

Scope of Work and Budget
Water Column Trend Assessment/Mirabeau Park Sampling
May 18, 2022 Draft

Background

This scope of work addresses two individual priority activities identified by the Task Force: 1) continuation of water column PCB monitoring to support long term trend assessment, and 2) monitoring of PCB concentrations in the Spokane River near Mirabeau Park. These two activities are merged here into a single scope to provide efficiencies in terms of field crew deployment and development of quality assurance program plans.

Water Column Trend Assessment: The Task Force was formed with a vision statement that they “will work collaboratively to characterize the sources of toxics in the Spokane River and identify and implement appropriate actions needed to make measurable progress towards meeting applicable water quality standards”. Demonstration that this measurable progress is occurring required the establishment of a long-term monitoring program. The Task Force has authorized long term monitoring of PCBs in the water column and fish tissue in the Spokane River starting in 2020. This project consists of the second round of the water column monitoring program for trend assessment. Semipermeable membrane devices (SPMDs) will be deployed to monitor PCB concentrations at four locations ranging from the WA/ID State Line down to Nine Mile Dam. SPMDs will be deployed for one month at a time, during each of the three primary seasonal flow regimes in the Spokane River: low summer flow, moderate winter flow and high spring flow. SPMD monitoring will be supplemented with water column grab samples for PCBs. The data collected under this study will be used to characterize annual average Spokane River water column PCB concentrations for the period Summer, 2022 through Spring, 2023, and serve as a reference point for comparison to monitoring data in past and future years.

Mirabeau Park: Recent PCB measurements in the water column and biofilm at Mirabeau Park suggest the potential presence of a groundwater PCB source, but do not provide a definitive explanation of the presence or magnitude of the load. Water column concentrations at Mirabeau are generally similar to those observed at upstream stations (<25 pg/l), with occasional observations above 200 ug/l. Biofilm PCB concentrations measured by Ecology show a noticeable shift in homolog distribution at Mirabeau compared to upstream stations (indicating the presence of a PCB source) but do not provide an estimate of the magnitude of the load. Deployment of semipermeable membrane devices will help better assess the significance of groundwater PCB loading entering the river upstream of Mirabeau Park, by measuring water column concentrations integrated over a 28-day period.

Scope of Work

Work will be covered via seven tasks:

1. Preparation of QAPP
2. Development of scopes of work
3. Field planning and coordination
4. Field monitoring
5. SPMD data assessment
6. Reporting
7. Data uploading

Task 1: Preparation of QAPP

LimnoTech will prepare a draft quality assurance program plan (QAPP) in accordance with Ecology's "[Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies](#)" covering both project activities. A draft QAPP will be submitted to Ecology for review and revised into a final version incorporating all comments.

Task 2: Development of scopes of work

LimnoTech will prepare draft scopes of work detailing contractor responsibilities and budget for use by the Task Force's Administrative and Contracting Entity (ACE) in developing contracts/purchase orders related to this work. Separate scopes and budgets will be developed for:

- Gravity Consultants: Performance of both monitoring activities
- SGS AXYS: PCB laboratory analysis for both monitoring activities
- SVL Laboratories: Conventional pollutant analysis for both monitoring activities
- EST Laboratories: Provision of SPMDs for both monitoring activities
- LimnoTech: Development of QAPP, field monitoring oversight, data validation, SPMD data assessment, reporting, and uploading of data to EIM.

Task 3: Field planning and coordination

Trend Assessment: Gravity Consultants will coordinate with staff from Avista to identify the specific location for placement of the Nine Mile Dam SPMD. Should the location used in 2020-2021 not be available, Gravity and LimnoTech will work with Avista to define a new location that is both accessible and representative of Spokane River PCB concentrations.

Mirabeau Park Sampling: Gravity Consultants will conduct field reconnaissance and coordinate with staff from Ecology in terms of the defining specific location of SPMD deployment. SPMDs will be located as close as possible to the previous Ecology biofilm monitoring site.

Task 4: Field Monitoring

Sampling will encompass locations ranging from the WA/ID State Line to downstream to Nine Mile Dam of the majority of PCB loading sources from the Spokane area. SPMD samplers for trend assessment will be deployed at the same four locations from the original study:

- WA/ID State Line
- Upriver Dam
- Near Upper Falls
- Nine Mile Dam

In addition, two SPMDs will be placed at Mirabeau Park during summer low flow conditions.

Two field SOPs will be followed during the study related to the use of SPMDs:

- Hobbs (2020) — Standard Operating Procedure EAP001, Version 4.1. Standard Operating Procedure for Conducting Studies Using SPMDs.

- Seiders et al. (2020) — Standard Operating Procedure for Semipermeable Membrane Devices (SPMD) Data Management and Data Reduction

In addition to the SPMDs, Gravity Consultants will collect grab samples in accordance with the Standard Operating Procedures listed in LimnoTech (2014):

- Grab samples of TOC/DOC/TSS at the deployment, mid-period, and retrieval of SPMDs at all locations.
- Grab samples of PCBs at the deployment, mid-period, and retrieval of SPMDs at all existing trend assessment locations.

Samples will be shipped overnight to SGS AXYS (for analysis of PCBs) and to SVL laboratories (for analysis of total organic carbon, dissolved organic carbon, and total suspended solids). Laboratory results will be blank-censored and validated in accordance with the project QAPP.

Task 5. SPMD data assessment

LimnoTech will calculate congener-specific water column dissolved PCB concentrations from the mass of PCBs in the SPMDs, using the equations developed in Huckins et al (2006) and implemented in the spreadsheet “SPMD Water Concentration Estimator v5-2”

(https://www.usgs.gov/centers/cerc/science/passive-sampling-using-spmds-and-pocis?qt-science_center_objects=0#qt-science_center_objects). Dissolved PCB concentrations will be converted to total PCB concentrations based on observed TOC and POC concentrations and established partition coefficients. Total PCB concentrations are being generated solely for informational purposes, as trend assessments are expected to be conducted using only dissolved PCB concentrations.

Observed PCB concentrations from collected field blanks will be processed to estimate both the limit of detection (LOD) and limit of quantitation (LOQ) by congener. The LOD will be calculated as the mean of the field blanks plus three standard deviations while the LOQ was calculated as the mean of the field blanks plus ten standard deviations as originally described by Keith (1991) and subsequently recommended in Ecology Standard Operating Procedures for SPMD data reduction (Seiders and Sandvik, 2020).

Task 6: Reporting

LimnoTech will prepare a project report documenting the conduct and results of both study components. The report will present dissolved phase homolog concentrations for all SPMD samples collected, with full congener results provided electronically as an appendix to the report. Annual average PCB concentrations at each of the four stations will be calculated as the arithmetic average of the observed concentrations of the three seasonal exposures, and presented in tabular form compared to results from the same stations from 2020-2021. The report will also provide concentration of total PCBs and homologs for all water column grab samples, with complete congener results being provided electronically as an appendix to the report.

PCB concentrations observed at Mirabeau Park will be compared to previously observed values and an assessment conducted regarding the potential significance of a groundwater PCB source entering the river upstream of the sampling location.

Task 7: Data uploading

Individual congener results and all relevant sampling information (e.g., locations, sampling and analytical procedures) from the grab sampling of PCBs will be appropriately formatted and uploaded to Ecology's Environmental Information Management (EIM) database.

Deliverables and Schedule

The expected deliverables and schedule for delivery are provided in Table 1.

Table 1. Deliverables and Schedule

Work type	Start Date	Due date	Lead staff
QAPP			
Draft QAPP	May, 2022	June, 2022	David Dilks
Final QAPP	June, 2022	July, 2022	David Dilks
Field and laboratory work			
Summer low flow sampling	August, 2022	September, 2022	Shawn Hinz
Winter moderate flow sampling	February, 2023	March, 2023	Shawn Hinz
Spring high flow sampling	May, 2023	June, 2023	Shawn Hinz
Laboratory analyses	September, 2022	August, 2023	Sean Campbell
Laboratory data validation	August, 2023	October, 2023	Renn Lambert
Database			
Database entry and review	August 2023	October, 2023	David Dilks
Final report			
Draft report to Task Force	October, 2023	December, 2023	David Dilks
Final report on web	December, 2023	December, 2023	David Dilks

Budget

The total cost for conducting this work is \$186,000, noting that approximately \$140,000 has already been authorized by the Task Force for conducting the SPMD trend assessment monitoring. Itemized costs are provided in Table 2.

Table 2. Itemized Budget

Item	Budget
Scopes of Work	\$6000
Draft QAPP	\$3000
Final QAPP	\$3000
Field planning and coordination	\$4,000
SPMD preparation/rental	\$15,000
Field labor	\$45,000
Laboratory analyses	\$75,000
Data validation	\$9,000
SPMD data assessment	\$12,000
Reporting	\$8,000
Data uploading	\$6,000
Total	\$186,000