

**Technical Evaluation Report**

of the

Northeast Consortium project development award,

“Pilot project to assess need and initialize a methodology to groundtruth existing multi-beam and side-scan sonar seafloor charts”

Anonymously reviewed

11/08/2010

## **1. Introduction**

This report documents an independent peer evaluation of the project, “Pilot Project to Assess Need and Initialize a Methodology to Groundtruth Existing Mult-beam and Side-scan Sonar Seafloor Charts.” This project development award received funding from the Northeast Consortium in FY2005 and was led by Salvatore Genovese of Northeastern University in partnership with Madeleine Hall-Arber (MIT Sea Grant), Anthony Wilbur (Massachusetts Office of Coastal Zone Management (CZM)), BG Brown (F/V Kathryn Leigh), David Bergeron (Massachusetts Fishing Partnership (MFP)), Olivia Free (MFP), and Nicholas Richon (F/V Kathryn Leigh). This mail review serves as a formal assessment of the completed project and focused on certification of results.

## **2. Reviewer**

The reviewer holds a Ph.D. in Oceanography with emphasis on geophysical methods in the marine environment. Professional experience largely includes application of acoustic and potential fields methods in coastal environments. Studies have been completed in a wide variety of geographic settings including the Pacific Ocean, Atlantic Ocean, and many locations along the east coast of the United States, and the Gulf of Mexico.

## **3. Documentation**

In advance of the evaluation, the reviewer was provided with the project’s final report entitled, “Pilot Project to Assess Need and Initialize a Methodology to Groundtruth Existing Mult-beam and Side-scan Sonar Seafloor Charts”, submitted to the Northeast Consortium on 25 September 2008. Along with the final report, the reviewer received the projects funding proposal.

## **4. Comments and Recommendations of the Reviewer**

All review criteria were considered, this evaluation focused on certification of results.

### **Project success:**

The objectives of this project, as described in the proposal were to: 1) determine the required extent of groundtruthing required for accurate interpretation of charts, and 2) initialize a method for groundtruthing.

The project goals seem to have been adequately satisfied for the level of funding and the approach described in the proposal. It is not clear, however, what the criteria for the fisherman interpretation were. As a reviewer who did not participate in the study, or the workshops during which the fisherman reviewed the charts, I can not envision how the fisherman determined whether the charts were accurate or not based on their experience. Perhaps some sort of criteria including catch rates and any sonar (single beam, sidescan, or other) that the fisherman have on their vessels would be useful. In fact, since the fishing vessels frequent the same waters, sidescan data could be collected over years, loaded into habitat classification software, and time rates of change of bottom type could be determined.

### **Certification of results:**

The methods are described adequately in the proposal, with the exception of the input from the fishing industry participants (see above). The PI adapted the photographing technique to ROV operations, following the unpredicted flooding of the drop camera housing. Underwater video and photography are very well established techniques at present and data can be collected efficiently and economically. One suggestion would be to put a small video camera in a subsea housing, mount it on a small sled, integrate the video tow with a GPS synchronized time stamp and run grids through the study areas. The video data can be subsequently coded, converted to GIS layers, and integrated directly with georeferenced bathymetry and sidescan imagery.

The data report is a bit confusing to follow. A well-labeled base map of the area would have been useful so that the reader may quickly locate Cape Ann and Jeffery's Ledge within the regional context and relative to each other. On the other charts and figures I had a difficult time making interpretations. Only one chart had a color scale indicator that showed backscatter variability. Are all color scales the same? There are no indications of relief on the charts. It would be useful to have a scale describing bathymetric variability as well. A few other layers could possibly be quickly assembled and included on the charts. For example, spatial variability of catch numbers would be a useful set of attributes.

Some other quick analyses could take this study a step further and potentially add some value. The modest amount of funds associated with this project may not have allowed for such analyses, however for further proposals and future studies there are some techniques that might help. For example, once multibeam grids are compiled as they are in this study, it is very simple to compute maximum surface derivatives and generate additional maps of slope. In addition, some basic rugosity analysis might be useful in efforts to better understand the relationships between bottom characteristics and high catch numbers. In fact, the USGS Woods Hole office has likely computed many of these values already.

The project herein reviewed has the main goal of comparing discrepancy between observations from fishing industry personnel and remotely sensed bottom characteristics from multibeam (interferometric?) sonar. The project is designed to determine the need for groundtruthing and to develop a suitable method for groundtruthing. The USGS has done extensive groundtruthing during collection of geophysical data including sidescan and bathymetric data. The PIs could benefit greatly from examining USGS sediment analysis results and comparing those to the chart information. It is not clear what the contribution of the fishing industry personnel is to this project. For example, what types of comments did the fishermen make to indicate that the charts may not be accurate or may need additional groundtruthing?

#### **Dissemination of results:**

The main result of this study indicates that there is good agreement between the sonar records and the groundtruthing study. The data are presented in an acceptable way for a technical report, but are not fit for publication otherwise. It is somewhat difficult to

interpret the figures based on the lack of detailed description of the attributes comprising each figure and what the reader is expected to understand from each figure.

Aside from the short report included in the review package, no further dissemination was indicated.

**Project partnerships:**

The partnerships involved with this project included participants from academia, fishing industry and Sea Grant. The study of bottom type and accuracy of remote sensing techniques is absolutely of value and interest to all participants.

The least successful aspect of the partnership is the lack of description of results from the meetings and workshops. What did the fishermen comment on and what was the basis for their comments?

**Project impacts:**

It is unclear from the report what the impacts actually are from this study. With a bit of further analysis, the impact could be significant. It seems that any information logged during fishing seasons should be converted into spatial data bases for further research and more detailed characterization of popular fishing grounds.

**End-Users:**

The fishing and fisheries management sectors could absolutely benefit from this type of study, but only if it is further developed in an effort to relate quantitative and qualitative observations to bathymetric and sidescan charts.

**Overall rating:**

Over rating for this project is fair/good. There may be some information missing in the review package, but it seems that the PIs could have done a bit more background investigation. The USGS often groundtruths remotely sensed areas extensively and this project could have benefited greatly from mining such information if it exists in the study areas. If not, the information from nearby surrounding patches of seafloor could have been described to provide a bit of regional context for the study area.

**Future research:**

No future research is proposed, pending or otherwise planned at this point.

**Additional remarks:**

none