Range Reference Areas: Determining seral stages and vegetation change on permanent range in British Columbia

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INTRODUCTION

Range Reference Areas form a system of livestock exclosures with vegetation-response monitoring provided by the Ministry of Forests. These sites are established on grassland or forested range at the most advanced seral stage, usually the Potential Natural Community[1]. Sites protected from natural disturbances, such as fire, do not typify a potential natural community. For example, Natural Disturbance Type 4 in British Columbia consists of ecosystems in which frequent, low-intensity fires maintain grasslands, shrub lands, and open forests. Fire suppression has changed the character and structure of plant communities in this natural disturbance type.

Reference areas represent the diversity of provincial rangeland. The majority of reference areas are in the Kamloops and Cariboo regions, where permanent range[2] comprises a large percentage of the total land area.

Range Reference Areas are benchmark sites that provide an information base for range management decisions and ecological guidelines. These areas serve management by providing:

- measures of grazing impact and ecosystem response;
- indicators of forage production potential;
- potential natural communities and seral stages; and
- demonstration areas for range use and biodiversity issues.

MATERIALS AND METHODS

Range Reference Areas were selected with the aid of existing classification and knowledge of district range staff. To meet program objectives, it was necessary to exclude livestock, and, in some cases, wild ungulates. The minimum size for these fenced exclosures was set at 1 ha, but many were larger. They were sampled when established, and resampled at selected intervals to track changes over time. Measurements were also taken on adjacent grazed areas to allow comparisons. Vegetation monitoring took place on macroplots[3], and included:

- detailed site description (slope, aspect, soils, elevation, etc.);
- establishment of five permanent transects;
- estimates of foliar plant cover by species (50 Daubenmire plots or 500 intercept points), plus litter, bare ground, and cryptogams[4];

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- measurements of trees and shrubs along five intercept lines; and,
- photographs at three permanent photopoints.

RESULTS AND DISCUSSION

A team of five range staff (four in regions) instituted the program, which included several other participants. A network of 200 new Range Reference Areas was established, adding to the 161 existing ones. All of the exclosures built under this program have undergone detailed vegetation monitoring on permanent transects. Consistent measurements and the ability to detect change in foliar plant cover have been particular sampling concerns.

Continuously monitoring the exclosures, some of which date back to the 1920s, will provide crucial long-term information on the nature and extent of changes that have occurred on provincial rangelands. The process of extrapolating reference area results and setting desired plant communities has been initiated. A gap analysis has been completed to identify any shortfalls in the representation of provincial biogeoclimatic ecosystem units. In addition to Range Reference Area program monitoring, several sites are being used by universities and colleges for research.

Products to date for the program include:

- an atlas with a description of all current reference areas (planned for the Web site);
- a data management system ("Venus de Moo") (under development);
- plans to merge previously separate regional data systems;
- data entry for both new and historic data;
- exploratory analyses and a review of potential methods (initiated);
- a seral classification for deciduous woodlands in the Prince Rupert Forest Region; and
- a Web site (http://www.for.gov.bc.ca/hfp/range/rra/rra.htm).

The status of the program is now uncertain. It received major funding (by range standards) in the establishment phase from external sources (Co-ordinated Resource Inventory Initiative and Forest Renewal BC). Since this funding expires in March 2000, ways to continue the Range Reference Area program and protect this investment are being investigated. Full utility of the program will only be achieved if well-planned remeasurements are supported with data analyses and reporting of results.

Numerous benefits could be realized if this program is continued in the future. The Range Reference Area program could:

- create a scientific baseline and long-term inventory information on the nature and extent of changes occurring on provincial rangelands;
- permit assessment of whether recovery guidelines are achievable;
- aid in the description of desired plant communities required in Range Use Plans;
- inform land use and resource management decisions at the site level (through Range Use Plans) and the landscape level (through Higher-level Plans); and
- allow refinement of the provincial classification for permanent range ecosystem.

1 A Potential Natural Community is the plant community that would establish on an ecological site if all successional sequences were completed, without interference by humans, under the present environmental conditions. Natural disturbances such as drought, wild fires, grazing by native fauna, and insect defoliation are inherent in its development. This community may include acclimatized or naturalized non-native species. It is roughly equivalent to the concept of a climax. See also the Biodiversity Guidebook.

2 Permanent range provides substantial herbaceous forage throughout most or all natural successional sequences, and may include open conifer forest, aspen woodland, grasslands, shrub lands, wetlands, subalpine meadows and alpine.

3 A macroplot is a sampling unit. See Habitat Monitoring Committee (1990).

4 Cryptogams are ground layer mosses, lichens, and related life forms that form a soil crust.

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