# Acoustic Detection of Oil in the Water Column Using an Acoustic Zooplankton Fish Profiler

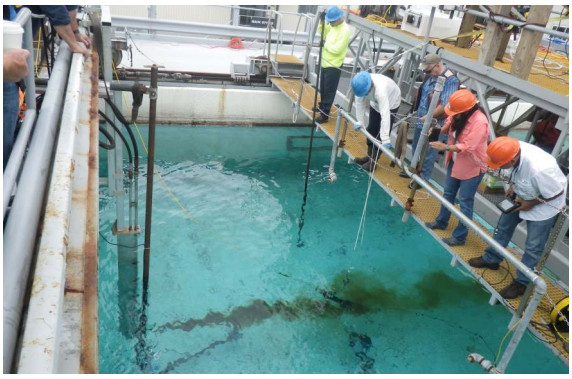

Figure 1. Subsurface oil release over AZFP.

Laboratory experiments were carried out in July 2018 with ASL Environmental Sciences' multi-frequency Acoustic Zooplankton Fish Profiler (AZFP) at the Bureau of Safety and Environmental Enforcement's OHMSETT Oil Spill Response Research and Renewable Energy Facility outdoor saltwater wave tank (Figure 1). These experiments were conducted with the collaboration of the US Naval Research Laboratory (NRL) and the US Environmental Protection Agency (EPA), with funding provided by the US Bureau of Safety and Environmental Enforcement (BSEE). BSEE has managed the Ohmsett in Leonardo, New Jersey.

In these experiments the AZFP was mounted to the bottom of the test tank and oil was injected at depths above the instrument with a series of different release rates and pressures. Acoustic backscatter was recorded of the oil releases using four distinct frequencies (455, 769, 1250 and 2000 kHz). In addition to the oil, air bubbles were also introduced to provide additional suspended particles within the water column. These spill experiments were designed to simulate real world conditions to test the ability of the AZFP to characterize suspended particle size distributions. Figure 2 shows the backscatter of the four frequencies. By examining this backscatter data, and comparing it to the known release rates, analysis is expected to develop techniques to resolve acoustically oil concentration and oil drop-size distributions from AZFP data. Further details of this project were presented in a poster (link to poster) at the 41st Arctic and Marine Oil Spill Program (AMOP) conference held in Victoria BC October 2–4, 2018.

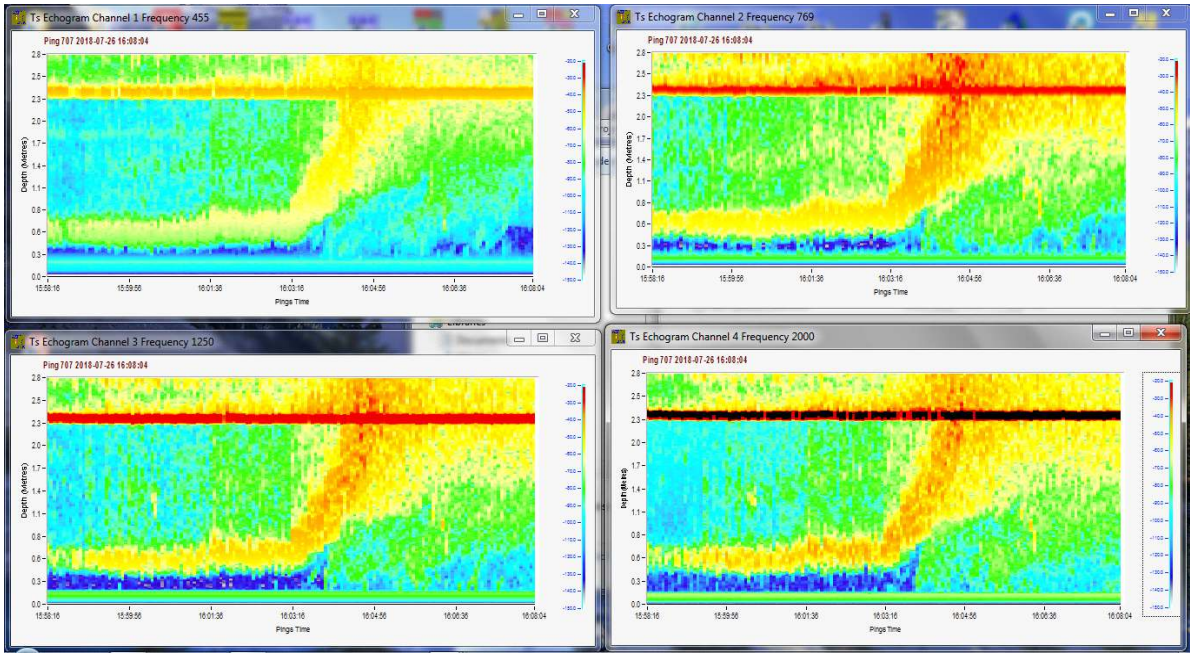


Figure 2. Acoustic backscatter data from all four frequencies (455, 769, 1250, 2000 kHz) during subsurface oil injections.



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