Comments – Spokane River Regional Toxics Task Force Phase II Technical Activities Report, LimnoTech 2015

**Overall Comments:**

The sampling event that is the subject of this report is the most comprehensive evaluation of PCBs in the Spokane River in low flow conditions to date. The sampling is also the first defensible evaluation of Spokane River water column PCB concentrations. Therefore this report should be a complete documentation of the sampling event, the results, and analysis. As it is currently written, it would be difficult for a reader not familiar with SRRTTF activities, did not attend the referenced workshops, and is less familiar with the Spokane River/Aquifer system to understand what insights into PCBs within the Spokane River system can be derived from the sampling.

**Executive Summary:**

Include the following footnote to the first sentence:

1-PCB concentrations utilized to place the Spokane River and Lake Spokane on the 303(d) list was derived from fish tissue concentrations and a bioconcentration factor specified in the National Toxics Rule.

The last sentence "Phase 3 activities are now underway to characterize the specific nature of these sources" give the reader the impression that Phase 2 activities are complete. Suggest adding "While Phase 2 activities are ongoing, Phase 3 …"

Report additions suggested in the following comments should also be incorporated into the Executive Summary.

**1 - Introduction:**

Add a brief synopsis of previous data gathering activities that have been conducted that aimed to accomplish similar goals, such as Ecology's Source Assessment work and river concentrations derived from SPMDs, and river concentrations from Ecology's 2012 sampling. Also include the river concentrations calculated from fish tissue that was used to place the river on the 303(d) list.

Add a brief description of the study area and hydrology/hydrogeology. The significance of the groundwater and surface water interactions during low flow periods cannot be understated. The river that leaves Lake CdA is significantly reduced by Barker Road and replaced by a river comprised of 75% groundwater and 25% surface water.

**2 - Synoptic Survey:**

How samples for PCB analysis are collected is extremely important. While the field activities are documented in Gravity's report, it is important to include some description of field activities in the report itself, especially factors related to analysis and conclusions found later in the report. Include a description of how the samples were collected, how the flow measurements were collected, difficulties

encountered in the field, deviations from the QAPP. Include a description of the weather that occurred during sampling. While the rain gage at Felts field did not show a significant rain event, there was a significant rain event in the area that created a change in the river flow regime. In fact this sampling event, in essence, captured a significant wet weather event.

**2.1 Sampling Locations:**

Include a description of where in the river the samples were collected. What depth, in the middle, near the shore, etc.

**2.2 Analytical Results:**

Include a more thorough description of the analytical results, including a comparison to other data that has been collected, comparison to water quality standards, comparison to lab and field blanks, ranges of data found, QAQC results. An evaluation of homolog data could also be conducted, such as homolog comparison of samples moving downstream. There is no discussion of point source discharge samples. Include a chart that compares loading from point sources and groundwater.

Remove qualitative statements such as "concentrations in this lower section of the river being much greater than those observed at the upstream stations"

The analytical results are very sensitive to blank correction method, therefore a thorough discussion of the blank correction method that was used and impacts to the results if of other accepted methods were used, such as blank subtraction, a 5x censor, using field blanks in addition to lab blanks. The reasoning for the choice of blank correction should also be included.

In addition to Figure 2, include a table of total PCB results. It appears there is some sort of color coding of the data points, but it is hard to distinguish. Also identify the anomalous data points.

**3 - Mass Balance Assessment:**

The first sentence states:

"The objective of the mass balance assessment is to use the results of the synoptic survey to determine if previously undocumented PCBs loads to the Spokane River exist during dry weather."

In the introduction it states "The intent of the low flow synoptic survey was to support a mass balance assessment to identify the potential significance of groundwater PCB sources."

If the intent was to evaluate undocumented groundwater sources, then that should be specified in the first sentence of this section.

**3.1 – Conceptual Approach**

The statement is made that the mass balance is based on the assumption that environmental loss processes are relatively insignificant. The assumption is based on analysis of the CE-QUAL-W2 model, observed data on suspended solids and literature. Is this a simplifying assumption that is valid at the

level of the mass balance, but should be evaluated further? What are the implications of this assumption? Does this assumption include internal loading from sediments? More information about this assumption should be included.

The conceptual approach does not discuss the interaction of ground and surface water and the implications on PCB loading, or how groundwater was dealt with in the analysis.

**3.2 - Initial Application:**

What is the purpose of including the initial application of the mass balance?

The flows from Nine Mile given in Table 1 are incorrect and should be flagged or removed.

A discussion of "anomalous" data should be included. Are they outliers or are they data that represent a different flow regime? It appears that they are the data that was collected around the storm events in the area.

Removal of the anomalous values removes a source between Trent and the Spokane gage. If they are included there is a source. If the anomalous values are related to a storm event it seems plausible that the source could be related to the storm event. There is also a significant increase in concentrations in Hangman Creek on the same day as the anomalous value at the Spokane Gage. This could also be related to the storm event.

**3.3 - Revision to Initial Application:**

Again, why two different applications of the mass balance?

**3.3.1 Sensitivity analysis of groundwater quality assumption**

Evaluating groundwater as two different components (background and sources) adds unnecessary complexity. Groundwater PCB concentrations likely vary throughout the aquifer. The variance is likely related to several factors, such as the location and magnitude of sources, flow paths of the aquifer, etc. The concentration is also likely the combination of many sources, and to label it as a singular source is not accurate.

Conceptually in each reach groundwater is a source or possibly a sink. With the mass balance those values can be estimated and reported for each reach. With that approach the assumption is that groundwater enters the river at a rate and concentration.

**3.3.2 Evaluation of storm water and CSO loading**

There is no need to evaluate the impact of storm water and CSO loading on the steady state low flow mass balance. The data that was considered anomalous is the data that was collected at the same time the storm water and CSO loading occurred, therefore there is little sensitivity to it. There is a missed opportunity to evaluate this loading as related to the data that was collected during the wet weather event.

### 3.3.4 Add Greene St. Segment

Indicate whether all of the data or the data without the anomalous values was used. With the anomalous values removed the mass balance indicates no source between Trent and Greene Street, while this analysis shows a source. If inclusion of the anomalous values create a source between Trent and Greene Street, and the anomalous values are related to a storm event, it stands to reason that the source between Trent and Greene could be storm water or CSO related. This possibility should be evaluated further.

## 4 – Seasonally Integrated Sampling

Include a map of the sampling locations, and analytical results.