

Prior Water Budgets for Lakes and SVRP Aquifer

Prepared for IWAC
Monthly Meeting
(February 11, 2025)

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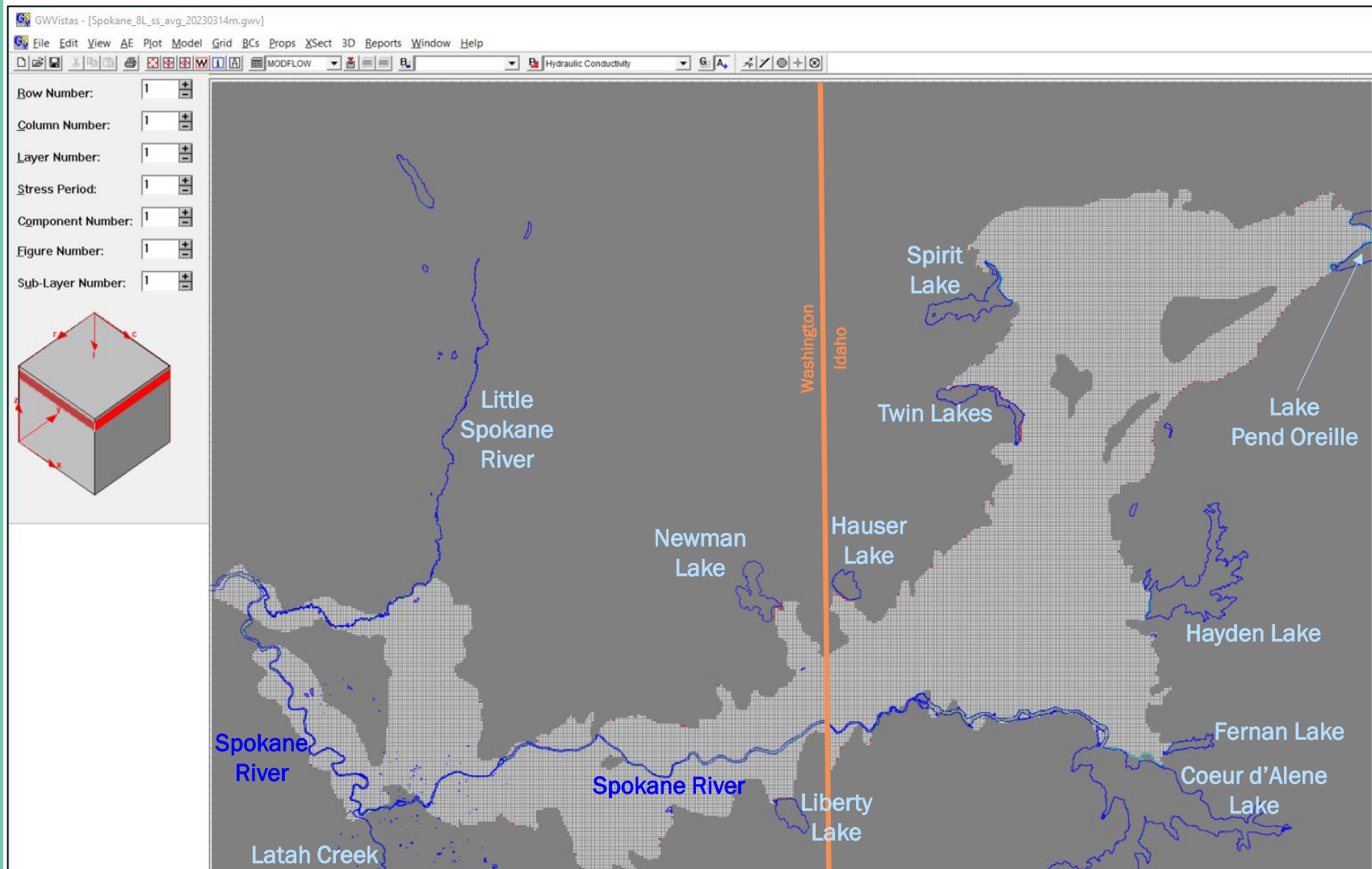
Evaluating Water Budgets

- Lake inflows
- Aquifer water budget (inflows and outflows)
- Part of Task 3 of the current data gathering effort (Phase 1 of the model update project)
 - Task 3: Evaluate best methods for simulating inflows
 - Specified versus model-calculated
 - Sources of information (data, past models)

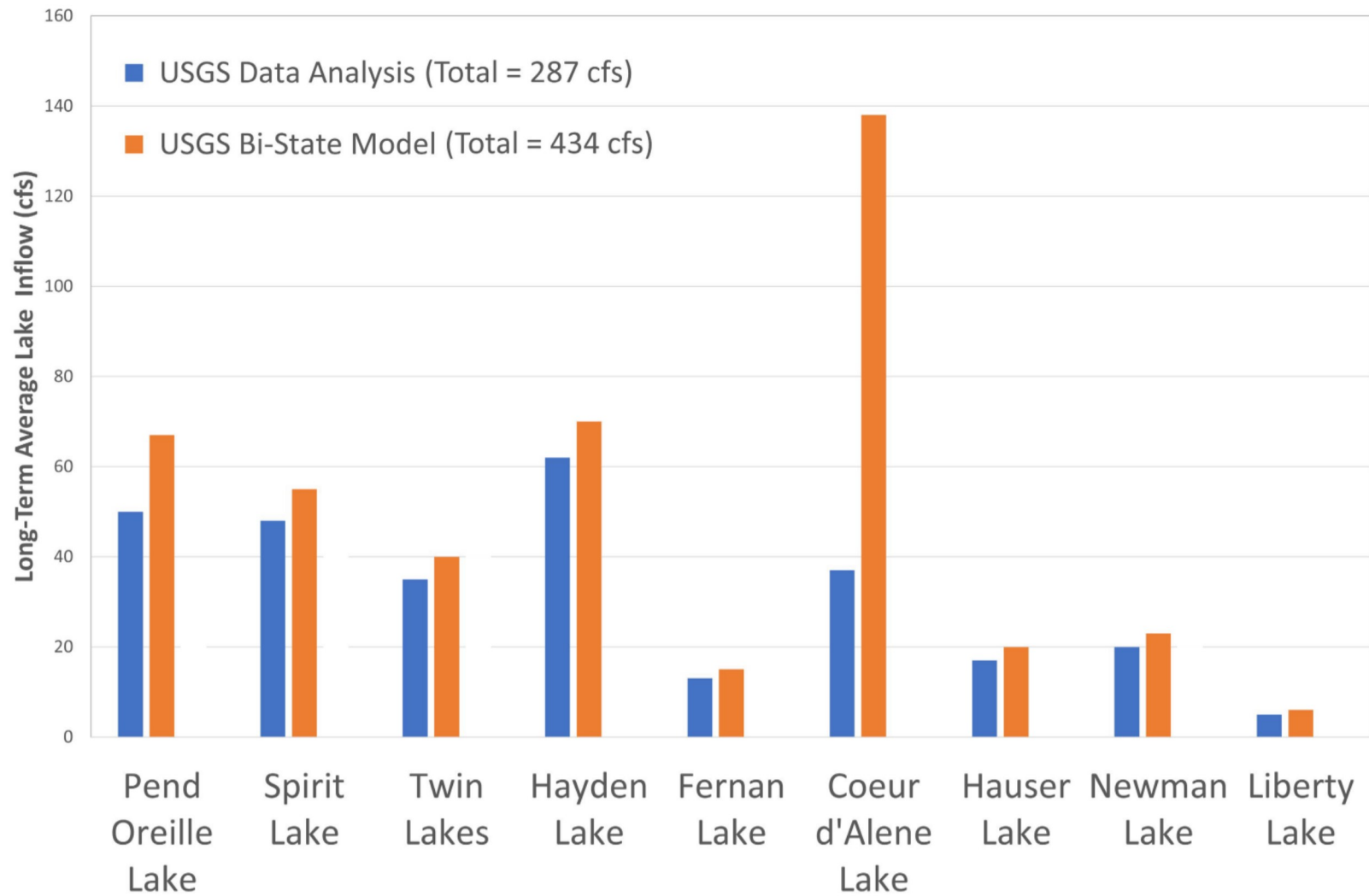
Evaluating Water Budgets

- Currently have three sets of estimates of long-term average lake inflows and aquifer water budgets
 - USGS data analyses leading to Bi-State modeling effort
 - Output from the Bi-State model
 - From the USGS modeling publication
 - Not from the actual model itself
 - Recent work by City of Spokane
 - Translation of USGS model, with updates

Basic Model Grid and Locations of Lakes



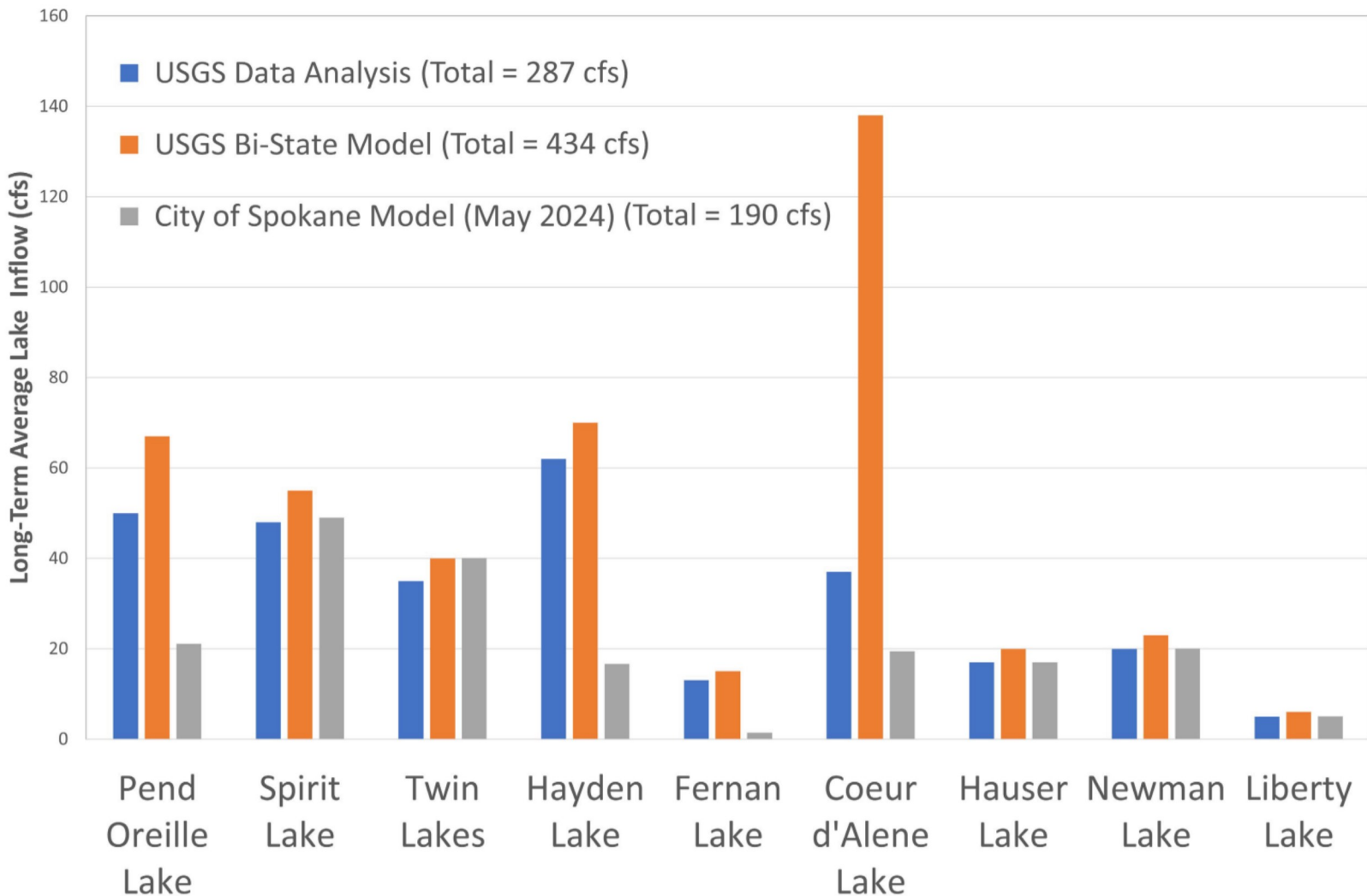
Long-Term Average Rates of Lake Inflows to the SVRP Aquifer System



Lake Inflows to Aquifer (cfs)

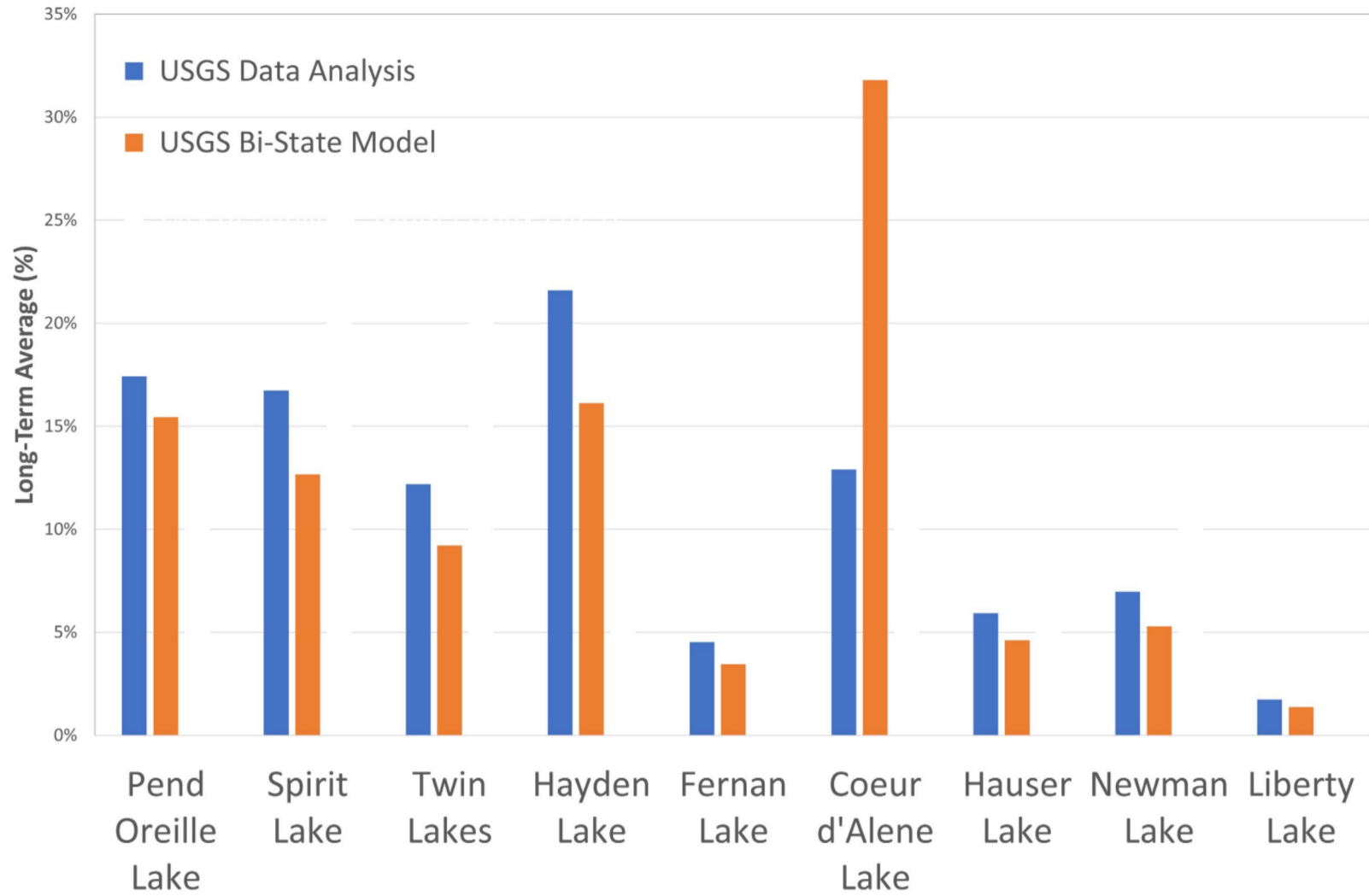
Long-Term Average Rates of Lake Inflows to the SVRP Aquifer System

Lake Inflows to Aquifer (cfs)



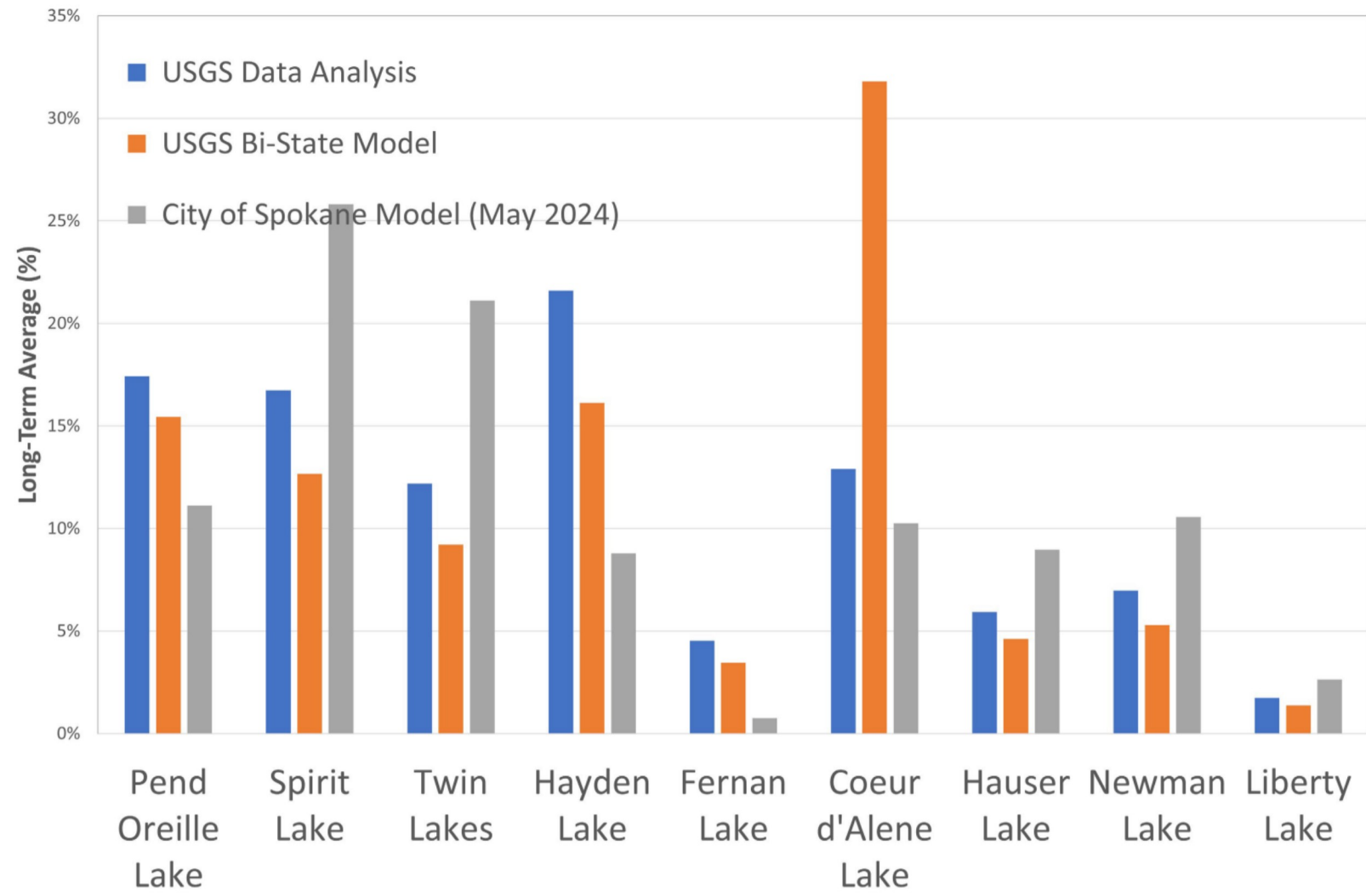
Lake Inflows to Aquifer (%)

Percent Contribution of Each Lake to Total Lake Inflow to the SVRP Aquifer System



Lake Inflows to Aquifer (%)

Percent Contribution of Each Lake to Total Lake Inflow to the SVRP Aquifer System

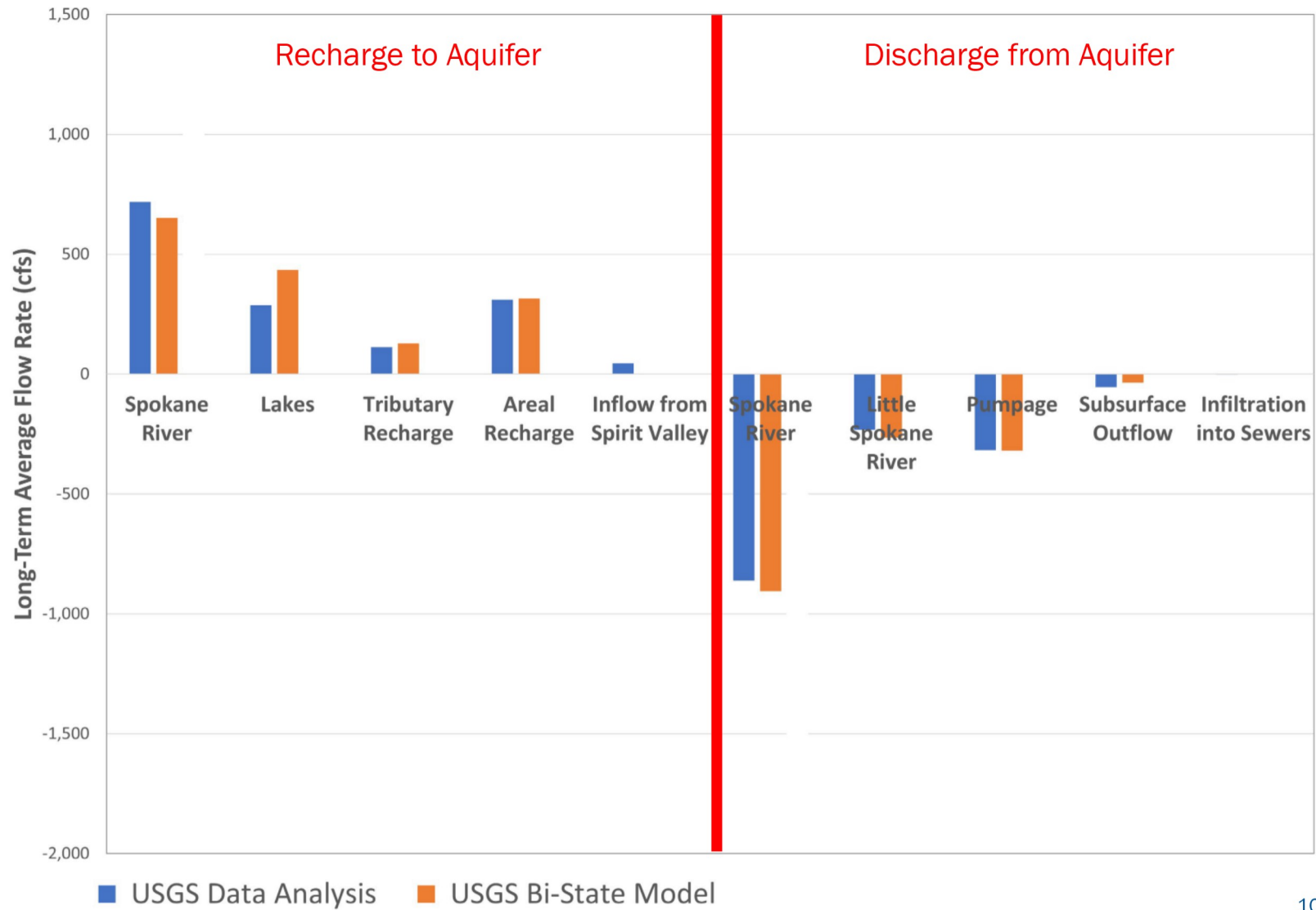


Summary: Lake Inflow Rates

- The USGS's Bi-State model has notable differences from the USGS's data study
 - The model has 50% more cfs of lake inflow than the study
 - The biggest cfs difference is Coeur d'Alene Lake
 - All lakes have higher cfs in the model than in the study
- The 2024 model has lower cfs inflow than USGS
 - Primarily Pend Oreille, Hayden, and Fernan Lakes
 - Maybe Coeur d'Alene Lake too
 - Suspect these are winter/spring differences, not summer

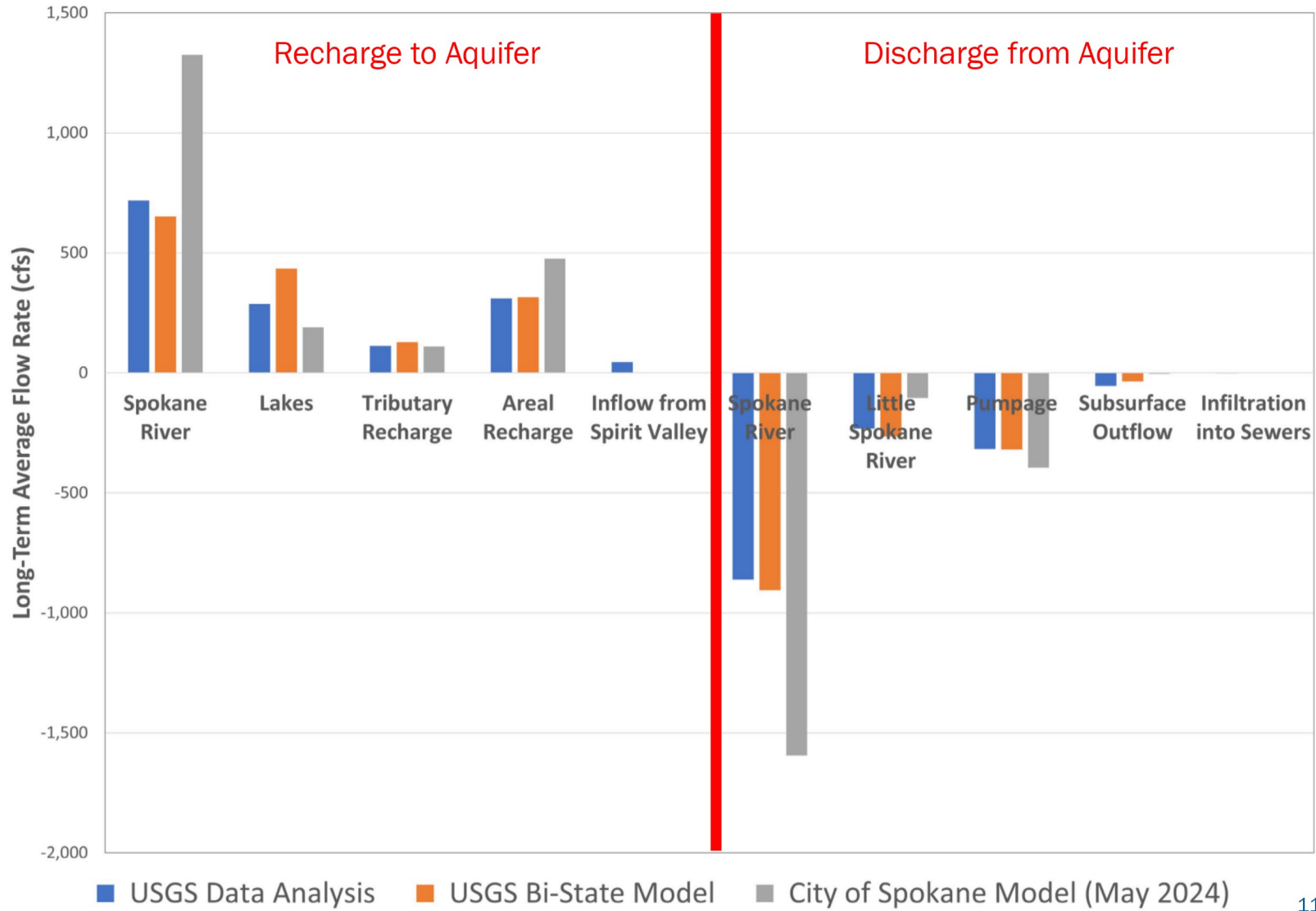
Aquifer Water Budget (cfs)

Long-Term Average Inflows and Outflows for the SVRP Aquifer



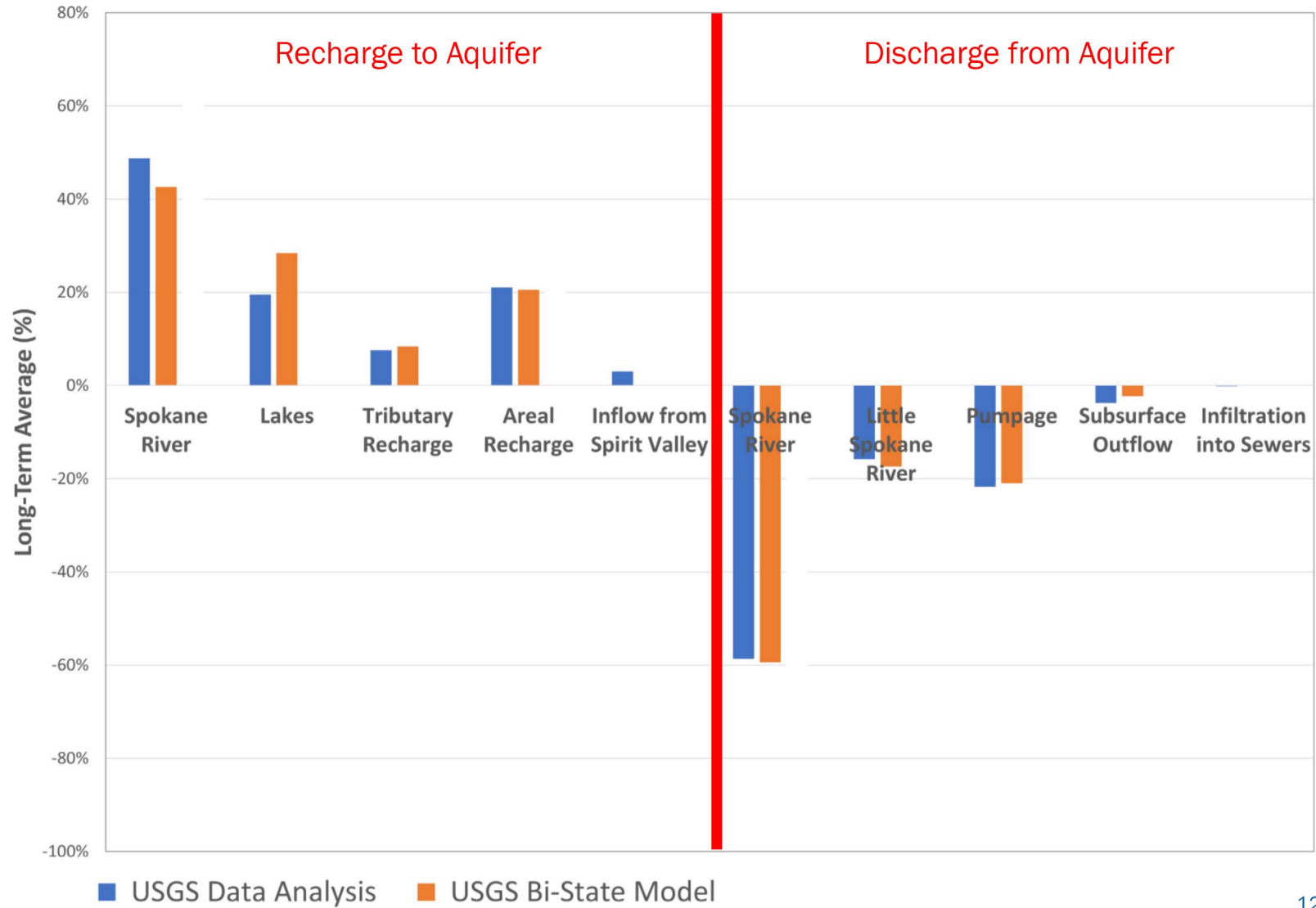
Aquifer Water Budget (cfs)

Long-Term Average Inflows and Outflows for the SVRP Aquifer



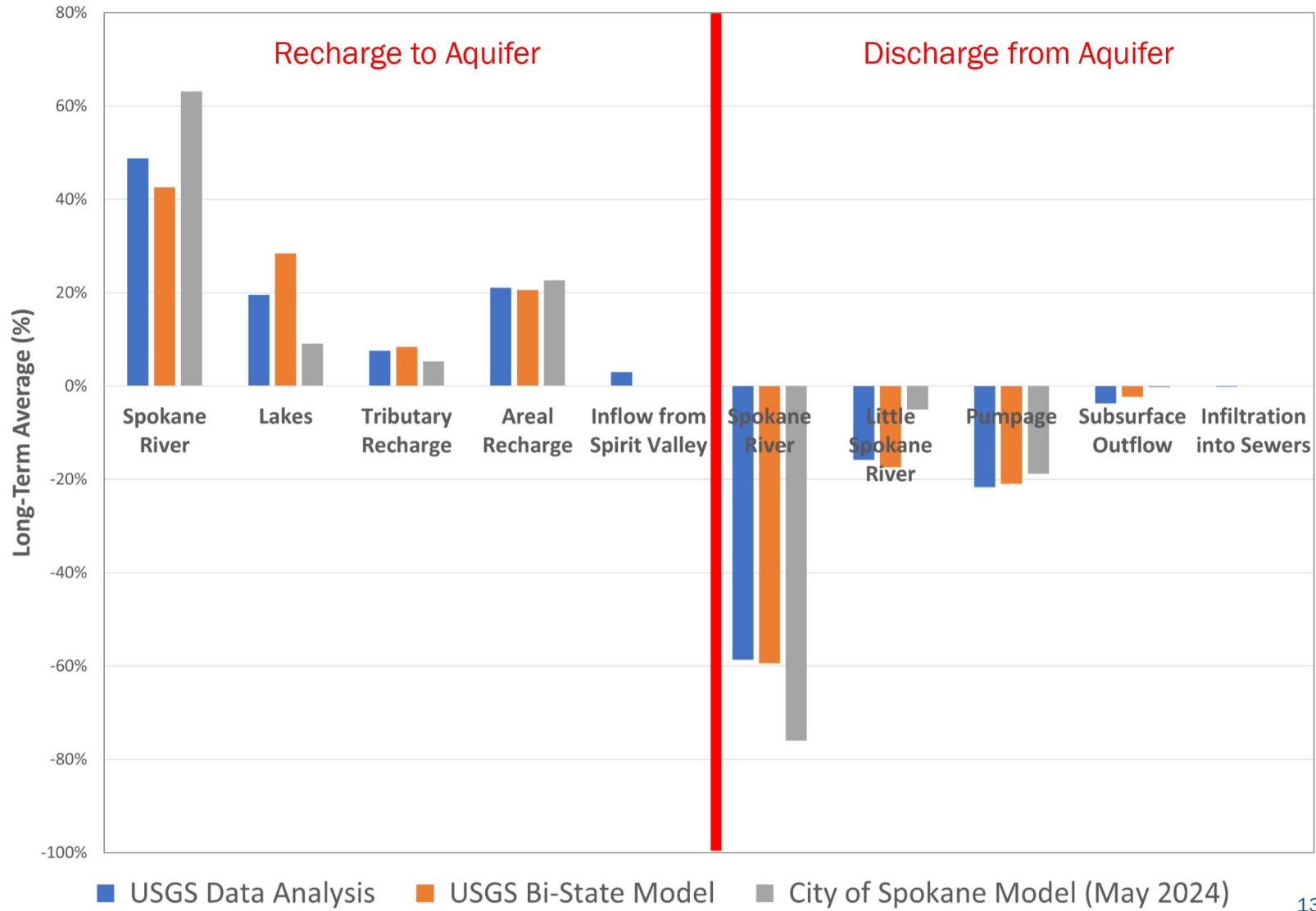
Aquifer Water Budget (%)

Percent Contributions to Inflows and Outflows for the SVRP Aquifer



Aquifer Water Budget (%)

Percent Contributions to Inflows and Outflows for the SVRP Aquifer



Summary: Aquifer Water Budget

- Bi-State model and 2024 model differ in how much the aquifer interacts with lakes and with the Spokane River on a long-term annualized basis
 - The USGS model seems to have:
 - Too little Spokane River interaction
 - Too much lake inflow
 - The 2024 model seems to have the opposite:
 - Too much Spokane River interaction
 - Too little lake inflow
 - These may be winter/spring issues more than summer

What This Means for Phase 2 of the Model Update Project

1. Updating areal recharge over the aquifer's footprint is a crucial input step before model calibration
 - Locations of different land use types
 - Recharge rates from:
 - Rainfall, drywells, urban irrigation, ag irrigation, septic systems
2. During model calibration, we need to test two different methods of simulating inflows from lakes
 - Use best available estimates of inflow rates
 - Or, let the model back-calculate rates during calibration

What This Means for Phase 2 of the Model Update Project

3. The model's calibration quality will be evaluated by comparing model results with certain data sets:
- Groundwater elevations from transducer data
 - City of Spokane and IDWR; maybe others?
 - USGS groundwater elevation contour map (Sept. 2004)
 - Spokane River gains and losses during late summer
 - USGS estimates (from the data study and the Bi-State model)
 - Mid-1990s studies by City of Spokane and Spokane County
 - Long-term average water budgets from the USGS study
 - The blue bars shown in prior slides

Schedule: Phase 1 of the Model Update Project

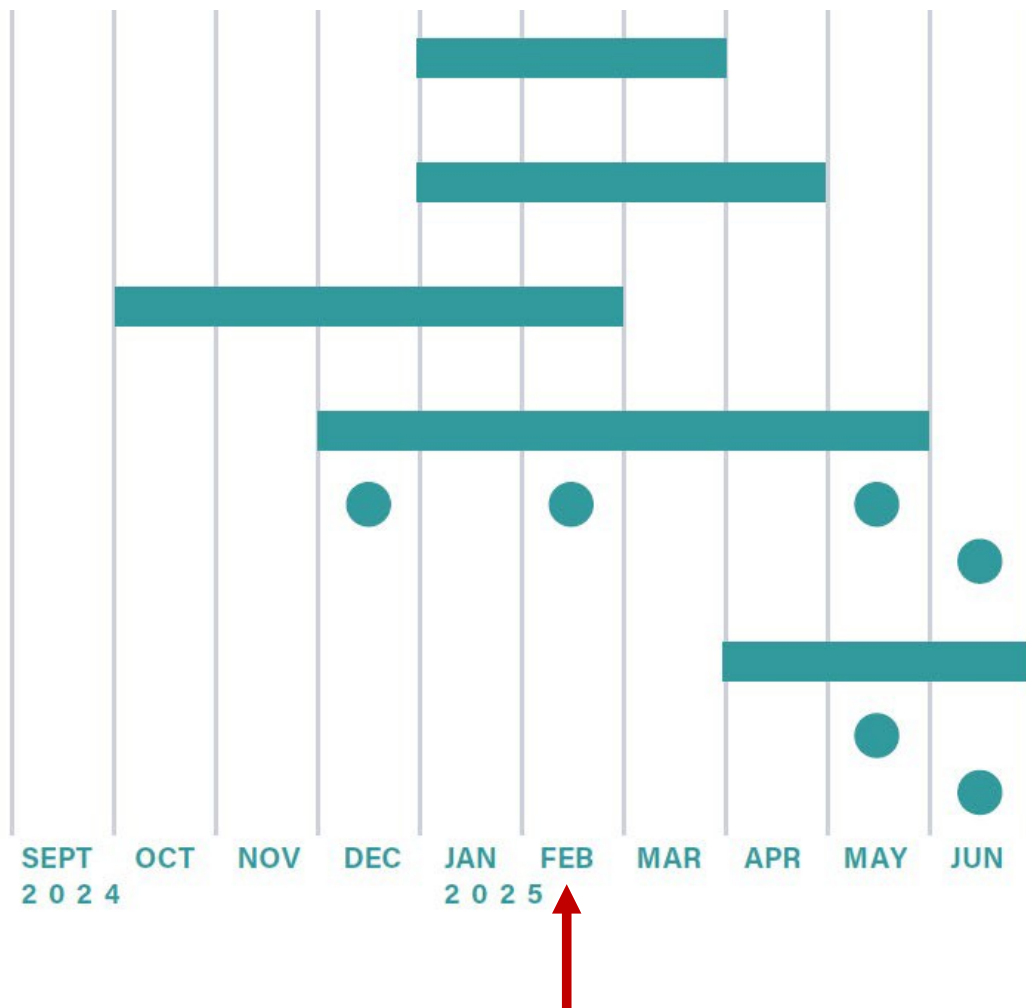
Task 1
Well Inventory and Data Collection

Task 2
Determining Pumping Rates

Task 3
Evaluating Model Inputs

Task 4
Meetings and Presentation
Quarterly Update Meetings
Presentation (June 10, 2025)

Task 5
Technical Memorandum
Draft Deliverable (May 16, 2025)
Final Deliverable (June 30, 2025)



Questions?

