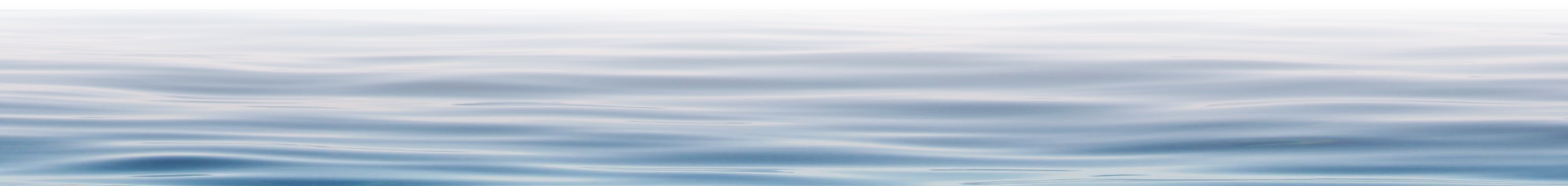


Partitioning Model Between Water Column and Sediments

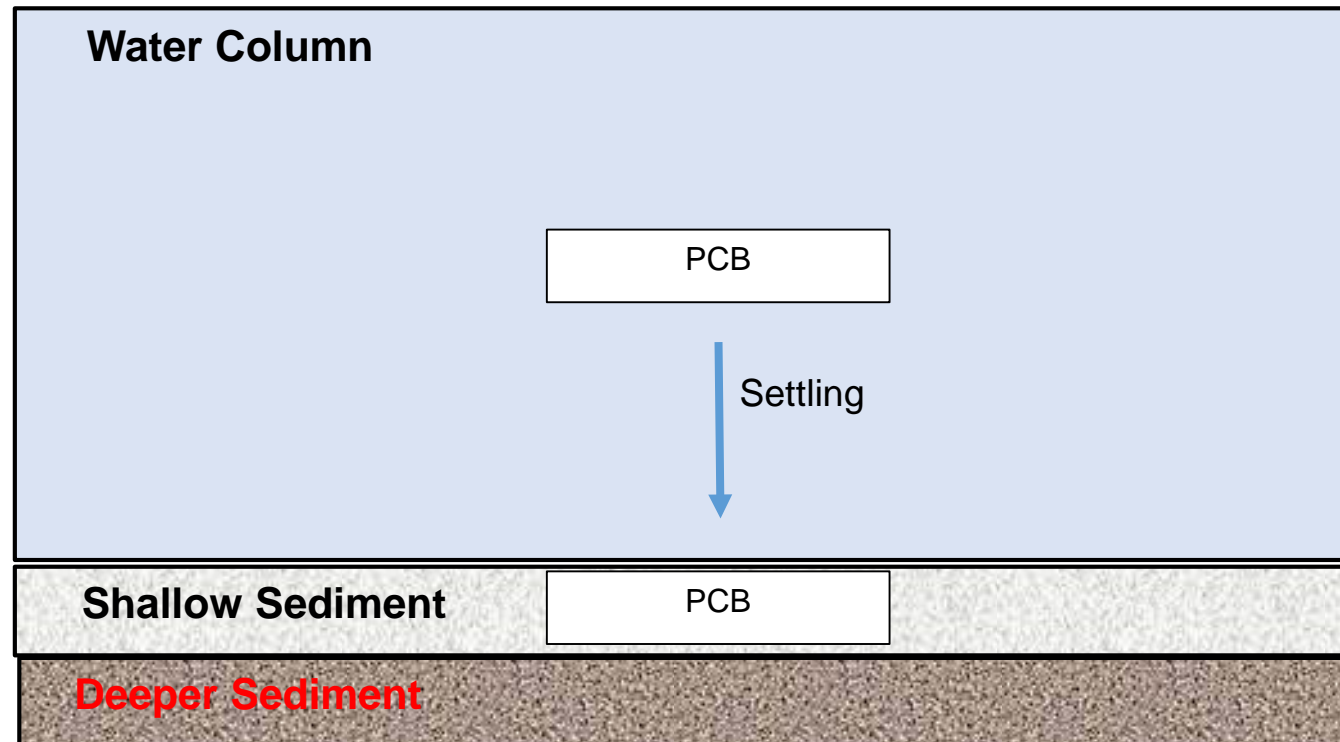


Partitioning Model Objectives

- Estimate expected PCB concentrations in Spokane River bottom sediments, in response to observed water column PCB and particulate organic carbon data
- Potential outcome
 - If water column sources under-predict observed sediment concentrations, provides indirect evidence of an un-accounted for source
- Examine potential for stormwater sources to preferentially contribute to sediment contamination

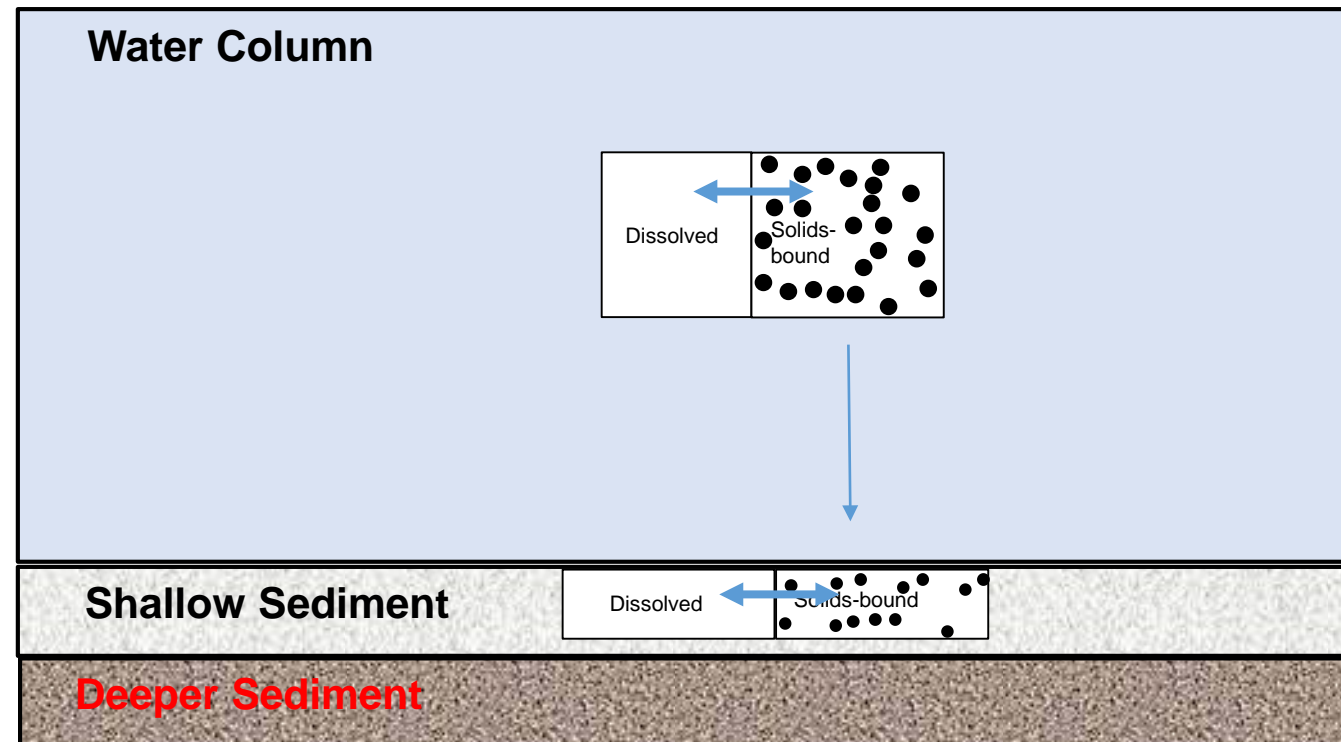
Partitioning Model Approach

- Apply model to estimate sediment PCB concentrations, assuming that they are driven solely by current water column concentrations
- Compare predicted sediment PCB concentration to observations



Partitioning Model Framework

- Assumes PCBs are either dissolved or bound to solids
- Model predicts amount in each phase based upon site-specific data on solids characteristics



Partitioning Model Inputs and Outputs

- Inputs

- Water column

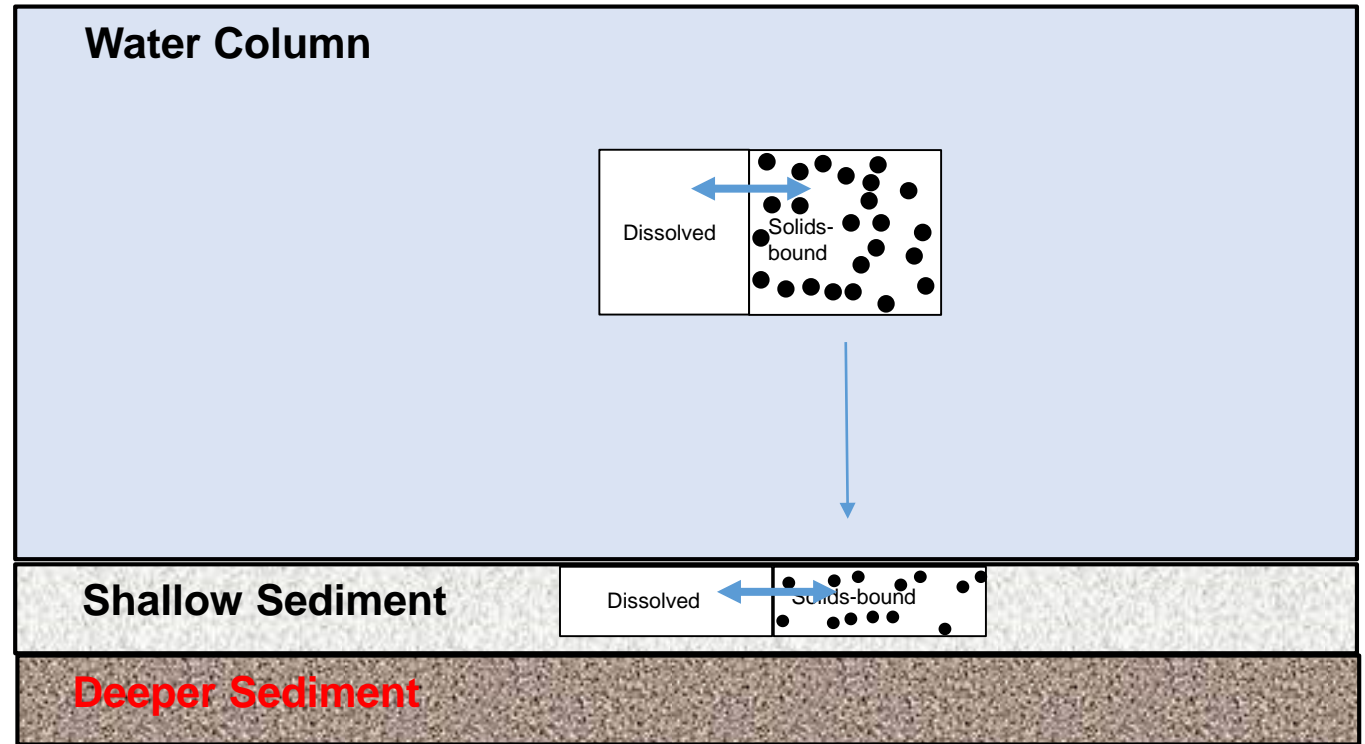
- Total PCB concentration
- Suspended solids
- Particulate organic carbon
- Partition coefficient

- Sediments

- Organic carbon content

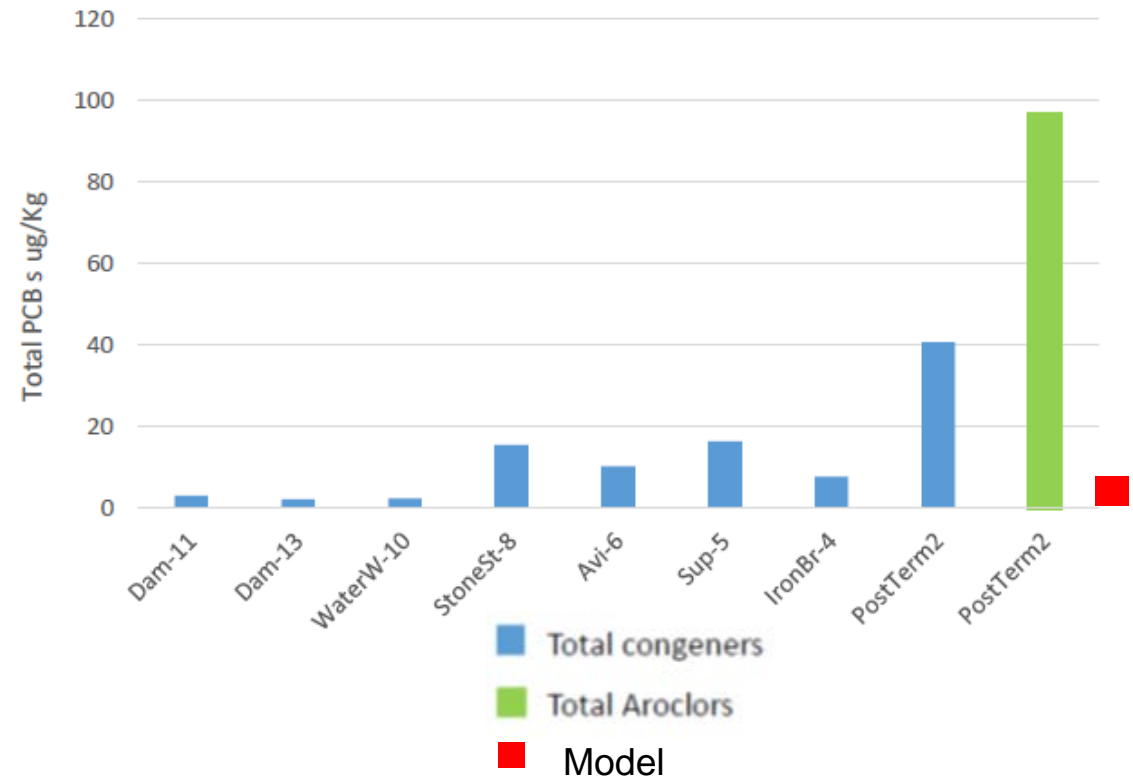
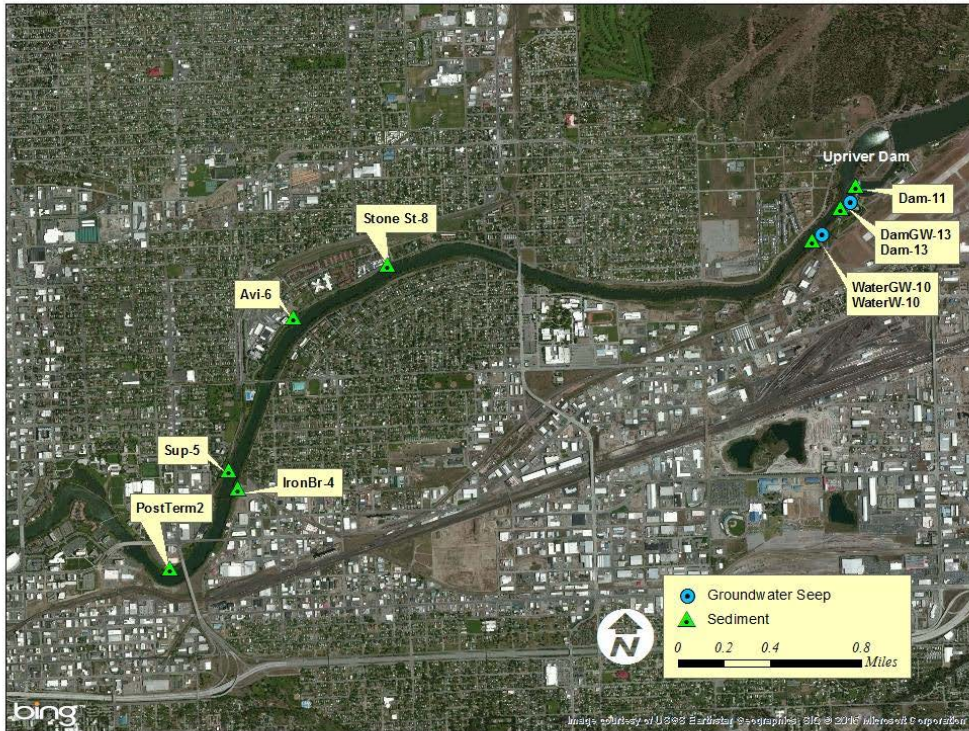
- Outputs

- Solids-bound PCB in water column
- PCB in sediments



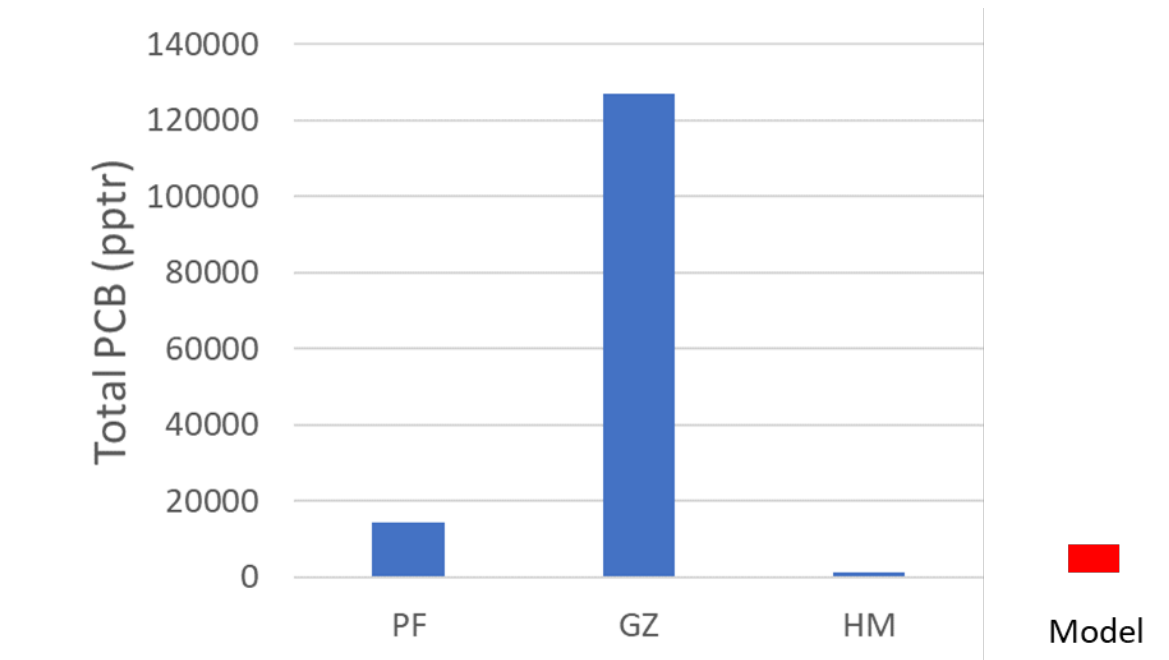
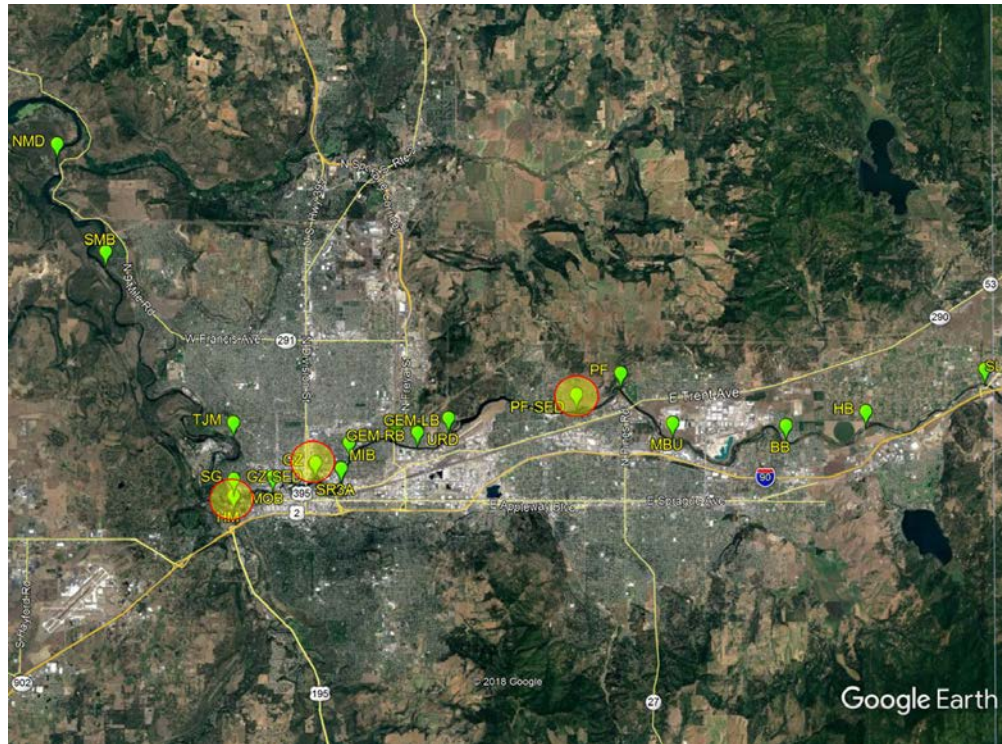
Comparison of Model Predictions to 2013 Urban Waters Sediment Data

- Other than an one observed elevated concentration, model predictions are consistent with observations



Comparison of Model Predictions to 2018 Ecology Sediment Data

- Model is within the range of the observations
 - But the observed range is very large



Partitioning Model: Dry Weather Conclusions

- PCB concentrations in bottom sediments are largely at expected levels
 - Exceptions exist
- How representative are occasional spikes?
 - Tough to say, from limited available data

Wet Weather Considerations

- Could stormwater sources preferentially contribute to sediment contamination?
- Previous analysis considered only dry weather conditions
 - Low PCB and suspended solids concentration
 - Large majority of PCBs in dissolved phase
- Wet weather sources are quite different
 - Higher PCB and suspended solids concentrations
 - More PCBs in solids-bound form
 - Can these settle out and contribute to sediment contamination?

Wet Weather Approach

- Estimate fraction of stormwater solids that settle to bottom prior to Nine Mile Dam
 - Consider range of river flow conditions
 - Affect of flow on river velocity and depth
 - Obtain settling velocities from CE-QUAL-W2 water quality model

Wet Weather Model Inputs

- Flow conditions considered
 - Summer low flow
 - Fall/winter moderate flow
 - Spring high flow

- Hydraulic inputs

Period	Flow	Time of Passage (days)
Summer low flow	1246	2.51
Fall/winter moderate flow	3000	0.75
Spring high flow	10,000	0.23

- Settling velocities
 - Inorganic solids 1.5 m/d
 - Particulate organic matter 0.1 m/d

Wet Weather Model Results

- Percent of stormwater solids expected to settle to bottom by Nine Mile
 - Most solids expected to be transported downstream, except for denser particles during lower river flow

Period	Inorganic	Organic
Summer low flow	56%	5%
Fall/winter moderate flow	21%	2%
Spring high flow	6%	0%