**Anthropogenic Effects on Grouse Detection and Abundance Based Upon Road and Trail Characteristics in Western Montana

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Anthropogenic structures, such as constructed roads and trails, and human use may affect space use, demography, and other wildlife population parameters. Alternately, human infrastructure and activity may result in perceived population responses by influencing the ability of biologists to detect individuals during standard population surveys. The evaluation of spatio-temporal factors correlates in detection probabilities and local abundances, which is necessary for proper population management. To evaluate the effects of human use on mountain grouse populations, we developed and conducted replicated surveys throughout western Montana during 2020. Biologists and volunteers collected count data for dusky, ruffed, and spruce grouse during 582 surveys along 291 survey transects located throughout FWP Regions 1-5. Survey transects occurred along two types of human infrastructure: U.S. Forest Service Trails and unimproved roads close to highway vehicle use during the survey period. As a first step, we compared count data for road and trail transect surveys for each species of grouse. Overall, raw counts of dusky grouse were higher for transects located along trails (0.59 ± 1.07SD grouse per transect) than unimproved roads (0.33 ± 0.91SD). Raw counts of ruffed grouse were similar for transects located along trails (0.75 ± 1.42SD) and unimproved roads (0.69 ± 1.55SD). Sample sizes for spruce grouse precluded comparison. In the next phase, we will use hierarchical models to evaluate whether the apparent effect of trail type on raw counts is manifested through effects on local abundance or the probability of detection, and consider the effects of other human-use and habitat characteristics.