DEPARTMENT OF
ECOLOGY
State of Washington

Addendum 2 to
Quality Assurance Project Plan

A Trend Monitoring Component for Organic PBTs in the Washington State Toxics Monitoring Program

May 2011

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Publication Information

Addendum

This addendum is an addition to an original Quality Assurance Project Plan. The addendum is not a correction (errata) to the original plan.

This addendum is available on the Department of Ecology's website at www.ecy.wa.gov/biblio/0703104Addendum2.html.

Ecology's Activity Tracker Code for this study is 08-538.

Original Publication

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The Quality Assurance Project Plan is available on the Department of Ecology's website at www.ecy.wa.gov/biblio/0703104.html. Data for this project will be available on Ecology's Environmental Information Management (EIM) website at www.ecy.wa.gov/eim/index.htm. Search Study Id PbTrends13.

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DEPARTMENT OF ECOLOGY

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FROM: Callie Meredith, Environmental Assessment Program

SUBJECT: **Addendum 2 to Quality Assurance Project Plan:**
A Trend Monitoring Component for Organic PBTs
in the Washington State Toxics Monitoring Program

Activity Tracker Code: 08-538
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The Washington State Departments of Ecology (Ecology) and Health have developed several chemical action plans (CAPs) to address the threat of persistent, bioaccumulative, and toxic chemicals (PBTs) in Washington State. The objectives of the CAPs are to reduce and phase out PBT uses, releases, and exposures to humans and the environment (Gallagher, 2007). As of 2010, CAPs have been published for mercury (Peele, 2003), PBDEs (Geller, 2006), and lead (Davies, 2009). Ecology's Environmental Assessment Program has a PBT monitoring program aimed at tracking changes in environmental levels of PBTs as a result of CAP reduction strategies.

In 2007, Ecology began monitoring organic PBTs in 12 rivers and lakes throughout Washington State using semi-permeable membrane devices, with the intention of adding other PBTs over the next few years (Johnson, 2007). Lead in suspended particulate matter was added to the sampling plan in 2008 (Meredith and Furl, 2008).

This addendum summarizes the change in monitoring site locations to the lead component of the PBT monitoring program.

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Experimental Design

The goal of this study is to characterize temporal trends in environmental levels of lead over time. Suspended particulate matter samples are collected via in-line filtration from 15 freshwater monitoring sites across Washington State annually. Sampling events occur in the spring and fall to capture high and low flow periods, respectively. Two samples per season are collected at each monitoring site, for a total of 60 samples annually.

Beginning in 2011, suspended particulate matter samples will continue to be collected from 11 of the established monitoring sites and four new sites will be added to the program (Figure 1). Three of the newly added sites represent small, urban streams and are being added in an attempt to characterize changes in lead levels resulting from CAP reduction strategies, such as the lead wheel-weight ban (RCW 70.270). The other newly-added site represents a small, non-urban stream to be used as a reference site.

New monitoring sites were chosen based on the following characteristics:

- Heavy vehicle traffic in the watershed.
- High percentage of impervious surfaces in the watershed.
- Length of above-ground flow.
- Small drainage basin size.
- Flow gages present (all streams have available stream flow data).
- Sampling site accessibility.

Specific changes to the study design include:

1. Discontinued monitoring at the following sites: Okanogan River, Snohomish River, Walla Walla River, and Lake Washington. These large river sites were dropped to allow increased funds for the new small stream sites. The river sites were chosen because of the low lead levels measured over the past three years. Lake Washington was chosen because lead levels vary greatly throughout the year and it is not a suitable site for long-term trend monitoring with the current sampling regime.

2. Addition of monitoring at three new urban sites: Leach Creek, Longfellow Creek, and Thornton Creek. These sites were chosen to represent small streams in urban environments.

3. Addition of monitoring at one small, non-urban stream: Huge Creek. This site was chosen as a reference stream to be used in comparisons with the small urban streams.

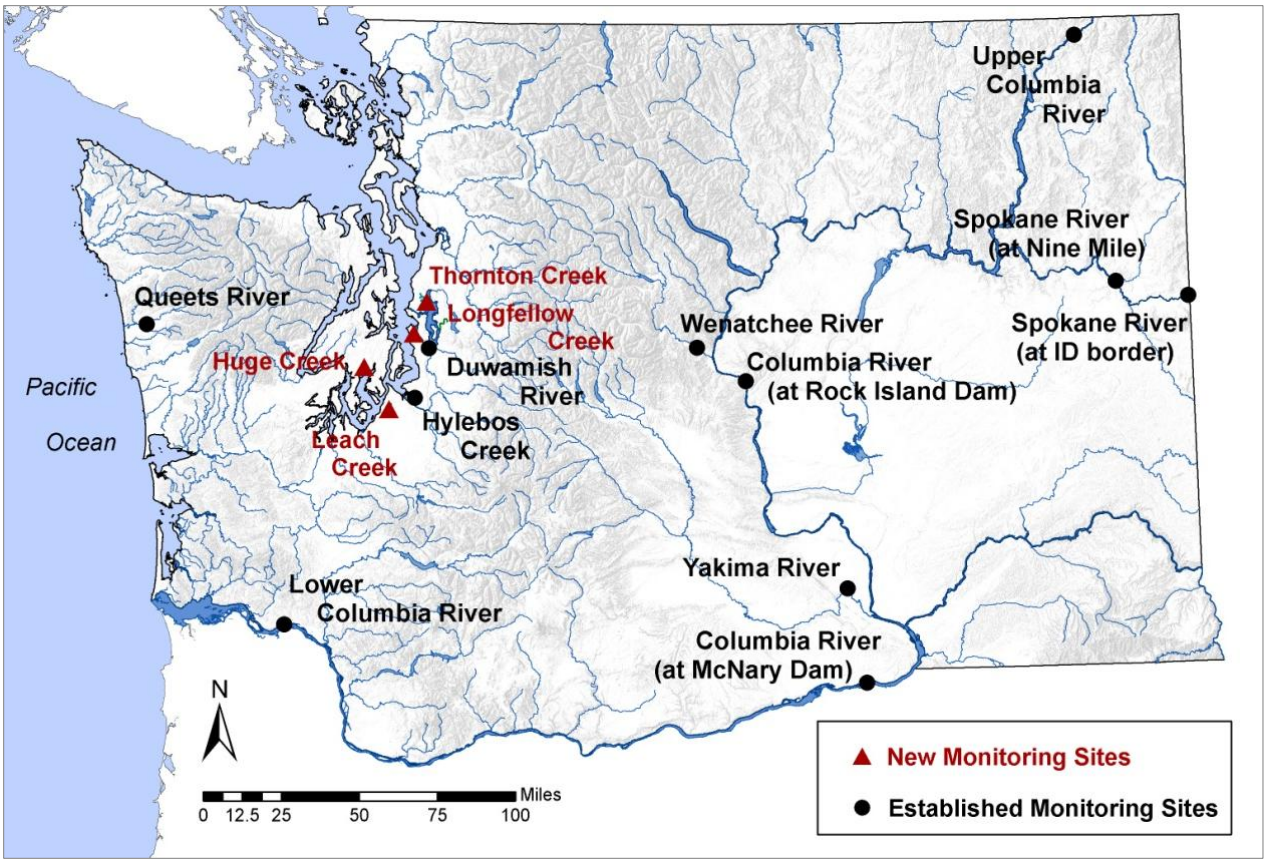

Figure 1. Lead Monitoring Sites, beginning in 2011.

Site Descriptions

Leach Creek

Leach Creek flows through Pierce County's cities of Fircrest, University Place, and Tacoma. It drains 6.5 sq. mi. of heavily urbanized residential and commercial land and feeds into Chambers Creek at its mouth. Stormwater from Tacoma and Fircrest is directed to a holding basin above Leach Creek which forms the headwaters of the creek (City of Tacoma, 2008). During high flow events, excess stormwater is diverted away from Leach Creek to the Thea Foss Waterway (City of Tacoma, 2008).

Leach Creek will be sampled at the crossing of Emerson Street.

Longfellow Creek

Longfellow Creek is located in West Seattle, King County, and discharges into the West Duwamish Waterway. The drainage basin is roughly 4.2 sq. mi. and drains heavily urbanized residential and commercial land with a high percentage of impervious surfaces (Kerwin and Nelson, 2000). One third of the creek, mostly towards the mouth end, is piped below-ground.

The monitoring site for Longfellow Creek will be located about halfway down the length of the stream. The site is just upstream of the golf course, at the Brandon St. crossing.

Thornton Creek

Thornton Creek flows through the cities of Shoreline and Seattle in King County and discharges to the northeast shore of Lake Washington. The 11 sq. mi. watershed is highly urbanized, including residential and commercial properties, as well as a major highway (TCWMC, 2000). Half of the watershed consists of impervious surfaces (TCWMC, 2000). Unlike many urban streams, most of the creek flows above ground (TCWMC, 2000).

Thornton Creek will be sampled near the mouth at Matthew's Beach Park.

Huge Creek

Huge Creek flows north to south through Kitsap and Pierce Counties. The creek drains into Minter Creek, which ultimately discharges into the Puget Sound at Henderson Bay. The 6.1 sq. mi. watershed is predominantly rural, with some commercial forest land in the upper watershed. While roads exist in the watershed, the degree of development and impervious surfaces is much less than the urban streams described above.

Huge Creek will be sampled upstream of 144th St., near the mouth.

Methods

Field and Laboratory Methods

No changes will be made to the field or laboratory methods. Suspended particulate matter samples will be collected via in-line filtration following standard operating procedures (Meredith, 2008) as outlined in the project plan (Meredith and Furl, 2008). Total lead will continue to be analyzed by MEL using EPA Method 200.8 (ICP-MS).

Quality Control

Field quality control (QC) consists of field replicates and field blanks. As stated in the project plan, two field replicates will be analyzed per season. Starting in 2011, five field blanks will be collected each season. Blank sampling frequency was increased to five per season in order to provide blank data from each field crew. Field replicate and blank collections will follow protocols outlined in the project plan (Meredith and Furl, 2008).

Laboratory QC will remain consistent with the project plan (Meredith and Furl, 2008).

Intended Use

The data will be used to assess trends in lead levels of rivers throughout Washington State. The 11 original sites provide annual lead data from 2008 – 2010 and future data collected from these sites will be used in statistical analyses of temporal trends. The four new sites will also provide data to assess temporal trends in future years, with the intention of specifically tracking changes that may reflect Lead CAP reduction strategies, such as the lead wheel-weight ban (Davies, 2009).

Organization and Schedule

The organization and schedule will remain consistent with that outlined in the project plan (Meredith and Furl, 2008).

Budget

The budget remains similar to that outlined in the project plan (Meredith and Furl, 2008). Field sampling frequency increased after the first year from 23/season to 30/season. In 2011, field blank sampling frequency will also be greater than stated in the project plan (from 2/season to 5/season). The yearly laboratory costs associated with this project are presented in Table 1.

Table 1. Estimated Annual Laboratory Costs for Lead Analyses.

Type of Sample	Number of Samples	Cost per Sample*	Cost*
Field Samples	60	$46.72	$2,803
QC Samples	18	$46.72	$841
		Total	$3,644

*Cost includes MEL's Ecology discount (50%).

Data Management Procedures

All data will be kept by the project manager and procedures outlined in the project plan will be followed (Meredith and Furl, 2008).

Data Verification

Data verification will remain consistent with the project plan (Meredith and Furl, 2008).

Audits and Reports

In accordance with the original project plan, MEL will be responsible for performance and system audits of laboratory procedures. Results of those audits are available upon request.

The project manager will continue to complete an annual report of findings which will be published annually in July.

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