Rhode Island OCEAN samp

- Marine Spatial Planning For Ocean Resources

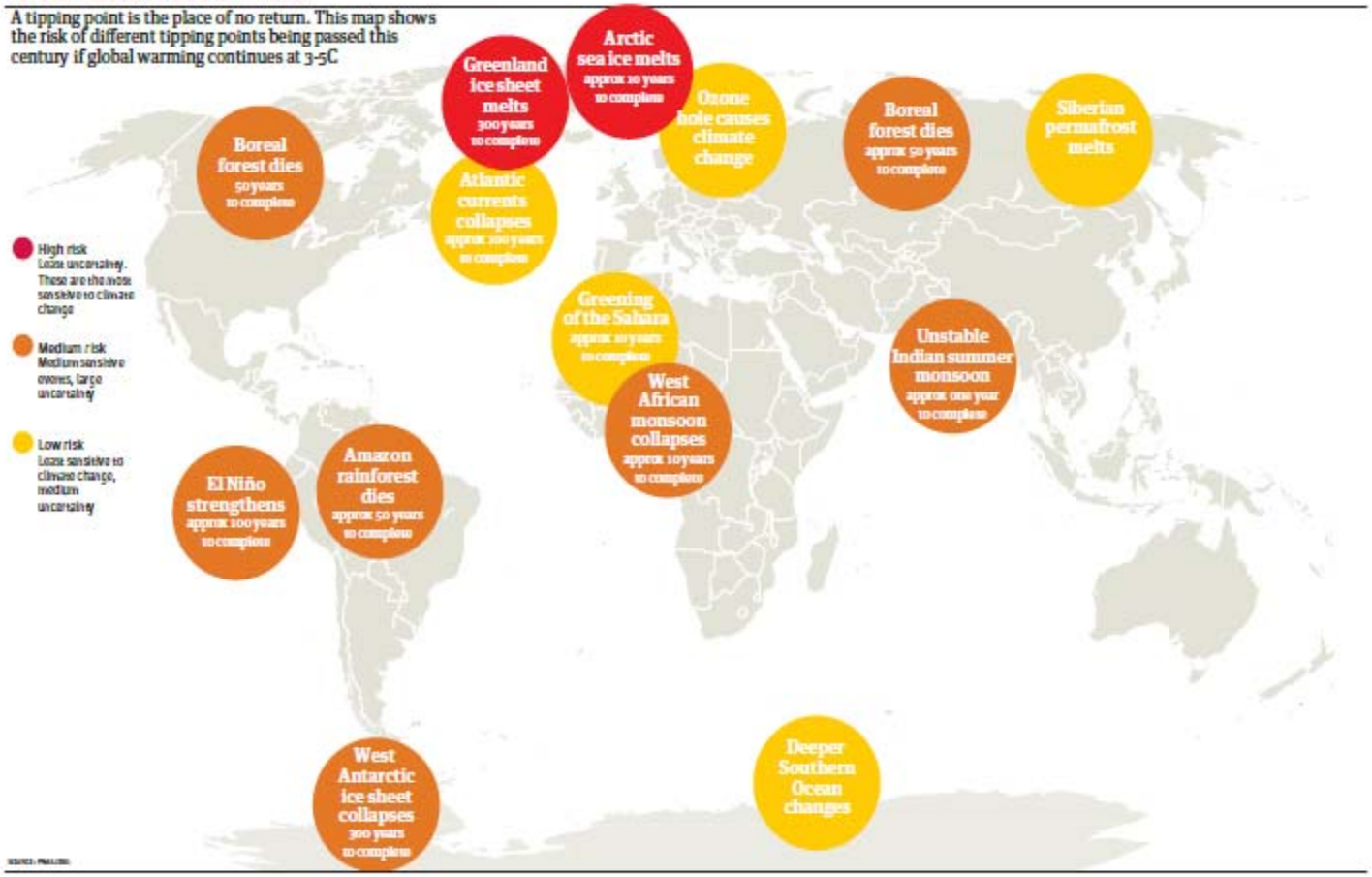
Climate Change

Three Choices

Adapt, Mitigate, Suffer

Global meltdown

A tipping point is the place of no return. This map shows the risk of different tipping points being passed this century if global warming continues at 3-5C



Marine Renewable Power

- Wave, devices in limited production
- Tidal flow, prototyping now
- Gulf stream, not yet prototyped
- OTEC, prototypes never perfected, “on hold”
- Offshore wind, commercial, devices have 15 years experience -- VIABLE NOW

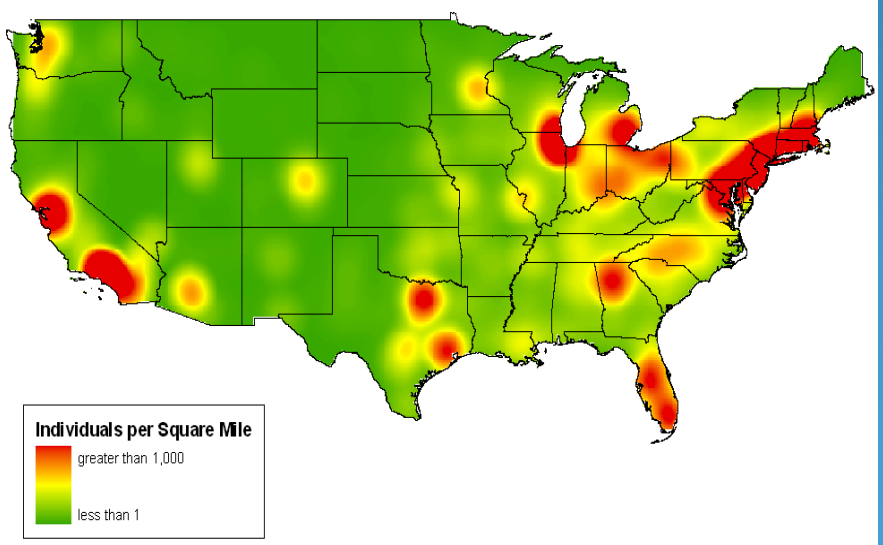
Why Offshore Wind?

28 coastal states use 78% of the electricity in US

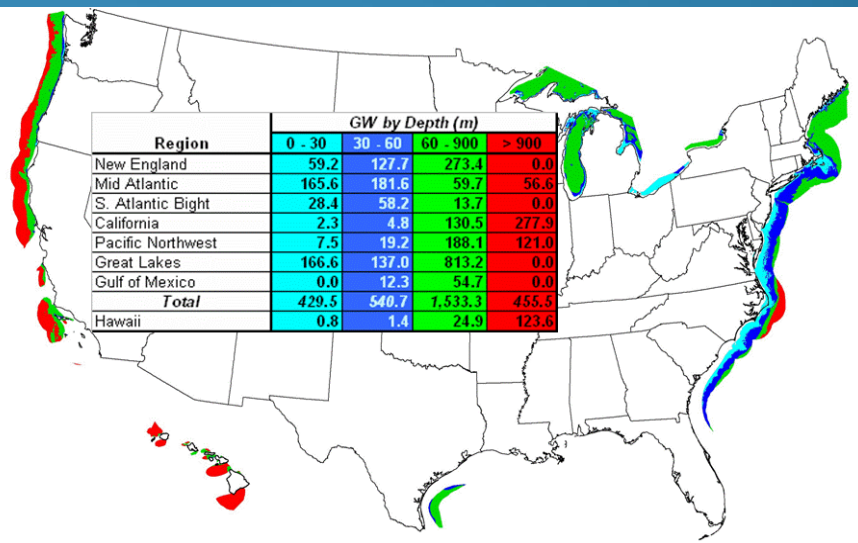
Coastal load centers are transmission constrained and cannot be easily served by land-based wind.

Wind energy goals cannot be achieved without offshore contributions

Population Density of the Counterminous United States



U.S. Wind Resource and Bathymetry



Region	GW by Depth (m)			
	0 - 30	30 - 60	60 - 900	> 900
New England	59.2	127.7	273.4	0.0
Mid Atlantic	165.6	181.6	59.7	56.6
S. Atlantic Bight	28.4	58.2	13.7	0.0
California	2.3	4.8	130.5	277.9
Pacific Northwest	7.5	19.2	188.1	121.0
Great Lakes	166.6	137.0	813.2	0.0
Gulf of Mexico	0.0	12.3	54.7	0.0
Total	*429.5*	*540.7*	*1,533.3*	*455.5*
Hawaii	0.8	1.4	24.9	123.6

16 U.S.C. § 1451. Congressional findings (Section 302) Federal Coastal Zone Management Act

Because of their proximity to and reliance upon the ocean and its resources, the coastal states have substantial and significant interests in the protection, management, and development of the resources of the exclusive economic zone that can only be served by the active participation of coastal states in all Federal programs affecting such resources and, wherever appropriate, by the ***development of state ocean resource plans*** as part of their federally approved coastal zone management programs.

STATE OF RHODE ISLAND
COASTAL RESOURCES MANAGEMENT COUNCIL

CRMC's legislative charge: "...to preserve, protect, develop, and where possible, restore the coastal resources of the state for this and succeeding generations..." Developed and Adopted Our Ocean Spatial Plan in 1983.

Providence Harbor Zone

CRMC

Coastal Resources Center

- Type 1 - Conservation Areas
- Type 2 - Low Intensity Uses
- Type 3 - High Intensity Boating
- Type 4 - Multipurpose Waters
- Type 5 - Commercial and Recreational Harbors
- Type 6 - Industrial Waterfronts/Com. Nav. Channels
- Development Sites

Sept. 2005
Data from RIGIS
Meets National Map Accuracy Standards

a

Section 200.1
Type 1 Conservation Areas

A. Definition

Included in this category are one or more of the following: (1) water areas that are within or adjacent to the boundaries of designated wildlife refuges and conservation areas, (2) water areas that have retained natural habitat or maintain scenic values of unique or unusual significance, and (3) water areas that are particularly unsuitable for structures due to their exposure to severe wave action, flooding, and erosion.

B. Findings

1. The coastline that fronts directly on Long Island and Block Island Sounds includes some of the most dynamic and naturally scenic features in Rhode Island. These include but are not limited to the South Shore barriers and headlands, the erosion-prone bluffs of Block Island, and Newport's rocky promontories. In order to adequately preserve these shorelines in these conservation areas, many activities proposed on shoreline features or in the tidal waters directly adjacent to these features must be severely restricted or prohibited.

2. Brigg's Marsh in Little Compton, Sachem Pond on Block Island, and Hundred Acre Cove in Barrington are examples of water areas which have exceptional value as waterfowl nesting and feeding habitat. Rare and unique assemblages of plants and animals and rich shellfish beds are found in these undisturbed waters. Many, but not all, water areas of well-recognized significance to wildlife are within established sanctuaries or management areas.

3. Opportunities for scientific research and education have been enhanced by the designation of a National Estuarine Sanctuary in the upper Bay, one of some 15 similar designations nationwide. The sanctuary includes Bay waters extending to the 18-foot depth contour around Patience Island, the northern half of Prudence Island, and Hope Island.

4. Valuable conservation areas are not all in clean, rural environments. For example, Watchemoket Cove in the heart of the East Providence industrial waterfront is an important waterfowl resting area, particularly during the winter months when large numbers of canvasbacks, scaup, widgeon, and black ducks are present.

5. Several stretches of shoreline within Narragansett Bay have survived the rapid proliferation of residential development during recent decades in pristine condition. Examples include the Potowomut River, the Palmer River in Barrington and Warren, and the Mt. Hope Cliffs in Bristol. It is important that as much of this land as practicable be preserved from alteration to assure that Rhode Island's rich diversity of shoreline types and high scenic value are preserved.

C. Policies

1. The Council's goal is to preserve and protect Type 1 waters from activities and uses that have the potential to degrade scenic, wildlife, and plant habitat values, or which may adversely impact water quality or natural shoreline types.

2. The mooring of houseboats and floating businesses, the construction of recreational boating facilities, filling below mean high water, point discharge of substances other than properly treated runoff water (see Section 300.6), and the placement of industrial or commercial structures or operations (excluding fishing and aquaculture) are all prohibited in Type 1 waters.

3. In Type 1 waters, activities and alterations including dredging, dredged materials disposal, and grading and excavation on abutting shoreline features are all prohibited unless the primary purpose of the alteration or activity is to preserve or enhance the area as a natural habitat for native plants and

Section 300.4
Recreational Boating Facilities

A. Definitions

Recreational boating facilities include marinas, launching ramps, residential boating facilities, recreational wharves, piers and slips, floats or floating docks, and recreational mooring areas.

1. Marina: any dock, pier, wharf, float, floating business, or combination of such facilities that accommodate five or more recreational boats.

2. Launching Ramp: a manmade or natural facility used for the launching and retrieval of boats.

3. Residential Boating Facility: a dock, pier, wharf, or float, or combination of such facilities, contiguous to a private residence, condominium, cooperative or other home owners association properties that may accommodate up to four (4) boats.

   (a) fixed terminal section: the seaward-most section of a residential boating facility which is configured as a T-section or L-section that provides access between a fixed dock and a vessel.

4. Recreational Mooring Area: any designated area managed by a commercial enterprise, a club, city, or town where five (5) or more recreational craft are kept at moorings.

5. Terminal Float: refers to the floating dock or docks that are typically at the seaward terminus of a residential boating facility to which the berthed vessels are typically affixed and from which the vessels are boarded or berthed. Terminal floats are typically accessed from a ramp leading from a fixed pier. Four foot wide floats that are used to provide perpendicular access to the berthing area in lieu of the utilization of a fixed pier are defined as access floats, not terminal floats. Additional floats, not at the seaward end and not used primarily for access, shall be considered a terminal float.

6. Limited Marina: Any facility marina intended for use by recreational vessels with a boat count between five (5) and twenty five (25).

7. Destination Harbor: A destination harbor is one in which the primary use is by people arriving by vessel. The following are considered destination harbors: Newport Harbor and Old / New Harbor in Block Island.

8. Alteration: an alteration of a marina is any activity that results in changes to the existing or previously approved recreational boating facility design. Such activities include but are not limited to the removal, addition, or relocation of piles, floating docks or fixed piers and changes to the Marina Perimeter Limit.

9. Significant Expansion: any expansion greater than 25 % of existing or previously authorized boat capacity, or an expansion of fifty (50) or more vessels.

10. Property Line Extension (PLE): projections of property lines used to demarcate the sideways bounds of a tidal water area adjacent to property on which a marina or residential dock is proposed to be sited. The PLE's are used in the application process as a tool to assess dock siting and are not to be construed as conveying any rights or privileges to an applicant or property nor as a determination of riparian rights.

Special Area Management Plans

Federal CZMA Definition

The term "special area management plan" means a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed and comprehensive statement of policies; standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone.

SAMPs for Ecosystem Management

- Describe the dynamics of marine ecosystems
- Characterize the salient issues
- Set clear policies and standards for permitting and regulation by federal /state/municipal governments
- Establish an integrated decision-making process
- Build an informed constituency for long term stewardship

SAMP Goals

- Foster a properly functioning ecosystem
- Promote and enhance existing uses
- Encourage marine-based economic development, including offshore renewable energy infrastructure
- Build a framework for coordinated decision-making

Existing CRMC Ocean SAMP Process*
August 1, 2008 – July 31, 2010

Step 1: Issue Identification and Assessment	Step 2: SAMP Preparation	Adoption

July 2008 | July 2009 | July 2010

Step 1: Issue Identification/ Assessment (Aug 2008-July 2009)

- Define boundaries, goals and principles
- Design public process
- Research ecosystem features and uses
- Identify issues/concerns, opportunities
- Prepare draft ecosystem and use zone maps

Step 2: SAMP Preparation (Aug 2009 - April 2010)

- Review boundaries and goals
- Develop the objectives and policies for each zone and SAMP component
- Draft SAMP chapters
- Identify research gaps

Step 3: Formal Adoption (May 2010 - July 2010)

- Formal hearings and reviews of the draft SAMP
- Adoption of the SAMP by CRMC
- Submit to federal agencies for approval

** This timeline is based on current knowledge.*

CRMC Coastal Resources Management Council

University of Rhode Island

Ocean SAMP Document

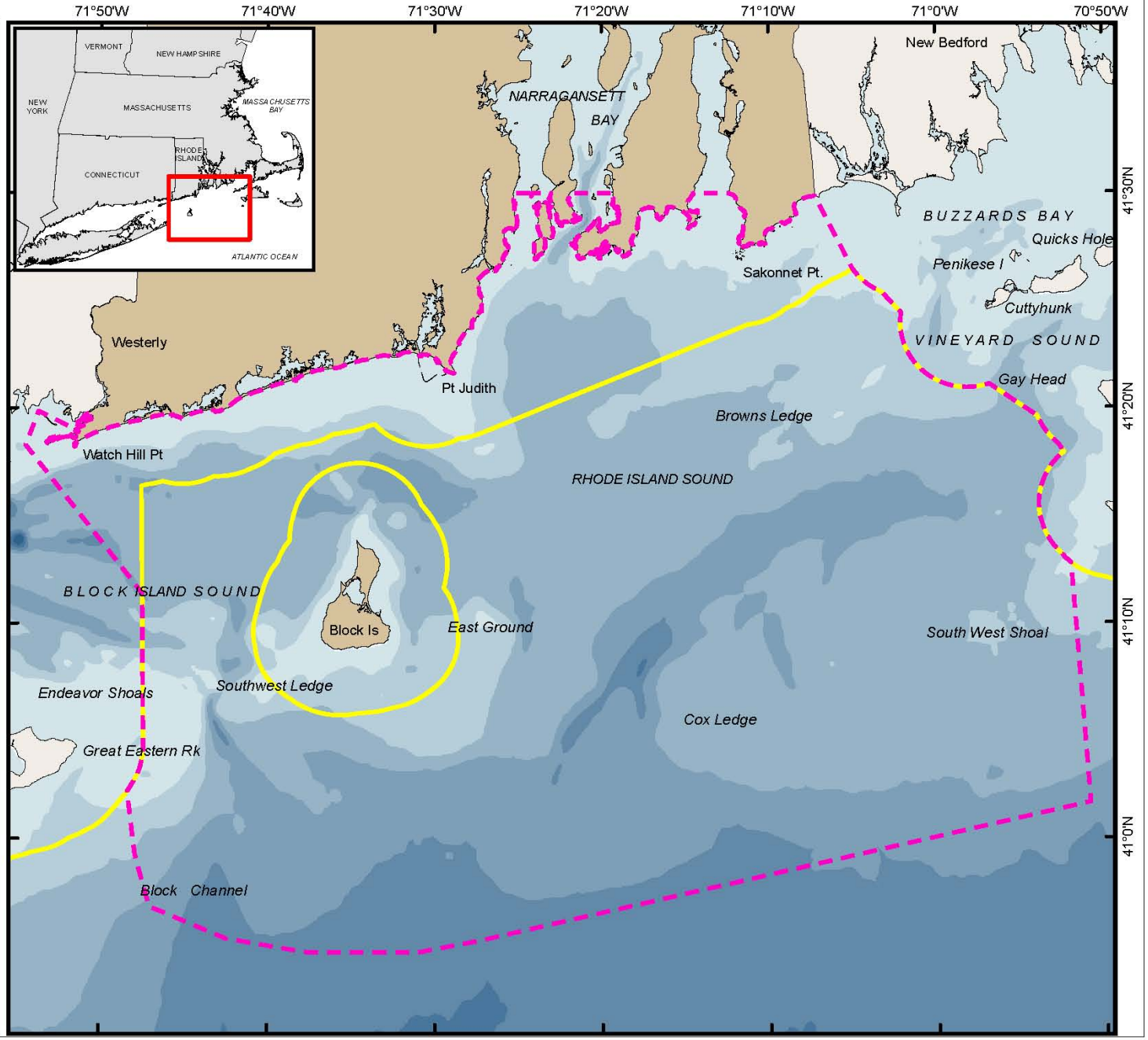
- Ecology of the Study Area
- Cultural and Historical
- Fisheries Resources
- Recreation and Tourism
- Marine Transportation
- Infrastructure
- Renewable Energy
- Future Uses
- Federal Process and Federal Consistency

Rhode Island OCEAN samp

CRMC Coastal Resources Management Council

University of Rhode Island

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

Proposed Ocean Study Area

State/Federal Waters Separation

Bathymetry (m)

- -20
- -30
- -40
- -50
- -60
- -70
- -80

N

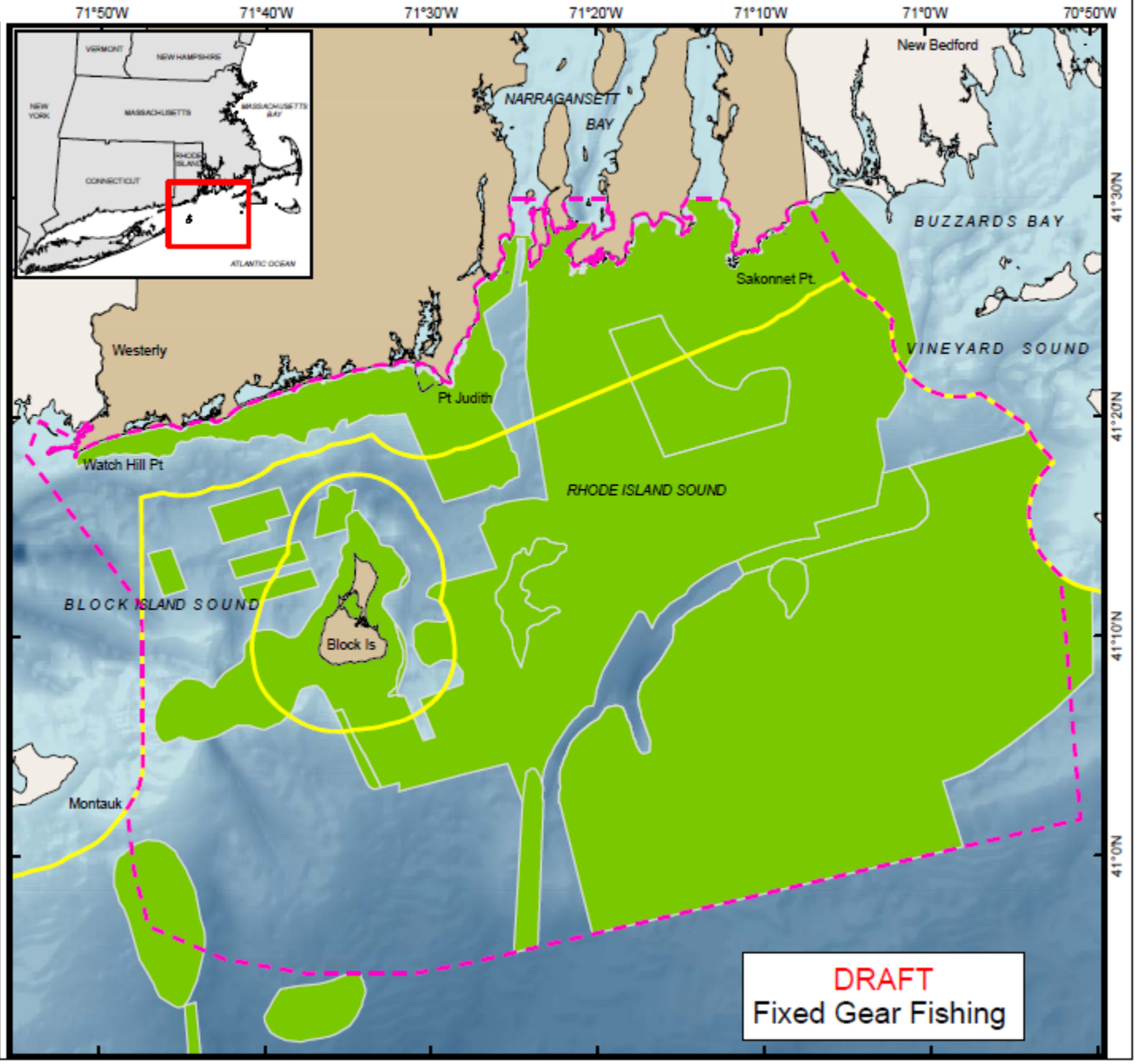
Miles: 0 – 5

Kilometers: 0 – 5 – 10

Coordinate System:
Projection: RI Stateplane
Units: Feet
FIPS Zone: 3800
Datum: NAD83

For Project Map and Data Products:
http://www.narrbay.org/d_projects/oceansamp

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

- Proposed Ocean Study Area
- State/Federal Waters Separation
- Fixed Gear Fishing

Miles
0 5
Kilometers
0 5 10

Coordinate System:
Projection: RI Stateplane
Units: Feet
FIPS Zone: 3800
Datum: NAD83

For Project Background Information:
http://seagrant.gso.uri.edu/oceansamp

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Tier #1 Screening

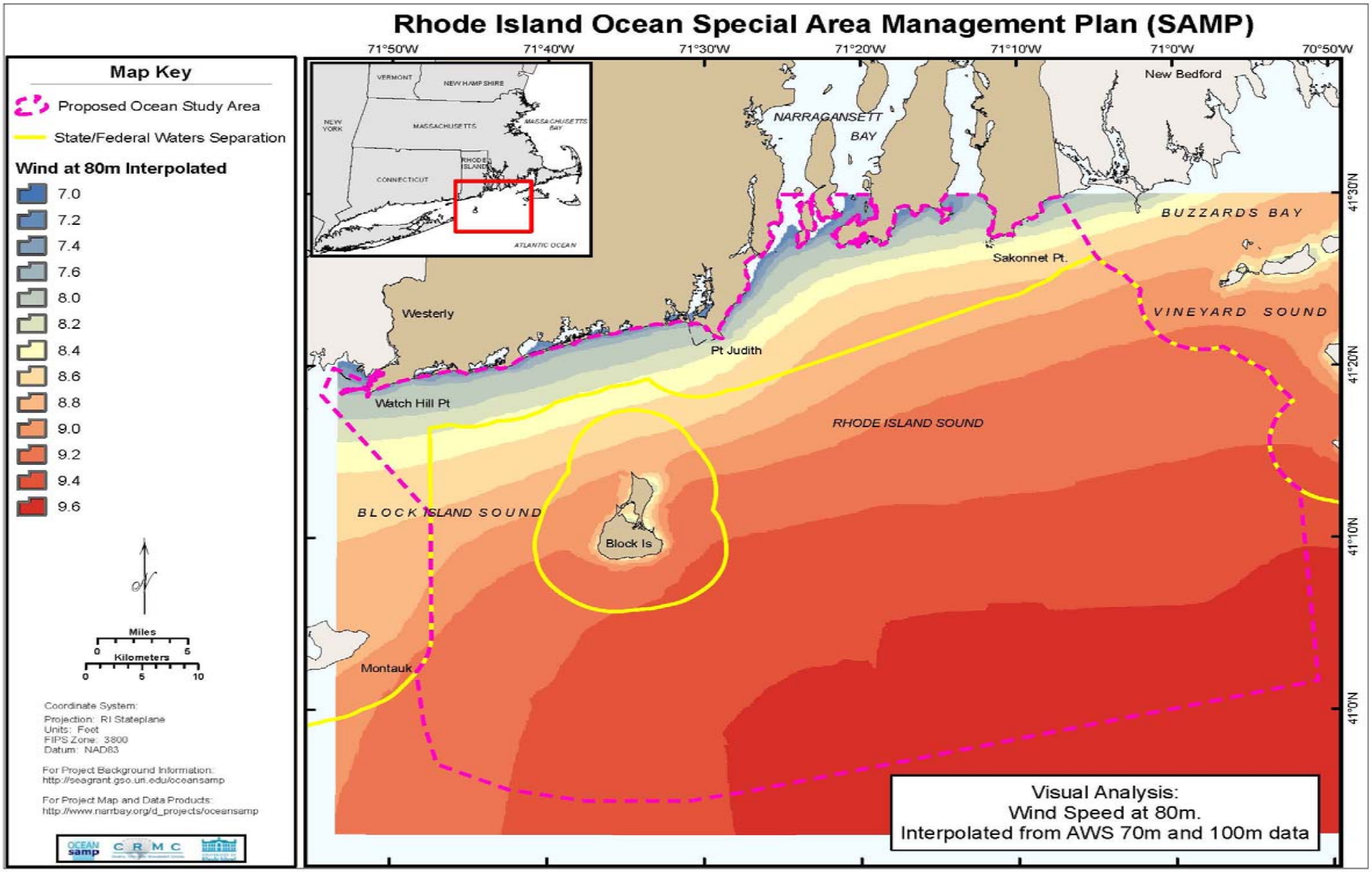
Wind Resource

- Adequate Wind Resources (greater than 7 m/sec at 80 m, hub height)

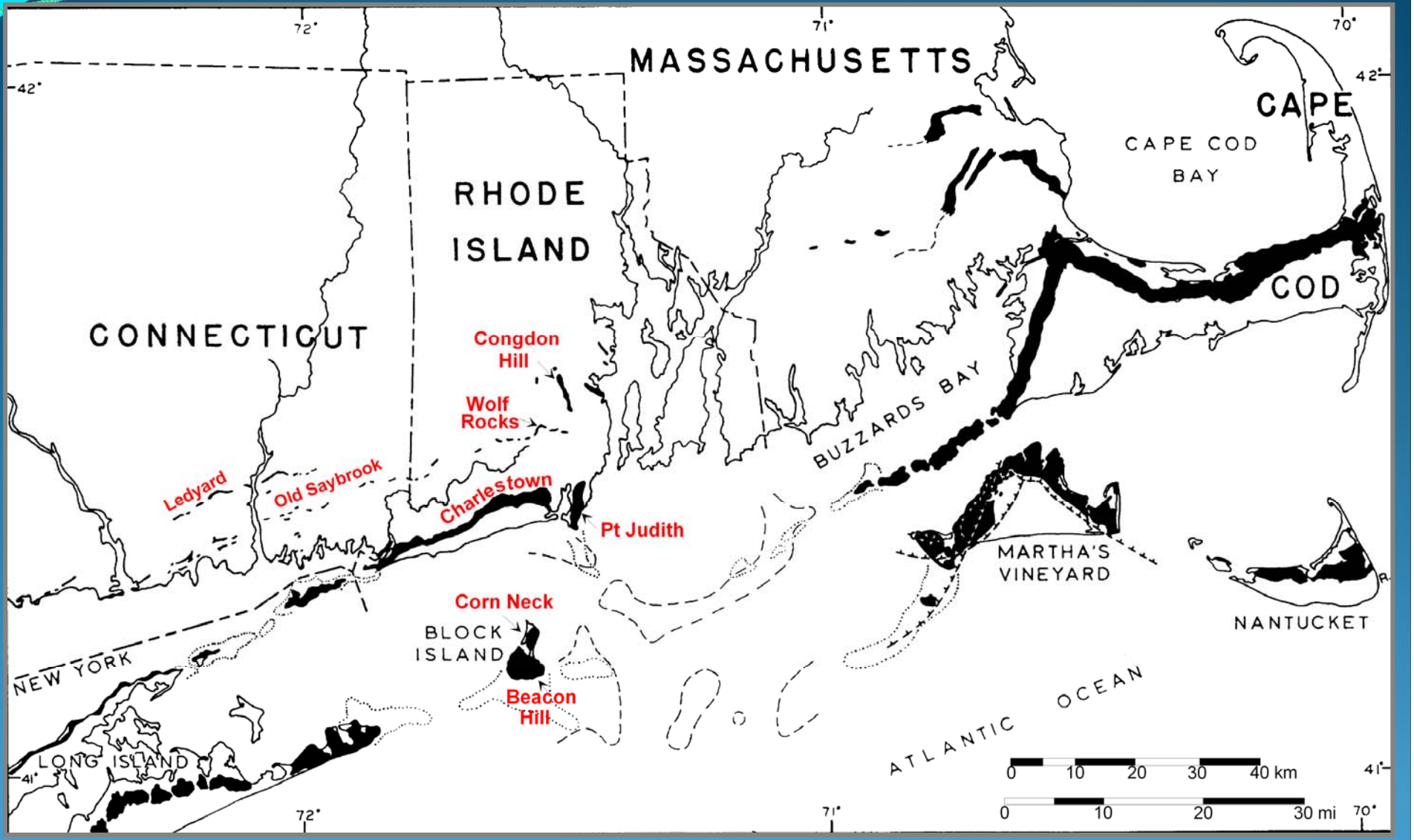
Exclusions

- Navigation Areas -Regulated (shipping lanes, precautionary areas, preferred routes)
- Vessel tracks (AIS data)
- Ferry Routes
- Regulated areas (disposal site, military areas, unexploded ordnance, marine protected areas)
- Airport buffer zones
- Coastal buffer zone (1 km)
- Cable Areas (?)

Estimates of 80 m wind speeds
AWS TrueWinds data



End Moraines of Southeastern New England

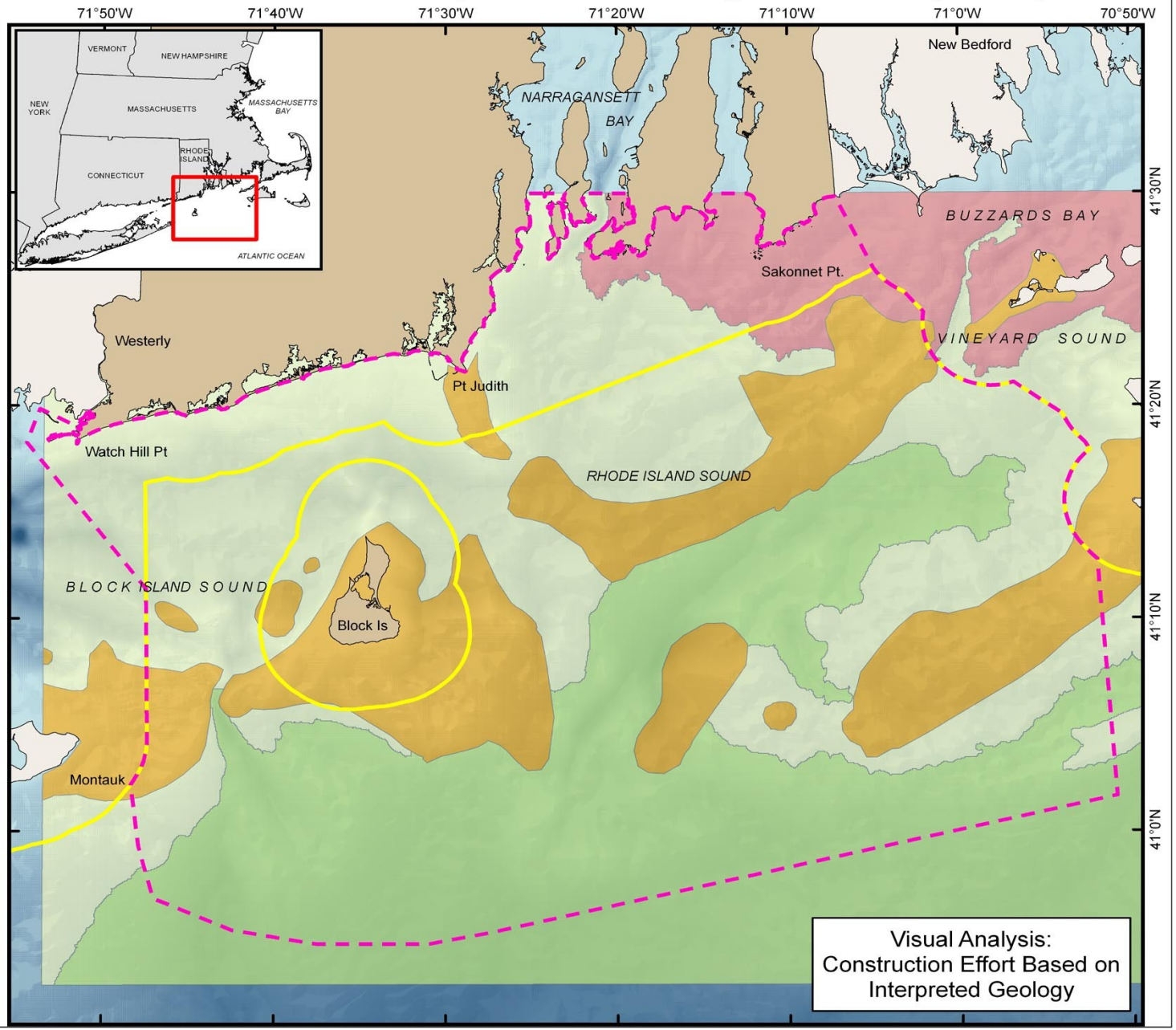


Schafer and Hartshorn, 1965; Sirkin, 1982

Mohegan Bluffs, BI – Complex Stratigraphy

Boothroyd and Sirkin, 2002

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

- Proposed Ocean Study Area
- State/Federal Waters Separation

Construction Effort

- 1 - 2
- 3
- 4 - 5
- 5

Miles: 0 – 5

Kilometers: 0 – 5 – 10

Coordinate System:
Projection: RI Stateplane
Units: Feet
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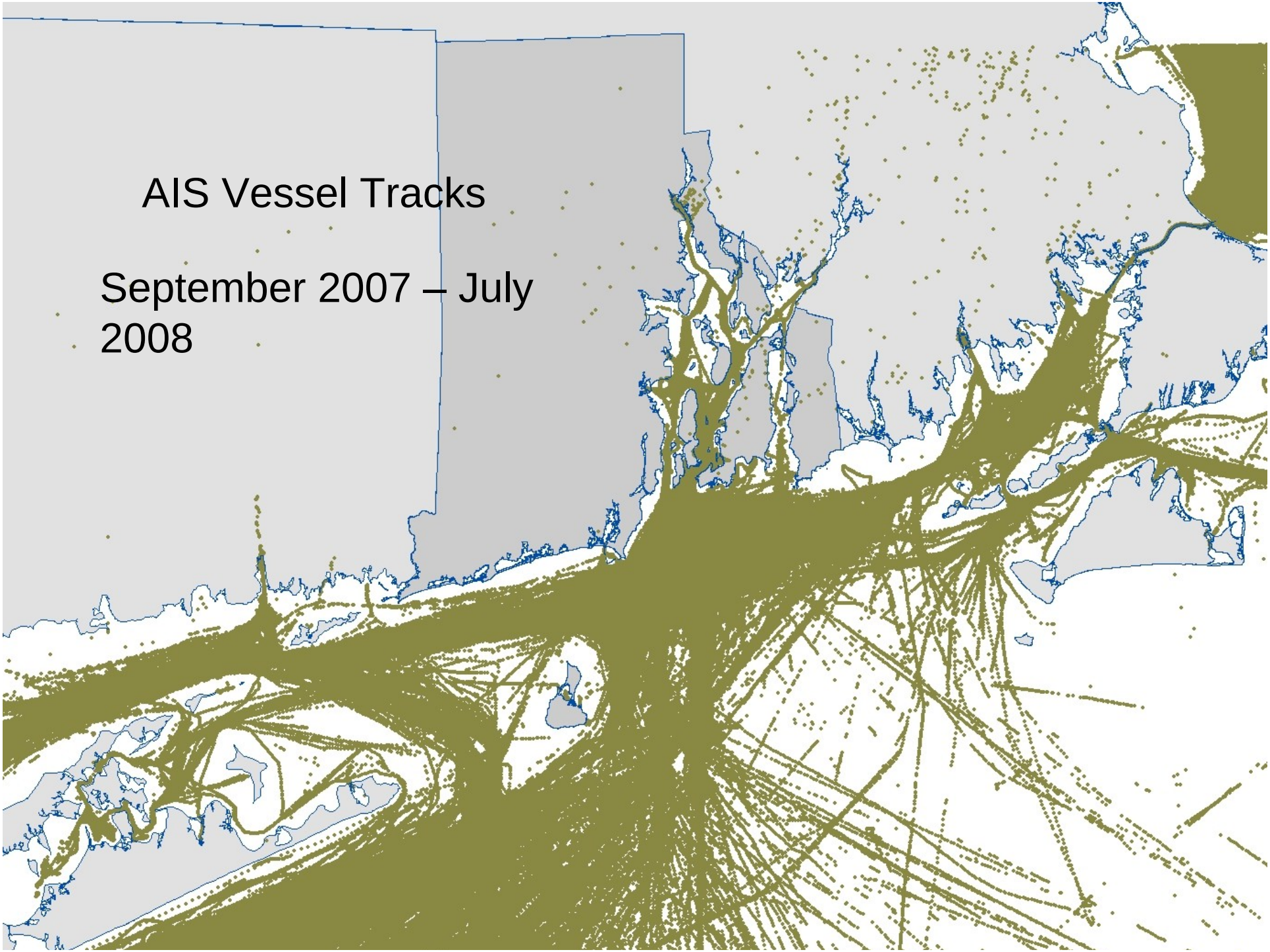
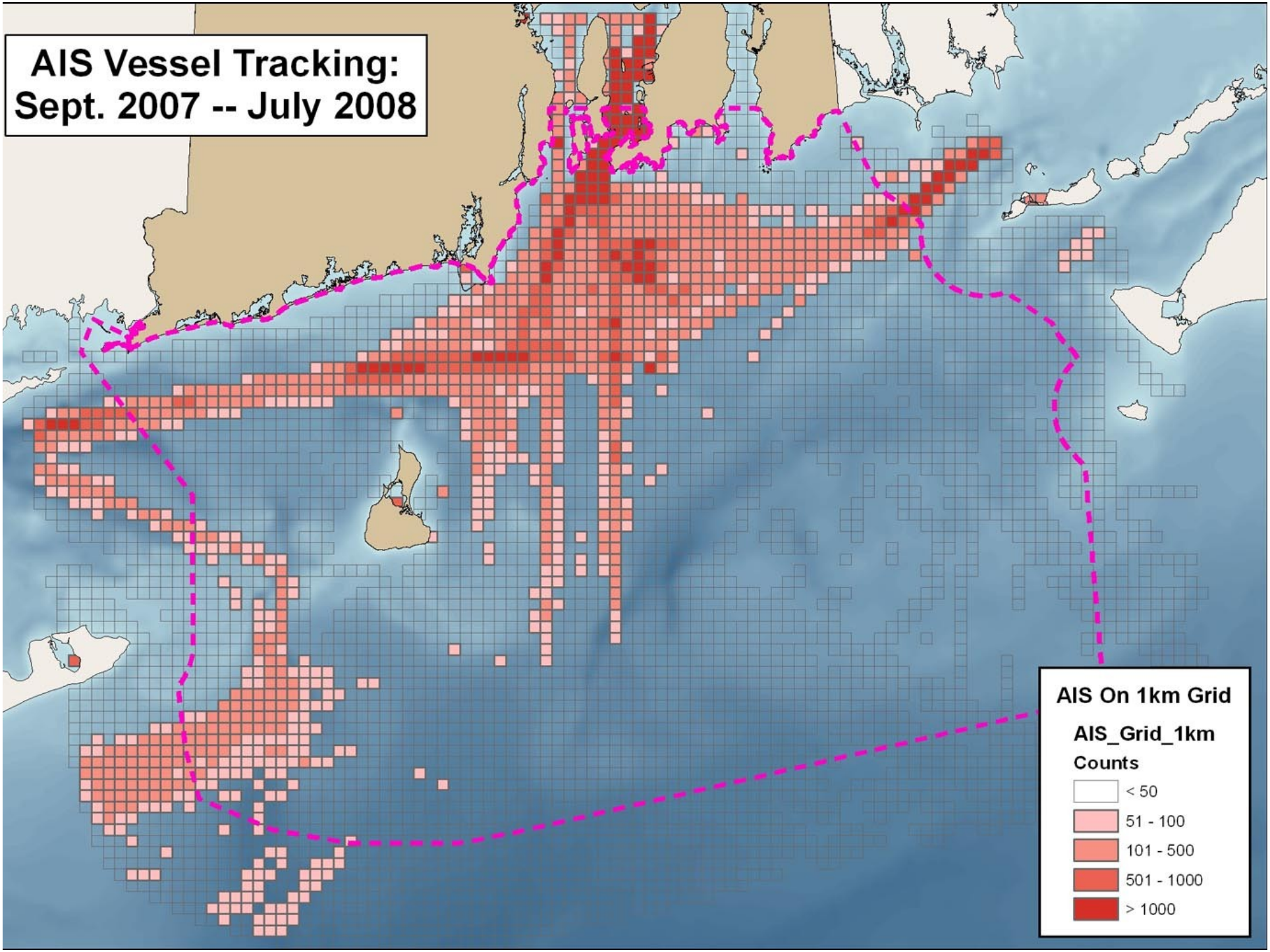
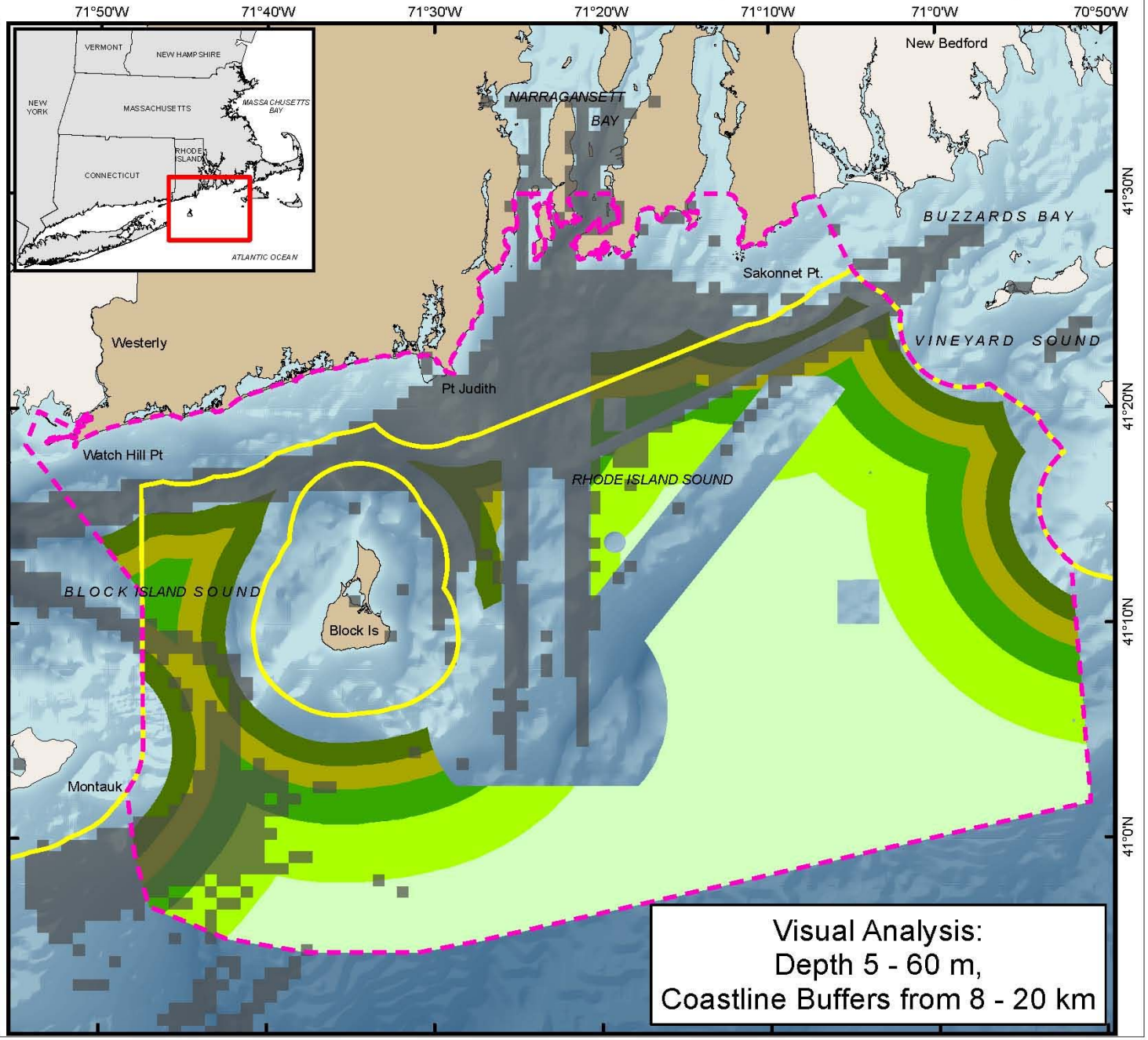

AIS Vessel Tracks
September 2007 – July 2008


AIS Vessel Tracking:
Sept. 2007 -- July 2008
AIS On 1km Grid
AIS_Grid_1km
Counts
< 50
51 - 100
101 - 500
501 - 1000
> 1000

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

- Proposed Ocean Study Area
- State/Federal Waters Separation
- AIS Vessel Traffic
- 20 Kilometer Buffer
- 15 Kilometer Buffer
- 12 Kilometer Buffer
- 10 Kilometer Buffer
- 8 Kilometer Bufer

N

Miles 0 5

Kilometers 0 5 10

Coordinate System:
Projection: RI Stateplane
Units: Feet
FIPS Zone: 3800
Datum: NAD83

For Project Background Information:
http://seagrant.gso.uri.edu/oceansamp

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Technology Based Assessment

Objective: Develop a metric based on technical challenge to power production potential to screen for sites.

$$TDI = TCI/PPP$$

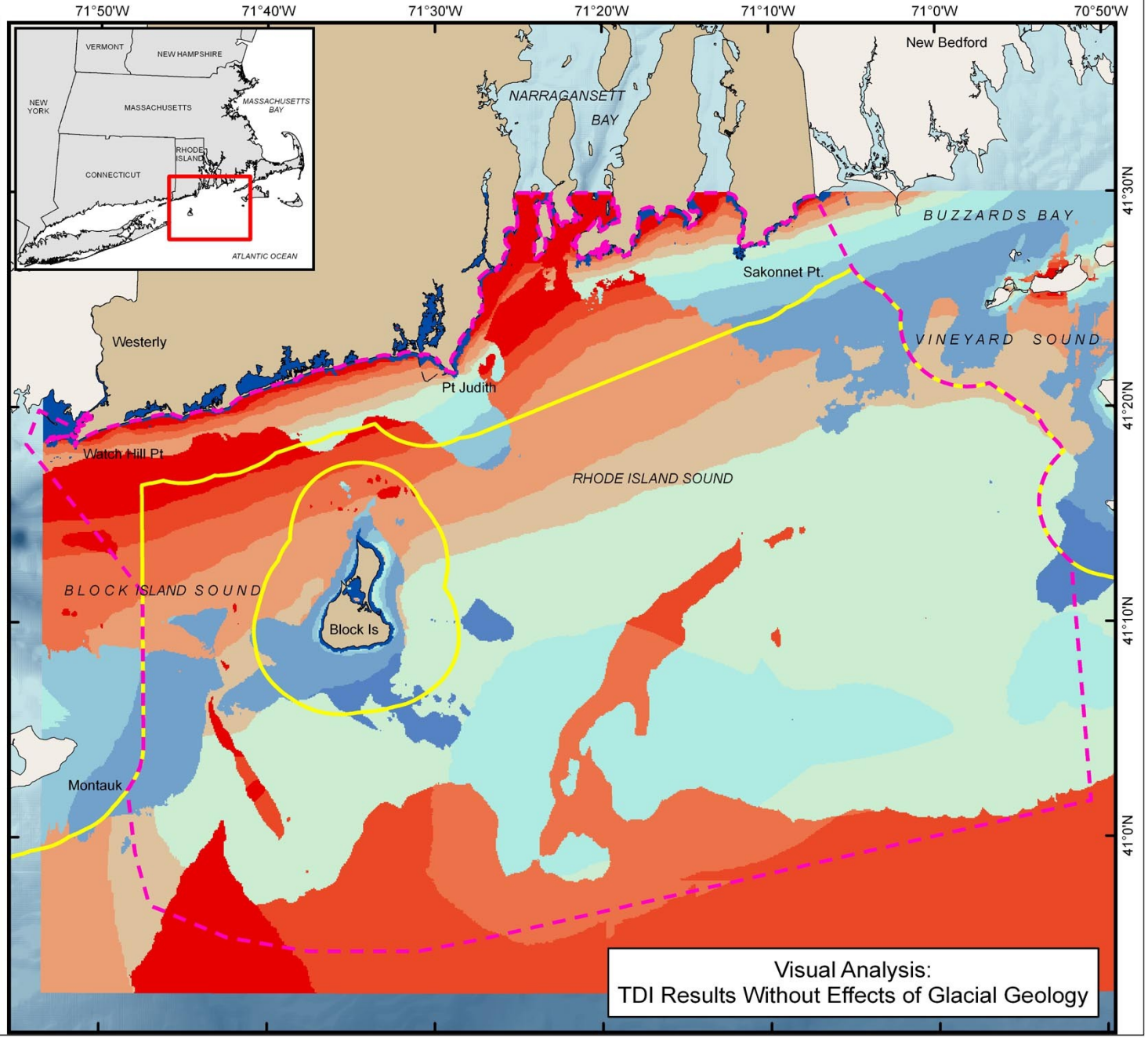
where TDI –Technical Development Index

TCI- Technical Challenge Index

PPP- Power Production Potential

Presented in form of dimensionless values (Predicted TDI divided by lowest TDI possible in area of interest)

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

- Proposed Ocean Study Area
- State/Federal Waters Separation

TDI - No Geology

- 1.0
- 1.1
- 1.2
- 1.3
- 1.4
- 1.5
- 1.6
- 1.7
- 1.8
- 1.9
- 2.0
- 2.1

Miles: 0 – 5
Kilometers: 0 – 5 – 10

Coordinate System:
Projection: RI Stateplane
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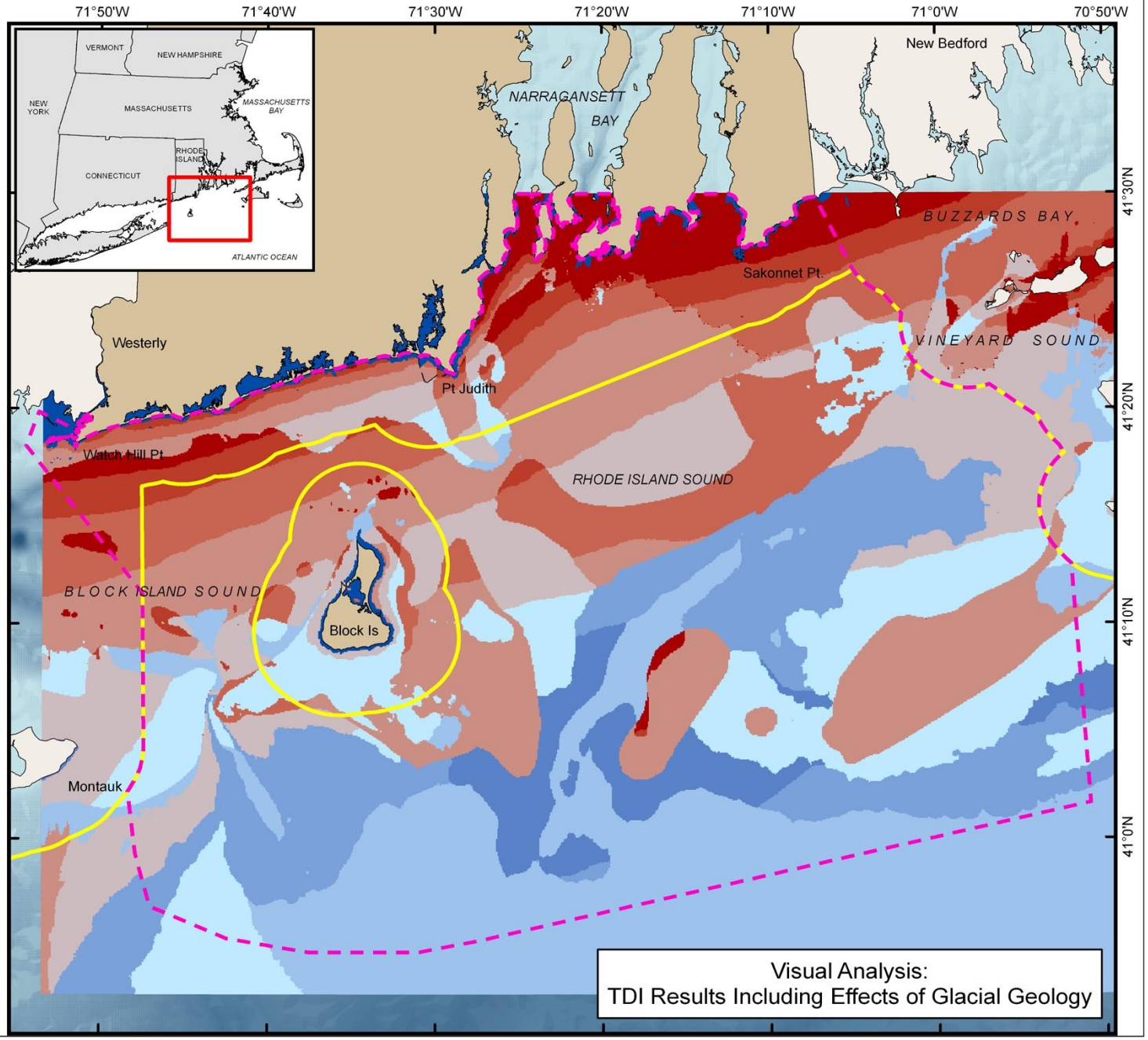

Map Key

- Proposed Ocean Study Area
- State/Federal Waters Separation

TDI - With Geology

- 1.00
- 1.25
- 1.50
- 1.75
- 2.00
- 2.25
- 2.50
- 2.75
- 3.00
- 3.25
- 3.50

Miles: 0 – 5
Kilometers: 0 – 5 – 10

Coordinate System:
Projection: RI Stateplane
Units: Feet
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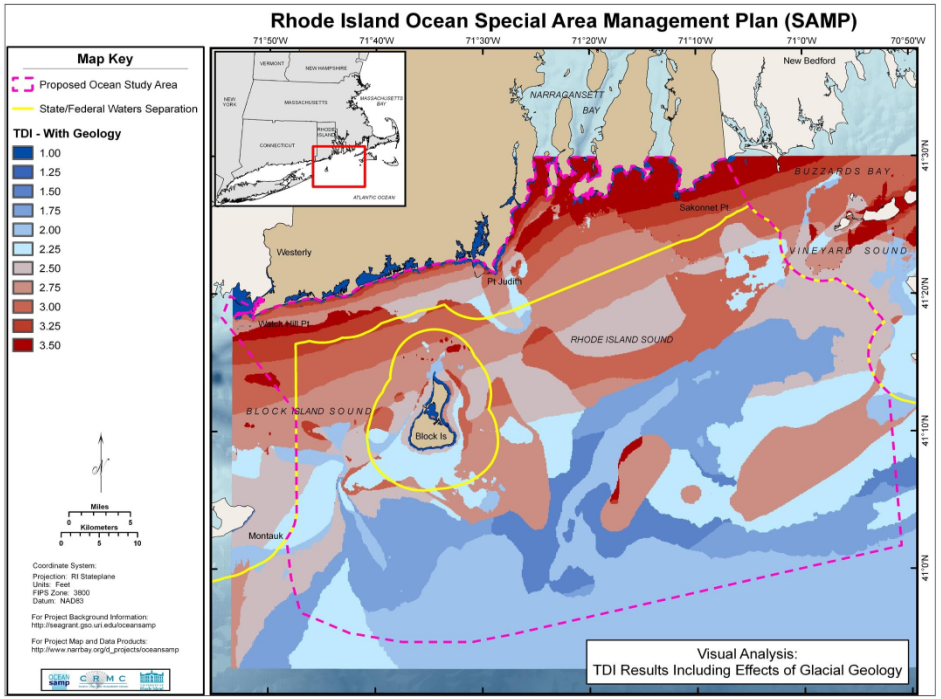
Rhode Island Ocean Special Area Management Plan (SAMP)
Map Key
Proposed Ocean Study Area
State/Federal Waters Separation
TDI - With Geology
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
Miles
Kilometers
Coordinate System:
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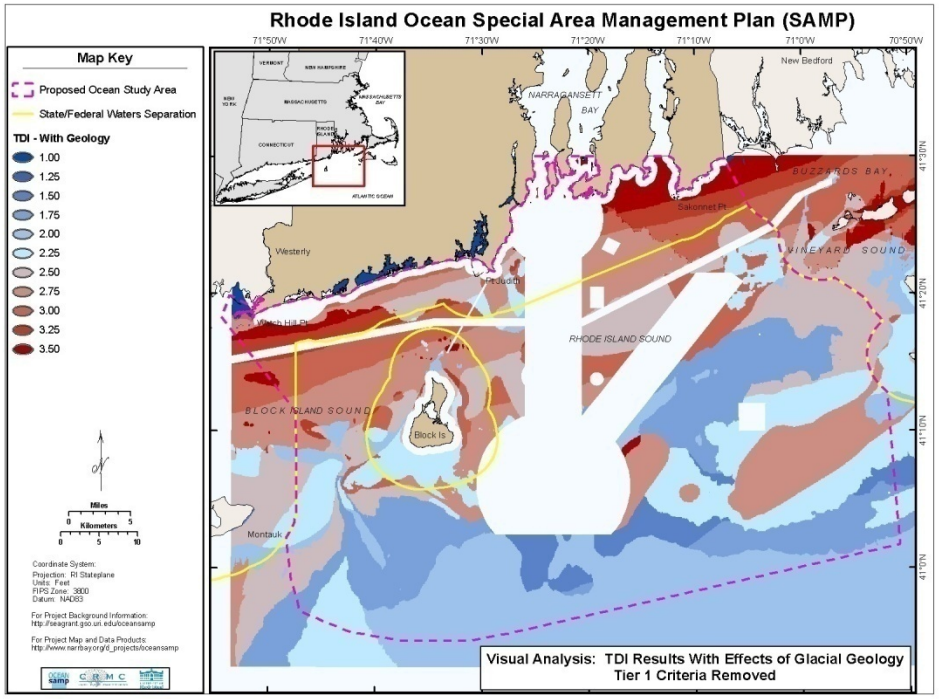
For Project Map and Data Products:
http://www.narrbay.org/d_projects/oceansamp
NARRAGANSETT BAY
New Bedford
BUZZARDS BAY
Sakonnet Pt
Westerly
Pt Judith
VINEYARD SOUND
Watch Hill Pt
RHODE ISLAND SOUND
BLOCK ISLAND SOUND
Block Is
Montauk
Visual Analysis:
TDI Results Including Effects of Glacial Geology


Rhode Island Ocean Special Area Management Plan (SAMP)
Map Key
Proposed Ocean Study Area
State/Federal Waters Separation
TDI - With Geology
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
Miles
Kilometers
Coordinate System:
Projection: RI Stateplane
Units: Feet
FIPS Zone: 3800
Datum: NAD83
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NARRAGANSETT BAY
New Bedford
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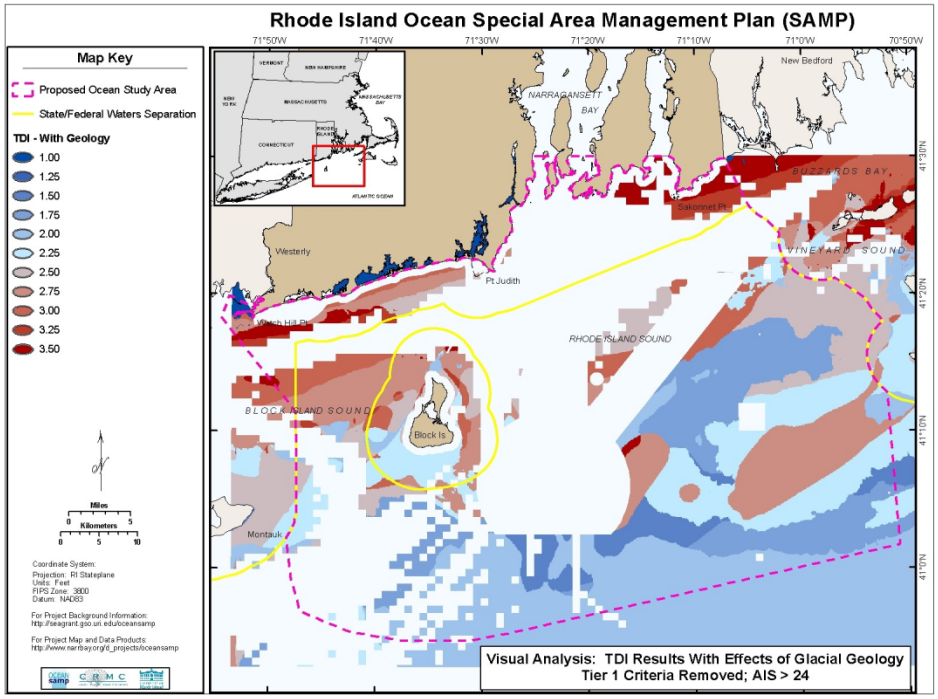
Sakonnet Pt
Westerly
Pt Judith
VINEYARD SOUND
Watch Hill Pt
RHODE ISLAND SOUND
BLOCK ISLAND SOUND
Block Is
Montauk
Visual Analysis: TDI Results With Effects of Glacial Geology
Tier 1 Criteria Removed


Rhode Island Ocean Special Area Management Plan (SAMP)
Map Key
Proposed Ocean Study Area
State/Federal Waters Separation
TDI - With Geology
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
Miles
Kilometers
Coordinate System:
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NARRAGANSETT BAY
New Bedford
BUZZARDS BAY
Sakonnet Pt
Westerly
Pt Judith
VINEYARD SOUND
Watch Hill Pt
RHODE ISLAND SOUND
BLOCK ISLAND SOUND
Block Is
Montauk
Visual Analysis: TDI Results With Effects of Glacial Geology
Tier 1 Criteria Removed; AIS > 24

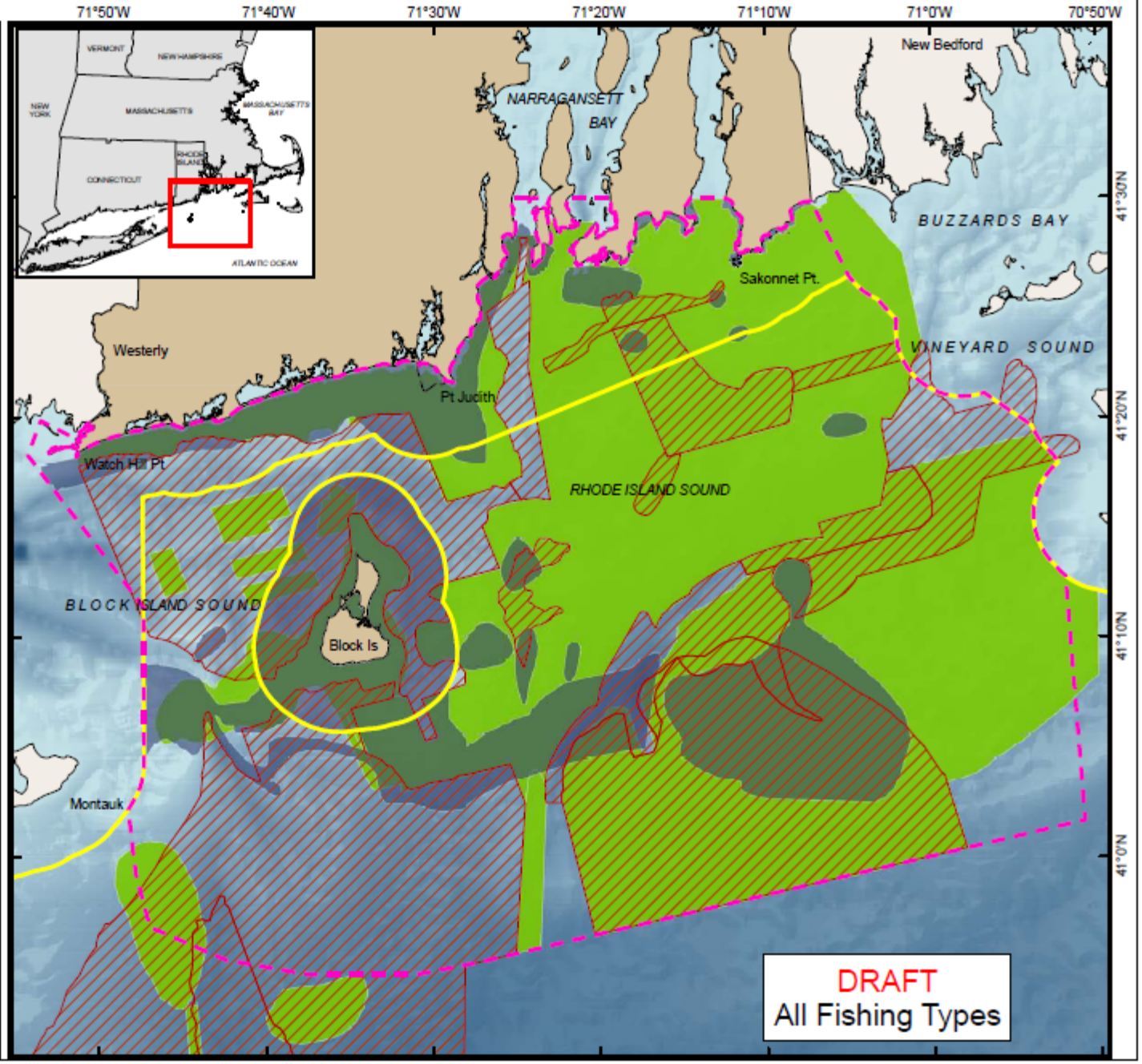
AIS SERIES

SAMP Research

Research Topics Include...

- Wind resources
- Marine mammals and birds
- Fisheries uses
- Physical oceanography
- Ecosystem interactions
- Sediment and benthic habitat
- Cultural resources
- Acoustics and electromagnetic effects
- Meteorology
- Engineering
- Marine transportation uses

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

- Proposed Ocean Study Area
- State/Federal Waters Separation
- Mobile Gear Fishing
- Recreational Fishing
- Fixed Gear Fishing

Miles: 0 – 5
Kilometers: 0 – 5 – 10

Coordinate System:
Projection: RI Stateplane
Units: Feet
FIPS Zone: 3800
Datum: NAD83

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For Project Map and Data Products:
http://www.narrbay.org/d_projects/oceansamp

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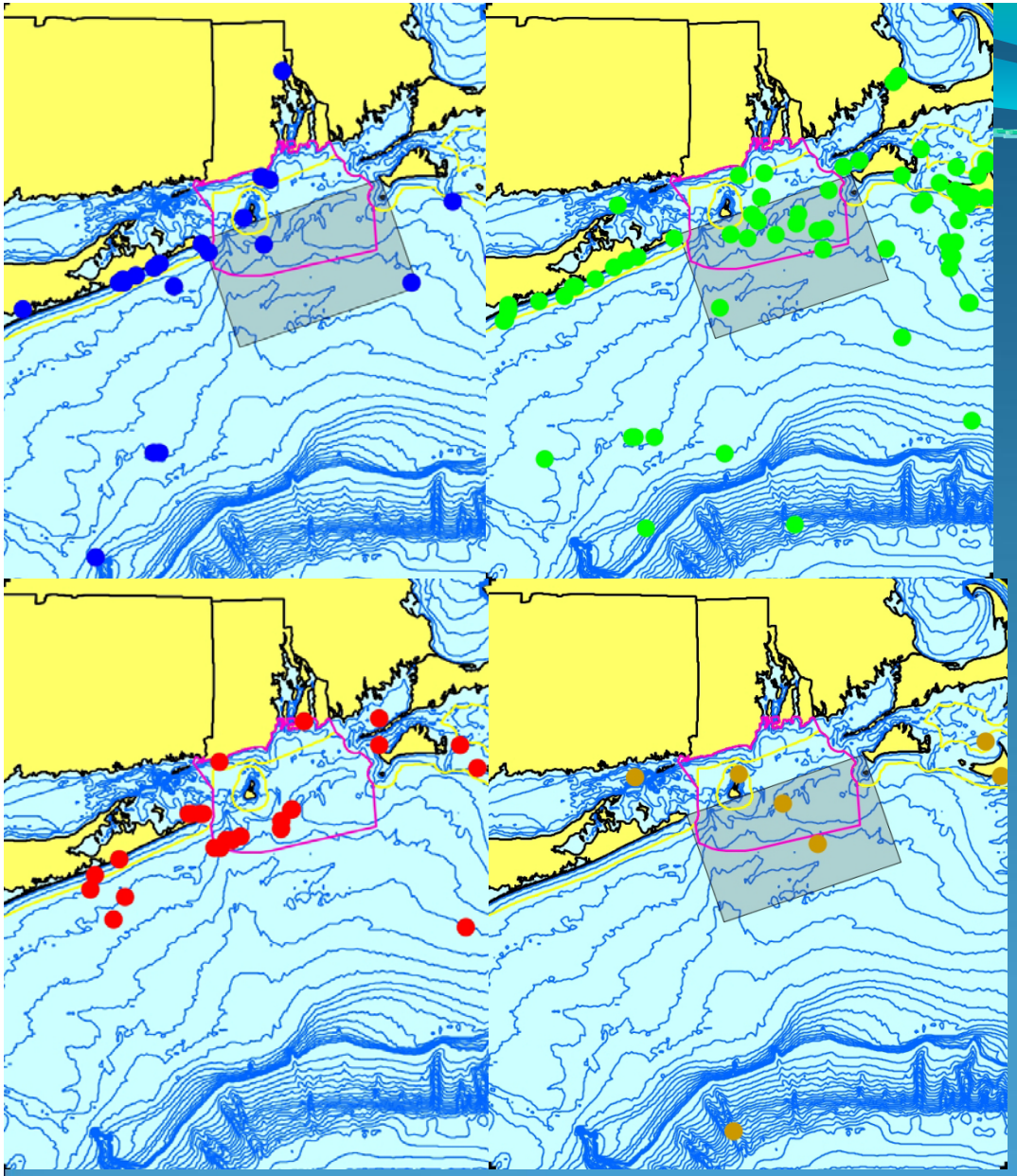
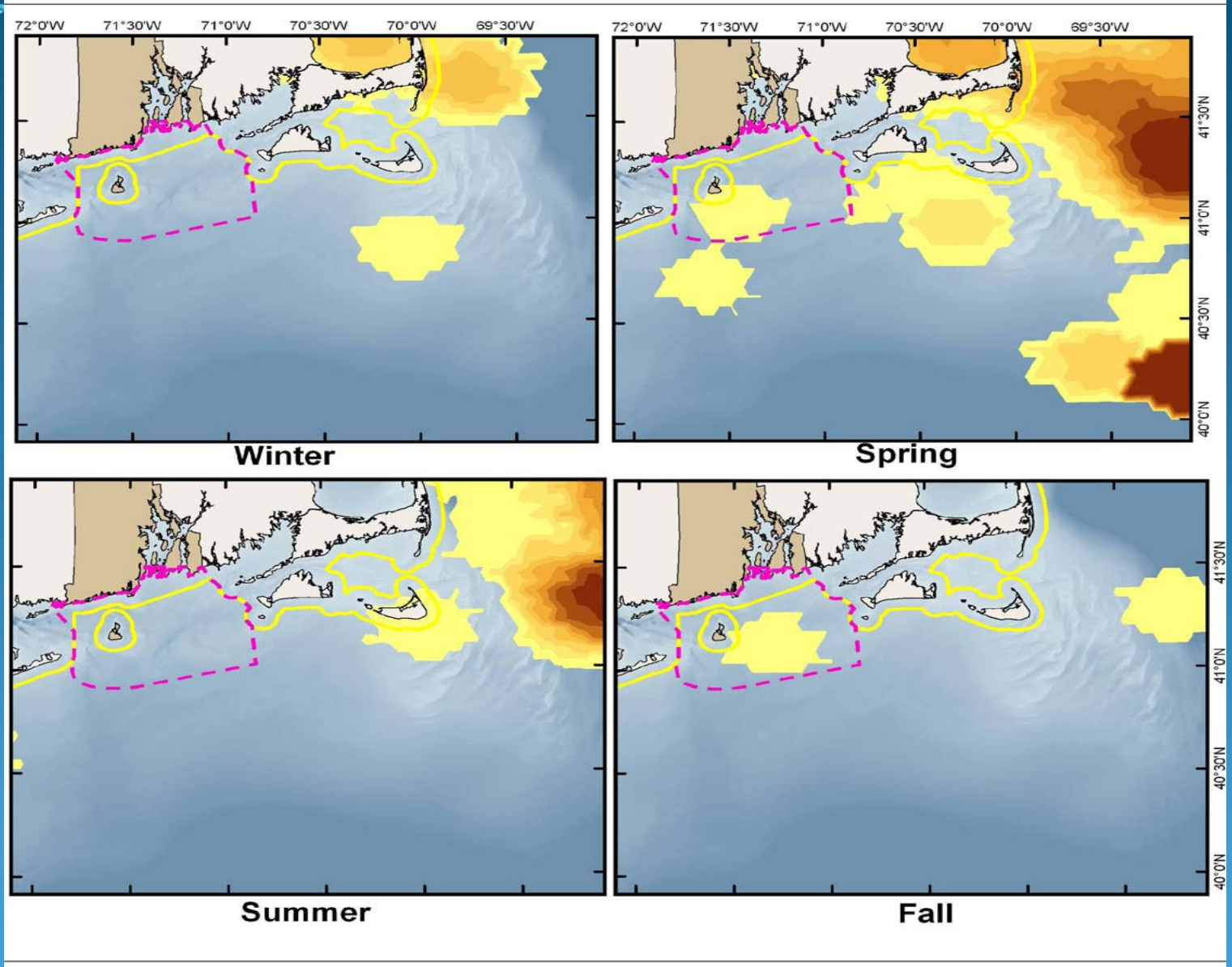
49 species addressed:

- 16 *common* (>100): North Atlantic right whale, humpback whale, fin whale, common minke whale, sperm whale, harbor porpoise, short-beaked common dolphin, long-finned pilot whale, Risso's dolphin, Atlantic white-sided dolphin, bottlenose dolphin, gray seal, harp seal, harbor seal, leatherback sea turtle, loggerhead sea turtle
- 6 *regular* (10-100): sei whale, pygmy sperm whale, white-beaked dolphin, striped dolphin, hooded seal, Kemp's ridley sea turtle
- 18 *rare* (<10): Bryde's whale, blue whale, dwarf sperm whale, northern bottlenose whale, Sowerby's beaked whale, Blainville's beaked whale, Gervais' beaked whale, True's beaked whale, Cuvier's beaked whale, beluga whale, short-finned pilot whale, killer whale, false killer whale, pan-tropical spotted dolphin, Atlantic spotted dolphin, ringed seal, West Indian manatee, green sea turtle
- 1 *extirpated*: Atlantic gray whale
- 8 *hypothetical*: pygmy killer whale, melon-headed whale, rough-toothed dolphin, spinner dolphin, Clymene dolphin, bearded seal, walrus, hawksbill sea turtle



North Atlantic Right Whale, 1828-2007

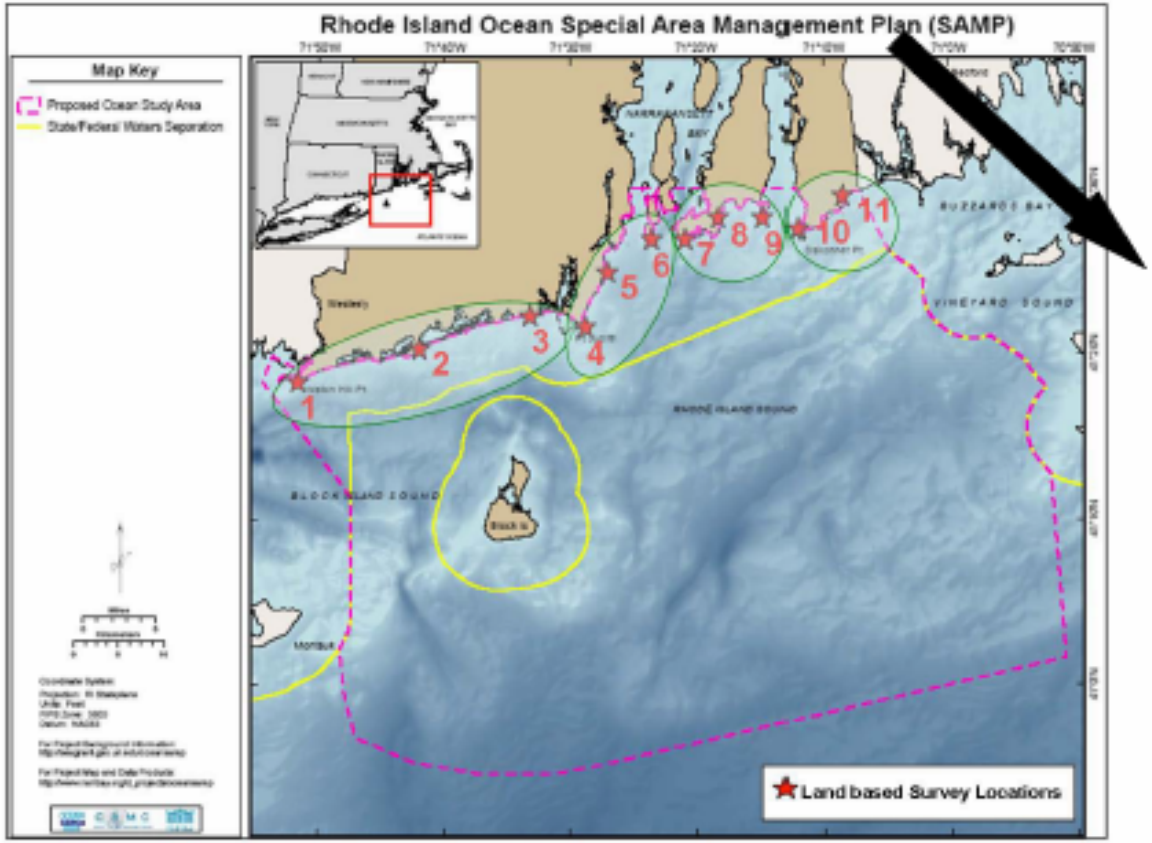
Dr. Robert Kenney, URI

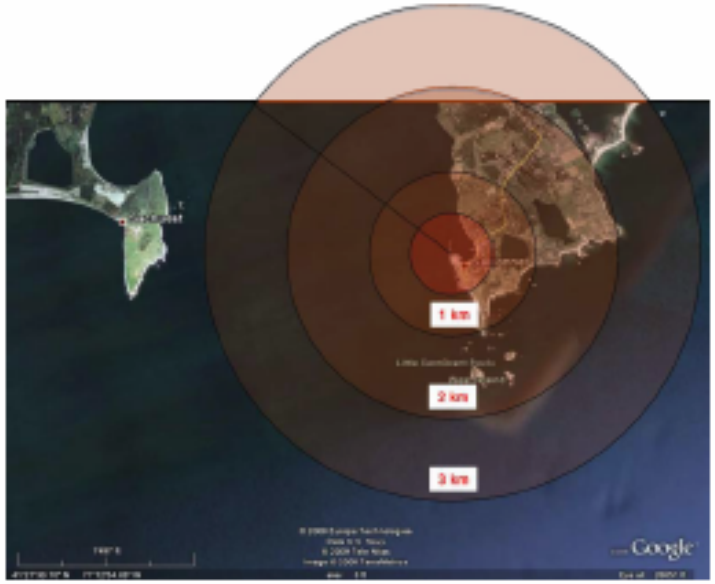


Dr. Robert Kenney, URI

Land-based Surveys (Jan 2009 – May 2010)

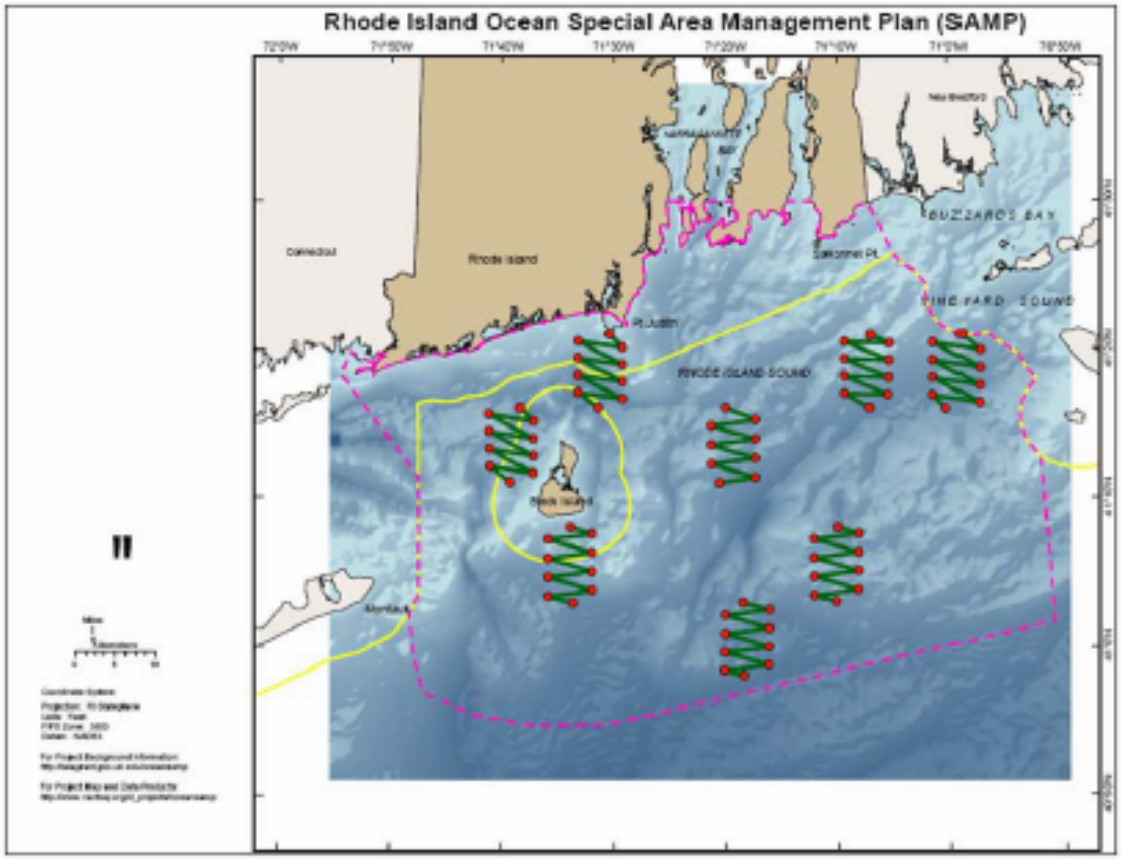
11 sites
- each surveyed 6 times per month
- 1 to 2 hours per survey, to 3 km offshore
- 3 morning and 3 evening surveys per month

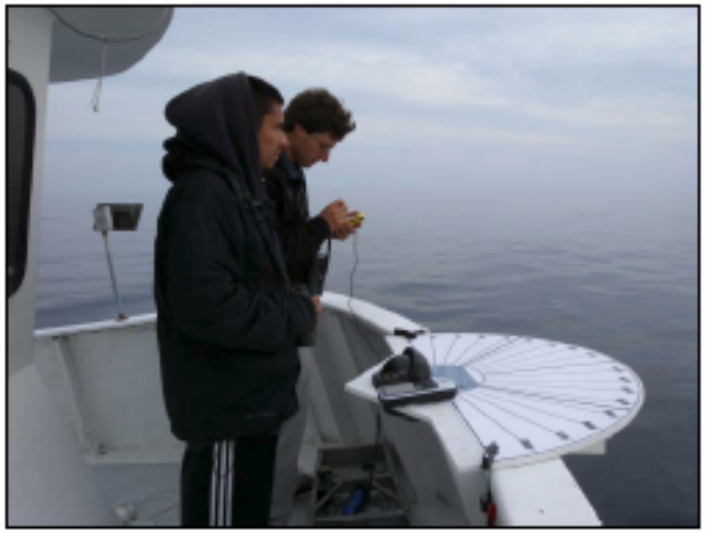


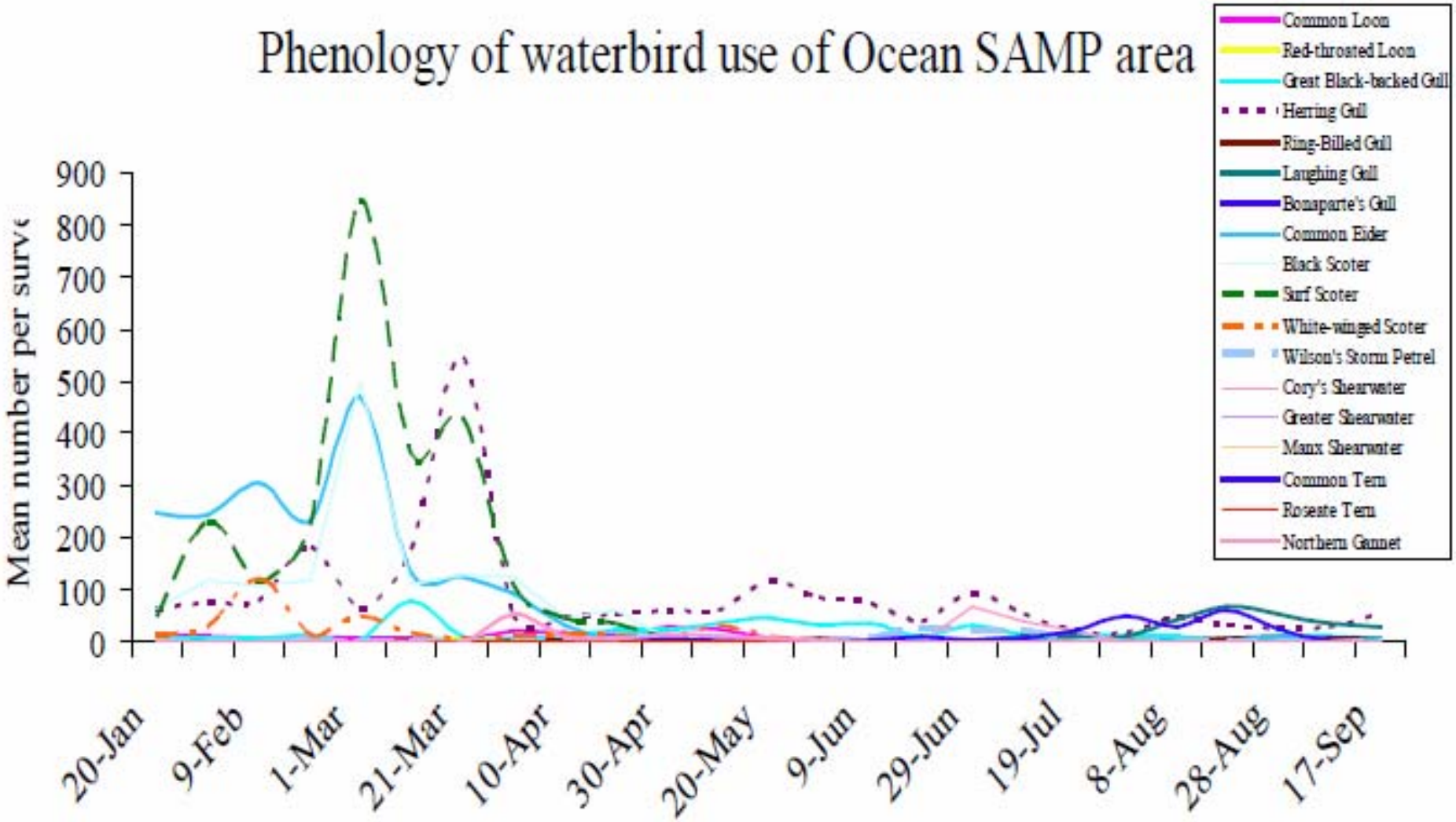


Boat-based Surveys (February 2009 – May 2010)

- 8 randomly-located sawtooth line transects to estimate density
- One survey per week conducted on 2 grids
- Each 4 by 5 nm grid gets surveyed once per month



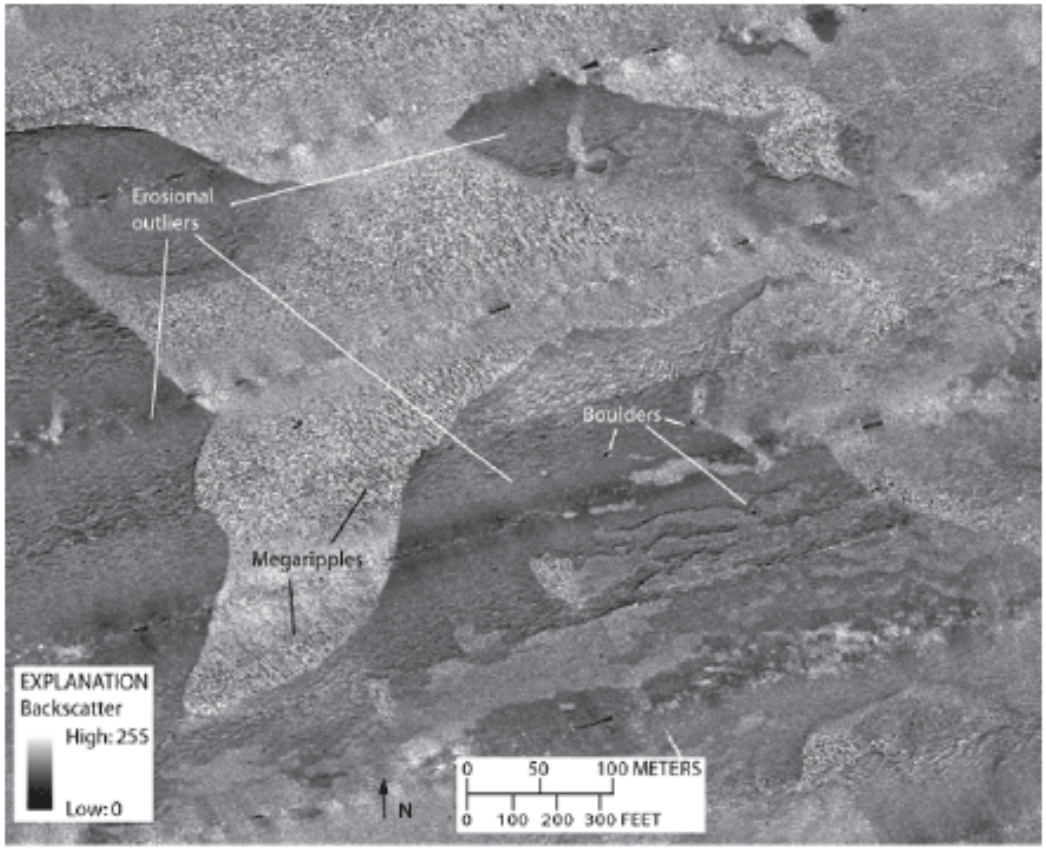



Phenology of waterbird use of Ocean SAMP area
Mean number per surve
900
800
700
600
500
400
300
200
100
0
20-Jan
9-Feb
1-Mar
21-Mar
10-Apr
30-Apr
20-May
9-Jun
29-Jun
19-Jul
8-Aug
28-Aug
17-Sep
Common Loon
Red-throated Loon
Great Black-backed Gull
Herring Gull
Ring-Billed Gull
Laughing Gull
Bonaparte's Gull
Common Eider
Black Scoter
Surf Scoter
White-winged Scoter
Wilson's Storm Petrel
Cory's Shearwater
Greater Shearwater
Manx Shearwater
Common Tern
Roseate Tern
Northern Gannet

Side-Scan Sonar Survey for Route Planning

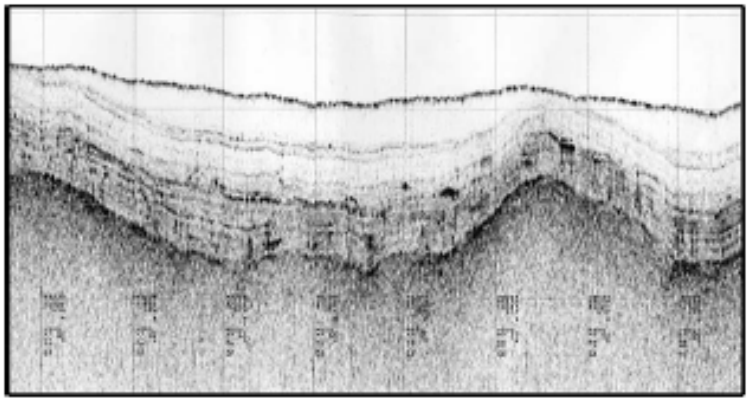
August 2009

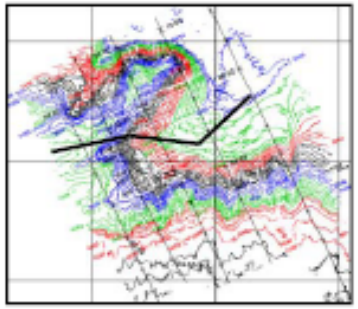
- Side-scan sonar survey performed along pipeline route to identify sediment types
- Map habitat types and identify sediment texture and bottom features

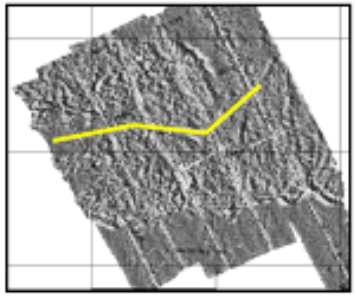


Marine route survey

To be performed in the Spring of 2010







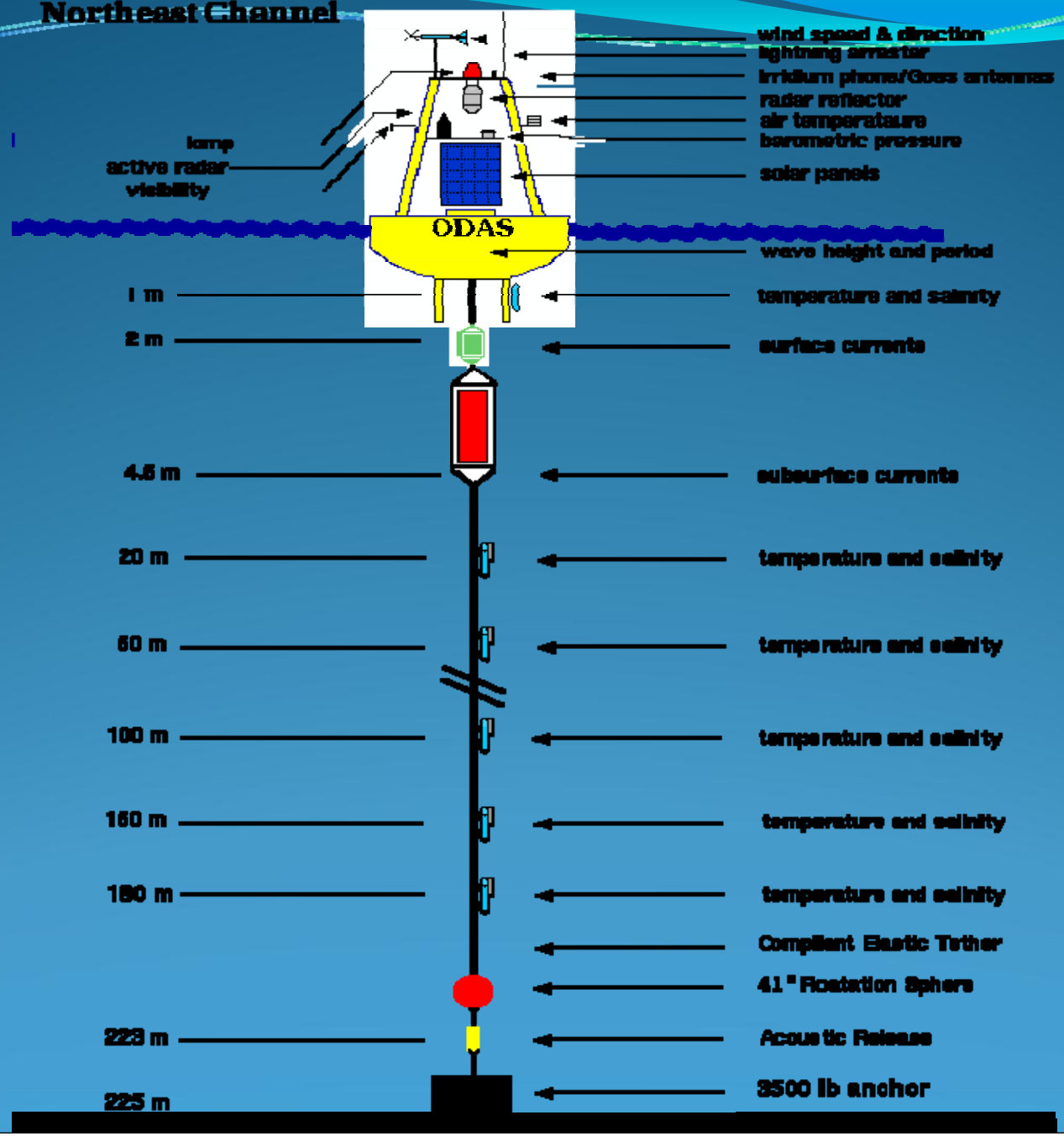
- Bathymetry
- Side scan sonar
- Sub-bottom profiler
- Burial assessment survey
- Archeological survey
- Route position list
- Finalize cable length

DEEPWATERWIND

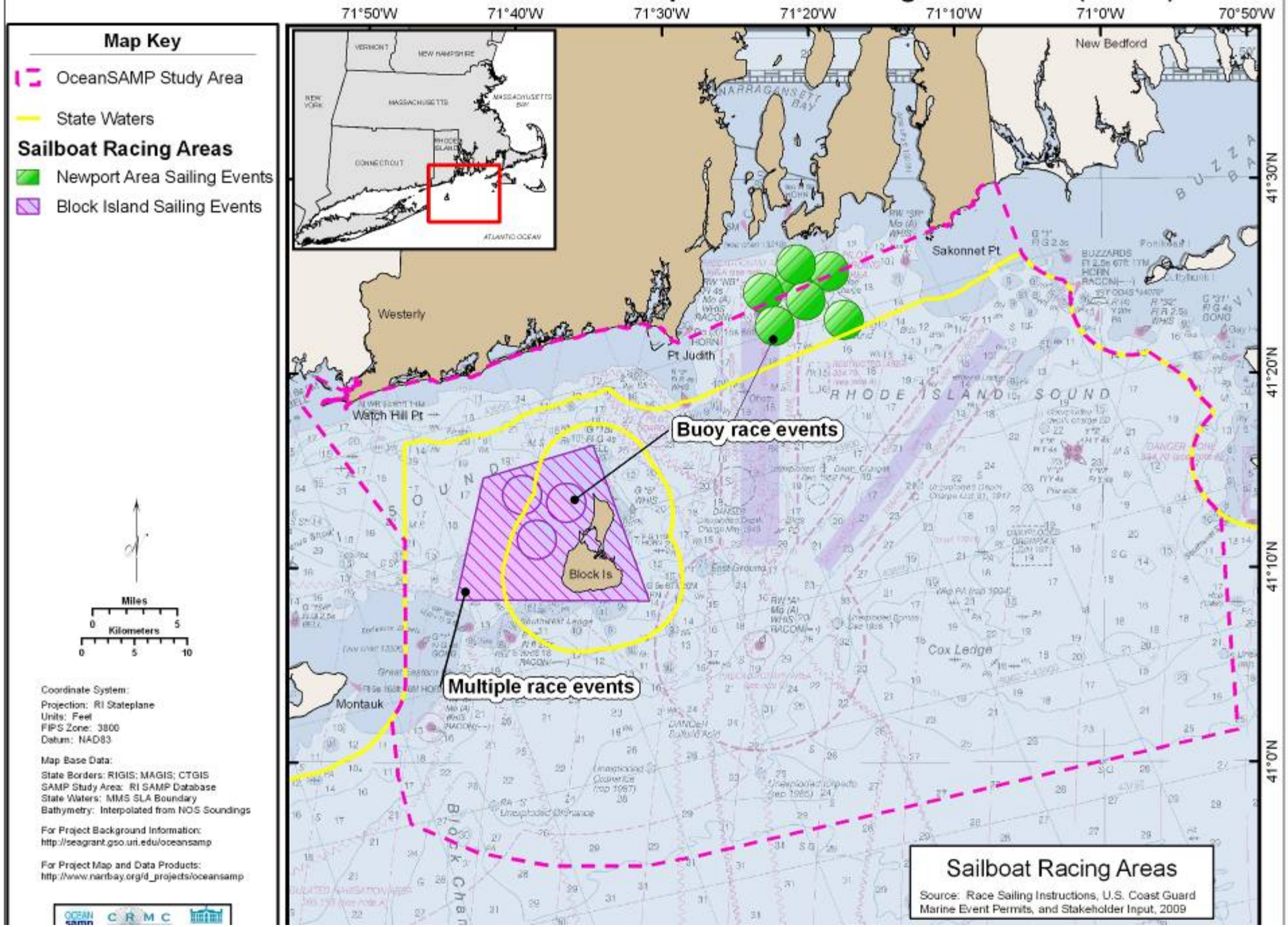
MOORING N

Northeast Channel

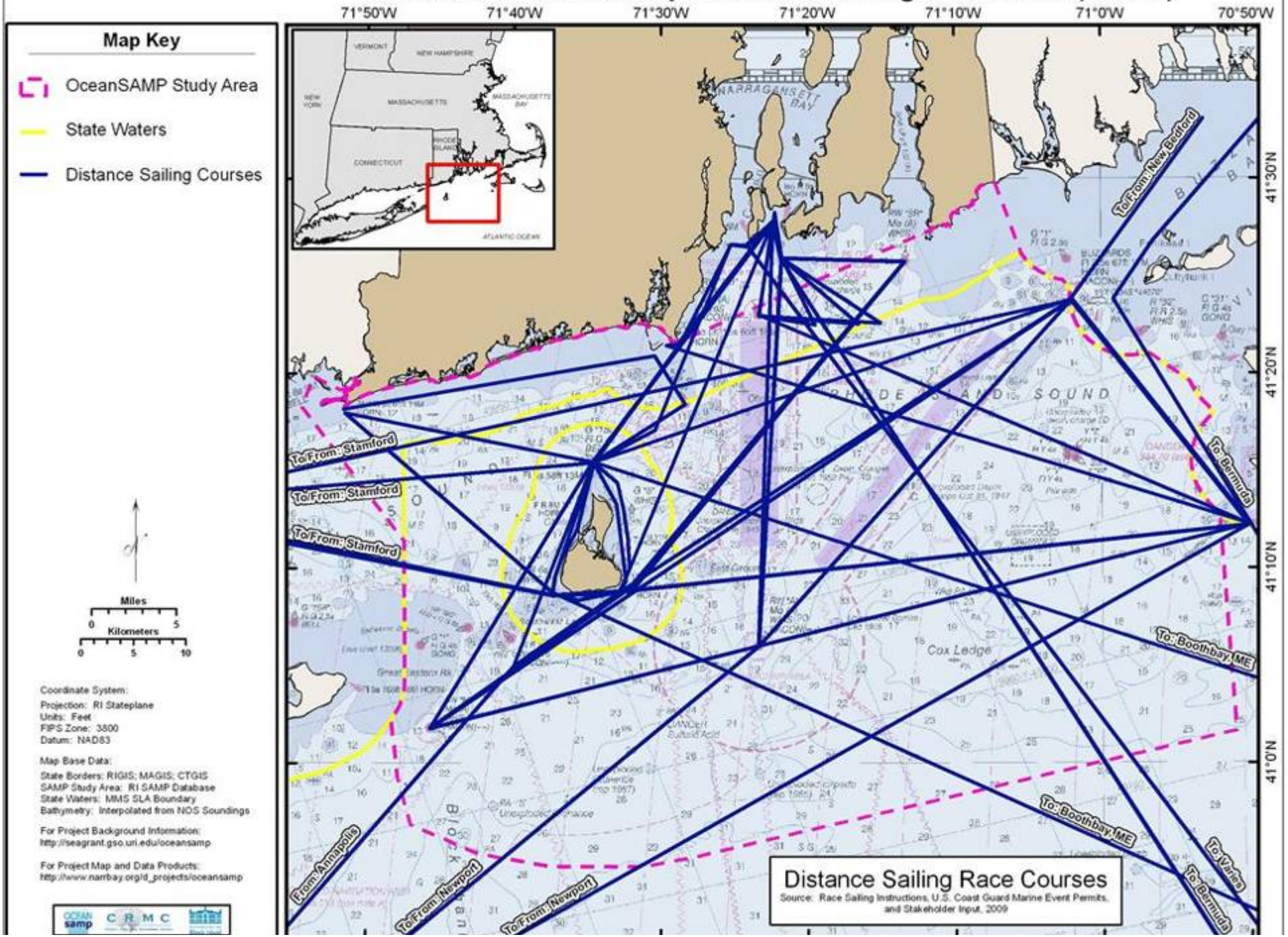
N01



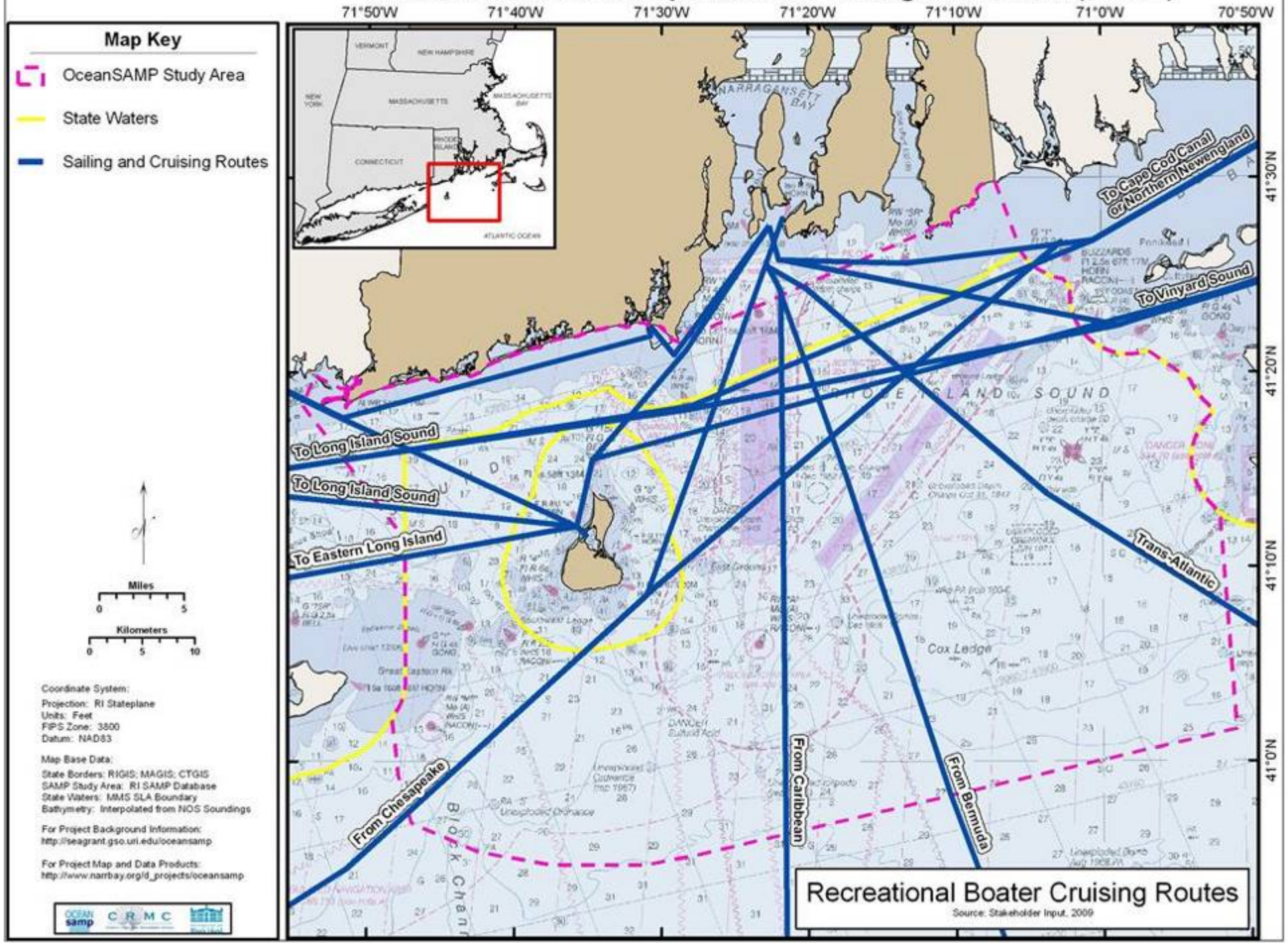
Rhode Island Ocean Special Area Management Plan (SAMP)



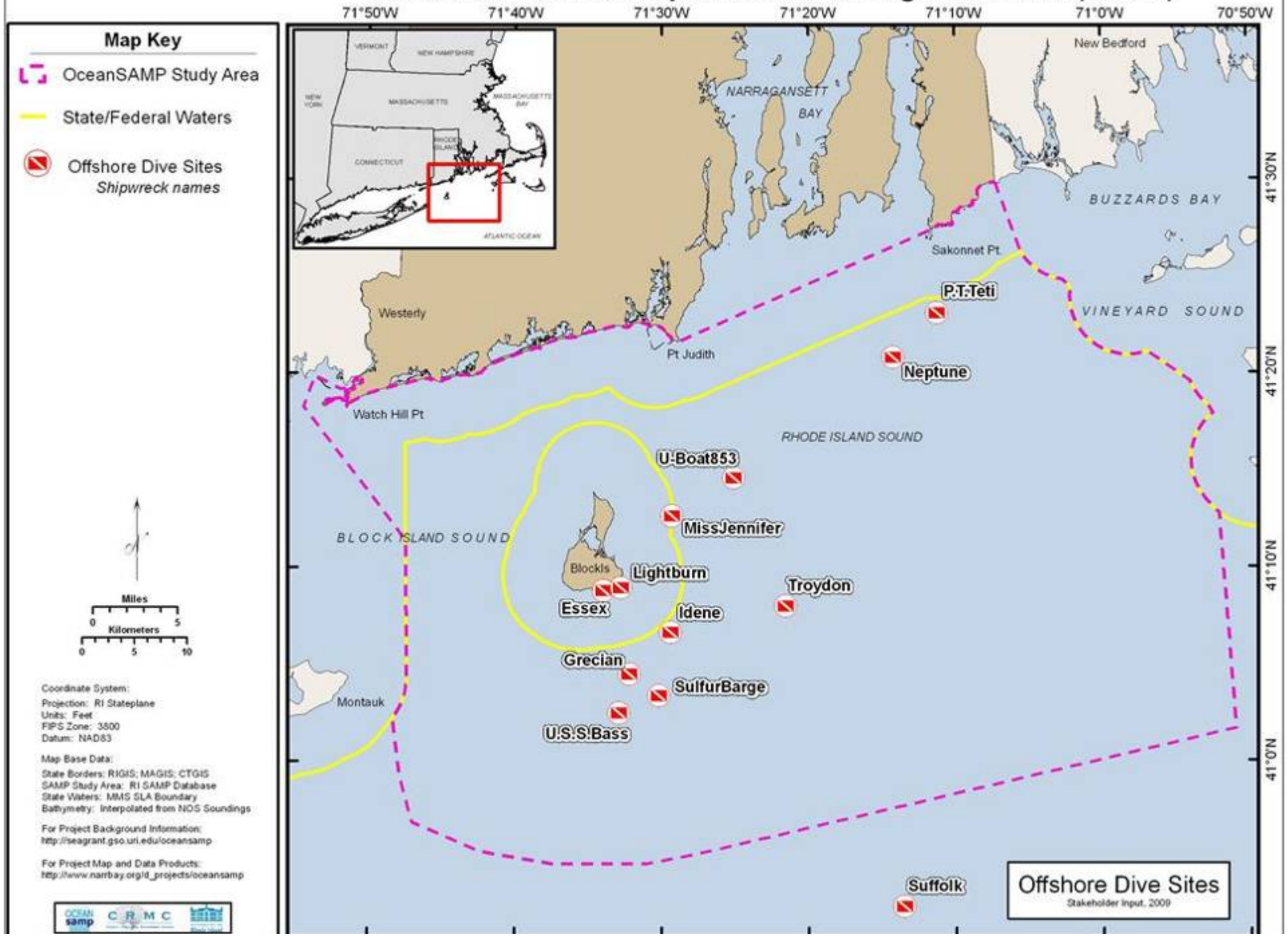
Rhode Island Ocean Special Area Management Plan (SAMP)



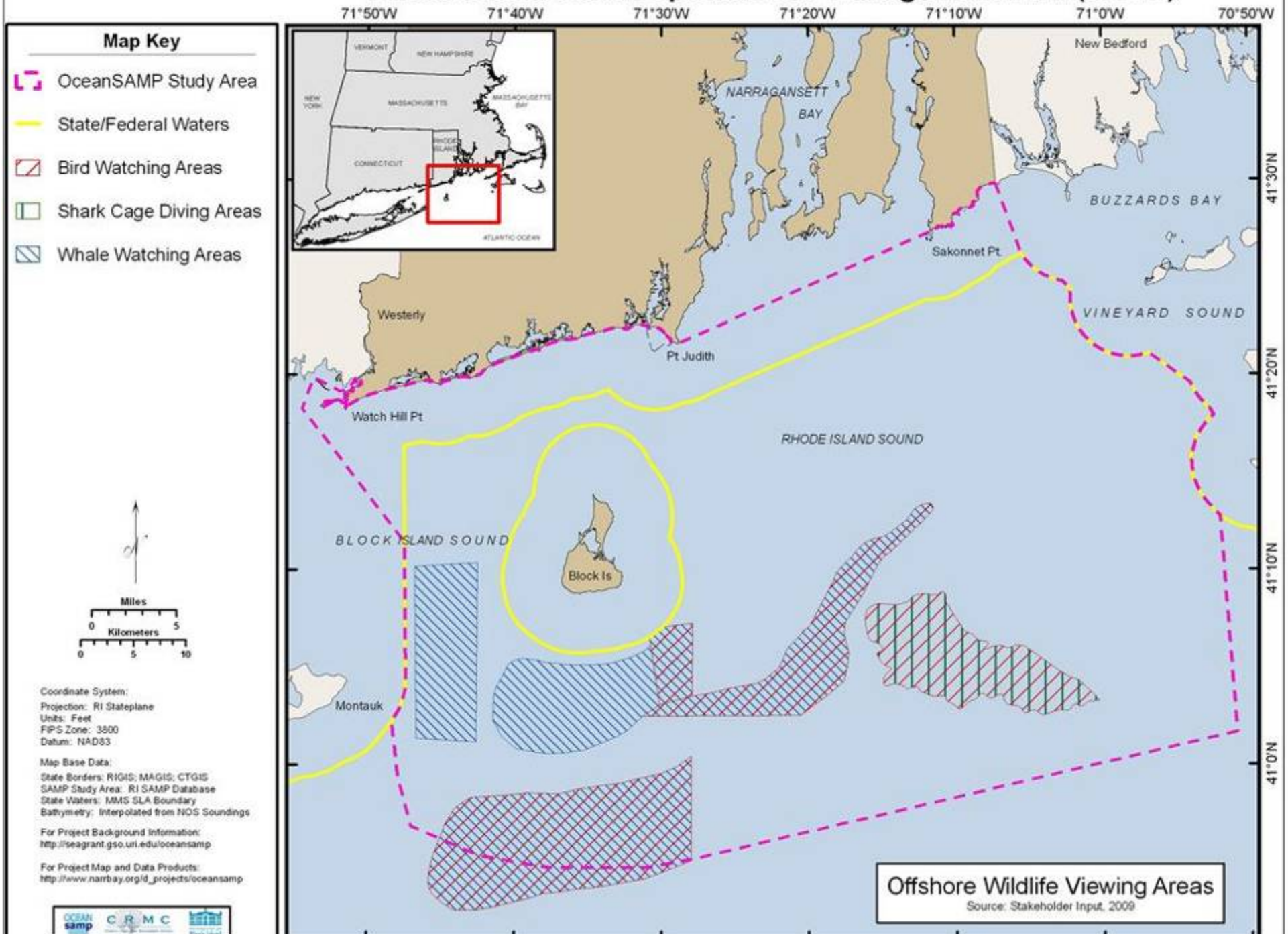
Rhode Island Ocean Special Area Management Plan (SAMP)

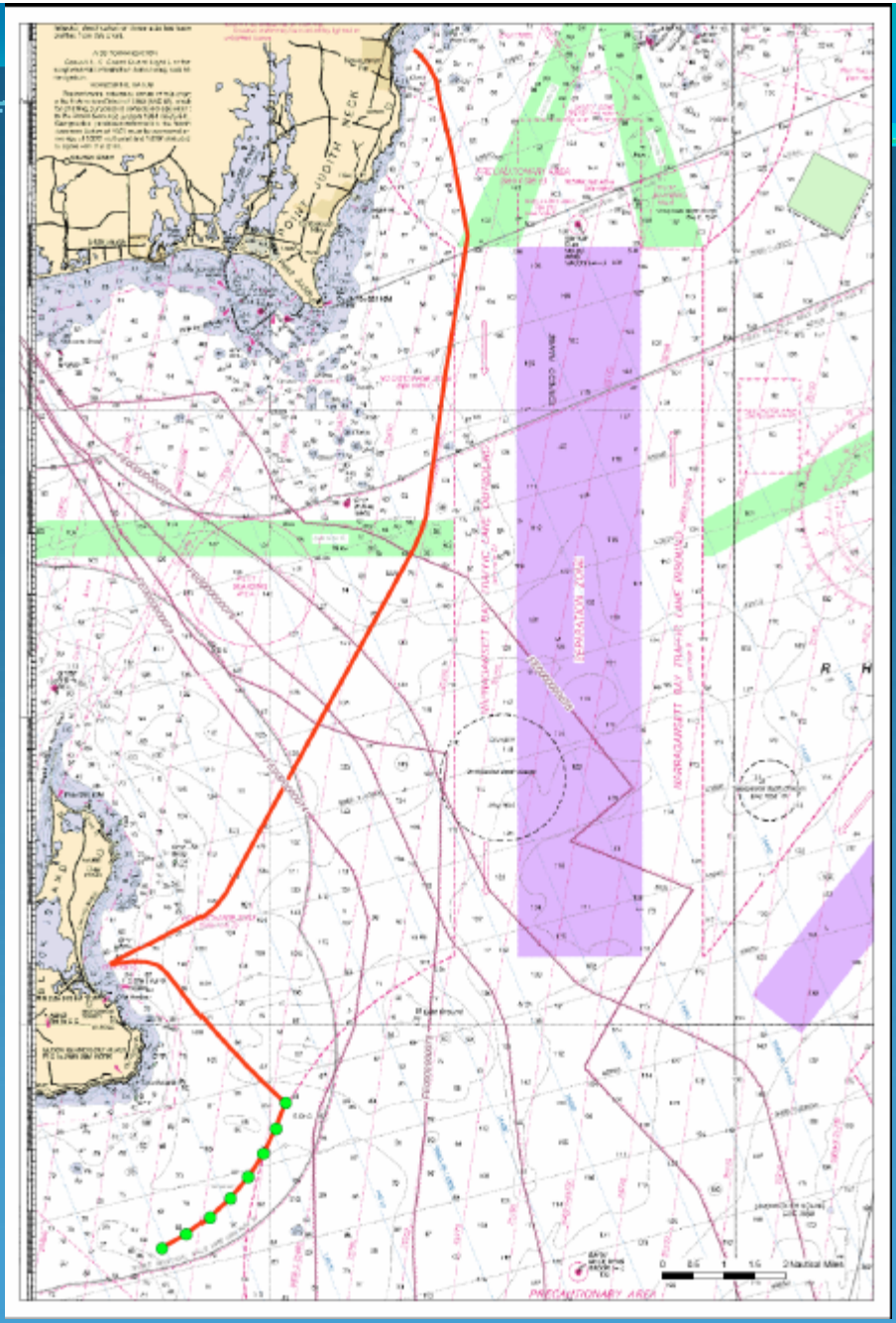


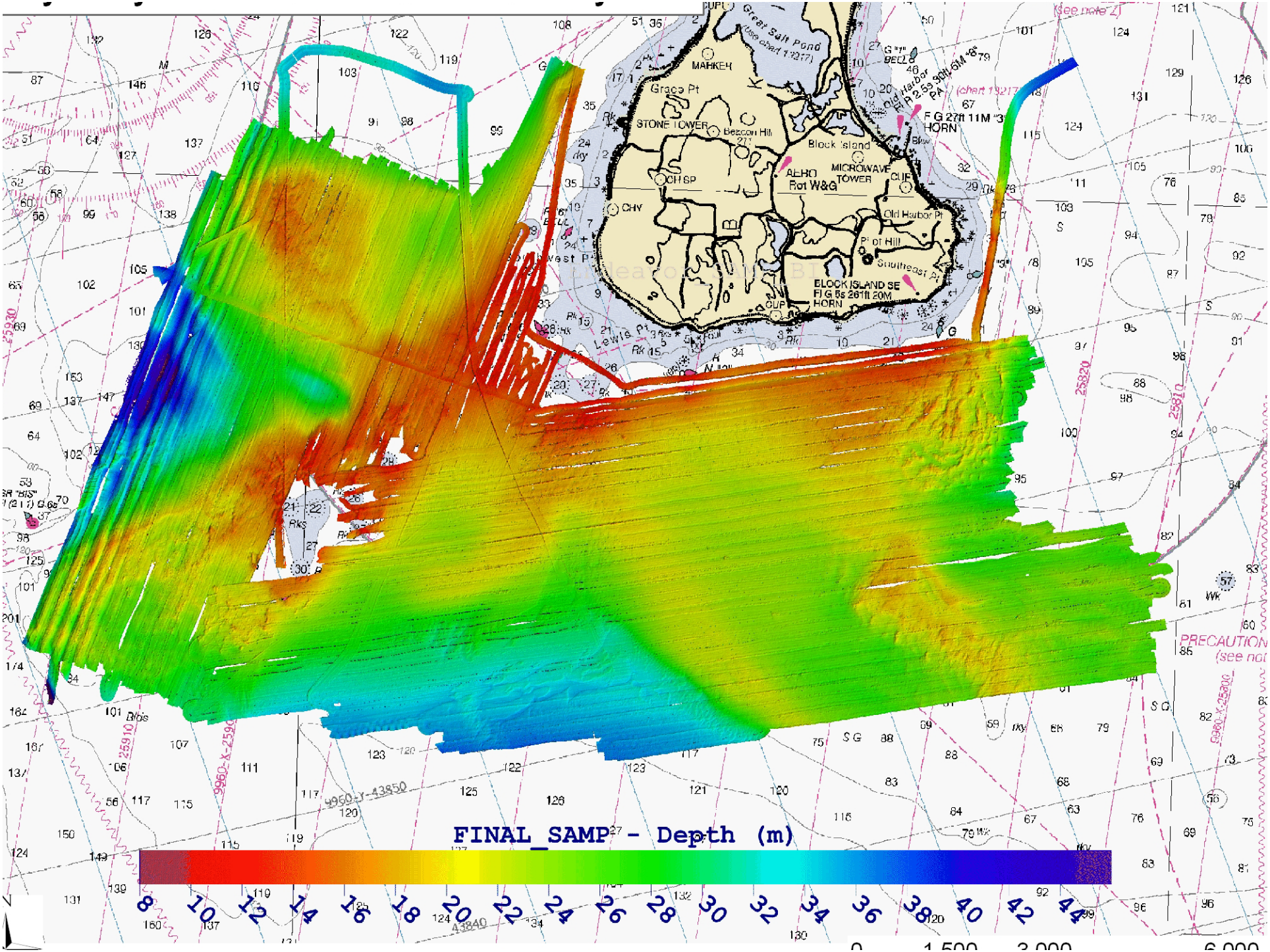
Rhode Island Ocean Special Area Management Plan (SAMP)

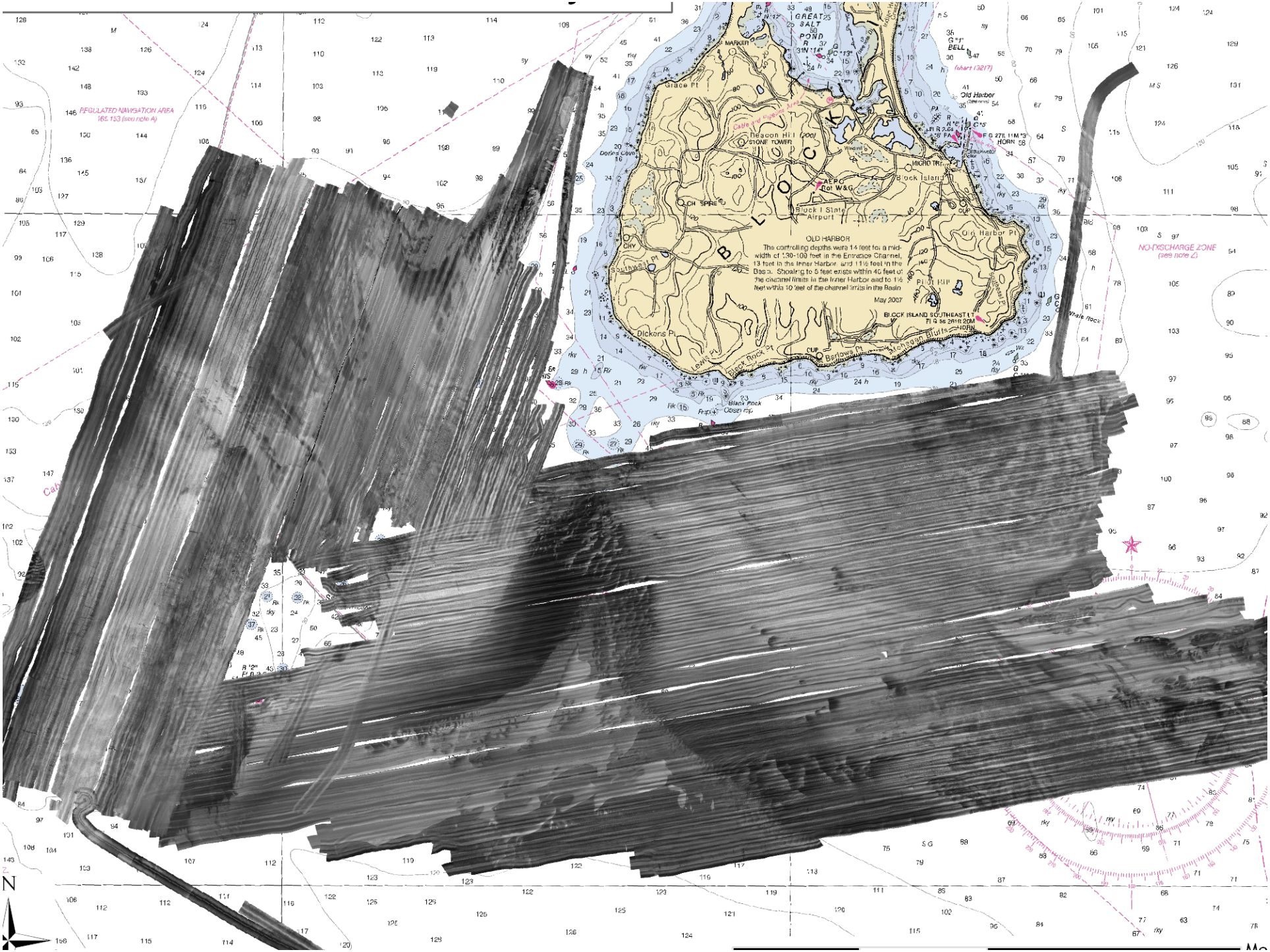


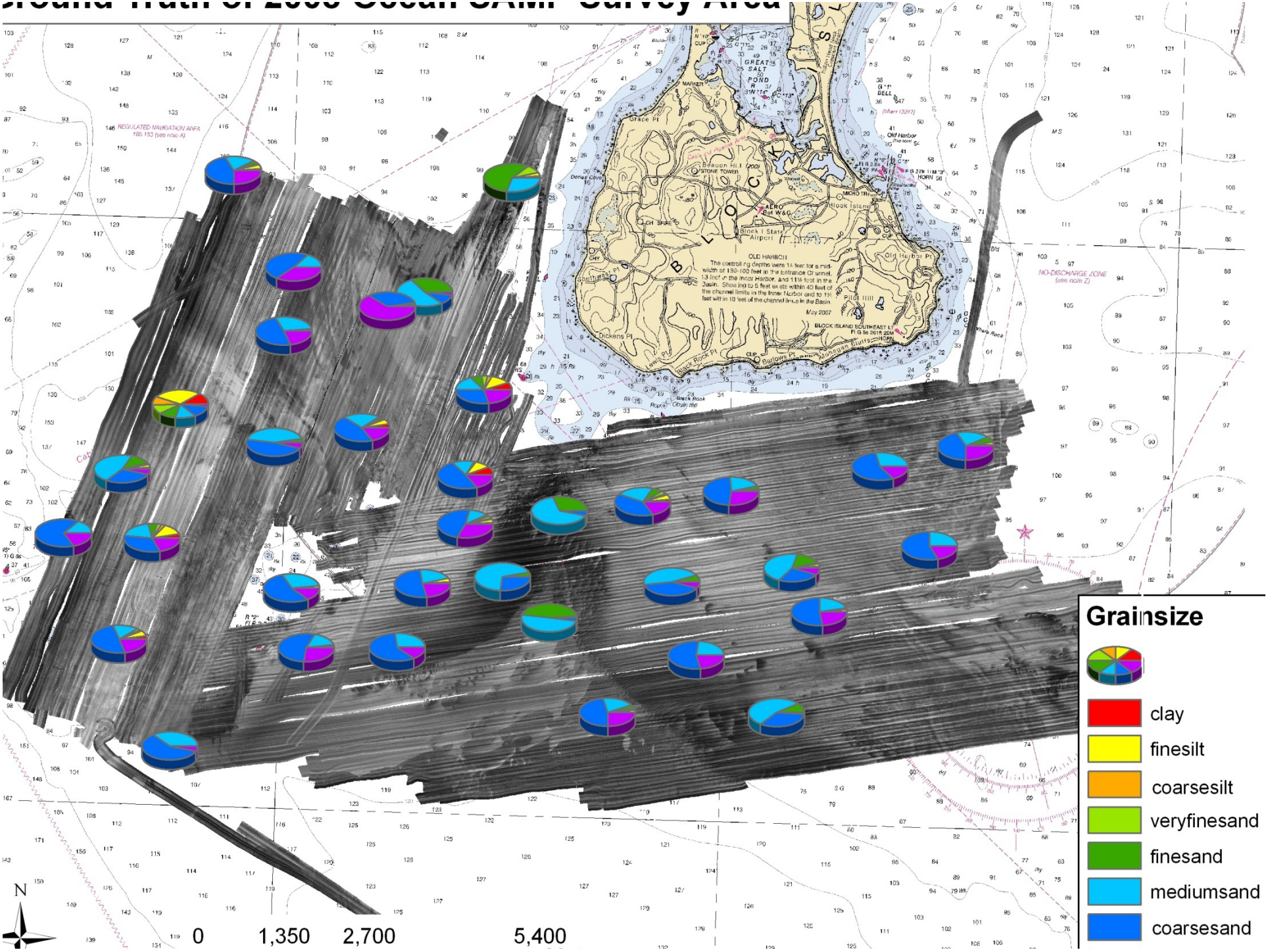
Rhode Island Ocean Special Area Management Plan (SAMP)



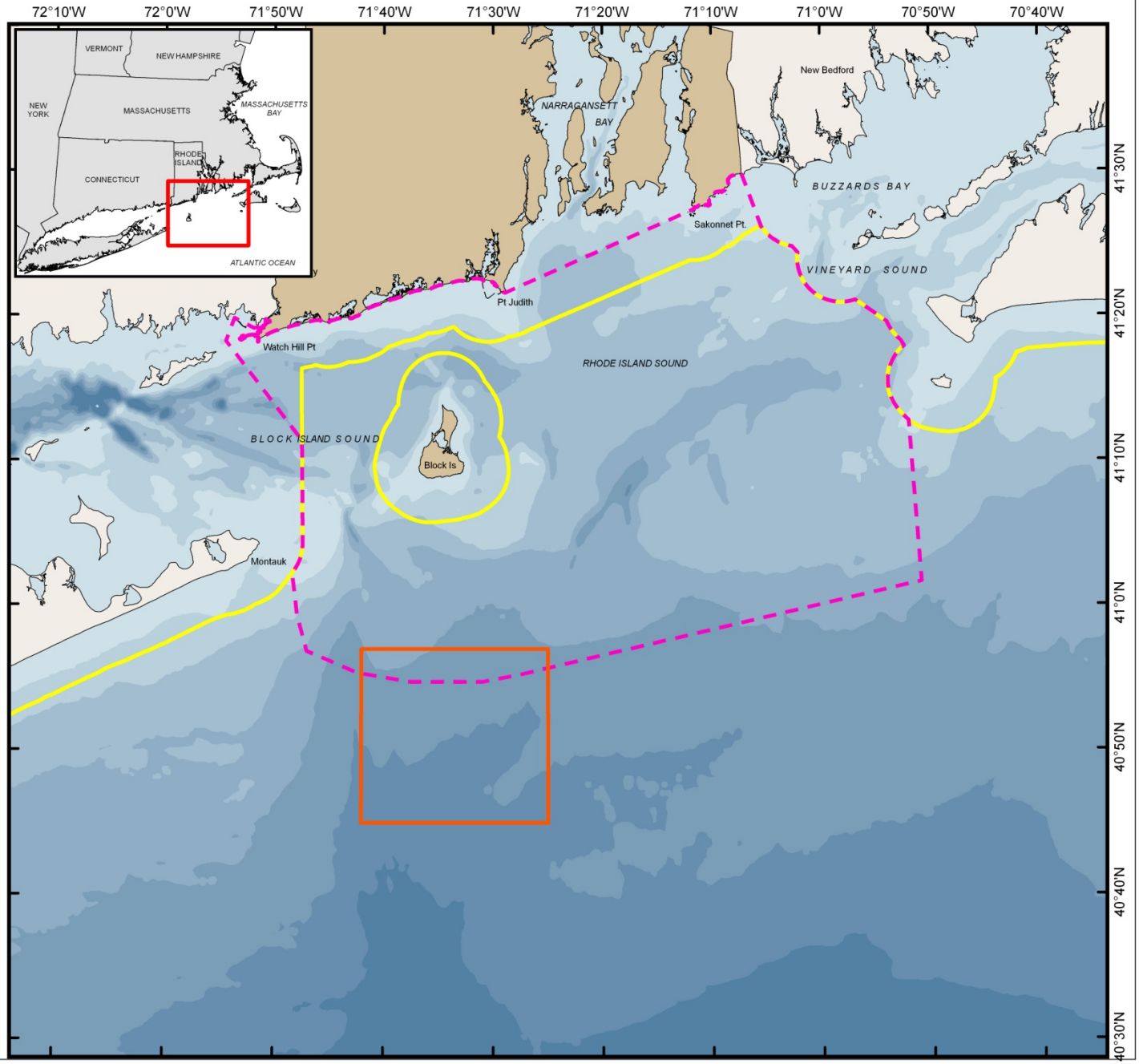

POINT JUDITH NECK
ANCHORAGE
RESERVATION AREA
NARRAGANSETT BAY TRAFFIC LANE INBOUND
PRECAUTIONARY AREA
0 0.5 1 1.5 2 Nautical Miles


FINAL_SAMP - Depth (m)
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
Great Salt Pond
MAHKEH
Grace Pt
STONE TOWER
Beacon Hill
Block Island
MICROWAVE TOWER
AERO Rot W&G
CHSP
CHY
Old Harbor Pt
Pilot Hill
Southeast Pt
BLOCK ISLAND SE
Fl G 5s 26ft 20M
HORN
Lewis Pt
West Pt
F G 27ft 11M
HORN
PRECAUTION
(see note 2)
0
1,500
3,000
6,000


GREAT SALT POND
BLOCK
Old Harbor
Grace Pt
Beacon Hill (200)
STONE TOWER
Doring Cove
Block Island
Block I State Airport
Old Harbor Pt
Southwest Pt
Dickens Pt
Lewis Pt
Black Rock Pt
Berlows Pt
Mohegan Bluffs
Southeast Pt
Black Rock
Whale Rock
REGULATED NAVIGATION AREA 165.153 (see note A)
NO-DISCHARGE ZONE (see note Z)
OLD HARBOR
The controlling depths were 14 feet for a mid-width of 130-100 feet in the Entrance Channel, 13 feet in the Inner Harbor, and 11½ feet in the Basin. Shoaling to 5 feet exists within 40 feet of the channel limits in the Inner Harbor and to 1½ feet within 10 feet of the channel limits in the Basin.
May 2007
BLOCK ISLAND SOUTHEAST LT
N


Grainsize
clay
finesilt
coarsesilt
veryfinesand
finesand
mediumsand
coarsesand
N
0
1,350
2,700
5,400

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

- Grays Harbor Proposed Site
- OceanSAMP Study Area
- State/Federal Waters Separation

Miles
0 5

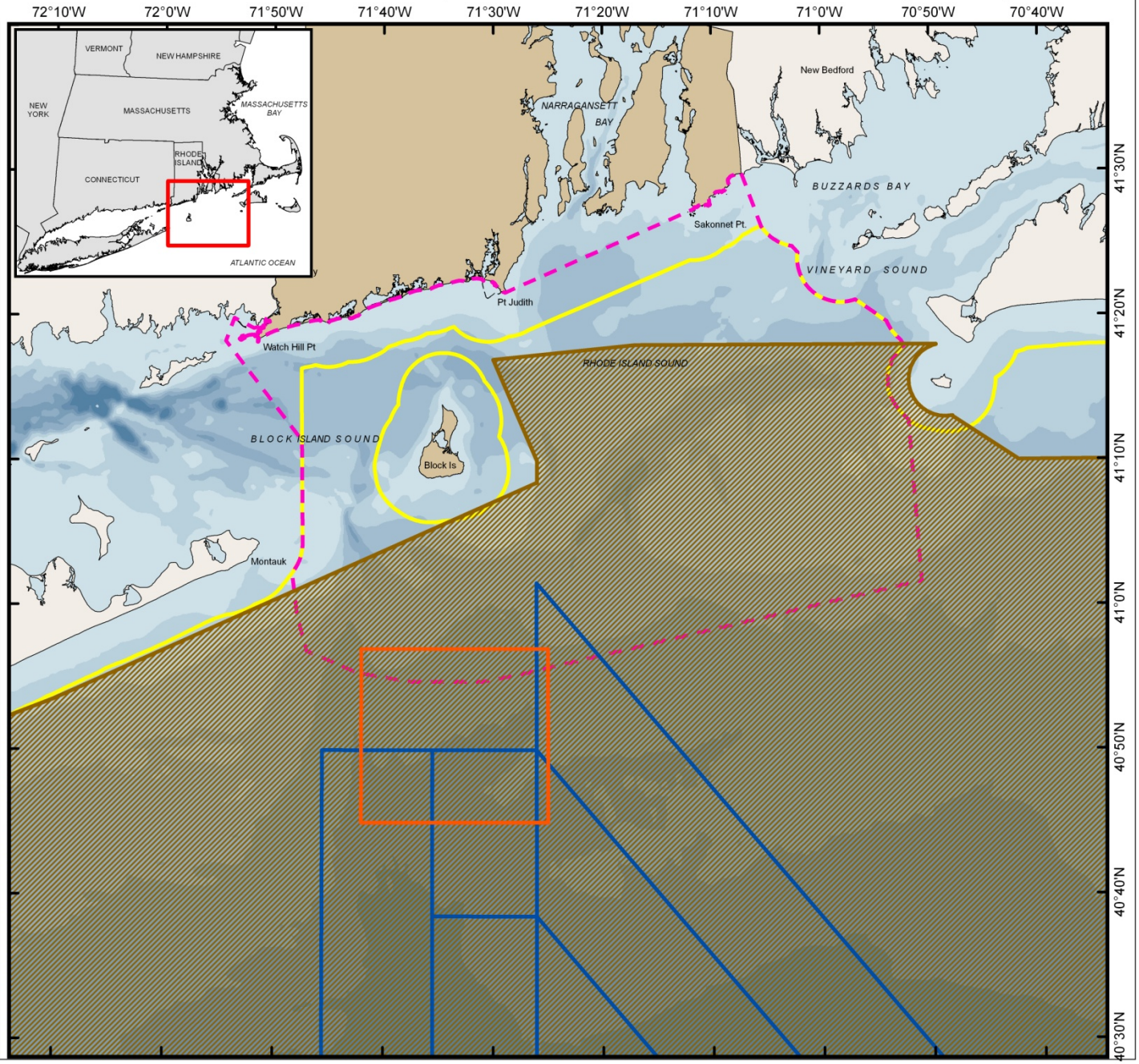
Kilometers
0 5 10 15

Coordinate System:
Projection: RI Stateplane
Units: Feet
FIPS Zone: 3800
Datum: NAD83

For Project Background Information:
http://seagrant.gso.uri.edu/oceansamp

For Project Map and Data Products:
http://www.narrbay.org/d_projects/oceansamp

Rhode Island Ocean Special Area Management Plan (SAMP)



Map Key

- Grays Harbor Proposed Site
- Navy Op Area Sub Lanes
- Navy Op Area Narragansett
- OceanSAMP Study Area
- State/Federal Waters Separation

N

Miles
0 5

Kilometers
0 5 10 15

Coordinate System:
Projection: RI Stateplane
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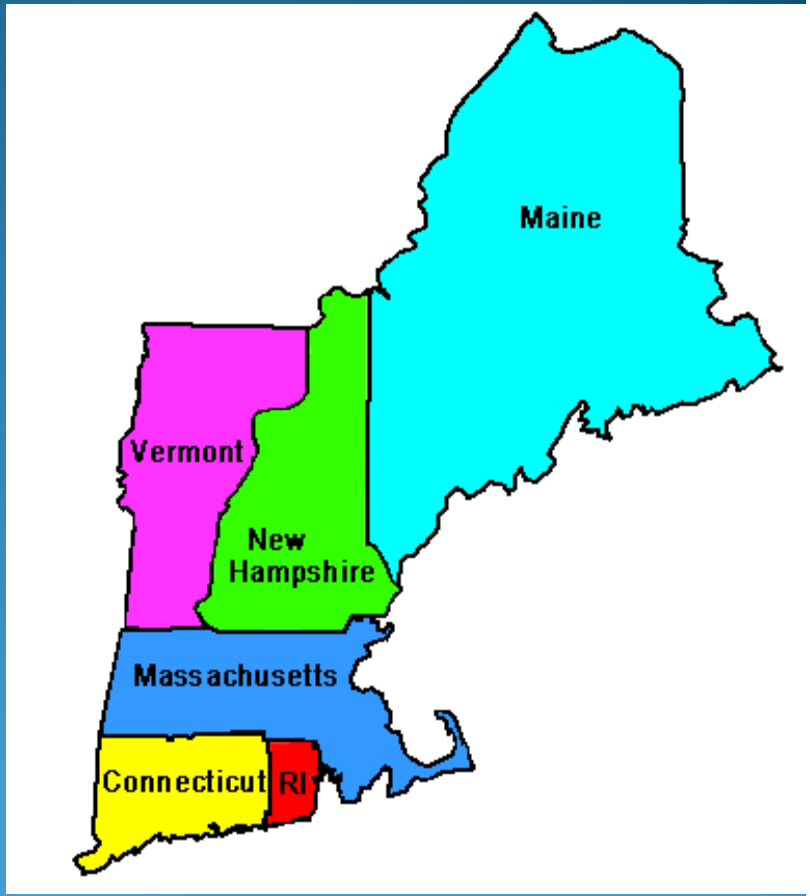
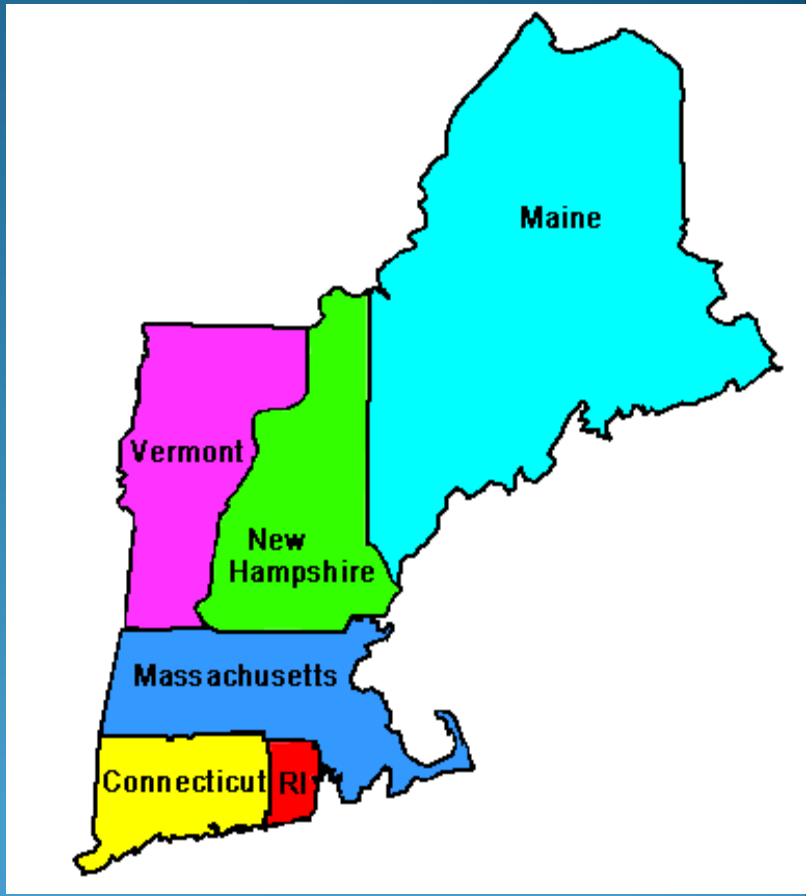
OCEAN samp CRMC

Northeast Regional Ocean Council

Organic Planning
Regional Framework
State Differences
Federal Imperative
Coordinated Framework
Regulatory Efficiencies
Incorporate State Efforts into Federal Program
Established Standards for NEPA
Data Sets Should be Standardized
Major Impacts Understood
Improved Accessibility to Data-VMS



Northeast Regional Ocean Council

-Regional Framework-

Decision Support Tools Regional Scale
One Stop for Information and Regulatory
Share Solutions
Build Capacity
Coordination of Regional Funds