NOAA FISHERIES

Northeast
Fisheries
Science Center

Offshore Wind Development: Implications for Northeast Fisheries Science Center Surveys

August 9, 2020

Scope of Presentation

- Potential impact on current survey operations
- Where we are now
- Where we plan and need to go

Affected Center surveys

- Nearly all long-term fishery-independent surveys will be affected.
  - Integrated benthic/Atlantic sea scallop
  - Spring and autumn bottom trawl
  - Surf clam
  - Ocean quahog
  - EcoMon (plankton, physical oceanography)
  - North Atlantic Right Whale

Types of implications for trawl surveys and other NEFSC long term monitoring programs in general

1. Vessel operations/access
2. Statistical survey design and estimation

Goals:

- Maintain historical time series
- Maintain quality of information flow for stock and ecosystem assessments; and fishery management

Bigelow Operation Impacts

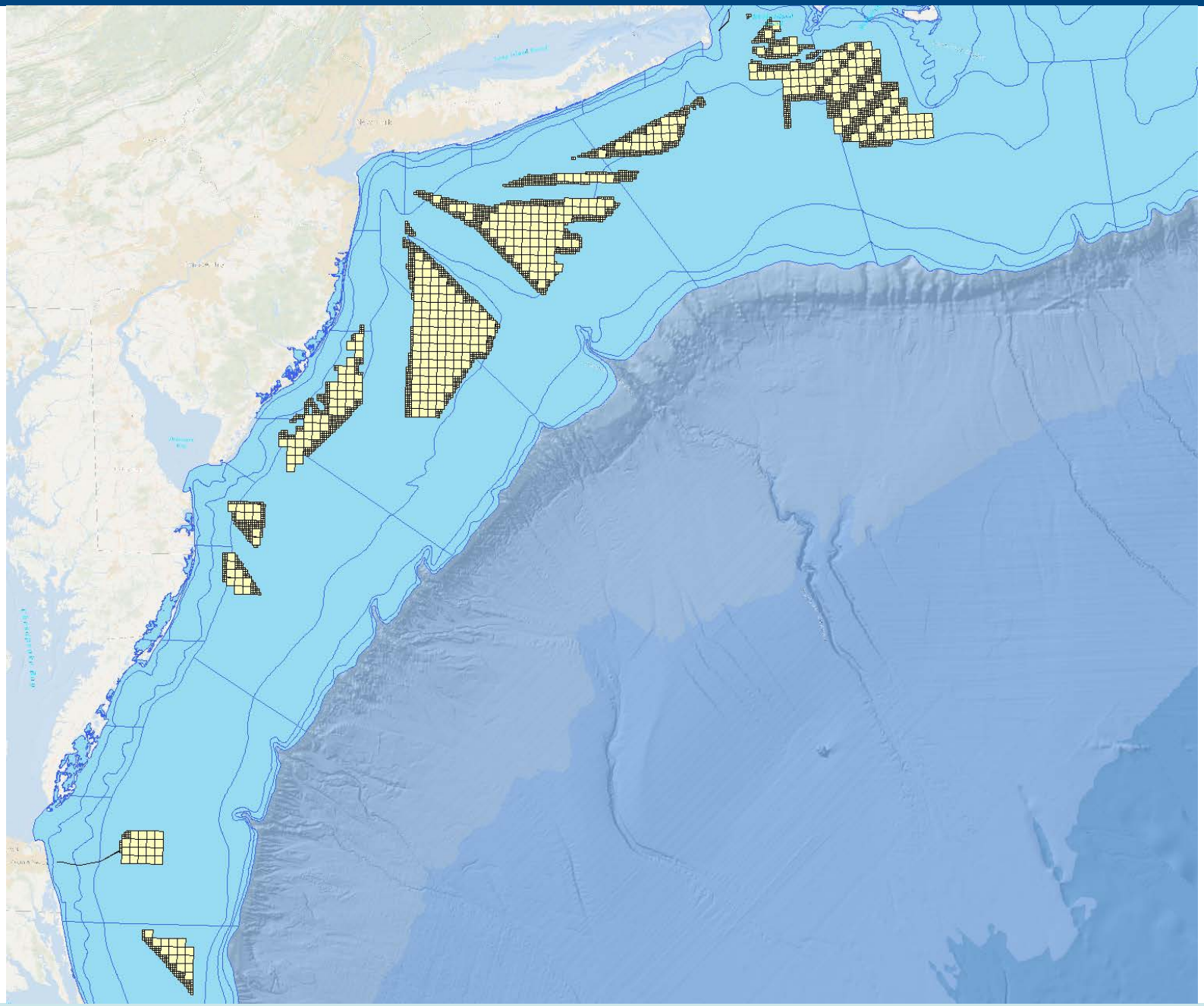
- Restrictions on vessel operations may turn wind energy areas into untrawlable habitat.
- Bigelow currently restricts operations to > 1 n mi from Block Island wind installation.
- Although OMAO leadership endorses this, there are no other standard protocols for operation within or near windfarm arrays.
- Commanding officer is ultimately responsible for safe navigation of vessel: operations depend on conditions, and are the call of each vessel's C.O.

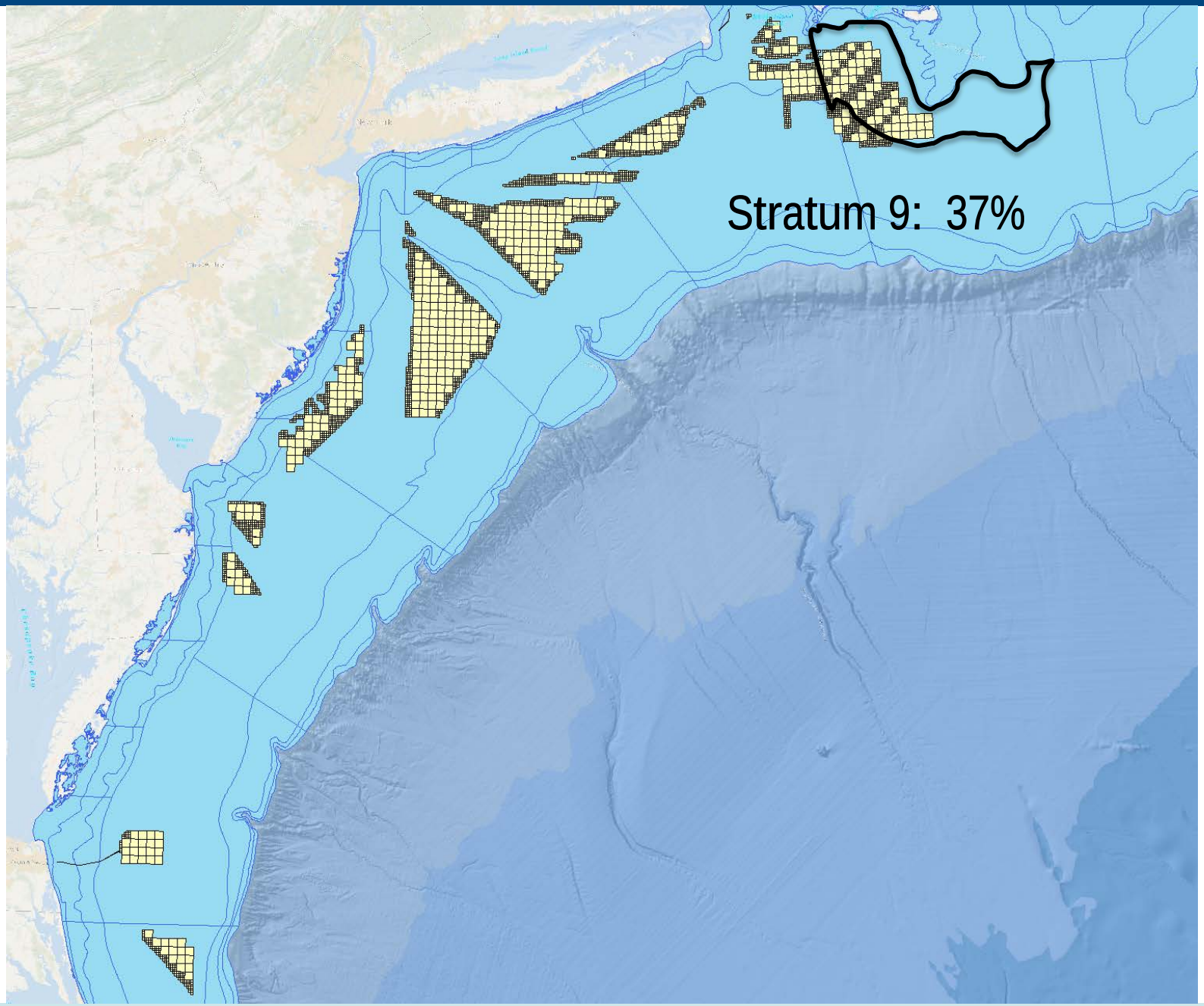
Vessel Operation Impacts

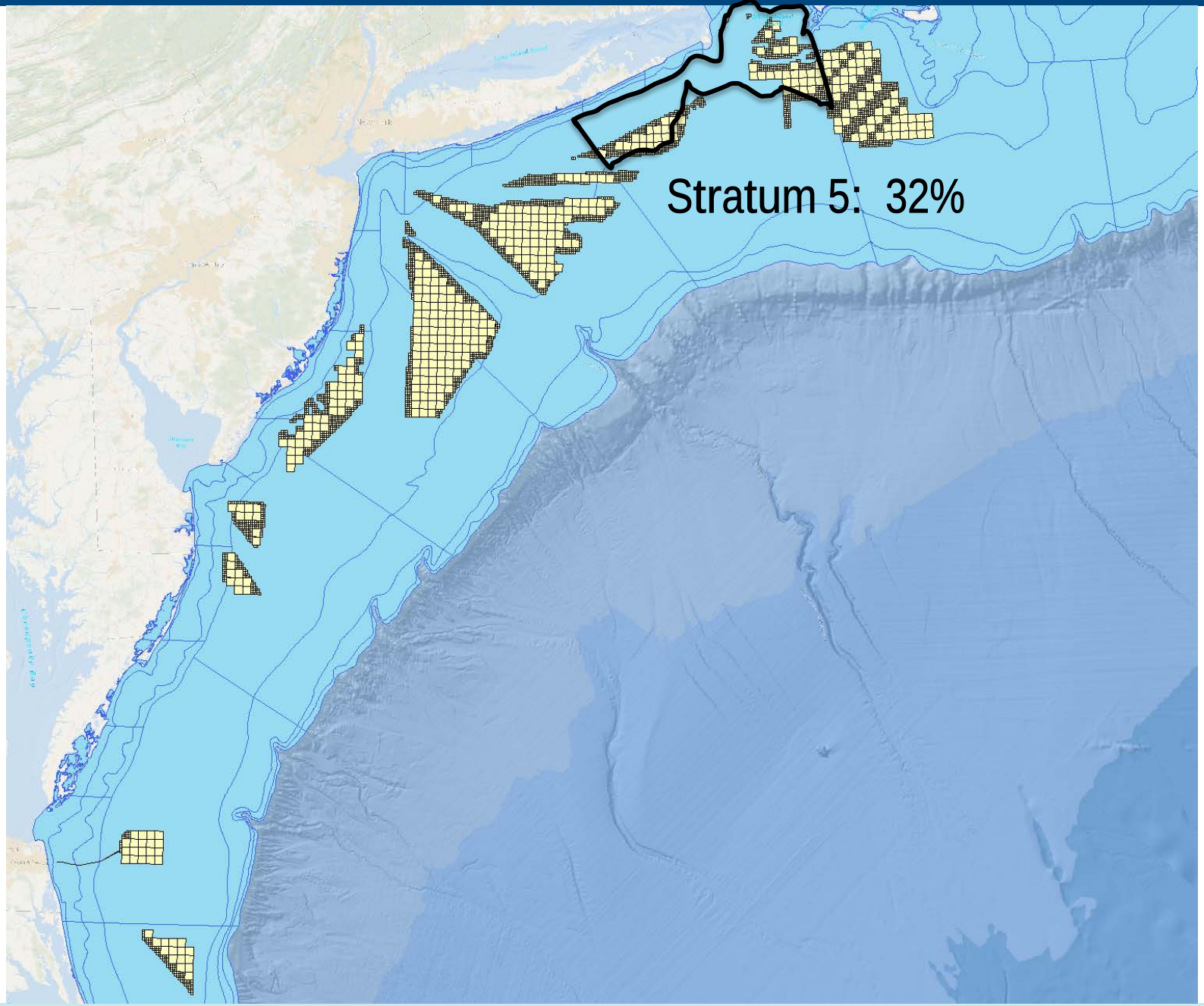
- Cabling will likely further reduce trawlable bottom (un- or under-buried) both inside and outside these areas.
- Any attraction of fixed gear or recreational effort to the area could also reduce trawlable habitat.
- Navigational restrictions from Coast Guard still under development for construction phase.

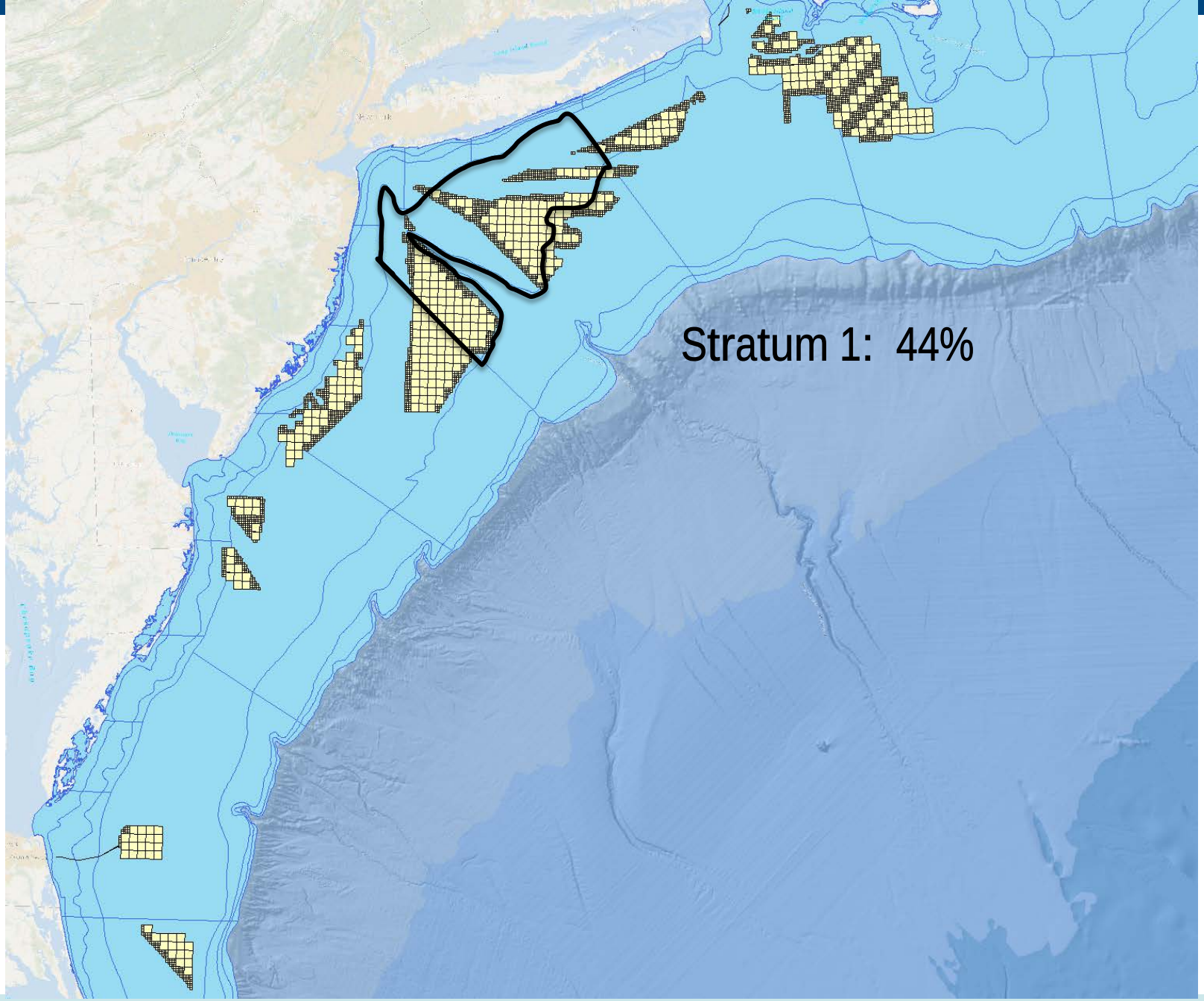
Statistical survey design

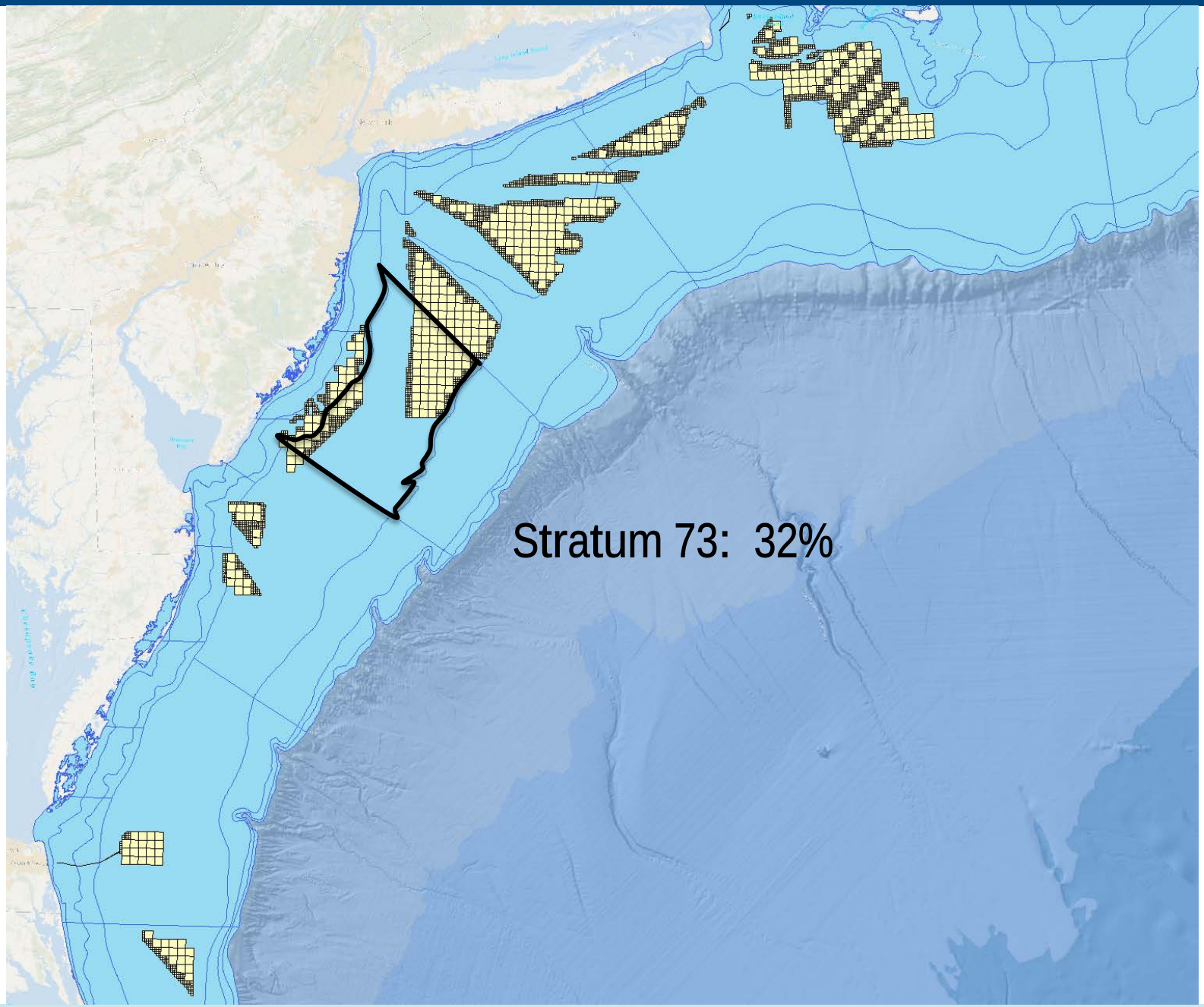
- We currently select station locations randomly within a stratum.
- Random site selection will no longer be possible: sites near turbines or potentially within entire wind energy areas will be systematically eliminated for trawl sampling.
- The area occupied by turbines (or entire wind energy areas) will increase over time.

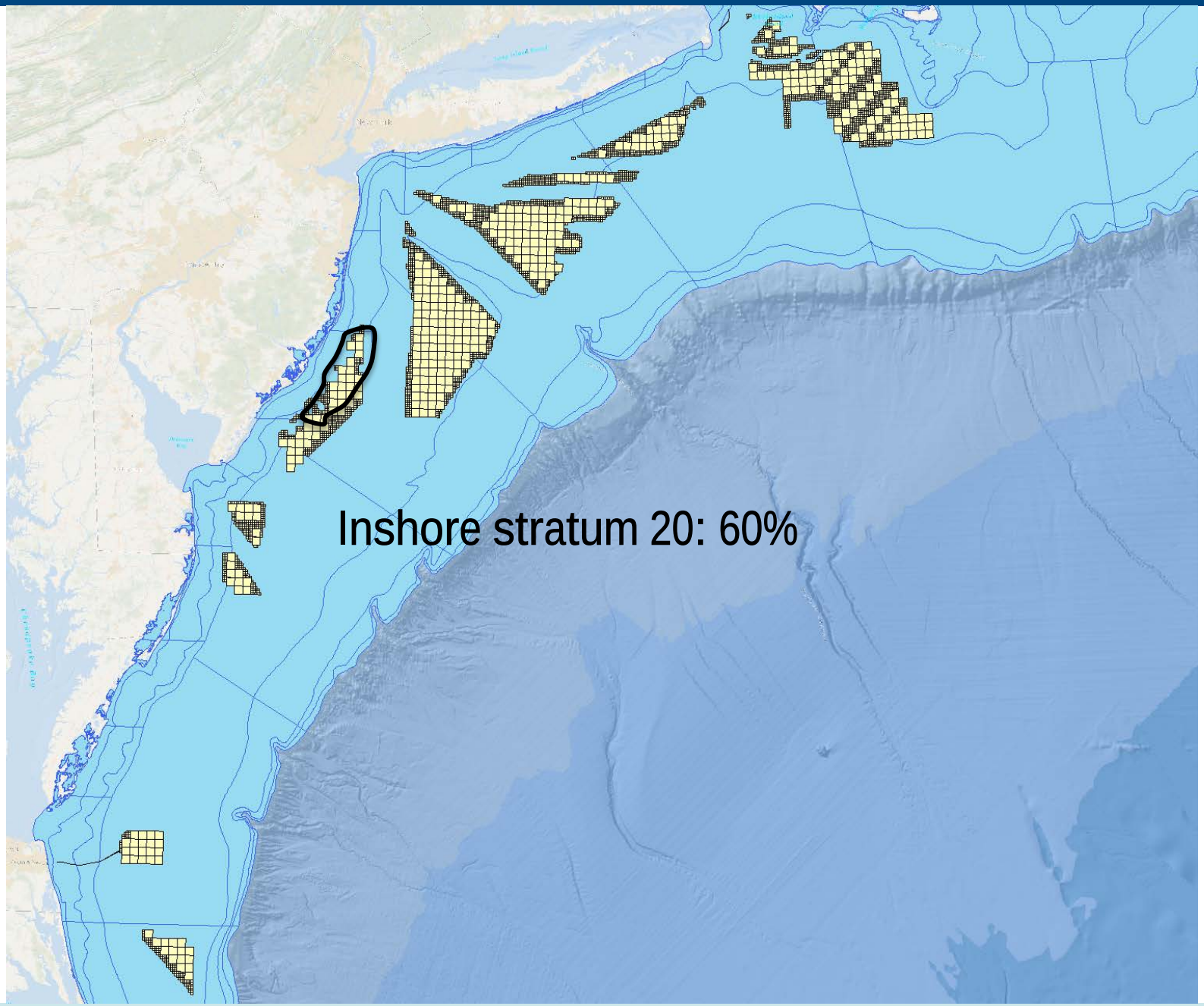


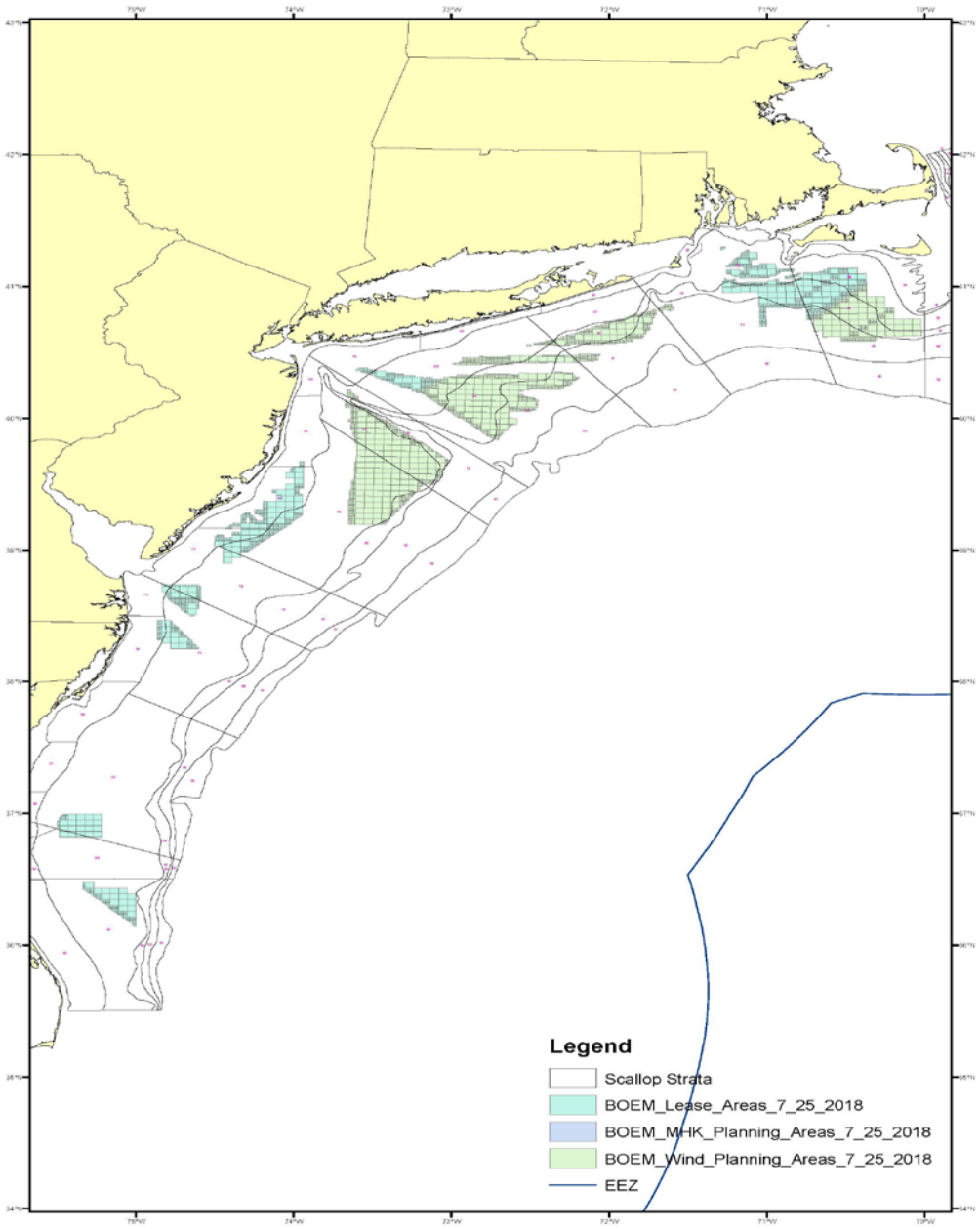

Stratum 9: 37%

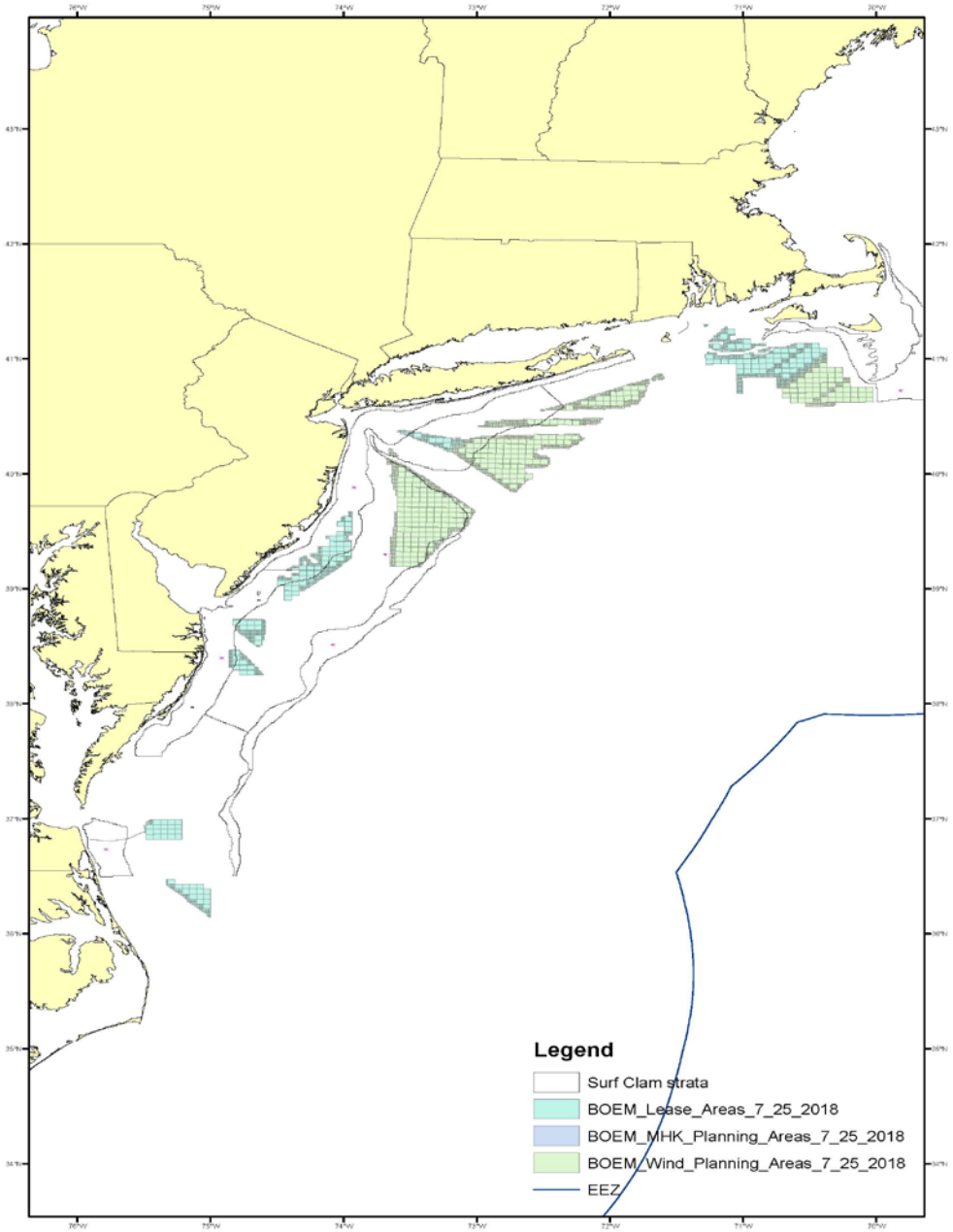

Stratum 5: 32%

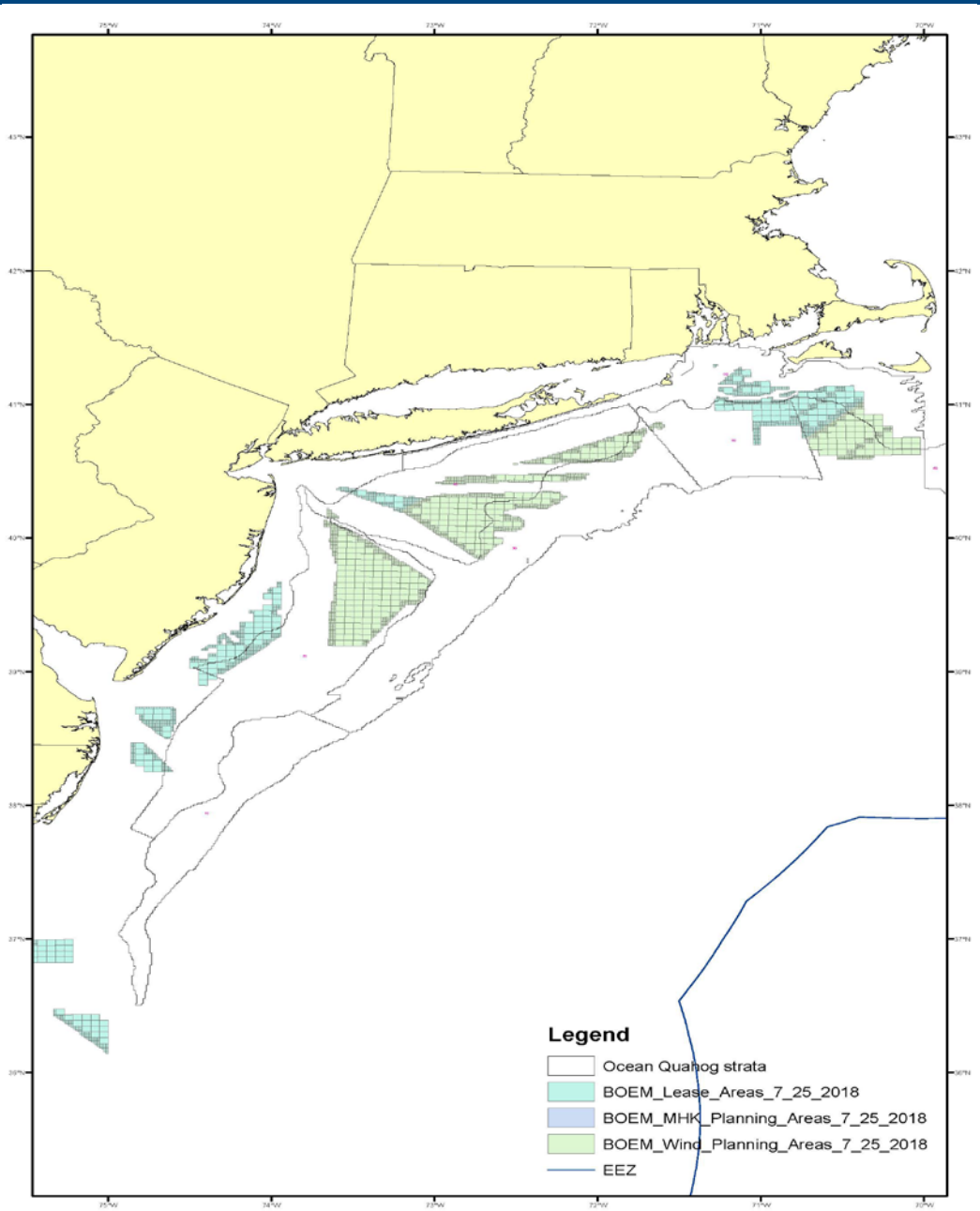

Stratum 1: 44%


Stratum 73: 32%


Inshore stratum 20: 60%


Legend
Scallop Strata
BOEM_Lease_Areas_7_25_2018
BOEM_MHK_Planning_Areas_7_25_2018
BOEM_Wind_Planning_Areas_7_25_2018
EEZ


Legend
Surf Clam strata
BOEM_Lease_Areas_7_25_2018
BOEM_MHK_Planning_Areas_7_25_2018
BOEM_Wind_Planning_Areas_7_25_2018
EEZ


Legend
Ocean Quahog strata
BOEM_Lease_Areas_7_25_2018
BOEM_MHK_Planning_Areas_7_25_2018
BOEM_Wind_Planning_Areas_7_25_2018
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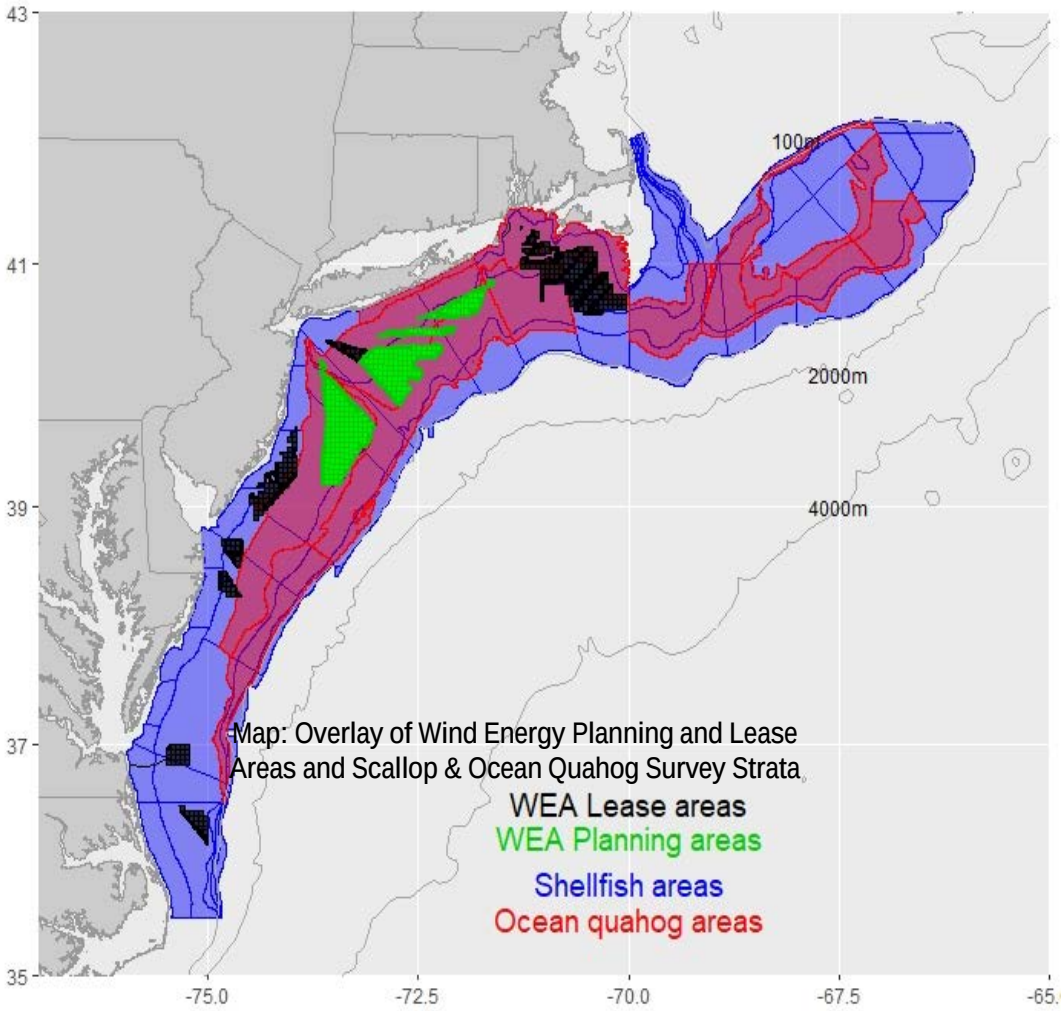

43
41
39
37
35
-75.0
-72.5
-70.0
-67.5
-65.
100m
2000m
4000m
Map: Overlay of Wind Energy Planning and Lease Areas and Scallop & Ocean Quahog Survey Strata
WEA Lease areas
WEA Planning areas
Shellfish areas
Ocean quahog areas

Using July, 2018 lease and planning areas

- Anywhere from 0 – 60% of a bottom trawl survey stratum area could potentially be included in a lease or planning area.
- Integrated sea scallop survey: 0 – 20%
- Surf clam: 0-7% (large strata)
- Ocean quahog: 2-11% (large strata)
- (Assumes all lease and planning areas covered)

Longer term

- Areas will expand : ME, NH, MA
- Areas will expand: greater depths with moored turbines
- (Aquaculture: may be coming soon)

Challenges: Bounding the problem

- How extensive will areas ultimately be?
- At what rate will they become completely occupied?

Moving out of the Slough of Despond

Gabriel

What next?

- The “do nothing” alternative: assume distribution and abundance within wind energy areas is the same as the surrounding stratum/strata areas.

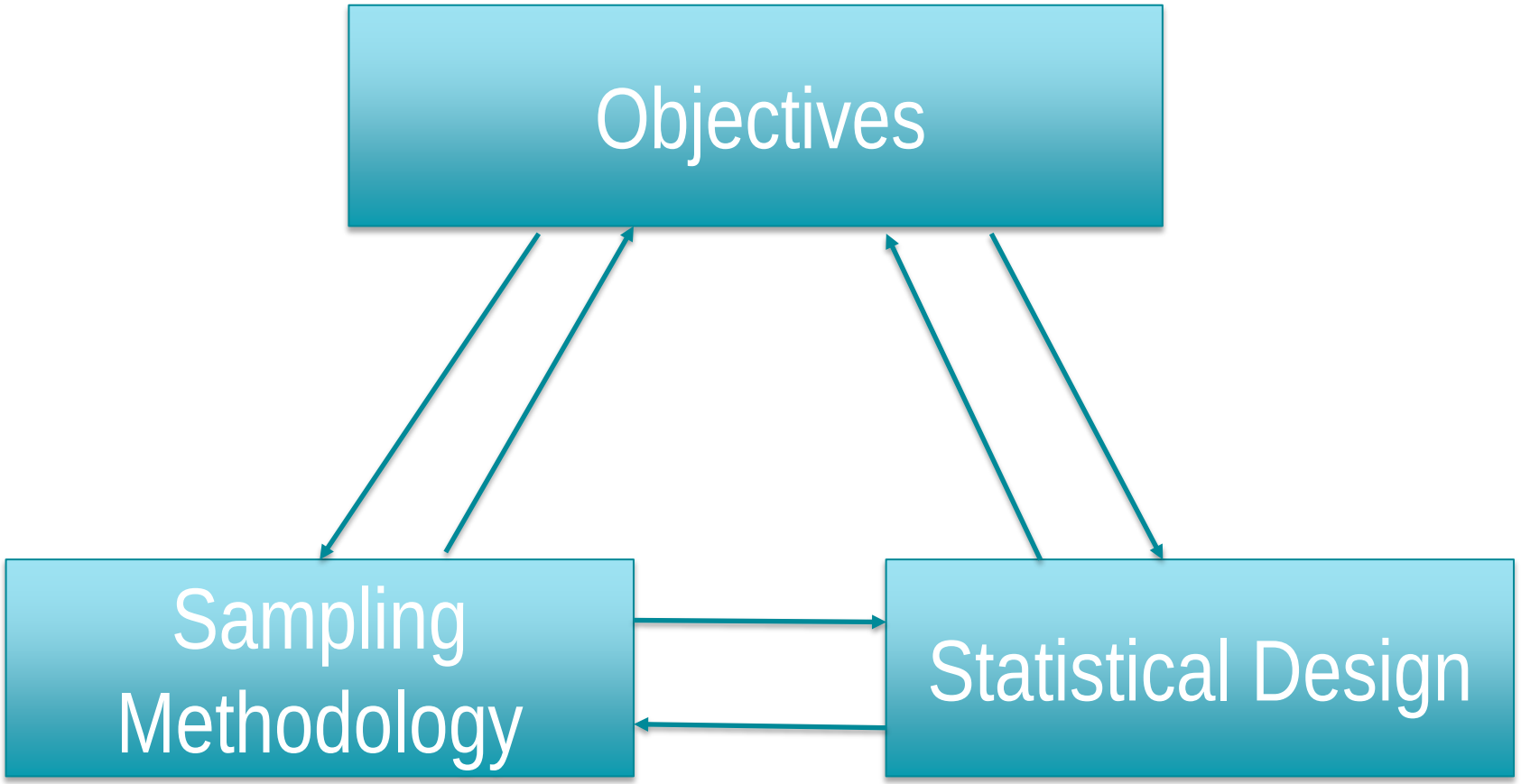
Do fish choose the “do nothing” alternative, though?

Black sea bass:

Would a decline in abundance in the trawlable area reflect decline in stock or shift to new structured habitat?

Life history-specific?

What next?



Example Objectives

- Maintain historical time series: integrate new data streams
- Maintain quality of information flow for stock and ecosystem assessments; management actions
- What components of those time series are critical to monitor within wind energy areas and integrate with historically surveyed areas?

Sampling Methodologies

- Platform alternatives
  - Smaller vessel?
  - Fixed (turbine attachment)?
  - Unmanned (glider, saildrone, AUV)?
- Detector/sensor alternatives

Sampling Methodologies

- Detector/sensor examples
  - Trawl : known sample footprint, “easy” calibration
    - Bigelow/NEAMAP
    - Special purpose
    - Beam
  - Other fixed gear: q issues by species, relative abundance?
    - Gill net, longline, pots

Sampling Methodologies

- Detector/sensor examples
  - Video: species, length; light avoidance? sampling footprint?
  - Acoustic: water column or range, absolute abundance estimates; need target strength estimates or broadband signatures; groundtruthing for species identification

Sampling Methodologies

Platform	Manned mobile (vessel)	Unmanned fixed	Unmanned mobile	Etc.
Detector/Sensor				
Trawl	+			
Fixed gear	+			
Video	+	+	+	
Acoustics	+	+	+	
Etc.				

What is measurable? Absolute/relative abundance? By species group, species, life history stage?
Precision? Accuracy?
Catchability/detectability?
Habitat type?

Statistical design

- Develop estimators that are compatible and integratable with survey data collected outside the area: intercalibration? additive?
- Stratify by distance from turbines, depth, habitat type?
- Fixed stations? Randomization basis?
- Spatial statistical models?
- Performance: underlying assumptions and groundtruthing; accuracy, precision

Then, evaluate combinations of sampling methodology and statistical design approaches; and impacts on stock assessments and management decisions

- Design and execute simulation “bake off”
- Observing System Simulation Experiment OSSE or other modelling approach
- After simulation evaluations, groundtruth, implement pilots and then develop optimal solution.

Current status: Bottom trawl survey (+)

- Interagency agreement with BOEM: Development of a Strategy to Evaluate Impacts of Offshore Wind Energy on the …NEFSC Multi-Species Bottom Trawl Survey

BOEM Interagency Agreement

- Identify specific impacts of offshore wind energy development on the collection of fisheries and ecosystem data;
- Identify specific impacts of offshore wind energy development on the provision of scientific advice to management of commercial and recreational fisheries;
- Determine the most appropriate methods to analyze impacts and identify adaptive measures;
- Design a modeling framework to support survey adaptation, to enable evaluation of new fishery resource survey methodologies, and to evaluate performance of new combinations of survey designs and methodologies.

Workshop 1

- Identify impacts of offshore wind energy development on fisheries and ecosystems data; and impacts on stock assessments and management advice; linkages and questions that need to be addressed; and outcomes that are needed.
- Define the objectives and questions that need to be answered.
- Identify candidate model approaches.

Workshop 2

- Design the analytic and empirical frameworks: parameters, assumptions, scenarios and key requirements.
- Develop goals and specifications for analytic and empirical work, which build on key questions and recommended approaches from Workshop I.
- Generate a roadmap to build a simulation to evaluate alternatives.

Where would that leave us after the workshops?

- Phase 2: Model would then need to be built and exercised; pilot testing may be needed. Optimal solution would be determined, reviewed and adopted ($0)
- Phase 3: Optimal solution would then be implemented, calibrated ($0).

The Dinner Party Model – An imperfect analogy

- Phase 1: figure out the guest list, scope theme and menu alternatives (in hand)
- Phase 2: figure out the menu, recipes and ingredient list (not in hand; modeling and analysis is relatively cheap, pilots are not)
- Phase 3: buy the groceries and start cooking (brother can you spare a dime)
- Phase 4: cook 1-2 times a year for 20 years and expect more guests and inflation

Current status: Integrated Benthic Survey

- Plans underway to address integration of multiple components of sea scallop survey activity.
- This could potentially include restratification, as was done for surf clam and ocean quahog.
- This would also incorporate effects of wind energy areas on sea scallop survey activity.
- Internal planning has begun.

Wind project research and monitoring: different or unified goals?

- Each individual project may develop research and monitoring programs designed to meet individual project permit processes.
- These currently are not necessarily designed to fill systematic long-term coastwide monitoring gaps.
- A unified coastwide approach would be valuable to leverage these projects' planned research and monitoring programs.
- Mitigation may be necessary to address gaps in long-term coastwide monitoring.

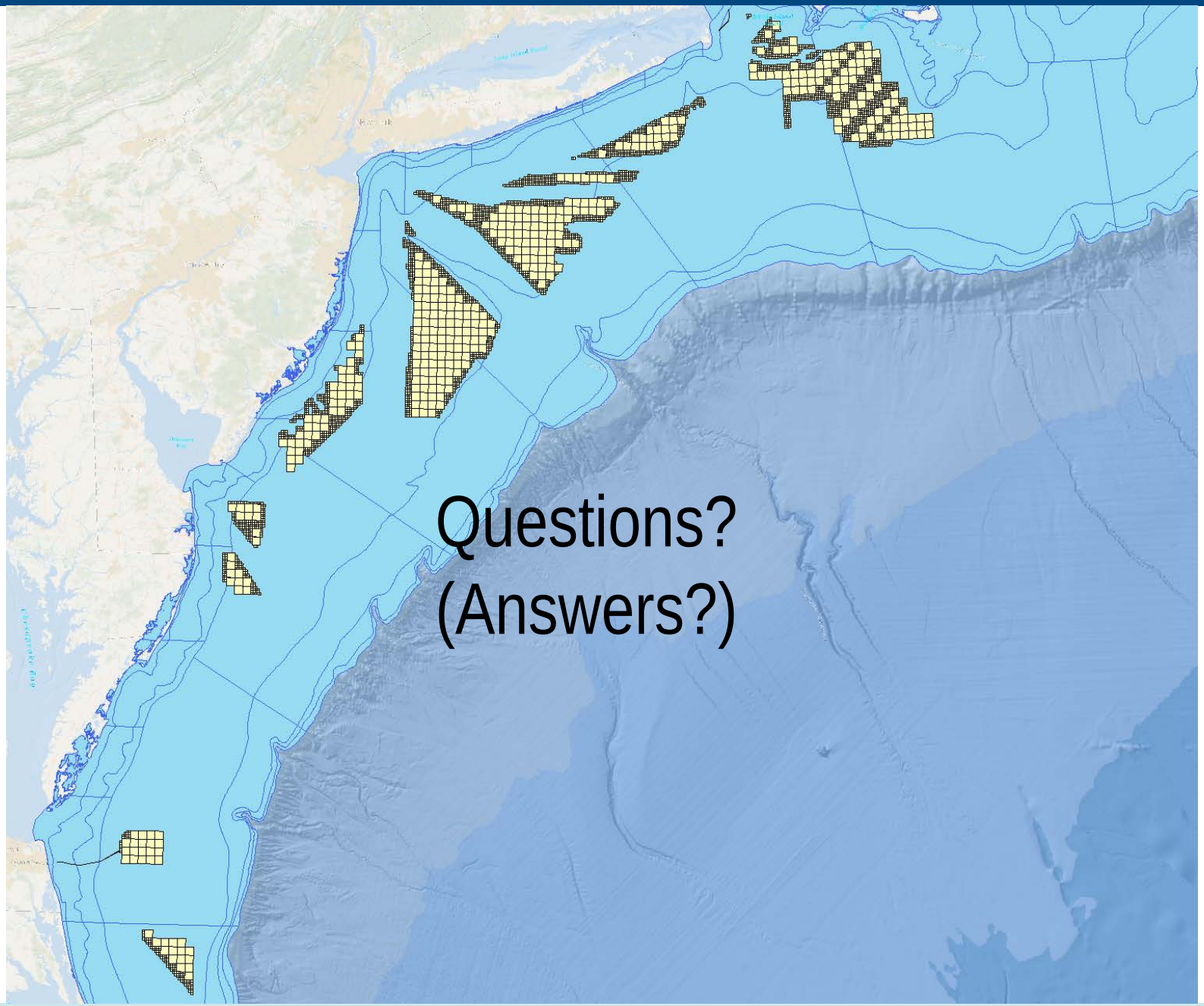
How can the SSC help?

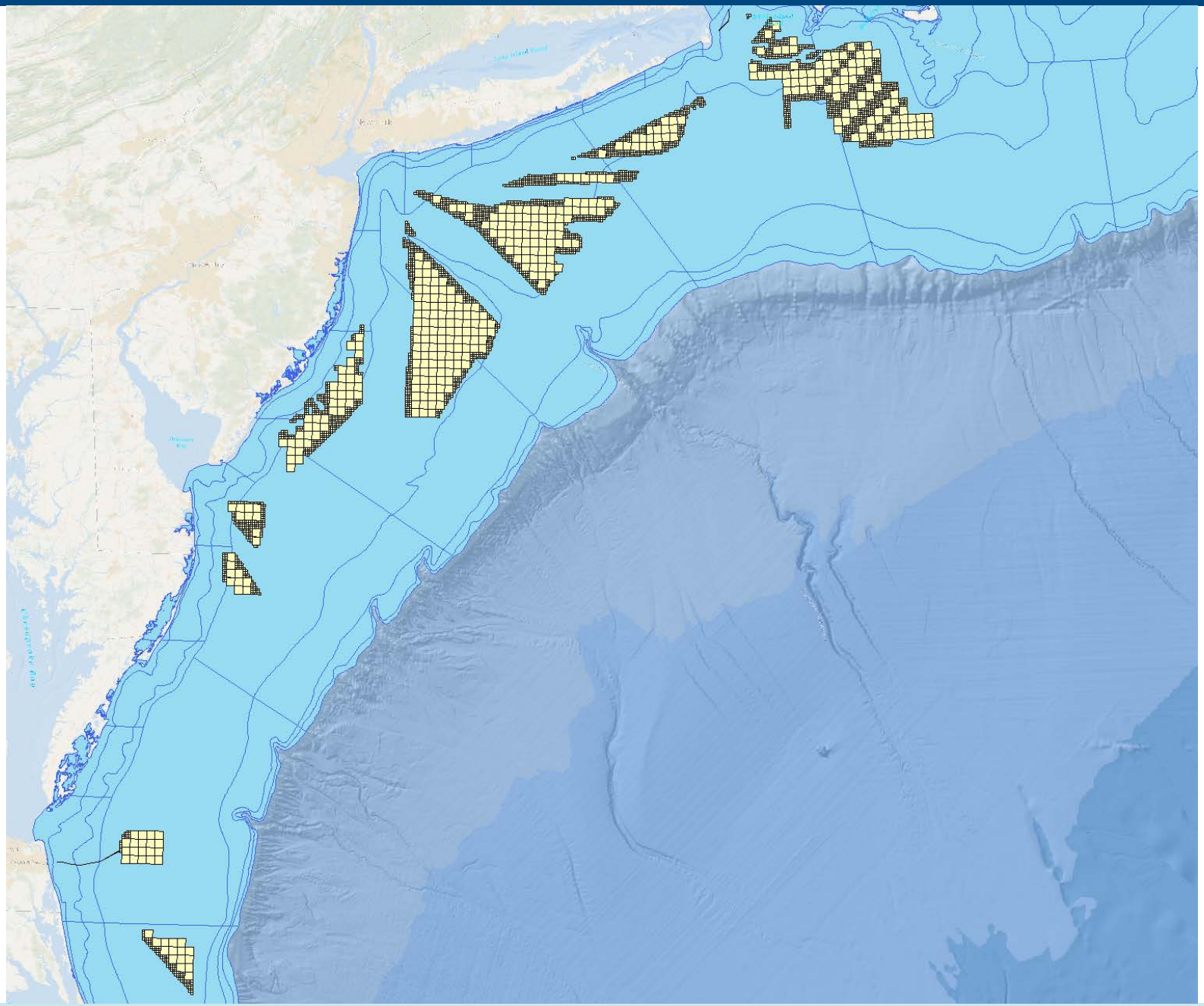
- SSC and Council support to help build Center capacity will improve the quality of fishery-independent data as wind farm areas increase.
- Collaboration with the Center, RODA, and ROSA will help address these issues.

In summary,

- Time and resources need to be available to design and evaluate new supplemental surveys that can be integrated into stock assessments and existing time series.
- That process includes peer review of the design, and calibration, and implementation.
- The SSC is positioned to make valuable contributions throughout this process.

("Wind Farm Effects that will Impact NEFSC Survey Operations and Concomitant Stock Assessments Impacts Draft Breakout Group Summary". November, 2018)


Questions?
(Answers?)



In summary, impacts will include (but are not limited to)

- Reductions in precision of fishery-independent survey indices in stock assessments.
- Reductions in accuracy due to potential changes in availability.
- Reductions in precision when calibrations are required (new vessels, gear types, protocols, statistical designs).
- Reductions in sampling efficiency as vessel transit times increase and/or sampling vessel size decreases.

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