April 30, 2011

Executive Summary, BC Forest Sciences Programme Project Y113122: Contrasting spring and fall grazing regimes for effects on grassland biota

Presented to the BC Forest Sciences Programme by:

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THEME: Ecosystem structure, composition, and processes related to sustainable management of forests.

TOPIC: Effectiveness of stand-level structures and habitat in maintaining biodiversity.

RESEARCH ISSUE: Effectiveness of management strategies in creating site-level structures and maintenance of site-level biodiversity… and rangeland habitat.

Project Dates: April 1 2008-March 31 2011

The research site of Lac Dubois Grasslands, North of Kamloops, was used to study seasonal grazing as an alternative to traditional grassland cattle grazing methods. This report outlines a three year study where entire quarter section pastures were treated either with spring or fall grazing. We measured plant, seed rain, invertebrate (ground beetle and grasshopper) and small mammal responses. Cattle grazing is one method of altering site level structure in grasslands, and therefore a tool for effective management and maintenance of site level biological diversity. In the Southern Interior Region, Rangeland managers mitigate grazing impacts in part by rotating cattle through seasonal pastures. Spring grazing is expected to have an inordinate effect on plant fitness by removing photosynthetic tissues at the beginning of the growing season, whereas fall grazing avoids this effect by utilization of plant material imminently destined for the grassland litter layer. Fall grazing also occurs after peak activity for plants and animals, whereby a largely intact canopy is present throughout the following summer. A twenty-year study conducted in these pastures by AAFC demonstrated that fall grazing allowed seral improvement of a bluebunch wheatgrass-sage association when compared against spring grazing at identical stocking rates. However, there are reasons to expect that spring grazing may benefit some components of the grassland biota. These expectations extend from plant structure and soil conditions observed during co-management of grassland pastures by Agriculture and Agri-Food Canada (AAFC) and local producers. We extended hypotheses about plant effects to look also at small mammal and invertebrate responses together, noting that there is good reason to expect covariation in these groups due to possible trophic relationships.

In 2008 we installed twelve, thirty-cell grids in six spring and fall grazed pastures (3 of each treatment), with a high grazing and a low grazing usage site in each pasture. Each grid was populated with pitfall, small mammal and seed rain traps, and used further to quantify associated vegetation presence and cover information. We have tentatively named nine species of ground beetles, three species of grasshopper, and 81 species of plants including forbs, shrubs and grasses. We have identified seed rain from eight groups of grasses. Furthermore we have quantified forb, shrub, litter, soil and grass cover for treatment units, and provided measures of wildlife cover using a vertical stratum method. Small mammals have been trapped in all treatment units, where low numbers of deer mice were caught throughout all sampling grids.

During our study, small mammal populations had declined to an historic low, meaning that catches were few and produced data which could not be meaningfully interpreted with the standard methods we employed. We also piloted a novel version of seed rain trap that yielded few data and should not be considered for further use in this ecosystem, where we believe ambient seed fall to be too sparse for this use of measure. Vegetation structure indicated some response to the grazing intensity treatment, but none of the variables we measured showed statistically significant responses to season of grazing. While this might indicate a lack of treatment effect, we also consider that observations taken at different sampling scales might produce different results.