Bellingham Bay
Regional Background
Draft Sampling and Analysis Plan
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Context and Decision Making Process for Developing the SAP

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Goals For Today

• Describe the regional background concept.

• Provide context on the regional background approach based on stakeholder and tribal feedback in other areas.

• Provide an overview of the Bellingham Bay SAP.

• Communicate next steps and our timeline for completing the Bellingham Bay regional background work.

• Discuss remaining questions and issues.
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Background & SMS rule - Establishing Cleanup Levels

Cleanup Screening Level

**Highest of:**

Sediment Cleanup Level

**Highest of:**

Sediment Cleanup Objective

**Highest of:**

Risk based criteria

**Lowest of:**

Regional Background

PQL

Risk based criteria

**Lowest of:**

Natural Background

PQL

Benthic Community Risk
Human Health Risk
Ecological Risk
ARARs

Benthic Community Risk
Human Health Risk
Ecological Risk
ARARs
Regional Background
How can it be used under the SMS rule?

To establish the **Cleanup Screening Level (CSL)** which can be used:

- To identify a cleanup site
- As the upper bound for establishing a sediment cleanup level
- To identify the areas of a cleanup site requiring active cleanup
- To identify areas for interim actions
How Cleanup Fits with Long Term SMS Goals

Near – Term Goals: Under the Cleanup Program Sediment Concentrations Significantly Reduced To Sediment Cleanup Levels

Long – Term Goals: Baywide Sediment Concentrations Reduced to Sediment Cleanup Objective by:
1) Further Cleanup of Sites and Site Units
2) Source Control/Pollution Prevention Programs
3) Toxics Reduction Strategy Efforts

Site – Specific Sediment Cleanup Level

Cleanup Screening Level

Existing Sediment Concentrations

SEDMENT CHEMICAL CONCENTRATIONS

 Near – Term (Within 10 years)

Long – Term (Over several decades)

T I M E

Sediment Cleanup Objective
SMS Background Definitions

• Natural Background WAC 173-204-505(11):
  • ...the concentration of a hazardous substance consistently present in the environment that has not been influenced by localized human activities.

• Regional Background WAC 173-204-505(16):
  • ...the concentration of a contaminant within a department defined geographic area that is primarily attributable to diffuse sources, such as atmospheric deposition or storm water, not attributable to a specific source or release.

The difference: Globally distributed contaminants from global sources versus locally distributed contaminants primarily from diffuse sources such as storm water, atmospheric deposition, etc.
Some Background on Regional Background

Regional background is one tool amongst several in the SMS rule, intended to help:

• Address the reality of ubiquitous contaminants continuously entering the environment that are not able to be physically or technically controlled in any practicable or timely manner.

• Provide a technically implementable structure to meet and maintain cleanup standards given the potential for recontamination from diffuse sources.

• Can include some influence from definable sources such as piped stormwater, but not the direct influence (that is, the primary contributor).
Regional Background - What it is NOT

• Not primarily influenced by definable sources (e.g. a cleanup site or immediate depositional zone of an outfall).

• Cannot sample within an area of relatively elevated concentrations due to the direct impact of a definable source. For example:
  • Within the immediate depositional zone of an outfall, if a clear depositional zone exists.
  • Within an established and un-remediated cleanup site for that chemical of concern.

• Not natural background – regional background must exceed natural background, otherwise local values default to natural.
Regional Background Engagement Process

Port Gardner:

- 2013 & 2014 Draft SAP reviewed by stakeholders/tribes & discussed at a workshop.
- 2014 supplemental data package being reviewed by stakeholders and tribes. Will convene a workshop on September 8, 2014 to discuss.

North Olympic Peninsula:

- 2013 Draft SAP reviewed by public & discussed at public meetings and 2013 data made available to public.

Elliott Bay / Lower Duwamish Waterway:

- September 2013: Technical workshop to discuss establishing regional background and SAP sampling design options due to feedback received for Port Gardner and Port Angeles work.
- SCUM II workshops: Regional background issues discussed at three workshops.
Establishing Regional Background
What We Have Heard

• Ecology needs to improve on regional background implementation and ensure that sampling reflects the appropriate influence of stormwater consistent with the intent of the SMS rule.

• It should be more clear that establishing regional background does not result in a default cleanup level. It is one provision amongst others to establish the CSL.

• Regional and natural background areas should be clearly delineated when establishing either type of background.
Refinements to the Regional Background Sampling Approach

- Developed a Conceptual Bay Model to guide development of the Area of Interest (AOI) for regional background sampling
- Analyzed existing data to:
  - Exclude areas from sampling due to natural features, sediment transport and recovery
  - Identify natural background areas
  - Identify potential sources and direct areas of influence
- Focused more on areas expected to be representative of regional background near the urbanized shoreline
Technical Overview of the Sampling and Analysis Plan

Teresa Michelsen, Avocet Consulting
The Conceptual Bay Model was used to guide the appropriate selection of sampling stations representative of regional background. Key features include:

- Hydrology
- Bathymetry
- Sedimentation and natural recovery
- Known sites
- Known sources
- All existing chemistry data
Conceptual Bay Model
Hydrology and Bathymetry

• Nooksack River discharge dominates the northern and eastern sediments of the bay; low chemical concentrations with a high rate of sedimentation throughout the bay

• The Nooksack River delta is very shallow over large areas, with the bay deepening gradually to the south

• Several smaller creeks and discharges from residential and industrial areas discharge into the bay along north/northeast shoreline and may contribute contaminants locally
Focusing on the northeast quadrant of the bay, down to Post Point.

Excluding deeper areas to the south as unrepresentative of the nearshore regional background areas.

Excluding shallow areas of the Nooksack River Delta – lack of diffuse sources and contaminants, too shallow to sample, overwhelmed by low-concentration discharges.
Conceptual Bay Model
Evaluation of Sites

• Ecology is currently focusing on cleaning up 12 identified contaminated sites near the bay, including 8 sediment sites.

• Existing chemistry data, RI/FS reports, and Ecology staff expertise were used to identify areas of influence.

• High sedimentation rates have resulted in substantial and ongoing natural recovery in many areas where sources/sites have been controlled. This process was also considered in setting boundaries around sites.
Additional sources with potential areas of influence were evaluated:

- Post Point Outfall and large CSOs (excluded; generally within existing sites)
- Former Georgia-Pacific deepwater outfall (excluded)
- Dredged Material Management disposal site, recently unused (outside the AOI)
- Several older dredged material disposal sites, including Starr Rock, receiving more contaminated material (most excluded)
- Urban watersheds (case by case, based on data)
• Areas of the bay representative of natural background were evaluated based on existing data and excluded from the AOI.
• This is a new evaluation procedure for the AOI.
• The 90/90 UTL of the Bold Plus data set was used to identify stations within the natural background distribution.
• The AOI may still include some areas that have recovered to natural background since the existing data were collected due to the high rate of natural recovery.
• The AOI was established roughly halfway in between stations above and below these concentrations on the bay ward side.
Conceptual Bay Model
Evaluation of Existing Chemistry

- Supports all exclusion decisions – natural background as well as the influence of sites and sources
- Apparent elevations of cPAHs and dioxins/furans – not in all the same areas
- Phthalates elevated, but not above SCO/CSL levels
- No real data for PCB congeners (non-detected at high PQLs)
- Mercury concentrations have rapidly recovered
- No apparent elevations of arsenic or cadmium except at a few locations
Mercury

Arsenic
Phthalates
Dioxins/Furans

cPAHs
Regional Background Analytes

- Conventionals (grain size, TOC, TVS)
- cPAHs
- Dioxins/furans
- PCB congeners

A smaller Area of Interest was chosen for dioxins/furans based on the existing data. The remaining COCs will be analyzed throughout the larger Area of Interest.
Areas Excluded from the AOI

- Course-grained, shallow areas in the delta of the Nooksack River
- Deeper areas south of Post Point
- Areas in the western half of the bay within the natural background 90/90 UTL
- All cleanup sites (other than areas that have naturally recovered)
- Starr Rock
- Post Point outfall and areas within its immediate depositional zone
- Former Georgia-Pacific outfall
Bellingham Bay Areas of Interest

1) Full area for conventionals, cPAHs, PCB congeners

2) Smaller area for dioxins/furans
Selection of Sampling Stations

We used a spatially balanced random sampling design:

• GIS algorithm was used to randomly distribute samples with minimum 250 m separation for the desired spatial balance.

• Samples were distributed proportionately to the sizes of the two AOIs:
  • 23 for dioxins/furans and
  • An additional 7 (total of 30) for the remaining analytes.

• All samples will be analyzed in the first round.

• Sample sizes exceed precision targets calculated from recent data.
Sampling Locations

Dioxin/Furan AOI: 23 Samples (yellow)

cPAH/PCB AOI: 30 samples (yellow + pink)
Timeline and Next Steps
Bellingham Bay Regional Background Timeline & Next Steps

**July - August 2014**
- Development of SAP
- Draft SAP Workshop
- Finalize SAP based on comments

**Fall 2014**
- Field Sampling
- Data Analysis
- Preliminary Data Package to Stakeholders & Tribes

**Fall/Winter 2014**
- Stakeholder and Tribal Review of Preliminary Data Package & Convene Technical Workshop(s)

**Early 2015**
- Finalize Data Report
- Ecology Determines Regional Background