

Environmental Monitors on Lobster Traps: Phase V Real-time Temperature Mid-Year Report 2010

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Contact information of the principal investigator:

Jim Manning

NOAA/NEFSC

166 Water St

Woods Hole, MA

02543

508-495-2211 james.manning@noaa.gov

Other key participants:

Erin Pelletier, 207-985-8088, eringomlf@gwi.net

Gulf of Maine Lobster Foundation

Dave Casoni, 508-224-3038, lobsterteacher@hotmail.com

Massachusetts Lobstermen

Major accomplishments and milestones:

Unfortunately, very little progress has been made on this phase of eMOLT in 2009. The one small accomplishment involved radio-telemetered temperatures from a free-floating buoy in Buzzards Bay (Oct 2009). This unit is still under development by DatisSystems of Pocaset, MA but the first prototype had very limited range of less than a few hundred meters and serious power-limitations.

The other noteworthy accomplishment this past year is a publication on eMOLT in the Journal of Operational Oceanography (Manning and Pelletier, 2009).

Unexpected difficulties and project alterations:

After the engineers at Advanced Design Consultants dropped the development of a real-time probe (due to a reorganization of their company in 2007), we have been unsuccessful in recruiting others to devise a reliable sensor. 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 but the development of this technology is slow and a usable probe is still not available. As noted in previous reports, few small steps have been made by local engineers such as that noted above but we are still not much closer to the ultimate goal of transmitting bottom temperatures to a NOAA server.

Next Steps, tasks for the next 6 months:

Since the technologies are still under development, much of the work in the next six months first involves talking with local engineers and encouraging them to generate a product for our specific application. Then, testing the functionality of the various alternative probes will be conducted. 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.

Again, 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.

Impacts of the project to fishermen and science community

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 2010, 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.

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. 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.

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.