**THE HISTORY OF WATER IN BEARS EARS NATIONAL MONUMENT, SOUTHEASTERN UTAH: TOWARDS A SYNTHESIS OF GEOCHRONOLOGY, NATIVE AMERICAN ORAL HISTORY AND ROCK ART**

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On December 28, 2016, President Barak Obama created the Bears Ears National Monument on 1.35 million acres in southeastern Utah, primarily to protect the archaeological heritage of the Basketmaker and Ancestral Pueblo cultures. Bears Ears was the first national park or monument to be jointly managed by federal agencies (U.S. Forest Service and Bureau of Land Management) and a Native American agency (the Bears Ears Commission, which includes representatives from the Hopi Nation, Navajo Nation, Ute Mountain Ute Tribe, Ute Indian Tribe of the Uintah Ouray, and Zuni Tribe). This project seeks to address the following questions based on research in Bears Ears National Monument:

1) What would mega-drought maps of southeastern Utah look like? That is, what water sources would persist after droughts of various durations?

2) On the other hand, what would the hydrography of southeastern Utah look like under increased precipitation or a change in the seasonality of precipitation?

3) How could the above hydrographic maps be used to interpret Native American oral histories from southeastern Utah, especially as they relate to springs?

4) How could the above hydrographic maps be used to interpret the rock art that is associated with springs in southeastern Utah?

The first two questions are being addressed by collecting water samples from 18 springs in Bears Ears National Monument. These water samples are being analyzed for concentrations of the anthropogenic gas CFC in order to determine groundwater residence times, and for stable isotopes in order to determine the sources of the groundwater. Results on two springs thus far indicate groundwater residence times of 30 and 39 years, so that these springs could persist as viable water sources even after mega-droughts lasting for three decades. Correlations will be sought among groundwater residence time, watershed area, elevation, groundwater source, and other factors in order to estimate the residence times for all of the unsampled springs. The third question will be addressed by comparing the rock art associated with springs with shorter and longer residence times. The final question is being addressed by conversations with elders of the Ute Mountain Ute Tribe, especially with regard to the origin of the names of the springs. Further results will be reported at the meeting.