NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE

Temporal analysis of non-snow fed streams in New Mexico

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Purpose of Study

The objective of this study is to identify, define, and analyze non-snow fed streams in New Mexico in order to determine what impact climate change is having on hydrological trends and variability. This study seeks to discover if there are any temporal trends in streamflow data including interannual and decadal variability. It also seeks to find patterns in streamflow variability by examining peak flows, floods, and droughts.

Study Underway

This study will use a mix of several different types of statistical analysis. First, hydrographs will be created from daily mean and peak flows for specific streams using gage records provided by the USGS and other sources in New Mexico in order to define their flow. Several hypothesized methods are used to determine patterns in intermittent flows, such as the frequency of days with nonzero streamflow, but it may be necessary to develop novel statistical methods of analysis. A temporal analysis will be performed on the daily mean and peak flows to ascertain whether there are any trends present in the data including the seasonal cycle, interannual variability, and decadal variability. Statistical techniques will be applied to test any trends for significance. Periods of non-flow will be calculated for intermittent and ephemeral streams and then plotted in order to discover any trends. These trends will also be tested for significance. A flood analysis will be run on all streams in order to determine if any floods occur, the magnitude of the floods, and if there are any temporal trends in the flood series. Interannual variability of flow statistics will be compared to known climatic drivers such as the El Niño-Southern Oscillation.

Benefits

Drought statistics and research concerning the change in precipitation trends globally suggests that intermittent and ephemeral streams in New Mexico will show a decline in discharge rates as well as longer periods between flows. This could have disastrous consequences on agriculture in New Mexico. With a comprehensive assessment of streamflow throughout the state, non-traditional agricultural techniques could be adopted such as spate irrigation. Spate irrigation uses flood waters of ephemeral streams to irrigate large plots of land. This provides much needed irrigation waters to areas with an arid or semi-arid climate. A flood or high-flow assessment of streamflow in New Mexico would provide water planners with better data in order to determine when and if to implement these irrigation techniques.

Fawn Brooks is currently working on a PhD in earth and environmental sciences at UNM. She received a BS in applied geography from the University of Louisville.