

Whitaker Slough Sediment Investigation

The Department of Environmental Quality completed settlement agreements with two private parties concerning cleanup of contaminated sediments in a segment of the Whitaker Slough, a tributary of the Columbia Slough. DEQ used the money generated from these settlements to conduct sediment sampling to lay the foundation for cleanup action in this part of the slough. This fact sheet describes the investigation and evaluation of the data generated from the study.

Background

In 2005, the DEQ issued a Record of Decision for the Columbia Slough that described the framework for cleanup of sediment contamination in the Slough. The three primary components of the sediment cleanup approach are:

- Pollutant source reduction
- Specific site cleanup
- Long-term monitoring.

There are currently over 30 active cleanup projects in the Columbia Slough watershed. These projects are in various stages of investigation or cleanup. A number of parties have resisted conducting site-specific Columbia Slough sediment investigations due to concerns that DEQ would hold them responsible for investigation and cleanup of contamination caused by others. Investigation and cleanup of contaminated sediments is difficult to implement using a site-specific approach because numerous private, commercial and industrial facilities have discharged stormwater to the slough.

To address this issue, DEQ created a process through which parties can settle potential Columbia Slough-related liability with the State of Oregon by paying an amount, based on number of site outfalls and other site information, into a fund that DEQ can use to address the sediment contamination. DEQ requires each facility to complete necessary upland cleanup and associated source control measures under existing agreements with DEQ.

In the summer of 2009 DEQ used some of the money to conduct a sediment study in a priority segment of the Lower Columbia Slough. DEQ issued a report on this study available on the

DEQ's website

(<http://www.deq.state.or.us/lq/cu/nwr/columbiaslough/ColumbiaSloughSedimentStudy.pdf>). In the winter of 2011, DEQ completed a similar sediment investigation in the Whitaker Slough.

Investigation area

The investigation area extends from the mouth of the Whitaker Slough for approximately 3.2 miles to the I-205 freeway. Existing data indicated that the area has relatively low levels of PCBs but consistently elevated levels of pesticides, with several areas showing elevated lead, chromium, and copper.



The general sampling strategy included two sample designs: an incremental sampling strategy to determine average sediment concentrations throughout the study area and targeted sampling in locations of suspected contamination. Incremental sampling provides a reliable, defensible, and cost-effective method to determine average concentrations within the area. Field activities were carried out in accordance with the Sampling and Analysis Plan, Whitaker Slough Sediment Investigation (DEQ, 2010).

Incremental sampling involved collecting 50 sediment samples spread throughout the study area and using them to create three composite samples which were analyzed for all contaminants of concern.



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Sediment Sample



Location of increment subsamples

Targeted samples, consisting of 3 to 8 samples composited into one, were located adjacent to outfalls or contaminated banks.



Location of targeted samples

Samples were analyzed for metals, polychlorinated biphenyls also known as PCBs, pesticides, PAHs (polycyclic aromatic hydrocarbons), petroleum, polybrominated diphenyl ethers also known as PBDEs, and tributyl tin. In addition, bioassays were performed on 9 samples to assess sediment toxicity to benthic organisms.

Results

The incremental sampling data shows low variability between the three replicates, indicating that it provides representative average concentrations for this segment of the slough.

DEQ considers the mean value to reflect baseline conditions for the Whitaker Slough. As can be seen from the table below, average metals concentrations were generally lower based on this data set compared to the slough-wide data set used to generate previous baseline concentrations. This possibly reflects improvements resulting from the NuWay cleanup action. Average PCB aroclor and pesticide concentrations were similar to previous values. While not shown in the table, PAH concentrations were much lower than slough-wide values, which may reflect the lack of large transportation corridors draining to this segment.

Analyte	Whitaker Slough IS Mean	Previous Slough Baseline
Organics (micrograms per kilogram)		
Aroclor 1260(PCB)	21	24
Dieldrin	1.45	1
DDE	6.58	6.1
DDT	0.95	2.5
Metals (milligrams per kilogram)		
Chromium	48	58
Copper	45	54
Lead	74	90
Zinc	181	314

Incremental sampling strategy and baseline concentrations for select contaminants

Targeted sampling results were, as expected, higher than the baseline values as they were located in the vicinity of likely source areas.

Five of the bioassays conducted on sediment samples indicated potential toxicity to organisms that live in the sediment. However, a comparison of toxicity indications and analytical data for all samples on which bioassays were performed indicated poor correlation. The longer (28 day) chronic bioassay tests conducted on Whitaker Slough samples did show greater sensitivity than the shorter (10-day) tests used in the Lower Slough study.

Specific uptake factors between sediment and fish tissue in the Whitaker Slough could not be generated due to limited tissue data available for this segment. However, the available data did suggest similar correlations between tissue and sediment concentrations as were observed in the data evaluated as part of the Lower Slough study.

Evaluation

DEQ is using the data from this study to:

- Establish baseline concentrations specific to the Whitaker Slough. These are values that define the practical level of active sediment cleanup efforts due to general area-wide contamination.
- Identify portions of the investigation area that warrant active cleanup to reduce the overall average concentration to levels amenable to natural recovery. Natural recovery involves reduction of surface level contamination through contaminant degradation or deposition of clean sediment entering the system.

Lower slough update

As a result of the evaluations conducted for the Whitaker Slough, conclusions associated with toxicity and bioaccumulation screening levels made as part of the Lower Slough evaluation were reconsidered. Because of the increased sensitivity observed in the chronic bioassay tests and the lack of chronic testing results in the Lower Slough, we are no longer recommending that the toxicity screening levels be modified from default values at this time. In addition, further scrutiny of the methods used to derive Lower Slough specific bioaccumulation values revealed that screening levels are approximately equal to the default values established in DEQ's

bioaccumulation guidance. Consequently, pending further evaluation of Columbia Slough data, segment-specific risk-based levels are no longer applicable.

For more information:

For the full report on this study go to

<http://www.deq.state.or.us/lq/cu/nwr/columbiaslough/index.htm>.

DEQ welcomes questions and comments on the Columbia Slough Sediment Project. For more information contact DEQ Project Manager, Jennifer Sutter, (503) 229-6148 or sutter.jennifer@deq.state.or.us.

Alternative Formats

Alternative formats of this document can be made available. Contact DEQ's Office of Communications & Outreach for more information at (503) 229-5696.

Priority Areas for Whitaker Slough cleanup circled in black

Whitaker Slough Priority Areas

