ABSTRACT FOR SHALLOW SURVEY CONFERENCE October 2008

Authors: Lloyd Huff[1], Luciano Fonseca[1], Tianhang Hou[1] and Robert McConnaughey[2]
1: Center for Coastal and Ocean Mapping (CCOM), University of New Hampshire, Durham NH
2: NOAA, National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle WA

A Workable Schema for Editing Multibeam Backscatter

There are circumstances when multibeam bathymetric sonar will report values for backscatter, which may faithfully represent the acoustic signal levels received by the sonar, but do not accurately represent the backscatter from the seabed.   Under these circumstances, it is still possible to make qualitative assessments of large spatial scale changes in the acoustic scattering properties of the seabed. However, if one is endeavoring to make quantitative assessments of the acoustic scattering properties of the seabed, as in conducting a Fisheries Habitat Survey, it is essential that efforts be made to disregard reported values for backscatter that do not appear to truly represent the scattering properties of the seabed.

In August 2006, a NMFS Fisheries Habitat Survey was undertaken in the shallow waters of the eastern Bering Sea on the NOAA Ship Fairweather, which acquired bathymetry and backscatter with her Reson 8111 and 8160 during three repeat passes along five different track lines. The Reson data were processed through the Geocoder software, developed at CCOM, to generate statistical representations of the backscatter. Often there would be good agreement between the backscatter statistics of two of the three passes, but there was a significant discrepancy between the backscatter statistics of the remaining pass. The discrepancies were associated with occurrences of noise, which had been noted on both the 8111 and 8160 during the cruise and discounted because in their real-time waterfall displays of backscatter snippets it was still possible to "read" through the noise and see subtle features in the imagery of the seabed.

A schema was developed wherein, file by file, histograms of backscatter were separately determined for the 8111 and 8160. The histograms were each separated into two sections, one where the backscatter was probably contaminated by noise and one where the backscatter probably was not. A separate exclusion list of ping numbers was generated for the 8111 and 8160, where the reported backscatter probably did not faithfully represent the backscatter from the seabed. Later when processing the backscatter data through Geocoder, those pings whose numbers were on the exclusion list were not used in the mosaicking or statistical determinations

The effectiveness of this schema for editing backscatter data will be demonstrated by comparisons of the backscatter statistics which were computed on data with and without editing. After this backscatter editing scheme was instituted for processing the Reson 8111 and 8160 backscatter from the shallow waters of the eastern Bering Sea, the internal consistency of either sonar's repeated measurements of backscatter was remarkable. The

spatial trends for the 8111 and 8160 were slightly different, as one might expect given their different acoustic frequencies.