Project Update – March 7, 2017

Drought Preparedness and Adaptation at Wind River Indian Reservation
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The NC CSC project "Wind River Indian Reservation's (WRIR) Vulnerability to the Impacts of Drought and the Development of Decision Tools to Support Drought Preparedness" supports tribal resource managers working with university and government partners to co-develop science, decision support tools, and a management plan for drought.

To date, the project team has developed nine quarterly drought and climate summaries as part of an effort led by the High Plains Regional Climate Center. The summaries are being used by the Office of the Tribal Water Engineer (TWE) as a decision support tool for making drought declarations on the reservation (December 2017 Drought Summary). With additional support from NIDIS, there have been six in-person workshops at WRIR in order to give all members of the project team, resource managers, decision-makers, and community members a forum to discuss progress, issues, and next steps. Also, two tribal water technicians have received training at the National Drought Mitigation Center and the High Plains Regional Climate Center. Finally, the University of Wyoming Experimental Program to Stimulate Competitive Research has provided education/outreach opportunities for WRIR students and community members, including the installation of a weather station at the Arapahoe School, spatial/watershed education using drones and GIS, and a conservation camp for learning about wildlife and fisheries habitat as well as groundwater and surface water treatment.

The social science team, led by NC CSC's Shannon McNeeley and the National Drought Mitigation Center's Cody Knutson, has completed 23 in-depth interviews with water managers at WRIR, which have provided baseline information about local impacts of drought, drought indicators that managers use, the spatial and temporal scales that are relevant to managers, historical drought periods, and barriers to drought response. The team is finishing up an initial report of findings to inform the drought planning process. The drought planning team, which started to meet in early January 2017, is working to provide drought planning guidance with the goal of collaboratively producing a reservation-wide drought mitigation and response plan. Tribal staff have completed a set of interviews with members from other tribes who have developed drought plans and are in the process of reviewing tribal drought plans to guide their planning. Finally, the Western Water Assessment (University of Colorado, Boulder) is conducting a scientific evaluation of the co-production process. This effort has reported on the needs, approaches, and outputs of each of the science teams and has identified gaps in information and additional resources that are needed to meet goals moving forward.

The physical climate science team has reviewed climate projections for the WRIR area, specifically with regard to how climate change will affect temperature and precipitation, the timing of snow-related processes, soil moisture stress, growing and fire season length, and the frequency of extreme events. The team has also evaluated the change in timing of the snow-to-rain shift and changes in streamflow and timing of discharge by comparing trends before and after 2000, and the average compared to past drought events as defined by tribal resource managers.

The NC CSC ecological impacts FSA team, with support from the TWE and BIA, initiated field sampling of sagebrush communities in the Wind River basin. The team is also working to relate the Greater Yellowstone Ecosystem (GYE) to the ecology of WRIR, which has included the development of maps of whitebark pine and land use/land cover changes over the last century, such as the conversion of grasslands to agricultural and rangelands.

The project team has also been busy working on products. For instance, Shannon McNeeley recently submitted an article for review in a special issue of Weather, Climate, and Society. This manuscript traces the background of many of the structural barriers to sustainable adaptation for tribes across the U.S., and then uses the case of water rights, use, and management at WRIR to illustrate the interplay of policy, culture, climate, justice, and limits to adaptation. Additionally, McNeeley is leading a broad WRIR science collaboration to evaluate the interacting social and climate factors that led to water shortages at the reservation during the 2015 irrigation season.