

## Spokane River Regional Toxics Task Force Data Synthesis Workshop

### WORKSHOP INTENT

- Provide an overall summary of the data available
- Provide results of new analyses defining the extent to which these data can address key management questions
- Identify critical data gaps, and (potentially) field studies to help fill those gaps
  - Is the (given) data set sufficient to improve our understanding of conditions/relationships?
  - Which data gaps are worth filling (e.g. is the source big enough to matter) and at what cost?
- Assess management actions that could be taken to address key sources, once gaps are filled

### MANAGEMENT QUESTIONS

#### Sources

What are the ultimate sources of PCBs to the system (inadvertent/legacy/other)?

How much is coming from each delivery pathway (and how much is unknown), including below Greene?

#### Relationships

How are fish obtaining their PCBs (and what does this tell us about the relative importance of sources)?

What is known about the fate and transport of PCB congeners through trophic levels?

#### Controls

How controllable are the various sources?

#### Status and Trends

How much PCB is in the river (and sediments and fish) now?

What are trends so far, and how do we identify future trends?

### POTENTIAL PRE-WORKSHOP ACTIVITIES

**Sources:** What are the ultimate sources of PCBs to the system (inadvertent/legacy/other)?

Potential Activity: Fingerprinting Assessment

Best accomplished under Lisa Rodenburg's scope.

**Sources:** How much PCB is coming from each delivery pathway?

Potential Activity: Summation of Existing Pathway Knowledge

Scope: Compile all existing information from Ecology (2011), Comprehensive Plan, and subsequent Task Force monitoring efforts.

Outcome:

- Magnitude of sources that can be clearly quantified
- Potential magnitude of unknown sources
- Define monitoring that could be done (and at what cost) to more accurately quantify unknown sources.

Estimated cost: \$3k

Potential Activity: Examine fingerprints at Coeur d'Alene for seasonality differences

Scope: Cosine-theta correlation assessment of summer low flow fingerprints versus winter/spring/fall fingerprints.

Outcome:

- Assessment of whether nature of upstream sources vary seasonally.

Estimated cost: \$3k

Potential Activity: Examine in-river fingerprints for seasonality differences

Scope: Cosine-theta correlation assessment of summer low flow fingerprints versus winter/spring/fall fingerprints at select Spokane-area locations.

Outcome:

- Potentially identify presence of seasonally-varying sources that we have not yet characterized.

Estimated cost: \$4k

Potential Activity: Compare atmospheric fingerprints to potential delivery mechanisms

Scope: Cosine-theta correlation assessment of atmospheric deposition fingerprints versus fingerprints in Lake Coeur d'Alene, groundwater upgradient of Kaiser, and/or City of Spokane stormwater.

Outcome:

- Potentially identify atmospheric deposition as a contributor to various delivery mechanisms.

Estimated cost: \$2k for Lake Coeur d'Alene, \$3k for upgradient groundwater, \$5k stormwater.

Potential Activity: Spatial assessment of PCBs in biofilm and water

Scope: Examine bioconcentration factors (ratio of total PCB concentration in biofilm:water) and/or correlation in fingerprints.

Outcome:

- Identification of spatial discontinuities in relationship between biofilm and water column PCBs
- Potential identification of new sources.
- Identification of data gaps

Estimated cost: \$1k for BCF, \$3k for fingerprints.

**Relationships:** What sediment PCB concentration should we expect from river concentrations?

Potential Activity: Spatial assessment of PCBs in fish and water

Scope: Compare levels of most prevalent congeners in fish to most prevalent congeners in the water column for each river segment where fish are available.

Outcome:

- Identification of spatial discontinuities in relationship between fish fingerprints and water column fingerprints
- Potential identification of new sources
- Identification of data gaps

Estimated cost: \$5k.

Potential Activity: Simple partition model between water column and sediments

Scope: Develop mass balance model that simulates the expected interaction between water column and sediment PCB concentrations.

Outcome:

- Expected sediment concentrations in response to existing river concentrations.
- Indirect evidence of contribution of un-accounted for source(s)

Estimated cost: \$3k

**Relationships:** Do stormwater sources have an exaggerated effect on sediment concentration?

Potential Activity: Expand simple model to consider wet weather loading

Scope: Develop mass balance model that explicitly considers the fate of sediment-bound stormwater PCBs and the rate that they are delivered to bottom sediments versus being transported downstream.

Outcome:

- Determination of whether stormwater sources contribute preferentially to sediment concentrations.

Estimated cost: \$3k

**Relationships:** How are fish obtaining their PCBs?

Potential Activity: Simple sediment-based bioaccumulation model

Scope: Apply Arnot-Gobas bioaccumulation model as described in Serdar et al (2011) using updated water column and sediment PCB concentration.

Outcome:

- Estimate of expected fish tissue concentrations, given observed water column and sediment concentration
- Understanding of whether fish tissue PCB are at expected levels
- Potential (indirect) identification of new sources

Estimated cost: \$2k

Potential Activity: Simple biofilm-based bioaccumulation model

Scope: Apply Arnot-Gobas bioaccumulation model as described in Hobbs and Friese (2016) using updated water column and recently observed biofilm PCB concentration.

Outcome:

- Estimate of expected fish tissue concentrations, given observed water column and biofilm concentration
- Understanding of whether fish tissue PCB are at expected levels
- Potential (indirect) identification of new sources

Estimated cost: \$4k

**Controls:** How effective is PCB removal from the 'Next Level of Treatment'?

Potential Activity: Examine PCB concentrations at WWTPs with Next Level of Treatment.'

Scope: Summarize effluent concentrations observed at Spokane County and Liberty Lake.

Outcome:

- Understanding of attainable effluent PCB concentrations for municipal WWTPs.

Estimated cost: \$0.5k

Potential Activity: Literature review of attainable Spokane effluent concentrations

Scope: Summarize effluent concentrations obtained at other sites employing Next Level of Treatment.

Outcome:

- Understanding of attainable effluent PCB concentrations

Estimated cost: \$1k

Potential Activity: Assess effectiveness of BMPs implemented as part of dischargers' Toxics Management Plans

Scope: Identify BMPs that have been implemented as part of Toxics Management Plans, and conduct statistical analyses to assess whether decreases have occurred in influent and/or effluent PCB concentrations.

Outcome:

- Determine presence of observable decreases in influent and effluent PCBs in response to BMP implementation.

Estimated cost: \$5k per discharger

**Status and Trends:** What are current levels of PCB in the river and fish now?

Potential Activity: Statistical summary of water column PCB concentration

Scope: Summarize observed water column PCB concentrations in terms of mean and variability at different locations and times.

Outcome:

- Assessment of what we know, and with what level of confidence.

Estimated cost: \$3k

Potential Activity: Statistical summary of fish tissue in terms of mean and variability at locations.

Scope: Summarize observed fish tissue PCB concentrations in terms of mean and variability for available species at different locations, times and age of fish.

Outcome:

- Assessment of what we know, and with what level of confidence.

Estimated cost: \$5k

**Status and Trends:** What are historical trends so far?

Potential Activity: Trend analysis for water column

Scope: Conduct statistical analyses, normalizing for river flow, to assess whether current PCB concentrations are decreasing.

Outcome:

- Assessment of whether concentrations are currently decreasing.
- Determination of amount of data required to estimate future trends with confidence.

Estimated cost: \$5k

Potential Activity: Trend analysis for fish

Scope: Conduct statistical analyses, normalizing for age of fish, to assess whether current PCB concentrations are decreasing.

Outcome:

- Assessment of whether concentrations are currently decreasing.
- Determination of amount of data required to estimate future trends with confidence.

Estimated cost: \$5k