



Summer 2012

*“News, research updates, and information on lobsters and the lobster industry.”*

**Published by the Lobster Institute**

**“Protecting and conserving the lobster resource, and enhancing lobstering as an industry...and a way of life.”**

## Understanding the Soft Shell Lobster

Newspapers this spring and summer have been filled with articles about the early arrival of shedders in 2012, and the resulting over-supply of soft shell lobsters on the market. Readers have learned that this over-supply means a low price is paid to the fishermen for their catch, and most of these soft shell lobsters are either eaten locally or sent to processors for cooking and picking. But what is happening physiologically to the lobster?

Lobsters are invertebrates. A lobster has no internal skeleton; however its shell serves as an external skeleton or exoskeleton. In order to allow for growth, this hard external skeleton is shed during what is called the molt cycle. As Dr. Diane Cowan describes it on the Lobster Conservancy Web site, [www.lobster.org](http://www.lobster.org), “The act of escaping from the old shell is known as *ecdysis* (from the Greek, *ekdysis*, meaning "getting out") or, more commonly, as shedding. The term molting refers to the entire cyclical process of preparing for, undergoing, and recovering from ecdysis.”

As the lobster prepares to shed, it is forming a new, identical, soft shell underneath its hard shell. It will pull blood away from its claws and other appendages causing them to shrink. It will draw minerals, particularly calcium, from the existing shell and store them in gastroliths (stone-like formations) found in the lobster’s stomach. It will then take in excess water which causes the lobster to swell, thus causing the old shell to crack right down the middle of its carapace (body) and between the carapace and the tail. The lobster then pulls itself out of the old shell. According to the Gulf of Maine Research Institute’s Web site, [www.gma.org](http://www.gma.org), “While the new shell is still soft, the lobster absorbs sea water to gain about 15% in size and 40-50% in weight. A just-molted lobster feels like a rubber toy...It stays in hiding for a week or two until the new shell is fortified

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## Lobster Institute to Host UMaine Lobster Showcase to Celebrate Its 25<sup>th</sup> Anniversary

As part of the yearlong celebration of its 25<sup>th</sup> Anniversary, the Lobster Institute will host a UMaine Lobster Showcase on September 21, 2012, from 11:00 a.m. to 3:00 p.m. The Showcase will highlight University of Maine lobster research through the years. Posters and exhibits will be on display in the Atrium at the University of Maine Memorial Union. Highlights will include work from the School of Marine Sciences, the Department of Animal and Veterinary Sciences, the Aquaculture Institute, the Darling Marine Center, the Department of Food & Human Nutrition, and more. This Showcase is open to the public free of charge. Refreshments will be served.

In addition to the Showcase, a special anniversary dinner will be held that same evening at the Buchanan Alumni House. The theme for the dinner will be a Downeast/Asian Lobster Fusion. As a tribute to the Institute’s 25<sup>th</sup> Anniversary, the cost will be held to \$25 per person. Those who would like to be sure their name is on the invitation list can contact Deb Seekins at 207-581-1443 or at [lobsterinstitute@maine.edu](mailto:lobsterinstitute@maine.edu). ☞

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## New Lobster Mandatory V-Notch Rules In New York Marine Waters

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New emergency regulations are now in place to establish mandatory V-notching of legal size egg-bearing female lobsters captured by lobster permit holders in Lobster Conservation Management Area 4, which encompasses the waters off the south shore of Long Island, the New York State Department of Environmental Conservation announced July 13. DEC took this action to comply with the requirements set forth by the Atlantic States Marine Fisheries Commission (ASMFC). The new rules also require that permit holders who fish in more than one Lobster Management Area (LMA) abide by the most restrictive V-notch rules of the LMAs listed on their fishing permit. These changes became effective July 11, 2012. The ASMFC American Lobster Management Board approved Addendum XVII to the American Lobster Fishery Management Plan (FMP). The objective of the Addendum is to decrease lobster harvest by 10 percent in Southern New England to initiate rebuilding of the lobster populations. This Addendum implements mandatory V-notch programs in LMA 2, 4 and 5 ...coastal areas from Cape Cod to Virginia.



*Note the v-notch in the second tail fin from the left on this egg-bearing lobster.*

A V-notch is a triangular cut on the tail fin of a legal size female egg-bearing lobster that takes several molts (when a lobster changes shells to grow) to disappear. It is illegal to harvest a lobster that has been marked thusly. The V-notch protects female lobsters from harvest for two years. [Editor's note: fishermen may choose to re-notch any v-notched lobsters to maintain the protection from harvest on an ongoing basis.]

In addition to the emergency filing of this rule, notice of this rule being in effect after the emergency period expires was filed with the Department of State, will appear in the New York State Register on August 1, 2012, and will initiate the public comment period. The 45-day public comment period will begin on August 1, 2012 and close September 17, 2012.

The new emergency rules are designed to meet the requirements of the lobster fishery management plan. For additional information, contact DEC Marine Resources Division at 631-444-0444. ❀

## Understanding the Soft Shell

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against predators.” The excess water remains in the shell until it is supplanted by tissue growth.

According to Dr. Bob Bayer of the Lobster Institute, who specializes in lobster nutrition, the newly molted lobster is likely to eat its old shell as a way to gain the extra calcium that is needed for the new shell to harden. Additionally, “Stored calcium from the gastroliths located on the lobster stomach is mobilized to help harden the new shell. The gastroliths are released into the gastric juices during shedding, and the calcium that is held there is re-absorbed by the lobster, thus helping to harden the shell. The rate of ongoing hardening will vary depending on what is available for feed.” It may take several months for a newly molted lobster to develop a shell that is considered hard enough for live shipping without risk of mortality. Bayer adds that following a shed a lobster has proportionately less hemocyanin per body fluids as it takes on extra water. Oxygen is carried by hemocyanin, and reduced oxygen diminishes the length of time a lobster will survive out of water. “It is important to note,” says Bayer, “that soft-shell lobsters are good and healthy even though they are not as strong as the hard shell. The nutritional quality of the meat is the same, and the taste even preferred by some diners.”

During its first month a lobster will molt repeatedly as it grows from the smallest larval stage to a post-larval size of approximately 15 millimeters. It will molt less and less frequently as it grows to market size over the next 5 to 7 years, at which point it will molt roughly once a year. Females typically molt every other year as they go through the reproductive cycle. There are several environmental factors that also come into play in the growth of a lobster, including: water temperature, salinity, depth of water, bottom type, and availability of food and shelter. Growth is accelerated as water temperatures rise, which is likely a key factor in the early shed of 2012. Data from the NOAA indicates that water temperatures in Maine were running from 3 to 10 degrees above ranges of the last 10 years. ❀



**As a Non-profit, the Lobster Institute relies on industry and private support to continue its work for and with the lobster fishery. Please consider donating as a Friend of the Lobster Institute today. Call 207-581-2751 or visit [www.lobsterinstitute.org](http://www.lobsterinstitute.org)**





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# RESEARCH REPORT

Readers may contact the Lobster Institute for more detailed information on any of these projects.

➤ **Effects of Acidification on Juvenile Lobsters Being Studied at UMaine** – Josh Hall, a graduate student work with Dr. Timothy Bowden and Dr. Bob Bayer of the Animal and Veterinary Sciences Department of the University of Maine is currently analyzing data from an experiment where juvenile lobsters were raised from hatch in an acidified environment for 90 days. The experimental group was raised at a pH (~7.9) which mimics the environment some reports indicate lobster would likely face within the next century. A control group was raised in nearly identical conditions, except the pH of their tank (~8.2) reflects current surface water in the open ocean (no estuaries or run-off influence). Sample were taken throughout the 90 days, and Hall is now looking at the expression of three immune genes, as well as the mineral content of the shell. The immune genes include an antimicrobial protein as well as , a signaling protein, and a pre-enzyme, which play important roles of crustacean immunity.

Hall also has a smaller subset of data from samples that look at development at a much lower pH (~7.6) over the course of 30 days, which have yet to be processed. More information must be gathered before any results concerning the expression rates or the mineral content can be accurately reported, but work is continuing. Look for more details in a future edition of the *Lobster Bulletin*.



➤ **Maine's Lobster License Plates Benefits Lobster Research** – In addition to a design that highlights Maine's signature seafood, the state's lobster license plates are benefiting lobster research as well as education and development projects. In addition to the regular registration fee, Maine residents and now those with commercial vehicles (with a registered weight of 10,001 lbs. to 100,000 lbs.) can pay an extra \$20 fee for the specialty plate and \$15 at renewal time. Ten dollars of this fee is dispersed by the Lobster Research, Education and Development Board to fund projects that benefit the lobster industry. For more information contact the Bureau of Motor Vehicles at: (207) 624-9000 ext. 52149 or by emailing [registrations@maine.gov](mailto:registrations@maine.gov).

➤ **Fact Sheet Released on Status of Eutrophication in the Gulf of Maine on Bay of Fundy** -- The Gulf of Maine Council's EcoSystem Indicator Partnership (ESIP) reports that they have released a fact sheet about eutrophication in the Gulf of Maine and Bay of Fundy. Eutrophication refers to an increase in nutrients in a body of water, stimulating plant growth. The fact sheet notes that, "human activity has supplemented natural nutrient sources by incrementally adding nitrogen and phosphorus to estuaries and coastal waters. Increased nutrient loads from human activities (i.e., sewage effluent, atmospheric deposition, and agricultural/urban runoff) can cause eutrophication, thus stimulating excessive growth of microalgae (phytoplankton) and macroalgae (seaweeds). The fact sheet compiled data from numerous sources ranging from coast watch groups to federal agencies. It summarizes data on four key indicators - nutrient loading, water clarity, chlorophyll a, and dissolved oxygen. The fact sheet proposes these indicators can be used as a means for tracking change, as they can be used as a tool to better understand the wide-ranging effects being seen in the Gulf of Maine region and Bay of Fundy. ESIP's Eutrophication fact sheet is available at [www.gulfofmaine.org/esip](http://www.gulfofmaine.org/esip).

According to the Gulf of Maine Council's Web site, "ESIP is developing indicators for the Gulf of Maine and integrating regional data for a new Web-based reporting system for marine ecosystem monitoring. Activities of ESIP initially center on convening regional practitioners in six indicator areas: coastal development, contaminants and pathogens, eutrophication, aquatic habitat, fisheries and aquaculture, and climate change." ❧

## Upcoming Conferences

### ➤ **Innovations in Fisheries Conference**

October 16-17, 2012 at The Portland Company, 58 Fore St., Portland, ME.

For information see: [www.gmri.org](http://www.gmri.org)

### ➤ **The American Lobster in a Changing Ecosystem: A U.S. - Canadian Science Symposium**

November 27-30 at Holiday Inn by the Bay, Portland, ME. For information see:

[www.seagrant.umaine.edu](http://www.seagrant.umaine.edu)



**LOBSTER INSTITUTE**

*Lobster Bulletin, Summer 2012*

**Nutrient Value of Lobster Meat**

Current figures from the USDA Nutrient Data Laboratory on the nutrient value of one cup of both steamed lobster meat and roasted chicken breast:

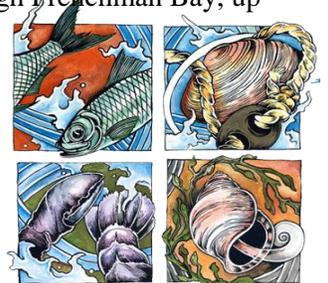
	<b>Lobster Meat</b>	<b>Chicken Breast</b>
Calories	129	231
Protein	27.55 g	43.33 g
Total lipids (fat)	1.25 g	5.0 g.
Saturated Fat	0.302 g	1.414 g
Mono Sat. Fat	0.367g	1.736g
Poly Sat. Fat	0.493g	1.078g
Cholesterol	212mg	119mg
Carbohydrates	0	0
Fiber	0	0
Sugars	0	0
Calcium	139mg	21mg
Iron	0.42mg	1.46mg
Magnesium	62mg	41mg
Phosphorus	268mg	319mg
Potassium	334mg	258mg
Sodium	705mg	104mg
Zinc	5.87mg	1.40mg

The Food and Drug Administration does not list any seafood as containing levels of mercury that are unsafe for the general public and only 4 species that are not recommended for pregnant or nursing women. Lobster is not listed in that category. Additionally, lobster contains omega-3 fatty acids, which are linked with a decreased risk of hardening of the arteries and heart attack. Though omega-3 levels are not as high in lobster as they are in salmon or some other fish, there is enough to be considered beneficial.



**Revitalized Downeast Fisheries Trail Launched**

On June 21, 2012, a revitalized Downeast Fisheries Trail was launched with an official ribbon-cutting ceremony for the new educational signage at the Cobscook Bay State Park boat launch. The Downeast Fisheries Trail connects both historic and modern-day sites that are integral parts of the many fisheries along the Maine coast from Penobscot Bay, through Frenchman Bay, up to Cobscook Bay. According to a new brochure that maps out the route and describes the trails 45 sites, “The Downeast Fisheries Trail builds on these local resources to strengthen community life and the experience of visitors.” The Downeast Fisheries Trail is a work in progress, and new sites



*DFT Logo*

and destinations are welcomed. Thus far, four interpretive signs have been placed along the trail, with the hopes of additional signage as funding allows.

The original Downeast Fisheries Trail was established in 2000 in Washington County, with the help of Sunrise County Economic Council, the Maine Aquaculture Innovation Center, the Maine Coastal Program, Quebec-Labrador Foundation, and the Maine Community Foundation . Recent efforts have expanded the trail into Hancock County, with additional funding from the Maine Community Foundation and Downeast and Acadia Regional Tourism.

Additional information about the Trail with descriptions of the sites, a list of events connected to those sites, and other educational material is available at [www.downeastfisheriestrail.org](http://www.downeastfisheriestrail.org).

