

Freshwater Sediment Standards

Issue

How should the Sediment Management Standard (SMS) be revised to provide sediment standards in freshwater environments?

Overview

The SMS does not provide detail on how to evaluate freshwater sediments. Freshwater sediments are evaluated on a case-by-case basis by Ecology site managers, which can cause inconsistency. No clear freshwater sediment standards limits how U.S. Environmental Protection Agency (EPA) uses the SMS in sediment cleanup sites that they oversee.

A lot of work has been done already to support the development of freshwater sediment standards for benthic invertebrates. Some state, federal, and tribal agencies have already adopted freshwater sediment criteria that are published in scientific papers. Ecology has several guidance documents on developing freshwater standards. The Regional Sediment Evaluation Team (RSET), a multi-state collaboration, will soon be publishing a document that may be helpful for Washington State in developing freshwater numeric and biological standards.

This issue paper only discusses criteria that protect benthic life from toxic chemicals in the sediment. Criteria to protect human health will be addressed in another issue paper.

Some of the options being considered to revise the SMS:

- 1. Do nothing and continue case-by-case evaluation.**
- 2. Develop Numerical Freshwater Sediment Standards only.**
- 3. Develop Biological Freshwater Sediment Standards only.**
- 4. Develop both Numerical and Biological Freshwater Sediment Standards.**

Problem Statement

Currently the Sediment Management Standards (SMS) rule outlines specific standards and decision-making processes to protect and clean up sediment. The SMS rule has promulgated chemical and biological standards for marine sediments but lacks promulgated freshwater chemical criteria and approved freshwater bioassays with their

respective endpoints. Instead, the SMS has only a narrative standard for freshwater systems.

There are many freshwater sediment sites in the state of Washington under the Model Toxics Control Act (MTCA) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) oversight. Because of the lack of promulgated freshwater criteria, the narrative standard requires a site-specific evaluation to determine cleanup standards. This site-specific process can create inconsistency on how freshwater sediment sites are managed by the department.

The SMS narrative language (which includes site-specific developed biological/chemical criteria) is an Applicable or Relevant and Appropriate Requirement (ARAR) under a CERCLA cleanup. However, the EPA prefers promulgated chemical and biological criteria as ARARs for CERCLA cleanups.

Since promulgation of the SMS, a variety of research papers and developmental documents¹²³⁴ have been produced and published on freshwater sediment numerical criteria and sediment quality guidelines. Ecology has used these documents as guidance to develop cleanup standards at freshwater sites and to aid in the promulgation of freshwater numerical standards. Some of the sediment quality guidelines in these papers have been adopted by federal, state and tribal agencies.

Although the guidelines proposed in the most recent documents were not promulgated, a similar statistical approach is being applied to a broader array of companion sediment chemistry and bioassay data sets from the states of Washington, Oregon, and Idaho. This work is being conducted under the guidance of the RSET that incorporates representatives from the federal government and the states of Idaho, Oregon and Washington. A report on the draft findings is expected in 2009 or 2010. This report, as well as the published literature, may provide useful guidance for Washington State to promulgate numerical freshwater chemical and biological standards.

Both marine and freshwater sediment standards also need to protect human health. The evaluation of sediments for human health criteria is addressed in the Human Health Issue Paper and not in this paper.

¹ Ecology. 1995. Summary of guidelines for contaminated freshwater sediments. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA. Publication No.: 95-.308.

² Ecology. 1997. Creation and analysis of freshwater sediment quality values in Washington State. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA. Publication No.: 97-323a.

³ SAIC and Avocet Consulting. 2002. Development of freshwater sediment quality values in Washington State, Phase I Final Report. Prepared by SAIC, Bothwell, WA and Avocet Consulting, Kenmore, WA for the Washington State Department of Ecology, Olympia, WA. Publication No.: 02-09-050.

⁴ Avocet Consulting. 2003. Development of freshwater sediment quality values in Washington State, Phase II Final Report. Prepared by Avocet Consulting, Kenmore, WA for the Washington State Department of Ecology, Olympia, WA. Publication No.: 03-09-088.

Options

1. No Action

The department continues to follow the narrative standard and use best available science to develop cleanup standards on a site-specific basis.

2. Develop Numerical Freshwater Sediment Standards Only

When developing numerical standards both the standards and how the sediment sites will be evaluated need to be determined. Subsection (a) of this option addresses the options for developing numerical standards into the SMS while subsection (b) addresses the options of how the numerical standards would be used to evaluate freshwater sediment sites.

A. Options for developing numerical standards.

- Review Sediment Quality Guidelines published in the literature that could be adopted into the SMS.
- Review previous developmental documents that have recommended numerical standards for adoption by Ecology (see footnotes 1-4) as to their adoption into the SMS.
- Evaluate the different approaches for developing freshwater numerical standards: floating or flat percentile of Apparent Effects Threshold, ERL and ERM.
- Evaluate the numerical standards produced by RSET in 2009/10 for potential promulgation into SMS.

B. Options for evaluating freshwater sediment sites using numerical standards.

- Continue following the process outlined in WAC 173-204-310 and 173-204-510 to designate freshwater sediments using numerical standards only. The promulgated freshwater sediment numerical standards would be developed into two categories: the Sediment Quality Standards (SQS) and the Cleanup Screening Levels (CSL). The SQS would be used to designate freshwater sediments for further evaluation while the CSL would be used as the minimum standards to which a freshwater sediment site must be cleaned up.
- Continue following WAC 173-204-310(2) which states: “Any person or the department may confirm the designation of sediments which have either passed or failed initial designation procedures listed in subsection (1) of this section using the applicable biological testing of WAC 173-204-315, as required below.” and also WAC 173-204-520 with the caveat that the biological testing standards referenced in the above statement are not promulgated for freshwater sediments. Ecology site managers, however, can determine the biological testing standards that would be used using Best Professional Judgment and Best Available Science.

3. Develop Biological Freshwater Sediment Standards Only

When developing biological standards both the standards and when they are required need to be developed. Subsection (a) of this option addresses the options for developing the individual biological standards and their respective effects criteria while subsection (b) addresses when biological evaluation tests would be required.

A. Add language into the SMS describing approved freshwater biological evaluation tests, their performance standards and their biological effects criteria with options being:

- Incorporate only the freshwater bioassays that were used in the sediment chemistry data evaluation by RSET in their exercise of the promulgation of freshwater sediment standards.
- Incorporate the freshwater bioassays that have been reviewed and recommended by RSET.⁵
- Incorporate benthic community assessments as a biological evaluation test that is similar to the marine standards of the SMS.
- Review the scientific literature and other agency (State, Tribe and Federal) regulations for approved biological evaluation tests that may be applicable for integration in the SMS.
- Seek input from Ecology personnel and the public for appropriate biological standards that could be adopted into the SMS.
- Determine the number of acute and chronic biological tests that are provided in the SMS.

B. Add language to the SMS that determines when freshwater bioassays are required in the absence of promulgated freshwater numerical standards in the SMS with options being:

- Use Best Professional Judgment based on all available site data to determine if biological evaluation tests are needed.
- Biological evaluation tests are required at all freshwater sediment sites.
- Continue following WAC 173-204-310(2) which states: “Any person or the department may confirm the designation of sediments which have either passed or failed initial designation procedures listed in subsection (1) of this section using the applicable biological testing of WAC 173-204-315, as required below.” with the caveat that the numerical screening standards used in the designation of sediments and also the cleanup screening levels standards in Table III of WAC 173-204-520 are determined or approved by the Ecology site manager on a case-by-case basis if freshwater sediment numerical standards have not been promulgated into the SMS.

⁵ RSET. 2009. Draft of the Final Sediment Evaluation Framework for the Pacific Northwest.
<https://www.nwp.usace.army.mil/pm/e/rset.asp>

- Add language that determines the minimum number of chronic and acute biological evaluation tests that would be required if a confirmatory analysis is performed.

4. Develop Both Numerical and Biological Freshwater Sediment Standards

If both the numerical and biological standards are to be promulgated into the SMS, the process to develop each of the standards would follow the options listed previously for each of the respective standards. The standards, methods and procedures for evaluating freshwater sediments would not be handled on a case-by-case basis. Only the numerical screening and biological standards that would be promulgated into the SMS would be used to perform the initial designation (WAC 173-204-310) and potential confirmatory analysis (173-204-315) along with the screening of sediment station clusters of potential concern (173-204-510) and the hazard assessment (173-204-530).

Factors to Consider When Selecting an Option

- The availability of Ecology staff resources to work on tasks to support rule making.
- Which option will be sufficiently protective of environmental threats and impacts on biological communities so that the biological communities are diverse and productive?
- Which approach will be sufficiently protective of human health threats, including disproportionate impacts to populations that rely on local seafood as a food source?
- Which approach best supports quick and efficient cleanup decisions and completion of cleanup actions? Approaches that provide clear decision-making guidelines, minimize data collection, and reduce uncertainty would be preferred.
- Which approach provides incentive to reduce risk by completing the most cleanup actions as quickly as possible?
- If approaches result in protracted data collection and decision making processes or incomplete cleanup actions, there is a loss of opportunity to accomplish more cleanup actions with limited staff resources.
- Potential for Unintended Consequences. Which approach may have the potential for unintended consequences including but not limited to: impairing or postponing sediment cleanup actions or increased risk to human health or the environment.
- Whether the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs, and the specific directives of the statute being implemented.

- Whether the rule differs from any federal regulation or statute applicable to the same activity or subject matter and, if so, determine that the difference is justified by the following:
 1. A state statute that explicitly allows the agency to differ from federal standards; or
 2. Substantial evidence that the difference is necessary to achieve the general goals and specific objectives in MTCA.
- Whether rule development has been coordinated, to the maximum extent practicable, with other federal, state, and local laws applicable to the same activity or subject matter.