

## DEPARTMENT OF ECOLOGY

### IV. Contaminated Sediment Listings by Category

#### A. Overview of the Contaminate Sediment Listing Process for 2004

##### ii. Comparison of the 1998 303(d) Contaminated Sediment List with Category 5 of the 2004 Assessment

#### Background on the 1996 and 1998 Sediment 303(d) Lists

The information provided for the 1996 and 1998 sediment 303(d) lists was not developed for Water Quality Program 303(d) listing purposes. These previously submitted lists are based solely on the contents of the Toxics Cleanup Program's (TCP) *Contaminated Sediment Site List* (CSSL).<sup>1</sup> The CSSL is based on Puget Sound<sup>2</sup> marine sediment data with *Sediment Management Standards* (SMS)<sup>3</sup> cleanup screening level (CSL) chemical and/or bioassay exceedances. For the 1998 list, EPA Region X added grids that contained SMS sediment quality standard (SQS) exceedances and were adjacent to grids containing CSSL sites. 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. In preparation for the 2002 listing process, Ecology and EPA met to discuss the additional 1998 listings and the methodology used to list contaminated sediment sites. Ecology committed to be more explicit in the 2002/2004 listings policy so that misunderstandings in the listing process did not occur similar to the 1998 process. Based on an understanding of the Sediment Management Standards cleanup screening levels and the basis for 303(d) listing in accordance with Policy 1-11 (revised September 2002), EPA agreed that the additional sediment listings in 1998 were in error.

#### Discrepancies Between 1996, 1998, and 2002/2004 Sediment 303(d) Lists

Previous 303(d) lists will not necessarily directly correlate to the current list, because of data screening criteria differences (e.g., age, depth, and geographic coordinates). Additionally, as previously stated, the 1996 and 1998 lists are based solely on the contents of the Toxics Cleanup Program's *Contaminated Sediment Site List* which only included Puget Sound chemical and biological data with CSL exceedances and did not include SQS exceedances for evaluation.

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

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<sup>1</sup> Ecology 1996. *Sediment Management Standards Contaminated Sediment Site List*. Pub #96-604. May 1996.

<sup>2</sup> CSSL waterbodies included: Strait of Georgia, Bellingham Bay, Port Gardner, Elliott Bay, Duwamish River, Commencement Bay, Liberty Bay, Dyes Inlet, Ostrich Bay, Sinclair Inlet, Eagle Harbor, and Budd Inlet.

<sup>3</sup> Ecology 1995. *Sediment Management Standards Chapter 173-204*. Amended December 1995.

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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 of 15 cm. in order 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.

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.

Though there may be some need for additional refinements, but we are confident that the 2002/2004 list was created using a systematic evaluation of raw sediment data and represents a more accurate sediment 303(d) list than any previously submitted.

### **2002/2004 Contaminated Sediment Assessment Process**

The 2002/2004 contaminated sediment assessment is separate and distinct from the previous assessments done in 1996 and 1998. For the 2002/2004 list, a data screening criteria was applied to all marine and freshwater data in the *Sediment Quality Information*

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System (SEDQUAL, release 4.0a May 2001) database<sup>4</sup> at the start of the TCP Sediment Management Unit's evaluation that met the following criteria. The result was an input file required for 303(d) listed grid identification.

### *Sediment 303(d) Screening Criteria*

The SEDQUAL database was screened based on:

- Age (July 1991 to December 2001) (i.e., data  $\leq$  10 years);
- Depth ( $\leq$  15 cm) (i.e., the biologically active zone / surface sediment);
- Spatial coordinate availability (i.e., sample has latitudinal and longitudinal coordinates);
- State (Washington); and
- *Sediment Management Standard* chemicals and bioassays.

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

### *Marine Chemical Assessment*

- For each grid which contains a chemical sample;
- Select up to the three most recent chemical samples based on collection date;
- Average up to the three highest chemical concentrations per SMS chemical; and
- If the average chemical concentration of the three highest was greater than the CSL then the grid was listed in Category 5. Average concentrations of 1-2 CSL were listed in Category 2. If the average chemical concentration of at least 1-3 SQS then the grid was listed in Category 2.

### *Marine and Freshwater Biological Assessment*

- For each grid which contains a bioassay sample;
- Select up to the three most recent bioassay samples based on collection date;
- Calculate a *bioassay point*<sup>5</sup> value for the three highest bioassay samples; and
  - ⇒ SQS biological exceedances are assigned 1 *bioassay point*
  - ⇒ CSL biological exceedances are assigned 2 *bioassay points*

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<sup>4</sup> SEDQUAL URL: <http://www.ecy.wa.gov/programs/tcp/smu/sedqualfirst.htm>.

<sup>5</sup> *Bioassay points* refer to applying a numeric value to bioassay exceedances.

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- If there are  $\geq 3$  points, the grid is listed on Category 5 based on bioassay. If  $< 3$  points but at least one, the grid is listed on Category 2.

If bioassays were performed in a grid that had initially been listed based on chemistry, the results of the biological analyses overrode the chemical results.

This change in using SEDQUAL directly (with the screening criteria applied to represent the most accurate data) makes it impractical to do a direct correlation with the previous listings on 1998.

### Grid Size

Sediment conditions are generally stable relative to the overlying water within the same area. Because as a media, water is dynamic, its condition is highly influenced by the mixing of adjacent waters. This occurs through numerous hydrodynamic forces. This mixing causes relatively rapid changes to water column conditions both temporally and spatially. Sediments, on the other hand, are relatively stable over time and space. That is, because they are not subject to mixing to the same degree as water, their conditions do not change as dramatically over as wide an area as water. Likewise, sediment does not change as significantly from year to year as water at the same location. This relatively slow mixing of adjacent sediments results in the two conditions discussed above:

1. greater spatial heterogeneity and
2. increased temporal stability.

Condition 1 above gave rise to the need to apply criteria which would enable Ecology's Sediment Management Unit to more accurately reflect the scale of the sediment conditions (e.g., greater heterogeneity within smaller areas). As a matter of standard practice, a single sediment sample is assigned an area that is representative of that sample. The area assigned encompasses from approximately 31,410 to 785,250 square feet. This is equal to the area contained within an area of a circle whose diameter is 200 to 1000 feet. Using three samples, this will therefore describe the quality of an area with a maximum of approximately 2.33 million square feet (msf) or 74 acres (i.e., approximately one-fourth the size of the current grid). The smaller grid size makes the location more accurate in describing the affected contaminated sediment area.

Comparatively, the 1998 listing process used a significantly larger grid size of 8.98 million square feet or 206 acres.