

IV. Contaminated Sediment Listings by Category

A. Overview of Contaminated Sediment Listing Process for 2004

Background

Ecology has listed contaminated sediments as part of the 303(d) listing process since 1996, starting with the 1996 303(d) list and then again on the 1998 list. Listing of contaminated sediments on the 303(d) list is required in Washington because a decision was made by EPA that Washington's adoption of the 1995 sediment management standards (Chapter 173-204WAC) were considered federally approved water quality standards in addition to the state surface water quality standards found at Chapter 173-201AWAC. This decision meant that Washington must also list contaminated sediments on the 303(d) List. Washington is one of the only states in the nation that has this additional requirement.

For the 1996 and 1998 contaminated sediment lists, the 303(d) sediment listing process used the chemical and biological criteria for Puget Sound marine sediments. Specifically, Puget Sound marine sediments were listed on the 303(d) List if a cleanup site had been identified through the procedures outlined in Chapter 173-204 Part V, Sediment Cleanup Standards. Specifically, standards in WAC 173-204-510-540 describe procedures, cleanup screening levels, and hazard assessment and site identification, to rank and list sites for cleanup. These results are encapsulated in Ecology's "Sediment Management Standards Contaminated Sediment Site List (CSSL)" maintained by the Toxics Cleanup Program (TCP). The last published list was May 1996; TCP maintains additions to the list.

EPA approved the 1996 303(d) List using the CSSL as the basis for listing contaminated sediments. For the 1998 303(d) List, Ecology submitted a candidate 303(d) List to EPA that followed the same basis for listing as the 1996 list. However, EPA only partially approved sediment listings for 1998, and added 69 sediment listings to the already established list. These additional listings were for grids or segments with excursions of the sediment quality standards (SQS) adjacent to identified contaminated sites from the CSSL. EPA's reason for additional listings was that the 1998 listing policy referred to compliance with the Sediment Management Standards without any elaboration on how to interpret the many parts of the Standards.

It was noted that during both listing processes there were fundamental translation problems with using the sediment management standards as a basis for a 303(d) listing. Ecology had struggled with each listing cycle to come up with a way to regulatory "crosswalk" between effects from historical sediment contamination and effects from ongoing discharges, and has never successfully made that link without confusion. It had been a force fit to try to use sediment contamination as a basis for water quality 303(d) listing because of differences in program purposes, location information, the SEDQUAL database vs. the WATS database, and the nature of sediment contamination in relation to water column information. For the 2002/2004 listing process, Ecology developed a process with the goal of alleviating the confusion and problems noted above.

Department of Ecology

Assessment Criteria and Procedures for the 2002/2004 303(d) List

Because of the apparent lack of clarity in past water quality listing policies (Policy 1-11) regarding sediment listings, Ecology Water Quality Program wanted to ensure that the 2002 listing policy provided more specificity in identifying what contaminated sediment sites should be listed on the various categories of the Water Quality Assessment. It was determined that the listing of contaminated sediment sites on the 303(d) list should be consistent with the intent and requirements described in the Sediment Management Standards.

A. Description of the Sediment Management Standards

It is important to note that the Sediment Management Standards are divided into several parts. Part I describes general information, Part II has definitions., Part III describes sediment quality standards, Part IV describes sediment source control, Part V describes sediment cleanup standards, and Part VI describes sampling and testing plans and recordkeeping.

Unlike the surface water quality standards, which do not include regulatory provisions for identifying triggers for when a water needs a cleanup plan, the Sediment Management Standards provide specific information on what constitutes a cleanup site (found in Part V, sediment cleanup standards).

Ecology notes that the sediment quality standards (SQS) found in Part III of the regulation were derived from Apparent Effects Thresholds (AETs) analysis, and were intended to provide an indication of where potential problems may be present due to contaminant concentrations and thereby establish sediment cleanup goals. They are not based on any cause/effect relationship between the concentrations and water quality impacts or ecological harm. It is therefore a misapplication of the Sediment Management Standards to use SQS by themselves as the final determinant of whether a water body is impaired. Use of the SQS in this way conflicts with the goals and structure of Ecology's sediment management program (the Model Toxics Control Act and the federal Superfund cleanup program) because a water body could remain 303(d) listed, even when all state and/or federal cleanup criteria have been met. This could create a serious disincentive for all parties to enter into cleanup agreements, knowing that despite all their efforts, the 303(d) listing will still be in place. In addition, sediment 303(d) listings based on SQS could result in significant expenditures with little or no actual environmental benefit, as dischargers will continue to be subject to TMDL-derived requirements even though the reason for the listing (sediments) has already been addressed.

B. Comparison of the Sediment Management Standards to the 303(d) List

Ecology Water Quality Program staff were directed to establish assessment criteria in Policy 1-11 for the 2002/2004 list that would mesh the Sediment Management Standards and the 303(d) water quality listing process as much as possible.

To do this comparison, components of the Water Quality Standards were compared with the Sediment Management Standards, as follows:

Department of Ecology

<u>Water Quality Standards</u> (173-201A) =	<u>Sediment Management Standards</u> (173-204)
Water Quality Criteria (173-201A-030 thru 060)	Sediment Quality Standards (173-204-300 thru350)
Source Control/NPDES Permits (173-201A-160 through 180)	Sediment Source Control/Permits (173-204-400 thru 420)
Tools-Mixing Zones (173-201A-100)	Tools-sediment impact zones (173-204-415)
303(d) List policy (Policy 1-11, revised 9/02)	Sediment Cleanup Standards (173-500-590)

Logical comparisons were also made of the categories required for the Integrated Report in relation to cleanup screening levels described in Part V of the Sediment Management Standards, 173-204-510, as follows:

Category 5 (Needs a TMDL)	=	Sites of “potential concern”(cleanup action list)
Category 2 (Water of Concern)	=	Sites of “low concern” (no action unless new information shows problem)
Category 4B (Has a Pollution Plan)	=	Approved Record of Decision under CERCLA, Cleanup Action Plan under MTCA, or correction measures under RCRA

Given the goal of developing a listing process for contaminated sediments that meshed the two programs, a decision was made to use the 303(d) listing process to compliment requirements already described in the Sediment Management Standards to the degree possible. Further, it seemed illogical that the lower priority cleanup sites for the Toxics Cleanup Program (those sites identified as areas of low concern in accordance with 173-204-501(2)(f)), would become a high priority for the Water Quality Program by being placed on the Water Quality Program’s 303(d) list for water quality cleanup. This is counter to the legislative intent behind the Sediment Management Standards and creates seriously conflicting program priorities for the Water Quality Program.

C. Decisions in Policy 1-11 for Assessing Sediment Listings

Based on the comparisons of the two program standards, and in keeping with the goal of meshing the 303(d) listing requirements with TCP requirements for cleanup sites, Policy 1-11 was revised and clarified for 2002 to include the following language:

Sediments

Assessment decisions for toxic pollutants in sediments are based on the standards and procedures in Chapter 173-204 WAC, *Sediment Management Standards*.

Department of Ecology

In waters of Puget Sound (as defined in WAC 173-204-200(20)), segments will be placed on the 303(d) list for pollutants in the sediment if the segment is part of a site on Ecology's Toxic Cleanup Program's Contaminated Sediment Site List, including the 1996 published list (Ecology Pub. No. 96, May 1996) and unpublished sites identified since 1996. However, segments that have an active cleanup in process that meets the criteria listed for the *Has a Pollution Control Plan* category will instead be placed in that category. A segment will be placed in the *Waters of Concern* category when the segment is not included on this list but at least one sample taken within the segment exceeds the applicable Sediment Quality Standard.

Waters outside Puget Sound were not considered for the 1996 Contaminated Sediment Site List. In marine waters not considered for the 1996 Contaminated Sediment Site List, segments will be placed on the 303(d) list for pollutants in the sediment if the segment is of potential concern because the average of the three highest concentrations for any chemical, biological effects, or other reserved criteria exceeds the cleanup screening level, as described in WAC 173-204-500 through 173-204-590.

For freshwater or low salinity sediments, assessment for potential listing of segments on the 303(d) list will be based on biological tests in accordance with adopted narrative standards, and will be done on a case-by-case, site-specific basis, in accordance with WAC 173-204-330 and 173-204-340. There are no numeric sediment quality standards in WACs for chemical effects in freshwater or low salinity sediments. However, information on chemical effects in these areas can be used to place a segment in the *Waters of Concern* category. (See Ecology, *Creation and Analysis of Freshwater Sediment Quality Values in Washington State*, Pub. No. 97-323a, July 1997.)

D. 2002/2004 Assessment Process for Contaminated Sediments

Because of difficulties in trying to accurately identify sediment listings for the 303(d) list that occurred in 1996 and 1998, the WQ Program and Toxics Cleanup Program worked together to create a process that would reflect most accurately the contaminated sediment data. It was recognized that for the previous lists, data had not been assessed directly from the SEDQUAL database. As a result, the 1996 and 1998 303(d) lists were not found to be entirely accurate for identifying pollutant parameters and locations.

A process was developed and implemented by the Toxics Cleanup Program to rescreen contaminated sediment data directly from SEDQUAL, in order to provide a more usable set of data for purposes of the Water Quality Assessment and 303(d) List. This screening process included screening out old data which is not in compliance with the WQ program policy data age of 10 years. The Toxics Cleanup Program also included a depth requirement to represent surface sediment in the biologically active zone..

The process of rescreening the SEDQUAL data took a significant amount of staff effort and involved several thousand data points for the various locations, especially considering that each site often screens for multiple chemicals. At the time, due to the large volume of data to be assessed and limited staff resources, staff did not track what individual chemicals were screened out based on the screening criteria. The results were then provided to the Water Quality Program for assessing based on Water Quality Policy 1-11.

Department of Ecology

Because chemicals that dropped off due to the screening criteria were not tracked individually as to what the specific reason was, it is not possible to provide a direct justification for the individual chemical listings on the 1998 303(d) list. Because Ecology rescreened all of the available SEDQUAL data, the assumption is that if a chemical did not show up on one of the 2002/2004 Water Quality Assessment categories, it was due to the screening criteria used to initially assess the data. Ecology does not consider chemicals that dropped off the 1998 list to be a “de-listing”, but rather a correction to the listing based on the screening data designed to more accurately identify contaminated sediment sites.

Ecology does not believe a rescreening of the SEDQUAL data base to identify reasons that individual chemical listings dropped off would be a prudent use of limited staff resources. In fact, many of the chemicals found in contaminated sediment are by-products of the breakdown process. The contaminated sediment cleanup process typically deals with a cleanup of the sediment and all chemicals found within the sediment.

2002 303(d) Sediment Chemical Analysis Process

A data screening criteria was applied to the Sediment Quality Information System (SEDQUAL, release 4.0a May 2001) to produce the chemical input file required for 303(d) listed grid identification. Data was screened based on:

- Age (July 1991 to December 2001)
- Depth (0 - 15 cm)
- State (Washington)
- Spatial coordinate availability
- *Sediment Management Standards* (SMS) chemicals

An ArcView GIS v3.2a extension was developed to enable the identification of 303(d) grids to be listed under the following circumstances:

- For each 303(d) grid cell which contains a chemical concentration;
- Select the most recent chemical samples based on collection date;
- Averaged up to the three highest chemical concentrations per SMS parameter; and
- If the average chemical concentration is greater than the applicable Sediment Management Standard sediment quality standards (SQS) then the grid is listed in the appropriate category.

2002 303(d) Sediment Bioassay Analysis Process

A data screening criteria was applied to the Sediment Quality Information System (SEDQUAL, release 4.3 July 2002) to produce the marine sediment bioassay input file required for 303(d) grid identification. Data was screened based on:

Department of Ecology

- Age (July 1991 to present)
- Depth (0 - 15 cm)
- State (Washington)
- Spatial coordinate availability
- *Sediment Management Standards* (SMS) bioassays

An ArcView GIS v3.2a extension was developed to enable the identification of 303(d) grids to be listed under the following circumstances:

- For each grid which contains a marine sediment bioassay sample;
- Select the most recent bioassay samples based on sample collection date; and
- Calculate a bioassay *point* value for the three highest bioassay samples.

A flow chart was designed to indicate the process for listing chemical and biological data (see attached).

References from Sediment Management Standards

WAC 173-204-200(8) "Contaminated sediment" means surface sediments designated under the procedures of WAC 173-204-310 as exceeding the applicable sediment quality standards of WAC 173-204-320 through 173-204-340.

⇒ WAC 173-204-310: SQS designation procedures

⇒ WAC 173-204-320 through 173-204-340: Marine, low salinity, and freshwater SQS

WAC 173-204-310(1)(b) Sediments with chemical concentrations which exceed any one applicable chemical or human health criterion in WAC 173-204-320 through 173-204-340 are designated as having adverse effects on biological resources or posing significant human health threats, and fail the sediment quality standards of WAC 173-204-320 through 173-204-340, pending confirmatory designation.

WAC 173-204-310(2) Confirmatory designation. 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. Sediment samples that pass all the required confirmatory biological tests are designated as passing the applicable sediment quality standards of WAC 173-204-320 through 173-204-340, notwithstanding the sediment's previous initial designation under subsection (1) of this section. Any sediment sample which fails any one of the required confirmatory biological tests shall be designated as failing the applicable sediment quality standards of WAC 173-204-320 through 173-204-340, notwithstanding the sediment's previous initial designation under subsection (1) of this section. The confirmatory biological test standards are described below.

Department of Ecology

WAC 173-204-200(15) "Minor adverse effects" means a level of effects that: (a) Has been determined by rule by the department, except in cases subject to WAC 173-204-110(6); and (b) Meets the following criteria: (i) An acute or chronic adverse effect to biological resources as measured by a statistically and biologically significant response relative to reference in no more than one appropriate biological test as defined in WAC 173-204-200(3); or (ii) A statistically and biologically significant response that is significantly elevated relative to reference in any appropriate biological test as defined in WAC 173-204-200(3); or (iii) Biological effects per (b)(i) or (ii) of this subsection as predicted by exceedance of an appropriate chemical or other deleterious substance standard, except where the prediction is overridden by direct biological testing evidence pursuant to (b)(i) and (ii) of this subsection; and (c) Does not result in significant human health risk as predicted by exceedance of an appropriate chemical, biological, or other deleterious substance standard.

WAC 173-204-200(26) "Surface sediments" or "sediment(s)" means settled particulate matter located in the predominant biologically active aquatic zone, or exposed to the water column. Sediment(s) also includes settled particulate matter exposed by human activity (e.g., dredging) to the biologically active aquatic zone or to the water column.