

Contaminated Sediments: How do we get from determination of risk to cleanup?

D. Michael Johns Windward Environmental Seattle, WA 98110

This presentation represents one of three brief presentations for the Workshop Session on the topic “Making Risk-Based Decisions: Deriving Risk-Based Cleanup Goals”. Sediments are a pathway for contaminant exposure to a wide variety of species that use aquatic systems. Some of the exposure pathways are direct, in that species are in direct contact with the sediment, using sediment as habitat (e.g., infaunal benthic organisms), in direct contact with the sediment surface (e.g., epibenthic organisms), or feed directly on benthic species (e.g., some species of fish and wildlife). Other exposure pathways are indirect, in that species do not come into direct contact with sediment, but may still be exposed to contaminants that originate in sediment. The majority of indirect exposure pathways are through the food chain: contaminants originating in sediment are passed successively from one trophic level to another. The process for defining cleanup goals that are risk-based differs depending upon whether the risk results from direct or indirect exposure pathways. It is easier to establish cleanup goals for risks associated with direct pathways than for risks associated with indirect pathways. For example, cleanup goals for risk to benthic communities can be derived using a variety of generally available sediment quality guideline (SQG) values, or from SQGs that are developed specific to the site. Other methods, which include the use of weight-of-evidence approaches (e.g., Sediment Quality Triad), can be used directly to establish a footprint for cleanup without establishing numeric cleanup goals. Establishing cleanup goals for risks resulting from indirect exposure requires a different approach. The types of information required about the species at risk from indirect exposure can be broad. One of the key considerations in defining cleanup goals is to determine where the initial exposure originates. For example, habitat use and selection of prey items by mobile species with large home ranges makes it particularly difficult to identify relevant areas of sediment contamination that should be remediated in order to significantly reduce risks. Options for defining cleanup goals include reverse risk modeling (e.g., using food web models to identify relevant sediment concentrations) and removal of hot spots.