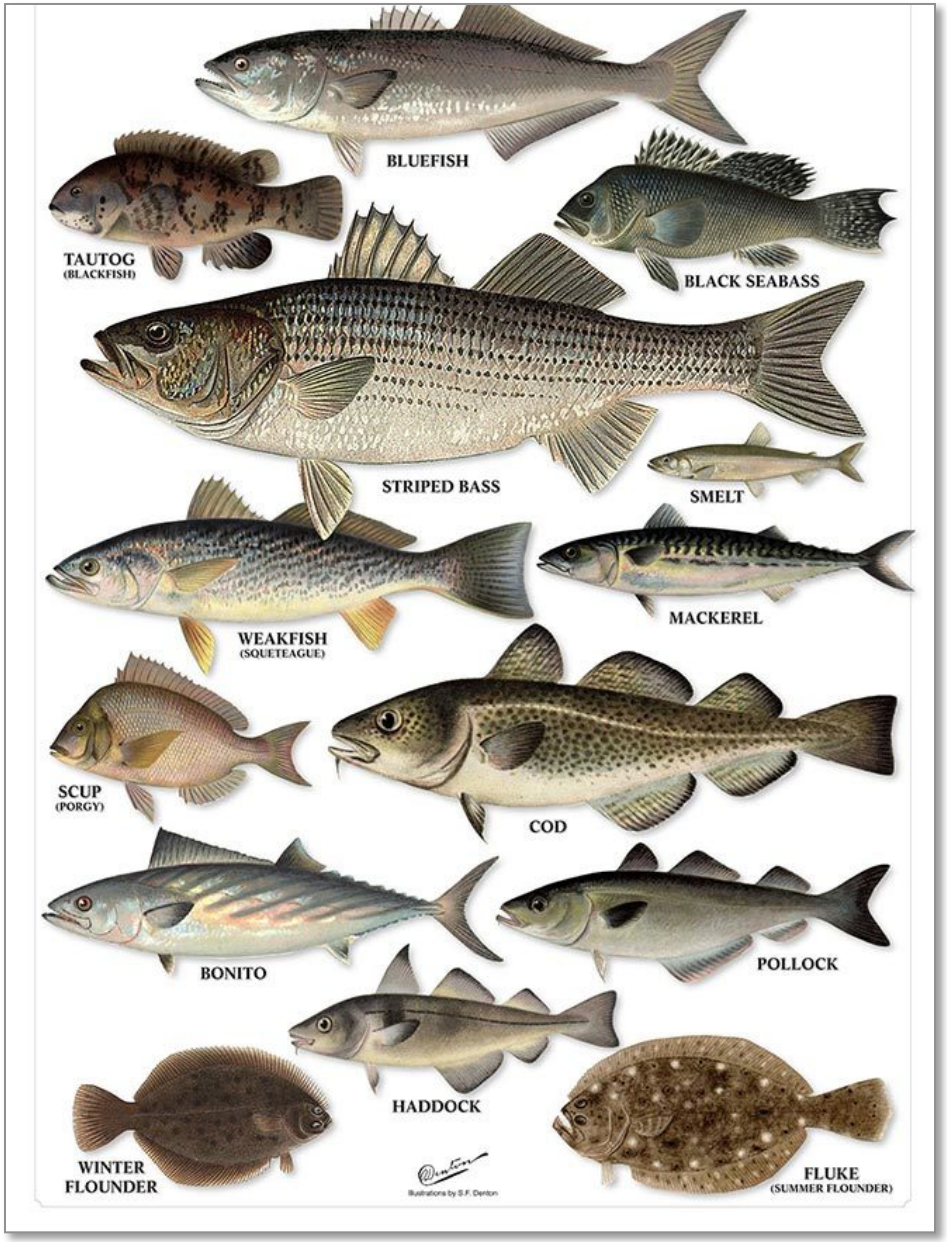
The Data "Ecosystem"

- NROC originals
- State
- Federal
- NGO
- Confidential
- Preliminary
- Unpublished
- Production
- Static
- Web Services



Types of Data

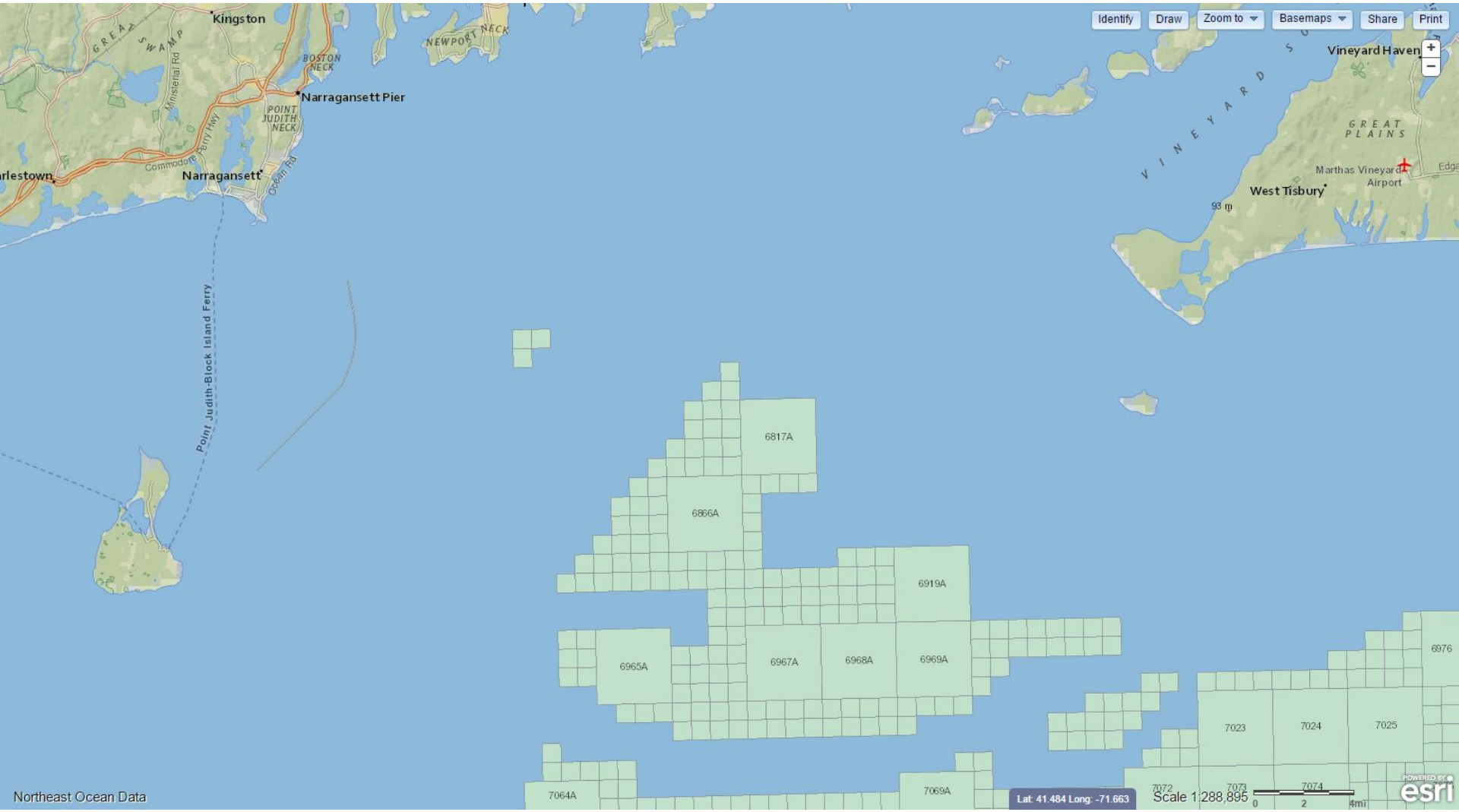
- Framework
- Thematic
- Observed
- Modeled
- Mapped
- Time-Series
- Survey
- Crowd Sourced
- Original
- Derived



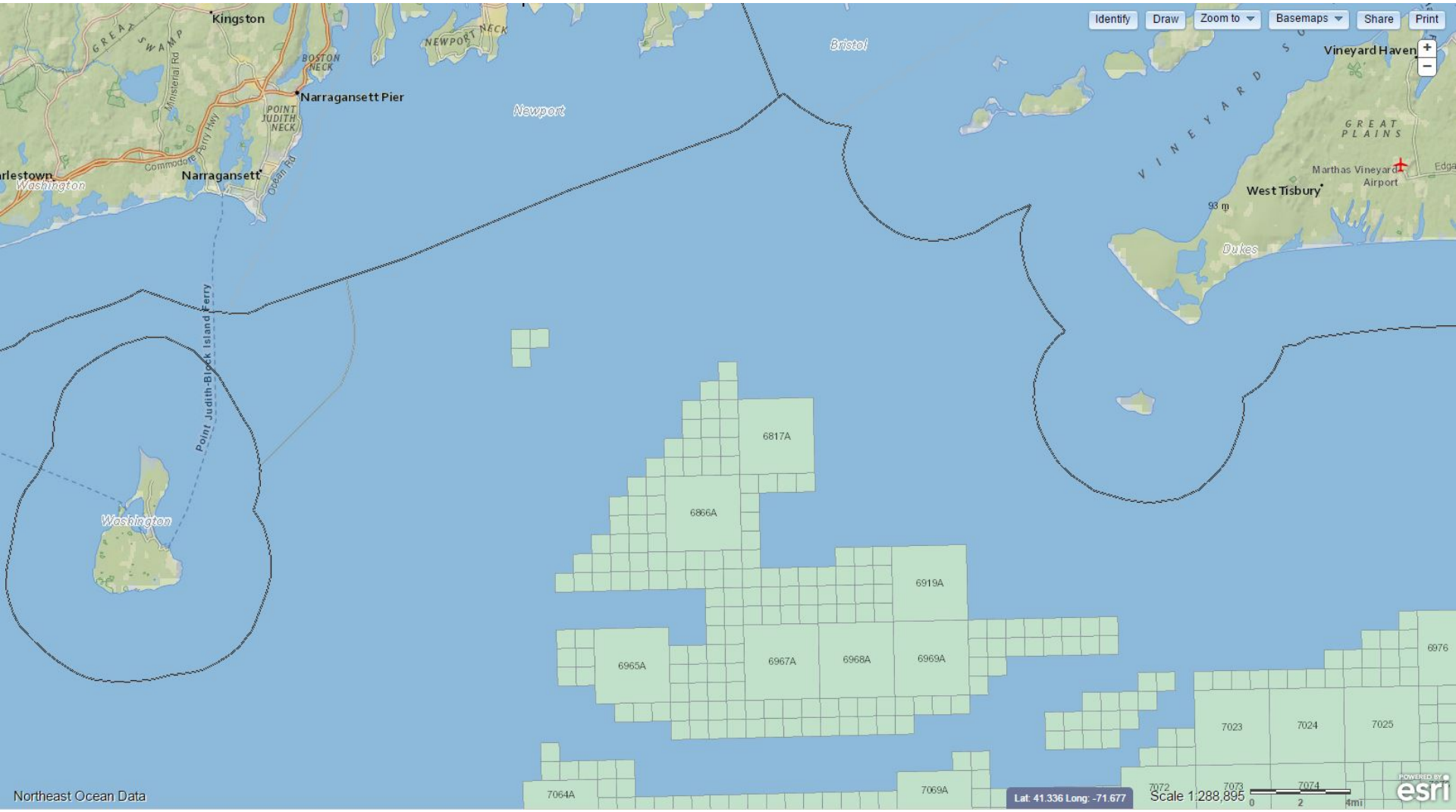
Occurrence *(Location is Important)*

- Location
- Size
- Shape
- Quantity
- Proximity
- Context
- Jurisdiction
- Frequency
- Persistence

Context


Identify
Draw
Zoom to
Basemaps
Share
Print
Kingston
Narragansett Pier
Narragansett
Vineyard Haven
West Tisbury
Marthas Vineyard Airport
Point Judith-Block Island Ferry
6817A
6866A
6919A
6965A
6967A
6968A
6969A
6976
7023
7024
7025
7064A
7069A
Northeast Ocean Data
Lat: 41.484 Long: -71.663
Scale 1:288,895

Context *(State and County Jurisdictions)*



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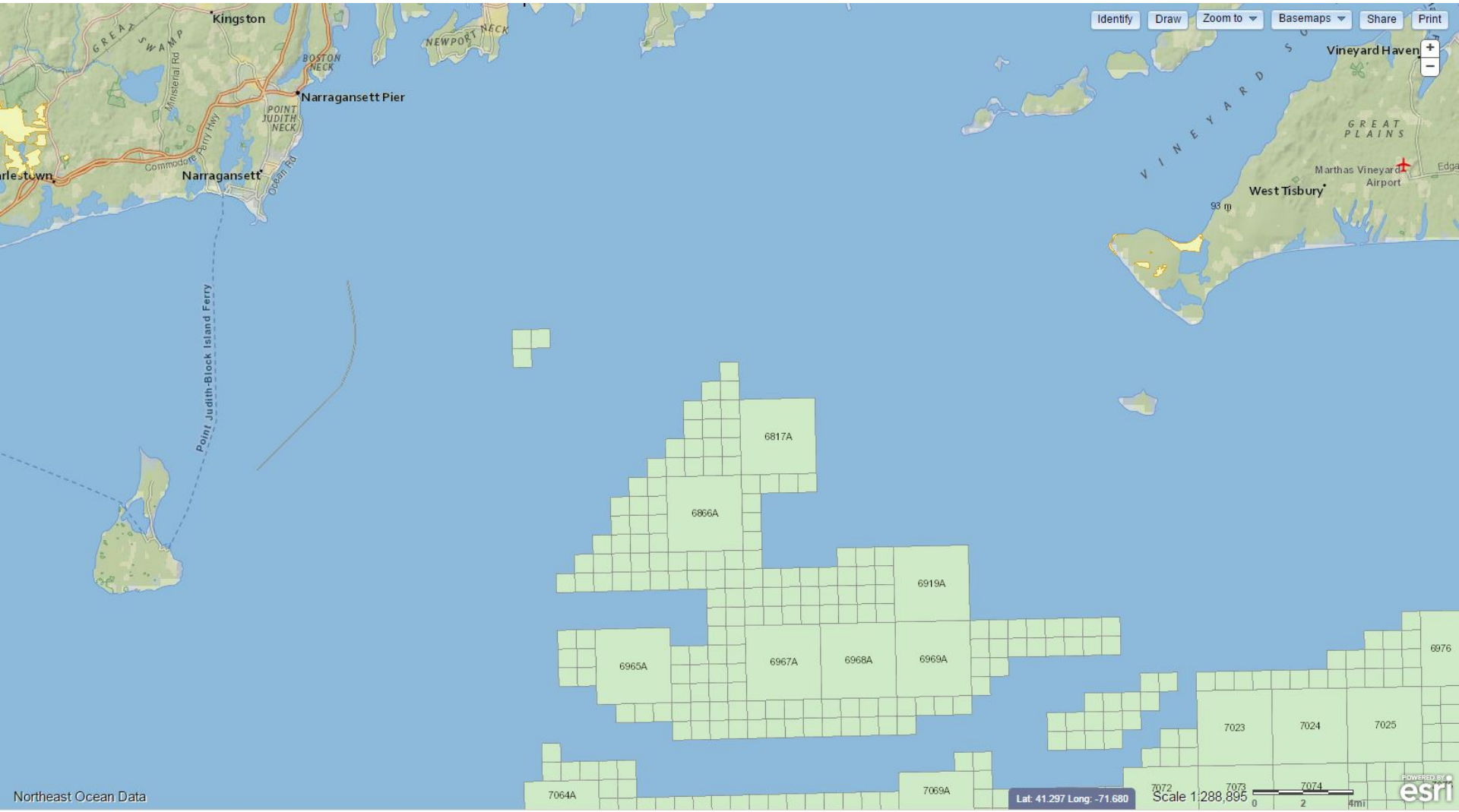
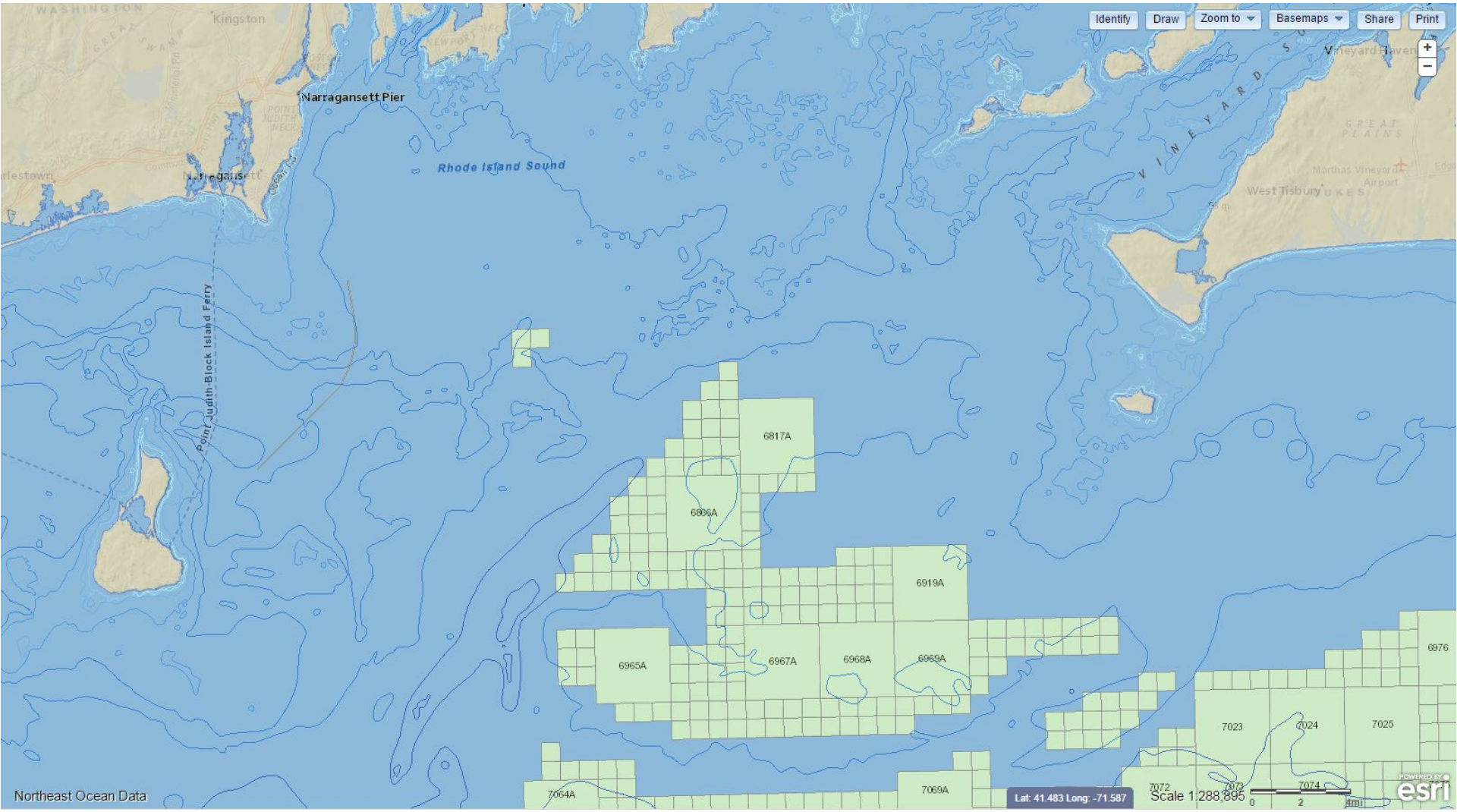
Context *(Tribal Interests)*



Context *(Landforms)*



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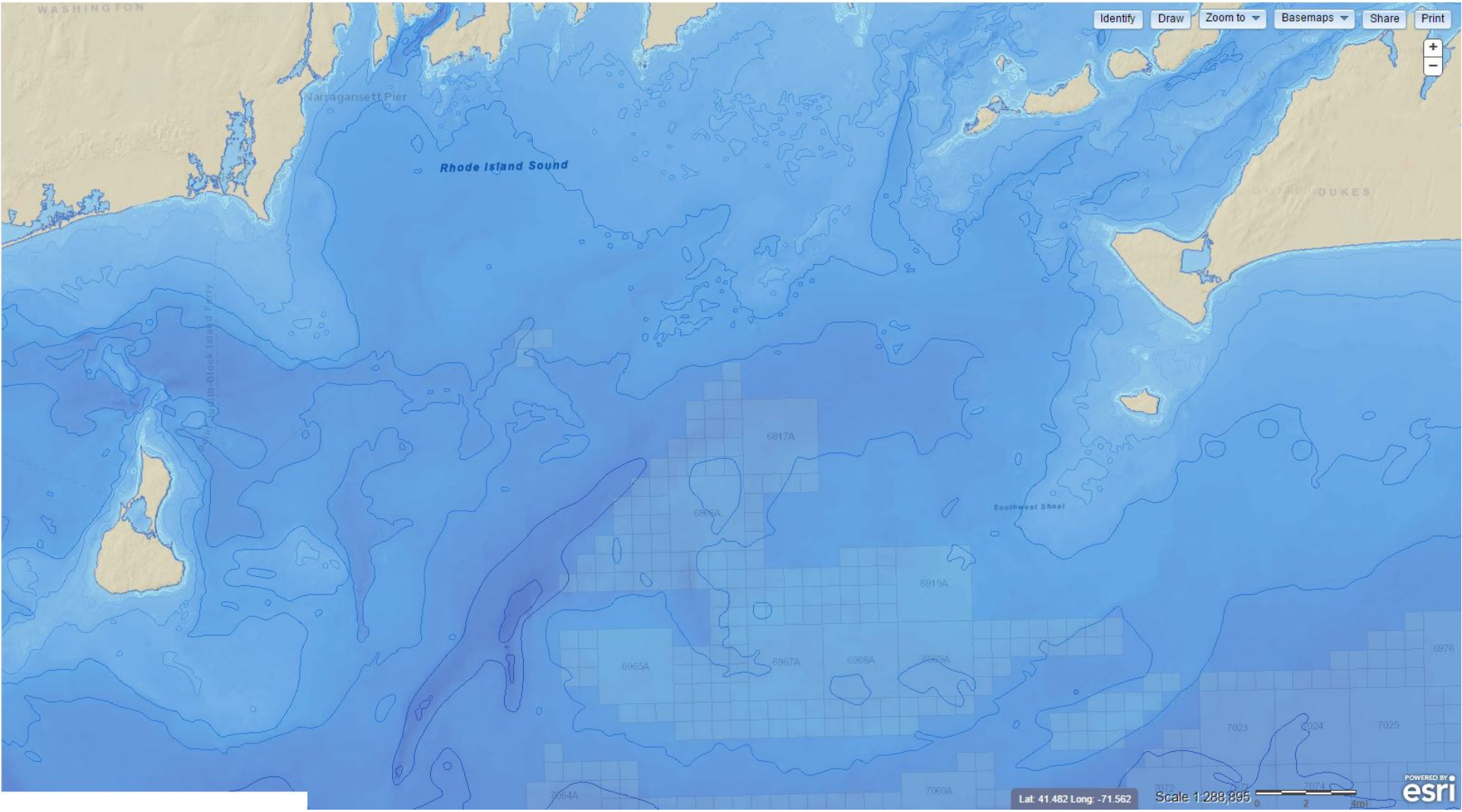
Context *(Landforms)*



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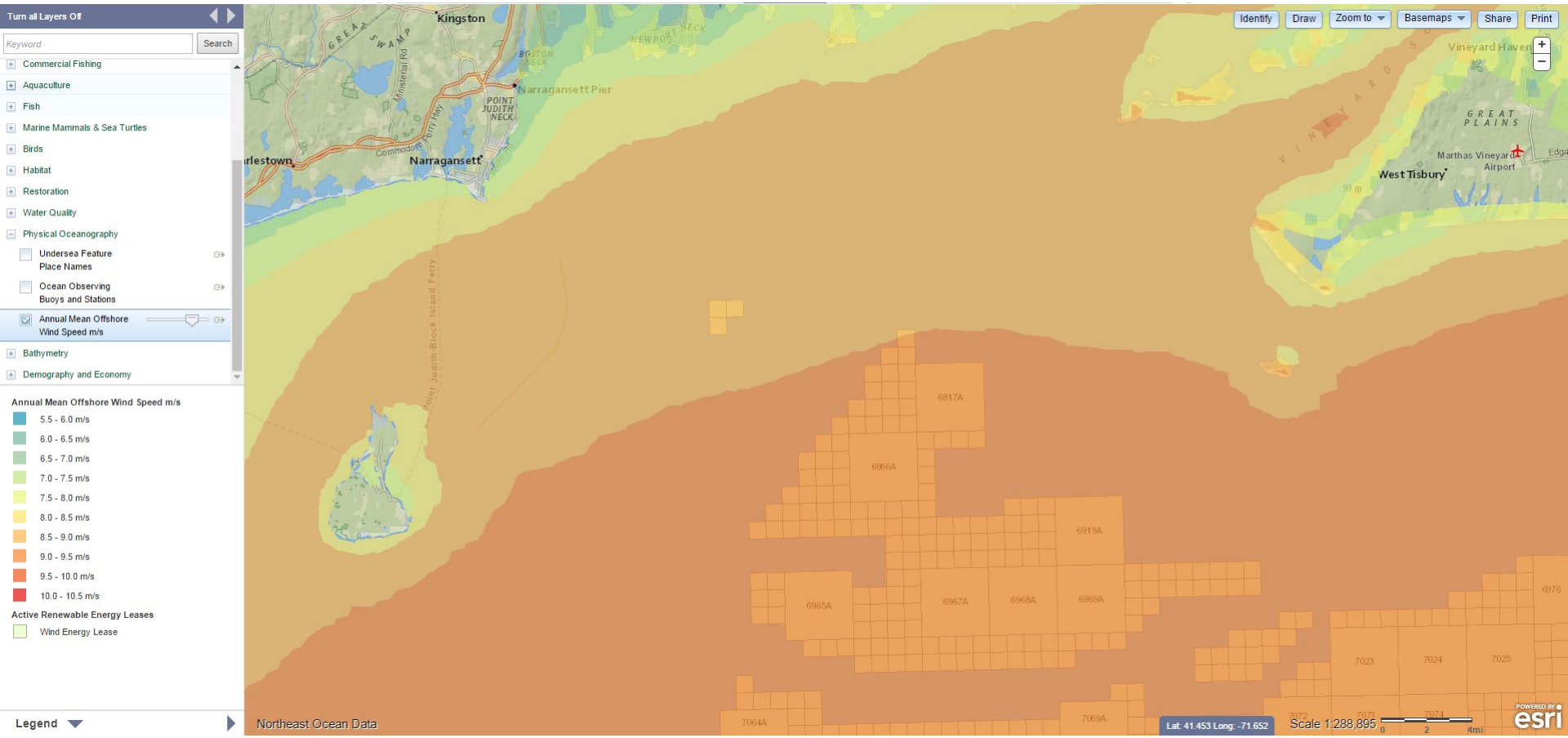
Context *(Wind Resources)*



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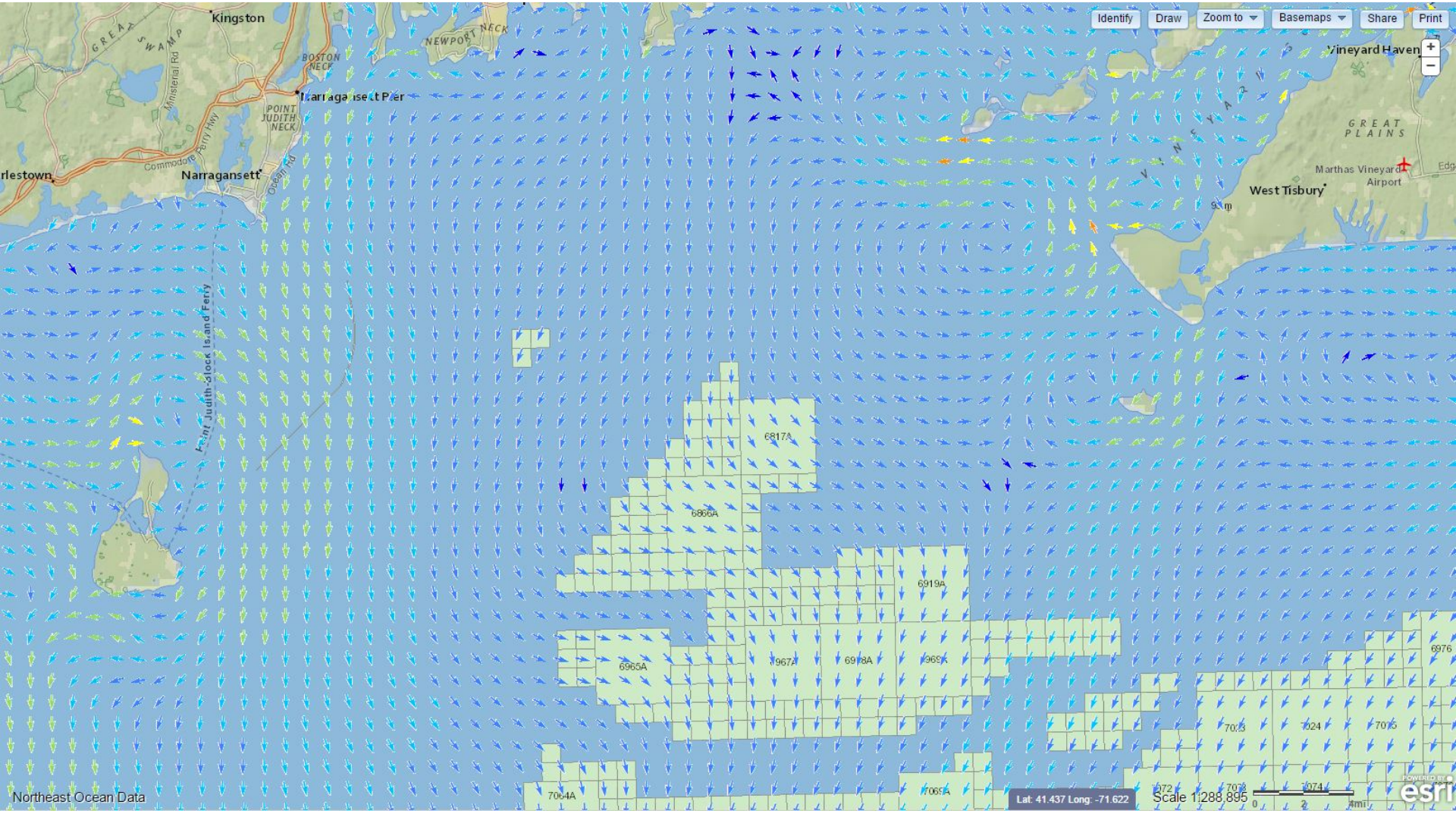
Context *(Surface Currents)*



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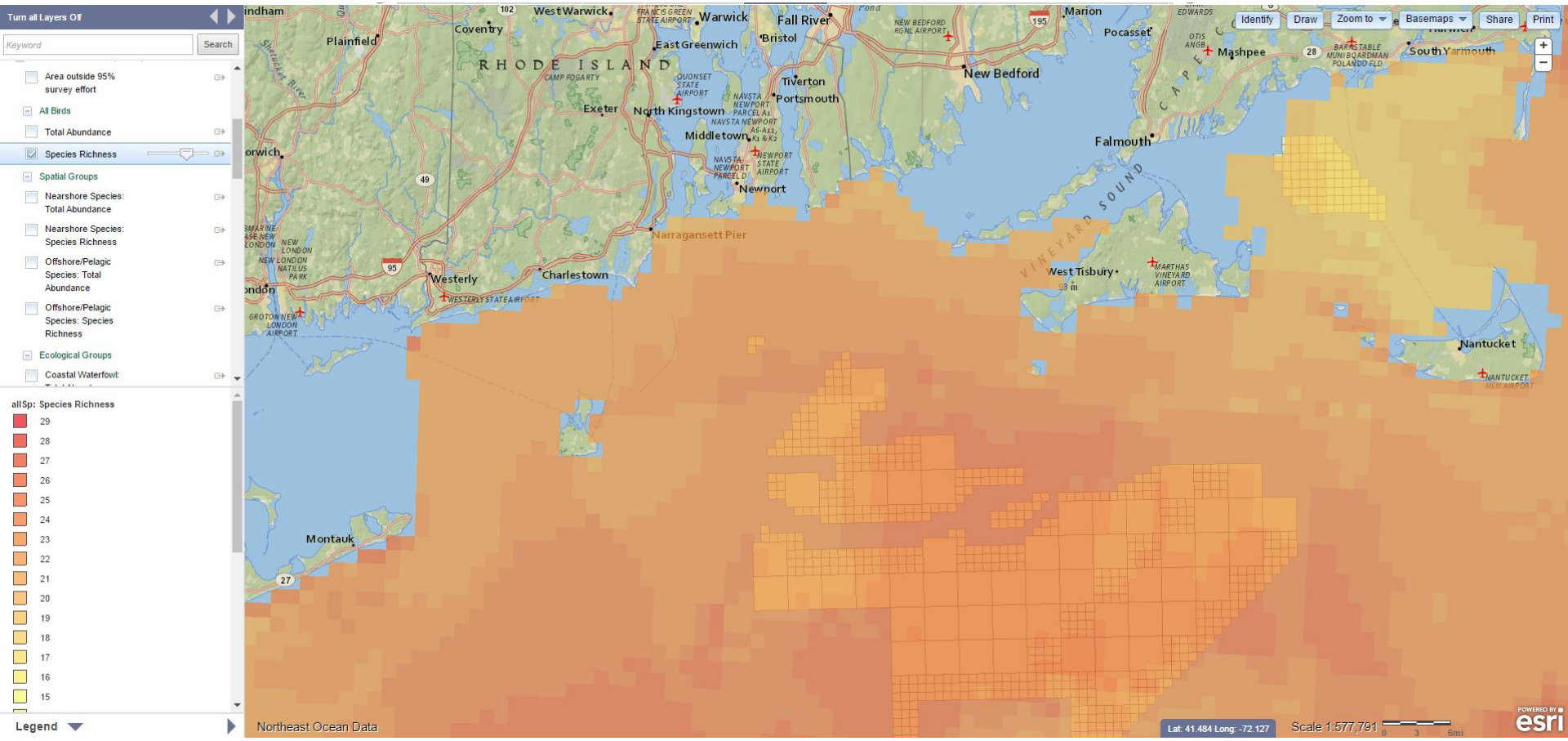
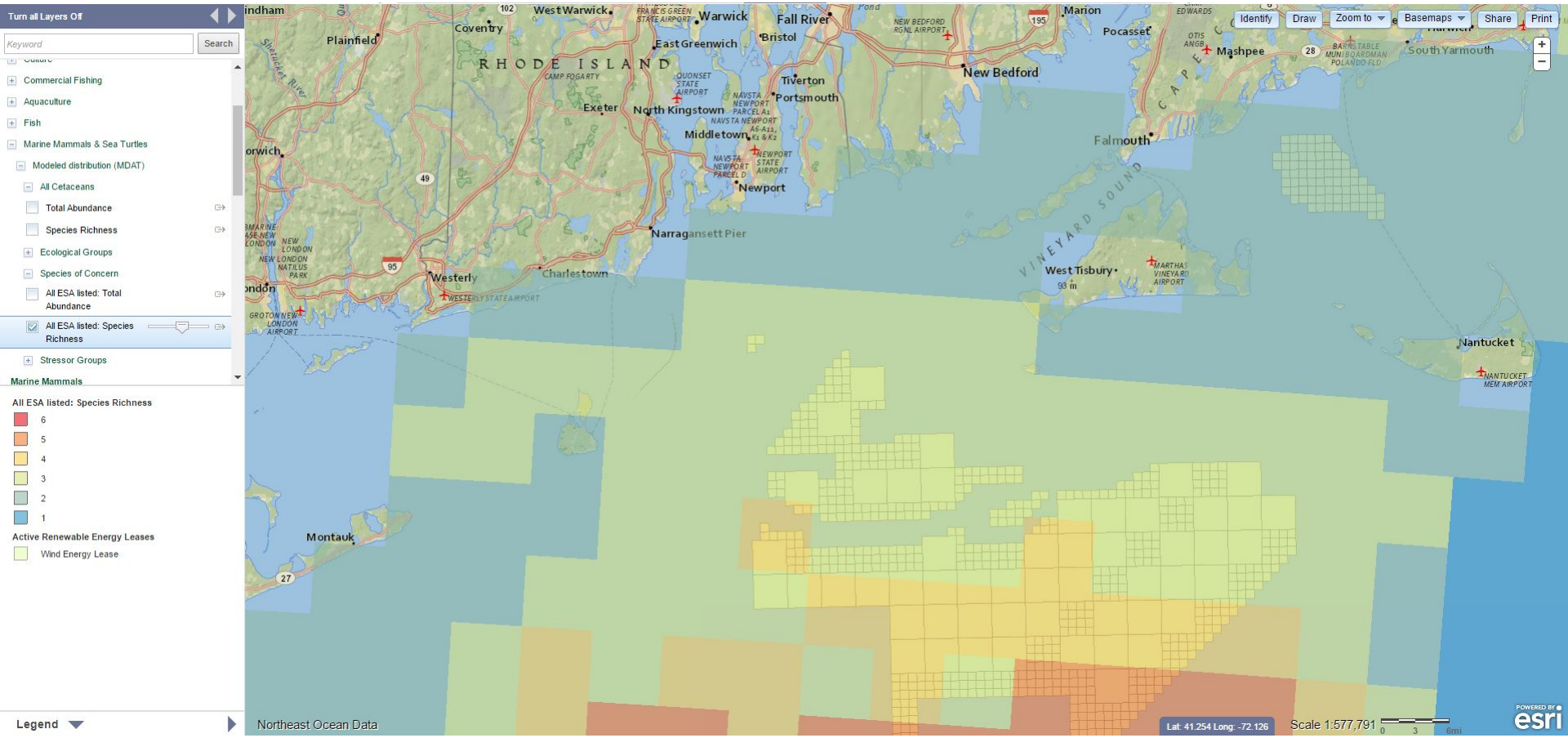
Resources and Uses *(Valued Ecosystem Components)*

- Physical
- Biological
- Socioeconomic
- Marine Life
- Habitat
- Commercial
- Industrial
- Recreational
- Cultural Heritage
- Ocean Economy

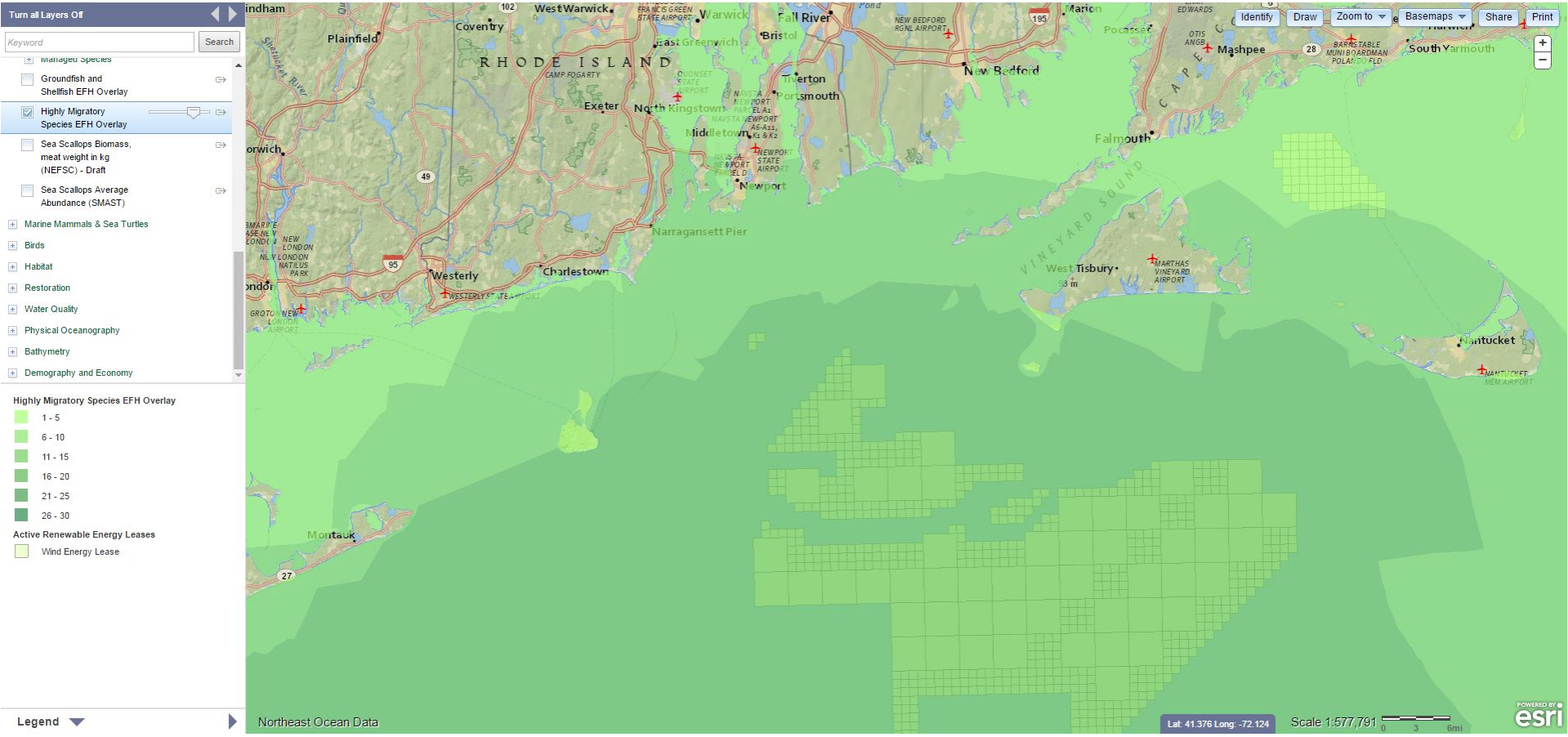
Resources and Uses *(Avian Species Richness)*



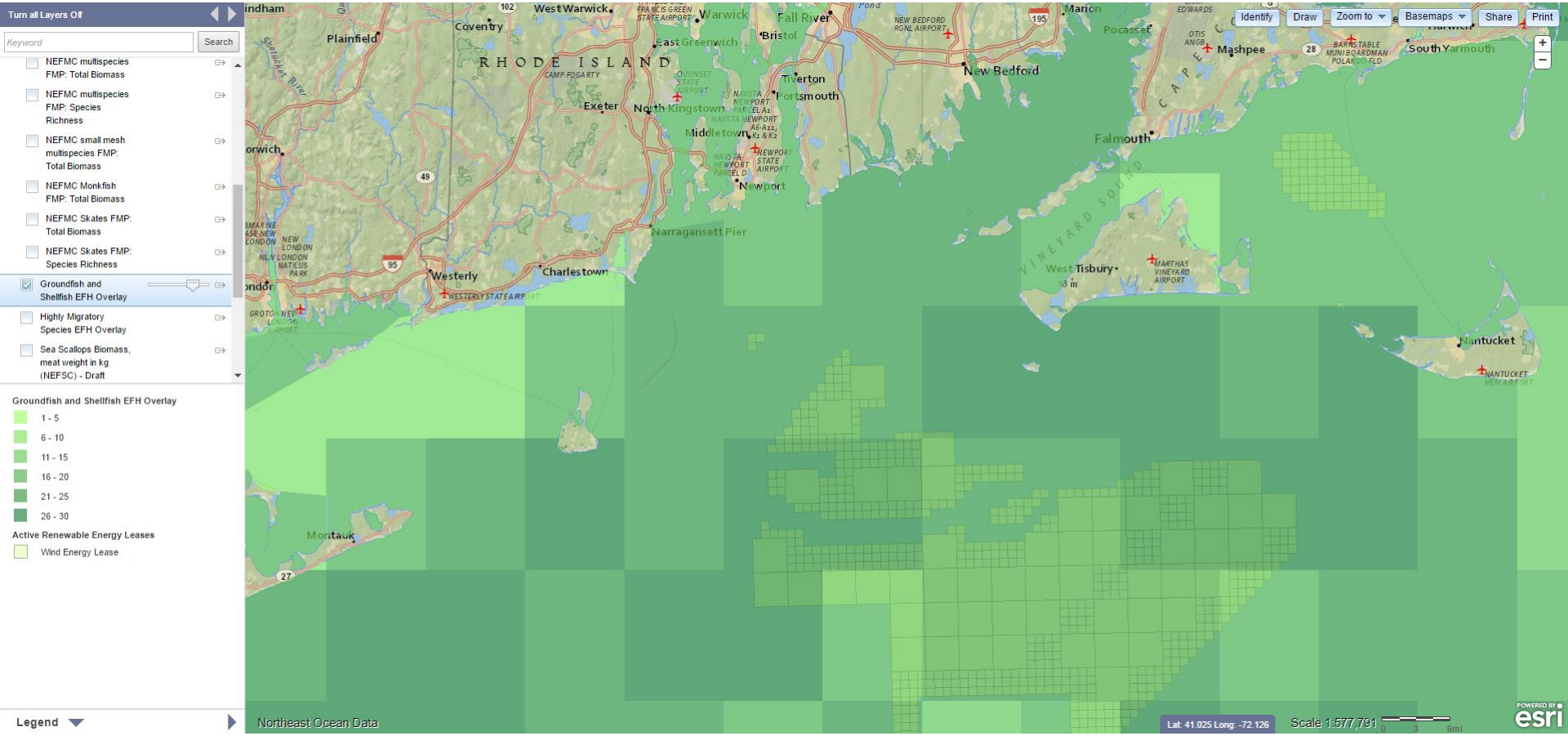
Resources and Uses *(ESA Listed – Cetacean Species Richness)*



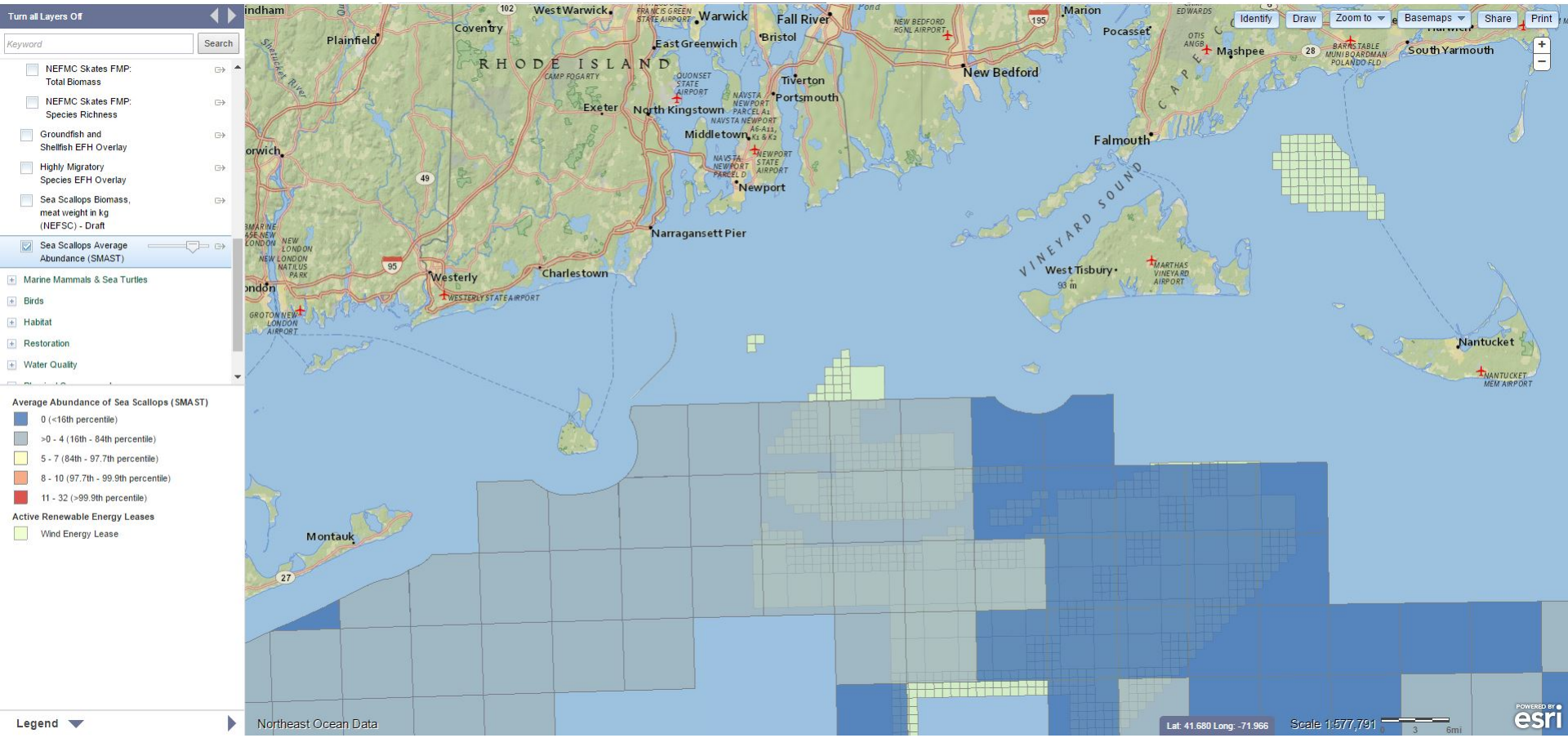
Resources and Uses *(EFH – Highly Migratory Species)*



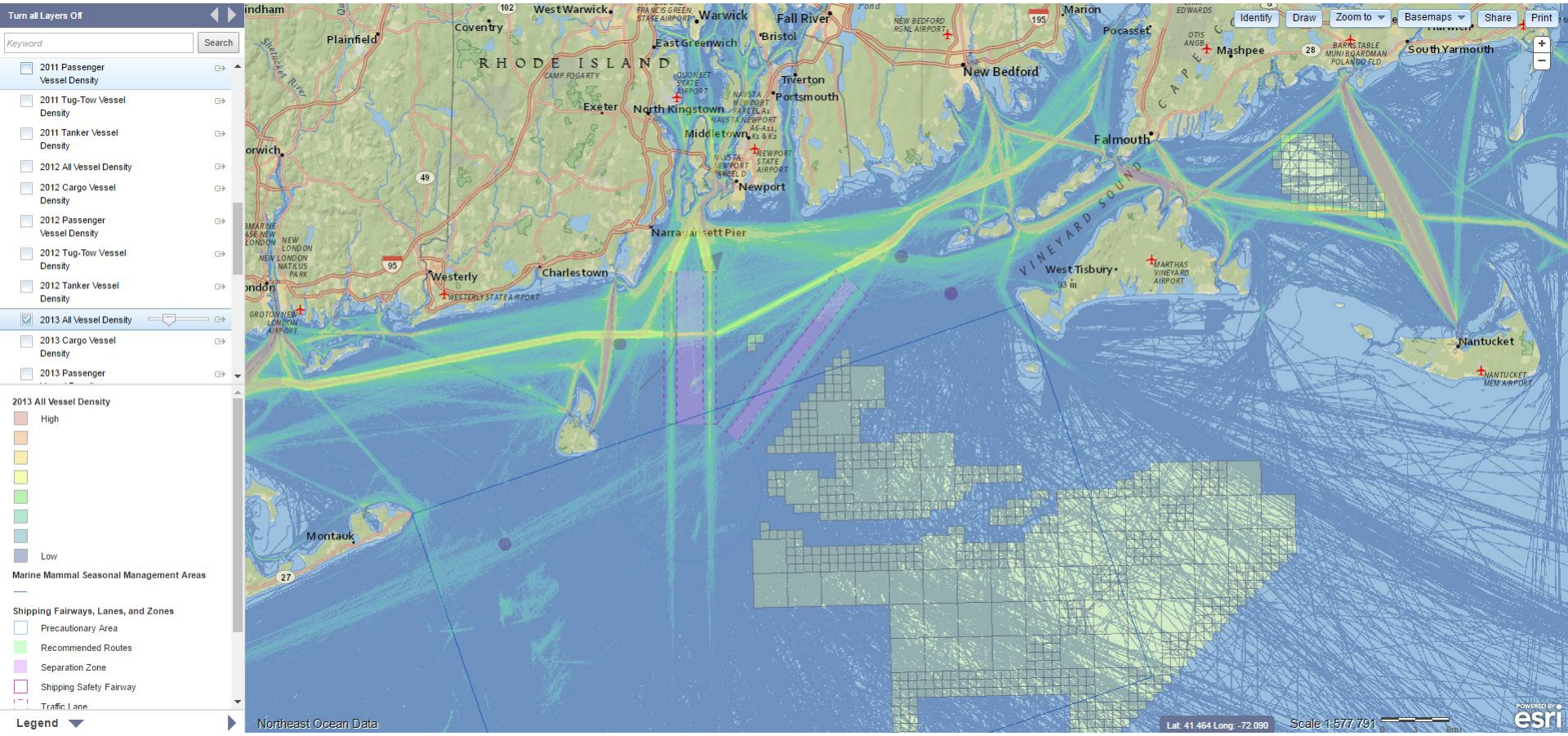
Resources and Uses *(EFH - Groundfish and Shellfish)*



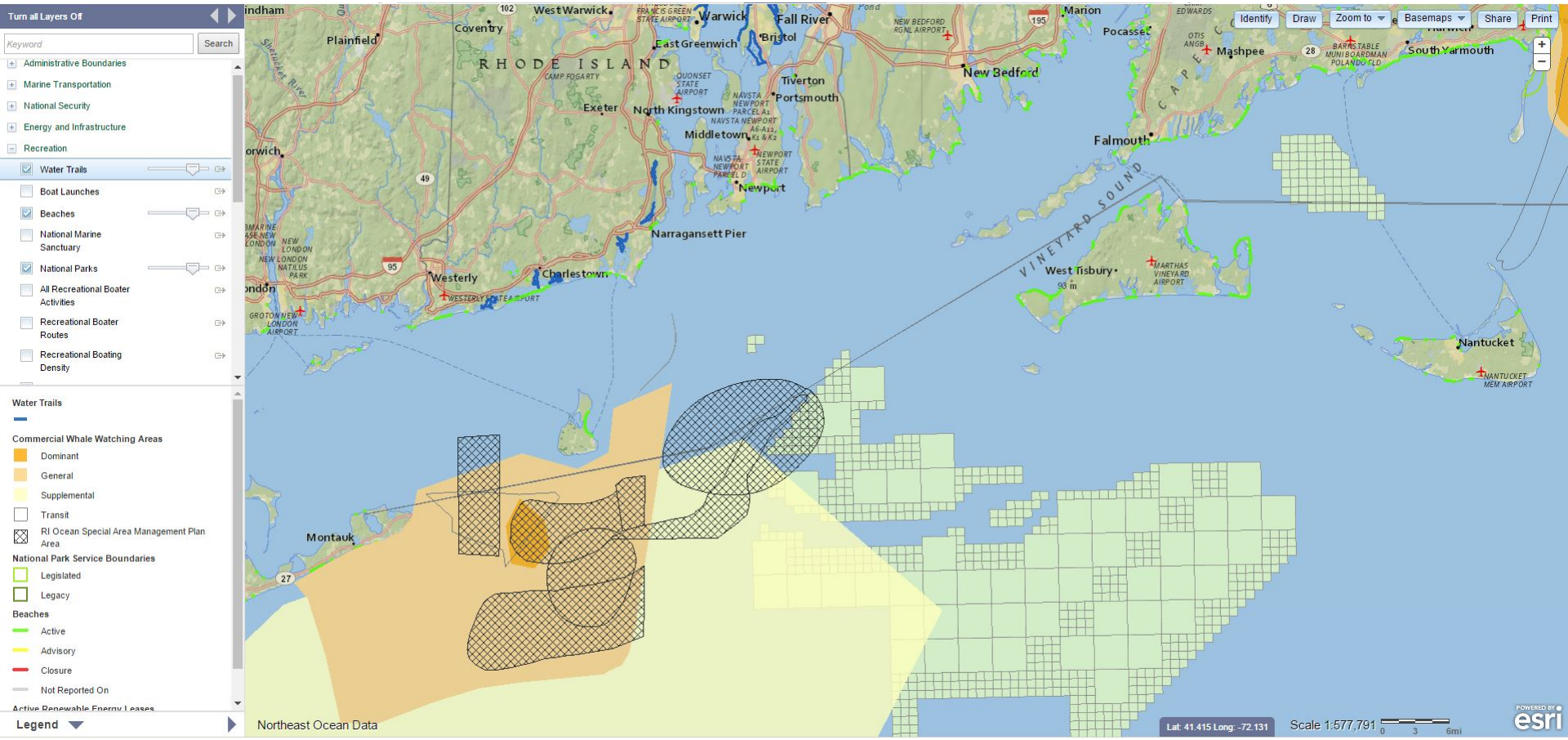
Resources and Uses *(Average Abundance of Sea Scallops)*



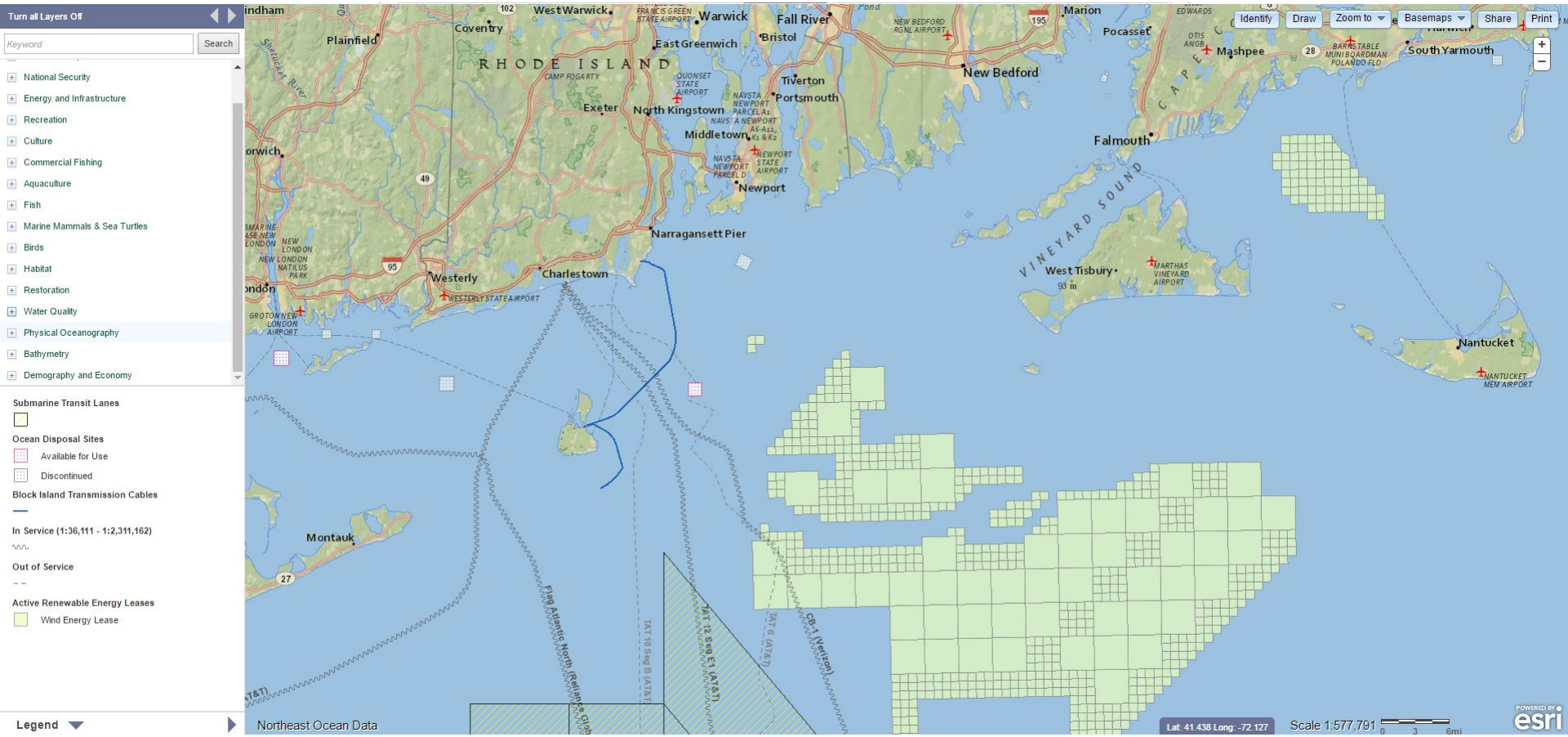
Resources and Uses *(Marine Transportation)*



Resources and Uses *(Recreation, Commerce)*



Resources and Uses *(Communications, Disposal, Security)*

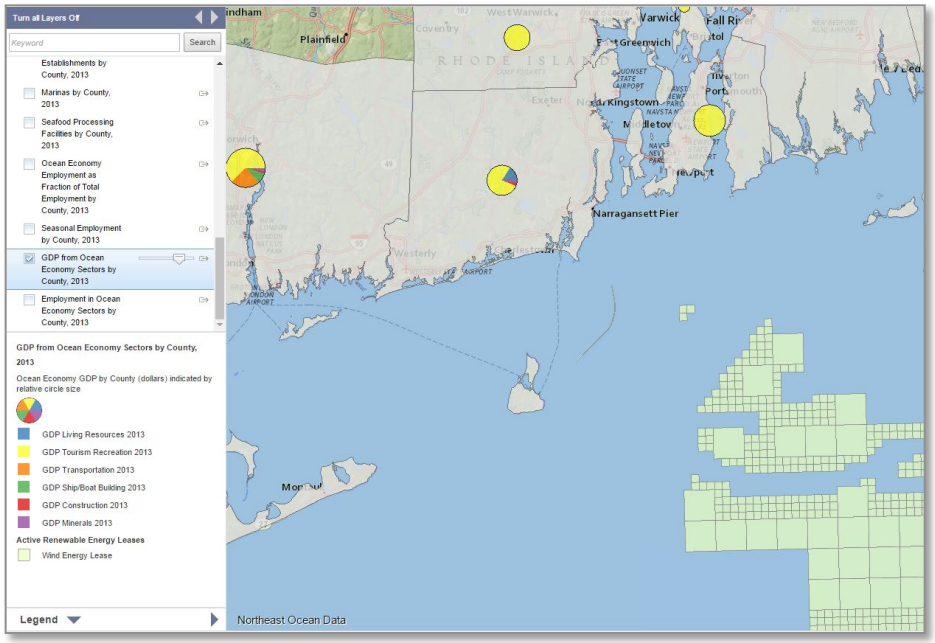


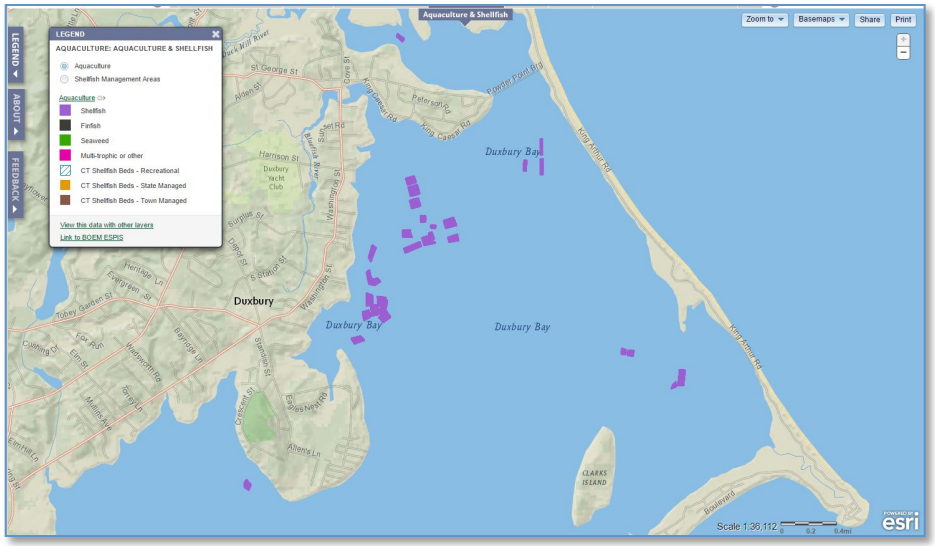
Stressors

- Infrastructure
- Disposal
- Exploration
- Extraction
- Development Density
- Contaminates
- Sound
- Light
- Temperature

State Interest

- Economic
- Recreation
- Ecotourism
- Navigation
- Transportation
- Communication
- Energy
- Natural Resources
- Ecosystem Services





Declarative and Foreseeable Effects

Direct and Indirect Effects:

- Intensity, Thresholds, Diversity
- Impact on a Valued Ecosystem Component

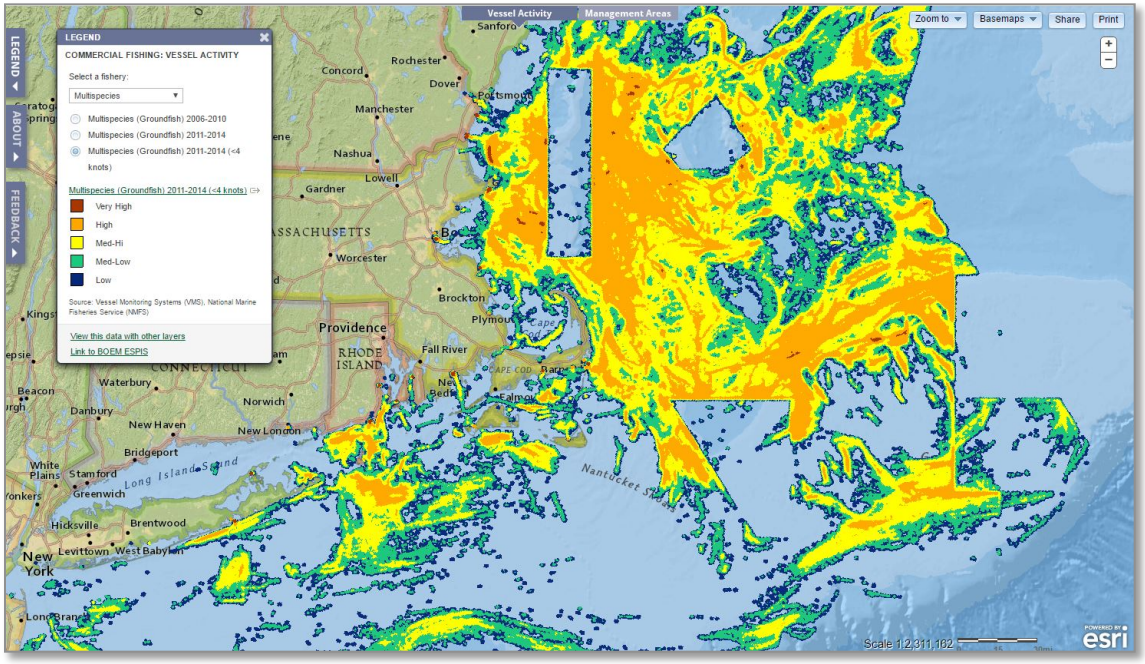
Cumulative Effects:

- Time / Space Crowding
- Interactive
- Indirect (chain of events), nibbling

The Council on Environmental Quality (CEQ) Regulations state that the determination of significance using an **analysis of effects** requires examination of both **context and intensity**, and lists ten criteria for intensity (40 CFR 1508.27). In addition, the National Oceanic and Atmospheric Administration Administrative Order **(NAO) 216-6 Section 6.01b. 1 - 11** provides eleven criteria, the same ten as the CEQ Regulations and one additional, for determining whether the impacts of a proposed action are significant.

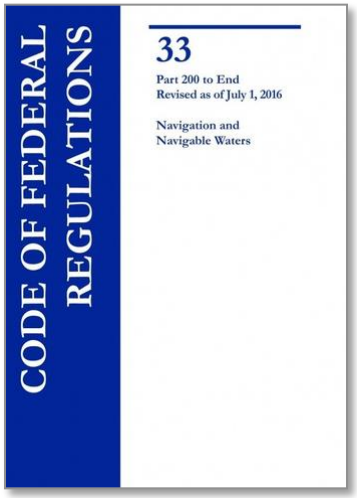
Geostatistical Analysis *(data science)*

- Interpolation
- Trend Analysis
- Spatial Autocorrelation
- Cluster and Outliers
- Distribution
- Regression:
  - Exploratory
  - Ordinary Least Squares
  - Geographically Weighted



Causality – Empirical Data

- Data Quality
- Appropriate Use
- Source and Lineage
- Currency, Completeness
- Resolution
- Collection Methods
- Uncertainty
- Frequency of Resource
- Frequency of Effect
- Frequency of Data


CODE OF FEDERAL REGULATIONS

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Part 200 to End
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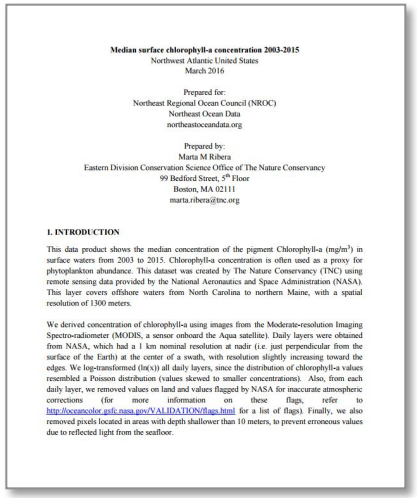
Navigation and
Navigable Waters


Median surface chlorophyll-a concentration 2003-2015
Northwest Atlantic United States
March 2016

Prepared for:
Northeast Regional Ocean Council (NROC)
Northeast Ocean Data
northeastoceandata.org

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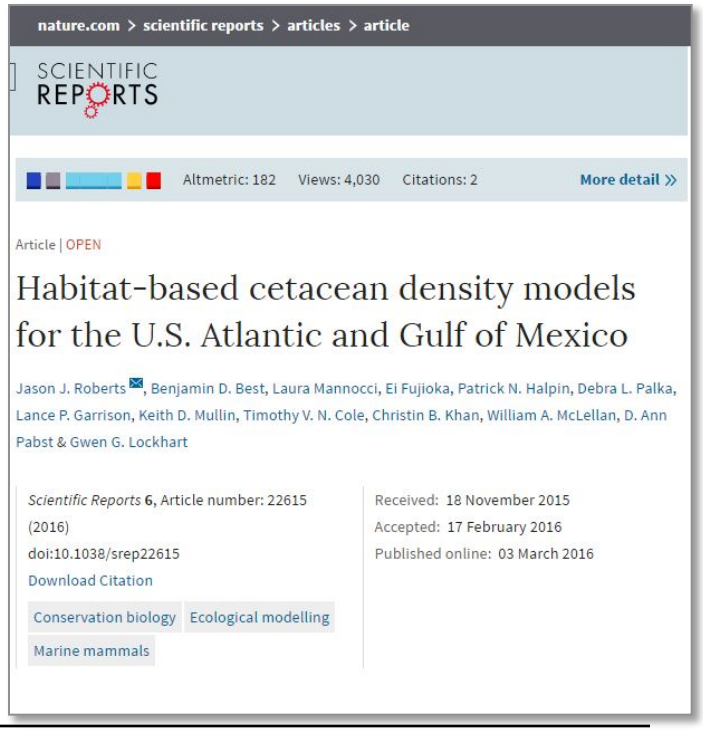
1. INTRODUCTION

This data product shows the median concentration of the pigment Chlorophyll-a (mg/m^3) in surface waters from 2003 to 2015. Chlorophyll-a concentration is often used as a proxy for phytoplankton abundance. This dataset was created by The Nature Conservancy (TNC) using remote sensing data provided by the National Aeronautics and Space Administration (NASA). This layer covers offshore waters from North Carolina to northern Maine, with a spatial resolution of 1300 meters.

We derived concentration of chlorophyll-a using images from the Moderate-resolution Imaging Spectro-radiometer (MODIS, a sensor onboard the Aqua satellite). Daily layers were obtained from NASA, which had a 1 km nominal resolution at nadir (i.e. just perpendicular from the surface of the Earth) at the center of a swath, with resolution slightly increasing toward the edges. We log-transformed (ln(x)) all daily layers, since the distribution of chlorophyll-a values resembled a Poisson distribution (values skewed to smaller concentrations). Also, from each daily layer, we removed values on land and values flagged by NASA for inaccurate atmospheric corrections (for more information on these flags, refer to http://oceancolor.gsfc.nasa.gov/VALIDATION/flags.html for a list of flags). Finally, we also removed pixels located in areas with depth shallower than 10 meters, to prevent erroneous values due to reflected light from the seafloor.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Questions and Discussion