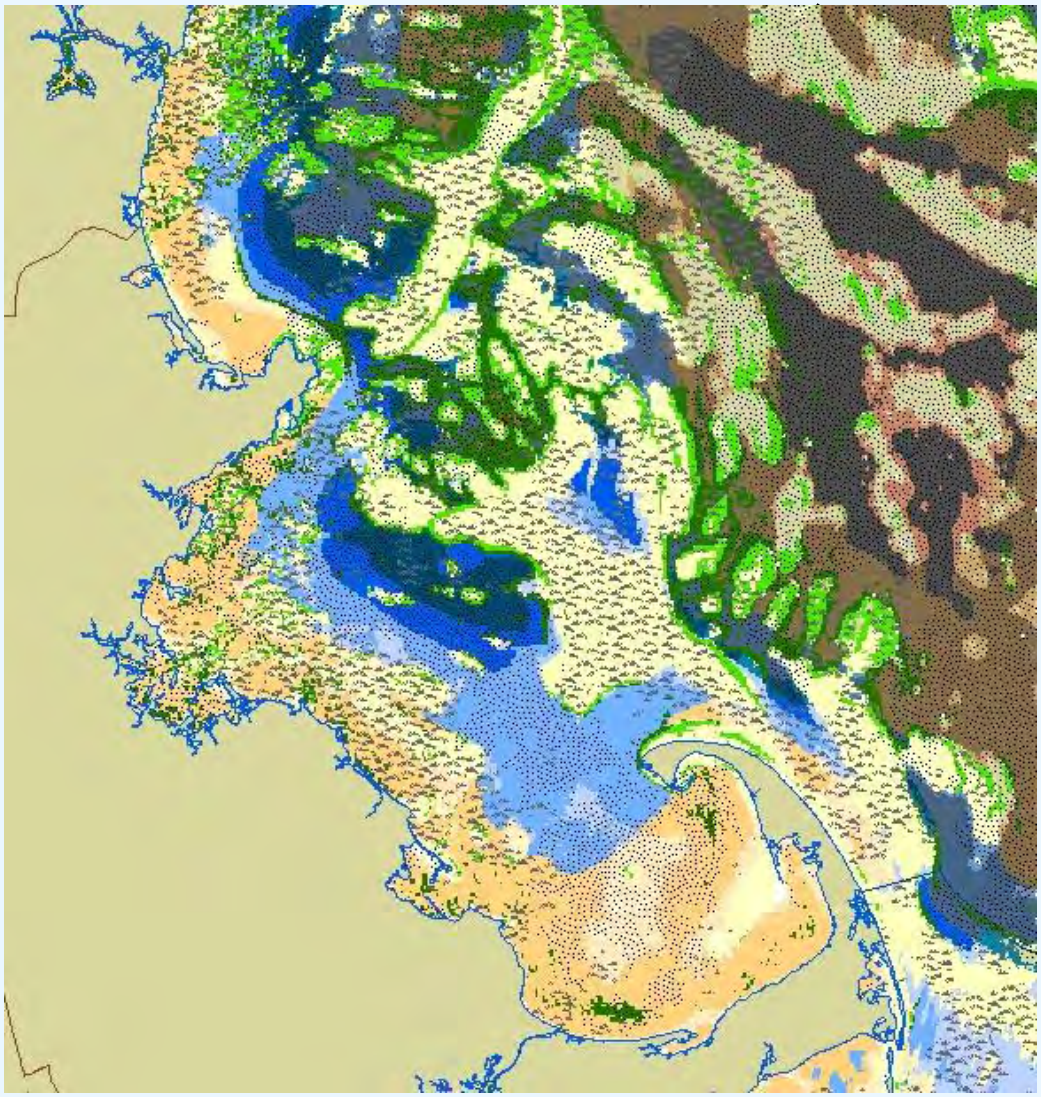
Seafloor: Identifying the best examples

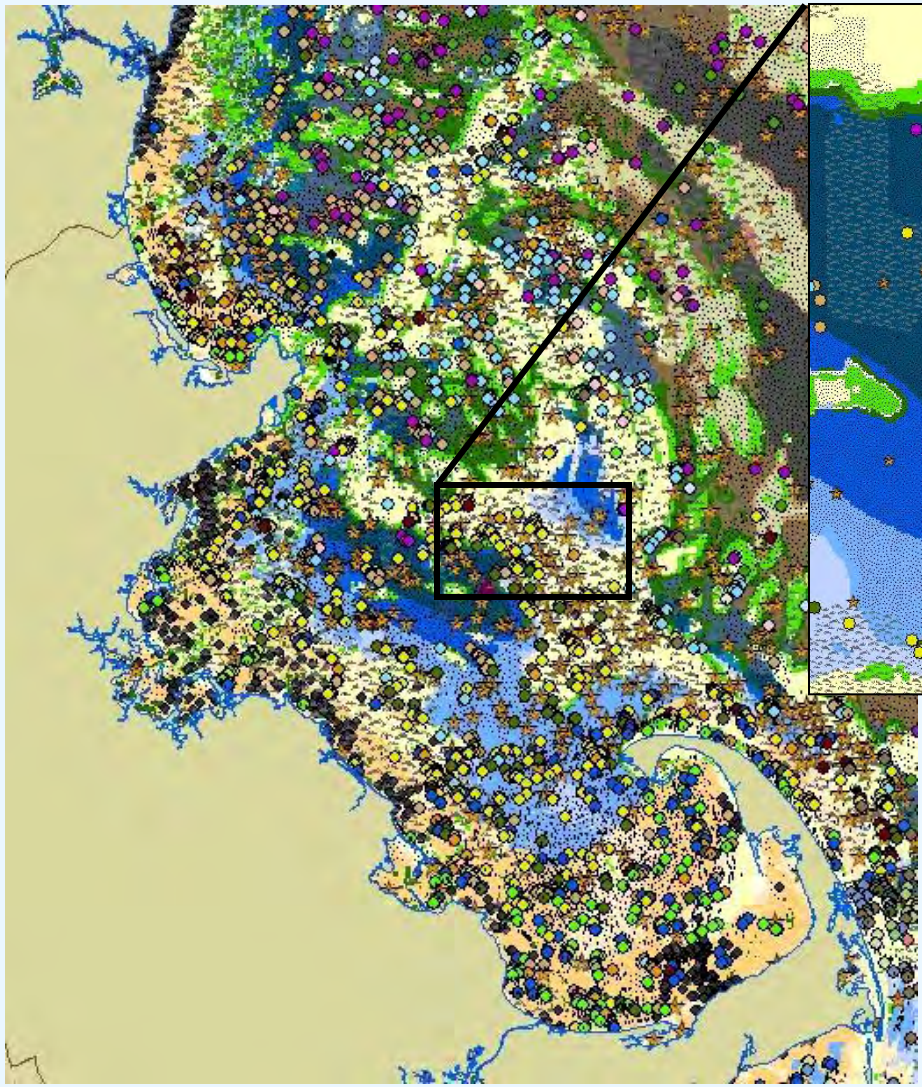


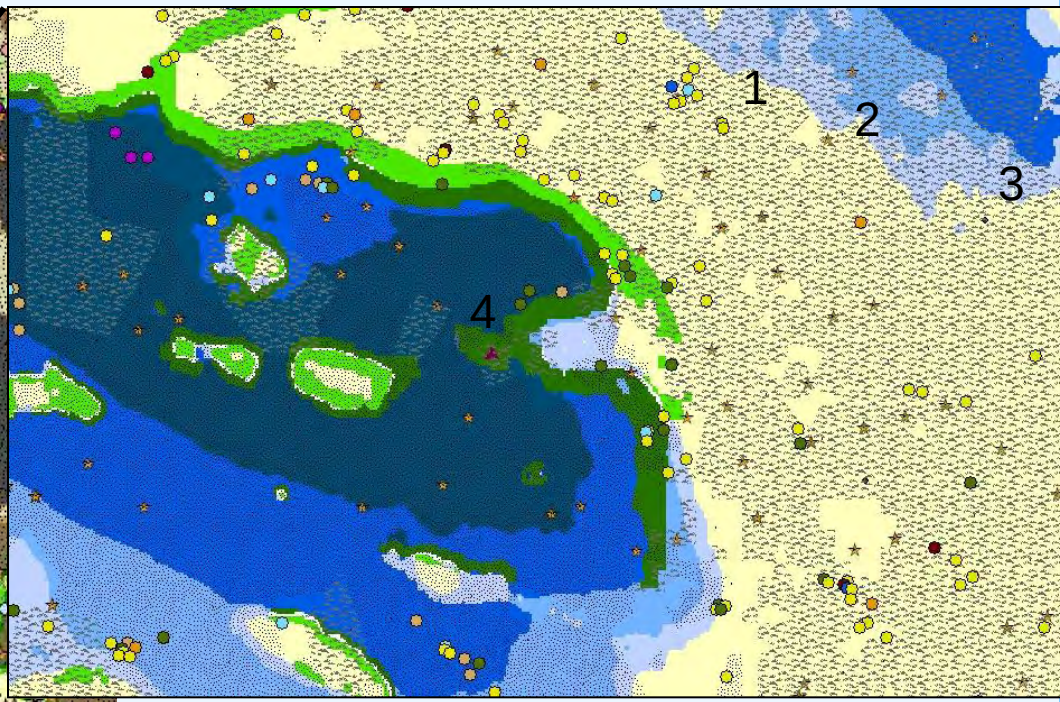
How do we measure the impact of a feature on marine diversity?

What biota does it contain?

Is this a good place for the species and communities?

Seafloor: Corroborating points





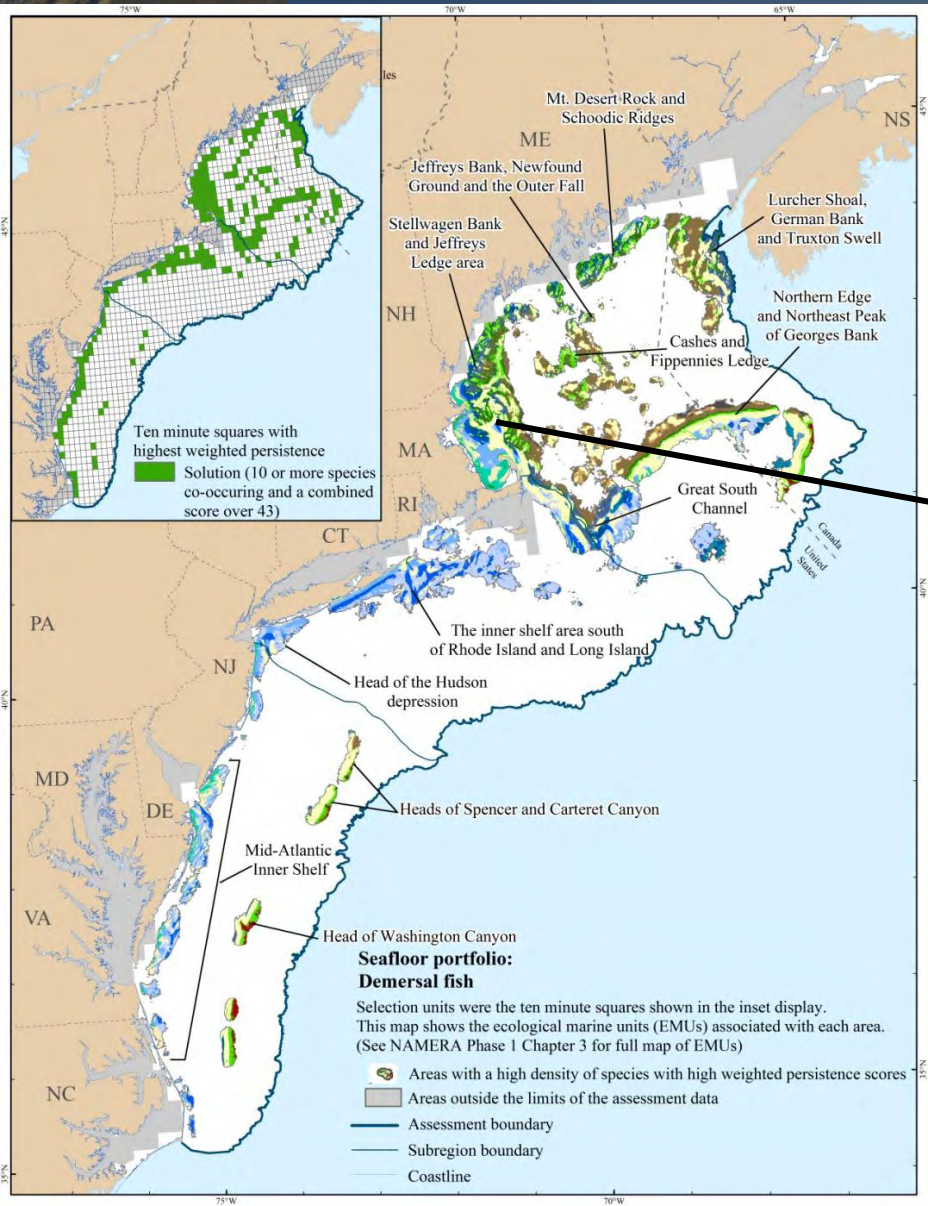
1) Fish trawl survey points
   -communities and targets
2) Benthic grab samples
   -communities
3) Hard bottom points
4) Corals

Seafloor: Six Criteria

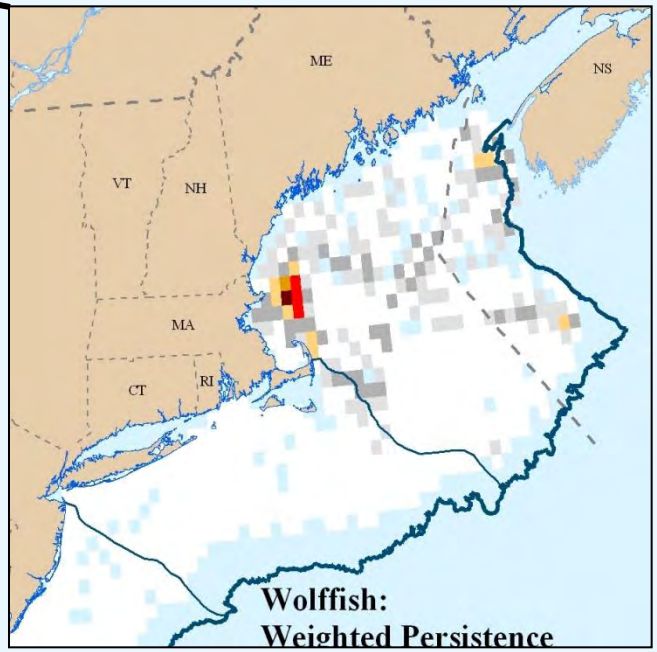
- Persistence of demersal fish species
- Diverse demersal fish communities
- Corals and canyons
- Hard bottoms
- Seagrass
- Benthic habitats

* relative to the community type

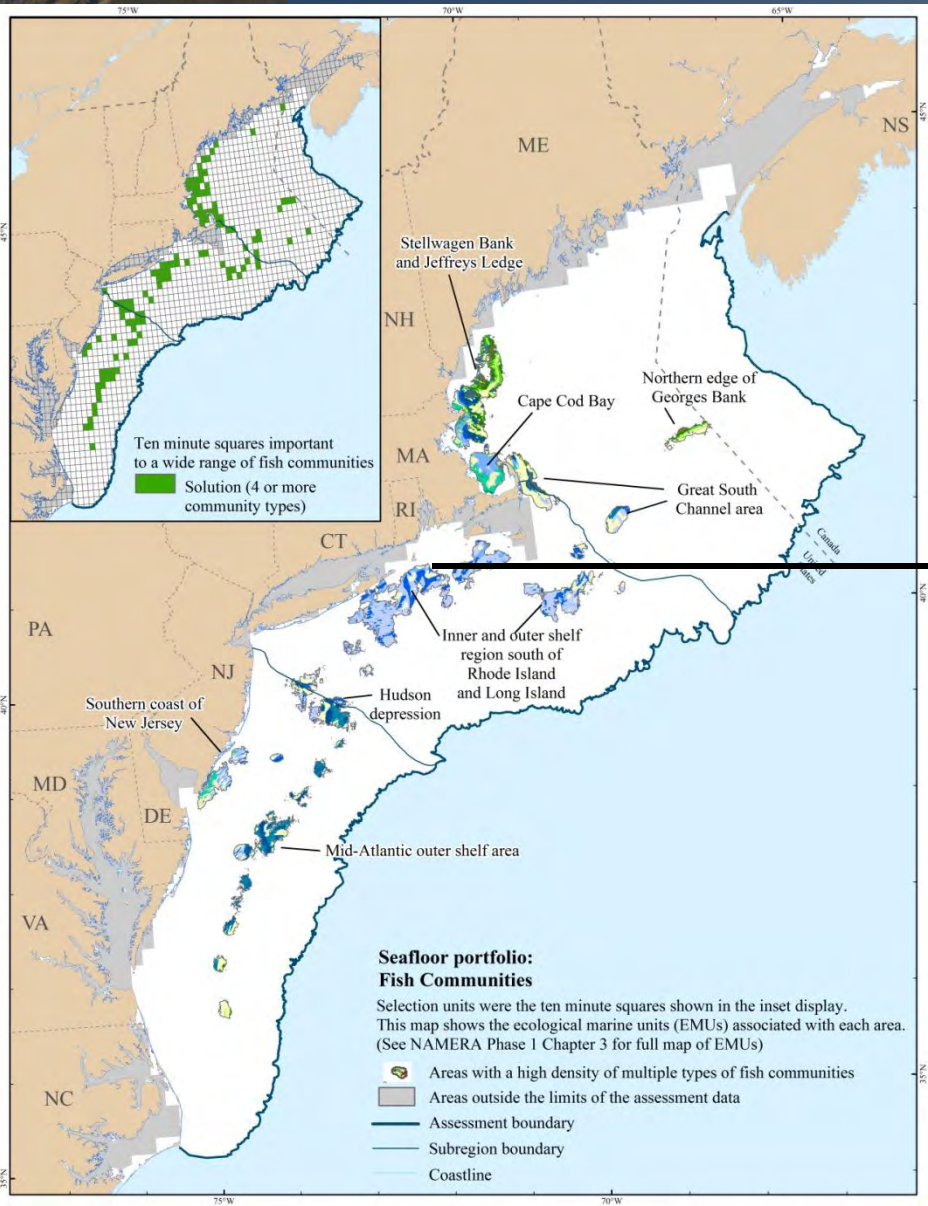
Seafloor: Demersal fishes (32 species)



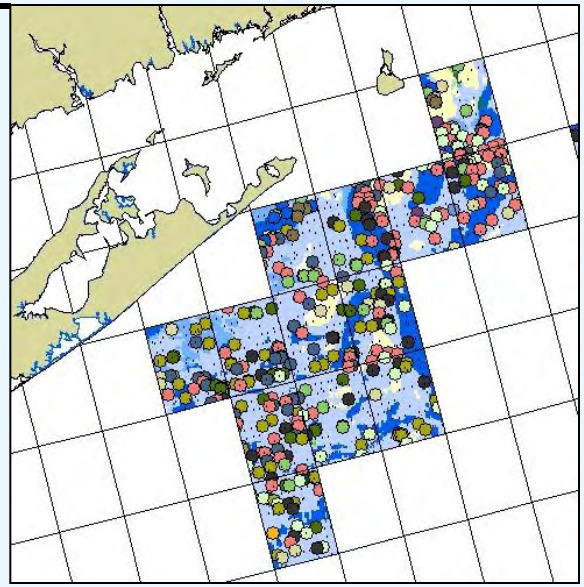
- Each target species has been consistently found in the square for 3 to 4 decades
- At least 10 species



Seafloor: Bottom-dwelling Fish Communities

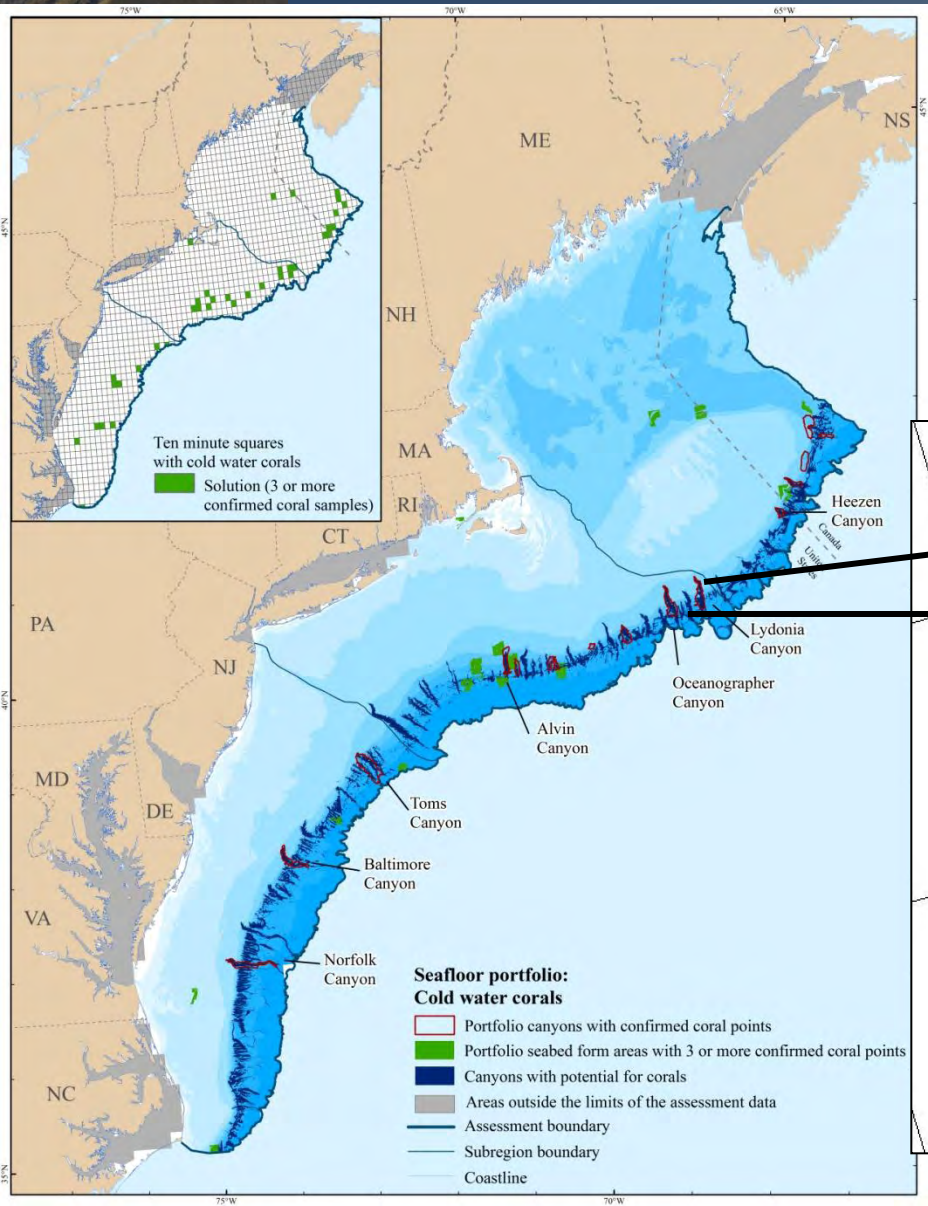


- 3 to 5 years of samples (depauperate examples excluded*)
- Over 4 fish communities in the square

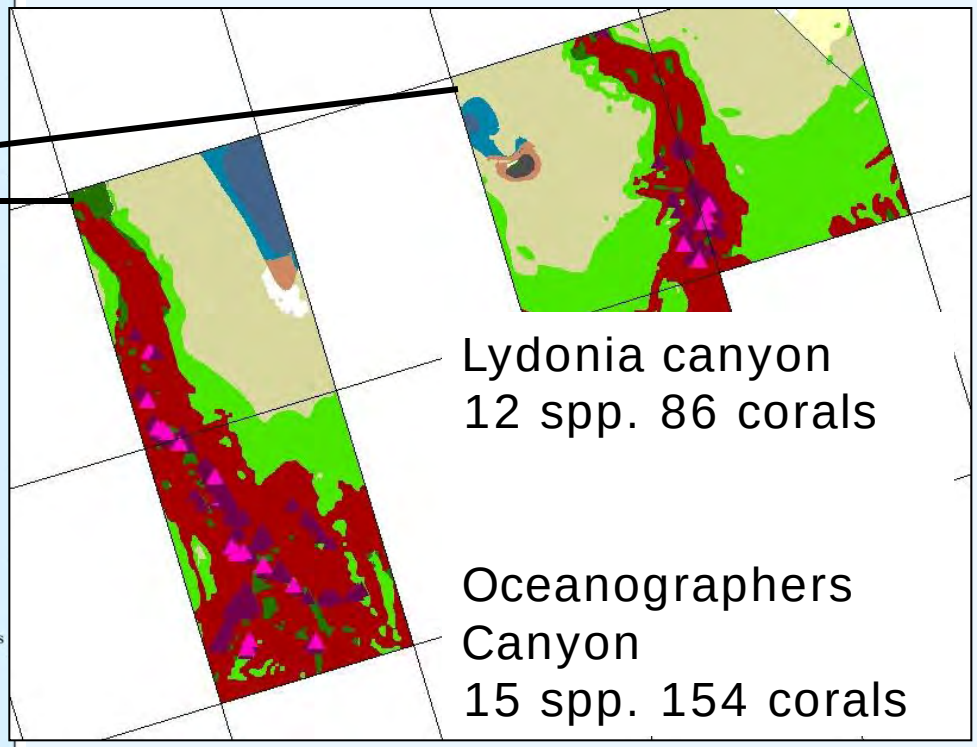


* relative to the community type

Seafloor: Corals and Canyons



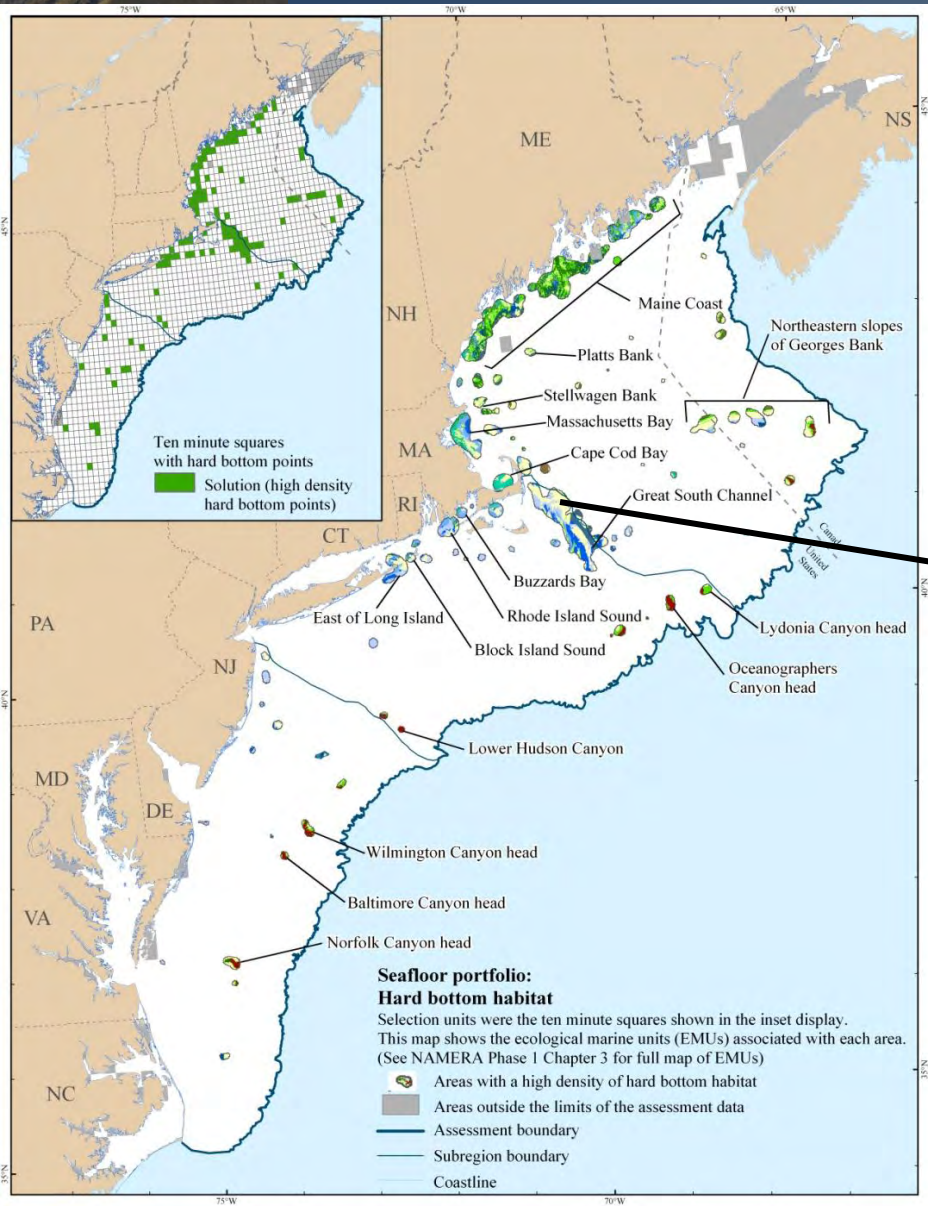
- Over 3 confirmed corals
- Multiple species a plus



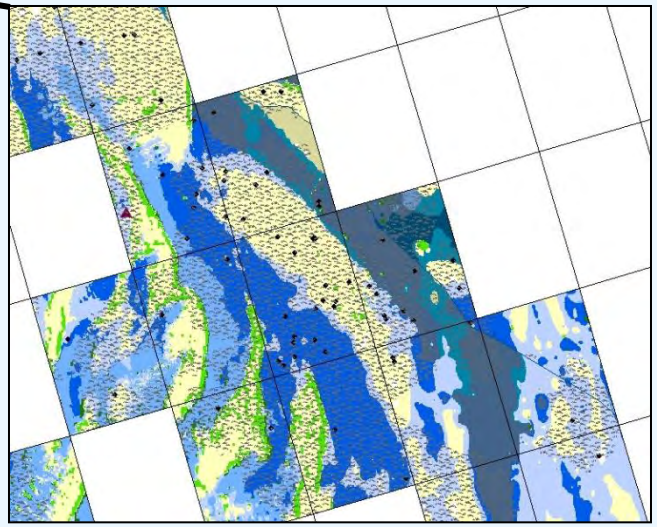
Lydonia canyon
12 spp. 86 corals

Oceanographers
Canyon
15 spp. 154 corals

Seafloor: Hard Bottoms (fine-scale structure)

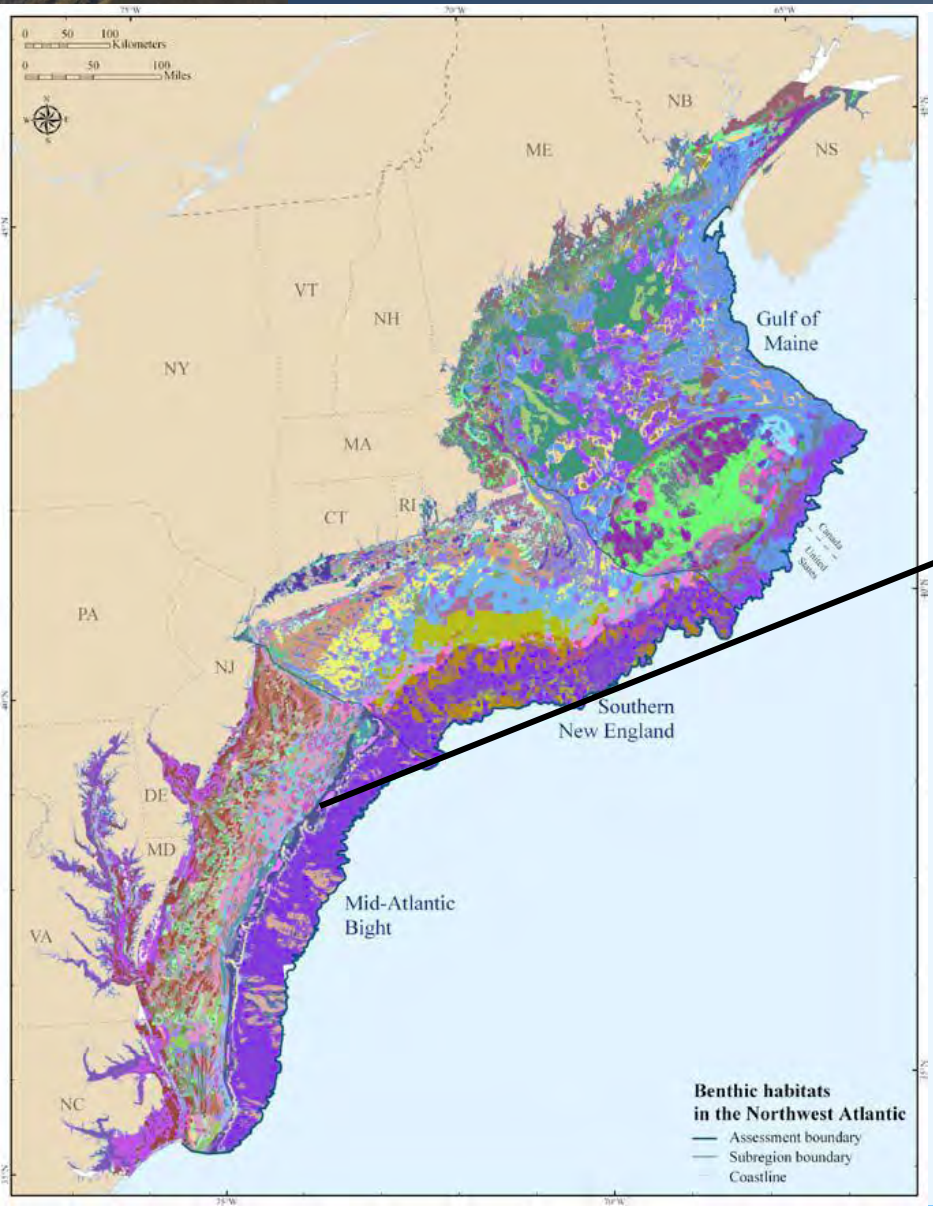


- High densities of hard bottom points
- Reflects ecological differences

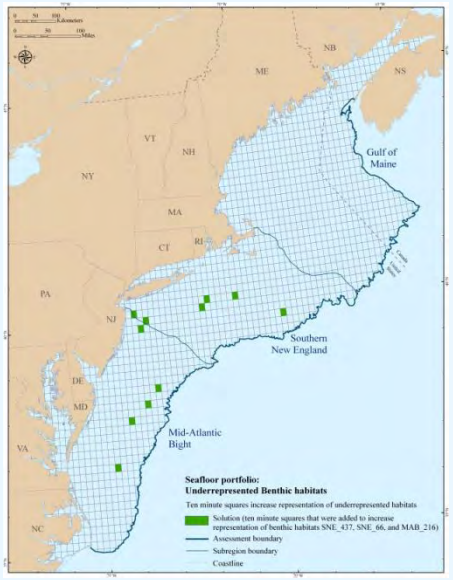


Southeast channel

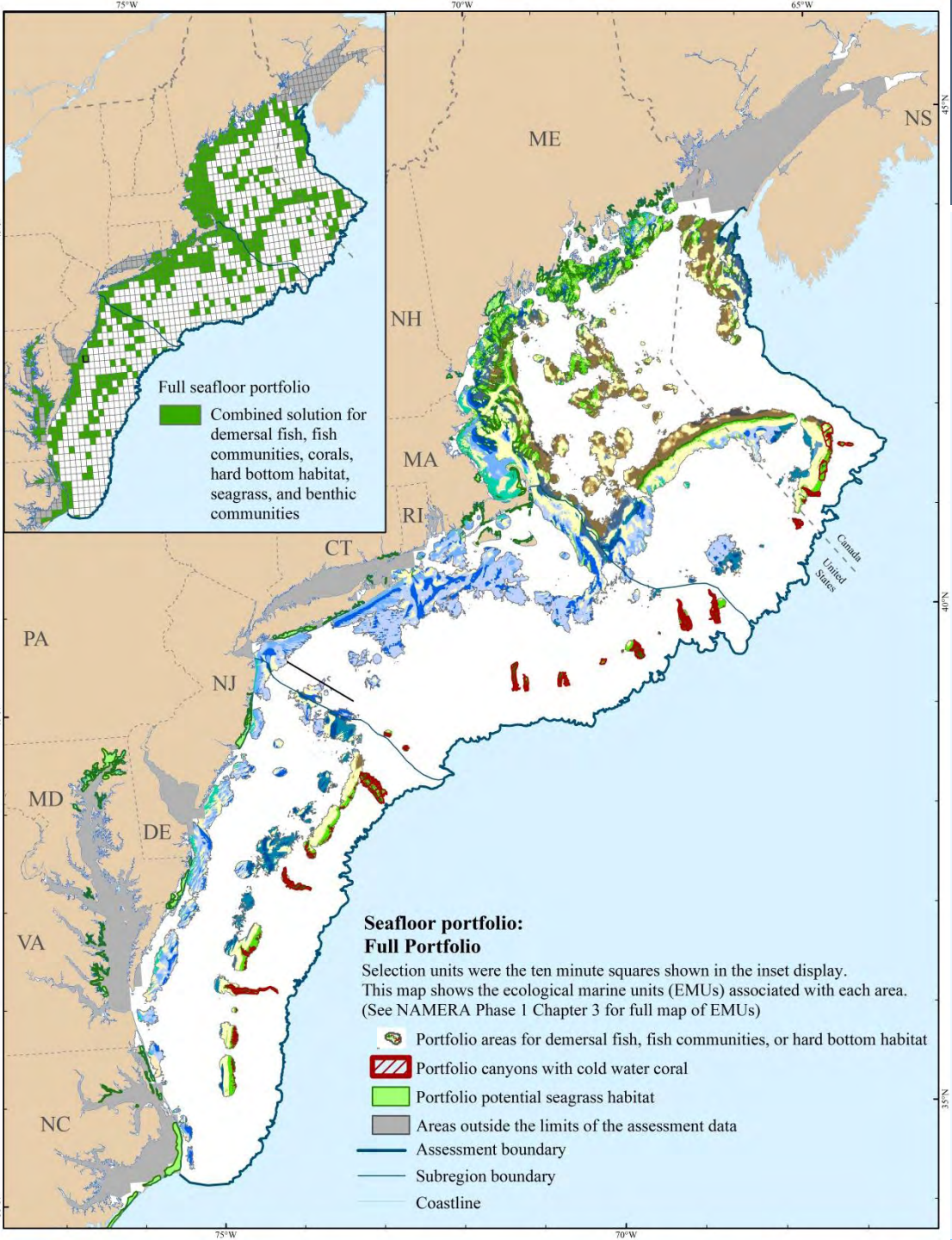
Seafloor: Benthic Communities



- Under-represented habitats. < 10%
- MAB_216 (high slopes in deep water)



Seafloor Portfolio: Key areas for Benthic Diversity



- Grand Manan Bank
- Mass Bay/Stellwagen
- Southeast Channel
- Western Georges Bank
- RI Sound, Nantucket Shoals
- Coxes Ledge area
- Hudson Canyon
- Coast from Long Island to Pamlico
- Shelf/slope break

Migratory Theme

Right whale

Bottlenose dolphin

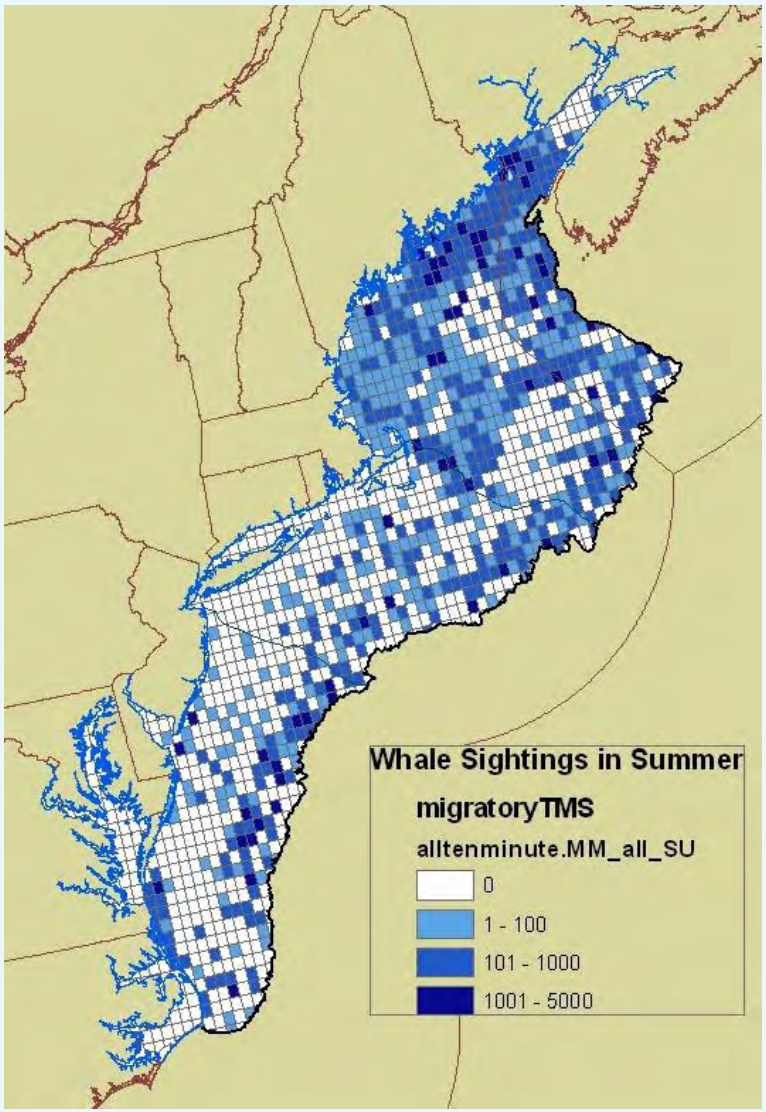
Humpback whale

Migratory Species: Six Criteria

- Baleen Whales and Northern Dolphins
- Toothed Whales
- Large Pelagic Fish
- Sea Turtles
- Small Pelagic (forage) Fish*

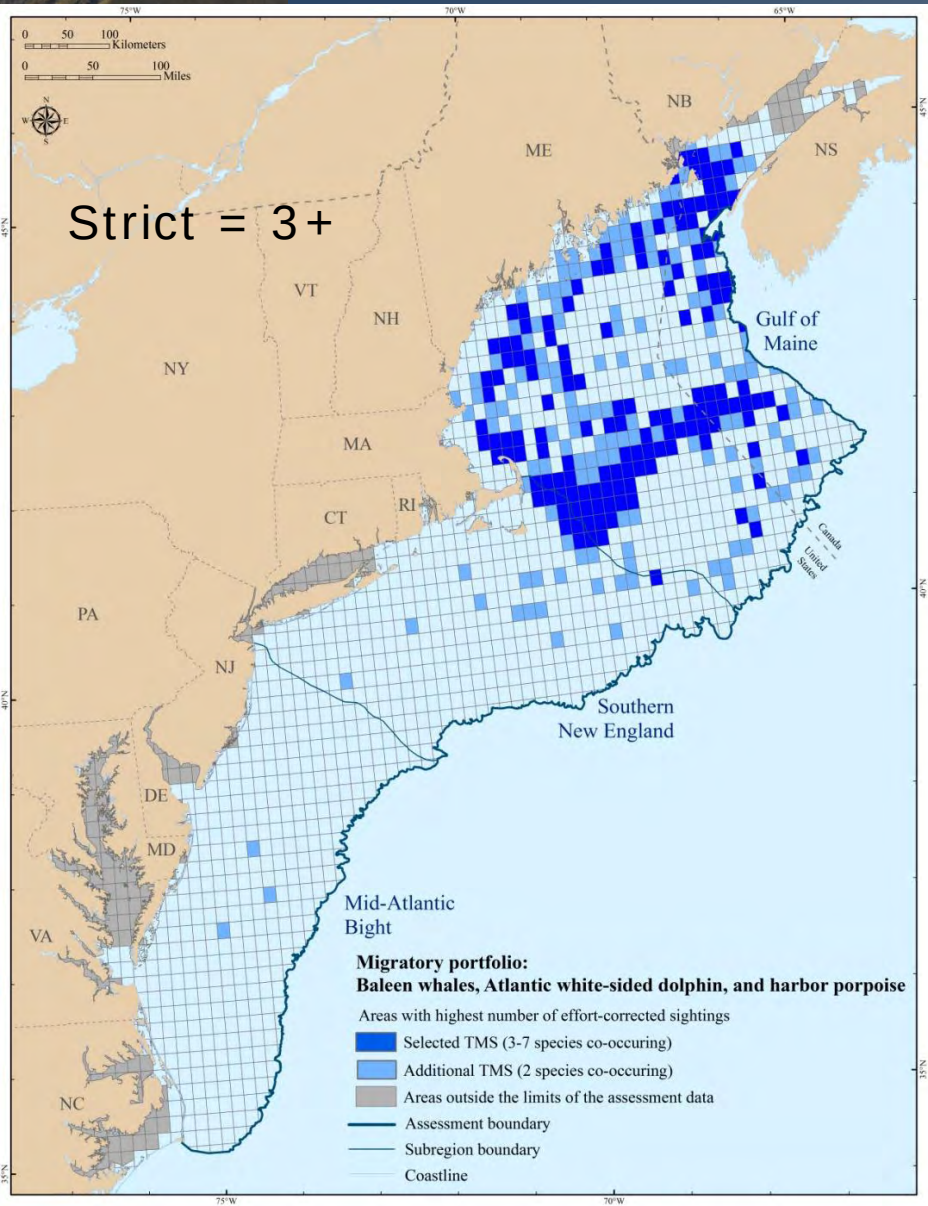
* Used only indirectly

Marine Mammals



- 17 Species of whales and dolphins
- Based on 30+ years of sightings data corrected for effort
- How do you pare this down to the key areas?

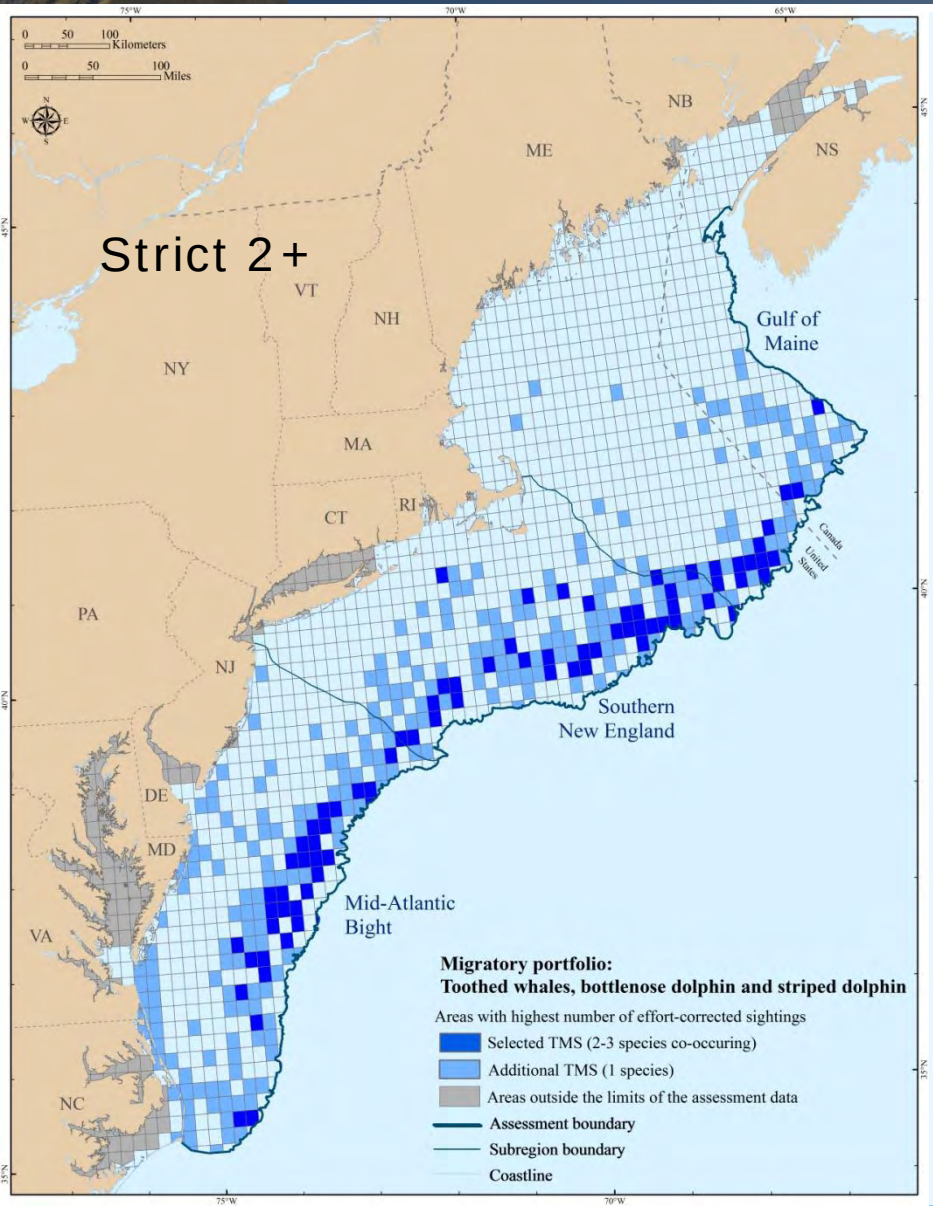
Baleen Whales and N. Dolphins: 14 Species



Number of observations way above average (>2.5 Std)

- Humpback whale
- Minke whale
- North Atlantic Right whale
- Sei whale
- Fin whale
- Atlantic white-sided dolphin
- Harbor porpoise

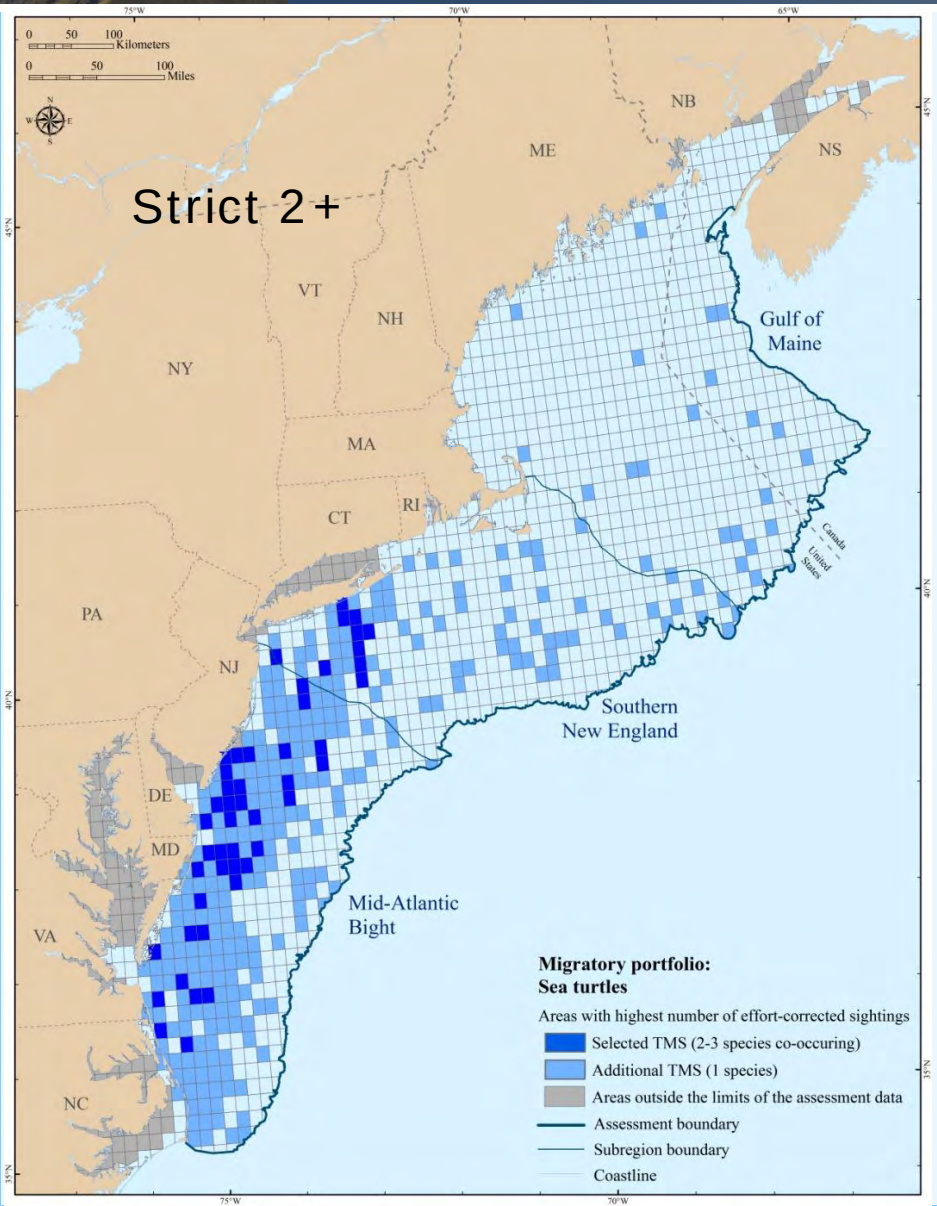
Toothed Whales and Dolphins: 3 Species



Number of observations way above average (>2.5 Std)

- Sperm Whale
- Bottlenose Dolphin
- Striped Dolphin

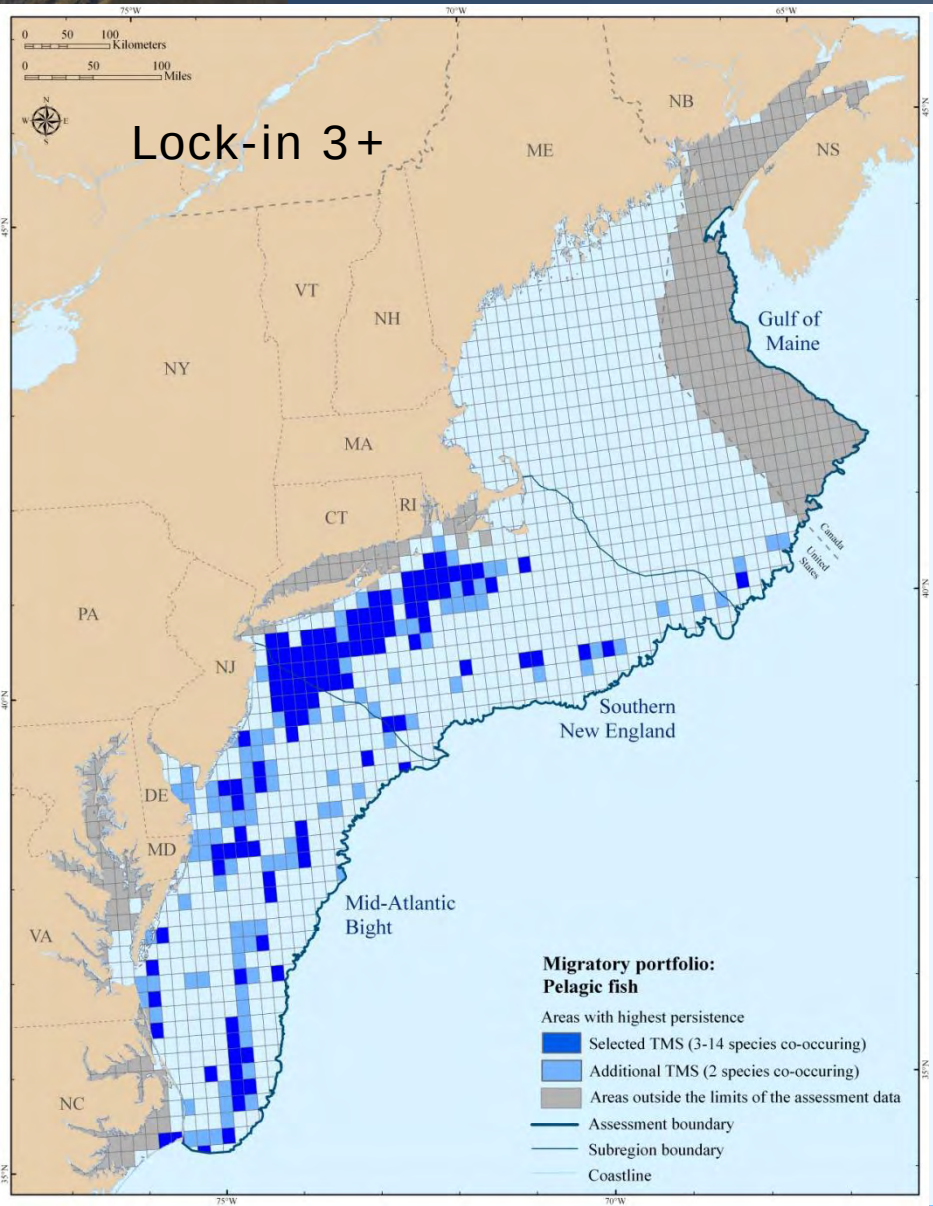
Sea Turtles: 3 Species



Observations 2 SD above the mean

- Green sea turtles
- Leatherback turtle
- Loggerhead turtle

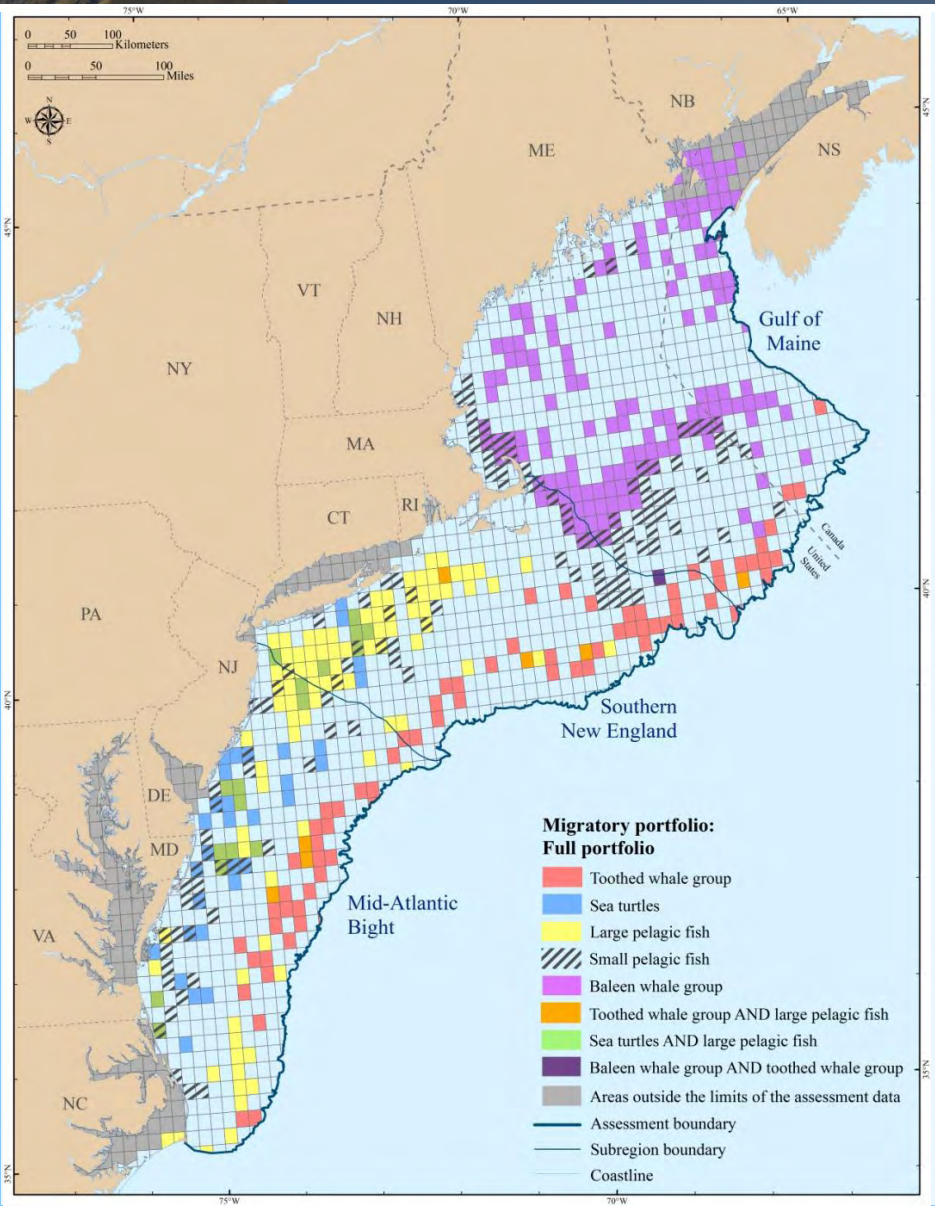
Large Pelagics: 14 Species



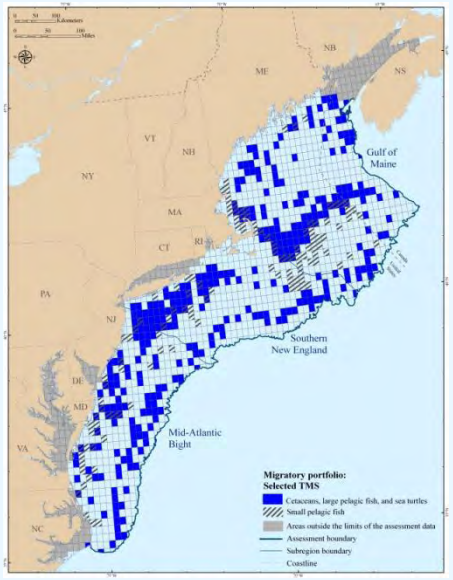
Persistence across 3 or 4 decades

- Albacore Tuna
- Bigeye Thresher
- Blue Marlin
- Bluefin Tuna
- Dusky shark
- Great Hammerhead*
- Porbeagle
- Sandbar shark
- Sandtiger
- Shortfin Mako
- Swordfish
- Thresher
- White Marlin
- Scalloped Hammerhead

All Highly Migratory Species

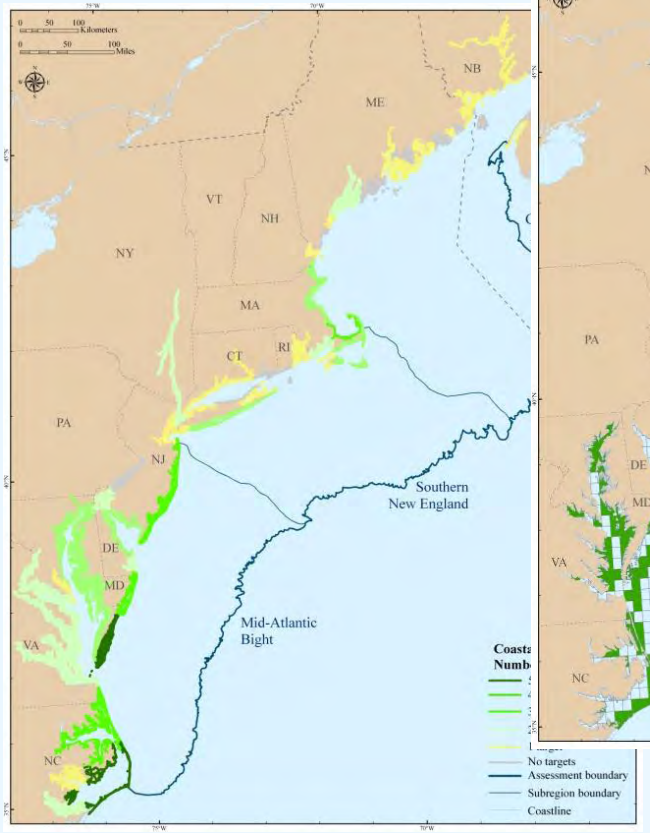


- Large Pelagics
- Baleen Whales
- Toothed Whales
- Sea Turtles
- Small Pelagics

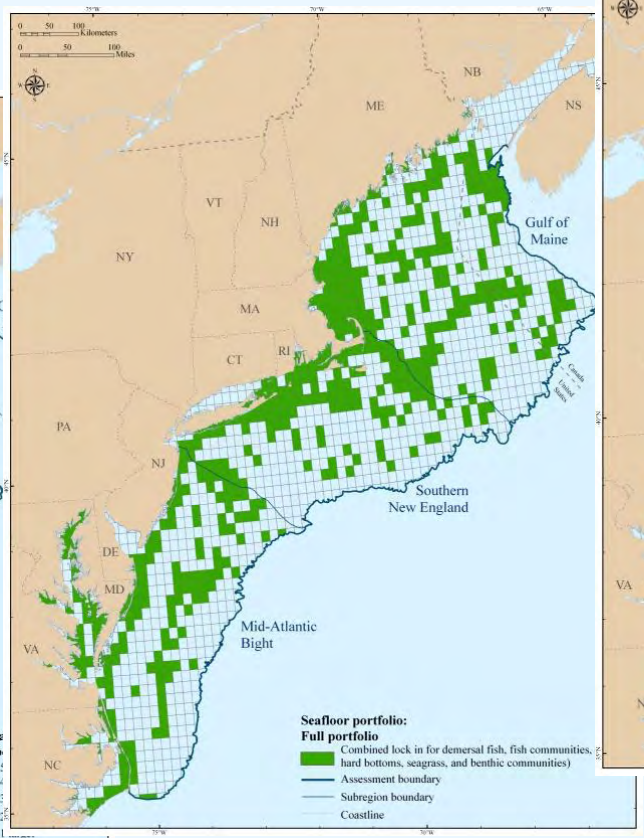


Integration

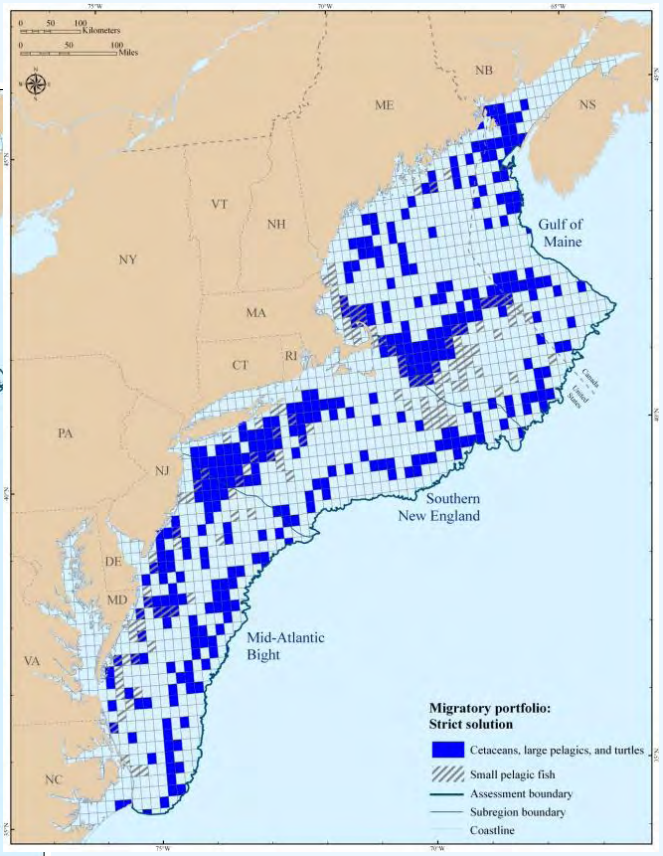
Coastal



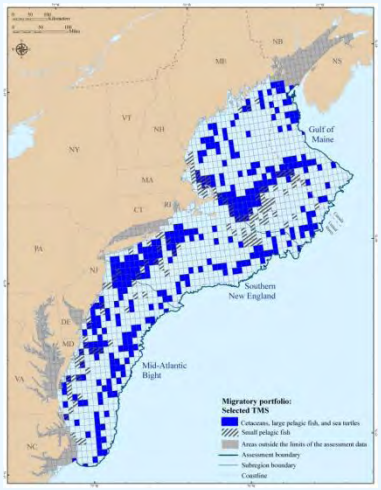
Seafloor



Migratory

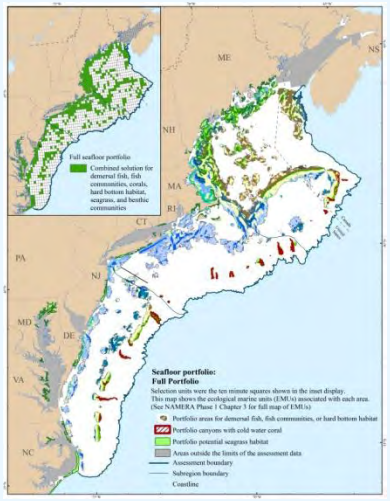


Integrated Portfolio

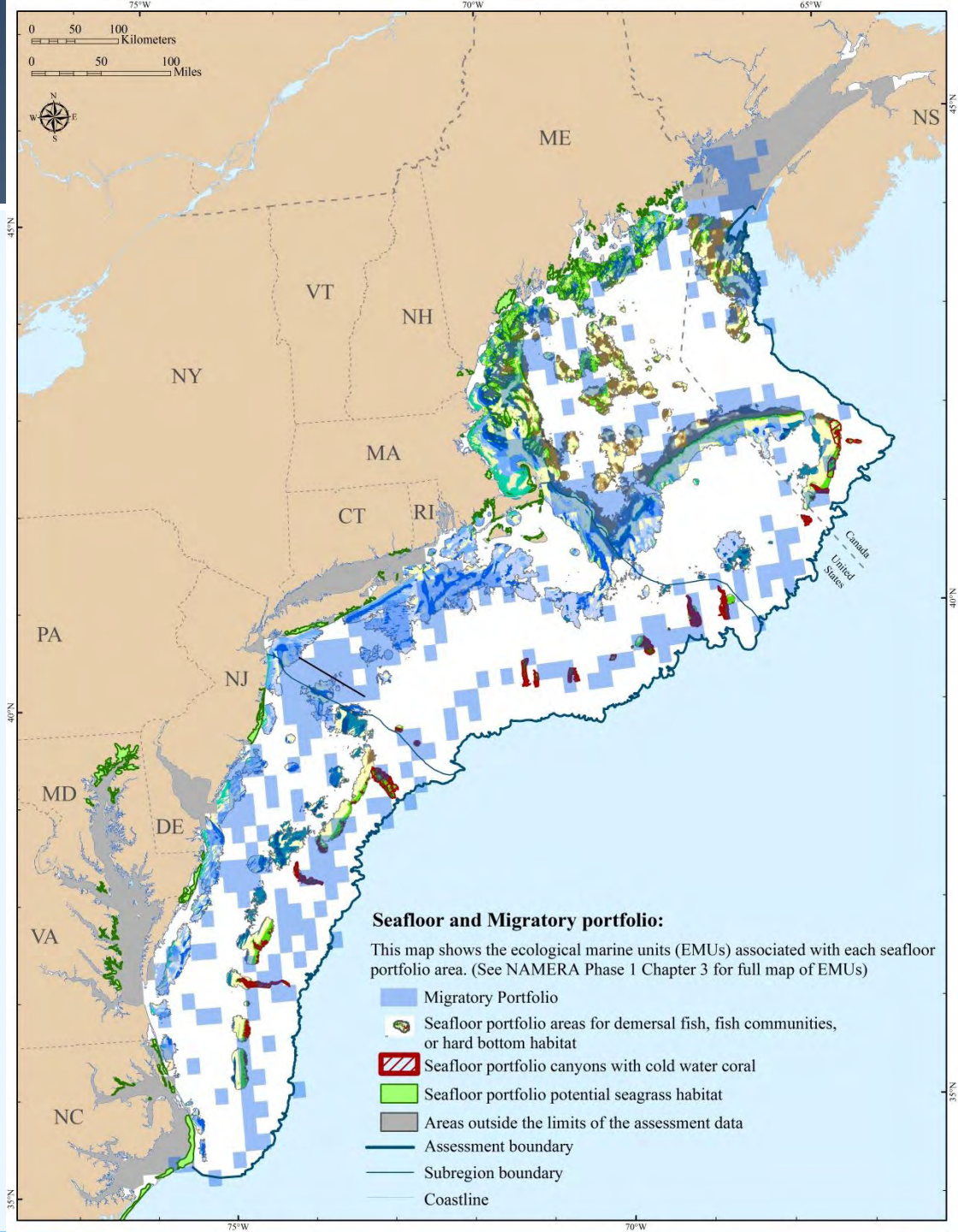


Migratory

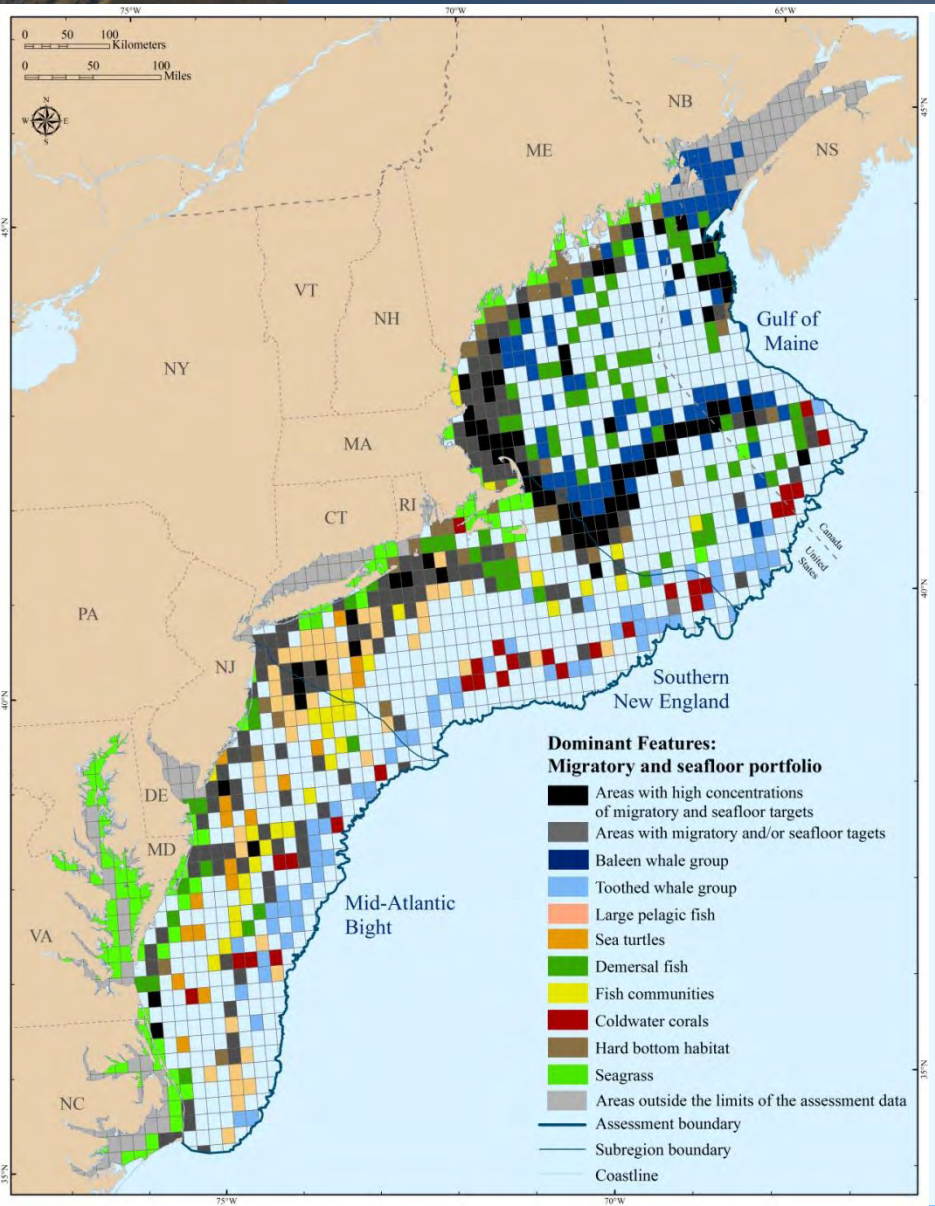
+

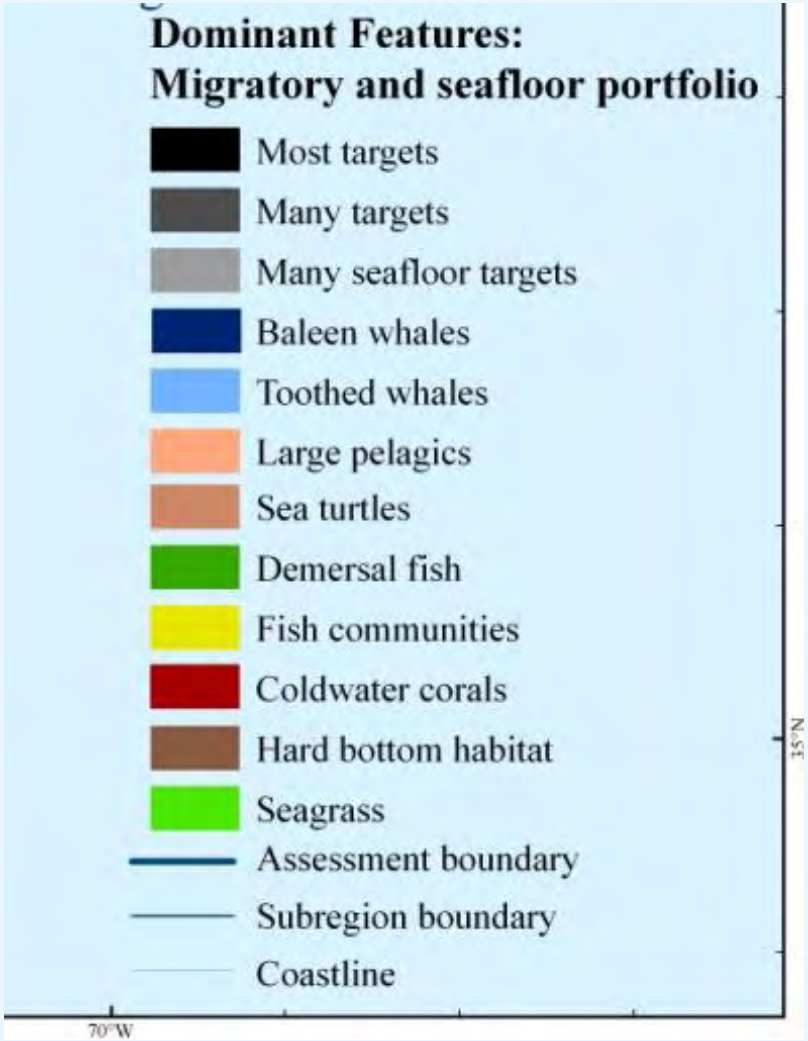


Seafloor

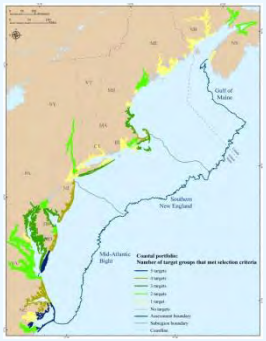


Seafloor + Migratory Portfolio



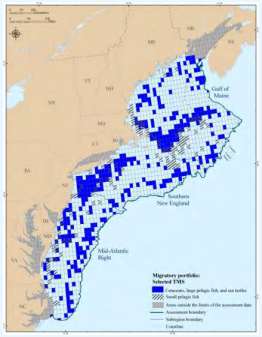


Integrated Portfolio



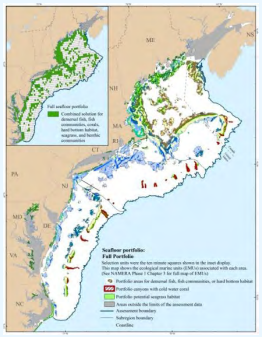
Coastal

+

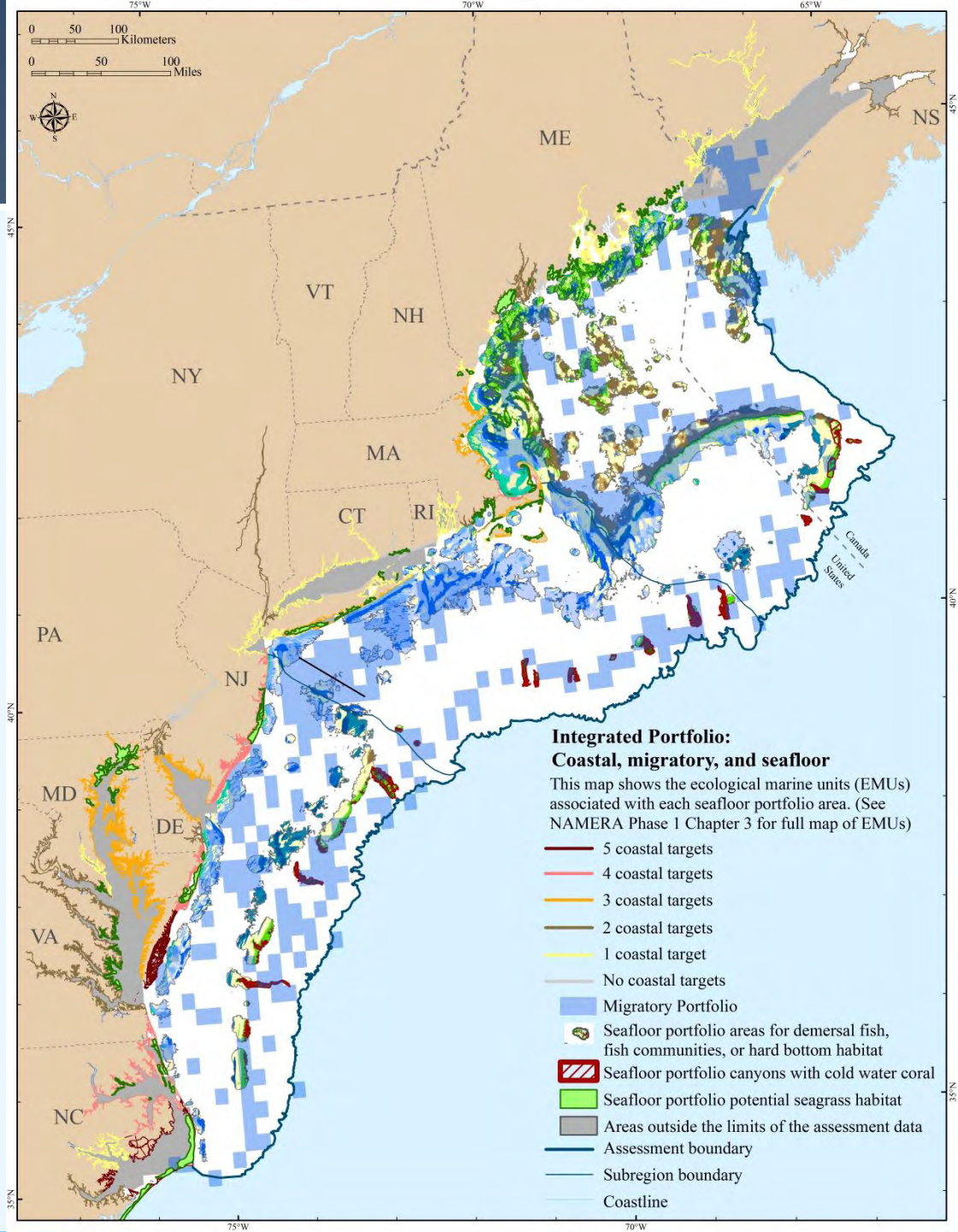


Migratory

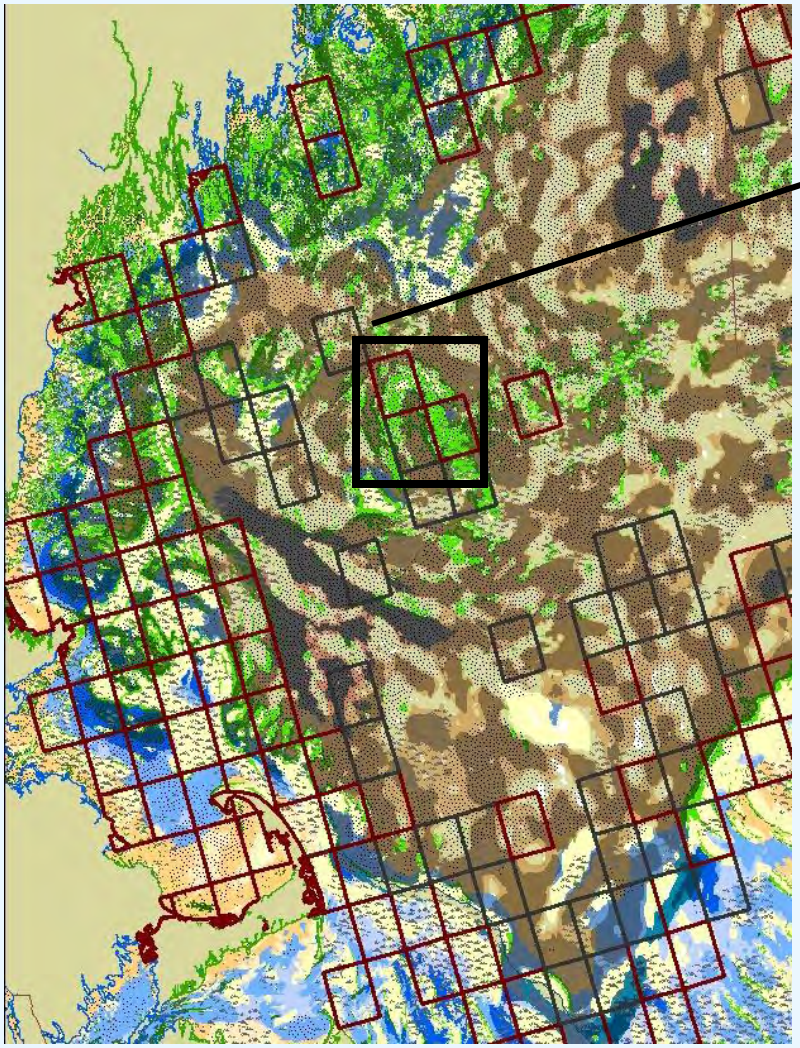
+



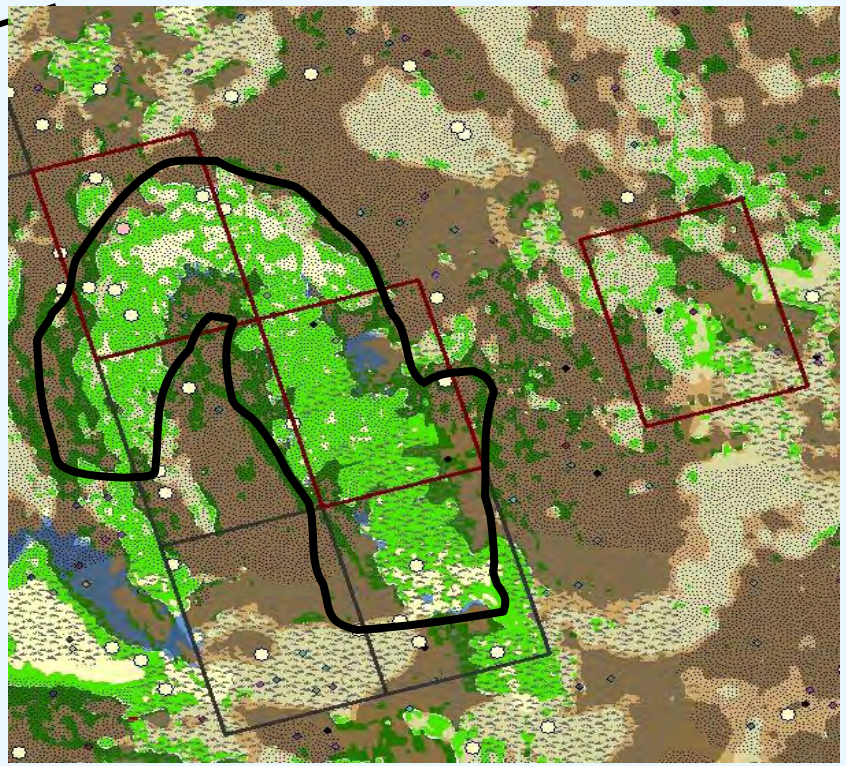
Seafloor



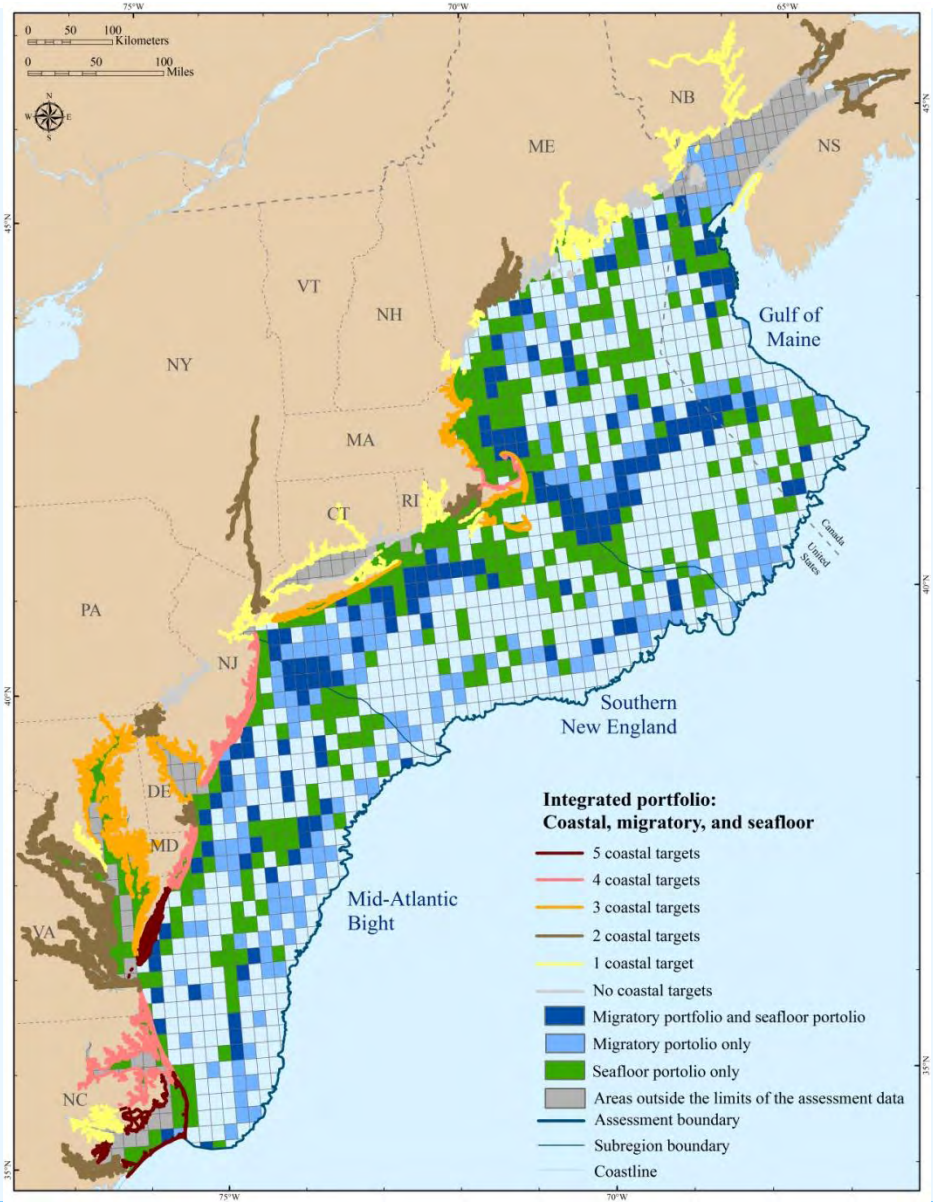
Next Steps: Example for Gulf of Maine

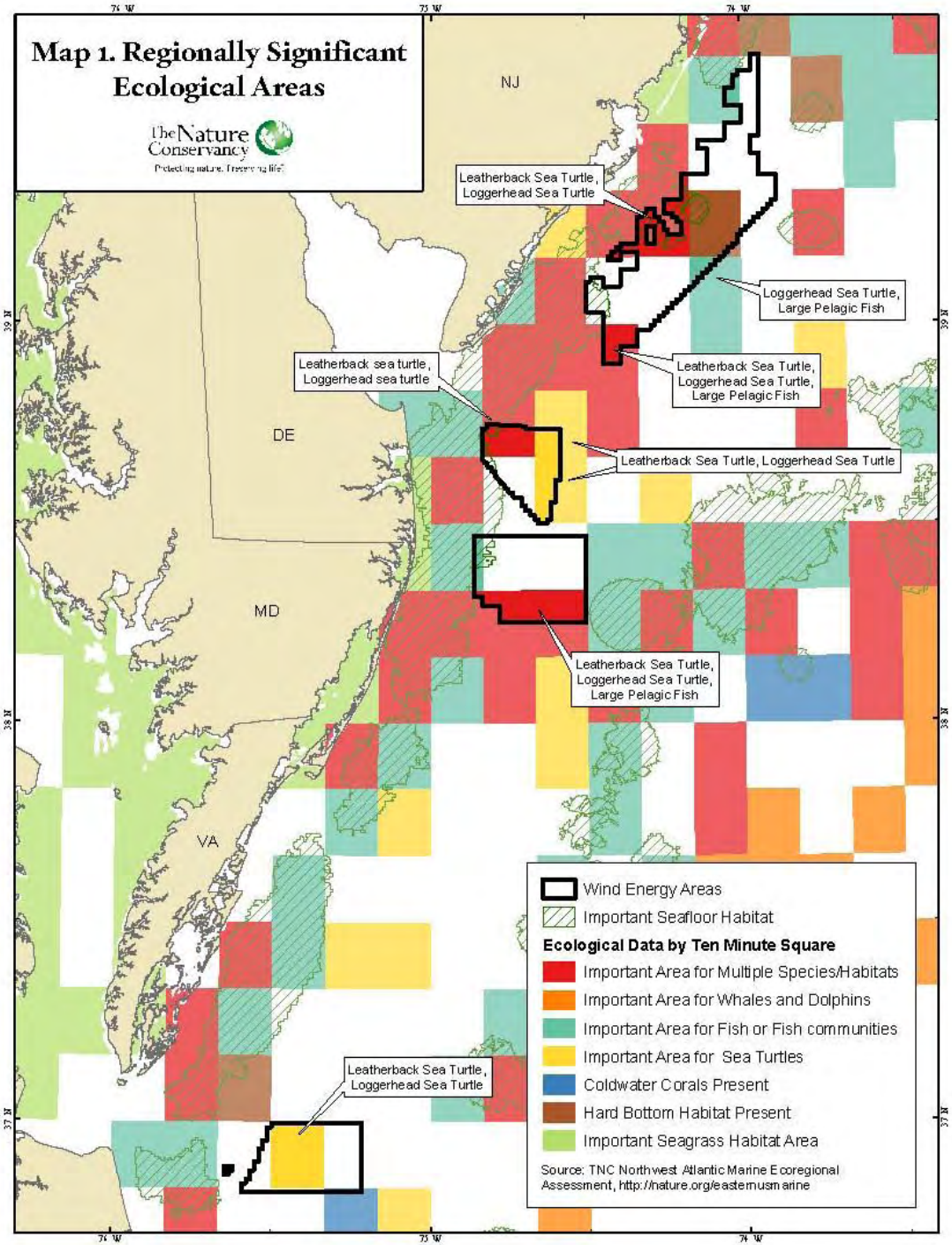


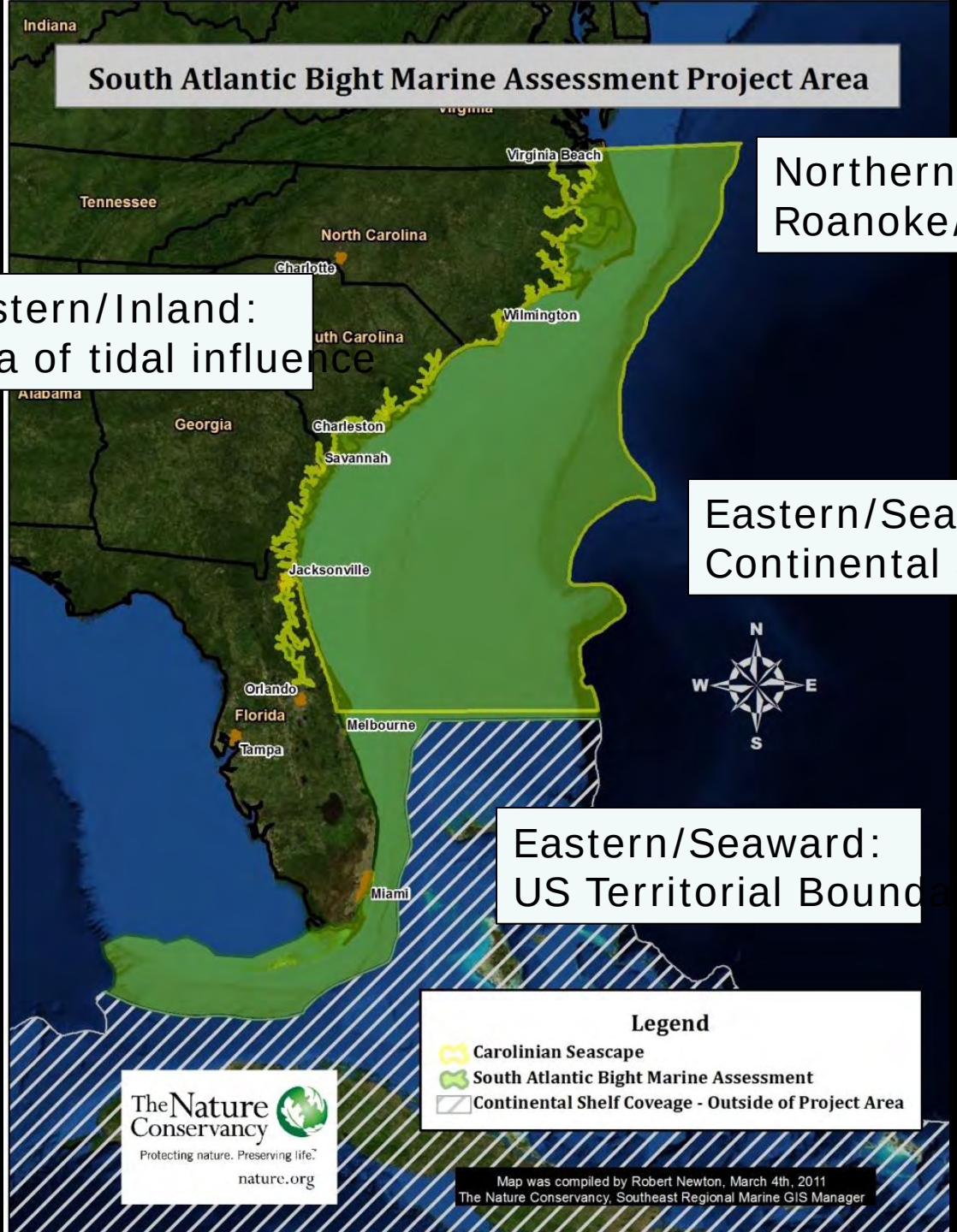
Site design: Cashes Ledge



Integrated Portfolio




Map 1. Regionally Significant Ecological Areas
The Nature Conservancy
Protecting nature. Preserving life.
NJ
DE
MD
VA
Leatherback Sea Turtle, Loggerhead Sea Turtle
Loggerhead Sea Turtle, Large Pelagic Fish
Leatherback Sea Turtle, Loggerhead Sea Turtle, Large Pelagic Fish
Leatherback sea turtle, Loggerhead sea turtle
Leatherback Sea Turtle, Loggerhead Sea Turtle
Leatherback Sea Turtle, Loggerhead Sea Turtle, Large Pelagic Fish
Leatherback Sea Turtle, Loggerhead Sea Turtle
Wind Energy Areas
Important Seafloor Habitat
Ecological Data by Ten Minute Square
Important Area for Multiple Species/Habitats
Important Area for Whales and Dolphins
Important Area for Fish or Fish communities
Important Area for Sea Turtles
Coldwater Corals Present
Hard Bottom Habitat Present
Important Seagrass Habitat Area
Source: TNC Northwest Atlantic Marine Ecoregional Assessment, http://nature.org/easternusmarine



Northern:
Roanoke/Chowan Waters

Western/Inland:
Area of tidal influence

Eastern/Seaward:
Continental Slope E

Eastern/Seaward:
US Territorial Bound