

## NOAA FISHERIES

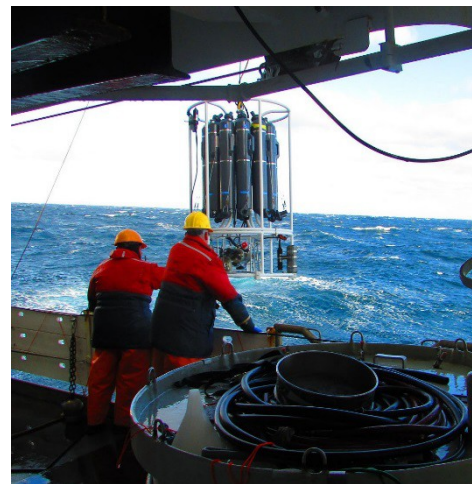
### Top Story

## Long-Term Ecological Research Site Established on the Northeast Shelf



Photo top left: Pairs of small (top) and large bongo nets are used to capture plankton in the water column during an Ecosystem Monitoring survey aboard the NOAA Ship *Gordon Gunter* in 2016. Photo by Jerry Prezioso, NEFSC

Photo top right: A CTD rosette (Conductivity/Temperature/Depth) is deployed from the NOAA Ship *Henry B. Bigelow* during the winter 2017 EcoMon survey. The instrument package measures the salinity, temperature, depth and concentration of particles in the water column. Photo by Jerry Prezioso, NEFSC



**Ecosystem Monitoring (EcoMon) cruises conducted by the Northeast Fisheries Science Center will be enhanced as part of the Center's collaborating role in the new LTER.**

NOAA Fisheries and the Northeast Fisheries Science Center (NEFSC) will play an integral role in the new Long-Term Ecological Research (LTER) site on the Northeast U.S. continental shelf announced March 1 by the National Science Foundation (NSF).

NSF announced grants totaling \$5.6 million over five years to scientists at the Woods Hole Oceanographic Institution (WHOI), University of Massachusetts, University of Rhode Island and Wellesley College for the Northeast LTER site. A second oceanic LTER site was also announced by NSF in the northern Gulf of Alaska, to be managed by scientists at the University of Alaska Fairbanks, in collaboration with researchers at Western Washington University, Oregon State University and the University of California, Santa Cruz.

The new Northeast shelf site, known as the NES-LTER, will connect two established research installations, the Martha's Vineyard Coastal Observatory (MVCO) off the south coast of Martha's Vineyard and the Pioneer Array, a series of moorings, autonomous underwater vehicles and other technologies on the edge of the continental shelf that is part of the national Ocean Observatories Initiative. Heidi Sosik of WHOI, which developed and maintains the two installations, will lead the NES-LTER research team.

David Richardson, a fisheries biologist at the NEFSC's Narragansett Laboratory in Rhode Island, is the NEFSC's principal point of contact for the project, which will



Pelagic juvenile (top) and larval (bottom two) haddock (*Melanogrammus aeglefinus*). Photo by Harvey Walsh, NEFSC



A typical night plankton catch in the Gulf of Maine: *Calanus* copepods and euphausiids (krill). Photo by Jerry Prezioso, NEFSC

take advantage of the Center's longstanding Ecosystem Monitoring (EcoMon) cruises in the region.

"Researchers will be using a nested sampling strategy, conducting fine-scale and high resolution sampling off southern New England as well as taking a broader look at the continental shelf as a whole to determine how long-term environmental change is impacting the ecosystem," Richardson said. "The EcoMon cruises collect samples at 120 randomly selected sites on the Northeast shelf six times a year. These cruises continue an oceanographic and plankton time-series that started in the 1970s. They cover a much broader scope and a wider area of the shelf than the designated LTER area, and will be critical to this project."

Given the variability on the Northeast Shelf, research will focus on short-term responses to environmental change in order to characterize food webs, understand the linkages and transfer of energy from phytoplankton to pelagic fish, and identify the mechanisms that underlie shifts between communities.

Six forage fish species – Atlantic mackerel, Atlantic river herring, butterfish, sand lance, alewife and blueback herring – will be studied to understand differences in their diet and their role in connecting the planktonic food web to upper trophic level species.

Richardson said that new sampling will occur on the EcoMon cruises as part of the project, for example, genetic identification for zooplankton. He also expects researchers to access fisheries and environmental data collected on the shelf as part of ongoing Center research and monitoring activities.

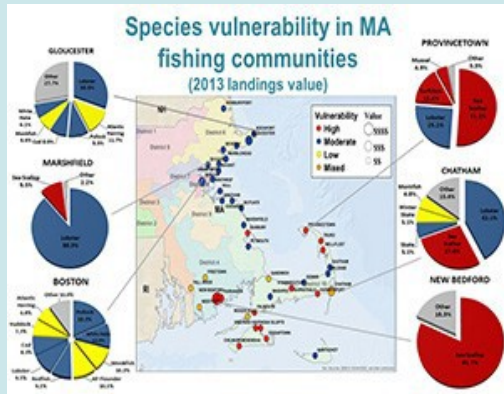
Shelf-wide plankton surveys have been conducted by the NEFSC over the entire Northeast U.S. Continental Shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia, since the 1960s, including spring and autumn bottom trawl surveys and the four EcoMon cruises in winter, late spring, late summer and late autumn.

Some additional staff and equipment may join the NEFSC's EcoMon cruises, which already include researchers from many other organizations, graduate and undergraduate students, teachers, and students as part of NOAA's existing educational and outreach programs.

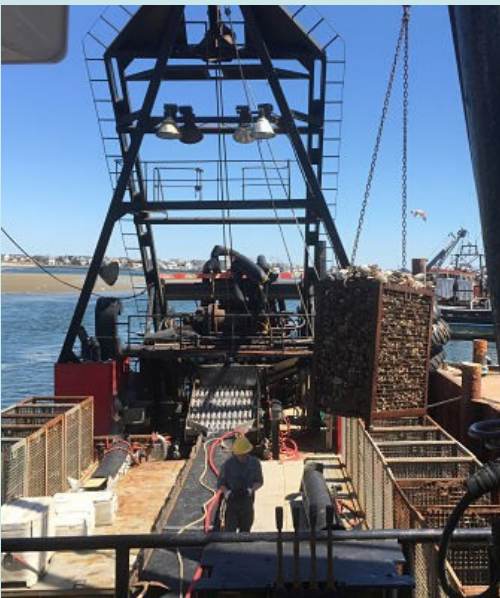
Part of the plans for the NES-LTER include an outreach and education program, and producing marine biodiversity and ecosystem change content for NOAA's "Science on the Sphere" (SOS) displays in public science facilities around the country.

"The new LTER sites will bring new locations, technologies and scientists to the challenge of understanding our coastal oceans," said Rick Murray, director of NSF's Division of Ocean Sciences, in a news release. "The sites are in areas where there's much recreational and commercial fishing, and both sites are in the midst of significant environmental changes."

"Research at the new sites will matter to everyone who eats U.S. seafood, is involved in coastal industries, or depends on the coastal oceans in any way," Murray said in the announcement. "That includes all of us, through the oceans' importance



Species vulnerability to climate change in Massachusetts fishing communities, based on landings value. Image credit: NOAA Fisheries/Lisa Colburn, NEFSC. To see enlarged version and other information, go to: [http://www.nefsc.noaa.gov/press\\_release/pr2017/scispot/ss1702/](http://www.nefsc.noaa.gov/press_release/pr2017/scispot/ss1702/)



Surfclam vessel offloading, New Jersey. Photo by Peter Plantamura, NEFSC

in weather and climate and a long list of other 'ecosystem services' the sea provides."

NSF currently supports about 30 LTER sites, chosen to represent major ecosystem types or natural biomes. Studies focus on ecological phenomena over long periods of time, based on data collection in five core areas. The LTER program was designed to provide the long-term data and information needed for informed decision making from a broad range of key ecosystems, both on land and at sea. Among LTER sites in the Northeast and Mid-Atlantic regions are the Harvard Forest, Plum Island Ecosystems, the Baltimore Ecosystem Study, and the Virginia Coast Reserve. To learn more about the Long-Term Ecological Research (LTER) Network, go here: <https://lternet.edu/>

## Social Vulnerability Indicators Could Help U.S. Fishing Communities Plan for Change

Coastal communities that depend on fishing have a new tool for describing and evaluating how vulnerable their communities are to sea level rise, shifting fishery populations, and changes in ocean chemistry. Using social, demographic and fisheries data, NOAA Fisheries social scientists have developed an initial set of community social vulnerability indicators, not just in the Northeast U.S. where the first climate vulnerability assessment for fisheries was conducted, but along the entire U.S. coast. Researchers looked at a range of issues or pre-existing conditions that could affect the ability of a fishing community to cope with and respond to disruptive events such as changing fishery management regulations or climatic conditions. Each indicator was assigned a vulnerability ranking from low to high and was applied to each community. Initially, 2,659 communities in coastal counties in 19 states, from Maine to Texas, were identified. Of these, 1,130 had commercial and/or recreational fishing activity, with 174 scoring in the high range for engagement or reliance on commercial fishing. That study, published in 2016 and based on data through 2013, was updated and expanded in 2016 to include nearly 3,800 coastal communities nationally, and now includes a measure for risk from sea level rise. More here: [http://www.nefsc.noaa.gov/press\\_release/pr2017/scispot/ss1702/](http://www.nefsc.noaa.gov/press_release/pr2017/scispot/ss1702/)

## Science Shorts

### Clam Boats Test Paperless Reporting

NEFSC cooperative research and data management staff are offering to install equipment on commercial fishing vessels for electronic trip reporting in the surfclam and ocean quahog fisheries. So far, 35 vessels from New Bedford, MA to Atlantic City, NJ have been outfitted to voluntarily test the system, and more than 700 e-trip reports have been transmitted. Called *eClams* (Electronic Clam Logbook and Account Management Software), the system allows fishermen to electronically record all the information required on the paper-based fishing trip report. These data are transmitted to NOAA Fisheries after the trip using land-based communication services such as WiFi. More here:

<http://www.nefsc.noaa.gov/news/features/eclams/>





NEFSC Science and Research Director Jon Hare (far right) speaks about the changing Northeast Shelf climate and the impact on fisheries with the Mashpee Wampanoag Tribe at a NOAA Tribal Roundtable March 22. Photo by Shelley Dawicki, NEFSC



Monitoring the carboy-scale microalgal culture in the NEFSC's Milford Laboratory Mass Culture Room. Photo by Shannon Meseck, NEFSC

### Acoustic Buoy Proves Productive for Whale Sightings

A day-long trip to an acoustic buoy in Rhode Island Sound led to the sightings of a dozen North Atlantic right whales on Feb. 21. Researchers from the NEFSC's Protected Species Branch at the Woods Hole Laboratory took a trip in one of the Center's small boats, R/V *Selkie*, to check out an acoustic mooring south of Martha's Vineyard near Nomans Land when they sighted the whales, who have arrived in the area earlier than expected. The buoy is part of the Northeast Acoustic Network (NEPAN). More here:

[http://www.nefsc.noaa.gov/press\\_release/pr2017/other/right\\_whale\\_mv/](http://www.nefsc.noaa.gov/press_release/pr2017/other/right_whale_mv/)

### NOAA and Mashpee Wampanoag Hold Tribal Roundtable

Adapting to the changing climate was the theme for a day-long meeting March 22 attended by NOAA scientists and staff from various line offices and members of the Mashpee Wampanoag Tribe. The roundtable, organized by NOAA's North Atlantic Regional Team, was held at the Tribal Community and Government Center in Mashpee. In addition to climate and fisheries, topics included aquaculture and ocean acidification, harmful algal blooms and ecological forecasting, and extreme weather preparedness. The Tribe expressed interest in issues related to fish and shellfish, habitat and water quality. Members spoke to their desire to bring traditional ecological knowledge to NOAA partnerships, and to participate in the resource management process in some way.

### Researchers Return to Study Gray Seal Pups on Muskeget, Monomoy

NEFSC researchers and colleagues spent a week in January on Muskeget and Monomoy islands off the southeastern Massachusetts coast gathering data from gray seal pups for studies of abundance and distribution as well as the health of the animals. Similar studies have been underway on the islands each January for the past five years. Gray seal pupping season generally runs from mid-December to early February, with peak time in mid-January. The team on Muskeget Island off Nantucket, the largest gray seal breeding and pupping colony in the U.S., collected samples from 50 pups during January field operations. Another team on Monomoy, an island near Chatham on Cape Cod that is part of the Monomoy National Wildlife Refuge, captured and sampled 71 pups during two trips to the island. More here: [http://www.nefsc.noaa.gov/press\\_release/pr2017/scispot/ss1701/](http://www.nefsc.noaa.gov/press_release/pr2017/scispot/ss1701/)

### Milford' Green Room: Growing Microalgae for Shellfish Aquaculture

Continuity is key when it comes to growing microalgae at the NEFSC's Milford Laboratory in Milford, CT. The lab grow lots of it for specific research needs, and maintains a unique collection of microalgal strains developed decades ago that are used by the commercial aquaculture industry worldwide. The Laboratory's Microalgal Culture Collection and the Mass Culture Room are related but unique facilities started in the 1950s. Small-scale microalgal cultures are maintained in one room as a research tool, a highly valued resource to commercial shellfish hatcheries and academic researchers in the form of "starter cultures" in small vials with growing instructions. The culture collection also provides the Mass Culture Room with a ready supply of sterile microalgae to grow as food for shellfish larvae under controlled and repeatable conditions in the lab's own shellfish research projects. More here: [http://www.nefsc.noaa.gov/press\\_release/pr2017/scispot/ss1703/](http://www.nefsc.noaa.gov/press_release/pr2017/scispot/ss1703/)

## Latest NEFSC Publications

S.A. Hayes, A.J. Amman, J.A. Harding, J.L. Hassrick, L. deWitt, and C.A. Morgan. 2016. Observations of steelhead in the California Current lead to a marine-based hypothesis for the "half-pounder" life history, with climate change implications for anadromy. NPAFC Bull. 6: 97–105 doi:10.23849/npafcb6/97.105.

Northeast Fisheries Science Center. 2017. 62nd Northeast Regional Stock Assessment Workshop (62nd SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 17-03; 822 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026.

Stehlik, Linda L., John P. Manderson, and Jeffrey Pessutti. Use of gill nets and telemetry in tracking movements and feeding of striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), and weakfish (*Cynoscion regalis*) at a salinity front in a small estuary. Fishery Bulletin 115(2): 143-154 doi:10.7755/FB.115.2.2 (<http://fishbull.noaa.gov/1152/stehlik.pdf>)

McBride RS, Johnson AK, Lindsay EK, Walsh HJ, Richards RA (2017/early view) Goosefish *Lophius americanus* fecundity and spawning frequency, with implications for population reproductive potential. J Fish Biol: n/a-n/a doi:10.1111/jfb.13272

Rosenberg AA, Kleisner KM, Afflerbach J, Anderson SC, Dickey-Collas M, Cooper A., Fogarty MJ, Fulton EA, Gutiérrez NL, Hyde KJW, Jardim E, Jensen OP, Kristiansen T, Longo C, Mente-Vera CV, Minto C, Mosqueira I, Osio GC, Ovando D, Selig ER, Thorson JT, Walsh JC, Ye Y. 2017. Applying a New Ensemble Approach to Estimating Stock Status of Marine Fisheries Around the World. Conservation Letters (in press)

Abdelrahman H, MEI Hady, A Alcivar-Warren, S Allen, R Al-Tobasei, L Bao, B Beck, H Blackburn, B Bosworth, J Buchanan, J Chappell, W Daniels, S Dong, R Dunham, E Durland, A Elasad, M Gomez-Chiarri1, K Gosh, X Guo, P Hackett, T Hanson, D Hedgecock, T Howard, L Holland, M Jackson, Y Jin, K Kahlil, T Kocher, T Leeds, N Li, L Lindsey, S Liu, Z Liu1, K Martin, R Novriadi, R Odin, Y Palti, E Peatman, D Proestou, G Qin, B Reading, C Rexroad, S Roberts, M Salem, A Severin, H Shi, C Shoemaker, S Stiles, S Tan, KFJ Tang, W Thongda, T Tiersch, J Tomasso, WT Prabowo, R Vallejo, H van der Steen, K Vo, G Waldbieser, H Wang, X Wang, J Xiang, Y Yang, R Yant, Z Yuan, Q Zeng, and T Zhou. 2017. The Aquaculture Genomics, Genetics and Breeding Workshop: Aquaculture genomics, genetics and breeding in the United States: current status, challenges, and priorities for future research. BMC Genomics 18:191. <http://dx.doi.org/10.1186/212864-017-3557-1>

## Manual for Estimating Age and Growth of Atlantic, Gulf of Mexico Species

NOAA scientists from the NEFSC's Woods Hole and Narragansett Laboratories and the SEFSC's Beaufort and Panama City Laboratories are collaborating with the Atlantic and Gulf States Marine Fisheries Commissions to produce a manual on best practices for estimating the age and growth of marine bony fishes and elasmobranchs. They have completed final revisions of the manual together with representatives from both Commissions, at least eleven state labs (LA, MS, FL, GA, SC, NC, VA, NJ, RI, CT, MA) and two universities (the University of Massachusetts-Dartmouth and Old Dominion University).

## Red King Crab Ocean Acidification Project in Kodiak, AK

Milford Laboratory staff traveled to the Alaska Fisheries Science Center's Kodiak Laboratory to continue work on hemocyte analysis of red king crabs. Twenty-four crabs were bled before molting to get initial immune response using the flow cytometer. The study, to be completed by early April, is looking at differences between immune function before, during, and within a month of molting.

## Canada DFO/NEFSC Joint Workshop on Collaborative Research

NEFSC researchers participated in a joint DFO/NEFSC workshop March 21-22 in St. Andrews, Canada aimed at exploring opportunities and areas for collaborative research between Canada and the US on Ecosystem-Based Fisheries Management, with a particular focus on marine areas inhabited by transboundary stocks, such as the Georges Bank, Gulf of Maine, Bay of Fundy and Scotian Shelf areas and the activities they support.

## 2017-2018 Sea Scallop Research Set-Aside Project Recommendations Announced

The NEFSC and the New England Fishery Management Council announced the 17 projects that have been recommended for support. Details [here](#).

## ICCAT Advisory Meeting Hears Information on Atlantic Bluefin Tuna Spawning

A NEFSC researcher presented new information on spawning by Atlantic bluefin tuna in the Slope Sea at a one-day International Commission for the Conservation of Atlantic Tunas (ICCAT) workshop March 21 on western Atlantic bluefin tuna science. The presentation included information on bluefin tuna larvae collected during 2016 sampling, evaluations of museum samples, larvae provided for population genetics, and ongoing work to develop a strategy to evaluate whether there are other undocumented spawning grounds. More on the initial finding here: [http://www.nefsc.noaa.gov/press\\_release/pr2016/scispot/ss1605/](http://www.nefsc.noaa.gov/press_release/pr2016/scispot/ss1605/)

## Working Group Formed on Using Shellfish and Seaweed Aquaculture to Reduce Nitrogen in Long Island Waters

NEFSC researchers are joining representatives of the shellfish and seaweed industries, local, state and federal agencies, and academic researchers in this effort, which is New-York-based.

## Screenings of Ocean Frontiers III: Leaders in Ocean Stewardship & the New Blue Economy

The film sells the story of how ocean planning helps us manage and balance all of the uses of our ocean to keep it thriving for generations to come. The film recently had its world premier. Additional screenings are planned in Rhode Island, New Hampshire, Connecticut, New Jersey, Maine, Massachusetts, and New York. You can find a full listing here: <http://ocean-frontiers.org/find-a-screening>

**Latest NEFSC Publications***(continued from page 5)*

Tommasi D, CA Stock, AJ Hobday, R Methot, IC Kaplan, JP Eveson, K Holsman, TJ Miller, S Gaichas, M Gehlen, A Pershing, GS Vecchi, R Msadek, T Delworth, CM Eakin, MA Haltuch, R Seferian, CM Spillman, JR Hartog, S Siedlecki, JF Samhouri, B Muhling, RG Asch, MLPinsky, VS Saba, SB Kapnik, CF Gaitan, RR Rykaczewski, MA Alexander, Y Xue, KV Pegion, P Lynch, MR Payne, T Kristiansen, P Lehodey, FE Werner. 2017. Managing living marine resources in a dynamic environment: the role of seasonal to decadal climate forecasts. *Prog. In Oceanog.* 152(2019):15-49.

Palmer MC. 2017. Vessel trip reports catch-area reporting errors: Potential impacts on the monitoring and management of the Northeast United States groundfish resource. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 17-02; 47 p.

O'Malley MB, Saunders R, Stevens JR, Jech JM, Sheehan TF. accepted. Using Hydroacoustics to Describe Pelagic Fish Distribution in the Penobscot Estuary, Maine. *Transactions of the American Fisheries Society*.

**Assessment Update****SAW/SARC-63 Peer Review for Ocean Quahog, Woods Hole , MA**

The peer review benchmark assessment for ocean quahog was held in Woods Hole during February 21-23, 2017. The SARC panel comprised three reviewers from the Center for Independent Experts and one NEFMC Science and Statistical Committee member who served as chair. The assessment concluded that the ocean quahog stock is not overfished and that overfishing did not occur in 2012-2016, the period since the last benchmark assessment. Details: <http://www.nefsc.noaa.gov/publications/crd/crd1709/crd1709.pdf>

**Vessels and Field Updates****Effectiveness of Low-Profile Gillnets to Reduce Sea Turtle and Sturgeon Bycatch**

NEFSC's Protected Species gear research group completed 60 paired gillnet sets for a comparative research study on the effectiveness of using a low-profile gillnet to reduce sea turtle and sturgeon bycatch in federal and state waters off Cape Hatteras, NC. Most of the field work was done onboard the F/V *Salvation*. Sea turtles were tagged for behavioral analysis under an ESA permit.

**Winter Ecosystem Monitoring Survey on the FSV *Henry B. Bigelow***

After a storm delay the *Bigelow* departed Feb 11 from Newport, RI for the winter Ecosystem Monitoring survey. Despite rugged weather at the start of the survey, the ship made 114 of the planned 120 stations from the Chesapeake Bay to the Gulf of Maine before the cruise ended Feb. 23. Hundreds of plankton samples were collected and observations made of water properties, ocean currents, ocean chemistry, as well as seabird, marine mammal and sea turtle sightings. Learn more on Field Fresh, the NEFSC's field science blog: <https://nefsc.wordpress.com/category/ecosystem-monitoring-cruise/>

**FSV *Henry B. Bigelow* Spring Bottom Trawl Survey**

Leg I of the spring bottom trawl survey got underway March 6 and concluded March 23. Leg II began March 28. Learn more on the NEFSC's Field Fresh blog: <https://nefsc.wordpress.com/category/bottom-trawl-surveys/>.

**R/V *Gloria Michelle* Returns to Woods Hole After Winter Maintenance**

The 72-foot vessel returned to Woods Hole after undergoing maintenance at the Eastern Fisheries, Inc. dock in New Bedford, MA over the winter. The ship is now preparing for the spring Massachusetts groundfish survey.

**Collaboration on Winter Flounder Sampling with UNH Completed**

Cooperative Research Branch staff assisted UNH in completing sampling of winter flounder. Over 200 samples were collected from Stellwagen Bank, Scantum, Bigear, Ipswich, Jeffreys Ledge, Nantucket Sound and the Cove.

**Unmanned Instrumented Sailboat Deployed by the NCRP Study Fleet**

Study Fleet participant Steve Arnold deployed an unmanned 5-foot sailboat on New Jersey's outer shelf as part of the Educational Passages 2016-2017 regatta. *Ginger Judge* is powered by the sun and wind. It reports surface temperature, pH, oxygen, and tilt every two hours. Sponsored by Endicott College's Makerspace, it is equipped with a few hundred dollars of Arduino-based primitive electronics/sensors. Gloucester Innovation put it together. You can follow the *Ginger Judge* and other drifters in the regatta [here](#).