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# Restoration of Bighorn Sheep Habitat and Associated Open Forest and Grassland Ecosystems at Radium Hot Springs, B.C.

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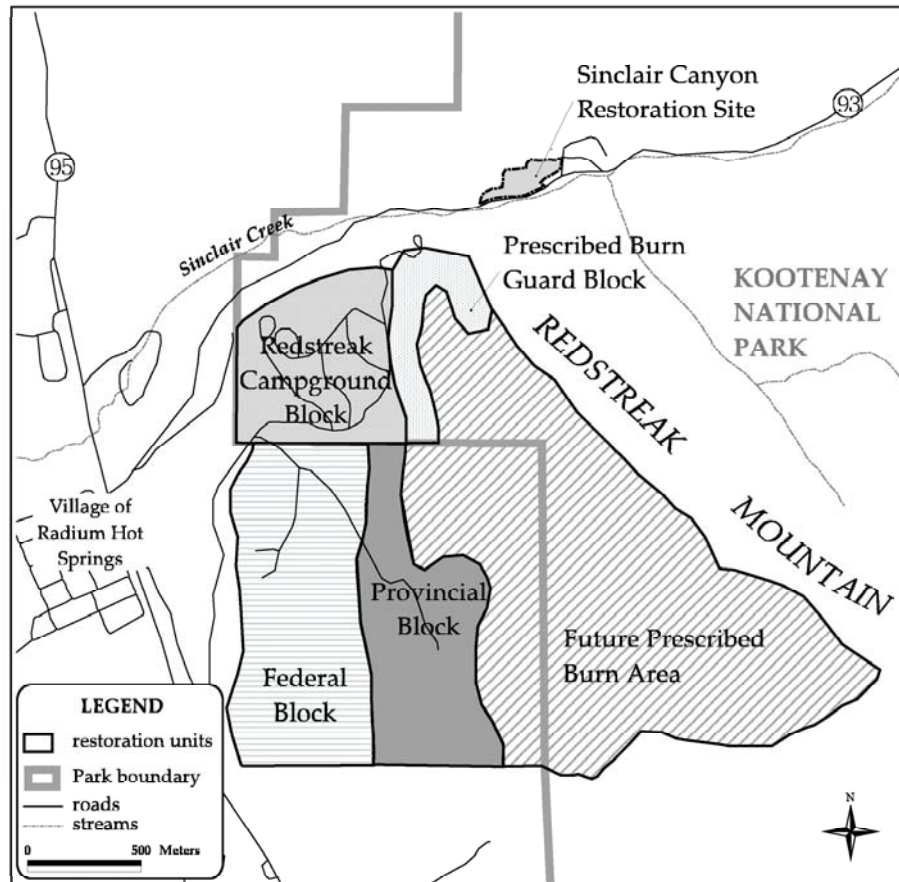
**Key Words:** Rocky Mountain bighorn sheep, *Ovis canadensis canadensis*, bighorn sheep, *Ovis canadensis*, grassland, Kootenay National Park, radiotelemetry, habitat restoration, Rocky Mountains, British Columbia

**Extended Abstract:** Open forest and grassland ecosystems in southeastern British Columbia (B.C.) provide critical habitat for the blue-listed Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*)<sup>1</sup> and other species; however, these habitats are disappearing due to human encroachment, nonnative plant invasions, and forest ingrowth from lack of fire (Tremblay and Dibb 2004). In 1997, a public education and stewardship program, 'Bighorn in Our Backyard', was initiated at Radium Hot Springs, B.C. (Dubois et al. 2004). It uses bighorn sheep as an ambassador species to focus local conservation attention on these threatened ecosystems. This was followed, in 2001, by a cooperative, multi-agency project to restore open forest and grassland at and near Radium Hot Springs.

In 2001, restoration work started at the Stoddart Creek winter range on provincial Crown land just south of Kootenay National Park. In 2002, a second block of provincial land was treated, this one at the base of Redstreak Mountain on the border of Kootenay National Park at Radium Hot Springs (Fig. 1). An adjacent block of federal land owned by Kootenay National Park was treated in the winter of 2003. Prior to restoration, forest stand density at these sites was high, reducing forage production and sight lines for bighorns and creating considerable potential for wildfire. Mechanical harvesting was used on 200 ha to thin existing stands to approximately 8-m spacing; veteran trees were retained. On the federal block, 'leave' trees were clumped, and five areas (of about 1.5 ha each) were left untreated to retain snags and wildlife trees. Within Kootenay National Park, additional thinning was completed in Redstreak Campground primarily to protect the facility and public safety. These treatments will help safeguard the village of Radium Hot Springs from fires on Redstreak Mountain and will simplify future use of prescribed fire.

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<sup>1</sup>Currently, the BC Species and Ecosystems Explorer (September 2004) does not list subspecies of the bighorn sheep. NatureServe Explorer (version 4.0, July 2004) lists the subspecies *canadensis*, but does not show its range as occurring in British Columbia.



**Figure 1. Redstreak Mountain restoration sites near Radium Hot Springs, B.C., 2002 and 2003. Stoddart Creek restoration site (3 km to south) not shown.**

Future restoration priorities will be determined, in part, by the results of ongoing radiotelemetry studies of the Radium bighorn sheep. Restoration objectives include maintaining open habitat types in winter ranges and in transitional ranges between winter and high-elevation summer ranges. Although restoration work is guided by bighorn sheep habitat requirements, it is anticipated that other species at risk will benefit, such as the badger (*Taxidea taxus jeffersonii*)<sup>2</sup>, rubber boa (*Charina bottae*), and flammulated owl (*Otus flammeolus*), and a large suite of red- and blue-listed plants.

A radiotelemetry study of the Radium bighorns was started in 2002 (Tremblay and Dibb 2004). The objectives were to:

- determine seasonal range selection;
- locate migration corridors between seasonal ranges;
- locate critical habitat elements including lambing ranges and mineral licks; and
- measure bighorn responses to restoration activities.

<sup>2</sup>Currently, neither the BC Species and Ecosystems Explorer (September 2004) nor NatureServe Explorer (version 4.0, July 2004) list subspecies for the badger.

In each of 2002 and 2003, 10 animals (a mix of adult females and  $\frac{3}{4}$  curl rams) were fitted with GPS radio collars programmed to store GPS locations several times a day (Table 1). Ground-based VHF telemetry was used to verify collar function and to determine group composition characteristics. Collars were retrieved following up to 12 months of data collection. Simple analysis of telemetry data was used to locate migration routes and critical habitat elements. Although bighorns in this area typically travel quickly between seasonal ranges, the sampling frequency used seems to have been sufficient to infer locations of movement corridors.

**Table 1. Summary of bighorn sheep captures and mortalities, 2002–2003.**

	<i>No. of study animals</i>	<i>No. of highway mortalities</i>	<i>No. of surviving females</i>	<i>No. of surviving males</i>
2002	10	1 (male)	7	2
2003	10	1 (female)	5	4
Total	20	2	12	6

Future work will include continued studies of bighorn sheep using GPS radio collars in 2004. Investigations will focus on migration corridors and responses to restoration activities. Location data will be used to test Tremblay's (2001) theoretical model of bighorn sheep corridors at Radium Hot Springs. Prescribed burning is planned for the mechanically harvested federal and provincial blocks at Redstreak in spring 2004. Larger scale prescribed burning in subsequent years is being considered in the Redstreak Mountain and upper Stoddart Creek areas. Pending funding, an inventory of red- and blue-listed native plants in dry forest and grasslands in the study area will be conducted in 2004, and a multi-jurisdictional restoration plan will be developed over the entire Radium bighorn range.

### Acknowledgments

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