

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: How well do Yellowstone bison use the spring greenup conditions during migration to breeding areas?

Discipline: Natural
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: University of Wyoming
Student Participation: Yes, post doc
Effective Dates: 9/15/2016 to 3/31/2017
Funding Amount: \$33,578

Investigators and Agency Representative:

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Project Abstract: Successful management of migratory wildlife populations requires understanding the forces that shape migratory movements. Yellowstone bison provide a perfect example. Bison migrate from summer ranges within the park to important wintering areas in the State of Montana where there is limited tolerance for bison. Under current practices animals are confined to predetermined management areas and only allowed to use them during certain times of the year. Management is costly, time consuming, dangerous, and, at times, seemingly ineffective. Further, management-induced displacement of animals from desired habitats may negatively affect bison by altering diet. Understanding animal movements can help managers assess the appropriateness of defined tolerance areas and time periods, and identify potential negative effects of management on bison. This is particularly relevant, because Yellowstone National Park is developing a new bison management plan with the State of Montana.

The "green wave hypothesis" suggests that ungulates time spring migrations by moving from lower to higher elevations in step with early-season vegetation growth. By tracking the wave of spring green-up, ungulates can prolong access to newly emerging vegetation that is high in protein and digestible organic matter, and low in fiber. It has been shown that ungulates use a variety of phenology tracking strategies, both between species and within individuals. Some (species/individuals), such as mule deer, do an excellent job of "surfing the green wave". Others, such as red deer in Norway, jump in front of the green wave and wait for it to catch up by making rapid movements between stopover sites along migration corridors. The underlying causes of these differences are not known, but likely include environmental constraints such as those posed by landscape configuration and habitat fragmentation, and life-history tradeoffs such as reproduction and predator avoidance. We aim to study green wave surfing in Yellowstone bison with a focus on why individuals use different strategies. In particular, we will evaluate how reproduction and landscape configuration alter green wave surfing in bison.

This project will provide several public benefits. The analyses associated with this project will explore biological and physical features of the Yellowstone ecosystem that best explain how bison select the habitats they use and utilize this information to help public constituencies on both sides of this controversial debate. This information is important for informing private land owners within the bison conservation area, wildlife conservation organizations like Greater Yellowstone Coalition, National Wildlife Federation and Defenders of Wildlife, stockgrower organizations that represent the livestock side of the debate and the general public. The results of this work will provide information about the opportunities to conserve this iconic public trust resource while establishing management recommendations to resolve conflicts with private land owners and agricultural interests outside the National Park. These analyses are being conducted to better protect wild Yellowstone bison for future generations of local residents and visitors to observe, appreciate, and enjoy. The results of this project will be made available to the public and through publication of one or two peer reviewed journal articles and through presentations at public meetings. Project benefits also include the continued conservation of the Yellowstone bison population that is managed by both YELL and the State of Montana.

Keywords: bison, migration, Yellowstone National Park, University of Wyoming, Wyoming Cooperative Fish and Wildlife Research Unit