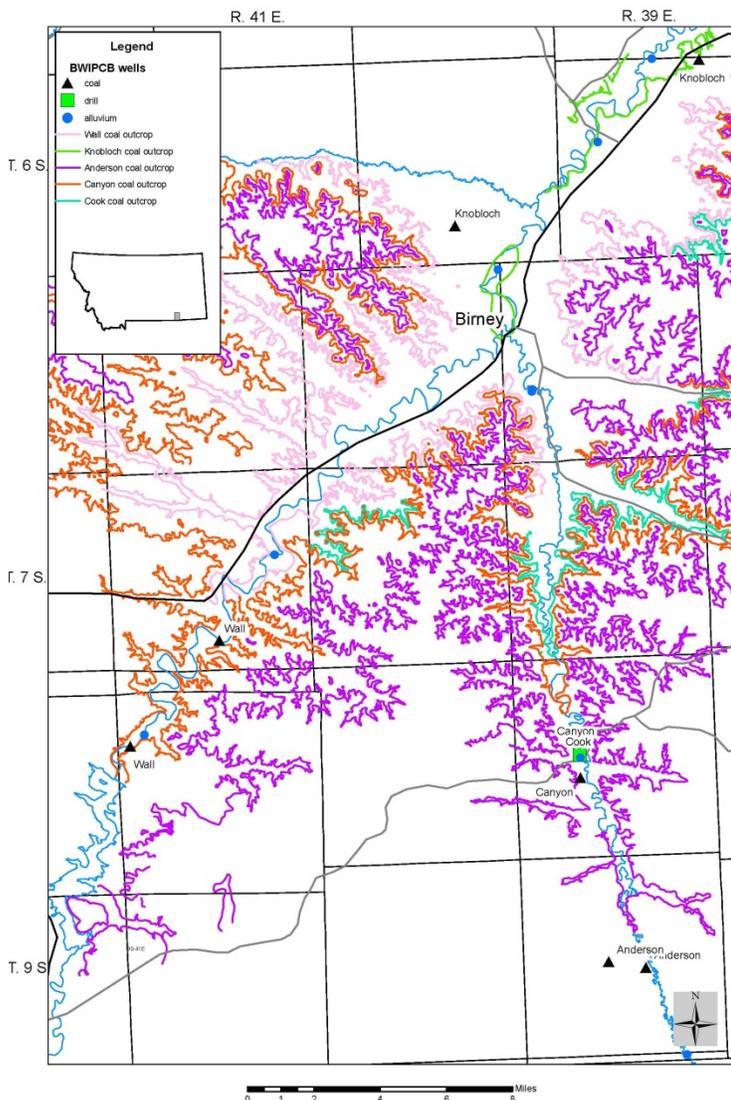


# GWIP PROJECT AREA: COAL AQUIFER BASEFLOW TO POWDER RIVER BASIN STREAMS

Coalbed methane production requires the extraction of large quantities of groundwater from coal aquifers; aquifers that provide baseflow to streams and are used throughout the region for domestic and stock purposes. Groundwater withdrawal during CBM production, up-gradient from where the produced coal seam subcrops to streams, has the potential to reduce baseflow to those streams. The volume of water contributed by coal seams to surface drainages in the Powder River Basin is unknown, which has created an environment of discord between the many water users in both Montana and Wyoming. The presence or magnitude of impact to coal aquifers is difficult or impossible to show without a better understanding of the relationship between coal aquifers and surface streams in the Powder River Basin.



Isotopes of carbon and strontium have been shown to effectively fingerprint the groundwater contribution to surface water in the Powder River Basin. Geochemical parameters will be combined with traditional in-stream flow measurements to identify – and perhaps quantify – the contribution to Powder River Basin streams from coal aquifer baseflow. Samples and flow rate measurements were taken during the lowest point in the stream hydrograph to maximize the proportional contribution of groundwater to the surface water hydrograph. Wells completed in the targeted coals near outcrop were sampled.

The ability to quantify the impact to surface water from up-gradient energy development will aid in the acquisition of the necessary permits that will allow the energy producers to use the coproduced water for beneficial purposes, rather than treat it as a waste product. Defining and quantifying the relationship between the coal aquifers and streams will allow stakeholders to have science based discussions of best management practices.

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