Follow-up Investigations from Multi-media Data Collection

Task Description and Initial Status

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Spokane River Regional Toxics Task Force

May 21, 2020 Technical Track Work Group Meeting

Task Description

- Identify river reaches where multi-media (i.e. water, sediment, biofilm) data indicate effects from non-point sources
- Provide a best estimate of:
  - the mass loading contribution
  - the aerial extent and concentration of the area identified
- Prioritize identified reaches for further study

Data Considered

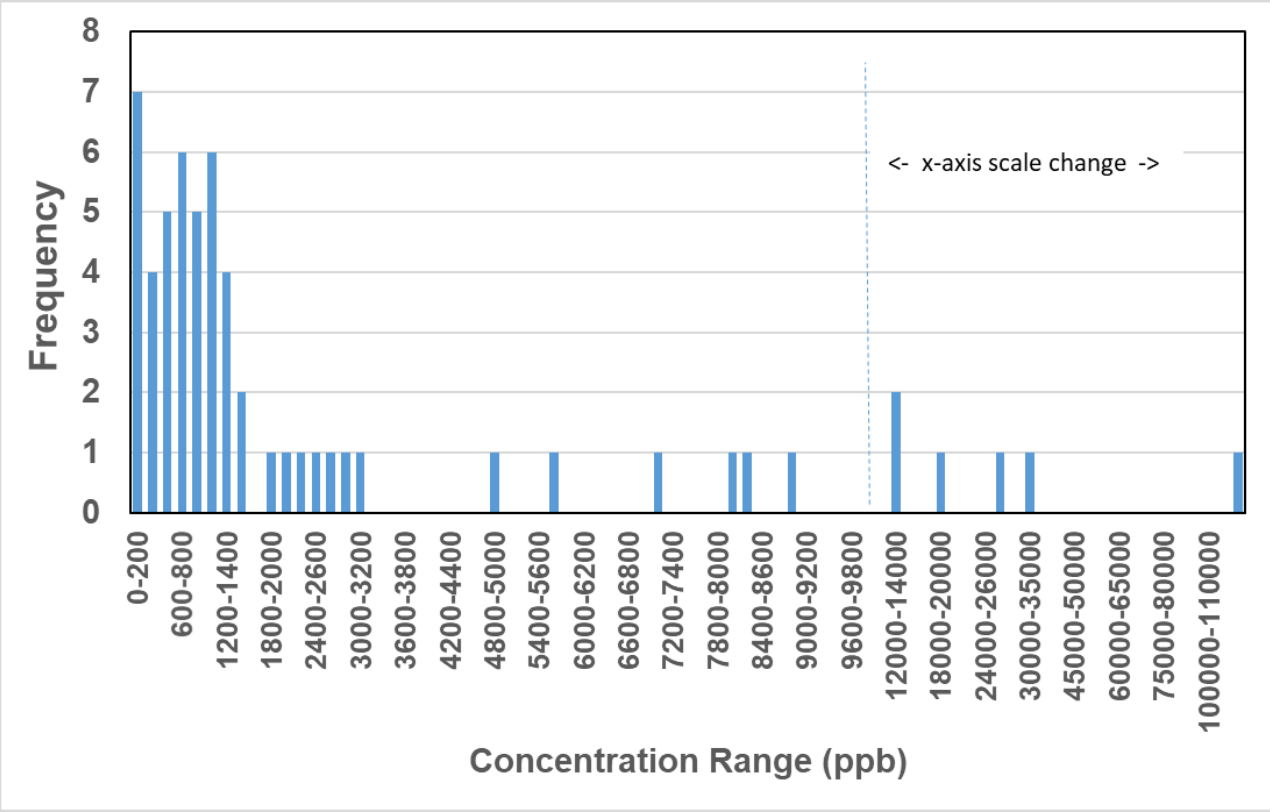
- Water Column
  - 2014, 2015, 2018 synoptic surveys
- Biofilm
  - 2018, 2019 Ecology surveys
- Sediment
  - 2018 Ecology (biofilm) survey

Initial Analyses

- What constitutes a biofilm hot spot?
- Exploratory geostatistics
- Potential products

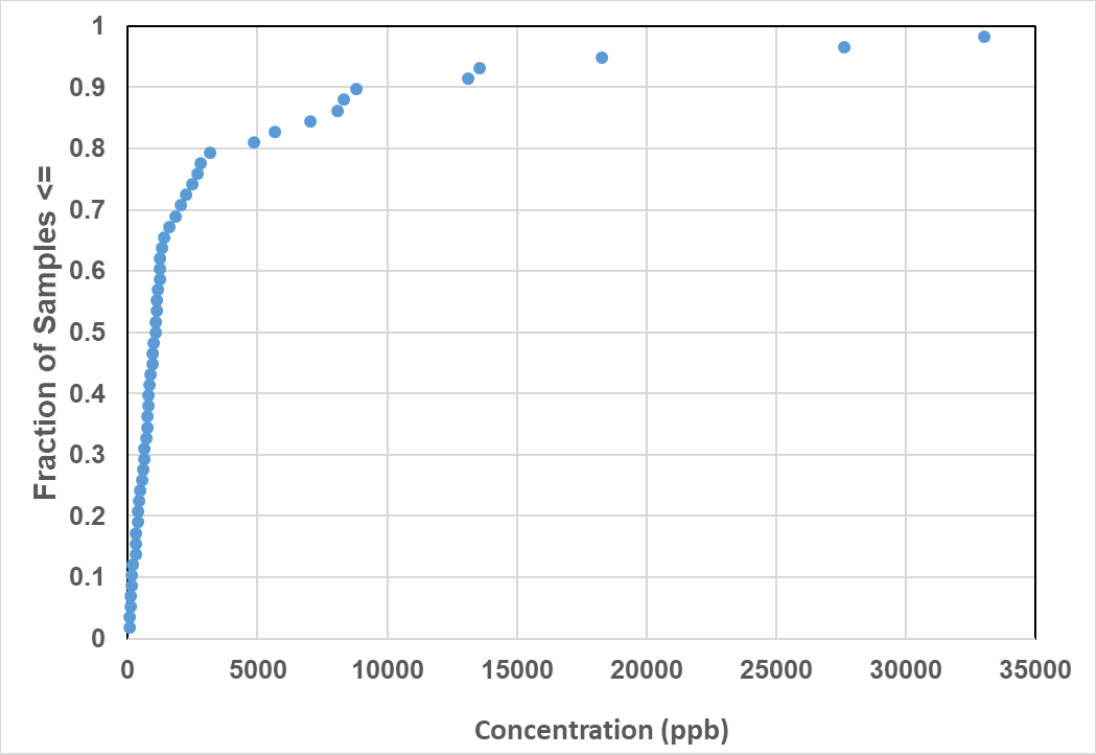
What Constitutes a Biofilm Hot Spot?

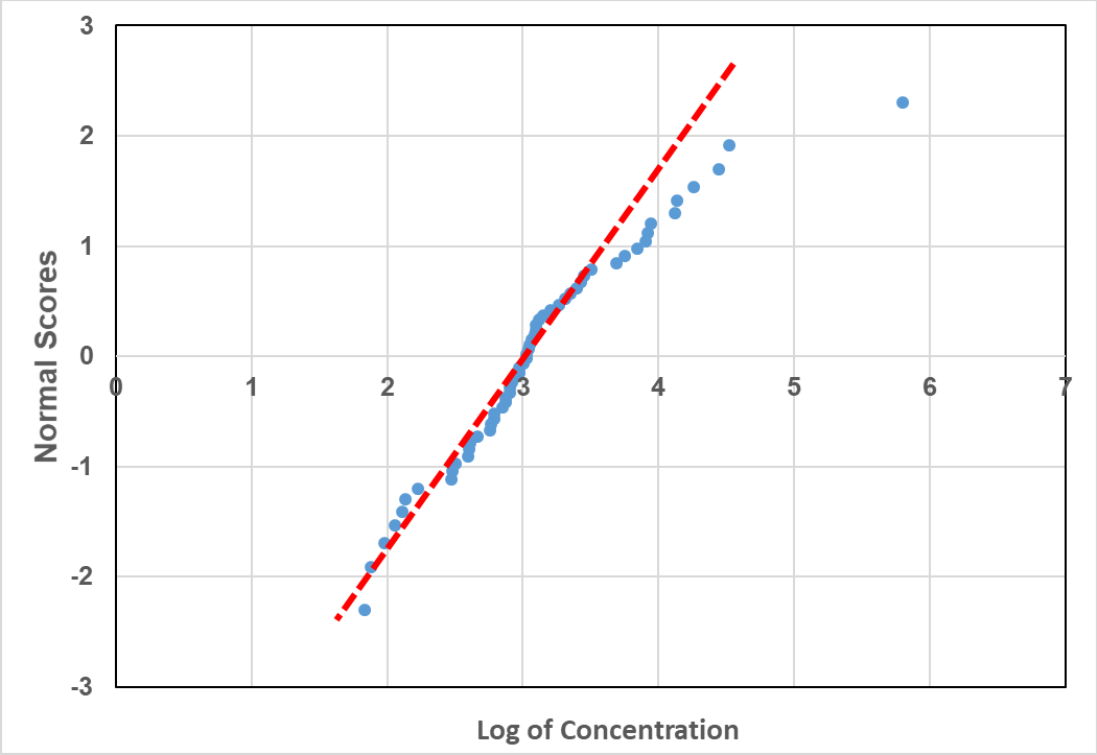
- Examine frequency distribution of available data



What Constitutes a Biofilm Hot Spot?

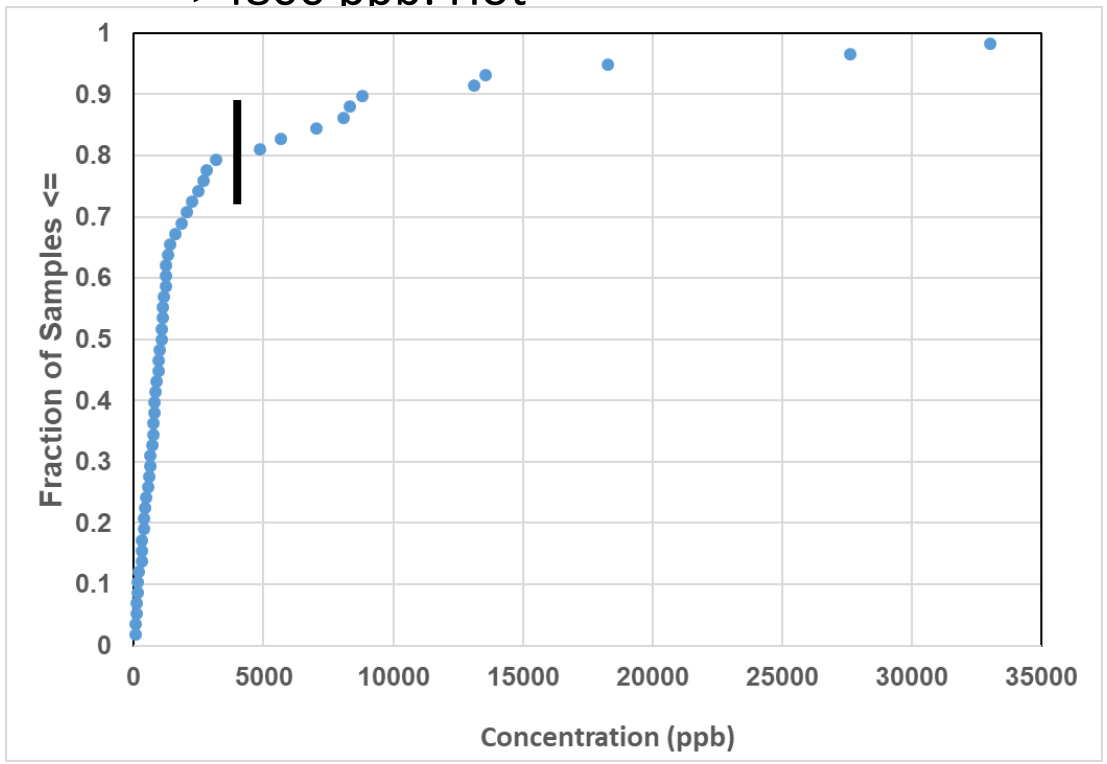
- Examine frequency distribution of available data
  - Define which samples appear to be from a different population

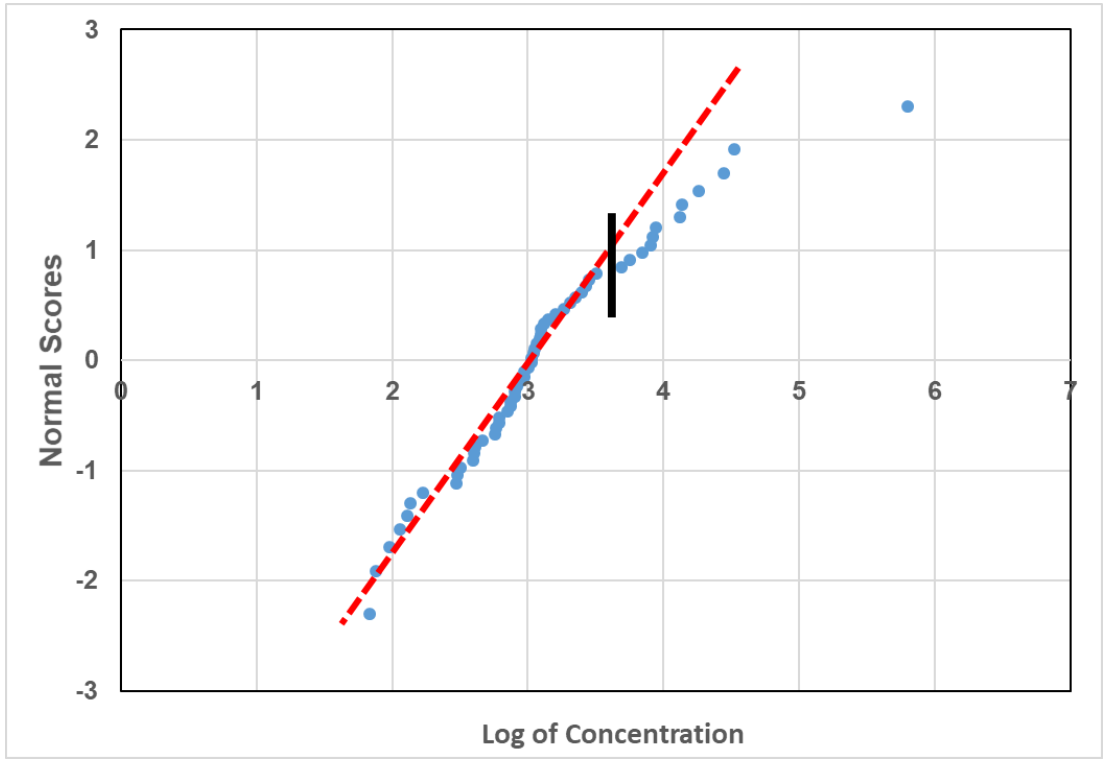




What Constitutes a Biofilm Hot Spot?

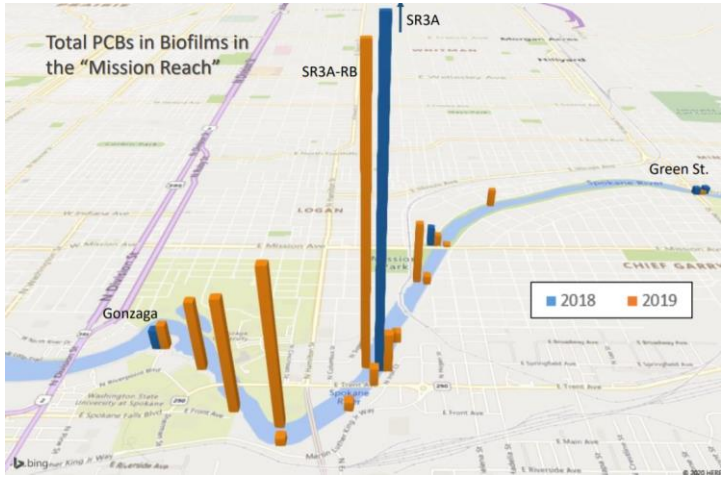
- Examine frequency distribution of available data
  - Define which samples appear to be from a different population
    - <3200 ppb: Not hot
    - >4800 ppb: Hot

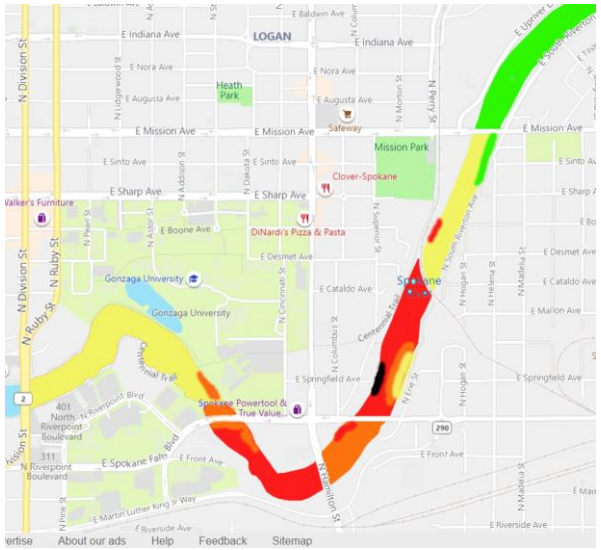




Geostatistics

- Class of statistics used to analyze and predict the values associated with spatial phenomena
  - Practical means to describe spatial patterns and interpolate values for locations where samples were not taken





Areal extent
Mass of PCBs
Potential sampling locations

Geostatistics: Initial findings

- Sufficient number of stations to make credible estimates for biofilm
- Insufficient number of stations to make credible estimates for sediments

Initial Summary

Reach	Biofilm (ppb)	Water Column Mass Balance (mg/day)	Sediment (ppb)	Comments
Upstream of Barker	<200	Negligible	No data	Not a problem.
Barker to Trent	500-1000	~130	14	Contribution of sources up-gradient of Kaiser are being evaluated.
Trent to Upriver Dam	300-1400	Net negative	14	
Upriver Dam to Greene	600-1500*	Net neutral	No data	*Small PCB signal (~2000 ppb) in biofilm near GE site
Greene to USGS Gage	>2000	~40	90-130	Top priority
USGS Gage to Nine Mile	300-700	~40	No data	

Discussion

- Greene St. to USGS Gage (and in particular, “Mission Reach”) clearly appears to be the priority reach
  - All samples characterized at “hot spots” are located here
  - Biofilm and sediment concentration are disproportionately large relative to water column concentration
    - Implies a “bottom-oriented” source
  - Net losing reach for groundwater