United States Department of the Interior

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PO Box 47600
Olympia, WA
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Subject: COMMENTS – **Washington Department of Ecology Proposed SMS Rule Amendments**

Dear Ms. Dorrah:

The U.S. Department of the Interior (Department) has reviewed the Washington Department of Ecology (Ecology) Draft Sediment Management Standards (SMS) Rule Proposed Amendments - Chapter 173-204 WAC (Dated August 15, 2012); Development of Benthic SQVs for Washington, Oregon, and Idaho (Ecology 2011); and the Review Comment and Responses for the Sediment Management Standards (SMS) Rule Revisions Freshwater Sediment Standards. The Department agrees that it is reasonable and appropriate to establish sediment management standards for freshwater sediments; however, it does not appear that the numerical SQVs that were developed as part of the Proposed SMS Rule Amendments will provide an adequate basis for managing contaminated sediments in Washington State or elsewhere in the Pacific Northwest.

Based on our review, the Department recommends that the following be incorporated or addressed prior to promulgating the Proposed SMS Rule Amendments:

- Revise the freshwater benthic criteria to ensure they are consistent with the narrative intent of the SQVs in that they provide for no adverse effects for the sediment cleanup objectives and minor adverse effects for the cleanup screening levels, as stated in WAC 173-204-563;
- Clarify the ecological bioaccumulation narrative to articulate the need to minimize adverse effects on wildlife species (WAC 173-204-564);
- Establish consistent procedures for developing regional background levels as part of the Proposed SMS Rule Amendments [WAC 173-204-560(5)];
- Eliminate the practical quantitation limit override included in the SMS two-tier framework and develop consistent guidance on the detection limits for chemicals of

potential concern (COPCs) at contaminated sites within the state [WAC 173-204-560(3) and (4)];

- Develop review and approval procedures for upward adjustment of the sediment cleanup level that includes meaningful consultation with affected government agencies; and,
- Include effective provisions for establishing sediment cleanup levels below the sediment cleanup objectives to ensure protection of sensitive, culturally important, and threatened and endangered species).

In addition, given our current understanding of the Proposed SMS Rule, we are concerned that these standards will not be protective of sensitive and federally listed species and their critical habitat. The Department recommends that the protectiveness of these standards to threatened and endangered species and their critical habitat, and other highly sensitive and special status species be assessed and reflected in the final rule. This assessment should address both direct effects to sediment dwelling invertebrates and indirect effects to other aquatic-dependent species exposed to sediments.

Freshwater Benthic Criteria

Section WAC 173-204-563 of the Proposed SMS Rule Amendments describes two types of sediment cleanup levels based on protection of the benthic community in freshwater sediments, including:

- Sediment cleanup objectives (SCOs); and,
- Cleanup screening levels (CSLs).

According to Section WAC 173-204-563(2a), the SCOs establish no adverse effect levels, including no acute or chronic adverse effects, on the benthic community. By comparison, the CSLs establish minor adverse effects levels, including minor acute or chronic effects, on the benthic community. The numerical criteria established for the SCOs and CSLs, as presented in Table VII of this section of the Proposed SMS Rule Amendments, were developed using a Floating Percentile Model (FPM) applied to matching sediment chemistry and benthic toxicity test data compiled for select sites located in Washington and Oregon. The concept of establishing numerical criteria that define the concentrations of COPCs that represent no and minor adverse effects on the benthic community is reasonable and appropriate; however, the numerical criteria presented in Table VII of the Proposed SMS Rule Amendments do not adequately define the concentrations of COPCs that correspond to no or minor adverse effects levels and therefore do not satisfy the narrative intent of the SCOs or CSLs, as required under Section WAC 173-204-563 of the Proposed SMS Rule Amendments. Accordingly, the proposed SCOs and CSLs will not provide an adequate basis for assessing or managing contaminated sediments in Washington State or elsewhere in the Pacific Northwest. The Department recommends that the freshwater benthic criteria be revised to ensure the criteria are consistent with the narrative intent of the SQVs (i.e., no adverse effects for the sediment cleanup objectives and minor adverse effects for the cleanup screening levels, as stated in WAC 173-204-563).

Floating Percentile Model

The FPM that was used to derive the numerical criteria presented in Table VII of Section WAC 173-204-563 relies on matching sediment chemistry and sediment toxicity data from sites located in Washington and Oregon. The first step in the application of the FPM is determination of whether adverse biological effects are observed in each sample (referred to as a "hit" if toxicity is observed and a "no hit" if toxicity is not observed; Ecology 2011). Table VIII of Section WAC 173-204-563 describes the procedures that were applied by Ecology to determine if individual sediment samples used in the FPM were toxic (a hit) or not toxic (a no hit). These procedures are inappropriate relative to the narrative intent of the SCOs and CSLs for the following reasons:

1. In some cases, test acceptability was evaluated using reference performance standards. While Table VIII indicates that Ecology "shall use the most updated American Society for Testing and Materials and EPA protocols and performance standards", neither ASTM (2012) nor USEPA (2000) describe performance standards for freshwater reference sediment sites. Therefore, it is unclear what performance standards were applied when evaluating data for potential use in the derivation of numerical criteria;
2. The procedures described for normalizing response data for amphipods, *Hyalella azteca*, and midge, *Chironomus dilutus*, are incorrect for the mortality endpoint. Toxicity test results should be control normalized by dividing the response observed for a test sediment sample by the average response for the control treatment(s). Instead, the toxicity data for the mortality endpoint appears to be control normalized by subtracting the response for the control treatment from the response for a test sediment sample. This approach to control normalization biases the designation of sediment samples as toxic or not toxic in a way that results in fewer samples being designated as toxic to benthic invertebrates (see Figure 1). However, it does appear that the weight data for both species were correctly control normalized.

3. The adverse effects levels presented in Table VIII for interpreting the results of sediment toxicity tests are not consistent with the narrative intent of the SCOs in relation to describing no adverse effects (see attached Table 1). Specifically no adverse effects are reported when:

    - Midge survival (10-d toxicity test) <20% decrease compared to control;
    - Midge growth (10-d toxicity test) <20% decrease compared to control;
    - Amphipod survival (10-d toxicity test) <15% decrease compared to control; and,
    - Amphipod growth (28-d toxicity test) <25% decrease compared to control.

    Based on our experience in developing standard methods for toxicity testing (see USEPA 2000 and ASTM 2012), we believe the no adverse effects levels proposed by Ecology are much larger than appropriate for no adverse effects levels (see Ingersoll et al. 2005).

4. The adverse effects levels presented in Table VIII for interpreting the results of sediment toxicity tests are not consistent with the narrative intent of the CSLs in relation to describing minor adverse effects. Specifically minor adverse effects are reported when:

    - Midge survival (10-d toxicity test) <30% decrease compared to control;
    - Midge growth (10-d toxicity test) <30% decrease compared to control;
    - Amphipod survival (10-d toxicity test) <25% decrease compared to control; and,
    - Amphipod growth (28-d toxicity test) <40% decrease compared to control.

    Based on the Department's experience in developing standard methods for toxicity testing, we believe the minor adverse effects levels proposed by Ecology are much larger than appropriate for minor adverse effects levels (see Ingersoll *et al.* 2005).

As an example of points 3 and 4 above, the Department conducted a comparison of effect values using a case study and presented results in the attached Tables 2 through 4. These tables present the results of toxic/not toxic designations for sediment samples from the Upper Columbia River using the reference envelope approach (the approach recommended by the Department for developing tolerance limits) and the approach that was used by Ecology (identified as the SMS SCO in Ecology 2011). A comparison of the number of samples designated as toxic using the two approaches for four toxicity test endpoints is presented in Table 4. Ecology has not demonstrated that such a magnitude of effect on growth as indicated in the tables represents no adverse effect in benthic invertebrates. The case study also demonstrates that application of the biological criteria for CSLs results in designation of even highly contaminated sediment samples as not toxic. The Departmental analyses presented in Tables 2, 3, and 4 demonstrate that application of such criteria only rarely identify toxic samples, and the sediment management standards proposed by Ecology are not sufficiently protective.

The Department recommends that Ecology revise the proposed SMS Rule Amendments to indicate that the acceptability of freshwater toxicity tests will be evaluated using the test acceptability criteria established by ASTM (2012) and USEPA (2000) for control samples. In addition, Table VIII should be revised to describe the widely accepted procedures for control normalizing toxicity test data. Finally, the adverse effect levels presented in Table VIII should be revised to reflect values that correspond to no adverse effects levels and minor adverse effect levels for benthic invertebrate communities.

<u>Short-Term Toxicity Tests</u>

The results of short-term toxicity tests do not provide a basis for directly establishing numerical criteria consistent with the narrative intent of the SCOs and CSLs.

Section WAC 173-204-563 of the Proposed SMS Rule Amendments indicates that the numerical criteria presented in Table VII (i.e., the sediment cleanup levels) were developed using sediment toxicity data. The five endpoints that were used in the FPM included:

- Amphipod 10-d mortality;
- Amphipod 28-d mortality;
- Amphipod 28-d growth;
- Midge 10-d mortality; and,
- Midge 10-d growth.

The data compiled for these five endpoints were used directly to derive the numerical SCOs and CSLs. While such data (if correctly interpreted to identify hits and no hits) are likely to provide some of the information needed to derive numerical criteria for managing contaminated sediments, they do not provide all of the information needed to establish SCOs or CSLs that are protective of the benthic community in freshwater ecosystems. Some of the key limitations of the data used by Ecology to establish the numerical SCOs and CSLs include:

1. The biomass of benthic invertebrates was not considered in the derivation of numerical criteria. Biomass is calculated as the product of survival and growth (weight; i.e., Biomass = Survival x Weight, where survival and weight are expressed as percentages on a control-normalized basis; USEPA 2000; ASTM 2012). Biomass is an important endpoint because one of the ecosystem services that the benthic community provides is food for fish and wildlife species. Therefore, the amount of food available for fish and wildlife is reduced when the biomass of benthic invertebrates decreases. Because biomass integrates the survival and growth endpoints, it frequently provides a more sensitive indicator of effects on the benthic community than does either survival or growth alone (MacDonald *et al.* 2010; 2012). To illustrate the relative sensitivities of the biomass and survival endpoints, matching sediment toxicity data for midge and amphipods for the Upper Columbia River site are presented in Figures 2 and 3 (MacDonald *et al.* 2012). Biomass is a more sensitive endpoint than survival for any sample plotted below the line of unity on these figures. Failure to consider the biomass endpoint indicates that the numerical SCOs and CSLs are likely to be underprotective of the benthic community.
2. The reproduction of benthic invertebrates was not considered in the derivation of the numerical criteria presented in Table VII. For both of the species used by Ecology in the derivation of freshwater SCOs and CSLs, standard methods are available to evaluate reproduction (see ASTM 2012; USEPA 2000). Reproduction is an important endpoint because the results of studies conducted on many invertebrates indicate that adverse effects on reproduction can occur at contaminant concentrations substantially lower than those that adversely affect either survival or growth. Figure 4 shows the relationship between the survival and reproduction of amphipods in 28- to 42-d toxicity tests, conducted with sediment samples from the Anniston polychlorinated biphenyls (PCB) Site in Alabama (Ingersoll *et al.* 2012). Failure to consider the reproduction endpoint indicates that the numerical SCOs and CSLs are likely to be underprotective

of the benthic community. While it is understood that sufficient data to derive numerical criteria directly for the reproduction endpoint for amphipods or midge are likely not available, an application factor can be used to adjust the SCOs and CSLs in a manner to ensure that they protect against adverse effects on the reproduction of benthic invertebrates.

3. The results of toxicity tests conducted on more sensitive benthic invertebrate species were not considered in the derivation of numerical criteria. Data collected at the U.S. Geological Survey, Columbia Environmental Research Center and elsewhere over the past decade indicate that freshwater mussels can be more sensitive to sediment-associated contaminants than are midge or amphipods (Besser *et al.* 2009). Similarly, sediments contaminated with metals and polyaromatic hydrocarbons (PAHs) associated with coal mining activities were more toxic to mussels than to either amphipods or midge (Wang *et al.* 2012). Therefore, numerical criteria derived using toxicity data for midge or amphipods may not be sufficiently protective of freshwater molluscs or other invertebrates that exhibit similar sensitivities to contaminants. Failure to consider data on the toxicity of contaminated sediments to freshwater molluscs indicates that the numerical SCOs and CSLs are likely to be underprotective of the benthic community. Importantly, it has not been demonstrated that SCOs or CSLs would be protective of threatened and endangered species of fish and invertebrates or other special status fish or invertebrate species. Therefore, the SCOs or CSLs should be applied at any site where special states species occur (or where they ought to occur) with any expectation of protecting those species.

The Department recommends that the sediment cleanup objectives and cleanup screening levels be revised to provide numerical criteria that correspond with no adverse effects levels (for the SCOs) and minor adverse effect levels (for the CSLs). In addition, mussel toxicity testing should be required at the site, where mussels are present or have historically occurred.

<u>Existing Sediment Quality Guidelines</u>

The proposed SCOs and CSLs are not comparable to existing sediment quality guidelines with similar narrative intent.

According to Section WAC 173-204-563, the SCOs establish no adverse effect levels, including no acute or chronic adverse effects, on the benthic community. If the numerical SCOs accurately represent no adverse effects levels, then they should be comparable to other sediment quality guidelines that are intended to represent no adverse effects levels. MacDonald *et al.* (2000) conducted a review of the literature to identify sediment quality guidelines that represent threshold effect concentrations or TECs). The sediment quality guidelines that corresponded with this narrative intent were compiled and used to derive consensus-based TECs (Table 5). Comparison of the consensus-based TECs with the SCOs that are proposed by Ecology in Table VII of Section WAC 173-204-563 indicates that many of the SCOs are comparable (within a factor of three) to the TECs (). However, the following SCOs are substantially higher than the TECs and do not represent no adverse effect levels for these contaminants:

- Copper;
- Lead;
- Mercury;
- Zinc;
- Total polycyclic aromatic hydrocarbons(PAHs);
- Sum DDD;
- Sum DDE;
- Sum DDT; and,
- Endrin.

Moreover there are only a limited number of SCOs compared to TECs provided by MacDonald *et al.* (2000).

Similarly, the CSLs establish minor adverse effect levels including minor acute or chronic adverse effects on the benthic community, as indicated in Section WAC 173-204-563. To accurately represent minor adverse effects levels, the CSLs should be comparable to other sediment quality guidelines intended to represent minor adverse effects levels. Based on a literature review, MacDonald *et al.* (2000) derived probable effect concentrations (PECs) or concentrations of contaminants above which adverse effects are likely to be observed. The sediment quality guidelines that corresponded with this narrative intent were compiled and used to derive consensus-based PECs (Table 6). Comparison of the consensus-based PECs with the CSLs that are proposed by Ecology in Table VII of Section WAC 173-204-563 indicates that many of the CSLs are comparable (within a factor of three) to the PECs, but the following CSLs are substantially higher than the PECs and do not represent minor adverse effect levels for the following contaminants:

- Arsenic;
- Copper;
- Lead;
- Zinc;
- Total PCBs;
- Sum DDD; and,
- Sum DDT.

Moreover there are only a limited number of SCOs compared to PECs provided by MacDonald *et al.* (2000).

Many of the proposed SCOs and CSLs are substantially higher than the sediment quality standards that have been established by the Confederated Tribes of the Colville Reservation and the Spokane

Tribe of Indians (Table 7). Furthermore, the proposed SCOs and CSLs have not considered the nationally applicable sediment quality benchmarks established by USEPA (2003; 2005). Neither the proposed SCOs nor the proposed CSLs would provide an adequate basis for protecting benthic invertebrate communities on lands where such sediment quality standards apply.

The Department recommends that the SCOs and CSLs be revised to provide numerical criteria that correspond with no adverse effects levels (for the SCOs) and minor adverse effects levels (for the CSLs). In addition, precedence of tribal and other sediment quality standards and other regulations should be explicitly recognized in the Proposed SMS Rule Amendments.

Toxicity Thresholds

The proposed CSLs for certain contaminants are higher than toxicity thresholds based on spiked-sediment toxicity tests.

According to Section WAC 173-204-563, the CSLs establish minor adverse effects levels, including minor acute or chronic adverse effects, on the benthic community. If the numerical CSLs accurately represent minor adverse effects levels, then they should be substantially lower than the toxicity thresholds that have been established based on the spiked-sediment toxicity tests. The reason why they should be lower is that CSLs are intended to be used for assessing field-collected sediments that likely contain mixtures of COPCs, whereas the results of spiked-sediment toxicity tests provide toxicity thresholds (often median lethal concentrations or LC_{50}s) for individual COPCs in sediments. Therefore, toxicity thresholds derived from spiked-sediment toxicity tests are lower when mixtures of COPCs are tested (e.g., see Swartz *et al.* 1988).

While the Department did not conduct a comprehensive review of the literature on spiked-sediment toxicity testing, our review of copper demonstrates that toxicity to benthic invertebrates in spiked-sediment is frequently observed at concentrations of copper below the CSL at 1,200 mg/kg dry weight). Malueg *et al.* (1986) reported a 48-h LC_{50} of 654 to 688 mg copper/kg dry weight for the water flea, *Daphnia magna*. For the midge, *Chironomus dilutus*, a 10-d LC_{50} of 857 mg/kg dry weight was reported for copper (Cairns *et al.* 1984). By comparison, Cairns *et al.* (1984) reported a 48-h LC_{50} of 937 mg copper /kg dry weight for the water flea (*D. magna*) and a 10-d LC_{50} of 964 mg copper /kg dry weight for the amphipod *Gammarus lacustris*. All of these median lethal concentrations are substantially below the levels that Ecology expects to cause minor adverse effects on the benthic community. Therefore, the CSL for copper would not be protective of the benthic community.

The Department recommends that the SCOs and CSLs be revised to provide numerical criteria that correspond with no adverse effects levels (for the SCOs) and minor adverse effects levels (for the CSLs).

Identification of Sediments Causing No Adverse Effects or Minor Adverse Effects

The SCOs and CSLs do not provide a reliable basis for identifying sediments causing no adverse effects or minor adverse effects on benthic communities.

According to Section WAC 173-204-563(2a), the SCOs establish "no adverse effect levels", including no acute or chronic effects, on the benthic community. Accordingly, no adverse effects on benthic invertebrates should be observed when the concentrations of COPCs are below the SCOs. To determine if the SCOs provide a reliable basis for classifying sediment samples as not toxic, matching sediment chemistry and toxicity data from the Upper Columbia River and elsewhere in Washington State were compiled (Table 8). In the resultant database, individual sediment samples were designated as toxic or not toxic using:

- Methods used by Ecology (as described in Table VIII of Section WAC 173-204-563); or,
- Methods more commonly applied by sediment quality investigators (i.e., statistical comparison to negative control or using the reference envelope approach; see Table 8 for an overview of toxicity designation methods by study).

In this analysis, the SCOs were considered to provide a reliable basis for designating sediment samples as not toxic if the incidence of toxicity was <20% when the concentrations of all COPCs were below the SCOs (MacDonald *et al.* 2002; 2009; 2012).

In the first analysis, the reliability of the SCOs was evaluated using the toxicity designations assigned by Ecology. The results showed that the incidence of toxicity was generally low (about 6%) for samples from the Upper Columbia River when the concentrations of all COPCs where below the SCOs and when the results of 28-d toxicity tests with amphipods (survival or growth) were considered (Table 9). While the incidence of toxicity was also low (about 6%) when midge growth was considered toxicity to midge was frequently observed (about 29%) when midge survival was considered for samples from the Upper Columbia River. These results indicate that the SCOs do not represent "no adverse effects levels" in Upper Columbia River sediments. No data from elsewhere in Washington State were available to evaluate the reliability of the SCOs.

In a second analysis, the reliability of the SCOs was evaluated using the toxicity designations assigned by statistical comparison to negative control or using the reference envelope approach. The results of this analysis showed that the incidence of toxicity was generally low (about 5 to 13%) for samples from the Upper Columbia River when the concentrations of all COPCs were below the SCOs and when the growth or biomass of amphipods in 28-d toxicity tests were considered (Table 10). However, about 40% of the samples with COPC concentrations below the SCOs were toxic to amphipods when 28-d survival was considered. The incidence of toxicity to midge was also elevated in sediment samples from the Upper Columbia River with the concentrations of all COPCs below the SCOs (about 23% for midge survival, 40% for midge growth, and 70% for midge biomass). For both 10-d and 28-d toxicity tests conducted with sediment samples from elsewhere in Washington State, the incidence of toxicity to amphipods exceeded 20% when the concentrations of all COPCs were below the SCOs (Table 10).
According to Section WAC 173-204-563(2b), the CSLs establish minor adverse effects levels, including minor acute or chronic adverse effects, on the benthic community. Using the toxicity designations assigned by Ecology, the incidence of toxicity to amphipods or midge was low (0 to about 10%) when the concentrations of all COPCs were below the CSLs (Table 11). However, a

different result occurs when sediment samples were designated as toxic or not toxic using statistical comparison to negative control or by using a reference envelope approach. The results of this analysis showed that the incidence of toxicity was generally low (about 8 to 19%) for samples from the Upper Columbia River when the concentrations of all COPCs were below the CSLs and when the growth or biomass of amphipods in 28-d toxicity tests were considered (Table 12). However, about 42% of the samples with COPC concentrations below the CSLs were toxic to amphipods when 28-d survival was considered. The incidence of toxicity to midge was also elevated in sediment samples from the Upper Columbia River with the concentrations of all COPCs below the CSLs (about 19% for midge survival, 43% for midge growth, and 66% for midge biomass). For both 28-d toxicity tests conducted with sediment samples from elsewhere in Washington State, the incidence of toxicity to amphipods exceeded 20% when the concentrations of all COPCs were below the CSLs (Table 12).

The proposed SCOs and CSLs were developed using the results of toxicity tests conducted with field-collected sediment samples that typically contain complex mixtures of COPCs. To determine if the resultant numerical criteria would provide a reliable basis for classifying sediment samples from the Upper Columbia River or elsewhere in Washington State as toxic and not toxic, a supplemental data analysis was conducted. In this evaluation, the incidence of toxicity to amphipods and midge was determined when the concentrations of individual COPCs were below the SCO or CSL. This analysis was conducted using the toxicity designations that were established by statistical comparison to negative control or using the reference envelope approach. The results of this analysis (Tables 13 to 18) indicate that the SCOs for the individual COPCs evaluated should not be used to reliably classify sediment samples from the Upper Columbia River or elsewhere in Washington State as not toxic. That is, the incidence of toxicity below the SCOs for individual COPCs exceeds 20% for one or more of the endpoints considered. Therefore, the SCOs do not define the concentrations of COPCs that represent no adverse effect levels.

These results of these evaluations demonstrate that the SCOs and CSLs do not provide a reliable basis for establishing the levels of COPCs that represent no adverse effect levels or minor adverse effect levels. These results also emphasize the importance of considering the biomass endpoint in assessments of sediment quality conditions. To resolve these concerns, the Department recommends that the SCOs and CSLs be revised to provide numerical criteria that correspond with no adverse effects levels (for the SCOs) and minor adverse effect levels (for the CSLs).

Ecological Bioaccumulation Narrative

The ecological bioaccumulation narrative is confusing and will be difficult to effectively implement.

Section WAC 173-204-564 of the Proposed SMS Rule Amendments describes the process for establishing sediment cleanup levels based on the protection of higher trophic level species. More specifically, this section of the document indicates that:

> "Sediment cleanup objectives and cleanup screening levels based on protection of higher trophic level species shall not be established at concentrations that do not have the potential for minor adverse effects."

This statement is difficult to understand, but appears to indicate that SCOs and CSLs based on protection of higher trophic-level species shall be established at concentrations that have the potential for minor adverse effects. It is unclear why such SCOs or CSLs would need to be established at levels that result in minor adverse effects on higher trophic level species. A better approach is to require that the SCOs or CSLs be established at levels that are not associated with adverse effects on wildlife species.

The definitions of minor adverse effects contained in Section WAC 173-204-564 of the Proposed SMS Rule Amendments are also problematic. For threatened and endangered or other special status species, minor adverse effects can include "a significant disruption of normal behavior patterns, such as breeding, feeding, or sheltering." Minor adverse effects can also include impairment of growth, reproduction, and survivals of individuals. It is unclear why SCOs or CSLs need to be established at levels that could result in a significant disruption of normal behavior patterns, such as breeding, feeding, or sheltering of threatened and endangered or other special status species. These minor effects may present significant barriers to the recovery of threatened and endangered species, or the stability of current populations.

Bioaccumulation of sediment-associated contaminants is a key concern for the Department. Accumulation of metals, certain PAHs, PCBs, organochlorine pesticides, dioxins/furans, and other substances in the tissues of aquatic organisms has the potential to adversely affect aquatic invertebrates, fish, amphibians, reptiles, birds, and mammals including threatened and endangered species. Therefore, it is essential that the SCOs and CSLs protect against such adverse effects, or have provisions to address bioaccumulation. The proposed ecological bioaccumulation narrative and the numerical criteria listed in Table VII currently are not protective of these species.

The Department recommends that the ecological bioaccumulation narrative be rewritten in clearly understandable language and provide a basis for protecting higher trophic level species, including special status species, from adverse effects associated with exposure to bioaccumulative COPCs (i.e., Section WAC 173-204-564).

Determination of Regional or Natural Background Levels of Contaminants

Regional or natural background levels of contaminants should not be determined on a case-by-case basis.

Section WAC 173-204-560 of the Proposed SMS Rule Amendments describes the process for establishing SCOs or CSLs for a contaminant in sediment. More specifically, these sections of the document indicate that the SCOs or CSLs are the highest of:

- The risk-based concentration of the contaminant, based on WAC 173-204-561 to WAC 173-204-564;
- Natural background or regional background; and,
- Practical quantitation limit.

While it is reasonable and appropriate to consider background levels of contaminants in the establishment of SCOs and/or CSLs, the Proposed SMS Rule Amendments do not provide sufficient information to ensure that natural background or regional background concentrations of contaminants are determined using consistent and scientifically-defensible procedures. As establishment of background levels of COPCs is of fundamental importance to the sediment quality assessment and management process, other jurisdictions have either determined background levels on an *a priori* basis and/or established formal procedures for determining background levels (see Protocol 4 for Contaminated Sites, promulgated under the British Columbia Environmental Management Act). In contrast to the approach that has been used in other jurisdictions, the Proposed SMS Rule Amendments indicate that Ecology will determine the appropriate statistical analyses, number and type of samples, and analytical methods to establish a regional background level on a case-by-case basis. It is not clear how this approach will ensure the consistent and appropriate application of methods to establish background and, ultimately, the fair application of the SMS Rule.

The Department recommends that the SMS two-tier framework be revised to include regional background concentrations of listed contaminants or detailed guidance for establishing regional or natural background levels of contaminants in sediment. Such procedures for calculating background levels of contaminants in sediment should describe the number and type of samples that need to be collected, the criteria that need to be applied to confirm that a sample qualifies for inclusion in the background calculation, the analytical methods that must be used to generate the required sediment chemistry data, and the statistical analyses that must be conducted to estimate regional or natural background concentrations of contaminants in sediment. These revisions need to be included in Section WAC 173-204-560 of the Proposed SMS Rule Amendments.

Consideration of Practical Quantitation Limits

Practical Quantitation Limits should not be considered in the development of SCOs or CSLs.

Section WAC 173-204-560 of the Proposed SMS Rule Amendments describes the process for establishing SCOs or CSLs for a contaminant in sediment. More specifically, these sections of the document indicate that the SCOs or CSLs are the highest of:

- The risk-based concentration of the contaminant, based on WAC 173-204-561 to WAC 173-204-564;
- Natural background or regional background; and,
- Practical quantitation limit.

While it is reasonable and appropriate to consider the risk-based concentration and background concentration of a contaminant in the establishment of SCOs and CSLs, we do not believe it is appropriate to consider the practical quantitation limit in this process. For all of the contaminants explicitly addressed in the Proposed SMS Rule Amendments, analytical methods have been developed that provide detection limits sufficient to assess risks to human health and the environment. This inclusion of a practical quantitation limit override in the Proposed SMS Rule Amendments may inadvertently result in the consideration of sediment chemistry data that does

not conform to the requirements for human health risk assessments or ecological risk assessments. Guidance on the detection limits that are required to support sediment quality assessment activities already exists (see for example MacDonald *et al.* 2008) and there is no reason to include a practical quantitation limit override in the Proposed SMS Rule Amendments.

The Department recommends that the practical quantitation limit override included in the SMS two-tier framework be removed and that Ecology develop guidance on the detection limits that must be achieved for chemicals of potential concern that require investigation at sediment contaminated sites within the state.

Consultation with Affected Federal and Tribal Governmental Agencies and the Public

Decisions regarding the upward adjustment of SCOs should be made with meaningful consultation with affected federal and tribal government agencies and the public.

Section WAC 173-204-560 of the Proposed SMS Rule Amendments describes the methods for establishing site-specific sediment cleanup levels. In this section, sediment cleanup levels are defined as the concentrations of contaminants in sediments or levels of biological effects determined by Ecology to be protective of human health and the environment. This section also states that the SCO shall be used to establish the sediment cleanup level, unless an upward adjustment from the SCO is necessary because:

- It is not technically possible to achieve the sediment cleanup level at the applicable point of compliance within the site or sediment cleanup unit; or,
- Meeting the sediment cleanup level will have an adverse impact on the aquatic environment, taking into account the long-term positive effects on natural resources and habitat restoration and enhancement and the short-term adverse impacts on natural resources and habitat caused by cleanup actions.

However, the Proposed SMS Rule Amendments do not indicate who would conduct the evaluation of technical feasibility analysis or harm-benefit analysis. This is important because the Department's has experienced that technical infeasibility and cleanup impacts have been used to justify inaction at many other contaminated sites throughout the United States. Inaction or incomplete cleanups at sediment contaminated sites have real implications for individuals and organizations that rely on natural resources, particularly tribal members and other subsistence users. Therefore, it is inappropriate to adjust the SCO upwards without appropriate and meaningful consultation with other affected governments and the public.

The Department recommends that procedures for reviewing and approving upward adjustment of the sediment cleanup objectives that includes meaningful consultation with other affected governments and the public be developed and described in the Proposed SMS Rule Amendments.

Establishment of Sediment Cleanup Levels

SCLs should be established below the SCOs.

Section WAC 173-204-560(2b) of the Proposed SMS Rule Amendments indicates that Ecology may establish sediment cleanup levels more stringent than those established under Section WAC 173-204-560(2a) when, based on a site-specific evaluation, Ecology determines that such levels are necessary to protect human health and the environment. Section WAC 173-204-560(2a) indicates that:

- ”the sediment cleanup objective shall be used to establish the sediment cleanup level,” notwithstanding the provisions for upward adjustment.

It is reasonable to include provisions for establishing a sediment cleanup level that is lower than the SCO in those situations where the SCO would not provide the required level of protection for human health or the environment. However, the last sentence in Section WAC 173-204-560(2b) eliminates Ecology’s flexibility for establishing more stringent sediment cleanup levels by indicating that:

- ”The sediment cleanup level may not be established below the sediment cleanup objective.”

The Department believes it is inappropriate to include the last sentence in Section WAC 173-204-560(2b) because the statement eliminates any possibility that Ecology could establish sediment cleanup levels that are more stringent than the SCOs; therefore, we recommend that the last sentence be eliminated from Section WAC 173-204-560(2b) of the Proposed SMS Rule Amendments.

Thank you for the opportunity to comment on the Draft Sediment Management Standards. The Department looks forward to working with Ecology on this effort and would welcome the opportunity to discuss the concerns presented in this letter further. If you have any questions regarding these comments, please direct them to one of the following: Chris Ingersoll with USGS at cingersoll@usgs.gov or (573) 876-1819; Jeremy Buck with USFWS at Jeremy_Buck@fws.gov or (503) 231-6179; or Keith Holliday with NPS at Keith_Holliday@nps.gov or (509) 633-3860 ext. 161. If you have any other questions, please do not hesitate to contact me at (503) 326-2489.

Sincerely,

Allison O’Brien
Regional Environmental Officer

Attachment (1)
USDOI Comments on WDOE SMSs Tables Figure Appendix.pdf

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