

MULE DEER BROWSE SPECIES RESPONSE TO THINNING AND BURNING IN INTERIOR DOUGLAS-FIR FORESTS IN BRITISH COLUMBIA

Robert W. Gray

R.W. Gray Consulting Ltd., 6311 Silverthorne Road, Chilliwack, BC V2R 2N1, Canada

Kenneth L. MacKenzie

Iverson & MacKenzie Biological Consultants, P.O. Box 511, Lac la Hache, BC V0K 1T0, Canada

ABSTRACT

The dry interior Douglas-fir (*Pseudotsuga menziesii*) forests of British Columbia and the western United States have undergone significant changes in structure and species composition since the pre-settlement era. Studies of historic stand structure, species composition, and disturbance regimes indicate that in many cases stand density has increased, forests have experienced dramatic species shifts in both the overstory and understory, and fire regimes have shifted from frequent, low-intensity fires to infrequent, high-intensity fires.

These changes in Douglas-fir ecosystem process are widely understood and accepted, but their effects on wildlife habitat and use are poorly understood. In the interior of much of British Columbia, including the coast–interior transition zone, the management of mule deer (*Odocoileus hemionus*) habitat has focused on providing three primary winter range requirements: snow interception cover, thermal cover, and forage. Research has shown that a large proportion of winter food eaten by mule deer in British Columbia is Douglas-fir litterfall and arboreal lichens. This finding is reflected in management plans and strategies that seek to promote Douglas-fir stands of high canopy closure to provide increased quantities of litterfall. The general lack of diverse and nutritious understory browse in many stands studied is seen as further evidence that browse must be provided by Douglas-fir foliage. The data that have driven these management recommendations were collected in ecosystems where fire exclusion has occurred for perhaps a century and the diversity, abundance, and nutritional quality of understory shrubs has changed significantly from historical conditions.

In the coast–interior transition zone found in the Squamish Forest District, historic stand reconstruction and fire history studies point to a pre-settlement era landscape of much lower tree density than current stands, and a frequent fire regime (mean fire intervals of 6–17 years). We hypothesize that these open forests would have had greater shrub and other rooted forage abundance, that mule deer historically had a higher proportion of rooted forage in their diet, and that the frequent fire regime maintained a greater diversity of forage plants with a higher palatability and nutritional quality than occurs with fire exclusion.

In 1998, 46.2 ha of ingrown Douglas-fir forests in northern Squamish Forest District were treated to reduce tree densities to three levels: shelterwood (80–90 stems/ha), seedtree (35–45 stems/ha), and salvage (15–25 stems/ha). In April 1999, 40 ha of these treated areas were burned. Understory vegetation species, frequency of detection along intercept transects, and heights were measured at nine plots before and after the prescribed fire. The understory plant community was also measured in unburned, thinned and in control (unthinned, unburned) plots.

Understory vascular plant richness increased in all plots (average of 10 additional vascular species per plot) and cover increased following burning in all plots (10.5% increase). Shrub richness increased by an average of 4 species per plot and abundance increased in all plots following burning (11.1% increase). High-quality browse species increased by an average of 2% following the burn treatment.

Shrub height was assessed within a year of the burn with highly variable results. Areas with the widest range of shrub heights and tallest proportional heights were inversely correlated with burn severity. The unburned salvage area, burned salvage area, and untreated area had the tallest shrub heights. The burned seedtree and shelterwood areas all contained low shrub heights with a lower variability. Preferred shrub browse species and their relative post-burn nutrition and palatability were taken from published sources. A simple qualitative assessment was made of browse preference with three values: poor, fair, and good. The breakdown by treatment type was thin and burn (4 poor, 8 fair, 4 good), thin only (3 poor, 6 fair, 3 good), and control (2 poor, 3 fair, 0 good). Many of the shrub species listed as fair to good in the thin-only and control areas are considered to increase in nutrition and palatability following fire.

Citation: Gray, R.W., and K.L. MacKenzie. 2004. Mule deer browse species response to thinning and burning in interior Douglas-fir forests in British Columbia [abstract]. Page 265 in R.T. Engstrom, K.E.M. Galley, and W.J. de Groot (eds.). Proceedings of the 22nd Tall Timbers Fire Ecology Conference: Fire in Temperate, Boreal, and Montane Ecosystems. Tall Timbers Research Station, Tallahassee, FL.