

Option discussion- Option 1 (MTCA approach)

How should the human health narrative and background concentrations be considered when setting Sediment Cleanup Standards?

Decision

When setting cleanup standards for human health exposure pathways at contaminated sediment sites:

- Use a decision making framework, background definition, and level of human health protection that align with the MTCA approach for setting cleanup standards. (Option 1)

OR

- Use a decision making framework that is consistent with the current SMS approach for benthic toxicity so that cleanup standards may be set within a range of acceptable concentrations. This option uses MTCA levels of human health protection and natural background as the goal, but allows higher cleanup standards to be set under certain conditions. (Option 2)

What is the option?

Clarify the SMS rule so that sediment cleanup standards are set based on an approach that is the same as MTCA cleanup standards for other media. Some of the features of this approach include:

- The cleanup standard is the highest concentration associated with:
 - The lowest risk-based concentration based on reasonable maximum exposure with a level of protection of:
 - A one in one million (1×10^{-6}) excess cancer risk for a single carcinogenic chemicals and single exposure pathways.
 - A one in one hundred thousand (1×10^{-5}) excess cancer risk for multiple carcinogenic chemicals and multiple pathways.
 - A hazard quotient of one for single non-carcinogenic chemicals.
 - A hazard index of one for multiple non-carcinogenic chemicals with similar modes of toxicity.
 - “Natural background” which is defined in MTCA to include ubiquitous anthropogenic sources but not localized anthropogenic sources.
 - Practical quantitation limit – the minimum concentration at which a chemical can be quantified with a specified degree of accuracy and precision.
- No consideration of cost or feasibility when setting the cleanup standard by this method.
- An alternate method, similar to MTCA Method C, that allows one in one hundred thousand (1×10^{-5}) cancer risk for a single carcinogenic chemical in some cases where it is not technically possible to achieve the lower risk level of 1×10^{-6} . Total allowable site risk for multiple chemicals and multiple pathways remains at 1×10^{-5} . This is based on MTCA Method C as described in WAC 173-340-706(1)(a)(iii).

What are the advantages of this option?

This approach is aligned with the MTCA cleanup regulation approach. The process for a sediment human health pathway would be similar to the MTCA cleanup regulation for soil, surface water and groundwater at a cleanup site. Cost would not be considered when setting sediment cleanup standards. Technical possibility is still considered if MTCA Method C language is also used for sediment.

The process of setting sediment cleanup standards would be simplified, relative to other options. A simpler process may save time and money in investigations and negotiations relative to other options. This process provides more predictability for the Potentially Liable Parties (PLP) and the public. A simplified process makes it easier to compare remedy options if all options must have the same level of protection.

Remedial actions may be able to achieve very low cleanup levels. This option may result in lower sediment cleanup standards relative to other options, providing greater protection of human health and the environment at completed cleanup sites. Low cleanup levels may not be sustainable due to recontamination.

Method C alternative method provides a higher risk-based cleanup standard in cases where it is not technically possible, regardless of cost to meet the MTCA risk-based cleanup standard. This only allows higher cleanup standards (1×10^{-5}) for one single carcinogen in a single exposure pathway. The risk levels are unchanged for multiple carcinogens and multiple pathways, and for non-carcinogens.

What are the disadvantages of this option?

Cleanup standards based on the MTCA rule level of protection and background definition may not be technically possible, or may be very expensive at some sediment cleanup sites. Dredging and capping are not viable options at all sites. Institutional controls that limit access or set compliance points at site boundaries may not be a viable option for sediment sites. Not being able to achieve final cleanup standards and settle liability at sediment sites may:

- Reduce incentives for PLPs to participate in cleanup actions.
- Increase the number of interim actions, resulting in longer times to site closure.
- Result in increased workload for Ecology staff to oversee interim actions and incomplete cleanup actions. This can reduce opportunities for cleaning up additional contaminated sites.
- May lengthen the negotiation process causing increased exposure duration.
- Does not allow consideration of other environmental benefits of not taking some cleanup action (net environmental benefits).

In some cases, sites with sediment cleanup standards based on MTCA levels of protection will become recontaminated by other nearby sources. These sources may include local- or regional-scale contamination, point and non-point source discharges, and aerial deposition. Cleanup standards that are not sustainable may not be economically justified.

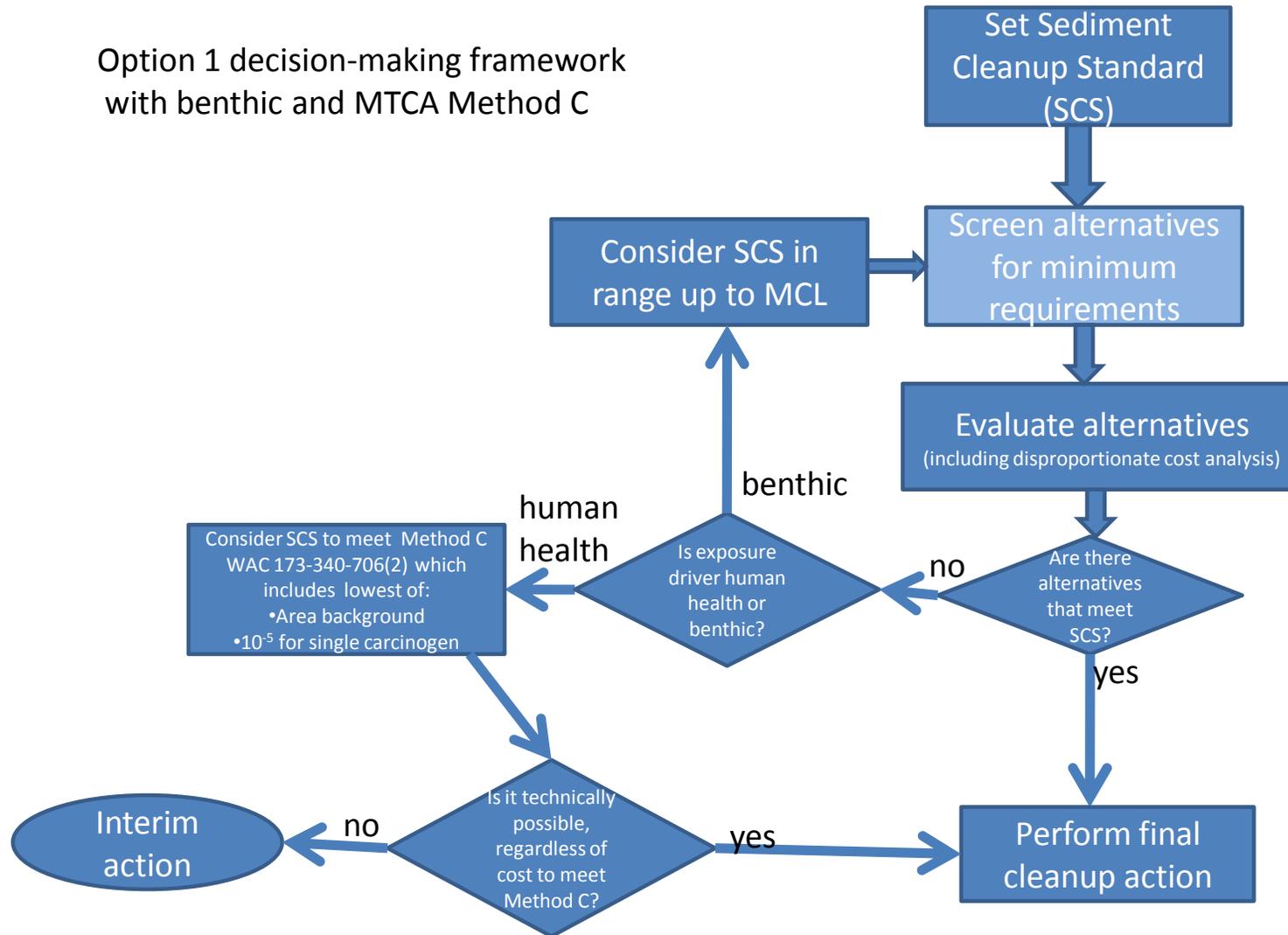
This option may not reduce overall risk as much as anticipated because of the potential for fewer cleanups being completed in a timely manner, and the potential for allowing continued transport of contaminants thus increasing the contamination footprint as well as increasing recontamination of nearby remediated sites. If cleanups are delayed, become interim actions, or become recontaminated, then the lower cleanup standard is “on paper” only and has not effectively reduced risk at the site.

If this level of protection is used for setting sediment cleanup standards based on human health, site boundaries may become unmanageable and it’s possible for entire urban bays to become a cleanup site. . .

What is the scope of the proposed option?

- Specify in the SMS rule the acceptable level of exposure to protect human health from sediment contamination based on the MTCA rule levels.
- Use MTCA rule definition of natural background in setting sediment cleanup standards.
- Allow an alternate method, similar to the MTCA rule Method C to also be used for sediment sites, allowing a higher risk level of 1×10^{-5} for a single carcinogen at sites where it is not technically possible to achieve the 1×10^{-6} risk level for a single carcinogen regardless of cost.
- Do not allow cost to be a consideration in setting sediment cleanup standards based on human health.
- The SMS framework would remain unchanged for the benthic toxicity exposure pathway, allowing the cleanup standard to be set within a range between SQS and CSL considering net environmental effects, cost, and feasibility.
- If the human health exposure-based concentration is lower than the benthic toxicity criteria, the human health criteria would have to be met and vice versa.
- If “natural background” concentrations of the chemical is higher than the exposure-based concentrations, natural background (using MTCA rule definitions) would become the cleanup standard.
- If the Practical Quantitation Limit for the chemical is higher than exposure-based concentrations and natural background, the Practical Quantitation Limit would become the cleanup standard.

Option 1 decision-making framework
with benthic and MTCA Method C



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DRAFT - For internal discussion only.

How could this option apply to the WAC?

The following sections provide a general concept of sections of the Sediment Management Standards that might be revised. This is not being proposed as specific rule language.

For option 1, there are three sections that would address setting sediment cleanup standards.

The first section (-570(2)) sets the lower level or goal of the cleanup, equivalent to the Sediment Quality Standards (SQS) for benthic toxicity.

The second section (-570(3)) sets the upper level, or maximum cleanup level allowed at the site, equivalent to the Minimum Cleanup Level (MCL)/ Cleanup Screening Level (CSL) for benthic toxicity.

The levels of human health protection and use of background are the same in both of these sections (570-(2) and 570-(3)), but the benthic toxicity criteria are different.

The third section describes the alternative method of setting human-health based cleanup levels, similar to MTCA Method C, which allows a higher risk level (1×10^{-5}) for a single carcinogenic chemical.

WAC 173-204-570 (2) establishes the cleanup objective for sediment cleanup sites. This section may be revised to specify the level of human health protection and background definition for the cleanup objective, and to state that the cleanup objective shall be the highest of:

(1) The lowest exposure-based safe sediment concentration for:

(a) **Benthic community protection: Sediment Quality Standards criteria as described in WAC 173-204-320 through 173-204-340.**

(b) Human Health protection: The lowest risk-based concentration based on reasonable maximum exposure of the most sensitive receptor (humans, in this case) with a level of protection of:

(i) A one in one million (10^{-6}) excess cancer risk for a single carcinogenic chemicals and single exposure pathways.

(ii) A one in one hundred thousand (10^{-5}) excess cancer risk for multiple carcinogenic chemicals and multiple pathways.

(iii) A hazard quotient of one for single non-carcinogenic chemicals.

(iv) A hazard index of one for multiple non-carcinogenic chemicals with similar modes of toxicity.

(c) Biological resource protection from bioaccumulative pollutants. (This has been described in a separate issue paper. See "Ecological Risk from Bioaccumulative Chemicals" issue paper for details. Specific language is to be determined.)

- (2) "Natural background" as defined in MTCA to include concentrations of hazardous substance consistently present in the environment that has not been influenced by localized human activities.
- (3) Practical quantitation limit – the minimum concentration that a chemicals can be quantified with a specified degree of accuracy and precision.

WAC 173-204-570 (3) establishes the minimum cleanup level (maximum concentration) allowed at the site and the level of biological effects permissible at the cleanup site by year ten after completion of the active cleanup action. This section may be revised to specify the level of human health protection for the maximum concentration allowed at the site, and to state that the sediment cleanup standard shall not exceed the highest of:

- (1) The lowest exposure-based safe sediment concentration for:
 - (a) Benthic community protection: **Minimum Cleanup Level criteria as described in WAC 173-204-520 through 173-204-540.**
 - (b) Human Health protection: The lowest risk-based concentration based on reasonable maximum exposure of the most sensitive receptor (humans, in this case) with a level of protection of:
 - (i) A one in one million (1×10^{-6}) excess cancer risk for a single carcinogenic chemicals and single exposure pathways.
 - (ii) A one in one hundred thousand (1×10^{-5}) excess cancer risk for multiple carcinogenic chemicals and multiple pathways.
 - (iii) A hazard quotient of one for single non-carcinogenic chemicals.
 - (iv) A hazard index of one for multiple non-carcinogenic chemicals with similar modes of toxicity.
 - (c) Biological resource protection from bioaccumulative pollutants. ((This has been described in a separate issue paper. See "Ecological Risk from Bioaccumulative Chemicals" issue paper for details. Specific language is to be determined.)

- (2) "Natural background" as defined in MTCA to concentrations of hazardous substance consistently present in the environment that has not been influenced by localized human activities
- (3) Practical quantitation limit – the minimum concentration that a chemicals can be quantified with a specified degree of accuracy and precision.

Additional section (based on MTCA Method C provisions WAC 173-340-706 (1)(a)).

Alternative method for setting sediment cleanup standards.

- (1) An alternative method of setting sediment cleanup standards that are protective of human health exposure pathways from contaminated sediment may be used under certain conditions. The alternative method of setting sediment cleanup standards for human health may be used where the person conducting the cleanup action can demonstrate:

- (a) The alternative method sediment cleanup standard must comply with applicable state and federal laws.*
 - (b) All practicable methods of treatment are used.*
 - (c) The alternative method sediment cleanup standard is in all cases less than the levels specified in subsection (2) of this section.*
 - (d) And that one or more of the following conditions exist:*
 - (i) The alternative method sediment cleanup standard is at or below area background concentrations.*
 - (ii) Where attainment of the sediment cleanup standards by the usual method has the potential for creating a significantly greater overall threat to human health or the environment than attainment of the alternative method sediment cleanup standard. Alternative sediment cleanup standards may be established at concentrations that minimize the overall threats, but not to exceed subsection (2). Factors that may be considered in making this determination include:*
 - (A) Results of a site-specific risk assessment.*
 - (B) Duration of threats.*
 - (C) Reversibility of threats.*
 - (D) Magnitude of threats.*
 - (E) Nature of the affected population.*
 - (iii) Where attainment of sediment cleanup standards by the usual method is not technically possible. Alternative sediment cleanup standards may be established at the technically possible concentrations, but not to exceed subsection (2).*
- (2) Alternative method of setting sediment cleanup standards shall establish cleanup standards that are at least as stringent as the following:*
- (a) Concentrations established under applicable state and federal laws;*
 - (b) Concentrations that are estimated to result in no significant adverse effects on the protection and propagation of aquatic life, and no significant adverse effects on wildlife.*
 - (c) For chemicals where there are no sufficiently protective human-health based state or federal standards, sediment cleanup standards, alternative sediment cleanup standards that are protective of human health will be determined by the following methods:*
 - (i) Concentrations that are estimated to result in no significant adverse acute or chronic toxic effects on human health as estimated using a hazard quotient of one (1).*
 - (ii) For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in one hundred thousand (1×10^{-5}).*

(3) More stringent cleanup levels. *The department may establish more stringent sediment cleanup standards than those required in subsection (2) when based on a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment.*

(4) Multiple hazardous substances or pathways. *Concentrations established under sections (2) and (3) will be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathways of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one(1) or the total excess cancer risk would exceed one in one hundred thousand (1×10^{-5}). In making these adjustments, the hazard index shall not exceed one and the total excess cancer risk shall not exceed one in one hundred thousand (1×10^{-5}).*

(5) Adjustments to sediment cleanup standards based on applicable laws. *When a sediment cleanup is based on an applicable state or federal law and the level of risk upon which the applicable law is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level must be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) and the hazard index does not exceed one (1) at the site.*

(6) Limitation on adjustments. *Alternative method sediment cleanup standards, including cleanup levels adjusted under subsections (4) and (5) of this section, shall not be set at levels below the practical quantitation limit or natural background, whichever is higher.*