

GULF OF MAINE LOBSTER FOUNDATION



Annual Report to Northeast Consortium

Project Title: Determining Effect of Eastern Maine Bottom Currents On Groundlines

Award Number: 07-090 (NEC development grant)

Period of Performance: 04/05/07 – 11/30/07 (extended to 6/30/10)

Date of Report Submission: 6/26/09

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Project Objectives & Scientific Hypotheses

In the project called "Determining Effect of Eastern Maine Bottom Currents On Groundlines", Gulf of Maine Lobster Foundation (GOMLF) proposed to investigate whether there is a geographic line in Downeast Maine east of which the bottom current is so strong that it can be presumed to reduce the profile of any floating rope used as groundline. Working with scientists from the University of Maine and Maine Environmental Resources, bottom currents were measured by deploying data loggers, acoustic Doppler sensors and a flow meter on lobster gear. Ocean current data from the eastern-most GoMOOS buoys will be integrated into the analysis of all datasets to craft a model of currents in areas of similar topography to that where the project was conducted.

While there was no change in the objectives or hypotheses for this project since its outset, the timeline for the modeling work has been extended due to unforeseen difficulties in the data analysis.

Methods & Work Plan

These were outlined in our earlier annual report (12/07).

Work Completed to Date

While no field work has been conducted on this project in the last twelve months, data retrieved from all three measuring devices has been in the hands of the Lead Scientist since January 2008. The readings from the Star-Oddi pressure sensors have presented some difficulties and much time has been spent smoothing out the data. There were two extreme cases where the data was incomplete or inaccurate, involving traps at different depths and the height of the groundline arc during very strong current flows.

The Lead Scientist has been able to assess the theoretical distribution of the floating line for the case of two traps at different depths in still water but he indicated that it was not fully solvable without knowing the separation of the traps. A comparison with the data during slack tide should allow a closer assessment.

Many of the pressure sensors indicated a below-bottom height. Close scrutiny of the data provided information about the height of the line during very strong flows, where the drag overwhelms the buoyancy. This information can be used to determine the minimum height above bottom for maximum flood and ebb tides. While the Lead

Scientist believes this should help remove readings that show negative heights above bottom, data that indicates less than very strong flows may result in an under-estimation of the height above bottom.

It has become clear through this intense data scrutiny that the pressure sensors are not very accurate, and may have offsets that are themselves pressure dependent. Much of the data analysis effort so far has been to compensate for the fact that the Star-Oddi sensors are not of sufficient quality to provide precise readings on this gear-type in tidal current conditions.

Results to Date

The theoretical appendix has been completed and the Lead Scientist is applying the solutions to the data to see if they can be used to overcome the problems with the pressure data. (See "Preliminary Draft Report to GOMLF", submitted 3/09.)

Future Work

On 5/12/09, GOMLF received notification from the Northeast Consortium that the award agreement for the development grant 07-090, "Determining Effect of Eastern Maine Bottom Currents On Groundlines," was extended through 6/30/10. GOMLF intends to submit a final report on this project well ahead of that date.

In the next several weeks, the Lead Scientist will compare the data obtained from the Doppeler current sensors to that from the pressure sensors (once all possible adjustments have been made to reveal the most accurate readings), and will be able to depict the floating groundline's arc through a tide cycle.

To do so, it will be important to try to solve for the intermediate case when buoyancy and drag are of similar importance. The Lead Scientist and his team will soon be completing a tidal analysis that will be used to further assess the accuracy of the pressure sensors, including a correlation analysis so that more can be said about the effect of the currents on the line.

Once that correlation has been made, the Lead Scientist will model the currents in the eastern waters of nearshore Maine, highlighting where oceanographic processes and features may result in similar effects on floating groundline used in a trawl or traps.

A final version of the scientific report and findings will be posted to the GOMLF website, www.gomlf.org.

Impacts and Applications

While the Principal Investigator has nothing but the highest regard for the Lead Scientist on this project, the lengthiness of the data processing effort has been frustrating for GOMLF, given that the field work was completed by December 2007. The Final Whale Rule mandating the use of sinking groundlines in the very area this project was conducted (and most of the rest of the Maine coast as well) now renders the impact of this project's resultant data ineffectual. The lesson learned for all parties involved in the protracted data work is that highly-qualified individuals often have tremendous demands on their time from other priorities, particularly when the impetus for summarizing the data and presenting a model for possible use in the regulatory process has been removed.

While the federal rule regulating the use of floating groundline was implemented during the timeframe of this project, and much of these waters are now regulated to use sinking groundline, the information resulting from this project will be of great interest to the lobstermen who have been fishing in these waters for generations, and may be useful for state or federal regulators and scientists who need information about the bottom currents in eastern Maine.

Presentations; Published Reports & Papers

Apart from a brief reference at a talk in 2007 by Chris Heinig and a fixed display of preliminary data at the Maine Fishermen's Forums in 2008 and 2009, no presentations or papers involving this data have been made.

Data

Datasets from all measuring equipment will be submitted to the NEC database after it has been cleaned up by the Lead Scientist; and the final data interpretation will be made available to the NEC and any other interested agency or individual.