

Freshwater Sediments Standards Preferred Option Summary

Issue

How should the Sediment Management Standards be revised to add Freshwater Sediment Standards?

Decision

There are three possible decisions.

1. Develop and adopt only biological criteria for evaluating freshwater sediments/
2. Develop and adopt only numeric chemical criteria for evaluating freshwater sediments/
3. Develop and adopt both numeric and biological criteria for freshwater sediments.

a. What is the preferred option?

Adopt biological standards for evaluating and managing freshwater sediments. This entails selecting appropriate bioassay organisms, bioassay protocols, end points, interpretive criteria and statistical methods for applying these. A list of proposed species has been assembled based on Ecology's developmental work on freshwater criteria and regional experience with a variety of bioassay species. These are presented later in this document.

b. Why is this the preferred option?

While it would be preferred to develop and adopt numeric and biological criteria concurrently, this may not be likely given the timeline for this rule revision effort. If the timeline for development of numeric criteria allows, these will be considered for this rule revision process.

Ecology is currently working on developing numeric criteria for freshwater sediments and will continue to do so as the rule revisions continue. In 2003, Ecology published the Phase II report for the Development of Freshwater Sediment Quality Values for use in Washington State (<http://www.ecy.wa.gov/pubs/0309088.pdf>). Since this report, Washington, Oregon, and Idaho agreed to gather data from a larger geographical area to develop values for the tri-state region using methods described in the report. Although it was hoped that values would be ready for consideration as

Washington's regulatory standard, two issues have resulted in delays to the expected schedule. The first is a technical issue; due to regional differences in availability, toxicity, and naturally occurring concentrations of metals across the state, additional analysis is warranted prior to adopting a single set of values for the entire state. The second is a regulatory issue; although it is preferred that a single set of values be used for the same body of water, rivers such as the Columbia are borders between states with different regulations. Discussions regarding individual state-mandated levels of protection associated with the numerical criteria are ongoing and may not be resolved quickly.

Adoption of biological criteria with a framework for applying them to assess sediment quality will result in a much clearer path for site evaluation and establishing site-specific cleanup standards than exists now. Freshwater sediment criteria are presently reserved under the SMS and Ecology project managers are required to assess impacts and determine cleanup requirements on a case-by-case basis. This can result in inconsistent management of freshwater sediments and uncertainty for both Ecology project managers and the regulated community.

The Preferred Option for Freshwater Sediment Standards

What is the scope of the preferred option?

The promulgation of biological criteria entails selection of a suite of bioassay organisms, test protocols and creating a decision framework for applying those tests. The proposed array of tests was chosen with several objectives in mind:

- Multiple species and life-history stages to best represent the range of sensitivity of species comprising a freshwater benthic community.
- Preference for bioassays with well developed protocols (e.g., ASTM approved bioassay protocols for freshwater sediments).
- Those bioassays that have been most widely used in the northwest (at least in Washington, but also Oregon and Idaho).
- Availability of endpoints consistent with SMS Sediment Quality Standards and Cleanup Screening Levels.

Proposed Freshwater Bioassay Organisms, Endpoints, QA limits, and Interpretive Criteria
 (From Phase 1 Task 6, Development of Freshwater Sediment Quality Values for Use in Washington State, September, 2002, Publication # 02-09-050)

Test	QA limits Control	QA limits Reference	SQS	CSL
<i>Hyalella azteca</i> *10-day mortality	$C \leq 20\%$	$R \leq 25\%$	$T - R > 10\%$	$T - R > 25\%$
<i>Hyalella azteca</i> *28-day mortality	$C \leq 20\%$	$R \leq 30\%$	$T - R > 10\%$	$T - R > 25\%$
<i>Hyalella azteca</i> **28-day growth	$CF \geq 0.15 \text{ mg/ind}$	$RF \geq 0.15 \text{ mg/ind}$	$T/R < 0.75$	$T/R < 0.6$
<i>Chironomus tentans</i> *10-day mortality	$C \leq 30\%$	$R \leq 30\%$	$T - R > 10\%$	$T - R > 25\%$
<i>Chironomus tentans</i> **10-day growth	$CF \geq 0.48 \text{ mg/ind}$	$RF/CF \geq 0.8$	$T/R < 0.8$	$T/R < 0.7$
<i>Chironomus tentans</i> *20-day mortality	$C \leq 32\%$	$R \leq 35\%$	$T - R > 15\%$	$T - R > 25\%$
<i>Chironomus tentans</i> **20-day growth	$CF \geq 0.48 \text{ mg/ind}$	$RF/CF \geq 0.8$	$T/R < 0.75$	$T/R < 0.6$
Microtox® **15min decrease in luminescence	$CF/CI \geq 0.72$	$RF/CF \geq 0.8$	$T/R < 0.85$	$T/R < 0.75$

C = Control, CI = Control Initial, CF = Control Final
 R = Reference, RF = Reference Final
 T = Test Sample, * = Acute, ** = Chronic

Also proposed is a framework for applying these tests that would match that used for marine sediments where the minimum requirements include a suite of three tests comprised of at least two species and at least two acute tests and one chronic test. In cases where bioaccumulative chemicals may be present, the framework would require consideration of environmental and human health receptors at risk as detailed in the bioaccumulation issue papers for human health and ecological risk.

Disadvantages of this option

To support the most consistent and efficient process for assessing and cleaning up freshwater sediments, the availability of both numeric chemical criteria and biological criteria are desired. Implementing the SMS with only biological standards for freshwater sediments will result in higher analytical costs for sediment evaluations. If numeric chemical criteria were available, these would allow lower cost initial screening of sediments using chemical analyses.

Biological criteria are only protective of benthic organisms and do not adequately protect human health or ecological receptors from bioaccumulative compounds.

Long-term goals for freshwater sediments should include adopting numeric criteria. However, if these are not adopted during this rule revision, it may take a considerable time before the rule is reopened to allow these updates to the SMS.

How does this option apply to the WAC?

Part III - Sediment Quality Standards:

WAC 173-204-310 establishes the procedures for initial designation of sediments.

This section may be revised to include appropriate designation procedures for freshwater sediments.

New Section - WAC 173-204-335 establishes biological tests used to confirm designation of freshwater sediments. This section would include those tests used for confirmation of freshwater sediments.

WAC 173-204-340 currently reserved for freshwater sediment quality standards.

This section would be revised to include the biological tests and interpretive criteria for establishing SQS level effects in freshwater sediments.

Part V – Sediment Cleanup Standards:

WAC 173-204-500 to 590 establishes cleanup decision process and policies, hazard assessment and site identification, Cleanup Screening Level effects (for marine sediments). Biological tests and interpretive criteria that establish CSL effects for freshwater sediments would be added to this part of the rule and referenced in pertinent sections implementing their use. The freshwater biological tests could be added under a new subsection WAC 173-204-525, immediately after the marine sediment CSLs in WAC 173-204-520.