



Spokane & Little Spokane Rivers PCB TMDLs Development

U.S. Environmental Protection Agency
Spokane River Forum Conference
April 26, 2023
Brian Nickel (Nickel.Brian@epa.gov)

Project Overview

- TMDLs are required where existing pollution control requirements are not stringent enough to implement applicable water quality standards (“impaired waters”) (Clean Water Act Section 303(d)(1), 40 CFR 130.7)
 - The Spokane River was first identified as impaired by PCBs in 1996 (based on data collected in 1993).
- EPA is developing Spokane & Little Spokane River PCB total maximum daily loads (TMDLs) as a result of a litigation consent decree
 - Plaintiffs: Sierra Club, Center for Environmental Law and Policy
 - Intervenor: Spokane Tribe of Indians
 - Defendant: U.S. EPA
 - Intervenors: Spokane County, Kaiser Aluminum, Washington Department of Ecology
- TMDL implementation plan will be developed by Washington Department of Ecology after TMDLs are issued

General TMDL Elements

$$\text{TMDL} = \text{WLA} + \text{LA} + \text{MOS}$$

- TMDL = Total Maximum Daily Load
 - Maximum amount of pollutant that can be assimilated by a water body each day while still achieving and maintaining water quality standards
- WLA = Waste Load Allocation
 - Portion of TMDL set aside for point sources
- LA = Load Allocation
 - Portion of TMDL set aside for nonpoint sources
- MOS = Margin of Safety
 - Portion of TMDL set aside to address uncertainty in conditions and analysis

Consent Decree Provisions

- Address PCB-impaired waters of the Spokane & Little Spokane Rivers
 - Consent decree identified 19 assessment units listed as “Category 5” (impaired and needing a TMDL) for PCBs in 2012 Washington 303(d) list
 - 2014-2018 Washington 303(d) list identified 20 Category 5 assessment units
 - 19 in the main stem Spokane River and Lake Spokane
 - 1 in the Little Spokane River
- Status reports to court every 180 days
 - Reports filed in August 2022 and February 2023
 - Next report due August 2023
- ***Final TMDLs to be issued no later than September 30, 2024***

September 2024

Calendarpedia
Your source for calendars

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

© Calendarpedia® www.calendarpedia.com 2 Labor Day Data provided "as is" without warranty

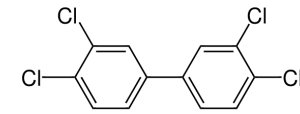
PCB Human Health Impacts

- Cancer

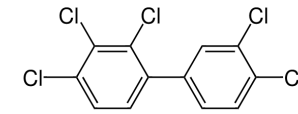
- EPA considers PCBs probable carcinogens
- International Agency for Research on Cancer considers PCBs carcinogenic to humans
- Water quality criteria are based on cancer risk

- Non-cancer

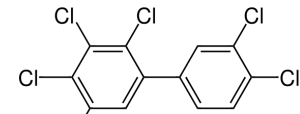
- Immune
- Reproductive
- Nervous system
- Endocrine system
- Liver toxicity
- Dermal and vision
- Elevated blood pressure, triglyceride and cholesterol



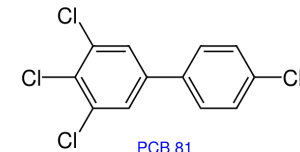
PCB 77



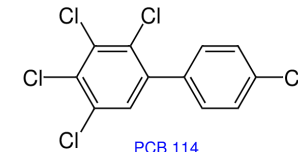
PCB 105



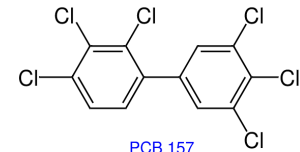
PCB 156



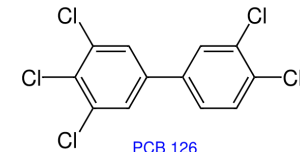
PCB 81



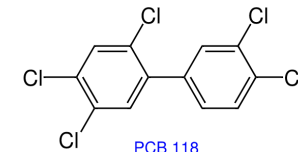
PCB 114



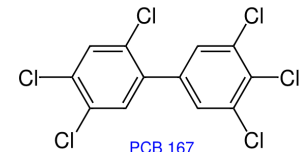
PCB 157



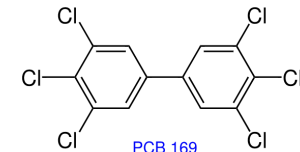
PCB 126



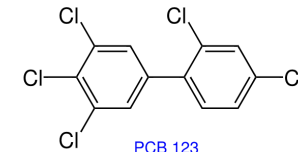
PCB 118



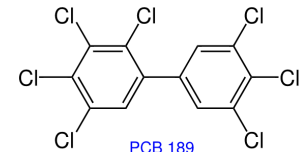
PCB 167



PCB 169



PCB 123



PCB 189

PCB Pollution Sources

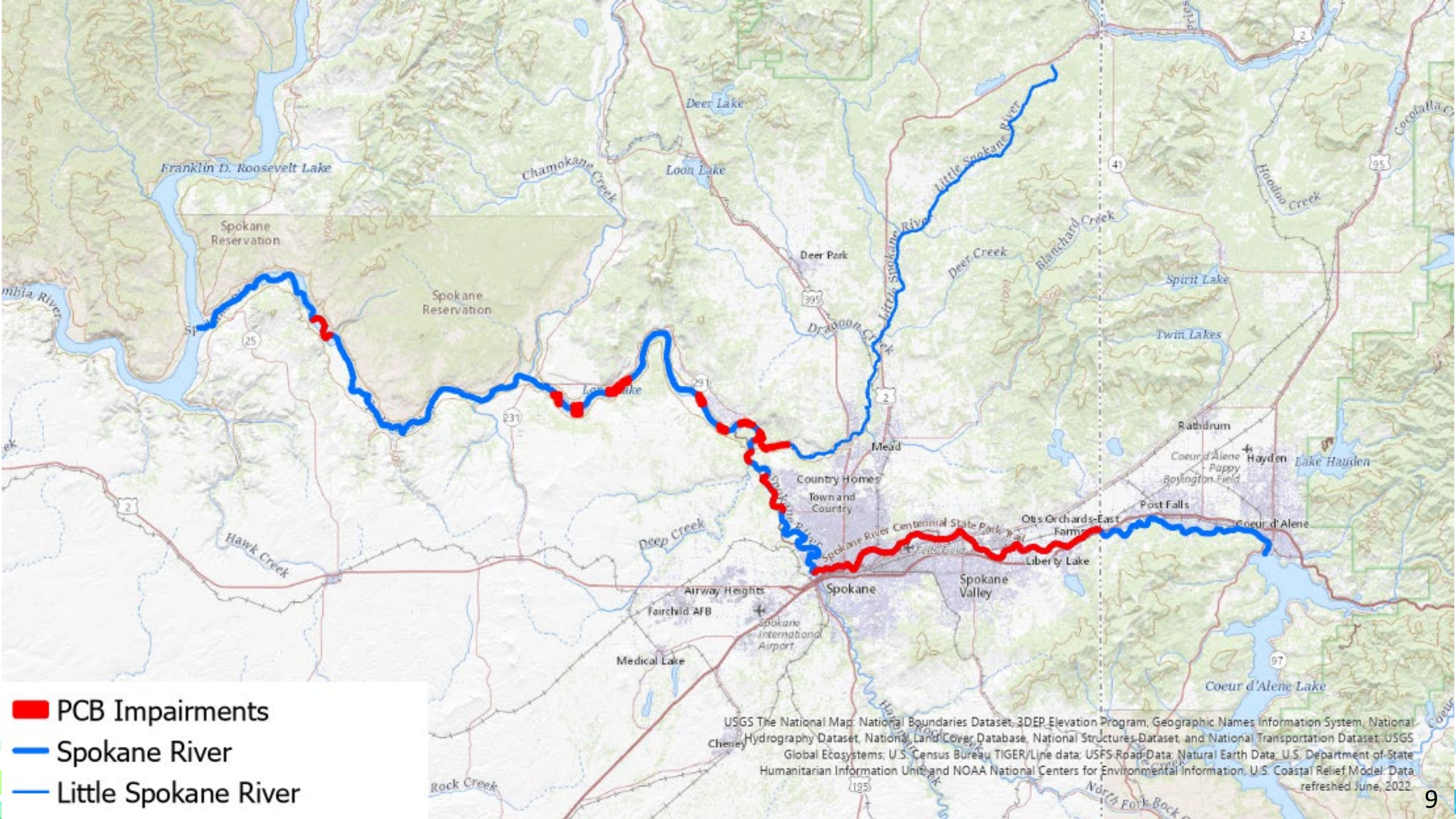
- U.S. manufacture was banned in 1979, but PCBs were used in...
 - Electrical, heat transfer, and hydraulic equipment
 - Plasticizers in paints, plastics, and rubber products
 - Pigments, dyes, and carbonless copy paper
 - Fluorescent light ballasts, caulking, and floor finishes
 - MANY other industrial applications
- PCBs enter rivers through industrial and municipal wastewater, stormwater, groundwater, and atmospheric deposition
- Though regulated, many goods still contain PCBs. Concentrations range up to ≈ 800 parts per billion, while applicable water quality standards are measured in parts per quadrillion.
 - 1 part per billion = 1,000,000 parts per quadrillion
 - 1 part per quadrillion is 1 postage stamp on a letter the size of California and Oregon

Primary Spokane PCB Pollution Challenges

- Bioaccumulative in organisms (including humans), magnified through food chains
 - Environmental levels deemed safe are *very* low concentrations
 - Below levels most treatment technologies can presently achieve, below current detection levels, low-level monitoring is complex and costly
- PCBs are virtually everywhere and essentially don't break down
- Difficult for industries, as well as local, state, federal, and Tribal governments, to fully mitigate
- ***EPA recognizes addressing Spokane PCB issues will take tremendous dedication and that there are no simple solutions***

Project Extent

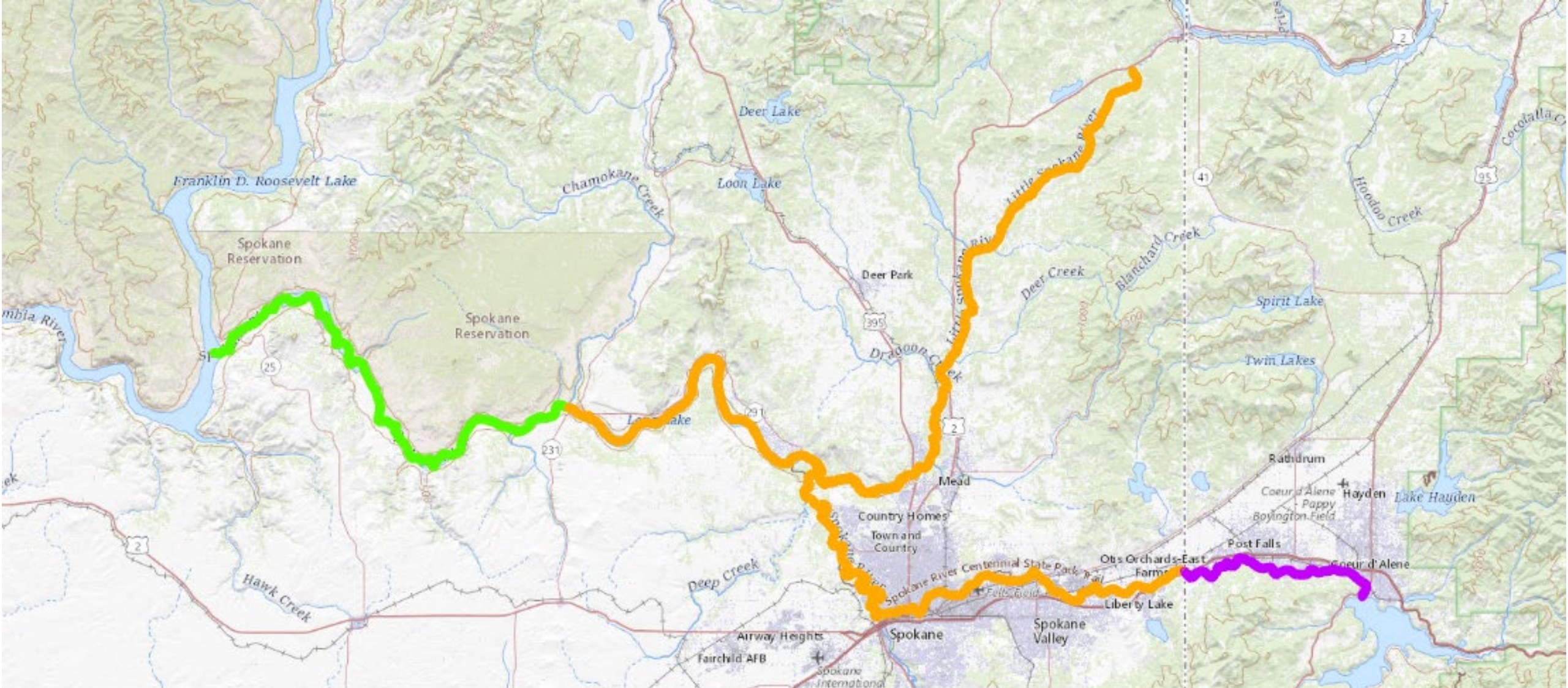
- TMDLs will address all Spokane and Little Spokane River assessment units listed as impaired (Category 5) for PCBs
- Spokane River
 - Confluence with Columbia River to Washington/Idaho border
 - Water resource inventory areas 54 (Lower Spokane) and 57 (Middle Spokane)
- Little Spokane River
 - Confluence with Spokane River to headwaters
 - Water resource inventory area 55



Relevant PCB Water Quality Standards

- Spokane Tribe of Indians = 1.3 pg/L
 - Columbia River to Spokane River mile \approx 35.5
- Washington = 7 pg/L
 - Spokane River mile \approx 35.5 to \approx 99.5
 - Entirety of Little Spokane River (\approx 52 miles long)
- Idaho = 190 pg/L
 - Spokane River mile \approx 99.5 to Coeur d'Alene Lake
- *TMDLs must...*
 - ***Achieve and maintain all applicable water quality standards***
 - ***Be protective of applicable downstream water quality standards***





- PCB WQS**
- █ STOI (1.3 pg/L)
 - █ WA (7 pg/L)
 - █ ID (190 pg/L)

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed June, 2022.

Overview of TMDL Elements

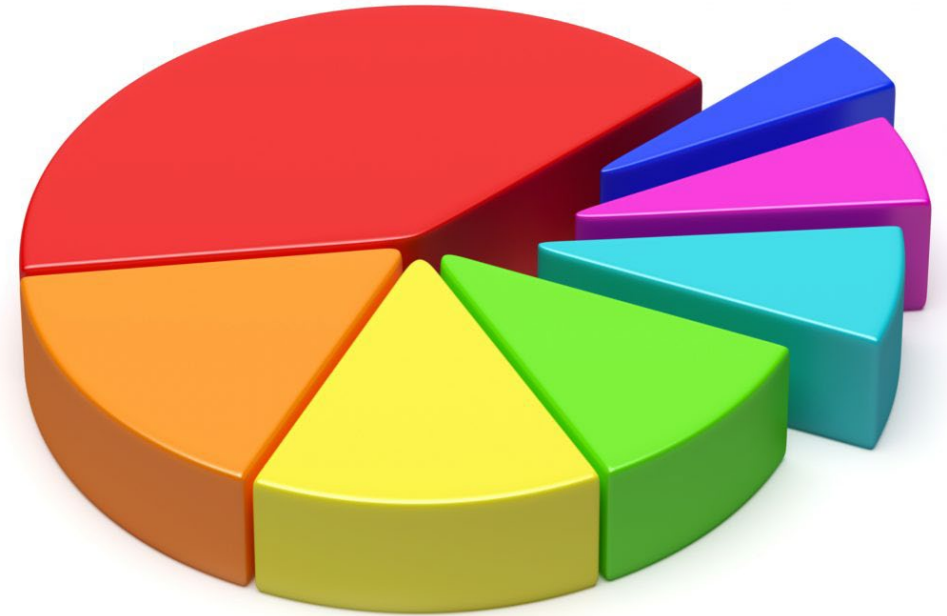
- Target parameter = total water column PCBs
- Target values
 - ≤ 7.0 pg/L in Washington state waters
 - ≤ 1.3 pg/L in Spokane Tribe of Indians waters
 - These are $> 90\%$ reductions from current conditions.
- Design conditions for loading capacity calculations
 - Annual harmonic mean river flow
 - 30 year record of gaged river flows
 - Groundwater flow based on USGS studies

Mainstem Harmonic Mean River Flows (30 years) and Load Capacities

Gauge Name	Station Number	Harmonic Mean Flow (CFS)	Applicable PCB Criterion (pg/L)	Loading Capacity (mg/day)
Estimated flow at WA-ID Border	N/A	1,878	190 (ID)	873
			7 (WA)	32
Spokane River Below N Greene St at Spokane, WA	12422000	2,700	7	46
Spokane River at Spokane, WA	12422500	2,639	7	45
Spokane River Below Nine Mile Dam at Spokane, WA	12426000	2,975	7	51
Spokane River at Long Lake, WA	12433000	3,535	7 (WA)	61
			1.3 (STOI)	11

TMDL Allocation Categories

- Sources upstream of the Washington/Idaho border
 - Single load and/or concentration assigned at border
- Permitted Point Sources in Washington
 - Municipal and industrial point sources
 - Stormwater sources with permits
- Nonpoint Sources
 - Toxics cleanup sites
 - Stormwater sources without permits
 - Major tributaries
 - Loads and/or concentrations at mouths
 - Regional groundwater inflow
 - Atmospheric deposition
 - Nonpoint sources not captured in other allocations



Technical Approach

- Spreadsheet based mass balance model
- Conservative margin of safety assumptions
 - No attenuation or decay of PCBs along rivers
 - No settling of particulate PCBs out of water column
- Model applications
 - Assessment unit/river mile TMDL loading capacities
 - PCB reduction scenario explorations

Anticipated Project Schedule

Year	2022				2023				2024		
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Ancillary GIS and hydrology analysis	Active	Active	Active	Active							
Collate PCB monitoring data*		Active	Active	Active	Active	Active	Active				
Develop and refine technical approach			Active	Active	Active	Active					
PCB monitoring data analysis			Active	Active	Active	Active	Active	Active			
Public/stakeholder outreach			Active	Active	Active	Active	Active	Active	Active	Active	Active
Issue public comment draft of TMDLs										Active	
Respond to public comments										Active	Active
Issue final approved TMDLs											Active

*2023 Q2-Q3 extension to accommodate recently collected PCB data, if made available

Additional Public Outreach

- EPA hosting quarterly webinars, with the next in June.
- Available environmental PCB data and detailed model assumptions
 - Current PCB conditions and monitoring data summary
 - Hydrology summary, including stormwater and groundwater estimates
- Initial PCB mass balance model
 - Source assessment analysis
 - TMDL concentration calculator
- Sign up for our email distribution list for webinar updates and invitations!

June 2023

Calendarpedia
Your source for calendars

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1

© Calendarpedia® www.calendarpedia.com All rights reserved. Data provided as is without warranty.

Additional Project Information

- Spokane River PCB TMDLs project website
 - <https://www.epa.gov/tmdl/spokane-river-pcb-tmdls>
 - Background information, PCB and TMDL resources, project updates
 - Interested parties can also join EPA's email list for project updates
- Comments and Questions
 - Please contact Gunnar Johnson (Washington State TMDL Coordinator)
 - Johnson.Gunnar@epa.gov
 - 360-753-9543
 - U.S. EPA, 300 Desmond Drive SE, Lacey, WA, 98503

Further References & Resources

- General PCB facts: <https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs>
- Inadvertent PCBs:
 - General Information: <https://www.epa.gov/pcbs/inadvertent-pcbs>
 - Ecology product testing: <https://apps.ecology.wa.gov/publications/documents/1604024.pdf>
 - EPA Product Testing: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=355517&Lab=CEMM
- Integrated Risk Information System (IRIS) PCB risks: https://iris.epa.gov/ChemicalLanding/&substance_nmbr=294
- Harmonic mean design flows: <https://www.federalregister.gov/d/00-27924/p-166>
- Washington water quality impairments: <https://apps.ecology.wa.gov/waterqualityatlas/wqa/map>
- Water quality standards:
 - Spokane Tribe: <https://www.epa.gov/wqs-tech/water-quality-standards-regulations-spokane-tribe>
 - Washington:
 - <https://www.epa.gov/wqs-tech/water-quality-standards-regulations-washington>
 - Federally promulgated criteria including PCB criteria: <https://www.epa.gov/wqs-tech/federal-human-health-criteria-washington-state-waters>,
 - Idaho: <https://www.epa.gov/wqs-tech/water-quality-standards-regulations-Idaho>
- PCB TMDL handbook: <https://www.epa.gov/system/files/documents/2021-08/p100dp8k.pdf>
- USGS hydrological data: <https://waterdata.usgs.gov/wa/nwis/sw>