

Environmental Monitors on Lobster Traps Annual Report 2009

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Other key participants:

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Massachusetts Lobstermen

Project objectives:

The objective of eMOLT Phase V is to demonstrate that New England lobstermen can contribute to the region's integrated ocean observing systems. It is hoped that, given the eventual development of a "realtime" temperature probe (which would telemeter bottom readings via satellite communication each time the trap is hauled on deck), lobstermen around the region could collectively deliver data on a regular basis. While the development of this technology is slow and a usable probe is still not available, a few small steps have been made by local engineers so that this idea is closer to fruition. Ultimately, it is hoped that a probe will be developed and the data will be transmitted to a NOAA server and posted on the web.

Methods and work plan:

Since the technologies are still under development, much of the work involves testing the functionality of the various probes. While the probes undergo extensive evaluations in the laboratory, exposing them to the marine environment is the ultimate test. Lobstermen help in this regard by providing inexpensive platforms.

Work completed to date:

The real-time probe development has progressed on multiple fronts in the past (see annual reports from the last few years), the most promising work as of this writing is being done by Jim Valdes. As an independent Woods Hole ocean engineer for multiple decades, he has been devising state-of-the-art solutions for large government-funded projects around the world. While he has very little time for this project, he has worked on a system for other projects where both the temperature sensor and the satellite transmitter are sealed together in a housing and submerged as a package. The advantage of this strategy is that the entire system is contained in a single unit and does not need a shipboard base station. The disadvantage of this strategy is that the lobstermen do not get immediate access to the readings and the expense of the satellite transmitter will prohibit lobstermen from deploying multiple units. Modifications to existing technology are underway to provide the lobstermen with wireless realtime readings.

Results to date:

Compared to previous years, very little results are available. We only have reports from the one engineer on the development of the probe. This past month (June 2009), an email reported "I have the logger averaging temperature. I can now calculate the crc for the command code to the transmitter. I'm new working on getting data to/from the tx module. I have have a Delrin P-Case." but then a month later we received a less-optimistic email reporting "Not so good news, I haven't been able to get the satellite transmitter to talk. I'm not sure if it's a bad unit or software at this point. In any event, I had to make yet another unscheduled trip to Bermuda last week so it's unlikely that I'll have it done by the

end of the month (June). Sorry!! I'll keep working at it." Given these delays, we were glad to get an extension on the grant period since there is little we can do without a working technology.

Data:

Data from future deployments of Valdes units will obviously become part of the eMOLT server and accessible. When the system is fully operational we expect the data to be available on the web within minutes of the lobstermen's haul. The data will be relayed through either GLOBALSTAR or iridium satellite network, processed on the NOAA server at Woods Hole, and, after some automated filtering/QC operations, posted for the general public. The data will be served through OPeNDAP system and documented through the Gulf of Maine Ocean Data Partnership and NASA's Global Change Master Directory. The data user interface for eMOLT data is at emolt.org under "Data Access".

Impacts and applications:

Lobstermen have been asking for more immediate (realtime) information since the eMOLT project began several years ago. Well before the eMOLT project began, in fact, many New England lobstermen have attempted to deploy thermometers of various kinds on the seafloor to obtain some indication of the thermal environment at depth. While some of these may have worked to some extent, the accuracy of the results were difficult to quantify. Now finally, in 2009, there is some hope that they may have a reliable means of determining temperature changes that may be important to the activity and movement of their prey (Drinkwater et al, 2006). A statistical relationship between catch and bottom-temperature is difficult to quantify however and has eluded some researchers to date. Only with sustained record keeping of quality data in the years to come will it be possible to prove a significant relationship.

Related Projects:

A variety of related projects have sprung up in the last few years that are closely related to the goals and applications of eMOLT. In addition to the obvious relation to the Northeast Regional Association of Coastal Ocean Observing Systems (NERACOOS), eMOLT has been collaborating with multiple "ventless trap" projects around the region. Since these projects are deploying traps at specific sites and depth zones and the intention is to continue monitoring the juvenile populations of lobster for multiple years, an effort has been made to equip these traps with temperature probes. The newly formed "ASFMC Regional Ventless Trap" project seems most promising as a funded mechanism to get lobster catch data concurrent with temperature records.

In addition to the ventless trap projects in both US and Canada, we are working with the lobster settlement studies of both Wahle (Bigelow Lab), Cowan (Lobster Conservancy), and Bob Glenn (Mass-DMF). Each of these projects now have a temperature probe component.

Partnerships:

As noted in the related projects section above, eMOLT is connected with a variety of projects around the gulf. A short list of them is provided in Table 1.

Project	Contact
GoMOOS/GoMODP	Tom Shyka
DMF Ventless	Bob Glenn
GoMLF VentTS	Erin Pelletier
FSRS monitoring	Patty King
Lobster Conservancy	Diane Cowan
S Maine Comm. College	Brian Tarbox
ASFMC Ventless Trap	Carl Wilson
RIDEM	Tom Angel
Bigelow Lab	Rick Wahle

Presentations:

eMOLT was presented for the 8th year-in-a-row at the Maine Fishermen Forum in early March 2009. A press release from NEFSC in late March 2009 spawned hundreds of articles and website posting about eMOLT around the country. An article on eMOLT (Manning and Pelletier, 2009) was published in March 2009 issue of the Journal of Operational Oceanography. In April 2009, eMOLT was featured on Boston WBZ news with meteorologist, Mitch Michaels, interviewing both Dave Casoni and Jim Manning. An abstract was submitted and accepted to the Coastal Environmental Sensor Network 2009 conference in Boston on 23-24 July.

Student Participation:

As of this writing, there is no student participation specifically associated with phase V. However, we continue to involve students in the previous phase IV through our collaboration with several marine science departments around the country. At least seven new schools were added to the list in 2009.

Images:

A collection of images are stored on the emolt.org website including an archive of maps, plots, and photographs. A gallery of images describing the development of technology, for example, is posted at:

http://www.nefsc.noaa.gov/epd/ocean/MainPage/lob/pic_links.html

The most up-to-date images of recent findings are posted under the “What’s New” page.

References:

Drinkwater, K.F., G.C. Harding, K.H. Mann, and N. Tanner, 1996, Temperature as a possible factor in the increased abundance of American lobster, *Homarus americanus*, during the 1980s and early 1990s., *Fisheries Oceanography*, 5:3/4, 176-193.

Manning, J.P. and E. Pelletier, 2009. Environmental Monitors on Lobster Traps (eMOLT): long-term observations of New England's bottom-water temperatures, *Journal of Operational Oceanography*. Vol 2-1, p.25-33.