Brief report of the soil sessions at the Setac North America Annual Meeting, that took place virtually, within the days 15 to 19 of November, 2020.

The SETAC Global Soils Advisory Group Sponsored three sessions at the virtual SETAC NA annual meeting, November 15-19 2020.

Soil Contaminants: Fate, Bioavailability, Environmental Toxicology in Ecological and Human health Risk Assessments
This session included the following presentations. “Effect of Soil Particle Size, pH and Organic Carbon on In Vitro Bioaccessibility of Arsenic.” “Toxicity of Nano Zero-Valent Iron (nZVI) to Soil Invertebrates in Artificial Soil.” “Association between Surface Soils Trace Metal Pollution and Economic Status in the Houston Metropolitan Area”, which concluded that health risk of trace metals in surface soil, is likely to be significantly higher in children living in economically disadvantaged communities. “Levels of Polycyclic Aromatic Hydrocarbon and Metal Contamination in Urban Playground Soils throughout Oklahoma City Metropolitan Area.” “Natural Iron Dynamics in Irrigated Soils” concluded application of synthetic ferrihydrite to soil might attenuate metal uptake and improve water holding capacity and nutrient availability. A study with Imidacloprid pesticide contaminated soil showed toxicity, life-stage vulnerability and recovery in Folsomia quadrioculata. Another study used acute earthworm toxicity test results to predict chronic test results for the Environmental Assessment of veterinary medicinal products.

Fate, Toxicology, or Risk Assessment of Materials of Interest to the Military
This session included the following highlights. “Environmental risks posed by Underwater Military Munitions (UWMM)” described challenges while obtaining site-specific contamination data and identified knowledge gaps associated with ecological risk assessment at UWMM sites. Two polymers developed for in situ passive sampling of munitions compounds will provide a low-cost technique for
remediation and monitoring programs at both military and non-military sites. Multi-species ecotoxicological evaluation of parent and UV-degraded methyl-nitroguanidine (MeNQ) in aquatic exposures determined that MeNQ had low potency relative to TNT; however, more work is needed to understand the toxicity of UV-degraded MeNQ in aquatic environments. Two independent studies in the same US Army laboratory developed draft Ecological Soil Screening Levels (EcoSSLs) for soil invertebrates exposed to the new insensitive munitions (IM) DNAN and NTO were greater (lower toxicity/risk) compared with TNT EcoSSLs. The present studies also revealed lower toxicities of IM compounds in a soil with greater organic matter and clay constituents. Two independent US Army studies described extension of U.S. EPA Method 8330 for insensitive munitions, and extraction and analysis techniques used to detect and quantify per- and polyfluoroalkyl substances (PFAS) in various matrices.

**Soil and Sediment Background Studies and their Utility in Risk Assessment and Remedial Decision Making**

Soil and sediment background is important to consider when making risk assessment decisions for cleanup or disposal of contaminated soil and sediment. Too often, soil and sediment background is either not used at all or used inappropriately when making important decisions. This session offered three presentations and two posters regarding how soil and sediment background has been effectively used in risk assessment.

Soil and sediment screening values are used to evaluate whether contaminants pose risks to people or the environment. Since they are intended to be protective of people or ecological species, they are derived using toxicity data, exposure parameters, and contaminant specific parameters, but they don’t account for the amount of a contaminant present in soil or sediment due to background. In some cases, soil and sediment screening values for a contaminant are below soil and sediment background. When background concentrations are similar to or above soil or sediment screening levels, it is important to understand the contribution from soil and sediment background and include this in risk assessment.

Topics covered included: site-specific soil and sediment background evaluations; characterizing baseline sediment metal concentrations; spatial variations in ambient polycyclic aromatic hydrocarbons; background concentrations in fish; variations in metal concentrations in a river; and comparison of x-ray Fluoresces (XRF) and inductively coupled plasma mass spectrometry (IPC-MS) methods.
Presentations

- Christine Peterson of EHS Support discussed a soil and sediment background evaluation at a former wood treating facility in West Virginia. They used EPA’s ProUCL to calculate upper tolerance limit (UTL) background threshold values for several metals to determine whether site concentrations were representative of soil and sediment background.

- Michael Kierski of Exponent discussed and evaluation of ambient polycyclic aromatic hydrocarbon (PAH) sediment background at a gas manufacturing plant on the Chicago River. They used the upper tolerance limit (UTL) concentration to compare site PAH concentrations to several other ambient concentrations in the Chicago River.

- Betsy Ruffle of AECOM discussed background polychlorinated biphenyl (PCB) concentrations in fish from markets and groceries in the Washington DC area and how they compared to risk based values. Results showed PCB concentrations varied between species and in some cases were higher than risk-based values.

Posters

- Michele Hornberger of the United States Geological Survey displayed sediment sampling sites along the Klamath River (which runs from Oregon to California) and some tributaries. Samples were analyzed for metals and results were displayed on heat maps to show where concentrations were highest.

- Brian Ng of Florida International University displayed soil profiles for Miami, California ad Rwanda. Soil samples were also analyzed using both x-ray Fluoresces (XRF) and inductively coupled plasma mass spectrometry (IPC-MS) and results from the two methods were compared.