1. COVER SHEET

Project Title	**Microbial mediated mercury methylation and sulfur cycling in deep brine sediments of Great Salt Lake- a mechanistic and molecular approach.**
Lead Project Sponsor	University of Utah
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Project Description/abstract	Mercury is one of the most toxic trace elements that is found in the environment, and has no recognized biological functions. Nevertheless, it is being introduced at profoundly alarming rates through various anthropogenic activities. The global cycle of Mercury (Hg) is a result of slow and complex bio-physiochemical transformations, involving various environmental pathways, and influencing its speciatiation into the highly toxic methylated form known as methyl mercury. This has resulted in bioaccumulation and biomagnification of mercury in the various water bodies of The United States, including the Great Salt Lake (GSL), Utah. The GSL watershed and the surrounding wetlands are of critical importance, and are instrumental in the sustenance of the regional ecosystem. Recent studies have reported alarmingly high concentrations of mercury in the Great Salt Lake (GSL), posing serious questions on its ecological viability. Bacteria mediated methylation of mercury and sulfur cycling in GSL ecosystem have come to be issues of recent concern and focus of interest in this study. The research approach will employ the synoptic analysis of the Total Mercury (THg) and Methyl Mercury (MeHg) concentration in the water column and sediments cores at four locations. The project has four distinct objectives: (1) Obtain sediment core and water samples from 4 locations in GSL to obtain total and methylmercury concentrations. These sampling locations will be selected at places with varying degree of salinity (i.e Farmington Bay versus Gilbert Bay)., (2) Estimate mercury methylation rates in sediments with 20-cm sediment core sliced at every 5~7 cm depth, (3) Estimate sulfate and sulfide concentrations in water column to estimate sulfide formation rates and correlate it with methylation rates and, (4) Profile the ecology of sulfate reducers and develop site specific biomarkers for these for management purpose. This research directly **addresses two of the main research priorities identified in the recently released RFP by DNR**. These two research priorities (1) mercury and methylation in sediments and brine layer and, (2) microbial sulfur cycling in GSL. This project is built upon Principal Investigator's 6-year long research experience related to GSL and his partnership with several agencies and stakeholders.
Project Funding	**Amount Requested** $48,508 / **Matching Funds** $ Will be leveraged / **Total Project Cost** $48,508