Shellfish Fisheries and Offshore Wind:
Modeling potential interactions & surveying resource changes

@MunroeLab

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NOVA SCOTIA OFFSHORE WIND R&D FORUM
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Haskin Shellfish Lab Facilities

Legend
Laboratory

Haskin Shellfish Research Laboratory

Cape Shore Laboratory

Aquaculture Innovation Center

Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO.
Image Landsat / Copernicus

N

30 mi

RUTGERS

New Jersey Agricultural
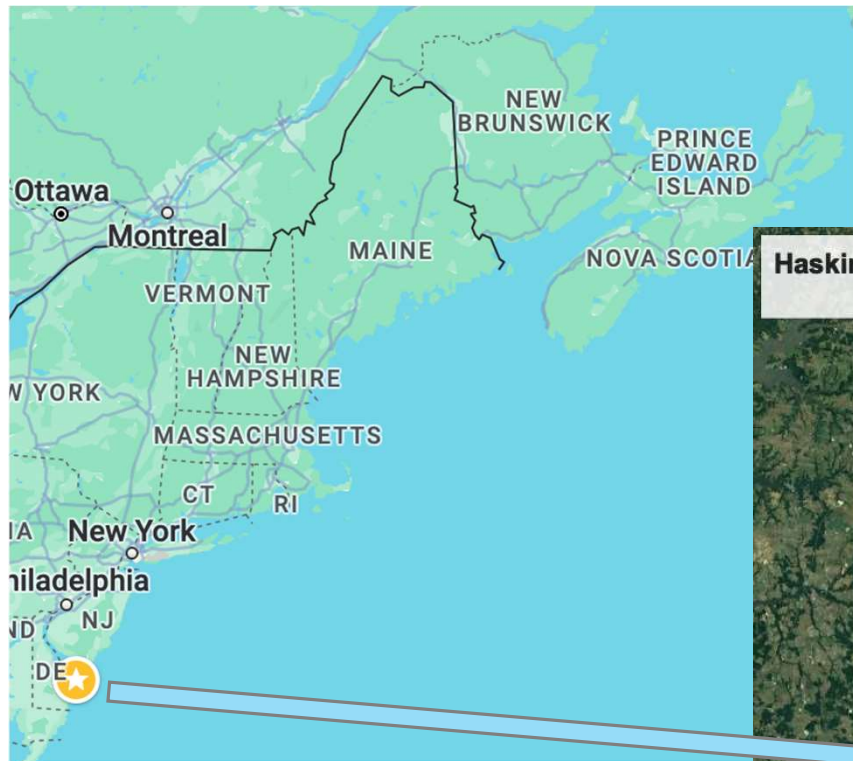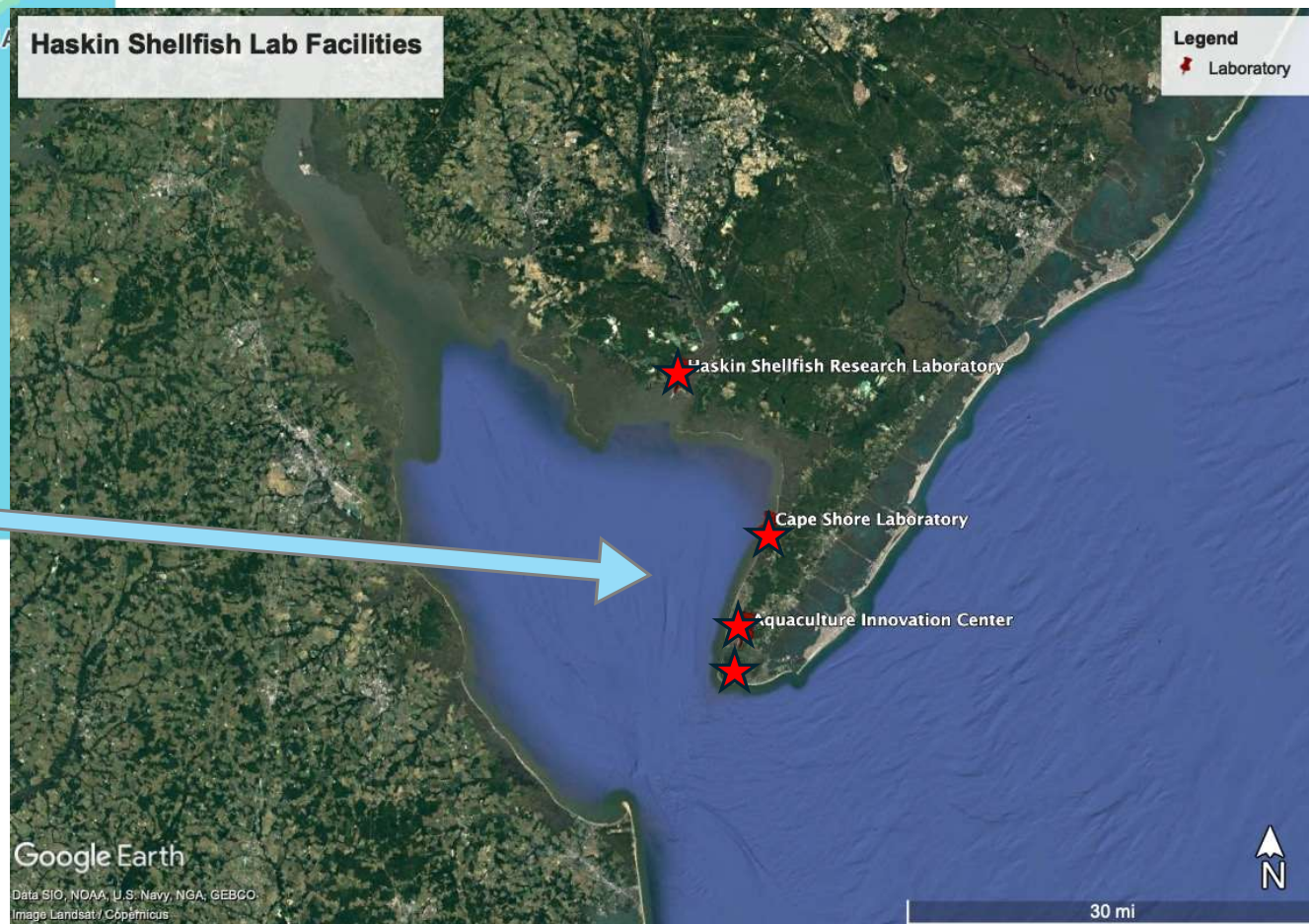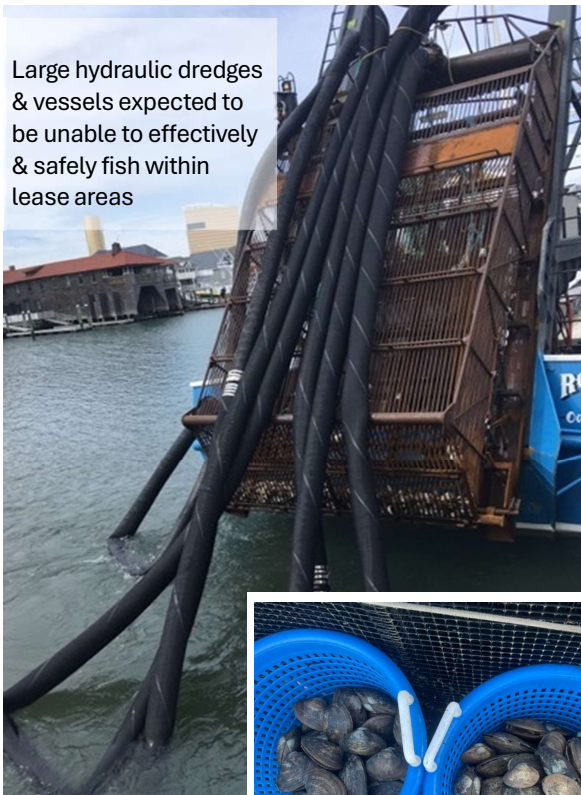Experiment Station

HASKIN SHELLFISH
RESEARCH LABORATORY

Offshore Wind and the Surfclam Fishery:

- What are the status of surfclam populations within wind leases?
- What are the economic consequences of fleet displacement?
- How should we think about mitigation in this métier?

Atlantic Surfclam Fishery

Large hydraulic dredges & vessels expected to be unable to effectively & safely fish within lease areas

- Key fishery in the region & long-term history of effective management
- **Among most exposed** to offshore wind energy development
  - location of **harvests**, **ports**, and **gear used**
- Fishery & survey vulnerability
  - some areas **inaccessible** to the fishing & cooperative survey
- Survey impacts
  - Increase uncertainty in stock status & increase precautionary approach in quota setting
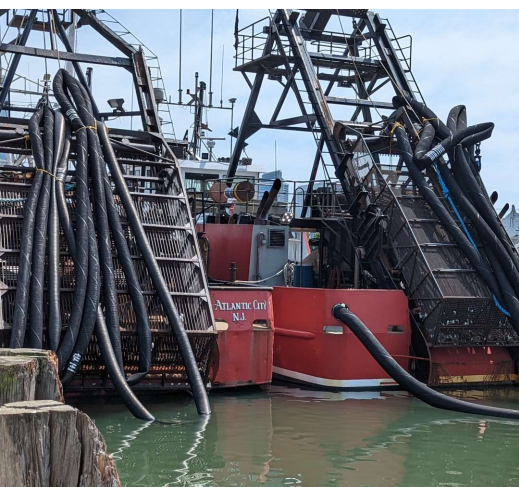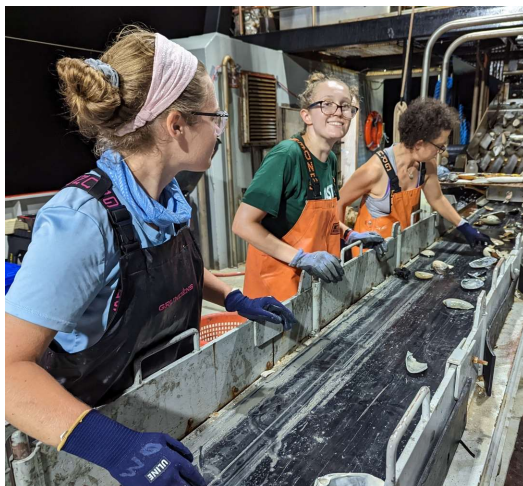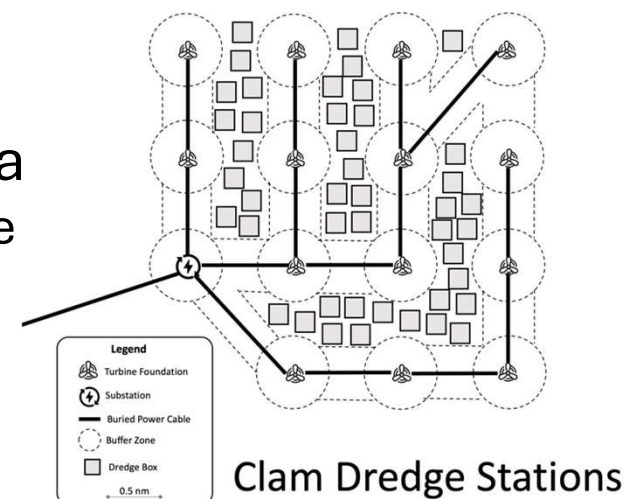
Surfclam Fishery Surveys

- Fishery Cooperative Surveys
  - Part of Developers' Fishery Monitoring Plans
- Strategy Follows the Federal Survey
- Samples Collected with a Calibrated Science Dredge
- Before-After-Control-Impact Design

Surfclam Fishery Surveys

Atlantic Shores South

Ocean Wind 1

Coastal Virginia Offshore Wind

- 3 Lease Areas Surveyed
  - Before construction
- Generating Population Data
  - Age-at-length, biomass, size composition, recruitment
- Collecting Oceanographic Data
- Collaborative with Other FMP Elements
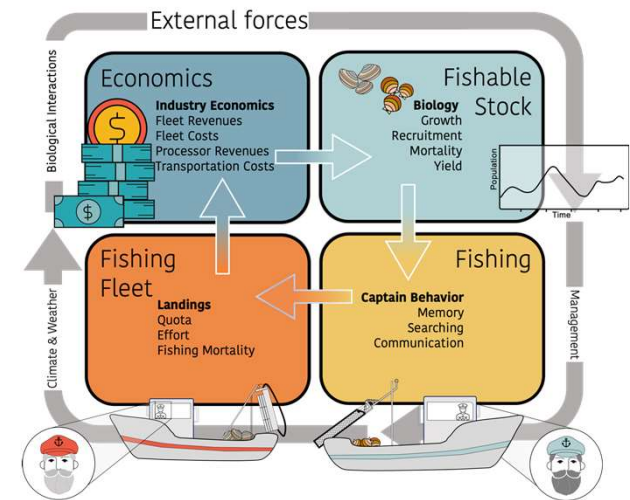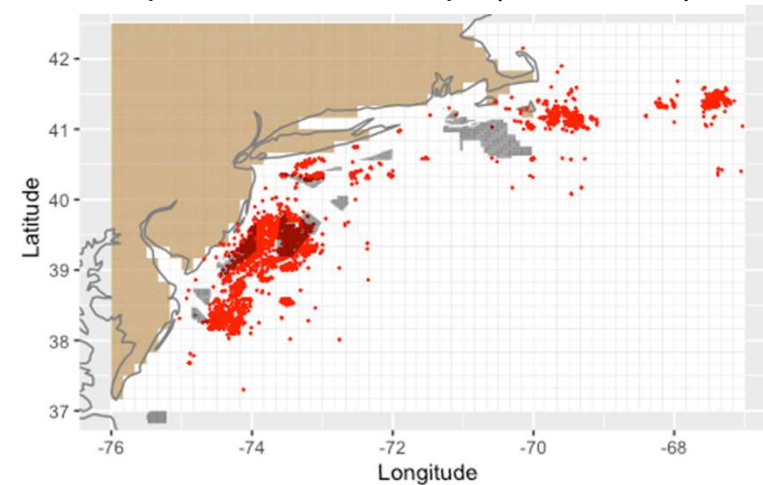 - eDNA, acoustic telemetry, trawl, baited camera trap, gliders

Clam Dredge Stations

Legend
- Turbine Foundation
- Substation
- Buried Power Cable
- Buffer Zone
- Dredge Box
- 0.5 nm

Potential economic consequences of fleet displacement

Reported Surfclam trips (2015-2019)

POTENTIAL IMPACTS

1. Changes in fishing effort
   - **NUMBER OF TRIPS & AGGREGATE FISHING EFFORT**

2. Changes in vessel movement
   - **TO/FROM FISHING GROUNDS**

3. Shoreside impact
   - **SPATIOTEMPORAL SHIFTS IN EFFORT & LANDINGS**

4. Changes in access to stock assessment surveys
   - **LIMITING, EXCLUDING,** or **ALTERING ACCESS** to survey vessels

Potential economic consequences of fleet displacement

The Atlantic surfclam fishery and offshore wind energy development: 1. Model development and verification

Daphne M. Munroe [1,*], Eric N. Powell[2], John M. Klinck[3], Andrew M. Scheld[4], Sarah Borsetti[1,4], Jennifer Beckensteiner[4,5] and Eileen E. Hofmann[3]

SCAN — **PROJECT WEBSITE**

The Atlantic surfclam fishery and offshore wind energy development: 2. Assessing economic impacts

Andrew M. Scheld [1,*], Jennifer Beckensteiner[1,2], Daphne M. Munroe[3], Eric N. Powell[4], Sarah Borsetti[3], Eileen E. Hofmann[5] and John M. Klinck[5]

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VIRGINIA INSTITUTE OF MARINE SCIENCE

OLD DOMINION UNIVERSITY

THE UNIVERSITY OF SOUTHERN MISSISSIPPI.

- The number of trips declines and average time at sea increases

- Decreases in fishing activity lead to decreases in revenues ~3-15%

- Costs increase by 10% and revenues decline by 25% for Atlantic City fleet

Model has also been used to:
- Examine species interactions
- Estimate stock assessment impacts
- Project future stock distributions and forecast OSW interactions
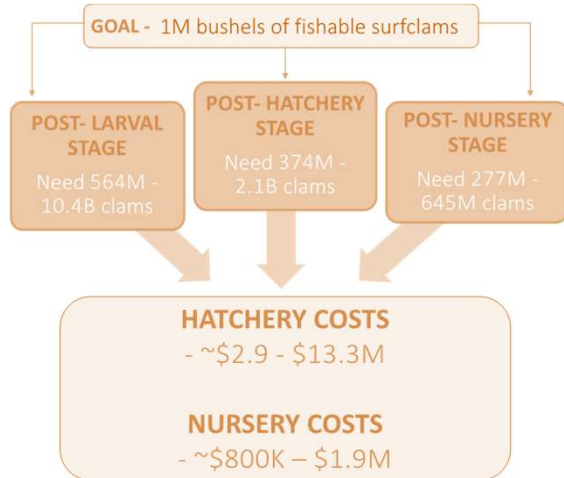
How should we think about mitigation?

- Offshore wind development could lead to losses in surfclam fishery (Scheld et al., 2022)
  - $1-$5M annually for fishing vessels ; $3-$17M annually for processing sector

- **Mitigation** of lost fishing opportunities
  - Priority for federal agencies who will require mitigation by the wind companies

- Possible strategy: plant surfclam seed to enhance fishing grounds outside of lease areas.

Seed Production

A desktop study demonstrated this may be feasibly supported by hatcheries.

GOAL - 1M bushels of fishable surfclams

POST- LARVAL STAGE
Need 564M - 10.4B clams

POST- HATCHERY STAGE
Need 374M - 2.1B clams

POST- NURSERY STAGE
Need 277M - 645M clams

HATCHERY COSTS
- ~$2.9 - $13.3M

NURSERY COSTS
- ~$800K – $1.9M

Seed Survival & Growth

Experiments underway evaluating response of seed clams to ocean environmental stressors, seed growth and survival under various planting densities and sizes, and vulnerability to predators.

More information

Paper:
Seed Production Scale

Video:
Seed Clams

Seeding Strategies

Design and optimization of a custom seeding machine is underway. Machine learning planned to identify locations for enhancement.

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Virginia Institute of Marine Science

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