Where's the Oil?  Shortcomings of the Deepwater Horizon Oil Spill Response Data

Marissa Valentine

Awarded Most Public Health Significant poster

This project emerged after conducting a literature review that uncovered no evidence of Deepwater Horizon (DWH) oil in seafood based findings from the FDA, Florida Dept. of Agriculture and Consumer Services, as well as two other studies that sampled seafood in Mississippi as well as Louisiana.  Most of these studies only looked at parent compounds of polycyclic aromatic hydrocarbons (PAHs), which have toxicity data to perform risk assessment.  To fill in the gap, this study analyzed the fingerprint of DWH wellhead oil and weathered oil components obtained from the scientific literature and databases, respectively and mapped out the pattern of both types of oil based on 38 aromatic hydrocarbons used by Mussel Watch, the historical U.S. coastal contaminant monitoring program.  By understanding the fingerprint of weathered oil, or oil transformed by various processes such as photo-oxidation, evaporation of volatiles, and microbial degradation, this will help scientists identify what components exist in oil as it washes up on shorelines and impacts biota.

Using this fingerprint, the project used public databases, such as Mussel Watch and the Environmental Response Management Application to find pre- and post-spill locations for either sediment or biota sampled throughout oiled areas of the Gulf of Mexico, to determine where is the oil?  After searching the massive databases, which included over 1,000 sampling locations for sediment and 500 for biota, the databases only produced 3 datasets that met study criteria, mostly due to a lack of pre- and post-spill sampling.  Using SAS, the project did not identify any statistical significance for pre- and post-spill differences in the 38 analytes.

The major takeaways from this project included the lack of pre- and post-spill data sets collected in response to the largest oil-spill in U.S. history and that future spills need to target components actually present in weathered oil impacting shorelines--most parent PAHs tested for were nonexistent in the weathered oil profile.  More importantly, no toxicity data exists for alkyl-homologues of parent PAHs, which consist of the second most abundant group of analytes in the weathered oil; thus, toxicity data for alkyl-homologues of PAHs remains critical to conduct accurate risk assessment for the DWH oil spill.