

WILDLIFE RESEARCH PROGRAMS
AT LINE CREEK

Paper presented
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INTRODUCTION

Crows Nest Resources Ltd., (CNRL), is a wholly-owned subsidiary of Shell Canada Resources Ltd. The Line Creek Mine is located in the S.E. Kootenays, in the Elk Valley, approximately 20 km N.E. of the community of Sparwood.

The Line Creek Mine was the first coal mine in B.C. to come into production under the Coal Development Guidelines introduced in 1976. The mine initially proposed to produce 1.4 million tonnes/year (MTY) and is now scheduled to increase its production to 3.0 MTY of thermal and metallurgical coal. CNRL has extensive coal holdings in the Elk and Fording River Valleys. These coal properties cover an area of approximately 10,000 hectares or 100 square kilometers, of which active mining occupies approximately 140 hectares of 1.4 square kilometers.

Currently there are a number of environmental studies ongoing on the Elk Valley properties: revegetation trials, furbearer studies, base line environmental inventories and wildlife research programs. In this paper, I am going to deal exclusively with the wildlife research programs and how these studies will be incorporated into the reclamation plan for Line Creek.

The valley has long been recognized for its scenic beauty and high wildlife resource value, as well as for its coal resources. In terms of wildlife, the study area supports several hundred vertebrate species, grizzly and black bear, several predator species, and a very diversified avifauna. The major animal group in the study area are the ungulates, of which elk are the most common, followed, in decreasing order of abundance, by Bighorn sheep, moose, deer (white-tailed and mule deer), and mountain goat.

Development of the coal resources are obviously going to conflict to some degree with the wildlife resources of the area. To assess the degree of impact and to have the ability to make sound resource management decisions requires that the wildlife capabilities of the area have to be fully understood. Until present, most Government and Industry negotiations with respect to mitigation, habitat enhancement, and reclamation in B.C. were based on "judgement values" rather than being substantiated through baseline information. Currently it is the common practice to use "Canada Land Inventory Ungulate Capability Maps"

(scale 1:50,000), to estimate numbers of animals being replaced or adversely affected through development projects. However, in both cases the maps do not truly reflect actual land use capabilities. Wildlife densities and habitat capabilities are generally overestimated due to inaccuracy resulting from the large mapping scale, and from a lack of an adequate data base. To accurately determine the land use capabilities in respect to ungulates requires a good knowledge of the species population dynamics, habitat requirements, and most important, a good understanding of the carrying capacity of the area to be managed. Carrying capacity may be defined as "the maximum number of animals which can be supported by a specific range without causing ecological damage". Carrying capacity is a measure of the potential number of animals the range may carry, not a measure of the actual numbers currently present, as the range may be over-stocked or under-stocked.

Questions regarding land reclamation (in terms of habitat re-establishment) and mitigation (in terms of habitat improvement) can be addressed in concrete values (not judgement values) once the carrying capacities of the corresponding areas are known. Only if impacts can be numerically assessed, can proportionate mitigation and reclamation measures be defined in the same terms.

OBJECTIVE

Crows Nest Resources Limited has embarked on a wildlife research program on its Elk Valley Coal properties to determine the species specific carrying capacities of the major ungulate species utilizing the study area. The carrying capacities will be identified for each ungulate species for each habitat type occurring within the coal licences. The studies were initiated in the winter of 1981 and are scheduled to be completed by December 1983. At the time of writing this paper, many of the studies are still underway, consequently the results have not been finalized. To be presented is an outline of the studies and the methodology followed to determine the carrying capacities of the major ungulate species occupying the Elk Valley Coal properties.

METHODOLOGY

Habitat Classification

Habitats are qualified and quantified on a plant ecological basis

according to the vegetation cover types, taking slope aspects, inclination, elevation, and hydrological parameters into account. This information will be compiled to produce a vegetation map (scale 1:20,000) based on cover dominance identifying the habitat types. Particular habitat areas may be selected to be monitored over a number of seasons to provide information on habitat changes such as: serial succession, range degradation (resulting from overuse), or habitat enhancement through management techniques.

Habitat Utilization

Once habitat types have been identified, the species specific utilization of these habitats is determined. Degree of utilization is determined by browsing surveys, pellet group counts, winter population surveys, and tracking the movement patterns of animals fitted with radio-transmitting collars. The browsing surveys, pellet group counts, and population surveys provide information on relative population densities and animal distribution. Elk and sheep radio-telemetry tracking surveys provide information on movement patterns, travel corridors, and seasonal home ranges of the collared animals. Habitat classification and habitat utilization will provide estimates of animal distribution and relative population densities. However, to identify ungulate carrying capacities for specific habitat classes, additional information is required.

Chemical and Plant Species Analysis of Fecal Pellets

Animal species have specific nutritional requirements at different times of the year and often select specific plant species to fulfill the requirements. In addition, the animals' ability to absorb the nutritional value of a specific plant species varies with the seasons. The only way to determine the dietary composition of an animal is through direct observation, fecal analysis, or rumen samples. The most efficient method is a chemical and plant species analysis of the fecal pellets.

Plant species analysis of pellets collected from each ungulate species throughout the year will identify the plant species composition of the diet to species level by habitat type then by season. Preferred plant species will be identified on a seasonal basis.

Identification of Species Specific Key Forage Species on a Seasonal Basis

Forage characterizes the plant material available to herbivores as a food source throughout the year. It is generally accepted that during the summer, forage is in an unlimited supply. In the study area, winter forage becomes limited in supply mainly due to high snow accumulations. The winter diet of elk, moose, and deer may consist to a large extent, of twigs and bark of deciduous shrubs and tree saplings above the snow. Sheep depend in winter on the herb layer of the vegetation strata, since woody plants are not palatable to this species. Key browse species are identified through browsing surveys and fecal analysis. The relative biomass of the key browse species are assessed through visual estimates and exclosure trials to measure animal production. This will provide information on the total amount of browse available to the herbivores.

The total amount of herbaceous material available to the herbivores is determined through range productivity trials. Utilizing exclosure trials, a measure of the primary production or standing crop value is determined for three range classes (habitat types). This will provide information on the total amount of herbaceous forage available to the herbivores per habitat type.

Determine Proper Use Value Per Range Class

The "proper use value" may be considered as the proportion of available vegetation which may be grazed before overgrazing or range degradation occurs. The proper use value is determined from the range productivity trials and fecal analysis. Values usually range from 40 to 60 percent of the total biomass available to the herbivores before overgrazing occurs.

Determine Total Animal Use Days per Habitat Type

Using the species specific information on habitat utilization and relative population densities determines the number of days and the number of animals spent occupying each habitat type.

Relate Forage Consumption to Forage Production

Identify the amount of forage (herbaceous and browse) available to each ungulate species, and relate it to the amount of forage intake per animal per day to determine the species specific carrying capacity.

APPLICATIONS

With the species specific carrying capacities per habitat type defined, questions regarding habitat re-establishment (land reclamation) or habitat enhancement can now be addressed in concrete terms.

The information obtained from this research program can be incorporated into the design of the reclamation plan for Line Creek. The reclamation objective at Line Creek is to re-establish wildlife habitat for the ungulate species. With an understanding of the animal's habitat requisites such as the seasonal movement and range usage patterns of the animals, the seasonal dietary requirements, and the seasonal preferred plant species for the ungulate species, it will be possible to design a very site specific reclamation plan to fulfill these requisites.