

### Statement of Work

Duration: 01 February 2013 to 31 January 2014

To assess the transformation and microbial degradation of natural organic matter and of nitrogenous energetic compounds (NEC) such as TNT, the geochemistry of organic matter will be measured in samples collected across several ecosystem types where currently there is limited data. These ecosystems include a wet tropical reef and lagoon in the Florida Keys, FL, USA (4 DoD sites). The aromatic component (e.g. lignin, PAHs) of dissolved organic carbon (DOC) and particulate organic carbon (POC) in the water column and nepheloid and particulate organic carbon (POC) in sediment will be measured along with DOC absorption and fluorescence and base-extracted POC absorption and fluorescence. Field and experimental work will be conducted shipboard across the aforementioned ecosystem types. These incubations will complement NRL investigation of bacterial production and TNT mineralization and organic matter characterization. The absorption and fluorescence of DOC and POC will be measured along with DOC and POC concentrations and  $^{13}\text{C}$ -DOC values. Particulate and dissolved lignin phenols will be measured on select water column and sediment samples. Water column light measurements will be obtained *in situ* and used to identify stratification and photic zone depth. Working with NRL, lignin, a unique terrestrial carbon biomarker similar in structure to nitrogenous aromatics, will be used to track the input of recalcitrant material across salinity fronts. Multivariate statistical modeling of the fluorescence results will be done to establish a rapid proxy for OM sources and transformations. This will provide remedial program managers (RPM) with an easy-to-use assay for future analyses. A final report will be due to NRL on 31 January 2014.