

Atlantic Mackerel Cooperative Research Initiative

This industry-driven initiative is a two-year collaborative effort between scientists and the fishing industry. It will address uncertainties about Atlantic mackerel population dynamics and biomass estimates to help improve our understanding of the stock.

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Request for Proposals!

The [Atlantic States Marine Fisheries Commission](#) and our science center seek qualified commercially-permitted fishing vessels to record and share continuous, high-quality acoustic data collected from routine fishing operations during the 2026/2027 Atlantic mackerel fishing season. The goal of this work is to reliably detect and estimate mackerel biomass using active acoustics.

Vessels must have existing echosounders that meet specifications listed in the "Vessel Requirements" section.

Selected applicants will receive a \$10,000 annual stipend for time associated with acoustic system calibration, data collection, and echogram review and interpretation assistance. Additional funds will be allocated for installation and maintenance of data storage and transmission equipment and travel for an in-person project kick-off meeting.

The deadline to apply is midnight EST, September 18, 2026.

[Learn more about this opportunity](#)

Overview

We are partnering with members of our region's fishing industry to learn more about [Atlantic mackerel](#) and address uncertainties in population dynamics and biomass estimates. This work will help improve our understanding of the stock, which is managed by the Mid-Atlantic Fishery Management Council.

We will work with the captains and crew of more than 50 fishing vessels to collect and analyze data from five research elements. Together we'll:

- Develop active acoustic technologies to detect and quantify mackerel
- Collect mackerel samples for biological analysis
- Tag mackerel to understand movement between U.S. and Canadian waters
- Conduct mackerel egg surveys to better understand spawning
- Develop and test hypotheses about the ecosystem drivers of mackerel

Atlantic mackerel are migratory, pelagic fish that support valuable commercial and recreational fisheries in our region. They also contribute to healthy marine ecosystems. They eat plankton and krill and become rich, fatty prey that supports larger predators like whales, seabirds, and commercially prized fish like [Atlantic bluefin tuna](#) and [North Atlantic swordfish](#).

The Origins of the Mackerel Initiative

Atlantic mackerel are notoriously difficult to study. They're most widely distributed on the U.S. Continental Shelf during the winter—when long-term resource surveys do not operate. Atlantic mackerel are also not well sampled by traditional survey gear like bottom trawls because of their [pelagic nature](#).

The commercial fishing fleet has the unique ability to observe mackerel during their routine fishing practices. They can provide key insights on when, where, and how many mackerel they are seeing. In 2023, a group of fishermen reached out to scientists at our science center to share that they were seeing large schools of mackerel. The results from the 2023 stock assessment suggested that the stock was near an all-time low. To

address this disconnect, the Atlantic Mackerel Cooperative Research Initiative, or “MackPack,” was formed. The initiative will:

- Advance our understanding of mackerel
- Address key uncertainties in the stock assessment
- Develop novel tools to quantify on-the-water observations from the fishing industry

Initiative’s Five Research Elements

Spawning Seasonality

We are working weekly with more than 30 industry and research partners to collect Atlantic mackerel from the Gulf of Maine to the Mid-Atlantic, using a range of fishing gear types. Because the distribution of mackerel changes throughout the year, we need a vast network of vessels that are able to access mackerel anywhere, anytime. That’s why we’re partnering with commercial and recreational fishermen as well as shoreside fish processing facilities and research vessels to meet our sampling needs. Ultimately, this work will help improve what we know about when and where mackerel spawn in our region. Beginning in March 2026, we have been dissecting mackerel and collecting data and biological samples on:

- Fish length
- Whole fish weight
- Gonad weight
- Gonad maturity stage
- Otoliths, or fish ear bones, for ageing fish, mixed stock composition, and natal homing—the process where adult fish migrate back to the spawning grounds where they were hatched

Using this data, we are able to calculate mackerel gonadosomatic index. This index measures the ratio between gonad weight and body weight and is an important indicator of fish maturity and spawning. These data help us:

- Compare mackerel spawning activity with the long-term late May/early June egg index based on samples from [our Ecosystem Monitoring Survey](#)
- Estimate total annual egg production for the Atlantic mackerel stock assessment
- Improve our understanding of mackerel reproductive dynamics

This work will continue in 2027 and 2028.

Mackerel Egg Survey



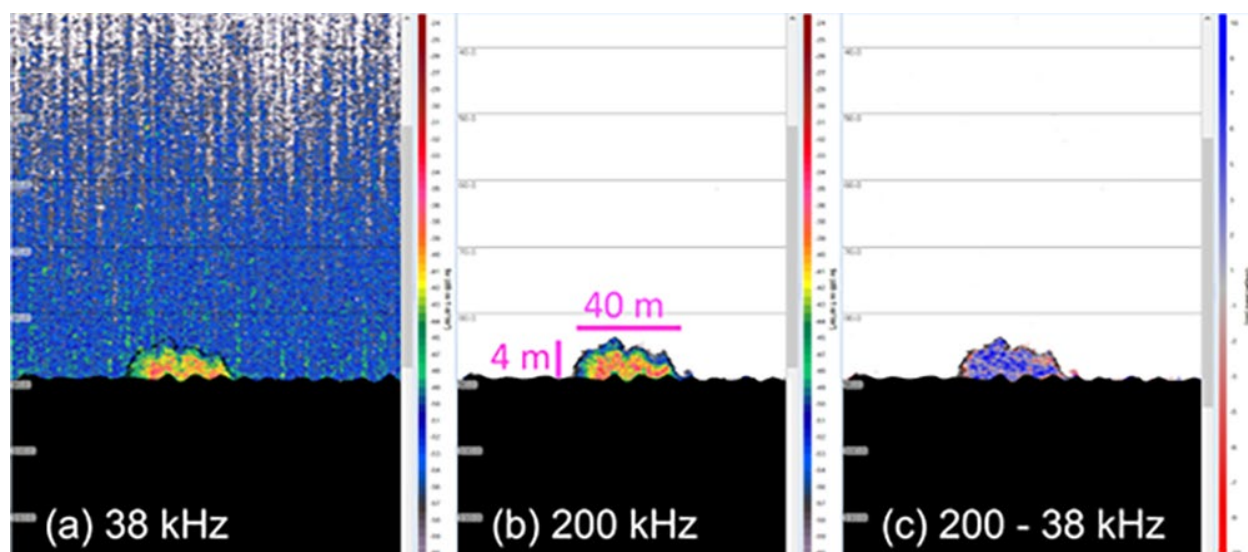
Deploying bongo nets for ichthyoplankton sampling. Credit: NOAA Fisheries/Chris Melrose

Because of uncertainties and sensitivities related to the existing Atlantic mackerel egg index, we are partnering with a commercial fishing vessel to conduct an industry-based egg survey focused on mackerel in May 2027 and 2028. We will:

- Perform plankton tows using a bongo net paired with oceanographic measurements
- Process plankton samples and count mackerel eggs
- Calculate an early May egg index

This first 12-day survey will occur in early May 2027, and will sample from the Gulf of Maine to the Mid-Atlantic. Once the early May egg index is developed, we will compare it to the standard late May to early June egg index based on samples from [our Ecosystem Monitoring Survey](#).

Detecting and Measuring Mackerel Biomass



Echogram of a school of mackerel observed in January 2026 aboard the F/V Retriever. After the data were processed and analyzed, the volume of the school was estimated at nearly 4,200 cubic meters—nearly the volume of two Olympic-size swimming pools. Credit: NOAA Fisheries/Mei Sato

Fish biomass is a key metric used in stock assessments to evaluate the health of a fishery. Because Atlantic mackerel are not reliably sampled by traditional bottom trawl survey gear, we lack quantitative measures of biomass. That's why we're working with industry and using advanced acoustic technologies and analytical methods to develop new tools to better quantify mackerel biomass.

We will work with five fishing vessels to collect active acoustics during their routine mackerel fishing activities in 2027 and 2028. We will also charter one fishing vessel in

the winter of 2027 and 2028 to conduct paired acoustic and biological sampling. By analyzing active acoustics data with biological data collected from trawl catch, and using machine learning, we'll be able to:

- Better estimate local mackerel biomass
- Compare these data to other biomass estimates from [our Bottom Trawl Survey](#)
- Improve the accuracy of mackerel stock assessments

Active Acoustics

We will use acoustic echoes, or backscatter, of mackerel to map where and when they can be found during the winter and spring. We will then use backscatter data to develop echo classifications to assign specific echogram patterns to fish species (individual and school), squid, plankton, and sea bed. Later we will use machine learning to refine echo classification and automate removal of non-target classifications from data processing and analyses.

Trawl Catch

Trawl catch serves three major purposes. It allows us to collect the biological data we need to develop biomass estimates, develop echo classifications, and improve classification models. Biological data we collect from trawl catch include:

- Fish size and weight
- Otoliths for fish ageing
- Gonads for determining sex and maturity

Quantifying Mackerel Movement and Mixing



We're using acoustic tags that we surgically insert into the abdomen of Atlantic mackerel to help us better understand their movements and mixing in the Northwest Atlantic Ocean Credit: NOAA Fisheries/Katie Viducic

There are two contingents, or distinct groups of Atlantic mackerel in the Northwest Atlantic—a northern and southern group. The northern group spawns in the Canadian waters around the southern part of the Gulf of St. Lawrence. The southern group spawns in U.S. waters in the Gulf of Maine and Southern New England. While we know some about their seasonal migrations and general mixing, we are currently unable to quantify the mixed-stock composition in the U.S. and Canadian fisheries. We also do not know if and how much they exhibit natal homing—the process where adult fish migrate back to the spawning grounds where they were hatched. Incorporating fish movement, mixing, and natal homing into stock assessments is important for managing fisheries sustainably. That's why we are partnering with the fishing community to address these knowledge gaps using acoustic telemetry and otolith chemistry.

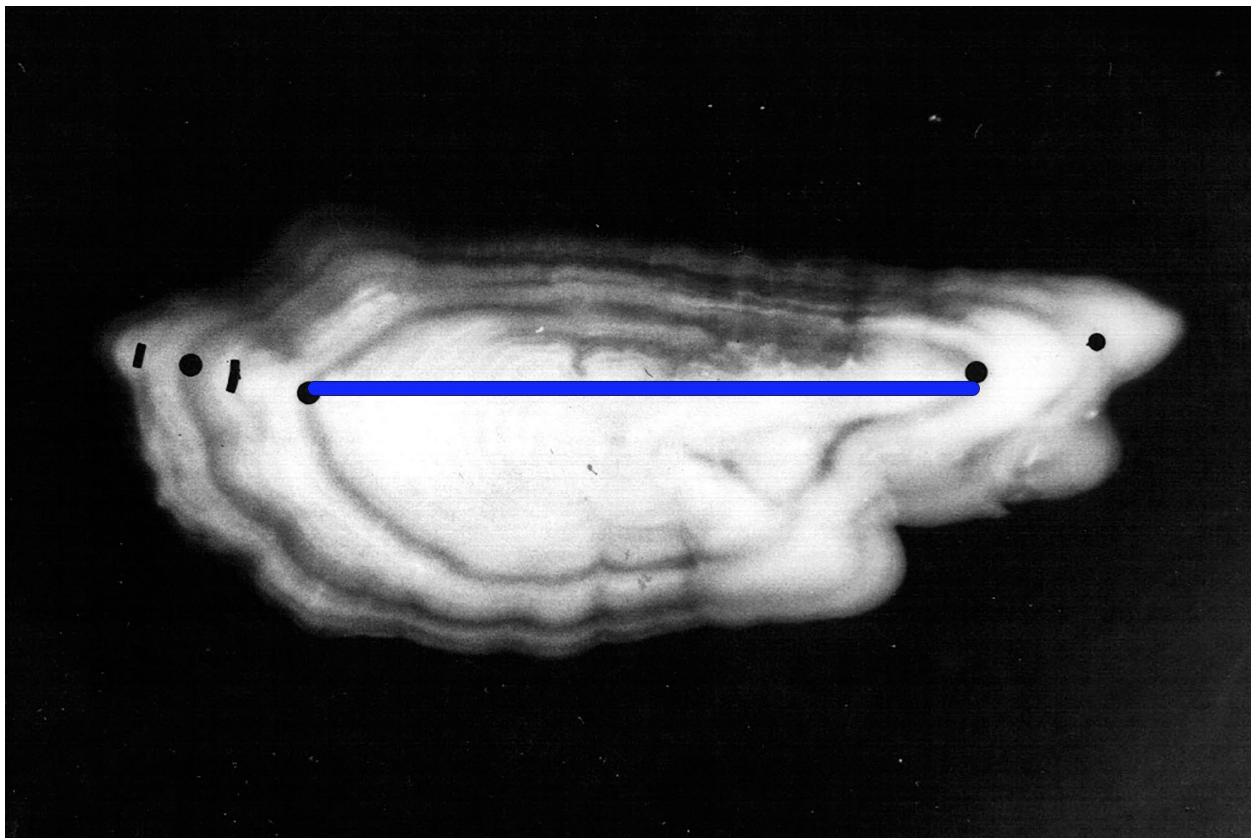
Acoustic Tagging

During peak mackerel spawning season in May and June 2027, we will charter fishing vessels in the Gulf of Maine and southern New England to tag healthy adult mackerel. We will surgically insert small acoustic tags into the abdomen. These tags emit uniquely identifiable, high-frequency pings that are detected by a network of underwater receivers. Once detected, the receivers record the exact date and time of each individually tagged fish that comes within range of the receiver.

By tagging mackerel and tracking their movements, we plan to:

- Estimate movement and mixing of northern and southern groups of mackerel
- Find out if mackerel return to the same spawning site each year
- Better understand how environmental factors influence timing and duration of mackerel presence in U.S. and Canadian waters

Otolith Chemistry



Atlantic mackerel otolith from a 32 centimeter fish collected in November. It's estimated to be 2 years old. The black dots mark winter zones. The blue line indicates the length of the otolith's core. Credit: NOAA Fisheries

[University of Maine professor and initiative partner Lisa Kerr](#) will analyze the chemistry of mackerel otoliths to better understand the current mixed stock composition of fish in the U.S. fishery. She will also analyze otoliths for evidence of natal homing—the process where adult fish migrate back to the spawning grounds where they were hatched.

Otoliths are calcium carbonate structures located in the inner ear of fish that build up layers over time. The core of otoliths can retain specific information about the environment that fish experience in their first year. Distinct water properties and temperature regimes in spawning and nursery habitats are captured in the chemistry of otolith cores. This creates a unique otolith “fingerprint” that can be analyzed to determine natal origin.

To do this, the team will look at the ratios of stable oxygen ($\delta^{18}\text{O}$) and carbon ($\delta^{13}\text{C}$) in otolith cores from mackerel collected in U.S. waters as part of the spawning seasonality work, and Canadian waters by [Fisheries and Oceans Canada](#). Analyzing otolith chemistry will help:

- Improve our understanding of stock composition in U.S. waters
- Advance the use of stock mixing in stock assessments and management

Improving our understanding of mackerel stock mixing in U.S. waters will help provide context for stock assessments and support more effective management.

Ecosystem Drivers of Mackerel



Northwest Atlantic Ocean at sunset. Credit: NOAA Fisheries/Todd Miha1

To advance our understanding of how ecosystem drivers affect Atlantic mackerel, we are partnering with [scientists Camrin Braun, Laura McDonnell, and Nima Farchadi at the Woods Hole Oceanographic Institution](#). Together we will look at several ocean conditions and processes to see how they might influence when, where, and how many mackerel are seen in our region. Conditions and processes include:

- Timing, strength, and frequency of water mass movement into the Gulf of Maine
- Sea surface and subsurface temperatures
- Ocean boundary layer, front, stratification, and mixing events
- Salinity, wind, current, eddy, and prey indicator anomalies

This work will help develop:

- Dynamic, ocean process-informed species distribution models
- A set of environmental indicators useful for mackerel stock assessments and management

Data

As data becomes available, we will add links to the portals.

Funding Source

The Atlantic Mackerel Cooperative Research Initiative received \$2.3 million in fiscal year 2026 to begin this work. This initiative supports the [Executive Order on Restoring American Seafood Competitiveness](#) by:

- Applying a cooperative research approach to advance Atlantic mackerel and Atlantic herring stock assessment and management
- Modernizing data collection and analytical practices to increase the responsiveness of fisheries science
- Pursuing Exempted Fishing Permits to promote scientific research and fishing opportunities

Contact

- [Anna Mercer](#), chief of the Cooperative Research Branch

Partners and Collaborators

Science

- [Camrin Braun](#), NOAA's Cooperative Institute for the North Atlantic Region Quantitative Ecology and Socioeconomics Training Program fellow and Woods Hole Oceanographic Institution
- [Jason Didden](#), Mid-Atlantic Fisheries Management Council
- [Laura McDonnell](#), Woods Hole Oceanographic Institution
- [Lisa Kerr](#), University of Maine

- [Nima Farchadi](#), Woods Hole Oceanographic Institution

Industry Partners

- Andrew Dangelo, *F/V Maridee*
- Bilbo Callaway, *F/VM.F. HYGRADER*
- Birch Brennan, [The Town Dock](#)
- Robert Ruhle and [Northeast Area Monitoring and Assessment Program Nearshore Trawl Survey](#), *F/V Darana R*
- Bill Bright, *F/V Retriever*
- Dan Dean, *F/V Sea Craft*
- David Axelsson, *F/V Dyrsten*
- David Goethel, *F/V Ellen Diane Too*
- Erik Hicks, *F/V Rayda Cheramie*
- Gabe Folan, *F/V Reel Irish*
- Gerry O'Neill, *F/V Endeavor*
- Glenn Goodwin, *F/V Buckeye*
- Helger Cabral
- Jack Patrican, *F/V Far Floater*
- Jason Sawyer, *F/V Cody*
- Joe Letourneau, *F/V Lady Rebecca*
- Katie Almeida, [The Town Dock](#)
- Kelly Smith, *F/V C-Devil II*
- [Lund's Fisheries Inc.](#)
- Malcom McClintock, *F/V Bulldog*
- Mark Phillips, *F/V Prevail*
- Mary Beth Tooley, O'Hara Corporation
- Matt Wright Trucking
- Meghan Lapp, [Seafreeze Ltd.](#)
- Mike Pratt, *F/V Perfect C's*
- Nate Phillips, *F/V Illusion*

- Noah Roebuck, fisherman
- [North Atlantic Pacific Seafood](#)
- Patrick Quinn, *F/VRetriever*
- Phil Ruhle, *F/VPersistence*
- [Red's Best](#)
- Richard Chatowsky, *F/VDrifter*
- Rick Bellavance, *F/VPriority Too*
- Rob Taylor, *F/VReel Ez*
- Robert Savino, *F/VCJ Victoria*
- Rory Mullen, *F/VEnterprise*
- Ryan Raber, *F/VProvidian*
- Shane Kissel, *F/VOsprey*
- Stefan Axelsson, *F/VDyrsten*
- Tom DePersia, *F/VBigFish*
- Tom Smith, *F/VSea Wolf*
- Troy Sawyer, *F/VDebbie Sue*

More Information

[Northeast Cooperative Research](#)

[Atlantic Mackerel Cooperative Research Initiative Announced](#)

[Atlantic Mackerel Species Page](#)