Agenda

- Summary of active projects and status
- Receipt of laboratory data
- 2022 expanded synoptic survey
- Fingerprinting of GE well PCB data
- Groundwater flow direction assessment
## Current Study Status

**Topics to be Discussed Today in Red**

<table>
<thead>
<tr>
<th>Project</th>
<th>Status</th>
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<tbody>
<tr>
<td>Groundwater flow direction study</td>
<td>Nearing completion.</td>
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<tr>
<td>Expanded synoptic survey (plus catch basins and artesian well)</td>
<td>Monitoring completed, received ~75% of lab results. Mass balance conducted using available data.</td>
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<tr>
<td>Sediment/biofilm</td>
<td>Monitoring completed, waiting on lab results.</td>
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<tr>
<td>Long term water column trend assessment</td>
<td>Low &amp; moderate flow monitoring completed, no lab results. QAPP for high flow monitoring approved by Ecology.</td>
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<tr>
<td>Fish tissue trend assessment</td>
<td>Sampling completed by WDFW, waiting on lab results.</td>
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<tr>
<td>GE fingerprinting</td>
<td>Waiting on 2022 lab results Preliminary fingerprinting conducted using 2018 data.</td>
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Receipt of Laboratory Data

- Lack of laboratory results is jeopardizing proper completion of projects
  - Amount of review time of draft reports by TTWG/Task Force
  - Independent validation of lab results
  - Upload of data to EIM

- April 17 conversation with SGS/AXYS
  - Fish data to be sent within a day, SPMD data soon
  - Reiterated that results will be of little value if not delivered soon
    - April 30 cutoff date for all data

- Options for moving forward
  - What do we do if April delivery deadline is not met?
2022 Expanded Synoptic Survey

• Purpose
  – Support updated mass balance assessment
  – Verify elevated PCB concentration in artesian well observed in 2021
  – Assess stormwater catch basin PCBs in the area identified by the PCB-sniffing dog

• Results status
  – Artesian well
    • Results have been obtained
  – Synoptic survey to support mass balance assessment
    • ~75% of results obtained
  – Stormwater catch basins
    • No results obtained
2022 Artesian Well Results

• Background
  – Discharge to Mission Reach observed by Ecology during summer temperature float
  – Single PCB sample in 2021 measured 2100 pg/l

• Results
  – Two samples collected in 2022
    • 1300 and 1500 pg/l
  – Confirmation that this source consistently discharges PCBs at 10x the concentration in the river
  – Significance of this load will be assessed via the mass balance
2022 Mass Balance Assessment

- **Purpose**
  - Add stations to provide more spatial resolution than prior assessments
    - Provide insight on homolog shift observed near Upriver Dam
    - Mass balance specific to Mission Reach
    - Divided the reach between USGS Gage and Nine Mile into two parts
  - Allow congener-specific mass balances
    - PCB 11
    - Upstream/downstream of GE site
Mass Balance Approach

- Measure flow and concentration of known loading sources
  - Point source, tributaries

- Calculate presence of unmonitored load entering the river between upstream and downstream stations
  - Measure flows and concentrations during steady state conditions
  - Unmonitored load = Downstream load – upstream load

\[
\text{Downstream Load} \quad (50 \text{ mg/day})
\]

\[
\text{Upstream Load} \quad (30 \text{ mg/day})
\]

\[
\text{Unmonitored Load} \quad (20 \text{ mg/day})
\]
Mass Balance Approach with Monitored External Load

- Measure flow and concentration of known loading sources
  - Point source, tributaries
- Calculate presence of unmonitored load entering the river between upstream and downstream stations
  - Measure flows and concentrations during steady state conditions
  - Unmonitored load = Downstream load – upstream load – monitored load

![Diagram](attachment:image.png)

- Downstream Load: 50 mg/day
- Upstream Load: 30 mg/day
- Monitored External Load: 15 mg/day
- Unmonitored Load: 5 mg/day
2022 PCB Concentrations
Data Received to Date

- Concentrations generally range from 20 to 150 pg/l
- Two outliers
  - 440 pg/l at Greene St.
  - 260 pg/l between USGS Gage and Nine Mile
- Similar range of concentrations as in 2018
2022 Mass Balance
Using Data Received to Date

- Results highly dependent on treatment of outliers
- Too early to draw strong conclusions
  - Variability in concentrations makes it difficult to discern “non-significant” loads
Homolog Balance between Trent and Greene

- Previous homolog-specific mass balances had shown a homolog shift between Trent Avenue/Plantes Ferry and Greene St.

- 2018 mass balance added a station downstream of Upriver Dam
  - Suggested that the loss of lower chlorinated homologs was occurring between Trent and below Upriver Dam
2022 Homolog Balance near Upriver Dam

- 2022 mass balance added an additional station upstream of Upriver Dam
  - Interim results suggest that homologs are being lost as water passes through Upriver Dam

- Results from downstream of Upriver Dam to Greene St. confounded by outlier data value at Greene
PCB-11 Mass Balance

• Initial investigation of sources of PCB-11 conducted in 2021
  – Concluded that concentrations were largely indistinguishable from blanks upstream of Greene St. and increased downstream from there

  – Mass balance assessments of 2014, 2015, and 2018 survey data showed potential for an unknown source occurring downstream of USGS gage in 2018
PCB-11 Mass Balance

- 2022 data generally consistent with historical spatial trend, but lower (especially at Nine Mile)

- Mass balance assessments using 2022 data show essentially zero incremental load, except
  - +70 mg/day between USGS Gage and mid-way to Nine Mile
  - -70 mg/day between mid-way to Nine Mile and Nine Mile
Congener-Specific Mass Balance

- Conduct congener-specific mass balance for the reach containing GE Site
  - Upriver Dam to Greene St.
- Compare congener pattern of predicted incremental load to observed congener patterns in GE wells
Comparison of Mass Balance Results to GE Well Congeners

• Compared congener pattern of predicted incremental load in 2018 to observed congener patterns in GE wells

  - While not a perfect predictor, strong probability (p<0.001) that a relationship exists

• 2022 results confounded by outlier at Greene St
  - Results with no outlier also show positive correlation
  - Inconclusive until remaining data arrive