

Note to readers:

Mr. Aune is Chief of Wildlife Research and Technical Services at the Department of Fish Wildlife and Parks at the State of Montana. Aune earned a Master of Science degree from Montana State University in Bozeman in 1981, with a thesis entitled “Impacts of Winter Recreationists on Wildlife in a Portion of Yellowstone National Park, Wyoming.” His CV is available by e-mailing yell_winter_use@nps.gov.

Mr. Aune’s review follows.

Comments for Garrott and White
Evaluating Key Uncertainties Regarding Road Grooming and Bison Movements

In general, this project proposal is very thorough and substantive. I would support further development of this project with a few comments considered below.

- 1) It has always baffled me that nobody considers the Northern bison as a control group considering that they are not influenced greatly by any snow grooming activity with the exception that central bison move into this area at times. How could the northern herd be considered in the design of this study?
- 2) Little is mentioned about the spring snow plowing that produces a mini-tourist season and creates a large tunnel effect for bison traveling the road network. Bison move out of the park more readily and commonly during the spring (April and May) after road grooming has been stopped and plowing begins. Is not plowing in the spring a consideration to ponder?

These are relatively well considered in the design but I have a comment to add here:

- 3) Timing and seasonal snow patterns as well as severe cold or mild weather are an uncertainty that will challenge this study design. Also I often wonder about the effects of summer drought. Unfortunately these are experimental conditions that cannot be controlled. The results of this study, of course, are likely to be confounded by dramatic weather events so results must be carefully framed in the context of the winter/spring weather and perhaps summer drought.
- 4) There are some habitat dynamics at play here but I think the study design will capture that.....the patchy distribution of resources and the thermal activity in portions of the Yellowstone dramatically influence bison distribution....hence foraging pressure on critical ranges. Although snow is found to be a big driver I wonder if we often miss some of the habitat effects that interplay with bison distribution over time and need to be careful to include them as you have done in research theme 2.

- 5) One other factor is the management activity outside the Park at the time of the study could influence bison distribution and movements. Forced movements of bison along the boundaries or intensive hunting pressure could be a factor influencing the current road use patterns within the system. Careful monitoring of management activity along the borders will need to be considered as a covariate in this analysis.
- 6) The authors considered the foraging behaviors for bison...how about anti-predator behavior. It might be important to consider what affect wolf occurrence has on the distribution of bison as a new player in the mix. Especially considering that elk numbers are going to continue to decline as a result of low calf recruitment and old age structure. Will wolves shift more heavily to bison and do they influence bison distribution?
- 7) Is it possible to use some loop drives in this as experimental areas. Leave ungroomed and monitor then introduce grooming or alternate grooming on alternative trails?
- 8) One concern I have is that with multiple treatments on various segments what will be the effect of one on the other. What will treatment on the Firehole Canyon do to the experiment on the Firehole?
- 9) I did not see where the authors proposed any products from the study. One assumes they will produce something in writing but it might help if there was a clearer commitment to some product or outcome following the experiment.