

# Collaborations

A report on collaborative research projects in the northwest Atlantic Ocean.



## Testing a Method to Evaluate Deepwater Settlement of the American Lobster

**T**he lobster is New England's most commercially valuable marine resource. (Landings bring in the neighborhood of \$250 million annually). Add to that figure the crustacean's unquantifiable worth as a marketing icon, the economic reverberations it casts far beyond the dock, and you'll begin to understand why scientists work in earnest to forecast the health of future crops.

It is a painstaking task that falls somewhere between art and science. And some will tell you that success depends on not a small measure of luck.

A large part of the challenge involves the random nature of the marine environment. Early on, lobsters exist as microscopic particles, beholden to the ebb and flow of wind, tide, and temperature. If they survive for a month or two they'll seek shelter on the bottom in fields of cobble and boulder. It will take another six to eight years before they grow large enough for the dinner table.

The odds of accurately predicting how many lobsters survive the journey from hatch to catch is improved greatly by analyzing large quantities of information about factors that influence settlement.

Over the years, biologists working with commercial fishermen, who bare wit-

### Project Specs:

Funded By: Northeast Consortium  
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Scientific Partners: Richard Whale,  
Charlene Bergeron, Bigelow  
Laboratory for Ocean Sciences; Carl  
Wilson, Maine DMR

Industry Partners: Matt Parkhurst,  
John O'Leary, Norbert Lemieux

Report available:  
[www.northeastconsortium.org](http://www.northeastconsortium.org)

## Fishing Community Needs a Shared Vision for the Role Science Plays in Management

*Collaborations is running a series of guest editorials about the science and society of collaborative fisheries research. Previous columns appeared from Bill Hogarth, Earl Meredith, and US Rep. Tom Allen.*

By Les Kaufman



Last year, members of the fishing community came together to craft a comprehensive plan for the future.

The Fleet Vision is a great step forward in uniting the industry behind a common set of values and hopes for the future.

Participants were not asked to weigh in on the quality of science that is used to make management decisions that affect their livelihoods (which is understandable considering the substantial barriers that exist to changing the government's data collection system.)

Nevertheless, I believe ultimately this issue is unavoidable, because science is our only way to attempt an objective view of any situation, and the only way thus far proven effective to predict the future and manage our behavior to anticipate it.

Thus, in order to put forth the goals of the Fleet Vision, the fishing community must also make some commitment to manage the fleet in accord with best available science.

Science means social science as well as natural science, so economic, social, and cultural considerations are included.

Not addressing science as a community leaves open various nagging problems.

The first, is that people are free to assume that the fleet will be managed on the basis of hunches, suspicions, opinions, and weak inference.

The other problem is that failure to mention science cedes the embrace of science to regulatory agencies. The Fleet should maintain the ability to both understand and question the science that is being used and participate in deciding how scientific truths can best be incorporated into responsive and adaptive fishing regulations.

The information that we get from a scientific approach, and the courses of best action that become evident from it, are frequently subjected to compromise between "best science" and "economic hardship" so as to reduce hardship by not fully applying what we have learned about ecology and economics.

This attitude is laudable for its compassion, but misguided and dangerous, and reflects a deep lack of understanding of what science is about. The survival of the fishing industry as a component of a sustainable ecosystem is everybody's goal here.

Another problem, one that I'm confident the fishing community does not feel ready to tackle, but is here nonetheless: fishing is only one of the activities that take place in our marine environment, and any Fleet Vision must dovetail with other Visions--for wildlife, for wilderness, for other forms of economic development.

Fishing industry representatives, fishermen, and even fisheries scientists sometimes act as if they can safely assume that management of the entire ecosystem for maximum sustainable yield is the sole objective of human society.

This is a bad assumption, and it sets the fishing community up for a fall. By coming fully to grips with the power of science to improve the management of the resource for everyone, we can move forward with a unified vision that is comprehensive, informed, and viable.

*Les Kaufman is a Professor of Biology at the Boston University Marine Program and Senior PI for Marine Management Area Science at Conservation International*

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# Whale also said that lobstermen frequently call changes in the marine environment to the attention of scientists, which sometimes leads to important new research.

Lobsters continued from front page

ness to secret life of lobsters every day, have expedited the data collection process.

“Working with the industry substantially improves the volume and quality of data we collect--vastly improving our forecasts,” said Richard Whale, a scientist at the Bigelow Laboratory in Maine.

Whale also said that lobstermen frequently call attention to changes in the marine environment that can lead to important new research.

For example, in the past several years, lobstermen from across the region began noticing high numbers of juvenile lobsters residing in deep water.

This observation ran against conventional wisdom, which had long held that early stage lobsters almost exclusively settle in water less than 10 meters, where water is relatively warm.

But few surveys had measured settlement across a range of depths that might be home to temperatures warm enough to trigger settlement.

For example, deep waters off Rhode Island are substantially warmer than equal depths in Maine. And, in places like the Bay of Fundy currents can keep the sea temperature surprisingly warm.

What’s more, previous studies deployed SCUBA divers to collect larvae between rocks and debris, a technique that is not safe in deep water.

To help fill in the research gaps, lobstermen Mark Parkhurst from Boothbay Harbor, Maine and Skip O’leary of Wakefield, R.I. partnered with Whale and Carl Wilson of the Maine Department of Marine Resources to develop a device capable of evaluating the settlement of young lobsters in deep water.

They were supported by a \$25,000 grant from the Northeast Consortium. Lobsterman Nibert Lemieux from Maine joined the project after it was underway.

## The Gear

Parkhurst took the lead on building a device capable of sampling for larvae at depths greater than 10 meters. The design reflected improvements to larvae collectors used in a previous Sea Grant research

project.

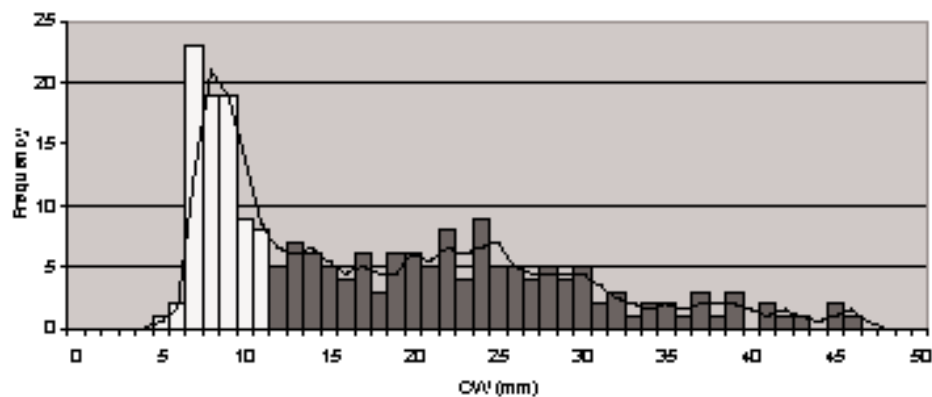
It is made of 10-gauge vinyl-coated wire with 2-inch mesh. Each measures 24 x 33 inches in the floor and 6-inches deep.

For strength, the upper edge was bent over to clasp the wire cover. The bottom was fitted with oak runners and the floor and walls were lined with plastic mesh to help prevent newly settled lobsters, crabs and other organisms from escaping.

Before being deployed the devices were filled with cobbles



10-gauge vinyl-coated wire with 2-inch mesh. Each measures 24 x 33 inches in the floor and 6 inches deep. For strength, the upper edge was bent inward to make lip to clasp the wire cover. Chris Manning photo.



**Fig. 4.** Size frequency distribution of lobsters found in 40 collectors. Lobsters less than or equal to 11 mm carapace width are considered settlers (light shaded bars). Larger lobsters immigrated from surrounding habitat. Line indicates 2-bin running average.

Continued on page 4

The traps were filled with cobbles ranging in diameter from 10-15 cm. The cover was constructed of 2-inch wire mesh that retained the rocks, but designed not to deter lobsters or crabs from settling.

**Methodology**

Two main objectives shaped the study’s design and sampling strategy:

*Objective 1, Evaluating Losses On Retrieval:* For this portion of the experiment hatchery raised lobsters in the first fully bottom-dwelling period of their life cycle (known as Stage V) were obtained from the New England Aquarium. To evaluate losses from the gear, divers seeded 20 collectors with ten, stage V lobsters. The next morning they returned to cover 10 randomly selected collectors with the mesh.

The intervening period gave lobsters the opportunity to stay or leave. If losses during recovery were substantial, the researchers knew there would be significantly fewer lobsters in the uncovered collectors. (A quick measurement evaluated this hypothesis from covered and uncovered collectors).

If losses were significantly greater from uncovered collectors, researchers had planned to develop a mechanism that would cover the collectors upon retrieval.

*Objective 2, Comparing Settlement in Collectors to Natural Nurseries:* For this comparison, 40 collectors were distributed along the shore of two islands in midcoast Maine that are monitored annually, and known to receive high settlement over the past 17 years.

At the beginning of the settlement season, collectors were placed directly adjacent to the natural cobble surveyed at these sites. At the end of the season, divers sampled the sites as part of the government supported New England Lobster Settlement Index Survey (an annual diver-based suction sampling survey supported by Maine, Massachusetts and Rhode Island, and DFO Canada. Visit:

www.bigelow.org).

This provided the opportunity to compare the performance of the collectors to natural settlement densities in the preferred habitat.

The methodology for the diver sampling has been published widely and adopted by several US state and Canadian agencies to quantify newly settled and older juvenile lobsters.

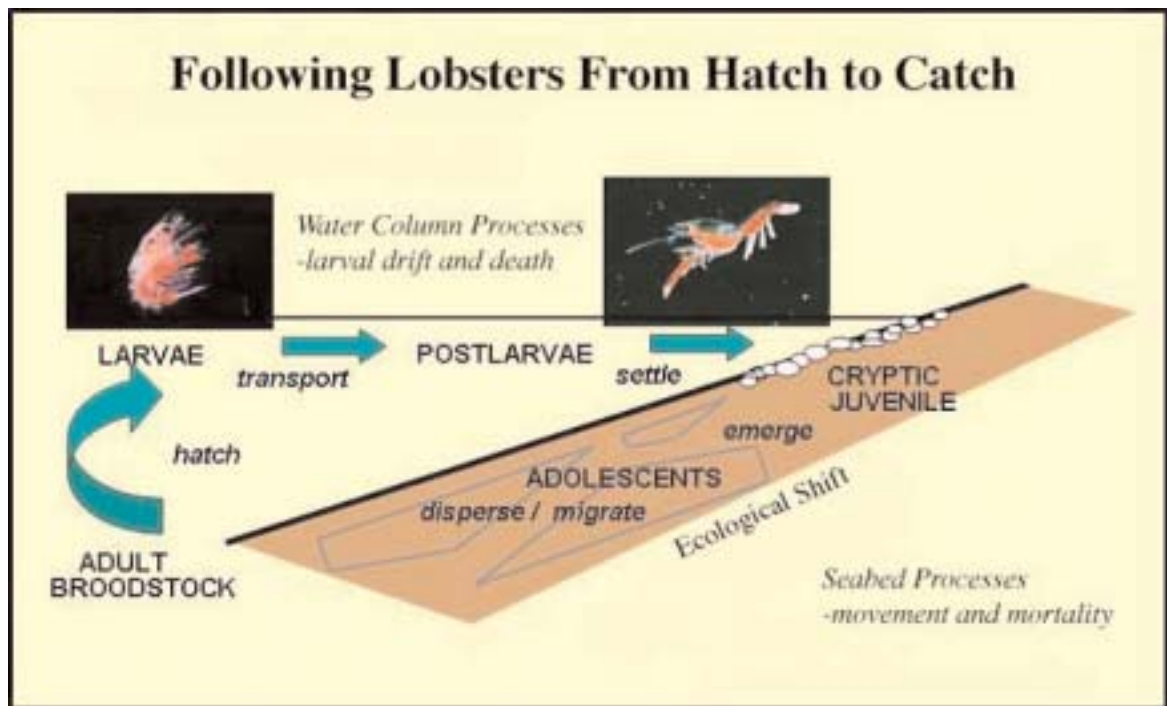
**Conclusions**

The results suggest that (1) the densities of newly settled lobsters in the collectors is comparable to densities found in natural nurseries; and (2) it will not be necessary to incorporate a mechanism to cover the collectors prior to hauling. The researchers concluded that the research is now ready to address the depth range of lobster settlement over a more significant portion of the species’ geographic range. (see figure 4 on page 3)

“We anticipate that success with this development phase of our project will allow us to proceed with our originally planned proposal and engage our industry collaborator in Rhode Island. The scientific objectives of that proposal would be to determine the depth-specific pattern of lobster settlement in two or three regions with contrasting oceanography along the New England coast that might result in different vertical distributions of settlers.

“This would provide the first empirical information available on the vertical extent of lobster settlement over a significant segment of the American lobster’s range, improving our ability to model regional production,” said Whale.

A full proposal is under consideration by the NEC for next



The American lobster has a complex life history which includes a planktonic larval phase and a large-bodied benthic phase. Larval and post-larval lobsters can drift in the water column for a couple of months before settling on the bottom. Once they do settle, they find shelter in beds of cobbles and boulders until they are large enough to defend themselves.

## Online Tag Reporting Now Available for Cooperative Tagging Programs Administered by NEFSC and Partners in New England

In July, the Northeast Fisheries Science Center (NEFSC) unveiled a new online data reporting site for tagging studies done in cooperation with commercial and recreational fishermen.

The site--available by visiting [www.nefsc.noaa.gov](http://www.nefsc.noaa.gov) and clicking on "Online Tag Reporting"--was designed to improve the return information about five NEFSC tagging projects as well as cod and haddock studies coordinated by the Gulf of Maine Research Institute (GMRI) and the Cape Cod Commercial Hook Fishermen's Association (CCCHFA).

"The site was designed to make reporting a tagged fish as convenient as possible. Tagging studies are only as good as the tag information we get back. Therefore, success relies heavily on cooperation from fishermen," said Azure Westwood, who coordinates the yellowtail flounder tagging program for NEFSC.

For nearly 50 years tagging has been used in the Northeast to track the movement of commercially valuable species. The research offers some of the best information available about the movement of fish, and by extension, how well management boundaries, such as marine protected and stock management areas, are working.

The studies are also some of the earliest examples of fishermen/scientists partnerships.

"Fishermen are the best source of information we have about the abundance and distribution of fish. The research simply wouldn't be possible without their cooperation," Westwood said.

Currently the NEFSC administers tagging projects for five species: Apex predators (sharks), Black Sea Bass, Yellowtail flounder, Scup, and Monkfish. Information about two other tagging efforts in the region--cod and haddock--can also be entered on the website.

The following provides a guide to the major tagging efforts



ongoing in the region.

### The Apex Predators Program (APP)

Located at the Narragansett, R.I. Laboratory of the National Marine Fisheries Service (NMFS) is one of three programs in the Population Biology Branch of the Fisheries and Ecosystems Monitoring and Analysis Division. The mission of the APP is to conduct life history studies of commercially and recreationally important shark species. Research is focused on distribution and migration patterns, age and growth, reproductive biology, and feeding ecology. Fishery independent surveys are conducted of large and small coastal sharks in US waters from

Florida to Delaware. Biological samples and catch data are collected at recreational fishing tournaments in the Northeast US. The program administers an extensive Cooperative Shark Tagging Program (CSTP) in the Atlantic Ocean, Gulf of Mexico, and Mediterranean Sea, utilizing thousands of volunteer anglers. APP staff manages and coordinates the Cooperative Atlantic States Popping and Nursery (COASTSPAN) Survey, that uses researchers in major coastal Atlantic states to conduct a comprehensive and standardized investigation of valuable shark nursery areas. Information gathered from our research programs provides baseline biological data for the management of large Atlantic sharks. Visit: <http://na.nefsc.noaa.gov/sharks/index.html>

### Scup Tagging Program

Since September 2005, this program has released more than 5,600 tagged scup. It chartered commercial fish trappers and recreational headboats for most of the tagging trips, but state survey vessels also played an important role in the release of tagged scup. The overall area of releases ranges from Nantucket Sound to the northeastern end of Long Island.



### The Cooperative Black Sea Bass Tagging Project

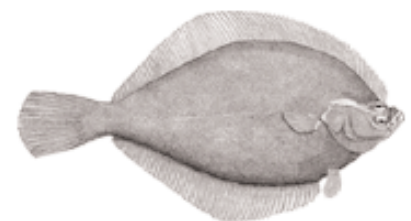
Designed to examine the population size, exploitation rate and seasonal movements of the northern Atlantic coast black sea bass, *Centropristis striata*. Black sea bass have been divided into two separate populations along the Atlantic coast, with the northern population distributed north of Cape Hatteras, NC. This project is conducted through cooperation among NOAA's National Marine Fisheries Service (NOAA Fisheries), state fishery agencies, and commercial and recreational fishermen. Tag recovery information is compared to release data to provide a basis for determining seasonal movements inshore and offshore as well as a better understanding of population dynamics and the ecological condition of the black sea bass.

Visit: <http://www.nefsc.noaa.gov/read/popdy/blackseabass-tagging/>



### Yellowtail Flounder

Yellowtail flounder is one of the principal resources in the Northeast Groundfish complex, with landings valued around \$14 million annually. Since 2003 NEFSC has



continued next page

cooperated with over a dozen commercial fishing vessels and captains to tag some 35,000 yellowtail with disk tags and archival data storage tags throughout New England. The collaborations have provided crucial information about the abundance and distribution of this important species. Visit: <http://www.cooperative-tagging.org/>

### Monkfish Research Set-Aside

NMFS and the New England and Mid-Atlantic Fishery Management Councils (Councils) have set aside 500 monkfish days-at-sea (DAS) to be used for research endeavors under a research set-aside (RSA) program. NMFS is soliciting proposals for research activities concerning the monkfish fishery for fishing year 2007 (May 1, 2007-April 30, 2008). Through the allocation of research DAS, the Monkfish RSA Program provides a mechanism to reduce the cost for vessel owners to participate in cooperative monkfish research. The intent of this program is for fishing vessels to utilize these research DAS to conduct monkfish related research, rather than their allocated monkfish DAS, thereby eliminating any cost to the vessel associated with using a monkfish DAS. Landings from such research trips may be sold to generate funds to help defray research costs. No Federal funds are provided for research. Rather, projects funded under the Monkfish RSA Program is provided with additional opportunity to harvest monkfish, and the catch sold to generate income to offset research costs. Projects funded under an RSA DAS award must enhance the knowledge of the monkfish fishery resource or contribute to the body of information on which management decisions are made.

Visit: <http://www.nefsc.noaa.gov/read/popdy/monkfish/>



### Other Tagging Programs Available for Website...

#### The Northeast Regional Cod Tagging Program (NRCTP)

The Northeast Regional Cod Tagging Program (NRCTP) began in late 2002 and represents the largest cod tagging program initiated to date along the eastern seaboard of the North American continent. A significant example of collaborative research, this program is international and region-wide, involving commercial fishermen and research organizations from Canada down to Cape Cod. This program focuses on Atlantic cod, *Gadus morhua*; a fish which has furnished a traditional fishery in Canadian and US waters for centuries. The program design is based on recommendations documented by the New England Aquarium. Funded by NOAA Fisheries, Northeast Regional Office, the NE Regional Cod-tagging Program is being coordinated by the Gulf of Maine Research Institute based in Portland, Maine. The program was planned to run for a minimum of two years, during which time over 100,000 Atlantic cod were to be tagged and released throughout the Gulf of Maine and neighboring waters in Canada and Southern New England. The Program has been extended more than once and currently had funds to continue its data collection through June 2006.



#### Northeast Regional Haddock Tagging Program

With grant support from the Northeast Consortium, CCCHFA has carefully developed a tagging program for Atlantic haddock (*Melanogrammus aeglefinus*). Northeast Consortium Cooperative Haddock Tagging will pool the resources of CCCHFA, the Gulf of Maine Research Institute (GMRI), NOAA Fisheries Northeast Fisheries Science Center, 20 benthic longline vessels and 15 fishermen trained and acting as tagging technicians. CCCHFA will be the central coordinating body, while GMRI will use the infrastructure developed for the Northeast Regional Cod Tagging Program to manage tag deployment and return data, tag returns and reward distribution. The project tests existing assumptions about the spatial distribution of the stocks in New England waters. We are particularly interested in the movement of haddock within and between closed areas and between eastern and western Georges Bank. While many fishermen, scientists and managers have pointed to year-round area closures as contributing to the recent promising news of a haddock population boom, we have scant information to determine the accuracy of this hypothesis. The project will be a two year effort to tag at least 20,000 haddock using longline gear. Haddock are being tagged on dedicated and non-dedicated fishing trips to open and closed areas within Georges Bank and the Gulf of Maine. In order to obtain the best data possible and maximize fish survival, all tagging trips are being staffed with qualified tagging technicians trained by CCCHFA and using a highly standardized protocol. The haddock are tagged with green T-bar tags using a standard meat tagging gun. Tagging operations are similar to that for the Northeast Regional Cod Tagging Program and technicians record tag #, fish length, location, water depth and temperature, spawning condition, and date and time. Visit: <http://www.ccchfa.org/pages/15/>

NMFS Releases are  
available at:

[www.nero.noaa.gov](http://www.nero.noaa.gov)



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
NORTHEAST REGION  
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Gloucester, MA 01930-2298

August 29, 2006

#### SMALL ENTITY COMPLIANCE GUIDE

Dear Summer Flounder Dealer and  
Commercial Vessel Permit Holder:

This letter is to inform you that the summer flounder commercial quota available to Maine has been harvested.

Effective 0001 hours August 31, 2006, fishing vessels issued a Federal moratorium permit for the summer flounder fishery may no longer land summer flounder in Maine for the remainder of the 2006 calendar year. Vessel owners issued Federal permits are also reminded that they must continue to complete and submit vessel logbooks. Additionally, dealers issued Federal dealer permits for summer flounder are advised that they may not purchase summer flounder from federally permitted vessels that land in Maine for the remainder of the calendar year. Federally permitted dealers must also continue to report all fish purchases from any vessel.

You may also receive permit holder letters, including closure notices, by e-mail by clicking on "Permit Holder Letters" on our website at <http://www.nero.noaa.gov>; or via fax by providing a fax number through a written request to the above address, or by faxing your request to 978-281-9135.1

Sincerely,

Patricia A. Kurkul  
Regional Administrator

This small entity compliance guide complies with section 212 of the Small Business Regulatory Enforcement Fairness Act of 1996.



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