



Project Title: Developing a VisTrails Platform for Modeling Streamflow Hydrology and Projecting Climate Change Effects on Streamflow

Headline Title (2-5 words): Determining Effects of Climate Change on Streamflow

Brief Summary (Abstract): This project will work to develop a workflow and visualization tool for model applications to determine future effects of climate change effects on streamflow.

Project Location: North Central U.S.

Partners: This project involves collaborators from the U.S. Geological Survey (USGS) National Research Program, the USGS Fort Collins Science Center, and the USGS Colorado Water Science Center.

Background: Hydrologic models are used throughout the world to forecast and simulate streamflow, inform water management, municipal planning, and ecosystem conservation, and investigate potential effects of climate and land-use change on hydrology. The USGS Modeling of Watershed Systems (MoWS) group is currently developing the infrastructure for a National Hydrologic Model (NHM) to provide internally consistent estimates of total water availability, water sources, and streamflow timing, and measures of uncertainty around these estimates, for the entire United States. VisTrails, a scientific workflow and provenance management system (www.vistrails.org), could be used to facilitate consistent, organized, reproducible data management, analysis, and visualization for the NHM. A VisTrails system for the USGS Monthly Water Balance model (MWB) and/or the USGS Precipitation-Runoff Modeling System (PRMS) would be widely used in the NHM effort as well as by numerous agencies and researchers for individual model applications.

Project Goals: Project researchers are working to develop a VisTrails system for MWB, as a first step in developing a more complex VisTrails system for PRMS. The resulting VisTrails system for MWB will facilitate consistent, organized, and reproducible model calibration and simulations for monthly streamflow projections by research hydrologists and managers nationwide.

Strategy Goals Implemented: Goal 5, Strategy 5.3, Action 5.3.5: Provide access to current climate data and ensure alignment with data management and decision support tools at agency and departmental levels.