A BIOPHYSICAL DESCRIPTION AND FORAGE USE ASSESSMENT OF SELECTED BIGHORN SHEEP WINTER RANGES IN THE ELK RIVER VALLEY, BRITISH COLUMBIA

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Abstract: A study in the Elk River valley of southeastern British Columbia known for big game hunting and open pit coal mining was initiated in 2009 with the objectives of (1) classifying and describing bighorn sheep (*Ovis canadensis*) winter range plant communities, (2) measuring standing crop production, (3) mapping forage utilization and range condition, and (4) documenting winter diet composition through fecal pellet analyses. The study was a collaboration between Teck Resources, government and local stakeholders, and was linked to a concurrent bighorn sheep seasonal movements and habitat selection study.

Fifteen winter ranges were identified by examining government and industry winter aerial survey data and by consulting with knowledgeable stakeholders in the area. The winter ranges were located within the Engelmann Spruce-Subalpine Fir dry cool woodland and the Engelmann Spruce-Subalpine Fir dry cool parkland biogeoclimatic variants and were typically a complex of grasslands, shrublands, vegetated and non-vegetated rock outcrops, and cliffs. A minimum of 3 permanent multi-plots were established within each winter range. Transect sampling was conducted for herbaceous and non-vascular plants while line intercept transects were used to record shrub species cover. Site and soil data were also collected. Terrestrial Ecosystem Mapping at a scale of 1:500 m was completed at each winter range. Multi-plot (n = 5) fecal pellet sampling was conducted at each transect at 5 winter ranges in early, mid, and late winter during the winters of 2009–2010 and 2010–2011. Pellets were analyzed for percent diet composition at the Wildlife Habitat Nutrition Laboratory at Washington State University. Snow cover and depth measurements were recorded concurrent with pellet sampling. Summer field work consisted of standing crop production sampling inside and outside range production cages at all winter ranges in 2009, and in 2010 at the 5 winter ranges selected for fecal pellet sampling.

Standing crop production was highest in winter ranges with the greatest percentage cover of graminoids and where productive soils were prominent. Both the number of sheep and elk pellets varied between winter ranges; winter range use overlap was more evident at two of the winter ranges. Standing crop production ranged from 101.11 kg/ha in a heavily grazed winter range to 1751.25 kg/ha in a productive *Festuca campestris*-dominated winter range. Grazing was highest on productive sites and declined with increasing distance from escape terrain. Due to high grazing pressure, some of the winter ranges were considered to be unhealthy ecologically. Graminoids, particularly *F. campestris*, *Poa alpina*, and *Elymus trachycaulus* were the dominant forage species with small proportions of forbs and shrubs. In the relatively high snow cover winter of 2010–2011, the proportion of sedges such as *Carex albonigra* in the sheep diets increased. Snow cover and depth varied between sites and years with snow cover and snow depth greatest in the winter of 2010–2011 at all winter ranges.

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