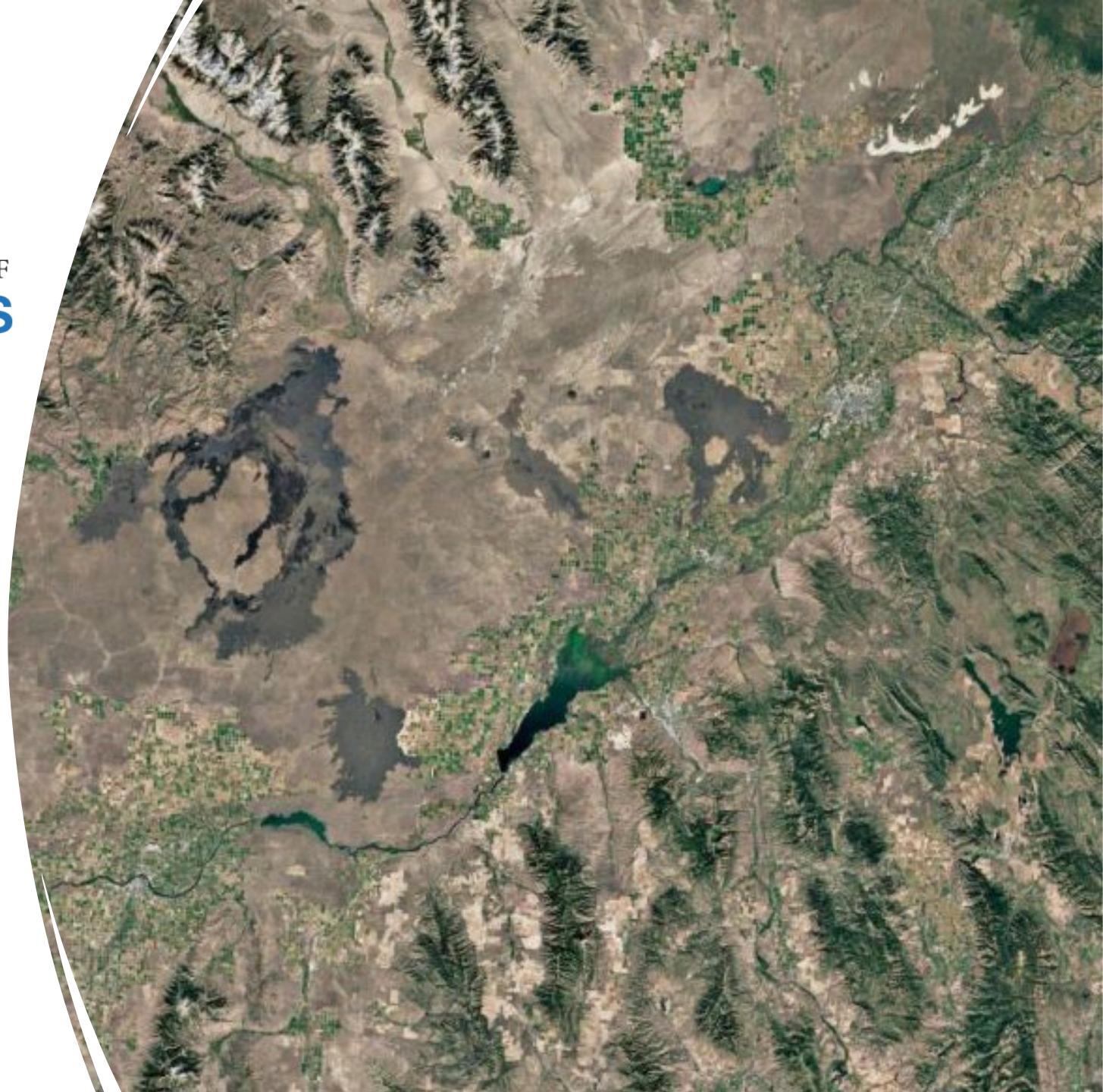
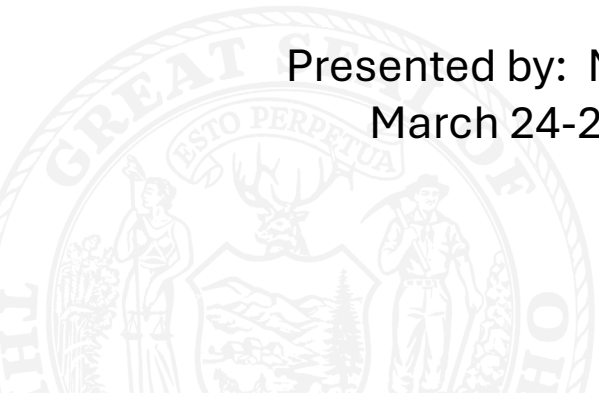




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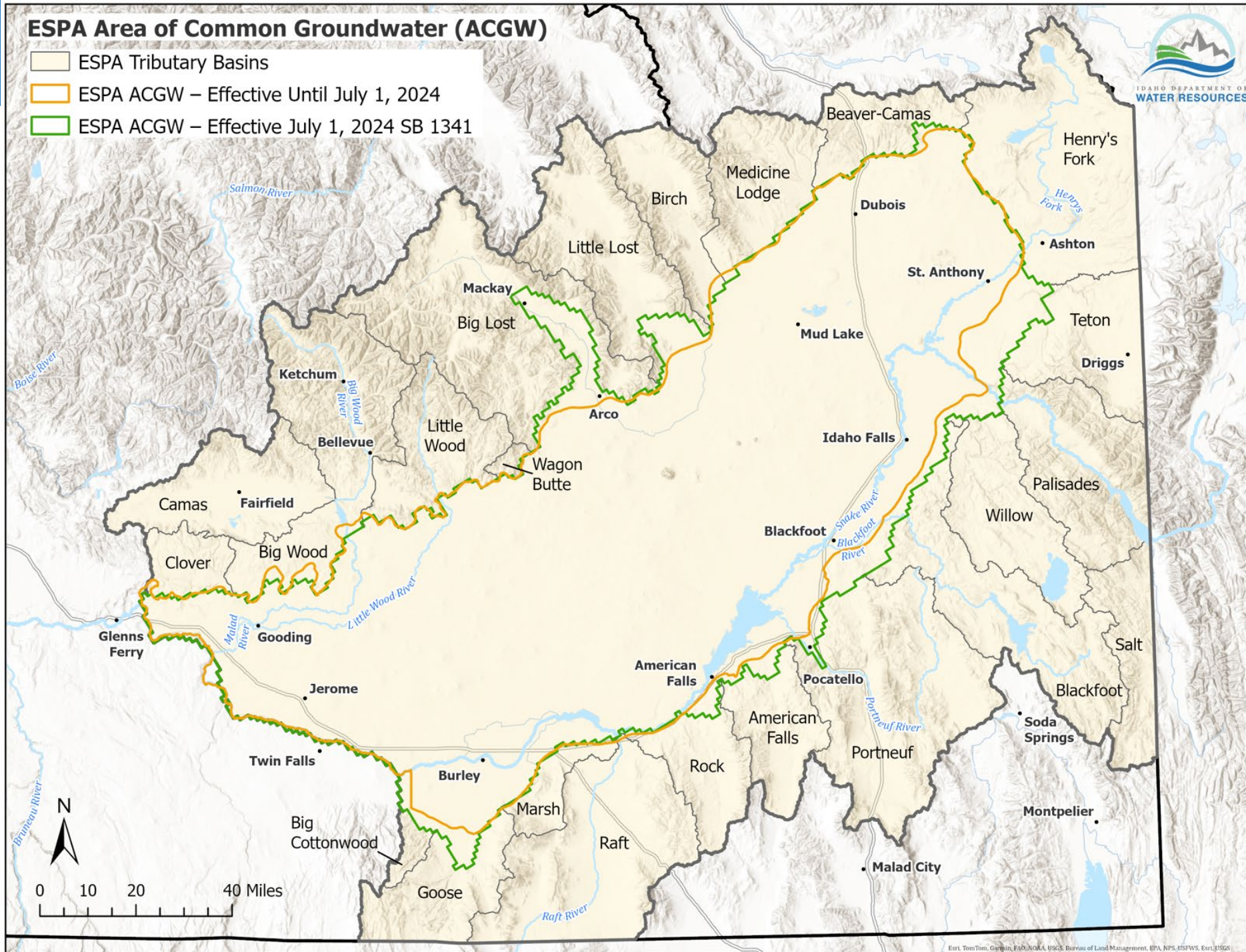
Hydrology of the Eastern Snake Plain & Its Tributaries

Presented by: Matt Anders
March 24-26, 2025



Eastern Snake Plain Aquifer (ESPA) & Tributary Basins

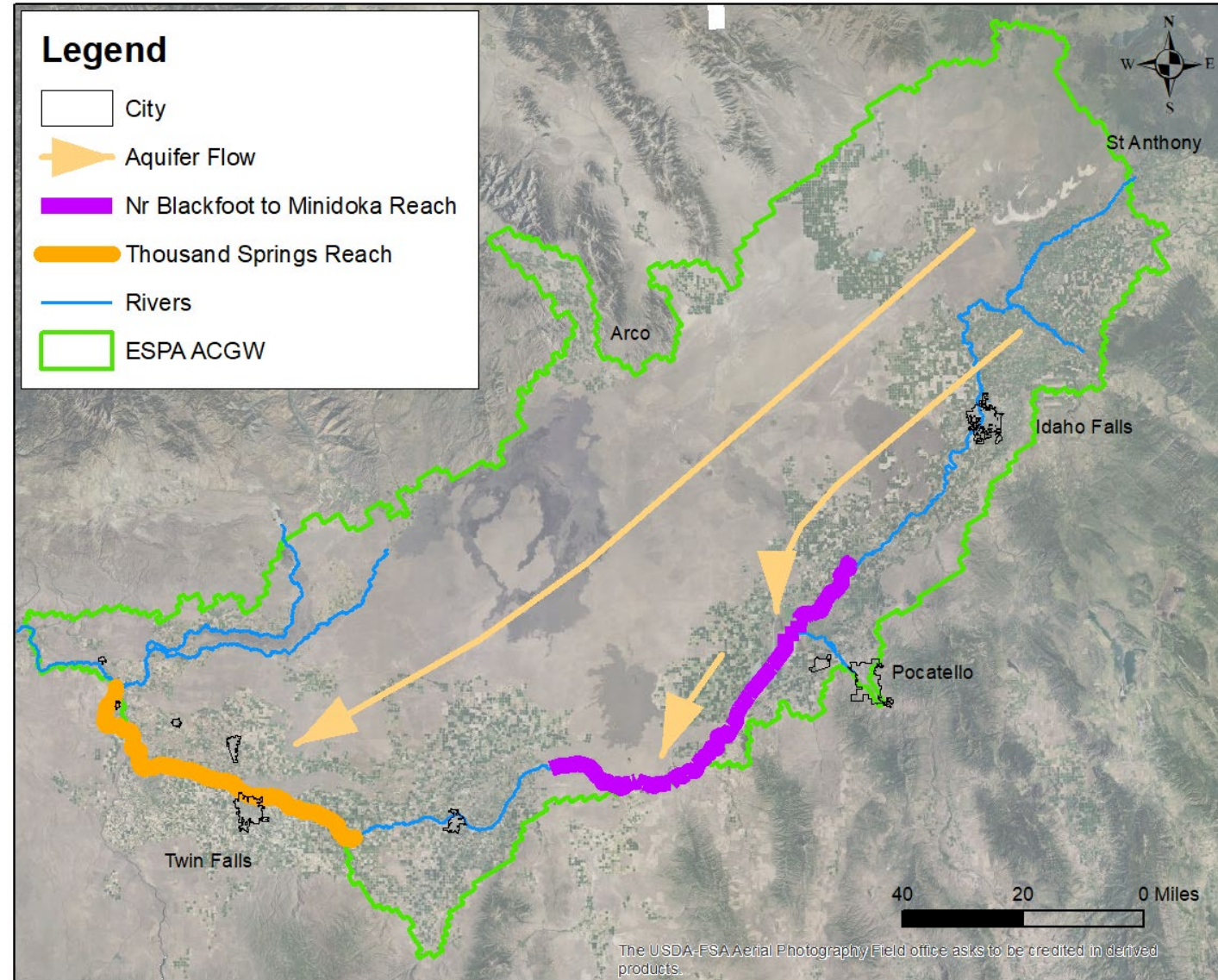
Area of Common
Groundwater
vs.
Tributary Basin





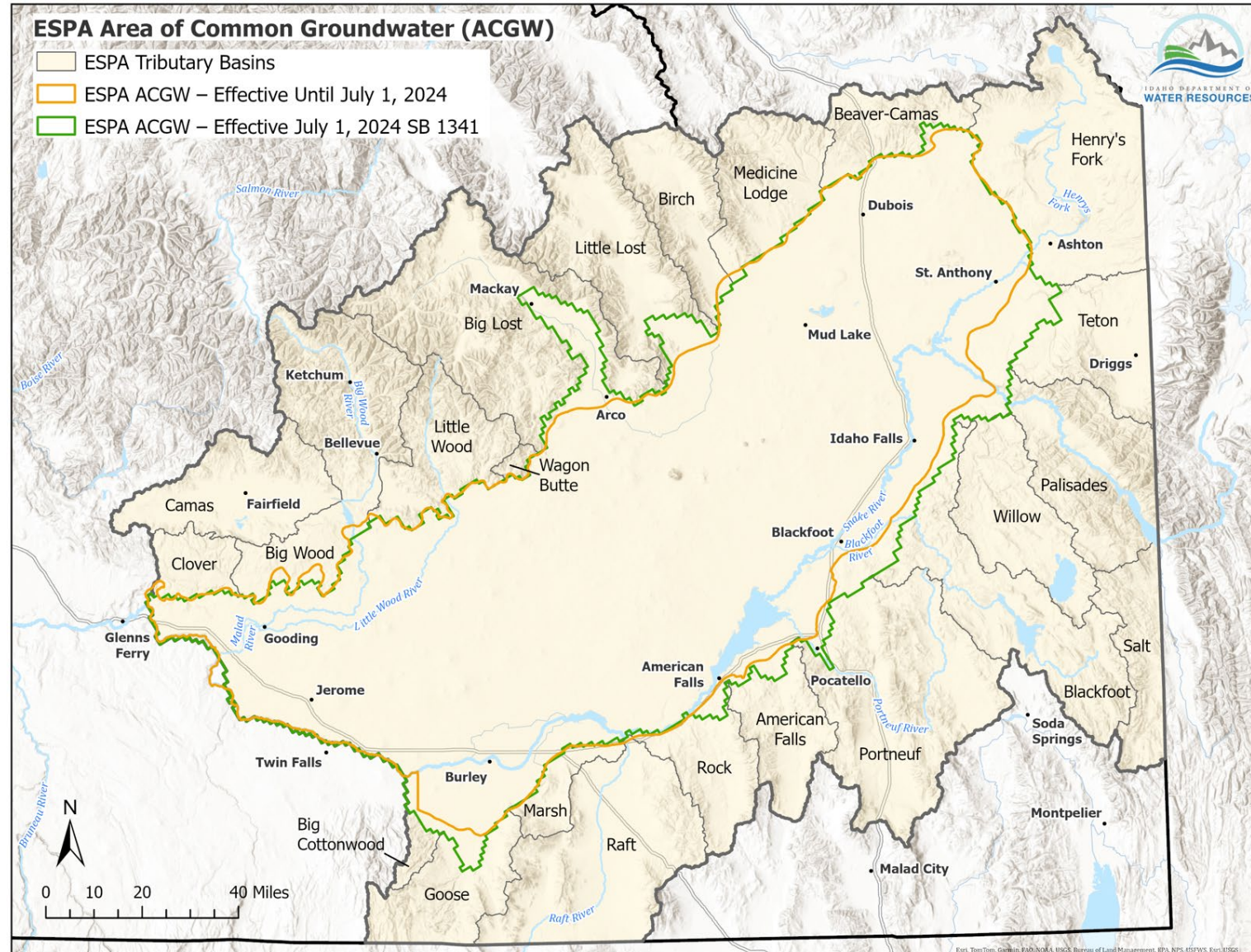
ESPA Surface & Groundwater Connection

- Groundwater flow is NE → SW
- ESPA discharges to Snake River
 - 1,000 Springs Reach
 - Near Blackfoot to Minidoka Reach
 - The natural flow water supply for the SWC.

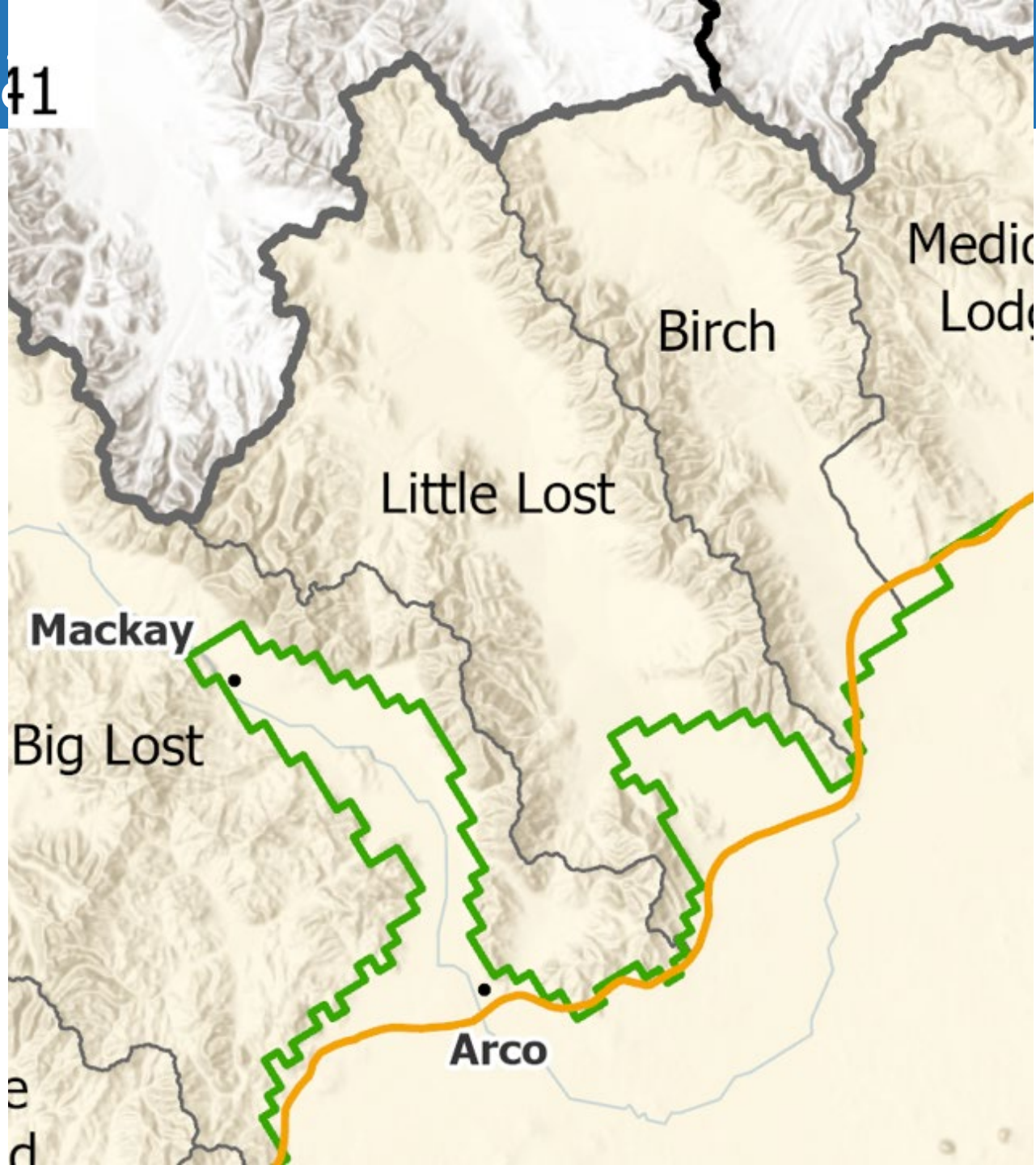


Tributary Basin Connection to ESPA

- U.S. Geological Survey mapped surface water drainage basins in the 1970s.
- Groundwater basin boundaries generally coincide with surface water basin boundaries.
- Groundwater divides in valley bottoms can be challenging
 - Bancroft-Lund GW divide
 - Arbon Valley GW divide

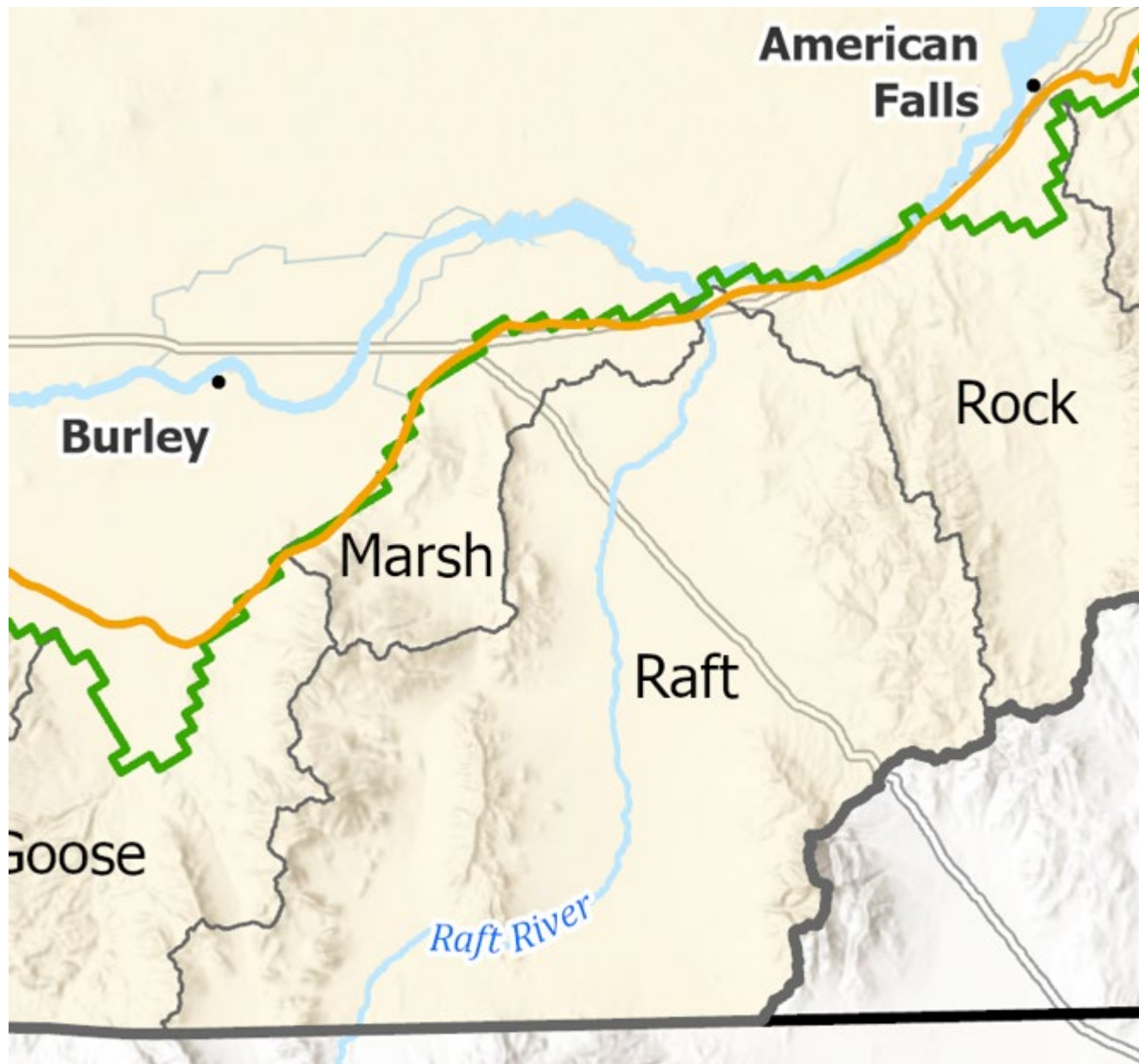






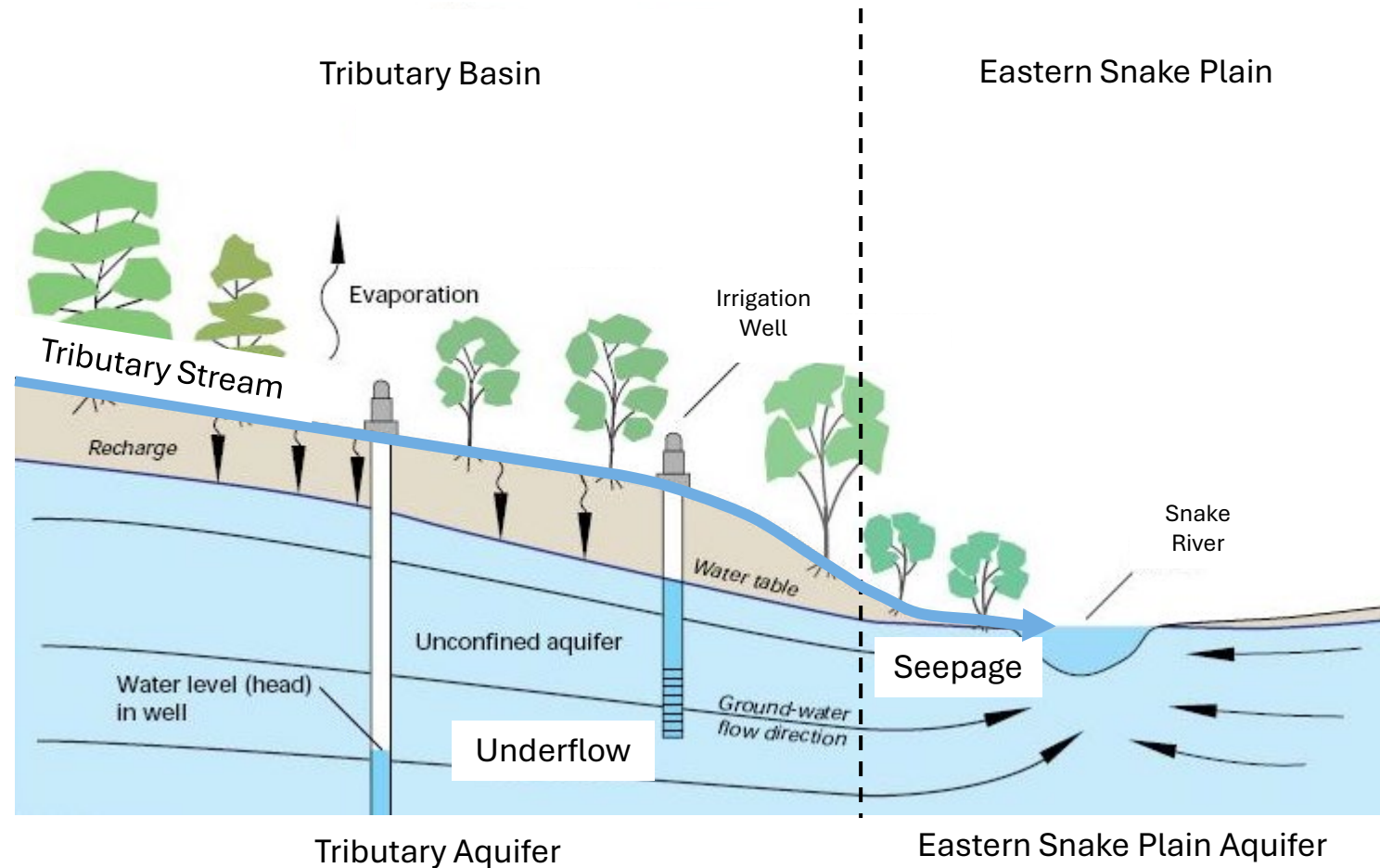






Tributary Basin Connection to ESPA

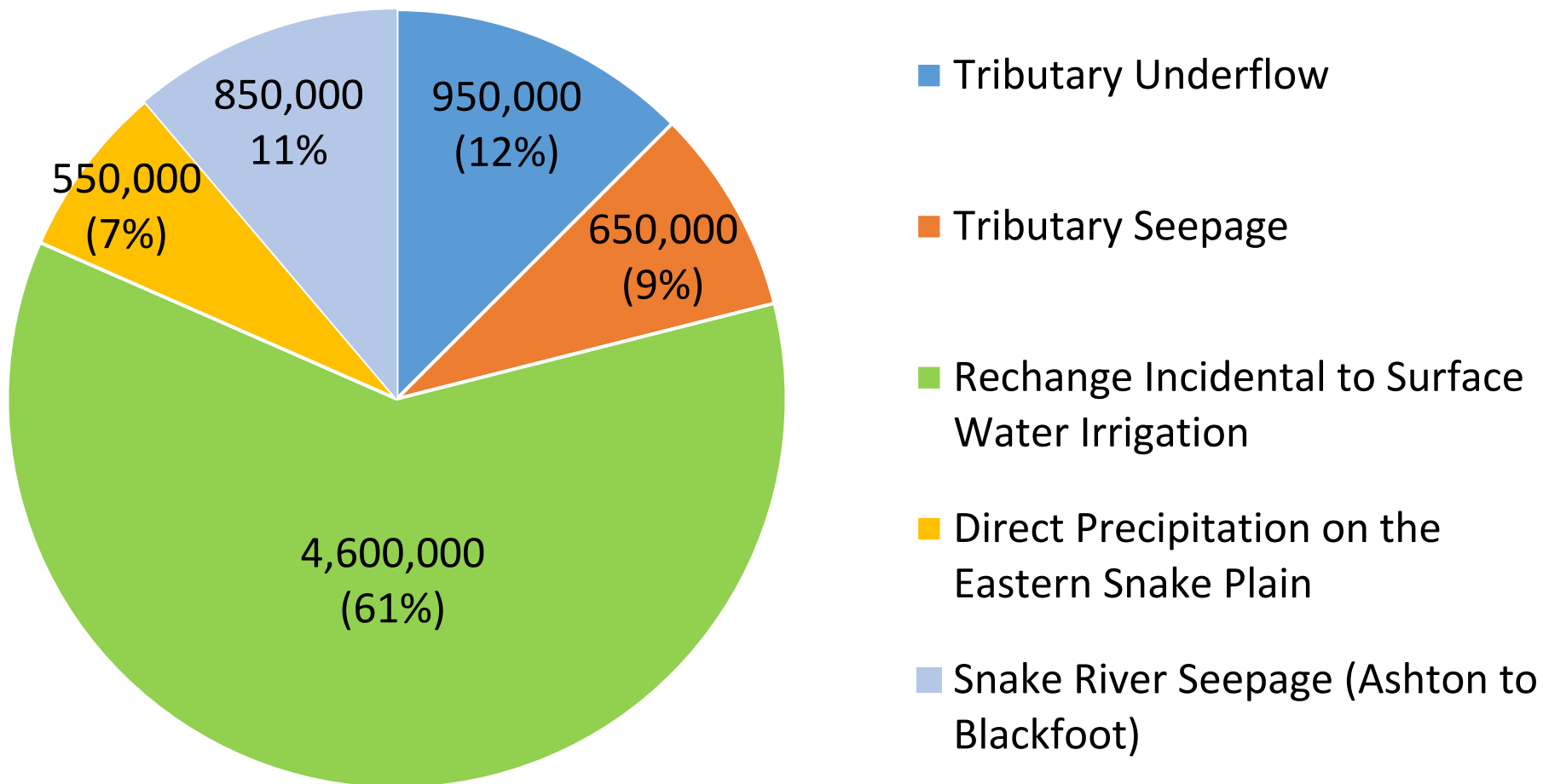
- Surface Connection
 - Tributary stream to Snake River
- Underground Connection
 - Seepage = tributary stream to ESPA
 - Underflow = tributary aquifer to ESPA
- Tributary basins contribute large, small, or intermittent quantities of water to the ESPA.





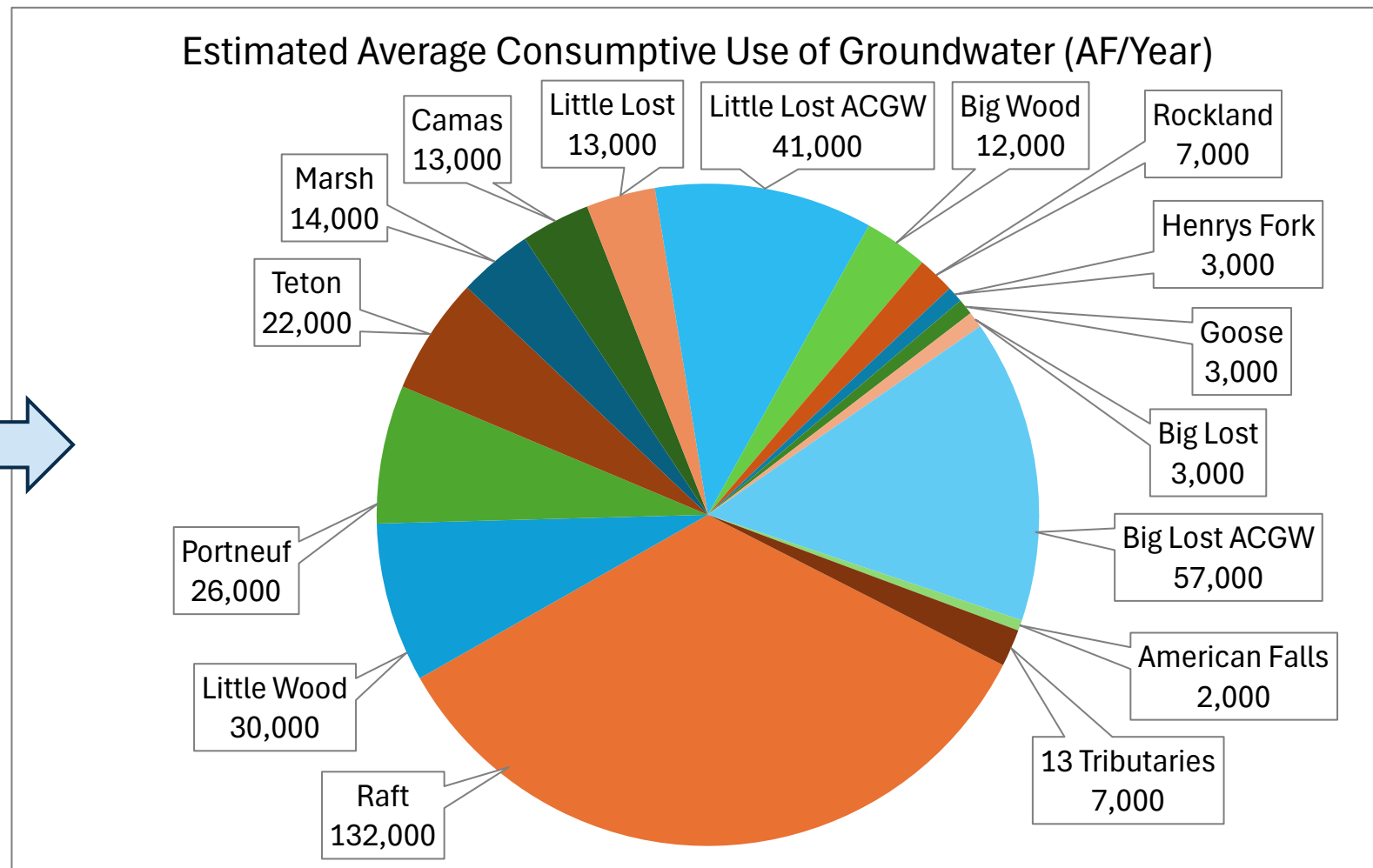
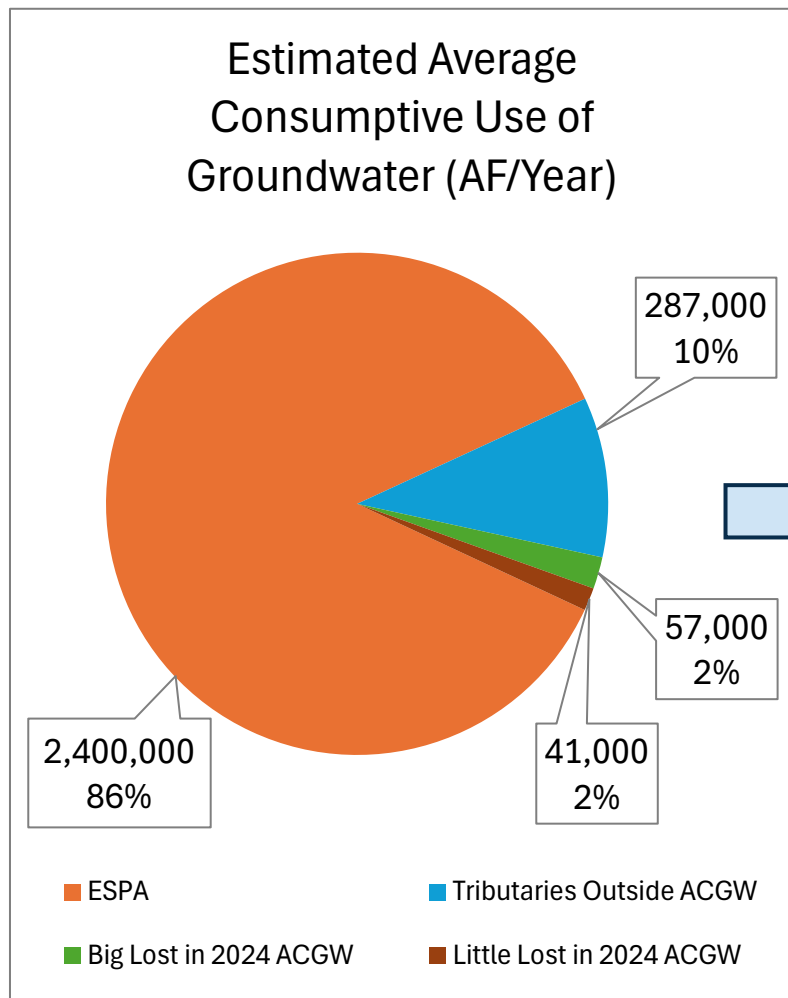
Tributary Basin Connection to ESPA

Average ESPA Recharge 2012-2021 (AF/YR)





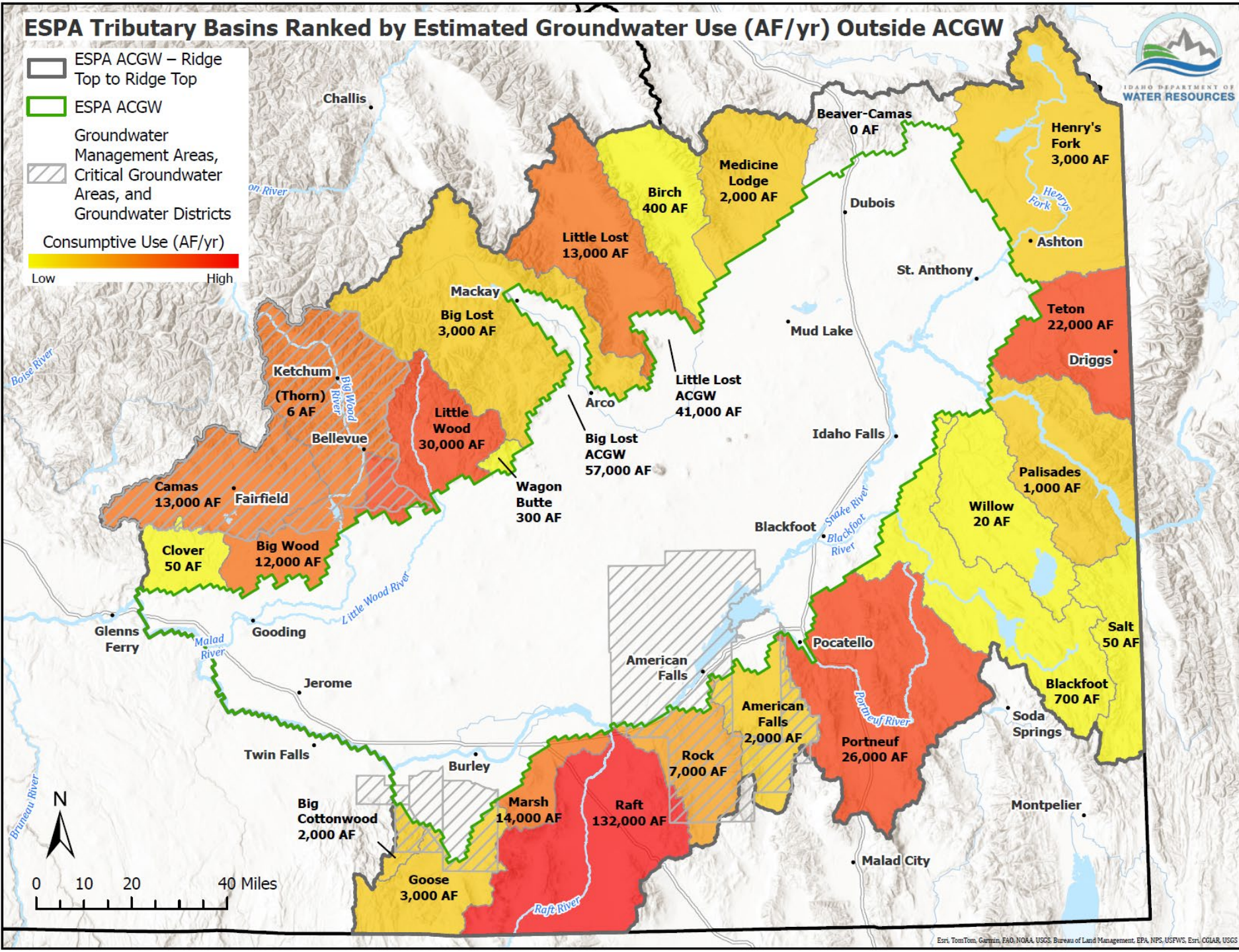
Tributary Basin Connection to ESPA



- Handout

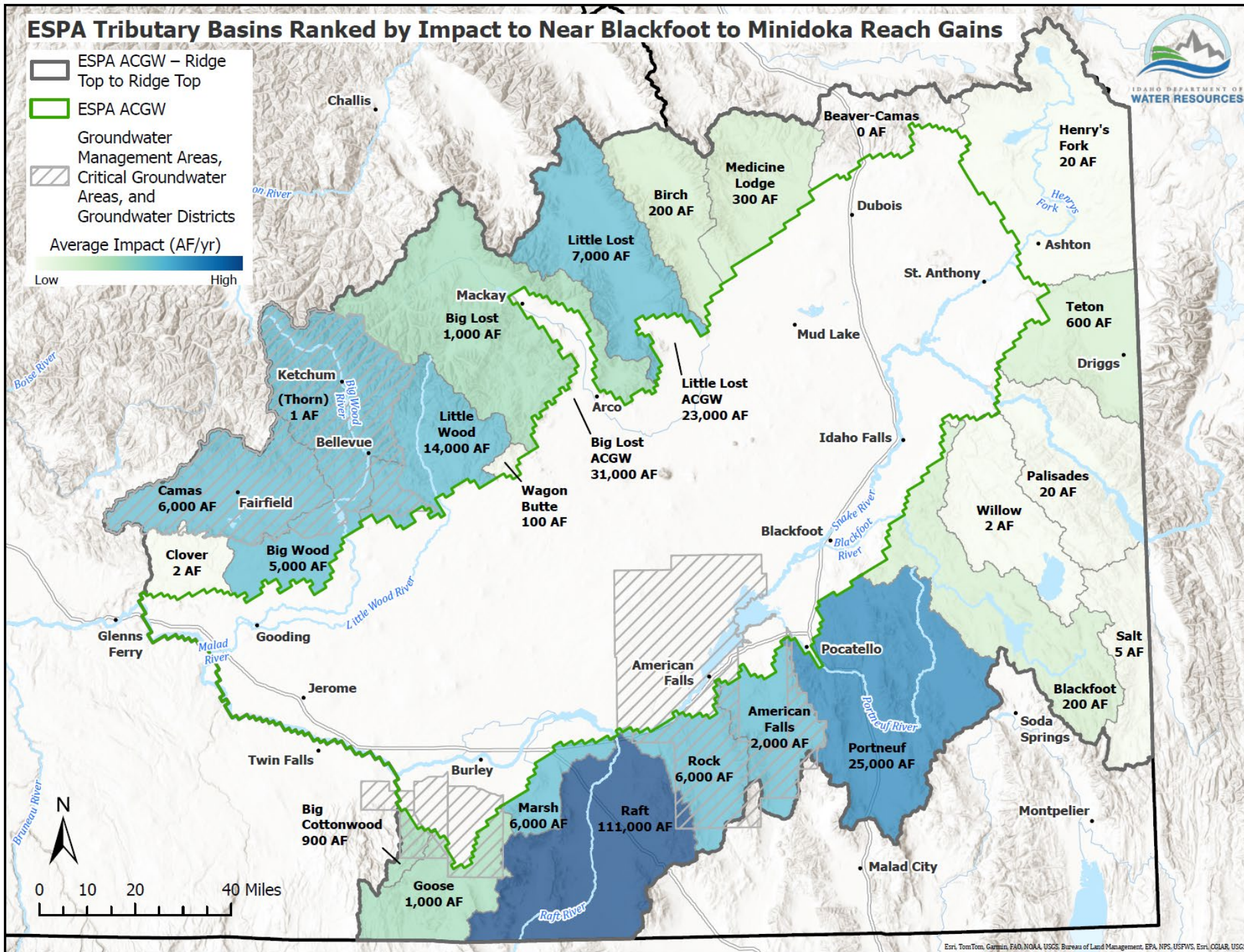
Tributary Basin Connection to ESPA

- Handout



Tributary Basin Connection to ESPA

- Consumptive groundwater use in tributaries reduces water inputs to ESPA.
- Estimated reduction in discharge to the Near Blackfoot to Minidoka Reach due to consumptive groundwater use.
- Handout



Questions?



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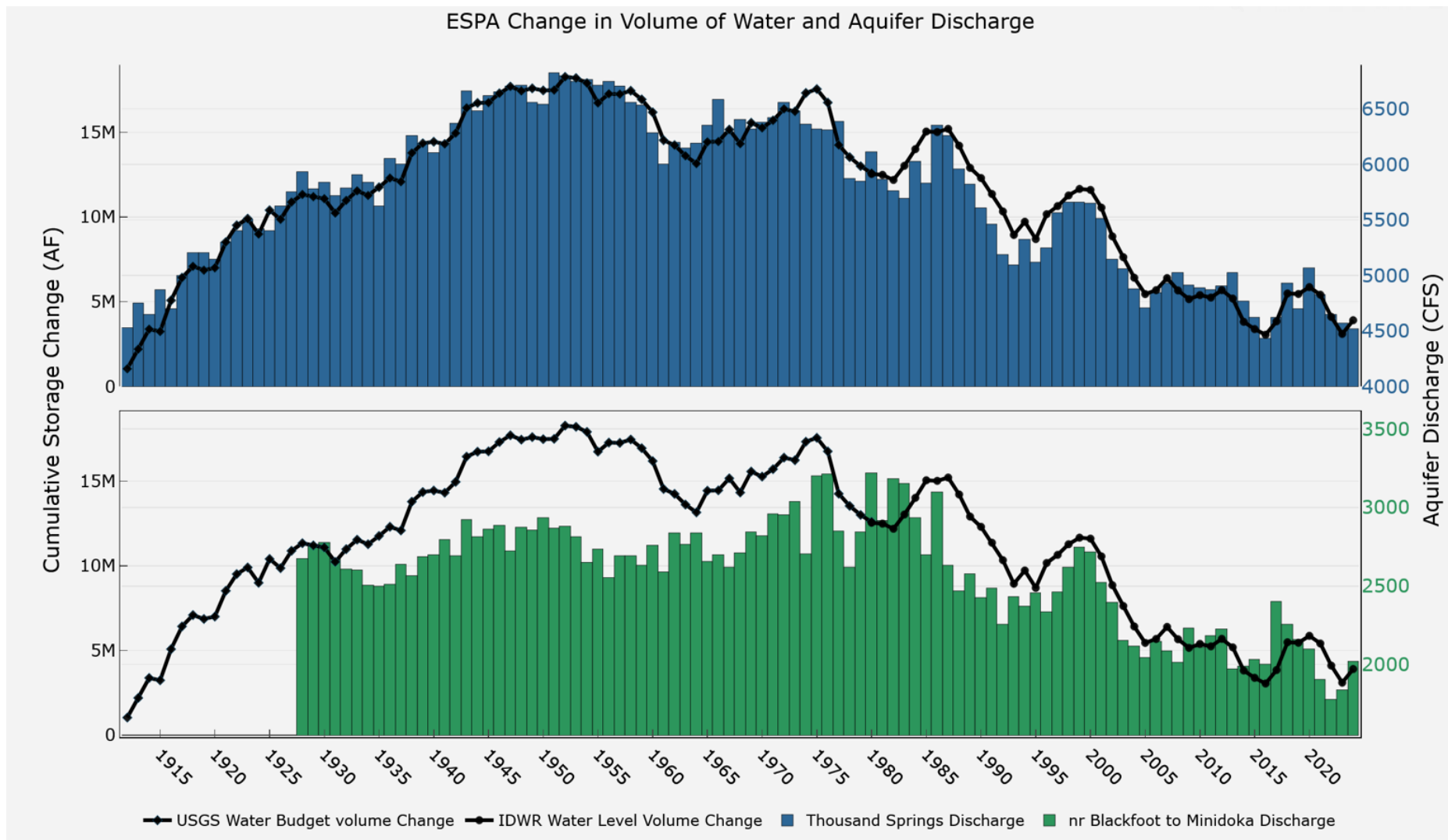
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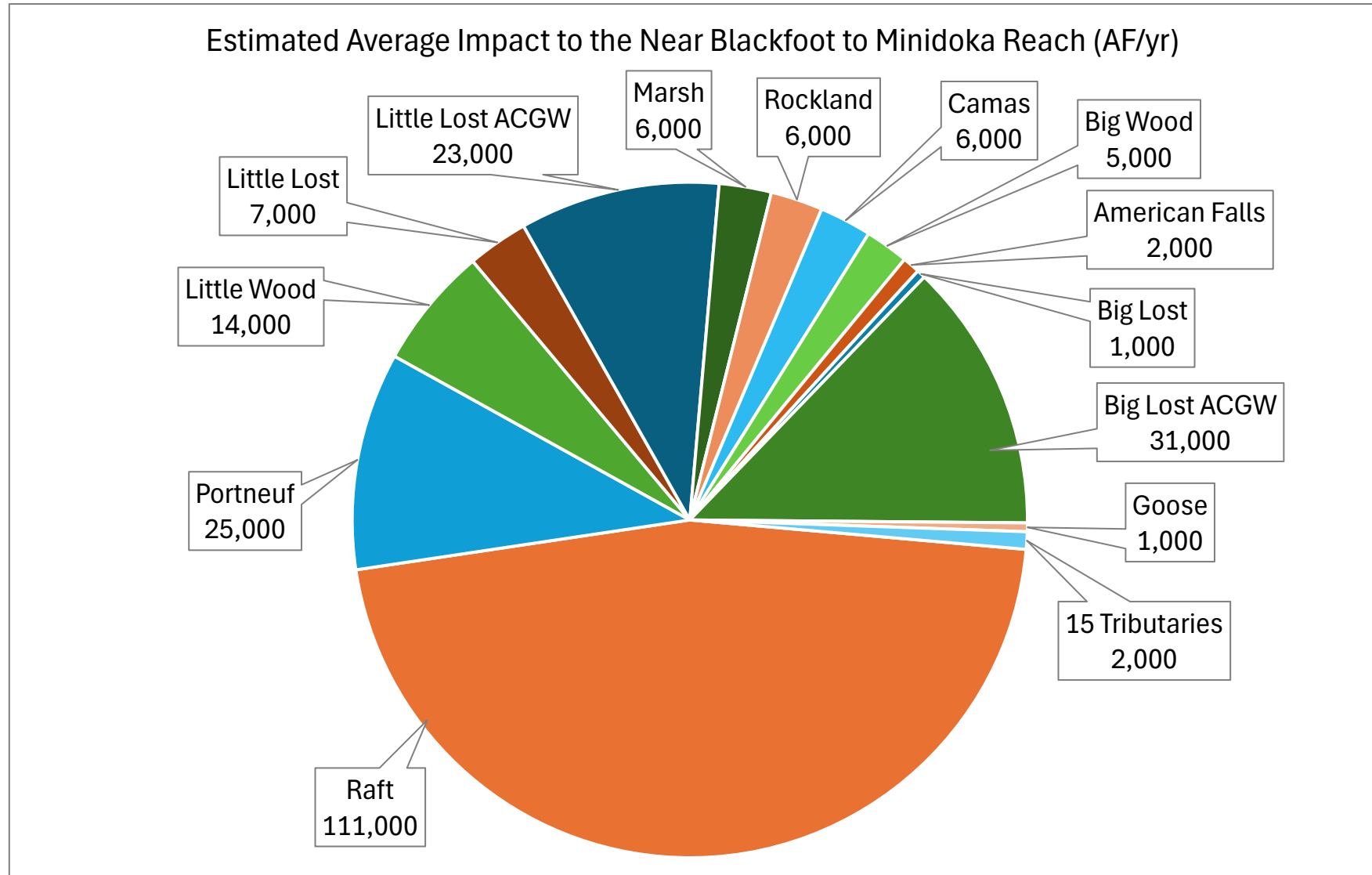
ESPA Surface & Groundwater Connection

- Black line is the change in storage in the ESPA.
- Blue bars are the ESPA discharge to Thousand Springs.
- Green bars are the ESPA discharge to the Near Blackfoot to Minidoka reach.
 - Natural flow water supply for the SWC is declining.



Tributary Basin Connection to ESPA

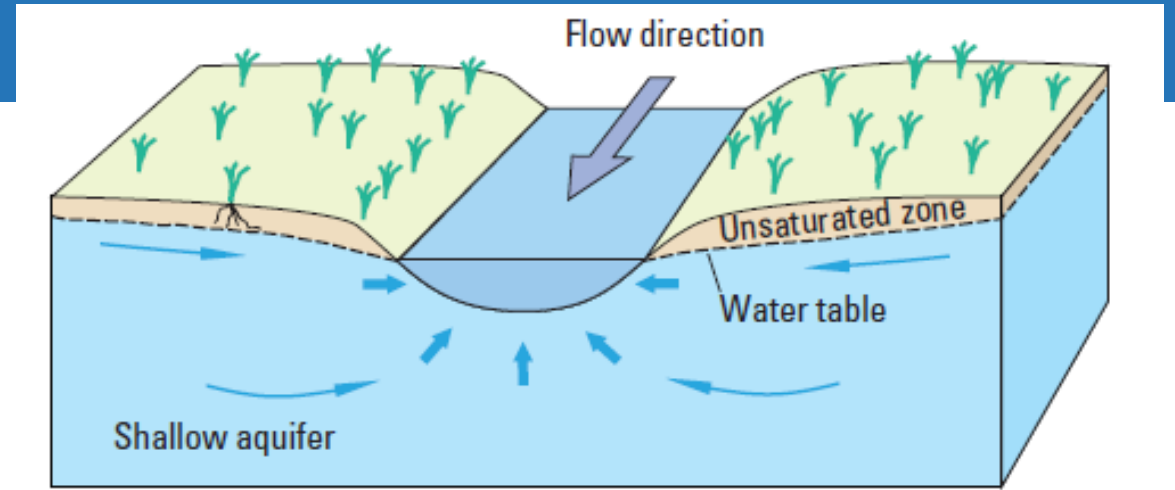
- Estimated reduction in discharge to the Near Blackfoot to Minidoka Reach due to consumptive groundwater use in tributary basins.



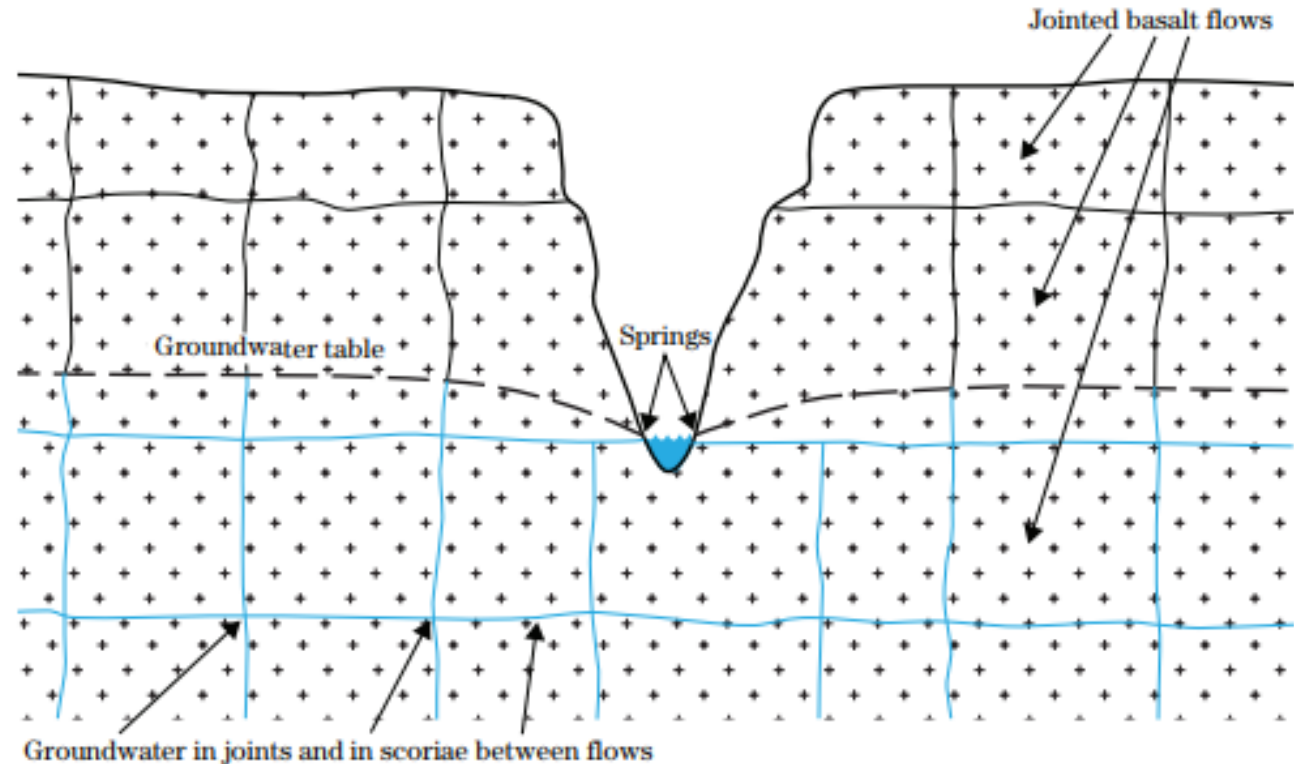


ESPA Surface & Groundwater Connection

- Springs occur when the groundwater table intersects the land surface or canyon wall.
- Discharge from springs is controlled by the water level in the ESPA.
- Higher water levels in the aquifer increase discharge at springs, and vice versa.



From USGS Circular 1376





Tributary Basin Connection to ESPA

Tributary	Estimated Seepage (AF/yr)*	Estimated Underflow (AF/yr)*
American Falls	---	21,000
Big Lost	138,000	80,000
Little Lost	25,000	275,000
Portneuf	---	22,000
Raft	---	30,000

* Estimated using ESPAM 2.2