

SPATIAL DYNAMICS OF THE CENTRAL YELLOWSTONE BISON HERD: USE OF A ROAD SYSTEM AND TRAVEL NETWORK^{TWS}

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The topic of winter recreation in Yellowstone National Park (YNP) has presented many controversial wildlife management issues. At the forefront of the debate is the effect of road grooming—done to facilitate over-snow vehicle travel—on bison (*Bison bison*) ecology. Bjornlie and Garrott (2001) conducted a two-year study from 1997-1999 on YNP's central bison herd and concluded that groomed road use by bison on the Madison-Gibbon-Firehole (MGF) winter range is neither sought out nor avoided and that roads are not a major influence on bison ecology—results contrary to popular belief. As an extension of Bjornlie and Garrott's (2001) research, data were collected from November to May from 1999-2004 on bison movements, road travel, distribution, and behavior in the MGF. In addition, daily snow water equivalent (SWE) estimates and related covariates were modeled at 28.5-m spatial resolution from 1997 to 2004. We assessed causes of temporal variation in bison travel—both

on-and off-road—by evaluating competing hypotheses to determine the relative contributions of snowpack, road grooming, density-dependence, and forage accessibility on magnitude of travel. Using multiple linear regression output and model comparison techniques, the best-supported models indicated that road travel is positively affected by SWE and the number of bison in the MGF but negatively influenced by road grooming. Likewise, bison density-dependence and SWE variability positively affect the magnitude of off-road travel. Our finding coincide with Bjornlie and Garrott (2001) that suggest that a suite of abiotic and biotic factors positively affected bison travel rather than road grooming.