Overview of Sediment & Biofilm PCB Results Fall 2022

TTWG Meeting May 16, 2023

Sediment and Biofilm Background

- 2018/2019 sampling by Ecology showed elevated PCB concentrations in biofilm and sediment in the Spokane River downstream of the Mission Ave. bridge
 - Spatial resolution was too coarse to pinpoint the source of elevated PCBs
- •Task Force implemented PCB sediment and biofilm monitoring at an increased resolution in Mission Reach in 2022
- Laboratory data from 2022 sediment and biofilm sampling has been received
 - Preliminary discussion of initial data review
 - Data have not been validated

Sediment Sampling Locations

- 1. SD6 Magnetic anomaly
- 2. SD4 Magnetic anomaly
- **3. SD2** Sediment contamination identified by Task Force (2021)
- 4. SD5 Magnetic anomaly
- 5. SD7 Magnetic anomaly
- 6. SD3 Magnetic anomaly
- SD1 Sediment contamination identified by Ecology (2018)



Sediment Sampling Details

- Sediment sampling conducted by Gravity
 - September 3, 2022
- Top 2 cm of sediment were sampled and mixed thoroughly in a bowl to homogenize
- Sediment sampled for:
 - PCB
 - TOC
 - Grain size
 - Percent moisture

Preliminary Sediment Results

Station Name	Total PCB (ug/kg)
SD6	53.2
SD4	4.18
SD2	7.16
SD5	285
SD7	15.4
SD3	44.2
SD1	28.5

- Highest sediment PCB concentration observed at SD5
 - During historical source assessment, 2 sites near SD5 were identified for potential PCB release



Sediment Homolog Distribution

- Elevated concentration at SD5 is driven by high penta- and hexa-chloro homologs
- SD5 homolog distribution is most similar to Aroclor 1254 and 1260 (cosine similarity 0.82 and 0.77, respectively)



Sediment Homolog Distribution – Comparison to Historic Data

Elevated total PCBs identified at SR-SED2 in 2021

- High nona- and deca-chloro homologs
 - Potentially indicative of Aroclor 1268

•Homolog distribution of SD5 does not resemble that of SR-SED2



Sediment Sampling - Comparison to Historic Data

- 2022 SD5 station is the secondhighest of these observed concentrations
- No consistent spatial trends
 - Locations with high historic concentrations did not show elevated concentrations in 2022



Biofilm Sampling Locations

- **42** sampling locations within Mission Reach
 - 6 sampling locations in direct proximity to Ecology's 2018/2019 stations to increase resolution
- Some sampling locations deviated from the planned location due to access issues



Biofilm Sampling Details

- Biofilm sampling conducted by Gravity
 - September 4-8, 2022
- Sampling included collection of rocks with a flat surface bearing visible biofilm
 - Biofilm was scraped from the rocks and homogenized

Preliminary Biofilm Results

- •16/42 sites greater than 5,000 pg/g
- Highest biofilm PCB concentrations observed upstream of Spokane Falls bridge (30,989 and 35,902 pg/g)





Biofilm Spatial Trends – Comparison to Ecology (Left Bank)

- High PCB at ASFB-LB in 2018/2019
 - 2022 sampling indicates the source is upstream
- 2022 sampling did not identify high concentrations upstream or downstream of 2018/2019 SR3A outlier location



Biofilm Spatial Trends – Comparison to Ecology (Right Bank)

- •2018/2019 sampling indicated a source at SR3A-RB
 - 2022 sampling indicates evidence of a source near this location
- Right bank concentrations are generally lower than left bank DS of SR3A



Biofilm Homolog Distribution- Comparison to Ecology

- Homolog distributions at all of the elevated PCB locations were dominated by the penta-chloro homolog except SR3A-RB-100D and SR3A-LB-200D
 - Agrees with Ecology's findings that stations GZ, BSFB, SR3A-RB, ASFB, and B-MID-RB-D were dominated by the penta-chloro homolog
- Homolog patterns at 2022 SR3A, ASFB, BSFB, and GZ stations were similar most similar to Aroclor 1254
 - Agrees with Ecology's findings
 - Ecology also found similarities between the SR3A stations and Aroclors 1260 and 1268. These similarities were not found in the 2022 data.

Findings – Sediment

- Elevated sediment PCB at SD5 (magnetic anomaly)
 - May indicate source of PCB in the river bed
 - Historical source assessment identified two potential PCB sources near SD5
 - Given inconsistency in prior data, the source of this high PCB may be from neither a riverbed source nor the facilities identified in the historical source assessment
- Homolog distribution at SD5 in 2022 is indicative of Aroclor 1254 and Aroclor 1260
 - Differs from that of the elevated station (SR-SED2) in 2019 which resembled Aroclor 1268

Findings – Biofilm

- 2022 observed biofilm PCB concentrations were generally consistent with 2018/2019 Ecology sampling with the exception of high values observed by Ecology at SR3A and B-HAM-RB in 2019
- Contamination of PCBs was found upstream of ASFB
 - Homolog pattern indicates this may be Aroclor 1254
- Confirmed presence of contamination at the sites where Ecology identified contamination
- Working theory: Groundwater may be the source of contamination
 - Groundwater analysis shows Mission Reach is gaining at certain times
 - Higher PCB concentrations observed at left bank than right bank (GW movement is believed to be from south to north (i.e., left bank to right bank)
 - Spatial correlation indicates that the contamination is in zones rather than discrete points which could be due to:
 - Contamination entering over diffuse area (such as via groundwater)
 - Contamination entering at a discrete location then carried downstream via the water column → data does not show elevated water column concentrations

Questions?