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## **GROUNDWATER/SURFACE WATER INTERACTIONS ON THE CLARK FORK RIVER**

Eva Hover \*, Geological Engineering, Montana Tech, Butte

Grant-Kohr's Ranch is a National Historic Site located near Deer Lodge, MT. The ranch stretches along a two mile reach of the Clark Fork River, which has been contaminated by mine tailings. Plans for remediation are in progress, and information regarding where groundwater enters and leaves the river is important in this remediation process. A handheld temperature (T) and specific conductivity (SC) probe was used to look for spatial anomalies of these parameters that may indicate where groundwater enters the river. To do this, fifteen cross sections consisting of several T and SC readings were collected perpendicular to flow, and several readings were collected along the river banks (no cross sections) between each cross section. Significant spikes in specific conductivity values are consistent with groundwater entering the river. Zones of low high water temperatures in the winter is consistent with areas where groundwater warmer than the surface water is infiltrating the river. This idea holds true in warmer months as well, as areas where low temperatures are logged may show where cooler groundwater is infiltrating the warmer surface water. Radon-222 ( $^{222}\text{Rn}$ ) was collected along both the right and left banks at all fifteen monitoring locations to verify groundwater inputs inferred from T and SC measurements.  $^{222}\text{Rn}$  de-gasses quickly when a river flows from a gaining to a losing reach, so this is an ideal validation. Local lithology suggests a sandy gravelly aquifer that would interact with surface water. Both  $^{222}\text{Rn}$  combined with T and SC suggest intermittent zones of groundwater inflow along the river banks, often only occurring along one side of the river at a time.