

## Project Summary

### Rocky Mountains Cooperative Ecosystem Studies Unit

**Project Title:** Estimating grizzly bear use of large ungulate carcasses with GPS telemetry data

**Discipline:** Natural Resources  
**Type of Project:** Research  
**Funding Agency:** National Park Service  
**Other Partners/Cooperators:** Montana State University  
**Effective Dates:** 8/1/2012 - 12/31/2013  
**Funding Amount:** \$30,000

**Investigators and Agency Representative:**

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**Project Abstract:** Ungulate meat is one of the most concentrated sources of digestible energy and protein available to grizzly bears (*Ursus arctos*) in the Greater Yellowstone Ecosystem (GYE). The relative dietary importance of this resource is inversely related to another important food source for grizzly bears, seed from whitebark pine (*Pinus albicaulis*) cones. Previous research has shown that during years with poor WBP cone crops, bears offset the potential calorie deficit by increasing consumption of ungulate meat. The mountain pine beetle outbreak implicated in recent declines of WBP has placed greater emphasis on understanding the role of ungulate carcass use to grizzly bear nutrition. Studies using stable isotopes currently being conducted by the IGBST are quantifying the proportion of energy derived from meat in the annual diet of bears, but the spatial relationships and encounter rates for carcass use remain important but unknown parameters.

This project represents, to the best of our knowledge, the first attempt to quantify and predict the frequency of encountering and using large ungulate carcasses by grizzly bears from GPS telemetry data. With little to no information available about the spatio-temporal patterns of GPS data relative to large ungulate carcasses, an initial phase (see phase 1 below) of data exploration is necessary to detect and describe the patterns associated with large ungulate carcass use. A recent pilot study of GPS data (Haroldson et al., unpublished data), showed a strong spatio-temporal pattern in GPS data associated with known adult elk carcasses detected during backtracking surveys of randomly selected bears (Fortin et al., unpublished data; Podruzney et al., unpublished data). The overall purpose of the project described herein is for the YNP bear management program, MSU Institute on Ecosystem, and the IGBST to collaborate on GPS analysis to predict grizzly bear use of large ungulate carcass across the entire GPS dataset (> 10 years of data from > 90 individual grizzly bears) to assess the relationship between large ungulate carcass use and variable whitebark pine cone production.

**Outcomes with Completion Dates:** December 31, 2011

Phase 1: Pattern detection of known carcasses - Report: Feb. 2013

Phase 2: Prediction of ungulate carcass use for the complete GPS dataset Report: May 2013

**Keywords:** Montana State University, Yellowstone National Park, grizzly bear, diet, ungulate meat