



Boreal Caribou Committee Quicknote

Developing A Habitat Planning Target for Range Planning

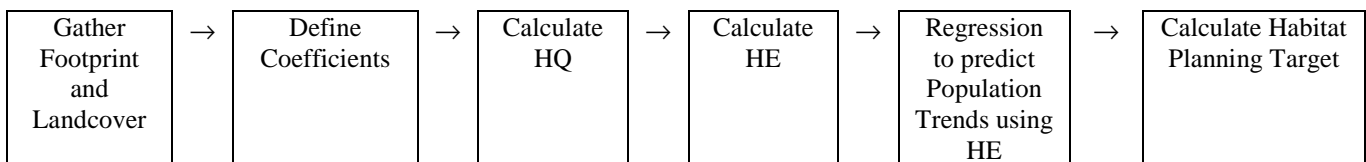
August 27, 2003

In 2001, the BCC initiated a small team of technicians to develop a habitat planning target for Boreal Caribou herds. The goal of the target was to: “describe the amount of effective habitat that must be present in caribou range in order for caribou populations to be stable”. The BCC further mandated a method to quantify the target: “...available population trends will be correlated with the proportion of habitat that is rated fully or partially effective in each range in order to establish the habitat effectiveness target.”

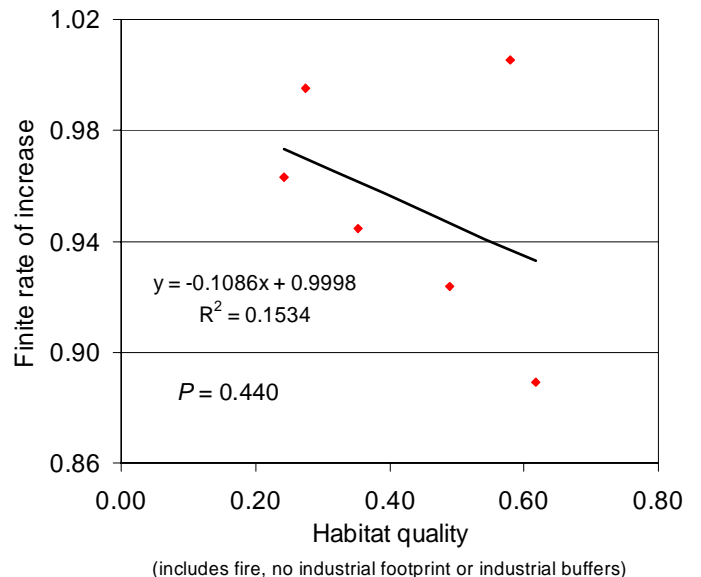
Preliminary Methods

The subcommittee decided early on that spatial GIS methods should be used to establish the habitat planning target because these methods are transparent and intuitive. ALCES is better suited to evaluating alternative land use strategies during the range planning process.

An initial attempt to develop a habitat planning target involved several steps. First, all the spatial data from various sources were assembled and prepared for analyses. Secondly, coefficients to describe the importance of land cover features were developed to create a model that described habitat quality. Additional coefficients were then developed to downgrade areas of the range where industrial features had reduced habitat quality (the remaining habitat being “effective”). The relationship between habitat effectiveness and population trend was then determined with a linear regression. Finally, the equation from the regression would be used to calculate a habitat planning target that met the population trend goal.

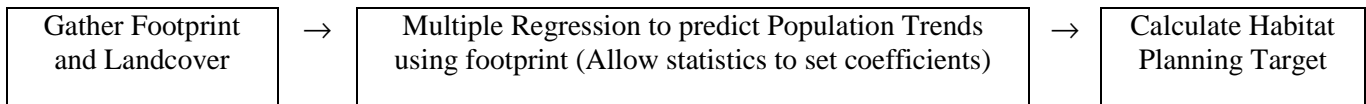


A workshop was held with 24 biologists and caribou specialists to agree on coefficients that would describe HQ and HE. It then took several months to collect, prepare, and summarize the spatial data. Once the linear regression was calculated, the underlying differences in Habitat Quality did not seem to affect population trends ($P = 0.440$, $R^2 = 0.153$). The results also suggested that Habitat Effectiveness (as defined by the workgroup) was a very poor predictor of population trends ($P = 0.90$, $R^2 = 0.0045$). The inability of HE to explain population trend was likely a result of inaccurate assumptions set by the workgroup.



Final Method

An alternate method was chosen that skipped the process (and assumptions) of calculating HQ and HE, and directly correlated the footprint with the population trend. This method allowed statistics, rather than caribou specialists, to determine coefficients for habitat features. This method will not calculate a habitat effectiveness target *per se*, but is simplistic and can still be used to determine the impacts on population trends by industrial activities, reclamation activities, wildfires, etc.



The existing literature pointed to two major factors that influence caribou habitat selection: industrial footprint and forest age (Dunford, Dyer, Smith et al. etc). These two factors were used in a multiple regression to predict finite rate of increase of each population.

Table 1. Attributes of Kernel Home Ranges (KHR) used to predict the herd’s finite rate of increase (growth rate). A finite rate of increase of 1.0 indicates a stable population (i.e. annual mortality equals annual recruitment).

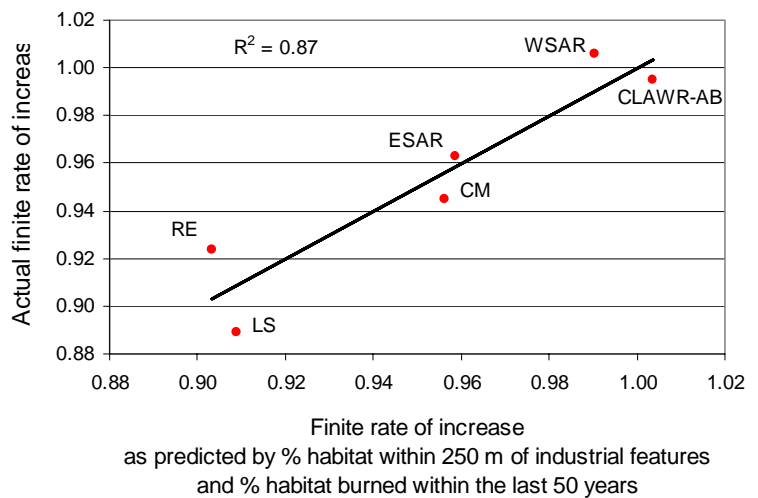
Range	% KHR within 250m of Industry	% of KHR burnt within 50 years	Finite Rate of Increase
WSAR	51.5%	7.99%	1.006
Cold Lake (AB)	31.6%	26.05%	0.995
ESAR	54.1%	19.86%	0.963
Caribou Mtn	31.7%	48.20%	0.945
Red Earth	67.8%	29.20%	0.924
Little Smoky	88.4%	1.50%	0.889

These two factors were excellent predictors of population trends ($P = 0.048$, $R^2 = 0.868$) and provided a formula that could easily be used to calculate targets for industrial footprint and forest age during range planning.

$$Y = (-0.258 * I) - (0.212 * F) + 1.140$$

Where

- Y is the goal for the herd’s finite rate of increase (1.0 is a stable population)
- I is the % of planning range within 250m of an industrial feature, and
- F is the % of planning range that is fire-origin and less than 50 years old



The target for each of the three variables within the formula will be established during range planning based on many factors such as the herd’s risk of extirpation, existing footprint, wildfire threat, and opportunities for range restoration.