BOEM
Bureau of Ocean Energy Management

Gulf of Maine:

Next Steps for Commercial & Research Planning & Leasing

Office of Renewable Energy Programs

Zach Jylkka, Project Coordinator

September 8, 2022

Next Steps for Offshore Wind in the Gulf of Maine

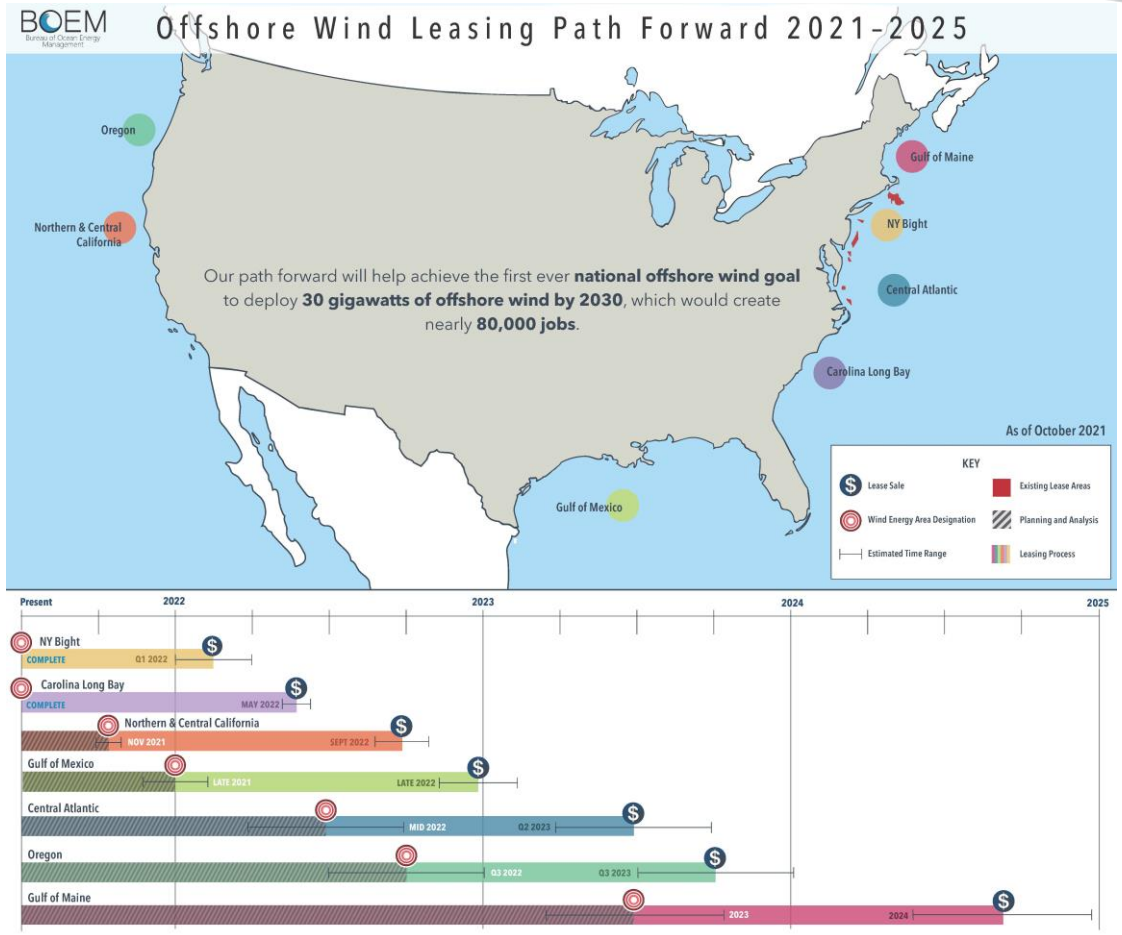
- On August 19th, BOEM published two documents in the Federal Register:
  1. Request for Interest (**RFI**) – first step in the **commercial** leasing process for the Gulf of Maine
  2. Request for Competitive Interest (**RFCI**) – next step in processing the State of Maine's **research** lease application

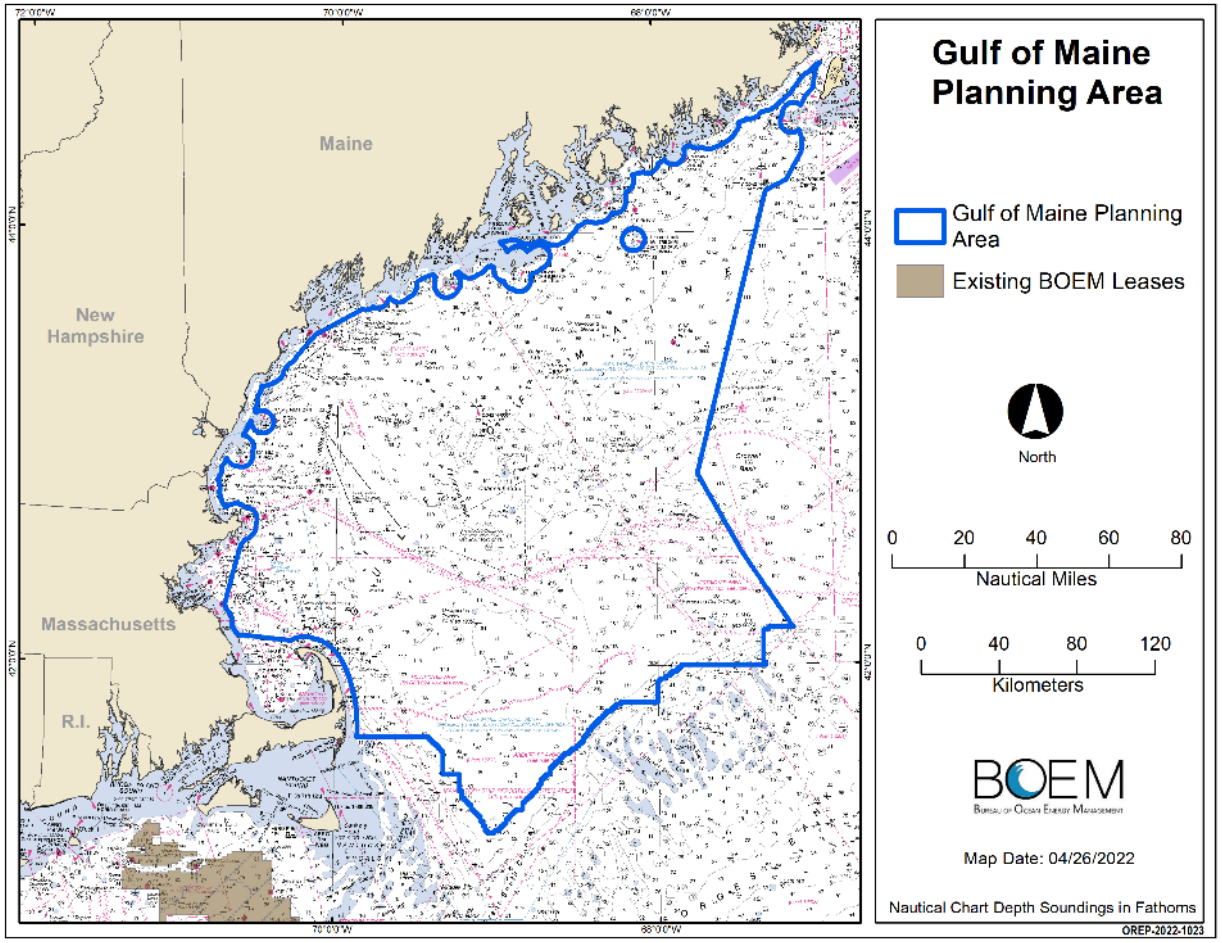
- The publication of these notices initiated two separate 45-day comment periods, which close on October 3rd.

Gulf of Maine: Commercial & Research Tracks

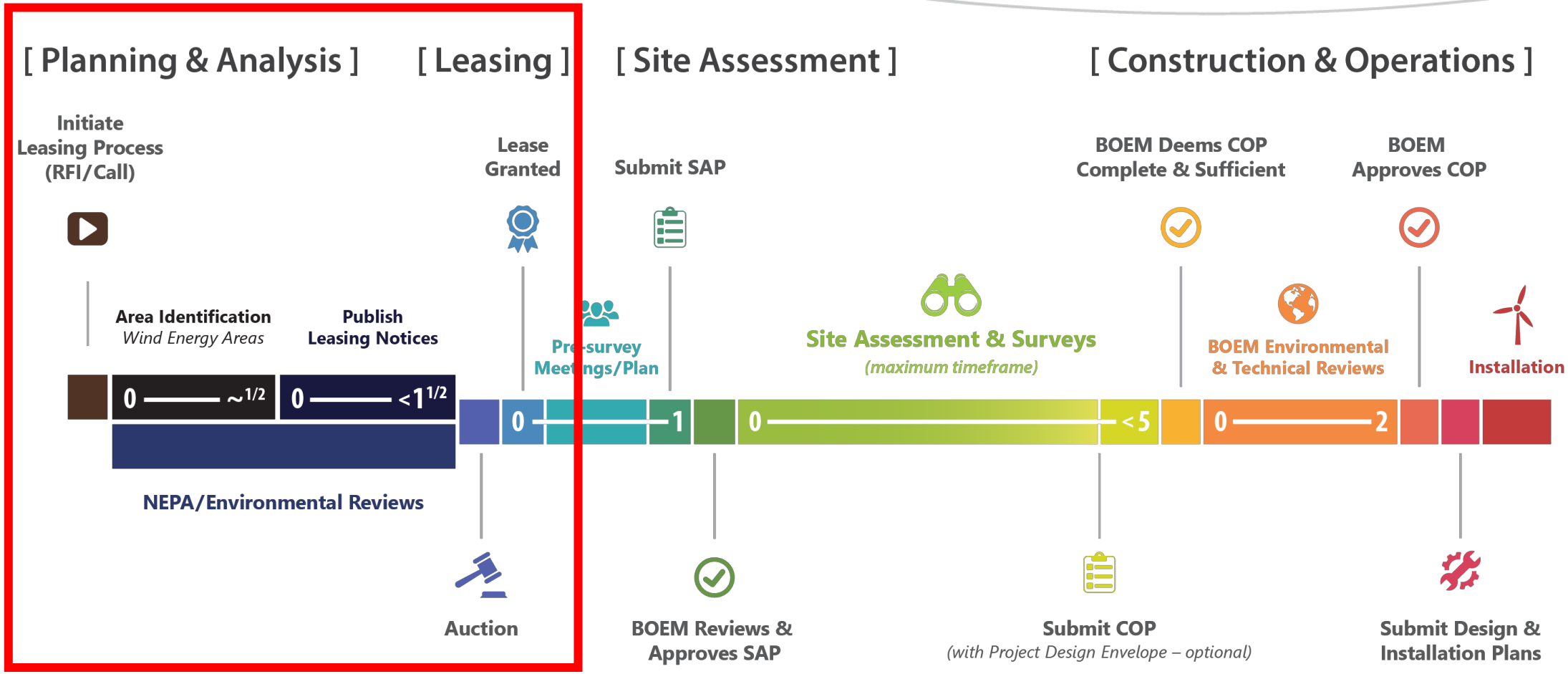
August 2022

Gulf of Maine: Commercial Planning & Leasing Process

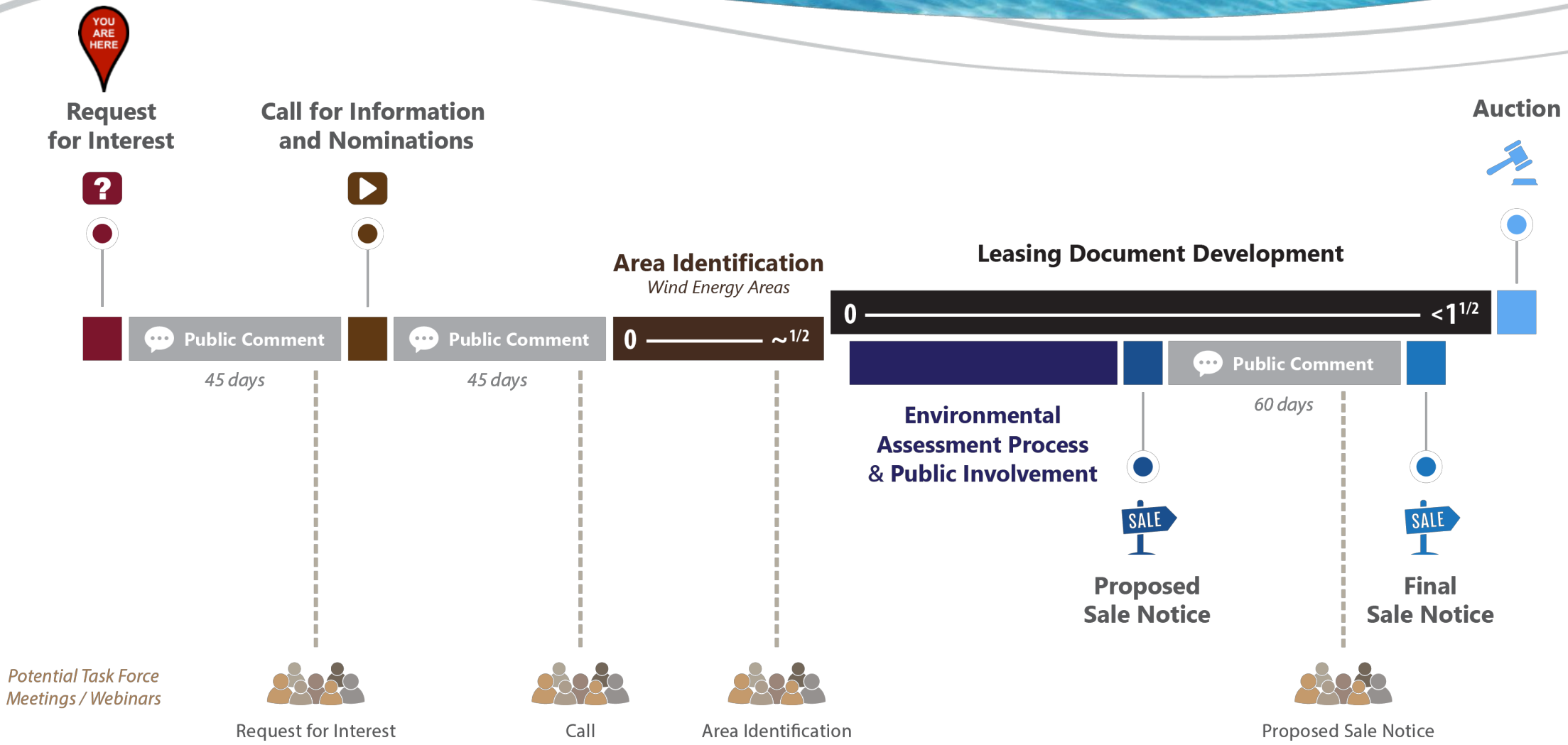




Renewable Energy Process: From RFI/Call to Operation



Commercial Leasing in the Gulf of Maine



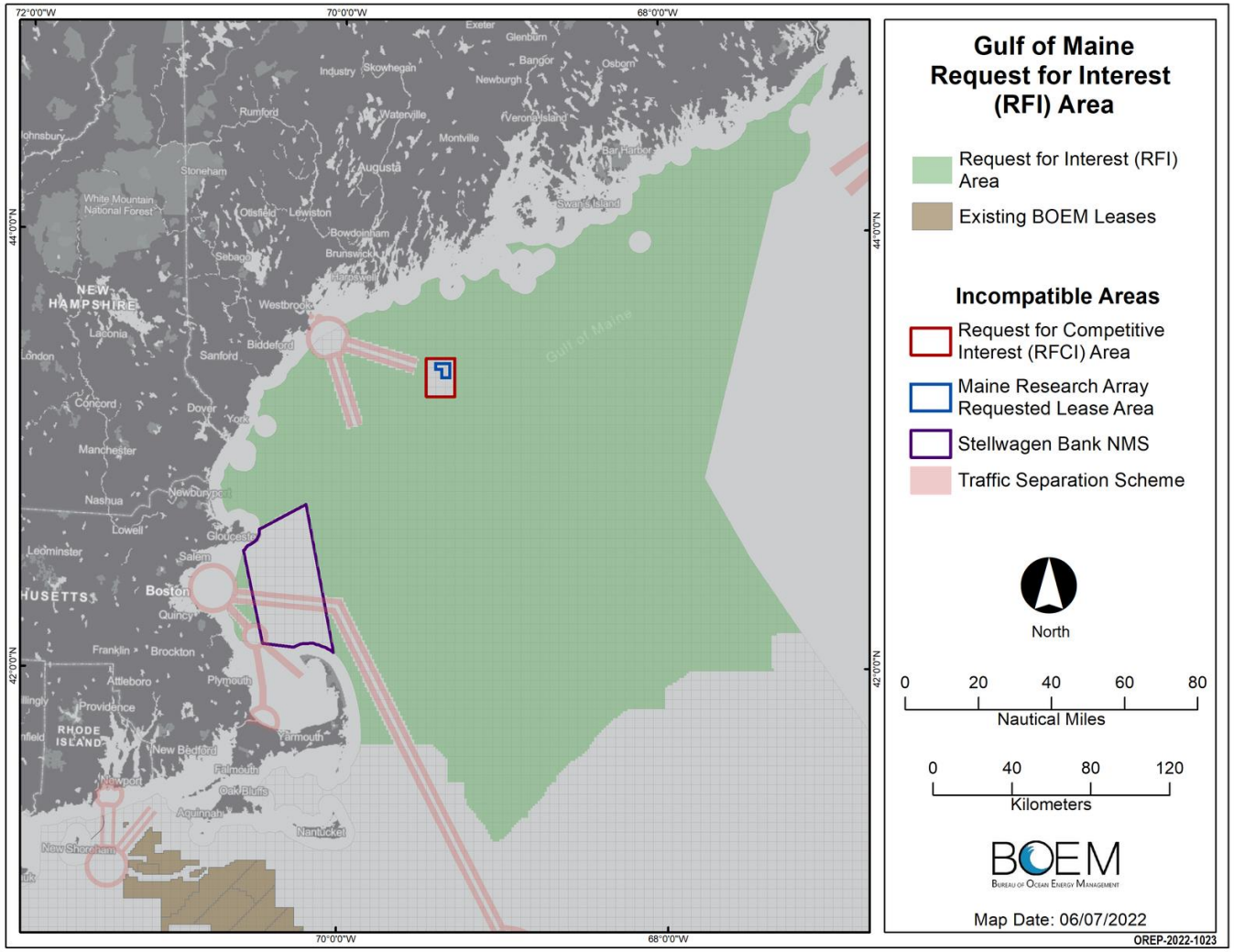
Gulf of Maine: Request for Interest (RFI)

Gulf of Maine Task Force

- Second Task Force Meeting: **May 19, 2022**
  - Request For Interest (RFI) Development Framework (Draft RFI Area)
  - Engagement Approach (2022-2023)

RFI

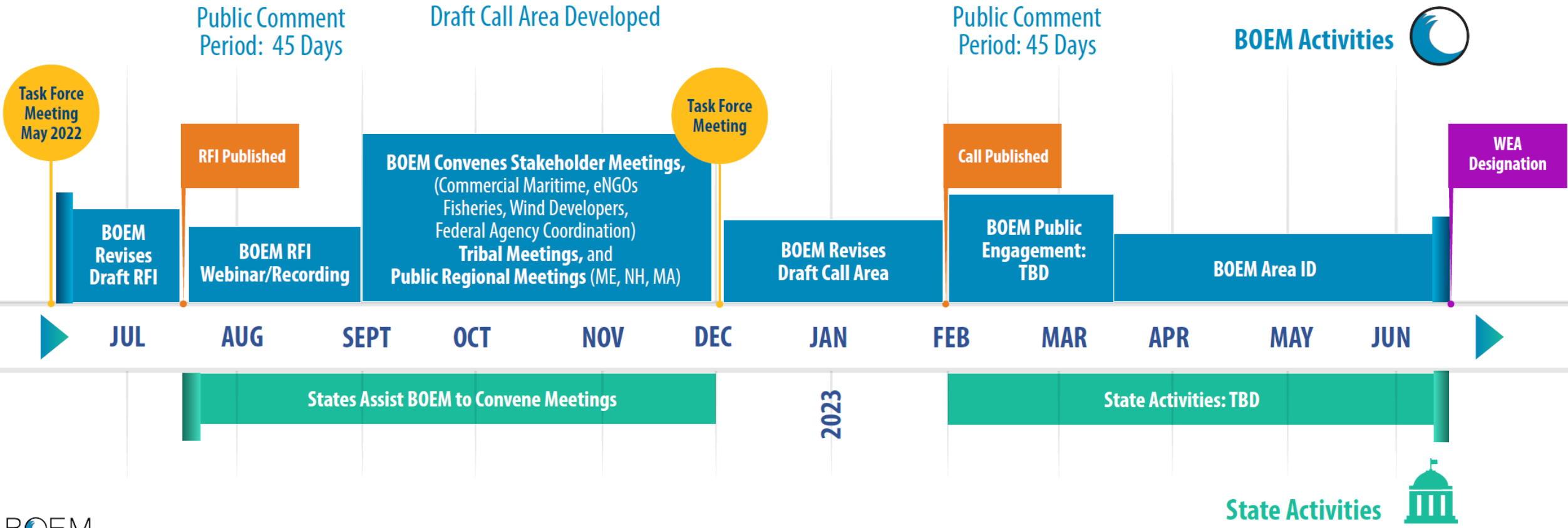
- Follows RFI Development Framework
  - Removes “incompatible areas”
    - TSSs, Stellwagen NMS, RFCI Area
  - 13,713,825 acres (area will be significantly reduced in subsequent planning phases (Call Area, Wind Energy Area)
- Requests Information from interested/affected parties
  - “Data Inventory” on BOEM website



Commercial Leasing in the Gulf of Maine: Planned Engagement

Gulf of Maine Engagement Approach

Moving from the Request for Interest to Wind Energy Area Designation



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NOTE: *This is a draft discussion document, and the dates of proposed meetings and planning/leasing milestones are all tentative.*

Commercial Leasing in the Gulf of Maine

Improving Best Available Science & Modeling

- BOEM Studies:
  - Standardizing Integrated Ecosystem Based Assessments (**SIEBA**)
  - Ecological Baseline Study of the U.S. Outer Continental Shelf Off Maine
  - Comprehensive Assessment of Existing Gulf of Maine Ecosystem Data and Identification of Data Gaps to Inform Future Research
- **Ecosystem Based Management (EBM) Modeling**:

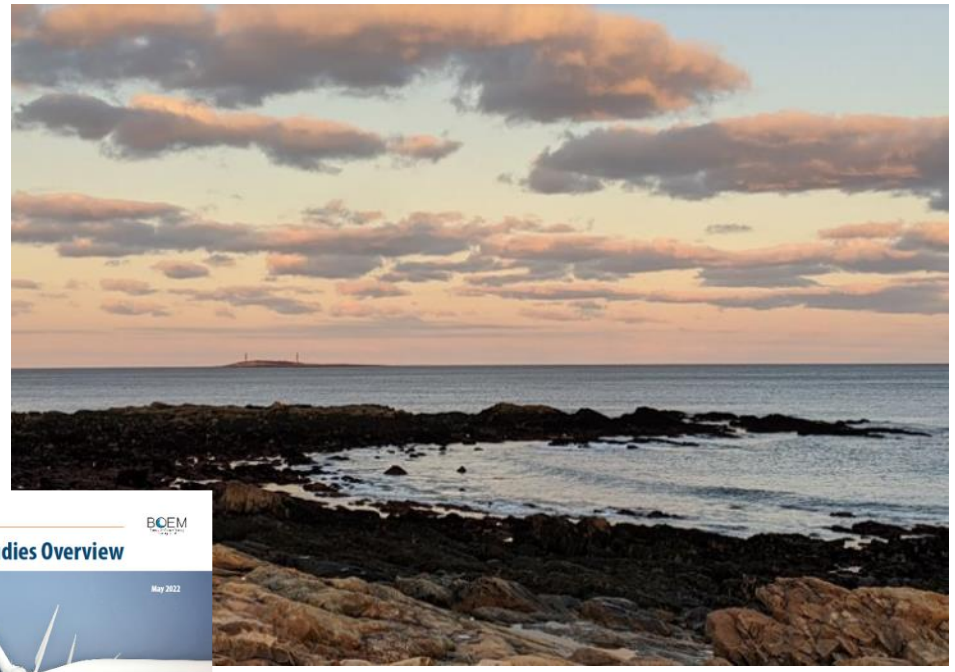
  BOEM SIEBA Study + NOAA NCCOS Collaboration

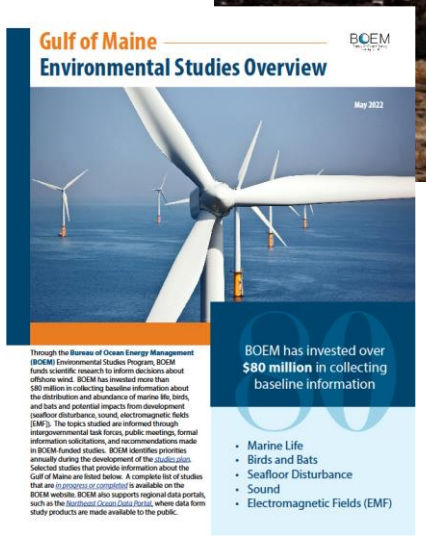
Engagement

- Starting with an RFI (optional) to expand opportunities for comment
- 2 Task Force meetings prior to publishing RFI
- Released Engagement Approach (2022-2023)
- 11 Draft Call Area meetings planned for Fall 2022

Transparency

- RFI Development Framework
- Publication of decision memos
- Publishing data inventory with RFI





Gulf of Maine Studies Fact Sheet

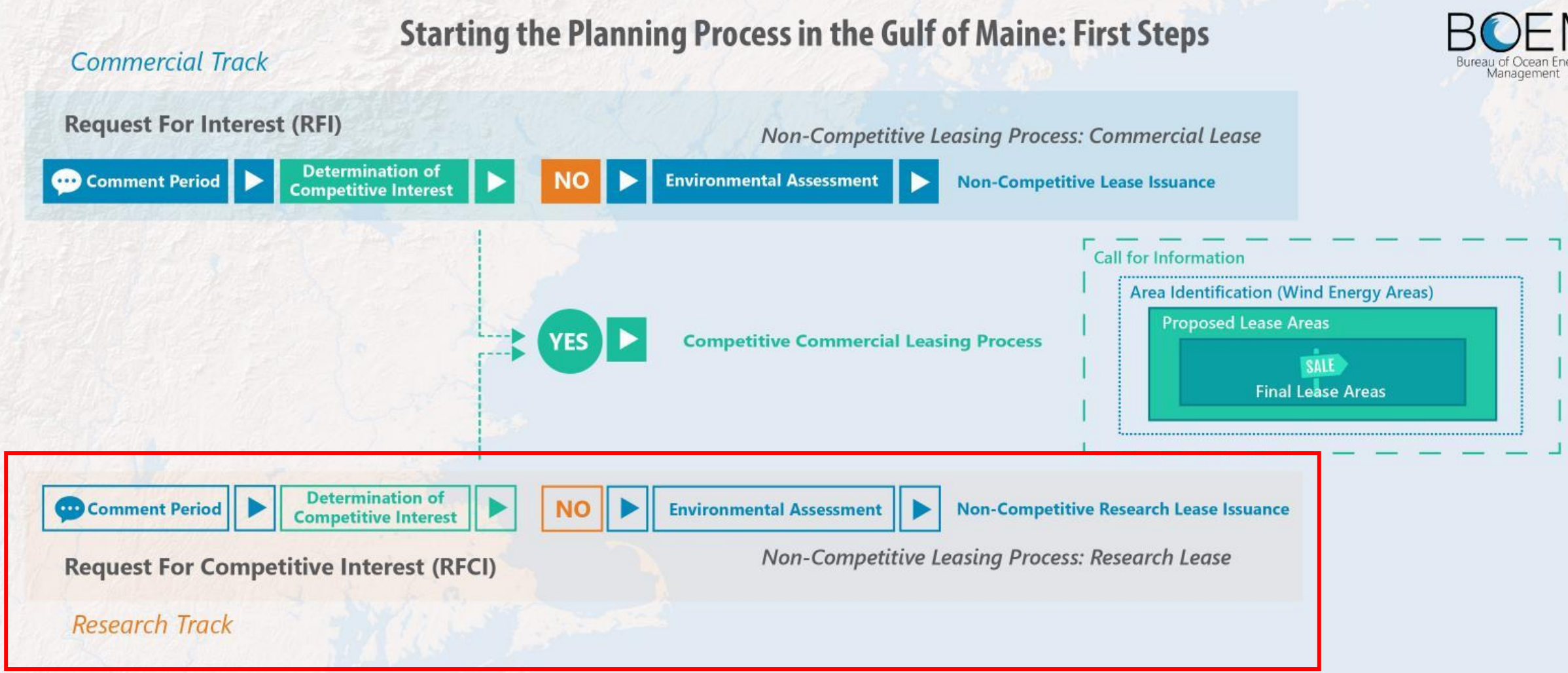
Gulf of Maine: Commercial Leasing Milestones

Milestone*	Action	Target Date**
Publish Request for Interest	**Publish RFI** *45-Day Comment Period*	**Q3 2022**
Publish Call for Information & Nominations	**Publish Call** *45-Day Comment Period*	**Q1 2023**
Area Identification	**Designate Wind Energy Areas (WEAs)**	**Q3 2023**
Lease Sale	**Proposed Sale Notice (PSN)**	**Q4 2023**
	Final Sale Notice (FSN)	**Q2 2024**
	Hold auction	**Q3 2024**

* Task Forces are incredibly valuable tools in the leasing process and **several meetings** can be expected, likely to be scheduled around significant process milestones.

** Dates of planning/leasing milestones are all tentative.

Gulf of Maine: Research & Commercial Tracks



August 2022

State of Maine's Research Lease Application

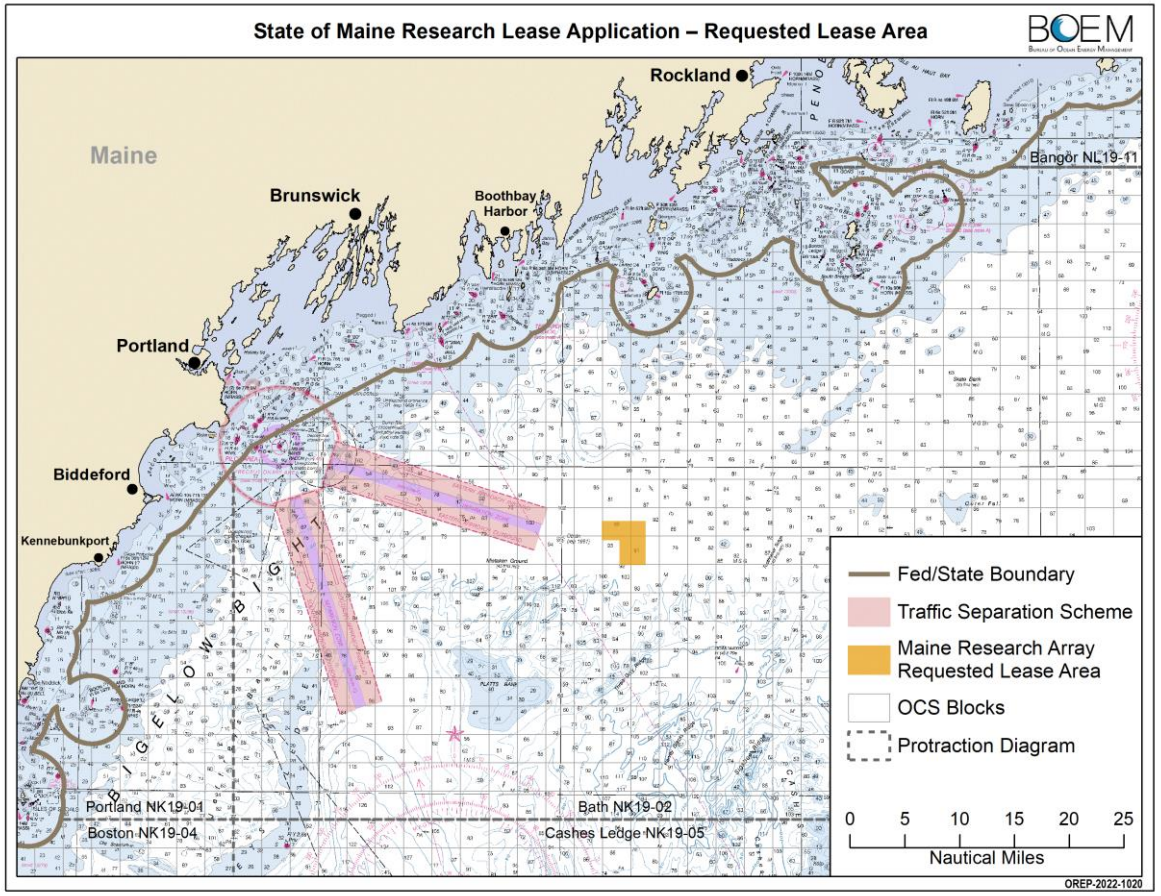
State of Maine Research Array

Maine submitted a research lease application (Oct. 2021) for a floating research array in Federal Waters

- ~25 nmi from the mainland; 15 Square Miles (~10,000 acres)
- ≤ 12 Floating Turbines (up to 144 MW)
- Research Framework:
  - Human Dimensions
  - Ecosystem & Environment)
  - Technology Development

BOEM Process: Unsolicited Lease Request

- Qualifications (Legal, Technical, Financial)
- Request for Competitive Interest (RFCI)
  - 45-day comment period

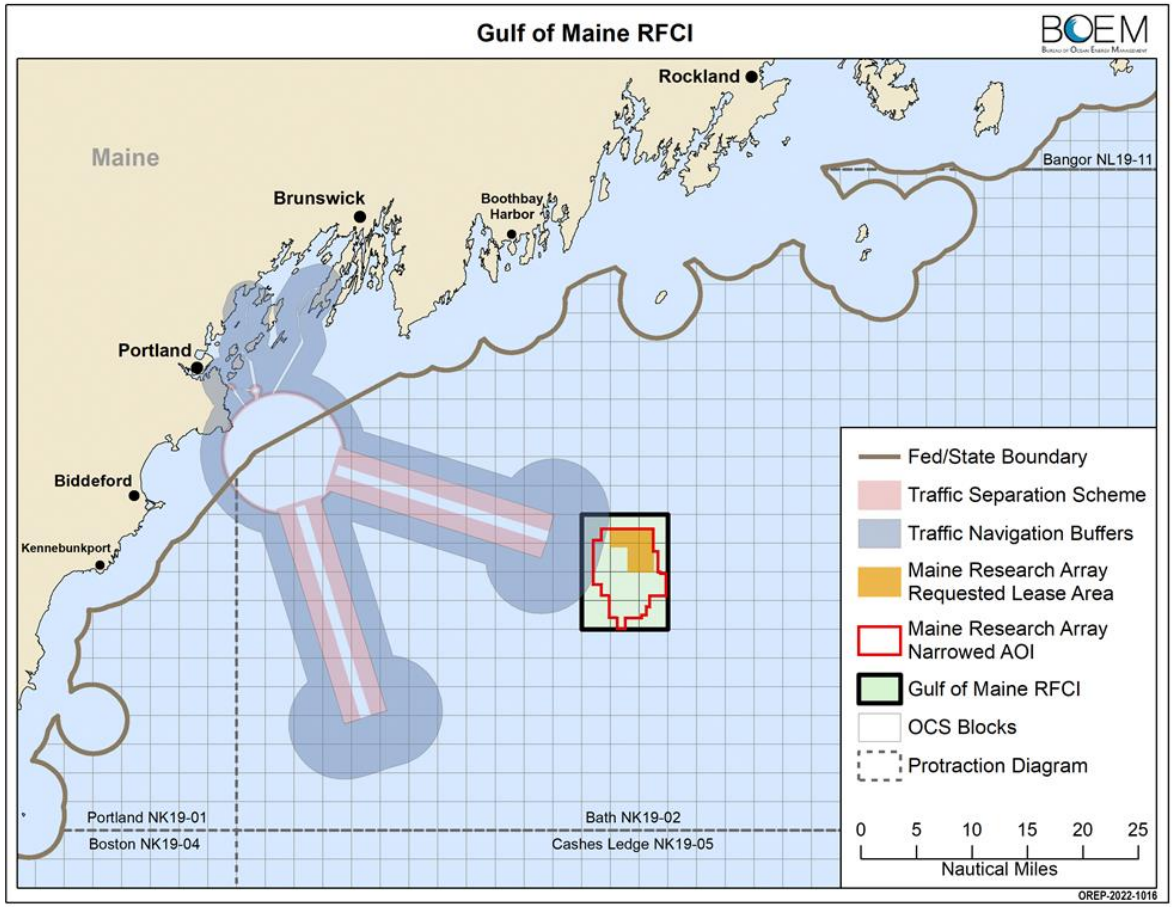


BOEM Website: State of Maine Research Lease Application

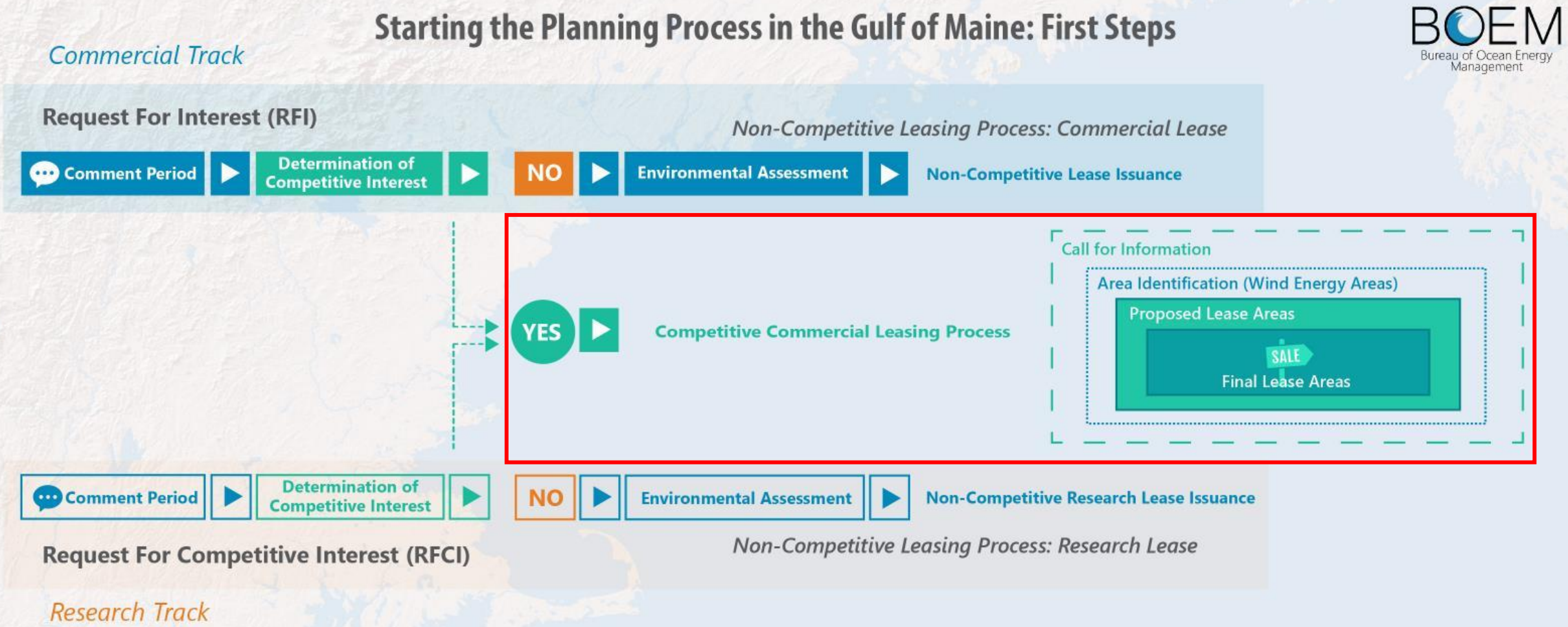
Gulf of Maine: Request for Competitive Interest (RFCI)

RFCI

- **RFCI Area**
  - Expands upon lease area requested by Maine
  - Only 1 lease of 10,000 acres will have potential to move forward (no more than 12 floating turbines)
- **Conceptual Research Framework**
  - Mirrors Maine Research Application
- **Next Steps:**
  - After comment period closes, review any indications of interest and public comments, then make determination:
    - *Competitive Interest* → Competitive Leasing Process
    - *No Competitive Interest* → Suitability Analysis, Environmental Assessment, Lease Negotiation

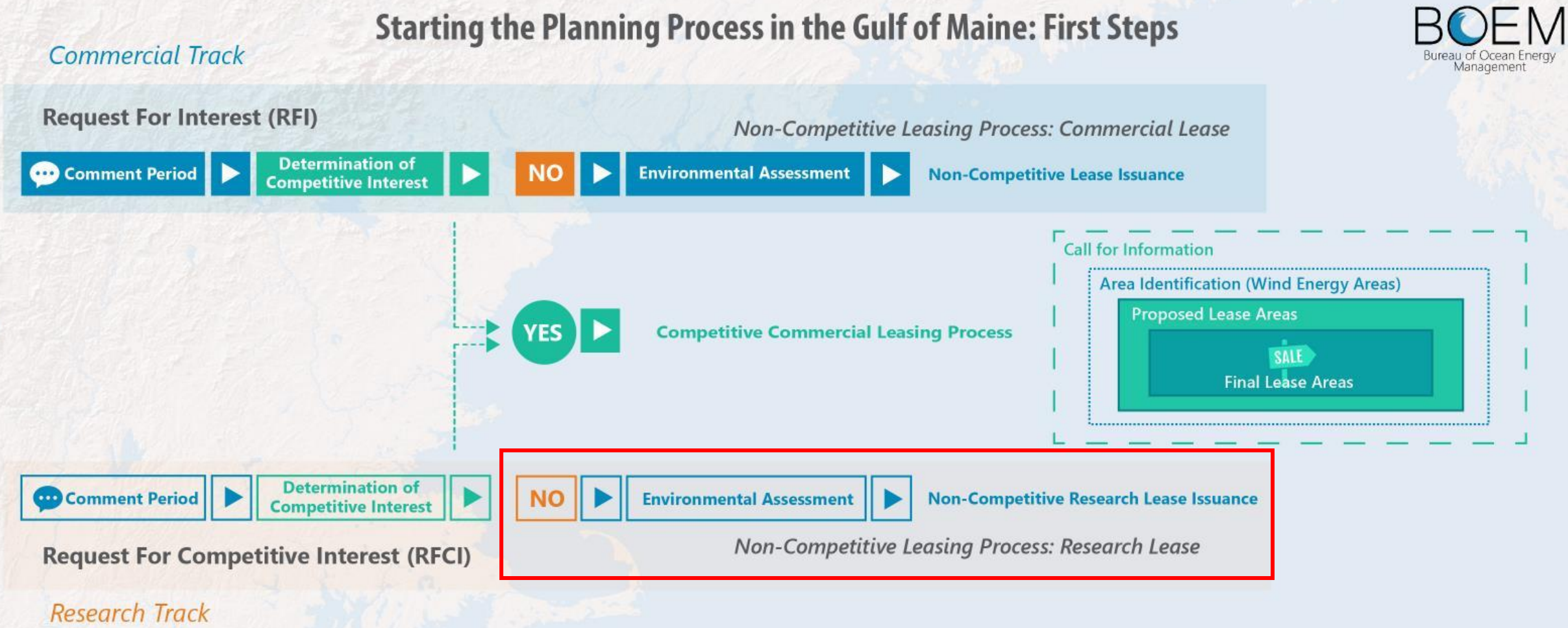


Gulf of Maine: Research & Commercial Tracks



August 2022

Gulf of Maine: Research & Commercial Tracks



August 2022

State of Maine Research Lease Application – Timeline

Milestone	Action	Target Date
Request for Competitive Interest (RFCI)	**Publish RFCI in FR** *45-Day Comment Period*	**Q3 2022**
Determination of Competitive Interest	**BOEM reviews indications of interest** *4 weeks*	**Q4 2022**
	BOEM publishes determination of no competitive interest (DNCI)*	**Q4 2022**
Environmental Assessment	**Publish Draft EA** *30-Day Comment Period*	**Q1 2023** *Q2 2023*
	Publish Final EA	**Q2 2023**
Issue Research Lease	**Execute Lease**	**Q2 2023**

*Timeline for non-competitive leasing process

How to Comment

- BOEM is published two documents in the Federal Register:
  1. Request for Interest (**RFI**) – first step in the **commercial** leasing process for the Gulf of Maine
  2. Request for Competitive Interest (**RFCI**) – Response to State of Maine **research** application

- The publication of these notices initiated two separate 45-day comment periods, closing on October 3rd.

- BOEM's How to Comment Fact Sheet

BOEM

Bureau of Ocean Energy Management

BOEM.gov

zachary.jylkka@boem.gov | (978) 491-7732

NOAA Northeast Fisheries Science Center

Right whales- foraging, distribution, and offshore wind development

Regulatory Context

Endangered Species Act

- Under section 7(a)(2) of the ESA, federal agencies must consult with NOAA Fisheries on activities that may affect a listed species and/or their critical habitat.
- The ESA requires that consultation be completed to insure that any federal action is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This assessment is carried out through the development of a biological assessment by the lead Federal agency and NMFS Biological Opinion.
- ESA consultations for offshore wind projects consider effects of construction, operations, and decommissioning on all ESA listed species and critical habitat in the action area. This includes consideration of effects to habitat and prey.

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Regulatory Context

Marine Mammal Protection Act - Sections 101(a)(5)(A) and (D)

The MMPA states that, upon request, the Secretary (of the Department of Commerce) shall allow the **incidental take** (but not intentional take) of **small numbers** of marine mammals pursuant to a specified activity (other than commercial fishing) within a specific geographic area if:

- After opportunity for public comment, the Secretary finds:
- The total taking will have a **negligible impact** on the affected species (or stock)
- The total taking will not have an **unmitigable adverse impact** on the availability of the affected species or stocks for **subsistence uses**

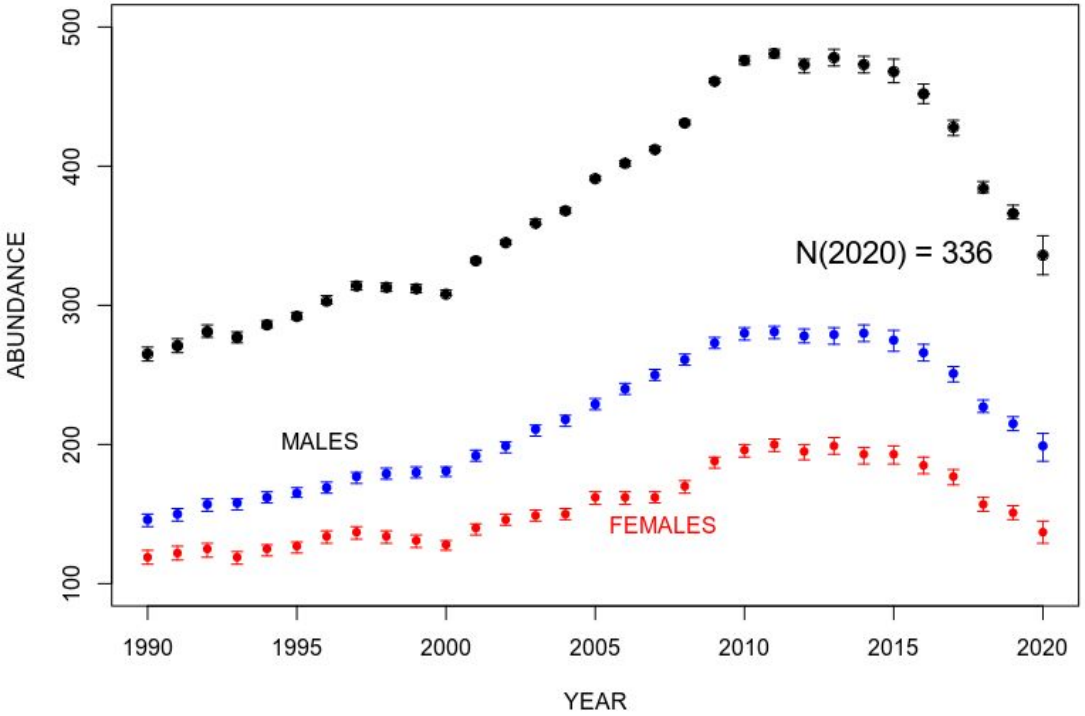
- The permissible methods of taking are clearly set forth

- Means of effecting the **least practicable adverse impact** on the affected species or stock and its habitat are set forth (**mitigation measures**), paying particular attention to rookeries, mating grounds, and areas of similar significance

- Requirements pertaining to the **monitoring and reporting** of the taking are set forth

Right whale population estimate update

As of the beginning of 2020



LCL=321

Median = 337

UCL=350

Females:

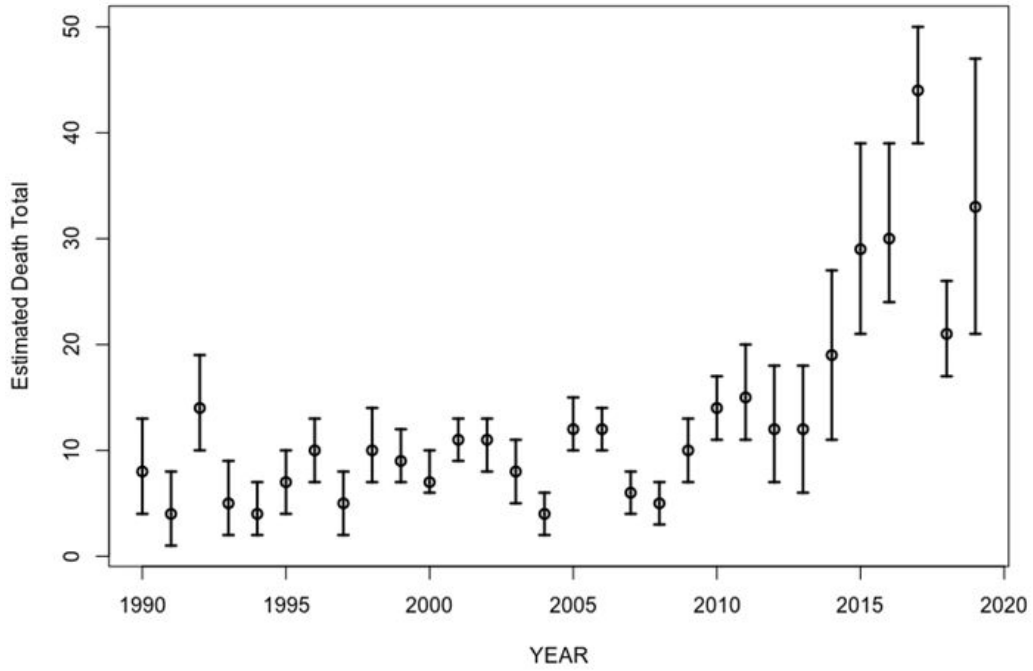
LCL=128

Median=137

UCL=145

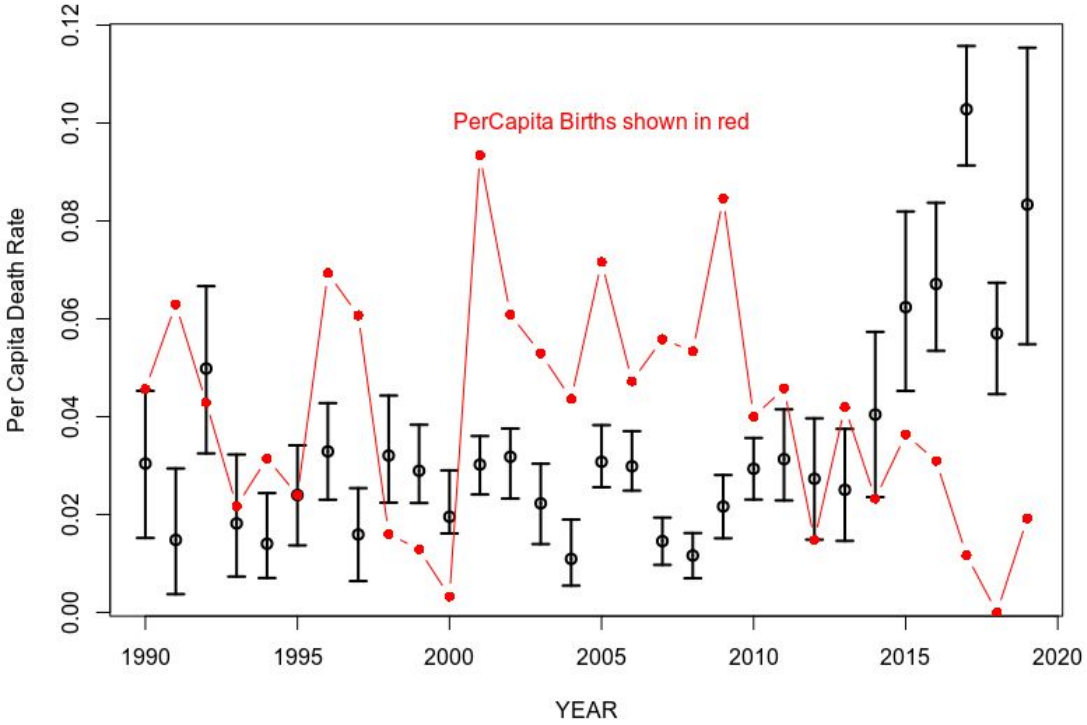
Known reproductive: ~68 with >50% probability of being alive

Estimated Annual Mortality



YEAR	EST Mort (median)	Obs Mort	Obs SI	Obs SI+M
2015	29	3	4	7
2016	30	4	9	13
2017	44	17	2	19
2018	21	3	6	9
2019	33	10	2	12

Birth rates are down…



Why?

- Ecosystem shifts
- Whale behavioral change
- More encounters between whales, fishing gear and ships
- Skinny whales don’t have babies

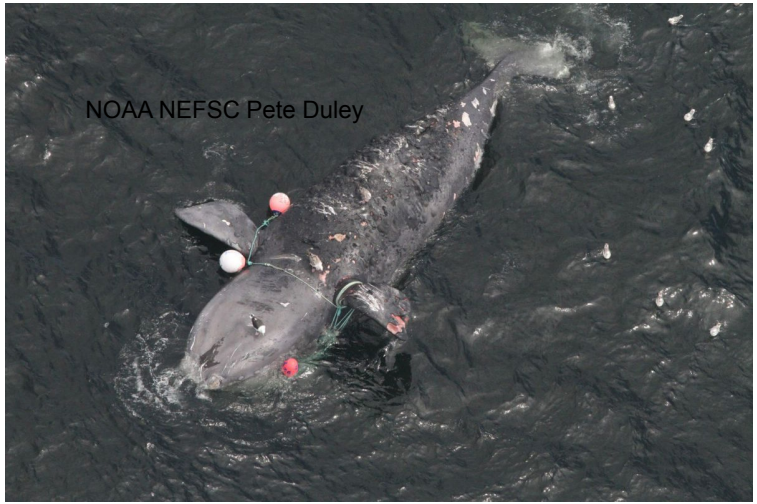
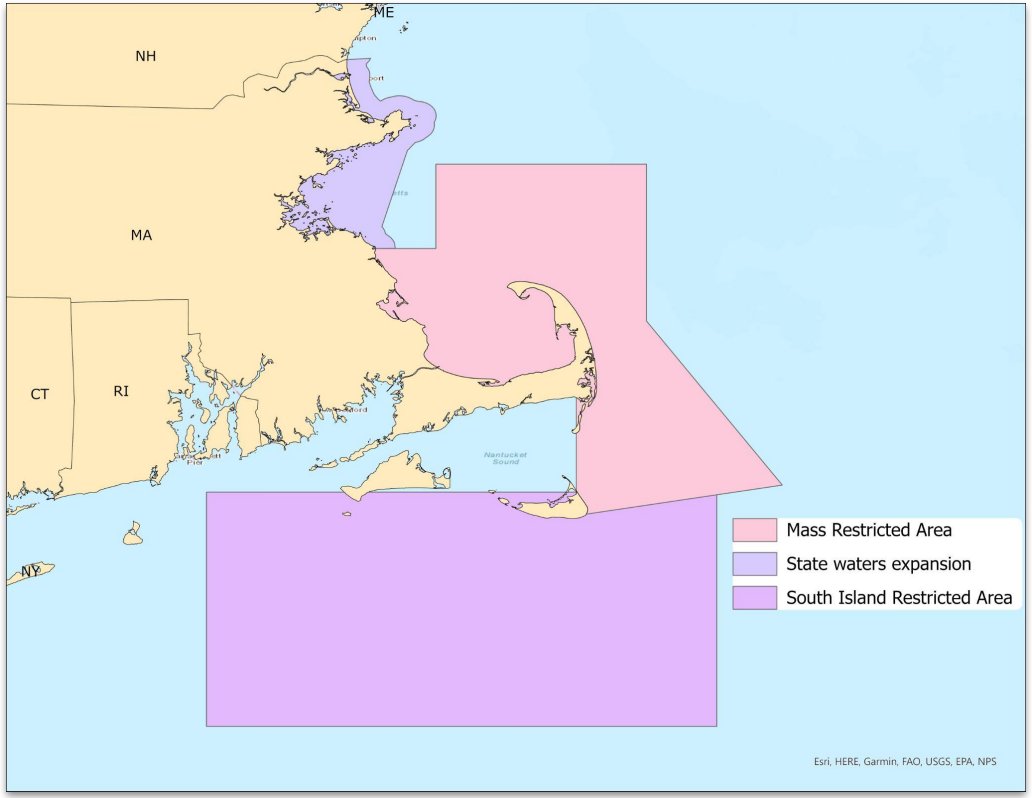


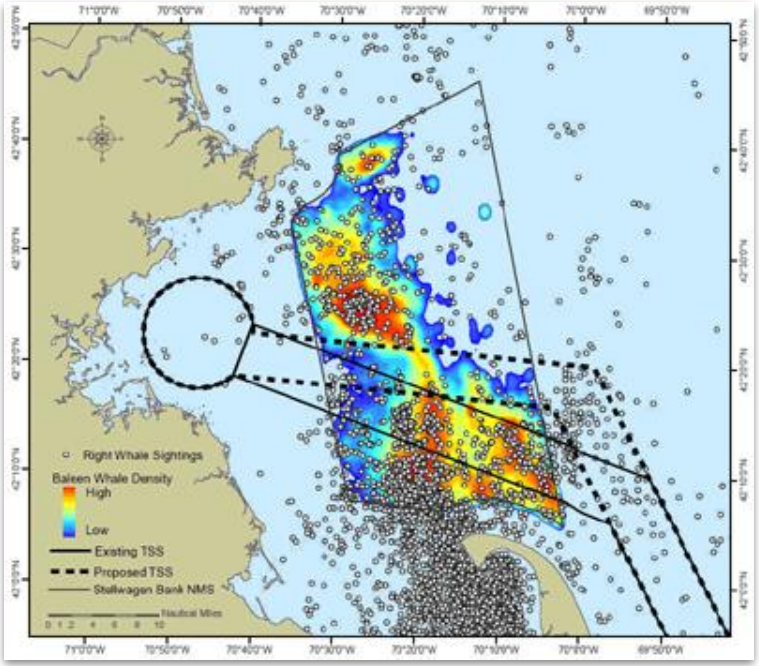
Photo: North Atlantic Right Whale (#3522); taken under NMFS/NOAA permit 655-1652-0. Photo Credit: Brenna Kraus/New England Aquarium

MA contributions to right whale conservation - entanglement



- Annual springtime closures to fixed gear fishing
  - State waters expansion beyond federal protections
- Pioneering use of sinking groundlines and weakened rope inserts/sleeves
- Extensive aerial survey monitoring program in state and federal waters to detect North Atlantic right whale presence

MA contributions to right whale conservation - vessel strikes



- In 2007, rotating the TSS to the north to reduce risk of strikes by 58% and to all baleen whales by 81%.
- In 2009, TSS into Boston was also narrowed – each lane reduced from 2 miles to 1.5 miles wide.

- In 2008, ship speed reduction rule implementing mandatory 10-knot speed restrictions and voluntary Dynamic Management Areas

https://www.andersoncabotcenterforoceanlife.org/blog/a-zoomed-in-look-at-our-aerial-survey-photographs/

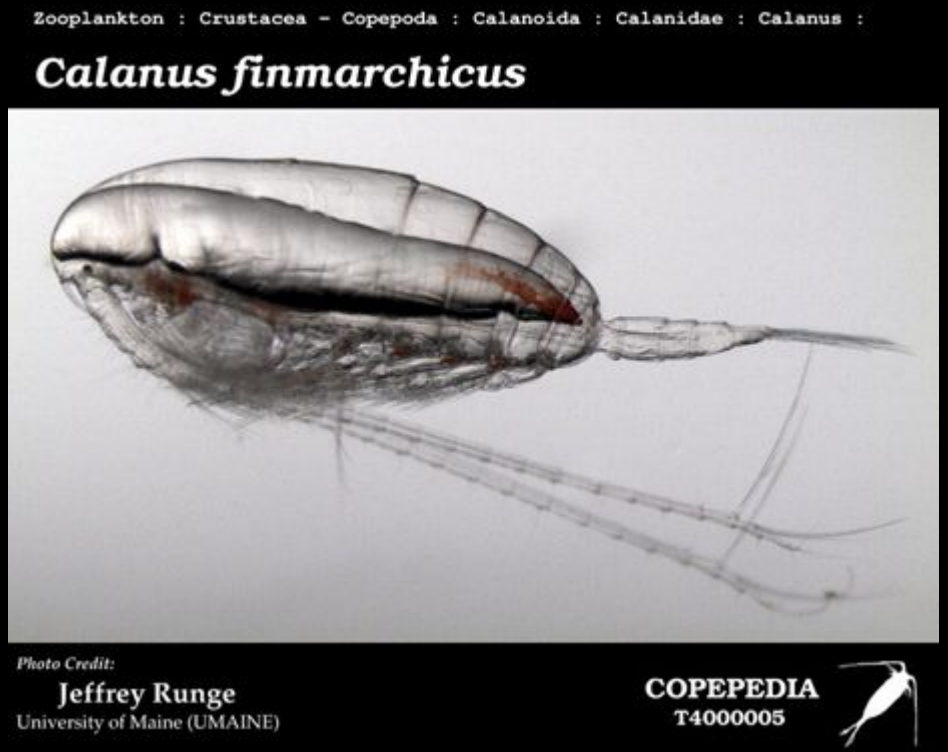
Foraging rates of ram-filtering North Atlantic right whales

	Bowhead Whale *Balaena mysticetus*	North Atlantic right whale *Eubalaena glacialis*	Whale shark *Rhincodon typus*	Basking shark *Cetorhinus maximus*
Gape Area	4.23 m^2	1–2 m^2	0.1 m^2	0.4 m^2
Body Length	12 m	10–14 m	6 m	4–6.5 m
Speed	0.7 m/s	1.2 m/s	0.3–1 m/s	0.85 m/s
Filtration Rate	3.0 m^3/s	1.4–2.4 m^3/s	0.01–0.1 m^3/s	0.3 m^3/s
Prey Concentration	1–10 g/m^3	>170 g/m^3 10^3–10^5 copepods/m^3	10^4 plankton/m^3	0.3–3 g/m^3
Pause Interval	150 s	50 s	120–180 s	30–60 s
References	Werth (2004) Simon et al. (2009) Laidre et al. (2007)	This study Murison & Gaskin (1989) Baumgartner & Mate (2003)	Nelson & Eckert (2007) Motta et al. (2010)	Hallacher (1977) Sims (2000)

Functional Ecology, Volume: 33, Issue: 7, Pages: 1290-1306, First published: 11 May 2019, DOI: (10.1111/1365-2435.13357)

Plankton disruption concerns

1. Abundance
2. Aggregation
3. Energy content

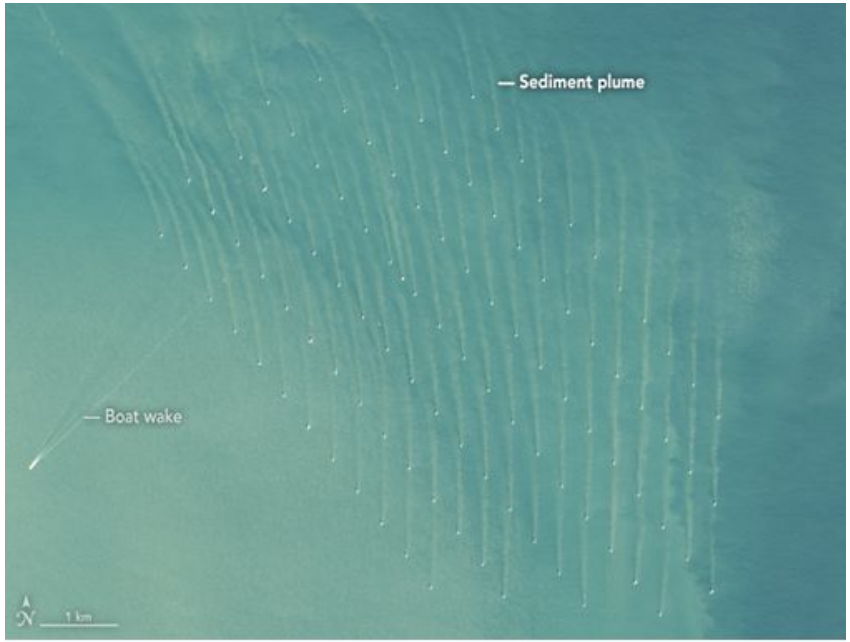


Potential conservation concerns with wind development

- Vessel Strikes
- Noise
- Fisheries Displacement
- Habitat alterations
- Oceanographic processes
- Increased entanglement in fishing gear

- All of the above scaled up across many projects

Structural impacts above and below the surface



https://earthobservatory.nasa.gov/images/89063/offshore-wind-farms-make-wakes

Wake effects of concern

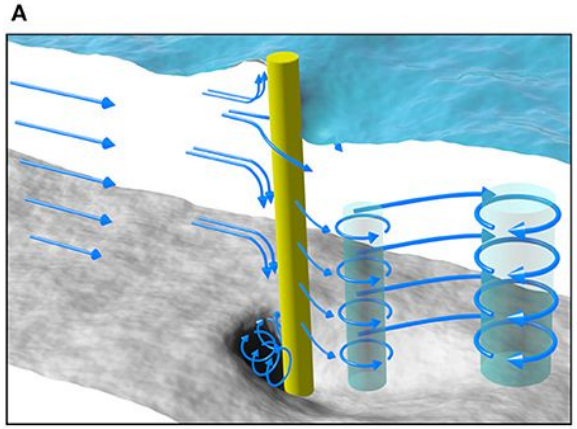
- Attenuation/energy loss
- ‘Damming’ effect
- Large scale dipoles
- Lateral and vertical flow change
- Stratification effects
  - Temperature
  - Salinity
- Magnitudes ? 1->10%?
- Changes to primary and secondary productivity?

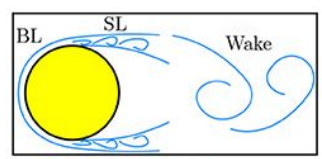
Christiansen, N., U. Daewel, B. Djath, and C. Schrum. 2022. Emergence of Large-Scale Hydrodynamic Structures Due to Atmospheric Offshore Wind Farm Wakes. Front. Mar. Sci., 03 February 2022 | https://doi.org/10.3389/fmars.2022.818501.

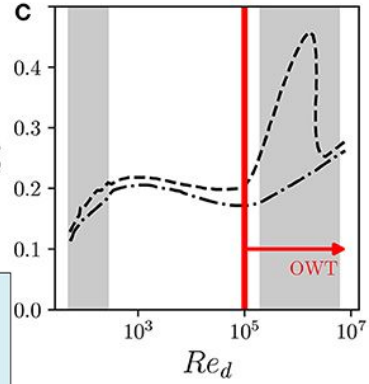
Golbazi, M., C. L. Archer, and S. Alessandrini. 2022. Surface impacts of large offshore wind farms. J Environmental Research Letters 17:064021.

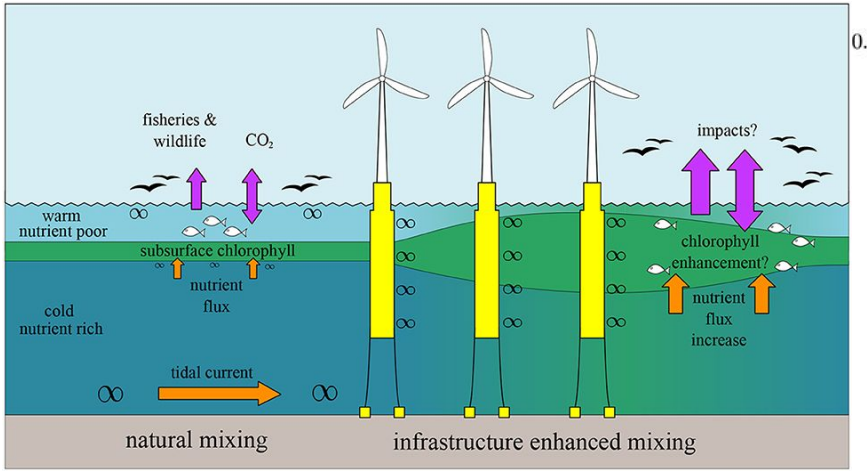
Sub-surface Mixing effects

- Wake turbulence
- Mixes cool bottom & warm surface water
  - Nutrient flux ↑
  - Chlorophyll ↑
  - Plankton?
- Reduce stratification









Dorrell, R. M., C. J. Lloyd, B. J. Lincoln, T. P. Rippeth, J. R. Taylor, C.-c. P. Caulfield, J. Sharples, J. A. Polton, B. D. Scannell, D. M. Greaves, R. A. Hall, and J. H. Simpson. 2022. Anthropogenic Mixing in Seasonally Stratified Shelf Seas by Offshore Wind Farm Infrastructure. Front. Mar. Sci., 22 March 2022 | https://doi.org/10.3389/fmars.2022.830927.

North Atlantic Right Whale Density Model Version 12

Brief Overview for the ALWTRT

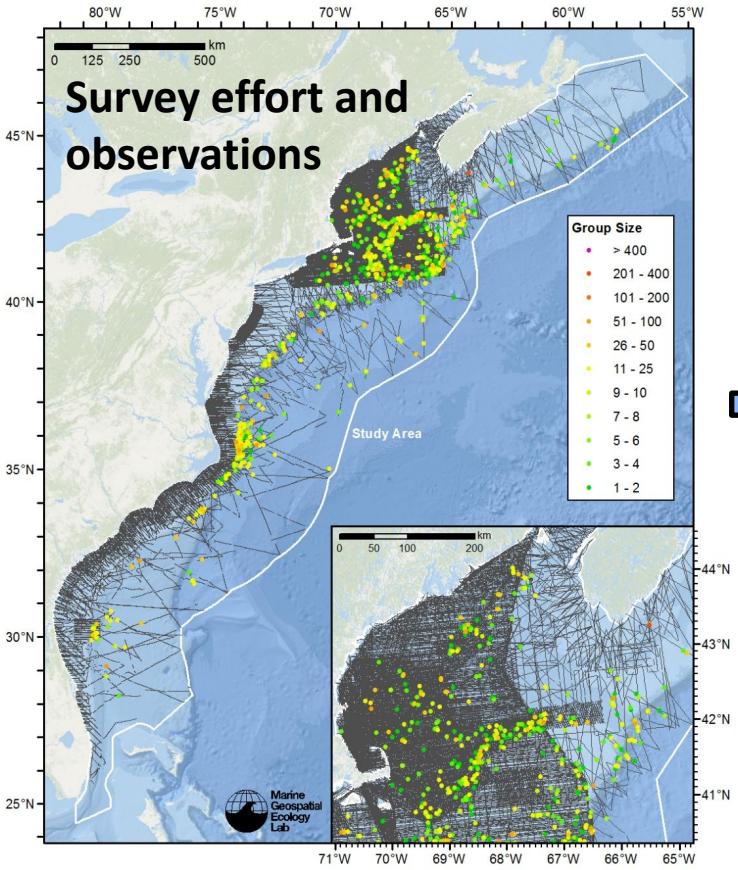
29 March 2022

Jason Roberts
Marine Geospatial Ecology Lab
Duke University

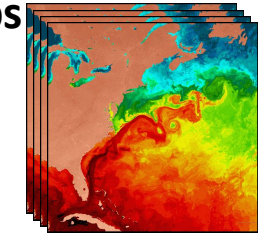
Duke | NICHOLAS SCHOOL OF THE ENVIRONMENT

Photo: NOAA Fisheries / Christin Khan (Permit #17355)

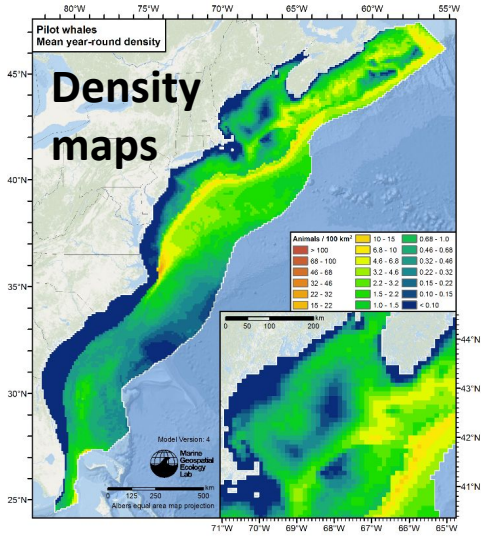
The basic idea:

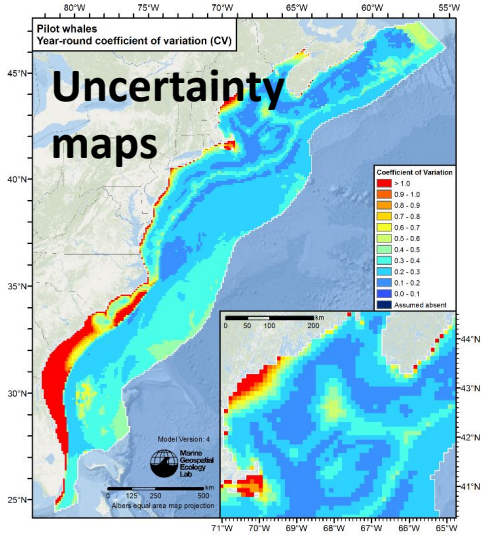


Oceanographic maps



Statistical models

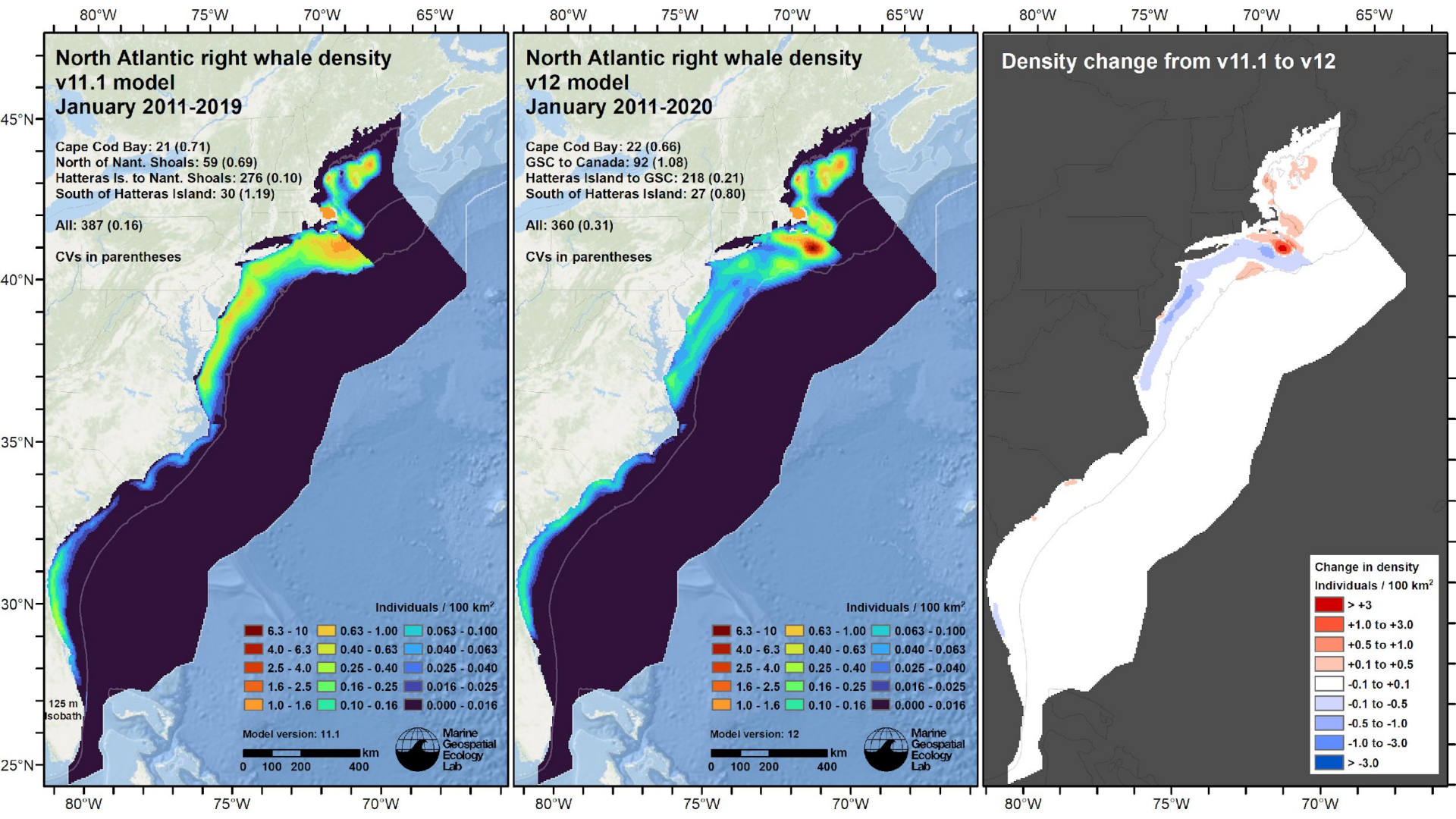


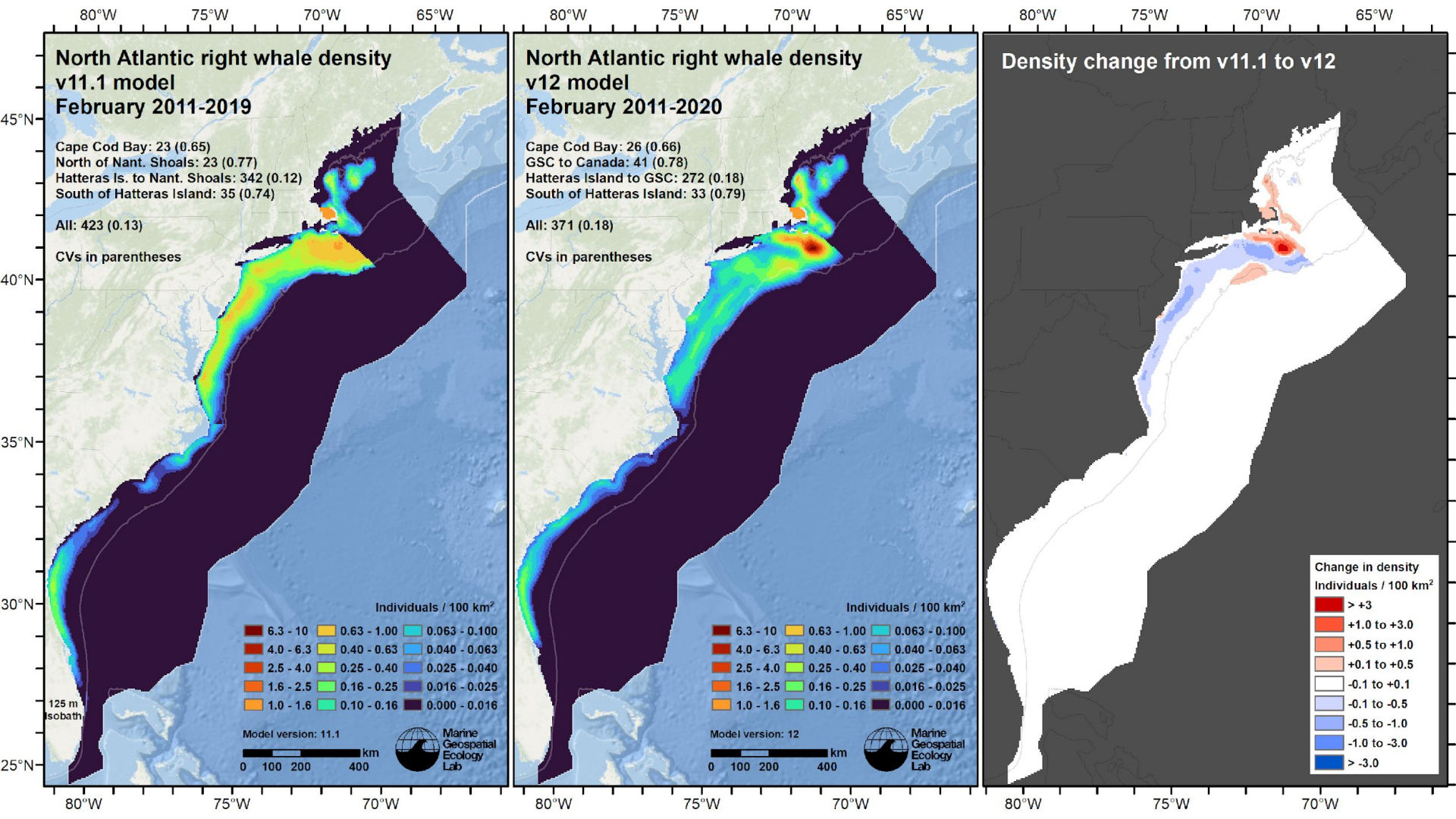


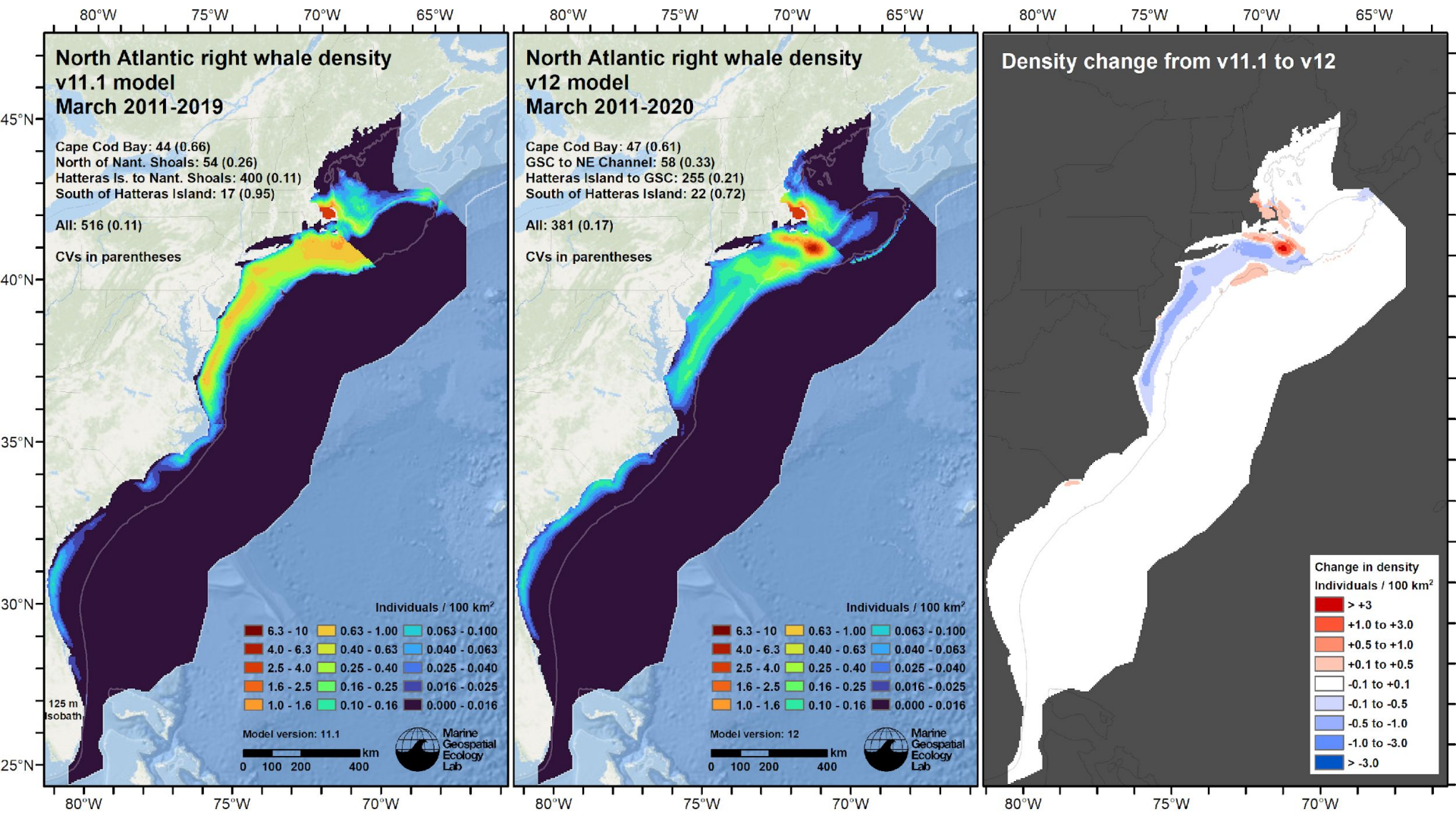
Density = individuals / km^2

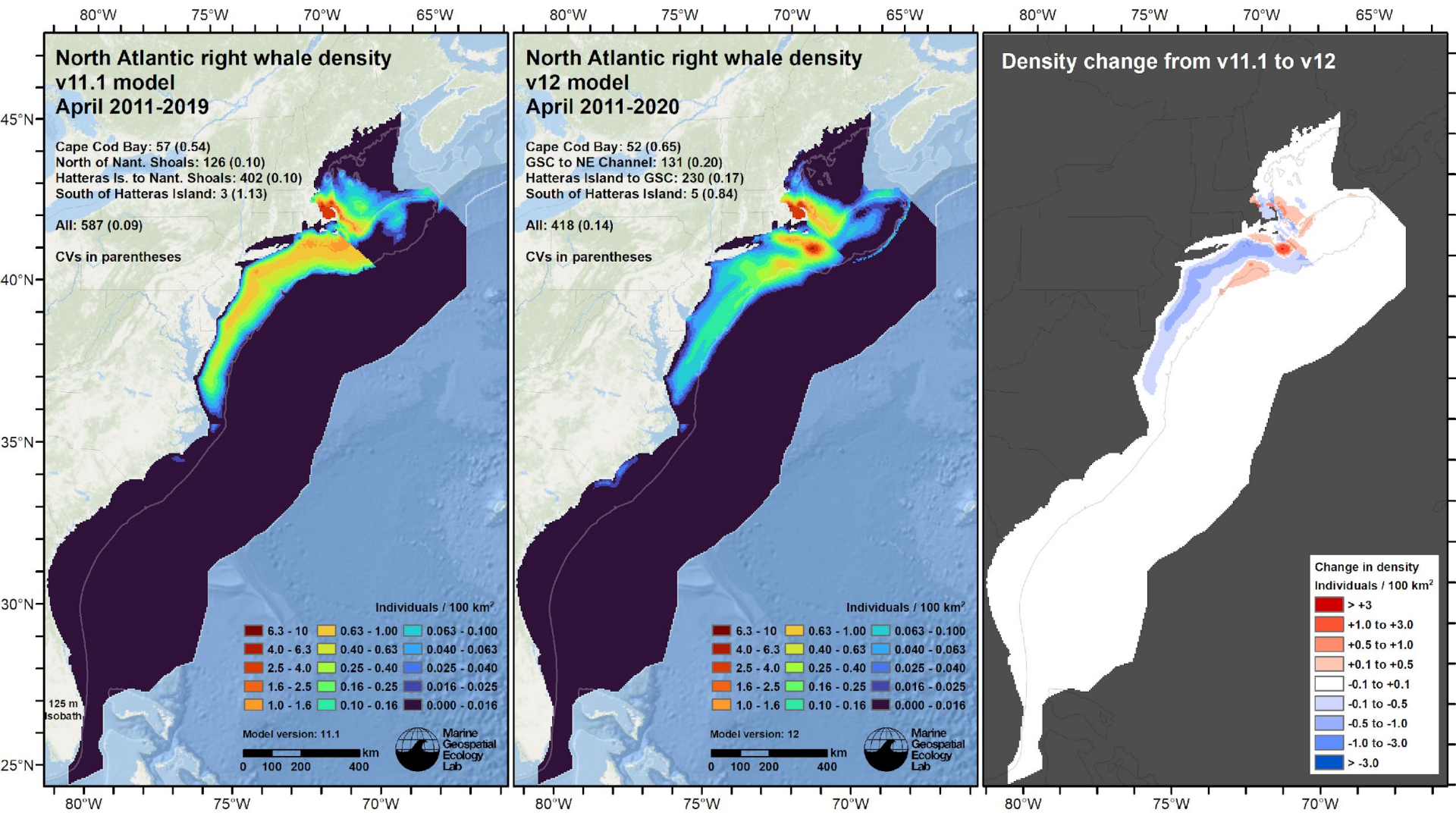
Highlights for NARW density model version 12

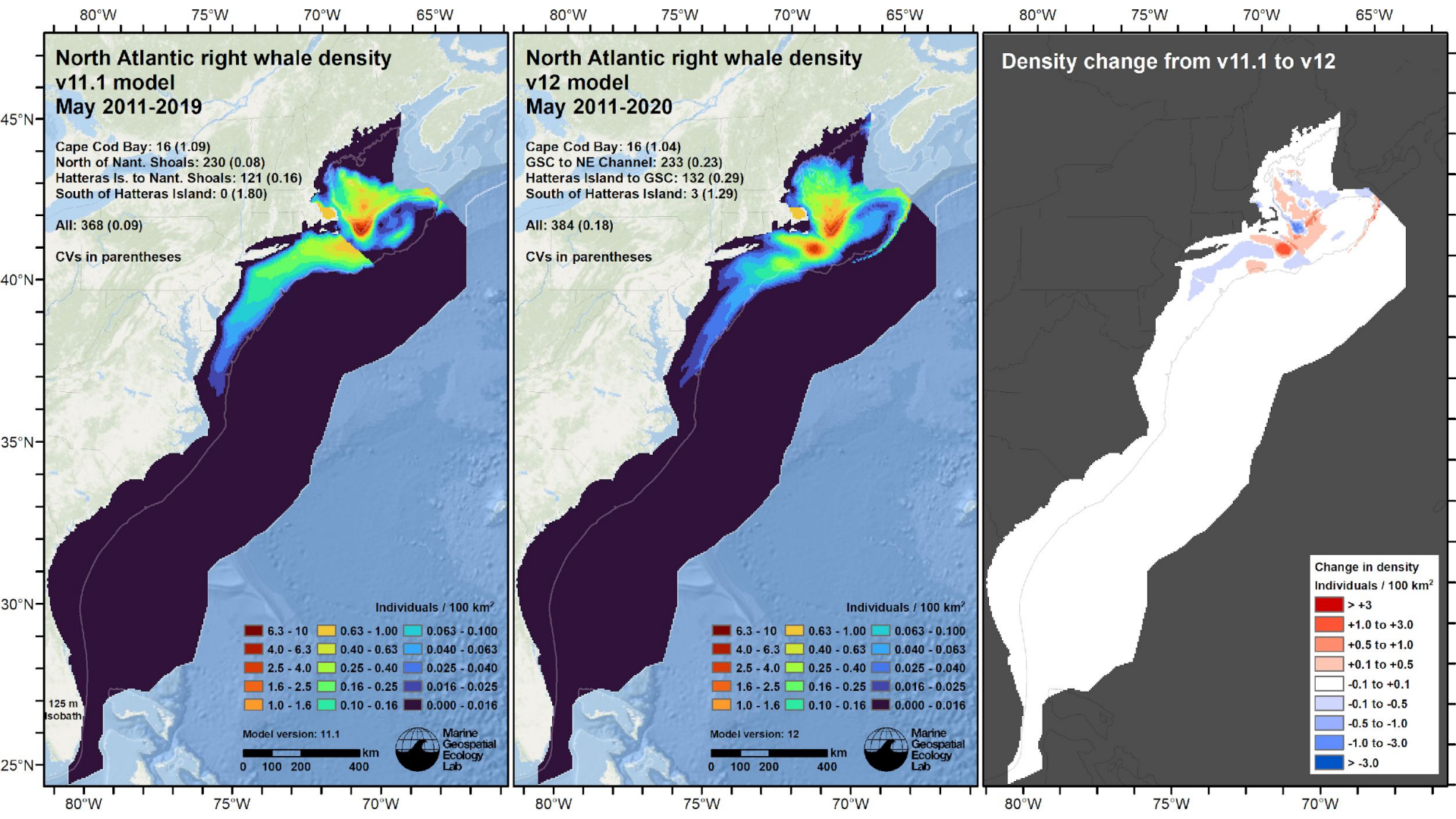
- Extended model forward with new data
  - v11: June 2003 - May 2019
  - v12: October 2003 - September 2020
- Refitted all detection functions and spatial models (last done in v9)
- Adjusted spatial models to better differentiate mid-Atlantic and SNE
  - Compared v11 model predictions to detectability-corrected SPUE summarized over geomorphic strata scaled to account for variability in survey effort
  - Results confirmed density was likely much higher in SNE than mid-Atlantic
  - Intensifies in v12: in 2019-2020, NARW sighted in SNE every month except October
  - In v12, we incorporated additional primary productivity and spatial covariates to better differentiate the areas
    - Eventually we'll try zooplankton models under development by N. Record, C. Ross, et al.

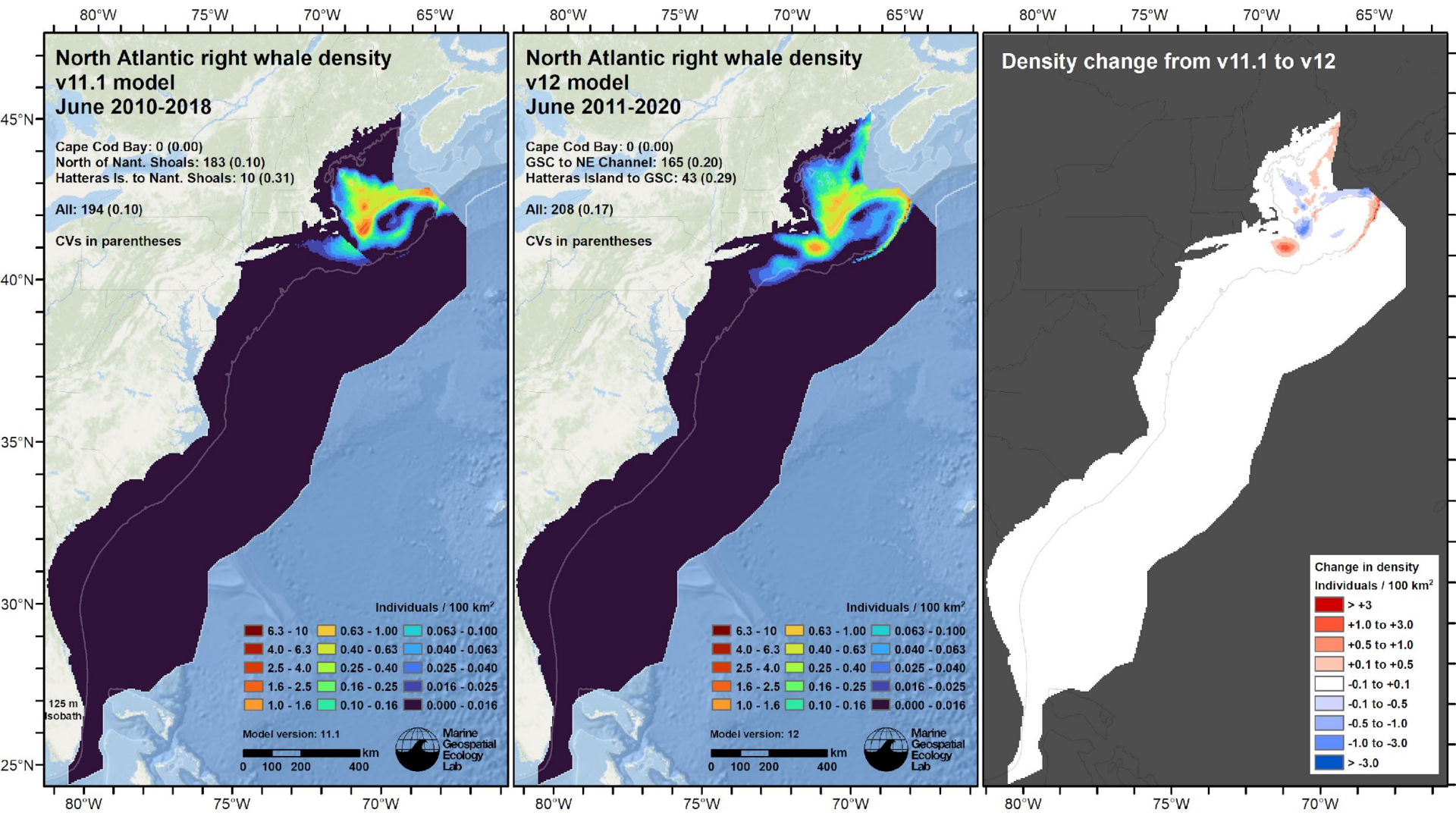

North Atlantic right whale density
v11.1 model
January 2011-2019
Cape Cod Bay: 21 (0.71)
North of Nant. Shoals: 59 (0.69)
Hatteras Is. to Nant. Shoals: 276 (0.10)
South of Hatteras Island: 30 (1.19)
All: 387 (0.16)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
0 100 200 400 km
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
January 2011-2020
Cape Cod Bay: 22 (0.66)
GSC to Canada: 92 (1.08)
Hatteras Island to GSC: 218 (0.21)
South of Hatteras Island: 27 (0.80)
All: 360 (0.31)
CVs in parentheses
Individuals / 100 km²
Model version: 12
0 100 200 400 km
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

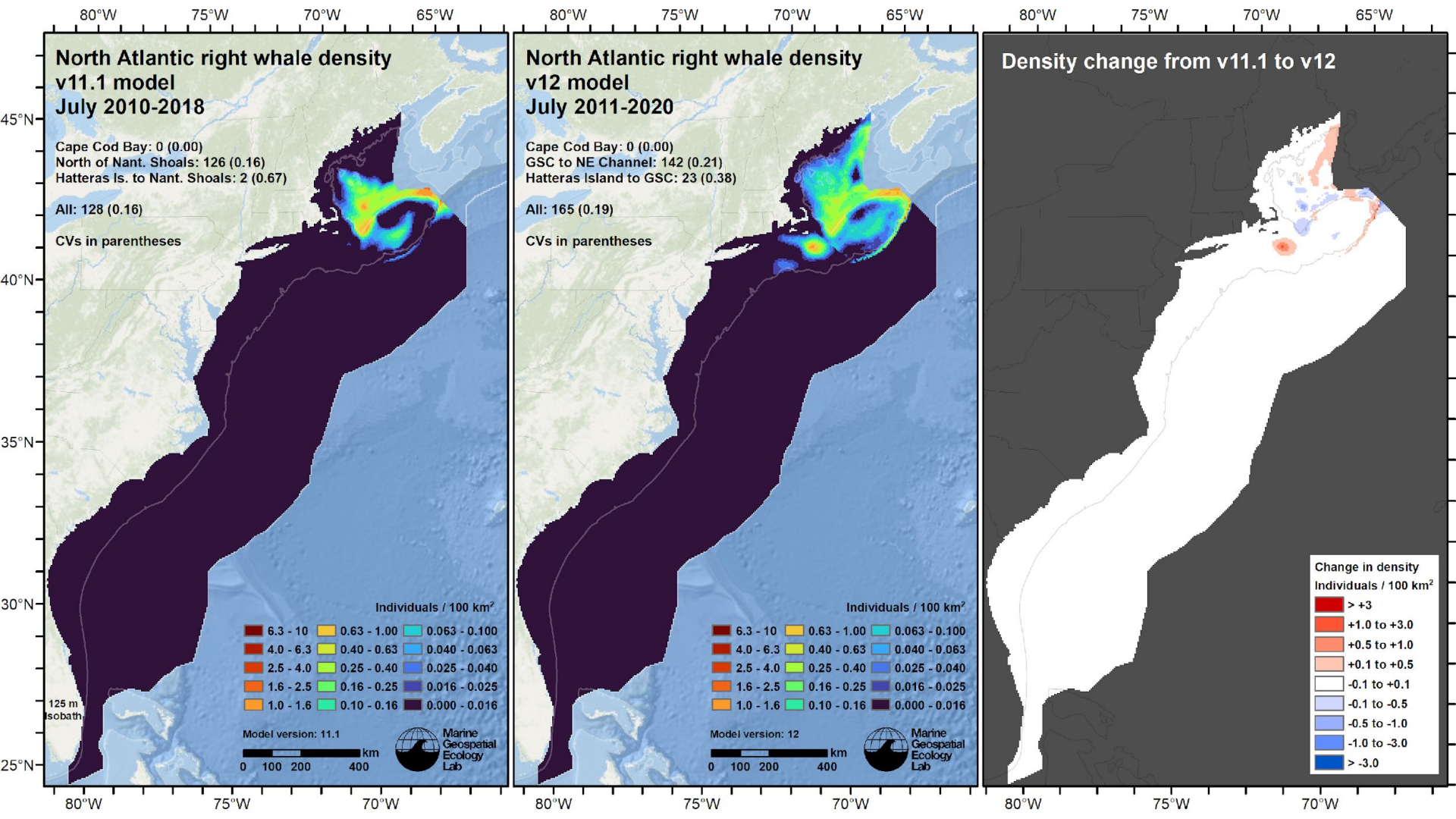

North Atlantic right whale density
v11.1 model
February 2011-2019
Cape Cod Bay: 23 (0.65)
North of Nant. Shoals: 23 (0.77)
Hatteras Is. to Nant. Shoals: 342 (0.12)
South of Hatteras Island: 35 (0.74)
All: 423 (0.13)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
km
0 100 200 400
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
February 2011-2020
Cape Cod Bay: 26 (0.66)
GSC to Canada: 41 (0.78)
Hatteras Island to GSC: 272 (0.18)
South of Hatteras Island: 33 (0.79)
All: 371 (0.18)
CVs in parentheses
Individuals / 100 km²
Model version: 12
km
0 100 200 400
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

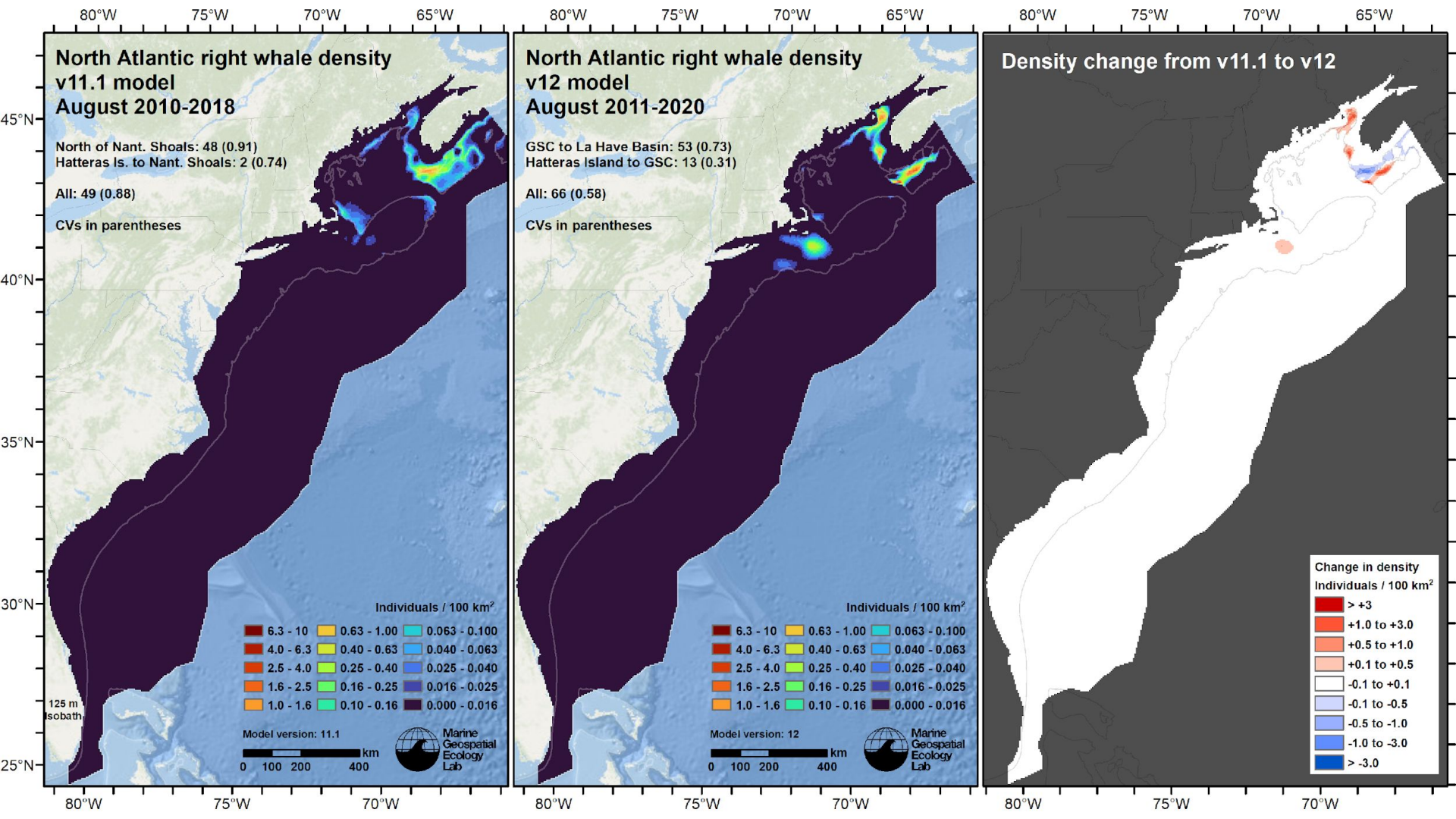

North Atlantic right whale density
v11.1 model
March 2011-2019
Cape Cod Bay: 44 (0.66)
North of Nant. Shoals: 54 (0.26)
Hatteras Is. to Nant. Shoals: 400 (0.11)
South of Hatteras Island: 17 (0.95)
All: 516 (0.11)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
km
0 100 200 400
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
March 2011-2020
Cape Cod Bay: 47 (0.61)
GSC to NE Channel: 58 (0.33)
Hatteras Island to GSC: 255 (0.21)
South of Hatteras Island: 22 (0.72)
All: 381 (0.17)
CVs in parentheses
Individuals / 100 km²
Model version: 12
km
0 100 200 400
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

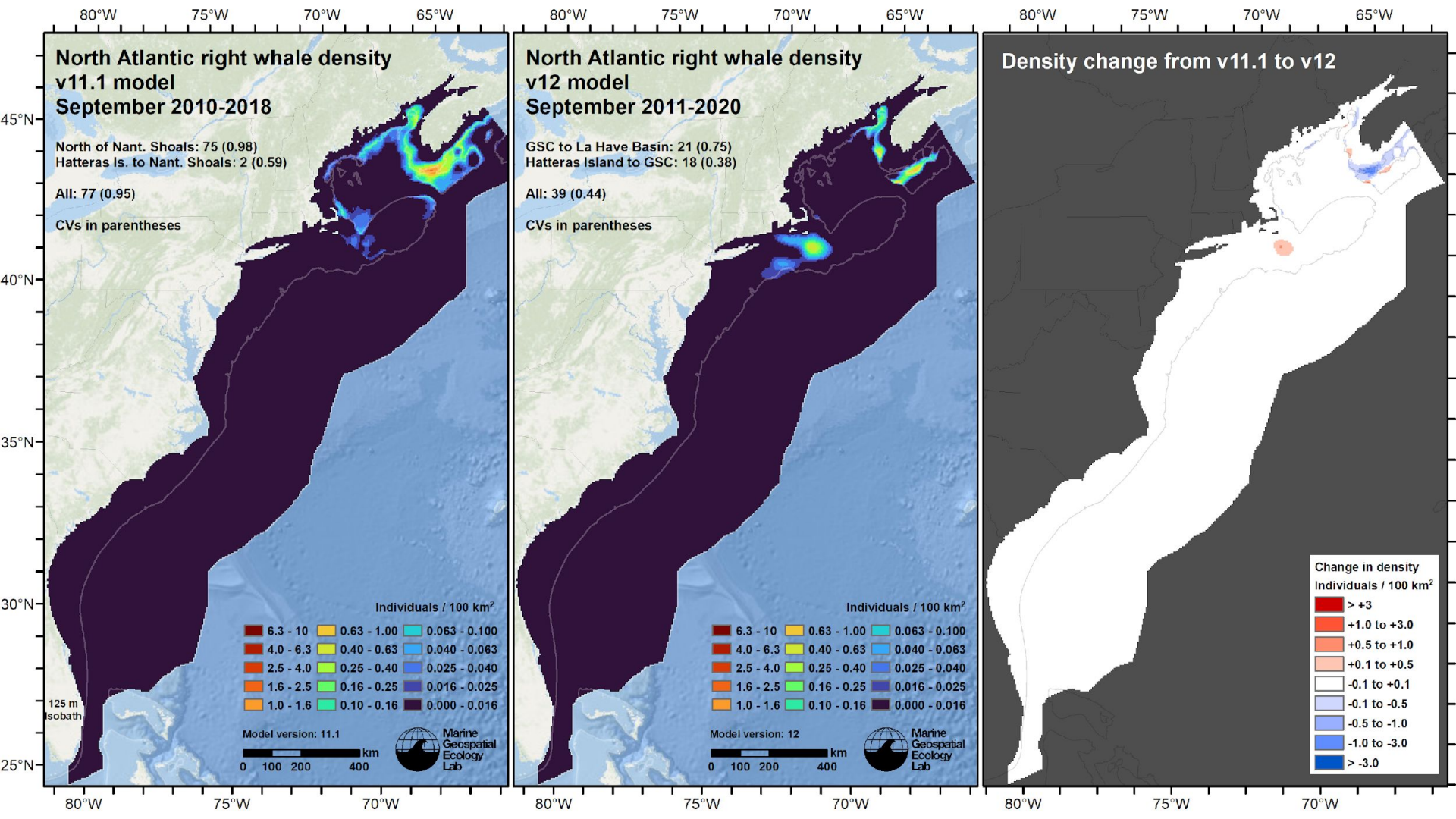

North Atlantic right whale density
v11.1 model
April 2011-2019
Cape Cod Bay: 57 (0.54)
North of Nant. Shoals: 126 (0.10)
Hatteras Is. to Nant. Shoals: 402 (0.10)
South of Hatteras Island: 3 (1.13)
All: 587 (0.09)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
0 100 200 400 km
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
April 2011-2020
Cape Cod Bay: 52 (0.65)
GSC to NE Channel: 131 (0.20)
Hatteras Island to GSC: 230 (0.17)
South of Hatteras Island: 5 (0.84)
All: 418 (0.14)
CVs in parentheses
Individuals / 100 km²
Model version: 12
0 100 200 400 km
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

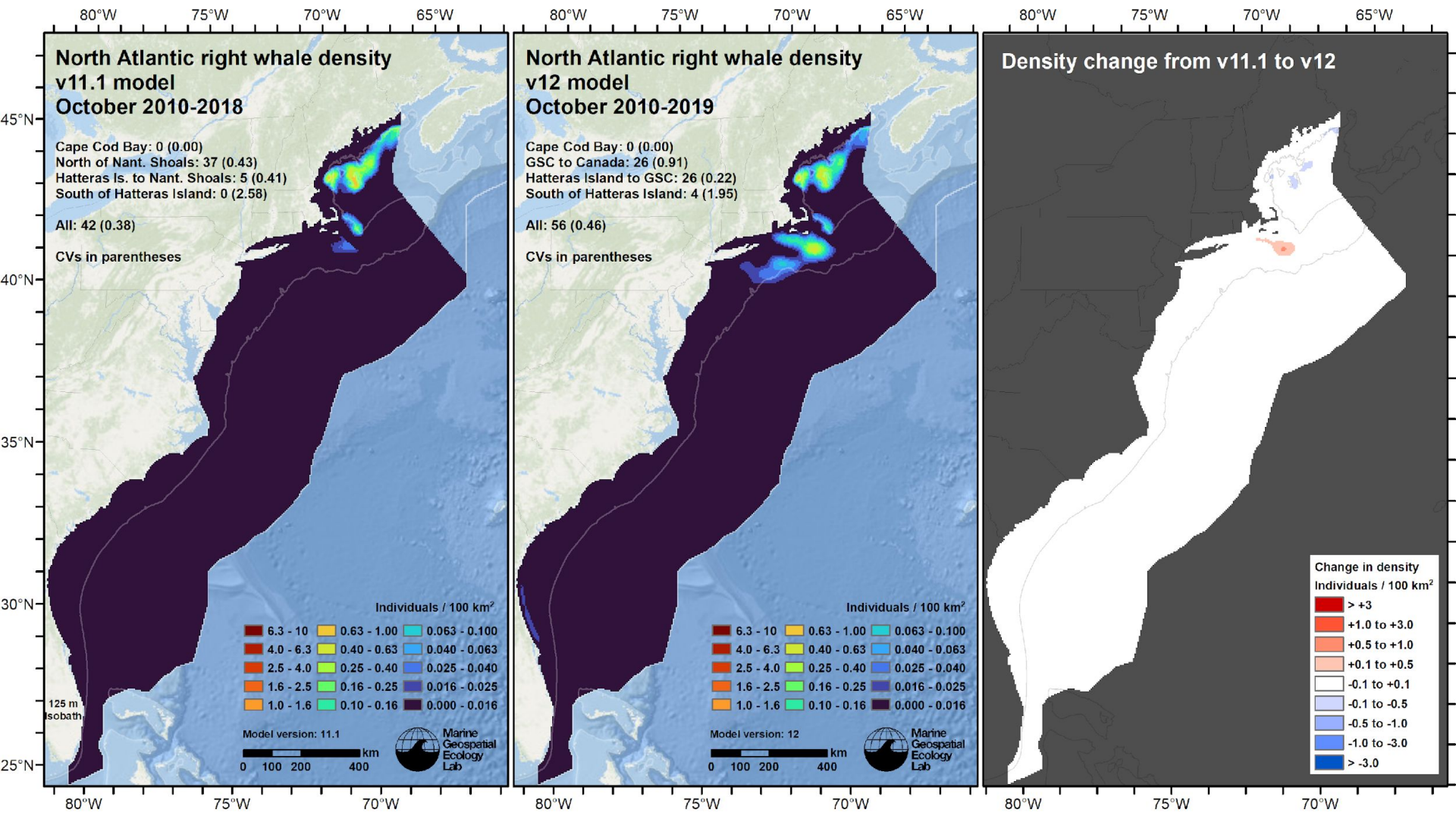

North Atlantic right whale density
v11.1 model
May 2011-2019
Cape Cod Bay: 16 (1.09)
North of Nant. Shoals: 230 (0.08)
Hatteras Is. to Nant. Shoals: 121 (0.16)
South of Hatteras Island: 0 (1.80)
All: 368 (0.09)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
0 100 200 400 km
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
May 2011-2020
Cape Cod Bay: 16 (1.04)
GSC to NE Channel: 233 (0.23)
Hatteras Island to GSC: 132 (0.29)
South of Hatteras Island: 3 (1.29)
All: 384 (0.18)
CVs in parentheses
Individuals / 100 km²
Model version: 12
0 100 200 400 km
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

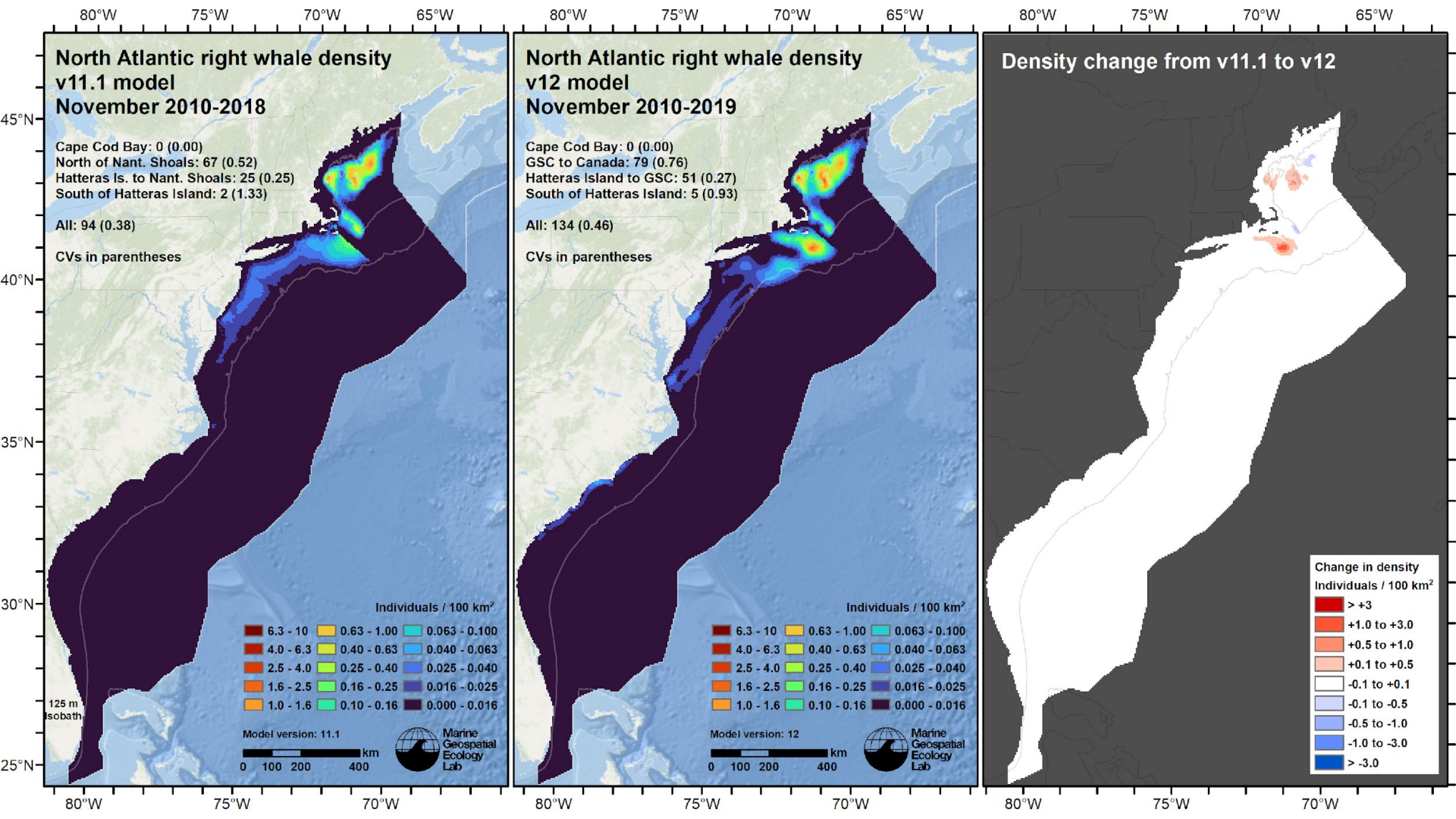

North Atlantic right whale density
v11.1 model
June 2010-2018
Cape Cod Bay: 0 (0.00)
North of Nant. Shoals: 183 (0.10)
Hatteras Is. to Nant. Shoals: 10 (0.31)
All: 194 (0.10)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
km
0 100 200 400
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
June 2011-2020
Cape Cod Bay: 0 (0.00)
GSC to NE Channel: 165 (0.20)
Hatteras Island to GSC: 43 (0.29)
All: 208 (0.17)
CVs in parentheses
Individuals / 100 km²
Model version: 12
km
0 100 200 400
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

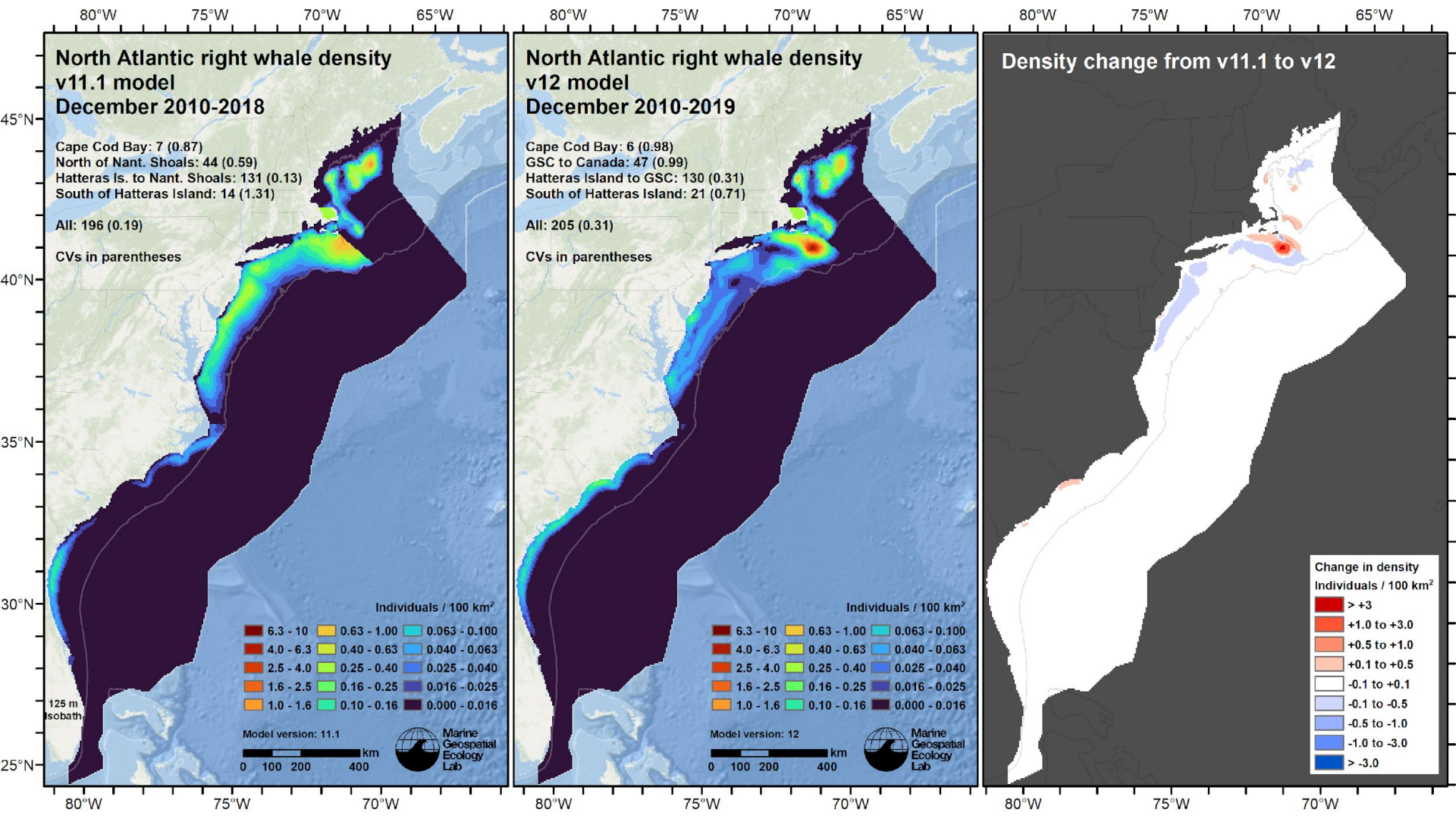

North Atlantic right whale density
v11.1 model
July 2010-2018
Cape Cod Bay: 0 (0.00)
North of Nant. Shoals: 126 (0.16)
Hatteras Is. to Nant. Shoals: 2 (0.67)
All: 128 (0.16)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m Isobath
Model version: 11.1
km
0 100 200 400
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
July 2011-2020
Cape Cod Bay: 0 (0.00)
GSC to NE Channel: 142 (0.21)
Hatteras Island to GSC: 23 (0.38)
All: 165 (0.19)
CVs in parentheses
Individuals / 100 km²
Model version: 12
km
0 100 200 400
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

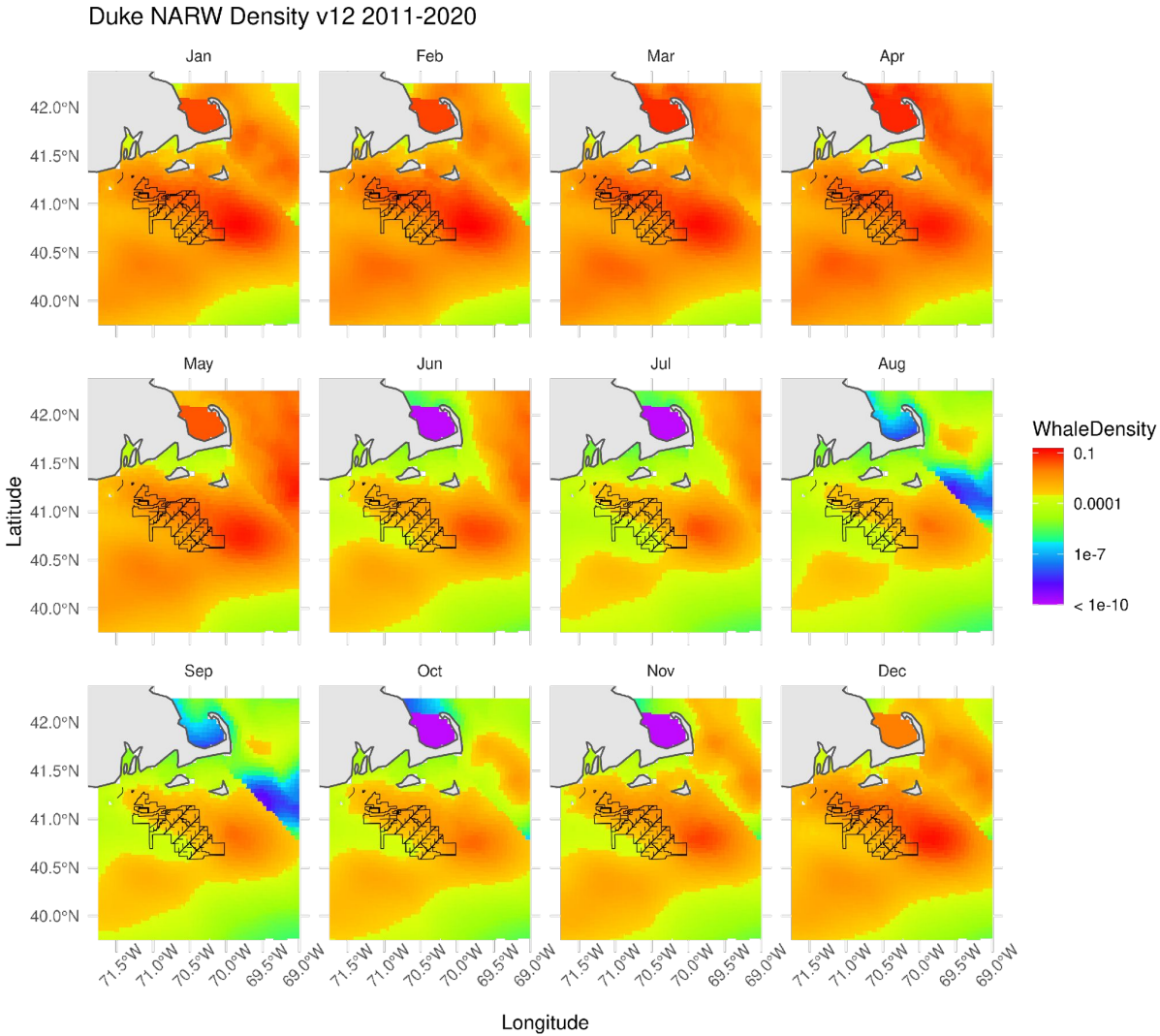

North Atlantic right whale density
v11.1 model
August 2010-2018
North of Nant. Shoals: 48 (0.91)
Hatteras Is. to Nant. Shoals: 2 (0.74)
All: 49 (0.88)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
km
0 100 200 400
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
August 2011-2020
GSC to La Have Basin: 53 (0.73)
Hatteras Island to GSC: 13 (0.31)
All: 66 (0.58)
CVs in parentheses
Individuals / 100 km²
Model version: 12
km
0 100 200 400
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

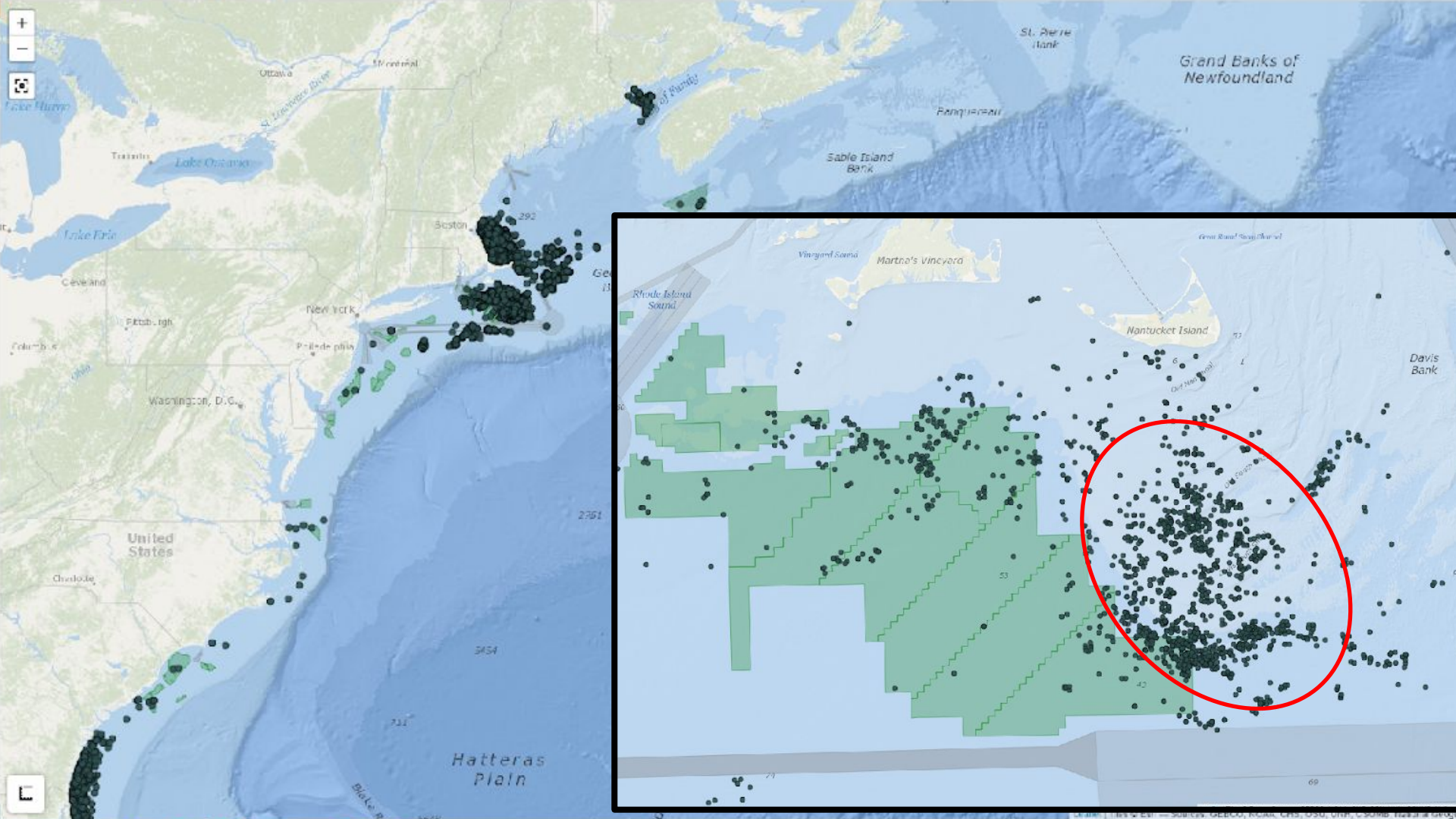

North Atlantic right whale density
v11.1 model
September 2010-2018
North of Nant. Shoals: 75 (0.98)
Hatteras Is. to Nant. Shoals: 2 (0.59)
All: 77 (0.95)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
km
0 100 200 400
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
September 2011-2020
GSC to La Have Basin: 21 (0.75)
Hatteras Island to GSC: 18 (0.38)
All: 39 (0.44)
CVs in parentheses
Individuals / 100 km²
Model version: 12
km
0 100 200 400
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N

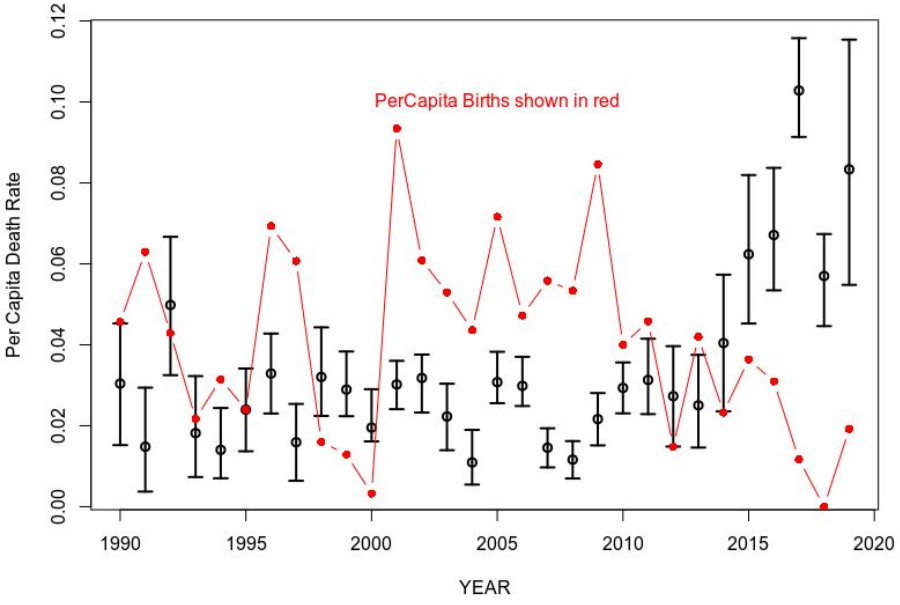

North Atlantic right whale density
v11.1 model
October 2010-2018
Cape Cod Bay: 0 (0.00)
North of Nant. Shoals: 37 (0.43)
Hatteras Is. to Nant. Shoals: 5 (0.41)
South of Hatteras Island: 0 (2.58)
All: 42 (0.38)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
km
0 100 200 400
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
October 2010-2019
Cape Cod Bay: 0 (0.00)
GSC to Canada: 26 (0.91)
Hatteras Island to GSC: 26 (0.22)
South of Hatteras Island: 4 (1.95)
All: 56 (0.46)
CVs in parentheses
Individuals / 100 km²
Model version: 12
km
0 100 200 400
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N


North Atlantic right whale density
v11.1 model
November 2010-2018
Cape Cod Bay: 0 (0.00)
North of Nant. Shoals: 67 (0.52)
Hatteras Is. to Nant. Shoals: 25 (0.25)
South of Hatteras Island: 2 (1.33)
All: 94 (0.38)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
0 100 200 400 km
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
November 2010-2019
Cape Cod Bay: 0 (0.00)
GSC to Canada: 79 (0.76)
Hatteras Island to GSC: 51 (0.27)
South of Hatteras Island: 5 (0.93)
All: 134 (0.46)
CVs in parentheses
Individuals / 100 km²
Model version: 12
0 100 200 400 km
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N


North Atlantic right whale density
v11.1 model
December 2010-2018
Cape Cod Bay: 7 (0.87)
North of Nant. Shoals: 44 (0.59)
Hatteras Is. to Nant. Shoals: 131 (0.13)
South of Hatteras Island: 14 (1.31)
All: 196 (0.19)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
125 m isobath
Model version: 11.1
0 100 200 400 km
Marine Geospatial Ecology Lab
North Atlantic right whale density
v12 model
December 2010-2019
Cape Cod Bay: 6 (0.98)
GSC to Canada: 47 (0.99)
Hatteras Island to GSC: 130 (0.31)
South of Hatteras Island: 21 (0.71)
All: 205 (0.31)
CVs in parentheses
Individuals / 100 km²
Model version: 12
0 100 200 400 km
Marine Geospatial Ecology Lab
Density change from v11.1 to v12
Change in density
Individuals / 100 km²
> +3
+1.0 to +3.0
+0.5 to +1.0
+0.1 to +0.5
-0.1 to +0.1
-0.1 to -0.5
-0.5 to -1.0
-1.0 to -3.0
> -3.0
80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
25°N


Duke NARW Density v12 2011-2020
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
42.0°N
41.5°N
41.0°N
40.5°N
40.0°N
Latitude
71.5°W
71.0°W
70.5°W
70.0°W
69.5°W
69.0°W
Longitude
WhaleDensity
0.1
0.0001
1e-7
< 1e-10


St. Pierre Bank
Grand Banks of Newfoundland
Sable Island Bank
Lake Ontario
Lake Erie
Boston
New York
Washington, D.C.
United States
Hatteras Plain
Vineyard Sound
Martha's Vineyard
Rhode Island Sound
Nantucket Island
Davis Bank


PerCapita Births shown in red
Per Capita Death Rate
0.00
0.02
0.04
0.06
0.08
0.10
0.12
1990
1995
2000
2005
2010
2015
2020
YEAR

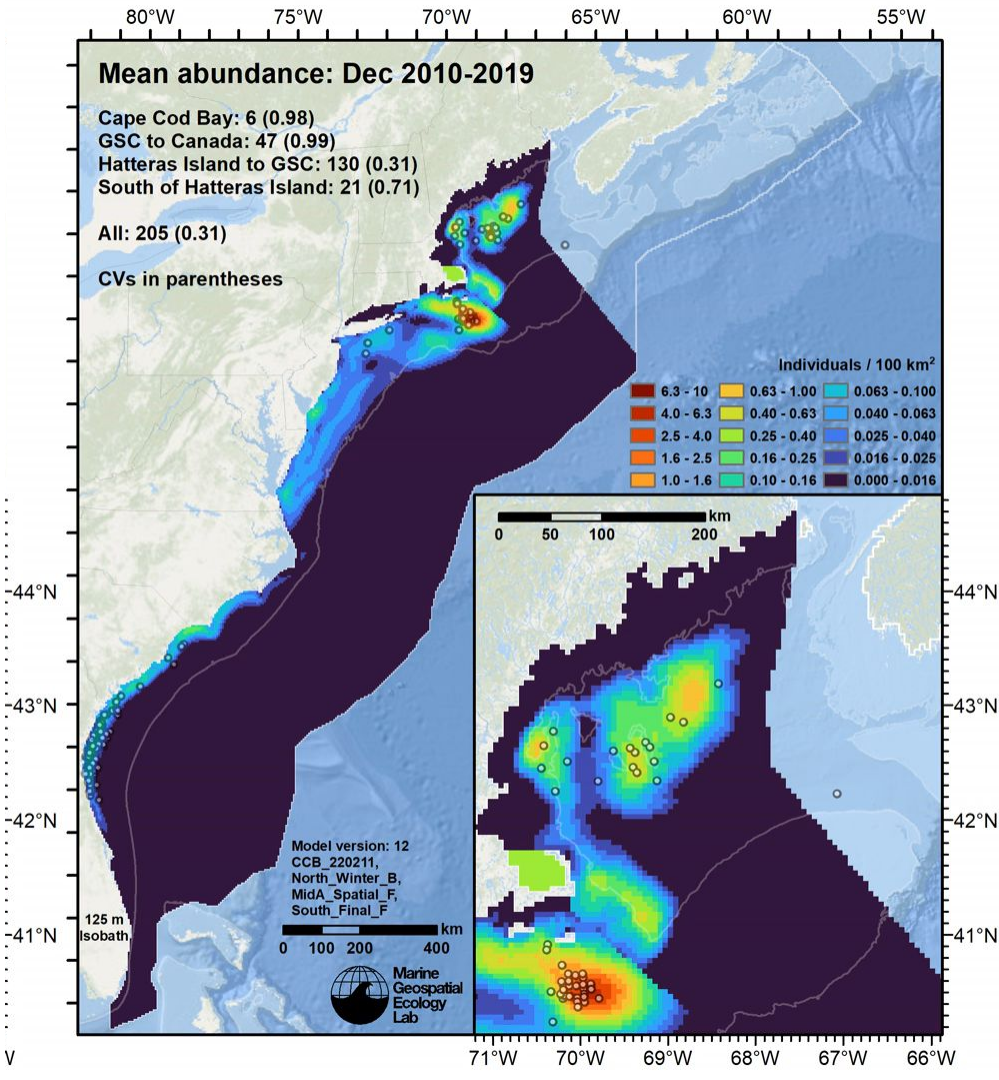

Mean abundance: Dec 2010-2019
Cape Cod Bay: 6 (0.98)
GSC to Canada: 47 (0.99)
Hatteras Island to GSC: 130 (0.31)
South of Hatteras Island: 21 (0.71)
All: 205 (0.31)
CVs in parentheses
Individuals / 100 km²
6.3 - 10
4.0 - 6.3
2.5 - 4.0
1.6 - 2.5
1.0 - 1.6
0.63 - 1.00
0.40 - 0.63
0.25 - 0.40
0.16 - 0.25
0.10 - 0.16
0.063 - 0.100
0.040 - 0.063
0.025 - 0.040
0.016 - 0.025
0.000 - 0.016
km
0 50 100 200
Model version: 12
CCB_220211,
North_Winter_B,
MidA_Spatial_F,
South_Final_F
125 m
Isobath
km
0 100 200 400
Marine
Geospatial
Ecology
Lab
80°W
75°W
70°W
65°W
60°W
55°W
44°N
43°N
42°N
41°N
71°W
70°W
69°W
68°W
67°W
66°W

Photo credit: New England Aquarium

MASSACHUSETTS CLEAN ENERGY CENTER®

Update on Aerial Surveys for Marine Mammals and Sea Turtles in Southern New England Wind Energy Areas

Presented By

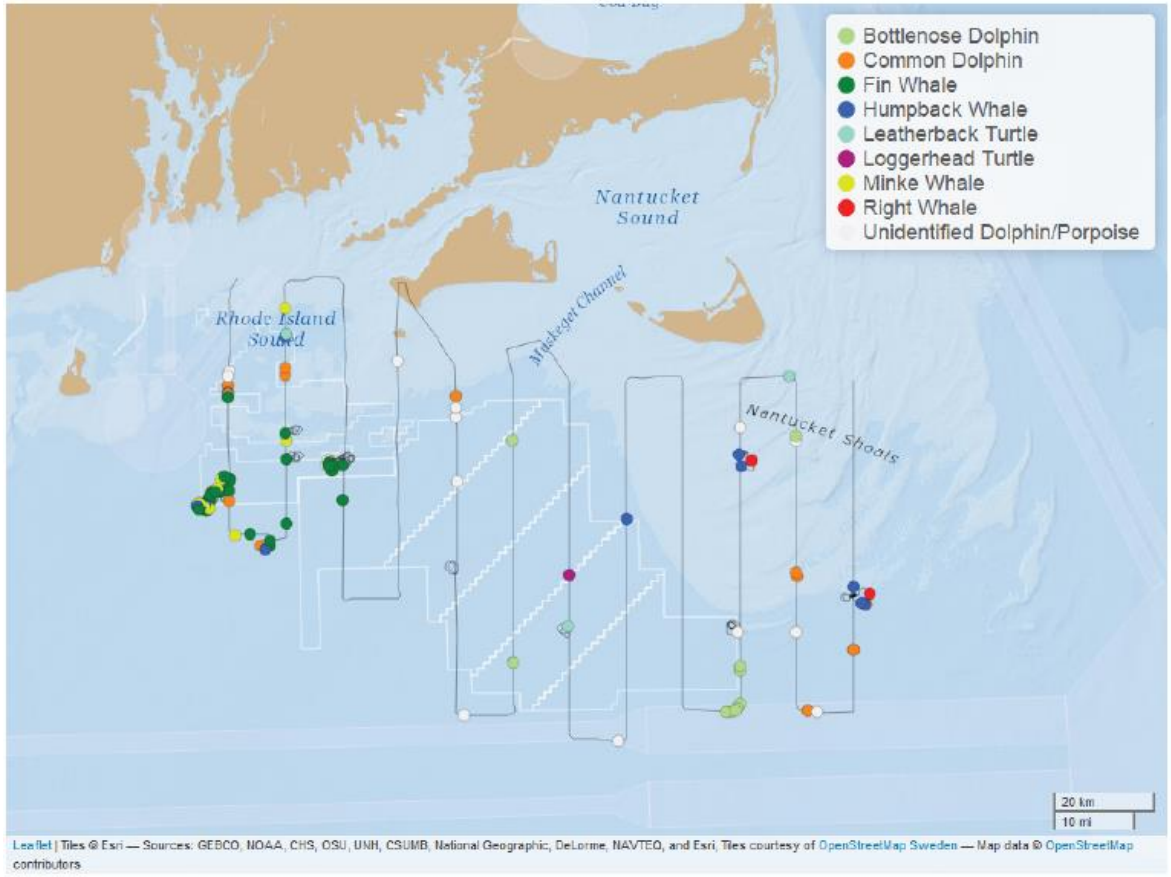
Nils Bolgen, Program Director

OUR MISSION

Accelerate the clean energy and climate solution innovation that is critical to meeting the Commonwealth's climate goals, advancing Massachusetts' position as an international climate leader while growing the state's clean energy economy.

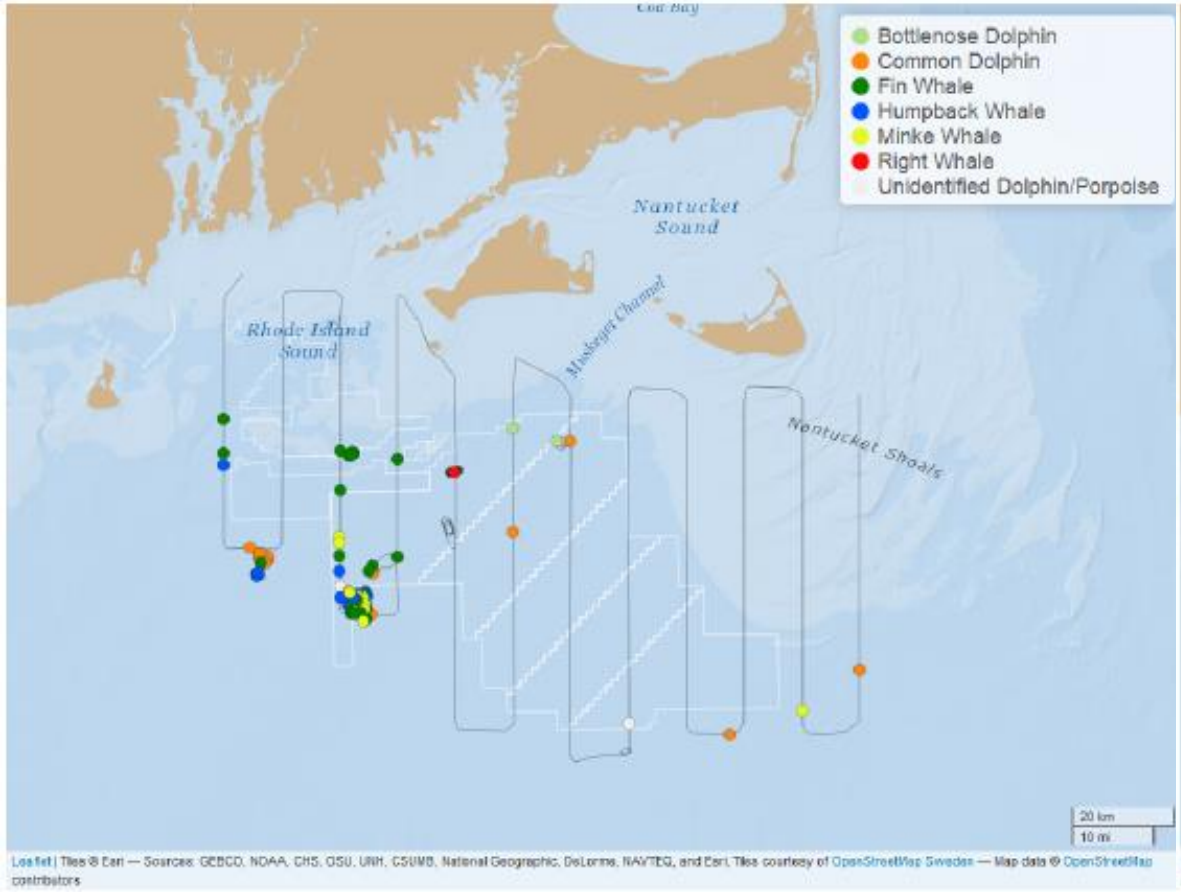
CAMPAIGN 7 STATUS

- Surveys began in January 2022
- Surveys ended August 2022
- 21 surveys were flown over the course of the campaign period
  - Day-after survey reports
- Final report coming early 2023

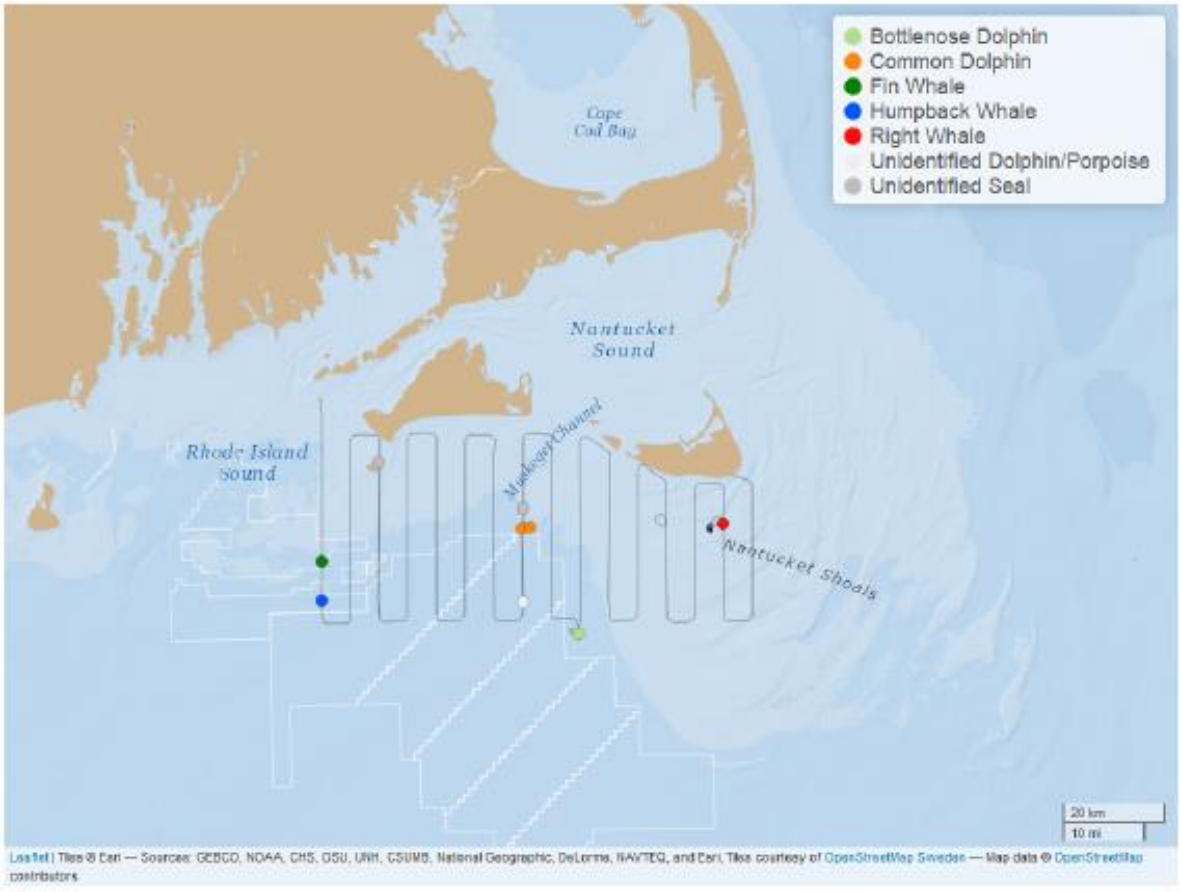


RIGHT WHALE – TWO SIGHTINGS

July 10, 2022



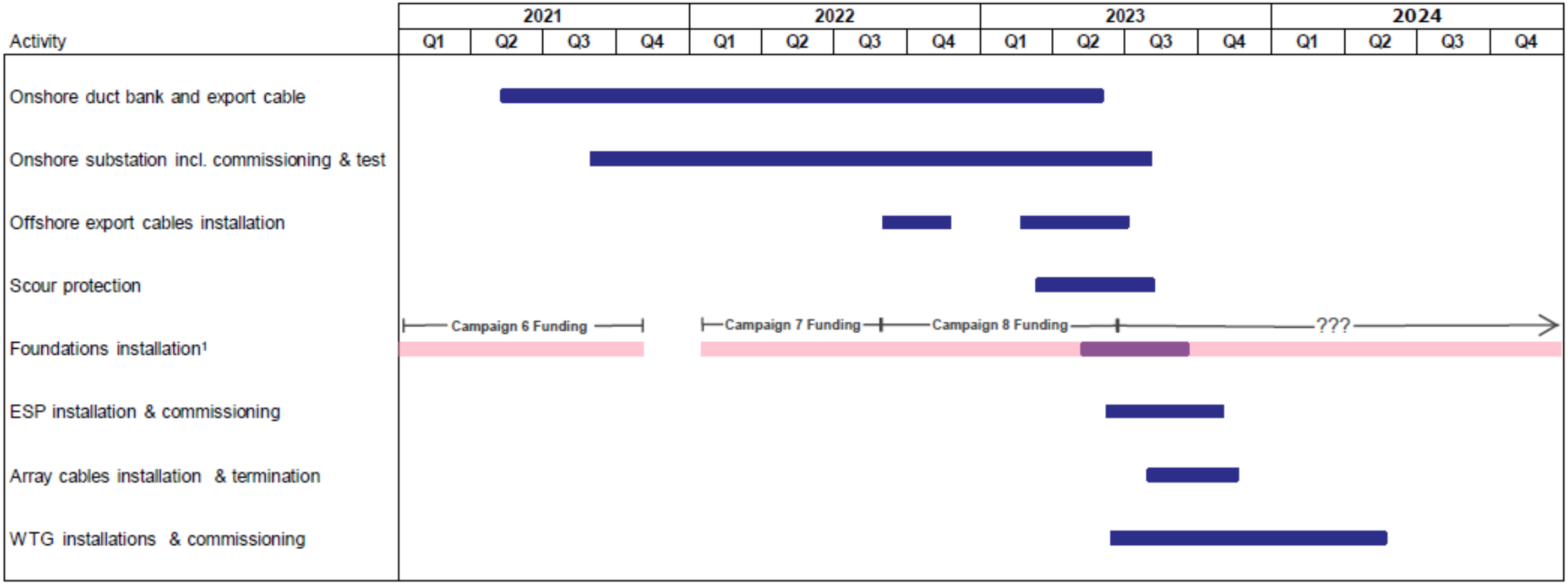
July 11, 2022



CAMPAIGN 8

- NOAA funding first three months of surveys
  - September - November 2022
- BOEM funding six months of surveys (administered by MassCEC)
  - December 2022 – May 2023

Vineyard Wind I Construction Schedule

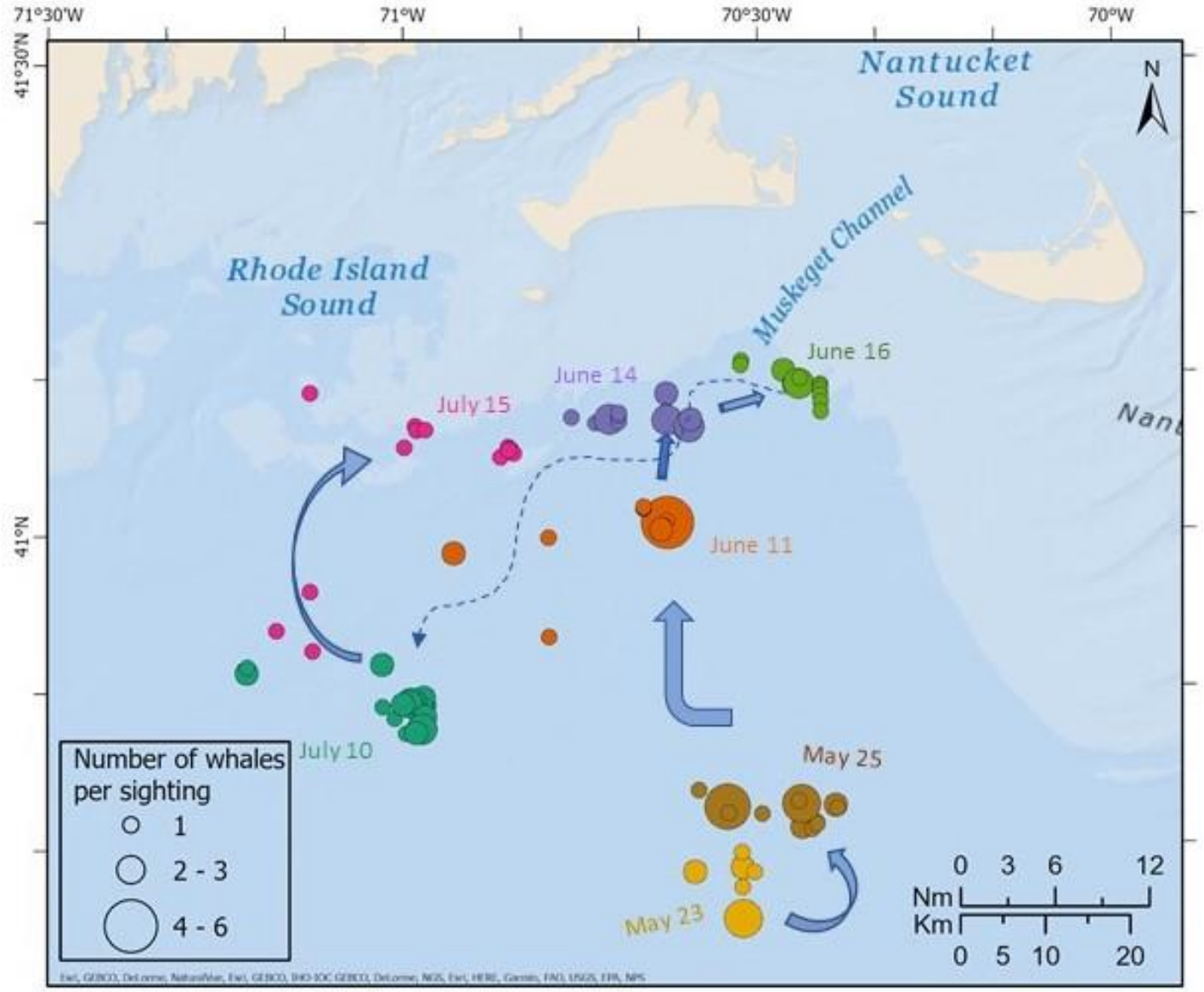


Note 1: Foundations installation activity includes monopile and transition piece installation.

Source: Bureau of Ocean Energy Management

BLOG POST: SUMMER SIGHTINGS FROM THE NEAq AERIAL SURVEY TEAM

https://www.andersoncabotcenterforoceanlife.org/blog/summer-sightings-aerial-surveys/



Credit: New England Aquarium

An Act Driving Clean Energy and Offshore Wind

(Ch. 179 of the Acts of 2022)

Amends MGL Ch. 169 S.83C (procurement)

SECTION 61.

(b) allows joint solicitations with other New England states

DOER shall produce a numeric score for each bid's economic development commitments and for plans for financial and technical assistance to support wildlife and habitat monitoring.

(c) DOER shall give preference to proposals that demonstrate benefits from: …(ii) mitigation, minimization and avoidance of detrimental environmental and socioeconomic impacts, including through meaningful consultation with impacted environmental and socioeconomic stakeholders,

(e)(1) DPU shall promulgate regulations consistent with this section . The regulations shall: ….require that proposals meet the following criteria:

(H) include an initial environmental and fisheries mitigation plan for the construction and operation of such offshore wind facilities, including consideration of commercial, recreational and indigenous fishing rights; (I) mitigate impacts to the marine environment by providing financial and technical assistance to support robust monitoring of wildlife and habitat through contributions to regional and tribal research efforts; ….

(2) A proposed long-term contract ...the DPU shall take into consideration the DOER recommendations on the potential costs and benefits to the rate payers, including economic and environmental benefits....

SECTION 62.

The plan shall include, but shall not be limited to, a detailed description of the best management practices and any on-site or off-site mitigation the applicant shall employ, informed by the latest science at the time the plan is made, that will avoid, minimize and mitigate impacts to wildlife, including, but not limited to: threatened or endangered species such as North Atlantic right whales, coastal and marine habitats; natural resources; ecosystems; and traditional or existing water-dependent uses, including, but not limited to, commercial and recreational fishing. The plan shall include pre-construction and post-construction monitoring to understand the effects of facilities on marine and avian species.

Massachusetts Habitat Working Group

Lease Area OCS-A 0534 Update

September 8, 2022

AVANGRID RENEWABLES

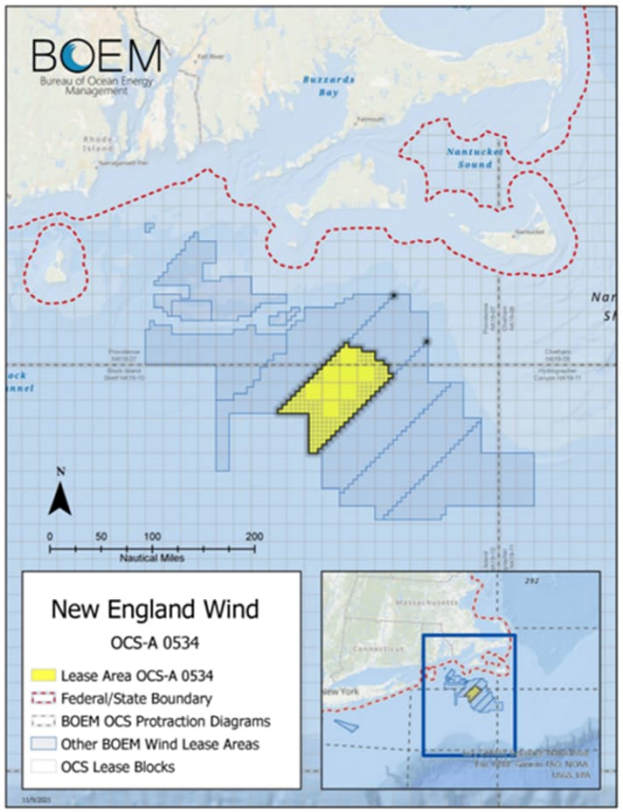
Permitting Round-up

Federal Permitting

- Lead Federal Agency: BOEM (Bureau of Ocean Energy Management)
  - New England Wind (comprised of Park City Wind and Commonwealth Wind) Construction and Operations Plan (COP) submitted July 2, 2020
  - Draft Environmental Impact Statement in preparation
    - Public comment period anticipated in Q4 2022
- **Progress since last quarter:**
  - Updated COP now available on BOEM's website

State Permitting

- New England Wind 1 Connector: Encompasses the portions of Park City Wind's offshore export cable located in state waters and onshore infrastructure in Massachusetts
  - Joint Water Quality Certification /Chapter 91 Application filed with the Massachusetts Department of Environmental Protection
  - Local Applications filed with Barnstable, Nantucket, and Edgartown Conservation Commissions
    - Nantucket authorization issued May 2022
- **Progress since last quarter:**
  - New England Wind 2 Connector (Commonwealth Wind) State Permitting anticipated to commence this fall
    - Environmental Notification Form (ENF) with the Massachusetts Environmental Policy Act (MEPA) Office ~end of September
    - Petition with the Energy Facilities Siting Board (EFSB) early October



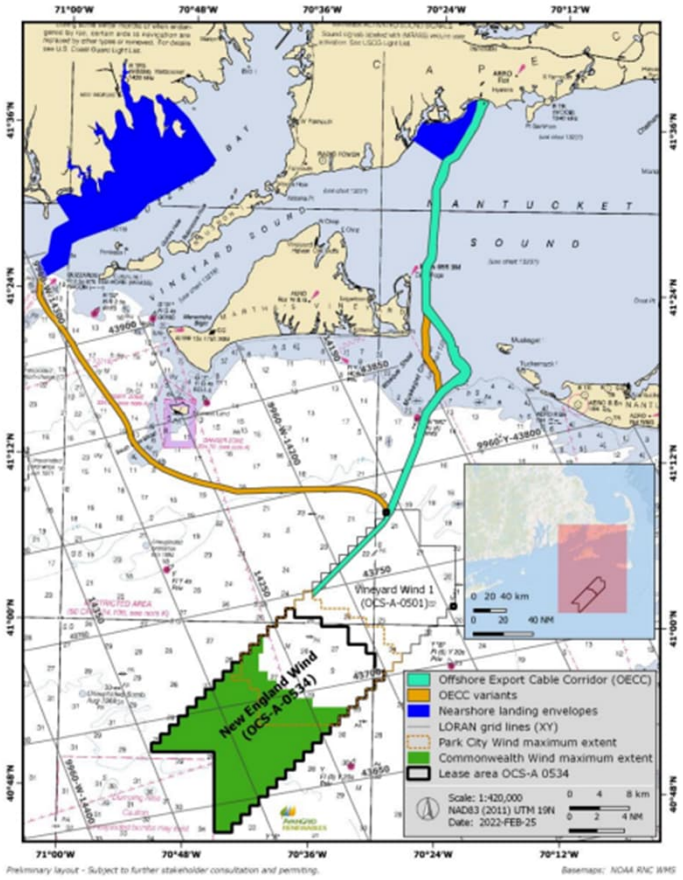
Fisheries and Geotechnical Surveys

Fisheries Survey Status

- 2022 survey season
  - Drop camera surveys completed
  - Trawl and ventless traps surveys on hold (pending federal permits)
- Two years of baseline surveys already completed by UMass Dartmouth's School for Marine Science and Technology (SMAST)
- All data publicly available

Geotechnical Surveys

- Commonwealth Wind deep geotechnical surveys on-going
  - Cone Penetration Test
  - Borings



Environmental Surveys

Highly Migratory Species Study

Purpose

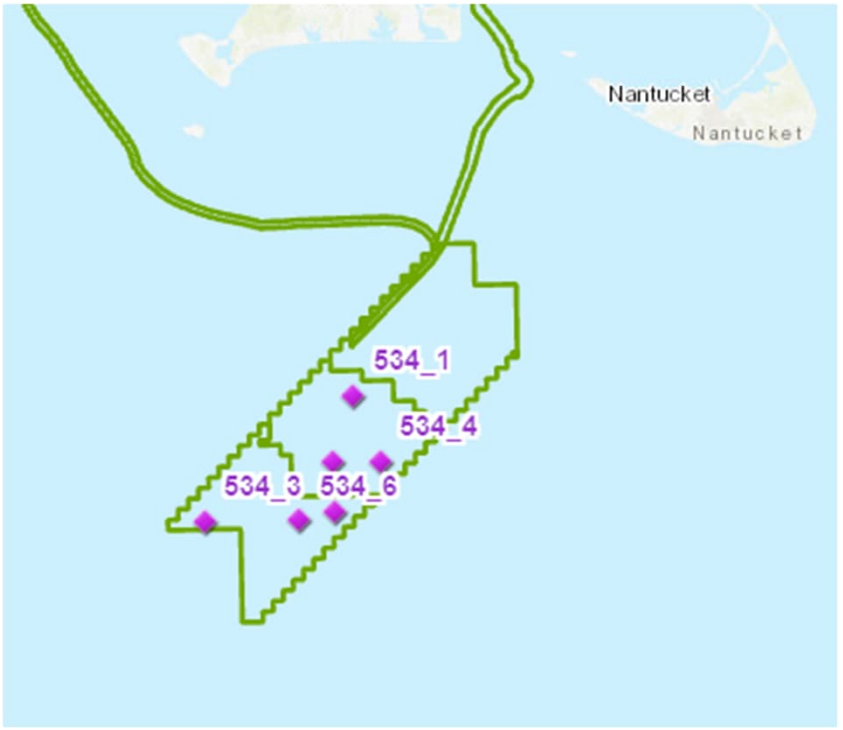
- Document presence, residency time, and movement patterns of high migratory species across the MA and RI/MA Wind Energy Areas
- Monitor baseline residency and movement metrics over time to evaluate impacts

Partners

- New England Aquarium
- Offshore wind developers
- Recreational fishermen

Status

- **All receivers have been successfully deployed in Lease Area OCS-A 0534 and tagging efforts are ongoing**



Environmental Surveys

Channeled Whelk Study

Purpose

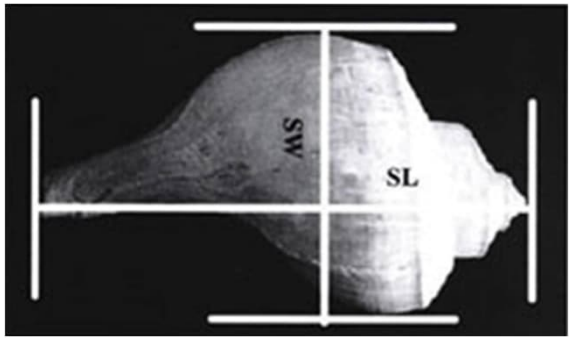
- Baseline study to clarify channeled whelk size at maturity at three locations in MA: Buzzards Bay, Nantucket Sound, and Vineyard Sound

Partners

- SMAST
- Commercial Fisheries Research Foundation's whelk study fleet
- Quahog fishery
- Massachusetts Conch Association
- Massachusetts Lobstermen's Association

Status

- **SMAST has started the first round of sample collection and analysis**



Environmental Initiatives

Nature Inclusive Design Start-up Challenge

Venture Capital arm, PERSEO, leading an offshore wind nature inclusive design start-up challenge, e.g.:

- Scour protection and subsea infrastructure
- Modification in foundation design
- Reduction in collision risks
- Blue carbon capture
- Sensing and monitoring

Focus

- Habitats and species of conservation importance

Benefits

- Cost for pilot
- Technical support from our engineering teams
- Potential global application
- Potential venture investment

Applications are due September 30 Website


Thank you
Questions?
AVANGRID
RENEWABLES

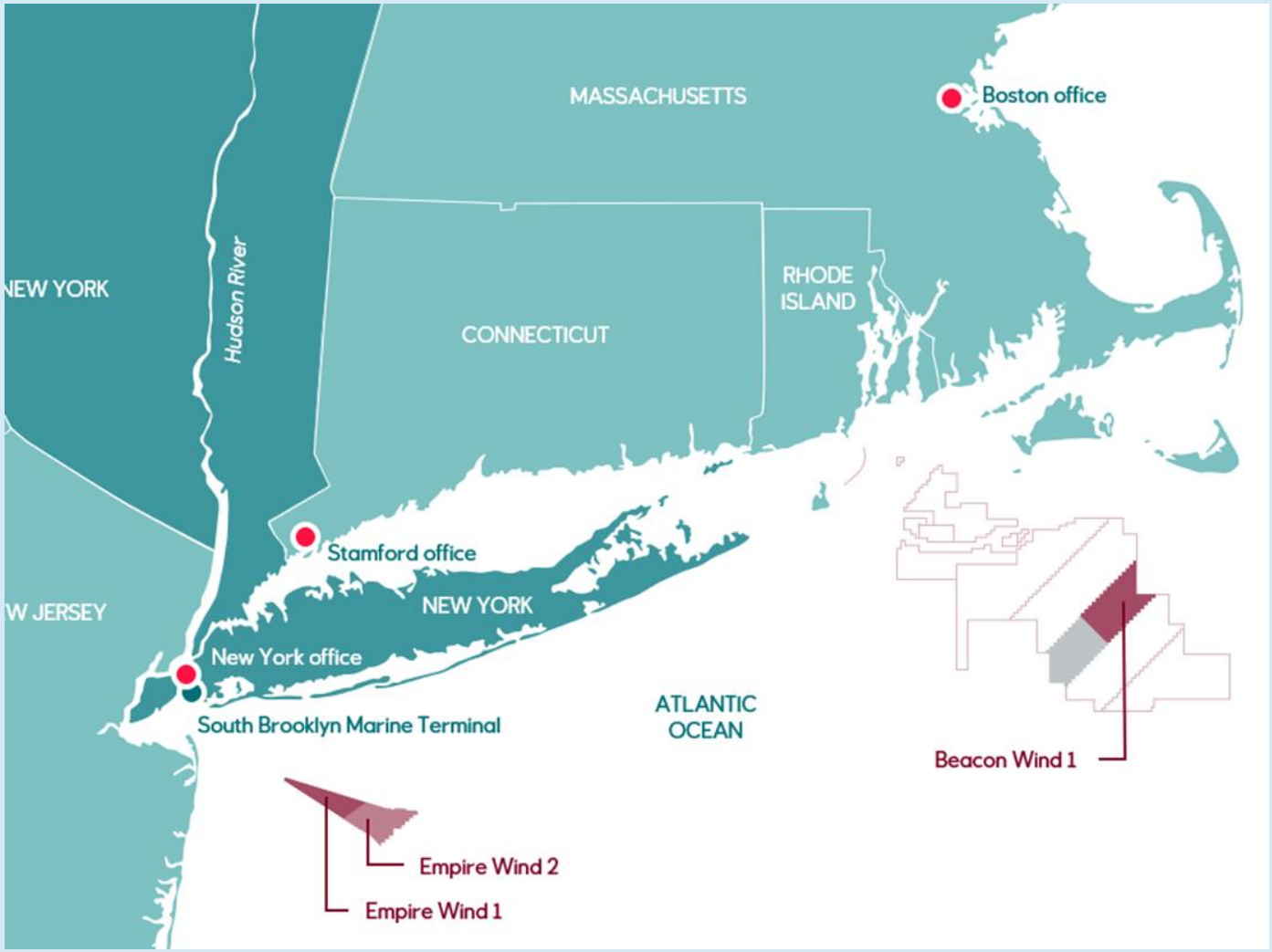
Beacon Wind

EEA Habitat Working Group
September 8, 2022

equinor

Beacon Wind | Agenda

- **Beacon Wind Timeline**
- **Status update on Survey Program**
- **Status update on Monitoring Program**
- **NYSERDA PSA Monitoring of Fish and Wildlife**
- **Questions?**



Beacon Wind | Timeline

2019 – Lease Acquired

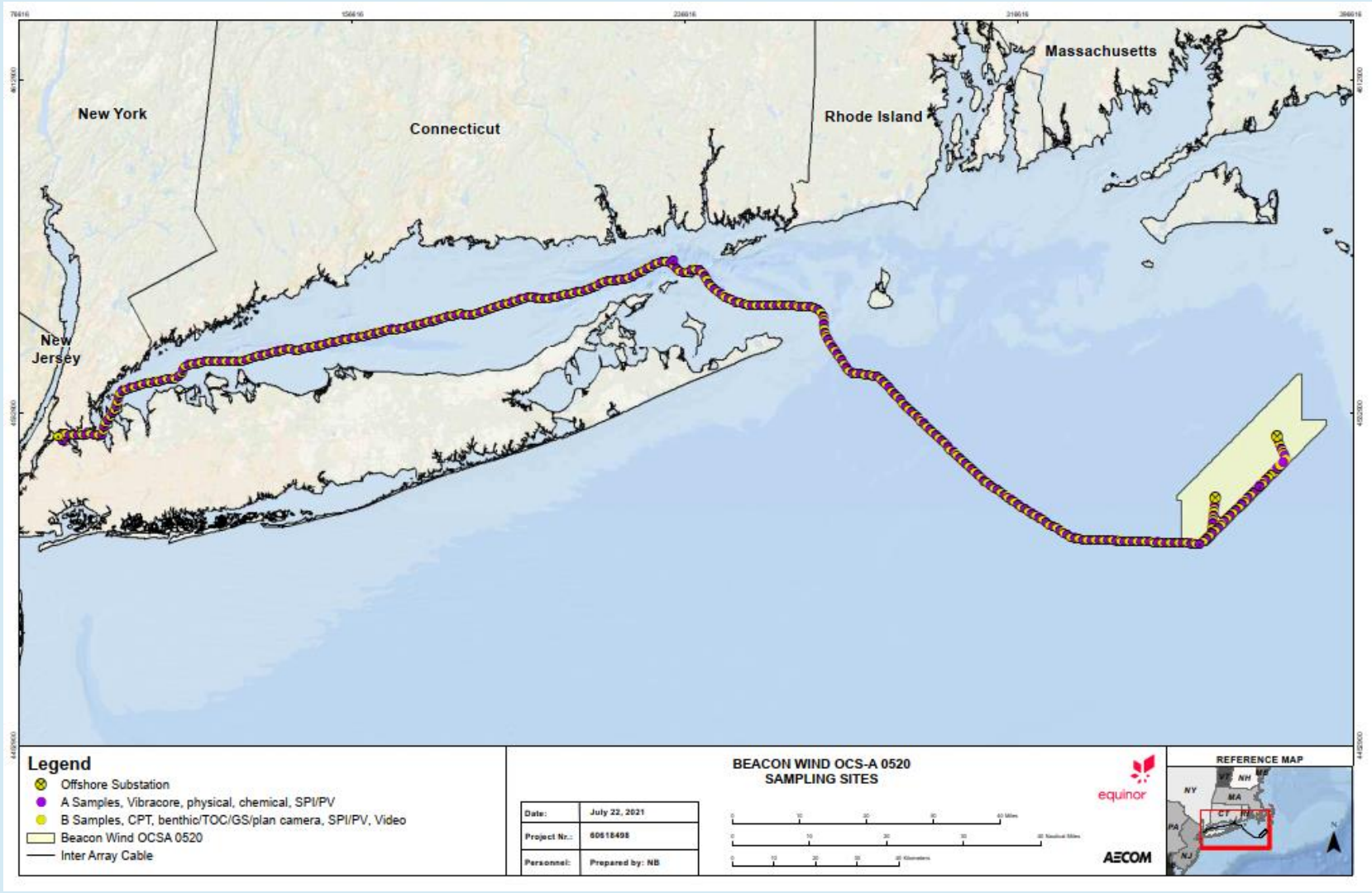
2020 – Aerial Wildlife and Marine Survey Commencement

2021 – Deployment of Metocean Buoys

2022 – Federal & State Permit Submission

2024 – Permits Approved

2025 – Construction and Fabrication

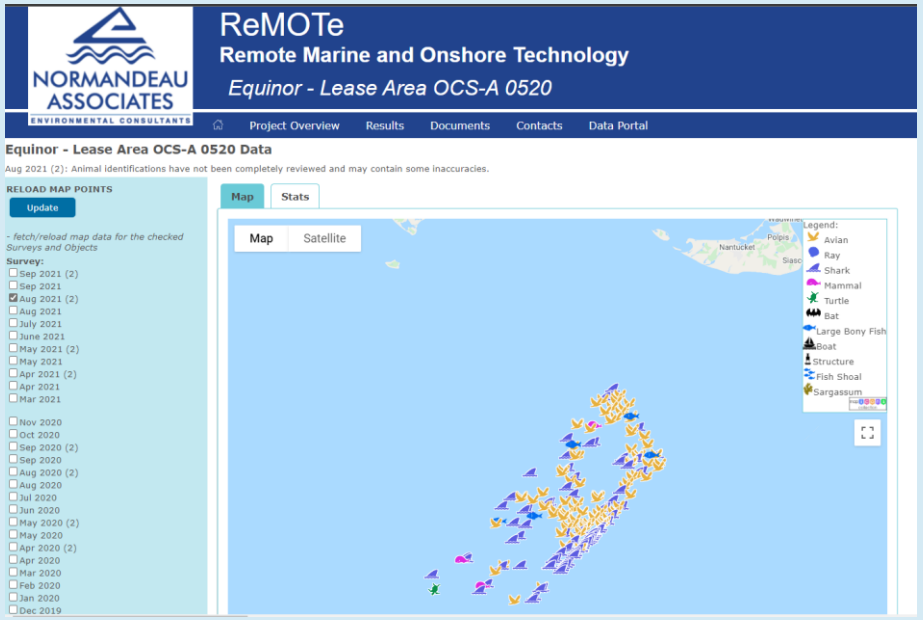


equinor

Beacon Wind Lease Area geotechnical sampling

Completed – June 2022

High-resolution aerial surveys



Data are currently available at https://remote.normandeau.com/eqn22_overview.php

and on Duke University's OBIS-SEAMAP
https://seamap.env.duke.edu/dataset/2192

https://seamap.env.duke.edu/dataset/2187

Highly Migratory Species (HMS) Passive Acoustic Telemetry

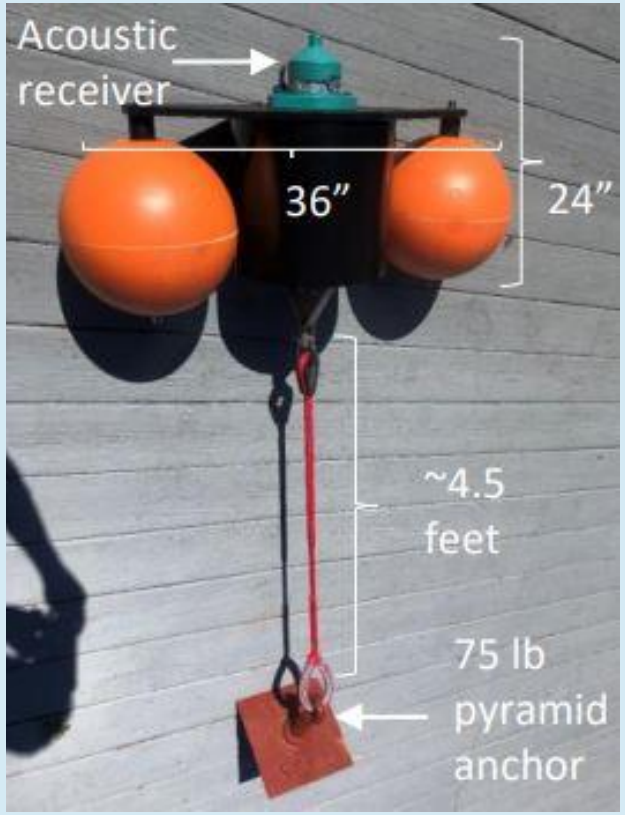
- The New England Aquarium is conducting research on the movements of HMS (sharks, tunas, and marlin) in partnership with the Massachusetts Clean Energy Center

- To reduce the risk of entangling protected species, receivers have NO surface buoys and are connected to a mooring system weighing approximately 75 lbs. that extends 2-3 meters (6-9 ft) off the sea floor

- Deployed May – December 2021
- Deployed May – December 2022

- To reduce risk of interaction with mobile fishing gear, receivers have been placed near obstructions to the extent possible

- Fishermen notified via email, port and dock visits, phone calls



Beacon Wind | Monitoring Program Update

Metocean Buoys and Moorings

- Deployed November 2021
- First service visit completed June 2022
- Next service visit planned November 2022

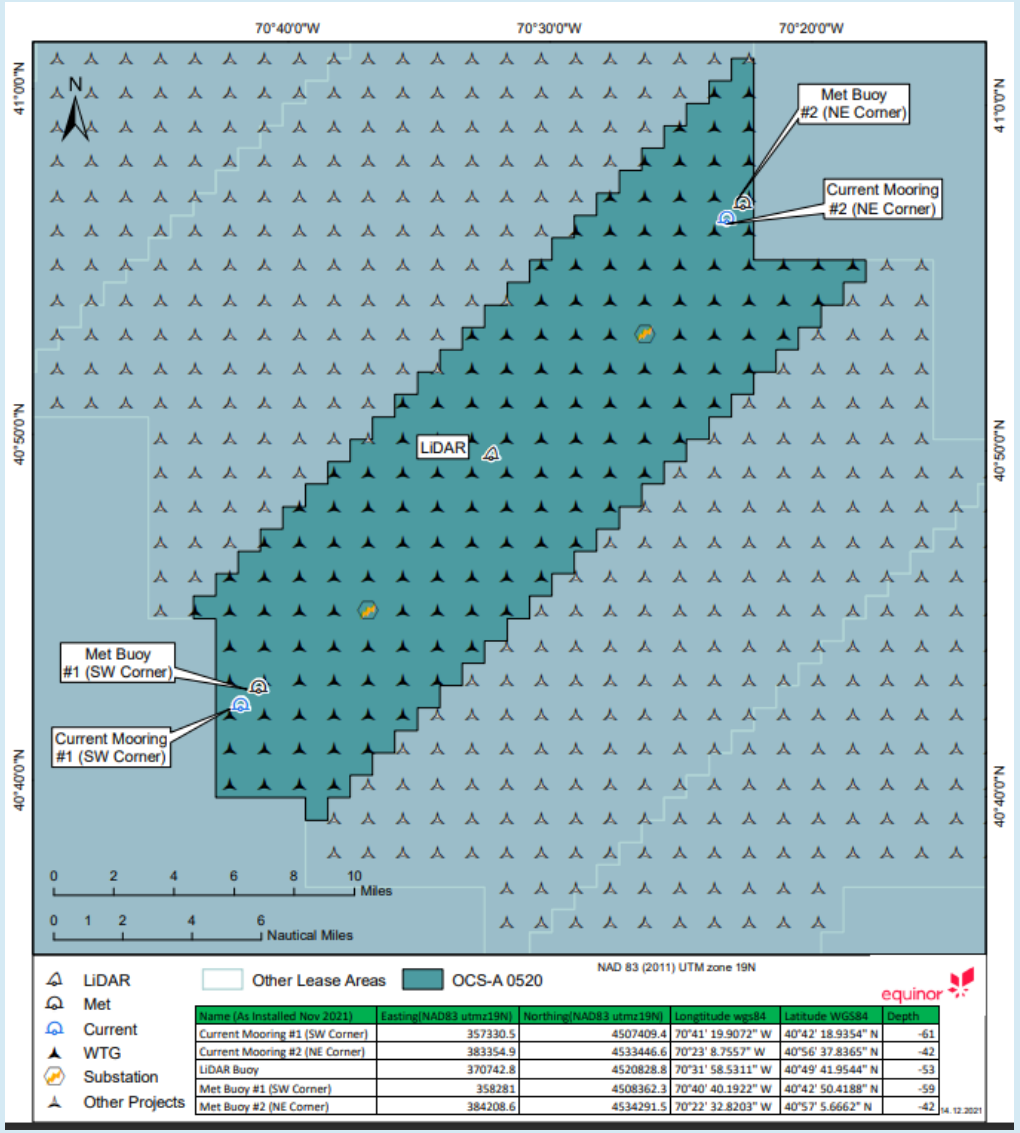
In addition to metocean instruments:

<u>434 MHz bird tag receiver</u>
- LiDAR
- Met Buoy #2

Motus Wildlife Tracking System

<u>Project: Beacon Wind (#538)</u>

<u>Vemco fish tag receiver</u>
- LiDAR
- Current Mooring #1
- Current Mooring #2



Support for Monitoring of Key Commercial Fish Stocks and Wildlife of Conservation Concern

- To support regional monitoring of key regional commercial fish stocks to better understand how offshore wind energy development is potentially altering the biomass and/or distribution of these stocks;
- To support regional monitoring of wildlife of conservation concern to better understand how offshore wind energy development effects distribution and abundance of sensitive species;
- To advance the responsible development of the offshore wind energy industry

Currently in the planning stages. Stay tuned for more information!

equinor

SHAPING THE FUTURE OF ENERGY

Thank you for your attention. Questions?

Michelle Fogarty
MFOG@equinor.com

Ørsted Offshore North America

Northeast Program Update

Ørsted

MA EEA Habitat Working Group Meeting on Offshore Wind

September 2022

Ørsted Offshore North America portfolio

Awarded over 4,000 MW of offshore capacity on the East coast

In Operation

Block Island Wind Farm (BIWF): 30MW

Awarded

Revolution Wind (REV): 50/50 JV w/ Eversource, 704MW (400MW to RI, 304MW to CT)
South Fork Wind (SFW): 50/50 JV w/ Eversource, 132MW
Sunrise Wind (SRW): 50/50 JV w/ Eversource, approximately 924MW
Ocean Wind 1 (OCW1): 75/25 JV with PSEG, 1,100MW
Ocean Wind 2 (OCW2): 1,148MW
Skipjack Wind 1 (SJW1): 120MW
Skipjack Wind 2 (SJW2): 846MW

Orsted Northeast Program
50/50 JV with Eversource

South Fork Wind

- Lease Area OCS-A 0517
- Deliver power to the East Hampton, NY
- NY Article VII approved March 2021
- COP Approval January 2022
- **Onshore: Construction Commenced**
- **Offshore: Pre-construction Fall 2022, Construction Spring 2023**

Revolution Wind

- Lease Area OCS-A 0486
- Interconnect to the existing Davisville Substation, RI
- RI EFSB Order Issued July 2022
- RI CRMC/RIDEM permit applications under review
- **DEIS September 2022, FEIS June 2023**

Sunrise Wind

- Lease Area OCS-A 0487
- Proposed interconnection at Holbrook Substation, NY
- NY Article VII Settlement meetings close to completed
- **DEIS December 2022, FEIS July 2023**

Northeast Program Update

FISHERIES SURVEYS

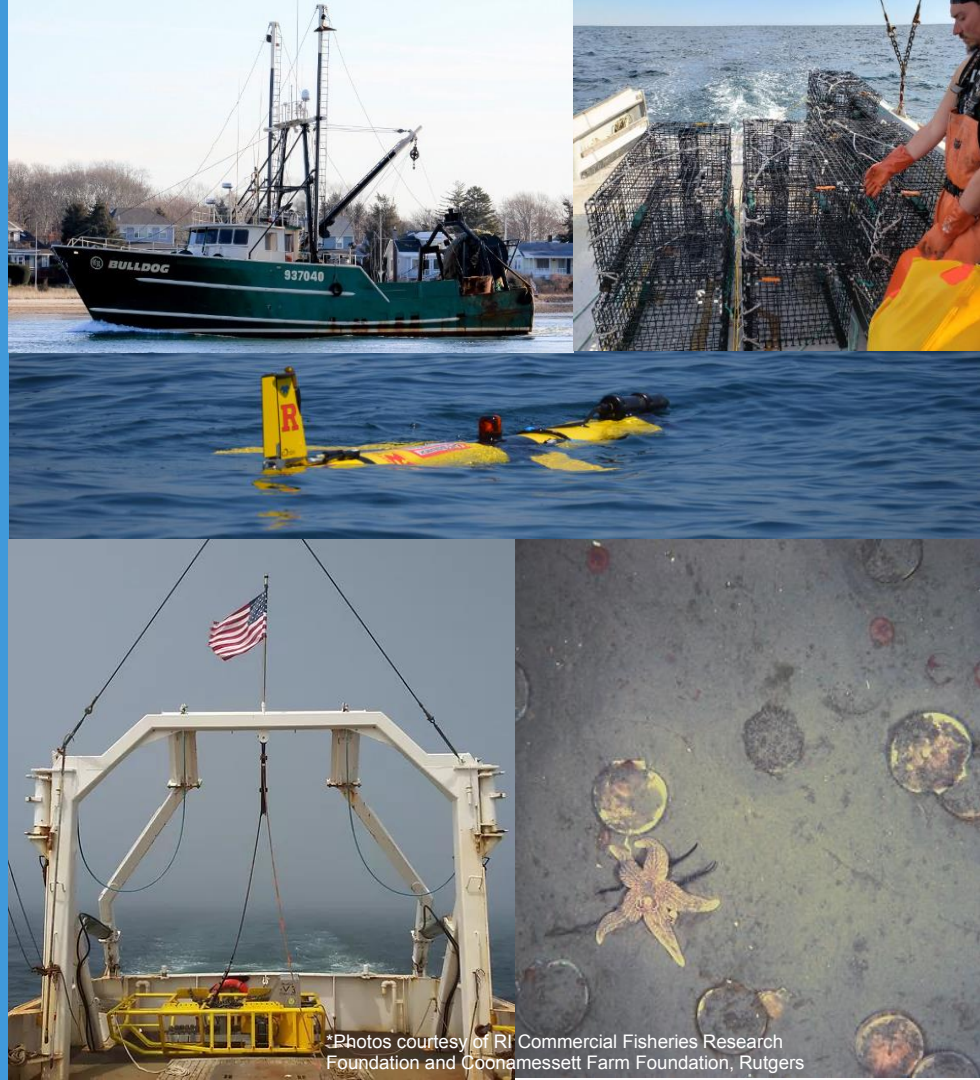
- **SFW (underway)**
  - Beam Trawl
  - Gillnet Survey
  - Fish Pot Survey
  - Ventless Trap Survey
  - Cod Spawning Monitoring (PAM)
- **REV/SRW (delayed by permitting)**
  - Bottom Trawl Survey
- **REV (delayed by permitting)**
  - Ventless Trap Survey
  - Cable Route Ventless Trap Survey (Winter 2022)
- **SRW (underway)**
  - HABCAM survey (first survey completed in Aug.)

ACOUSTIC TELEMETRY SURVEYS

- Highly Migratory Species (SFW/REV/SRW- 32 receivers deployed)
- Export Cable (SFW-underway/SRW-array deployed and ~80 sharks tagged to date)

BENTHIC SURVEYS (planned)

- Soft and Hard Bottom Habitats (SFW/REV)
- Soft Bottom Habitats (SRW)



*Photos courtesy of RI Commercial Fisheries Research Foundation and Coonamessett Farm Foundation, Rutgers

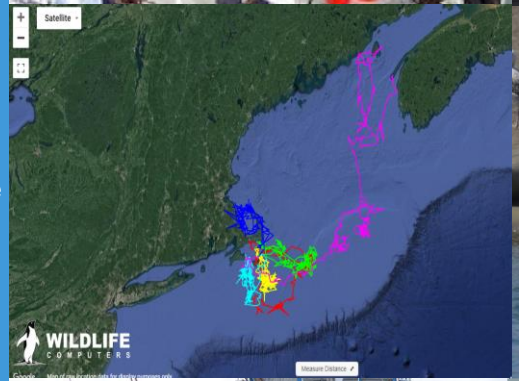
Northeast Program Update

MARINE MAMMAL LONG TERM PAM

- **SFW:** 2 Long Term archival recorders will be deployed in late September, final BOEM approval earlier this week
- **REV:** Long Term recorder deployments anticipated in 2023
- **SRW:** Long Term recorder deployments anticipated in 2023

MARINE MAMMAL & SEA TURTLE VOLUNTARY STUDIES

- **Ocean Wind ECO-PAM (WHOI/Mark Baumgartner):** buoy deployed thru early Fall south of Martha's Vineyard
- **REV**
  - **Mystic Aquarium/Dr. Tracy Romano**: studies commencing include laboratory e-DNA and stress studies and seal and ST tagging
- **SRW**
  - **PINNI-POD (AMSEAS/Rob DiGiovanni)**: 6 tags deployed to date on harbor and gray seals
  - **Syracuse U/Susan Parks**: acoustic density estimation study using Cape Cod data and Opportunistic Focal data collection of large whales
  - **ECO-POD (Stony Brook U/Joe Warren and Lesley Thorne):** Desktop zooplankton studies underway, Two field surveys completed to date
  - **Thermal Imaging A.I. (Stony Brook, Lesley Throne):** Developing and evaluating benchmarking criteria to test thermal imaging systems and autodetection of cetaceans



*Photos courtesy of JASCO Applied Sciences; Stony Brook U; Stockton U; AMSEAS/Wildlife

Thank you

Kyle Cassidy
Environmental and Permitting Specialist, Fisheries Science
kycas@orsted.com

Melanie Gearon
Head of Northeast Permitting
melge@orsted.com

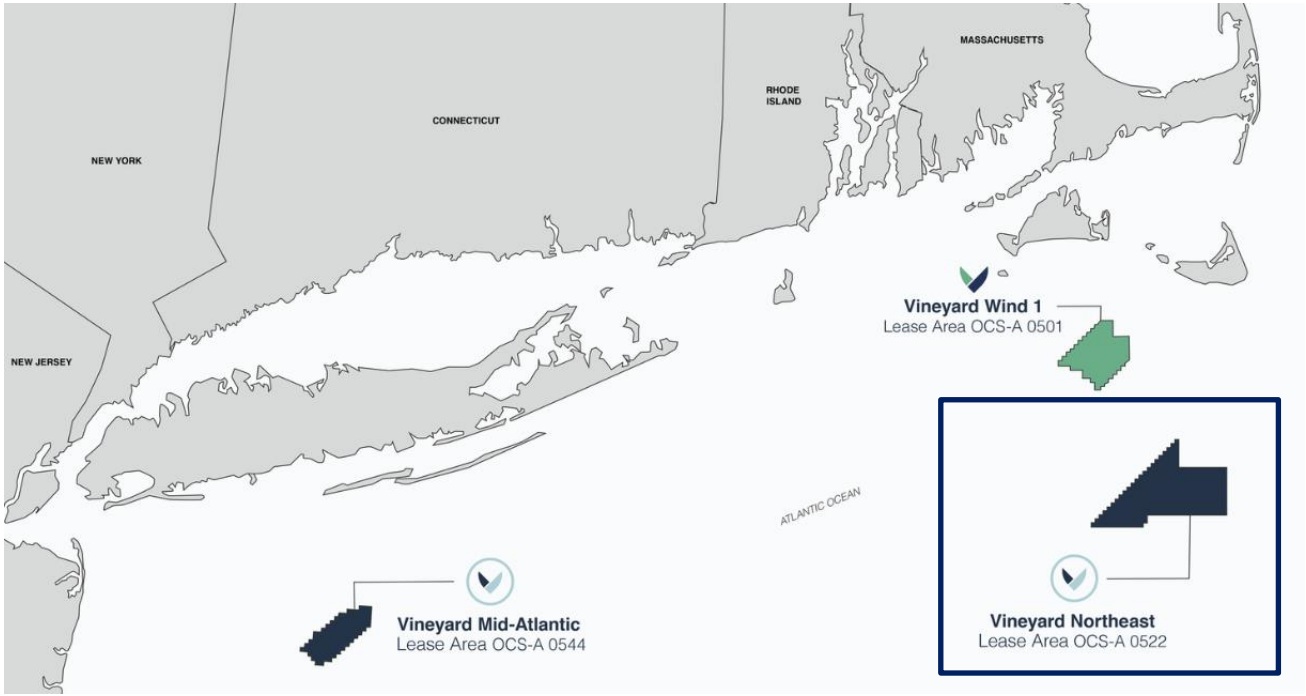
Ørsted

VINEYARD OFFSHORE

Habitat Working Group on Offshore Wind Quarterly Meeting – Vineyard Offshore Update

September 8, 2022

Our Projects and Lease Areas

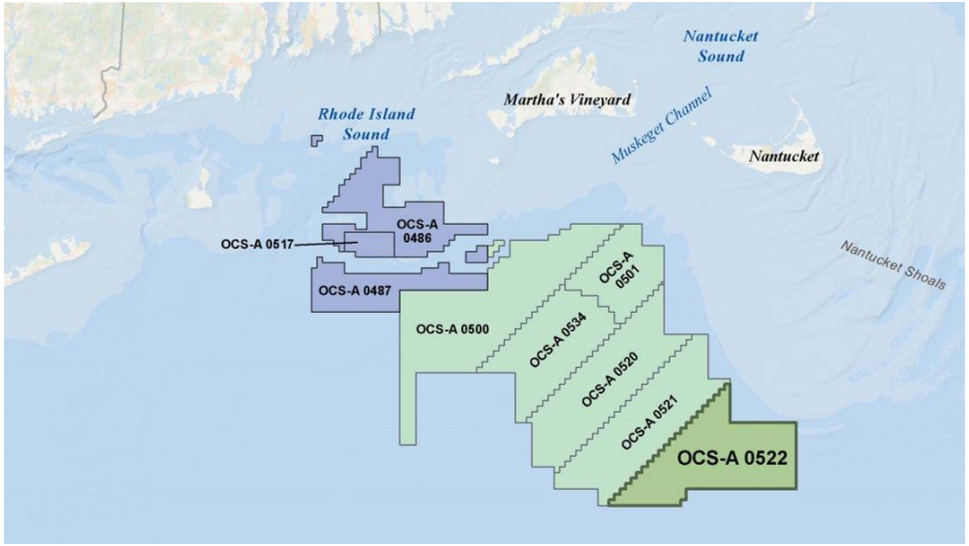


Combined with the Vineyard Wind 1 project, Vineyard Offshore will develop enough clean, renewable and cost-effective energy to power at least 2.4 million homes.

Vineyard Northeast

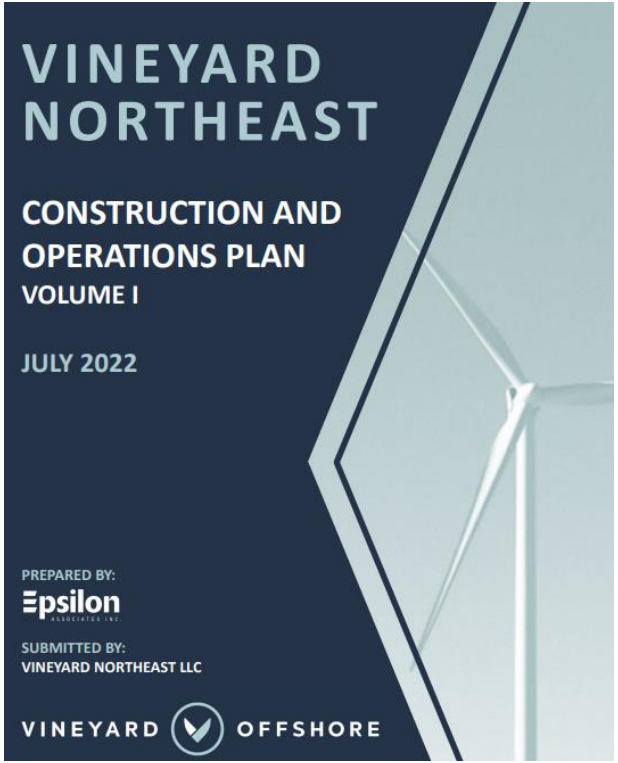
Overview

- Lease Area OCS-A 0522
- Located in the Massachusetts Wind Energy Area, 29 miles south of Nantucket
- Approximately 132,370 acres in size
- Abuts Mayflower Lease Area OCS-A 0521 along the northwestern edge
- Acquired in 2018



Federal Permitting

- Construction and Operations Plan (COP) for Vineyard Northeast submitted July 2022
- COP covers offshore wind energy facilities across the lease area
- Epsilon Associates is the lead environmental consultant
- Notice of Intent expected H1 2023



Lease and Cable Corridor Activities*

High-Resolution Geophysical

- Timeline: Completion anticipated by end of Q4 2022
- Purpose: Seabed mapping for various purposes and permit applications

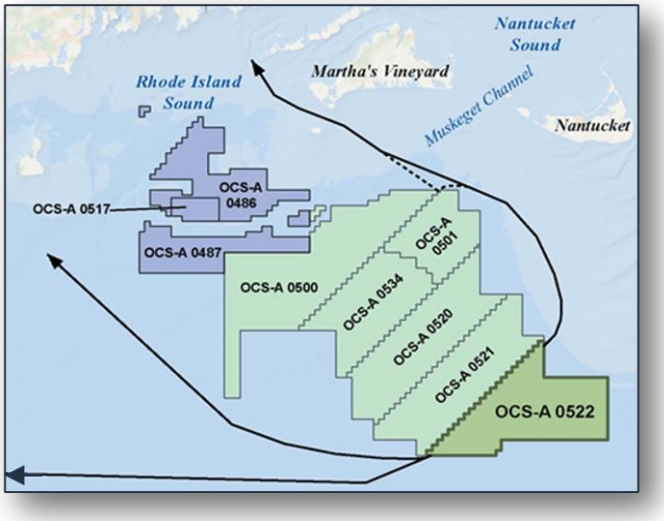
Geotechnical

- Timeline: Completion anticipated by end of Q3 2022
- Purpose: Core sampling

Benthic

- Timeline: Completion anticipated by end of Q3 2022
- Purpose: Seabed mapping, underwater video and grab samples

*Survey activity completion is contingent on weather, COVID-19, and stoppages for Protected Species Observer sightings



Lease and Cable Corridor Activities

FLiDAR Buoy Deployment

- A FLiDAR weather buoy will be deployed in Vineyard Northeast in September and will remain in position for approximately 1 to 2 years
- The buoy will collect weather data, including wave height and direction, surface current, and air temperature
- Buoy will be equipped with an acoustic receiver to track the movement of Highly Migratory Species

VINEYARD OFFSHORE

@VineyardOFSHR

/VineyardOffshore

/Vineyard-Offshore

VINEYARDOFFSHORE.COM

VINEYARD WIND 1

Habitat Working Group on Offshore Wind Energy

Vineyard Wind 1 Project Status Update
8 September 2022

Cynthia Pyć, Senior Manager of Environmental Affairs

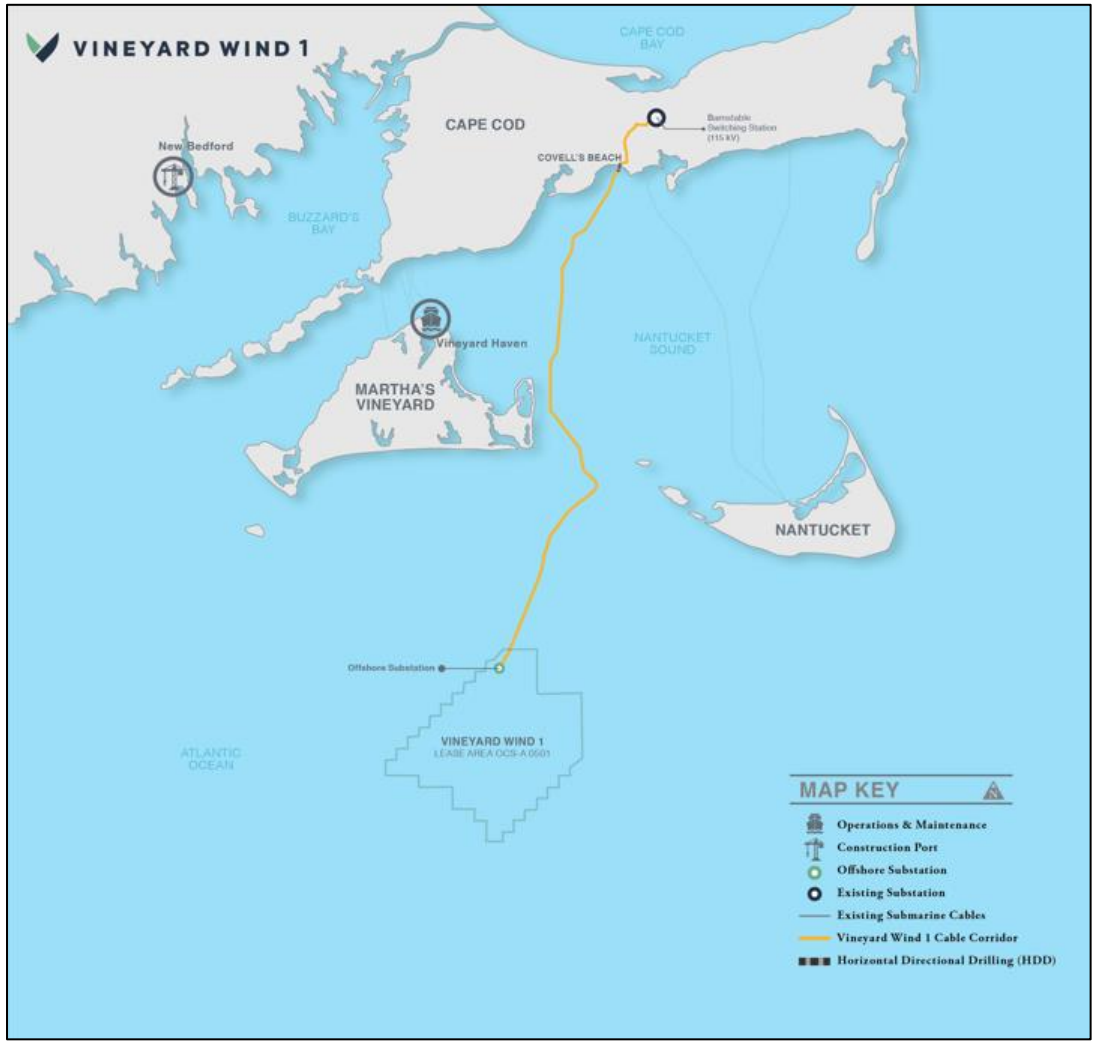
(Photo courtesy of General Electric Renewable Energy)

Vineyard Wind 1

Overview

- **Capacity:** 800 MW
- **Lease Area:** OCS-A 0501
- **Federal Permitting:** Complete
- **State Permitting:** Complete
- **Point of Interconnection:** Barnstable Substation (MA)
- **Power Purchase Agreements:** 20-year PPAs with Massachusetts utilities (approved)
- **Commercial Operations Date**: 2024

- **Near-term activities planned:** offshore export cable installation beginning late October 2022



Recent Survey Updates

Pre-lay Survey (completed July – August)

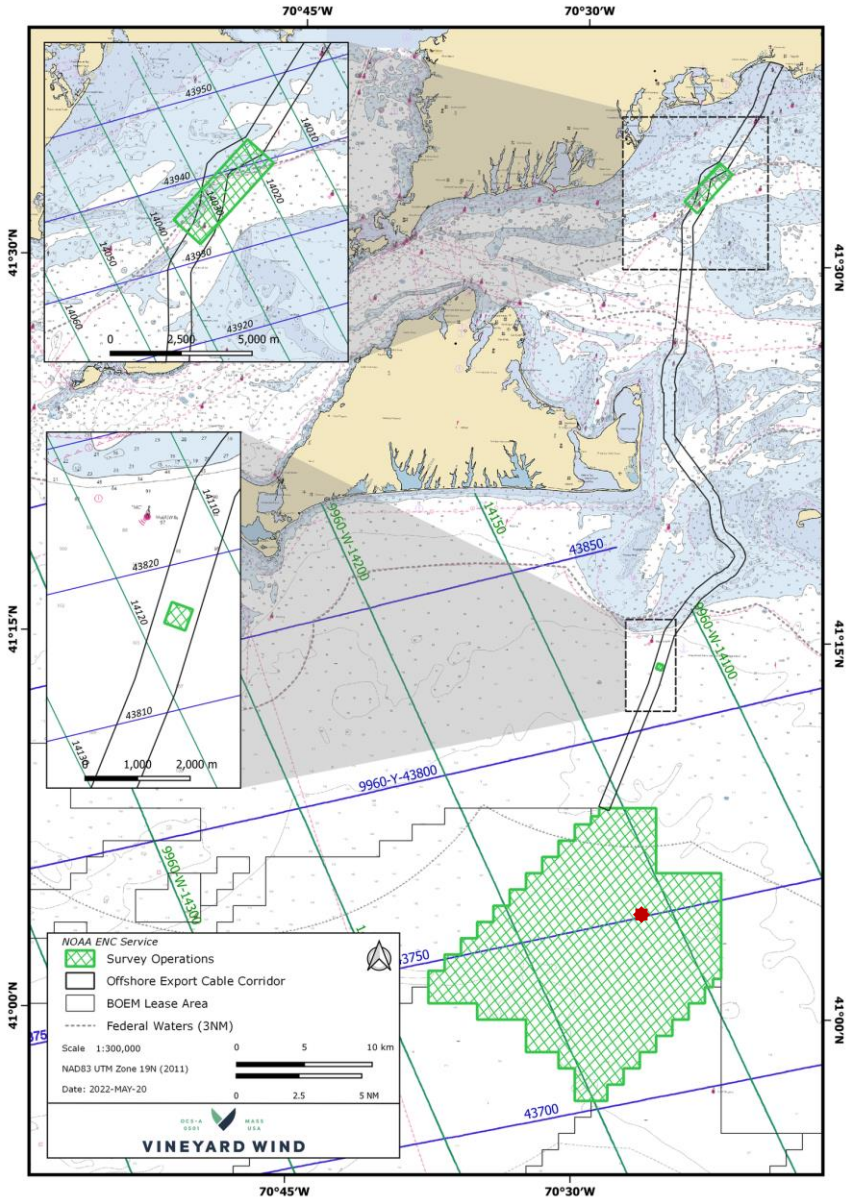
- Multibeam survey along cable corridor
- Supported by two fishing vessels

Objectives: identify potential marine debris and boulders, and verify conditions along the cable corridor prior to installation

Unexploded Ordnance (UXO) Survey
(completed in July)

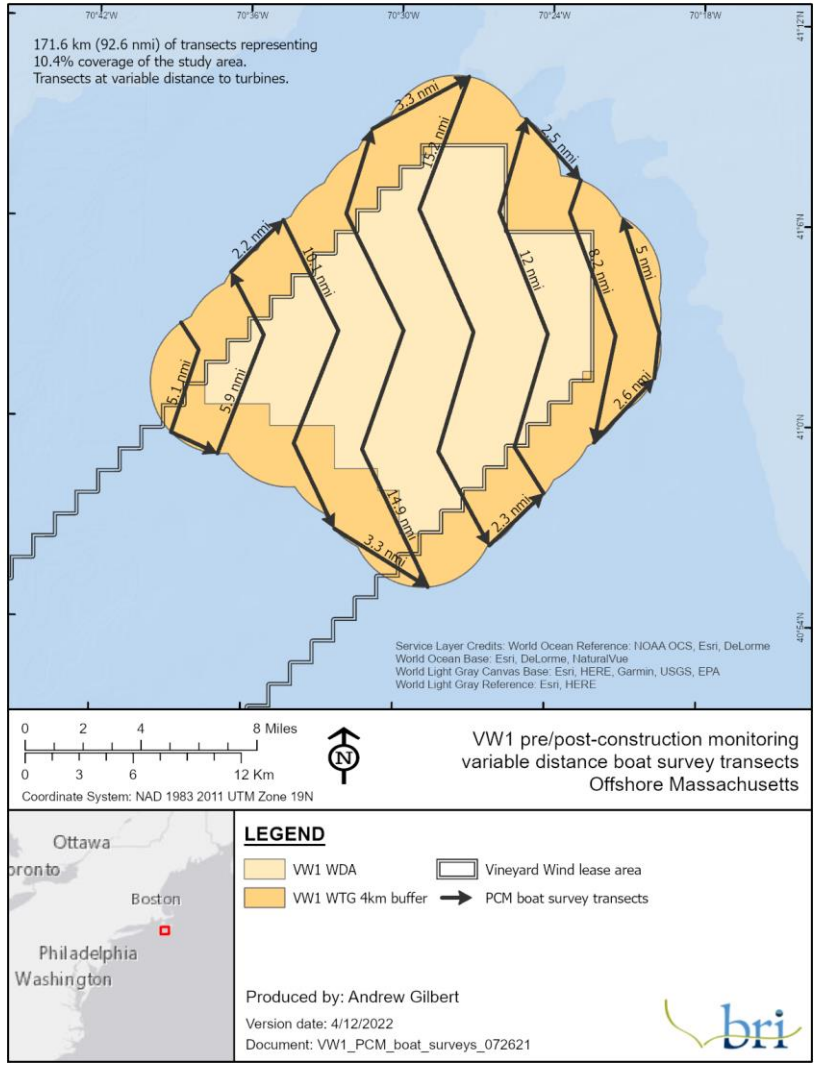
- The HOS *Mystique* uncovered a potential unexploded ordnance in ~129' water depth
- Supported by fishing vessel *Chicawa*

Press Release:
https://www.vineyardwind.com/mariners-updates/63



VINEYARD WIND 1

Ongoing Environmental Studies



Pre-Construction Avian Surveys

- **Objective:** Monitor occurrence and assess behavior of birds/wildlife within the Vineyard Wind 1 Wind Development Area
- **Frequency:** One survey per month for one year prior to construction
- **Methods:** Boat-based avian surveys following BOEM's Avian Survey Guidelines
- **Reporting:** Quarterly reports submitted to BOEM

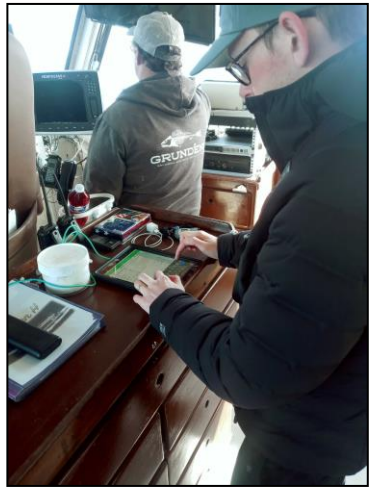
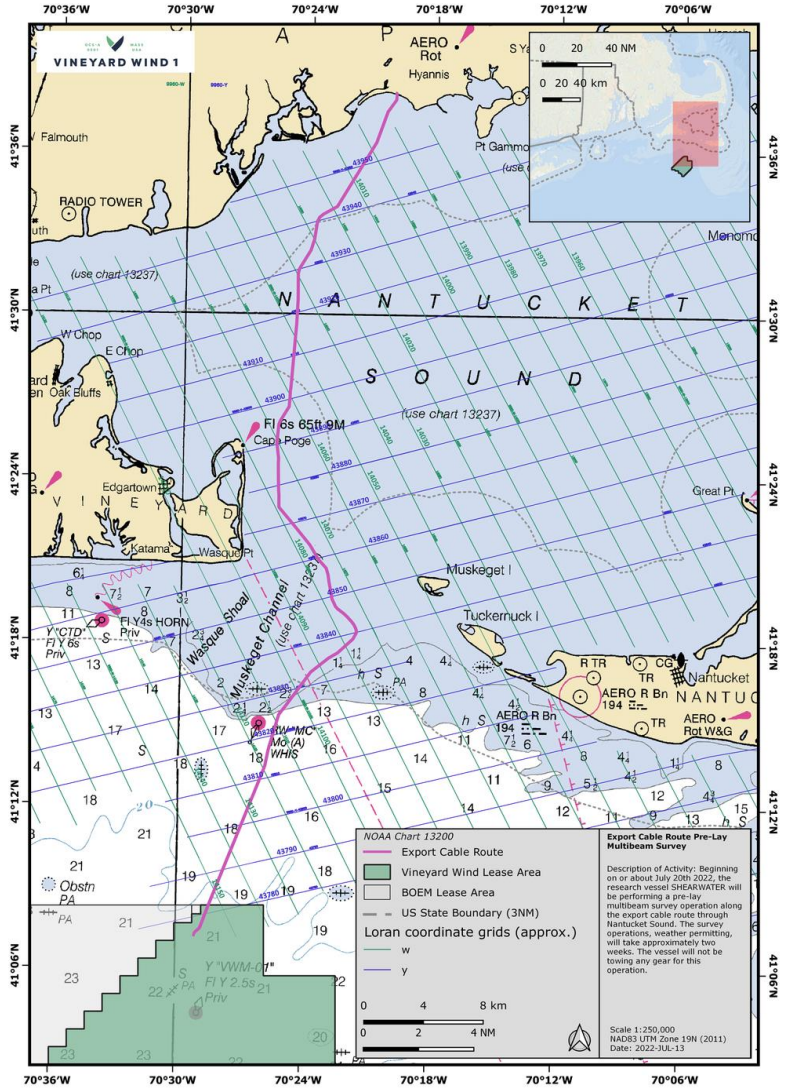


Photo credit: BRI

Upcoming Environmental Studies

Turbidity Monitoring

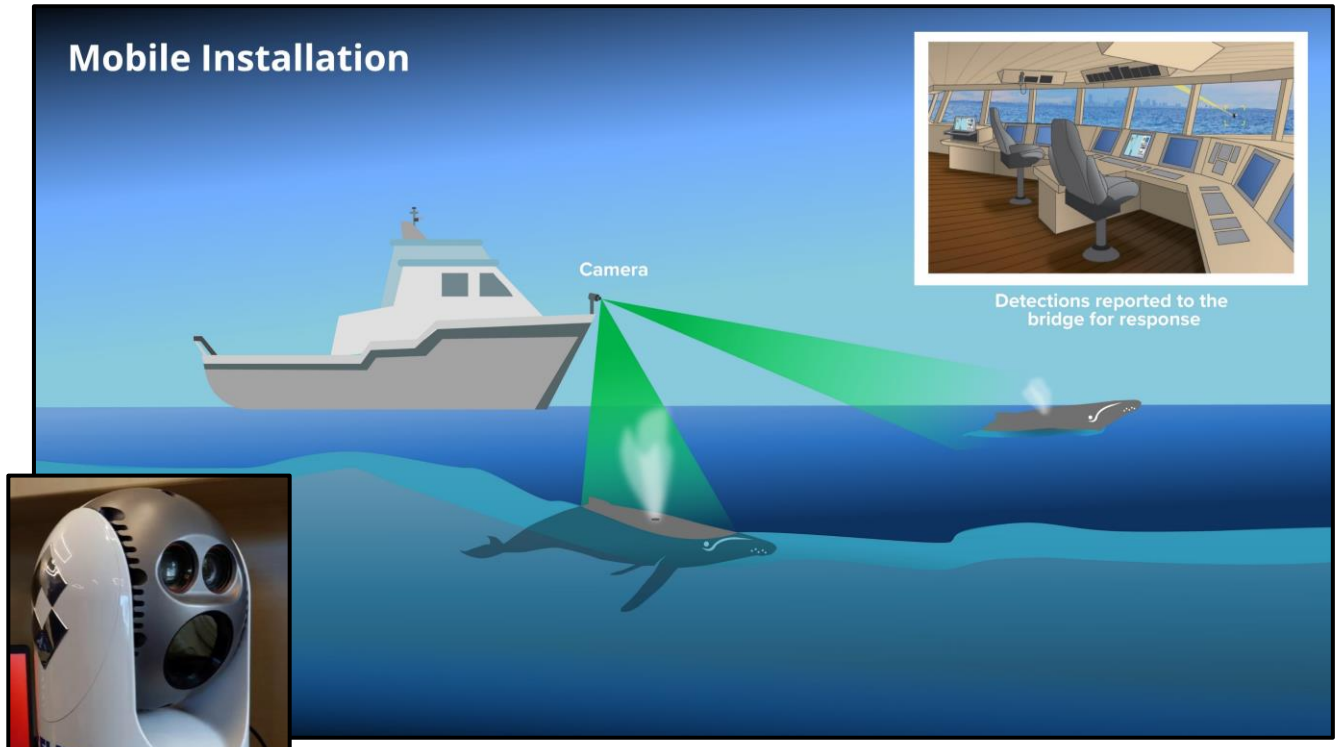
- **Objective:** conduct turbidity monitoring during offshore export cable installation to ensure compliance with the State Water Quality Certificate



Wind & Whales

Thermal Imaging Camera Monitoring Project

- **Objectives:**
  - Test efficacy of camera and locally-developed artificial intelligence software for long-distance detection of marine mammals in low-visibility conditions
  - Confirm use as a real-time vessel strike prevention tool during maritime operations
  - Conduct comparison of camera and human-observers at various vessel speeds and in different weather conditions
- **Frequency:**
  - Year 1: September – October data collection during high resolution geophysical surveys
  - Year 2: May – December 2023 monitoring during foundation installation
  - Year 3: 2024 results publication



Wind & Whales

Thermal Imaging Camera Monitoring Project

- **MWIR Camera:** Mid-Wave InfraRed imaging detects small temperature changes, making it possible to visualize obstructions through low-visibility conditions and darkness
- **Awarion** is an artificial intelligence (AI) and computer vision system that uses electro-optical and infrared video streams to detect, analyze, and report on the presence of whales, ships, and other objects, including fishing buoys and equipment

Future Wind & Whales initiatives are currently in discussion
Vineyard Wind 1 has solicited input from the RWSC marine mammal subcommittee on future initiatives

Questions?

Thank you