



2008 USDA-CSREES National Water Conference
Sparks, NV

Assessment of Rangeland Drought Mitigation Improved by *Castor canadensis* Impounded Water

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Abstract Text:

Present day climate change of the prairie has to some degree resulted from the unnatural removal or extinction of keystone species such as bison, beaver and prairie dogs. These animals were instrumental in facilitating the infiltration of sparse rainfall into the soil through their burrowing, wallowing, and dam building activities. The near extinction of these has to have contributed to increasing the severity of the current drought.

Water quantity impounded by *Castor canadensis* (North American beaver) was measured at the study site and compared to the nearby control site where beaver impoundment activity is non-existent. Stream transects and subsequent volumetric calculations indicate that significant amounts of water are being stored in beaver ponds. Grass clippings from a plot in the study area contained almost three times the total biomass as a comparable plot in the control area suggesting that vegetation productivity is significantly higher due to more consistently available water. This substantiates anecdotal information gained from long-time area ranchers, which credited beaver-impounded water with saving their ranching operations from certain disaster during major drought conditions. Data collected in this study to date clearly demonstrate that, by creating impoundments, beaver maintain pools of surface water in streambeds that would otherwise dry up during periods of drought. By keeping the water in surface pools, beaver ponds mitigate a negative impact of climate change by making water available for use by livestock and other fauna that inhabit the riparian zone.

Restoration of *Castor canadensis* to their rightful place in a balanced Northern Plains ecological system may contribute a significant portion of surface stored water, thereby locally mitigating the negative impact of current and future droughts and adverse climate changes on local ranching and wildlife management activities.

Future research in this study area will address delineation of the total water budget for Oak Creek with the intent to evaluate the positive impact of beaver impounded water on the riparian zone, soil moisture, and aquifer recharge.

Impact Statement:

The preliminary findings from this research suggest that permitting beaver habitation or reintroduction along small streams in the Northern Great Plains mitigates the adverse impact of drought on area farming/ranching by the impoundment of water in the beaver ponds.