



The NOAA FISHERIES NAVIGATOR

Reeling in the Data: Addressing Challenges to Enable On-Demand Fishing

The vertical lines and surface buoys traditionally used to mark fixed fishing gear pose entanglement risk to marine mammals. On-demand fishing, also known as ropeless or pop-up fishing, is an innovative approach being developed in collaboration with gear manufacturers, fishermen, government agencies, NGOs, and other partners to implement an electronic gear retrieval system that uses acoustic signaling and virtual gear marking, eliminating the need for persistent vertical lines and surface buoys. Without surface buoys to mark the position of the fishing gear, on-demand fishing requires a way for fishermen to share the gear geolocation data fleet-wide to avoid gear conflicts between fixed and mobile fishermen.

The Northeast Fisheries Science Center is collaborating with fishermen and gear manufacturers to test different approaches to on-demand fishing using an Exempted Fishing Permit (EFP), which provides the ability to deploy fixed gear without having to meet all of the current regulations (e.g., vertical lines and a surface buoy). Fishermen participating in the EFP voluntarily share information about their fishing activity, including the location of their deployed on-demand gear. When fishermen deploy their on-demand fishing gear, they transmit the location data to their gear manufacturer, which is then transmitted to EarthRanger—a software platform from the Allen Institute for AI (AI2). EarthRanger receives and consolidates information such as the gear location, gear manufacturer, unit serial number, and the direction of how the gear is deployed. The fixed and mobile



Leah Baumwell, Pew Charitable Trusts photo

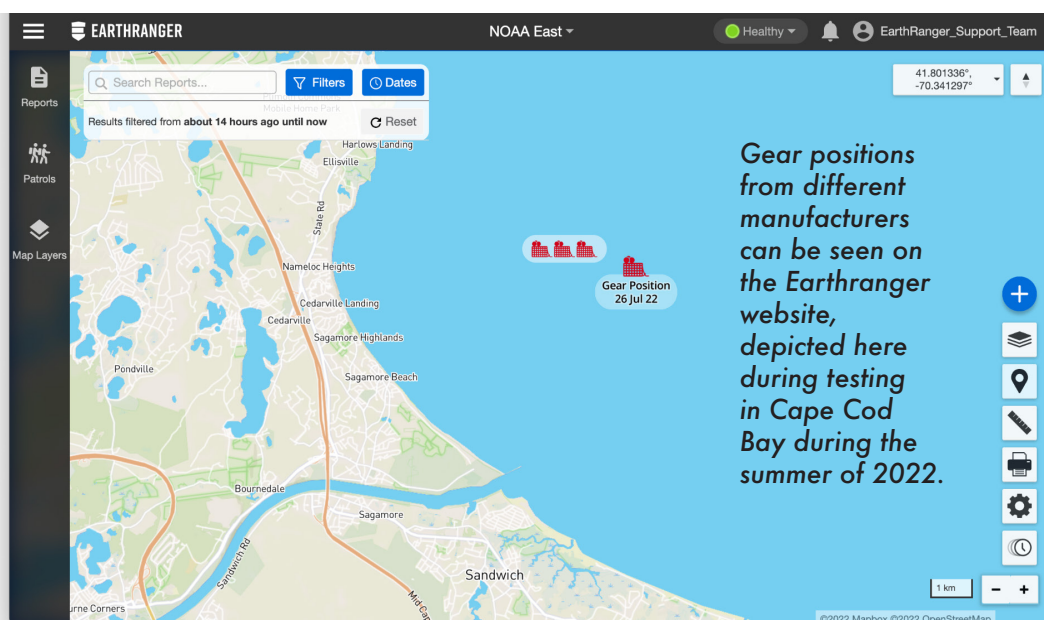
The team compares notes while testing the geolocation system out on the water with several vessels and gear manufacturers using EarthRanger from mobile phones. From left to right: Eric Matzen, Jes Lefcourt, Leah Baumwell, and Christin Khan.

gear fishermen participating in the EFP can view the positions of all on-demand gear within a limited range of 5 nautical miles via EarthRanger or the gear manufacturer's mobile application. EarthRanger

provides full database access to government fishery managers, such as NOAA Fisheries and the Department of Fisheries and Oceans Canada, as well as to gear manufacturers engaged in testing the geolocation system.

NOAA Fisheries will continue collaborating with gear manufacturers, fishermen, and partners to develop a successful on-demand fishing platform that can support collecting and disseminating data in near real-time to enable fixed-gear and mobile fishermen to operate at sea while avoiding gear conflicts. The research conducted under the EFP is the foundation for developing an interoperable and cost-effective solution applicable across different vessels, fisheries, and management jurisdictions. These endeavors also include the development of data specifications, standards for acoustic interoperability, and improved visualization options such as desktop and mobile applications and chart plotters. NOAA Fisheries encourages ongoing participation and collaboration in this process so that stakeholders' input helps shape the future of on-demand fishing.

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Squid Squad Brings Together Fishermen and Scientists to Advance Squid Research

Scientists and fishermen are collaborating to advance research on two commercially important squid species in the Northwest Atlantic: the northern shortfin squid (*Illex illecebrosus*) and the longfin squid (*Doryteuthis pealeii*). The goal of this collaboration, informally called the Squid Squad, is to better understand the population and fishery dynamics of these squid species, which will help to improve management of the fisheries.

One of the components of the collaboration is the Shortfin Squid Electronic Size Monitoring (ILXSM) program. This program enables squid processors across the region to collect and share standardized size and weight data on shortfin squid using electronic data collection systems. This data helps scientists to better understand the size composition and cohort structure of shortfin squid, which are key to advancing the assessment and management of this dynamic species.

Another component of this collaboration is the Longfin Squid Biological Sampling Program (SQUIBS). This program collects longfin squid (*Doryteuthis pealeii*) from commercial fishing vessels every week to assess the growth and reproductive dynamics of this species. Technicians at Northeast Fisheries Science Center's Narragansett Laboratory

measure biological characteristics of each squid collected, including mantle length, mantle width, body weight, reproductive organ sizes, and egg presence, using an electronic data collection system. This biological sampling effort will provide a comprehensive data stream of lengths, weights, age and maturity estimates throughout the year. This data will advance understanding of longfin squid life history, will be used in a new length-based assessment model for longfin squid, and will contribute to the 2026 longfin squid research track stock assessment.

The Squid Squad is also conducting research on the oceanographic drivers of squid distribution and abundance. This research is important because it can help to explain why squid populations fluctuate in time and space. By understanding these environmental drivers, scientists can develop tools to predict the productivity of squid, which can inform the management of the fisheries.

Finally, the Squid Squad has been developing novel tools to use fishery catch and effort data to track trends in abundance of squid. Dozens of captains and processors helped to define the factors impacting squid catch rates, which were integrated as covariates in catch per unit effort (CPUE) standardizations. Data collected by captains

participating in the Northeast Fisheries Science Center's Study Fleet were critical for this research. Ultimately, this research produced CPUE time series that can be used to understand trends in the squid population and fishery.

The research produced by the Squid Squad has been considered by the Mid-Atlantic Fisheries Management Council during the specification setting process, has contributed to the northern shortfin squid research track stock assessment, and has produced several peer-reviewed publications with members of the fishing industry as co-authors. The Squid Squad will also contribute to the upcoming longfin squid research track stock assessment. This work demonstrates that by working together, we can gather the data and insights needed to make informed decisions about the management of these important fisheries.

Here are some of the benefits of this collaboration:

- **Increased data collection and sharing**
- **Improved understanding of squid population dynamics**
- **Improved understanding of squid fisheries**
- **More informed management decisions**
- **Involvement of harvesters, processors, and scientists allows for more opportunities to identify patterns driving catch rate and distribution**

If you are a fisherman or a member of the squid industry, you can get involved in this collaboration by:

- **Participating in data collection programs, such as ILXSM, SQUIBS, and Study Fleet**
- **Sharing your knowledge and experience with scientists**
- **Attending workshops and meetings**
- **Providing feedback on research projects**

Together, we can make a difference in the future of squid fisheries.

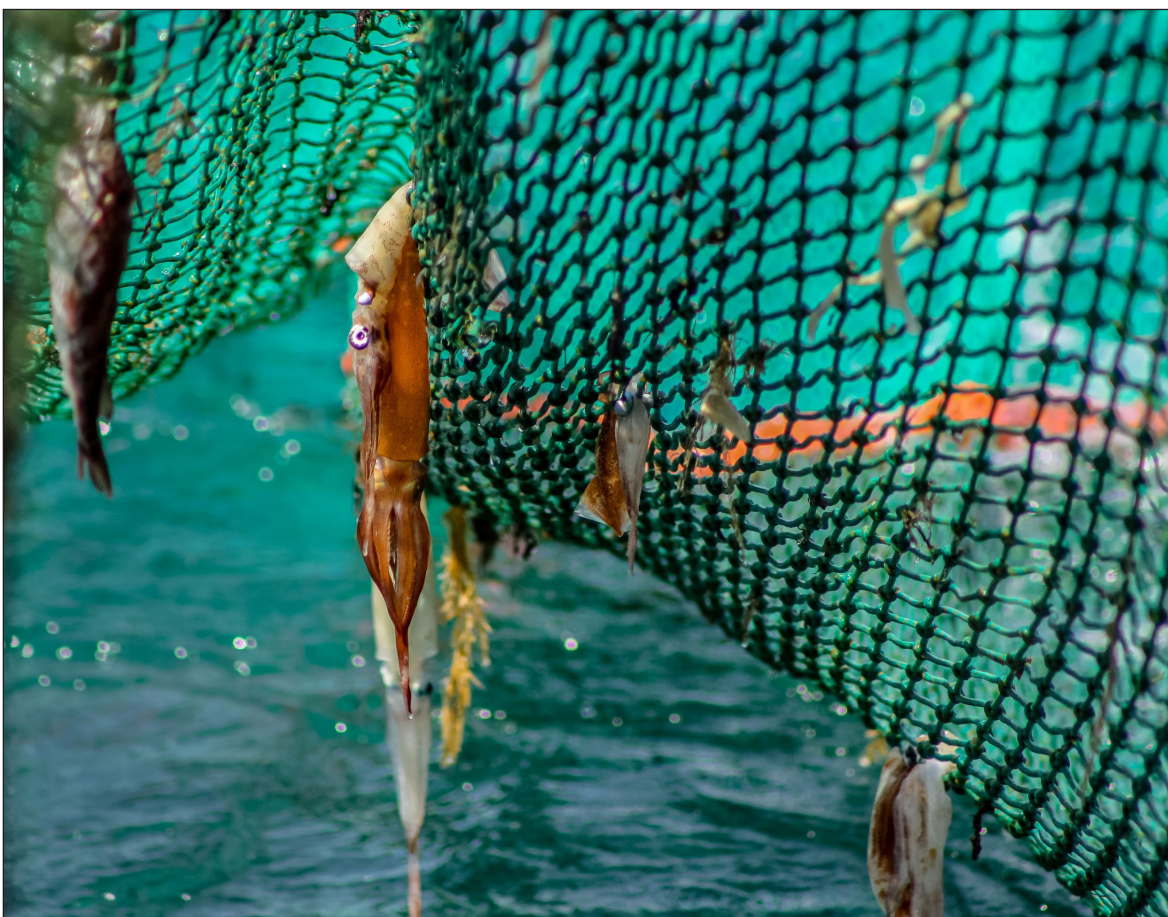
For more information contact <Anna.Mercer@noaa.gov>.

On-Demand

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By working together, we can address data sharing challenges and advance the implementation of on-demand fishing, paving the way for a more sustainable and efficient fishing industry.

For general inquiries or to get involved in gear research for on-demand fishing, please contact the Northeast Fisheries Science Center at <nec.gearlibrary@noaa.gov>.



NOAA and the University of Rhode Island Sign Agreement to Explore Effects of Offshore Wind Energy Development

N OAA's Northeast Fisheries Science Center and the University of Rhode Island (URI) have signed a 5-year formal partnership agreement to research how offshore wind energy development will affect marine ecosystems and the people who live near, or work on, the ocean.

Under the agreement, the multidisciplinary approach will focus on understanding these complicated relationships on an ecosystem level. For example, an early project under the agreement is to create an integrated ecosystem assessment for the Gulf of Maine, linking fishing, the environment, and offshore wind energy development.

Specifically, the partnership will streamline NOAA's ability to efficiently and effectively tap into URI science, outreach, and education expertise and resources. It will allow NOAA to respond to pressing and shared marine resources issues tied to offshore wind energy development. NOAA and URI are considering efforts to ensure that vessel-based data captured on commercial fish species can be adapted to accommodate navigation in wind farms.

The partnership was made through a cooperative research and development agreement, which allows federal and non-federal partners to do collaborative research. Through these agreements, NOAA and non-federal partners share ideas, technical expertise, facilities, and other research materials.

The center's wind energy team is primarily located in Narragansett, Rhode Island, steps away from the URI Graduate School of Oceanography. The center works to promote sustainability of marine life in the region, support seafood harvests, sustain coastal communities, and generate economic opportunities and benefits from the use of these resources.

The URI Coastal Resources Center at the Graduate School of Oceanography,



Bob Brewer on Unsplash photo

A small fishing vessel near wind turbines.

Rhode Island Sea Grant, and the Coastal Institute are providing key support for the university in the partnership. They will draw on expertise and collaboration from other URI entities, including the College of the Environment and Life Sciences and the Ocean Engineering Department/College of Engineering.

For more information on cooperative research and development agreements and other ways to partner with NOAA, visit the NOAA Technology Partnerships Office website: <https://techpartnerships.noaa.gov/partner-with-noaa/about_noaa_partnerships/>.

Sea Turtles Summer in the Greater Atlantic Region

Sea turtles are seasonal residents of the Greater Atlantic Region (Virginia through Maine). In May and June, turtles move into the southern portion of our region, heading up the coast as the waters warm. In July, turtles move into New England. They stay in coastal waters of the region until water temperatures drop in the fall. At that time, they migrate south again, overwintering in warmer waters.

When the sea turtle southern migration begins in the fall, unfortunately, some turtles become trapped by geographic features, like the arm of Cape Cod, which prevents them from heading south. Sea turtles are cold-blooded reptiles, meaning their body temperature is dictated by the surrounding water. When the water temperature drops beyond their acceptable range, they become "cold stunned," which is similar to hypothermia in people. They have decreased respiration and heart rates, and their immune systems are suppressed. They stop feeding and just float at the surface, with many eventually washing up on land. Cold-stunned sea turtles need immediate rescue or they will die. Staff and volunteers from the Sea Turtle Stranding and Salvage Network collect them from area beaches and bring them to local rehabilitation facilities, where they begin gradual warming and medical treatment.

Climate change affecting sea turtle strandings

With air and water temperatures changing, the number of cold-stunned sea turtles that strand (wash up on land) annually is increasing. The majority of cold stuns are documented along the beaches of Cape Cod, Massachusetts. The annual average number of cold-stunned turtles in the state is now over 750.

Last year, 2022, was the third highest season on record, with more than 1000 cold stuns documented in the region, almost 900 of which were in Massachusetts. This number of sick turtles quickly overwhelms local resources and we have to find rehabilitation space for these turtles.

NOAA Fisheries works with state coordinators and rehabilitation facilities all along the Atlantic and Gulf coasts, and beyond, to transport cold-stunned sea turtles for long-term medical care.

In 2022, 441 turtles were transported out of Massachusetts to 32 receiving facilities in 13 states. It is a huge collaborative effort among federal, state, and non-profit organizations. This collaboration is very successful, with three quarters of the turtles that strand alive ultimately being released back into the wild. It is an important component of the multi-faceted sea turtle conservation efforts to recover these endangered and threatened species.

Boaters and Fishers, Watch for Sea Turtles

One of the most common causes of sea turtle deaths and injuries is being hit by a boat. Sea turtles forage in coastal waters and are hard to see at the surface. While boating, you can help by keeping a bow watch and reducing speed if you sight either turtles or jellies (a common turtle prey) at the surface. Polarized sunglasses are helpful in reducing surface glare, making it easier to spot turtles and other animals just below the surface. While fishing, you can help by not casting lines where turtles have been sighted. If you accidentally catch a sea turtle in your gear or if you see a distressed or dead turtle, immediately call our marine animal hotline at 1-866-755-6622. Stand by live turtles at a safe distance until you receive further instruction from NOAA or network members. Please take photographs, if possible. All sea turtles are protected under the Endangered Species Act; their populations have declined due to threats in the ocean and on land. Everyone can help keep these turtles safe!



The NOAA FISHERIES NAVIGATOR

NOAA Fisheries Assesses Vulnerability of Atlantic Sharks, Tunas, Swordfish, and Billfish to Climate in the Atlantic, Gulf, and Caribbean Regions

Fisheries managers, climate policy specialists, and a scientific panel of 15 NOAA and external experts came together in San Juan, Puerto Rico to carry out an Atlantic Highly Migratory Species (HMS) Climate Vulnerability Analysis (CVA) workshop from May 16-18, 2023. NOAA Fisheries uses CVAs to identify which species may be most vulnerable to climate change based on their exposure to projected changes in the environment (e.g., warming oceans) and their sensitivity or adaptability to handle those changes based on their life history characteristics. Vulnerability in this context refers to how climate-related changes could affect fish species' productivity or abundance, and to some extent, their distribution.

The in-person workshop was hosted by NOAA Fisheries and specifically focused on the evaluation of life history or behavioral characteristics ("sensitivity attributes") that make HMS (Atlantic sharks, tunas, swordfish, and billfish) more or less vulnerable to climate change. Participants evaluated the sensitivity of HMS to climate change by individually scoring sensitivity attributes, and then discussed the scores and considered new information provided by scientists, Caribbean region experts, and observers to refine their scores, and opinions on, each HMS. Once the panelists finalize their evaluation of sensitivity attributes, NOAA Fisheries climate specialists will combine this information with the results of a climate projection model ("exposure analysis") to develop final vulnerability rankings for HMS. The exposure analysis compares the overlap in species distribution with the expected magnitude of climate change. Final results of the HMS CVA will be made available on the NOAA Fisheries website.

Questions? Contact Delisse Ortiz at <Delisse.Ortiz@noaa.gov>.



At left, workshop staff and members of the NOAA and external scientific panel pose for a photo on the last day of the workshop in San Juan, Puerto Rico.



Below, fisheries managers, climate policy specialists, and a scientific panel of 15 NOAA and external experts gathered to evaluate the sensitivity of HMS to climate change by individually scoring sensitivity attributes, and then discussing the scores and considering new information provided by scientists, Caribbean region experts, and observers to refine their scores, and opinions on, each HMS.

Jennifer Cudney photo

2023 Commercial Fishery Crew Survey Underway

This summer, social scientists from NOAA's Northeast Fisheries Science Center are conducting their third voluntary survey to collect information from the workers so crucial to commercial fishing operations: crew and hired captains. The results help inform decision makers about potential social and economic impacts of their management decisions.

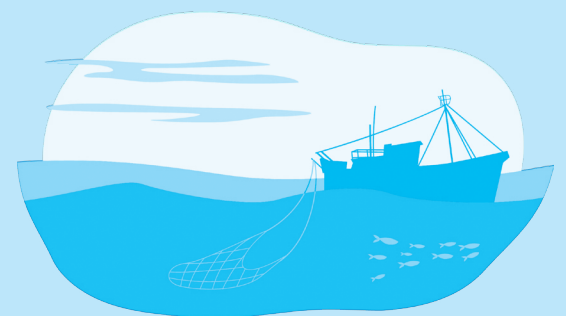
Participation is voluntary and takes about 10 minutes. Social scientists are visiting ports across the region to interview people directly, but those interested can also take the survey by mail or by phone. The team hopes to have an online option later this summer.

There is little basic demographic information about our region's commercial fishing crew. This survey is the only way NOAA Fisheries is currently collecting this kind of information. The

resulting data help show the challenges and threats that our region's commercial fishing industry faces, and help social scientists better predict how fisheries management decisions may change the lives, success, and well-being of commercial fishing crew in our region.

Examples of specific information the team will collect include basic demographics, job activities, employment opportunities, job satisfaction, wage systems and expenses, and attitudes about fisheries management.

Both participation in and individual responses to this survey are anonymous and confidential. No personally identifiable information is collected. All data will be presented in a way that protects confidentiality. Individual data can only be accessed by our staff and affiliates who have signed non-disclosure agreements.



Versions of this survey were conducted in 2012 and in 2018, garnering just over 800 responses. For more on those results and how to participate in this year's survey, visit our webpage: <<https://www.fisheries.noaa.gov/new-england-mid-atlantic/socioeconomics/2023-commercial-fishing-crew-survey>>.