

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Investigation of Hyporheic Microbial Biofilms as Indicators of Heavy Metal Toxicity in the Clark Fork Basin, Montana

Discipline: Natural
Type of Project: Research
Funding Agency: USGS
Other Partners/Cooperators: Montana State University
Students Involvement:
Effective Dates: 2/15/2015 - 2/14/2016
Funding Amount: \$12,000

Investigators and Agency Representative:

USGS Contact: Elliott Barnhart, Wyoming-Montana Water Science Center, 3162 Bozeman Ave, Helena, MT 59601, phone: 406-457-5921, email: epbarnhart@usgs.gov

Investigator: Dr. Matthew Fields, Montana State University, Department of Microbiology, 319 EPS Building, Bozeman, MT 59717, phone: 406-994-7340 email: matthew.fields@biofilm.montana.edu

Project Abstract: Biofilm communities in metal contaminated environments contain microbial community members that have genes which enhance survival in the presence of metal contamination (Bouskill et al, 2007). Mapping the community profile along an in situ metal contamination gradient present in the Clark Fork River with high-throughput gene-sequencing technology could determine specific community members that inhabit the biofilms under different heavy metal concentrations. Integration of the gene-sequencing analysis with the extensive geochemical and toxicity data available from the Clark Fork Basin could help define microbial community members as biomarkers of heavy metal contamination. The characterization of such relationships will provide insight into the development of faster and less expensive monitoring tools for environmental assessment.

The objectives of this research is utilize Illumina MiSeq DNA sequencing technology at the Center for Biofilm Engineering at Montana State University (MSU) to determine the community members present in the biofilm samples. Will then use statistical analysis to couple sequencing analysis with USGS water/sediment chemistry and insect toxicity data as previously described (Hwang et al., 2009).

Keywords: Heavy metal contamination, biofilm engineering, DNA sequencing, USGS, Montana State University