The Short-Term Effects of Wildfire on Sierra Nevada Bighorn Sheep

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Abstract: We studied changes in forage and habitat selection by Sierra Nevada bighorn sheep (*Ovis canadensis*; hereafter Sierra bighorn) for two years after the Seven Oaks wildfire. Forage biomass initially decreased but by the second year post wildfire had recovered to be equal to areas that had not burned. The amount of high quality forage available to bighorn initially decreased but plants within the burn had a 4% increase in crude protein for the duration of the study. In addition forage quality in the burned areas tended to be greater than unburned areas because the forage class composition within burns was forb dominated while areas outside the burn were shrub dominated. We assessed the effect of these changes in forage availability on Sierra bighorn with fecal measures of nitrogen and diet composition. We found no change in fecal N between Sierra bighorn in burned and unburned areas but there was a shift in diet composition; Sierra bighorn from burned areas had more forbs in their diet than Sierra bighorn from unburned areas. Sierra bighorn habitat selection was dominated by selection to be near escape terrain. We also found selection for grasses and forbs and this selection tended to be higher in winter than spring and highest in the first winter after the Seven Oaks Wildfire. It is during this winter of 2008 that Sierra bighorn had the largest exposure to lion use, indicating a forage predation tradeoff. It is likely that Sierra bighorn were driven by selection for forage and this led them into areas of high lion use. In general when in areas of higher lion use, Sierra bighorn showed increased selection to be near escape terrain and for visibility. It is unknown how effective these anti-predatory strategies were. We predict that as the forage in the burn increases beyond that of unburned areas (as it appears to be on a trajectory to do) that the benefits of the burned area will be twofold: increased forage quantity and quality and decreased exposure to areas of high lion use because forage will be readily available.

Biennial Symposium of the Northern Wild Sheep and Goat Council 17:129; 2010

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