

Update on the Henry Mountains Bison Research Project

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In the summer issue Wade Paskett, Wildlife Biologist with the Utah Division of Wildlife Resources (UDWR), provided a great overview of the Henry Mountains bison research project that SFW helps fund along with the U.S. Fish and Wildlife Service, the UDWR, the Bureau of Land Management and Utah State University (USU). In late January and early February of 2011, 44 bison were double-marked with GPS and VHF collars, with an additional 15 fitted only with VHF collars. These collars provide crucial data that will be used to help meet objectives laid out in Utah's bison management plan. Here, we at USU are glad to provide an update on our research progress concerning development of a visibility-corrected population survey, estimation of survival and reproductive success, bison movements, as well as dietary and land-use overlap between cattle and bison.

Visibility-Corrected Population Survey

The collared bison will help us estimate the fraction of animals that are seen and counted during the annual UDWR helicopter survey, as well as the fraction that are not seen. These estimates will then be used to develop a correction factor for estimating bison abundance from the aerial survey such that UDWR can allocate hunting permits in accordance with how large or small the population is relative to objectives.

To help observers determine whether GPS-collared individuals are seen or missed during aerial surveys, we placed a large strip of white belting on their collar. On August 1st and 2nd of 2011, 39 of the 44 individuals marked with the white-belting collars were observed during the helicopter survey led by UDWR biologists Wade Paskett and Brad Crompton, and experienced pilot Terry Mercer.

We equipped each observer with a head-mounted HD-Hero video camera (see image 1). The video obtained from the cameras will be used to verify field observations. Locations of the GPS-collared animals acquired during the aerial survey will provide another line of evidence for determining which collared animals were counted (image 2), which were in the area but not observed (image 3), and what type of habitat each individual was in. With additional data collected during the next couple of years, we'll develop a model for visibility correction based on

the ‘thickness’ of habitat the bison are utilizing. This should result in more accurate estimates of bison abundance for many years to come.

Survival and Reproductive Success

We’ve recently submitted a paper for publication in the Journal of Mammalogy, in which 38 years of UDWR calf:cow ratio data were used to examine the dual influences of population density, and precipitation on bison reproductive success. In years following below-average precipitation, we found that the negative effect of population density on reproductive success was much more severe relative to wet conditions (image 4). These findings could help managers plan the timing and scale of population reductions through hunting and removal for translocation, as well as the coordination of bison and cattle stocking schedules on shared rangelands. For example, the most effective way to reduce bison abundance would be to remove individuals following a drought.

Amongst all individuals marked with a VHF collar, we have yet to record a natural mortality. These collars should nevertheless last for at least another 10 years, and will help the UDWR estimate the annual rate of adult survival and the age at which it begins to decline because of tooth-wear and other factors. Research on survival and reproductive success will eventually be coupled with the visibility-corrected abundance estimates to guide management of the Henry Mountains bison population using the best available science.

Movement Behavior

We are currently examining the response of bison land-use to the aerial net-gunning capture methods. By studying daily movement patterns on the day of capture, the day after, and in subsequent days, we should be able to determine if capture induces abnormal behavior that could affect the way bison utilize the land. Results thus far indicate that bison did not move differently on the day of capture, or the day after, relative to any other day.

In future studies, we’ll be investigating how bison movement behavior is affected by precipitation, changing seasons, as well as activity during the hunting season.

Foraging Interactions with Cattle

The first step in investigating foraging interactions between bison and cattle will take place this October, when 40 8’x8’ exclosures will be erected on the northern section of the Steele Butte BLM grazing allotment. This allotment was selected for the exclosure study because of the high level of bison use in the area, the number of roads that allow for easy access to set up and maintain exclosures, and the flat terrain. This exclosure study, which will run for one year, will allow us to quantify the amount of forage used by cattle in the winter months and by bison in the summer months. Twenty of the exclosures will also exclude jackrabbits, as they too may have significant impacts on forage availability. These data, combined with data on plant community

structural differences from areas with different levels of bison and cattle grazing, will help determine the effects of bison on forage availability to cattle.

Land-use overlap analysis is an ongoing process of mapping out the bison locations from the GPS collars and comparing them with GPS points of cattle taken while doing field work. These ground points will be combined with information gained from livestock operators during interviews that will be conducted to determine what areas of the grazing allotments are key for cattle throughout the year to allow us to determine the amount of overlap between bison and cattle both in space and in time.

How Sportsmen Can Help

During the duration of this study, sportsmen can make a huge difference by harvesting only non-collared bison. If you obtain a Henry Mountains bison permit, please avoid shooting a collared animal, if at all possible.

If you harvest a collared bison, capture crews will have to return to the area and collar another animal to maintain the necessary sample size. This would increase the expense of the study, which is ultimately funded by sportsmen. You should also be aware that the cape of a harvested, collared bison could be damaged, which is another good reason to select a non-collared animal.

To review the Henry Mountains Bison Management Plan, visit http://wildlife.utah.gov/hunting/biggame/pdf/bison_15.pdf.

Image 1. Brad Compton with the HD Hero video camera attached to his helmet.



Image 2. Evidence that bison 30400 was being counted at 8:23 during the aerial survey. Green

points and lines indicate the bison's locations and path while white points and lines indicate the path of the helicopter. Counting was being conducted at this time, which explains why the flight path of the helicopter (white line) is erratic relative to the bison's path (green line).



Image 3. Evidence that bison 30415 was not counted on the aerial survey. Green points and lines indicate the bison's locations and path while white points and lines indicate the path of the helicopter. The red dot indicates the location of 30415 at the time when the helicopter was nearest (11:52 a.m) but no counting was being conducted by the observers at or near this time.

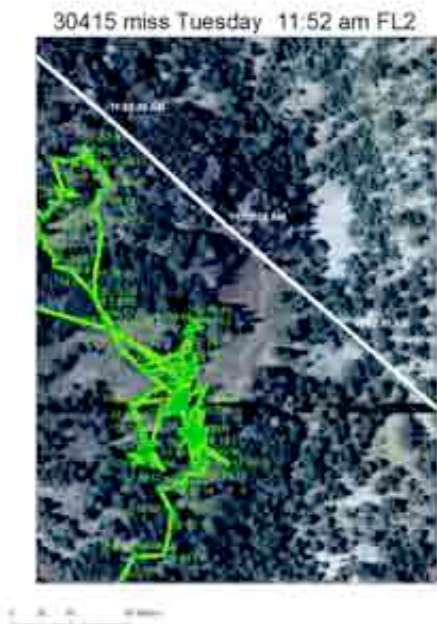
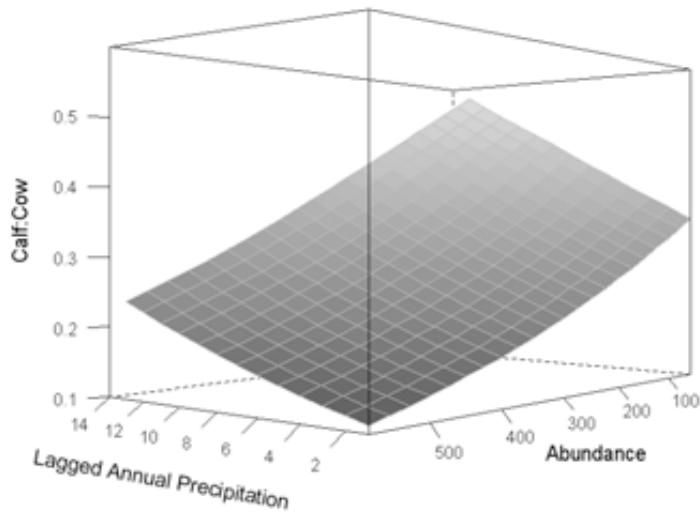


Image 4: Predicted reproductive success (calf:cow ratio) based on precipitation in the previous year and population density for years following below-average (panel A) and above-average (panel B) precipitation.

panel A



panel B

