# MA Habitat Working Group for Offshore Wind

October 12, 2023

Facilitated by the Consensus Building Institute

# Agenda

| | |
|---|---|
| 1:00 PM | Welcome & State Updates<br>• Boulder movement framework<br>• Wildlife mitigation - 83c |
| 1:15 PM | Seatrac Capabilities and Seafloor Mapping Efforts - Hobie Boeschenstein |
| 1:35 PM | Regional Wildlife Science Collaborative - Draft Science Plan - Emily Shumchenia |
| 1:45 PM | New England Aquarium Aerial Survey Update - Orla O'Brien |
| 2:00 PM | Working Group Member Updates |
| 2:10 PM | Offshore Wind Developer Updates |
| 2:25 PM | Next Steps |
| 2:30 PM | Adjourn |

# Offshore Wind Developer Updates

SeaTrac


# SeaTrac and SP-48 USV Overview with Mission Samples

*Hobie Boeschenstein*
*Director of Operations and Business Development*
*06/15/2023*

# SeaTrac Systems: Overview

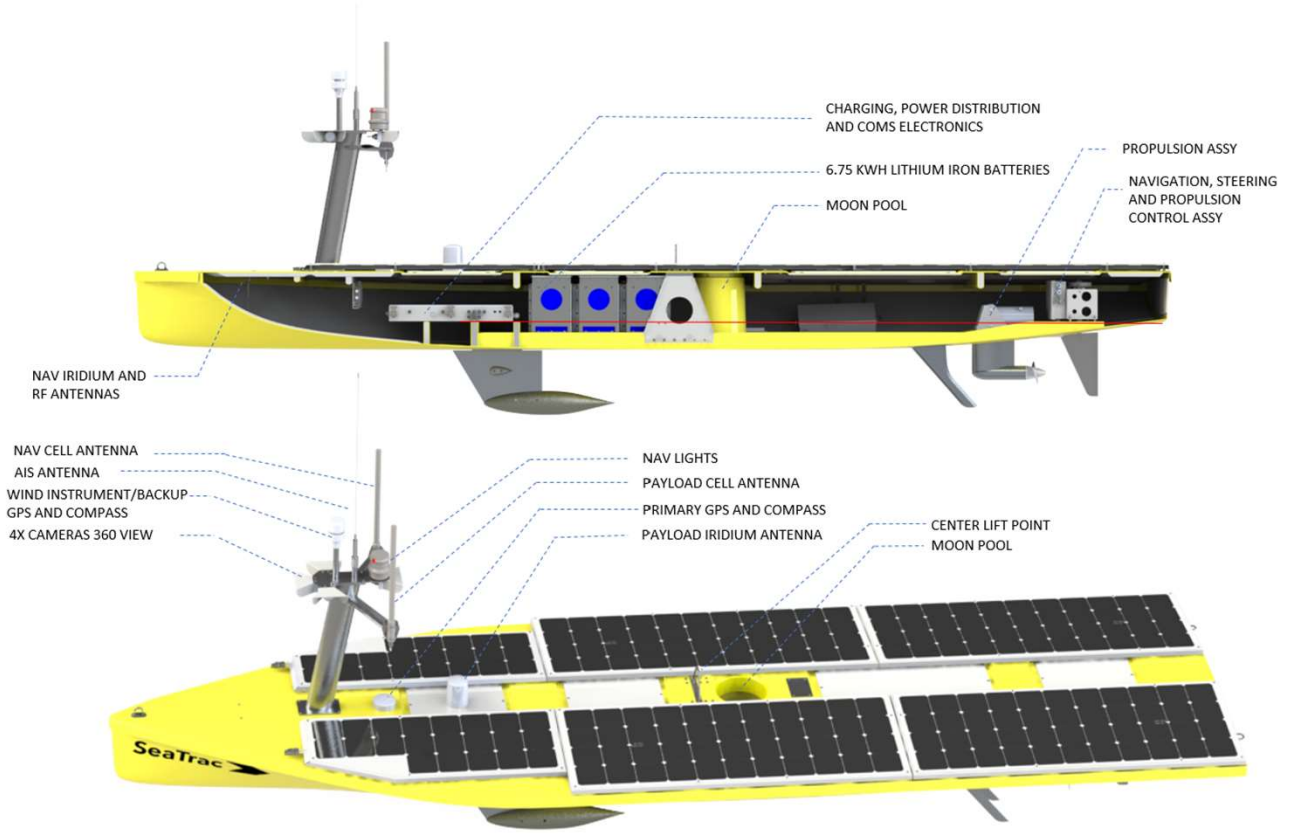
SeaTrac

## COMPANY OVERVIEW:

- Small Business
- Marblehead, MA
- Design and Build USVs
- Flexible Business Model
- Scientific, Commercial, Military
- 13 Operational Systems


# SP-48 Overview

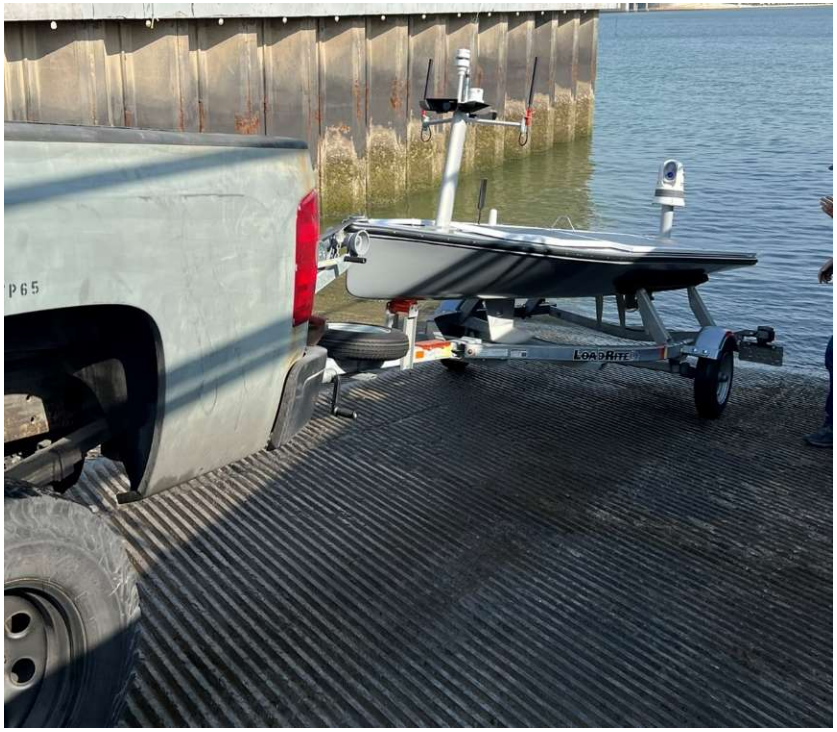
- 4.8 meters long (~650 lbs)
- 3 kt cruise, 5 kt max speed
- Solar Powered, Large Battery Capacity
- 24 x 7 operations, hours to months
- Near Shore to Open Ocean
- Low Logistics
- Redundant comms (LOS, Cell, Sat.) for Real Time Data
- Easily Configurable






*We view our platform as a pickup truck…Simple, Reliable and Cost-Effective Multi-Tasking USV*

# SP-48: Launch and Recovery



# Sensor Integrations / Customers

SeaTrac

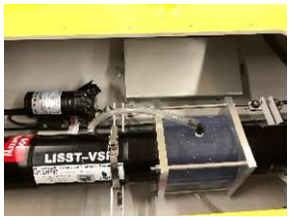
**Sensors Integrated:**

- Multibeam Sonar Norbit iWBMSh-N & R2Sonic 2020)
- Splitbeam Sonar
- Cameras: FLIR M364C EO/IR PTZ
- ADCP
- Wave Sensor
- Towed Hydrophone Arrays
- Water Quality Sensors:
    - CT, DO, CO2, Turbidity, pH, etc.
- Harmful Algae Bloom
- Optical Properties (water)

*Constantly engaging with customers about additional options / capabilities*



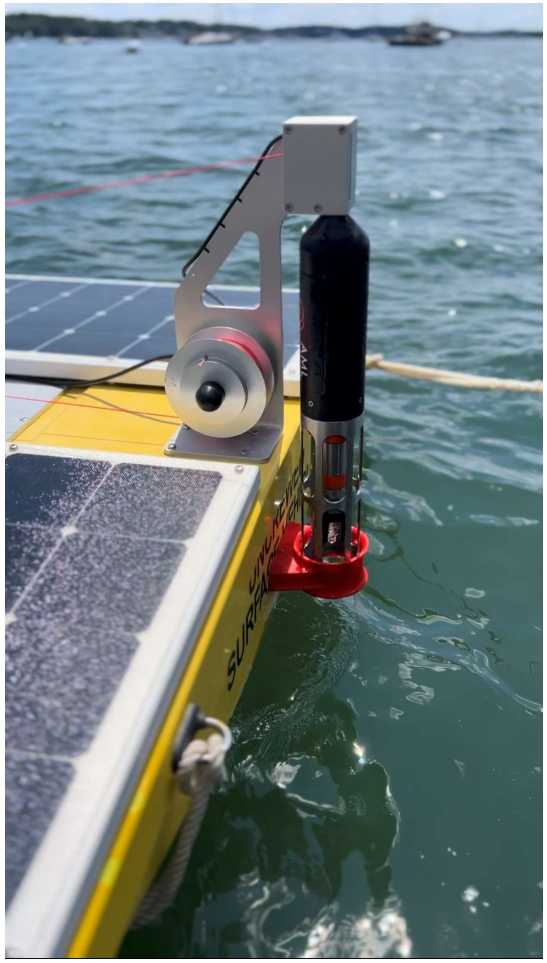


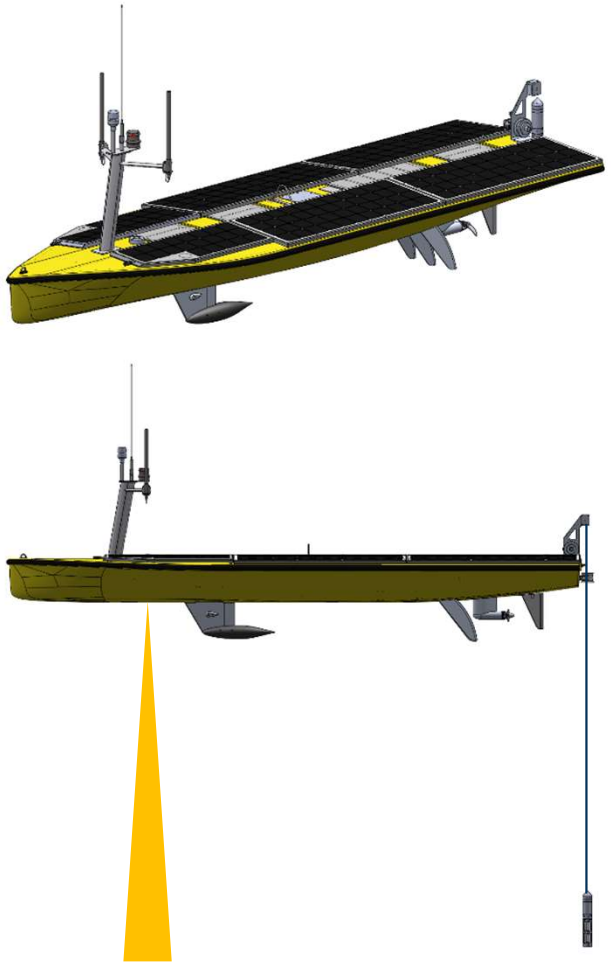




# SeaTrac Profiling Winch

- **Profiling Depth:** Up to 200m
- **Winch Control:** Set “Profiling waypoint” in SeaTrac Control Dashboard to define location, profiling speed, and bottom offset or bottom detect.
- **Data Retrieval:** After each cast, data downloaded to boat automatically over wifi and transmitted to operators onshore over available communications links (LOS, Cell, Satellite)
- **Instrument Package:** AML-3 Sonde
  - Multiparameter sampling (CTD, DO, pH, Turbidity, Chl)
  - Battery operated sonde will support ~60 casts
  - Wireless Charging option to be implemented in July/August 2023 to support persistent operations with unlimited casts

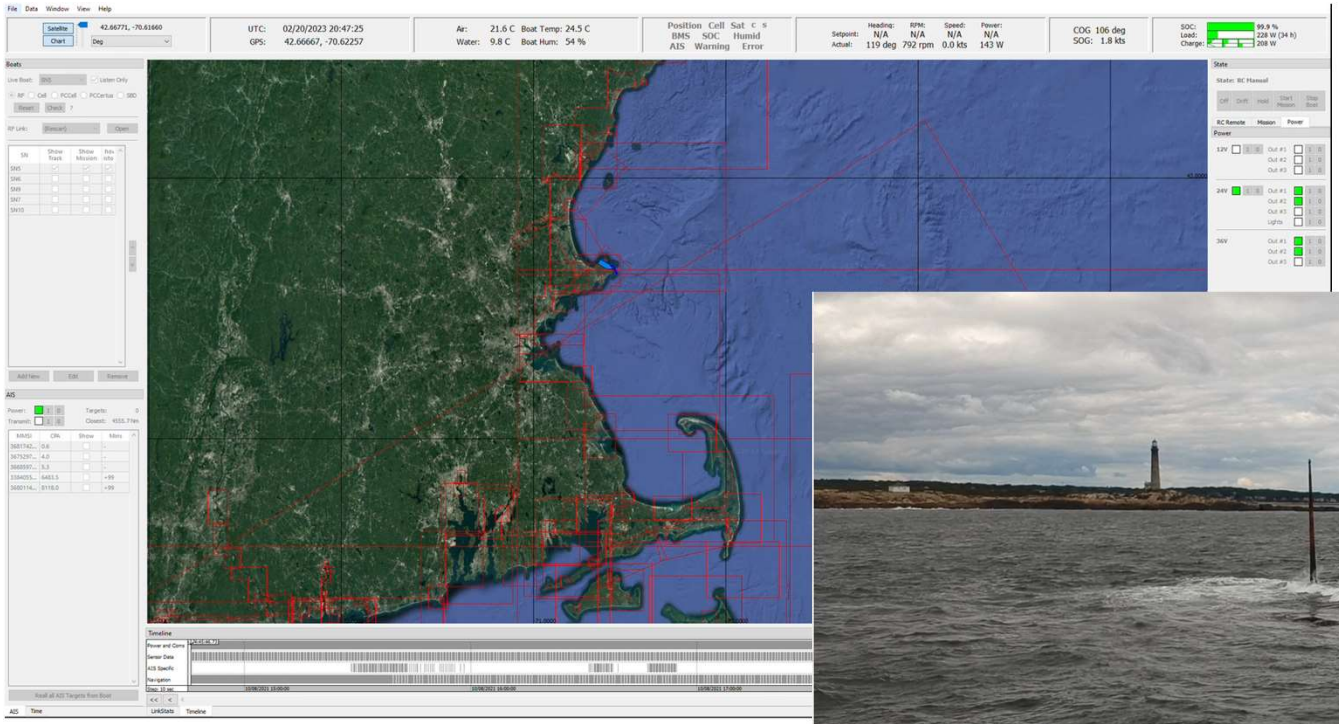




# Survey Capabilities

- Support high end MBES units (<200m)
  - Norbit iWBMS
  - R2 Sonic 2020
- Inland, Nearshore, Open Ocean
- Low logistics
- Long Endurance
- SVP / CTD Casts


# Survey: Coast Guard ATON



Mission Details:

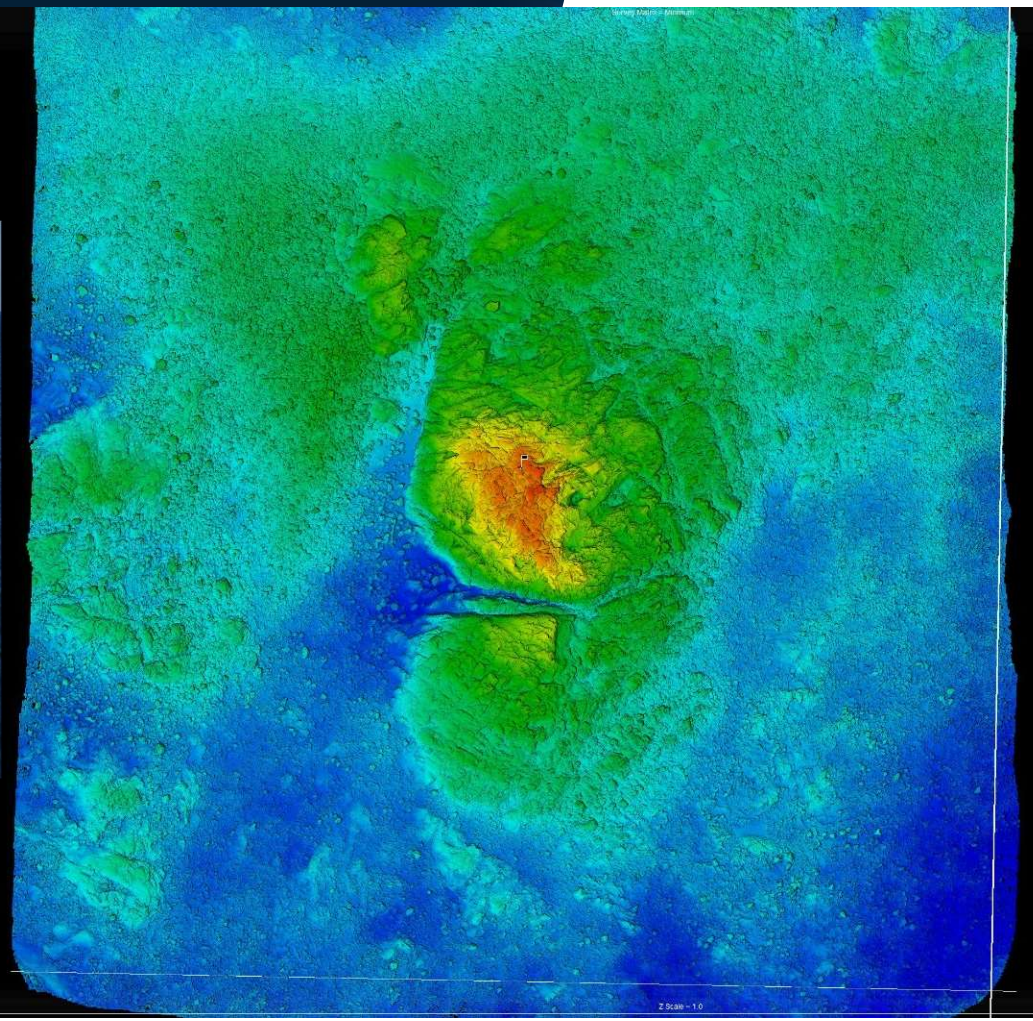
- 7 nm round trip transit from ramp to survey area
- 4.5-hour total mission
- 8% Battery used

SONAR: NORBIT iWBMSh-N

October 8th, 2021
Rockport, MA

# Survey: Coast Guard ATON

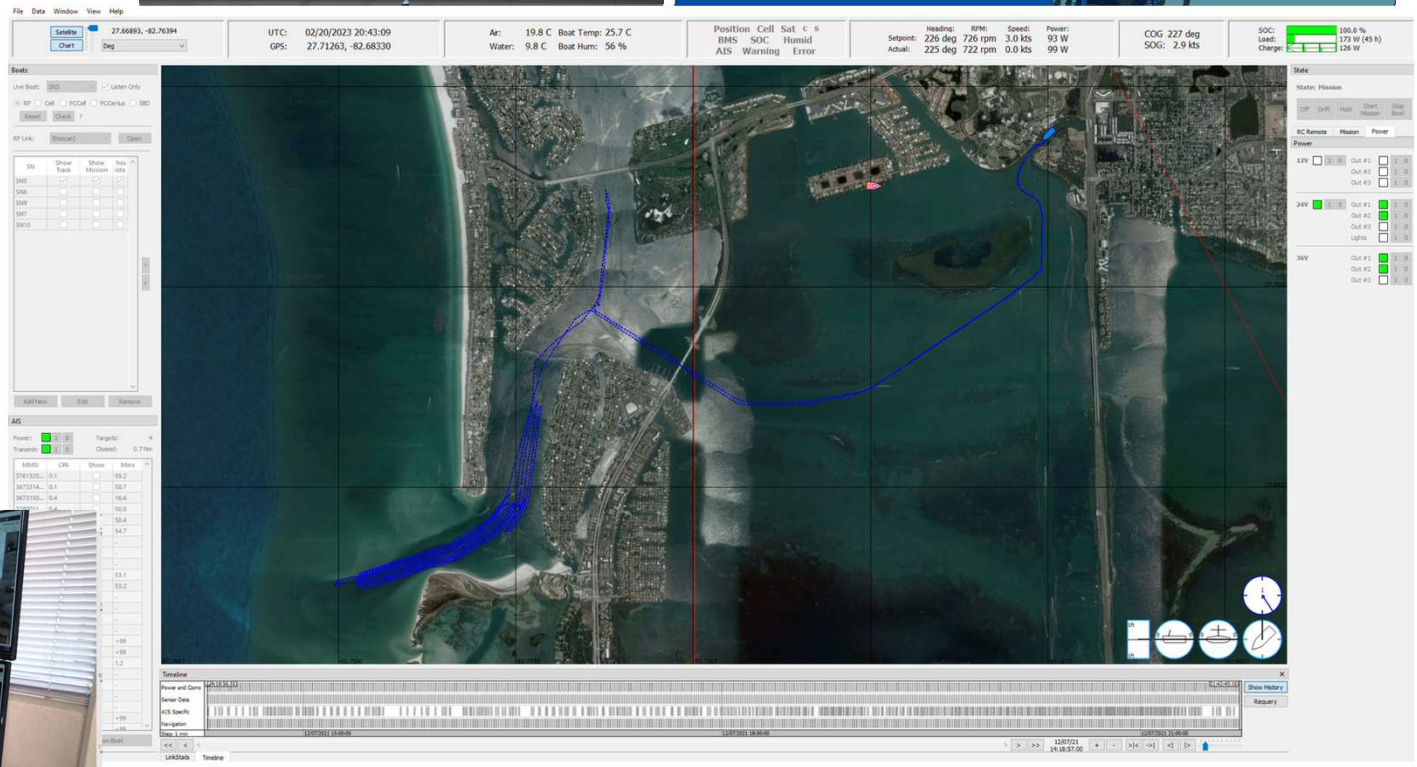
SeaTrac



# Multibeam Survey: Tampa Bay
# Center for Ocean Mapping and Innovative Technologies (COMIT) / USF

SeaTrac

- Center for Ocean Mapping and Innovative Technologies (COMIT), USF, FUGRO
- Tampa, Florida
- December 2021
- Norbit iWBMSh-N Multibeam
- Ops Stats:
  - 12 days of survey
  - 8-hour operations / day
  - 17% SOC
  - 5 kt survey speed

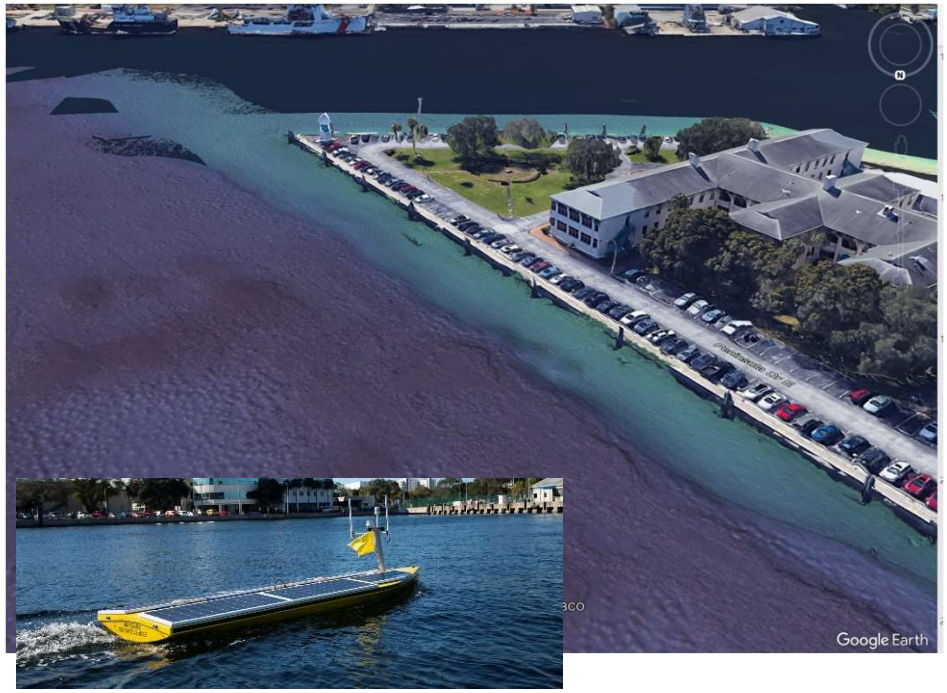


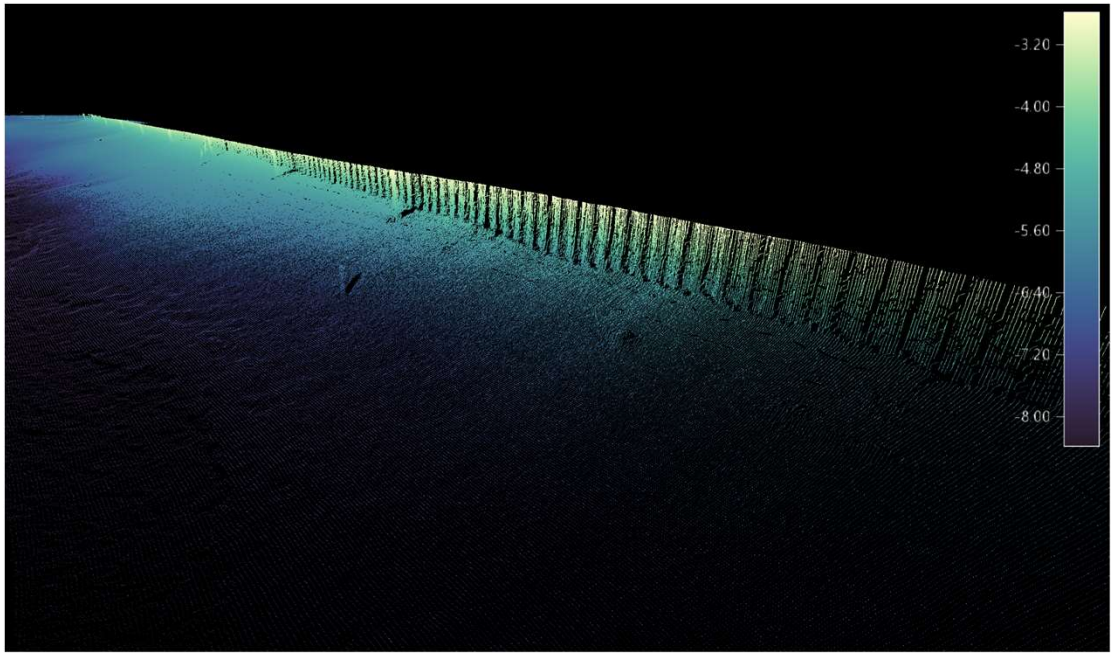
The Center for Ocean Mapping and Innovative Technologies (COMIT) was established in 2020 via a $9 million cooperative agreement with the National Oceanic and Atmospheric Administration's (NOAA) Office of Coast Survey.
Vist www.marine.usf.edu/COMIT/field for more information.

# Port Survey:
# USF College of Marine Science Seawall Survey

SeaTrac

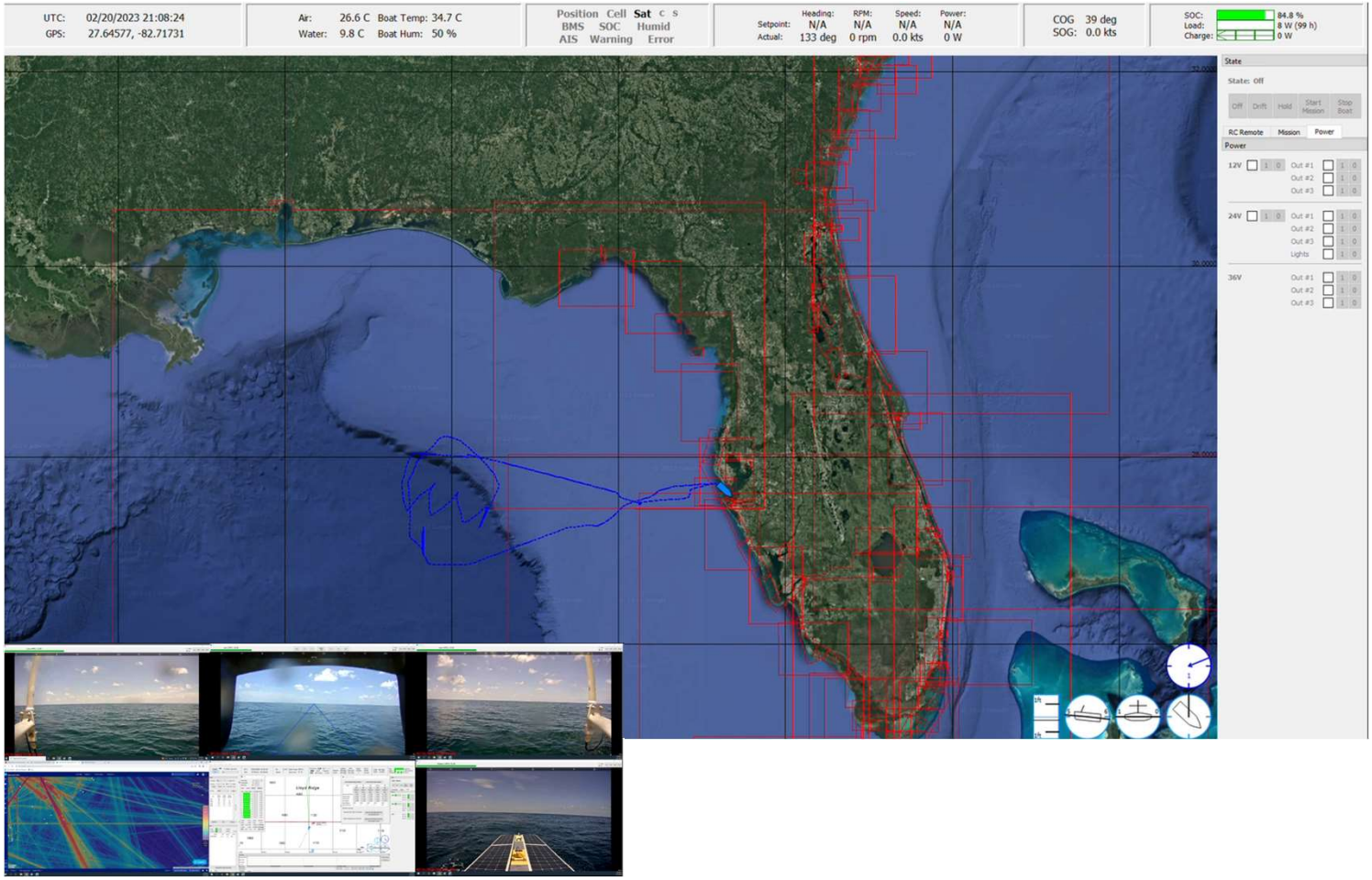
- Multibeam Survey using Norbit iWBMSh-N Sonar
- Change detection
- Hazard Identification



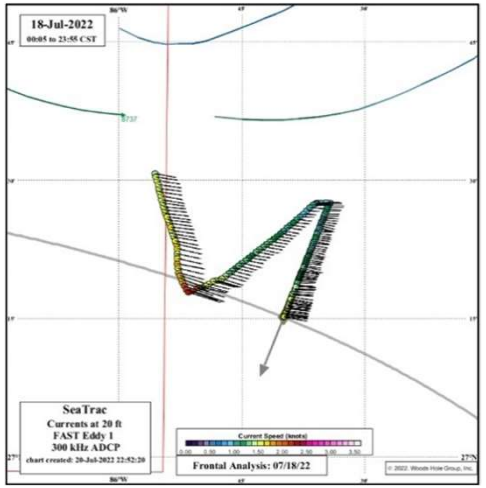



# Over The Horizon:
# Loop Current Monitoring

SeaTrac



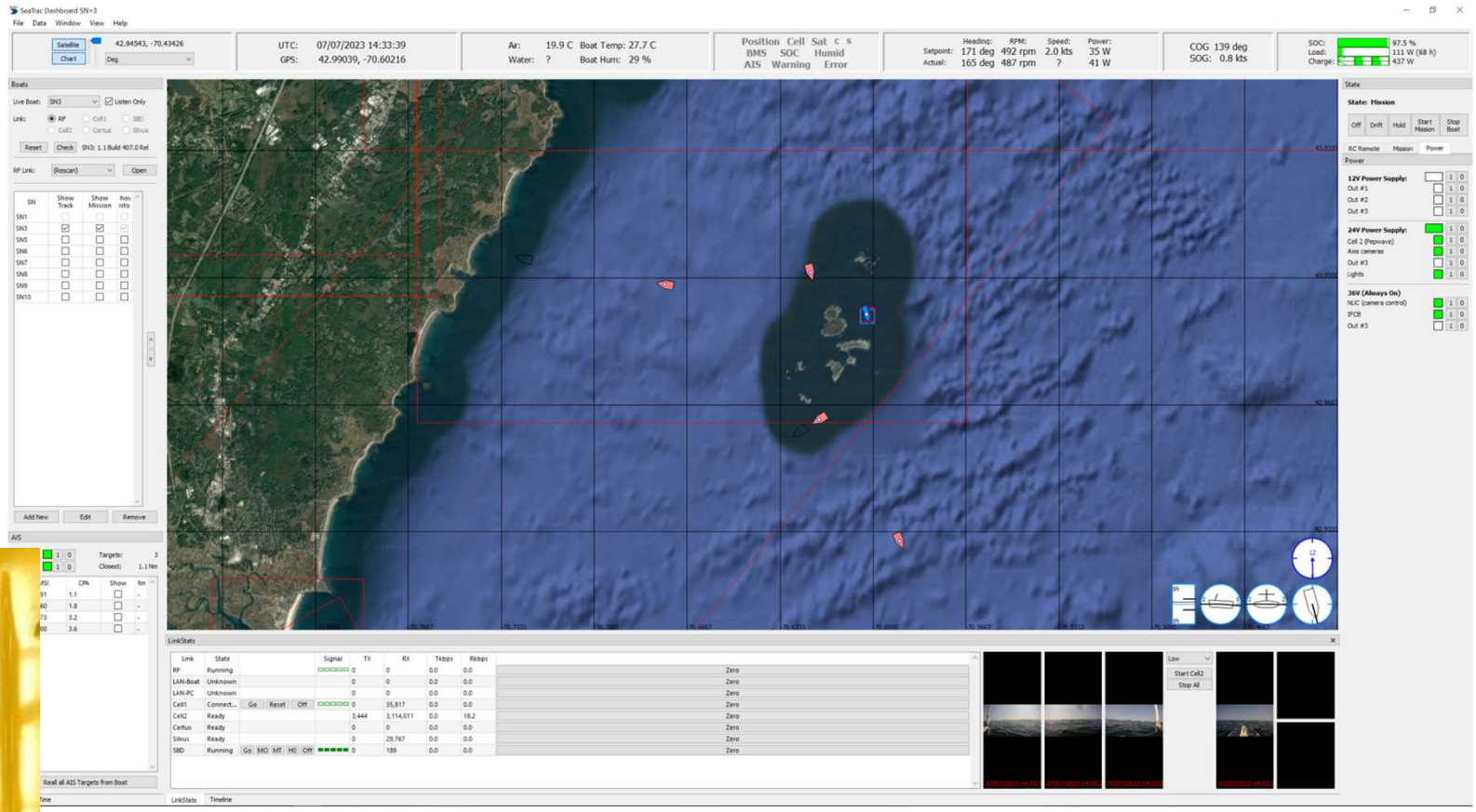

- 21 Day Deployment
- 800+ Nautical Miles
- Tracked movement of Loop Current with ADCP
- Real-time Data, Dynamic Mission Planning



# Mobile Buoy:
# HAB Monitoring with WHOI (3 weeks and counting…)

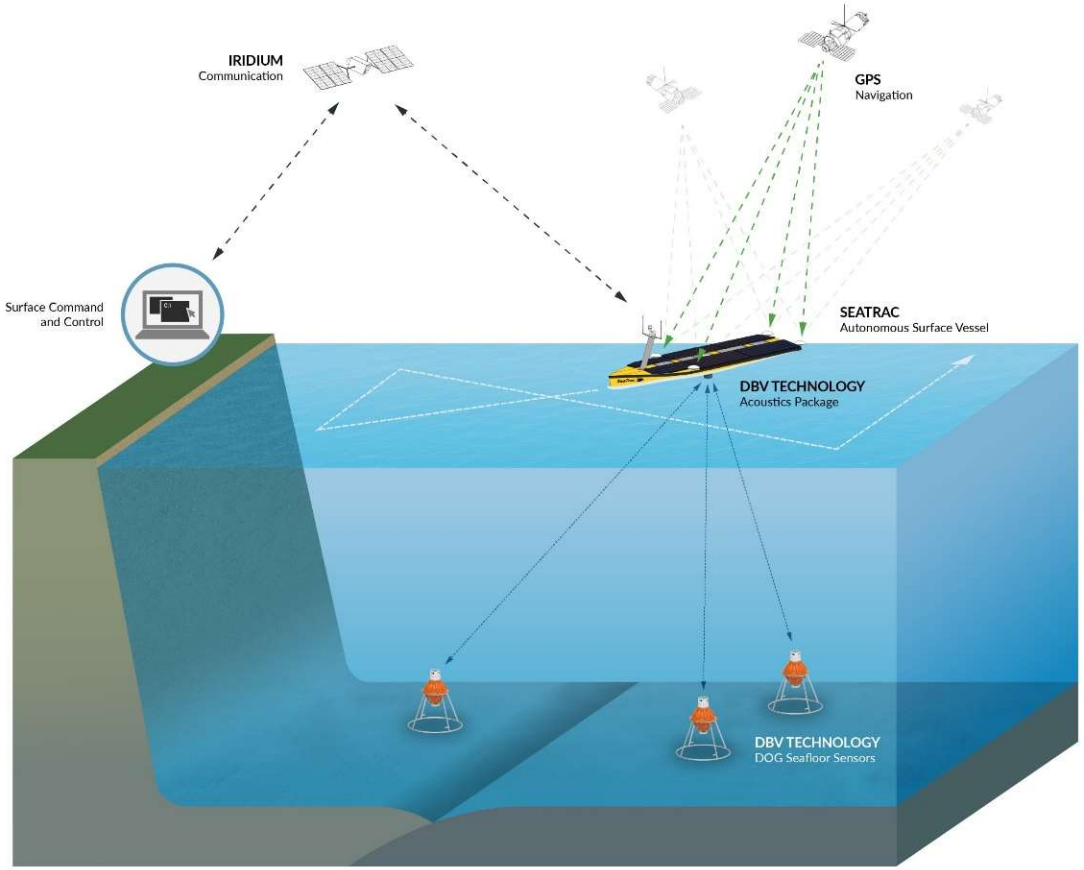
SeaTrac

- WHOI boat with IFCB sensor monitoring Harmful Algae Blooms
- Deployed 5 weeks
- Holding station ¼ mile off Isle of Shoals, NH
- HAB data relayed in real-time



# Seafloor Geodesy Info-Graphic

SeaTrac

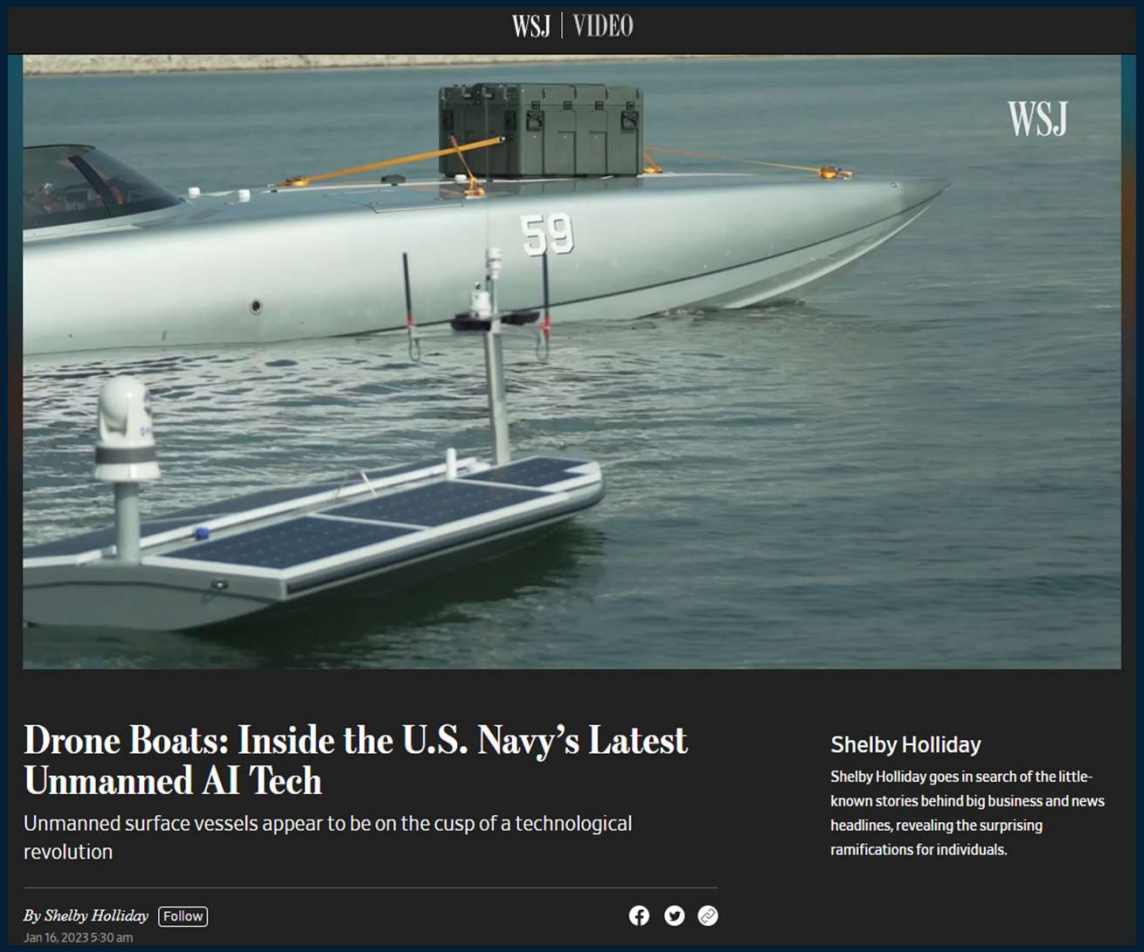


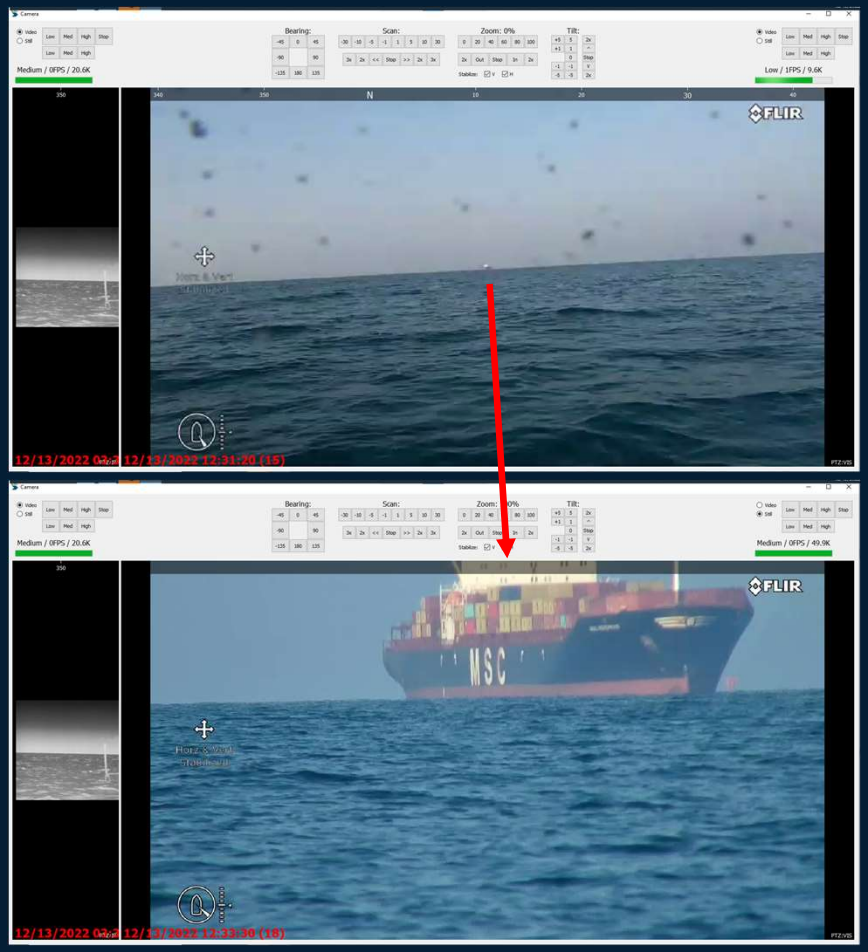


- Depths:
  - TDOG-1: 5,500 m
  - TDOG-2: 3,500 m
- Horizontal distances up to 11 km.
- Transmissions included signals for synchronization, survey, command and control, and data telemetry.
- Command and control messages consisted of putting T-DOGs into a low power state, waking up, transponding, and releasing.

# Maritime Domain Awareness:
# US Navy Exercises with Task Force 59

SeaTrac

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# SeaTrac and SP-48 USV Overview with Mission Samples

*Hobie Boeschenstein*
*Director of Operations and Business Development*
*06/15/2023*

# CTF-59 Ops Brief: SeaTrac SP-48

SeaTrac

**Mission**
- Persistent MDA using cameras

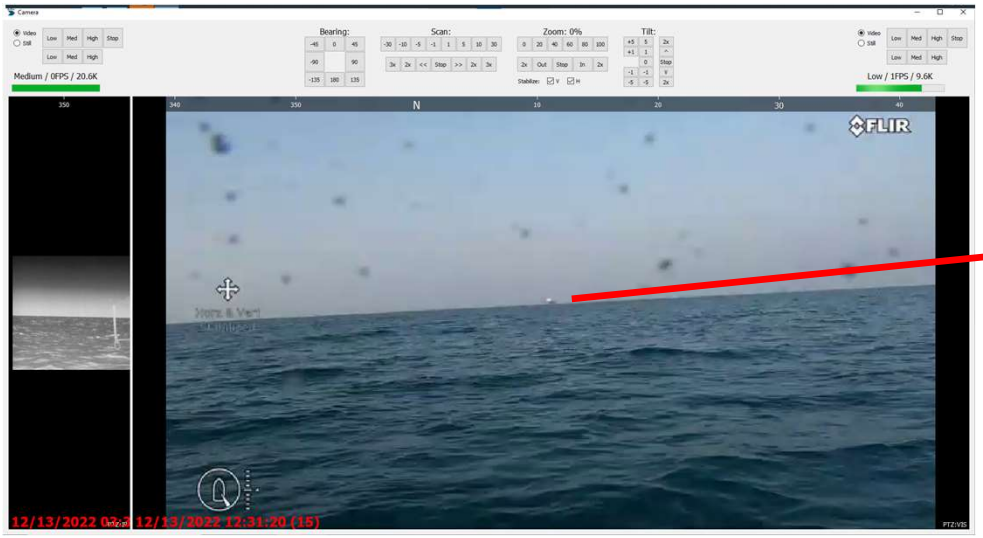
**Configuration**
- FLIR M364c EO/IR PTZ Camera
- Silvus Radio (Streamcaster 4200 / 4400)

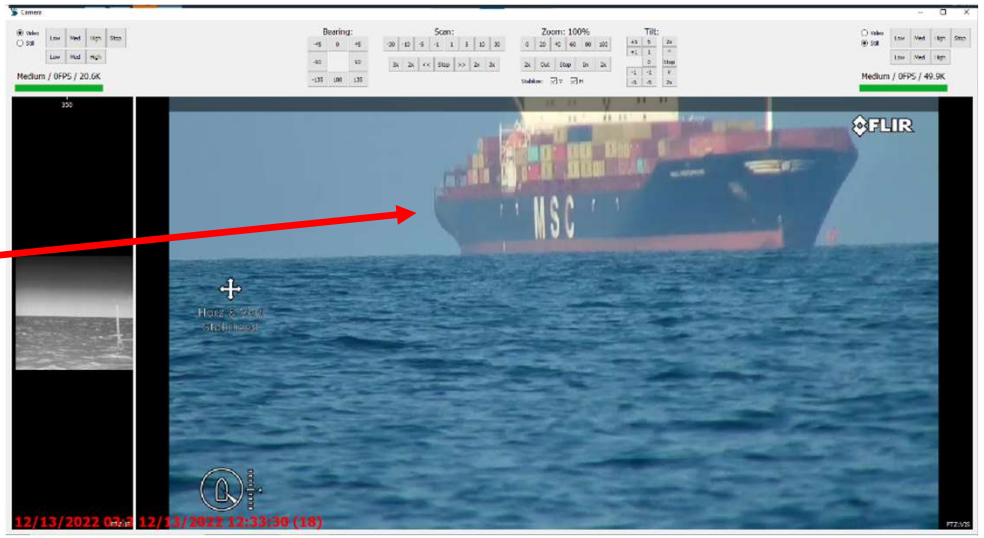
**Operations**
- DH22 (Nov & Dec)
  - Operated the boat for 11 days (including 4 overnights)
  - Accumulated over 145 hrs of remote piloting time
- IMX23

**Sensor Feed**
- Collected video from 6 streams (5 visible + 1 IR) for all 145 on-water hours
- Streamed video (EO & IR) over SILVUS to COP
- Also collected MET Data, including wind and waves

**C2 & Autonomy**
- Executed C2 reposition and maneuver by BWC from ROC

# Detection Image Samples




RWSC

Regional Wildlife Science Collaborative for Offshore Wind

# RWSC Draft Science Plan update

MA Habitat Working Group on Offshore Wind

Oct 12, 2023

# RWSC Science Plan development

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Regional Wildlife Science Collaborative for Offshore Wind

***Integrated Science Plan for Wildlife, Habitat, and Offshore Wind Energy in U.S. Atlantic Waters***

- Understand ongoing and pending data collection and active research
- Build on existing research priorities
- Identify data gaps and needs
- Standardize new data collection, facilitate data sharing, enhance data management
- Align funding
- https://rwsc.org/science-plan

# Draft Science Plan review

Comment deadline was Sept 30

- Each Sector Caucus met in August and September to provide input on draft
- A few dozen individuals/entities submitted formal comments
  - Letters
  - Annotated pdfs of the draft plan
  - Submitted comments via online form
- RWSC staff are compiling all comments in a single spreadsheet for tracking and integration purposes (with intent to share publicly)

# Draft Science Plan review - upshot

- Most chapters need significant consolidation
  - Background and reference material can be moved to appendices
  - Move specific data management and technology recommendations into each Subcommittee's chapter (info is either repeated or too scattered)
- Emphasize concise recommendations around data collection, data analysis, and data management for each species group

# Draft Science Plan revisions

New Executive Summary will articulate a joint commitment by the four Sectors to coordinate with each other and the research community through RWSC by:

- Continuing to use Sector Caucus and expert Subcommittee meetings to share updates on ongoing/pending research activities being funded by the four Sectors and RWSC
- Collaboratively developing and ensuring the use of best practices for data collection, QA/QC, data management and storage, and mechanisms and workflows for data sharing
- Participating in regular and adaptive identification of research priorities based on known data gaps and emerging decision-making needs through an annual RWSC & Partners Science Strategy Meeting (or similar)
- Aligning funds and developing collaborative funding plans to accomplish shared priorities for data collection, data analysis, and data management

# Draft Science Plan revisions timeline

- Since July – Staff are consolidating, removing repetition, shortening the document overall for Subcommittee review
- November – Sector Caucuses meet (prior to meetings, will receive draft Science Plan Executive Summary for review and input)
- After Thanksgiving – Steering Committee will receive revised Science Plan (including Exec Summary reflecting four Caucus input)
- December Steering Committee meeting – discuss revised Science Plan, identify any additional changes before finalization

# Draft Science Plan revisions timeline

Questions on Science Plan?

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for Offshore Wind

# PAM-related news and reminders

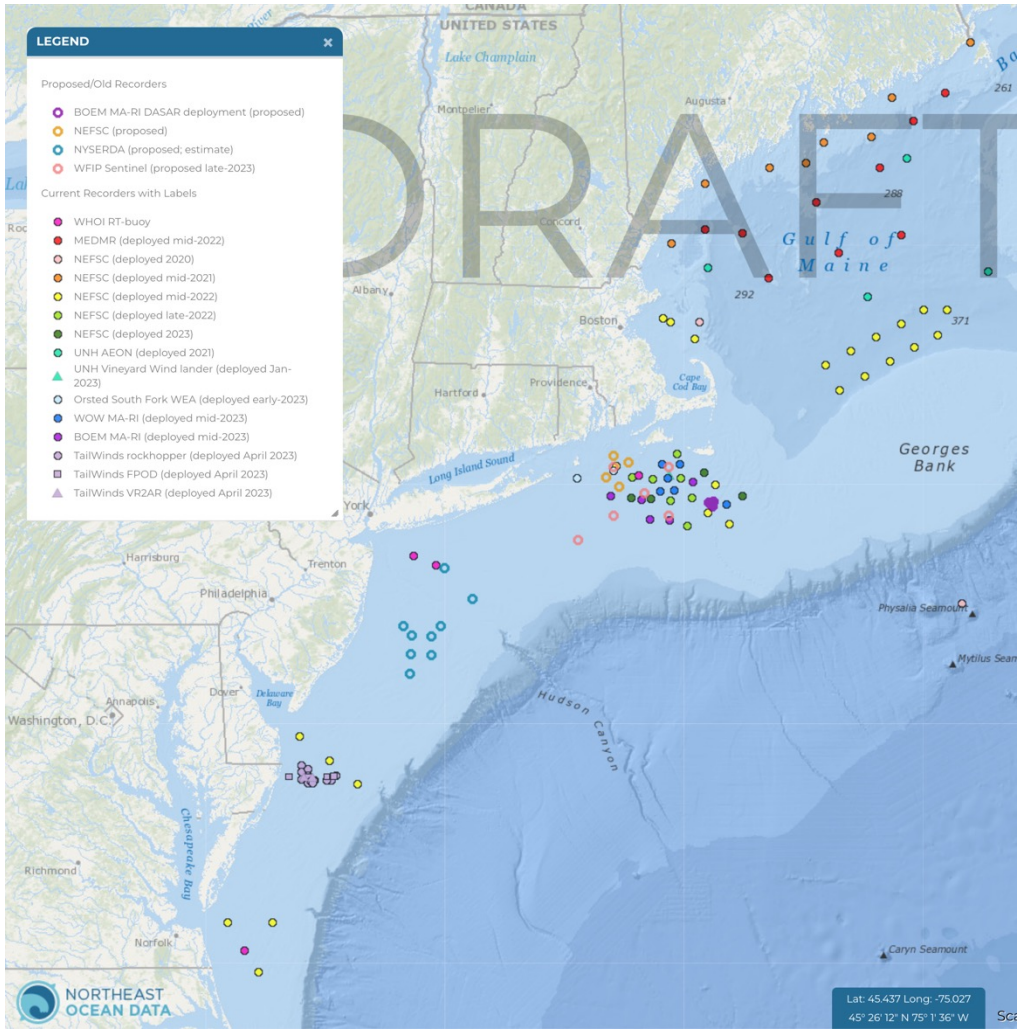
https://rwsc.org/pam

**Recent Portal updates**

- Marine mammal density models
- NOAA marine mammal climate vulnerability assessment released – update Portal products soon
- PAM current deployments grid (public); deployed and proposed coordinates (private/by request)

**BOEM requires coordination with RWSC Marine Mammal Subcommittee on long-term archival PAM deployment and data management:**

- South Fork COP Approval Letter, 1/18/2022
- Revolution Wind ROD 8/21/2023
- Ocean Wind 1 COP Approval Letter, 9/21/2023

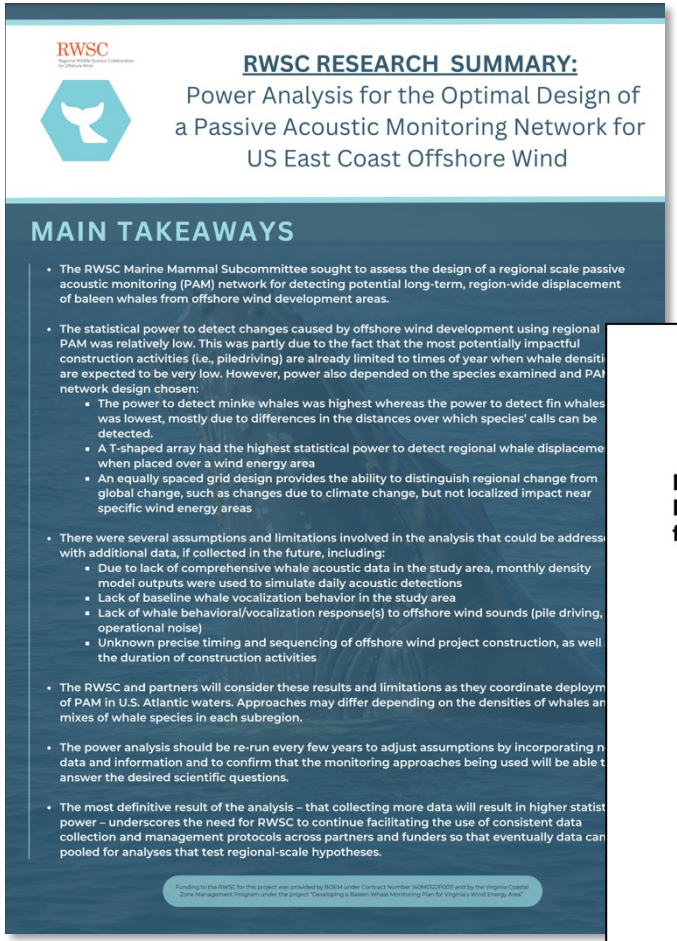


# PAM related news and reminders

https://rwsc.org/pam

## MM Subcommittee completed PAM power analysis

- BOEM report published to ESPIS (OCS Study BOEM 2023-041)
- RWSC produced plain-language Research Summary



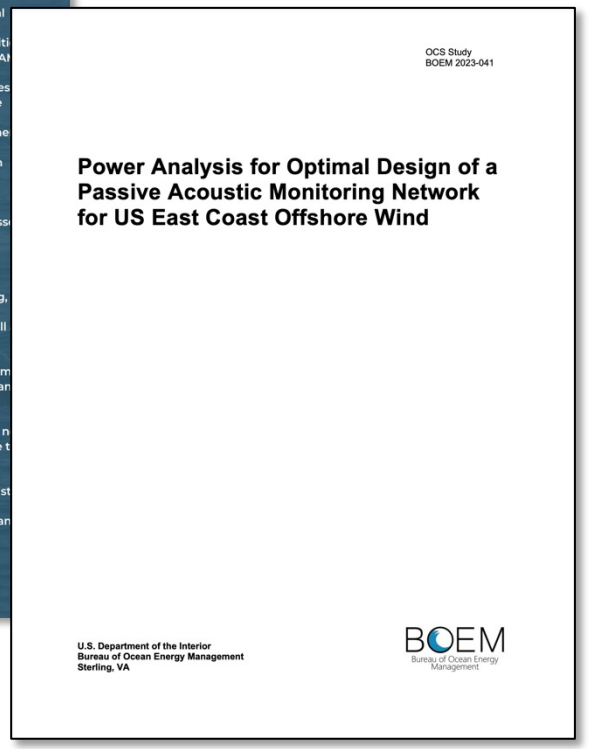
RWSC

**RWSC RESEARCH SUMMARY:**
Power Analysis for the Optimal Design of a Passive Acoustic Monitoring Network for US East Coast Offshore Wind

MAIN TAKEAWAYS

- The RWSC Marine Mammal Subcommittee sought to assess the design of a regional scale passive acoustic monitoring (PAM) network for detecting potential long-term, region-wide displacement of baleen whales from offshore wind development areas.
- The statistical power to detect changes caused by offshore wind development using regional PAM was relatively low. This was partly due to the fact that the most potentially impactful construction activities (i.e., piledriving) are already limited to times of year when whale densiti are expected to be very low. However, power also depended on the species examined and PA network design chosen:
  - The power to detect minke whales was highest whereas the power to detect fin whales was lowest, mostly due to differences in the distances over which species' calls can be detected.
  - A T-shaped array had the highest statistical power to detect regional whale displaceme when placed over a wind energy area
  - An equally spaced grid design provides the ability to distinguish regional change from global change, such as changes due to climate change, but not localized impact near specific wind energy areas
- There were several assumptions and limitations involved in the analysis that could be address with additional data, if collected in the future, including:
  - Due to lack of comprehensive whale acoustic data in the study area, monthly density model outputs were used to simulate daily acoustic detections
  - Lack of baseline whale vocalization behavior in the study area
  - Lack of whale behavioral/vocalization response(s) to offshore wind sounds (pile driving, operational noise)
  - Unknown precise timing and sequencing of offshore wind project construction, as well the duration of construction activities
- The RWSC and partners will consider these results and limitations as they coordinate deploym of PAM in U.S. Atlantic waters. Approaches may differ depending on the densities of whales an mixes of whale species in each subregion.
- The power analysis should be re-run every few years to adjust assumptions by incorporating n data and information and to confirm that the monitoring approaches being used will be able t answer the desired scientific questions.
- The most definitive result of the analysis – that collecting more data will result in higher statist power – underscores the need for RWSC to continue facilitating the use of consistent data collection and management protocols across partners and funders so that eventually data can pooled for analyses that test regional-scale hypotheses.

Funding to the RWSC for this project was provided by BOEM under Contract Number 140M0122P0011 and by the Virginia Coastal Zone Management Program under the project "Developing a Baleen Whale Monitoring Plan for Virginia's Wind Energy Area"



OCS Study
BOEM 2023-041

**Power Analysis for Optimal Design of a Passive Acoustic Monitoring Network for US East Coast Offshore Wind**

U.S. Department of the Interior
Bureau of Ocean Energy Management
Sterling, VA

BOEM
Bureau of Ocean Energy Management

RWSC
Regional Wildlife Science Collaborative for Offshore Wind

# September PAM Workshop Objectives

AGENDA

Day 1 – Hear about ongoing work, discuss research questions and strategies to address. All welcome to participate.

Day 2 – State and Federal funders of PAM only. Discuss what we heard on Day 1 and strategize a collaborative approach to achieving regional coverage with the current funding (next few years)

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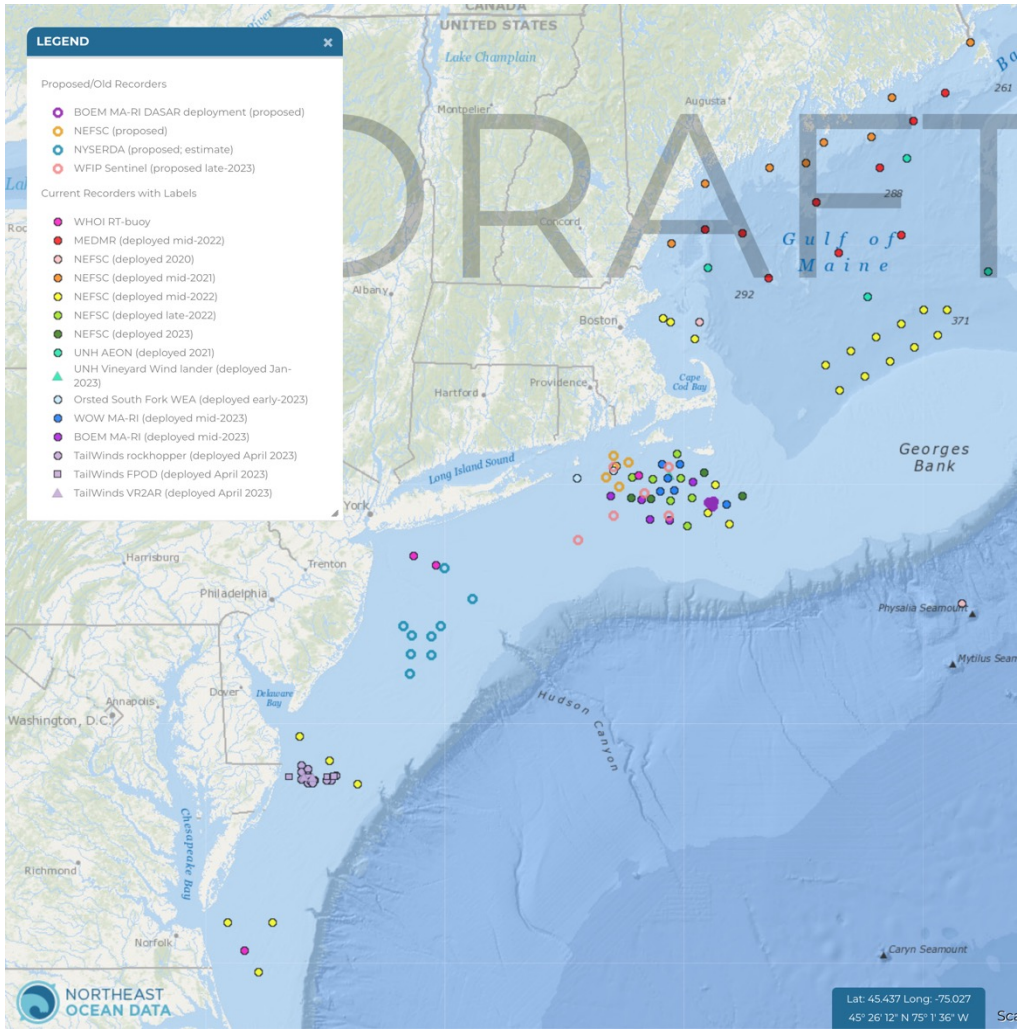
# Number of entities funding/deploying PAM

- Gulf of Maine = ~6
- Southern New England = 7-10
- NY/NJ Bight = 6-10
- Central Atlantic & Southeastern US Atlantic = 4-6

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# PAM data management

The data collection and research carried out by RWSC and its partners is for the purpose of advancing knowledge, use in decision-making, and is expected to have wide utility to other researchers, government agencies, and others.

PAM data collection is applied research – decision-makers need access as soon as possible. The Marine Mammal chapter of the Science Plan should reflect this and suggest discrete timelines for making data accessible.

# PAM data management

https://rwsc.org/pam

**Participants requested that RWSC develop language for funders to use in contracts that requires project budgets to support:**

- Specific and regular engagement with the RWSC Marine Mammal Subcommittee to ensure consistency and coordination with ongoing work
- Provision of information about the project/research for display at https://database.rwsc.org and data about deployments for display in RWSC maps:
- Upload of all daily detection data* to RWSC trusted digital repositories for PAM as specified in the Science Plan
  - For example, within 3 months of retrieval from the field
  - *Ensures that researchers retain right to use and publish raw and more detailed data and derivative works on different timelines

# PAM workshop outputs

https://rwsc.org/pam

Likely complete by next week:

1. All presentation materials and recording of Day 1 on RWSC website/sharepoint
2. Public summary of Day 1
3. Funders' summary of Day 2

4. Updated maps of deployed and planned PAM (will be ready by November MM Subcommittee meeting)

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Regional Wildlife Science Collaborative for Offshore Wind

# Thank you!

**RWSC website for all meetings and RWSC organizational materials:** https://rwsc.org

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Regional Wildlife Science Collaborative for Offshore Wind

# Update on Aerial Surveys of Southern New England wind energy areas and surrounding waters

New England Aquarium

*Protecting the blue planet*

Orla O'Brien

Jessica Redfern

# Outline

- Survey Background
- Recent results
- Modeling effort

# Aerial Surveys

Campaigns 1 - 3

Campaign 7 spanned February to August 2022
- Report available online

**2017 – 2021**

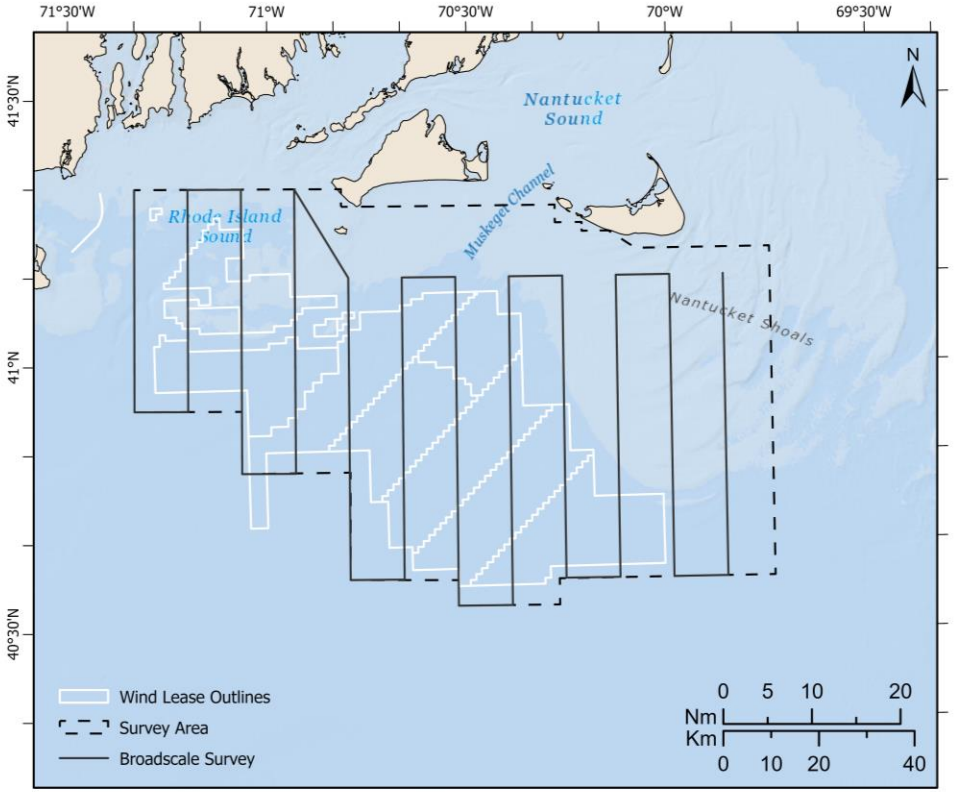
**Sep. 2022 - Present**

**2011 - 2015**

**Feb.–Aug. 2022**

Campaigns 4 - 6

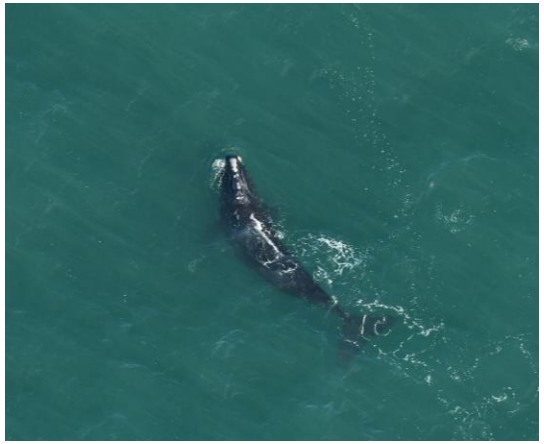
Campaign 8 has been ongoing since September 2022
- Supported by BOEM, MassCEC, NOAA
- Recently secured continuation of funding will allow surveys to continue through 2024



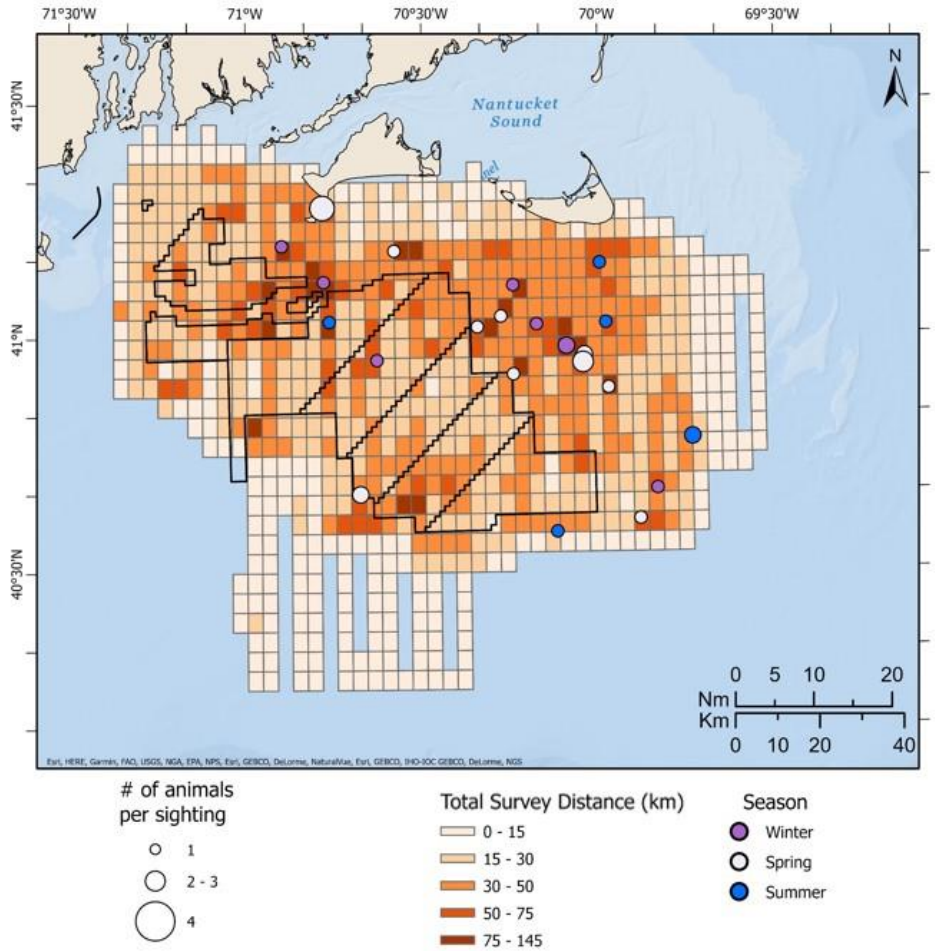

New England Aquarium

*Protecting the blue planet*

# Campaign 7 Results



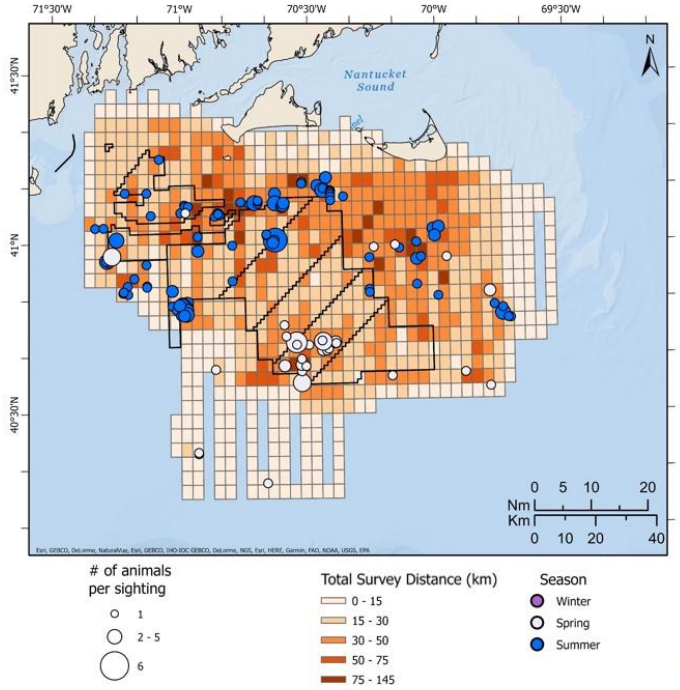
- Fewer right whales detected than past years
- Long dives made detection and photo-identification difficult



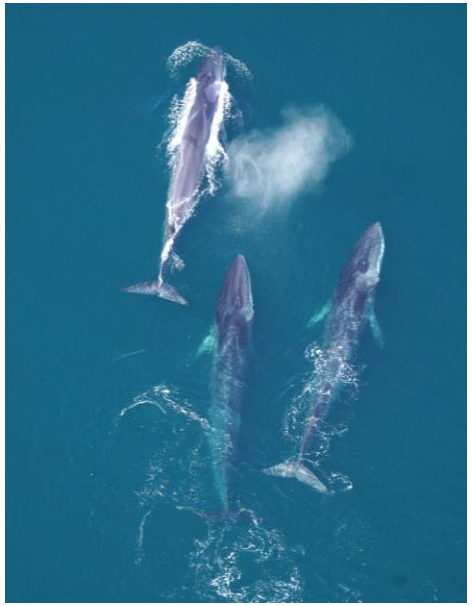

| Season | Effort (km) | # of detections | # of animals | Est. Density | Est. Abundance | 95% CI |
|---|---|---|---|---|---|---|
| Winter (February) | 1504.9 | 3 | 3 | 0.0006 | 5 | 1.8 – 18.0 |
| Spring | 3704.2 | 3 | 4 | 0.0003 | 3 | 0.9 – 9.9 |
| Summer | 3943.2 | 3 | 4 | 0.0003 | 3 | 0.9 – 8.1 |

# Campaign 7 Results

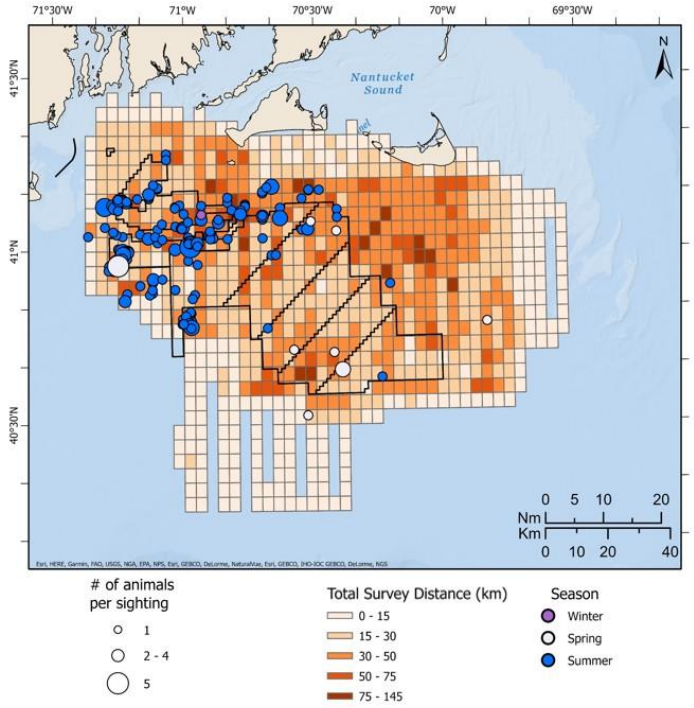
- Large feeding aggregations of balaenopterids in the spring (humpbacks) and summer (humpbacks, fin whales)
- Fin whale summer density (0.0055 whales/ $km^2$) was the second highest since 2011 (range: 0 – 0.0076 whales/ $km^2$)
- Humpback summer density (0.0027 whales/ $km^2$) was the second highest since 2011 (range: 0 – 0.0034 whales/ $km^2$)
- Whales were observed in multi-species feeding aggregations including dolphins, birds, and large fish




Humpback Whales

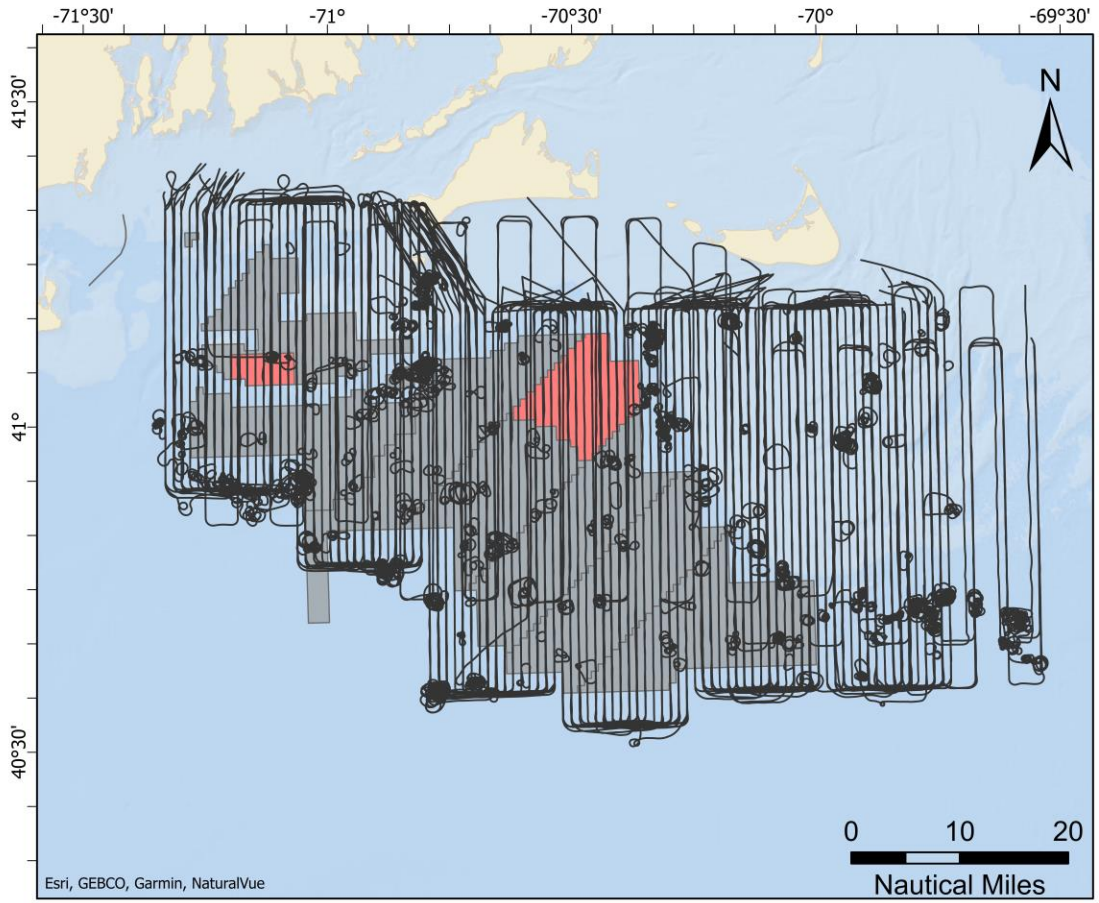


Fin Whales



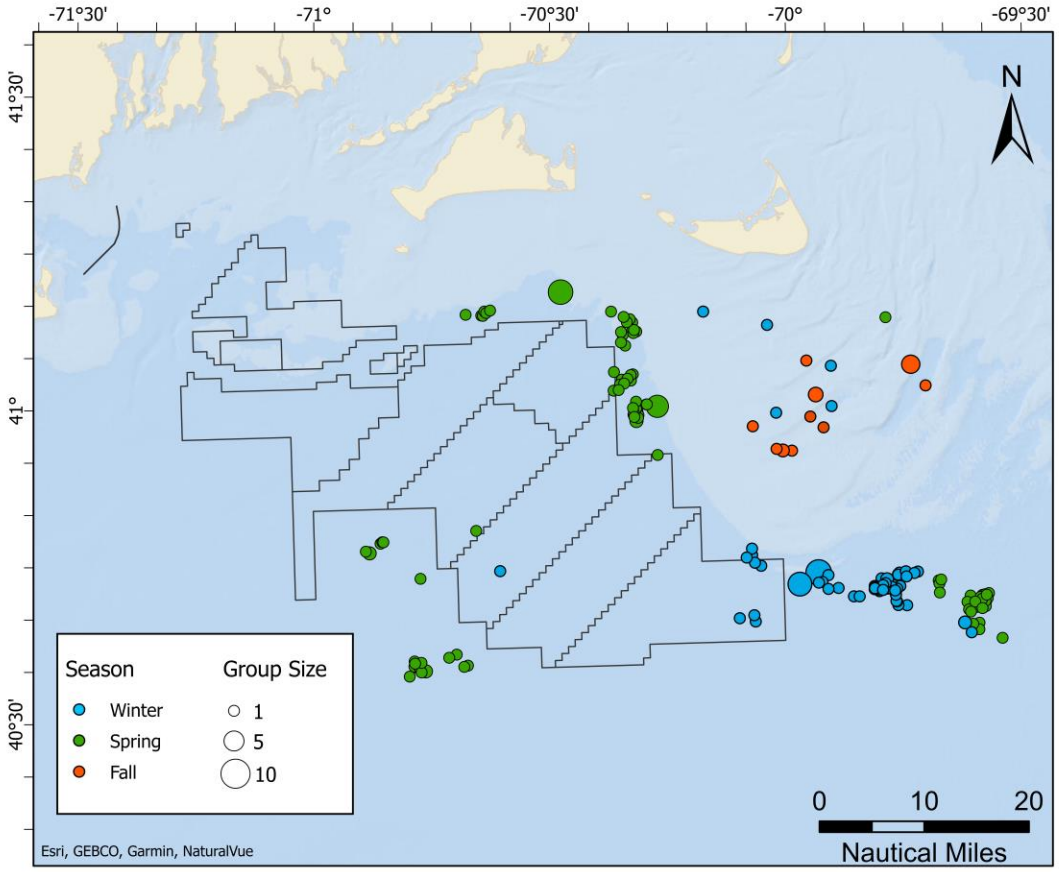
# Campaign 8 Prelim Results

- Ongoing since September 2022
- Now with additional funding from NOAA, BOEM, and MassCEC, projected to extend through the end of 2024
- In the past 14 months:
  - 42 surveys, ~ 250 hours
- Documented the beginning and continuation of construction in two lease areas
- Worked with developers to come up with deconfliction protocols



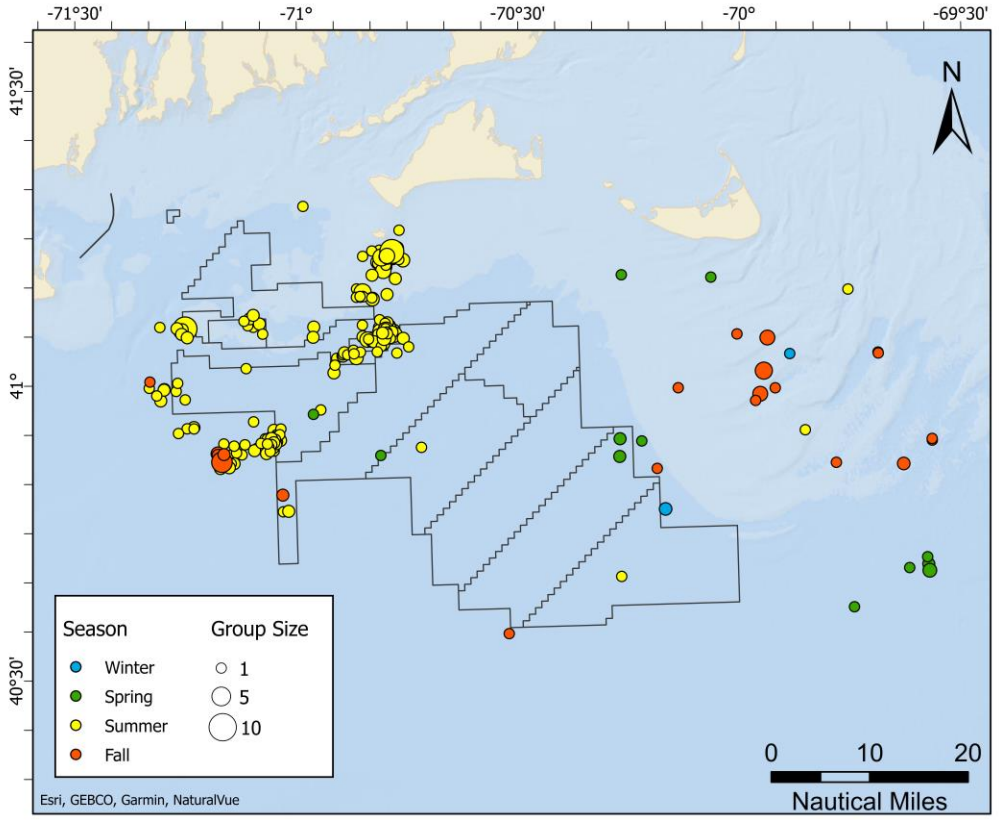
# Campaign 8 Prelim Results: right whales

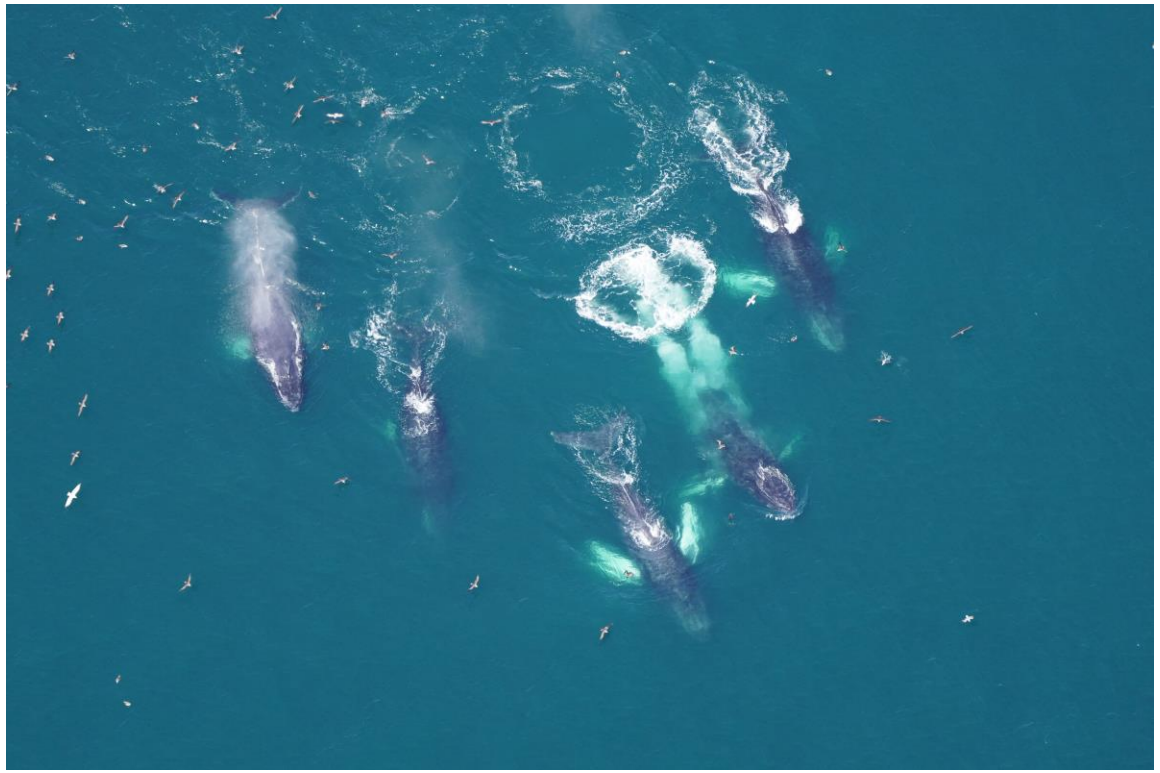
- Right whales detected from Sept – Apr (excluding Nov), on 16 of 22 surveys
  - Highest numbers in Feb - Apr
- 104 unique individuals identified
- Feeding and surface active groups identified in Sept and Feb - Mar



# Campaign 8 Prelim Results: humpbacks

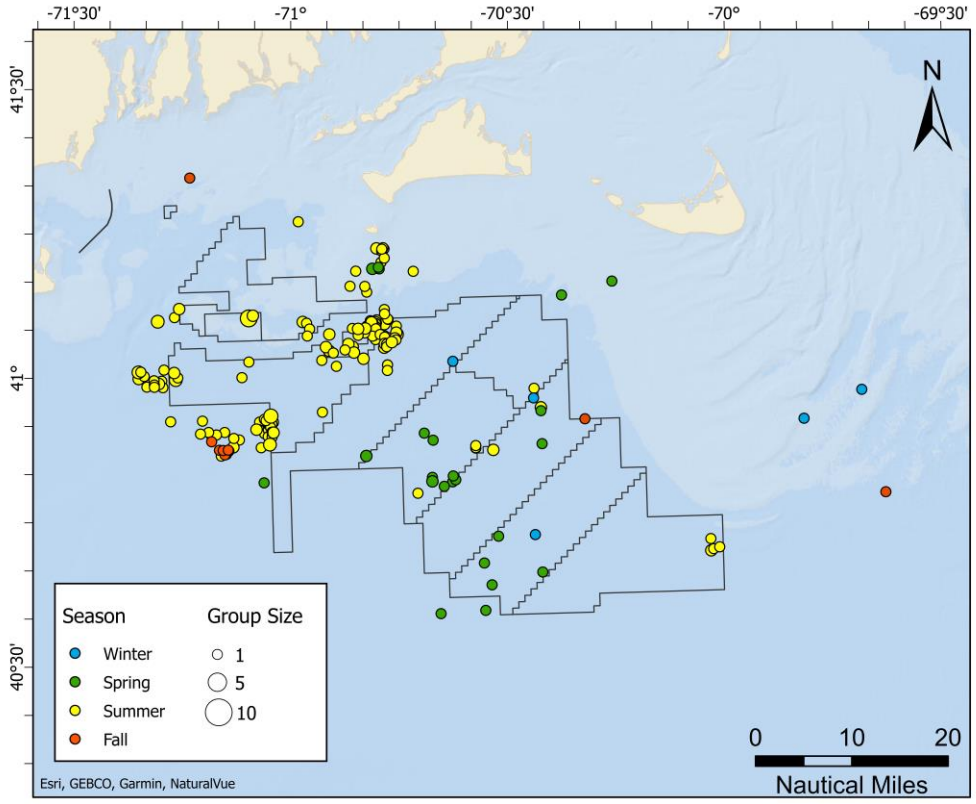
- Detected in every season
- Highest numbers in the summer
- Found in large, persistent, multi-species feeding aggregations



# Campaign 8 Prelim Results: fin whales

- Detected in every season
- Highest numbers in the summer
- Found in large, persistent, multi-species feeding aggregations

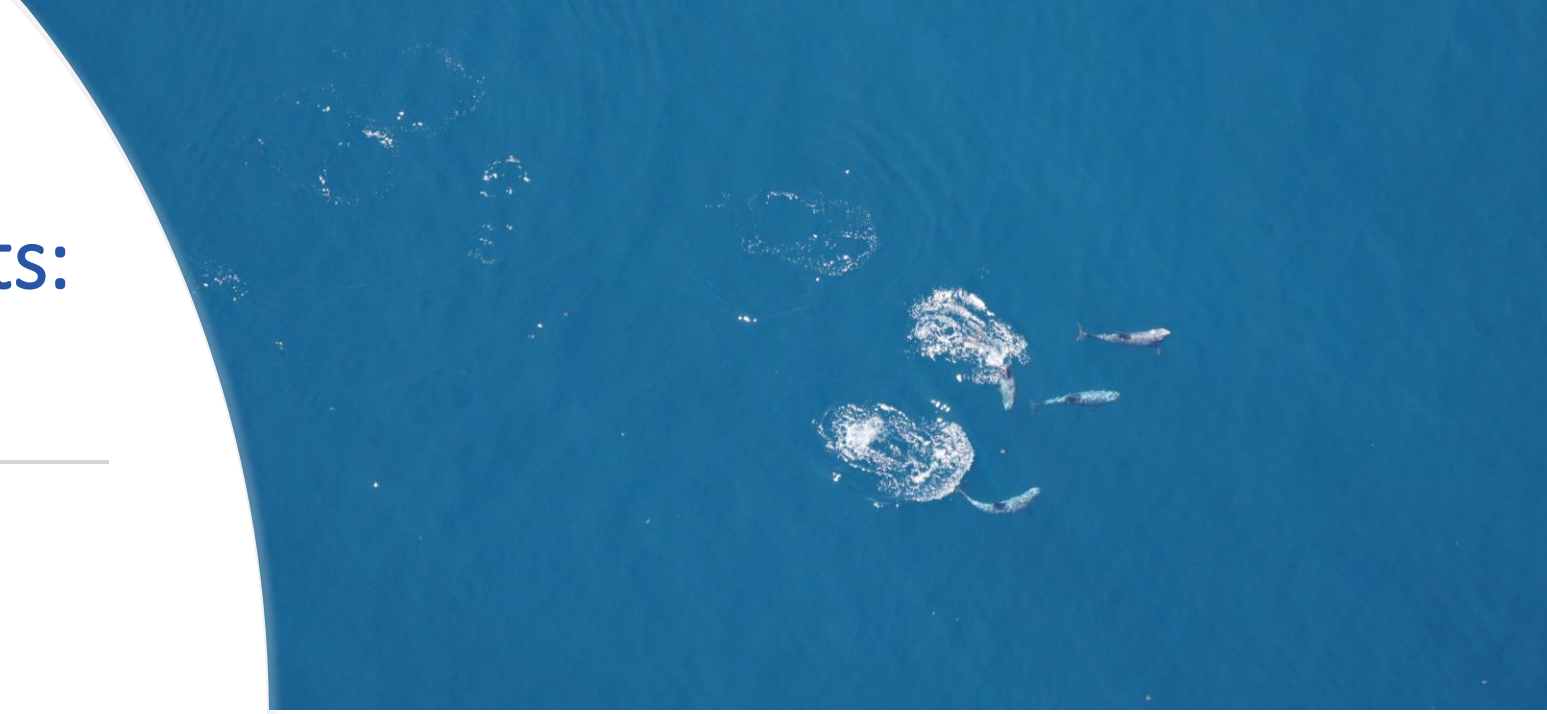



# Campaign 8 Prelim Results: fin and humpback demographics

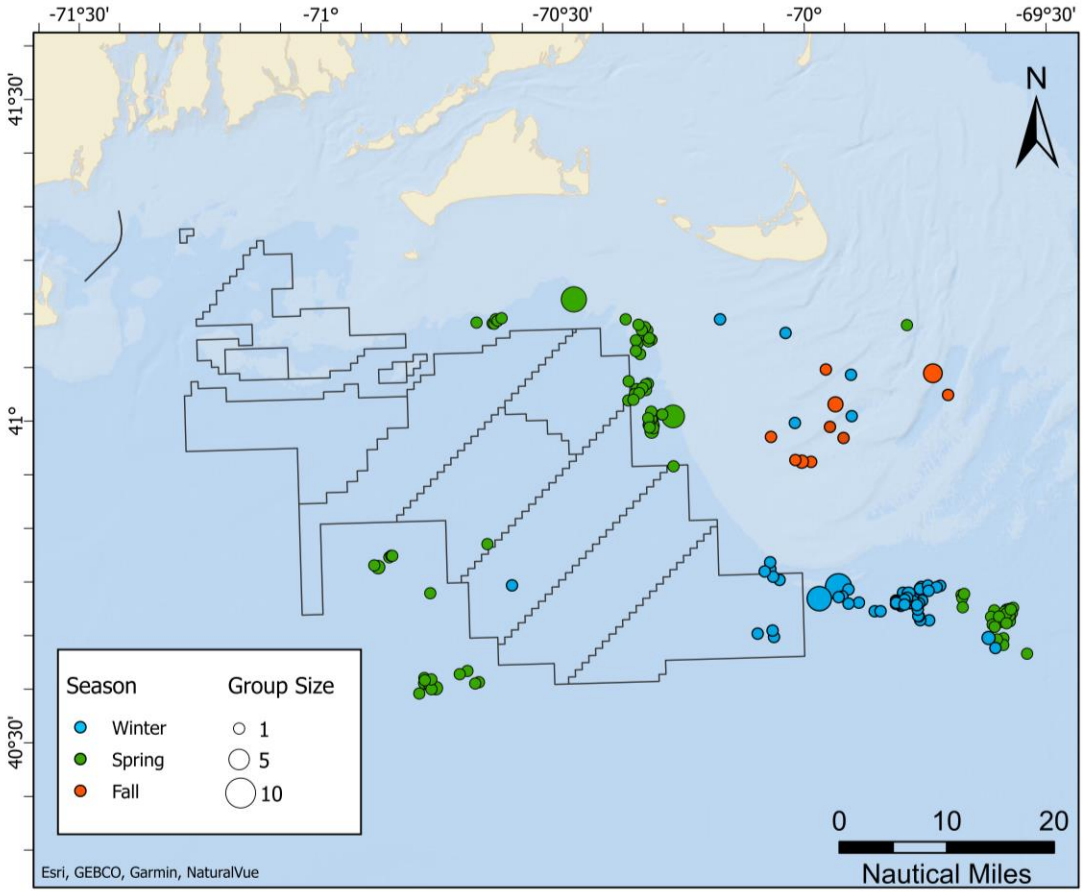
- Several fin and humpback mother/calf pairs documented
- Identifiable fin and humpback photos shared with Center for Coastal Studies for inclusion in databases
  - Has resulted in some interesting matches

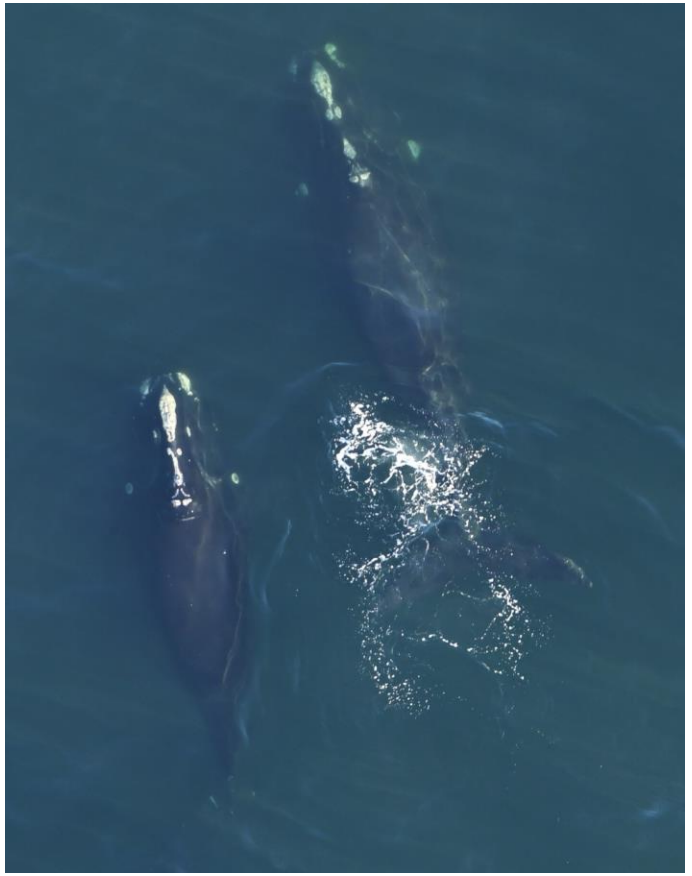
# Campaign 8 Prelim Results: unusual sightings

- Summer surveys have resulted in some unusual marine mammal sightings
- A pod of killer whales on the southern end of Nantucket Shoals (June)
- Several sightings of groups of Risso's dolphins (July, September)



# Right whale sightings: Sep. 2022 – Apr. 2023

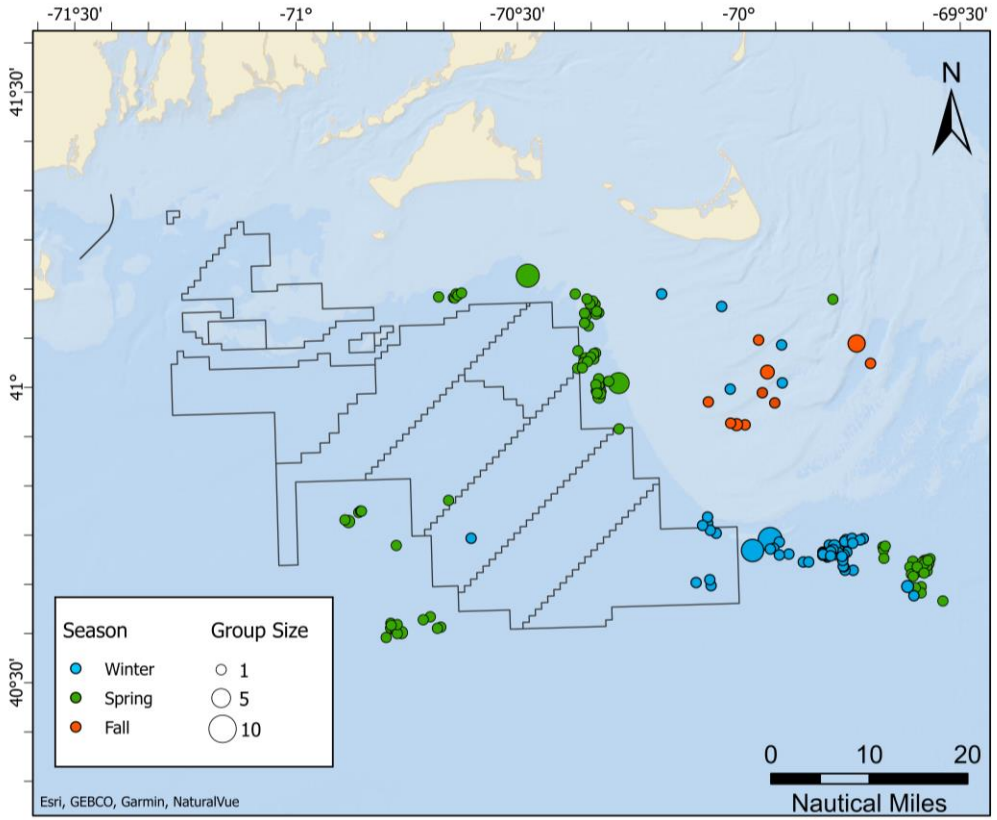


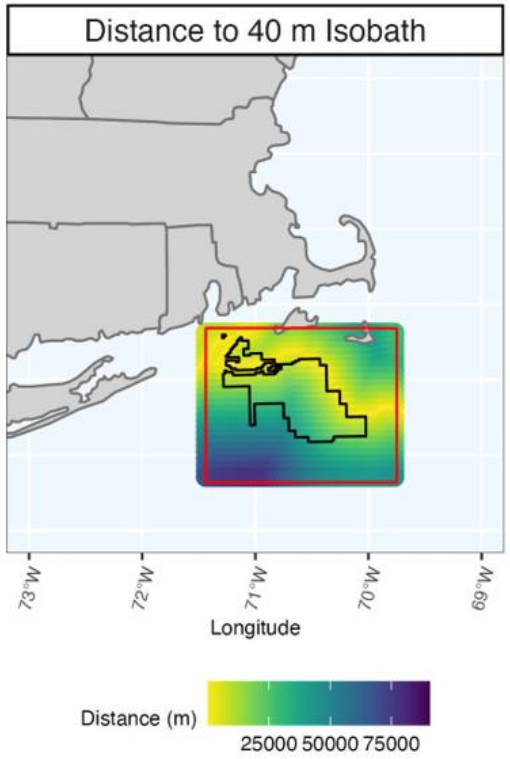



# Habitat models to understand distributions

Right whales are seen just outside of the lease areas because of an association with the 40m isobath

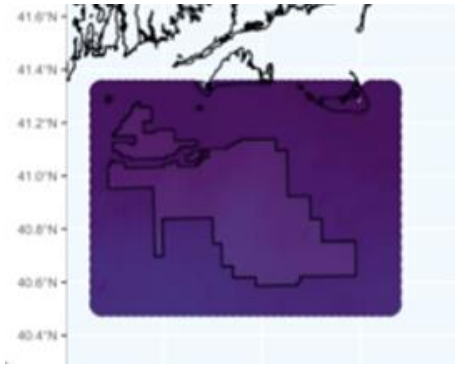
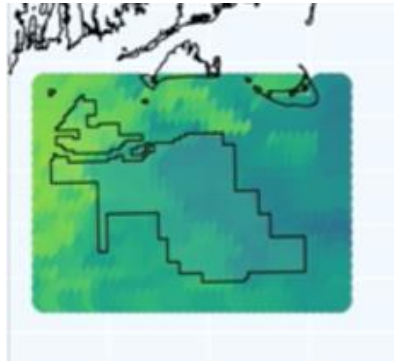
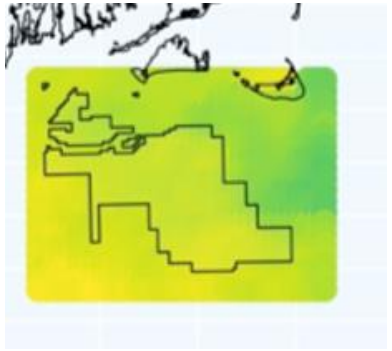
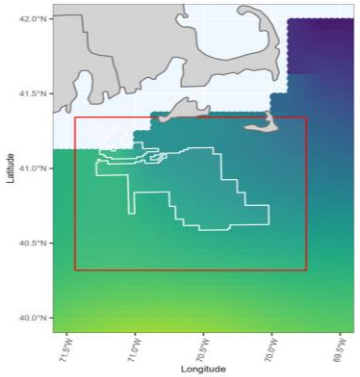
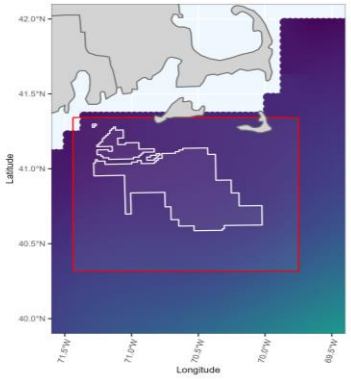
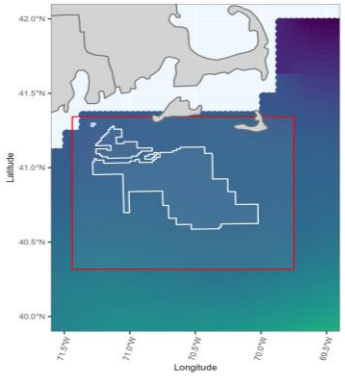
This relationship is seasonal



# Habitat models to understand distributions

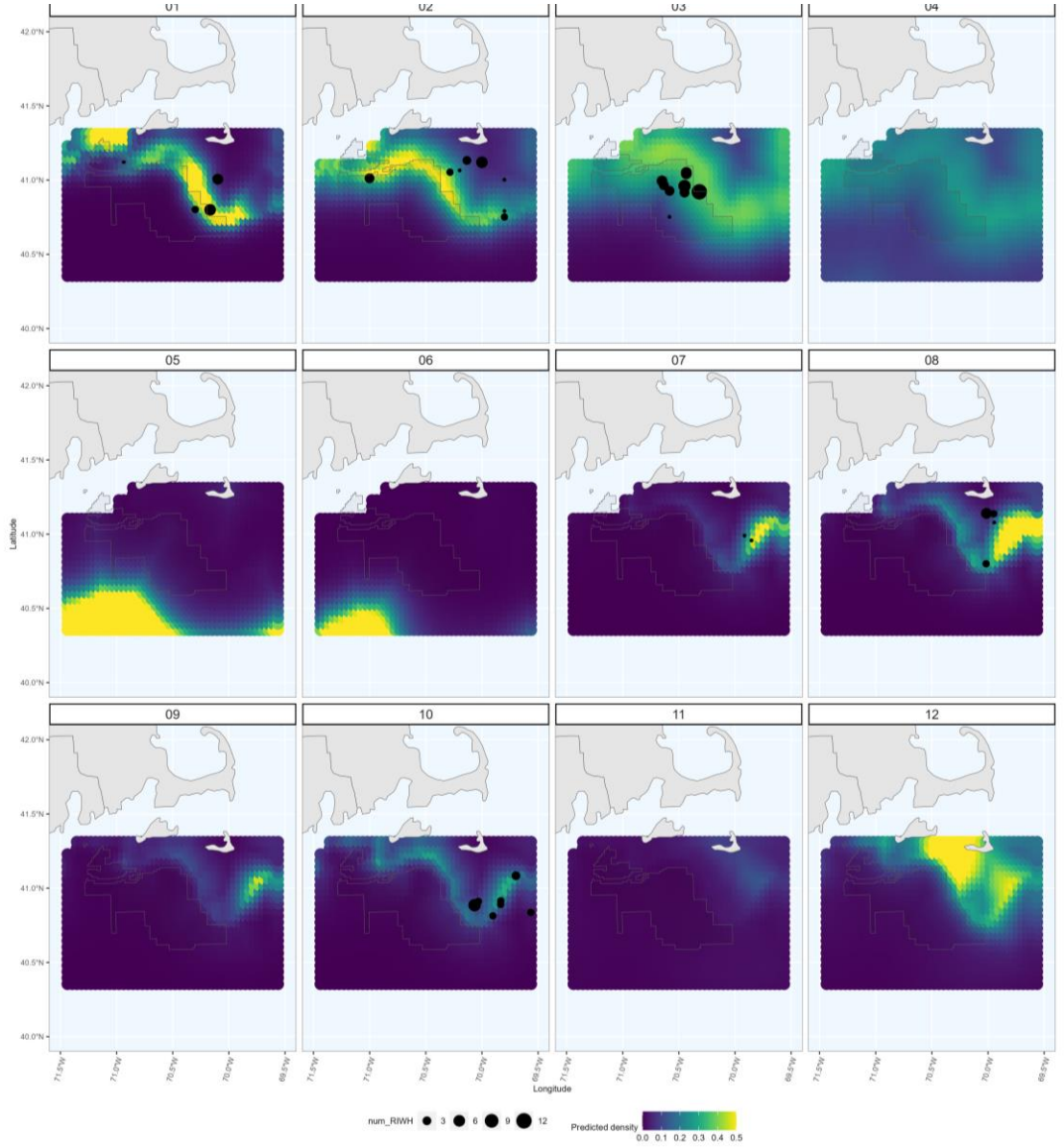
Their distribution is also influenced seasonally by ocean temperature and annually by salinity

| | March | June | September |
|---|---|---|---|
| **Temperature** |  |  |  |
| **Salinity** |  |  |  |

New England Aquarium

*Protecting the blue planet*

# Understanding expectations for right whale occurrence in lease areas




Predictions from our habitat models

# Questions?

New England Aquarium

*Protecting the blue planet*

MASSACHUSETTS CLEAN ENERGY CENTER

BOEM Bureau of Ocean Energy Management

NOAA

# Beacon Wind

EEA Habitat Working Group
October 12, 2023

## September 2023

# National Wildlife Federation sponsored trip to Equinor's Hywind Scotland floating wind farm in the waters offshore Peterhead, Scotland

**Day 1:** Meet with O&M personnel, visit wind farm on crew transfer vessel
**Day 2:** Meet with Equinor's environmental research team

Stay tuned for release of a video by National Wildlife Federation

# SOUTHCOAST WIND

## Overview

### Lease Area

- 127,388 acres
- Up to 149 wind turbine/offshore substation platform positions
- 25 nautical miles south of Nantucket
- 1 x 1 nautical mile grid layout

### Generation Potential

- Estimated 2,400 MW+ total generating capacity

### Two points of interconnection

- Brayton Point, Somerset, MA
- Falmouth, MA

## Project Updates

### Permitting

- USFWS Biological Opinion – Sept 2023
- ESA Consultation between BOEM and NMFS – ongoing
- MA DEP approval of Sediment Sampling Plan – Oct 2023
- Started our benthic review of the Project in RI with CRMC consultants Dr. John King and Dr. Bryan Oakley – Sept 2023
- 2023 G & G Campaign – complete

### Benthic

- Sediment Sampling occurring late October in the vicinity of Brayton Point

### Fisheries

- Presented preliminary fisheries economic exposure analysis to the MA Fisheries Working Group on Sept 29th

### Outreach

- Drop-In session for the project on Thursday October 12th 4pm – 8pm in Portsmouth, RI

## Surveys

Inshore | Vessel: R/V Lophius

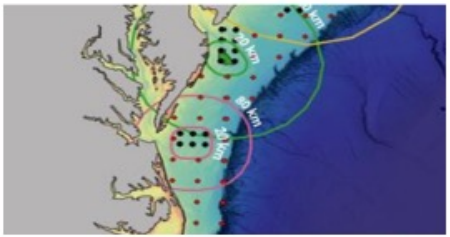
Activity: Sediment Sampling
Location: Mount Hope Bay
Phone: 774-454-0323
Dates: October 24 – 26

Contact Info:
Kyle Cassidy
*Marine Science Permitting Manager*
*kyle.cassidy@southcoastwind.com*

# Orsted Northeast Program Update

## MARINE MAMMALS

- Evaluating participation in BOEM POWERON fund for long term PAM monitoring
- South Fork long term PAM – first data collected (6 months) and processed
- Extension of funding of two science initiatives for further 2 years: ECO-POD (Stonybrook) and NARW acoustics (Syracuse)
- Completion of South Fork foundation installation
  - maintained high standard of marine mammal mitigation and compliance
  - working through monitoring and mitigation report for submission to agencies



## BIRDS/BATS

- SFW:
  - PCMP submitted to BOEM for final review (SFW)
  - MOTUS receiving stations installed on OSS and WTG
  - Bird and bat acoustic recorders being configured and installed
  - Worker Incidental reporting system- in progress
  - Support for Roseate Tern tagging – evaluating opportunities
- REV/SRW:
  - Draft PCMP being developed for submission
  - MOTUS receiving stations and bird and bat stations being configured
  - Evaluation of potential ESA avian tagging studies is underway
  - Radar monitoring devices procured and undergoing final lab testing
  - Integration of WIRS and MOTUS calibration with SFW

## FISHERIES MONITORING

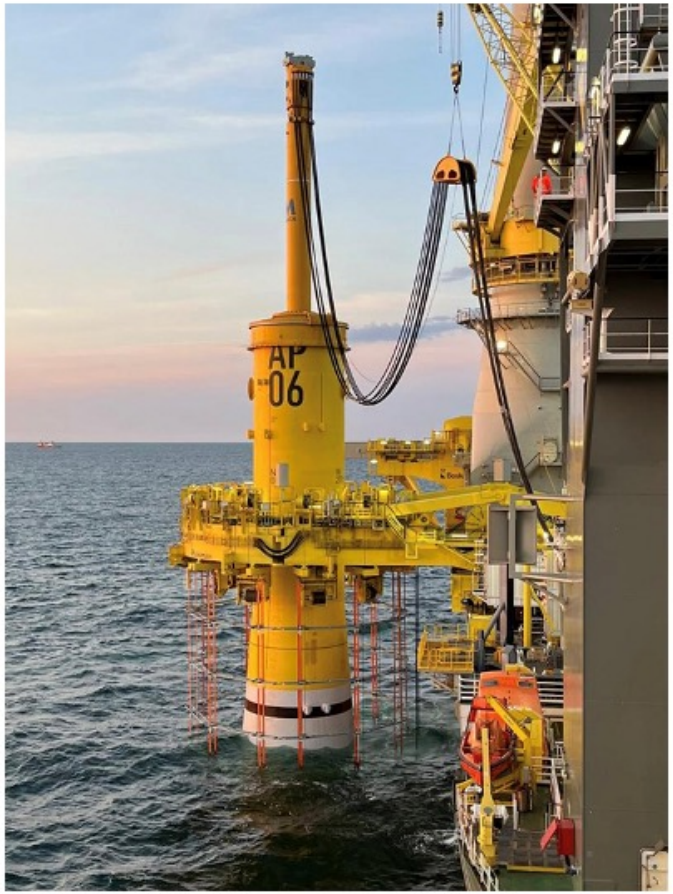
- SFW:
  - All surveys continued during construction with minimal disruptions
- REV:
  - Ventless Lobster Trap Survey began in May
  - Bottom Trawl Survey began in August
- SRW:
  - HabCam survey occurred in July
  - Bottom Trawl Survey scheduled to begin in November

## BENTHIC MONITORING

- SFW:
  - ROV survey of foundations scheduled for later this month
- REV:
  - Soft bottom SPI/PV survey and hard bottom ROV surveys completed in August and September respectively
- SRW:
  - Soft bottom SPI/PV survey completed in August

Ørsted

# SFW Construction




- **SFW Construction Timeline**
  - HDD work: November 2022 – January 2023
  - Export cable installation and burial: March 2023 – May 2023
  - Foundation installation: June 2023 – August 2023
  - Array cable installation and burial: June 2023 – September 2023
  - Scour protection installation: October 2023

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  - Wind turbine generator and blade installation: October 2023 – February 2024
  - Array cable protection installation: November 2023 (anticipated)
  - Commissioning: Ongoing

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VINEYARD OFFSHORE

# Massachusetts Habitat Working Group Project Update

October 12, 2023

*Vineyard Offshore is committed to developing, permitting, and deploying well-sited offshore wind projects with minimal environmental impact. We also strive to ensure mutually beneficial coexistence of our projects with host communities, fisheries, ocean users, native habitats, and wildlife.*

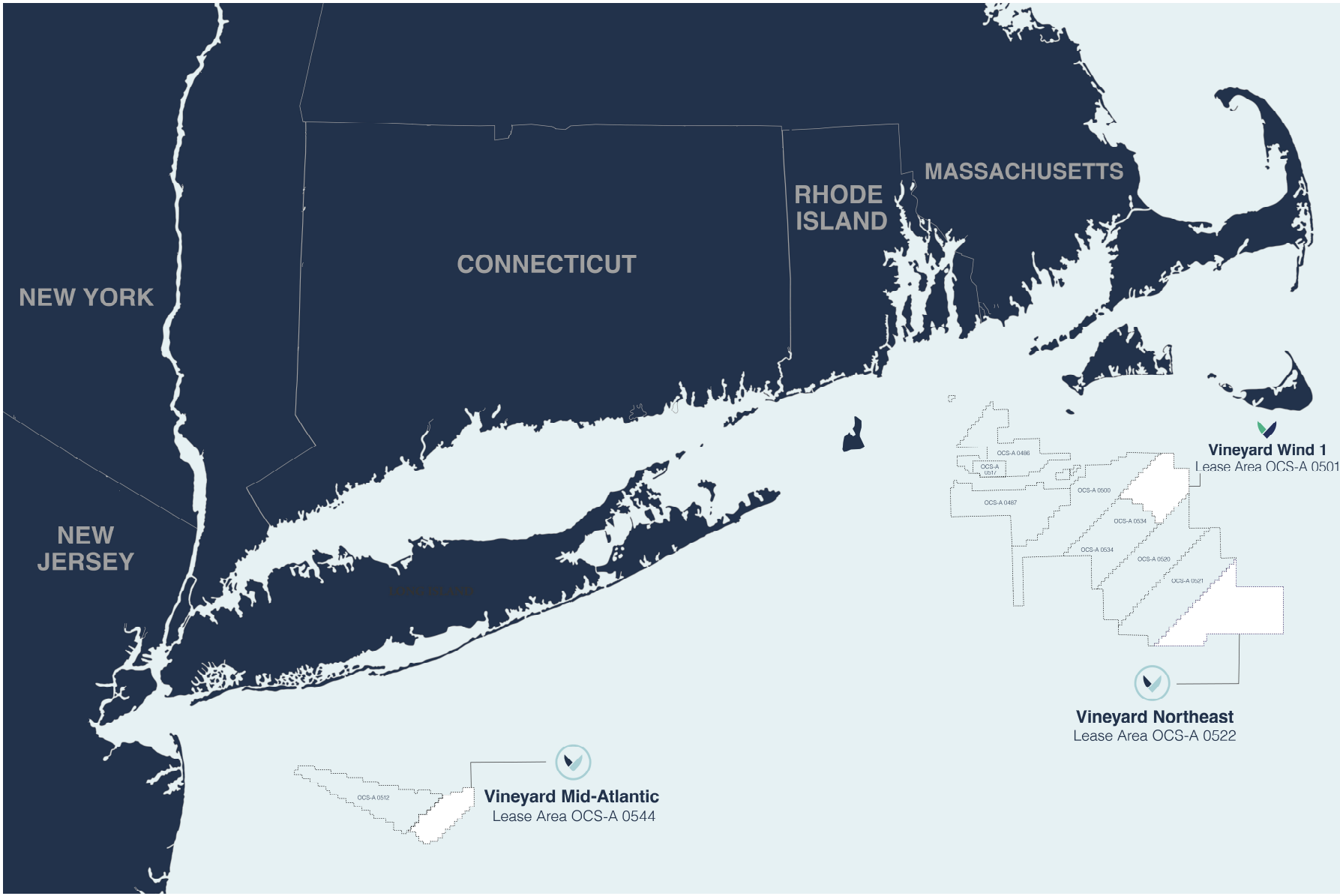
# Who We Are

- Vineyard Offshore is Copenhagen Infrastructure Partners' (CIP's) exclusive development partner in the US
- CIP is a global leader in clean energy investments with $19 billion of assets under management

VINEYARD OFFSHORE CIP

- Vineyard Offshore was launched in April 2022 by the development team behind Vineyard Wind 1
- Leading the **development of 3 lease areas** owned by CIP - OCS-A 0522 (MA WEA), OCS-A 0544 (NY Bight), and OCS-P 0562 (California)
- Combined with Vineyard Wind 1, Vineyard Offshore has more than **6 gigawatts of potential capacity** for development on the East and West Coasts

# Our East Coast Projects and Lease Areas



# VINEYARD WIND

First commercial-scale offshore wind project in the US


## Overview

- 806 megawatts (MW)
- 62 x 13 MW turbines
- Located 15 miles south of Martha's Vineyard
- Barnstable cable landfall and interconnection
- Currently under construction; commercial operation in 2024

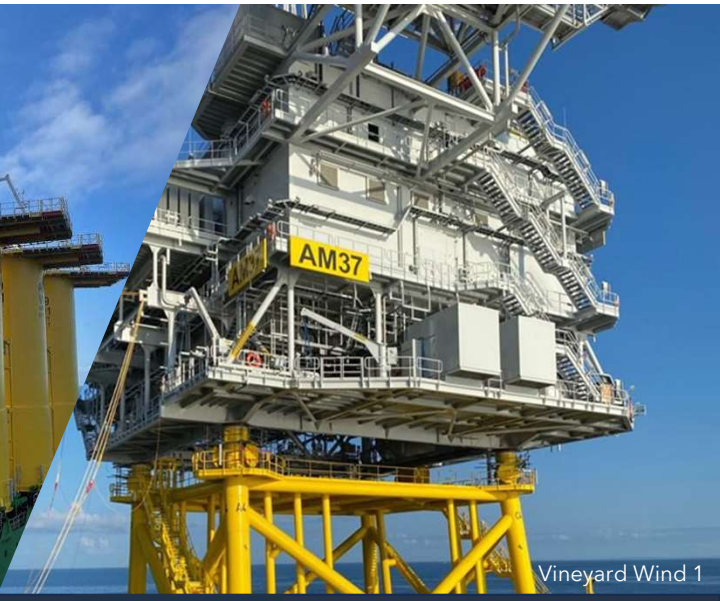
**400,000**
HOMES POWERED

REDUCES CARBON DIOXIDE BY
**1.6 MILLION**
METRIC TONS/YEAR

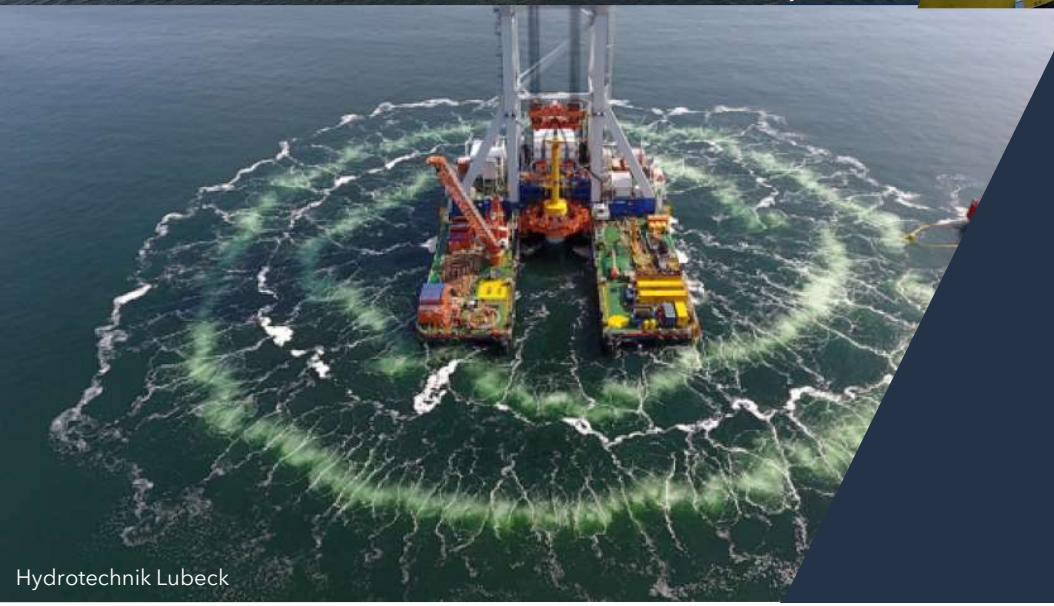
**= 325,000**
CARS OFF THE ROAD


Vineyard Wind 1


Vineyard Wind 1



Vineyard Wind 1

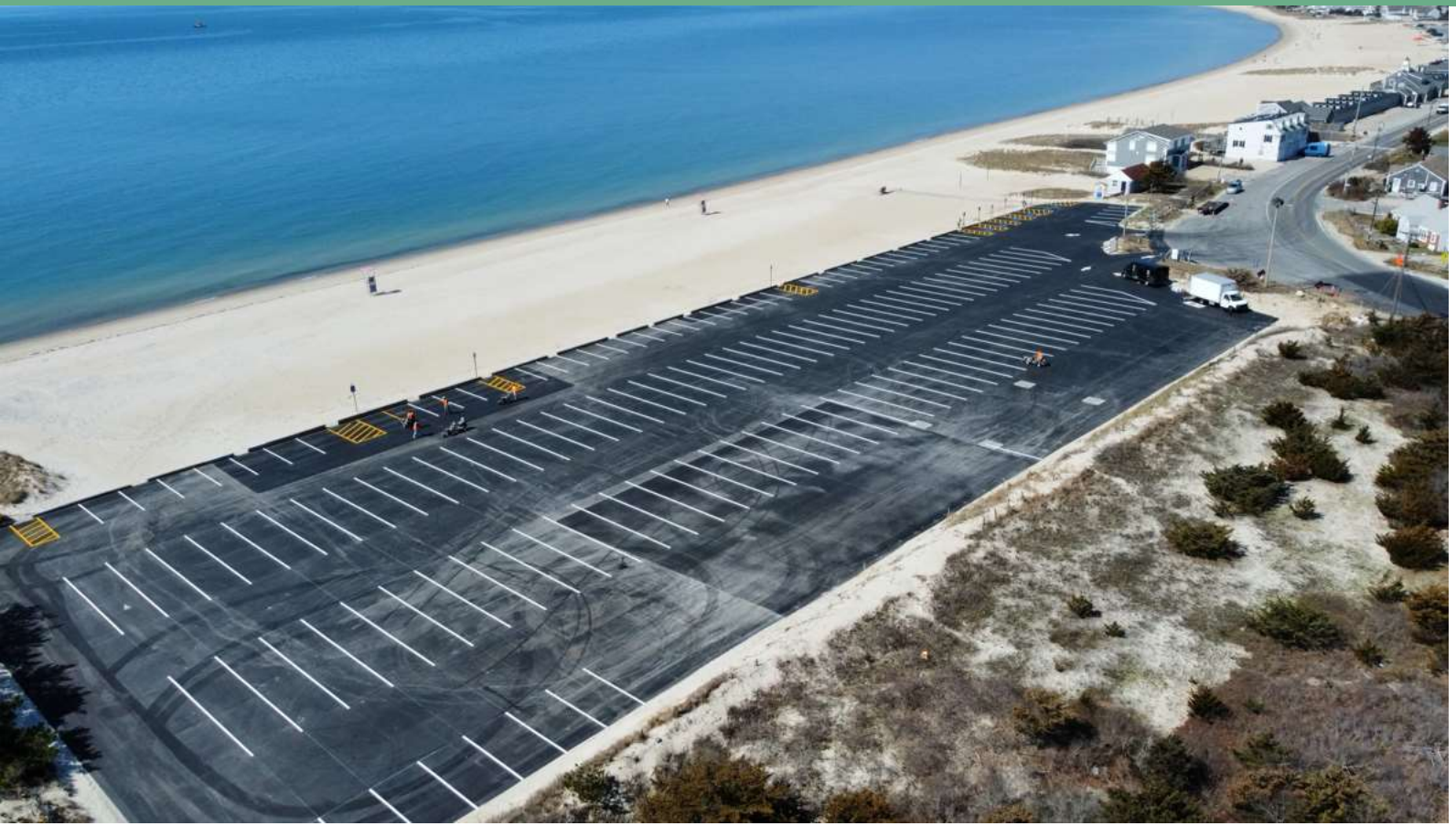

Hydrotechnik Lubeck

**Vineyard Wind 1 Construction Update**
**October 2023**

- Onshore Construction at Covell's Beach Parking lot complete
- Offshore export cable installation nearly complete
- Electrical service platform installation underway
- Inter-array cable installation underway
- Mononpiles and transition pieces being installed
- First wind turbine components departed New Bedford Commerce Terminal on September 6

VINEYARD WIND

# Environmental Excellence



## Covell's Beach

Covell's Beach landfall site as restored by Vineyard Wind 1, after installation of the two offshore export cables via horizontal directional drilling. Note the transition vault bay (four grey squares in the northwest corner of the parking lot), which serves to connect and transition the offshore cable to the onshore cable, bringing green electrons to the Vineyard Wind 1 Barnstable Substation.

VINEYARD WIND

# Science Update

October 2023

## Vineyard Wind 1 Science

Wind and Whales Fund Science

- Real-time Passive Acoustic Monitoring Vessel Transit Corridor
- Artificial Intelligence (AWARION™)

Compliance

- Passive Acoustic Monitoring Archival (Before, During, and After Construction) & Real-time
- Water Quality Sampling
- Fisheries Studies

AWARION™
Autonomous Lookout System

oasis
A ThayerMahan Company

ThayerMahan

## Regional Science Participation

Industry Advisor

- Project Wildlife and Offshore Wind
- Wind Turbine Radar Interference Mitigation
- Wind Forecast Improvement Project 3
- Realtime Opportunity for Development Environmental Observations II

WILDLIFE AND OFFSHORE WIND
WOW
A Systems Approach to Research and Risk Assessment for Offshore Wind Development

VINEYARD OFFSHORE

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