



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002AK4B

Title: Molecular characterization of organic matter in soil leachates from the Caribou Poker Creeks Watershed

Project Type: Research

Focus Categories: Hydrology, Methods, Groundwater

Keywords: Permafrost, hydrology, organic geochemistry

Start Date: 03/01/2002

End Date: 02/28/2003

Federal Funds: \$17,178

Non-Federal Matching Funds: \$14,033

Congressional District: Alaska

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Abstract

The Caribou and Poker Creeks Watershed (CPCRW) is an important component of the Bonanza Creek LTER (Long Term Ecological Research) Program. The CPCRW serves as a testbed for process studies on interactions between hydrology, meteorology and permafrost. By characterizing the nature and origin of organic matter in water leaching from soil it will be easier to identify the source of water above and below permafrost, in interpermafrost springs and in streams. In addition to a better understanding of the hydrology of permafrost watersheds in general, understanding the origin and character of organic matter is important to understanding the potential for contaminant transport in permafrost dominated watersheds. Depending on the origin of the organic matter, contaminants may be sequestered in the soil or mobilized, reappearing in drinking water wells far downgradient.

NOM in water from the CPCRW is being fingerprinted using pyrolysis -GC/MS as part of a current USGS/WERC project. Fingerprints for the organic matter in Caribou Creek, Little Poker Creek, as well as 6 springs and 2 wells are being analyzed. Water samples from each source were collected three times per year so that the molecular characterizations account for seasonal changes in the organic matter characteristics. In addition to the molecular characterization, a study is being conducted to evaluate the potential for organic matter in the CPCRW to transport heavy metal contaminants.

In this proposal, we seek to use fingerprints from soil leachates to determine infiltration areas for water emerging in springs and streams throughout the CPCRW. This will be accomplished by collecting and fingerprinting soil leachates, then statistically comparing them to spring, stream and well water samples already being processed. Furthermore, fingerprints from the soil leachates will be used to estimate the potential for waters derived from different infiltration areas to mobilize contaminants.