Autonomous solutions responding to the oceanographic and ecological monitoring needs of offshore wind development

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RUTGERS
Center for Ocean Observing Leadership

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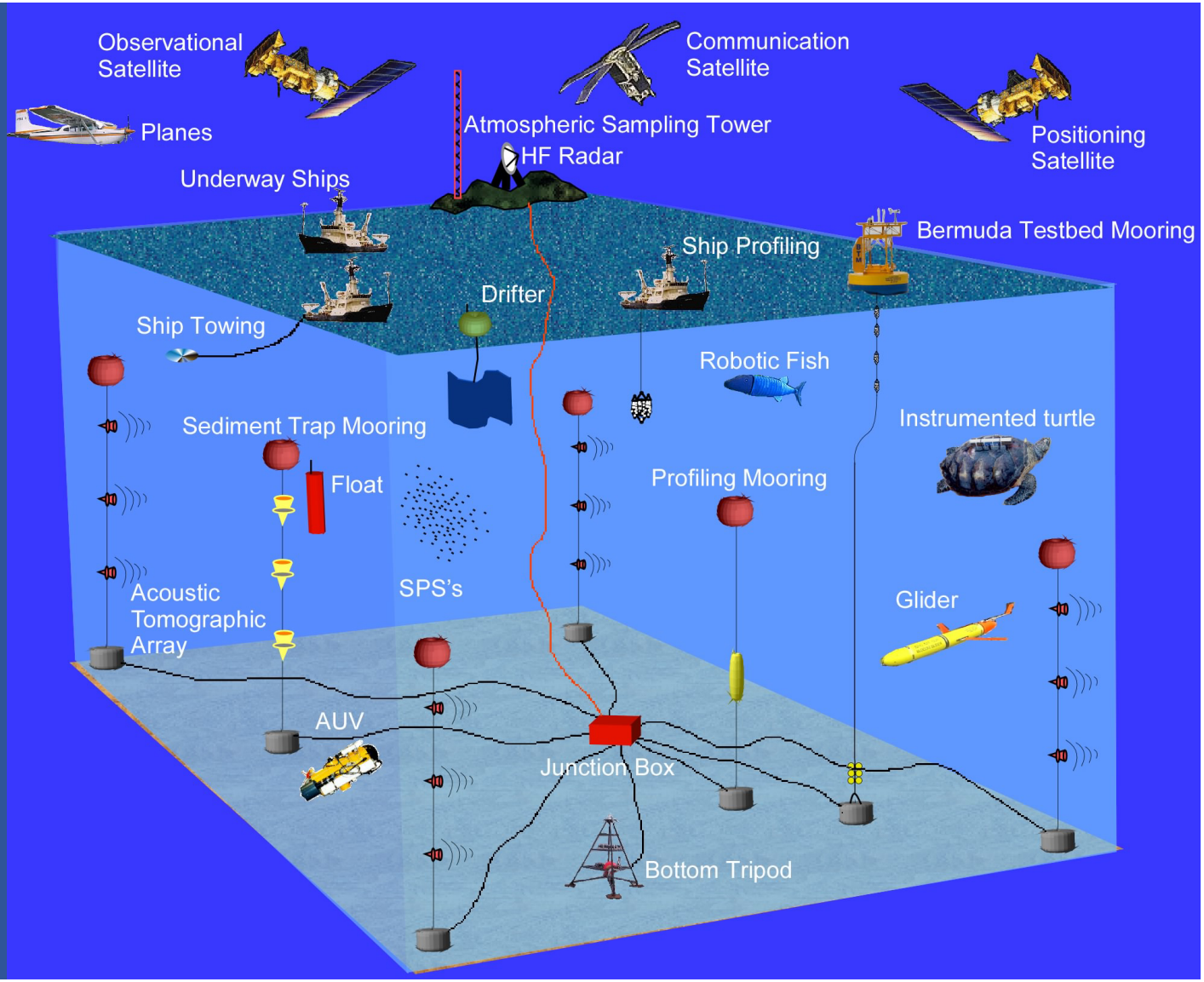
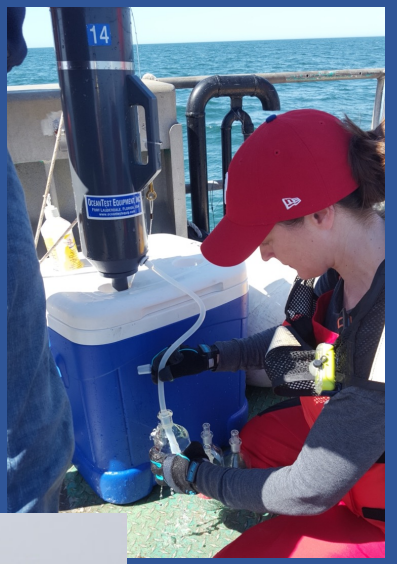
Ocean Monitoring Approaches



Traditional Platforms & Extractive Approaches

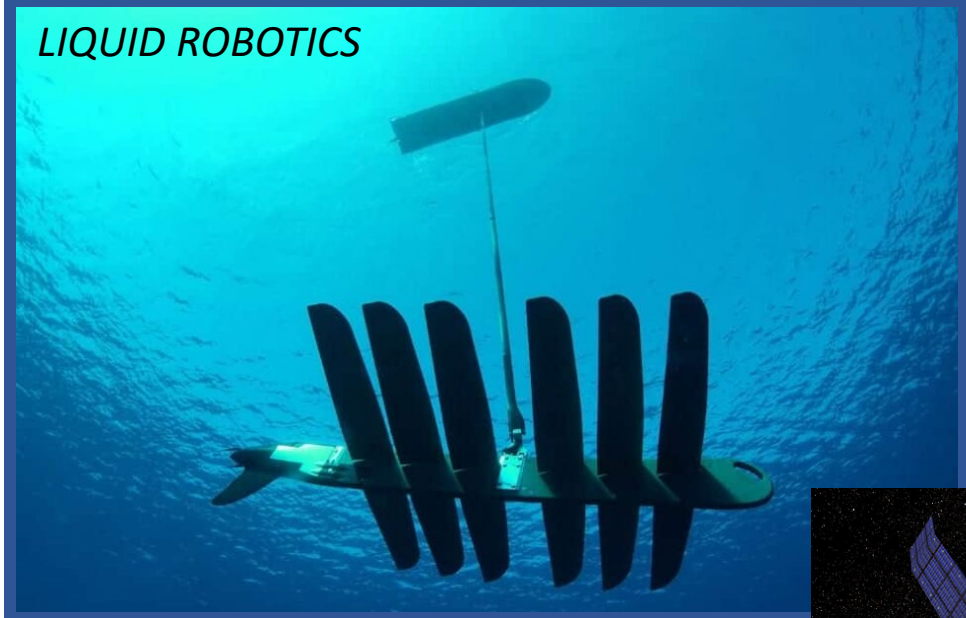
VIMS

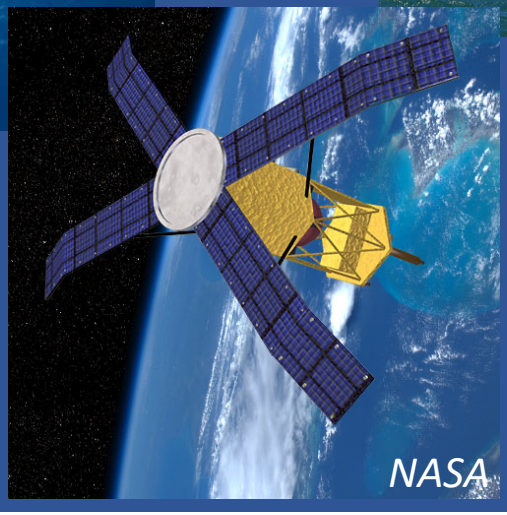
NOAA NEFSC



VIMS

Autonomous Platforms & Non-extractive Approaches





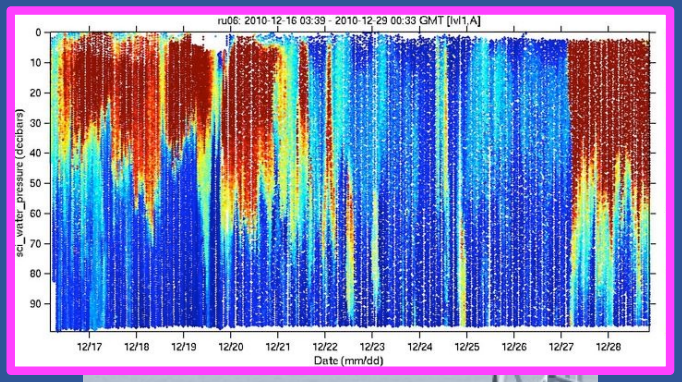
Glider-based Observations

- Samples surface to bottom
- Samples every 2s
- 20k per day

Autonomous Platforms for OW Research & Monitoring

Advantages:

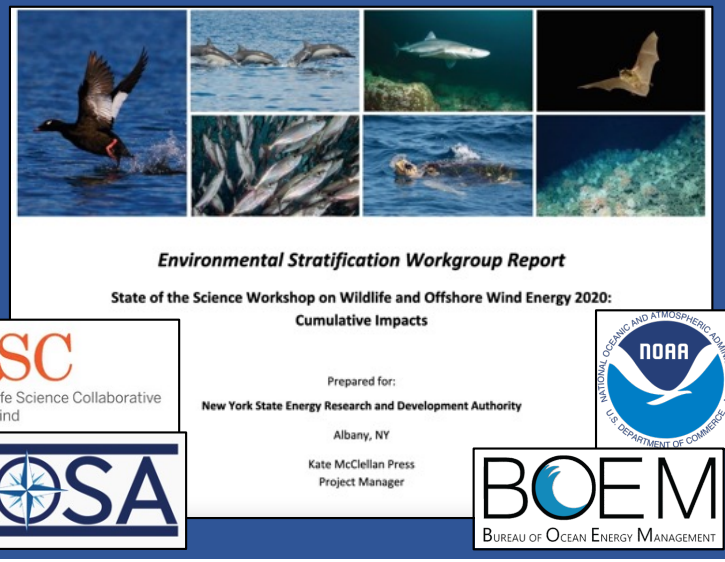
- High-resolution data
- Cost-effective
- Easy navigation/placement by wind farms
- Sample in hazardous conditions
- Variety of sensor types for integration
- Assess ecosystem impacts:
  - Effects of offshore wind turbines on water column stratification
  - Distribution, behavior, reproduction, and survival of marine fishery resources



Short-term Environmental Research Priorities (2020-2021)

- **Develop** a **methods and metrics** document to define what monitoring should be done and how
- **Link** the **physical effects** of offshore wind energy development to **biological effects**
- **Coordinate** existing **efforts** to maximize utility of available resources and expand scale of inference
- **Conduct** feasibility studies to identify the **types and scale of potential effects** and focus research in the eastern U.S.
- **Examine** effects of offshore wind energy development on **ocean stratification**
- **Assess** changes in **light conditions**
- **Mitigate the impacts** of wind on existing federal surveys

Search: 'State of the Science Workshop'
https://www.nyetwg.com/_files/ugd/78f0c4_0942f9d60ff84b45b6bea7e33ad6044e.pdf



Slide courtesy of Mark Baumgartner

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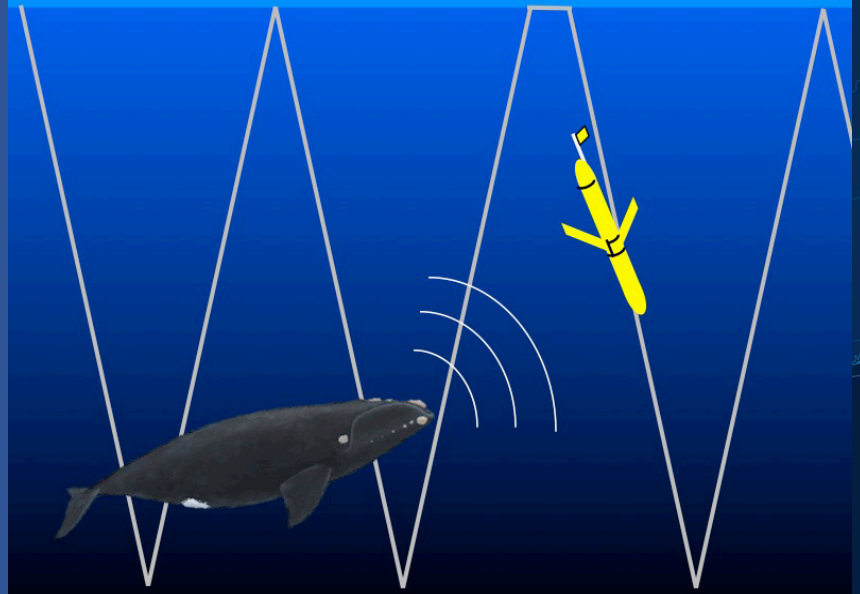
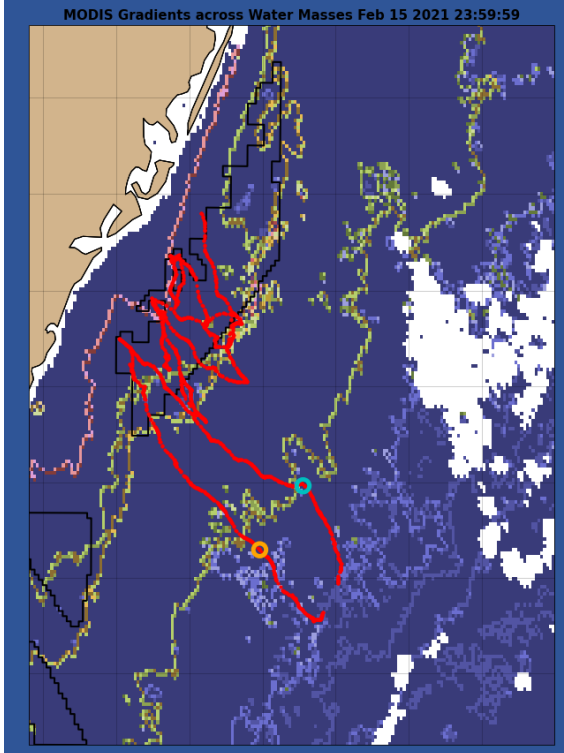
Robots4Whales

A system to detect whales in near real time from buoys and gliders, and to communicate those detections to a variety of stakeholders

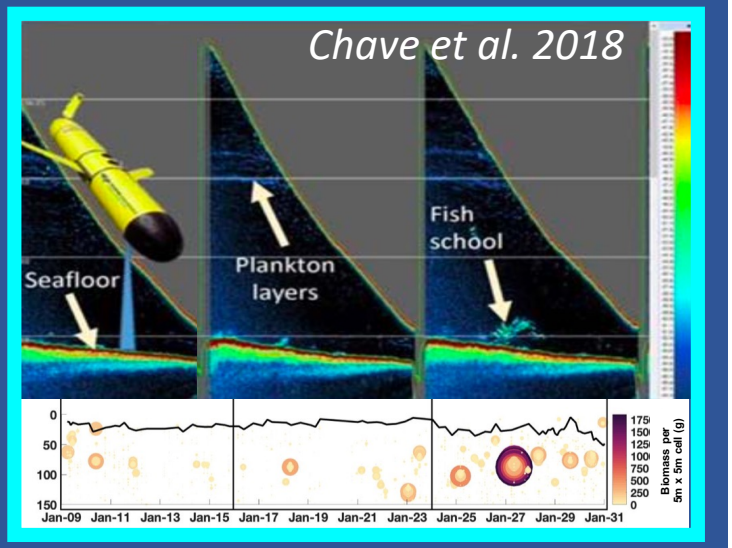


Industry-focused Efforts in the Mid-Atlantic

Dynamic mapping of ecological features



Method
Benthic Trawl Survey
Structured Bottom Survey
Clam Survey
Pelagic Fish Survey
Telemetry Measures
eDNA
Oceanography



**Glider with oceanographic, telemetry, and active acoustic sensors will test the potential for autonomous platforms to augment/replace traditional vessel-based efforts*

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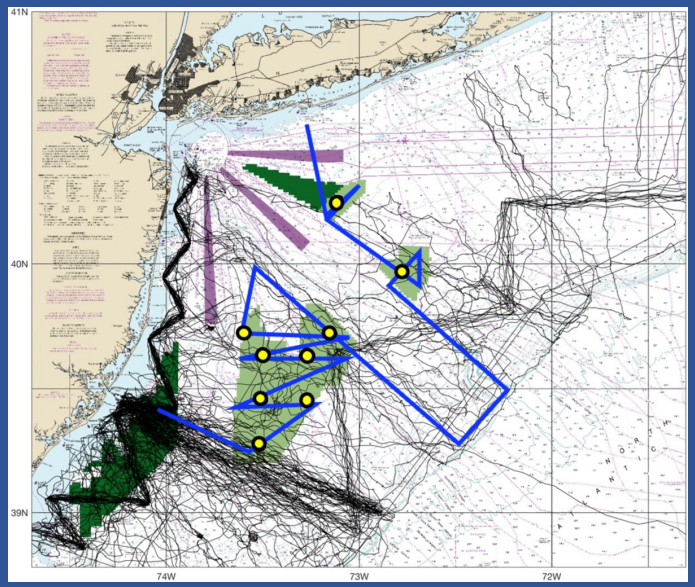
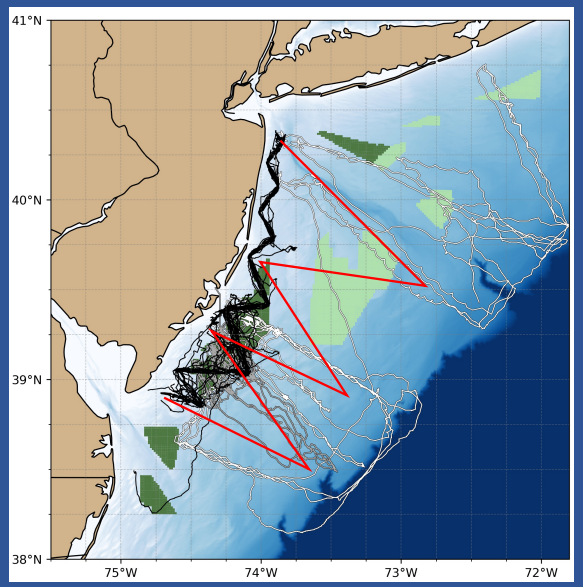
State-focused Efforts in the Mid-Atlantic

NYSERDA
(New York)



- Provide data relevant to ongoing environmental and ecological change
- Produce seasonal resolution data for physical (Cold Pool), chemical, & biological variables spanning from phytoplankton and zooplankton to pelagic fish and marine mammals

Research Monitoring Initiative
(New Jersey)



Federal-focused Efforts

Some examples from the Northeast

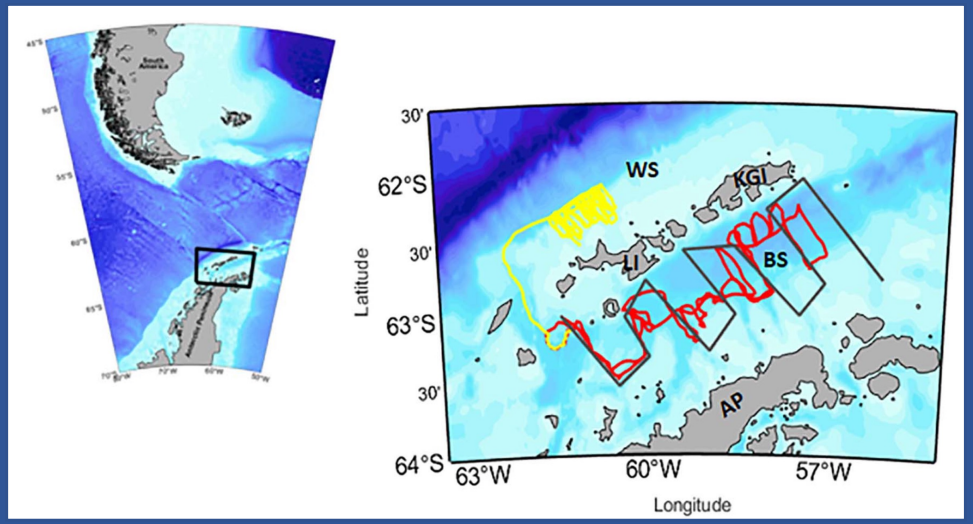
- Complementing existing surveys with eDNA
- Implementing uncrewed HABcam survey to support Atlantic scallop monitoring
- Expanding passive acoustic monitoring efforts in the Northeast
- Developing a multi-species bottom trawl survey simulator
- Using advanced imaging approaches for marine mammals and prey

And....

Federal-focused Efforts

NOAA Southwest Fisheries Science Center, Antarctic Ecosystem Research Division

*Christian Reiss
(and Anthony Cossio, Jennifer Walsh, George Cutter, and George Watters)



Glider-based surveys to support management of the krill fishery by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)