

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





- 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

























- 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.











• Handout





- 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.





Questions?



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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.





 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



Groundwater in joints and in scoriae between flows



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