Background Summary

How do the current regulations define background?

MTCA background definitions (WAC 173-340-200):

"Area background – means the concentration of hazardous substances that are **consistently present** in the environment in the vicinity of a site which are the result of human activities **unrelated to releases from the site."**

"Natural background – means the concentration of hazardous substance **consistently present** in the environment that has **not been influenced by localized human activities.** For example, several metals and radionuclide naturally occur in the bedrock, sediments, and soils of Washington state due solely to the geologic processes that formed these materials and the concentration of these hazardous substances would be considered natural background. Also, low concentrations of some particularly persistent organic compounds such as polychlorinated biphenyls (PCBs) can be found in surficial soils and sediment throughout much of the state due to global distribution of these hazardous substances. These low concentrations would be considered natural background. Similarly, concentrations of various radionuclide that are present at low concentrations throughout the state due to global distribution of fallout from bomb testing and nuclear accidents would be considered natural background."

SMS Non-anthropogenic background

"WAC 173-204-320 (6) **Nonanthropogenically affected sediment quality criteria.** Whenever the nonanthropogenically affected sediment quality is of a lower quality (i.e. higher chemical concentrations, higher levels of adverse biological response, or posing a greater health threat to humans) than the applicable sediment quality standards assigned for said sediments by this chapter, the existing sediment chemical and biological quality shall be identified on an area-wide basis as determined by the department, and used in place of the sediment quality standards of WAC 173-204-320."

"WAC 173-204-420 (6) **Puget Sound marine sediment impact zone maximum nonanthropogenically affected sediment quality criteria**. Whenever the nonanthropogenically affected sediment quality is of a lower quality (i.e. higher chemical concentrations, higher levels of adverse biological response, or posing a greater health threat to humans) than the applicable sediment impact zone maximum criteria established under this section, the existing sediment chemical and biological quality shall be identified on an area-wide basis as determined by the department, and used in place of the standards of WAC 173-204-420."

"WAC 173-204-520 (6) **Puget Sound marine sediment cleanup screening levels and minimum cleanup levels nonanthropogenically affected sediment criteria**. Whenever the nonanthropogenically affected sediment quality is of a lower quality (i.e. higher chemical concentrations, higher levels of adverse biological response, or posing a greater health threat to humans) than the applicable cleanup screening

levels or minimum cleanup levels criteria established under this section, the existing sediment chemical and biological quality shall be identified on an area-wide basis as determined by the department, and used in place of the standards of WAC 173-204-520."

There is no specific definition of "nonanthropogenically affected sediment quality" in the Sediment Management Standards.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund.

The following definitions are an excerpt from *USEPA Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites:*[1]

"Background refers to constituents or locations that are not influenced by the releases from a site, and is usually described as naturally occurring or anthropogenic :

1) ***Anthropogenic*** – natural and human-made substances present in the environment as a result of human activities (not specifically related to the CERCLA release in question); and,

2) ***Naturally occurring*** – substances present in the environment in forms that have not been influenced by human activity."[1]

How is background used in determining final cleanup levels?

Under MTCA, natural background can be used to establish final cleanup levels, if natural background is greater than risk-based cleanup levels and Practical Quantitation Limits (PQL).[2]

Under MTCA Method C, area background can be used to establish final cleanup levels for surface water, ground water and air, IF:

- It is not technically possible regardless of cost to achieve natural background.

AND

- Area background is below 1 x10^{-5} risk level for a single carcinogen in a single pathway, and below 1 x10^{-5} for multiple carcinogens in multiple pathways, hazard index of less than 1, and can meet all other applicable standards (ARARs).[3]

The Sediment Management Standards only allow a final cleanup level to be set at non-anthropogenic background determined on an area-wide basis, if the non-anthropogenic background concentration is above the Minimum Cleanup Level for benthic toxicity.[4]

---

[1] USEPA 2002. *Role of Background in the CERCLA Cleanup Program.* U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response OSWER 9285.6-07P

[2] WAC 173-340-700 (6) Requirements for setting cleanup levels (d) Natural background and analytical considerations.

[3] WAC 173-340-706 Use of Method C (1) Applicability

Under CERCLA… "Where background concentrations are high relative to the concentrations of released hazardous substances, pollutants, and contaminants, a comparison of site and background concentrations may help risk managers make decisions concerning appropriate remedial actions. The contribution of background concentrations to risks associated with CERCLA releases may be important for refining specific cleanup levels for COCs that warrant remedial action". " Generally, under CERCLA, cleanup levels are not set at concentrations below natural background levels. Similarly, for anthropogenic contaminant concentrations, the CERCLA program normally does not set cleanup levels below anthropogenic background concentrations (EPA, 1996; EPA, 1997b; EPA, 2000). The reasons for this approach include cost-effectiveness, technical practicability, and the potential for recontamination of remediated areas by surrounding areas with elevated background concentrations."[1]

How is background used for interim actions, where liability is not settled?

Under MTCA, "When area background concentrations would result in recontamination of the site to levels that exceed cleanup levels, that portion of the cleanup action which addresses cleanup below area background concentrations may be delayed until the off-site sources of hazardous substances are controlled. In these cases the remedial action shall be considered an interim action until cleanup levels are attained."[5]

Should sediments be treated differently from other media in determining background?

Sediments are physically different than other media.

- Sediments are a sink for persistent contaminants in the watershed.
- Due to hydrodynamic transport, sediments have greater mobility than soils, but less mobility than water.
- Sediment contaminants have different exposure pathways and endpoints, including seafood ingestion of persistent bioaccumulative concentrations, and ecological risks from sediment contamination.
- Due to uncertainty and variability in bioavailability of sediment contamination, trophic transfer and human consumption of different species, there is greater uncertainty in calculating risk from sediment contamination.

There are existing regulatory differences in how sediment contamination is addressed.

- It was intended that the sediment medium be treated differently – that is why there is separate regulation (Sediment Management Standards).

[4] WAC 173-204-320 (6) and WAC 173-204-520 (6)
[5] WAC 173-340-360 (4) (d)

- The Sediment Management Standards has different intent than the MTCA regulation. The Sediment Management Standards includes cross-program integration between Ecology's Toxic Cleanup Program and the Water Quality Program.
- The Sediment Management Standards are promulgated under both Model Toxics Control Act (70.105D RCW) and Water Pollution Control Act (90.48 RCW). The Sediment Management Standards have a different pathway for approval than the MTCA regulations.
- The existing decision-making structure in the Sediment Management Standards is different than MTCA, in that cleanup standards based on benthic toxicity are allowed to be set within a range, with consideration of cost, feasibility and net environmental effects.

There are differences that make sediment cleanup actions more difficult than other media.

- There is a greater risk of recontamination in sediment environment, due to sediment mobility.
- It can be more difficult to identify and control sources of sediment contamination.
- Sediment cleanup standards may be very low due to high seafood consumption rates and biomagnification in food chain.
- It can be more difficult to achieve final cleanup levels due to dredge residuals and redistribution of sediment.
- Institutional controls and deed restrictions to control exposure routes are more difficult to implement for sediment sites.
- Compliance for sediment sites needs to be throughout the biologically active exposure surface of the site , not just at site boundary

What is a proposed definition and usage for "Sediment Regional Background"?

" Regional Background" is a concept similar to the MTCA "Natural Background", in that it includes concentrations from ubiquitous and uncontrollable sources. It is different from "natural background in that is has a regional scale and can include contaminant concentrations that are ubiquitous and uncontrollable, but not from global sources.

Sediment Regional Background is defined as: **Hydrodynamically defined area based on mechanisms of contribution and distribution of persistent, ubiquitous and uncontrollable contaminants.**

Sediment Regional Background is being proposed as a final sediment cleanup standard that may be applicable for some chemicals at some locations. There are conditions that must be met for a higher sediment cleanup standard. Current proposed conditions include:

- Not technically possible to achieve natural background, regardless of cost

OR

- Likely to recontaminate from uncontrollable sources.

What is the difference between different types of sediment background?

- ***Non-anthropogenic***
- ***MTCA "Natural Background"***
- ***"Sediment Regional Background"***
- ***MTCA "Area Background"***

	SMS Non-Anthropogenic Background	**MTCA "Natural Background"**	**SMS "Sediment Regional Background"**	**MTCA "Area Background"**
Use	Final cleanup standard	Final cleanup standard	Final cleanup standard	Interim Action or Final Cleanup Standard under Method C
Sources	Not influenced by human activities	Not influenced by localized sources, includes global sources from air deposition.	Away from point sources, includes ubiquitous and uncontrollable sources on a regional scale.	Includes localized sources, but not affected by site.
Sample locations	Cores, below recent surface.	Reference areas.	Can include some urban bay data away from point sources.	Can be near site, but not influenced by site releases.