Revision and Combination of Ocean and Inland Manuals

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Overview

Problem:

- Currently ITM and OTM provide overlapping guidance
- Policy guidance sometimes conflicting or outdated
- Guidance does not include recent scientific and technical advances

Overview

Solution: Develop combined manual to provide consistent and updated guidance while recognizing the regulatory differences

- **Update policy:**
  - **Sediment quality guidelines**
  - **TBP**
  - **When/how can TBP and SQGs be used?**
- **Update technical**
  - **Bioaccumulation interpretation**
  - **Chronic toxicity tests**

Major Issues

- **When is testing required?**
- **Use of TBP, SQGs**
- **Identifying contaminants of concern**
- **Method detection limit issues**
- **Statistical issues**
- **Chronic toxicity tests**
- **Confounding factors in bioassays**
- **Test organisms**
- **Bioaccumulation interpretation**
- **Risk Assessment approaches**

Development of New Approach

- Risk-Based Conceptual Model
- Weight of evidence/lines of evidence
- Simplify tiers to two levels
  - Existing Information and Screening
  - Biological Assessment
- "Confine" changes to ensure compliance with existing regulations

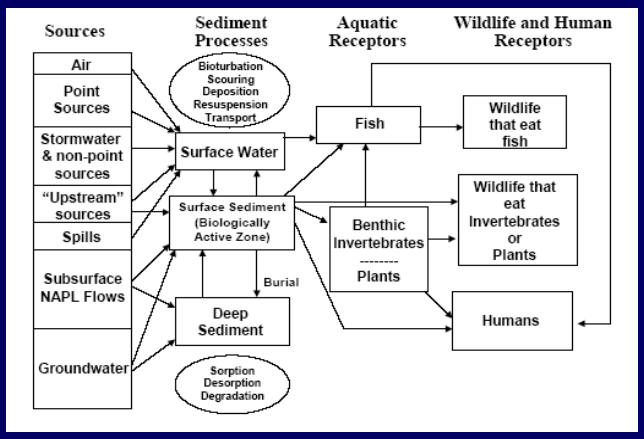
Distinctions between MPRSA and CWA

- Role of chemical evaluations (SQGs)
  - Sediment chemistry, SQGs, and TBP cannot substitute for required bioassays under MPRSA.
- Management options
  - Capping cannot be used "to cure a flunk" under MPRSA.
- Toxicity and bioaccumulation tests
  - Required under MPRSA unless one of the exclusions is met or earlier testing is valid.

Technical Revision:
Conceptual Model

- A generic conceptual model will be described for open water disposal
  - Guidance for making site-specific modifications
  - Establish linkage between exposure pathways and receptors and data collected during an evaluation
  - Direct evaluation process

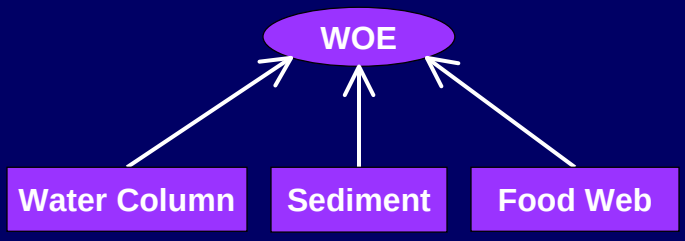
Technical Revision:
Conceptual Model



General Conceptual Model for Assessing Risk of Contaminated Sediments (From Driscoll et al., 2002)

Technical Revision:
Weight of Evidence (WOE) Approach

- Relies on multiple lines-of-evidence (LOE)
- Reach conclusions regarding the potential risks to receptors identified within the CM
- Three main lines-of-evidence



Lines of Evidence

LOE: Water Column Evaluation

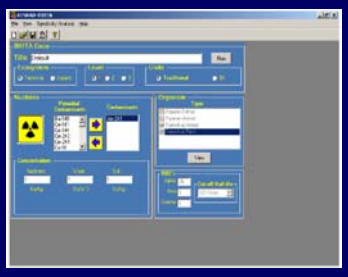
- Replacement of 0.01 application factor (for determining no-effect level from elutriate LC50 value) with a range of values.
  - 0.01 used only for persistent compounds
  - 0.05 used for non-persistent compounds
  - 0.1 used for ammonia
- Original 0.01 factor from 1972 WQC derivation document

LOE: Water Column Evaluation

- Updating test species list and protocols.
  - Survey conducted in 2004
  - Identified organisms used/not used/potential
- Reduce elutriate test duration to 24 h
  - Current tests require feeding past 48 h
  - Long term (96 h) is not realistic exposure
- Inclusion of additional dilution in test design. 100%, 50%, 10% and 1% to bracket LC50 value

LOE: Radionuclides/Pathogens

- Guidance for assessment of radionuclides in dredged material.
  - International Atomic Energy Agency (IAEA) model for assessing *de minimis* levels of radionuclides (public and dredge worker) (IAEA, 2003).
  - Dept. of Energy Biota Dose Assessment model for assessing impacts on benthos, fish, and wildlife (U.S. DOE, 2002).



- Updated guidance for assessing pathogens
  - Most probable number (MPN)
  - Membrane filter (MF) techniques

LOE: Benthic Evaluation

- Recommendations for the use of chronic toxicity tests when there is a reason to believe chronic effects are a concern.
  - *Neanthes araneceodentata* 28-day
  - *Leptocheirus plumulosus* 28-day
  - *Hyalella azteca* 42-day
  - *Chironomus tentans* 28-day tests.

- Currently determining
  - What additional information is gained?
  - Increased sensitivity?
  - How to interpret?
  - Additional costs?

LOE: Benthic Evaluation

- Use of sediment chemistry screening tools for rapid inexpensive analysis of chemicals
  - immunoassays
  - biomarkers
  - cell assays (dioxin assay)
- Expanded use of sediment quality guideline values as an additional line of evidence
  - Empirically based (ERL, ERM)
  - Theoretically based (AVS-SEM)

LOE: Bioaccumulation Evaluation

Bioaccumulation Assessment

- Expanded use of thermodynamically based bioaccumulation potential (TBP) to predict bioaccumulation of organic chemicals (Kow > 4.0).
- Additional guidance provided for bioaccumulation testing
  - Use of *Corbicula fluminea*
  - Consideration for metabolism
- Addition of more sophisticated food-web modeling to assess trophic transfer (e.g. TrophicTrace)

LOE: Bioaccumulation Evaluation

Bioaccumulation Interpretation

- Benthic Organisms
  - Elimination of use of bioaccumulation to predict benthic impacts.
  - Exceptions (Site specific considerations, TES)
- Fish and Wildlife
  - Tissue residue benchmarks (i.e., CBR values, probabilistic approaches, and TRVs)
- Humans
  - FDA fish advisory levels
  - cancer and non-cancer protection levels (IRIS database)

Conclusions

- **WOE/LOE should allow additional information to be used to make informed decisions**
- **CSM will provide direction for evaluation and ensure data quality through iterative process**
- **New updated evaluation procedures will enhance our ability to describe the nature of sediment proposed for dredging**