Tools for Focusing Contaminated Sediment Site Management Strategy Development.

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The Sediment Management Work Group (SMWG) was formed in 1998 and comprises more than forty members who have responsibility for managing contaminated sediment sites. The mission of the SMWG is to advance risk-based scientifically sound approaches for evaluation and implementation of contaminated sediment management decisions.

Two products of the SMWG can be used as tools to focus and streamline the evaluation process for potential management strategies:

- A set of eight key questions
- A *Decision Tree for Sediment Management* (fall 1999) www.smwg.org

The eight questions help to focus both early and later actions at contaminated sediment sites:

1. Does the presence of contamination present an unacceptable risk?
2. Are on-going, external sources significant and can these be readily controlled?
3. Are there any readily implementable solutions that may be initiated prior to final remedy selection that reduce the risk posed by the sediment contamination in whole or in part?
4. Will risks become acceptable via natural recovery and if so, over what time frame?
5. Can active remediation significantly accelerate the achievement of acceptable risk?
6. Will rare natural events or human activity significantly disrupt conditions?
7. What are all of the short term and long term risks for each option (including implementation and post-remedial risks)?
8. What are the comparative risk reductions of the sediment management options under consideration?

The *Decision Tree* offers a tiered approach to evaluation of sites mostly through the development and refinement of the Site Conceptual Model (SCM). A valid SCM is critical to the evaluation of any sediment site as it represents the environmental system and the physical, chemical and biological processes that determine the transport of contaminants from sources through complete pathways to receptors. The Site Conceptual Model is the main tool for problem formulation, and for testing hypotheses concerning site risk and the viability of risk-based sediment management strategies.

As a tool, the SCM presents a hypothesis or multiple working hypotheses of the problem and cause(s). These hypotheses are tested and refined through site characterization. Significant data are incorporated, data gaps are defined, and conflicting data are resolved and integrated into the SCM. The level of detail and iterations of refinement depend on the complexity of the site and the magnitude of risk posed by site conditions. To understand some of the complexities of a contaminated sediment site, it may be necessary to develop numerical models that describe current and future site conditions. Elements and processes that are significant in terms of pathways to receptors are incorporated into the SCM. Some of these include:

- external sources of contamination
- relevant mechanisms for contaminant flux from sediments or other sources
- sediment bed stability
- other natural processes that affect relevant pathways, such as burial of contaminants
- the degree to which contaminants are bioavailable and/or bioaccessible

The SCM is developed with consideration of potential remedial strategies in mind. The SCM is important for establishing risk-based Remedial Action Objectives (RAOs) and can lend insight into whether those RAOs can realistically be achieved. Beyond site risk characterization, the SCM can be used in "what if" scenarios to predict the response of a surface water system to a stress such as natural episodic events, human activity, or implementation of a remedial alternative.