

Project: Spokane River – PCBs and other Toxics – Long Term Monitoring at the Spokane Tribal Boundary

QAPP: <https://fortress.wa.gov/ecy/publications/SummaryPages/1503111.html>

July 2016: Summary of Preliminary Findings to Date

The plan is to monitor surface water at the Spokane Tribal boundary (just upstream of Chamokane Creek) during 3 hydrologic periods in 2015 – 2016. Sediment traps will be deployed for an entire year and will be retrieved and redeployed during each of the 3 hydrologic periods. Table 1 shows what work has been completed as of July 2016.

Table 1. Monitoring Plan

Action	Surface Water		Sediment Traps
	20 Liter	C.L.A.M.	
<i>Monitoring Season 1 – Spring High Flow</i>			
Collected	May 4 – 5, 2015		April 29 – Sept 10, 2015
Analyzed by AXYS	Yes	Yes	In process
Data Review by MEL	October 2015		
<i>Monitoring Season 2 – Summer Low Flow</i>			
Collected	Sept 9 – 10, 2015		Sept 10, 2015 – Jan 26, 2016
Analyzed by AXYS	Yes	Yes	In process
Data Review by MEL	December 2015		
<i>Monitoring Season 3 – Winter Moderate Flow</i>			
Collected	Jan 26, 2016		Jan 26 – June 9, 2016
Analyzed by AXYS	Yes (20 L XAD and 2 L)		In process
Data Review by MEL	April 2016		

AXYS = AXYS Laboratories, Sydney, B.C.

MEL = Ecology Manchester Environmental Laboratory

Surface water is being collected with both 20 liter composite samples and CLAM and are being analyzed for PCB congeners (EPA 1668C) and PBDEs (EPA 1614). Surface water grabs samples will be analyzed for low-level cadmium, copper, lead and zinc. Suspended sediments from sediment traps are being analyzed for PCBs (EPA 1668C), PBDEs (EPA 1614), metals, and dioxins (EPA 1613).

Results for PCBs in May and September 2015 surface water samples:

- PCB concentrations in surface water are within the background noise of the sampling system as shown in Figure 1. The reasons for this are several:
 - PCBs inherit in the SPE disk housing inside the CLAM contributes background PCBs to the CLAM samples.
 - PCBs in surface water at the Tribal Boundary are likely lower than those at upstream locations (above Long Lake Dam) in the Spokane River. Previous

sediment and fish tissue surveys have documented this already. Low PCBs in surface water make getting detections difficult without pre-concentrating large volumes of water.

- 20 – 40 liters may not be a large enough volume of water to concentrate PCBs. Note that the 20 liter composite samples from May and September were filtered through the same SPE disks as the CLAMs and so received the same background contamination.

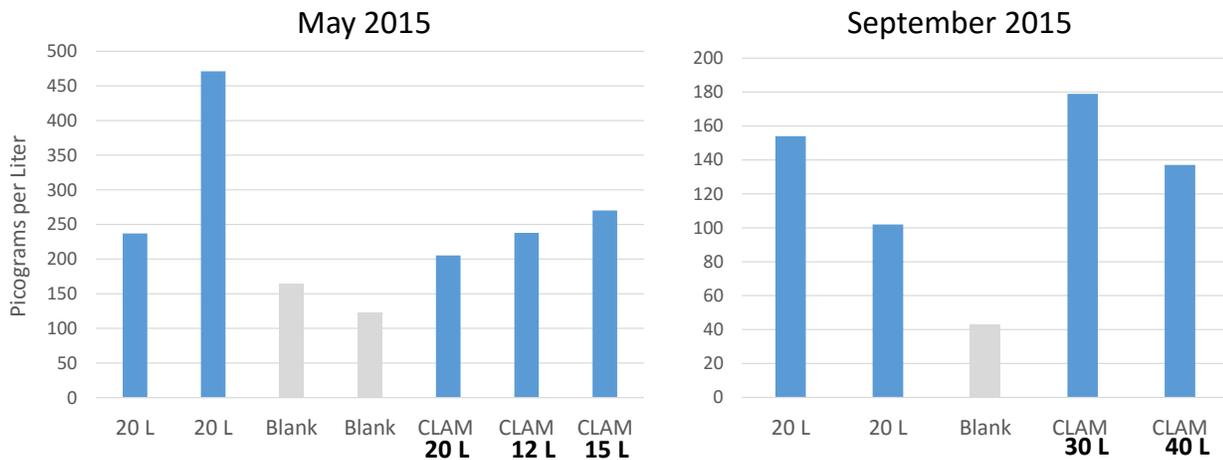


Figure 1. Total PCBs in Surface Water at the Spokane Tribal Boundary.

Results for PCBs in January 2016 surface water samples:

- Because of the issues with background contamination in the CLAM disk housing, The January samples were collected as 2 liter and 20 liter composites. The 20 liter samples were filtered at the lab using XAD-2 instead of the CLAM. The 2 liter samples were analyzed after liquid-liquid extraction, which is the normal extraction method for 2 liter samples. It appears that even with the change in pre-concentration methods, PCB concentrations in surface water are still close to the background concentrations found in the blanks.

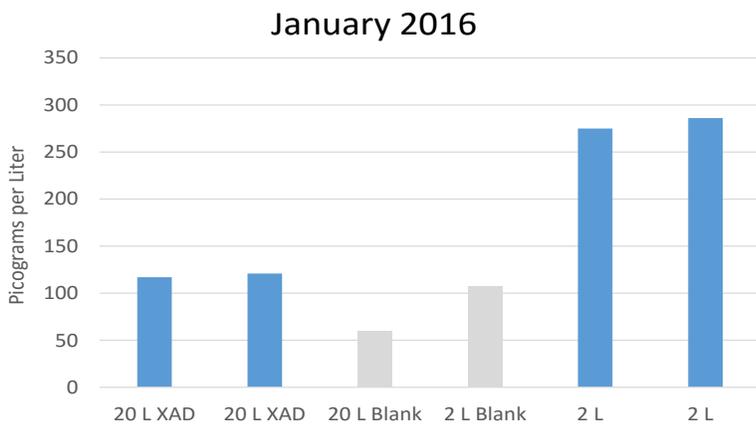


Figure 2. Total PCBs in Surface Water at Spokane Tribal Boundary.

What does this mean for the monitoring of PCBs in surface water containing low levels of PCBs and what about future use of CLAMs to measure PCBs?

- Ecology EAP recently started a study to develop recommendations for monitoring of low-level PCBs and PBDEs in surface water:
<https://fortress.wa.gov/ecy/publications/SummaryPages/1603111.html>
The first monitoring event for this study took place in June 2016 at the Spokane Tribal Boundary monitoring location. Three methods were used to sample surface water for PCBs:
 1. High volume centrifugation which separates solids and dissolved phase. Approximately 1600 liters of water was centrifuged over a 24 hour period.
 2. CLAMs were used with a new stainless steel disk housing to reduce PCBs from background contamination. Laboratory blanks conducted on the stainless steel housing shows little to no contamination.
 3. 20 liter composite samples were also collected and sent to laboratory for PCB congener analysis using XAD-2 to filter the samples.
- EAP has several concurrent projects that are using CLAMs to monitor low-level PCBs in surface water. We will soon have enough data to make some recommendations around the use of CLAM for monitoring of low-level PCBs.
- AXYS Lab is working with the manufacturer of the CLAM (C.I.Agent) to do more study of the background concentrations of PCBs in the CLAM's SPE disk housing. EAP is also trying out stainless steel disk housing in place of LDPE housing to see if background PCB levels can be reduced.