

Collaborations

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



Monhegan Lobster Research

Last year Maine's lobster landings were valued at over \$253 million, two-thirds of the state's seafood revenue; around 8,000 Mainers make their living lobster fishing, which, in turn, supports thousands more jobs and businesses; and the lobster is the state's most salient tourism icon—and there's no telling how many dollars that's worth. In short, a lot is riding on the state's lobster fishery.

Two recent bestsellers, *The Lobster Coast*, by Colin Woodard and *The Secret Life of Lobsters*, by Trevor Corson

went a long way to increasing the public's lobster literacy. Some of us know they're crustaceans, genetically similar to crabs and shrimp, some of us know that, unless their powerful claws are shackled with rubber bands, they can wreak all sorts of havoc on

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-Carl Wilson, Maine DMR.

each other (not to mention a carelessly placed finger), and most everyone who has at least visited the state knows that lobsters are harvested in traps, wire or wood.

It's true, we know quite a bit about lobsters. But, according to Carl Wilson, Maine's Department of Marine Resource's chief lobster biologist, there's at least as much we don't know about them.

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don't begin to get a handle on some of these questions we may find ourselves in a position we do not want to be in," Wilson said.

One of the big questions - that has gone conspicuously unan-

Message From The Editor

Monhegan Island, which rises like a breaching whale about 12 miles off the middle coast of Maine, has featured prominently throughout the history of fishing and exploration. Archaeologists have found 1,000-year-old evidence of Native American activity there, and Captain John Smith's ship's log records a landing in 1614, describing the place as a "round, high ile." Conveniently located near rich fishing grounds, and benevolently free of ledges and shoals, the island served as an important outpost for the colonization of the New World. Later, it became a valuable stopping point for vessels to take on fresh water and to dry cod flakes for trade on the mainland. Since the 19th Century, Monhegan's rugged beauty has attracted flocks of artists, including the likes of Edward Hopper, Rockwell Kent, and a trio of Wyeths, whose celebrated images of her people and places no doubt enhanced the island's emergent mystique. Indeed, more than one contemporary historian has described the place as the "Cradle of New England."

The round, high ile has also distinguished itself in the history of fisheries management, serving, in some ways, as a microcosm for the region. As early as 1907, Monhegan's fishermen took the unusual step of asking the state's legislature to close a 2-mile perimeter around the island to lobstering from December to June. Until the 1970s, when improvements in boats and gear allowed for greater access to its highly productive fishing grounds, the unofficial boundary was law, policed by Monhegan's fishermen, at times "with the knife" (A Maine expression for cutting a lobstering rival's traps). A few years before, the state's marine patrol agency was starting to crack down on vigilante justice, factors that together set the stage for a political debate - a fascinating moment in history, when changes in technology, society, and the rule of law converged on the island's shores.

Many readers are likely aware of the result. In 1998, the Monhegan Lobster Conservation Area, some 30-square-miles of bottom to be fished only by members of the island community six months out of the year was created by the legislature. At that moment, a new phase of the round ile's history began, as did a test of sorts: Can a community, bound together by shared interest and respect, be relied on to take care of its own natural resources for future generations? Only time, of course, will tell. (As you will read in the cover story, though, some results will be revealed by a new collaborative study of Monhegan's lobster zone to begin this Spring).

There are, however, a few important observations worth noting here. First, the Monhegan system builds and sustains community. When the island's fishermen are faced with decisions or challenges to the health of their resource, the problem is addressed with all members present at a town meeting. Internal issues (say an island lobsterman has been found taking shorts) are dealt with promptly; and bigger issues (say a proposal to study lobster biology in the closed area) are brought to the relevant state agency. Furthermore, to this day, Monhegan's lobstermen will not begin the harvesting season until every one of its fishermen is ready, a claim few (if any) coastal communities elsewhere in New England can make. The experiment has proved, at least on a small scale, that local, state, and federal harvest rules can compliment each other.

It can't be argued (I don't think) that the Monhegan example is the right for every community facing marine resource dilemmas. The Lobster Conservation Area, after all, is relatively small and the community has almost 100 years of experience with an area management-based system. But, there is one overriding lesson that I think we ought to take away from the island's experience. If the ultimate fate of the ocean's health depends on all of us buying into a conservation ethic - where fisherman, scientists, and landlubbers alike, recognize that we have all caused the ocean harm and therefore we all have a responsibility to fix it - communities will have to build and sustain that idea. A tall order, perhaps, but one we know is possible, because it is alive and well on Monhegan.

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-Carl Wilson, Maine DMR

swered over the years - Wilson said, is: What is the effect of an estimated 3 million traps off the coast of Maine on ocean ecology?

To start to get some answers, Wilson and a handful of lobstermen from Monhegan Island received a project development grant from the Northeast Consortium last year to test the feasibility of a trap density study there.

Wilson said that Monhegan offers a valuable setting to study lobster biology because since 1907 waters within 2 miles of the island have informally been closed from December to June (formally since 1998). “The Monhegan Area represents the only seasonal closure for lobster in the entire Northeast. Therefore, we have a unique opportunity to conduct experiments in an area that is fished half of the year and trap-free the other.”

Building on the results of that work the team, which now includes seven Monhegan Lobstermen and three additional scientists, was awarded \$250,000 to conduct research in the 2005

season.

But, before we get to the science, first a little lobster history. In 1995, the National Marine Fisheries Service (NMFS) declared the entire U.S. lobster fishery overfished. Under this designation, managers were compelled to act. Responsibility for rule changes transferred from NMFS to the Atlantic States Marine Fisheries Commission (ASMFC) in an effort to create more regional control. The

| | Size (km ²) | Density (traps km ⁻²) | TRAPS |
|---|-------------------------|-----------------------------------|-------|
| 1 | 0.9 | 50 | 45 |
| 2 | 0.9 | 50 | 45 |
| 3 | 0.9 | 100 | 90 |
| 4 | 0.9 | 100 | 90 |
| 5 | 0.9 | 500 | 450 |
| 6 | 0.9 | 500 | 450 |
| 7 | 0.9 | 1000 | 900 |
| 8 | 0.9 | 1000 | 900 |

Proposed trap-density treatments for manipulative experiments in the study area.



The view from Monhegan’s lighthouse hill toward town and Manana Island. Monhegan is located about 12 miles east of Port Clyde. The island’s harbor and proximity to fishing grounds have made it a convenient outpost to repair vessels, dry fish, and provision for nearly 400 years.

Maine Department of Marine Resources (DMR), feeling pressure from federal authorities, felt it necessary to take action or face potentially stiffer, imposed restrictions.

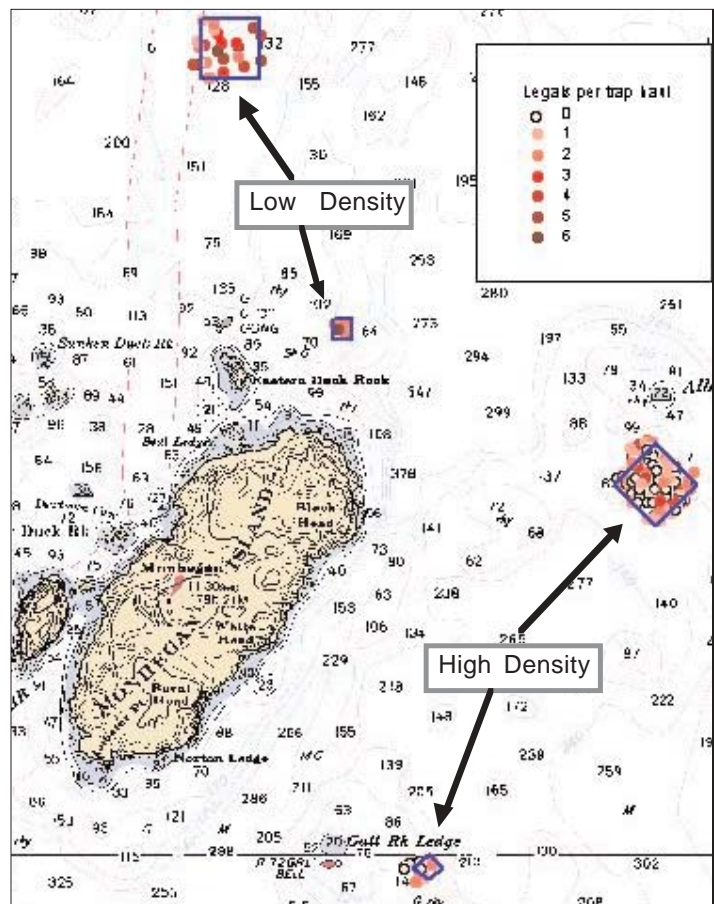
Trap reduction was officially on the table. By 1996, the Maine Legislature, under the direction of the DMR, implemented a limit of 1,200 traps. In 1997, the ASMFC lobster management plan known as Amendment 3 proposed a total trap limit of 1,200, with a reduction to 1,000 in 1999 and 800 in 2000.

It was during this time that the Lobster Zones and the Zone Councils were created. The Councils in part addressed the industry's call for more local control, but it would also be used as a vehicle for implementing new regulations in three areas: trawl limits, closures, and, of course, trap limits.

"With so much at stake in Maine's lobster fishery (and with traps being the primary tool used to manage it) we need to have a better idea of how trap density correlates to lobster mortality," Wilson said. "That is the primary purpose of the Monhegan Study."

Mathew Thomson, a Monhegan lobsterman who will participate in the study, said that the project serves several overlapping purposes. "The value of collaborative research starts by breaking down barriers that can exist between scientists and fishermen. It also gives us more confidence in the data, because we took part in gathering it. And, with our season closed six months out of the year, a few months of income during the summer is timely."

The research officially begins in April, when a vessel equipped with multi-beam sonar, begins to capture detailed imagery of the conservation zone's approximately 30 square-mile bottom. "The map will provide a mosaic of bathymetry and bottom-type for the survey area, as well as form a baseline for the project and future research," Wilson said. The data will



Trapping areas and trap haul locations on the first day of trapping during June 2004 work supported by NEC Development Funds. Areas with high density (500 traps km⁻²) of traps had lower catch per trap but higher cumulative catch than areas with low trap density (100 traps km⁻²).



be made available to the general public through the Maine Department of Marine Resources' web page (www.maine.gov/dmr).

Based on the imagery and experience gained during last year's research, eight one-square-kilometer blocks will be selected to minimize migration in and out of the study blocks and other variables that might influence results.

A total of 3,000 traps are available to be distributed appropriately among experimental areas to measure the effects of trap density on catch rates, population depletion, and lobster mortality.

The proposed experiment will utilize four different trap densities, distributed across those eight blocks (see Table 1 on p. 3). Wilson said that the determination of trap densities are based on recently published research along the coast of Maine (Steneck and Wilson 2001, Kelly 1993).

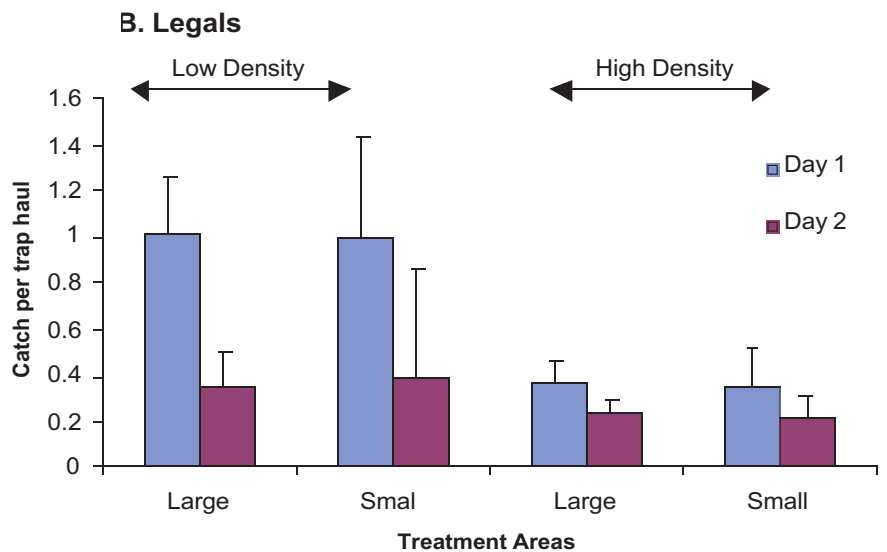
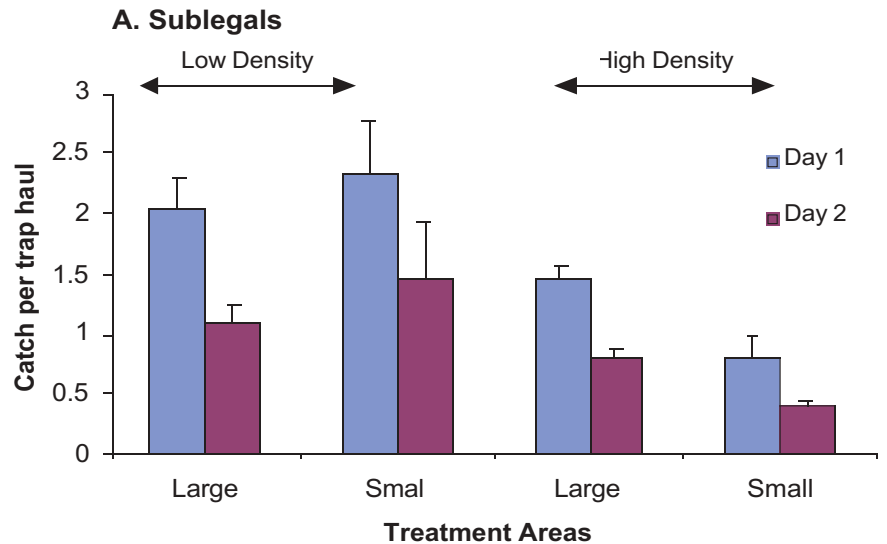
Further parameters of the experiment include:

- Density of traps will range from 50 to 1000 traps km⁻², and will remain constant throughout the experiment. The team will haul each trap six times during the course of the study (with a standard soak time of four days).

- Commercial four-foot double parlor wire traps, typically fished in Maine, will be used, and all traps will be equipped with standard escape vents and baited with salted herring.

- All participating vessels will be equipped with Thistle Marine Electronic Logbooks in order to record landings details. The amount of lobsters (legal, sublegal, egg bearing, V- notch, over size, and crabs) will be logged for each haul. On-board observers will quantify lobster size, sex, cull status and molt stage from approximately 10 percent of the traps hauled each day. Each lobster will be tagged and released with a temporary knuckle tag, which will allow for tracking of movements, recaptures and population estimates during the experiment.

- Catch rates will be compared to trap densities in experimental areas. Individual trap capacity will be estimated at low trap densities, and gear competition will be determined over the range of trap densities. Additional insights into catch patterns and lobster movements will be gained as each trap haul will be spatially referenced, and lobsters tagged marking release location and time. Spatial analysis will be conducted to investigate edge effects, movement of lobsters between traps, nearest neighbor interactions and to ensure



Sublegal (A) and Legal (B) catch rates over two days, two densities of traps and two areas.

proper execution of experimental design.

“Understanding the functional relationship between catch rates and trap density is an explicit objective of the experiment,” according to the project’s proposal. “At low trapping densities we anticipate catch per trap to be limited by capacity, whereas high density traps will more likely compete with each other. In this experiment we plan to return lobsters in the same location they were caught so as to evaluate catch rates in a population that is not being depleted by harvesting. To the extent population densities vary among areas we will also be able to evaluate the relationship between lobster population densities and catch rates.”

The Fisheries Ecosystem Project

At this year's Maine Fisherman's Forum, scientists from the University of New Hampshire Center for Excellence in Coastal Ocean Observing and Analysis (COOA) and the Gulf of Maine Ocean Observing System (GoMOOS) gathered to discuss the new demands for information required for ecosystem-based fisheries management strategies (EBM).

The meeting was the second of three workshops coordinated by the Northwest Atlantic Marine Alliance (NAMA) and representatives of the scientific institutions.

Heather Deese, who is heading up the project for NAMA, said the purpose of the project is to answer some basic questions central to a transition toward EBM: First, what does ecosystem-based management mean, exactly? and what kind of science will it require?

Based on the discussions between fishermen and scientists at the meetings, Deese said, graphic illustrations that reflect ecological relationships relevant to fisheries will be created by a professional artist.

"The old adage a picture is worth a thousand words is especially true in fisheries management. The ecosystem illustrations will be powerful tools to catalyze further discussions," said Deese.

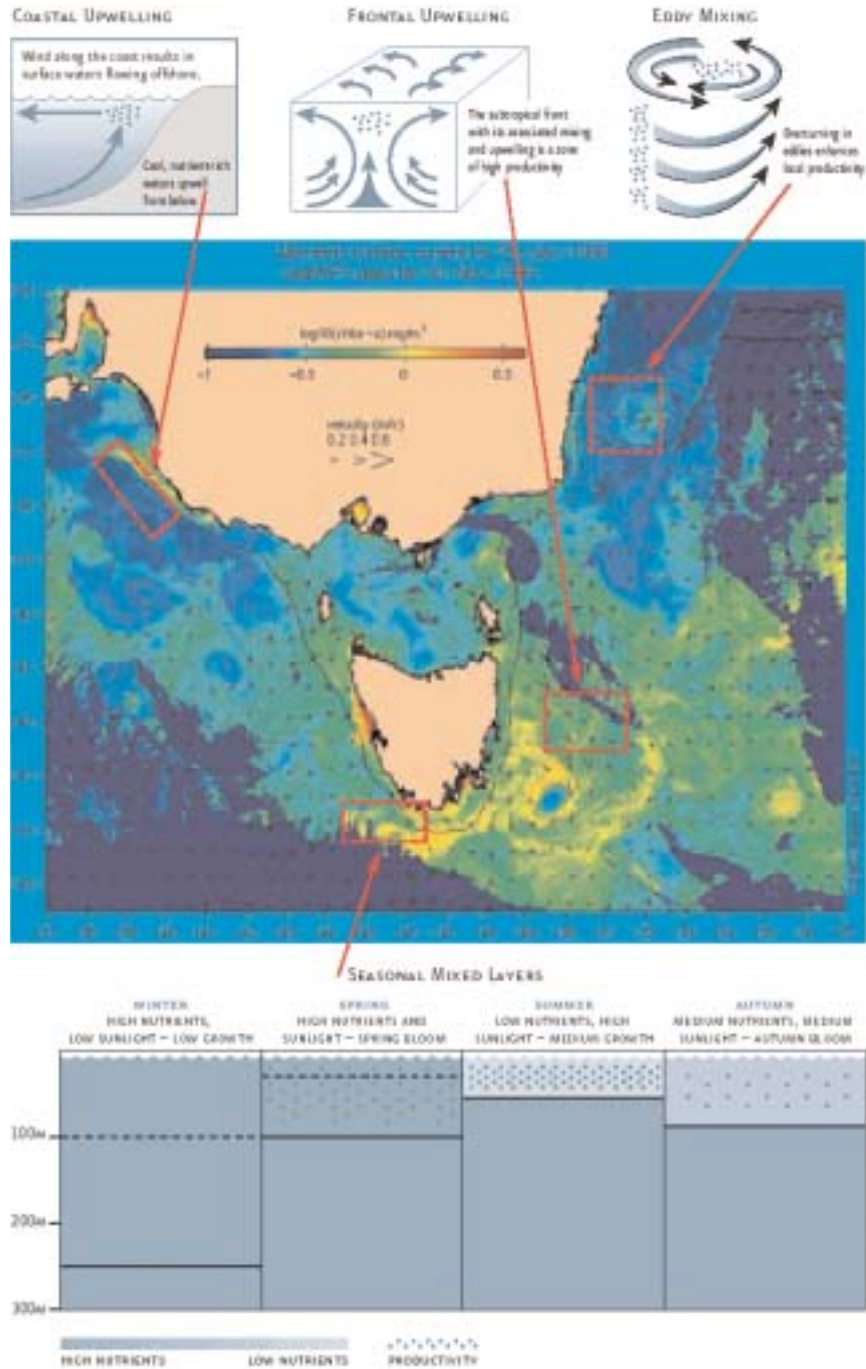
David Goethel, a New Hampshire fisherman, who sat on the meeting's panel (along with Craig Pendleton of NAMA and Dr. Jeff Runge of UNH) said that collaborative efforts such as the Fisheries Ecosystem Project are needed before real progress can be made toward an ecosystem-based approach to fisheries management.

"Right now there isn't even a single definition of ecosystem-based management that's agreed on. Discussions where fishermen and scientists can talk openly about what EBM is actually going to look like are critical to get us headed in the right direction," he said.

Deese said that an interesting characteristic of the meetings held so far has been how the conversations change according to the kinds of fishermen present.

"(At the Forum) most of the time was spent talking about bluefin tuna issues since there were a lot of tuna fishermen in the room. But, there are at least three resounding themes that arise from all of the conversations, especially issues associated with herring populations. First, fishermen and scientists both learn a lot from these discussions. Second, fishermen have a tremendous amount of knowledge to share about the ocean that is extremely valuable for scientists and managers, including the ability to map specific geographical areas associated with particular species, as well as feeding relationships and other species-species and species-environment interactions. Third, fishermen also have a lot of questions and concerns regarding the impacts of their own fisheries, other

fisheries, and other human activities (including huge issues surrounding pollution, climate change, coastal development, etc). In all, five meetings will be held in Portsmouth, N.H. and Portland, Maine. Currently organizers are seeking funding to expand the workshops into eastern Maine and Massachusetts. For more information contact Jen Levin at NAMA (jen@namanet.org or 207-284-5374).



Example of "Ecosystem conceptual model" showing oceanographic influences on productivity, southeastern Australia (copyright Australian National Oceans Office,

UNITED STATES DEPARTMENT OF COMMERCE
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Small Entity Compliance Guide



Dear Limited Access Northeast (NE) Multispecies Permit Holder:

This letter is to inform you that, pursuant to 50 CFR 648.85(a)(3)(iv)(C)(3), the Eastern U.S./Canada Area is closed to all limited access NE multispecies days-at-sea (DAS) vessels. Limited access NE multispecies DAS vessels are also prohibited from harvesting, possessing, and landing Georges Bank (GB) yellowtail flounder from the entire U.S./Canada Management Area (West and East). These measures are effective 0001 hours on April 1, 2005, through April 30, 2005. This action is being taken based upon Vessel Monitoring System (VMS) reports and other available information that indicates that 100 percent of the GB yellowtail flounder TAC has been harvested.

- Vessels that have not yet departed on a trip, or declared their intent to fish in the Eastern or Western U.S./Canada Area as of 0001 hours on April 1, 2005, may not declare their intent to fish in, enter, or fish in the Eastern U.S./Canada Area and may not possess or land GB yellowtail flounder caught in the Western U.S./Canada Area, respectively.
- Vessels that have already declared their intent to fish in the Eastern U.S./Canada Area through VMS, departed on a trip, and crossed the demarcation line as of 0001 hours on April 1, 2005, may finish their trip into the Eastern U.S./Canada Area.
- Vessels that have already declared their intent to fish in the Western U.S./Canada Area through VMS, departed on a trip, and crossed the demarcation line as of 0001 hours on April 1, 2005, may possess and land GB yellowtail flounder caught from the Western U.S./Canada Area.

This action is being enacted in accordance with the NE multispecies regulations to prevent overharvesting of the GB yellowtail flounder TAC in the U.S./Canada Management Area for the 2004 fishing year. This small entity compliance guide complies with section 212 of the Small Business Regulatory Enforcement Fairness Act of 1996.

This notice is authorized by the Administrator of the National Marine Fisheries Service, Northeast Region.



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