Expanding the Tiered Framework: Site-Specific Numerical Sediment Standards

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Science Advisory Board for Contaminated Sites in BC

Science and Standards Technical Advisory Committee

Why a Tiered Framework for BC Sediment Management?

Current Limitations

Generic numerical sediment standards are fixed concentrations without consideration of environmental factors affecting exposure and toxicity, resulting in high uncertainty, and conservative or under-protective assessments.

Adaptable Approach

Site-Specific Sediment Standards as a **Tier 2 option**, based on site conditions and not conservative assumptions, reduces uncertainty and streamlines assessment/remediation. **Protocol 2** procedure and model.

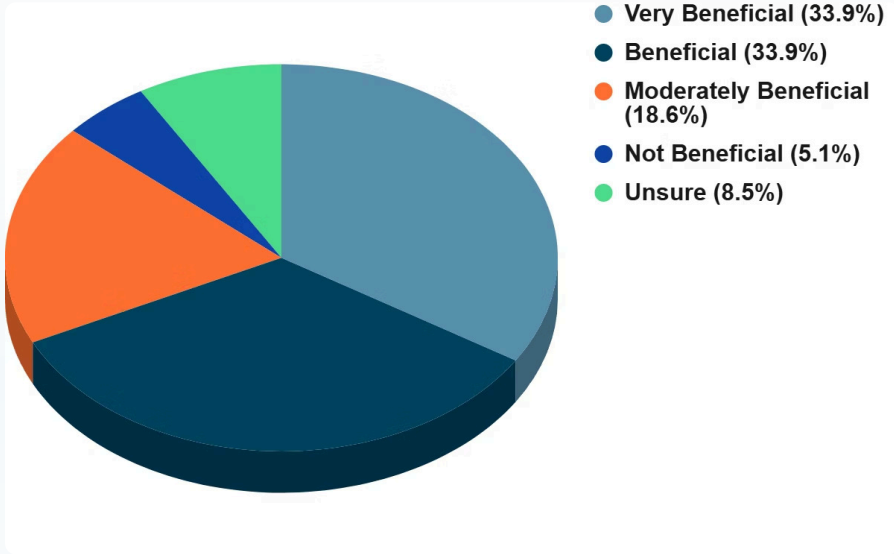
Enhanced Protection

Supports site-specific and risk-based decision-making, leading to better environmental outcomes and more effective resource allocation.

Key Messages from Survey: Site-Specific Standards & Tiered Framework

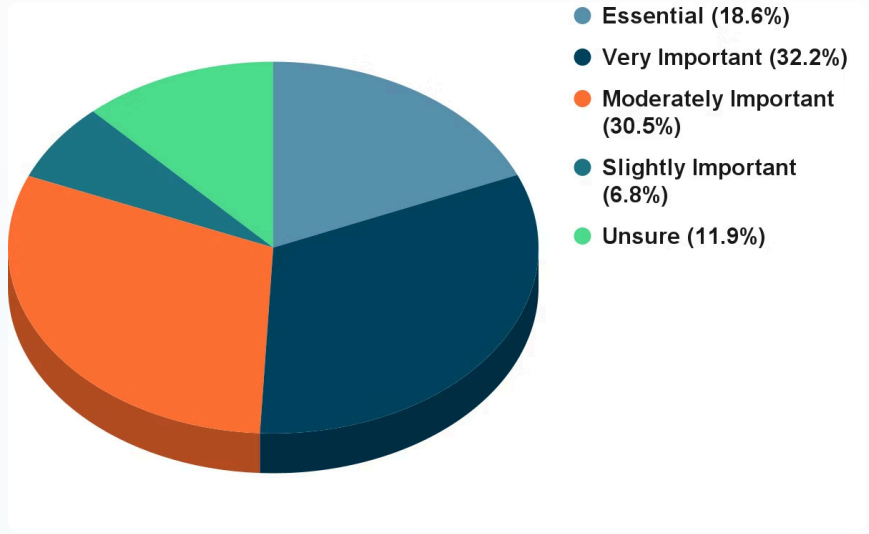
86.4%

Tiered Framework Beneficial for Future Sediment Standards Framework



88.1%

Importance of Bioavailability adjustments for Sediment Standards Framework in Future



"Exceeding a standard for a particular substance is almost irrelevant without the context of bioavailability (eg. AVS/SEM, organic carbon)"

"The bioavailability in sediment helps us understand not just how much contaminant is present, but whether it is causing harm or influencing environmental processes. This distinction is required to make informed decisions in managing contaminated sites"

Proposed Three-Tier Framework for Sediment Assessment

Tier 1: Screening Level Numerical Assessment

Conservative, generic standards for initial site characterization. Quick identification of sites needing further assessment.

Tier 2a: Refined Numerical Assessment

Follow procedures and use models (e.g., Cause-Effect) in Protocol 2 to derive site-specific sediment standards, predominantly for bioavailability adjustments.

Tier 2b: Screening-Level Risk-Based Assessment

Similar to Tier 2a, with an additional option for using prescribed lines of evidence such as community analysis as part of habitat assessment (Protocols 2 & 13).

Tier 3: Detailed Risk-Based Assessment

Detailed risk assessment using site-specific factors and multiple lines of evidence such as community analysis (Protocols 1 & 20).

Scientific Approaches for Bioavailability Adjustment

In developing Protocol 2 requirements, procedures, and a supporting model for bioavailability adjustments, would a cause-effect model (e.g., Bayesian Networks or Regression) be the best approach for a scientific framework that uses site-specific data and known toxicity-modifying factors to develop refined sediment standards?

(60s response + 60s results)

- Yes
- No
- It depends
- Unsure
- Other

Integrating Lines of Evidence

Please rank the following lines of evidence in order of importance for developing a robust scientific framework for deriving Tier 2b site-specific sediment standards for screening-level risk assessment (1 = most important).

Note: *Assume that professional judgment is limited to development of the framework, not implementation, since this is intended to support an enhanced numerical screening process, not risk assessment. Clear discretization thresholds and weights would be included in the framework.* (60s response + 60s results)

- **Environmental Conditions: Physical and chemical data**

  Quantitative analysis of well understood physical and chemical parameters that affect bioavailability (e.g., grain size, TOC, pH, SEM/AVS).

- **Bioaccumulation Data in Tissues of Local Species**

  Laboratory or field tests measure actual tissue concentrations of organisms exposed to sediment contaminants.

- **Benthic Community Structure Analysis**

  Assessment of in-situ organism populations reveals real-world ecological impacts and community-level effects of contamination.

- **Other**

Your Input: Guiding the Tiered Framework

Today's Discussion

Your expertise will directly aid the development of scientifically defensible and practical standards for ecological protection

Scoping Plan

Roadmap for future research to support the collaborative development of a modern framework for sediment standards

SSTAC White Paper

High-level summary of the Sediment Standards Project (Phase 1), including a synthesis of your input

Thank You!

Your Contributions Matter

Your expertise is vital as we work to modernize BC's sediment standards for comprehensive ecosystem protection.

Protecting Our Aquatic Ecosystems

Together, we're developing standards that safeguard aquatic ecological organisms and the predators that depend on them.

Contact SSTAC

For questions or additional input, please reach out to us. We appreciate your engagement in this important work.