Biennial Symposium Northern Wild Sheep and Goat Council 12:39.

GPS WILDLIFE COLLARS: BIAS FROM TOPOGRAPHICAL AND COASTAL FOREST CANOPY CONSTRAINTS

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Abstract: GPS wildlife collars have proven valuable research tools under many conditions. However, studies conducted within steep, narrow and heavily-forested coastal valleys are limited. I am currently conducting a mountain goat winter habitat study in coastal British Columbia near Knight Inlet using GPS collars (Lotek 2000L model). I plan on taking the following measures of collar performance: proportion of successful fixes, proportion of 2 dimensional vs. 3 dimensional fixes, and the levels of Dilution of Precision (DOP). Increasing the proportion of 3D fixes is desirable because it allows for a new elevation to be calculated with each fix (Moen *et al*. 1997), and when DOP is low, the spread of contributing satellite signals becomes wider, thereby improving satellite configuration geometry and increasing accuracy (Rempel *et al.* 1995). However, an evaluation of GPS performance based solely on the data I obtain from these animals may be biased because I can only determine location presence and not absence; forest canopy has been shown to have a negative effect on GPS satellite reception (Rempel and Rodgers 1997 and Moen *et al*. 1996), and the rugged topograpny of B.C.'s Coast Mountains places added constraints on collar performance. Therefore, I placed 3 additional GPS collars within forested habitats selected from 3 valleys of similar biogeoclimatic classification to the primary goat study site. Valleys of varying relief were selected to address the important GPS wildlife collar issue of topography. Categories of forest habitat included 3 tree height ranges, 2 canopy closure types and 3 ranges of topographical access to satellites. GPS collars were programmed to take repeated locations at 30 minute intervals from each sample location over a 24-hour period and the proportion of successful fixes (2D and 3D fixes) was recorded. The specific effects of topographic and forest habitat variables on GPS fix success were evaluated. Observations from this ground testing and from the collared mountain goats should allow me to address the suitability of GPS wildlife collars for species that inhabit the forests and topographical relief typical of British Columbia's coast.