

LOBSTAH!

The surprising resilience
of New Hampshire's
most popular crustacean

by
Joshua
Carltoni



My alarm woke me from a dead sleep at 3:30 a.m. It was the first day of my new endeavor as the lobster sea sampler for the N.H. Fish and Game Department. My job: scheduling trips aboard commercial lobstermen's vessels to collect biological data. The day's itinerary commenced with a 4:30 a.m. rendezvous at the Portsmouth Fishermen's Coop – the launch point for a day's trip aboard the Dotty Hobbs.

In the early morning darkness, I followed the sound of a diesel engine and the murmur of voices towards the wheelhouse of the old but well-kept wooden fishing boat. I boarded, and after a quick introduction, the deckhand released the lines from the cleats, and the captain began effortlessly navigating the 42-foot vessel down the Piscataqua River toward the open ocean. I found a seat inside the wheelhouse and tried to keep from imagining scenarios of the boat battling gale force winds. But then the sun broke over the horizon and the captain, smiling, said: "It's mornings like these that remind me of the reason I began this career. The freedom of the ocean; and

the challenges and rewards of her many moods. In time you'll learn that sunrises like these are one of the rewards to enjoy."

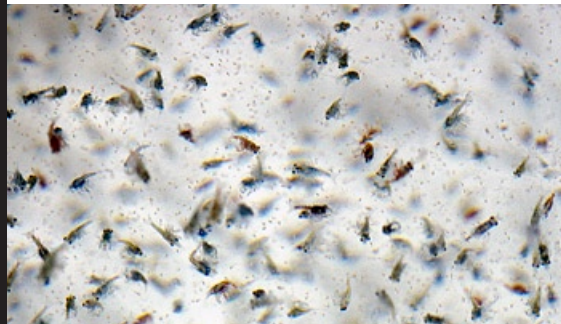
We sat in silence as the boat steamed seaward, smoothly carving a course toward an area known for its abundance of American lobster (*Homarus americanus*). After a short time on the job, I would find the species to be more than worthy of its prestige – not just as table fare for millions of hungry tourists every year, but for its amazing life history and resilience in the face of massive fishing pressure.

IT'S A LOBSTER'S LIFE

If you've enjoyed eating a steaming lobster, you've had an up-close look at, and probably picked apart, this succulent seafood delicacy. The familiar lobster on your plate goes through many life stages before it becomes a harvestable adult.

For a lobster to increase in size, it must periodically shed its exoskeleton (shell) and replace it with a new, larger shell. Molting





Lobsters go through many life stages as they mature, including (counter-clockwise from top left) egg; larva; the small but agile “superlobster”; and adult.

is an extraordinary process in which a lobster actually forms a new shell underneath the existing shell – a replica complete in every detail. When it is time for the lobster to molt, it absorbs water into the underlying new shell, causing it to swell and eventually push apart the “old” outer shell. The lobster then seeks out shelter and lies on its side to work its way free from the old shell. The new carapace (body) may be as much as 14 percent longer than the old one. Once a lobster’s new shell is exposed, it is very soft and thus vulnerable to predators. Though the shell will continue to harden for several months, during the first couple of weeks, the lobster is nearly defenseless.

The frequency with which lobsters molt decreases with age; a lobster in its first year of life may molt as many as 10 times, while a 1½-pound lobster only molts once a year. Depending on water temperature, it takes between 5 and 8 years for a lobster to reach legal catch size. The molting process is important for reproduction, because mating generally occurs just after a mature female lobster has shed her old shell.

Lobster breeding behavior never ceases to amaze me, since most of the time male and female lobsters seem to avoid each other. That changes during breeding season, when a female will seek out a dominant male and emit a pheromone outside his den. The

pheromone acts as a sort of aphrodisiac for the male, indicating that the female is nearly ready to mate. At this point, the male and female begin to cohabitate, soon after which the female casts off her old shell. The male gently turns the female onto her back – keeping her off the substrate by cradling her shell with his walking legs – and inserts a spermatophore (packet of sperm) into a pouch at the base of her third walking leg. The female can carry the sperm for as long as a year before fertilizing her eggs. It was recently discovered that larger females can fertilize more than one brood with a single insemination.

The number of eggs produced by a female lobster depends on her size. A one and a half pound lobster can produce approximately 10,000 eggs, while a 20-pound lobster can produce nearly 100,000 eggs. After the female’s shell has hardened, she extrudes the eggs from the oviducts, where they are fertilized by the stored sperm and cemented to the underside of her abdomen for the next 9 to 12 months. When the eggs hatch, the female fans her swimmerets – these are the short, feathery appendages on her abdomen – and the larvae are released into the water column. The larvae spend the next four to five weeks near the surface of the ocean, transported primarily by wind and currents, as they pass through four distinct

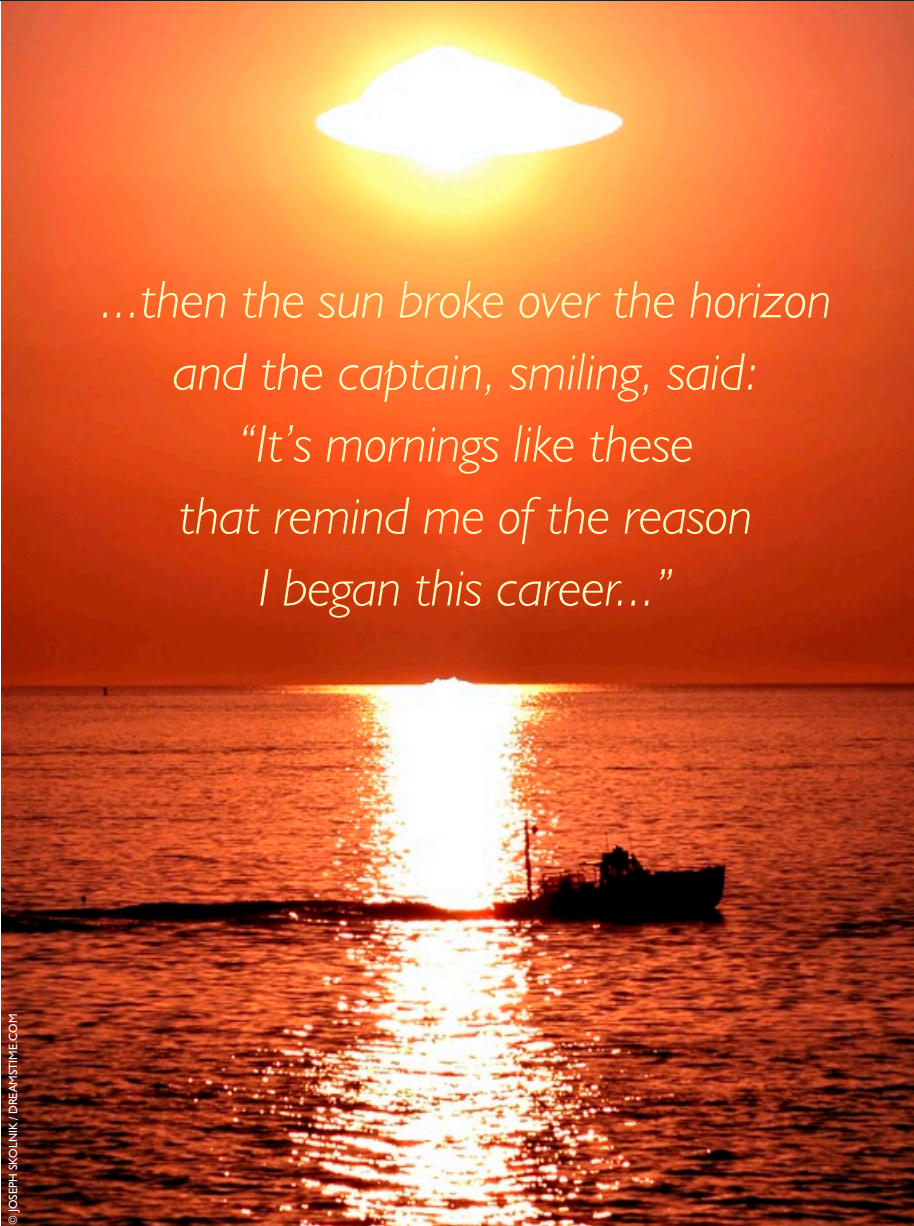
developmental stages. During the fourth stage, an extraordinary metamorphosis takes place, the larvae turning into postlarvae that scientists have dubbed “superlobsters.”

In the superlobster stage, young lobsters can swim forward and backward throughout the water column. It's the only time in a lobster's life that it is able to swim forward, and this ability is essential for its survival. Research suggests that superlobsters, which are less than an inch long but can swim extremely fast, take multiple trips from near the surface down to the ocean floor in search of suitable habitat where they can “settle.” They're looking for habitat with cobble-sized rocks that will provide protection from predators. Once the lobsters have found suitable habitat, they will settle on the ocean floor and molt into juvenile bottom-dwelling lobsters. This may sound like a tall tale – lobsters falling from above, picking out prime real estate and settling on the ocean floor. The truth of the matter is that less than one percent of lobster eggs will ever make it to the settlement stage.

The early years of a lobster's life are rather sedentary; they move little from the protection of cover. As lobsters mature, they begin to migrate offshore in the winter, returning to inshore waters in the summer for molting and copulation. Lobsters are generally nocturnal, with higher levels of activity during the nighttime. They're opportunistic feeders, dining on mussels, clams, crabs, flounder and sea urchins, as well as dead organisms.

CONSERVING A VALUABLE RESOURCE

Like other wildlife, lobsters are a finite resource, and they are carefully managed so that the population can sustain itself at a healthy (and harvestable) level. In New Hampshire, lobsters may only be taken if their carapace is 3¼ to 5 inches long; this ensures that younger lobsters have a chance to grow bigger, and older lobsters will continue to reproduce. One management strategy that has proved successful is a process known as V-notching, which requires commercial fishermen to cut a V-shaped notch in the flipper of all female lobsters that are egg bearing, then immediately return them to the water. Any lobsterman who catches a V-notched lobster knows in an instant that she must not be kept, but returned to the water to reproduce. Lobster traps are required to have escape vents that allow sub-legal lobsters to exit the trap before being hauled to the surface. This reduces the mortality associated with over-handling and with predation when the lobsters are released. There's also a cap on the number of traps that lobstermen are allowed to fish and on the number of commercial licenses permitted by the state.



*...then the sun broke over the horizon
and the captain, smiling, said:
“It's mornings like these
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I began this career...”*

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New Hampshire's thriving fishery yields a million pounds of lobster each year, contributing to the state's economy and its colorful coastal character.



(Clockwise from left) Egg-bearing lobsters are marked with a V-notch on their flipper and released, alerting harvesters to return her to the water; lobsters prey upon blue mussels, Atlantic rock crab and green sea urchins.

American lobsters are found in the northwest Atlantic Ocean from Labrador to Cape Hatteras. In New Hampshire's thriving lobster fishery, about a million pounds of lobster are harvested from state waters in a typical year. New Hampshire's lobsters are part of the Gulf of Maine stock, which is one of three regional divisions used when assessing the health of the lobster population; the other two are Georges Bank and Southern New England (south of Cape Cod to North Carolina). A 2009 stock assessment concluded that Georges Bank lobster stock and a majority of the Gulf of Maine stock were in favorable condition, with record high levels of abundance compared to the 26-year time series. The Southern New England stock was considered depleted, showing low levels of abundance; this decline coincides directly with increasing water temperatures, which

may be creating environmental conditions that are unsuitable for lobsters.

There are a variety of theories as to why the Gulf of Maine has seen an increase in lobster abundance and is able to sustain a fishery that lands over 80 million pounds a year. A combination of factors may contribute to this success, including the increase in protection given to reproductive females; increase in food in the form of lobster bait; favorable water temperatures; decreased predation from fish; and favorable larval settlement conditions. In any case, we watch the lobster population carefully, because "recruitment" – that is, young lobsters surviving to adulthood – fluctuates over the years for many reasons. Given the current level of fishing pressure, if consecutive years of poor recruitment were to occur, it could dramatically impact the sustainability of the lobster population.

Since my first sea sampling trip aboard the Dotty Hobbs eight years ago, I've found cause for optimism in the amazing life history of the American lobster and the positive management that has helped it become a sustainable fishery. I am hopeful that, with sound science and effective management, the lobster fishing tradition will remain viable and continue to help define the unique character of the New Hampshire seacoast, and lobstermen will continue the 150-year-old ritual of voyaging out to sea before the light of day to haul traps and match their wits against the ever changing ocean. Most importantly, however, I am hopeful that lobsters will continue what they've been doing for the past 150 million years, "settling" on the ocean floor.

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LOCAL & DELICIOUS

Many lobster harvesters have joined in the New Hampshire Seafood Fresh and Local movement, aimed at building awareness of local fisheries, keeping locally caught seafood in the area and restoring the relationship between consumer and harvester. Check www.nhseafood.com for specific info about restaurants, retailers and wholesalers where you can find New Hampshire-harvested lobsters and other seafood.



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