

## INFLUENCE OF GROUNDWATER ON STREAMFLOW IN SALMON-BEARING STREAMS

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Groundwater discharge plays a critical role in the proper functioning of streams, including the modulation of stream flow, temperature, and nutrient concentrations. In the Kenai Peninsula Lowlands, Alaska, groundwater resources are balanced between salmon-bearing streams and adjacent human users. These groundwater resources are limited and risk further depletion due to both rapid population growth and regional climatic drying trends. If stream flow in this region is primarily comprised of groundwater, a reduction in regional groundwater availability and discharge may be reflected by an accompanying reduction in stream flow. We analyzed the chemical hydrology of precipitation and groundwater across the Kenai Peninsula Lowlands to determine the relative contributions of these sources to stream flow. We used chemical fingerprints to infer the geologic history of different types of groundwater, and their relative contributions to instantaneous and annual stream flow. Contributions to stream flow come from both younger, shallow hillslope groundwater and older, deep-aquifer groundwater. We then used a three-end mass balance mixing model to determine the relative contributions of precipitation, shallow hillslope groundwater, and deep-aquifer groundwater to stream flow. We found that groundwater contributes over half of summer stream flow, more so in the winter. The younger, shallow hillslope groundwater contributes disproportionately to stream flow, though the older, deep-aquifer groundwater also contributes substantially to stream flow. Our results show that groundwater discharge plays an important role in supporting salmon-bearing streams in the Kenai Peninsula Lowlands. Additionally, our results indicate that water-supply wells draw from many of these same groundwater resources, creating a potential resource conflict. Further planned development in the area could result in further reduction of groundwater resources and eventually stream flow. Our results have implications for water resource management and associated ecological functions, and for the salmon-dependent Kenai Peninsula Lowlands economy.

**PRESENTER BIO:** Tyelyn Brigino earned a BS (Honors) in Chemistry and is currently a MS student in Geology at the University of South Florida.