Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Spatial Dynamics of the Central Yellowstone Bison Herd: Integration and Visualization of Large Spatial Databases

Type of Project: Research **Discipline**: Natural

Funding Agency: National Park Service

Other Partners/Cooperators:

Effective Dates: September 2002--September 30, 2007

Funding Amount: $73,025

Investigators and Agency Representative:

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Project Abstract:

The purpose of this project is to integrate data available from past bison research projects that have identified patterns of spatial distribution exhibited by bison and seek to explore more specifically how bison move across the landscape between areas of high and low occupancy of habitats. Managers at Yellowstone National Park need to understand these patterns of movement relative to the ecology of the species for implementing the Interagency Bison Management Plan. An understanding of how and when bison are likely to move through the landscape may help predict when animals are likely to move towards and outside park boundaries. In addition, understanding movement patterns will provide a mechanism for choosing locations to implement a remote vaccination program that delivers vaccines to a higher proportion of eligible individuals. Finally, the park needs to understand the physical distribution of bison travel network to objectively compare how it interfaces with human travel networks (primarily the road network used by motor vehicles). The product of this proposal will provide the park with a powerful data set to educate the staff and visiting public about the ecological dynamics of bison population movements across the landscape of central Yellowstone National Park, and about the relationship between snowpack dynamics and the propensity for animals to wander. This display of information will be invaluable to park staff trying to inform and interpret the Joint Bison Management Plan.

Several management questions will be addressed by this project:

What is the probability that bison will move toward and across the west boundary of the park?

Are there specific constriction points in the landscape that funnel bison travel corridors sufficiently to enable Yellowstone National Park to implement a highly efficient remote vaccination protocol? The two factors of efficiency would be high probability of most vaccination eligible animals wandering by a select few locations and a short period of time to deploy field technicians delivering vaccines.

Can YNP quantify by seasons of the year what percent of bison travel is conducted along roadways? Likewise, can YNP quantify the percent of the road system that overlaps with the bison travel network?

Can a system for classifying age and sex composition of the bison population be established along the bison migration corridor using the camera stations established for monitoring group movements?

Outcomes with completion dates:

Final Report: Dissertation by Jason Bruggerman received September 2006

Keywords: Spatial Dynamics, Central Yellowstone, Bison Herd, Large Spatial Databases, Montana State University