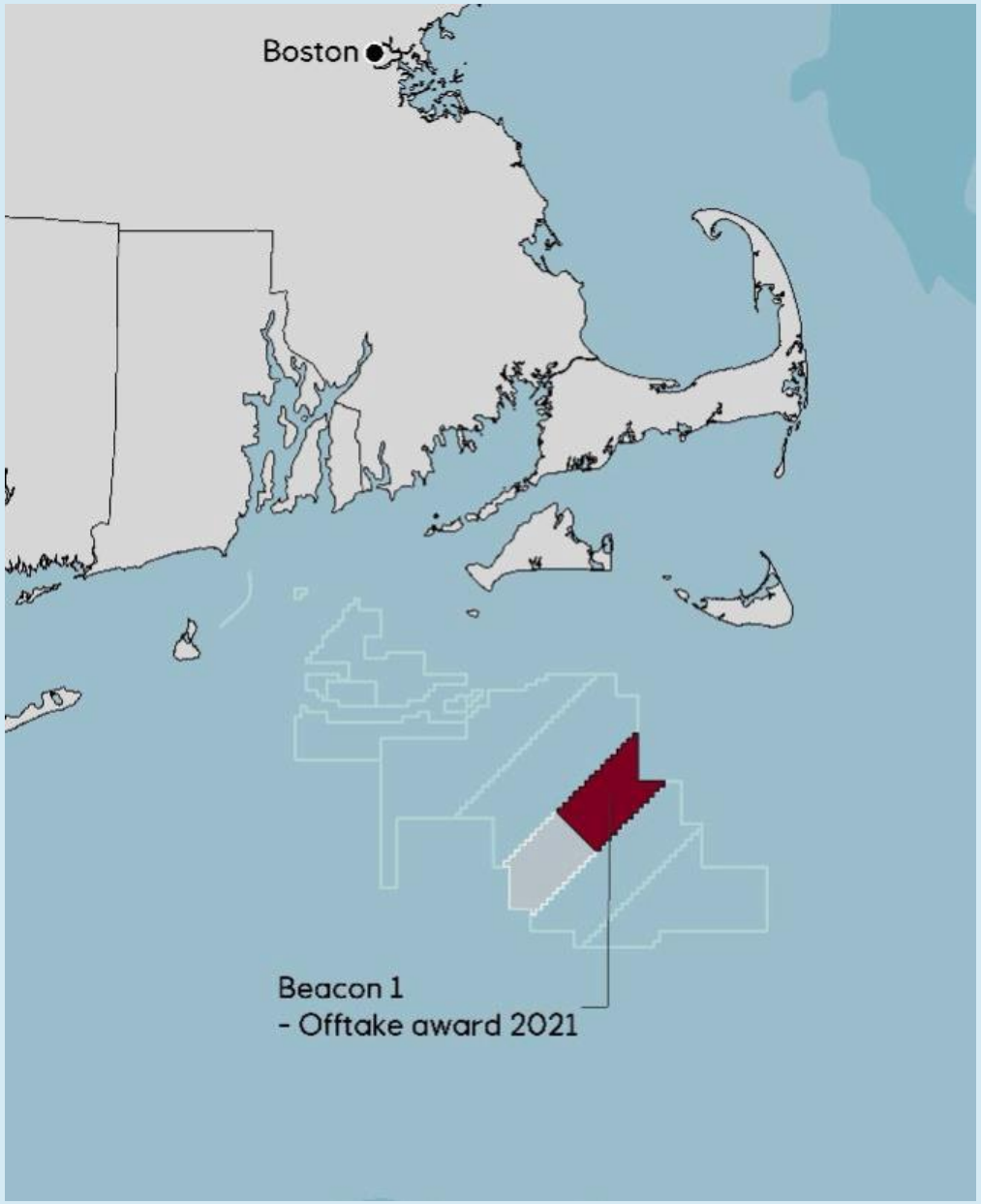
Beacon Wind

Fisheries Working Group
September 23, 2021

equinor

Beacon Wind | Agenda

- Status update on Survey Program
- Benthic Sampling Program Update
- Questions?



2021 Beacon Wind Activities

- HRG surveys for Lease Area completed and are underway along export cable route (mobilized August 2020)
- Offshore Fisheries Liaison Officer onboard survey vessels
- Scout Boat Program for survey activities
- Seafloor sampling for Lease Area and export cable route mobilizing summer 2021: vibracores, SPI/PV imagery, CPTs, and benthic grabs
- Survey newsletters distributed to fisheries stakeholders and available on website- www.BeaconWind.com
- Survey activities published via USCG LNM and updates to USCG NY VTS for nearshore activities
- Project websites show AIS for survey vessels operating in the Lease Area under “Information for Mariners”
- No gear conflicts since 2020 survey commencement

Go Electra

Rayda Cheramie

Stril Explorer

Karoline Marie

Saentis

Seehorn

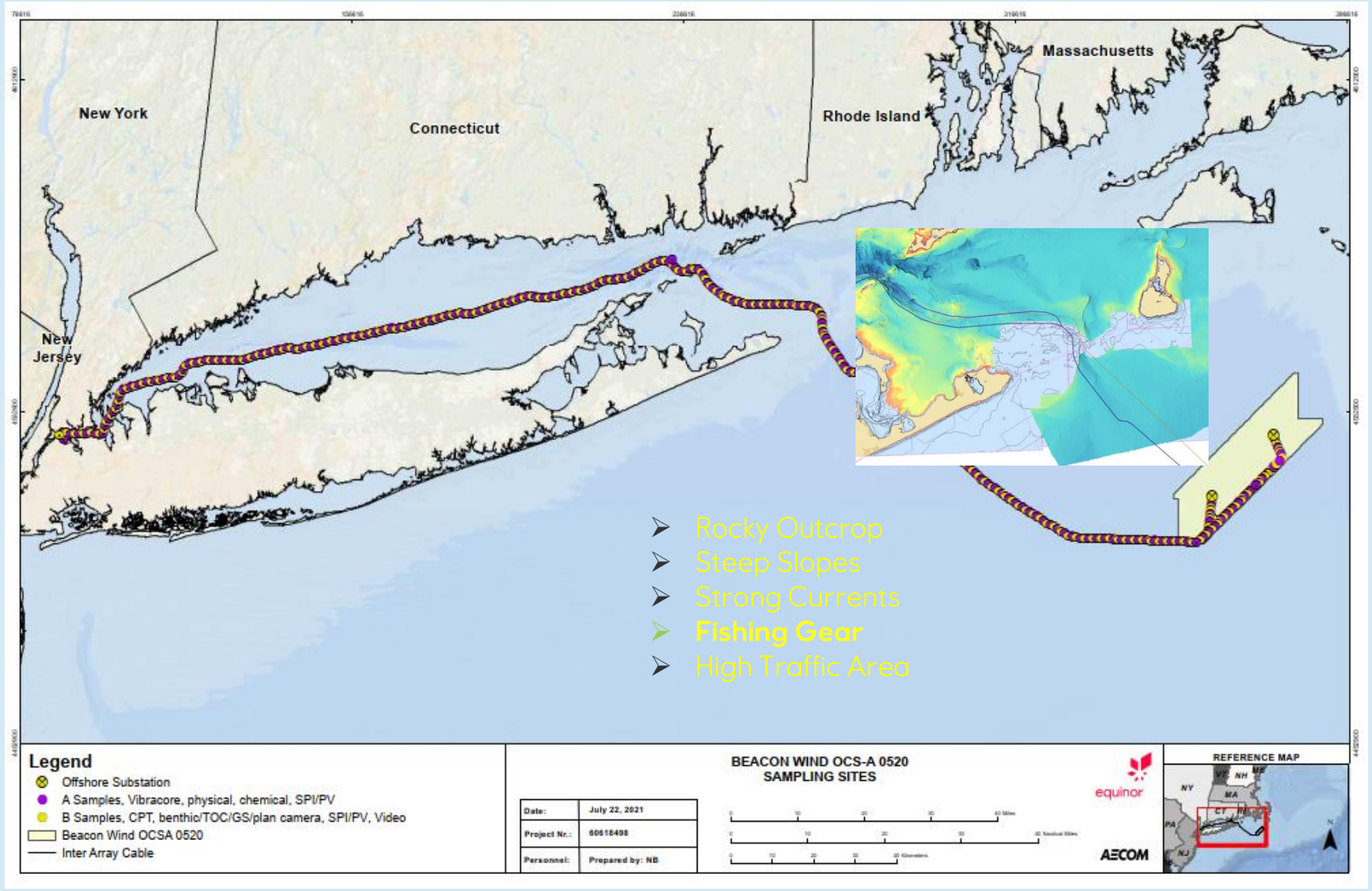
Deep Helder

Dolphin

Danielle Miller

Dina Polaris

Beacon Wind | Updated Sampling Strategy



Export Cable Route:

Routing has been revised many times

A Stations – Vibracore, Physical/Chemical, SPI/PV

B Stations – CPT, benthic, TOC, grain size, camera, SPI/PV, Video, plan view camera

Increased frequency of SPI/PV samples at both A and B stations

Regular communications between Beacon & LIS fishermen via phone, email & texts

Hard mailing notice to NY Commercial Harvesters permit holders per request of the NY Department of Conservation

SHAPING THE FUTURE OF ENERGY

Thank you for your attention. Questions?

Elizabeth Marchetti
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MAYFLOWER WIND

Project Update

Presented to

MA EEA Fisheries Working Group on Offshore Wind Energy

Presented by

Joel Southall, Fisheries Liaison Officer, Mayflower Wind

September 23, 2021

Mayflower Wind

Backed by two global energy companies with deep experience in working alongside communities and managing the complexities of offshore and onshore energy development projects

Shell's ambition is to become a net-zero emissions energy business by 2050 or sooner

Ocean Winds – a joint venture of EDP Renewables and ENGIE – share a vision where renewables, particularly offshore wind, play an essential role in the global energy transition

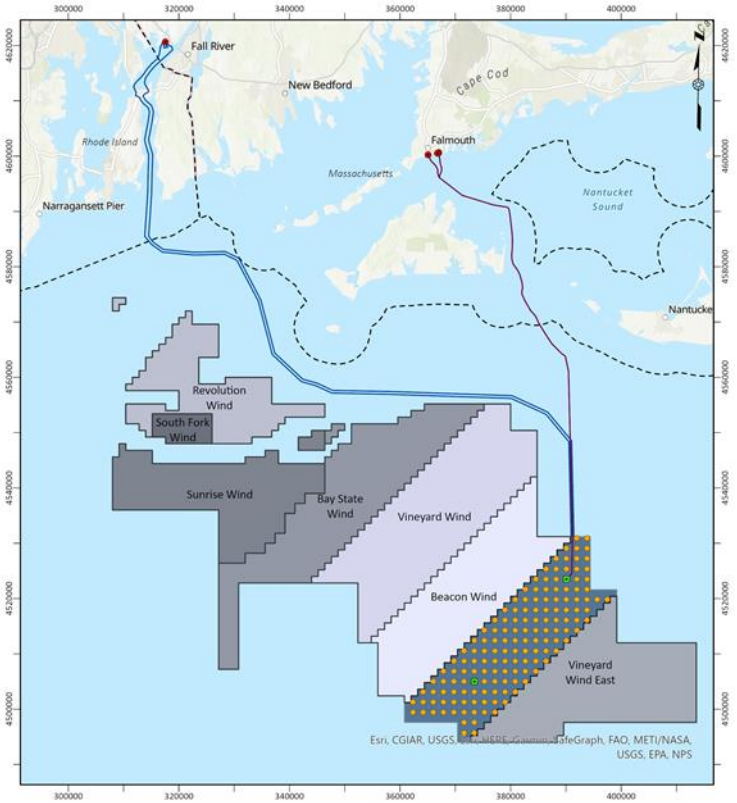
Mayflower Wind Project Overview

Points of Interconnection

- Falmouth Tap
- *New in 2021*: Brayton Point, Somerset MA

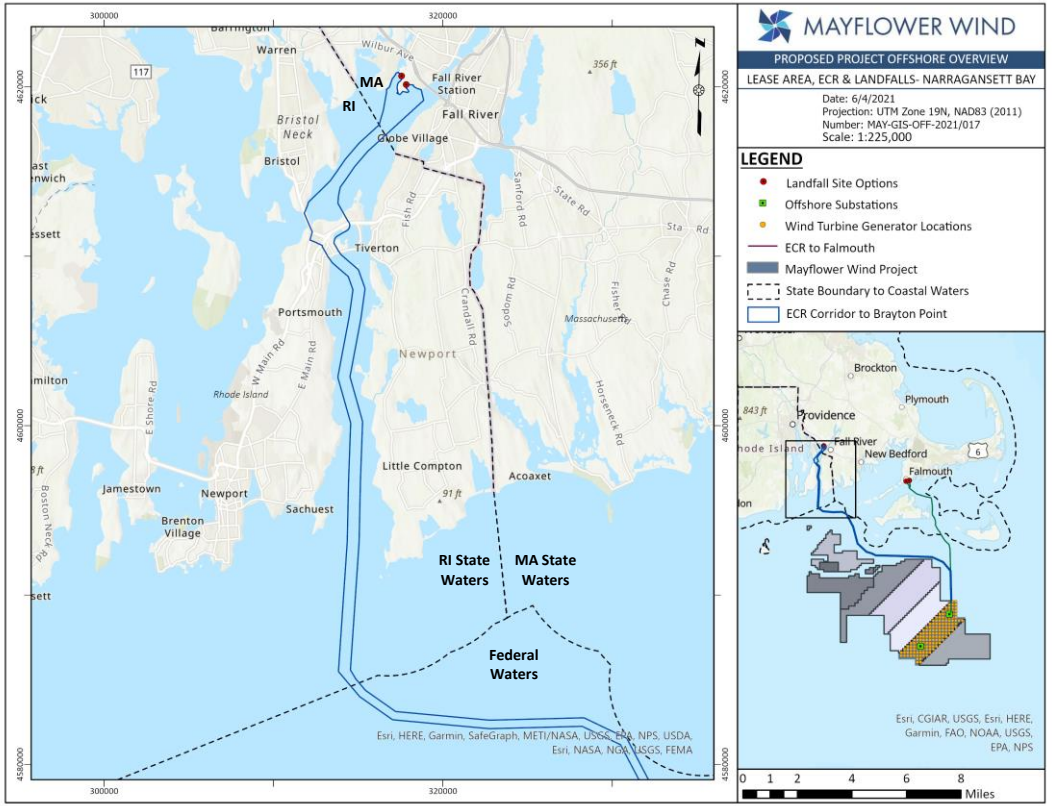
Lease OCS-A 0521

- 127,388 acres
- Up to 149 wind turbine generators (WTG)/offshore substation platform (OSP) positions within the lease area
- 1nm x 1nm spacing



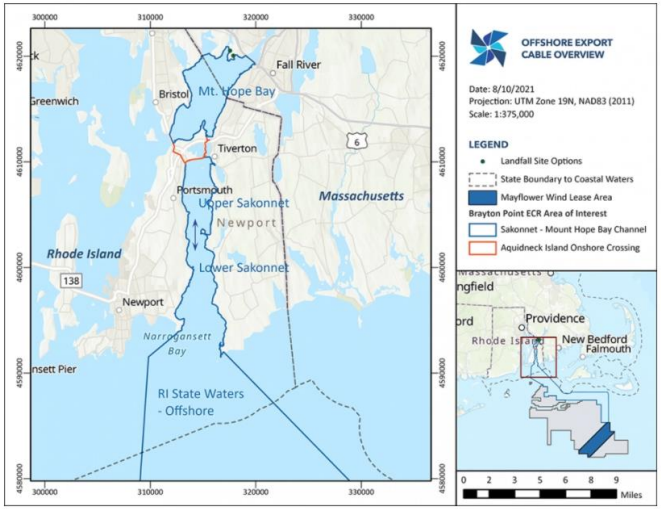
Export Cable Route (ECR) to Brayton Point

- **ECR in Federal Waters:**
  - ~145 km in federal waters
- **ECR in State Waters:**
  - Sakonnet River (~36 km)
    - ~32.5 km in RI state waters
    - ~3.5 km in MA state waters



mayflowerwind.com > Our Commitment > Mariners

Mayflower Wind G&G Surveys – Offshore, Sakonnet River and Mt. Hope Bay



Mariner Documents

2021 Boating Safety Flyer – Greater Fall River (PDF)

2021 Geophysical Surveys – Falmouth (PDF)

2021 Geophysical Surveys – Greater Fall River (PDF)

Mariners Archive

Mayflower Wind G&G Surveys – Vessel Operating Schedule

	September	September-October	October
	19-25	26-2	3-9
Mt. Hope Bay	*R/V Westerly*	*R/V Westerly*	*R/V Westerly / RV Henry Hudson*
Upper Sakonnet	*R/V Westerly*	*R/V Westerly*	*R/V Westerly / RV Henry Hudson*
Lower Sakonnet	*R/V Westerly*	*R/V Westerly*	*R/V Westerly*
Offshore - RI State Waters	*N/A*	*N/A*	*N/A*
Offshore - Federal Waters	*N/A*	*N/A*	*N/A*
Mayflower Wind Lease Area	*N/A*	*N/A*	*N/A*

Mayflower Wind Survey Vessels

Deep Water	Shallow Water	Ultra-Shallow Water	Shallow Water
			
VESSEL: GO PURSUIT	VESSEL: GO LIBERTY	VESSEL: WESTERLY	VESSEL: SHEARWATER
Water Depths > ~12m	Water Depths > ~7m	Water Depths > ~2m	Water Depths > ~5m
LOA: 150'	LOA: 170'	LOA: 50'	LOA: 110'
Call Sign: WDH6498	Call Sign: WDK6648	Call Sign: WDF7918	Call Sign: WDF5838
Phone: 337-205-7400	Phone: 337-735-1828	Phone: 805-850-9593	Phone: 201-297-6015

SIGN UP FOR MARINER UPDATES

Marine Surveys & Studies for Brayton Point

Schedule

- Started in July 2021

Surveys

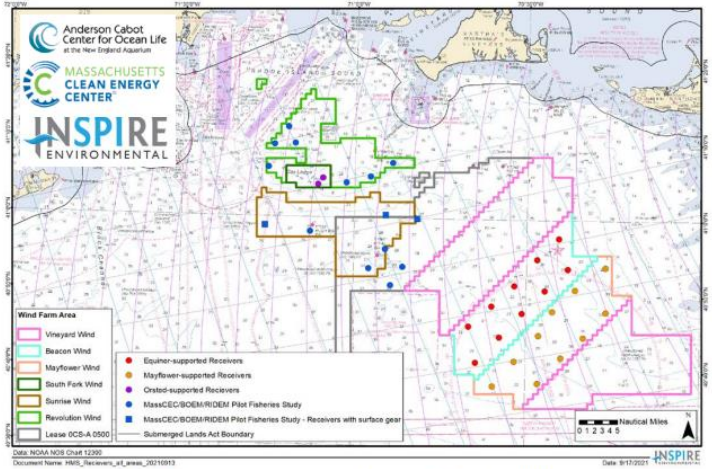
- Sidescan sonar (seafloor)
- Multibeam echosounder (water depth)
- Gradiometer (magnetic anomalies)
- Sub-bottom profiler (approximately 5-meter depth penetration)
- Single channel ultra-high resolution seismic (20-meter depth penetration)
- 2021 Geophysical survey
- 2021 Geotechnical survey
- 2021 Geoarchaeological investigation
- 2021 Benthic sampling program (Summer)
- 2022 Marine Archaeological Resource Assessment
- 2022 Marine Site Investigation Report

New England Aquarium & Inspire Environmental HMS Monitoring

- In partnership with MassCEC (with BOEM and RIDEM)
- Jointly supported by the offshore wind developers listed on the flyer
- LNM issued through 12/15/21

Acoustic Monitoring of Highly Migratory Fish Species in RI/MA Wind Energy Areas

The New England Aquarium and INSPIRE Environmental, in partnership with the Massachusetts Clean Energy Center (with BOEM and RIDEM) and with funding from the offshore wind developers shown on the map below, are conducting research on the movements of highly migratory fish species (sharks, tunas, and marlins) in the southern New England wind energy area. Part of this research requires small acoustic receivers about the size of a 1 liter water bottle to be placed on the sea floor in the locations shown as colored circles or squares in the below map. To reduce the risk of entangling protected species, receivers shown as colored circles have no surface buoys and are connected to a mooring system weighing approximately 70 pounds that extends 2 to 3 meters (6 to 9 feet) off the sea floor. Receivers shown as colored squares are rigged on surface gear marked with two red buoys. All receivers will be deployed in these locations until December 15, 2021.



For more information on the research, please contact the New England Aquarium, INSPIRE Environmental, or the Massachusetts Clean Energy Center. For more information on activities in a particular offshore wind lease area, please contact the developer staff listed below.

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Thank You

Questions and Comments?

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(617) 817-4682

Chinese (Simplified)
English
French
Hindi
Italian
Portuguese
Russian
Spanish

Ørsted Offshore North America

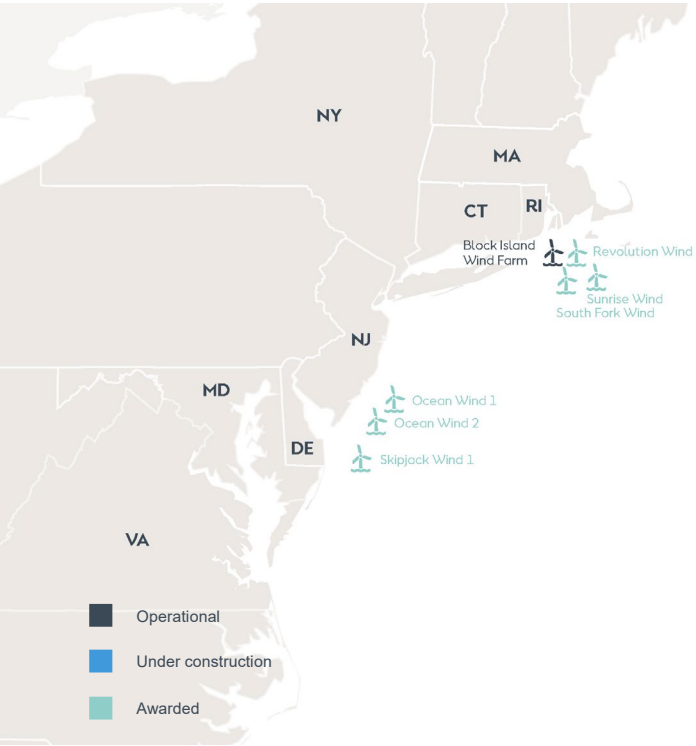
Northeast Program Update

Ørsted

MA Fisheries Working Group Meeting on Offshore Wind
September 2021

Ørsted Offshore North America portfolio

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



In Operation

Block Island Wind Farm: 30MW

Awarded

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

Orsted Northeast Program
50/50 JV with Eversource

South Fork

- Lease Area OCS-A 0517
- Deliver power to the East Hampton, NY
- FEIS issued August 2021
- NY Article VII approved March 2021

Revolution

- Lease Area OCS-A 0486
- Interconnect to the existing Davisville Substation, RI
- NOI issued April 2021, scoping ended June 11, 2021

Sunrise

- Lease Area OCS-A 0530
- Proposed interconnection at Holbrook Substation, NY
- NOI issued August 2021
- Scoping Meetings: September 16 (5:30) / 20 (1:00) / 22 (5:30)
- Comments due October 4

Revolution Wind Fisheries Monitoring Plan

Trawl Survey

- NEAMAP trawl net and sampling protocols will be used. Field work will occur on a local trawl vessel. Sampling will occur seasonally, and efforts will be made to coordinate timing with other regional surveys.
- Asymmetrical BACI design - Two control sites have been proposed with consideration to depth, habitat, consistency with NEFSC trawl survey strata, and proximity to future offshore wind development.
- Primary objective is to determine whether the construction and operational activities associated with the Project lead to a change in the relative abundance of fish and invertebrates within the Project Area.

Acoustic Telemetry

- Orsted will partner with researchers at the New England Aquarium and Inspire Environmental to carry out a five-year acoustic telemetry study at the Revolution Wind, Sunrise Wind, and South Fork Wind lease areas.
- Focal species – bluefin tuna, shortfin mako sharks, blue sharks
- An array of 36 receivers will be deployed starting in 2022. Target sample size of 150 transmitters will be deployed from 2023-2025.

Ørsted

Revolution Wind Fisheries Monitoring Plan

Ventless Trap Surveys

1) Revolution Wind will perform a Before-After Control-Impact ventless trap survey in the lease area and at two nearby control sites to evaluate changes in the relative abundance and demographics of lobsters, Jonah crabs, and rock crabs. The survey will be executed consistently with the protocols established during the Southern New England Cooperative Ventless Trap Survey (SNECVTS).
2) Gradient survey will be executed during the operational phase of the project to assess whether lobsters, Jonah crabs, or rock crabs occur in higher abundance near the foundation locations, relative to other locations within the RWF.
3) Orsted will partner with scientists at Rhode Island Division of Marine Fisheries to perform a Before-After Gradient ventless trap survey in Rhode Island state waters along the route of the Revolution Wind Export Cable.

Ørsted

Approach to Benthic Monitoring

1) An ROV equipped with state of the art underwater video will be used to examine the epifaunal growth and community composition on the wind turbine foundations. ROV will have a manipulator arm to collect physical specimens for species identification.
2) An ROV and a multi-beam echosounder will be used to evaluate recolonization of relocated boulders, and to evaluate physical changes to the habitat over time.
3) SPI/PV camera system will be used to evaluate changes in function of soft-sediment habitats around wind turbine foundations. Sampling will occur at a range of distances from the foundations (Before-After Gradient design). Sampling will occur at the same turbine foundations that are monitored using the ROV.
4) SPI/PV camera system will be used to assess recovery of benthic habitats along the Export Cable route after the cable is installed. Sampling will occur at a range of distances from the Export Cable (Before-After Gradient design), and sampling will be stratified based on habitat and the amount of fishing activity.

Ørsted

Questions?

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MA Fisheries Working Group

September 23, 2021

Nantucket Sound Vessel Activity

SHEARWATER

Flag: US

MMSI: 368528000

Captain: Wayne Porter

Cell: 201-312-5074

Onboard Fisheries Liaison: Roderick Murray

Cell: 508- 951-7443

Standing by on VHF channel 13 & 16

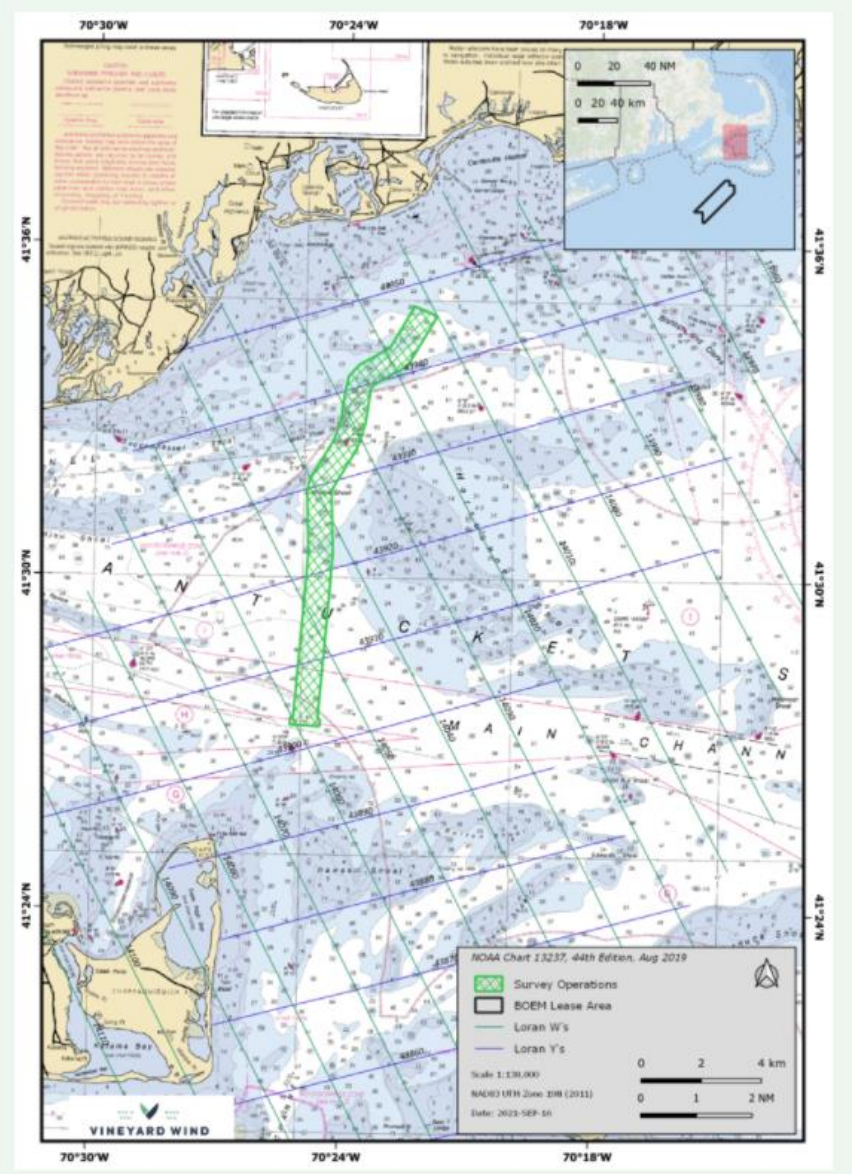
CHICAWA

Flag: US

Captain: Calvin Perry

Cell: 508-274-9832

Standing by on VHF channel 13 & 16



VINEYARD WIND

Nantucket Sound Vessel Activity

Benthic Habitat Data Collection

R/V CATAPULT

LOA: 35 feet
Flag: US
Captain: Breezy Grenier
Phone: 203-731-1529
Email: breezy.grenier4@gmail.com

Standing by on VHF channel 13 & 16

R/V DOLPHIN

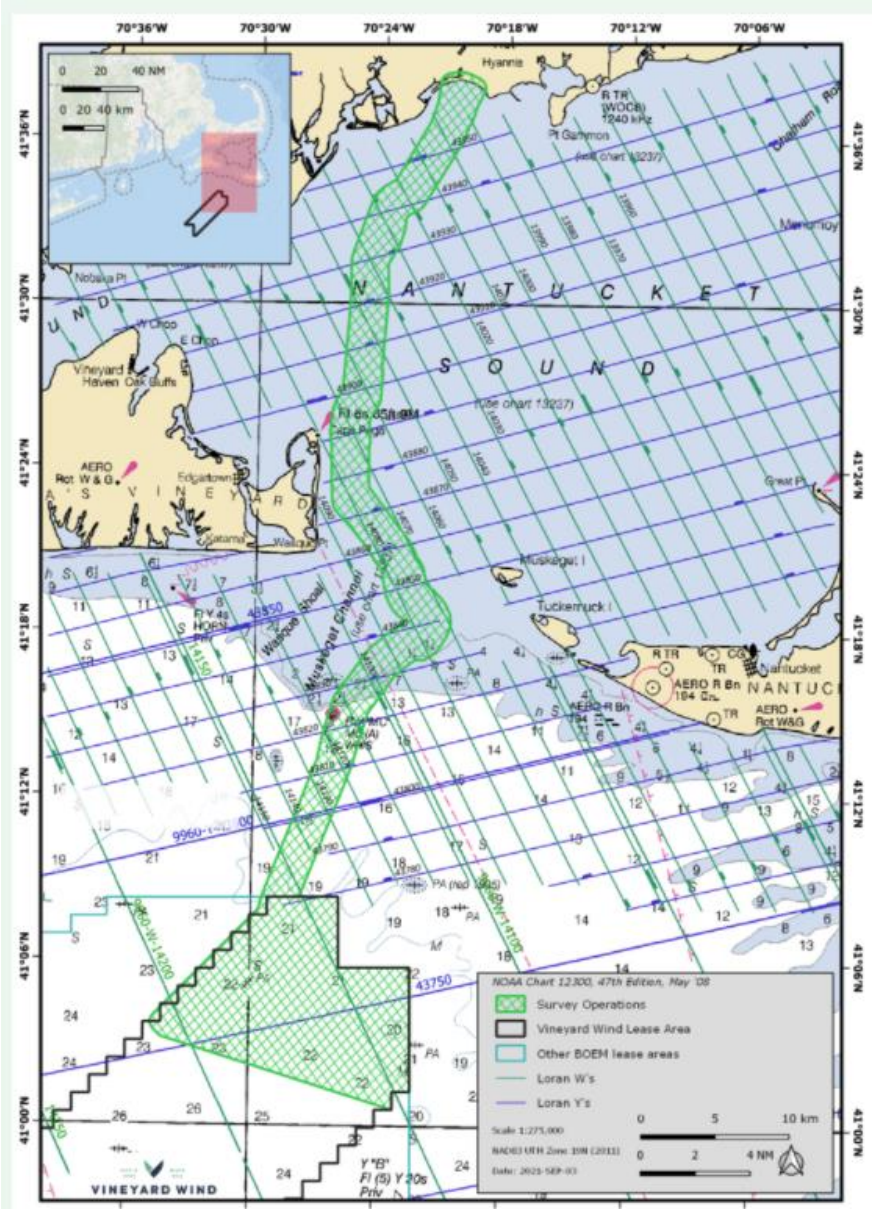
LOA: 49 feet
Flag: US
Captain: James Roth
Phone: 203-858-3322
Email: jroth@conshelf.com

Standing by on VHF channel 13 & 16

DANIELLE MILLER

LOA: 145 feet
Flag: US
Captain: Brad Pimer
Phone: 516-945-7077
Email: bpimer@millermarineservices.com

Standing by on VHF channel 13 & 16



VINEYARD WIND

OFFSHORE VESSEL ACTIVITY

VESSEL: FUGRO EXPLORER

LOA: 261 feet

FLAG: Panama

IMO #: 9208564

CAPTAIN: Siddharth Kumar

EMAIL: om@epr.fugro.com

PHONE: +1 713 369 4472

SAT PHONE: +881 641 470 351

ONBOARD FISHERIES LIAISON:

Edwin Lee 1-203-927-7113

VESSEL: F/V Provider

HULL #: 599943

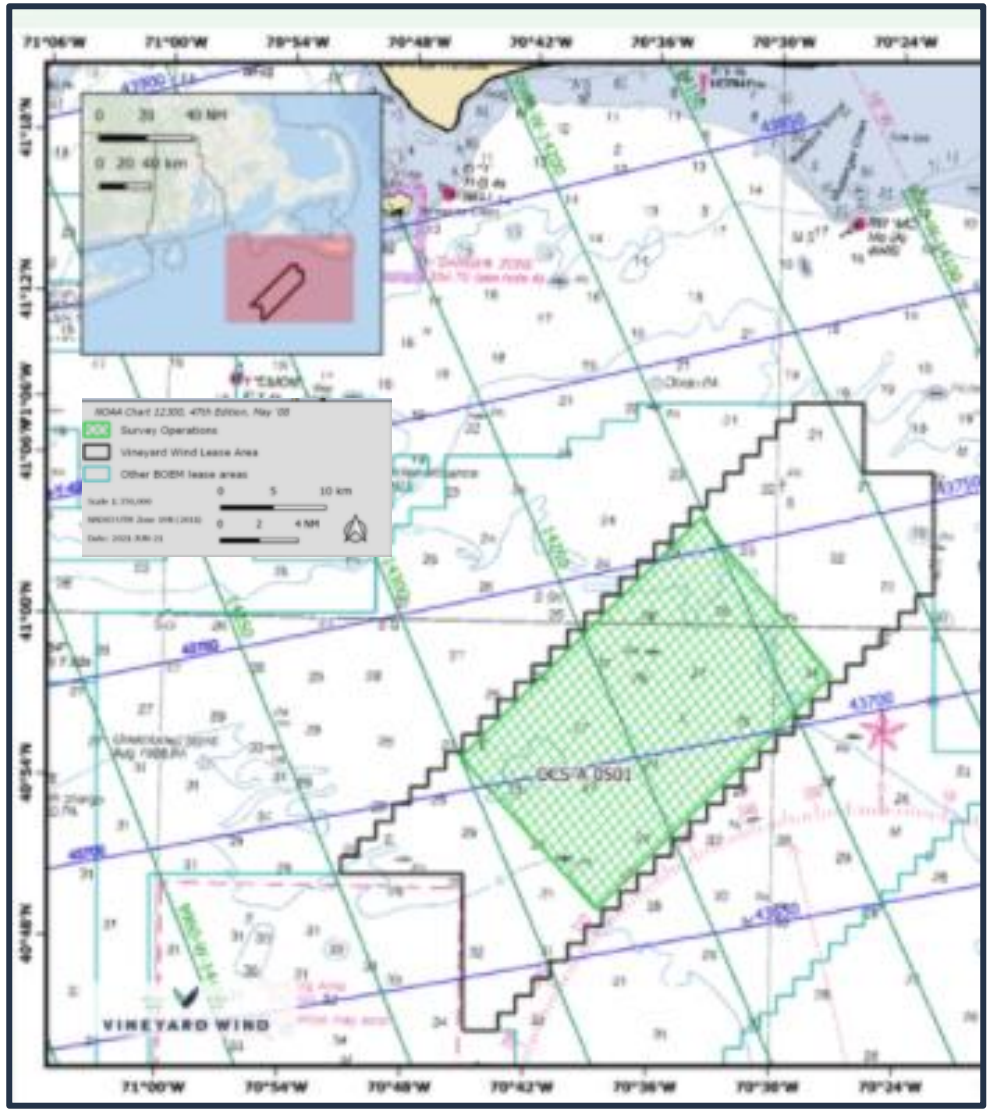
CAPTAINS:

Rob Cabral: 1-401-965-3364

Scott Dernberger: 1-401-626-7622

Standing by on VHF Channel 6 &16

LOCATION: Throughout Lease Area 501



VINEYARD WIND

OFFSHORE VESSEL ACTIVITY

R/V GO PURSUIT

Flag: US

Call Sign: WDH6498

Captain: Winston Lackey (Rudy)

Phone: +1 337 205 7400

MMSI: 367191410

Onboard Fisheries Liaison: Josh Greenleaf

Cell: 207-350-6406

Standing by on VHF channel 13 & 16

F/V FLEET KING

Flag: US

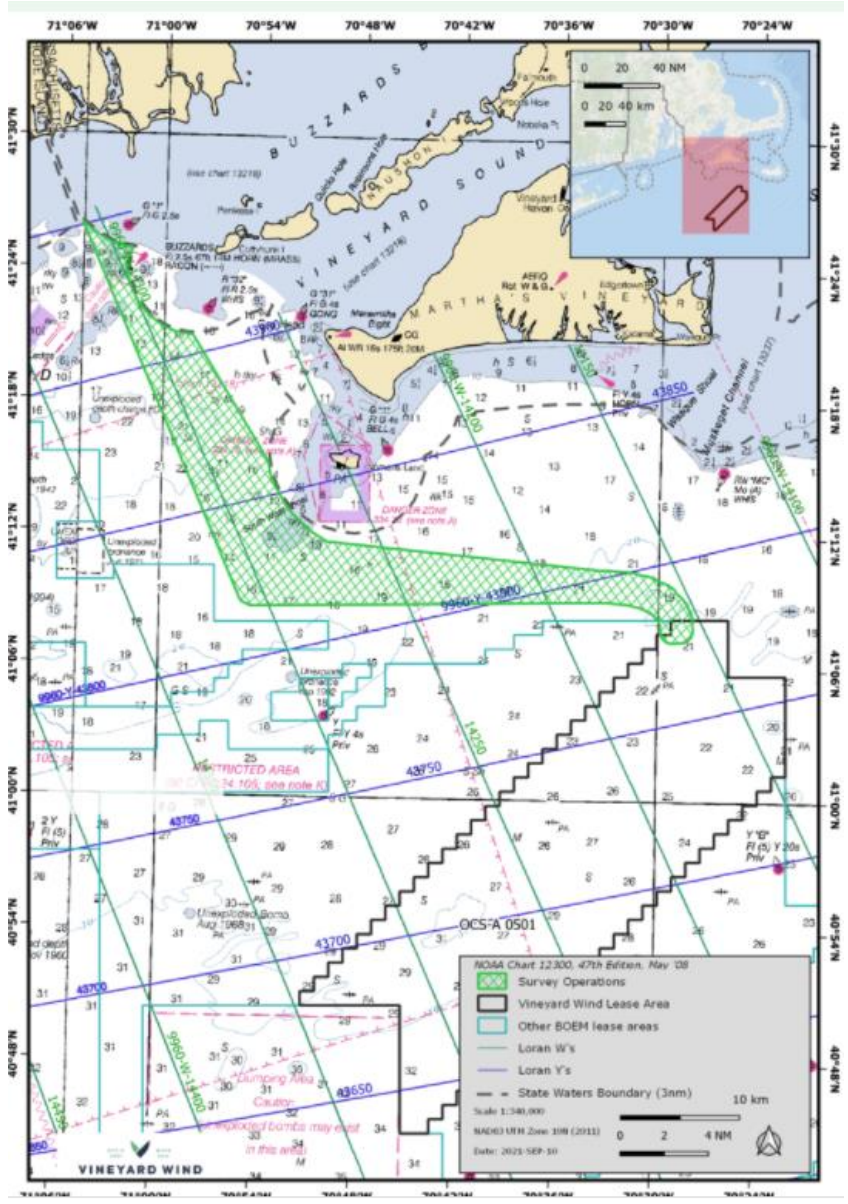
Call Sign: WCX4625

Captain: Matt Linnell

Cell: 508-237-9338

MMSI: 367751630

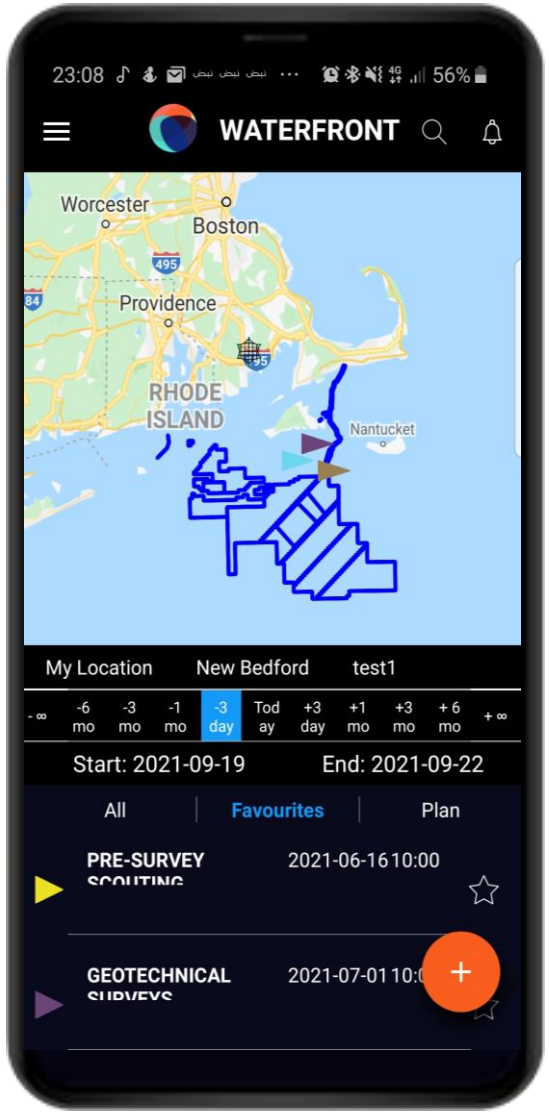
Standing by on VHF channel 13 & 16



VINEYARD WIND

WATERFRONT

- Realtime and streamlined project information to the fingertips of fishermen
- Users can set their area of interest, ensuring they only receive relevant and timely information
- Simple, clear, and interactive map based visualisation of all project marine activities
- User profiles can either be visible or remain anonymous. Either option allows for direct communication with developer's fisheries liaisons
- All communication channels are protected by end-to-end encryption
- User can save information for offshore / offline accessibility
- Weather, AIS, and LORAN-C information overlays are provided for the map



Dynamic Engagement with Marine Stakeholders

Mutually Beneficial Space

Streamlined Notifications

Data Privacy and Security

WATERFRONT

Additional Features / Functions:

- **All NtMs under one roof (also archived NtMs)**
- **User can raise traceable alerts with the Fisheries Liaisons regarding a particular marine activity**
- **User can pin-gear locations and share (privatley) with Fisheries Liaisons to avoid damage/loss**
- **User has access to FAQ responses**
- **User gets relevant site-specific data (such as buoy data) straight to phone**

Khalid Kamhawi, CEO

khalid.kamhawi@ithacacleanenergy.com

Contact Vineyard Wind:

Crista Bank, Fisheries Liaison
cbank@vineyardwind.com

Caela Howard, Fisheries Liaison
choward@vineyardwind.com

Sign up for EMAIL Updates OR TEXT ALERTS

www.vineyardwind.com/fisheries

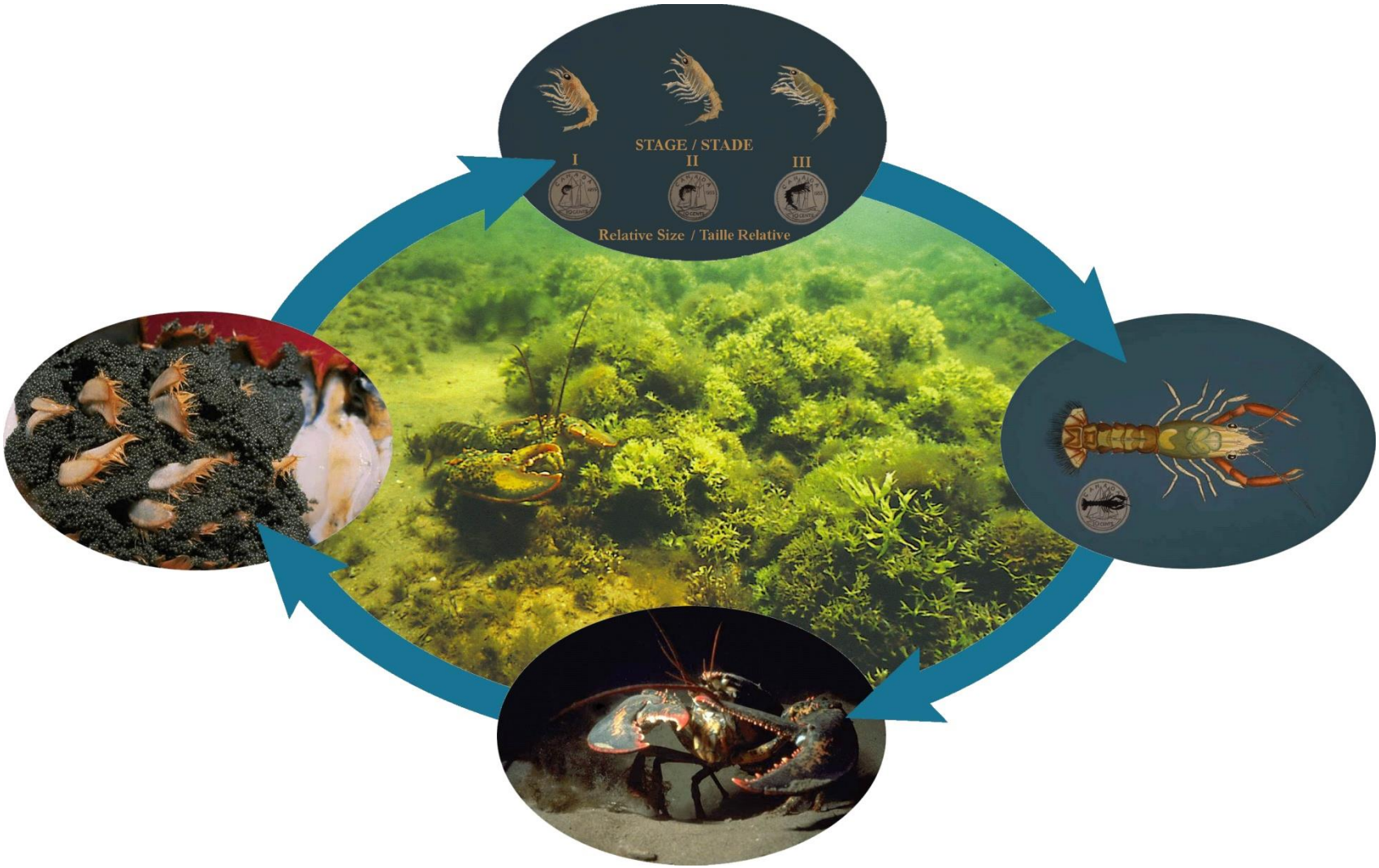
QUESTIONS?

Larval sampling in the Massachusetts Windfarm Lease Area

Kevin D. E. Stokesbury
Kyle Cassidy
Rachel Norton
Travis Lowery
Jeff Turner
Evan Weig

Department of Fisheries Oceanography
SMAST, UMASSD

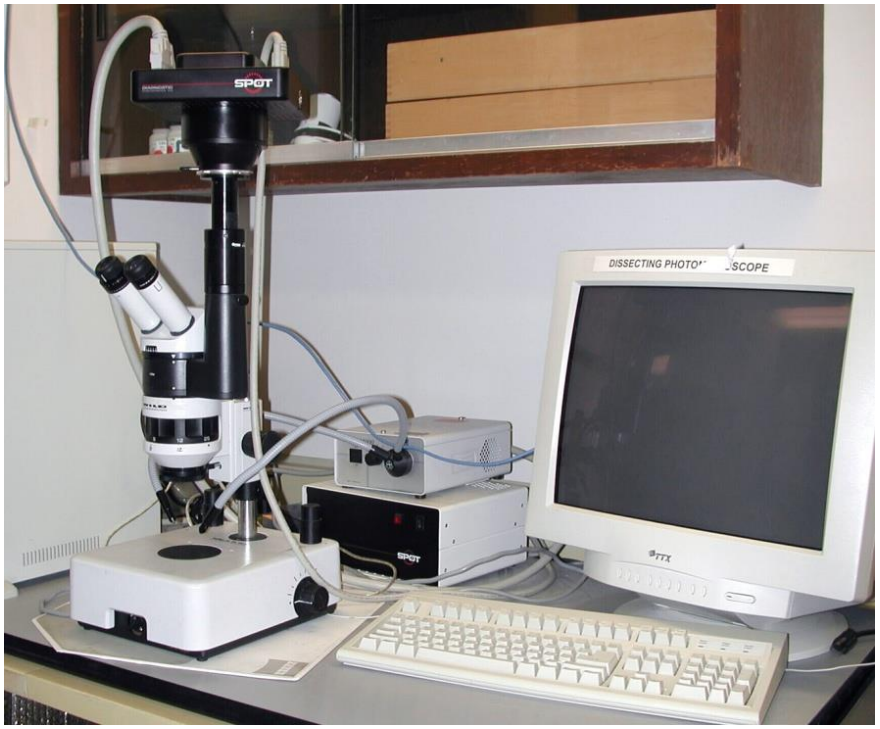
Life cycle of the American lobster



G. Sharp DFO Canada

Larval Lobster Plankton Net: Bob Miller DFO Canada

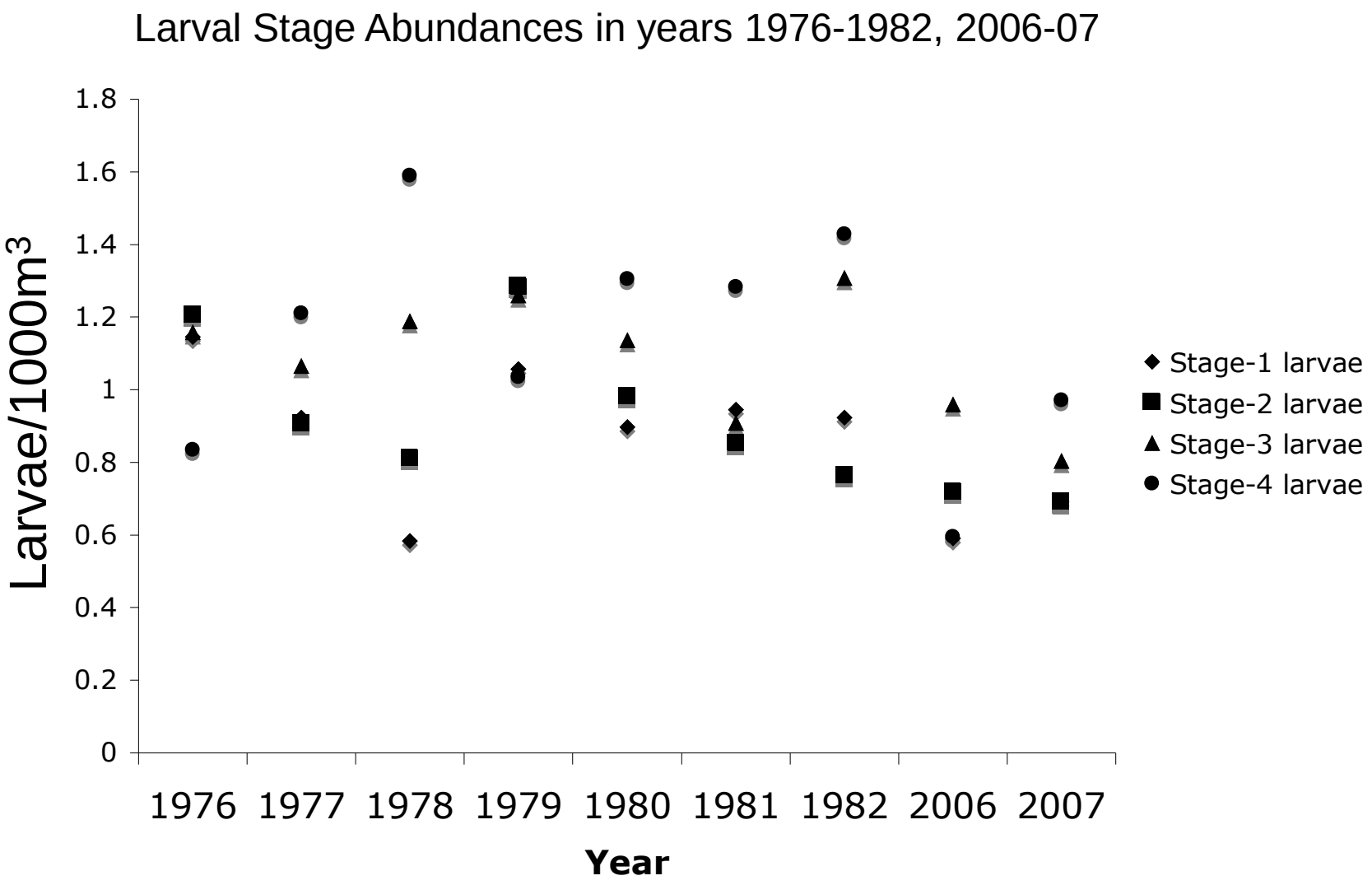
Larval measurements



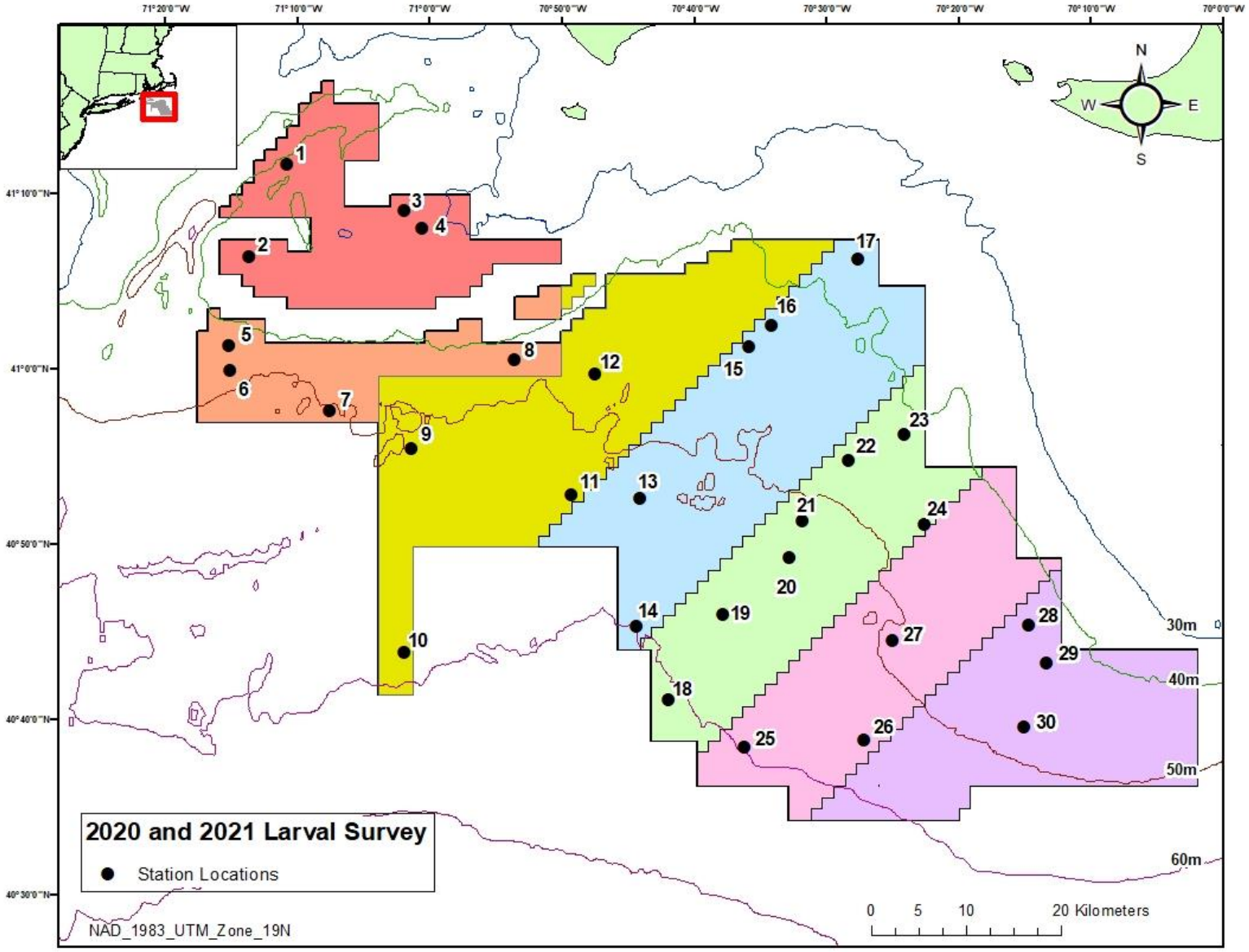
Sampling measure	*SMAST*	*NMFS/DMF*
Net mouth	0.67m * 1.67m	1m * 2m
Net mesh	1300µm	970µm
Net length	6.7m	9m
Effective sampling depth	0.0m to 0.67m	0.0m to (0.5m – 0.67m)
Standard tow volume	1200-1500 m^3	3000 m^3
Vessel speed	4 knots	3.25 knots
Vessel size	17m	12m
Standard tow time	10-15 minutes	30 minutes

M. Fogarty NMFS

Buzzards Bay Comparison between years



Sampling sites for 2020 and 2021 in the MASS Windfarm lease area



Larval Species Present

Fish Larvae (Gulf Stream Flounder)

Lobster Larvae

Crab Larvae

Mysis Shrimp

Sampling Periods for 2020 and 2021

2020 (June-September)

Date	Sampling Period	Stations Sampled	Vessel	Tow Length (Min)	Lobster Counts
6/9/2020	1	30	Both	10	64
6/25/2020	2	30	Both	10	74
7/8/2020	3	30	Both	10	3
7/29/2020	4	30	Both	10	0
8/12/2020	5	15	Encourager	10	0
8/13/2020	5	15	Rock & Roll	10	0
8/27/2020	6	15	Encourager	5*	0
8/29/2020	6	15	Rock & Roll	10	0
9/24/2020	7	30	Both	10	0

* Large aggregation of a species of tunicate. Tow length was adjusted

2021 (May and June)

Date	Sampling Period	Stations Sampled	Vessel	Tow Length (Min)	Lobster Counts
5/13/2021	1	15	Rock & Roll	10	0
5/14/2021	1	15	Rock & Roll	10	0
5/27/2021	2	30	Both	10	1
6/9/2021	3	30	Both	10	62
6/25/2021	4	30	Both	10	32

Species Counts

2020 (June-September)

Sampling Period	Month	Species Counts							
		Fish	Crab	Shrimp	Lobster				
					I	II	III	IV	Total
1	June	2	1946	0	35	25	4	0	64
2	June	15	896	0	42	21	9	2	74
3	July	89	281	3	1	1	1	0	3
4	July	369	1192	116	0	0	0	0	0
5	August	506	110	4	0	0	0	0	0
6	August	326	31	36	0	0	0	0	0
7	September	1174	34	1	0	0	0	0	0
Total		2481	4490	160	78	47	14	2	141

2021 (May and June)

Sampling Period	Month	Species Counts							
		Fish	Crab	Shrimp	Lobster				
					I	II	III	IV	Total
1	May	57	34	0	0	0	0	0	0
2	May	2	19	5	1	0	0	0	1
3	June	0	95	10	22	36	4	0	62
4	June	31	1669	36	1	10	18	3	32
Total		90	1817	51	24	46	22	3	95

Species Abundance

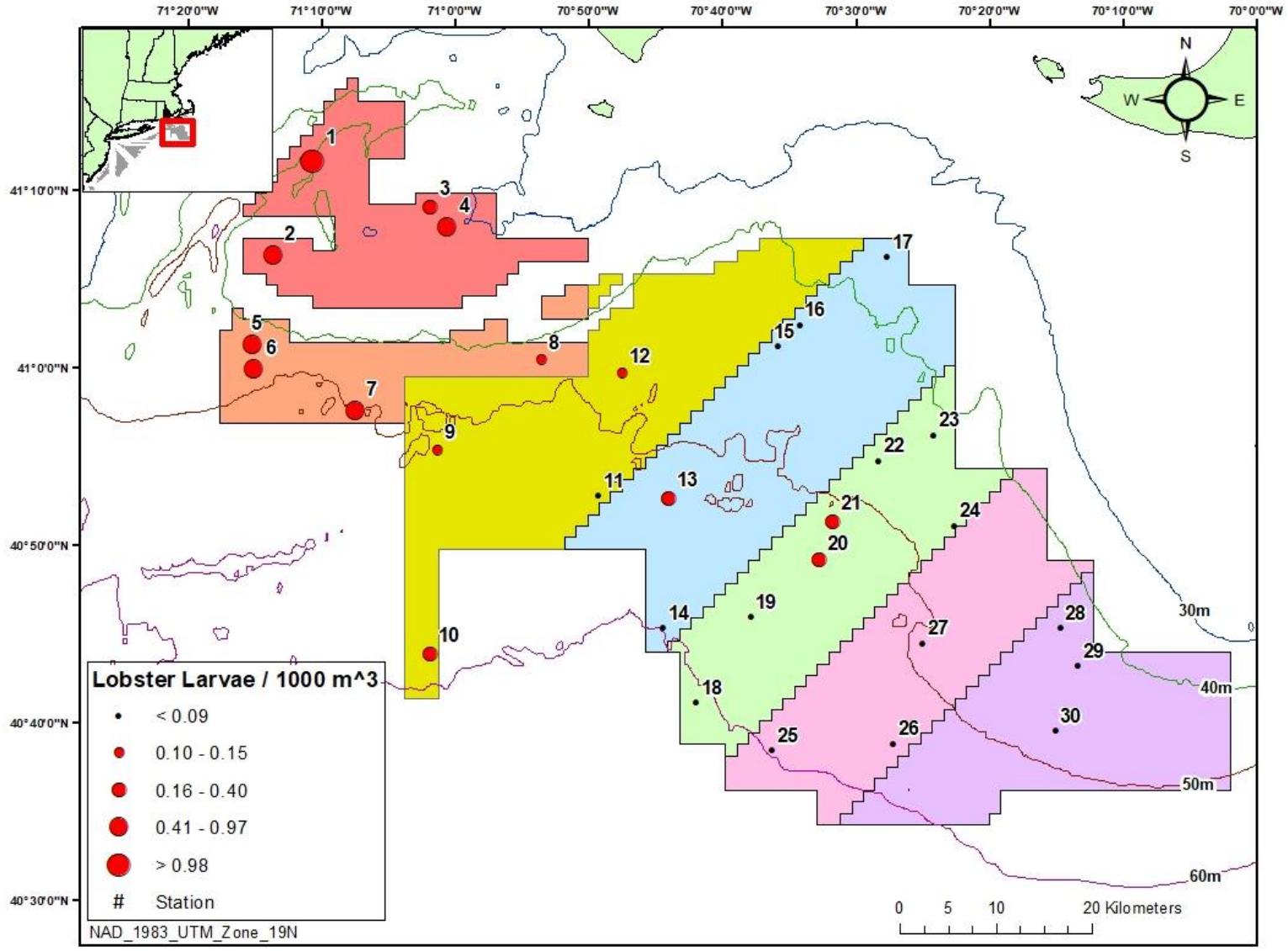
2020 (June-September)

Sampling Period	Month	Mean Species Larvae / 1000 m³ (StdDev)							
		Fish	Crab	Shrimp	Lobster				
					I	II	III	IV	Total
1	June	0.04 (0.15)	44.9 (80.77)	0	0.81 (1.91)	0.53 (0.91)	0.1 (0.32)	0	1.43 (2.68)
2	June	0.30 (0.87)	17.42 (31.33)	0	0.89 (3.97)	0.44 (1.99)	0.17 (0.58)	0.05 (0.18)	1.54 (6.28)
3	July	1.82 (3.47)	6.1 (18.68)	0.05 (0.2)	0.03 (0.15)	0.02 (0.08)	0.02 (0.11)	0	0.06 (0.2)
4	July	6.92 (16.27)	20.71 (79.12)	2.24 (4.96)	0	0	0	0	0
5	August	10.98 (15.24)	2.8 (8.73)	0.1 (0.34)	0	0	0	0	0
6	August	9.25 (10.89)	0.97 (1.51)	0.85 (1.77)	0	0	0	0	0
7	September	23.41 (73.37)	0.61 (0.97)	0.02 (0.11)	0	0	0	0	0
Total		7.53 (29.88)	13.36 (46.81)	0.47 (2.12)	0.25 (1.69)	0.14 (0.84)	0.04 (0.26)	0.01 (0.07)	0.43 (2.63)

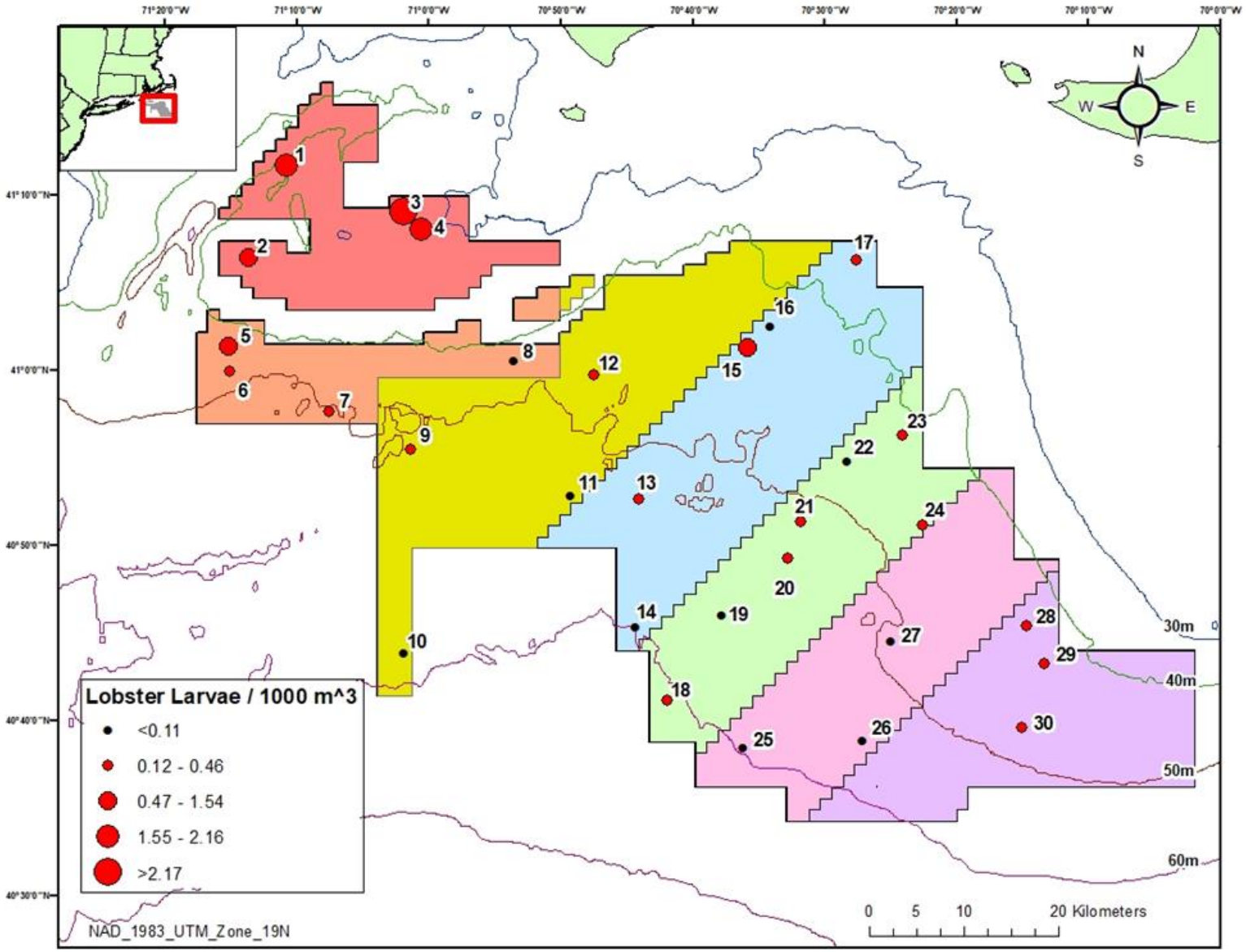
2021 (May and June)

Sampling Period	Month	Mean Species Larvae / 1000 m³ (StdDev)							
		Fish	Crab	Shrimp	Lobster				
					I	II	III	IV	Total
1	May	0.96 (3.43)	0.56 (1.54)	0.00	0.00	0.00	0.00	0.00	0.00
2	May	0.04 (0.14)	0.38 (0.80)	0.10 (0.36)	0.02 (0.11)	0.00	0.00	0.00	0.02 (0.11)
3	June	0.00	2.35 (7.64)	0.25 (0.59)	0.55 (1.43)	0.86 (2.97)	0.08 (0.29)	0.00	1.49 (4.09)
4	June	0.54 (0.63)	27.25 (48.21)	0.72 (1.59)	0.02 (0.08)	0.16 (0.36)	0.32 (0.53)	0.06 (0.17)	0.55 (0.72)
Total		0.39 (1.77)	7.63 (26.67)	0.27 (0.90)	0.15 (0.75)	0.25 (1.52)	0.10 (0.33)	0.01 (0.09)	0.52 (2.14)

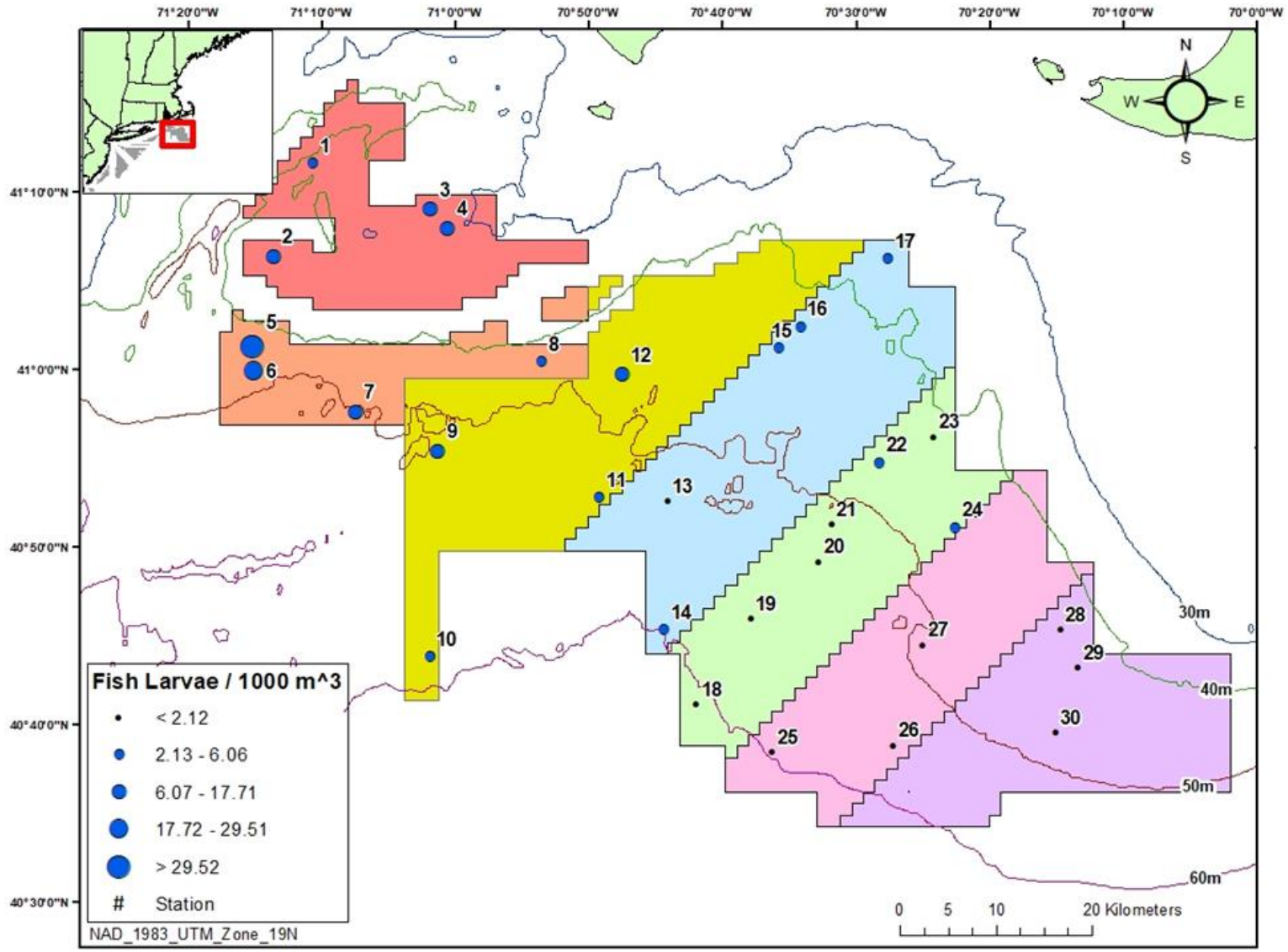
Larval lobster abundance per 1000 m^3 of water sampled throughout all sampling periods in 2020 (June to September)



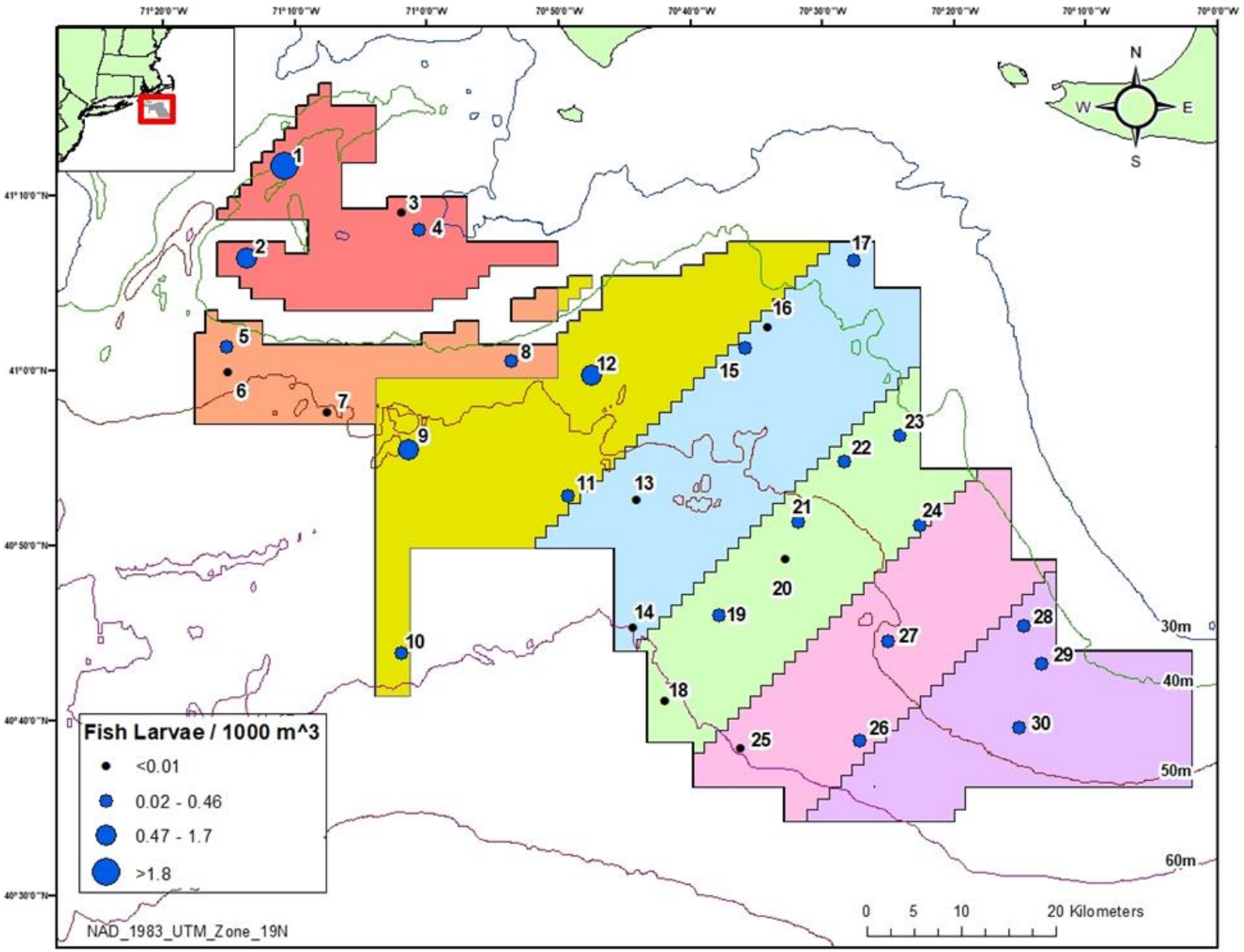
Larval lobster abundance per 1000 m^3 of water sampled throughout all sampling periods in 2021 (May and June)



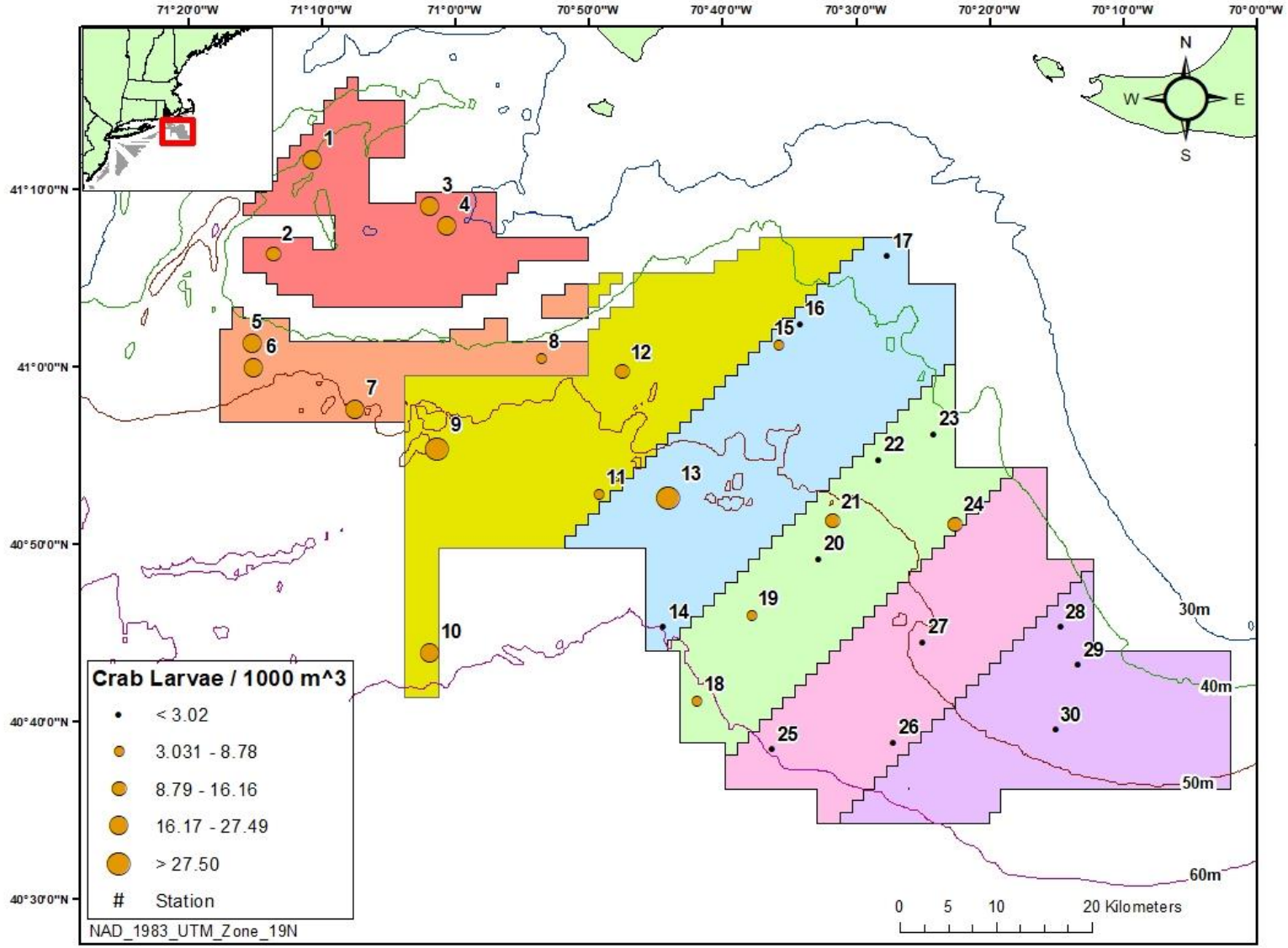
Larval fish abundance per 1000 m^3 of water sampled throughout all sampling periods in 2020 (June to September)



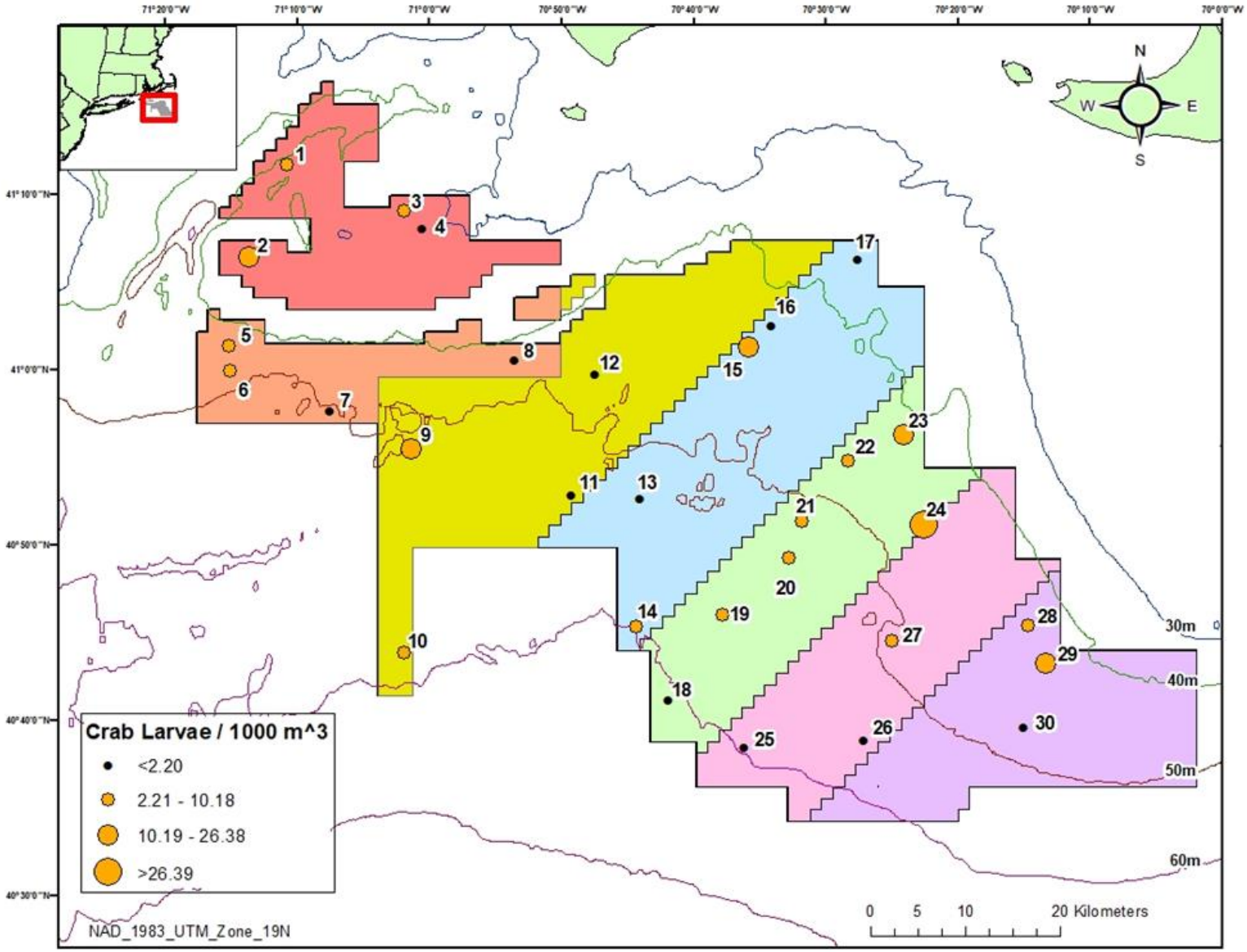
Larval fish abundance per 1000 m^3 of water sampled throughout all sampling periods in 2021 (May and June)



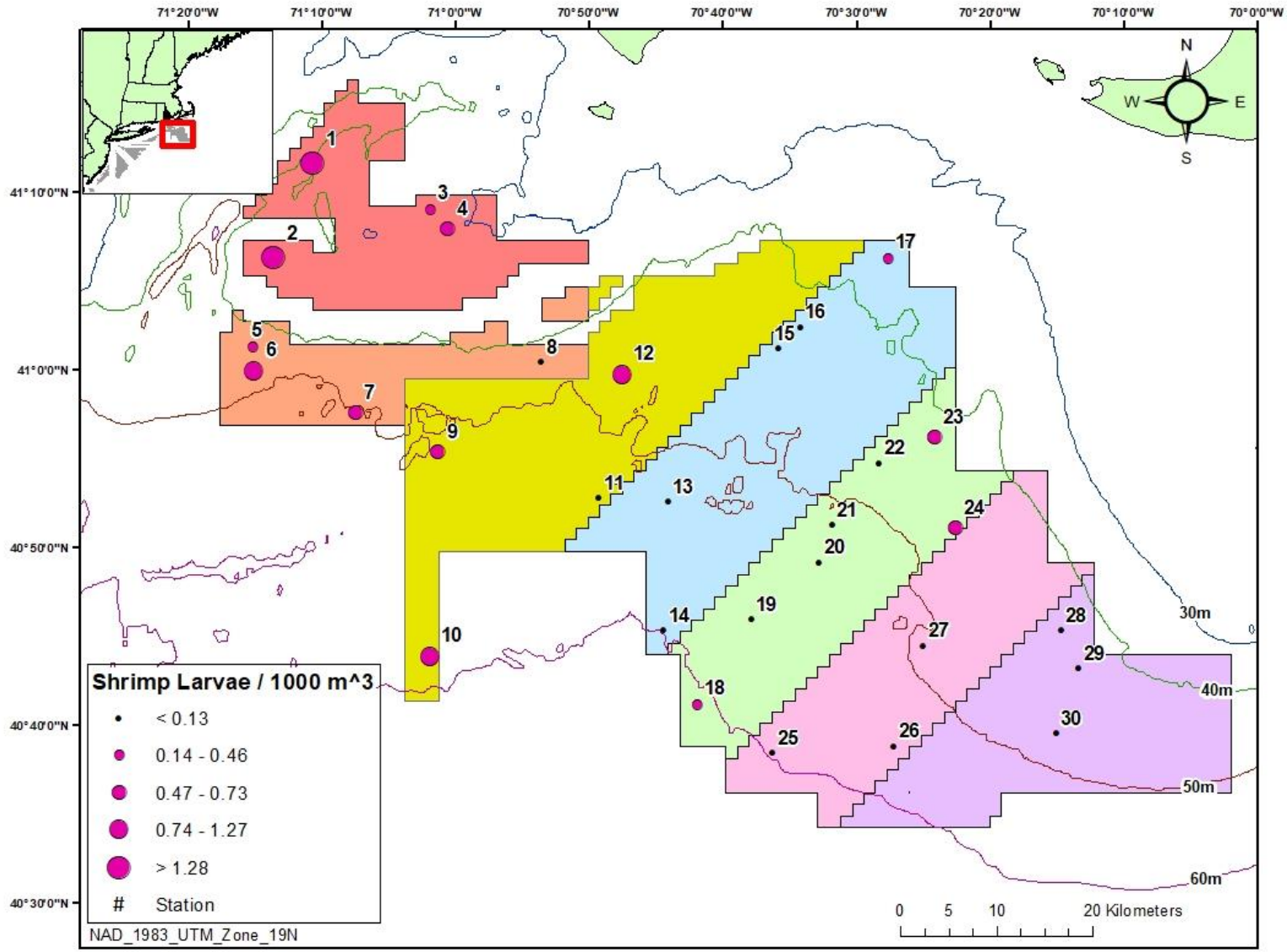
Larval crab abundance per 1000 m^3 of water sampled throughout all sampling periods in 2020 (June to September)



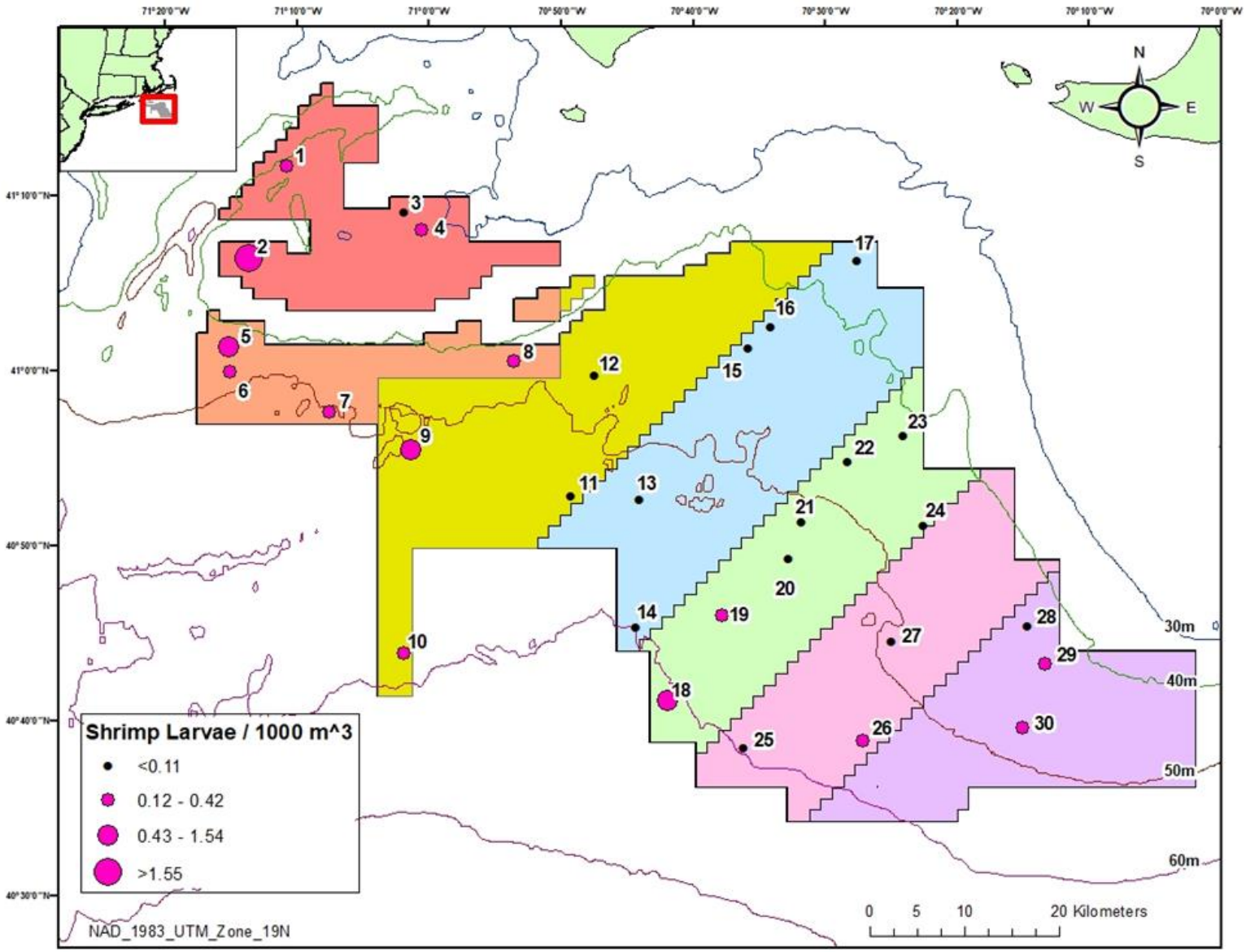
Larval crab abundance per 1000 m^3 of water sampled throughout all sampling periods in 2021 (May and June)



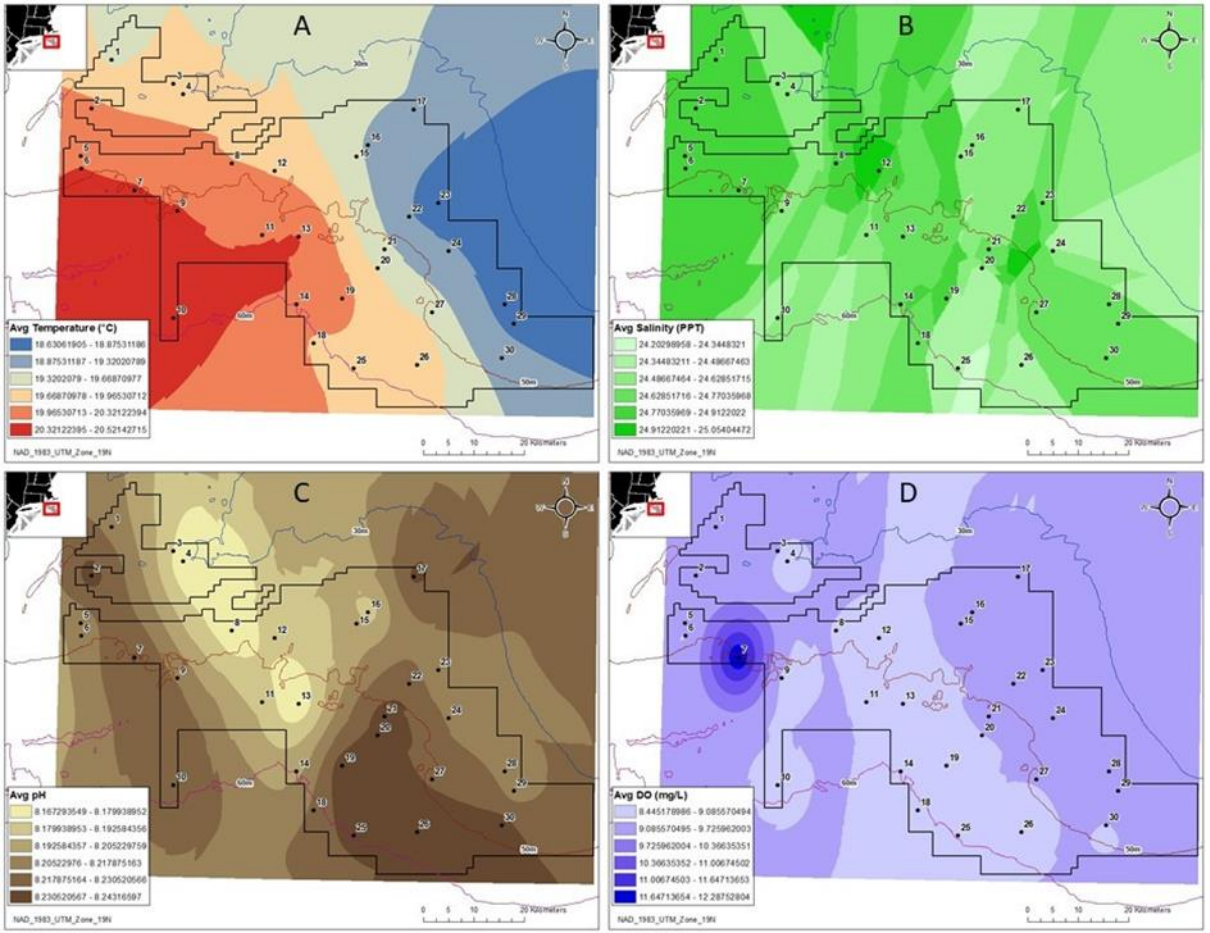
Larval shrimp abundance per 1000 m^3 of water sampled throughout all sampling periods in 2020 (June to September)



Larval shrimp abundance per 1000 m^3 of water sampled throughout all sampling periods in 2021 (May and June)



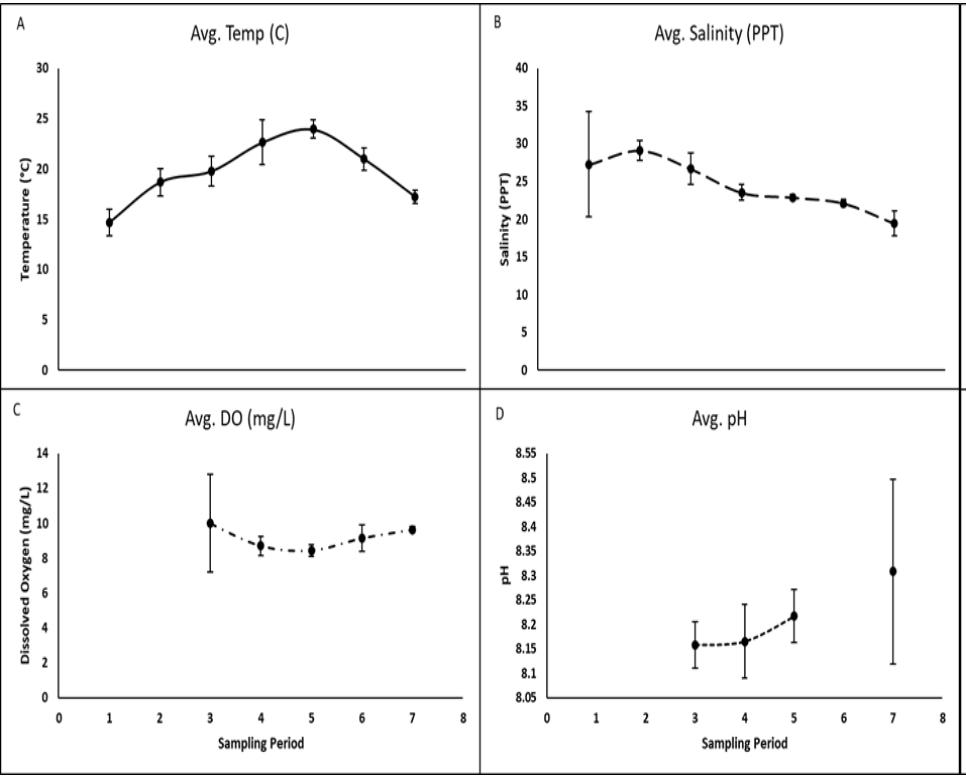
2020 Environmental Data Mapped



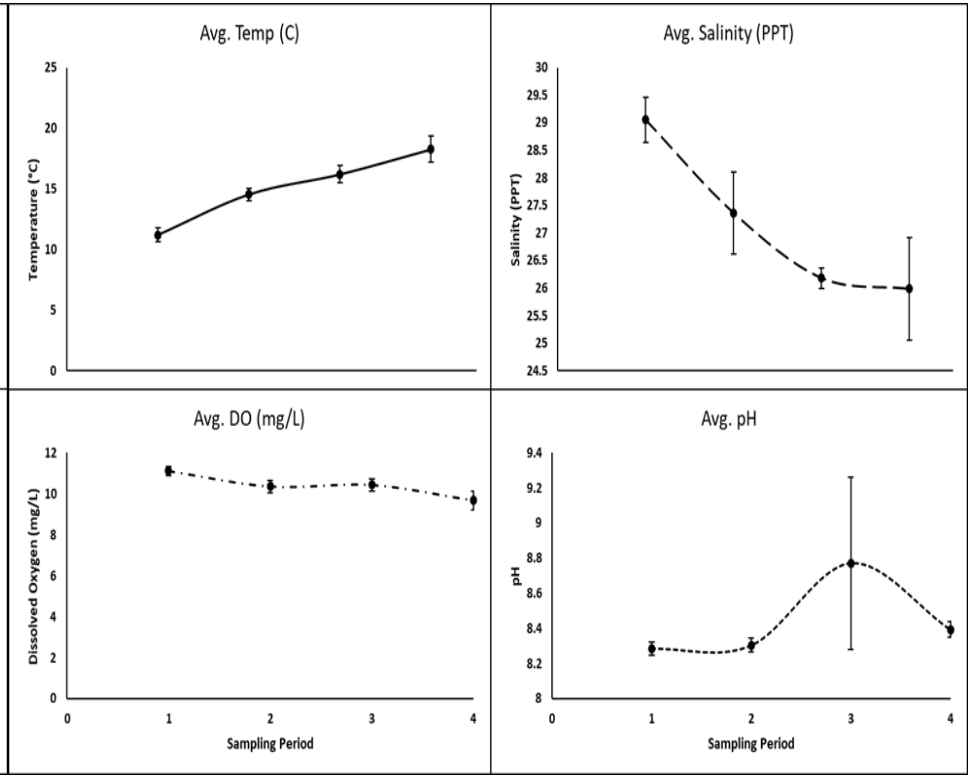
Environmental factors averaged over the course of all sampling periods. A) Temperature (°C), B) Salinity (PPT), C) pH, D) Dissolved Oxygen (mg/L).

Environmental Data

2020



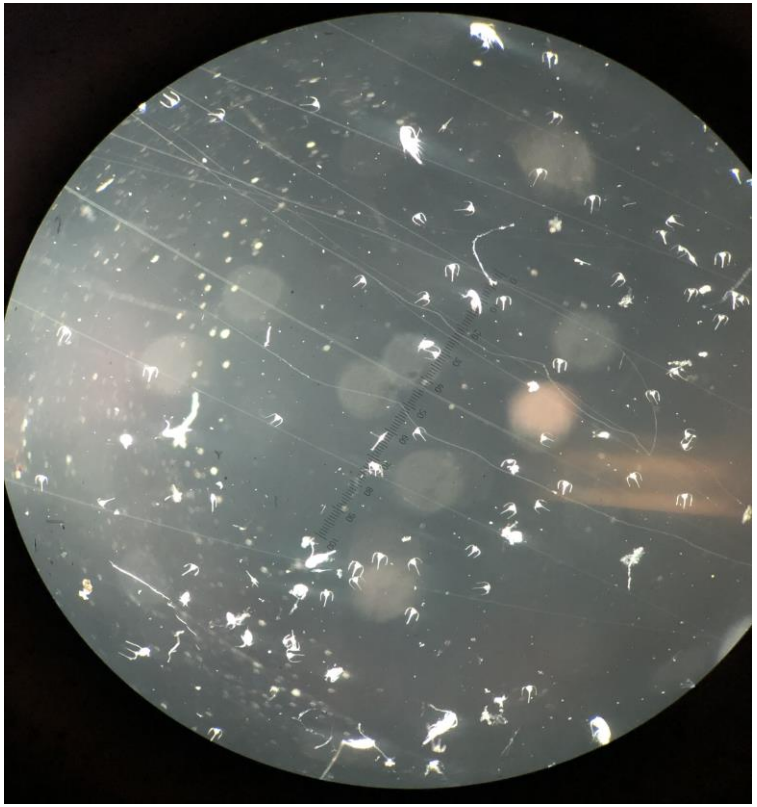
2021



Sampling Period	Month	Environmental Factor			
		Temp (C)	Salinity (PPT)	DO (mg/L)	pH
1	June	14.69 (1.31)	27.26 (6.98)	-	-
2	June	18.70 (1.36)	29.11 (1.30)	-	-
3	July	19.78 (1.50)	26.67 (2.08)	9.99 (2.79)	8.16 (0.05)
4	July	22.64 (2.21)	23.53 (1.03)	8.70 (0.55)	8.17 (0.08)
5	August	23.94 (0.91)	22.90 (0.42)	8.44 (0.31)	8.22 (0.05)
6	August	20.99 (1.10)	22.12 (0.49)	9.15 (0.75)	-
7	September	17.23 (0.66)	19.45 (1.63)	9.64 (0.16)	8.31 (0.19)
Total		19.71 (3.17)	24.43 (3.37)	9.18 (0.64)	8.21 (0.07)

Sampling Period	Month	Environmental Factor			
		Temp (C)	Salinity (PPT)	DO (mg/L)	pH
1	May	11.21 (0.55)	29.05 (0.40)	11.11 (0.24)	8.29 (0.04)
2	May	14.55 (0.51)	27.36 (0.75)	10.36 (0.30)	8.3 (0.04)
3	June	16.20 (0.73)	26.18 (0.19)	10.43 (0.31)	8.77 (0.49)
4	June	18.26 (1.07)	25.98 (0.92)	9.68 (0.45)	8.39 (0.04)
Total		15.06 (2.70)	27.28 (1.42)	10.40 (0.61)	8.44 (0.31)

Zooplankton Survey

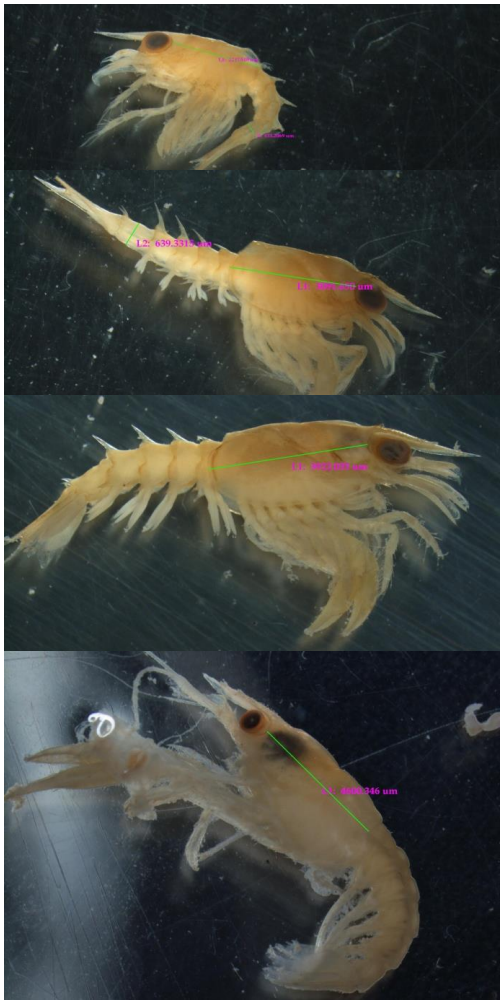


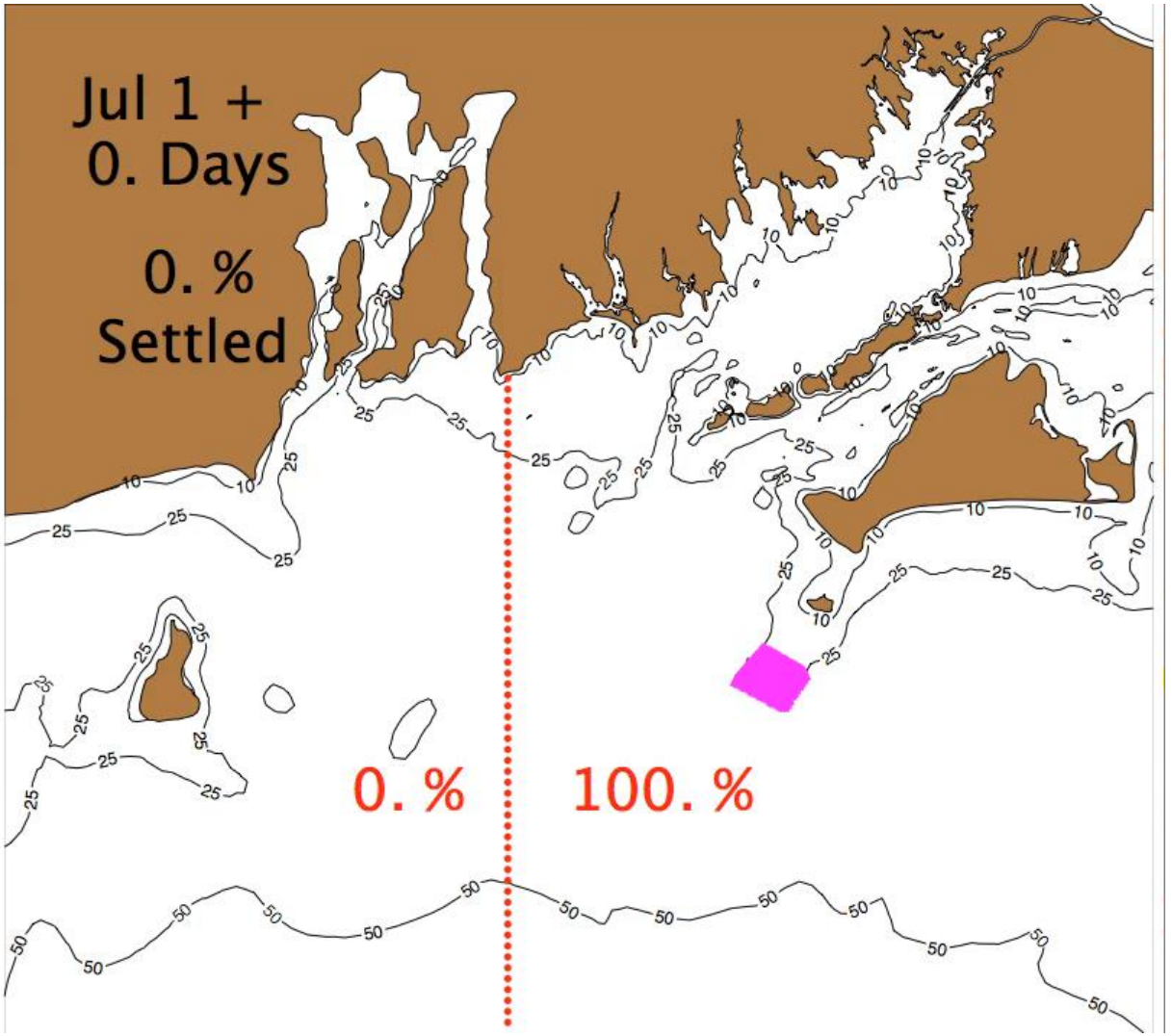
Atlantic Right Whale >450 individuals

Sampling Period	Month	Zooplankton			
		Copepod Nauplii	Oithona Similis Copepodite	Oithona Similis Adult Female	Centropages Copepodite
1	May	4,575	1,899	230	5
2	May	4,517	1,911	160	52
3	June	1,925	1,020	94	136
4	June	N/A	N/A	N/A	N/A
Total		11,017	4,830	484	193

*Not all samples from sampling period 3 and none from sampling period 4 have been counted

G Cowles and F Casey

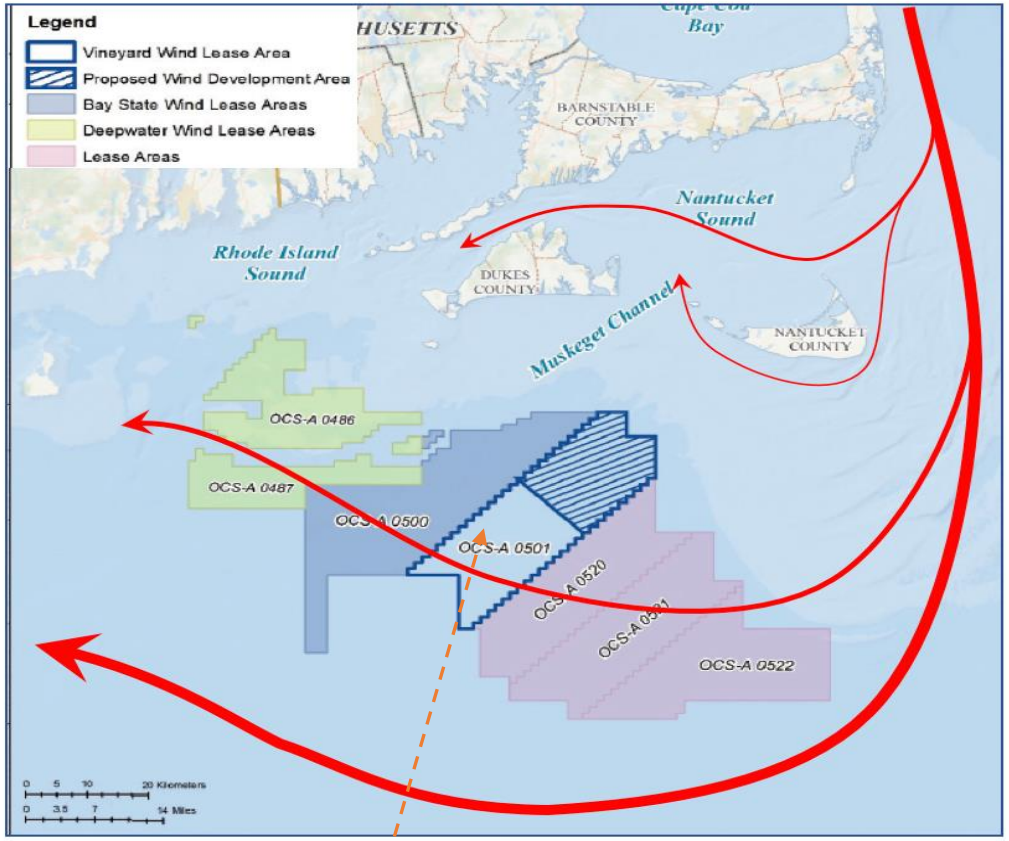




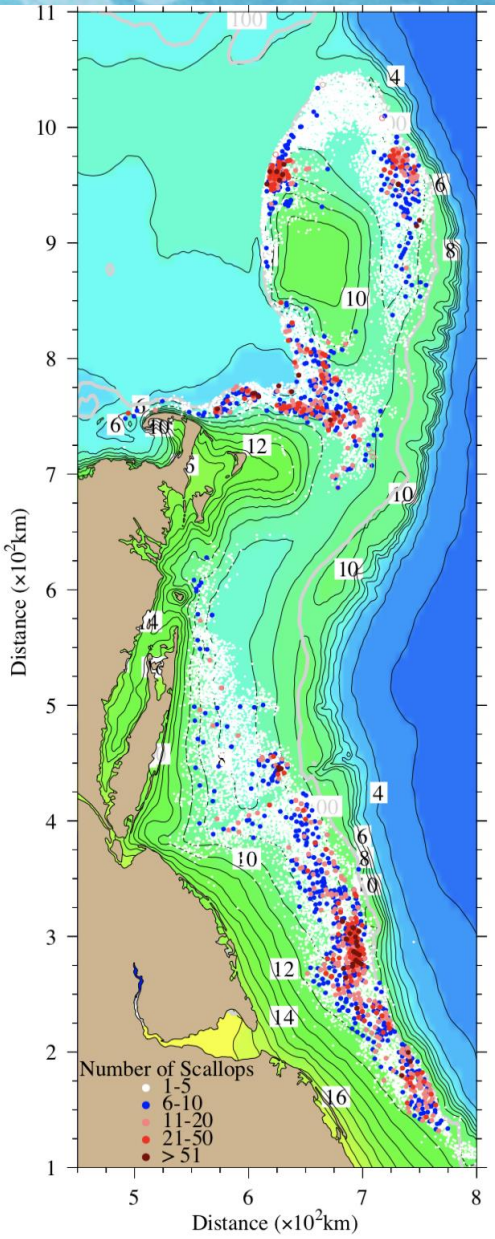
On-going Work

Offshore wind farm

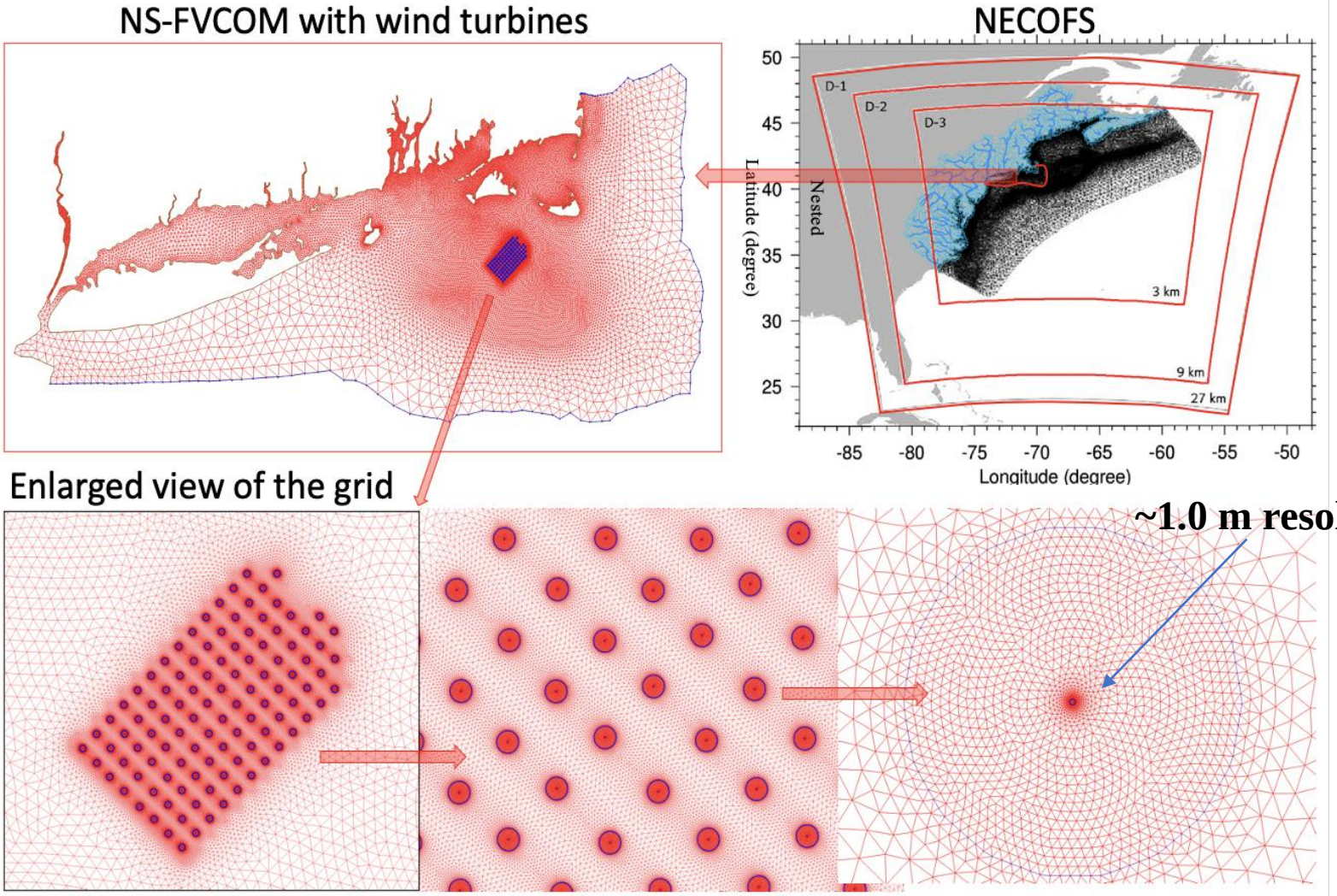
Could the offshore wind renewal energy development affect the connectivity of scallop between Georges Bank/South South Channel and Mid-Atlantic Bight?



Vineyard Wind Leased Area: OCS-A-0501



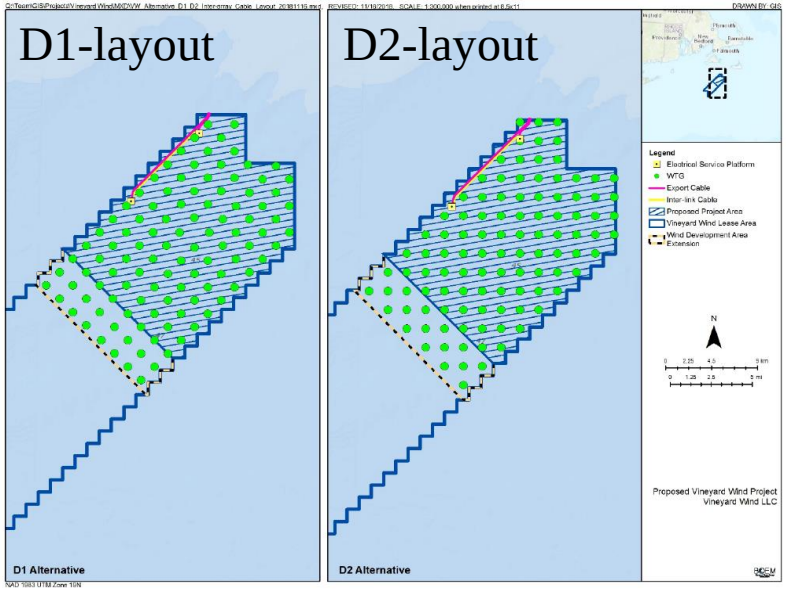
A Nested Subdomain Wind Turbine-resolving FVCOM (NS-FVCOM)



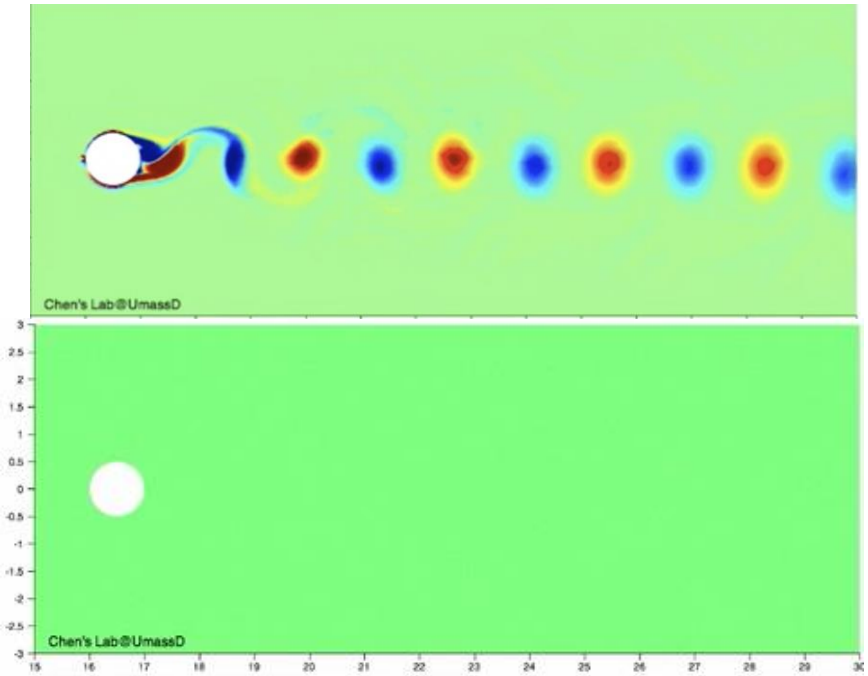
On-going Work

Offshore wind farm

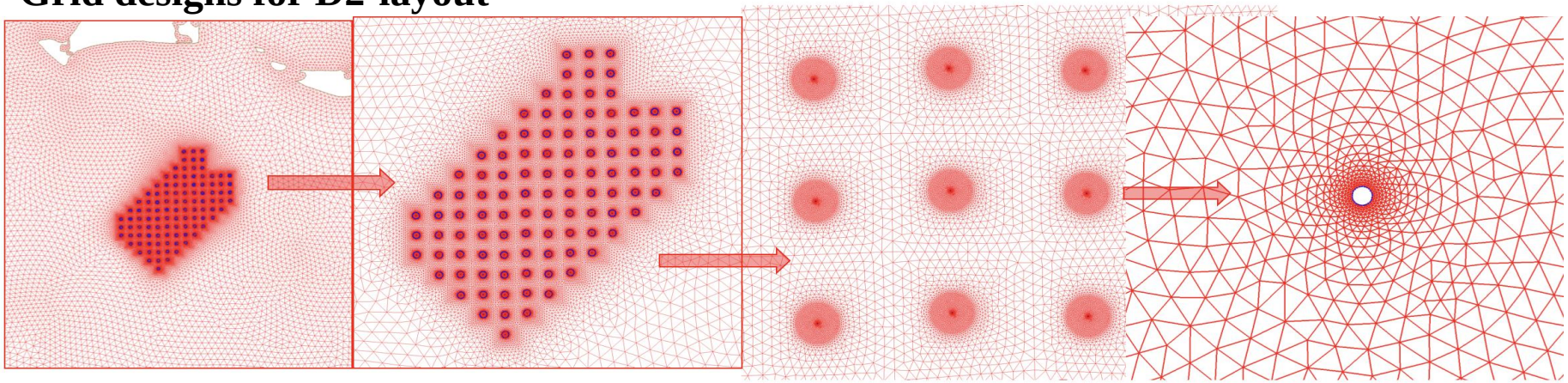
Vineyard Wind proposed two alternative layouts (D1 and D2)



Vortex Wake

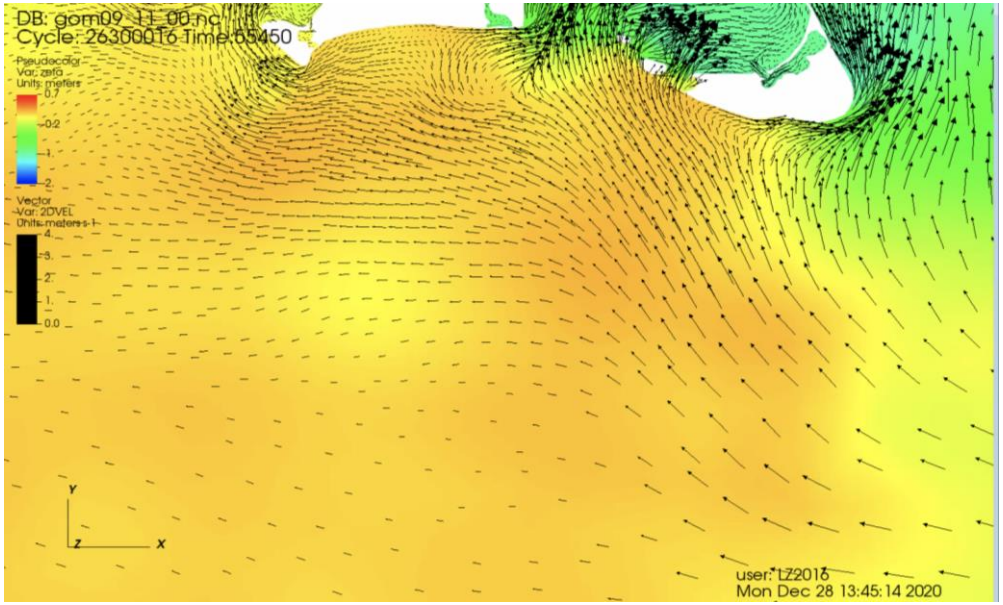


Grid designs for D2-layout



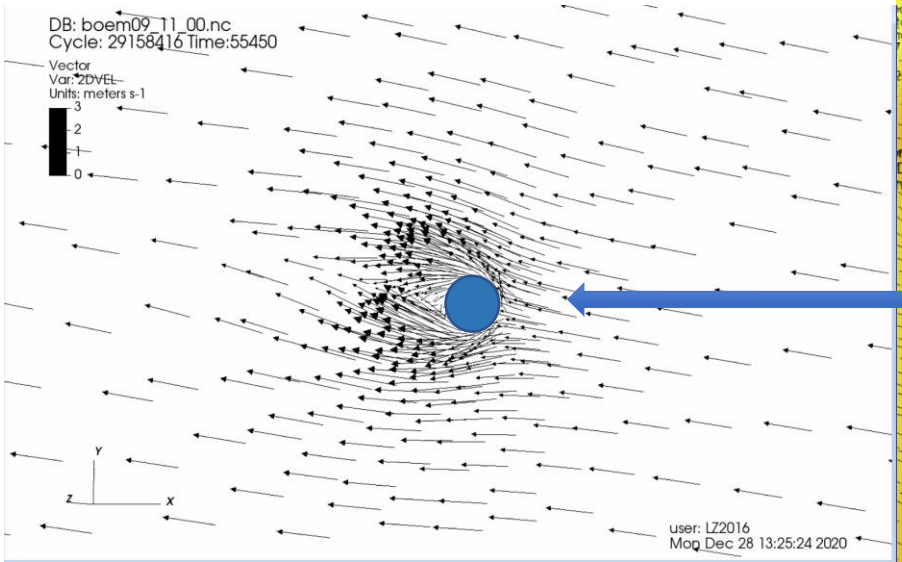
On-going Work

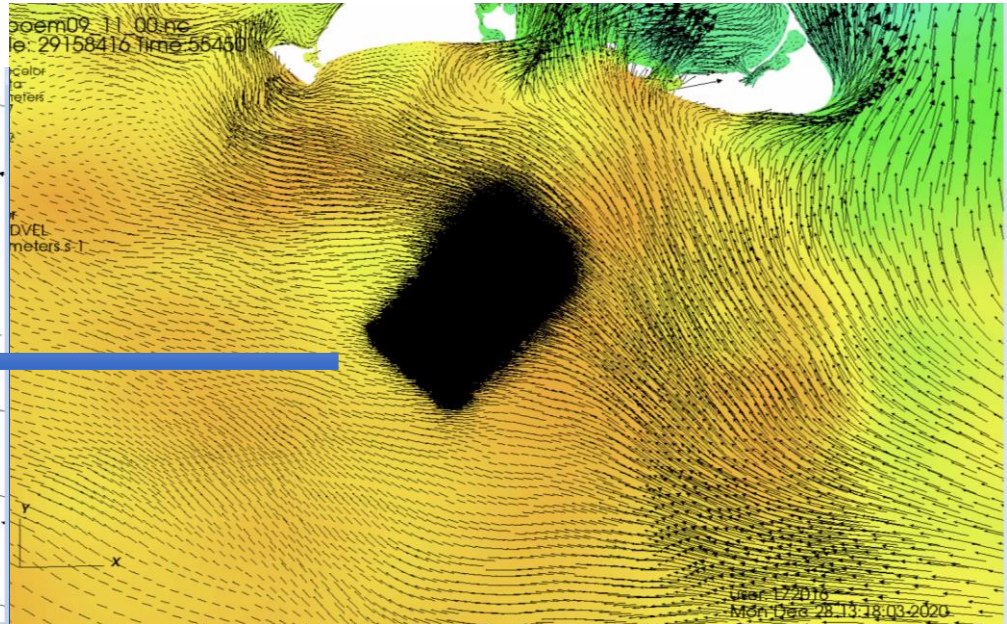
Offshore wind farm



No wind turbines

With wind turbines



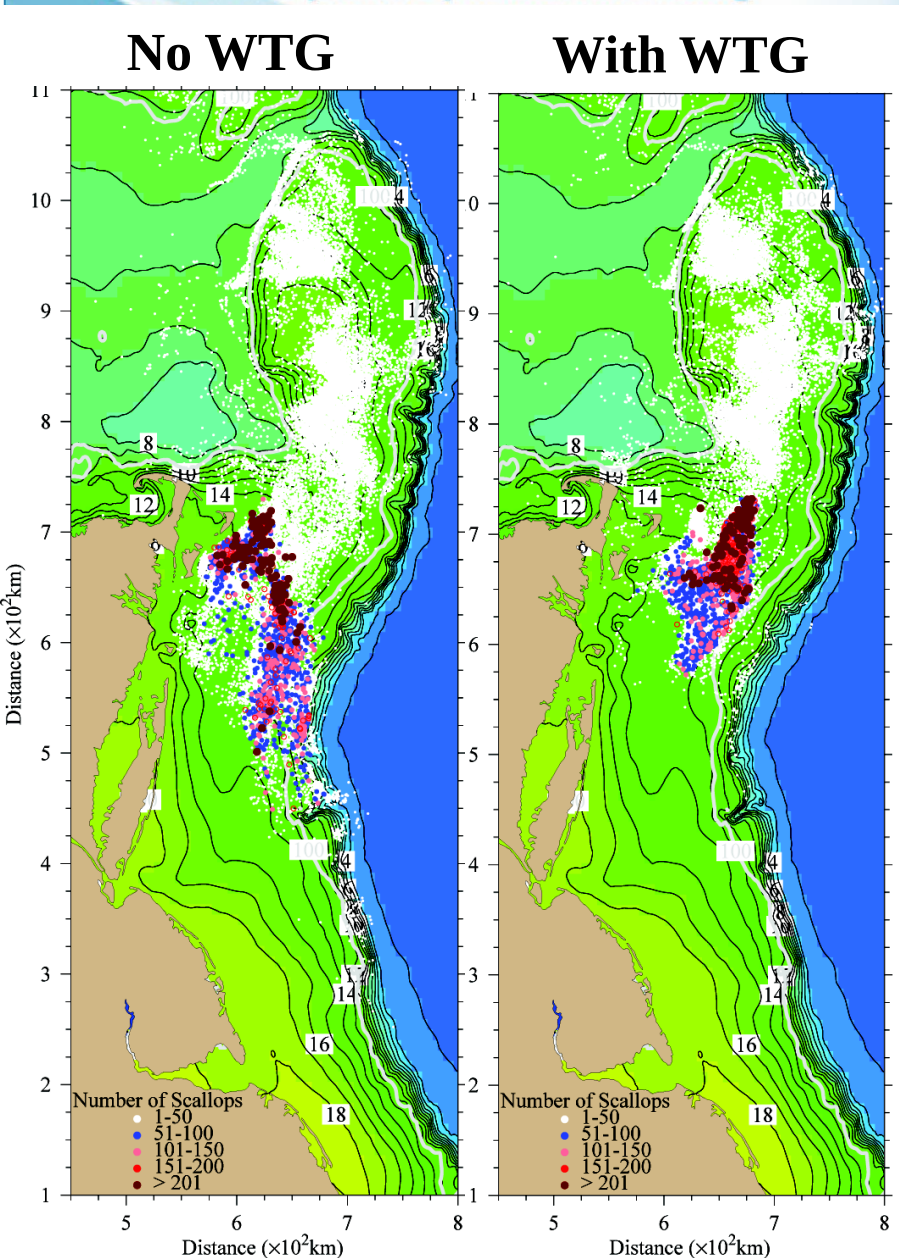


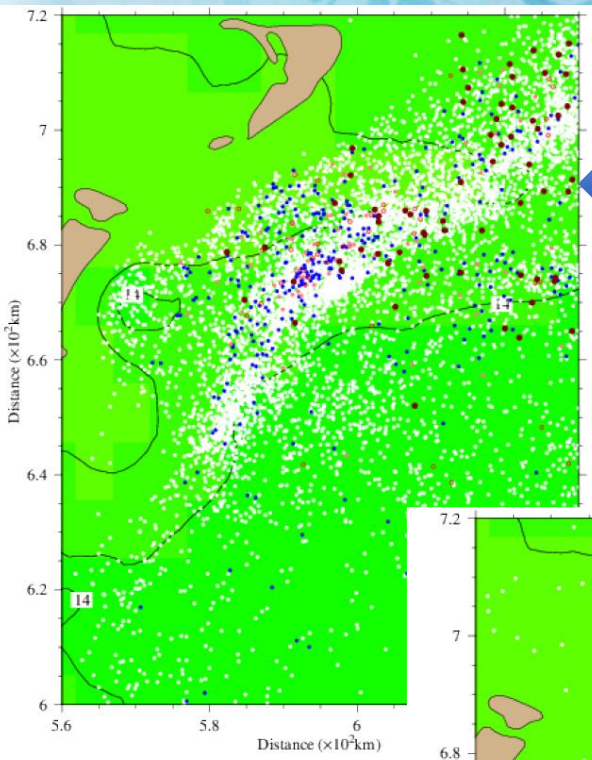
MEDM Lab

Marine Ecosystem Dynamics Modeling

On-going Work

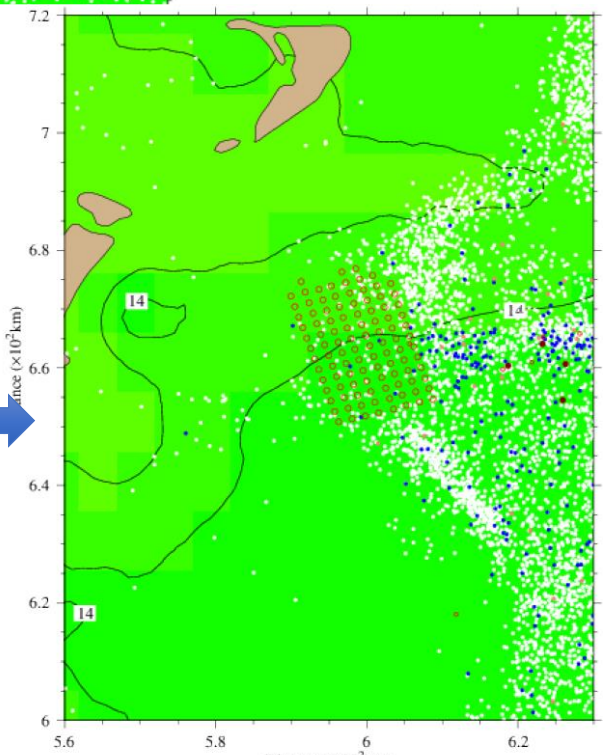
Offshore wind farm: 2010



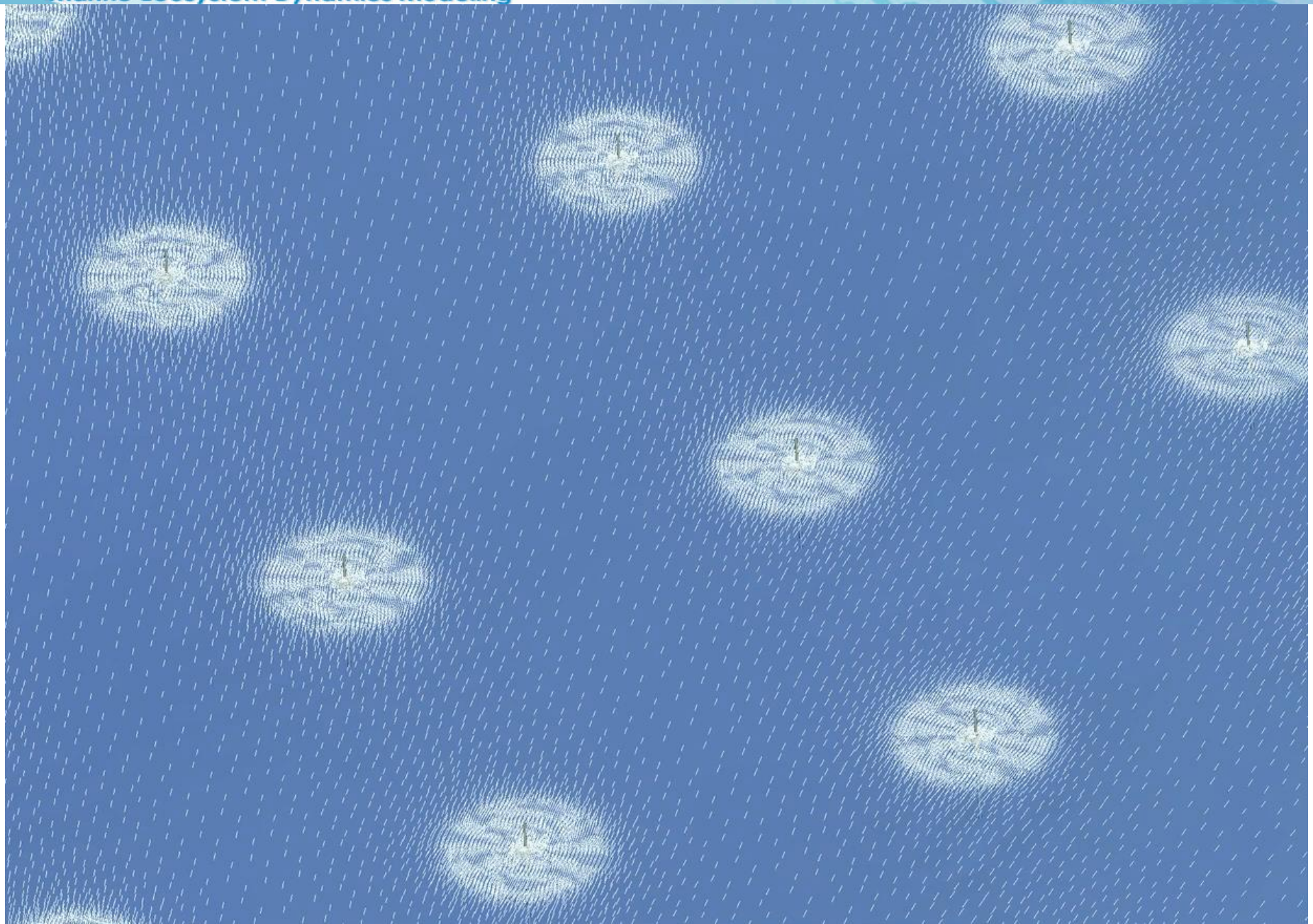


No WTG

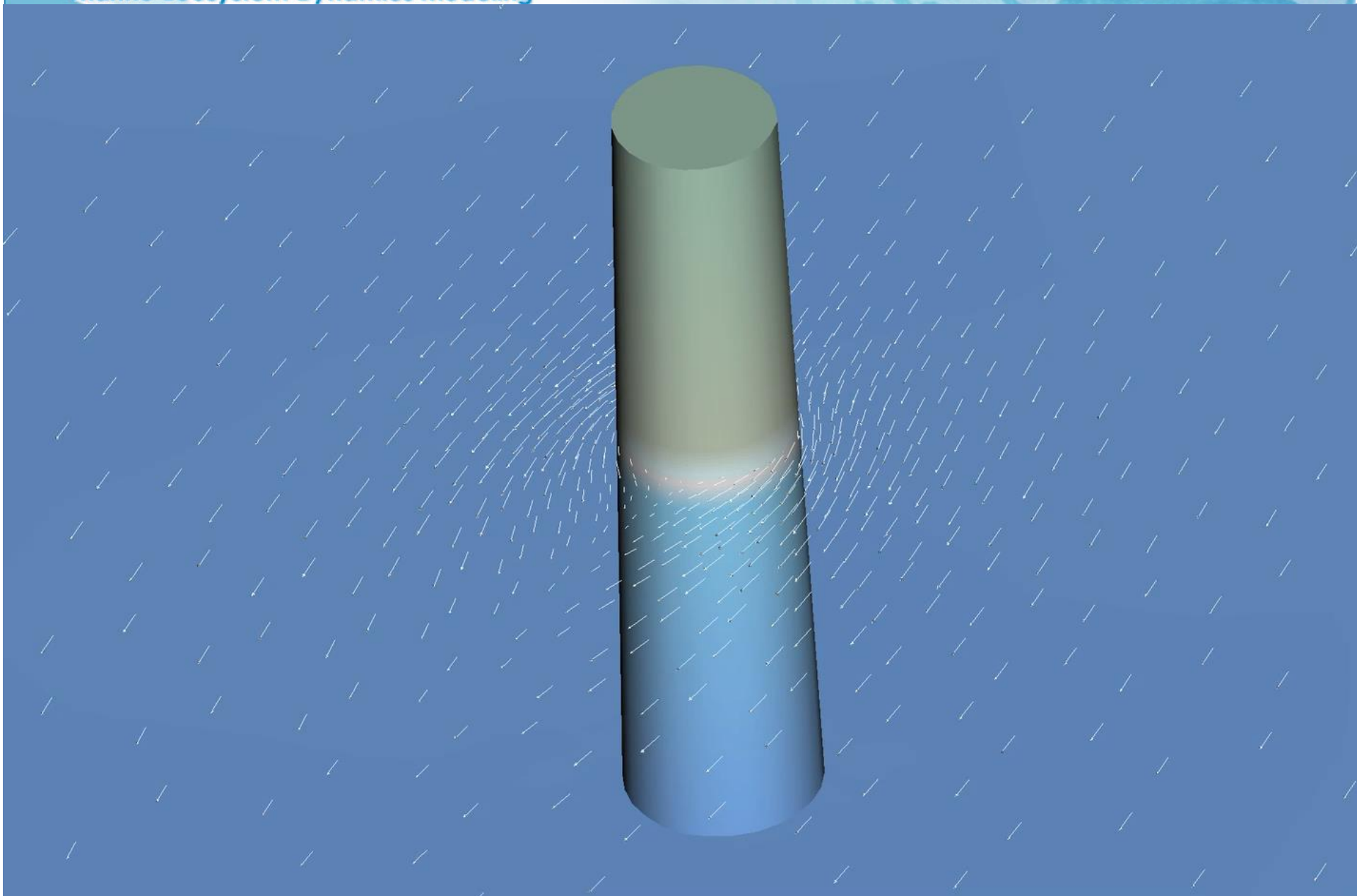
With WTG



Assessment in OCS-0501



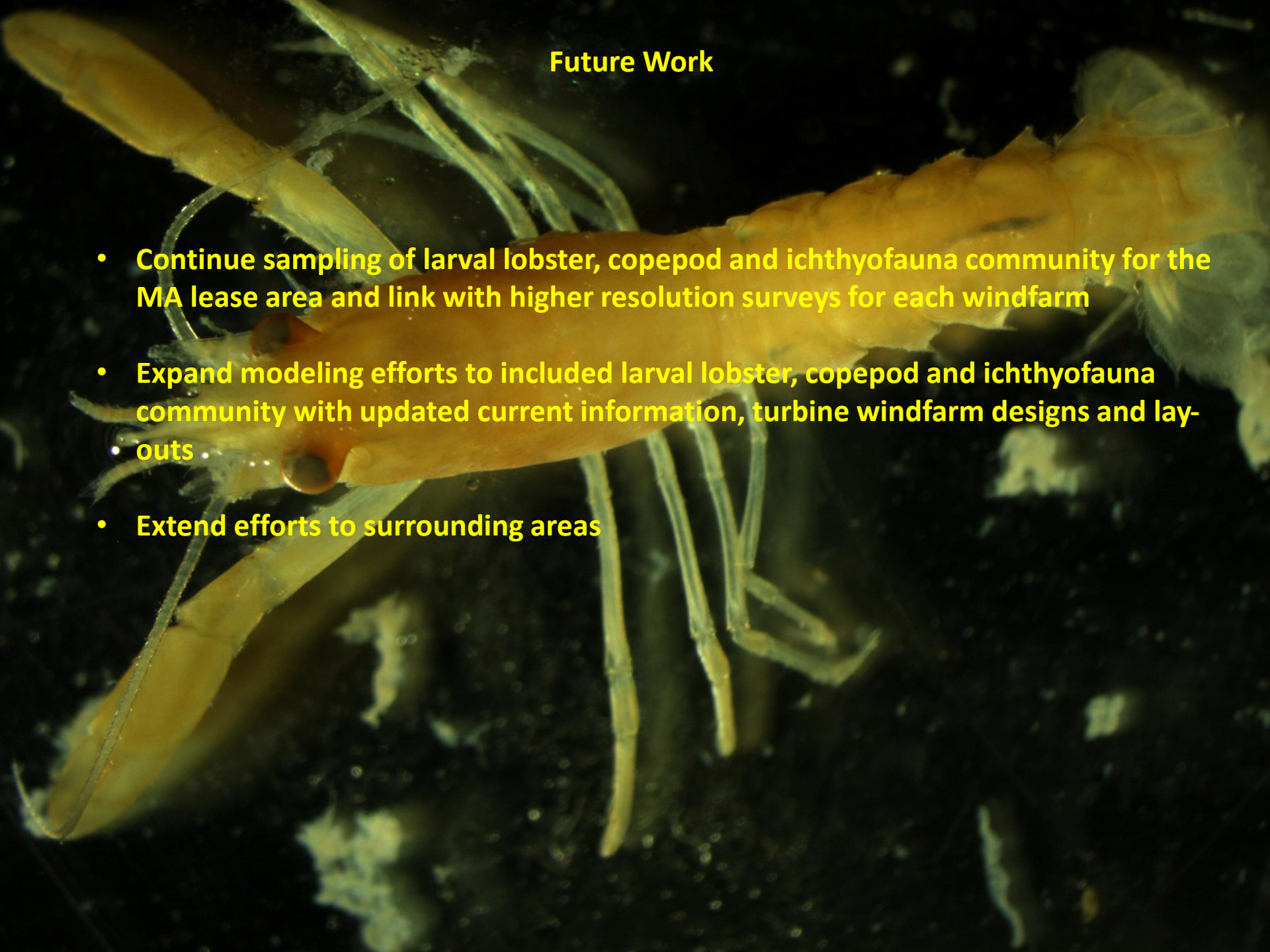
Assessment in OCS-0501



Conclusion

- 2020: 7 sample periods (June-September)
  - 98% of lobster larvae was in June (138 of 141)
  - Majority of crab larvae caught in June (63%)
  - Majority of fish larvae caught during 1 sample period in September (47%)
  - Majority of shrimp larvae were caught in July (74%)
  - Temperature is a large driving factor of larval abundance and distribution (slight significant relationship between temperature and lobster larval abundance $p = 0.049$)
  - June average temperature and salinity: 16.70°C 28.19 PPT

- 2021: 4 sample periods (May and June)
  - 99% of lobster larvae was in June (94 of 95)
  - Majority of crab larvae caught in June (97%)
  - Low fish counts (N= 90), tend to see higher numbers in late summer early fall (like 2020)
  - Majority of shrimp larvae were caught in June (90%) but with low counts (N= 51)
  - June average temperature and salinity: 17.23°C 26.08 PPT



Future Work

- Continue sampling of larval lobster, copepod and ichthyofauna community for the MA lease area and link with higher resolution surveys for each windfarm
- Expand modeling efforts to included larval lobster, copepod and ichthyofauna community with updated current information, turbine windfarm designs and lay-outs
- Extend efforts to surrounding areas

ROSA RESPONSIBLE OFFSHORE SCIENCE ALLIANCE

Update to the Mass. Fisheries Working Group on Offshore Wind

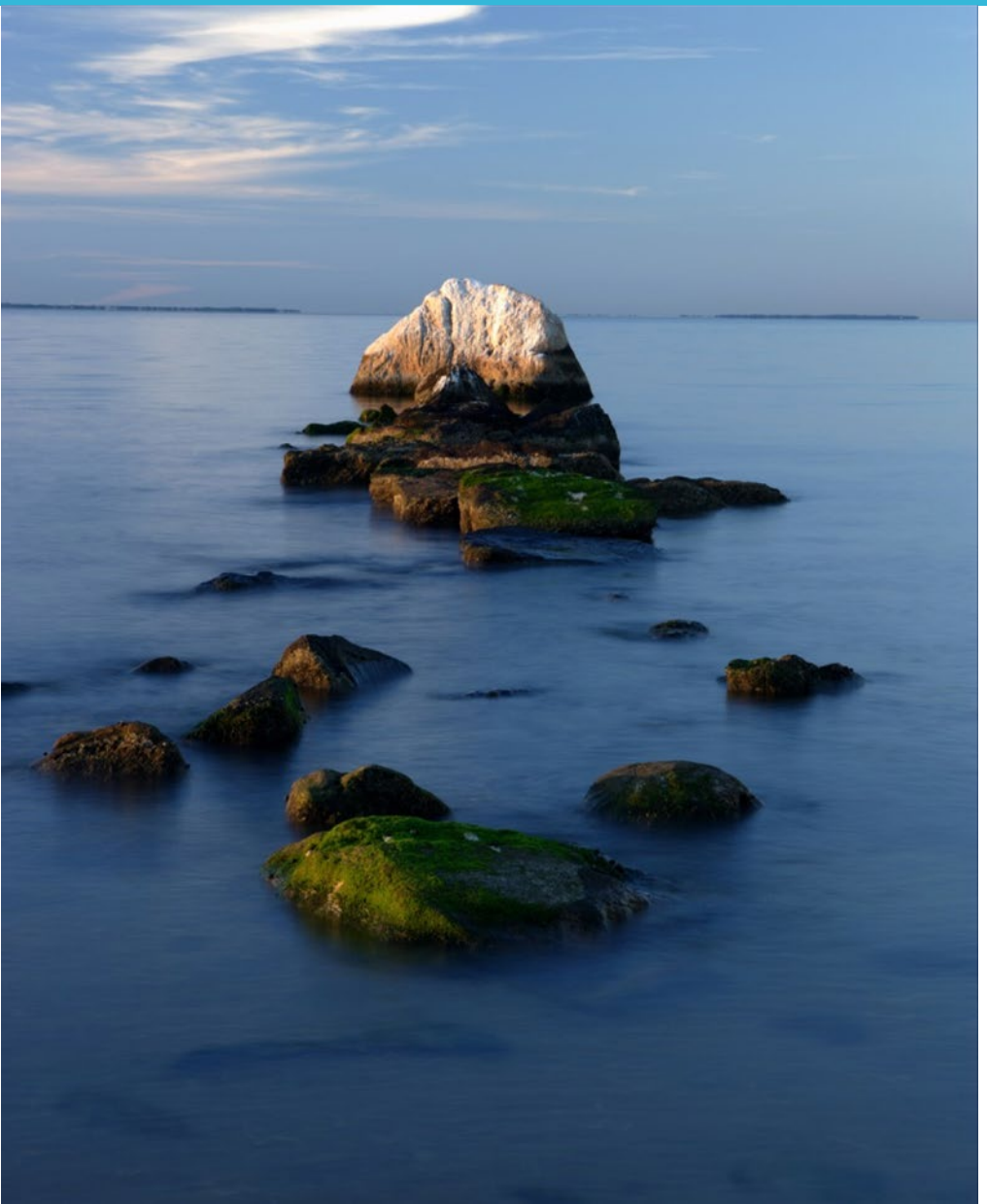
23 September 2021

COOPERATION
COLLABORATION
SCIENCE BASED
DATA DRIVEN

Mike Pol, PhD
Research Director, ROSA

M: (508) 927-2817
Mike@rosascience.org
https://www.rosascience.org/

ROSA Background

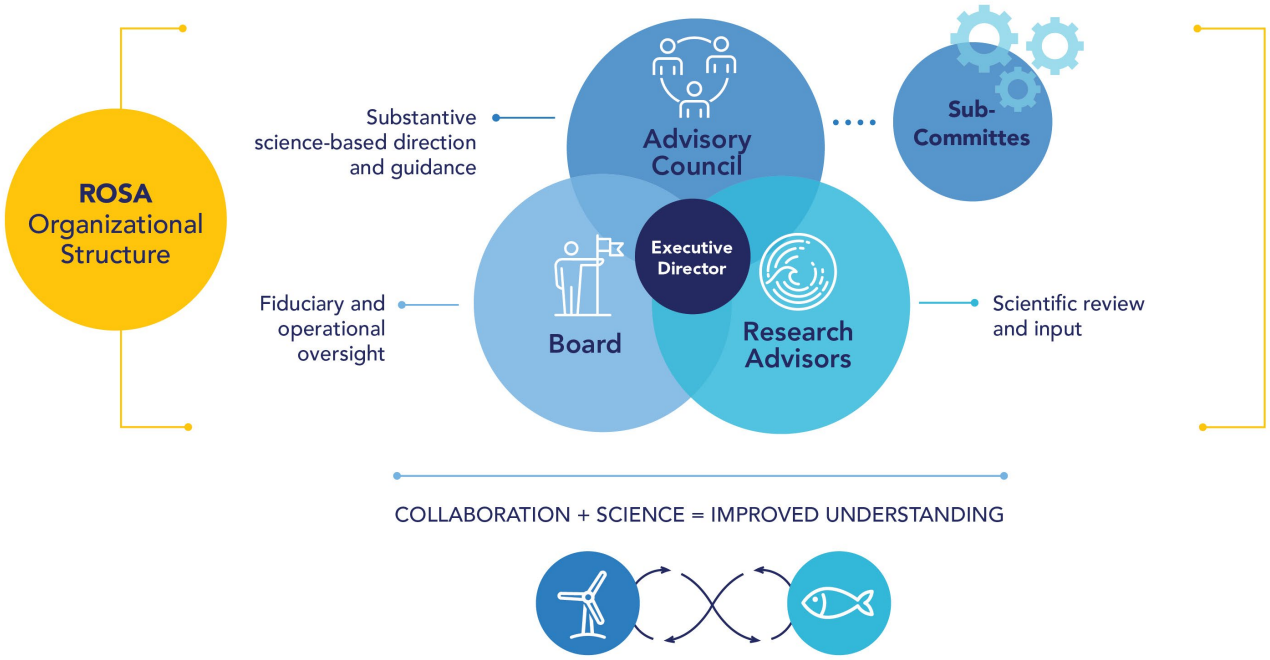


- Recognized need for **coordinated regional science** related to offshore wind development and fisheries
- **Limited capacity** within existing groups and agencies
- Forum needed to **improve cooperative partnerships**
- Need to **increase relevant and credible data and improve our knowledge** of the effects of wind energy development on fisheries and ocean ecosystems

ROSA formed in early 2019 as a 501(c)3 through partnership between RODA and OSW developers

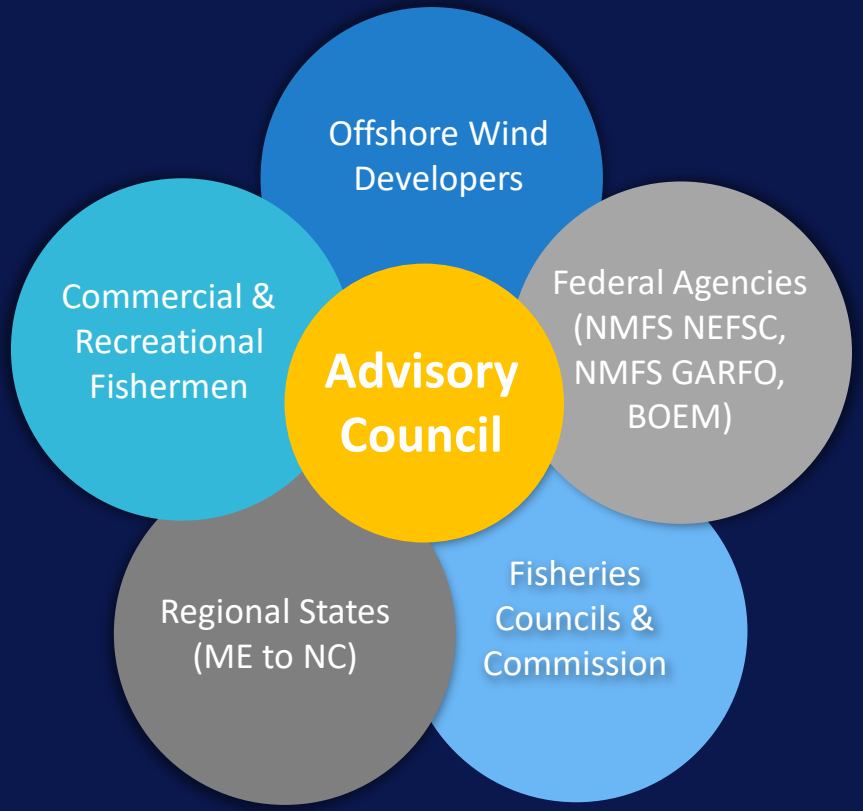
ROSA Objectives

- Identify **regional research** and **monitoring** needs
- Provide a forum for **coordinating existing programs**
- Advance regional understanding through **collaboration, partnerships, and cooperative research**
- Facilitate and improve **standardization** and **access to data** and **administer research**
- **Disseminate research** and **communicate findings**



More details at: https://www.rosascience.org/

ROSA Advisory Council



- Provides **substantive direction** and **focus**
- Meets quarterly to provide **overall leadership** and **strategic guidance** for ROSA
- Nomination/Invitation Process **varies by sector**
- Vacancies at Massachusetts agency level and in commercial sector (replacing George Maynard)

- Prior meetings: September 2020, November 2020, March 2021, June 2021
  - *Agendas and presentations at rosascience.org*
- Next meeting **1-4 PM on September 24, 2021 (tomorrow!)**
  - Primary focus: Regional data collection: purpose & goals
- Open to the public- **register at rosascience.org**

ROSA's Role in Offshore Wind Research

ROSA'S MISSION AND GOALS

To provide for and advance regional research and monitoring of fisheries and offshore wind interactions through collaboration and cooperation

- **ROSA focuses on science to inform policy**
  - Empirical studies and collaborative research improve our understanding of potential impacts on species, habitats, ecosystems, and socioeconomics and help **reduce uncertainty**
  - Research informs environmental policy and regulatory processes to support **evidence-based decision making**
  - Supports research and monitoring requirements in state and federal regulatory processes
- **Collaborative work is central to ROSA's mission**
  - Our organizational structure includes offshore wind developers, commercial and recreational fishermen, federal and state agencies, regional fishery management councils and commissions, universities, consultants, non-profits, and others
  - Work across sectors to identify priority needs for applied research
  - Aim for an **inclusive, transparent, unbiased process**

ROSA

Focus on Fisheries Resources: Recent Collaborative Projects

Synthesis of the Science

- **Synthesis of the Science Symposium on Fisheries and Offshore Wind**
- RODA received grant from NMFS to support white paper and symposium
- Partnership through RODA/NMFS/BOEM MOU; ROSA part of planning team
- **Symposium Fall 2020; white paper expected Fall 2021**

ICES WGOWDF

- **International Council for the Exploration of the Sea (ICES) Working Group on Offshore Wind Development and Fisheries (WGOWDF)**
- Brings together experts from US and Europe; **Meetings held in April 2020 and June 2021**
- **March 2021-** Workshop on the Socio-Economic Implications of Offshore Wind on Fishing Communities (WKSEIOWFC)

Monitoring Guidance

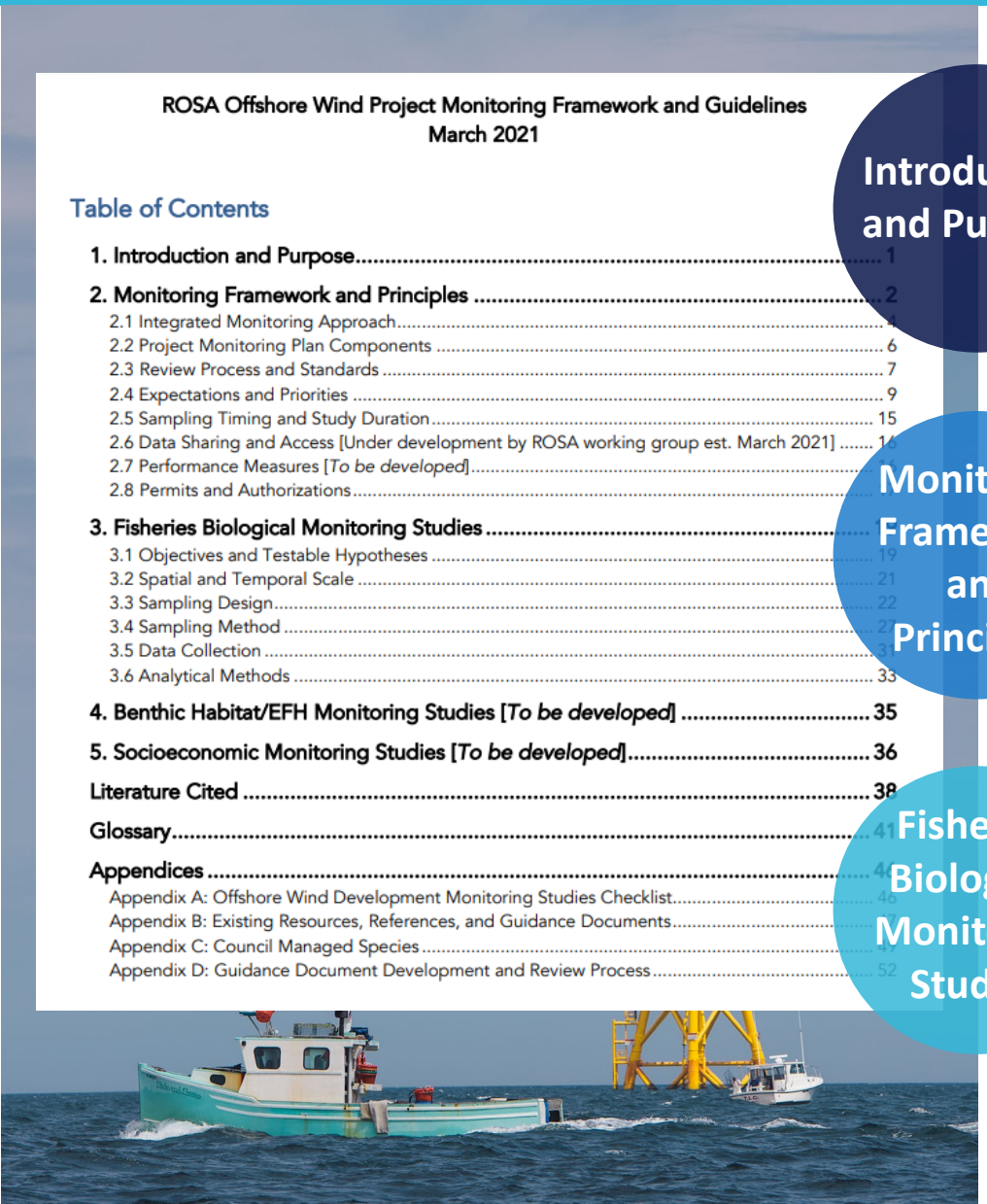
- **ROSA Interim Fisheries Monitoring Working Group** developed monitoring guidance for offshore wind development and fisheries
- Working group included state and federal government fisheries managers, fisheries scientists, fishing industry representatives, and offshore wind developers
- Document published online **March 2021**

ROSA Offshore Wind Project Monitoring Framework and Guidelines

- Began in **June 2020** to address need identified by NOAA Fisheries
- Builds upon existing **BOEM guidance** and **member expertise** to highlight **best practices** and elements that could help **improve future monitoring plan submissions**
- After the public comment period, had follow up calls with **US state and federal agencies** to ensure document **aligns with existing regulatory standards**
- Review of comments and agency discussions led to reorganization of document to create a more **comprehensive framework**
- Guidance should be considered a **living document**
- First step of many to improve our **regional coordination** for research and monitoring

Guidance available at: ***https://www.rosascience.org/resources***

Framework and Guidance focusing on:



Introduction and Purpose

- **Identifies value added through collaboratively developed framework and guidance such as:**
- Streamlining monitoring plan development and review
- Encouraging standardized protocols and integration of monitoring efforts across multiple spatial and temporal scales
- Encourages proactive engagement, collaboration, and involvement

Monitoring Framework and Principles

- **Describes framework and principles for integrated monitoring approach including:**
- Project monitoring plan components
- Review process and standards
- Expectations and priorities

Fisheries Biological Monitoring Studies

- **Outlines key components of fisheries biological monitoring studies including:**
- Objectives and testable hypotheses
- Spatial and temporal scales
- Sampling design and methods
- Data collection and analytical methods

ROSA

Near-Term Priorities Identified by ROSA Advisors

- Expand Offshore Wind Project **Monitoring Framework and Guidelines**
- Develop a **research framework for socioeconomic studies**, building upon the ICES Workshop on the Socio-Economic Implications of Offshore Wind on Fishing Communities (WKSEIOWFC)
- Develop **Regional-Scale Framework and Objectives**, building off the outcomes of the Synthesis of the Science
- Support **standardization of consistent and appropriate fishing gear** to collect baseline and monitoring data
- Identify specific and implementable ways that **fishermen's traditional ecological knowledge** can contribute to and be integrated into various types of offshore wind research
- Improve **data management, storage, & access** beginning with a pilot study
- Define & expand **baseline data** for commercial & recreational fisheries
- Develop an **inventory** of ongoing relevant research projects

ROSA

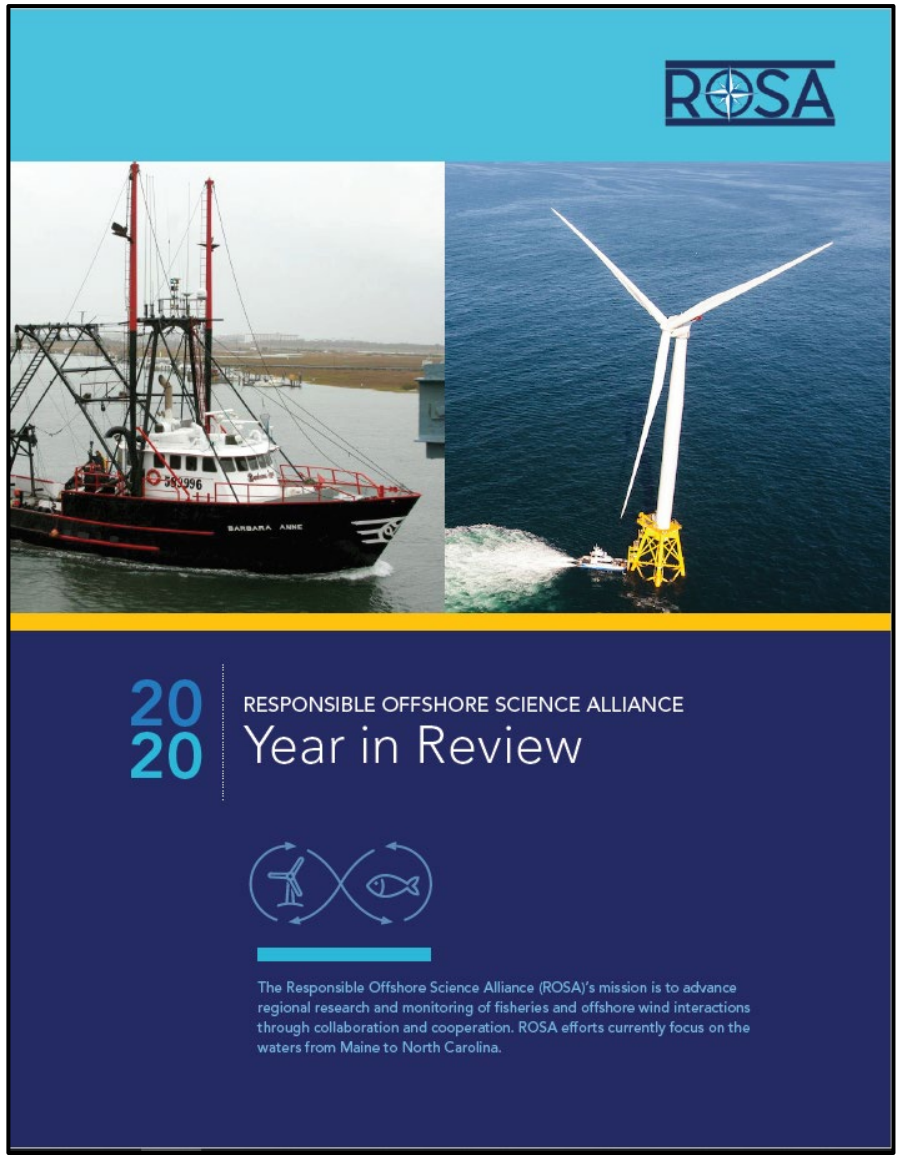
ROSA Engagement

ROSA'S MISSION AND GOALS

To provide for and advance regional research and monitoring of fisheries and offshore wind interactions through collaboration and cooperation

- How do you see ROSA fitting into the MA FWG?
- What do you see as priority focus areas for ROSA?
- Are there informational resources that should be added to our website?

For more information



ROSASCIENCE.ORG

- Organizational details, research & monitoring resources
- Info on previous and future Advisory Council meetings
- Sign up for our mailing list!

Contact us:

- Mike Pol, Research Director: Mike@rosascience.org; 508-927-2817
- Lyndie Hice-Dunton, Executive Director: Lyndie@rosascience.org

ROSA