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277 Hatchville Road • East Falmouth, MA 02536
Tel: (508) 356-3601 • Fax: (508) 356-3603
Website: www.coonamessettfarmfoundation.org

Research Cruise Summary Report 2026

Project Name:	Pumping larval scallops
Vessel Name:	FV <i>Susan L</i>
Departure Date:	5/1/2026
Land Date:	5/4/2026
Port:	Cape May, NJ
Chief Scientist:	Andrew D. Corso, PhD
Scientific Crew:	Cassie Tillotson, Nathan Shivers, Grace Wells, and Adriano Giangiardi
Report Completed by:	Andrew D. Corso

STUDY AREA

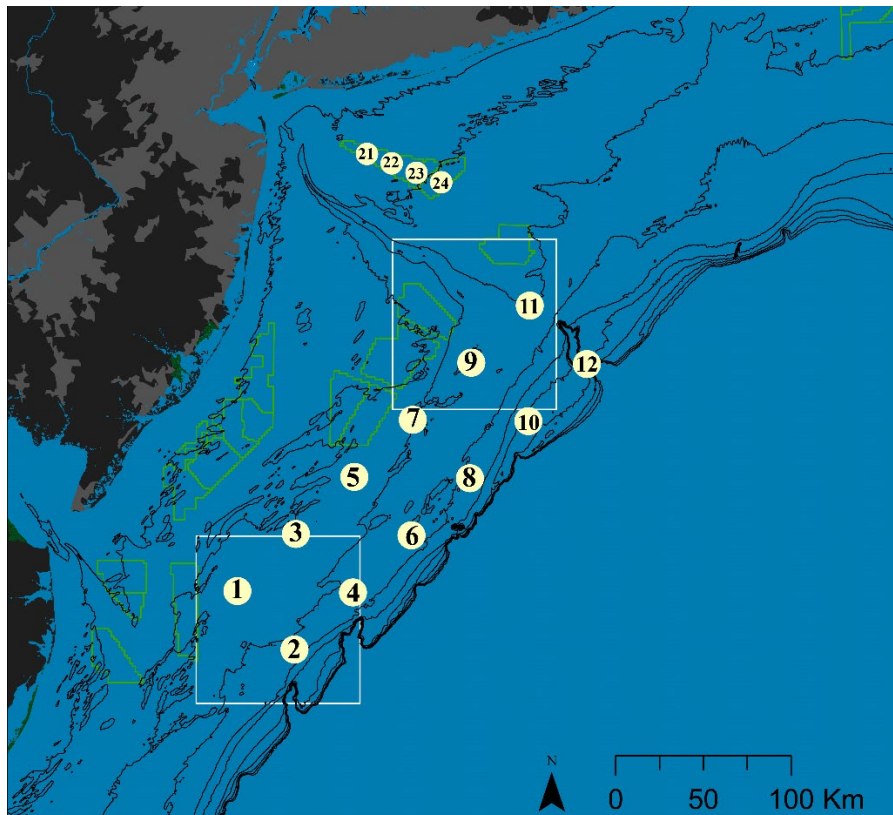


Figure 1. Study area with primary Stations 1 – 12 spaced approximately 25 nautical miles (46 km) apart. The two white squares show scallop management areas and the green boundaries show offshore wind farm lease areas, including auxiliary Stations 21 – 24 within Empire Wind (OCS-A 0512).

CRUISE OBJECTIVES

This research cruise was conducted as part of the 2025 Scallop Research Set Aside (RSA) award, “Assessing the recruitment dynamics and impacts of offshore wind development on larval Atlantic sea scallops with a novel 47-year dataset along the U.S. Northeast shelf”. This project aims to sort historical larval bivalve samples with novel technologies, while also improving collection methods and platforms for larval bivalves moving forward. Thus, we aimed to test the feasibility of targeting larval Atlantic sea scallops (*Placopecten magellanicus*) aboard a commercial sea scallop fishing vessel in response to reports of peak scallop spawning activity.

In lieu of the traditional net systems (e.g., bongo or neuston nets) employed by recent larval surveys along the northeastern United States, we constructed a new sampling system modelled after pumps that were used in the 1980s and 1990s by Fisheries and Oceans Canada (DFO) to target larval sea scallops on Georges Bank (Tremblay & Sinclair 1990). This pump system is much more effective at sampling larval bivalves, while net systems are more capable of collecting ichthyoplankton and larger zooplankton. Tremblay and Sinclair (1990) used an electric centrifugal pump (FLYGT model 2051) with a flow rate of 66 - 106 gallons per minute (GPM) to sample depth intervals ranging from 0 to 80 m. Here, we employed a similar submersible pump (Apex SD115HH/230/3), which can pump over 200 GPM (Figure 2).



Figure 2. Two crew of the F/V Susan L prepare the Apex submersible pump to be deployed.

Aboard the FV *Susan L*, the electric pump was lowered to a maximum depth of 80 meters, then progressively winched back to the surface at intervals of 10 meters. At each depth stop, we ran the pump for approximately 3 minutes to sample ~ 570 gallons of water. A 3-inch hose was attached to the pump, which connected to a PVC manifold that fed the water into a modified bongo net with 50- μm mesh. Samples were collected from the net and preserved in 70% ethanol. At each station, we also deployed a CTD sonde that we developed with Acbotics Research Inc. to be easily used on fishing vessels (Figure 3). In addition to salinity, temperature, and depth, the sonde also recorded pH and dissolved oxygen (DO). We plan to use these data to verify model predictions, as well as pair them with larval abundance to evaluate potential trends.

In addition to the sonde, we also trialed a new tool developed by Acbotics Research that uses a hydrophone and paired acoustic device to monitor the depth of tools in real-time. However, during the first station this sensor had a malfunction that prevented us from using it further.



Figure 3. Crew of the FV Susan L preparing to deploy the Acbotics Research Fisherman's Sonde using an electric deepwater fishing reel and rod.

In order to target peak larval abundance of sea scallops, we collaborated with Drs. Liuzhi Zhao, Siqi Li, and Changsheng Chen at University of Massachusetts Dartmouth School for Marine Science and Technology (SMASST) to model spawning and distribution in the Middle Atlantic Bight (MAB) during the spring. Based on their preliminary results (Figure 4), the average peak larval abundance in this region was determined to be 45 days post-spawn. Following the assumed spawning peak of about March 20th in this region, model simulations suggest peak larval abundance should occur around May 4th. Thus, we planned our survey for the first week of May 2026.

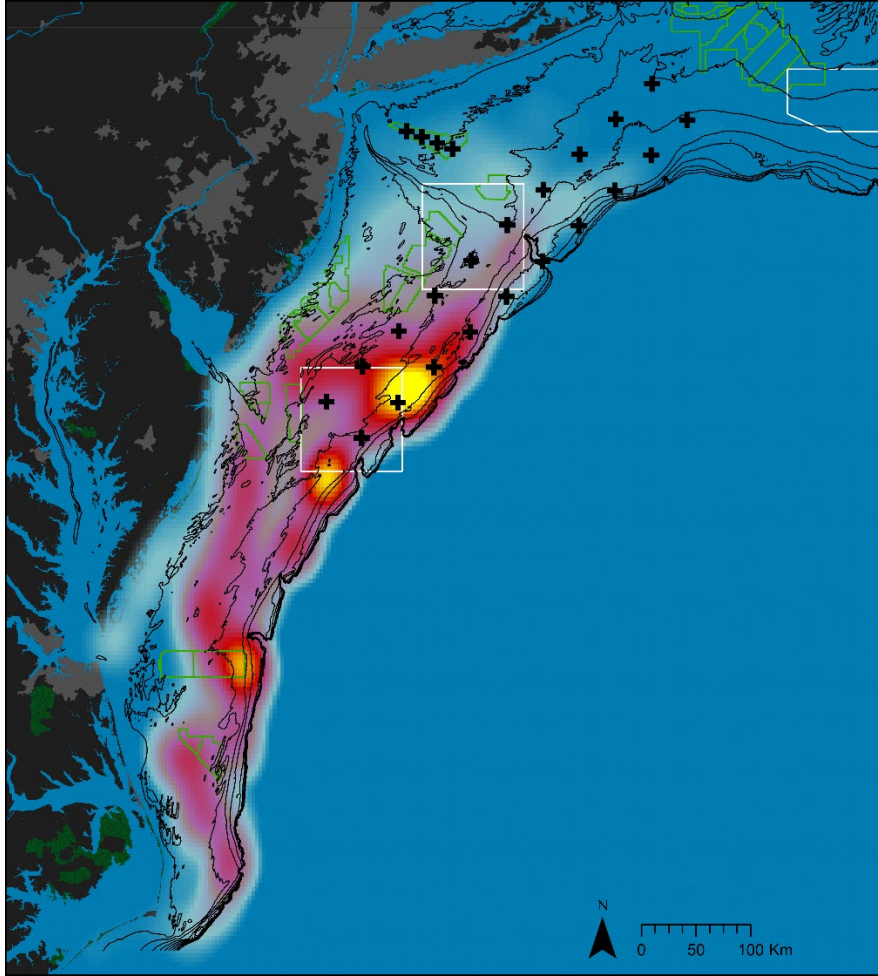


Figure 4. Kernel density estimation (KDE) based on output from a spring Individual-Based Model (IBM) produced by Liuzhi Zhao, Siqi Li, and Changsheng Chen and parameterized following Munroe et al. (2018). They parameterized the IBM based on individual years from 2017 – 2023 and annual results were averaged together in this KDE. Spawning initiated on March 20th in all years. Hot spots correspond to especially high densities of larval sea scallops. White squares show scallop management areas and the green boundaries show offshore wind farm lease areas. These results are preliminary and model development is ongoing.

OBSERVATIONS AND KEY POINTS

We are currently collaborating with Scott Gallager at Coastal Ocean Vision to process all samples on a Bivalve Larval Imaging System (BLIS) and will not know the taxonomic composition until processing is complete (approximately 1 – 2 months). However, we observed significantly more larval bivalves and pteropods present at Stations 1 – 4 (Figure 1). General abundance of larval bivalves appeared to decrease as we progressed through the grid, with the fewest amount observed within the Empire Wind lease area.

In addition to collecting larval sea scallops, a key objective of this trip was to evaluate the working limits of the pump system in different sea states. Luckily, the sea was generally calm

when we began the trip with a swell of less than a meter. We planned to continue sampling for another 1.5 days and eight more stations extending farther north; however, the sea state and winds worsened on Sunday May 3rd, with swell over 2 meters, approaching 3 meters, and winds near 30 knots. In these conditions, it was very challenging to keep the vessel steady for the pump to operate safely and we had to stop operations. We transited to the Empire Wind lease area stations (21 – 24), which were more protected from the wind and had less swell.

Finally, we are pleased with the performance of the Acbotics Research sonde on this trip and believe it is ready for wild-scale deployment on fishing vessels during other research activities, as well as during normal fishing trips.

RESULTS

- We successfully constructed and deployed a pump system from a commercial fishing to target larval bivalves.
- We deployed the pump at 16 total stations within the MAB (Figure 1).
 - Collected a total of 98 depth intervals.
- We deployed the Acbotics Research sonde at 16 stations.
 - Preliminary checks suggest each deployment resulted in high-resolution data.

ADDITIONAL COMMENTS

This trip was successful due to the tireless effort of Captain Jake Wiscott and crew of the FV *Susan L*, we are grateful for their contributions. We also appreciate the assistance of Paul Nosworthy of New England Marine Engineering in designing and installing the pump system. Furthermore, we value the feedback of Ricky Brown (Peak Mechanical) and Joey Pruett (Dyna Pump & Electric) for assisting in pump selection. We also are thankful for the ongoing collaboration between CFF and Acbotics Research to develop these oceanographic sensors and thank Erin Fischell and Sam Fladung for assistance with operations and data processing.

REFERENCES

- Munroe DM, Haidvogel D, Caracappa JC, Klinck JM, Powell EN, Hofmann EE, Shank BV, Hart DR (2018) Modeling larval dispersal and connectivity for Atlantic sea scallop (*Placopecten magellanicus*) in the Middle Atlantic Bight. *Fisheries Research* 208:7–15.
- Tremblay MJ, Sinclair M (1990) Sea scallop larvae *Placopecten magellanicus* on Georges Bank: vertical distribution in relation to water column stratification and food. *Marine Ecology Progress Series* 61:1–15.