

Study evaluates exposure, adaptation to how climate change affects North American rangelands

October 11 2013, by Blair Fannin

(Phys.org) —A group of eight U.S. scientists, including Texas A&M University's Dr. David Briske and Dr. Bruce McCarl, recently published two assessments that identify trends and projections for rangeland effects of climate change and evaluate adaptation strategies.

"These papers offer an objective, comprehensive assessment of climate trends and contingency planning as it relates to North American rangelands," said Briske, a professor in the department of ecosystem and science management at Texas A&M.

Changes in mean climatic trend and increased variability will affect the ability of rangelands to provide [ecosystem services](#) and support human livelihoods, but in varied and geographically specific ways, Briske said.

Climate models project that the U.S. Southwest and Southern Plains will become warmer and drier. The Northwest will become warmer and drier during summer and experience less snowpack in winter. The northern United States and southern Canada are projected to become warmer and wetter.

"Such developments will affect rangeland enterprises and productivity," said McCarl, a Texas A&M AgriLife Research economist.

The interacting effects of atmospheric warming, increased carbon

dioxide concentrations, and modified precipitation patterns will modify fire regimes, soil carbon content, and forage quantity and quality, according to the scientists. This will, in turn, affect livestock production, plant community composition, and the distribution of plant, animals, and diseases.

Human actions to minimize negative impacts and to capture potential opportunities need to be geographically specific to effectively contend with these varied consequences, according to the authors. The study authors also indicate that specific actions to increase carbon sequestration are not an economically viable mitigation strategy because carbon uptake is limited by low and variable precipitation.

However, they concluded, numerous adaptation strategies, including changing perceptions of risk, greater flexibility in production systems and policy changes to emphasize climatic variability rather than consistency will prove highly valuable.

Livestock production systems also will need to adjust as a result of changing environmental conditions, according to the scientists. Some of the adaptations specific to livestock production may include flexible herd management, alternative livestock breeds or species, innovative pest management, modified enterprise structures and, in extreme cases, relocation. Increasing awareness of and preparedness for changing climatic trends and increasing climatic variability will promote both the supply of ecosystem services and the maintenance of human livelihoods in future climates.

Full text of the articles, "Climate Change and North American Rangelands: Trends, Projections, and Implications" and "Climate Change and North American Rangelands: Assessment of Mitigation and Adaptation Strategies" appears in *Rangeland Ecology and Management*, Vol. 66, No. 5, 2013, or online at www.srmjournals.org.

Provided by Texas A&M University

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