

# Collaborations

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



A computer-generated rendering of the Gulf of Maine Research Institute's new laboratory. (Courtesy of GMRI.)

At a time when Maine's economy seems to be moving ever more rapidly away from its maritime heritage, the Gulf of Maine Research Institute (GMRI) has embraced the working waterfront—choosing to build a state-of-the-art science laboratory in the heart of Portland's Commercial Street, where the drone of diesel engines still precede sunrise and the smell of lobster bait still hangs in the air.

Tucked in between the Portland Fish Pier and the nation's first all-display fresh seafood auction, the facility will serve as a center for marine research as well as for education on the Gulf of Maine marine system.

Over the past six years, GMRI (formerly known as the Gulf of Maine Aquarium) has emerged as a leader in cooperative fisheries research, earning the respect of fishermen and scientists from across the region.

"No other organization that I know of has been as effective at negotiating the logistical and political pitfalls of large-scale

fisheries research. This new building, in my view, has unlimited potential to elevate the role Maine's fleet plays in cooperative research," said Capt. Curt Rice, a Portland fisherman who has worked with the GMRI and Maine's Department of Marine Resources on the state's inshore trawl survey the past three years.

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-Capt. Curt Rice

This year alone GMRI will facilitate almost \$2 million in research projects, joining fishermen from 40 different vessels with scientists from six research institutions.

The projects represent a wide-range of scientific inquiry: From monitoring spawning herring stocks to assessing the impact of fishing gear on the ocean floor to studying the relationship between shrimp populations and climate.

On September 20th, a groundbreaking ceremony will be held for the new facility, which will be built in two phases. Phase I will complete 44,000 square feet of space devoted to fishery ecosystem research and marine science education. The second

## Groundbreaking

phase will add some 20,000 square feet, dedicated to attracting marine biotechnology interests, which some regard as the future of Maine's marine-based economy.

The facility will feature a glass atrium, through which

*It will also serve as a meeting place to integrate fishermen's knowledge about fish behavior, observations, climate changes, vessel operations, gear design and use into the scientific framework necessary for use in management.*

Portland can be seen from the Harbor and vice versa, as well as granite walls and a copper roof.

But the jewel of the laboratory may be the Fishery Ecosystem Research Wing, where scientists will work directly with fishermen to study the Gulf of Maine marine ecosystem.

This interdisciplinary team of researchers will contribute expertise in biological oceanography, benthic ecology, ground-

fish ecology, pelagic ecology, genetics, population dynamics, fish behavior, gear design and resource economics.

It will also serve as a meeting place to integrate fishermen's knowledge about oceanography and the fishing industry into the scientific framework necessary for use in management.

Laboratory space within this wing will also be leased to the Gulf of Maine Ocean Observing System and the University of Southern Maine to support related research efforts.

GMRI projects the lab will create 145 research jobs, which in turn will support Maine's fishing community with unbiased science and diversify the state's marine economy.

"(The laboratory) will allow us to rapidly expand our work with fishermen and scientists to learn collaboratively about the Gulf of Maine ecosystem and facilitate dialogue among members of the marine resource community," said Laura Taylor-Singer, director of collaborative research at GMRI.

During the 2003 building season, GMRI will set pilings, pour the foundation, and erect the structural steel. Lab completion for occupation is expected by December 2004. Research activities and tenant occupation is expected by January 2005.

## Maine's forgotten fishery: How a lack of scientific understanding and regulations may be putting baitworms at risk.

By Michael Crocker

They're certainly not the most glamorous of Maine's marine resources, but last year over \$7.9 million worth of baitworms were harvested, making bloodworms and sandworms the state's fourth-most-valuable fishery—more lucrative even than cod or crab, scallops or sea urchins.

However, some worm watchers are concerned that a lack of regulations and scientific understanding of the creatures is leading to a decline that, if ignored, could end in a collapse.

"Not only am I worried that there won't be any worms left for my children; the way things are going, I'm worried that there won't be any worms left for my own business," said Robin Brooks, whose family has been involved in the harvesting and selling of baitworms for over 50 years.

"We just don't know enough about worms to continue harvesting them virtually unrestricted."

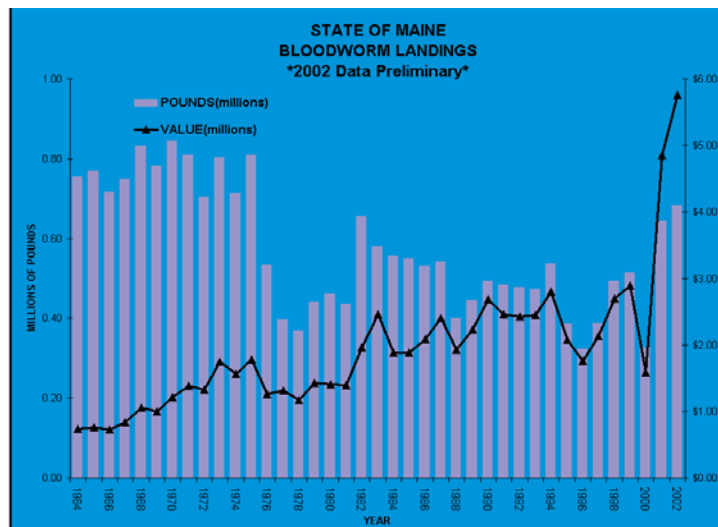
Today, there are 1000 or so licensed diggers of baitworms in Maine and, for many, the practice is an important component to a collection of agricultural jobs that may also include picking blueberries in the late summer and splitting fire wood in the fall.

Sandworms (*Nereis virens*) and bloodworms (*Glycera dibranchiata*) are the two species of commercially valuable baitworms in Maine, which are sold primarily for use in recreational fishing.

Brooks is most concerned about the health of bloodworms—named for their red coloring—that she said are being over harvested in many areas and at too small a size.

"Some diggers are harvesting worms that are only one-inch long, that's smaller than a lot of the hooks they're baited on. Today, many dealers—mostly from out-of-state—pay the same price for a one-inch worm as they will for a 12-inch worm and, as a result, there is no incentive to protect worms before they've had a chance to spawn," said Brooks.

"Unfortunately, it's a situation where the characteristics of the fishery are changing even before we even understand the biological characteristics of the resource," said Les Watling, a marine scientist at the University of Maine.



Courtesy Maine DMR

But scientists say that because most of the state's research funding goes to study more well known species, like lobster and cod, little attention is paid to the biology of marine worms or to the social and economic impacts of the fishery.

To dig bloodworms a hoe with nine-inch metal tines attached to a wooden handle is used. The labor can be back-breaking with diggers spending up to

## Baitworms

five or six hours at a time hunched over in knee-high mud. They begin by collecting worms high on a mudflat and follow the receding tide with a meter-wide trench; then reverse direction when the sea returns.

Bloodworms are found in intertidal zones bordering brackish waters and estuaries from Nova Scotia to Florida. In Maine, the Sheepscot Estuary near Wiscasset is an example of productive worm habitat.

The annelids (similar to earthworms and leeches) are thought to be predators, capable of excreting a neurotoxin through their needle-like proboscis into prey, which may include other worms and small crustaceans. Many a wormer has known the discomfort that accompanies a bloodworm bite.

The baitworm fisheries in Maine are largely unregulated. State residents are eligible for a license, which cost \$43 and raise around \$46,000 annually to fund worm-related research. And worms may only be harvested with “devices or instruments operated solely by hand power,” according to the regulatory bylaw. Additionally, digging is prohibited on Sundays.

A 1991 review of the baitworm fishery by Bets Brown, a biologist at Colby College, found that bloodworm landings were at a maximum between 1960 and 1976, ranging between 140,000 and 215,000 lbs. landed annually. A sharp decline began in the late 1970s with landings ranging between 102,000 lbs. in 1988 and 168,000 lbs. in 1982.

And Brooks said that in eastern Maine things are only getting worse. “About 20 years ago, you could harvest 2000 worms a tide, now we’re getting, at best, 1000 worms a tide. Just this past year we’ve seen landings decrease between 250 and 500 worms a tide,” she said.

Possible explanations for the decline range from the natural cycles of intertidal ecology to over harvesting to mussel dragging, where heavy iron baskets (similar to scallop drags) are pulled across mudflats to scoop up colonies of mussels. Critics argue that the practice damages habitat by scrapping away nutrients and sealing off the burrows worms need for food and oxygen.

But scientists, at least for now, have little data to weigh in on the debate.

Peter Thayer, a biologist for Maine’s Department of Marine Resources who now specializes in marine worms, confirms that there has been a decline of worm landings, but said without scientific data to corroborate the apparent trend it amounts to little more than anecdotal evidence.

“Statistics suggest that there has been a decline in the number of worms and we have received a number of complaints

from out-of-state dealers saying that the worms they’ve been getting are much too small. But, without any scientific evidence, we can’t say, with any certainty, what the cause is—or really even if a decline has occurred,” said Thayer.

Thayer added that mussel draggers and wormers recently reached a “gentlemen’s agreement” to keep drags out of parts of mudflats near the Sheepscot River and farther east, but the unofficial truce has since fallen by the wayside.

This September, Tom Atherton, a graduate student from the University of Maine, who is also a worm digger, will begin the first comprehensive study of Maine’s baitworm fishery since the early 1980s.

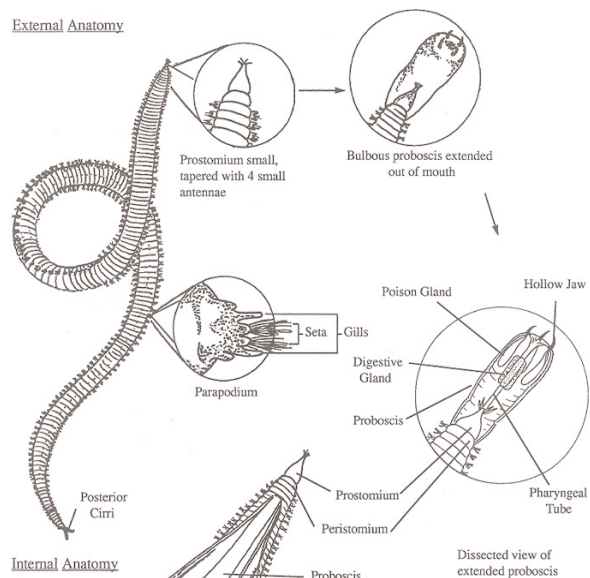
And for Brooks, who is also the proprietor of Maine Bait, a company that sells baitworms across the country, the forthcoming research is long overdue.

“Both in the amount of money it generates and for the way-of-life it supports, worming is an important part of Maine’s fisheries. If we’re not careful greed is going to ruin this fishery,” she said.

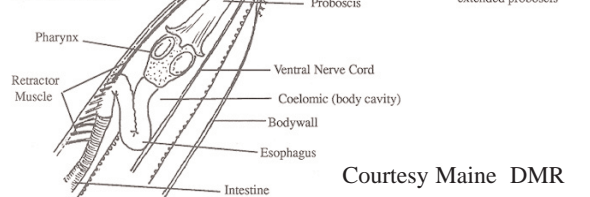
“From a research perspective—particularly for harvesters and scientists working together—this area is wide-open; much work needs to be done,” Brown added.

### Blood Worm

#### External Anatomy



#### Internal Anatomy



Courtesy Maine DMR

## Collaborations:

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