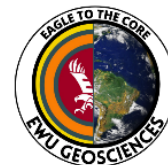


# West Plains PFAS Fate + Transport Study

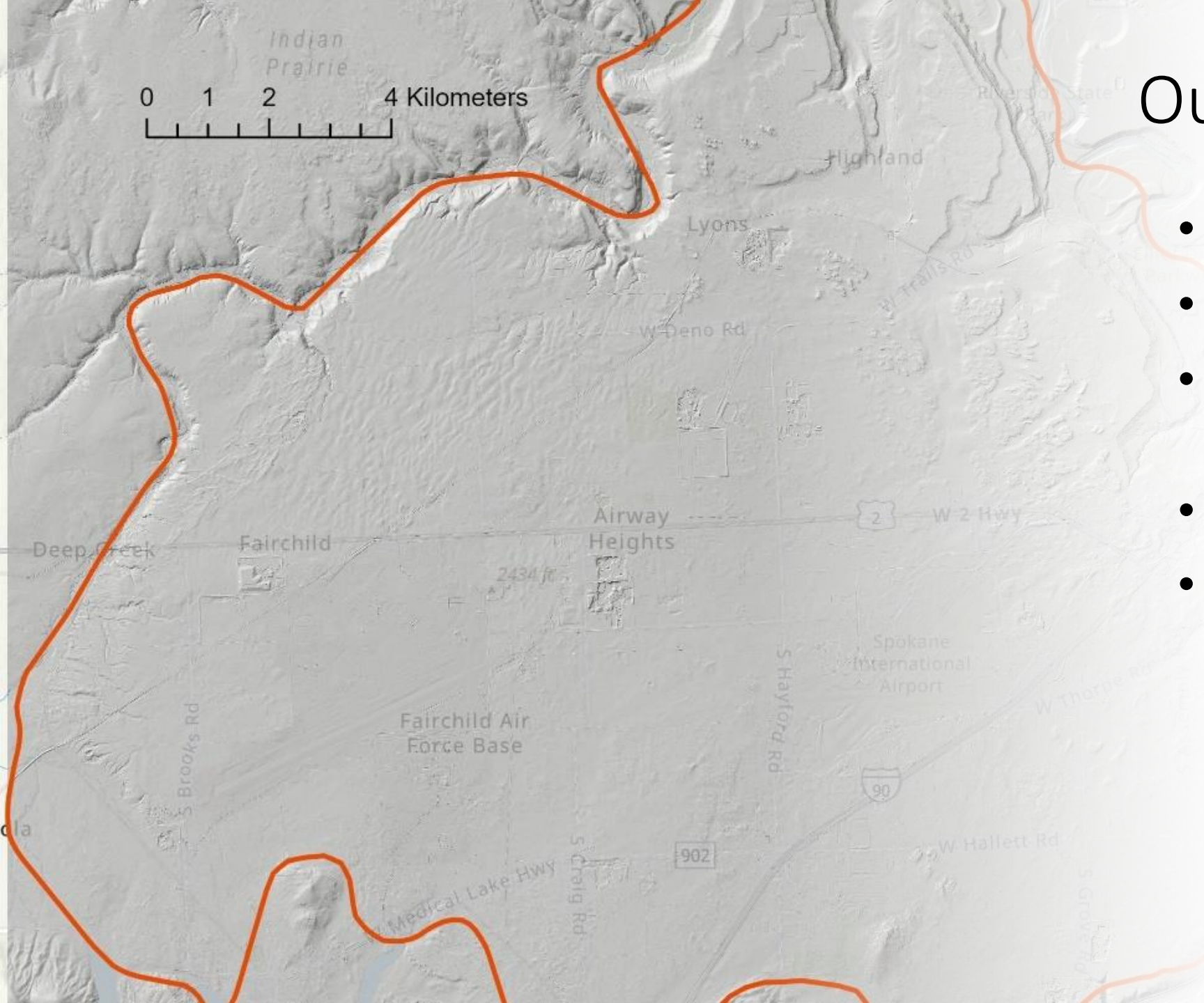
*The Spokane River  
April 14, 2025*

Chad Pritchard, Ph.D., P.G., Jerusha Hampson,  
Emersen Slanga, & Cadence Meier-Grolman

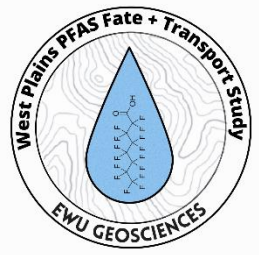
WA Dept. of Ecology Agreement Number: TCPRA-2123-CiMedL-00076



Department of Geosciences  
Eastern Washington University

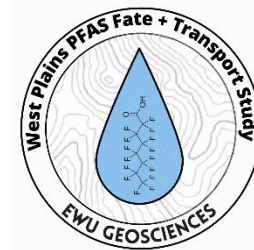


# Outline



- What are we doing?
- Why are we doing it?
- Introduction to aquifers
- Where are we doing it?
- Results for Spokane River
  - General PFAS distribution in GW
  - Hangman Watershed
  - Spokane River





# What are we doing?

- \$450,000 Ecology grant over 2-years. Needed to be to a regional government
  - \$50,000 to City of Medical Lake for administration
- Build a 3D model of the West Plains
  - Identify the orientation of rock types that control groundwater flow
- Sample ~35 locations four times over a year. PFAS, Temp, DO, pH
- Added about 100 extra wells to test over the summer of 2024 to help residents outside of the FAFB and SAI testing zones
- Use results to calibrate the groundwater model to track PFAS transport.
- Using Positive Matrix Factorization modeling and geospatial analyses for fingerprinting sources of PFAS
- Report due in June 2025.

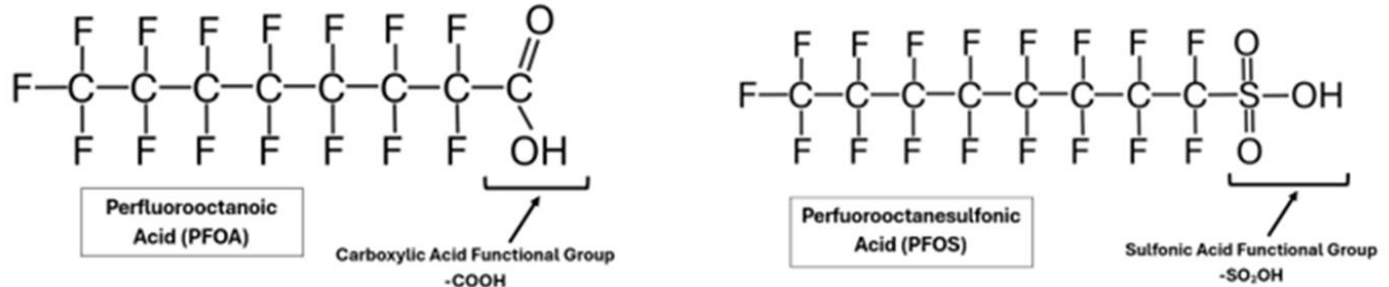


# Why?

- To help people know where PFAS is likely to be present and in what aquifer.
- PFOS, PFOA, PFHxS, PFNA, and PFBS are regulated toxins

## Some Common PFAS Compounds

One large group of PFAS are perfluoroalkyl acids, or PFAAs. Two of the most common PFAAs are perfluoroalkyl carboxylic acids (PFCAs) and perfluoroalkyl sulfonic acids (PFSAs). Names and abbreviations are derived from the number of carbon atoms and the attached functional group.

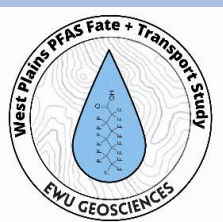


# Carbon Atoms	PFCAs (perfluoroalkyl carboxylic acids)		PFSAs (perfluoroalkyl sulfonic acids)	
4	PFBA	Perfluorobutanoic acid	PFBS	Perfluorobutanesulfonic acid
5	PFPeA	Perfluoropentanoic acid	PFPeS	Perfluoropentanesulfonic acid
6	PFHxA	Perfluorohexanoic acid	PFHxS	Perfluorohexanesulfonic acid
7	PFHpA	Perfluoroheptanoic acid	PFHpS	Perfluoroheptanesulfonic acid
8	PFOA	Perfluorooctanoic acid	PFOS	Perfluorooctanesulfonic acid
9	PFNA	Perfluorononanoic acid		
10	PFDA	Perfluorodecanoic acid		
11	PFUnA	Perfluoroundecanoic acid		
12	PFDoA	Perfluorododecanoic acid		

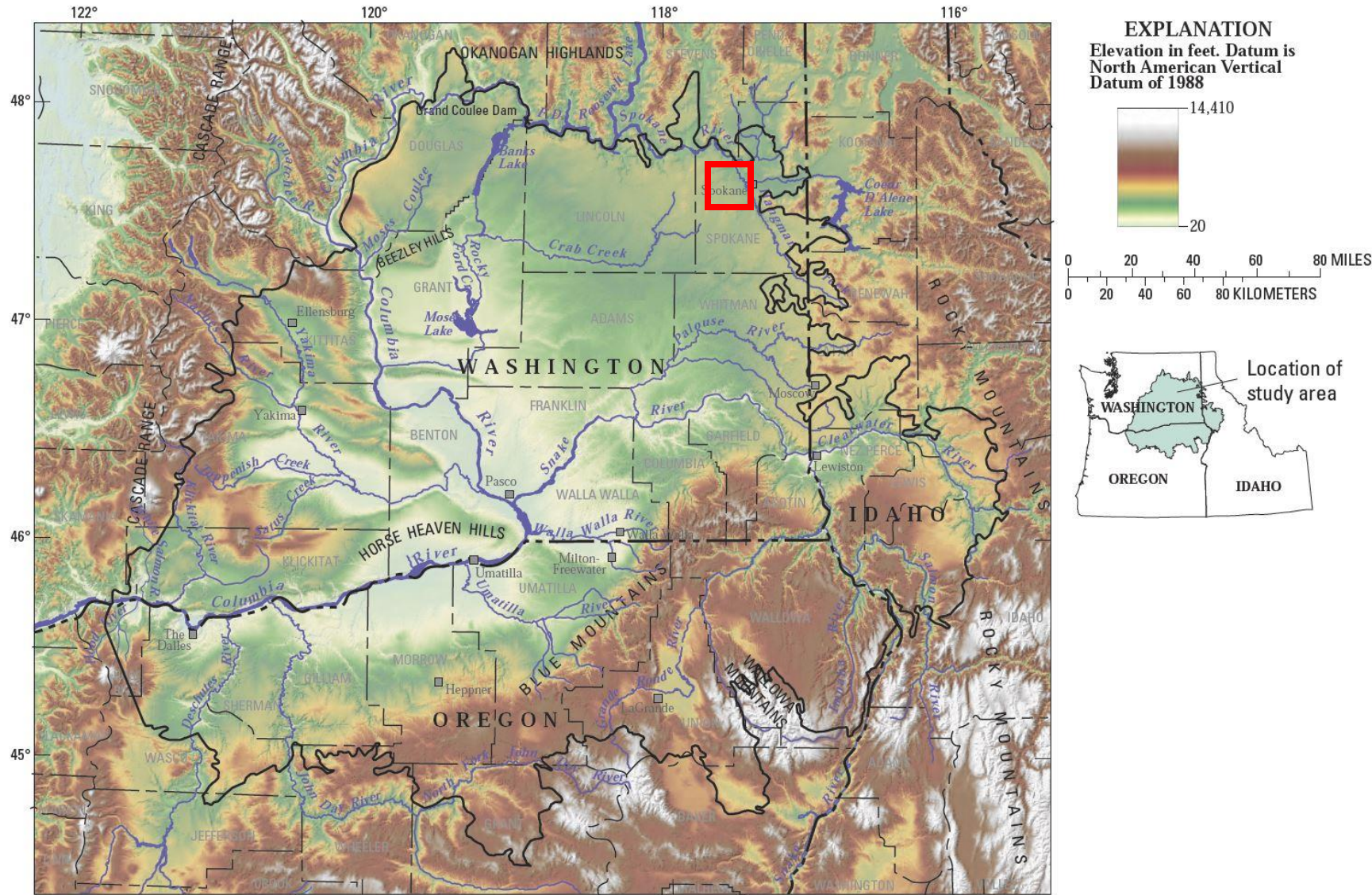
	Short-Chain PFAS
	Long-Chain PFAS
	EPA Regulated

### Other Common Compounds:

- 4:2FTS, 6:2FTS, and 8:2FTS.  
FTS= fluorotelomer sulfonic acid
- HFPO-DA (aka GenX): another EPA regulated compound.
- PFOSA:  
Perfluorooctanesulfonamide



# Aquifers - Columbia Basin



Base modified from U.S. Geological Survey digital data, 1:2,000,000, 1972

Figure 3. Shaded relief of parts of Washington, Oregon, and Idaho.

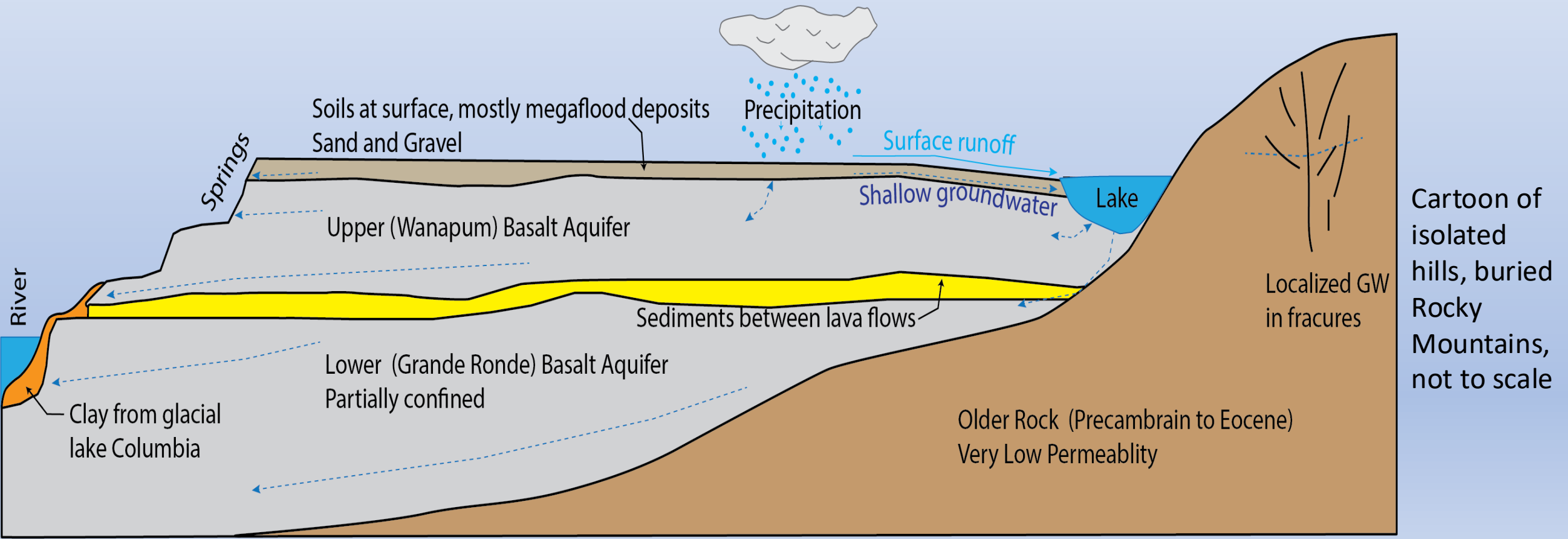
- Generally the water flows to the center of the basin – to the Snake or Columbia or Rivers
- As always Spokane County does things their own way.

USGS, 2014



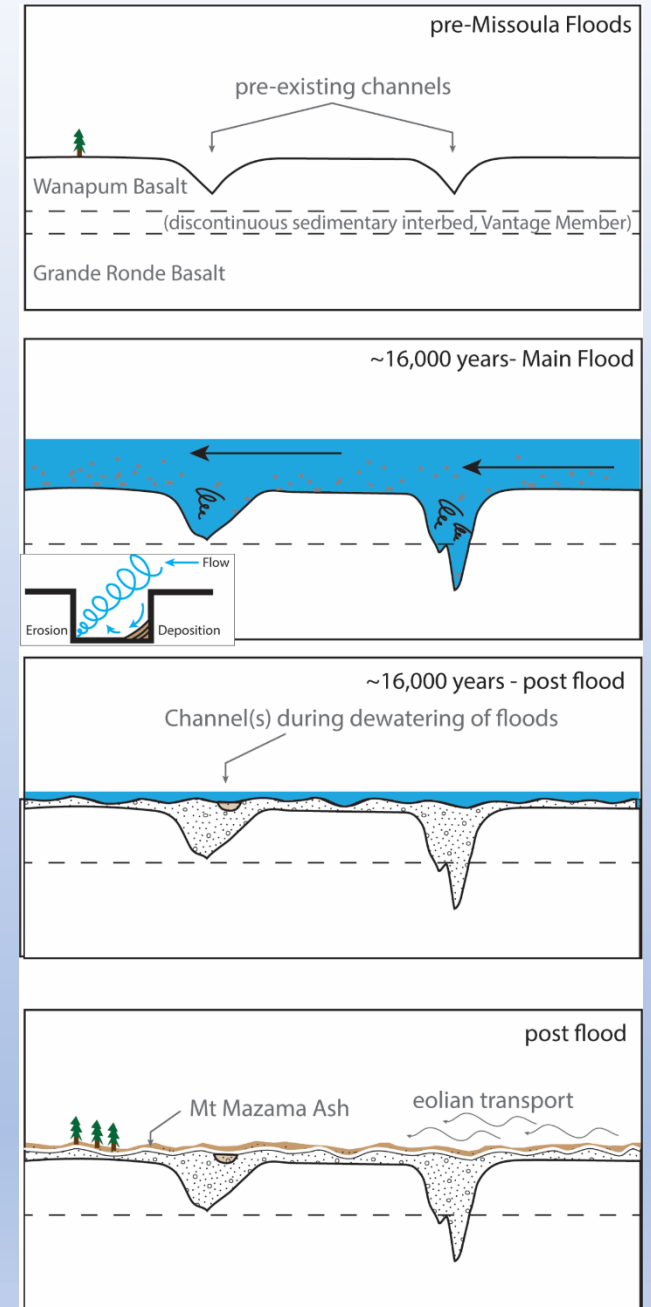
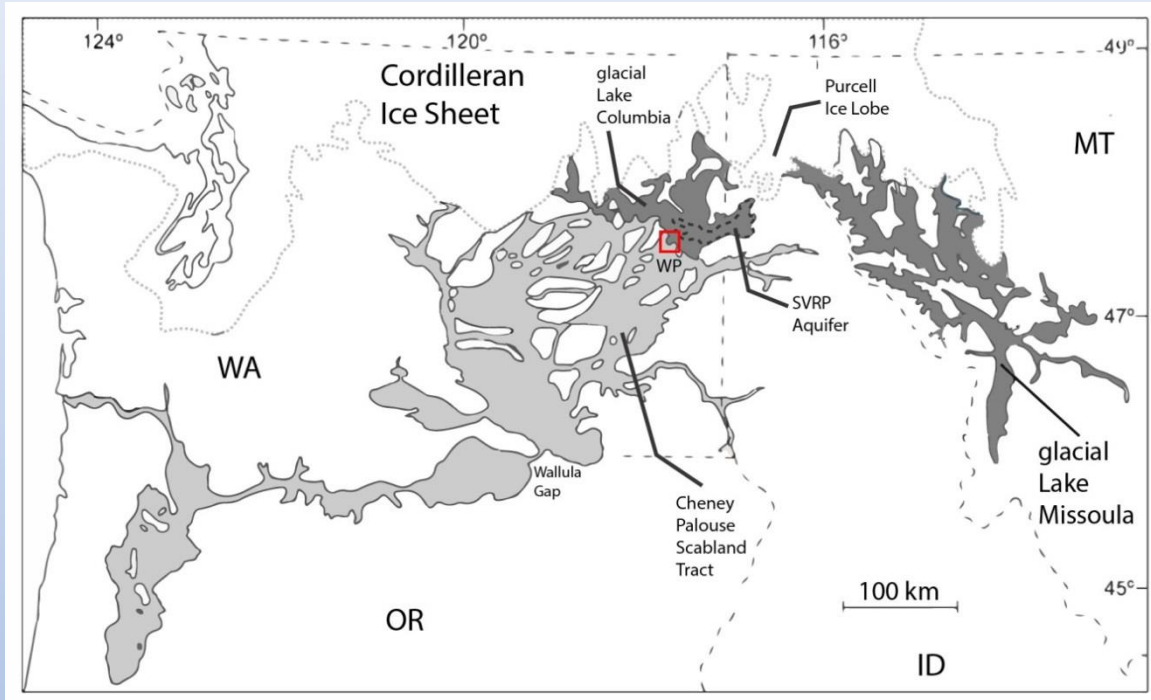
# General Geology (The Aquifers)

- Older than 48 million year old metasedimentary and igneous rocks – The “Rocky Mountains”
- ~16 million year old Columbia River Basalt Group
- ~ 16,000 year old megaflood erosion/deposition, loess, and alluvium



# Pleistocene Missoula Flood Deposits

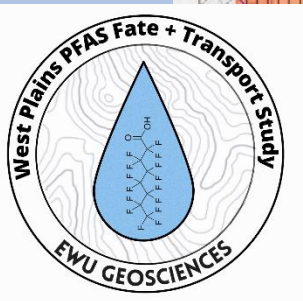
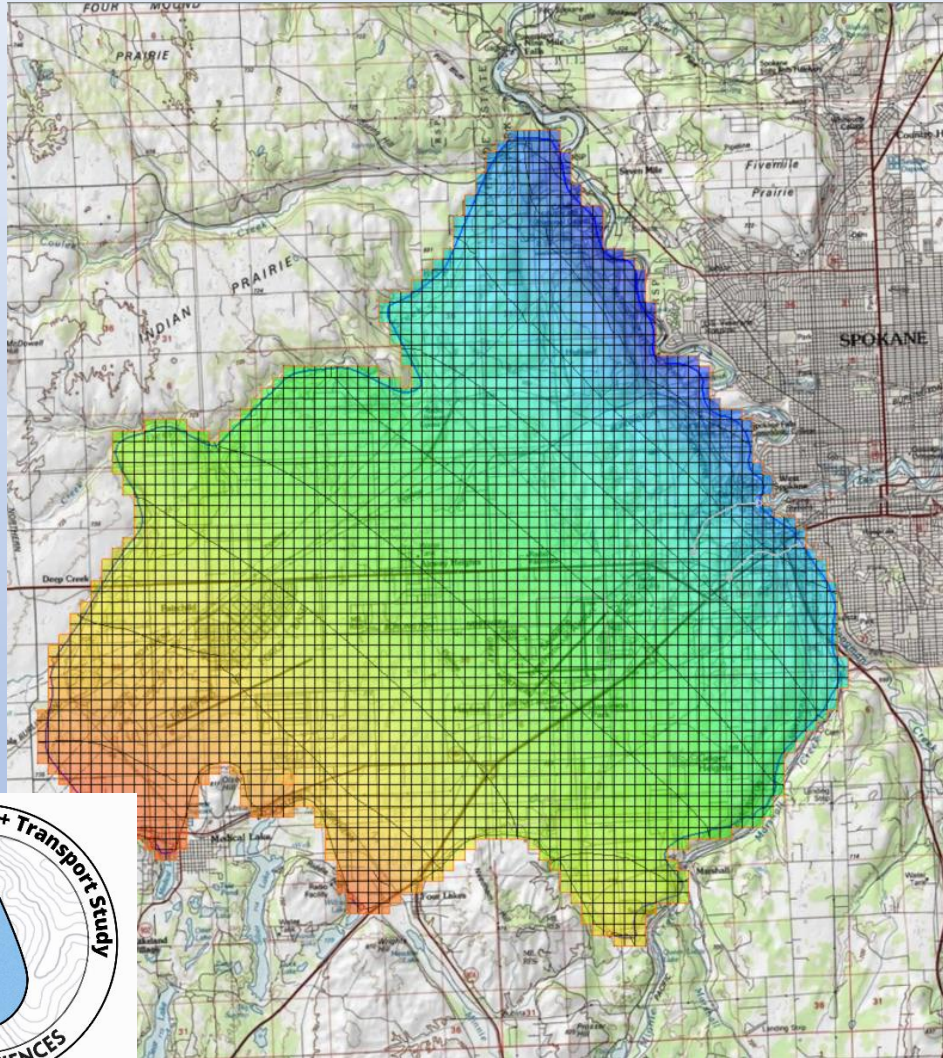
$\sim K = 28+ \text{ ft/day}$



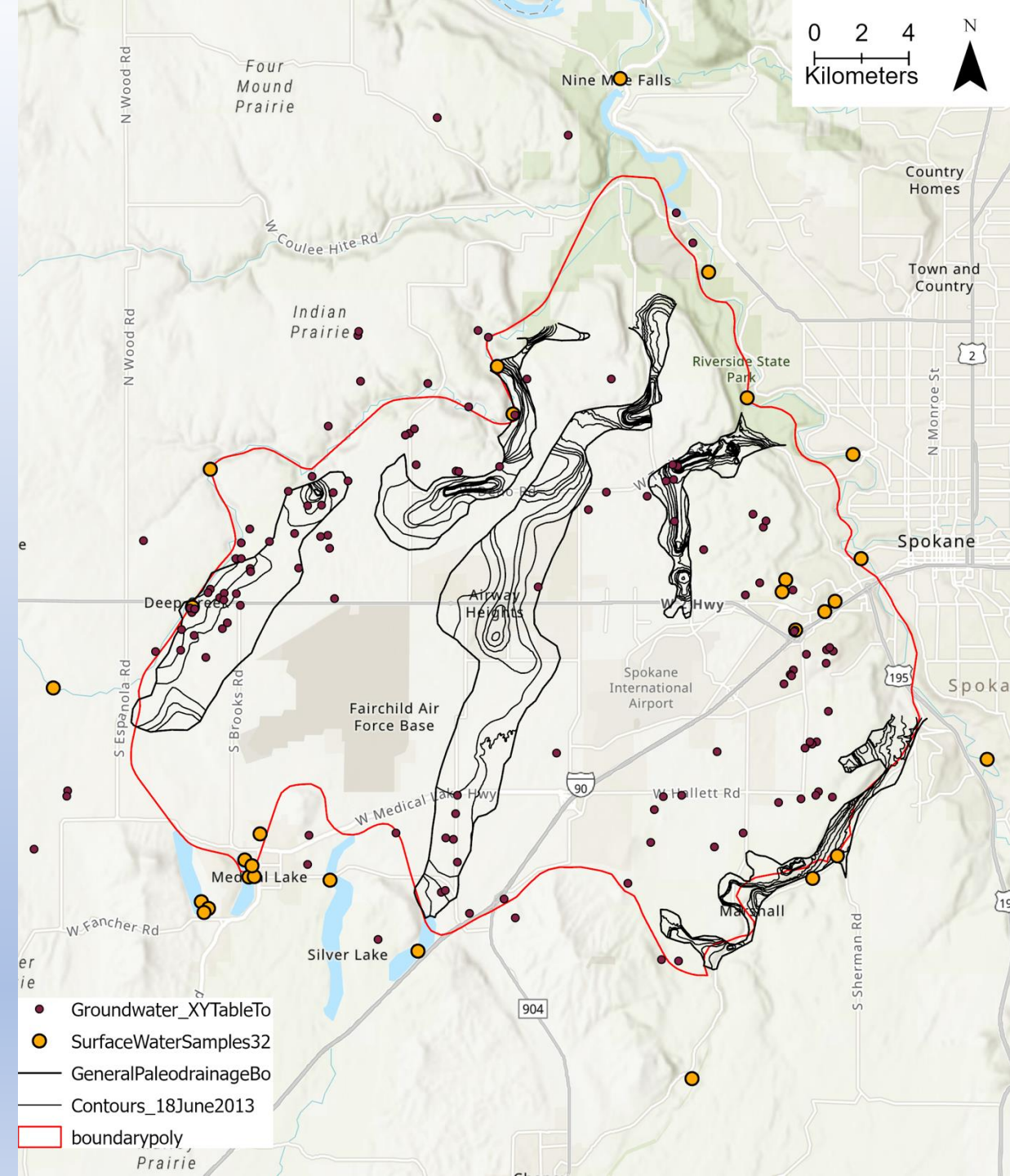
Pritchard et al (2020)



# Where are we doing the study?

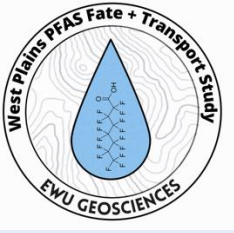


## GMS model cross sections across West Plains

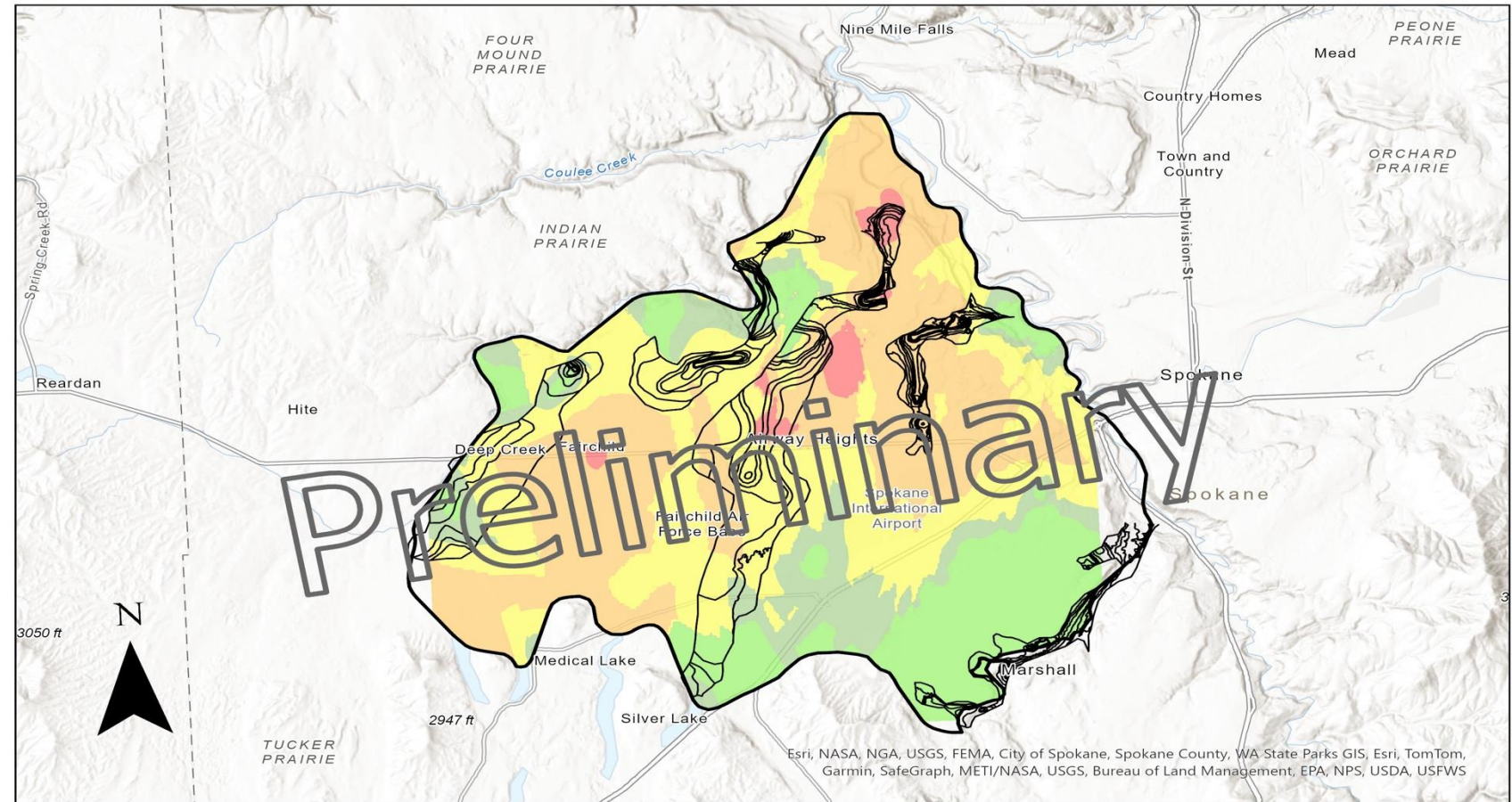




# A Preliminary + General Map



Includes data from multiple aquifers



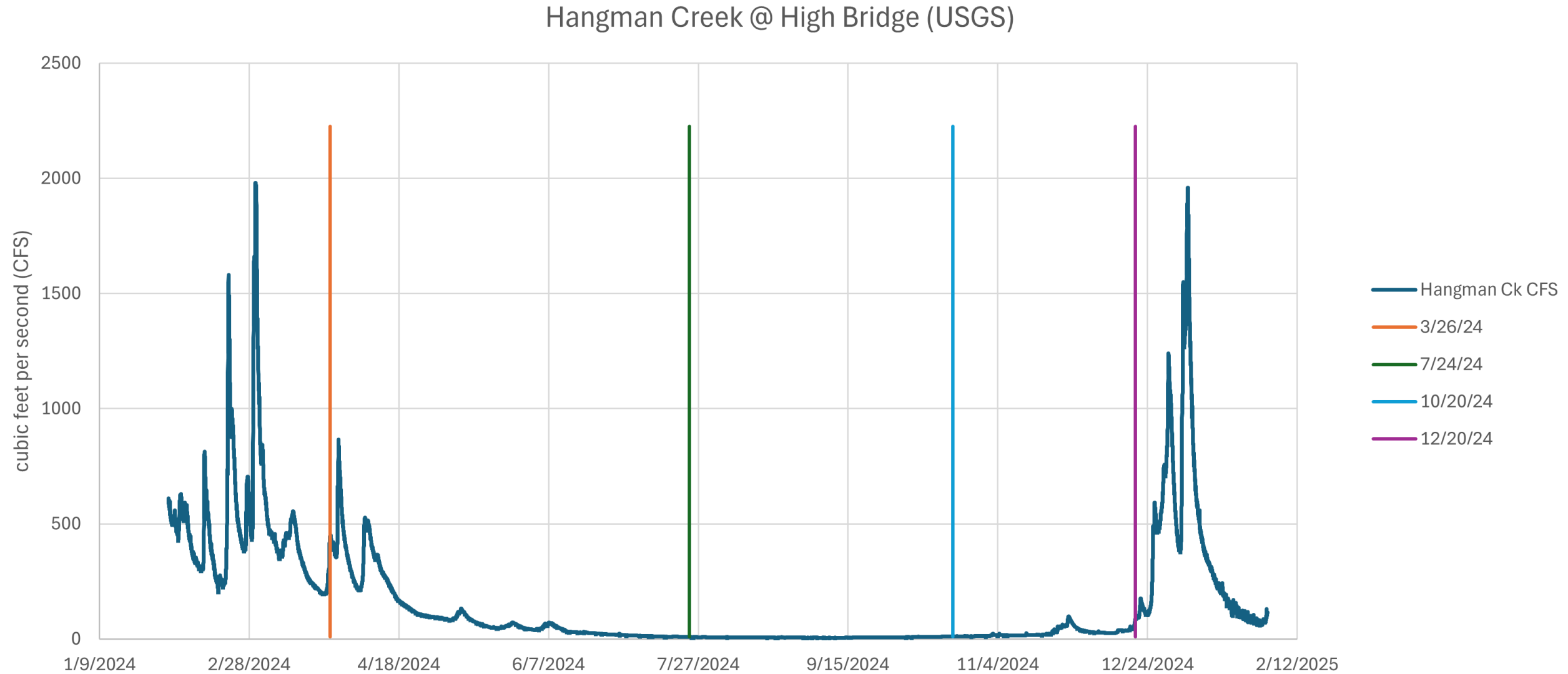
**Preliminary Hazard Index of the West Plains of Spokane County, WA. From EWU and EPA Summer of 2024**

By: Emersen Slanga, Stacy Warren, & Chad Pritchard

0 3 5 Miles

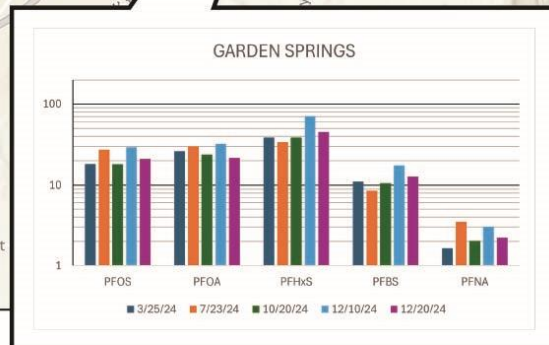
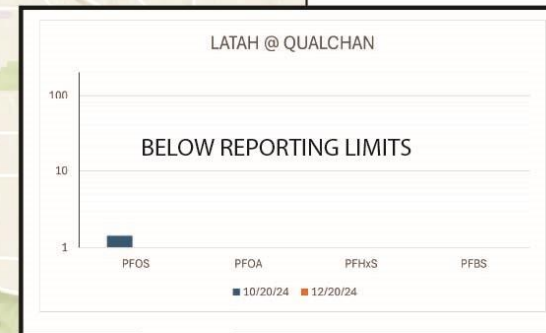
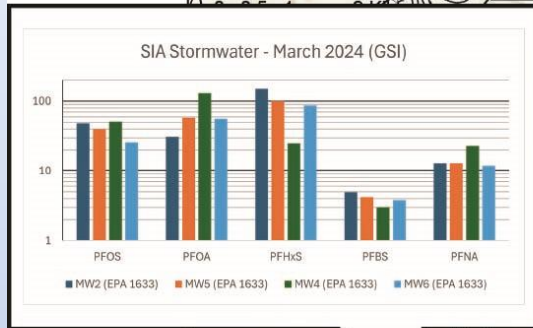
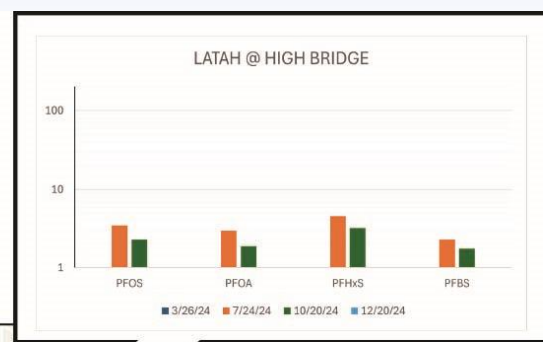
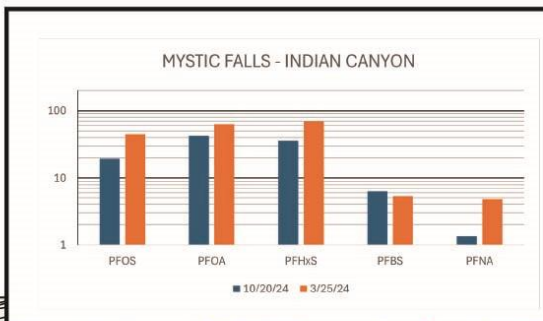


# Hangman Creek or Latah or ?





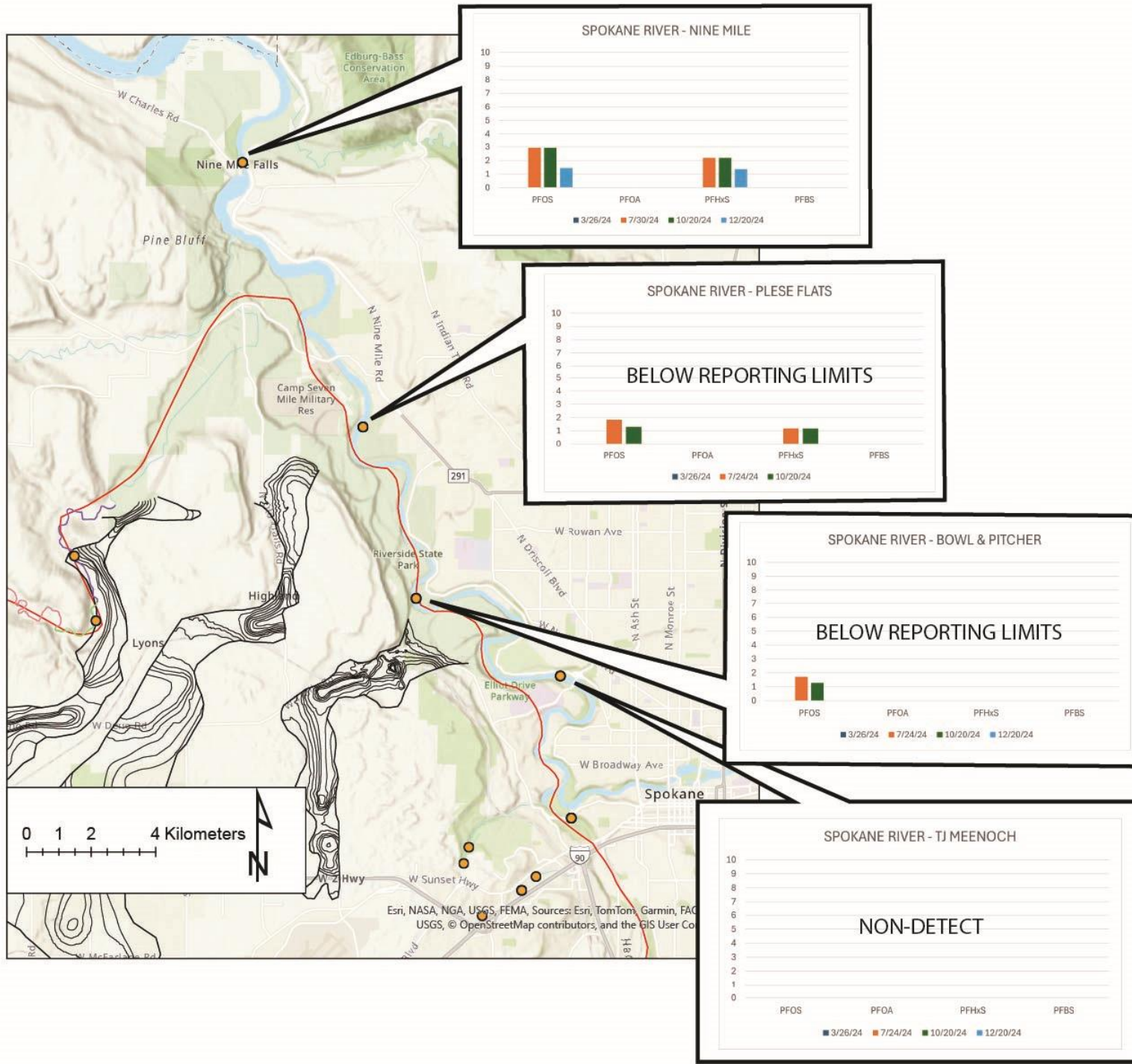
# Hangman (Latah) Watershed



A, USGS, FEMA. Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

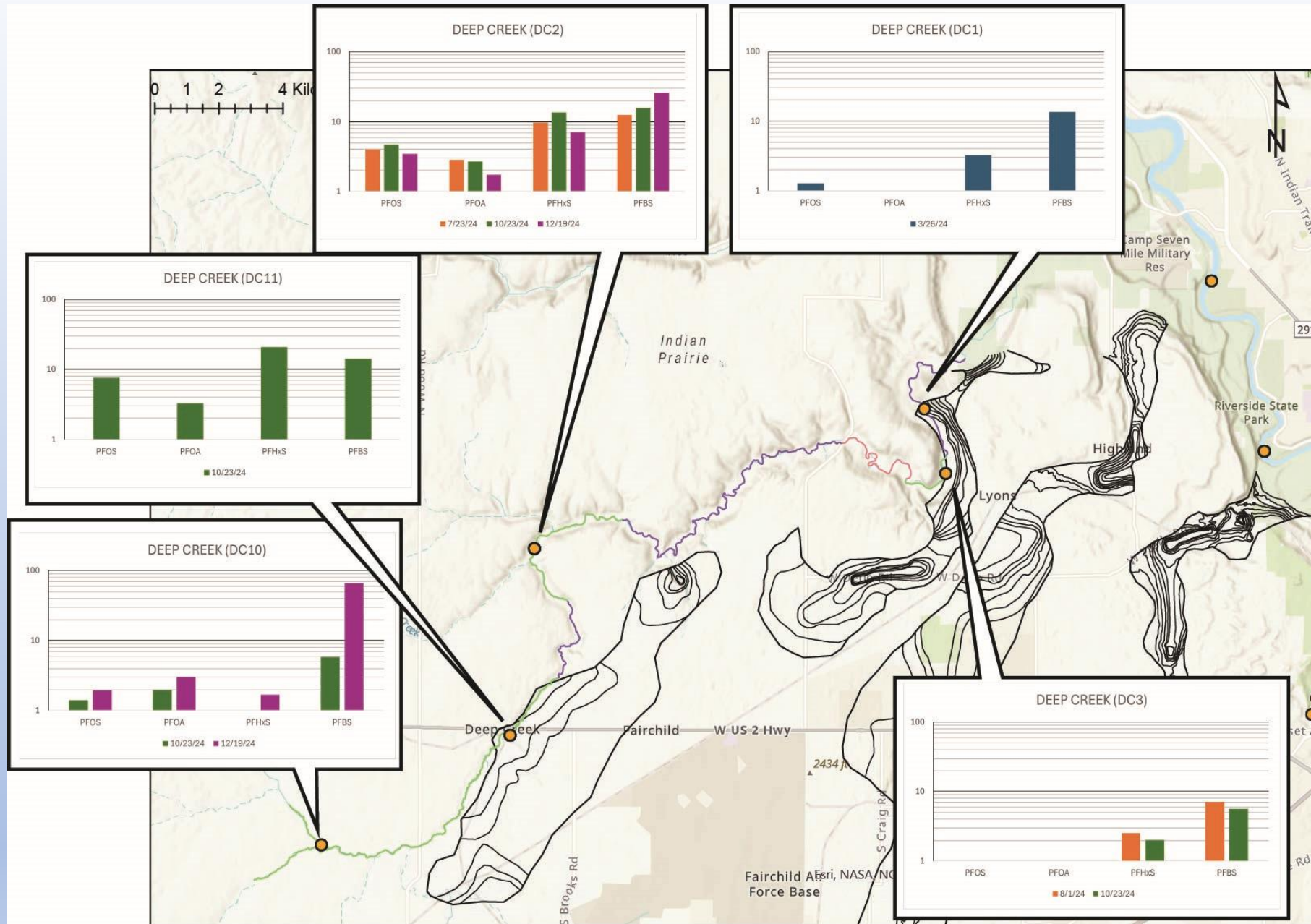


# Spokane River



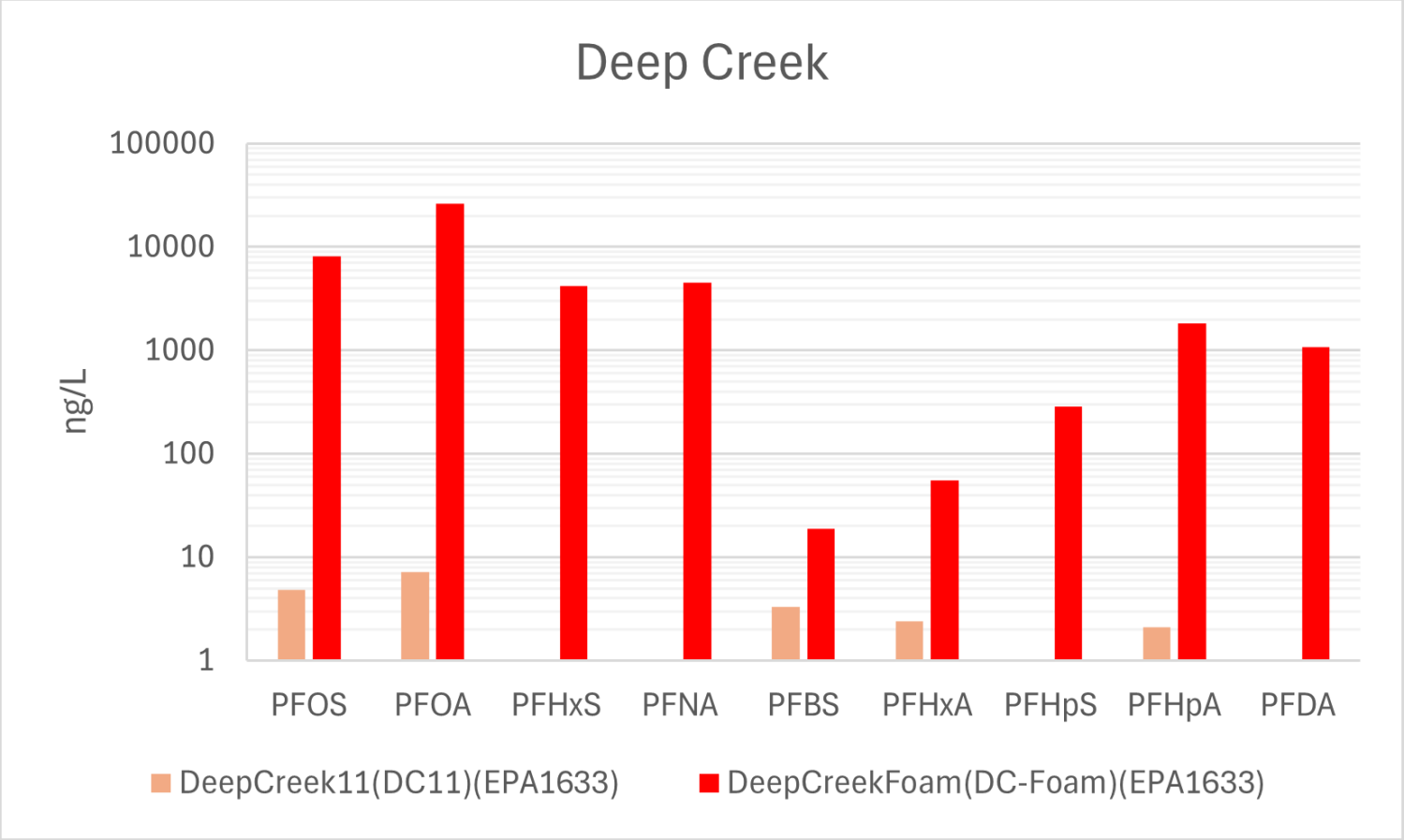


# Deep Creek





# Other interesting findings – Natural Foam





# Thank you!!

Contact: Chad Pritchard, PG, Ph.D.  
[cpritchard@ewu.edu](mailto:cpritchard@ewu.edu)

