LimnoTech
Water Environment | Scientists Engineers

Draft Scope of Work: Initial Data Mining to Assess Bioaccumulation of PCBs in Spokane River Fish

SRRTTF Meeting

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Background

- The Task Force has raised several questions over the years related to fish tissue PCBs
  - How can we be near compliance with (prior) water quality standards, yet so far above fish tissue targets?
  - Why do we see some PCB congeners in fish that are near zero in the water column?
  - Is there some undiscovered sediment hot spot (e.g. legacy contamination) driving fish tissue levels?
  - Do PCBs in older fish reflect historical contamination?
- Prior to designing monitoring plans to address these questions, we recommend some initial data mining

Task Description

- Quickly review available data to test the hypothesis:
  - Fish tissue levels are roughly where we would expect them to be, once all site-specific factors are considered
- Factors to be considered
  - Higher than average percentage of PCBs are bioavailable
  - Amount of water column PCBs that attach to solids particles, and settle to the bottom
  - Exposure of bottom-dwelling bugs to PCB in sediments
  - Food chain bioaccumulation of PCBs
  - Differential bioaccumulation among congeners
  - Elimination rate of PCBs from fish tissue

Steps

Work to be conducted through four steps

1. Calculate the concentrations of PCBs in Spokane River sediments that would be expected to occur given currently observed water column concentrations
   - Use available organic carbon data, partition coefficients
2. Calculate site-specific bioaccumulation factors
   - Use updated version of the simple bioaccumulation model originally applied for Ecology's 2011 PCB Source Assessment Study
   - Calculate expected fish tissue concentrations resulting solely from present-day water column concentrations

Steps (continued)

3. Examine congeners in fish
   - Calculate average blank-corrected concentrations for those congeners observed in fish tissue but absent from some water column samples
   - Apply bioaccumulation factors calculated in Task 2
   - Compared predicted fish tissue concentrations to observed fish tissue concentrations
4. Calculate in “residence time” of PCBs fish
   - Use literature-based excretion rates

Deliverables

- Presentation of findings, addressing the following issues:
  - The level of PCBs expected in Spokane River fish, given observed water column concentrations
  - Whether observed congener concentrations in Plante's Ferry fish are consistent with observed water column concentrations
  - "Residence time" of PCBs fish
- Assessment of key data gaps, to help guide upcoming Task Force and EAP monitoring
- Copies of all calculation spreadsheets

Cost and Schedule

- Cost
  - $2000
- Schedule
  - Work completed within one month