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## In This Edition

1. [Blue Lobster Project:](#)
2. [Lobster Cookbook Promises to be a Success](#)
3. [Aeration Systems Put to Test in Stonington Pound](#)
4. [Cranberry Island Video Project Off and Running](#)
5. [Lobsters are Discriminating Creatures](#)
6. [Escape Vents Tested](#)
7. [Pegged vs. Banded Lobsters:](#)
8. [Choose Another Bulletin](#)

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# Blue Lobster Project: Do Hatcheries Work?

If the experiment conducted by Sam Chapman of the University of Maine's Darling Marine Center is a success, lobstermen should see a lot more blue lobsters turning up in their traps in a few years. This past summer, Chapman and his research associates released over 6000 juvenile blue lobsters in the mid-coast area near Damariscove Island and in Pemaquid Harbor. The real question is: Will these lobsters survive for the six or seven years it takes for them to become harvestable size adults?



In 1986, at the Darling Center in Walpole, Chapman began developing the technology to hatch and release lobsters. In this culture system, algae are fed to brine shrimp which are then fed to lobsters. In the spring of that same year, the Cutler Marine Hatchery was established in Downeast Maine. This hatchery, which used feeding techniques developed in Walpole, was the first privately operated, fishermen-sponsored lobster rearing facility in the United States .

For three years now, thousands of lobsters have been hatched, raised, and released in coastal Maine waters. The Darling Center alone has released almost 90,000 baby lobsters. Lobstermen provide partial support for the Cutler Hatchery through the stateadministered Seed Lobster Fund. Both the state and lobstermen now want to determine whether lobster

hatcheries are effective before they expand the program. According to Irv Kornfield, of the University of Maine's Center for Marine Studies, if three percent of the lobsters released by hatcheries survive until they are of legal size, hatcheries will be considered economically feasible for the fishery.

To determine whether hatcheries are effective, lobsters must be marked in some way so that researchers will know how many hatchery-raised animals are trapped. Most hatchery-raised lobsters are ready to be released (have reached stage IV development) in two weeks. Lobsters can be marked with a microwire tag but they must first be raised until they are three or four months old. Microwire tagging is also a very tedious method when there are thousands of lobsters to tag. And finally, specialized equipment is necessary to detect lobsters that carry microwire. This would make it difficult for fishermen to identify which lobsters in their traps were raised in a hatchery.

"Color-coded" blue lobsters were chosen as a way to differentiate those that are hatchery-

raised from those that develop naturally in the wild. Blue lobsters are ideal because they are very rare--occurring one in four million--and they are easy to spot. However, the question still remains whether blue lobsters survive as well as normal ones.

In addition to the "baby blues" released last summer, Chapman is rearing several hundred juvenile lobsters that resulted from a number of crosses, such as a blue male mated with a normal female and a blue male mated with a bluish/normal female. This will help researchers determine the color ratio of blue or bluish lobsters to normal greenish-brown ones, and to establish the genetics of lobster coloration . One goal of the project is to develop a broodstock of three or four dozen pure blue females which will supply the thousands of juveniles needed for future work.

For the next stage of this research, Chapman and his associates will sample sites where the blue lobsters were released, try new release sites along the coast, and develop more "color-coded" lines from rare yellow and red lobsters.

*Funding for the lobster hatchery project was provided by the Maine Lobstermen's Association, the Lobster Advisory Council of the Maine Department of Marine Resources, the Fisheries and Aquaculture Research Group (FARG) of the University's Agricultural Experiment Station, the Maine Aquaculture Association, and the Maine Lobster Institute.*

[Back to Beginning](#)

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## Lobster Cookbook Promises to be a Success

Representing the coast of Maine from Kittery Point to Beats Island, fifteen women of the lobster industry have joined forces with the Maine Lobster Institute (MLI) to produce a lobster cookbook. With the working title, "A Lobster in Every Pot: More Than Just a Cookbook," the book will contain not only recipes of the many delicious ways to prepare lobster, but also interesting and humorous lobster-related anecdotes, photographs, and illustrations. In addition, interspersed throughout the book will be facts about the history of lobstering, lobster biology and behavior, harvesting, storage, handling, shipping, economic importance, and nutritional value. In effect, the book will attempt to answer everything the general public ever wanted to know about lobsters and more.

Judging by the enthusiasm shown by the committee, the book can't help but be a success.

Members are:

Jean Aldrich  
Harriet Heanssler  
Jane Alley  
Roberta Joyce  
Mary Blackmore  
Ruth Lane  
Cindy Brown  
Sue Nickerson  
Pat Carver  
Sue Smith  
Myrna Coffin  
Donna Vachon  
Paula Colwell  
Lisa Werner  
Susan Hawks

[Back to Beginning](#)

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## Aeration Systems Put to Test in Stonington Pound

Bob Bayer, of the University's Animal and Veterinary Sciences Department, is working with John Riley and graduate student Daniel Hagopian of Agricultural Engineering to test three aeration systems for lobster pounds. They will install the systems in Tom Colwell's pound in Stonington, Deer Isle. Through their research, they will determine which system gives the most efficient oxygen distribution.

The three systems which will be tested are the existing diffusion stone method, and two different types of surface aeration systems. As part of his masters project, Hagopian will monitor oxygen levels in the pound at various time intervals during low tide when the water is below the dam, and correlate this data with different levels of lobster loading and the water temperature.

Much of the equipment for the study was donated by the manufacturers. Additional support was provided by the Maine Lobster Pound Association, the Maine Lobster Institute, and the Maine Agricultural Experiment Station.

## [Back to Beginning](#)

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### Cranberry Island Video Project Off and Running

Bob Bayer, lobster researcher at the University of Maine and graduate student George Kupelian, installed an underwater video surveillance system off the Cranberry Islands at the beginning of the summer. The system, developed by Mike Manuzza, graduate student in Agricultural Engineering, and Kupelian, monitors lobster activity in and around a series of pots.

The experiment was designed to find out whether lobsters can escape from traps once they're inside, as well as answer other research questions about lobster behavior in and around traps. At the end of the study, the video footage will be edited and condensed into a 20-minute segment showing lobster behavior that researchers found was the most interesting and informative.

Islesford lobstermen Jack Merrill and Bruce Fernald have assisted researchers by monitoring the equipment and checking to see that no other gear interferes with the study. After observing hours of video footage, Bayer and Kupelian agree that it appears that lobsters can get out of traps, but only from the "kitchen" or forward compartment. Also, it seems more likely that once lobsters are inside the kitchen, there is a greater possibility that they will wander into the "parlor" section than leave the trap.

According to researchers, once the lobsters in their study entered the "parlor" area, "no one



got out."

Video observations showed that when lobsters first discovered they were trapped, they probed around and tried very hard to escape. However, after awhile they gave up and settled down in the corners of the trap. Another interesting observation was that lobsters entered traps even after the bait was gone.

An offshoot of this project is another video system, designed by Kupelian, which will be implemented at Conary Cove Lobster Pound in Deer Isle. The purpose of this study is to observe lobster behavior over a 24-hour period and to study their feeding habits. If affordable underwater video systems can be developed, pound owners could use them to determine when pounded lobsters have eaten, and to monitor the lobsters' health.

Both of these studies are being conducted by the Fisheries and Aquaculture Research Group of the Maine Agricultural Experiment Station at the University of Maine. The equipment was funded through the University's Center for Marine Studies.

[Back to Beginning](#)

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## Lobsters are Discriminating Creatures

According to Bob Steneck, marine ecologist at the University of Maine, lobsters choose different places to live depending on their size and the bottom characteristics of the habitat.

In his main study site in the Damariscotta River "Thread of Life" region, Steneck discovered that there is a close relationship between the number of shelter spaces in a given area and the number of lobsters living there. Also, the size of the spaces is directly related to the size of the lobsters that inhabit them.

Small lobsters [less than 1-1/2" carapace length (CL)], called Early Benthic Phase lobsters, live mainly in shallow waters where there is a small rock or "cobble" bottom. These lobsters depend on the small shelters created between cobbles which protect them from predators. Adolescent Phase lobsters (1-1/2" to 3-1/2" CL) live in areas with larger boulders, remain under cover during most of the day and go foraging at night.

Reproductive size (greater than 3-1/2" CL) adult lobsters appear to be less shelterdependent than the other two phases . They usually inhabit deeper water and can migrate long distances.

Steneck points out that shelter space can be limited for Adolescent Phase lobsters even though empty spaces of the right size are available. This is because these lobsters are highly competitive and aggressive. When shelters are too close together or face each other, lobsters compete with dominant lobsters forcing subordinate individuals from their territory. Thus, the number of empty shelter sites depends on their spacing as well as on the aggressiveness of the lobsters in the area.

Where lobsters live, their population densities, and food availability are factors which contribute to the "carrying capacity" of the lobster habitat. Over the past several years, Steneck has been studying how these factors affect the carrying capacity, so that future studies can determine the impact of human activities on it.

Next summer Steneck is proposing, with support from Sea Grant and the Maine Lobster Institute, to study the impacts of dragging on lobster populations and the carrying capacity of their habitats . He will again use the "Thread of Life" area for his study site where lobsters and shelter spaces are most abundant, and the population is stable. Questions he will address include: Does dragging kill lobsters in areas where they are abundant? What impact does dragging have on their food? What is the impact of dragging on bottom characteristics and other factors which determine the carrying capacity?

[Back to Beginning](#)

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## Escape Vents Tested

The South Bristol Fishermen's Co-op asked Bob Steneck to look into the impact of various changes in escape vent sizes, and offered to supply the traps for the research. After testing three different makes of both the current 1-3/4" size vent and the proposed 1-15/16" vent, researchers found that there was no significant difference between the various makes for either size. However, legal size lobsters **weren't able to escape from traps with either the smaller or larger vents.**

With smaller lobsters, it was a different story. Traps with the 1-3/4" vent retained more sub-legal size lobsters than those with the larger vent. This could be damaging if a lobster molts, throws a claw, or is preyed upon by another lobster while trapped inside. One possible explanation is that smaller lobsters don't appear to move around as much as larger ones and therefore may not find the escape vent.

[Back to Beginning](#)

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## Pegged vs. Banded Lobsters: There is a Taste Difference

For years, members of the lobster industry have questioned whether using wooden pegs affects the flavor of lobster claw meat. Terry Work, Assistant Food Scientist at the University of Maine, conducted a study with Ruth True, Bob Bayer, and John Riley to find out if there is a noticeable difference in taste between meat from pegged and banded lobsters.

After lobsters were boiled for fifteen minutes in a three per cent solution of salt water, claw meat from both banded and pegged lobsters was removed and placed in coded serving dishes. Twenty panelists were asked to indicate which sample they preferred for flavor, and whether they could detect a slight, moderate, or large difference between the two samples. Results indicated that the flavor of claw meat from banded lobsters was preferred over that from pegged lobsters. Panelists could also detect a flavor difference between the two although it was described as "slight." Most said that meat from pegged lobsters had a "slightly bitter aftertaste." Researchers suggest that a follow-up study is now needed to determine whether meat from banded lobsters has a distinctive flavor when compared to meat from claws cooked with the bands removed.

[Back to Beginning](#)

The Lobster Bulletin is a periodic newsletter published by the Lobster Institute in cooperation with the Maine/New Hampshire Sea Grant Marine Advisory Program. We welcome your comments and suggestions. For more information please contact us at:

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[Back to the Bulletin Menu](#)

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