Environmental Review of Renewable Energy Projects on the Atlantic Outer Continental Shelf (OCS)

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Bureau of Ocean Energy Management

BOEM
Bureau of Ocean Energy Management

Bureau of Ocean Energy Management

- Department of the Interior's Ocean Energy Agency
- Manages the nation's natural gas, oil and other mineral and energy resources on the OCS

Authority and Purpose

- Energy Policy Act of 2005 granted authority to regulate renewable energy development on the Outer Continental Shelf
- Final rule completed in 2009 established a process for granting leases, easements, rights-of-way and revenue sharing for offshore renewable energy development

Stages of Renewable Energy Development

Planning and Analysis

- Call for Information
- Area Identification

Leasing

- Competitive or non-competitive

Site Characterization and Assessment

- Lessee conducts surveys (geological, geophysical, archaeological and biological)

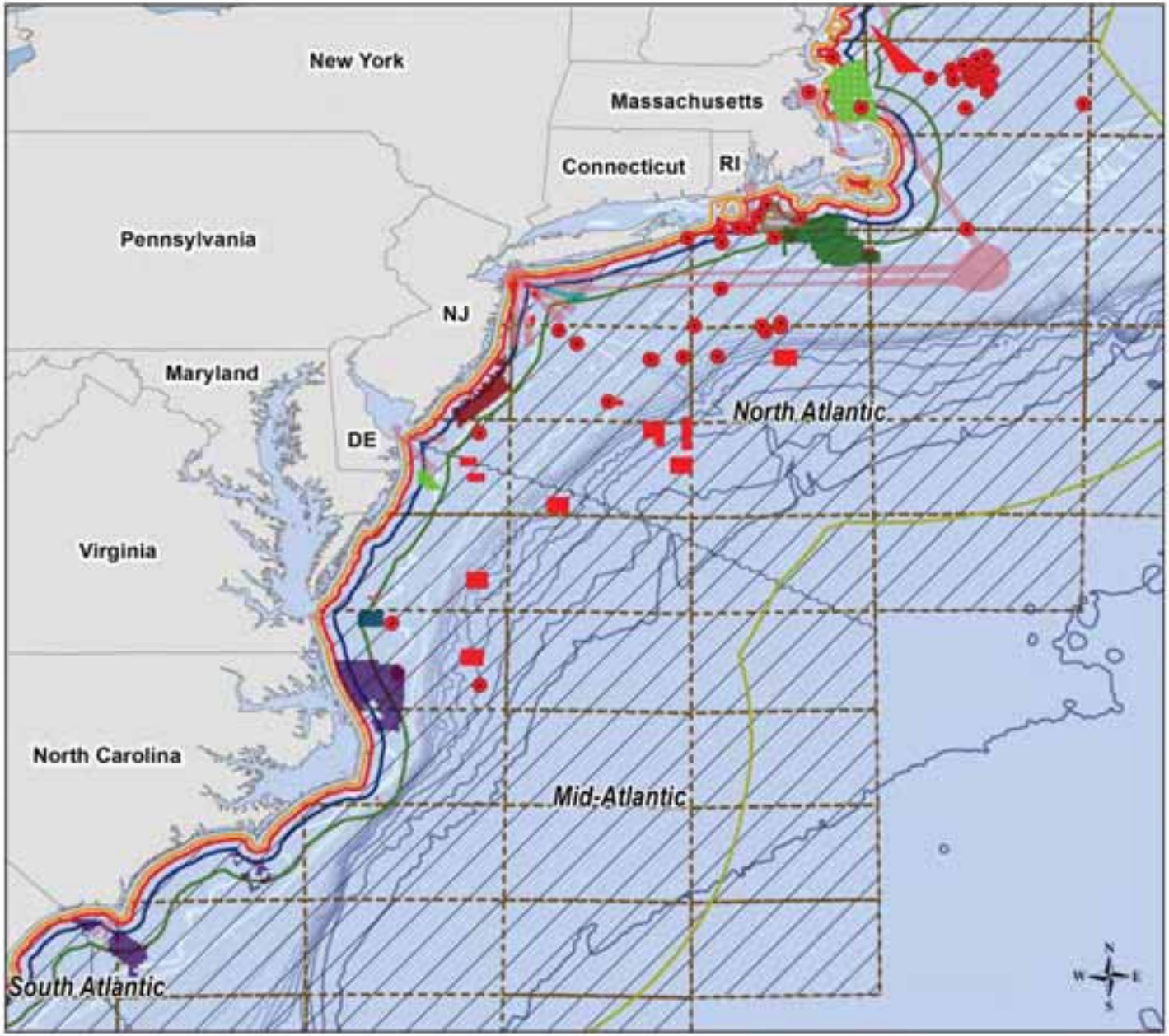
Commercial Development

- Construction and operation
- Decommissioning

- Call for Information informs Area Identification
- BOEM delineates Wind Energy Areas in collaboration with Intergovernmental Task Forces
- Considers environmental resources and multiple use issues

Atlantic Coast Data Themes

- Bathymetry
- Planning Areas
- Protractions
- Maritime Boundaries
- Traffic Separation Scheme
- National Marine Sanctuaries
- Dumping Grounds
- Wind Planning Areas



Conduct Compliance Review Under National Environmental Policy Act (NEPA)

Protect the environment and develop information necessary to assess and manage environmental impacts on the human, marine and coastal environments

- Engage stakeholders and public; consult with affected federal, state, local, and tribal government officials to gather information
  - Magnuson-Stevens Fishery Conservation and Management Act (EFH)
  - E.O. 13186: Protection of Migratory Birds
  - E.O. 12898: Environmental Justice
  - Federal Water Pollution Control Act
  - Clean Air Act
  - Coastal Zone Management Act
  - Marine Mammal Protection Act
  - National Historic Preservation Act
  - Endangered Species Act
- Conduct environmental studies to fill data gaps

Lease Issuance and Site Assessment Activities

- One or more WEA
- Site characterization activities (geophysical, geotechnical, archaeological and biological surveys)
- Site assessment activities (installation of meteorological towers and buoys)

Construction and Operations of Commercial Facilities

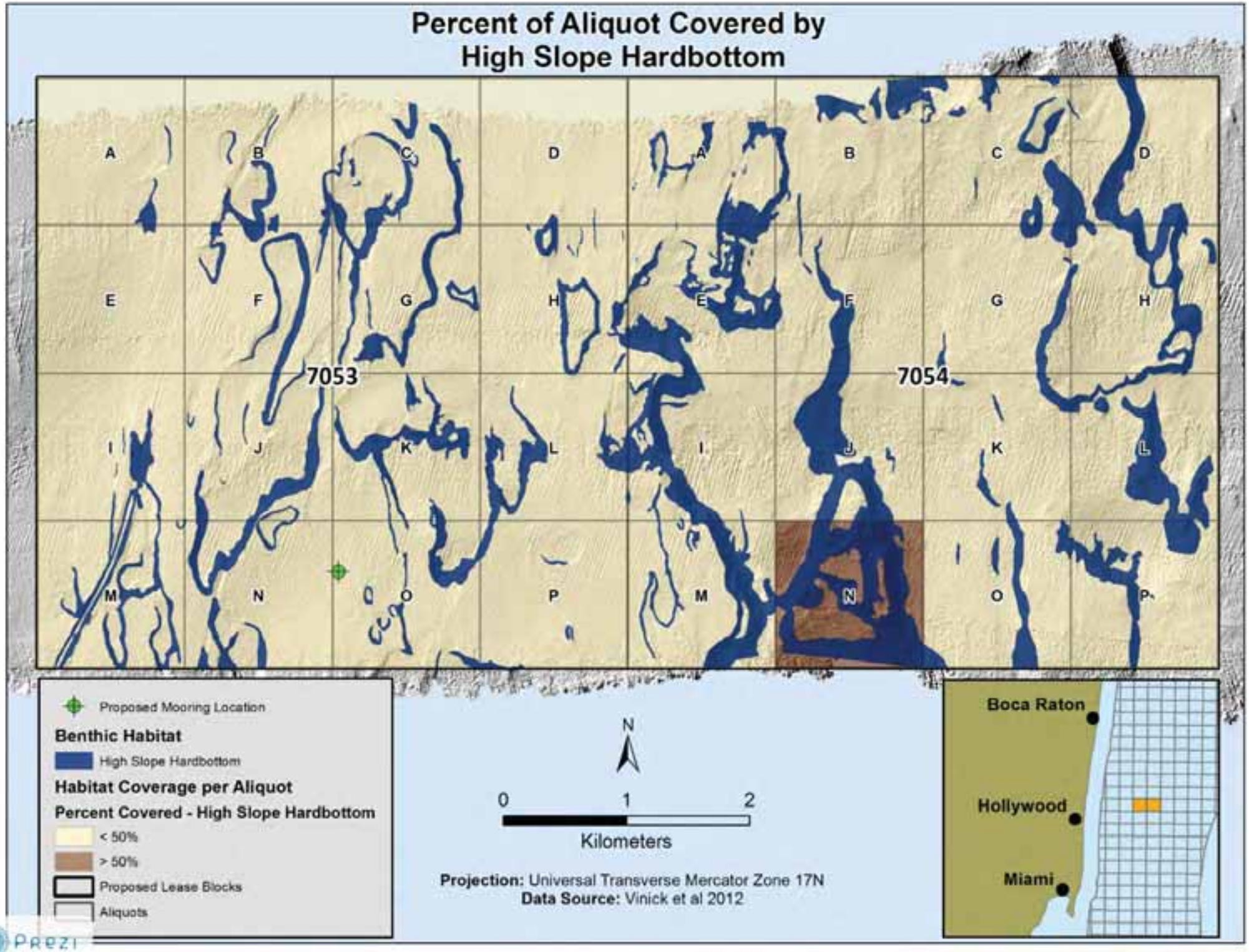
- Site Specific NEPA document
- Generally covers up to 25 years of activities

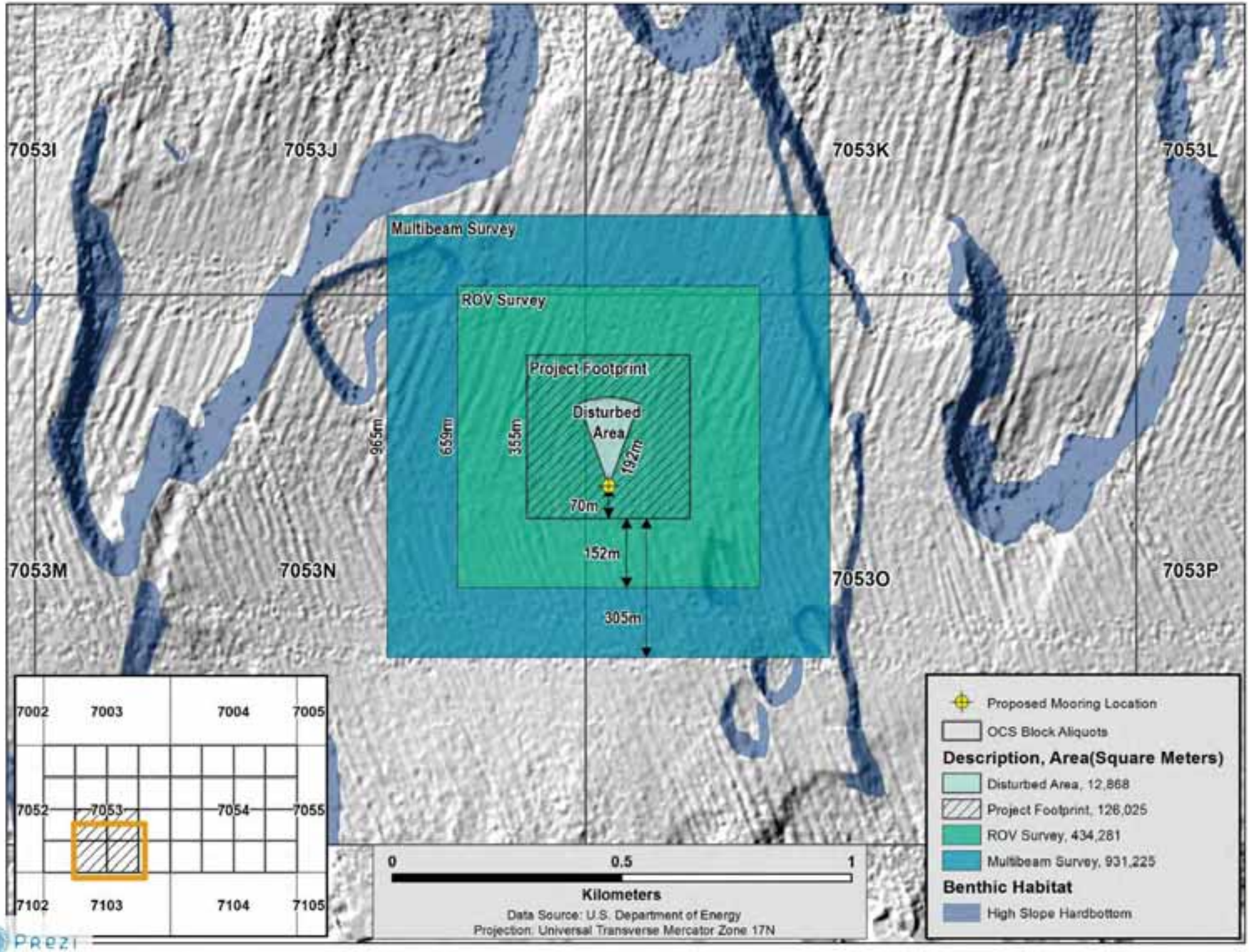
Environmental and Socioeconomic Resources Considered

Air Quality
Water Quality
Marine Mammals
Sea Turtles
Marine and Coastal Birds
Bats
Seafloor Habitat

Physical Oceanography
Coastal Habitat
Socioeconomics
Cultural Resources
Fisheries
Multiple Use Conflicts

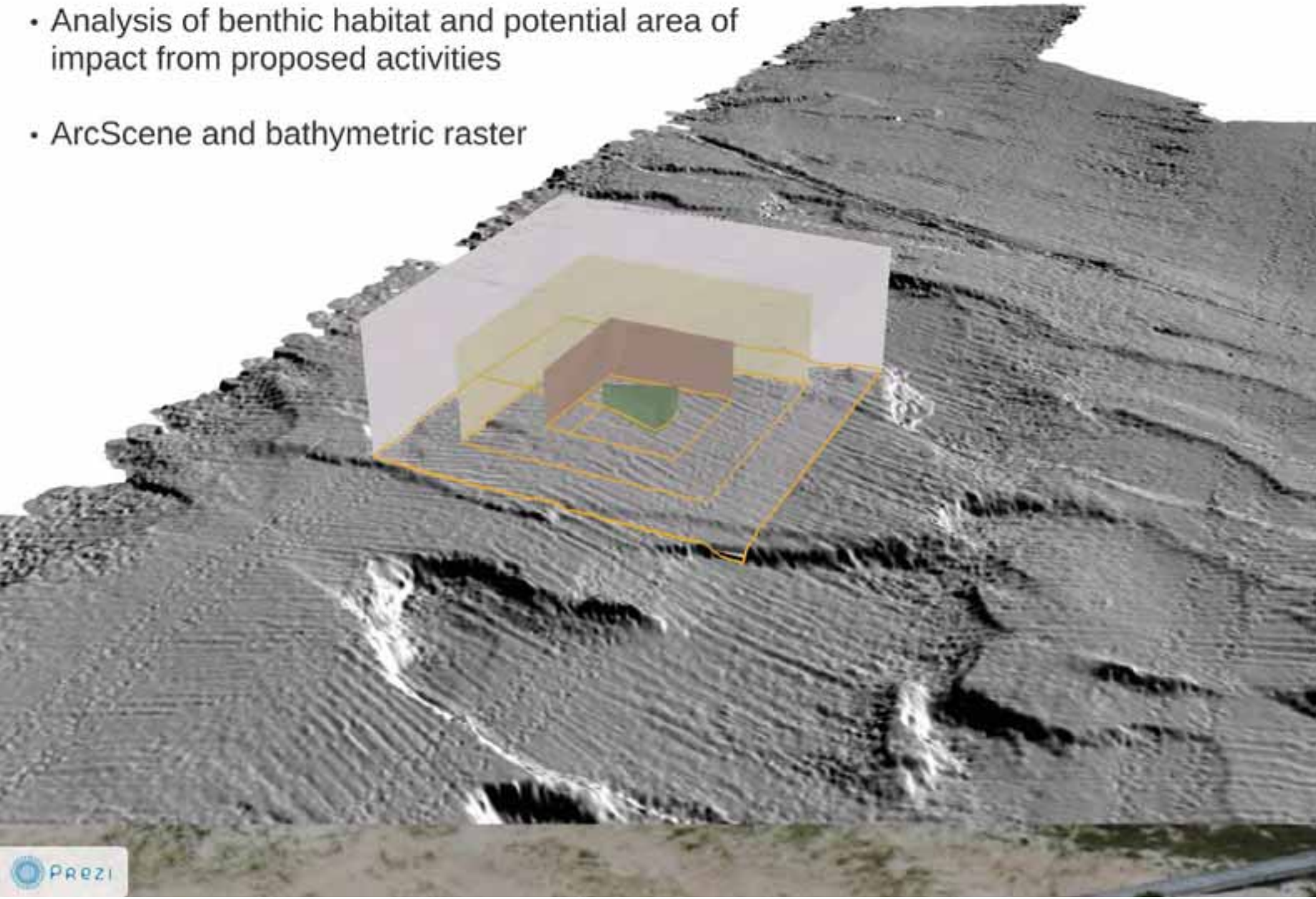
Percent of Aliquot Covered by High Slope Hardbottom

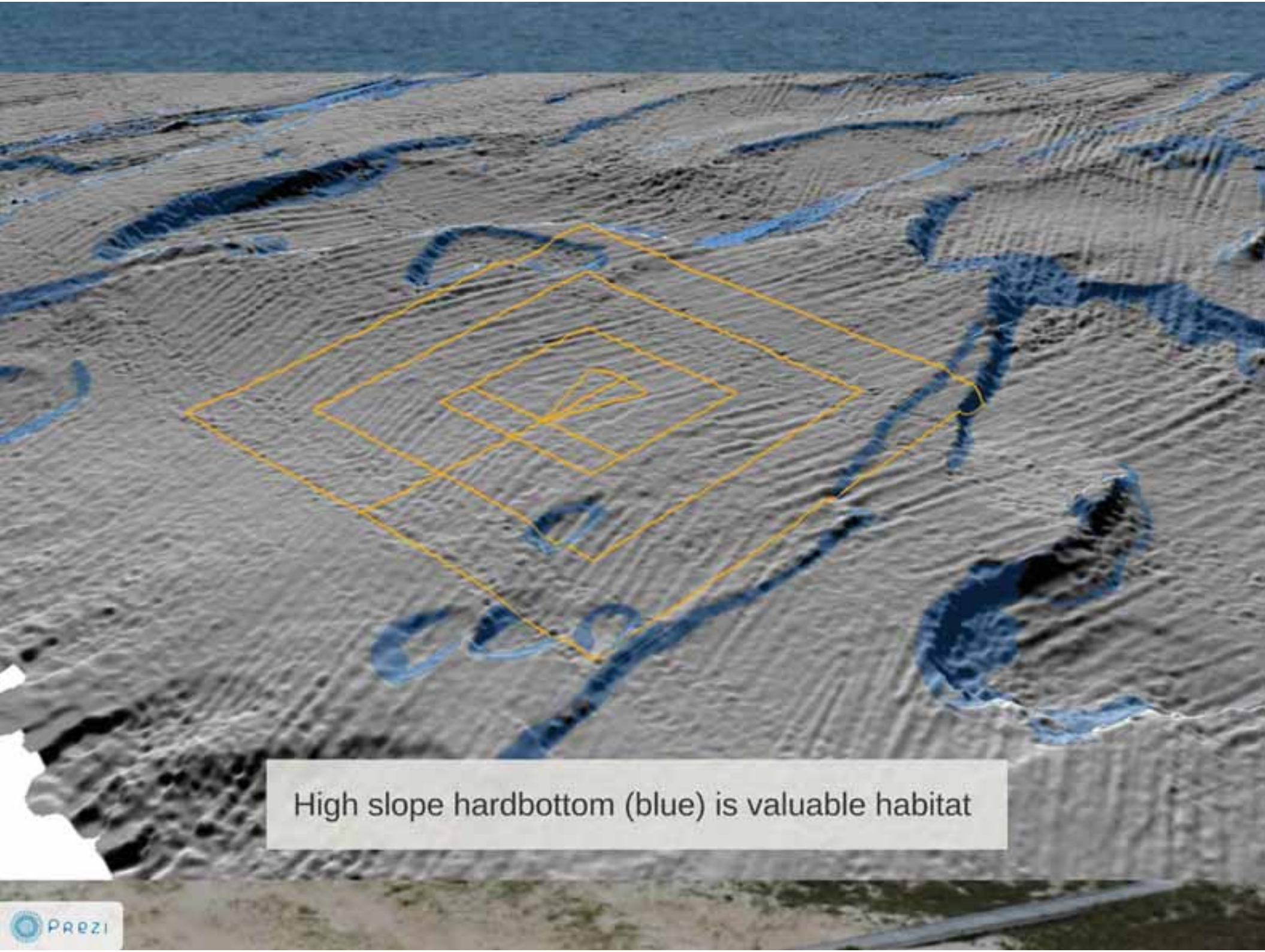


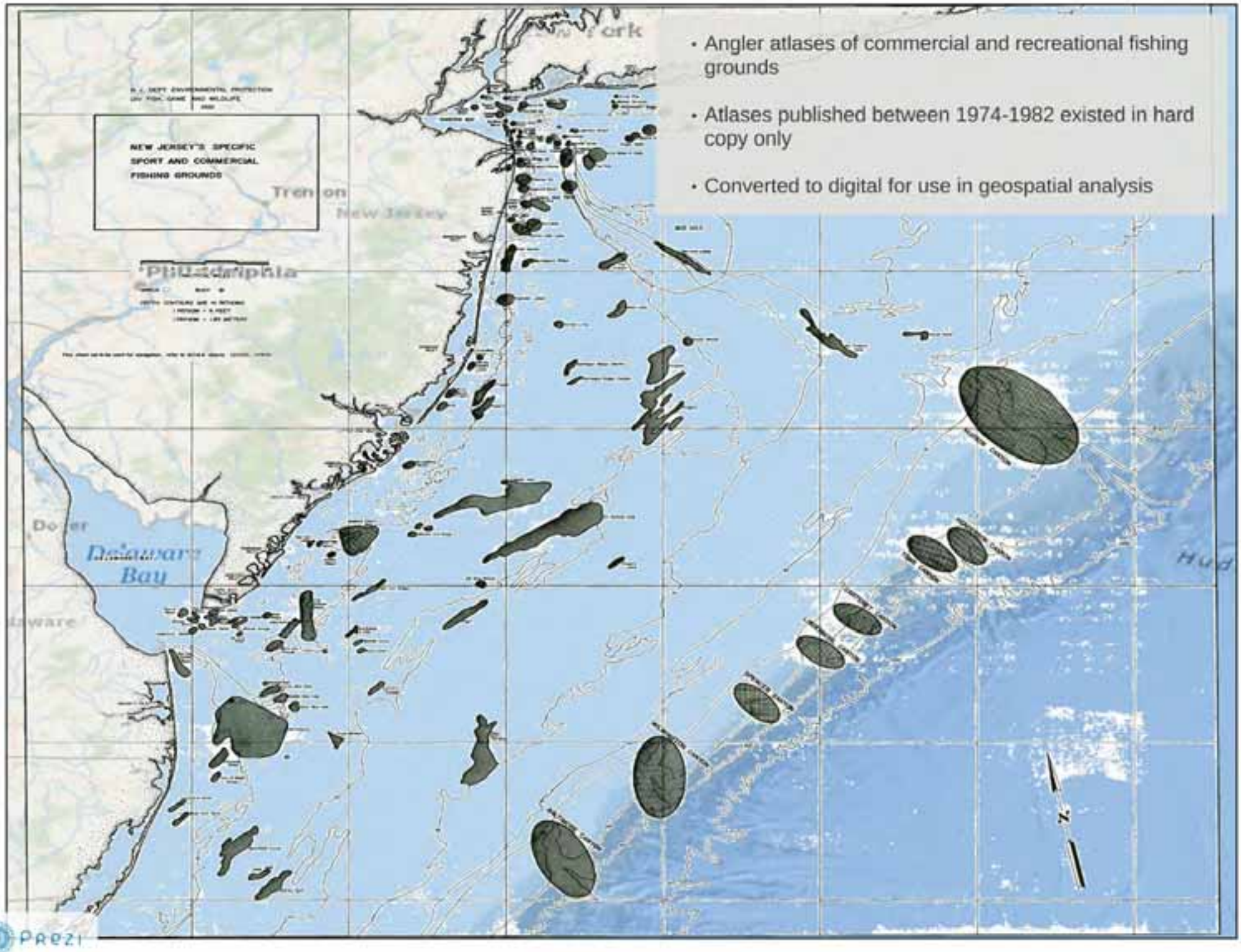

7053I
7053J
7053K
7053L
7053M
7053N
7053O
7053P
Multibeam Survey
ROV Survey
Project Footprint
Disturbed Area
965m
659m
355m
192m
70m
152m
305m
7002
7003
7004
7005
7052
7053
7054
7055
7102
7103
7104
7105
0
0.5
1
Kilometers
Data Source: U.S. Department of Energy
Projection: Universal Transverse Mercator Zone 17N
Proposed Mooring Location
OCS Block Aliquots
Description, Area(Square Meters)
Disturbed Area, 12,868
Project Footprint, 126,025
ROV Survey, 434,281
Multibeam Survey, 931,225
Benthic Habitat
High Slope Hardbottom

- Analysis of benthic habitat and potential area of impact from proposed activities

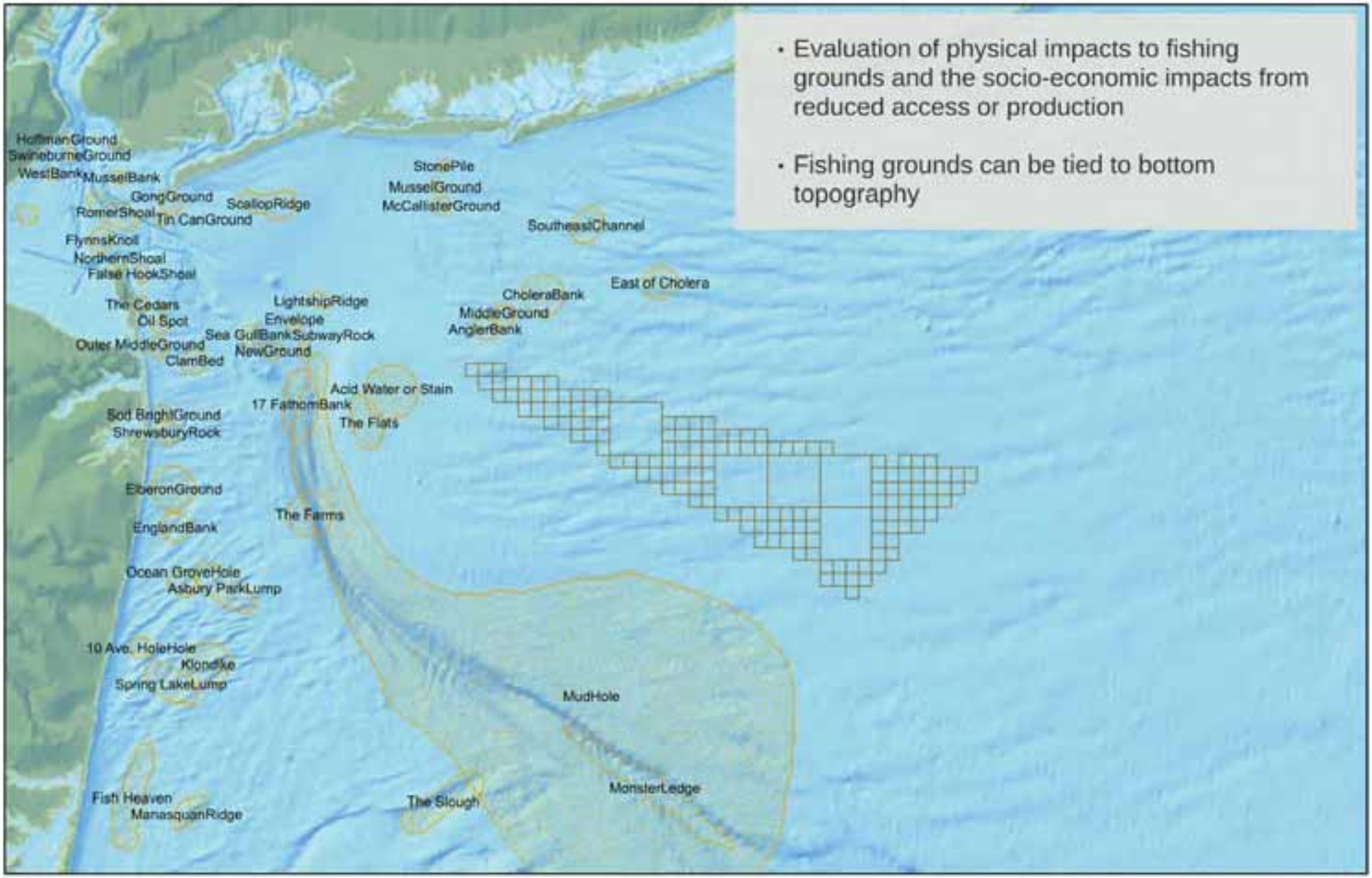
- ArcScene and bathymetric raster




High slope hardbottom (blue) is valuable habitat



- Angler atlases of commercial and recreational fishing grounds
- Atlases published between 1974-1982 existed in hard copy only
- Converted to digital for use in geospatial analysis



- Evaluation of physical impacts to fishing grounds and the socio-economic impacts from reduced access or production
- Fishing grounds can be tied to bottom topography

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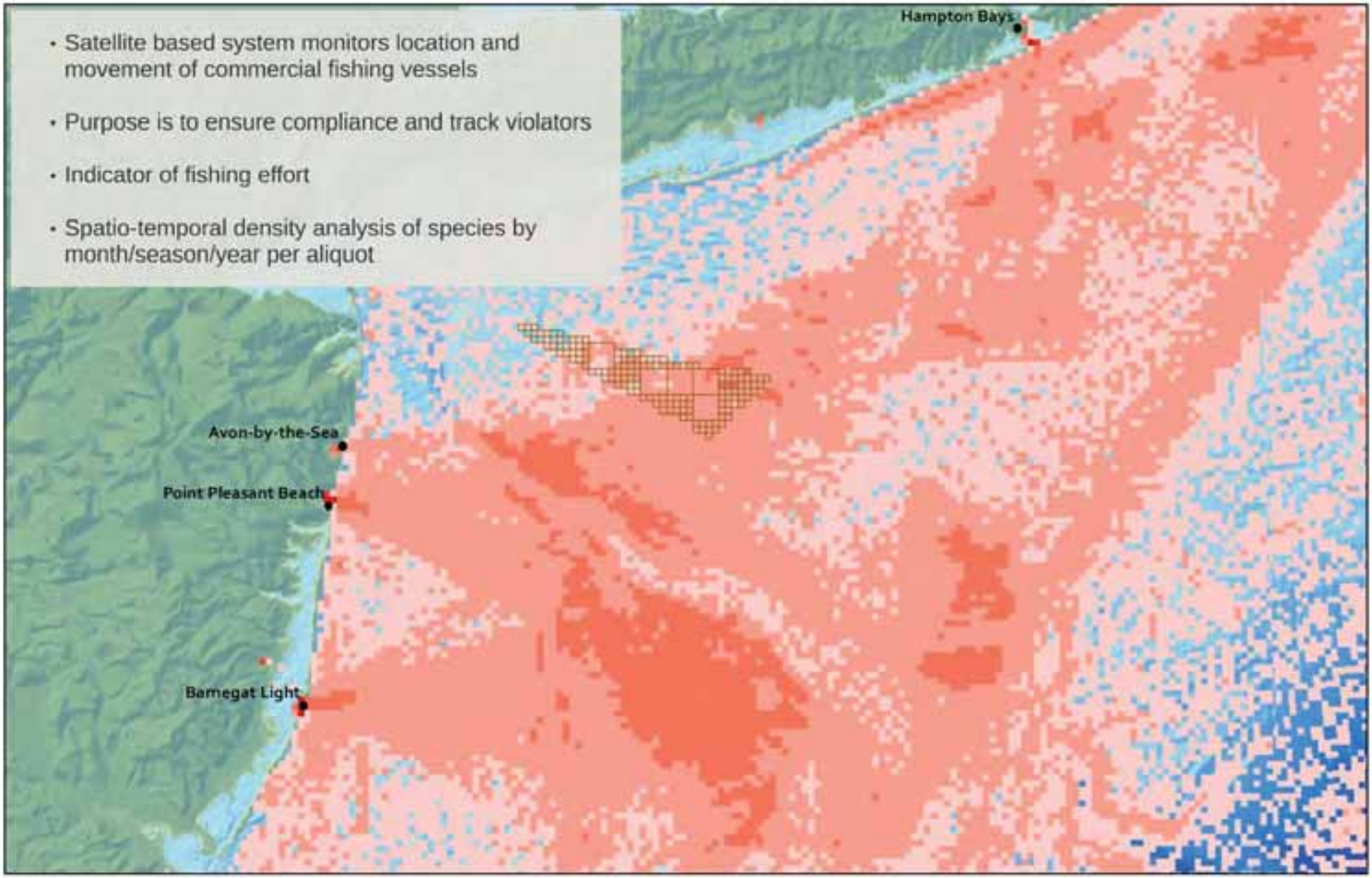
NJ Fishing Grounds Atlas

Nautical Miles
0 2.5 5 10
Kilometers
0 2.5 5 10

Coordinate System: NAD 1983 UTM Zone 18N
Projection: Transverse Mercator
Datum: North American 1983

NY RFI
Sea Floor Characteristic Area

PREZI



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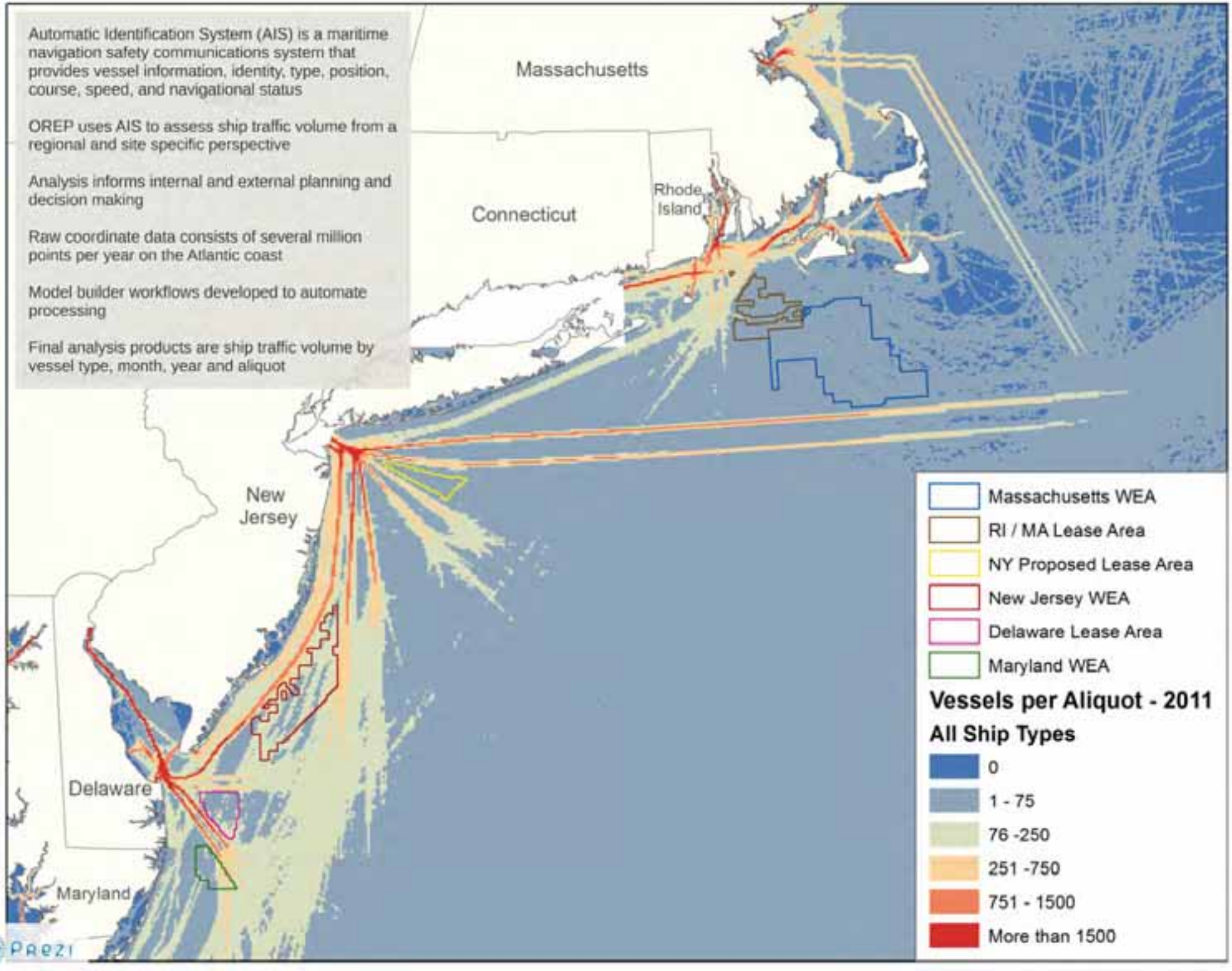
Vessel Monitoring System

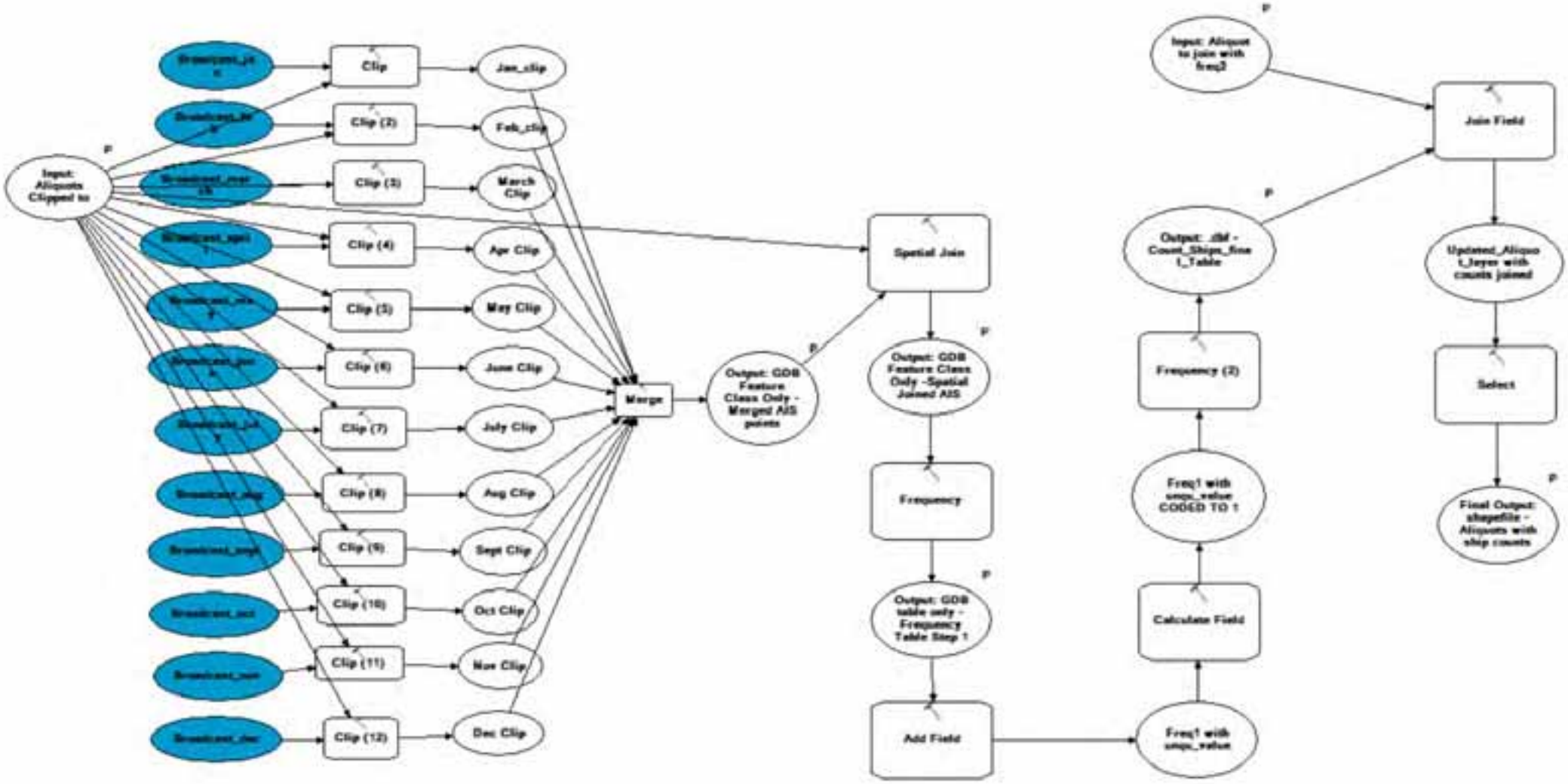
Nautical Miles
0 5 10 20
Kilometers
0 5 10 20

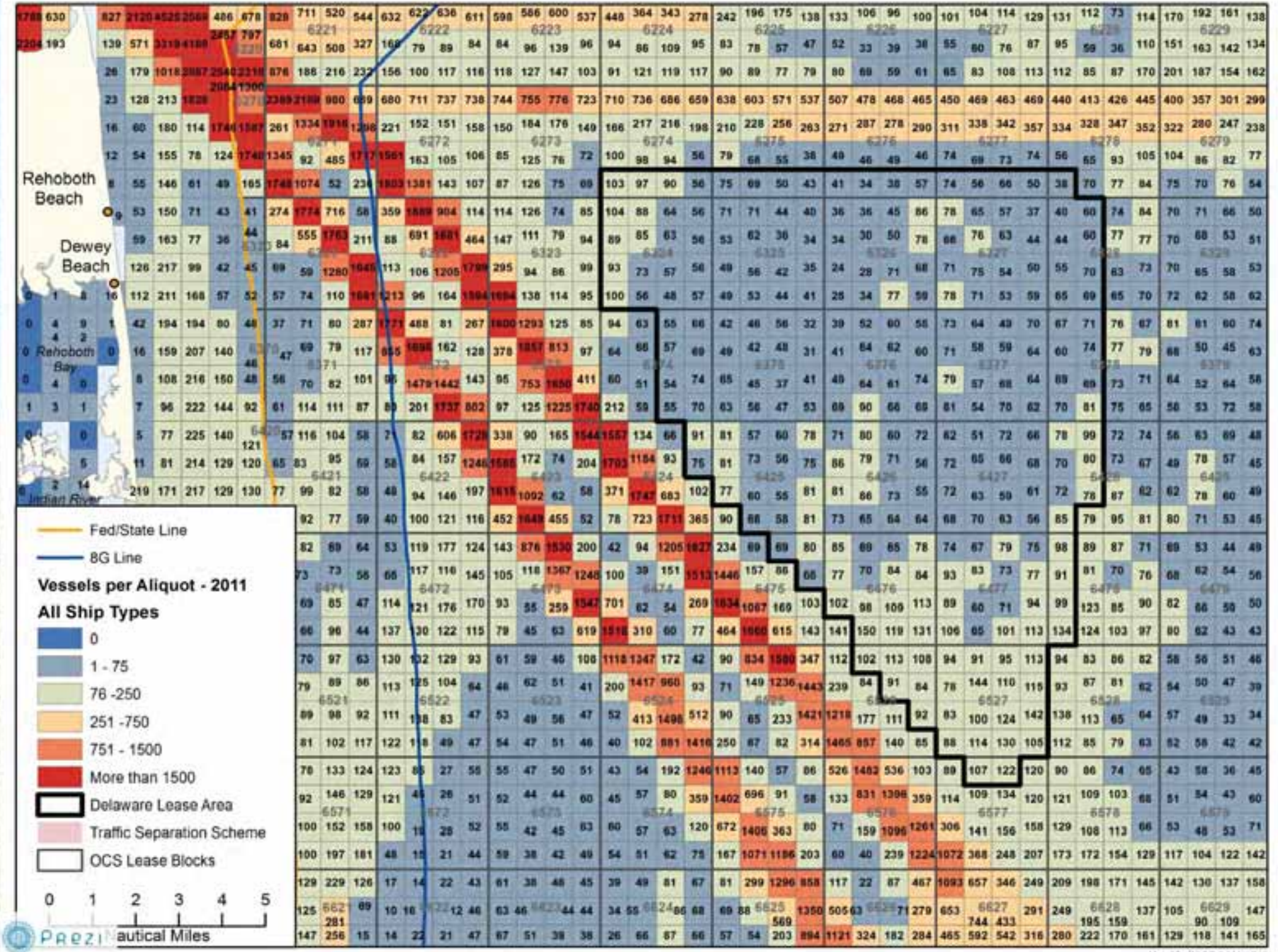
Coordinate System: NAD 1983 UTM Zone 18N
Projection: Transverse Mercator
Datum: North American 1983

NY RFI
Aliquots - Annual
FREQUENCY
Low
Medium
High

PREZI


Automatic Identification System (AIS) is a maritime navigation safety communications system that provides vessel information, identity, type, position, course, speed, and navigational status
OREP uses AIS to assess ship traffic volume from a regional and site specific perspective
Analysis informs internal and external planning and decision making
Raw coordinate data consists of several million points per year on the Atlantic coast
Model builder workflows developed to automate processing
Final analysis products are ship traffic volume by vessel type, month, year and aliquot
Massachusetts
Connecticut
Rhode Island
New Jersey
Delaware
Maryland
Massachusetts WEA
RI / MA Lease Area
NY Proposed Lease Area
New Jersey WEA
Delaware Lease Area
Maryland WEA
Vessels per Aliquot - 2011
All Ship Types
0
1 - 75
76 -250
251 -750
751 - 1500
More than 1500


Input: Aliquots Clipped to
Clip
Clip (2)
Clip (3)
Clip (4)
Clip (5)
Clip (6)
Clip (7)
Clip (8)
Clip (9)
Clip (10)
Clip (11)
Clip (12)
Jan_clip
Feb_clip
March Clip
Apr Clip
May Clip
June Clip
July Clip
Aug Clip
Sept Clip
Oct Clip
Nov Clip
Dec Clip
Merge
Output: GDB Feature Class Only - Merged AIS points
Spatial Join
Output: GDB Feature Class Only -Spatial Joined AIS
Frequency
Output: GDB table only - Frequency Table Step 1
Add Field
Freq1 with smpc_value
Calculate Field
Freq1 with smpc_value CODED TO 1
Frequency (2)
Output: .dbf - Count_Ships_final_Table
Input: Aliquot to join with freq2
Join Field
Updated_Aliquot_layer with counts joined
Select
Final Output: shapefile - Aliquots with ship counts


Rehoboth Beach
Dewey Beach
Rehoboth Bay
Indian River
Fed/State Line
8G Line
Vessels per Aliquot - 2011
All Ship Types
0
1 - 75
76 -250
251 -750
751 - 1500
More than 1500
Delaware Lease Area
Traffic Separation Scheme
OCS Lease Blocks
0 1 2 3 4 5
Nautical Miles
PREZI
Map ID: PACB-2013-1030

Environmental Studies

The majority of studies have a spatial component

- Social, Economic and Cultural Resources
- Marine Mammals and other Protected Species
- Birds
- Benthic
- Fishing
- Effects of Sound in the Environment
- Information Synthesis, Data Management and Gap Analysis
- Environmental Monitoring
- Wind Resource Assessment

Analytical Tool for Assessing Magnetometer Coverage and Confidence

Developed jointly with the National Park Service

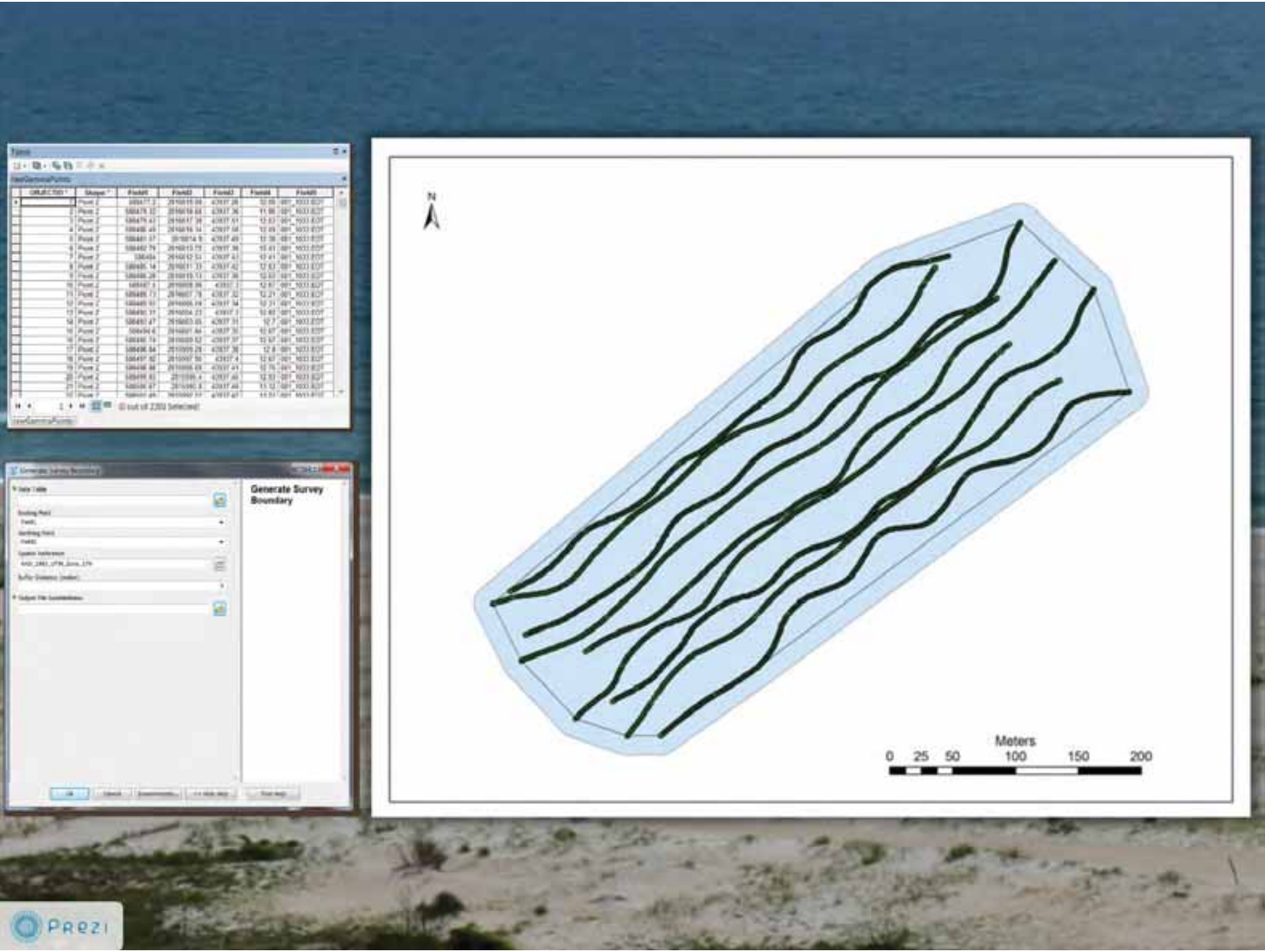
Tool is used to assess marine magnetic surveys for archaeological resources

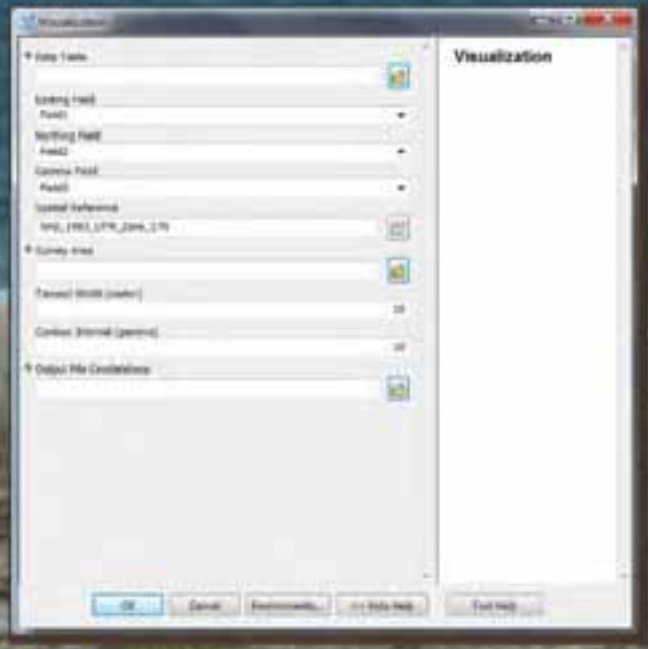
Built using model builder and custom python scripting

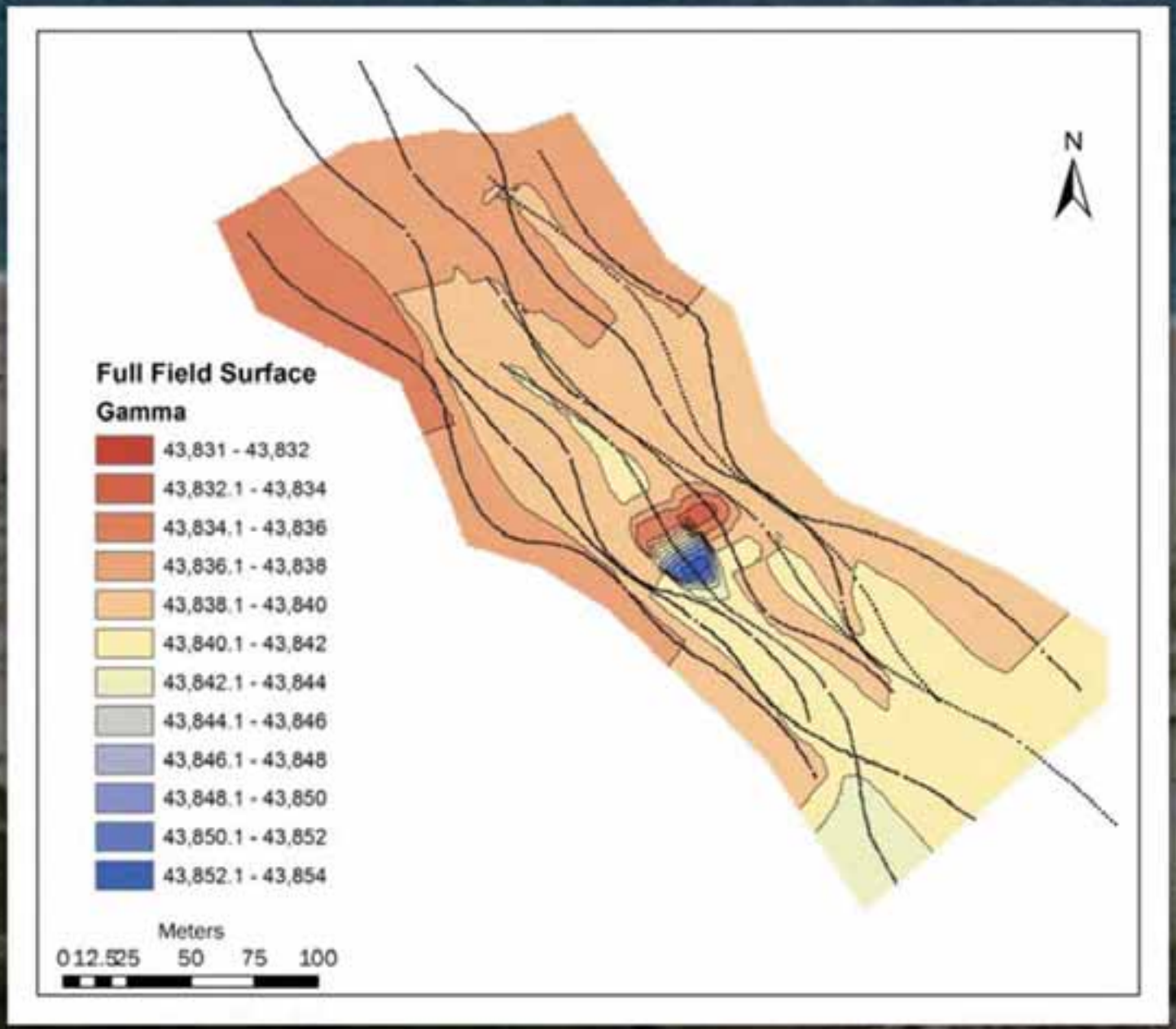
Product is a Python toolbox and script tools

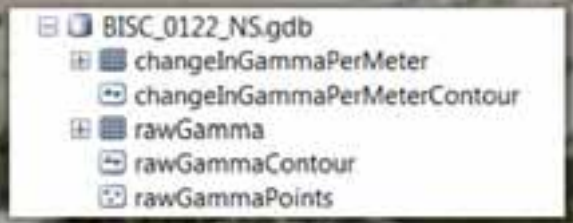
Answers these questions:

- What is the coverage of the survey area
- What is the smallest potential object detected
- What is the largest potential object detected

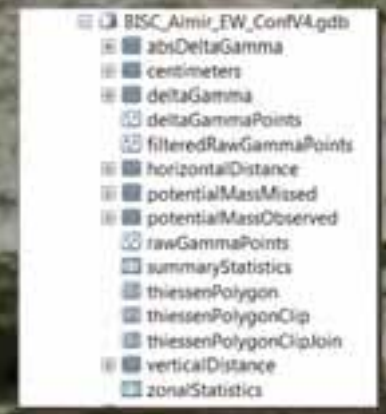

N
Meters
0 25 50 100 150 200
Generate Survey Boundary

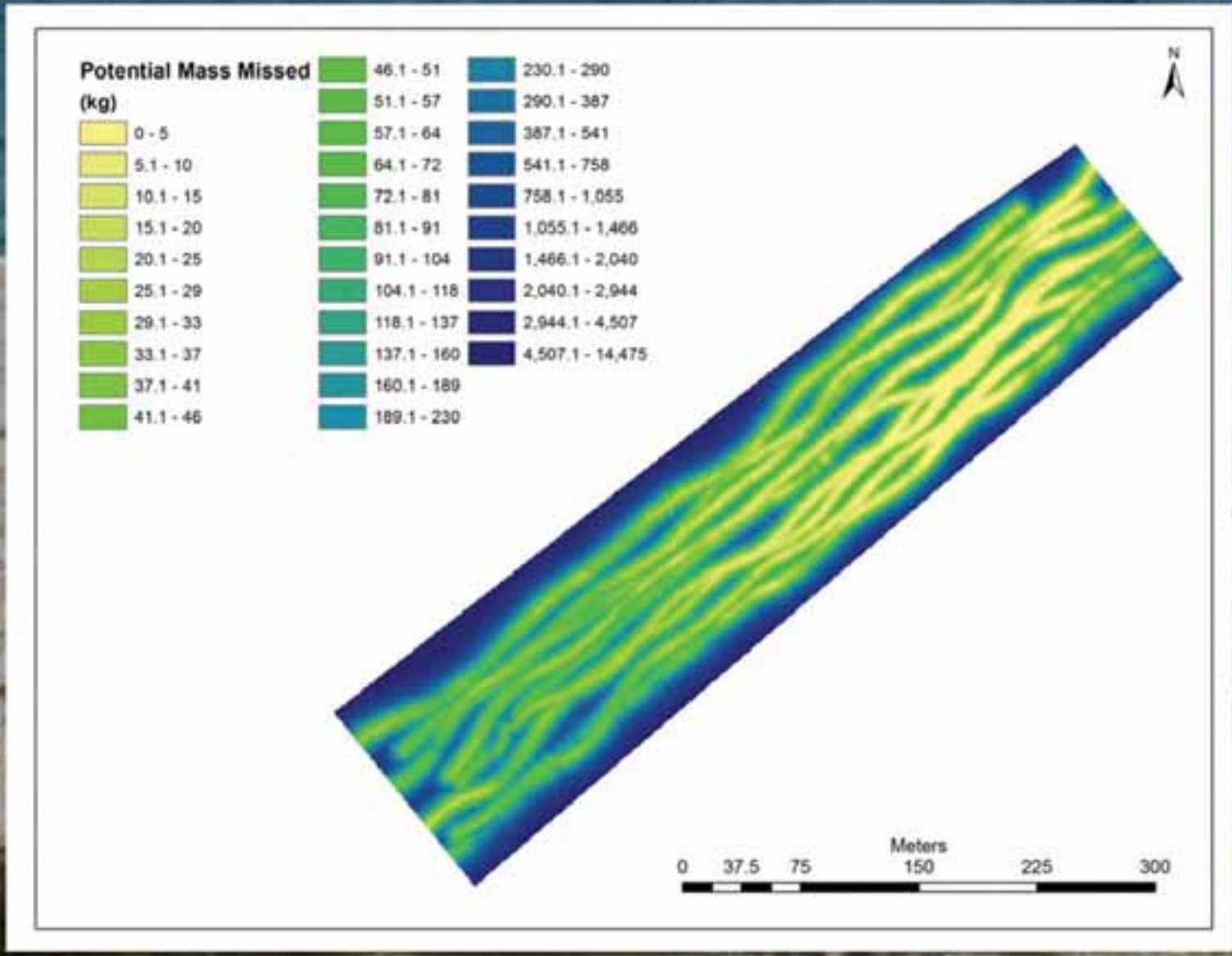

Visualization


N
Full Field Surface
Gamma
43,831 - 43,832
43,832.1 - 43,834
43,834.1 - 43,836
43,836.1 - 43,838
43,838.1 - 43,840
43,840.1 - 43,842
43,842.1 - 43,844
43,844.1 - 43,846
43,846.1 - 43,848
43,848.1 - 43,850
43,850.1 - 43,852
43,852.1 - 43,854
Meters
0 12.5 25 50 75 100


BISC_0122_NS.gdb
changeInGammaPerMeter
changeInGammaPerMeterContour
rawGamma
rawGammaContour
rawGammaPoints


Confidence Model


BISC_Aimir_EW_ConfV4.gdb
absDeltaGamma
centimeters
deltaGamma
deltaGammaPoints
filteredRawGammaPoints
horizontalDistance
potentialMassMissed
potentialMassObserved
rawGammaPoints
summaryStatistics
thiessenPolygon
thiessenPolygonClip
thiessenPolygonClipJoin
verticalDistance
zonalStatistics

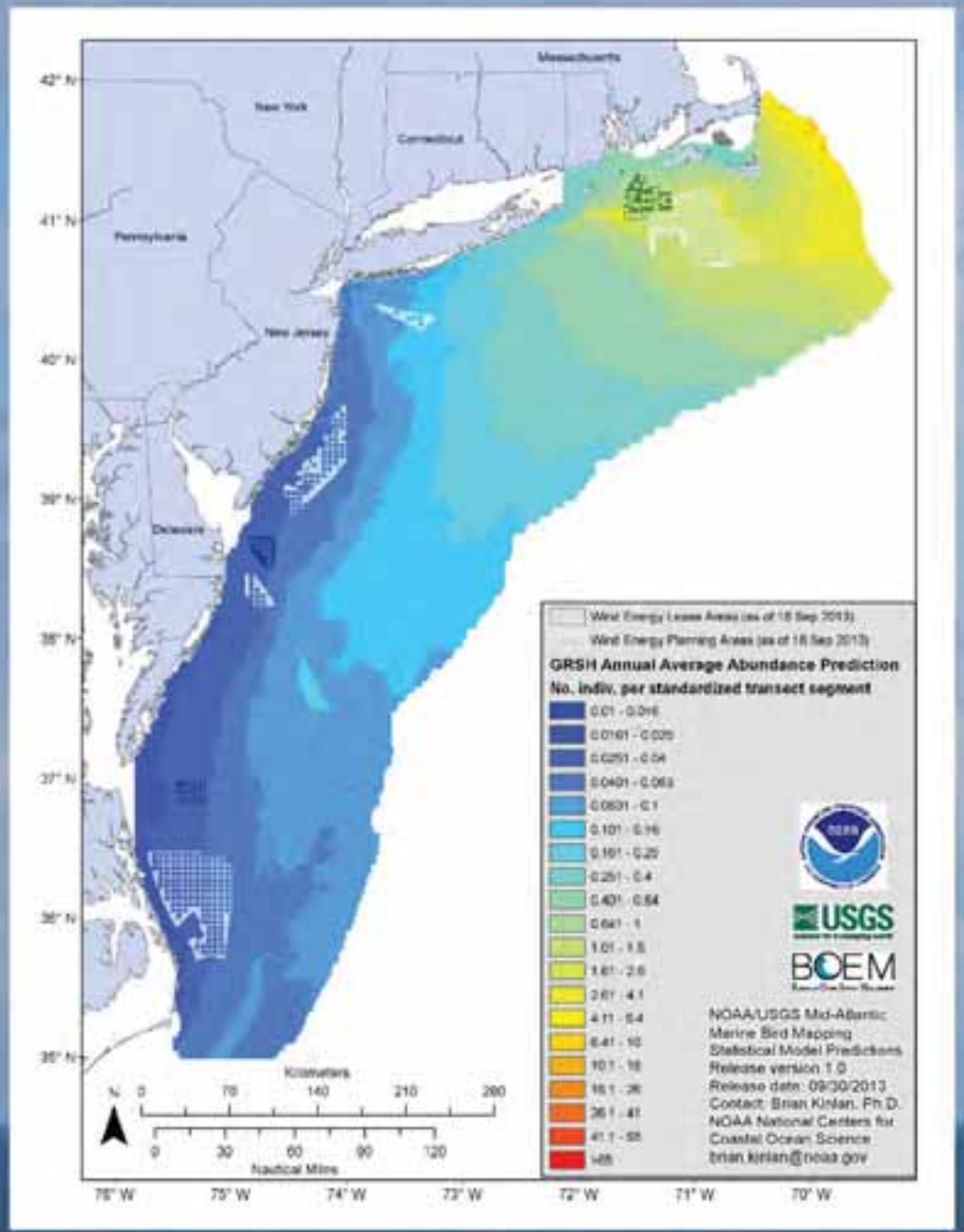

Potential Mass Missed
(kg)
0 - 5
5.1 - 10
10.1 - 15
15.1 - 20
20.1 - 25
25.1 - 29
29.1 - 33
33.1 - 37
37.1 - 41
41.1 - 46
46.1 - 51
51.1 - 57
57.1 - 64
64.1 - 72
72.1 - 81
81.1 - 91
91.1 - 104
104.1 - 118
118.1 - 137
137.1 - 160
160.1 - 189
189.1 - 230
230.1 - 290
290.1 - 387
387.1 - 541
541.1 - 758
758.1 - 1,055
1,055.1 - 1,466
1,466.1 - 2,040
2,040.1 - 2,944
2,944.1 - 4,507
4,507.1 - 14,475
N
Meters
0
37.5
75
150
225
300

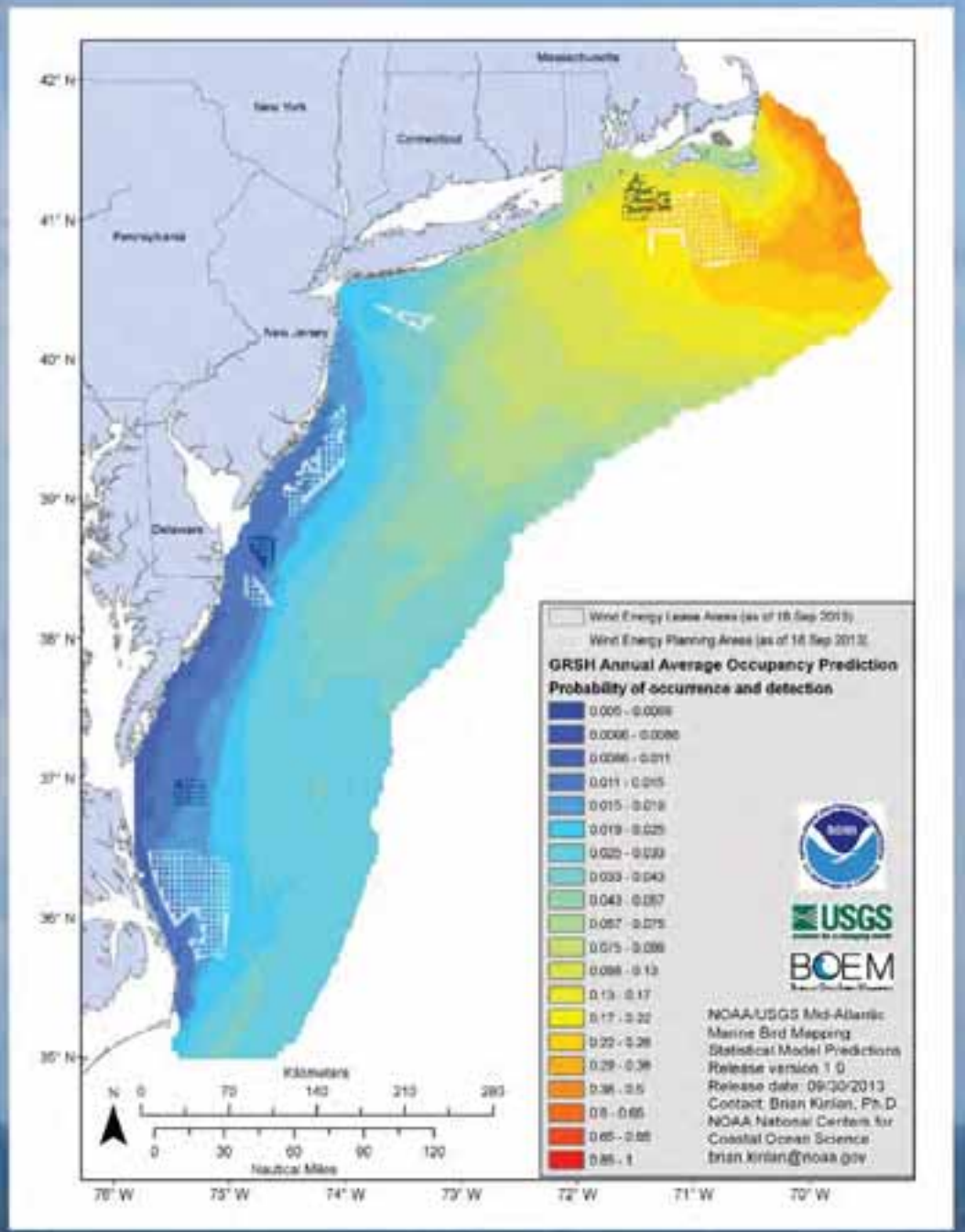
Marine Bird Modeling and Predictive Mapping of Seabird Distribution and Abundance on the OCS

Joint effort between NOAA, USGS and BOEM

Model combines all available science quality seabird survey data and predictor variables (oceanography, geomorphology, prey distribution) to predict probabilities of seabird occurrence and abundance between survey locations

Abundance and occupancy predictions of over 20 species


Massachusetts
New York
Connecticut
Pennsylvania
New Jersey
Delaware
42° N
41° N
40° N
39° N
38° N
37° N
36° N
35° N
76° W
75° W
74° W
73° W
72° W
71° W
70° W
Wind Energy Lease Areas (as of 18 Sep 2013)
Wind Energy Planning Areas (as of 18 Sep 2013)
GRSH Annual Average Abundance Prediction
No. indiv. per standardized transect segment
0.01 - 0.016
0.0161 - 0.025
0.0251 - 0.04
0.0401 - 0.063
0.0631 - 0.1
0.101 - 0.16
0.161 - 0.25
0.251 - 0.4
0.401 - 0.64
0.641 - 1
1.01 - 1.6
1.61 - 2.6
2.61 - 4.1
4.11 - 6.4
6.41 - 10
10.1 - 16
16.1 - 26
26.1 - 41
41.1 - 65
>65
USGS
BOEM
NOAA/USGS Mid-Atlantic Marine Bird Mapping Statistical Model Predictions
Release version 1.0
Release date: 09/30/2013
Contact: Brian Kinlan, Ph.D.
NOAA National Centers for Coastal Ocean Science
brian.kinlan@noaa.gov
Kilometers
0 70 140 210 280
Nautical Miles
0 30 60 90 120
N


Massachusetts
New York
Connecticut
Pennsylvania
New Jersey
Delaware
42° N
41° N
40° N
39° N
38° N
37° N
36° N
35° N
76° W
75° W
74° W
73° W
72° W
71° W
70° W
Wind Energy Lease Areas (as of 18 Sep 2013)
Wind Energy Planning Areas (as of 18 Sep 2013)
GRSH Annual Average Occupancy Prediction
Probability of occurrence and detection
0.005 - 0.0066
0.0066 - 0.0086
0.0086 - 0.011
0.011 - 0.015
0.015 - 0.019
0.019 - 0.025
0.025 - 0.033
0.033 - 0.043
0.043 - 0.057
0.057 - 0.075
0.075 - 0.099
0.099 - 0.13
0.13 - 0.17
0.17 - 0.22
0.22 - 0.29
0.29 - 0.38
0.38 - 0.5
0.5 - 0.65
0.65 - 0.86
0.86 - 1
USGS
BOEM
NOAA/USGS Mid-Atlantic Marine Bird Mapping Statistical Model Predictions
Release version 1.0
Release date: 09/30/2013
Contact: Brian Kinlan, Ph.D.
NOAA National Centers for Coastal Ocean Science
brian.kinlan@noaa.gov
Kilometers
0 70 140 210 280
Nautical Miles
0 30 60 90 120
N

Summary

Purpose of spatial analysis in OREP is to avoid, minimize or mitigate marine spatial planning conflicts by assessing the natural and human environment

A variety of analytical methods are employed to review regional and site specific environmental factors for the siting of renewable energy

The combination of subject matter expertise and geospatial analysis solves general questions that need specific answers

Scientific studies fill data gaps

Questions?

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