

# Project Summary

## Rocky Mountains Cooperative Ecosystem Studies Unit

**Project Title:** Evaluating Wildlife Responses to Motorized Winter Use in Yellowstone National Park

**Discipline:** Natural

**Type of Project:** Research

**Funding Agency:** National Park Service

**Other Partners/Cooperators:** Montana State University

**Effective Dates:** 5/1/2004 - 9/30/2009

**Funding Amount:** \$20,000.00

**Investigators and Agency Representative:**

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### Project Abstract:

The collection, analysis, and interpretation of reliable information is essential for evaluating the effectiveness of management actions designed to minimize potential adverse effects of winter human use on wildlife in Yellowstone National Park. The purpose of this cooperative agreement is to gain needed sampling design and statistical expertise through collaboration with Dr. John Borkowski, a statistician at Montana State University. Under this project, Dr. Borkowski will use model selection techniques to: 1) analyze and interpret data collected regarding the effects of motorized winter recreation on wildlife; 2) evaluate and compare the effects of motorized winter use on wildlife among years using an integrated data set of winters 1999-2006; and 3) assist graduate students at Montana State University in evaluating bison distribution and road use using integrated data sets. This effort will continue in 2007-2008, with further analyses of nutritional indices and demography of bison and elk.

### Outcomes with Completion Dates:

1. August 30, 2004 - final report on analyses and interpretation of data collected during winter 2004 regarding the effects of motorized winter use on wildlife, including recommendations for improving the sampling design and copies of digital databases and analyses created during this project.
2. September 30, 2004 - report with recommendations and ideas for the development of a rigorous monitoring plan for winter use (wildlife).
3. November 30, 2004 - final report on analyses and comparisons of the effects of motorized winter use on wildlife among years from the integrated data set (1999-2004), including copies of digital databases and analyses created during this project. 4. July 1, 2005 - final report on analyses and interpretation of data collected during winter 2005 regarding the effects of motorized winter use on wildlife, including recommendations for improving the sampling design and copies of digital databases and analyses created during this project. The report will include detailed explanation of methods and supporting information that explicitly defines model assumptions and parameters, and illustrates how revised estimates of model parameters can be incorporated in the future. It will also contain explanations and interpretations of model outputs and analyses, including pertinent examples of outputs and analyses.
4. June 1, 2006 - final report on analyses and interpretation of data collected during winter 2006 regarding the effects of motorized winter use on wildlife, including recommendations for improving the sampling design and copies of digital databases and analyses created during this project. The report will include detailed explanation of methods and supporting information that explicitly defines model assumptions and parameters, and illustrates how revised estimates of model parameters can be incorporated in the future. It will also contain explanations and interpretations of model outputs and analyses, including pertinent examples of outputs and analyses.
5. September 30, 2006 - Manuscript on model selection analyses of wildlife (bison, elk, coyotes, bald eagles, swans) responses to motorized winter recreation in Yellowstone National Park during 2003-2005. The report will include detailed explanation of methods and supporting information that explicitly defines model assumptions and parameters, and illustrates how revised estimates of model parameters can be incorporated in the future. It will also contain explanations and interpretations of model outputs and analyses, including pertinent examples of outputs and analyses.
6. December 30, 2006 - Report on analyses of allantoin:creatinine ratios from collections of snow-urine to compare the winter nutrition of cow elk in several free-ranging herds during 1992-2006. The report will include detailed explanation of methods and supporting information that explicitly defines model assumptions and parameters and interprets model outputs and analyses.
7. July 1, 2007 - final report on analyses and interpretation of data collected during winter 2007 regarding the effects of motorized winter use on wildlife, including recommendations for improving the sampling design and copies of digital databases and analyses created during

this project. The report will include detailed explanation of methods and supporting information that explicitly defines model assumptions and parameters, and illustrates how revised estimates of model parameters can be incorporated in the future. It will also contain explanations and interpretations of model outputs and analyses, including pertinent examples of outputs and analyses.

8. July 1, 2008 - final report on analyses and interpretation of data collected during winter 2008 regarding the effects of motorized winter use on wildlife, including recommendations for improving the sampling design and copies of digital databases and analyses created during this project. The report will include detailed explanation of methods and supporting information that explicitly defines model assumptions and parameters, and illustrates how revised estimates of model parameters can be incorporated in the future. It will also contain explanations and interpretations of model outputs and analyses, including pertinent examples of outputs and analyses.

**Keywords:** wildlife response, motorized vehicles, winter use, statistical analysis, Yellowstone National Park, Montana State University, bison, elk, trumpeter swans