Summary of Ambient Data from Mission Reach

SRRTTF-TTWG Data Synthesis Workshop

January 31, 2022

Objective

- Summarize what the available data tell us about PCB concentrations in the Mission Reach
- Help inform identification of unknown PCB source(s)

Studies Considered

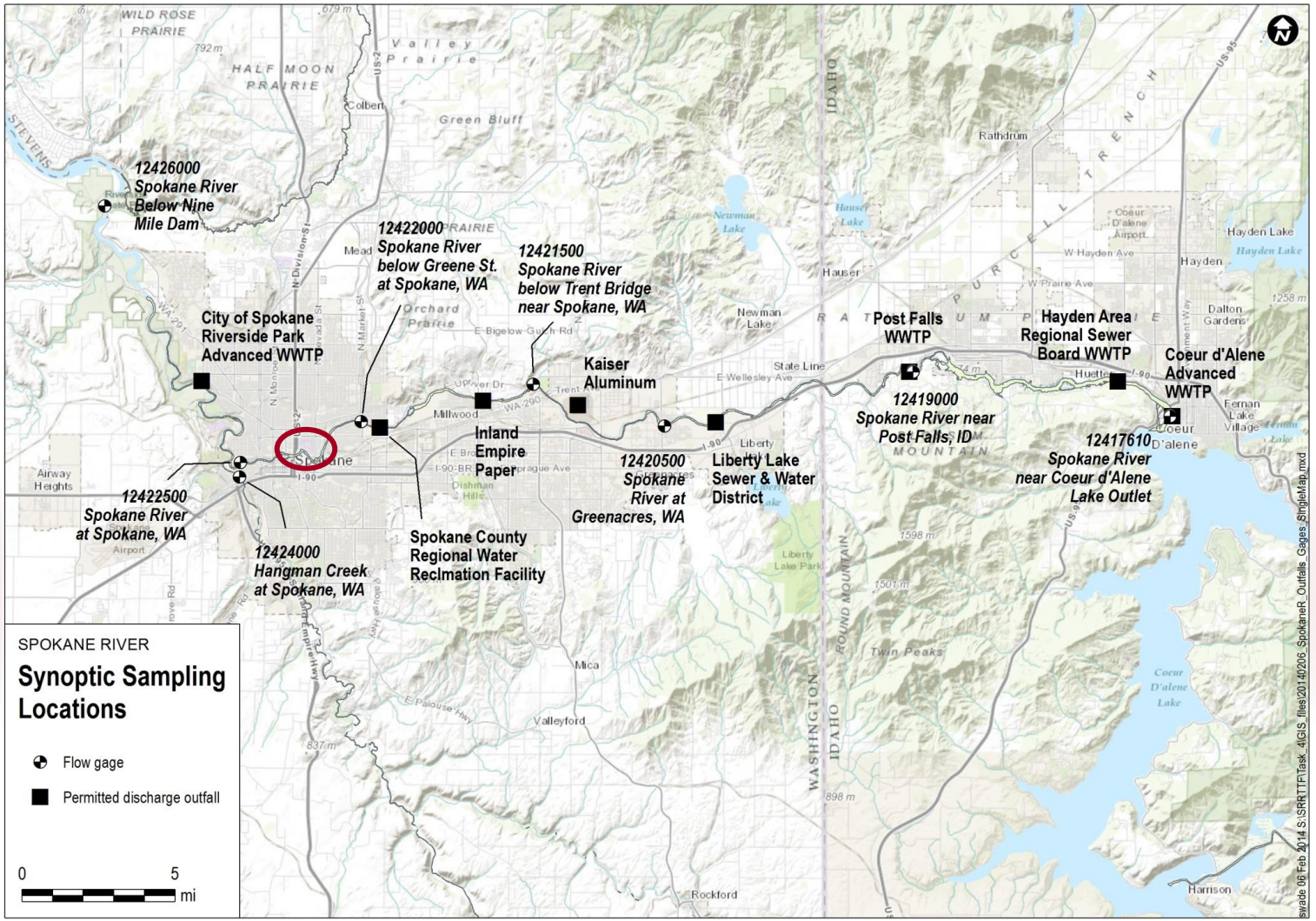
- Water Column
  - SRRTTF: 2014, 2015, 2018, 2020, 2021
- Sediments
  - Ecology: 2013, 2018
  - SRRTTF: 2020, 2021
- Biofilm
  - Ecology: 2018, 2019
- Fish
  - Ecology: 2005, 2012
  - SRRTTF/WDFW: 2020

SRRTTF Water Column Studies

- Grab sampling efforts
  - Intensive surveys over 1-2 weeks during summer low flow
    - Did not sample in Mission Reach
    - Did sample areas immediately upstream and downstream of Mission Reach
  - 2021 Mission Reach-focused sampling
- One year of SPMD monitoring
  - Three month-long deployments in 2020-2021
  - One station located in Mission Reach
  - Intended for trend analysis

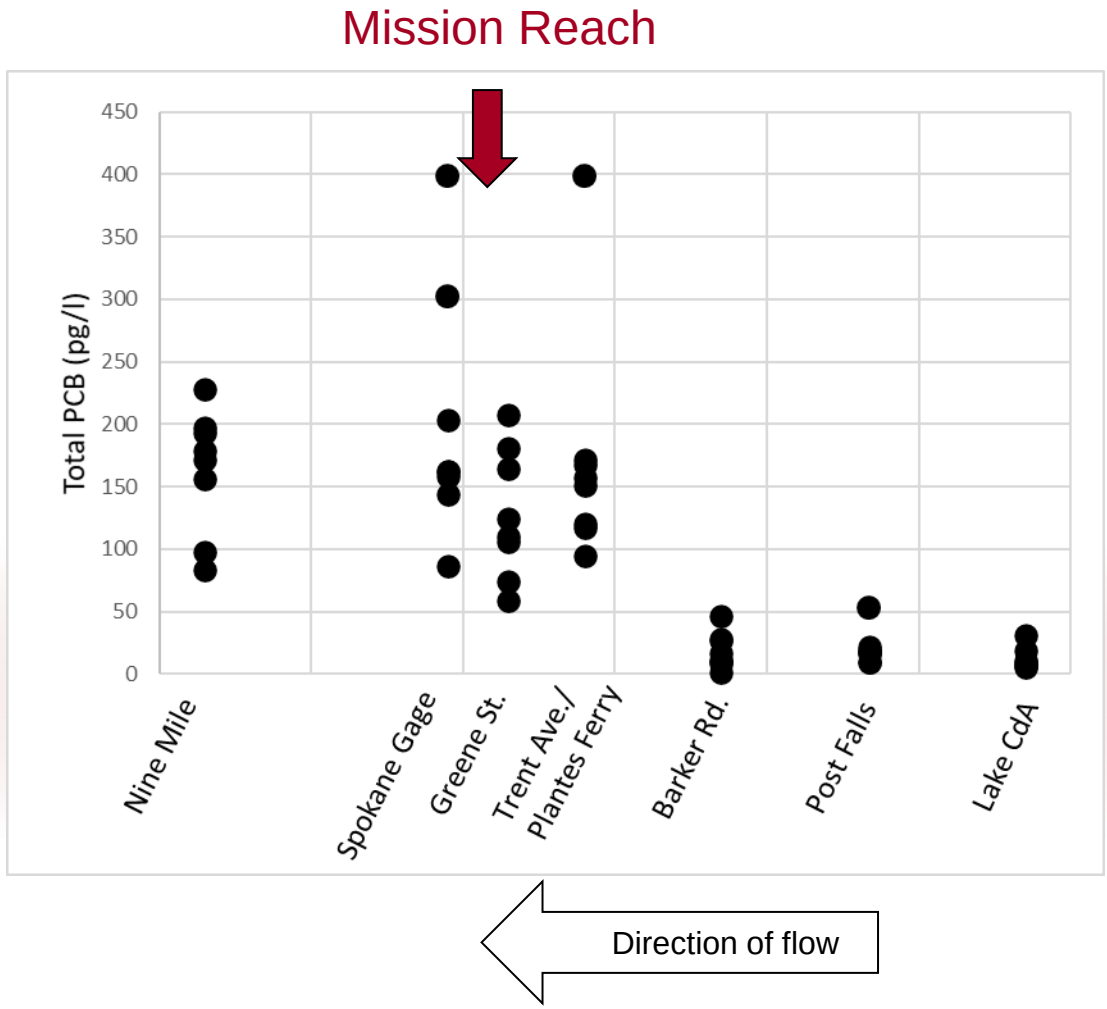
Water Column: SRRTTF, 2014

- August 12-24
- Seven river locations
  - None focused on Mission Reach (⬭)



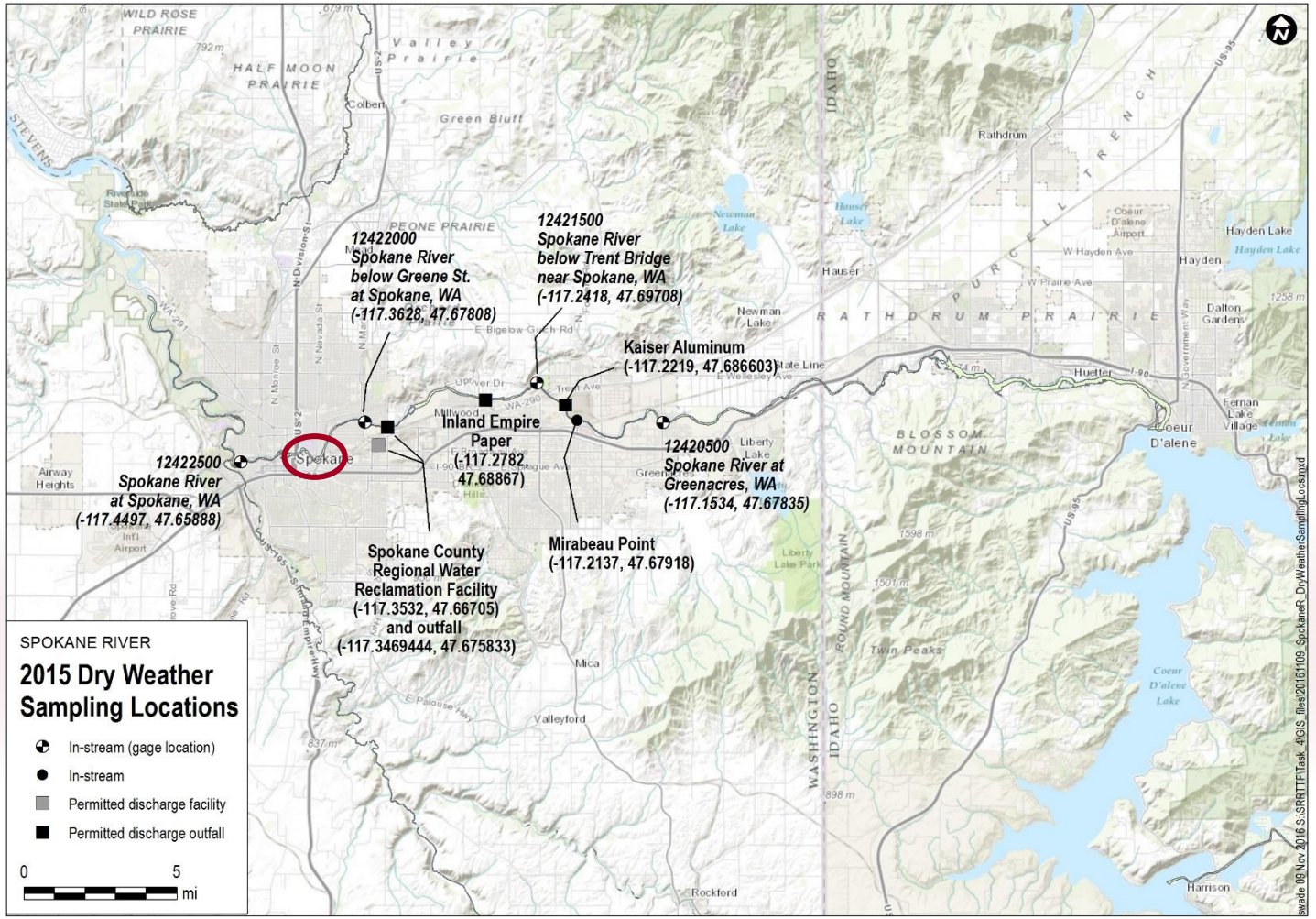
Water Column: SRRTTF, 2014

- No noticeable increase in median concentrations between Greene St. and Spokane Gage



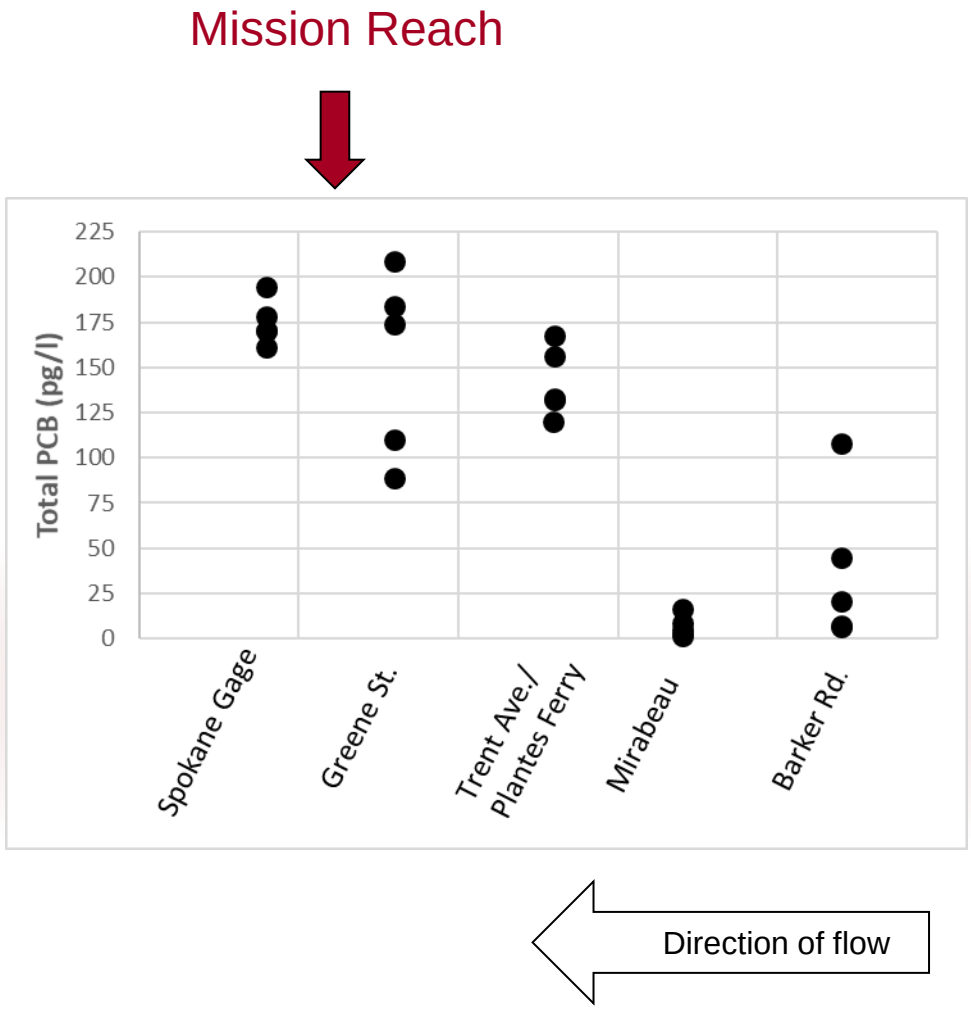
Water Column: SRRTTF, 2015

- August 18-22
- Five river locations
  - None focused on Mission Reach (⬭)



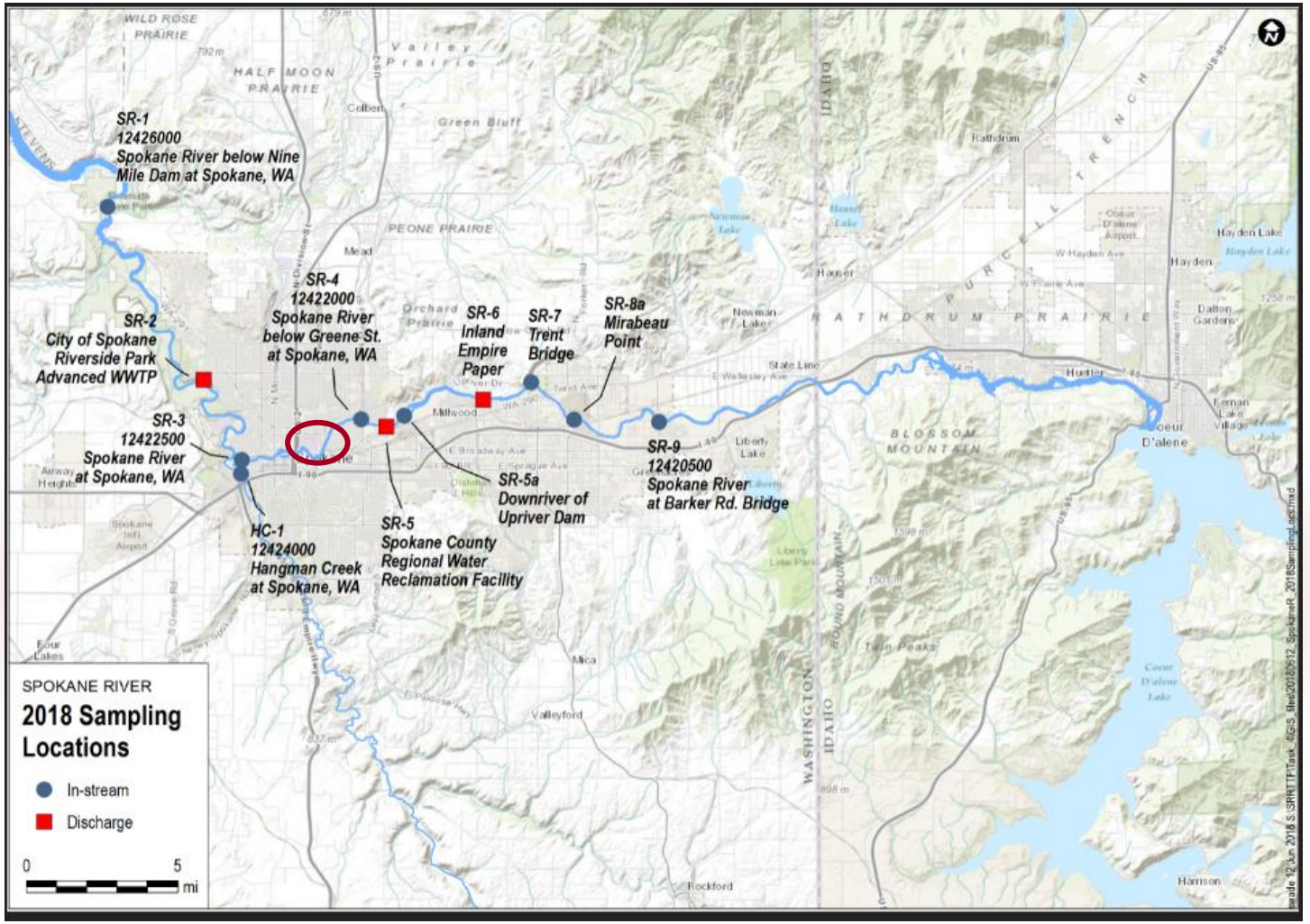
Water: SRRTTF, 2015

- No noticeable increase in concentrations between Greene St. and Spokane Gage



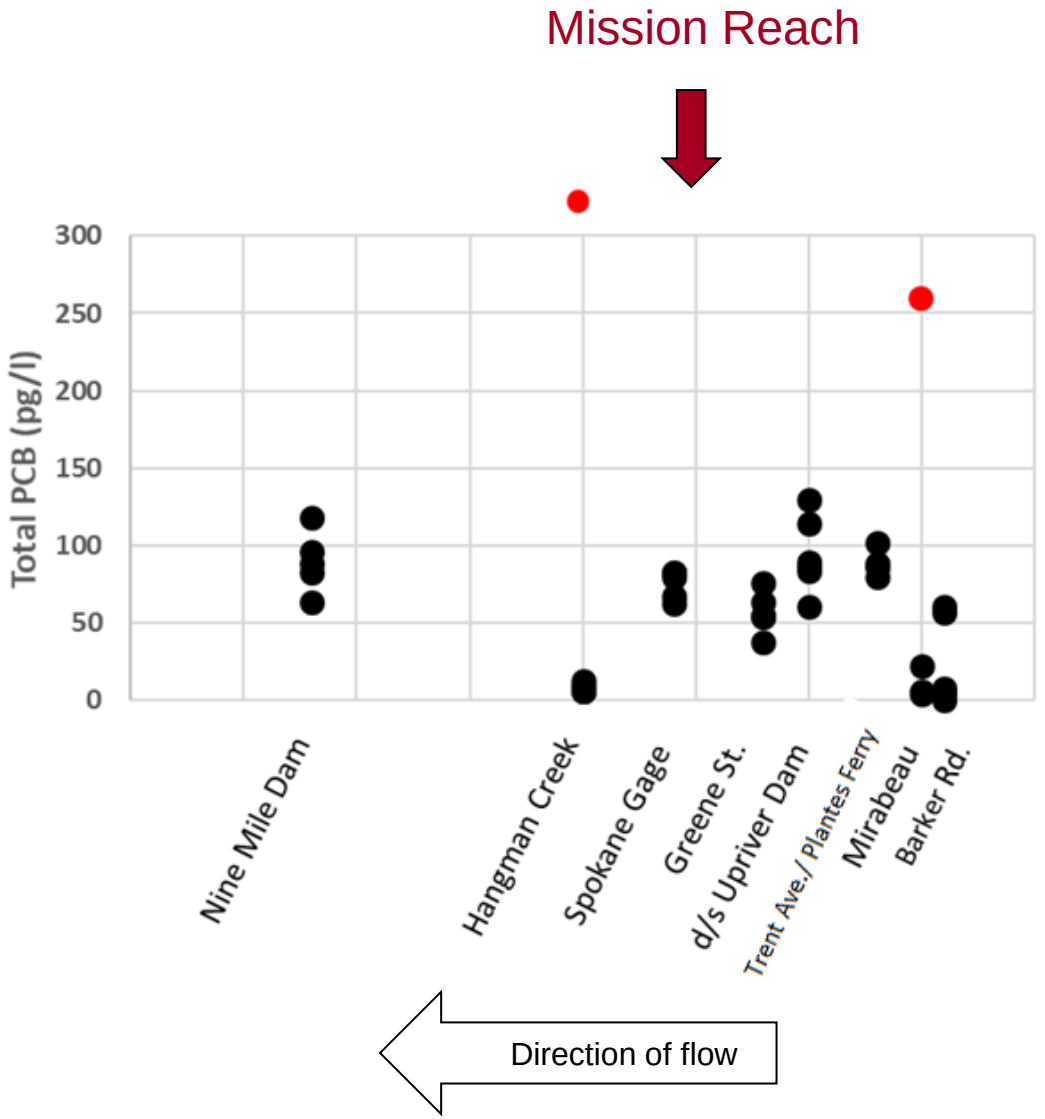
Water Column: SRRTTF, 2018

- August 4-8
- Seven river locations
  - None focused on Mission Reach (⬭)



Water Column: SRRTTF, 2018

- No noticeable increase in concentrations between Greene St. and Spokane Gage



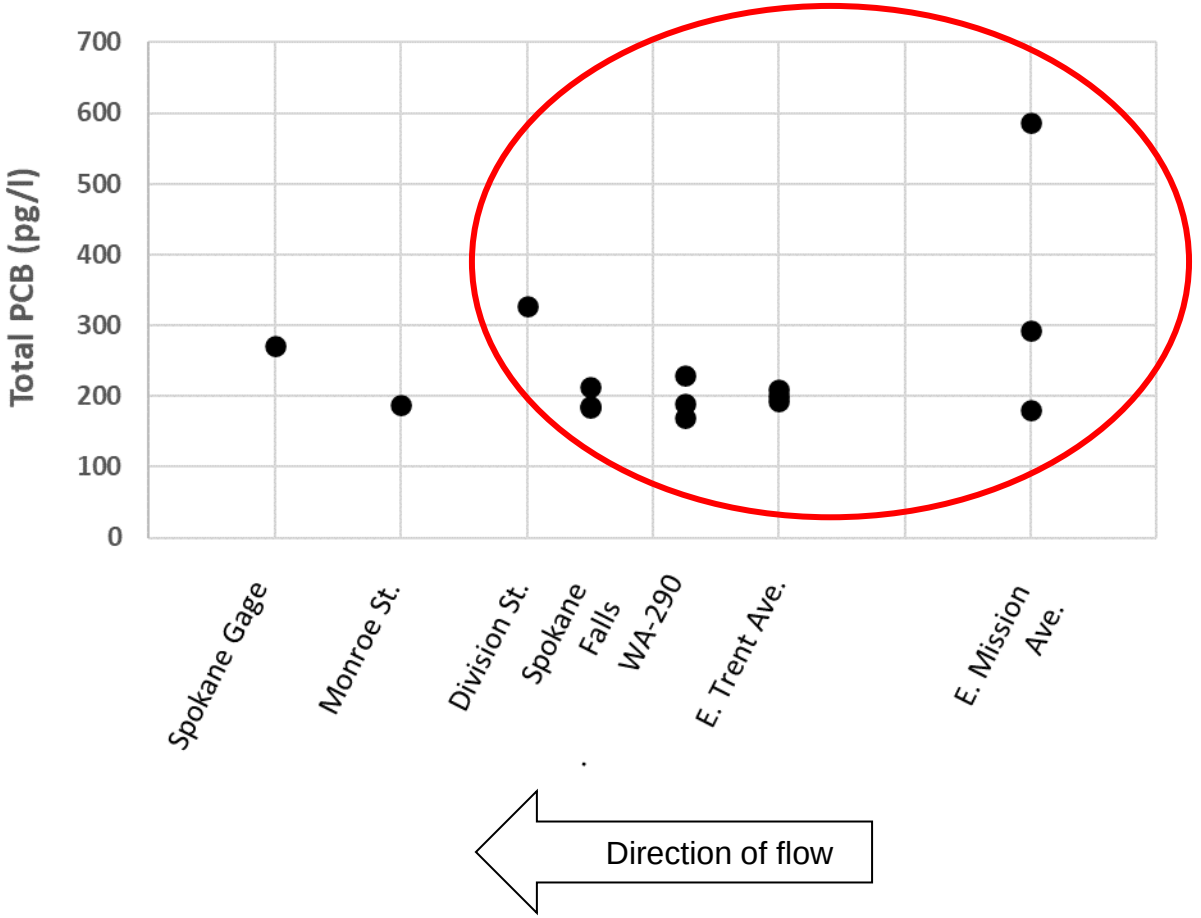
Water Column: SRRTTF, 2021

- September 7-8, 2021
- Seven river locations
  - Focused on Mission Reach and downstream areas

Direction of flow

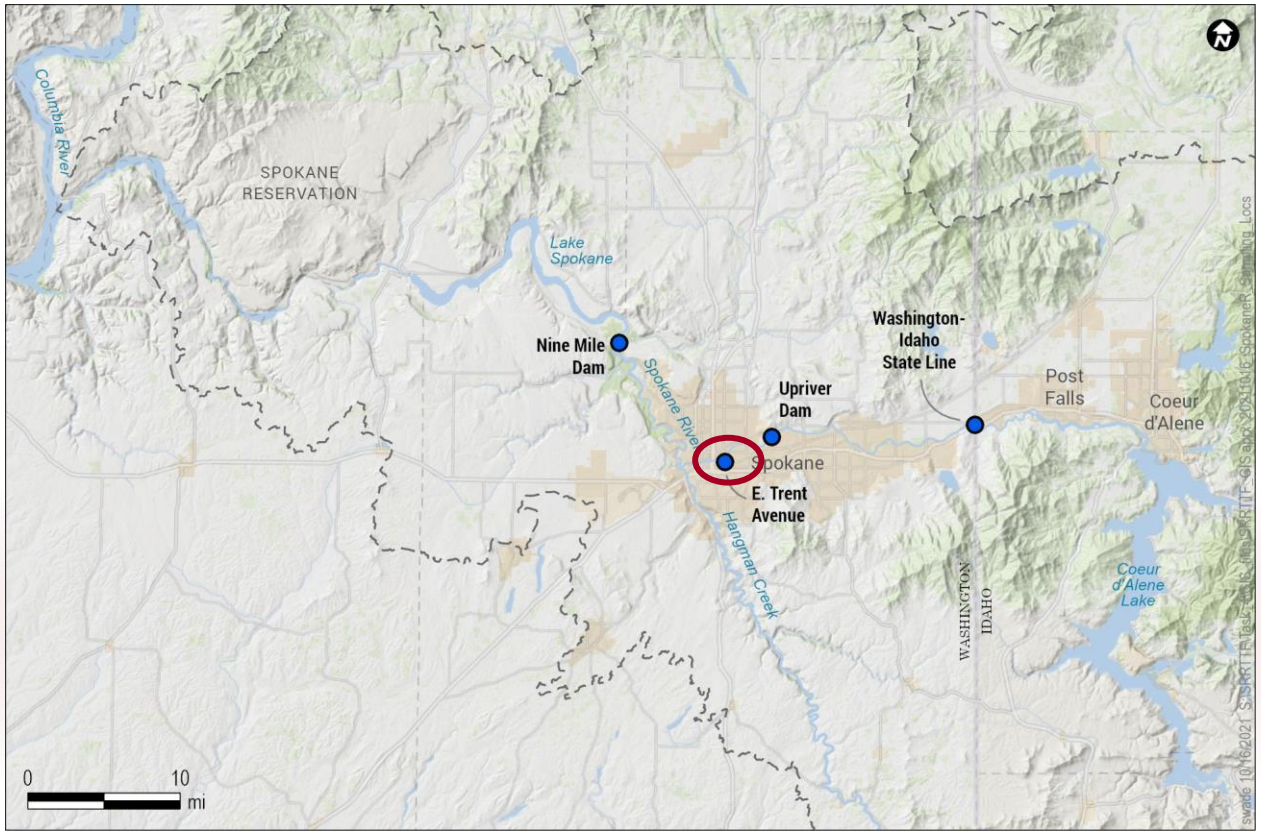
Water Column: SRRTTF, 2021

- No noticeable increase in concentrations as river passes through Mission Reach
  - One elevated concentration at upstream end of Mission Reach (left bank)



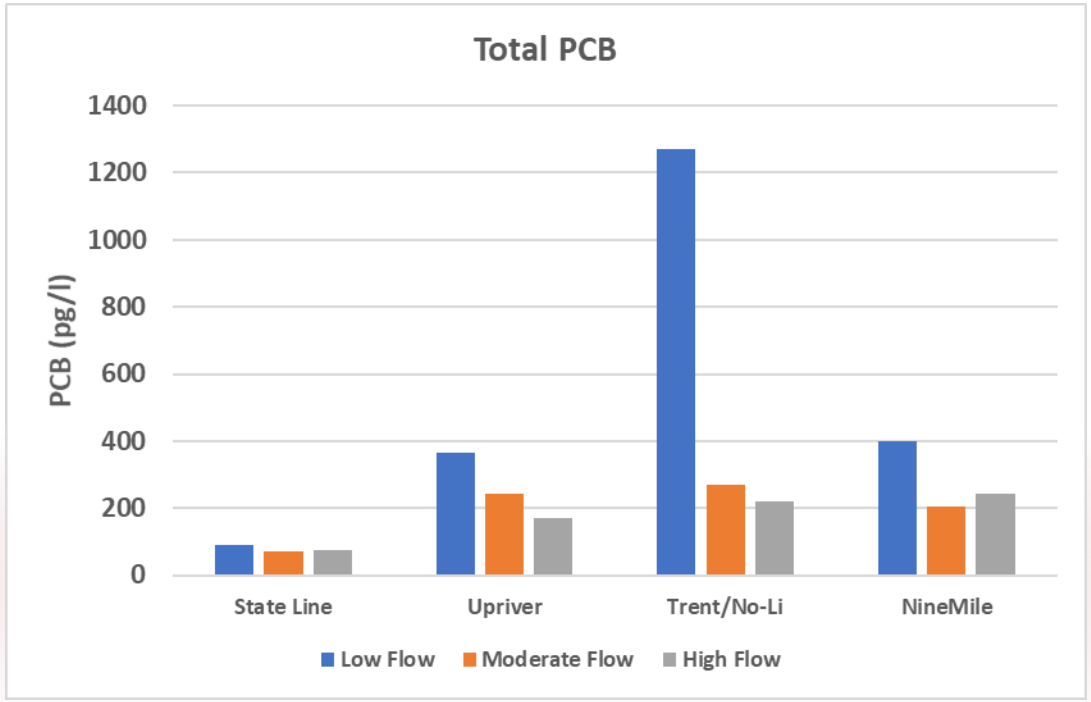
Water Column: SRRTTF, 2020-2021

- Samples collected via semi-permeable membrane devices (SPMDs) for trend analysis
- Four locations
  - E. Trent Avenue station, located at No-Li brewing, selected to represent Mission Reach (⬭)
- Three deployment periods
  - Low flow (Aug/Sept 2020)
  - Moderate flow (Feb/Mar 2021)
  - High flow (Apr/May 2021)



Water Column: SRRTTF, 2021

- Elevated concentration observed in Mission Reach during low flow condition
  - Unclear how representative this sample is of river conditions as a whole



Direction of flow

Water Column Summary

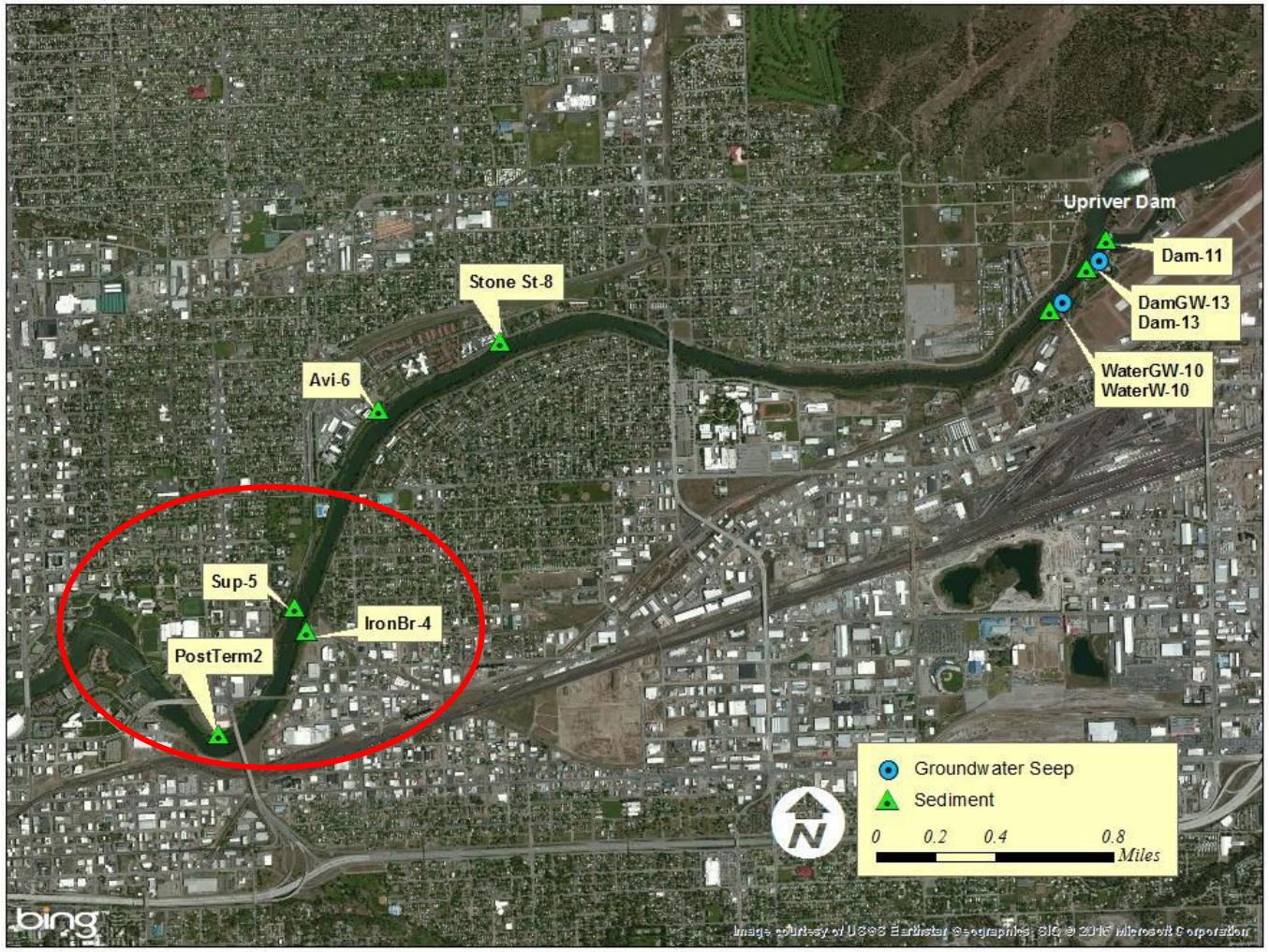
- Grab samples show little evidence of an unknown PCB source in Mission Reach
  - Synoptic surveys show no discernable increase in PCB concentration between Greene St. and Spokane Gage
  - Mission Reach-focused grab samples show no increase in PCB concentration over the length of the reach
- SPMD samples show elevated PCB concentration in Mission Reach during low flow condition

Sediments

- Four separate sampling efforts
  - Ecology: 2013
  - Ecology: 2018
  - SRRTTF: 2020, 2021

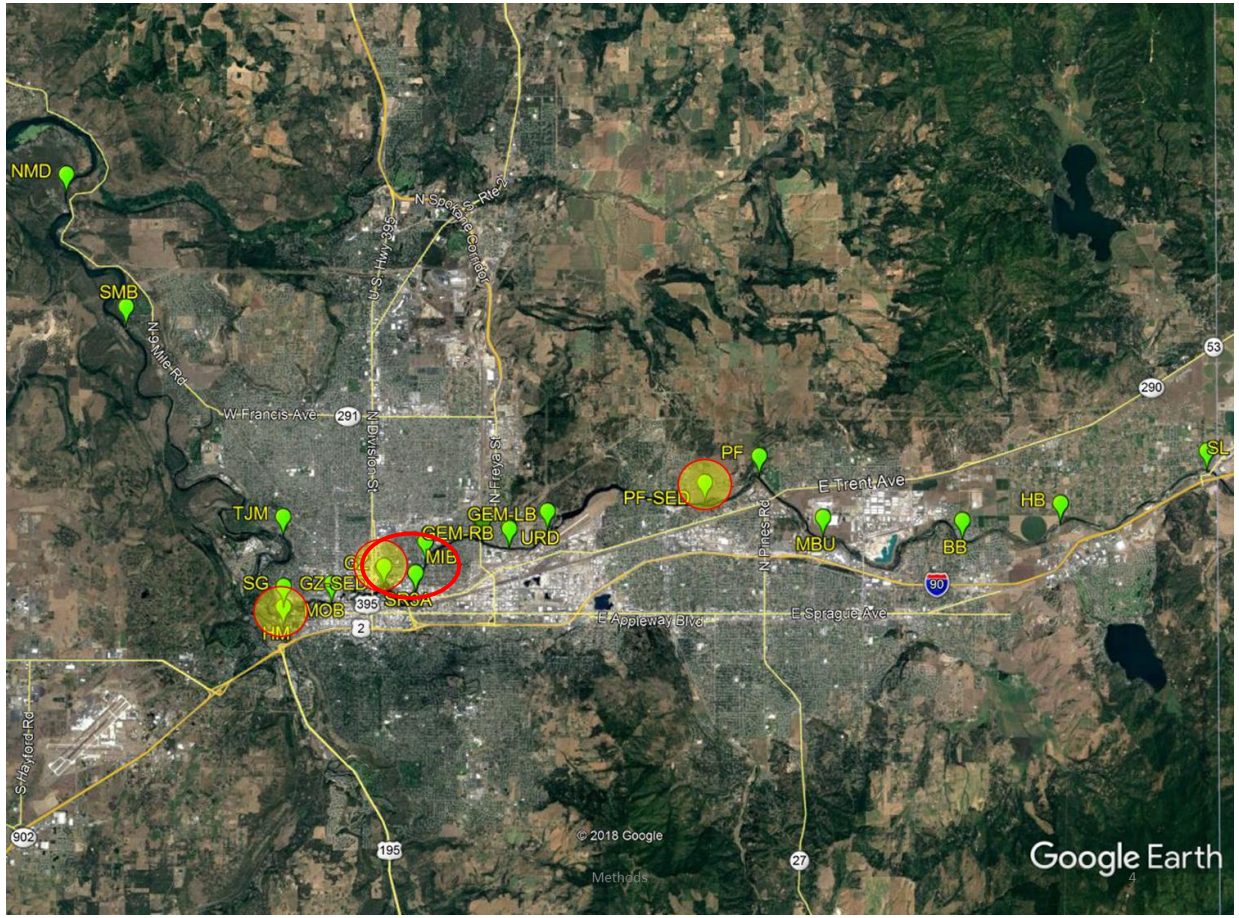
Sediments: Ecology, 2013

- Samples collected by Ecology Urban Waters Program at eight locations in Mission Reach and upstream



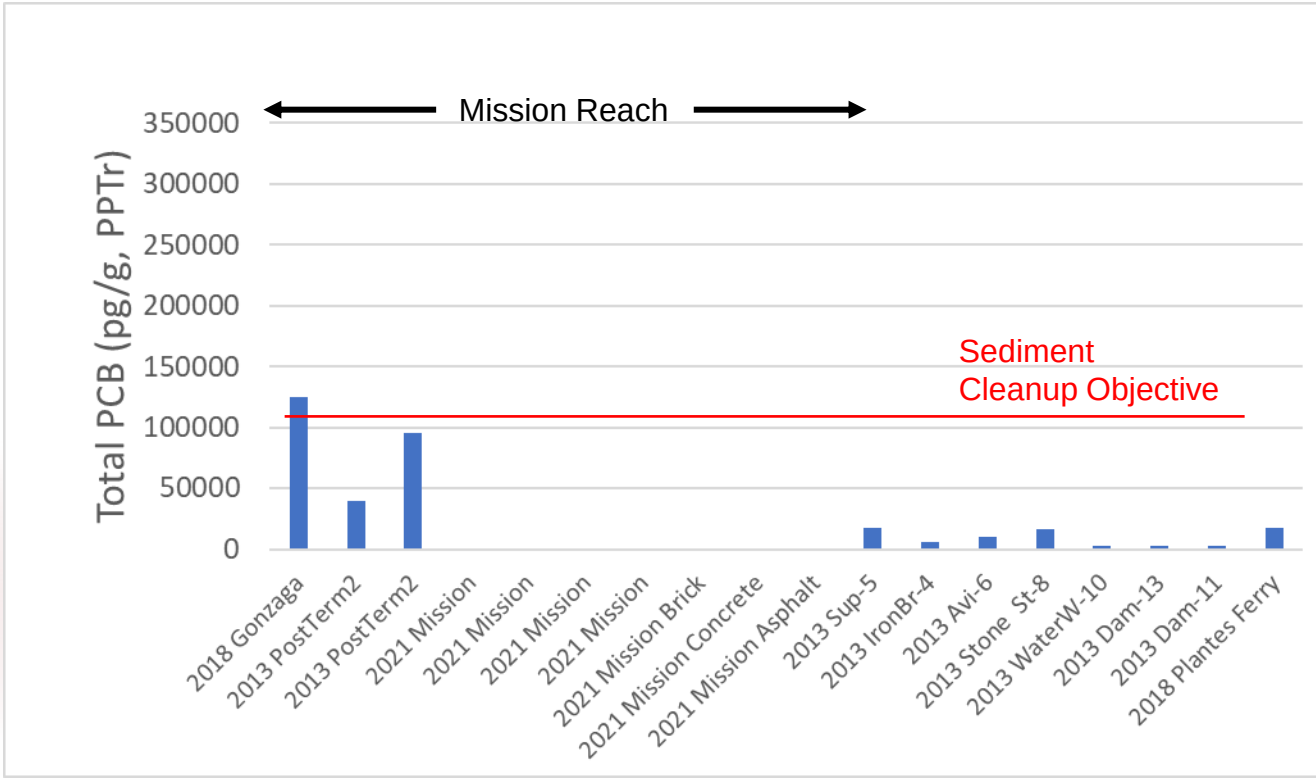
Sediments: Ecology, 2018

- EAP measured PCBs in sediment at two Spokane River sites plus Latah Ck.
  - One site (Gonzaga) in Mission Reach



2013-2018 Sediment PCB Concentrations Across Studies

- PCB concentrations are higher in Mission Reach than upstream
- Large variability in concentration across Mission Reach sites
- Concentration at Gonzaga site in 2018 exceeds Sediment Cleanup Objective



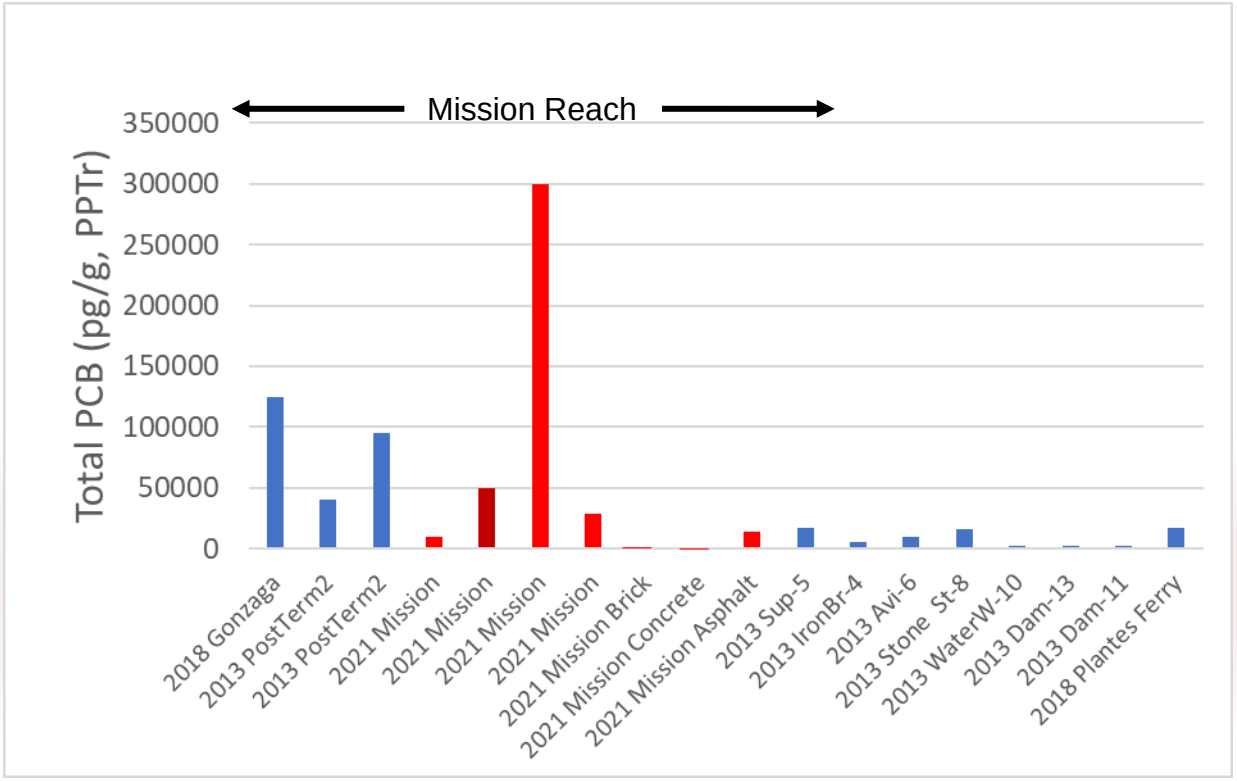
Direction of flow

SRRTTF, 2021

- Two separate efforts focusing on Mission Reach
  - PCBs in artificial fill material (concrete, brick, and asphalt) in March
  - PCBs in naturally occurring sediment in September

Observed Sediment PCB Concentrations in 2021 Studies

- Highest recently observed concentration seen (left bank)
- Large variability in concentration across Mission Reach sites
- PCB concentration in artificial fill is at or below background levels



Sediment Summary

- PCB concentrations are higher in Mission Reach sediments than at upstream sites
- Large variability in concentration across Mission Reach sites
- From limited sampling, artificial fill doesn’t seem to be the cause

Biofilm

Brandee Era-Miller
Ecology EAP

Fish

- Three “recent” sampling efforts
  - Ecology, 2005
  - Ecology, 2012
  - SRRTTF/WDFW, 2020

Fish: Ecology, 2005

- Four fish species from six reaches along the Spokane River
  - Four reaches with our study area
- Mission Park segment corresponds to Mission Reach

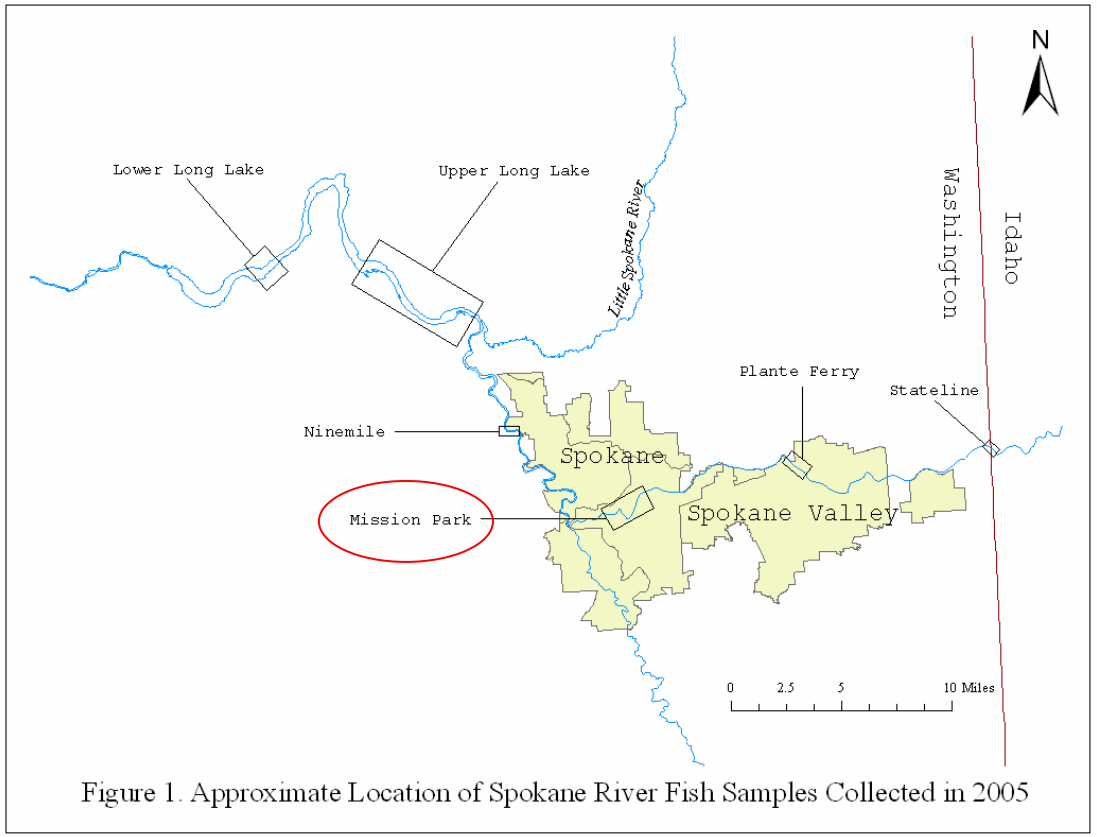
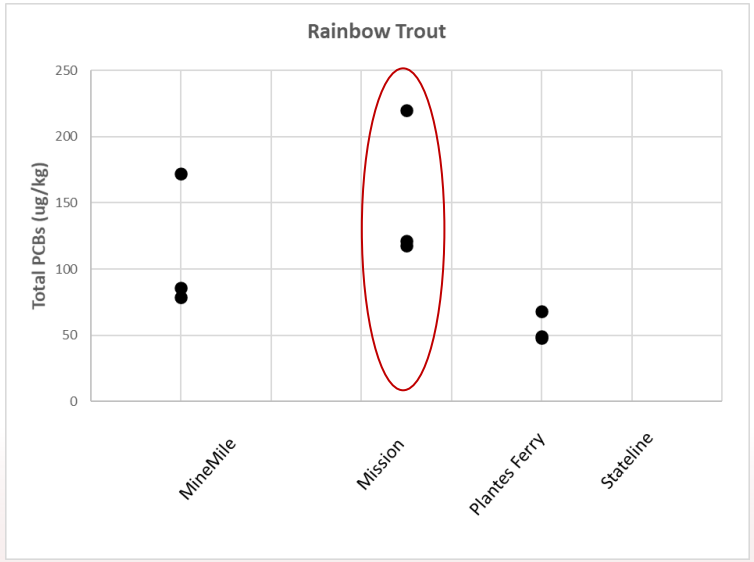
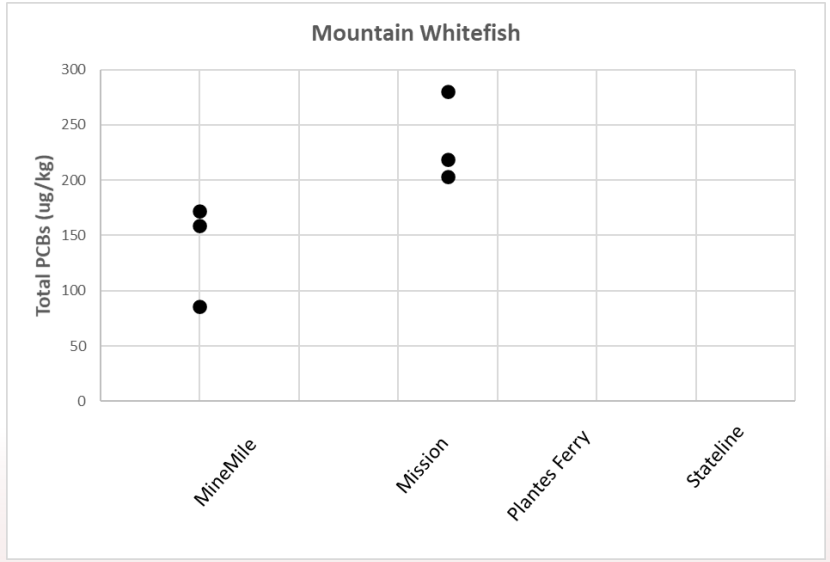


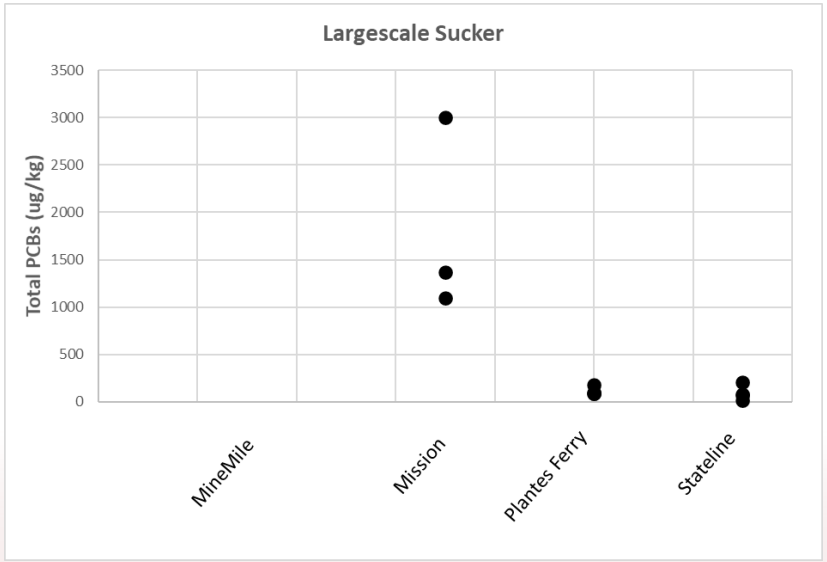
Figure 1. Approximate Location of Spokane River Fish Samples Collected in 2005

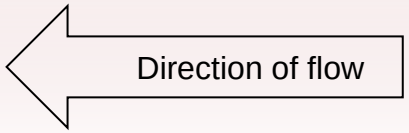
Fish: Ecology, 2005

- Results







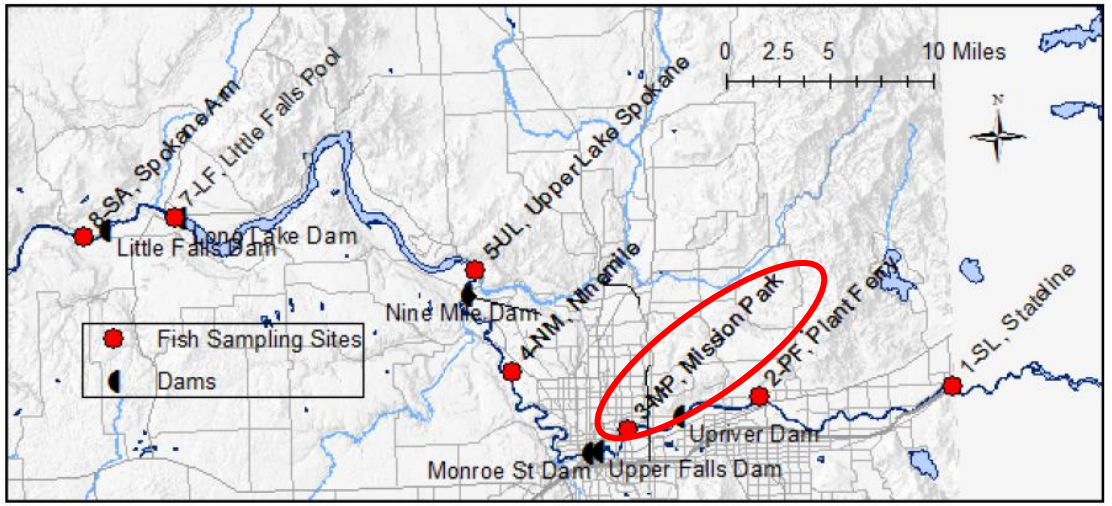


- Comparison between reaches
  - No statistical comparison conducted, but PCBs in mountain whitefish and largescale sucker were noticeably higher in Mission Reach than elsewhere

Fish: Ecology, 2012

- Four fish species from four locations in the Task Force study area
  - Mission Park segment corresponds to Mission Reach
  - Three to seven samples collected across species

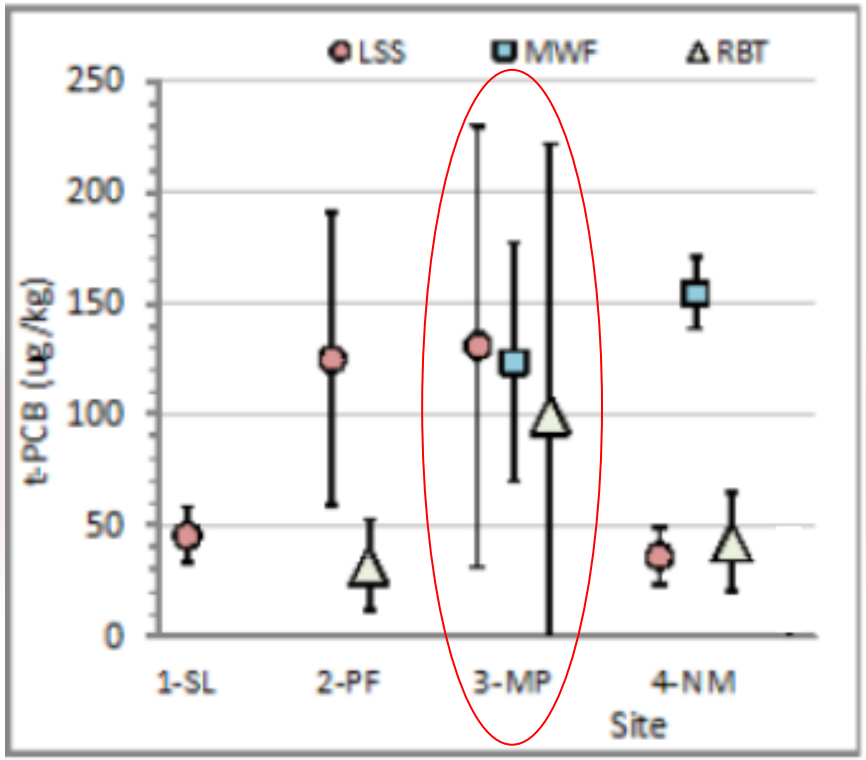
Sample Location	LSS	RBT	MWF
Spokane River			
Stateline (1-SL)	7		
Plante Ferry to Upriver Dam (2-PF)	7	3	
Mission Park (3-MP)	7	3	5
Ninemile Dam, upstream (4-NM)	7	3	7



- LSS = Largescale sucker
- RBT = Rainbow trout
- MWF = Mountain whitefish

Fish: Ecology, 2012

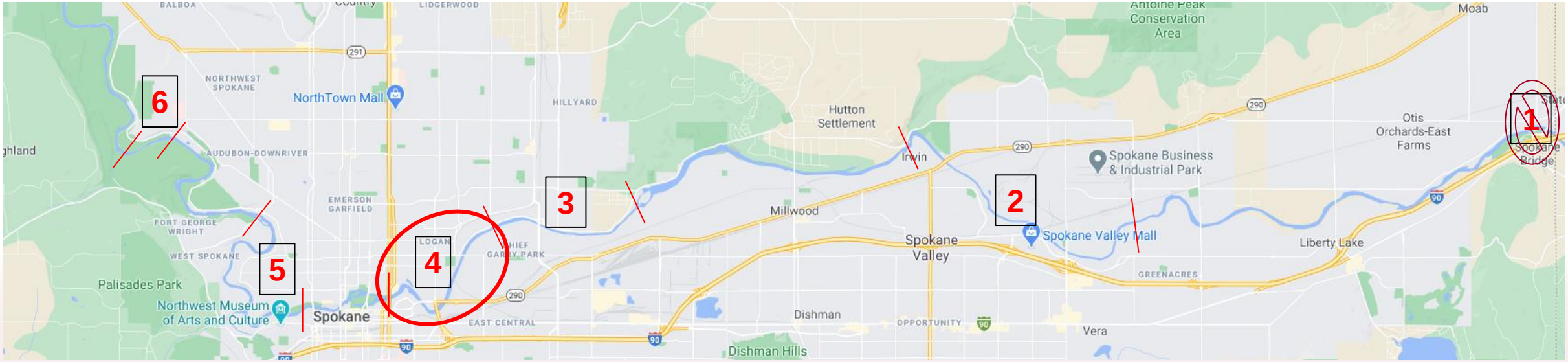
- Results



- Statistical comparisons of Mission Reach concentrations to other reaches
  - Largescale sucker
    - Greater than Stateline and Nine Mile
    - Similar to Plante's Ferry
  - Mountain whitefish
    - Similar to NineMile
  - Rainbow Trout
    - Greater than Plante's Ferry
    - Similar to Nine Mile

Fish: SRRTTF/WDFW, 2020

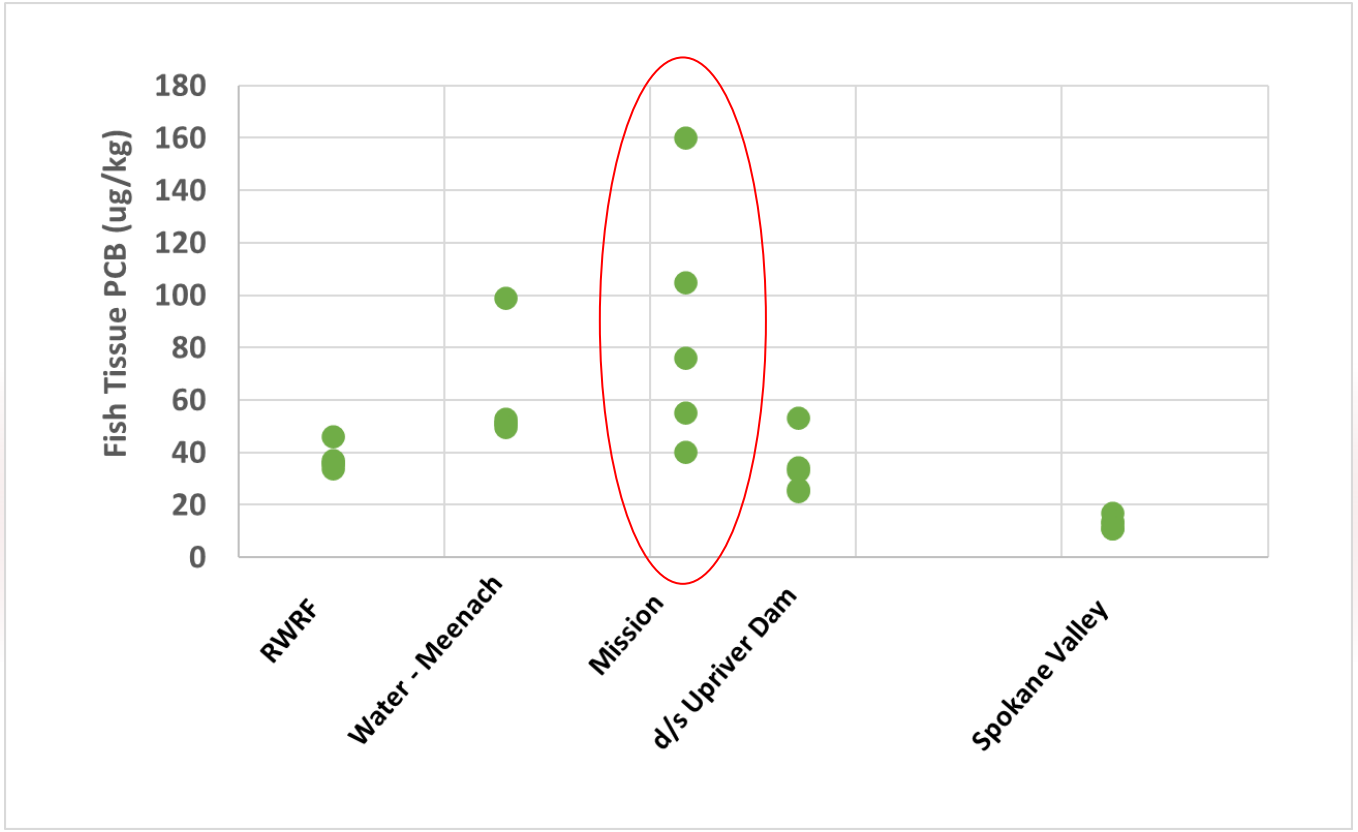
- Year old Rainbow Trout collected from five reaches



1. State Line
   - Insufficient numbers of fish available
2. Spokane Valley
3. Downstream of Upriver Dam
4. Crestline Street to Division Street (Mission Reach)
5. Water St. to TJ Meenach
6. RWRF to the kayak takeout site

Fish: WDFW, 2020

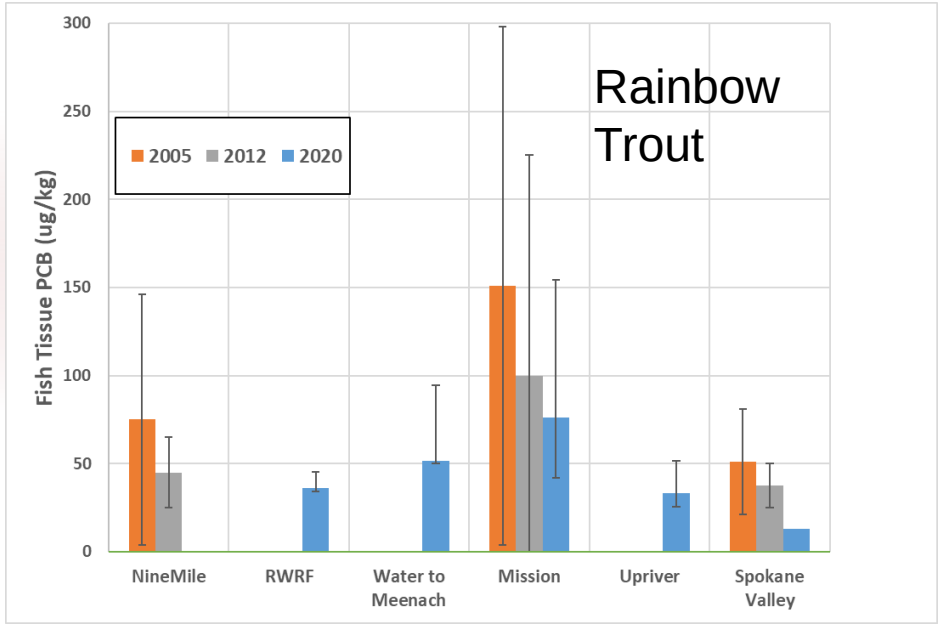
- Results



- Statistical comparisons of Mission Reach concentrations to other reaches
  - Greater than Spokane Valley, Upriver Dam, and RWRF
  - Similar to Water-Meenach

Temporal Trends in Mission Reach Fish

- Between 2005 and 2012
  - Significant decrease in PCB concentrations in Mountain Whitefish and Largescale Sucker
  - No significant trend in PCB concentrations in Rainbow Trout
- 2020
  - Statistical comparison not applicable due to difference in age class of fish and sampling methodology
  - Decreasing trend in concentration appears to be occurring



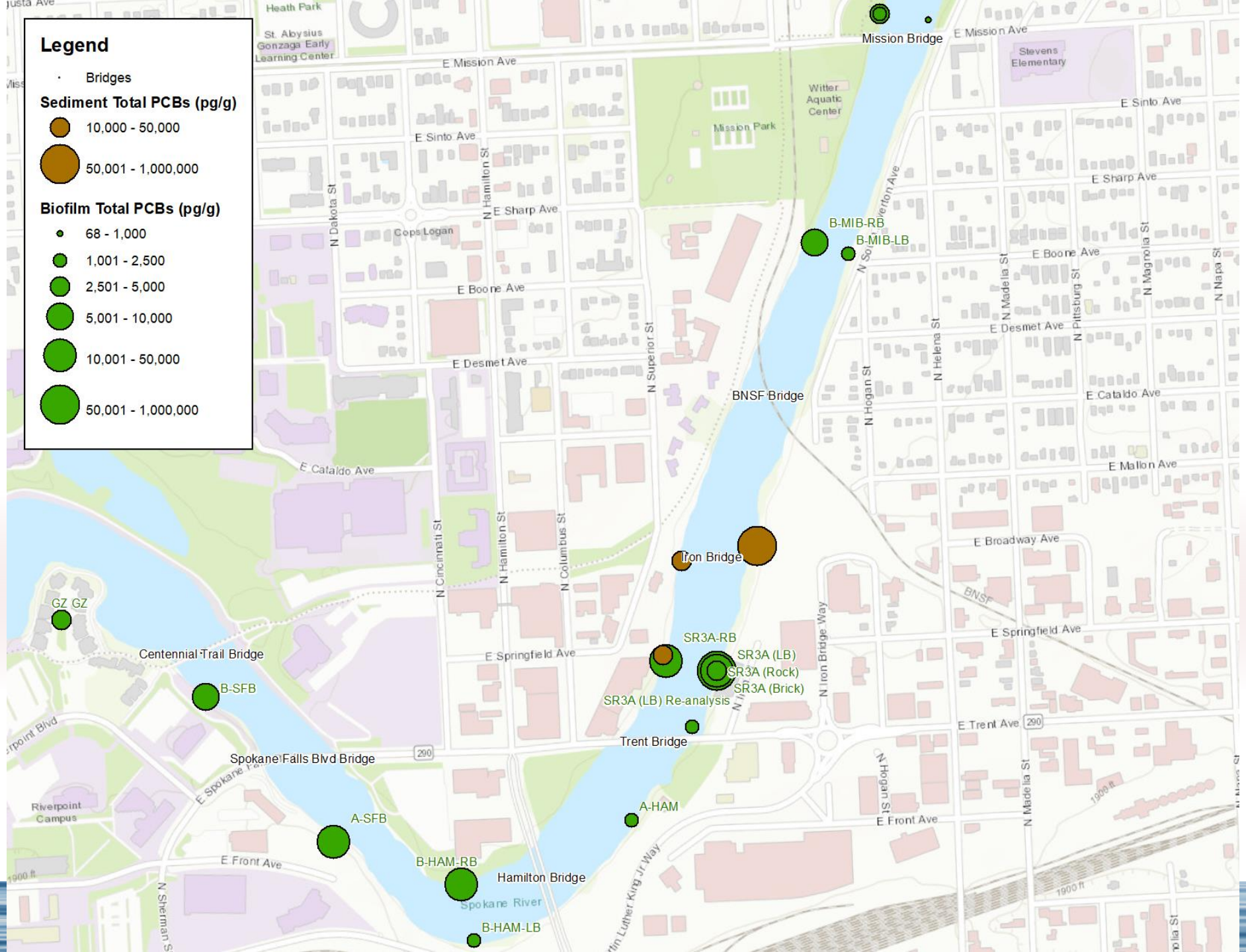
Fish Summary

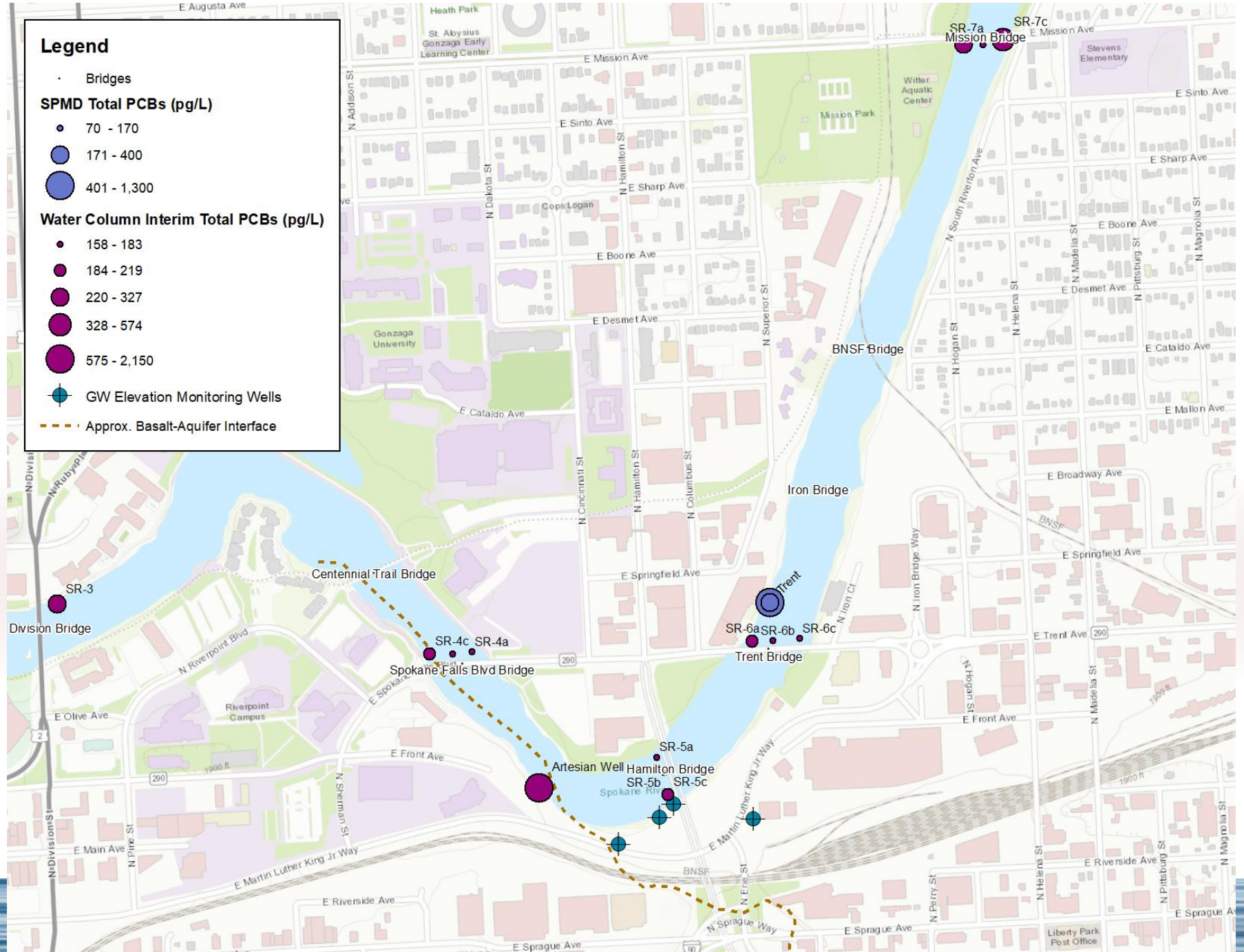
- Fish tissue PCB concentrations are generally higher in the Mission Reach than other locations
  - The difference in concentration between Mission and other reaches appears to be decreasing over time
- Tissue PCB concentrations in rainbow trout appear to be decreasing over time
  - Differences in fish age, and method of analysis prevent firm statistical conclusions

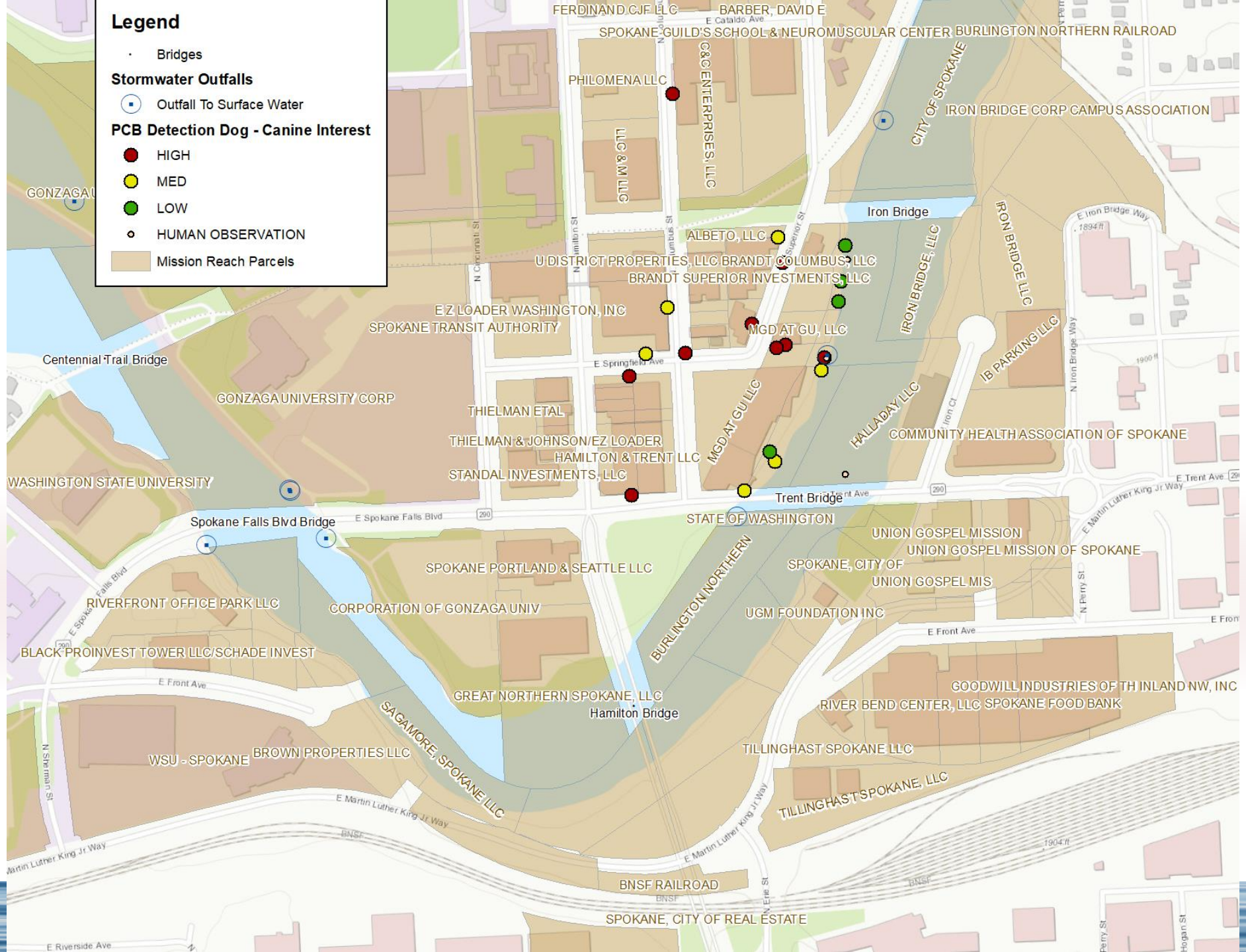
Mission Reach Summary

- PCB concentrations in sediment, biofilm and fish tissue are generally higher in the Mission Reach than other locations
  - Water column concentrations aren't significantly higher downstream of Mission Reach than they are upstream
- Elevated PCB concentrations in are very patchy
  - Occur in many different locations within the reach
- Tissue PCB concentrations in Rainbow Trout appear to be decreasing over time

Supplemental Maps


Legend
Bridges
Sediment Total PCBs (pg/g)
10,000 - 50,000
50,001 - 1,000,000
Biofilm Total PCBs (pg/g)
68 - 1,000
1,001 - 2,500
2,501 - 5,000
5,001 - 10,000
10,001 - 50,000
50,001 - 1,000,000
Mission Bridge
E Mission Ave
Stevens Elementary
Witter Aquatic Center
Mission Park
E Sinto Ave
E Sharp Ave
B-MIB-RB
B-MIB-LB
E Boone Ave
E Desmet Ave
BNSF Bridge
E Cataldo Ave
E Mallon Ave
E Broadway Ave
BNSF
E Springfield Ave
Iron Bridge
SR3A-RB
SR3A (LB)
SR3A (Rock)
SR3A (Brick)
SR3A (LB) Re-analysis
Trent Bridge
E Trent Ave
290
GZ GZ
Centennial Trail Bridge
B-SFB
Spokane Falls Blvd Bridge
Riverpoint Campus
A-SFB
A-HAM
E Front Ave
B-HAM-RB
Hamilton Bridge
Spokane River
B-HAM-LB
N Dakota St
N Hamilton St
N Cincinnati St
N Columbus St
N Superior St
N Hogan St
N Helena St
N Madelia St
N Pittsburg St
N Magnolia St
N Napa St
N Iron Bridge Way
Martin Luther King Jr Way
1900 ft


Legend
Bridges
SPMD Total PCBs (pg/L)
70 - 170
171 - 400
401 - 1,300
Water Column Interim Total PCBs (pg/L)
158 - 183
184 - 219
220 - 327
328 - 574
575 - 2,150
GW Elevation Monitoring Wells
Approx. Basalt-Aquifer Interface
SR-7a
SR-7c
Mission Bridge
BNSF Bridge
Iron Bridge
Centennial Trail Bridge
SR-3
Division Bridge
SR-4c
SR-4a
Spokane Falls Blvd Bridge
Trent
SR-6a
SR-6b
SR-6c
Trent Bridge
SR-5a
Artesian Well
Hamilton Bridge
SR-5b
SR-5c
Gonzaga University
Riverpoint Campus
Mission Park
Witter Aquatic Center
Stevens Elementary
Cops Logan
Heath Park
St. Aloysius Gonzaga Early Learning Center
Liberty Park Post Office
E Augusta Ave
E Mission Ave
E Sinto Ave
E Sharp Ave
E Boone Ave
E Desmet Ave
E Cataldo Ave
E Mallon Ave
E Broadway Ave
E Springfield Ave
E Trent Ave
E Front Ave
E Olive Ave
E Main Ave
E Riverside Ave
E Sprague Ave
N Riverpoint Blvd
E Martin Luther King Jr Way
N Sprague Way
N Division St
N Ruby St
N Addison St
N Dakota St
N Hamilton St
N Cincinnati St
N Columbus St
N Superior St
N Hogan St
N Iron Bridge Way
N Iron Ct
N Madelia St
N Pittsburg St
N Magnolia St
N Helena St
N South Riverton Ave
N Pine St
N Sherman St
N Erie St
N Perry St
BNSF
290
2
1900 ft


Legend
Bridges
Stormwater Outfalls
Outfall To Surface Water
PCB Detection Dog - Canine Interest
HIGH
MED
LOW
HUMAN OBSERVATION
Mission Reach Parcels
FERDINAND CJF, LLC
BARBER, DAVID E
SPOKANE GUILD'S SCHOOL & NEUROMUSCULAR CENTER
BURLINGTON NORTHERN RAILROAD
PHILOMENA LLC
C&C ENTERPRISES, LLC
L&G & M LLC
CITY OF SPOKANE
IRON BRIDGE CORP CAMPUS ASSOCIATION
Iron Bridge
ALBETO, LLC
U DISTRICT PROPERTIES, LLC BRANDT COLUMBUS, LLC
BRANDT SUPERIOR INVESTMENTS, LLC
IRON BRIDGE, LLC
IRON BRIDGE LLC
E Z LOADER WASHINGTON, INC
SPOKANE TRANSIT AUTHORITY
MGD AT GU, LLC
IB PARKING LLC
Centennial Trail Bridge
GONZAGA UNIVERSITY CORP
THIELMAN ETAL
THIELMAN & JOHNSON/EZ LOADER
HAMILTON & TRENT LLC
MGD AT GU LLC
HALLADAY LLC
COMMUNITY HEALTH ASSOCIATION OF SPOKANE
STANDAL INVESTMENTS, LLC
WASHINGTON STATE UNIVERSITY
Trent Bridge
STATE OF WASHINGTON
Spokane Falls Blvd Bridge
UNION GOSPEL MISSION
UNION GOSPEL MISSION OF SPOKANE
SPOKANE PORTLAND & SEATTLE LLC
SPOKANE, CITY OF
UNION GOSPEL MIS
BURLINGTON NORTHERN
RIVERFRONT OFFICE PARK LLC
CORPORATION OF GONZAGA UNIV
UGM FOUNDATION INC
BLACK PROINVEST TOWER LLC/SCHADE INVEST
GREAT NORTHERN SPOKANE, LLC
Hamilton Bridge
GOODWILL INDUSTRIES OF TH INLAND NW, INC
RIVER BEND CENTER, LLC SPOKANE FOOD BANK
SAGAMORE, SPOKANE LLC
WSU - SPOKANE
BROWN PROPERTIES LLC
TILLINGHAST SPOKANE LLC
TILLINGHAST SPOKANE, LLC
BNSF RAILROAD
SPOKANE, CITY OF REAL ESTATE
E Cataldo Ave
E Iron Bridge Way
E Springfield Ave
E Spokane Falls Blvd
E Trent Ave
E Martin Luther King Jr Way
E Front Ave
E Riverside Ave
N Cincinnati St
N Hamilton St
N Columbus St
N Superior St
N Iron Bridge Way
N Perry St
N Sherman St
N Erie St
Iron Ct
BNSF
1894 ft
1900 ft
1904 ft
290