

THE USE OF FECAL CORTICOSTERON AND BEHAVIORAL OBSERVATIONS TO EVALUATE HUMAN DISTURBANCES TO BIGHORN SHEEP^{TWS}

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This study investigated the impact of human activity in Yellowstone National Park through the use of non-invasive fecal corticosterone monitoring and behavioral observations. Intensive behavioral observations were used to determine rates of human related disturbances in four distinct ewe groups and rams. Results indicated that the prevalence of humans did not correlate with the rate of overt disturbances observed in bighorn sheep groups. Foot traffic was the activity least likely to cause overt disturbances, while helicopter traffic caused the greatest and most predictable disturbances. The yearly cycle of corticosterone in free ranging bighorn sheep was determined from the analysis of 348 fecal samples from collared and non-collared rams and ewes. No significant difference was found in radio collared and non-collared bighorn sheep. Results indicated that higher levels of fecal corticosterone corresponded with greater disturbance rates of bighorn sheep groups. Cold temperatures and depletion of forage quantity and quality did not cause detectable increases in environmental stress on bighorn sheep during winter months. Significant increases in the fecal corticosterone levels of both rams and ewes during spring, can best be explained by increases in social activity and the near term conditions of pregnant ewes. Significant differences were also found between mature rams and both ewes and younger males. If the accumulation of disturbances was high enough, populations could experience poor recruitment and higher rates of disease and mortality. The baseline information collected on levels of fecal corticosterone will allow further environmental impact assessments of bighorn sheep and other vertebrate species.