

Morice & Lakes



IFPA



April 2008
Summary No. 65

Morice & Lakes Innovative Forest Practices Agreement

PROJECT SUMMARY

The ecosystem management component of the Morice & Lakes IFPA has embarked on several projects that assess biodiversity, ecological attributes, and fish and wildlife habitat. These projects provide important ecological data used in learning scenario development for the IFPA.

Ecosystem
Management

Forest Productivity

Public Involvement

Adaptive
Management

Effects of a Mountain Pine Beetle Epidemic on Northern Caribou Habitat Use



Adult female caribou radio-collared in December 2007.

Introduction

The Tweedsmuir-Entiako caribou (*Rangifer tarandus caribou*) population winters in the Entiako and East Ootsa areas. During winter, caribou select mature lodgepole pine (*Pinus contorta*) forests on poor sites and forage primarily by cratering through the snow to obtain terrestrial lichens (Cichowski 1993). This

project was initiated in 2005/06 to assess the effects of the current mountain pine beetle (*Dendroctonus ponderosae*) epidemic during the "grey-attack" phase on Tweedsmuir-Entiako caribou migration, landscape level habitat use, and winter stand level habitat use and forage site selection. This year, 2007/08 was the second of three years of data collection. The Tweedsmuir-Entiako caribou population is the first caribou

Visit our website at: www.moricelakes-ifpa.com

population to experience epidemic levels of mountain pine beetles on their range, so no information on the effects of mountain pine beetles on caribou habitat use was available prior to this study.

Objectives

Objectives for the project in 2007/08 were:

- to capture and collar nine caribou and to remove the collar from the adult male caribou (December);
- to remove three GPS collars (March);
- to conduct monthly radio-telemetry flights during summer months (April to November) and bi-weekly radio-telemetry flights during winter months (December to March);
- to conduct four winter site investigations sessions (December to March);
- to conduct spring (June), fall (October) and winter (March) calf survival surveys; and,
- to conduct mortality investigations when necessary.

Methods

From December 14-15, 2007, caribou in Entiako Provincial Park were captured using a net gun fired from a helicopter and were restrained without the use of drugs. Each caribou was fitted with a radio-collar and two eartags. An attempt was made to remotely release three GPS collars in February 2008; the remote release mechanisms failed so the caribou were captured in March 2008 and their collars were removed manually.

Eighteen radio-telemetry flights were conducted between April 2007 and March 2008 to assess seasonal movements and habitat use. Flights were conducted approximately monthly during summer months and biweekly during winter months. Habitat type and GPS coordinates were recorded for each radio-collared caribou location.

Four winter site investigations sessions were conducted during winter 2007/08: December 18-20; January 22-24; February 18-21; and, March 11-13. A helicopter was used to locate radio-collared caribou to access recent foraging areas and fresh tracks. A total of 28 sites were visited. Fresh tracks were backtracked or followed. Tracks were counted and track number was used to document start and finish of each habitat class. Habitat class was characterized by species (pine, pine/spruce, spruce, etc.); pine disturbance (none, MPB-green, MPB-red, MPB-grey, etc.); age (very young, young, mature), and canopy openness (very open, open, moderate, closed). Track number was also used to document location of each feeding site (terrestrial vs. arboreal lichen feeding). Snow depth, snow penetrability, percent canopy closure and percent vegetation cover were recorded for each terrestrial lichen feeding (crater) site. In addition to crater sites, snow was excavated every 100 steps where caribou were traveling and not cratering, and snow depth, snow penetrability, percent canopy closure and percent vegetation cover were recorded. Caribou sinking depth, snow depth and snow penetrability were opportunistically recorded for caribou tracks in different habitat types.

Calf survival surveys were conducted during calving (2 July 2007), fall (20 October 2007) and winter (25 March 2008). A helicopter was used to locate radio-collared caribou to determine whether they had a calf. All caribou associated with radio-collared caribou and other groups of caribou sighted opportunistically were also counted and classified. Mortalities of adult radio-collared caribou were investigated whenever feasible.

Results and Discussion

A total of ten caribou were captured during the December 2007 capture session. Nine adult female caribou were captured and fitted with four VHF collars and five GPS collars. In addition, the previously collared adult male caribou was captured and his collar was removed. In March 2008, three GPS collars (placed on caribou in January 2007) were removed. As of 31 March 2008, 23 adult female caribou in the Tweedsmuir-Entiako caribou population were radio-collared (7GPS, 16VHF).

Seasonal movements and habitat use in 2007/08 were similar to seasonal movements and habitat use prior to mountain pine beetle attack. One difference in 2007/08 was that in spring 2007, caribou remained on their winter range later than usual, which was likely due to the deep snow accumulation in 2006/07 rather than the grey stage of the mountain pine beetle epidemic. During spring migration, caribou traveled through low elevation mountain pine beetle-attacked stands; by calving, 60% of the radio-collared caribou were found at high elevations in alpine and subalpine habitat in northern Tweedsmuir Park area. Use of high elevation habitat declined slightly in the summer as caribou increased their use of low elevation forests, but by the rut in October, caribou were found primarily in high elevation subalpine and alpine habitat. In mid November, most radio-collared caribou had moved to the area on the north and south sides of Tetachuck Lake where they used mountain pine beetle killed stands. Two caribou remained in northern Tweedsmuir Park in alpine habitat near Tweedsmuir Peak until late December. During winter, caribou mostly used mountain pine beetle-killed/live pine stands at low elevations on the south side of Tetachuck Lake. Some caribou were found on the north side of Tetachuck Lake until mid March. In late March, many caribou moved north and east to the area between the Entiako River and Euchu Reach. No caribou were found in the Fawnie Mountains in the winter of 2007/08.

During winter, radio-collared caribou in low elevations selected habitats with abundant terrestrial lichens (Dry Lichen/Lichen Moss [DLLM] and Lichen Moss [LM] habitats), and avoided habitats with few or no terrestrial lichens (Moss/Seepage Forest – Aspen Forb [MSF/AF], Moss- Dry Lichen / Lichen Moss [MDLLM]), and lakes. For forest cover, caribou selected mature pine and pine/spruce forests on medium productivity sites and avoided lakes and mature pine/spruce stands on low and poor productivity sites. Caribou also heavily used mature pine stands on low and poor productivity sites, and immature pine stands, but not in excess of their coverage.

During winter site investigations, snow depth in low elevation forested habitat used by caribou varied through the winter but was greatest in January and February. Caribou sinking depth

stayed relatively constant throughout the winter with a slight drop in February. From December to mid February, temperatures were generally cold and did not go above freezing resulting in a relatively unconsolidated snowpack. From late February to mid March, temperatures increased and were often above freezing during the day. Although snow was slightly more consolidated in March, snow continued to be relatively soft due to thawing, especially in the afternoon. By March, caribou often used old frozen tracks for traveling in single file rather than undisturbed snow.

A total of 296 craters and 1408 arboreal lichen feeding sites were examined. Craters were found primarily in mature grey-attacked pine stands with open or very open canopies and young grey-attacked pine stands with open canopies. Arboreal lichen feeding occurred in all habitats. Craters contained more terrestrial lichens and were found in more open canopies than non-crater sites (where caribou were traveling and foraging on arboreal lichens). Snow depth and snow penetrability were generally greater at craters than at non-crater sites except in December. In March, percent snow penetrability was higher at craters than non-crater sites suggesting that caribou were cratering in areas with softer snow and walking in areas with harder snow in the latter part of the winter.

A number of craters were observed at the base of mature pine or spruce trees, and were most often associated with grey attacked pine trees. It was unclear why the caribou were cratering at these sites but the most common species at these sites were twinflower and bunchberry with wintergreens and spirea at some sites. No terrestrial lichens were present in these craters.

Seven radio-collared caribou mortalities occurred between April 2007 and March 2008. Timing of mortality was consistent with timing of mortality prior to the mountain pine beetle epidemic, with the majority of mortalities occurring between May and mid July while caribou were on their summer range. Of the seven mortalities, one was due to wolverine predation (winter), one was likely due to bear predation and one was likely due to predation but the predator was not identified (both bear and wolf scats were present). The causes of the other four mortalities were undetermined due to lack of evidence. Adult female mortality rate for April 2007 to March 2008 was 29.2%. For radio-collared caribou, calf survival was low in July (post-calving) and most calf mortality occurred during summer months; calves that survived to October also survived to March. For all caribou counted, calf survival was low in July (post-calving) and continued to decline until late winter. By March, 17.7% of adult female radio-collared caribou had calves, and calves made up 9.3% of all caribou counted. The calf recruitment rate was lower than the adult female mortality rate suggesting that the population declined in 2007/08.

Preliminary results from 2007/08 suggest that caribou continued to select pine habitats where terrestrial lichens were abundant and continued to forage on terrestrial lichens where they were available, despite the grey attack phase of the mountain pine beetle epidemic. Caribou winter habitat use patterns in 2007/08 were similar to winter habitat use patterns prior to mountain pine beetle attack in that:

- caribou used low elevation pine stands throughout the winter;
- caribou cratered for terrestrial lichens where they were available and abundant, predominantly in open and very open pine stands (now dead);
- caribou foraged on arboreal lichens in all habitats throughout the winter; and,
- in mid March, caribou started using the area in the northeastern part of their winter range between the Entiako River and Natalkuz Lake.

The effect of weather conditions on snow conditions appears to play a greater role in terrestrial lichen foraging than changes in snow conditions due to mountain pine beetle attack.

Information from this study will be used to develop forest management guidelines for the Tweedsmuir-Entiako caribou winter range and for other Northern Caribou winter ranges that experience epidemic levels of mountain pine beetles.

References

Cichowski, D.B. 1993. Seasonal movements, habitat use and winter feeding ecology of woodland caribou in west-central British Columbia. *B.C. Ministry of Forests Land Management Report No. 79*, Victoria. 54p.

Contact

Deborah Cichowski
Caribou Ecological Consulting
Box 3652, Smithers, BC, V0J 2N0
caribou@bulkley.net

A full text of this study is contained in the Ministry of Forests and Range library website:

Cichowski, D. 2008. Tweedsmuir-Entiako Caribou Project: Effects of a mountain pine beetle epidemic on Northern Caribou habitat use – Annual Summary – 2007/08. Prepared for Ministry of Environment, Prince George, B.C. Habitat Conservation Trust Fund, Victoria, B.C., Bulkley Valley Centre for Natural Resources Research and Management, Smithers, B.C., and Morice-Lakes Innovative Forest Practices Agreement, Prince George, B.C. 22p.

Acknowledgements

Funding sources:

- Ministry of Environment, Mountain Pine Beetle Response;
- Habitat Conservation Trust Fund (Project 6-174);
- Forest Sciences Program of the Forest Investment Account (FSP Project: M08-6047 through the Bulkley Valley Centre for Natural Resources Research and Management);
- the Morice & Lakes Innovative Forest Practices Agreement (IFPA) Forest Investment Account funds (FIA Project: NOTSA 202660-013); and,
- the Ministry of Forests, Nadina Forest District.

Chris Ritchie and Brady Nelles (Ministry of Environment) secured Mountain Pine Beetle Response funding and Jim Burbee (Morice & Lakes IFPA) secured Forest Investment Account (FIA) funding through the Morice-Lakes IFPA. Agathe Bernard (Ministry of Forests) also secured some funding for helicopter support for an extra day of winter site investigations in February, and for contributing to capturing and removing GPS collars in March. Scott McMillan (BC Parks), Craig Paulson (BC Parks), Don Morgan (Ministry of Forests), Agathe Bernard (Ministry of Forests), and Anne Macadam (Consultant) helped with winter site investigations. Mark Williams (Ministry of Environment), George Schultze (Ministry of Environment), Bill Borrett (Ministry of Forests), and Tom Smith (Consultant) helped with calf survival surveys. George Schultze, Rod Dalziel (BC Parks), Andy Macdonald (BC Parks), Craig Paulson, and Mark Parminter (BC Parks) helped with mortality investigations. Eric Stier and Travis Mitchell of Guardian Aerospace conducted radio-telemetry flights. Pat Rooney and Kerry Guenter of Highland Helicopters flew us around during winter site investigations, calf survival surveys and mortality investigations. Lou Dubuc of Lakes District Air Services flew us into one of the mortality sites by floatplane. The capture sessions in December 2007 (collaring) and March 2008 (removal of three GPS collars) were conducted by Brad Culling and Diane Culling of Diversified Environmental Services, and Greg Altoft of Altoft Helicopters. Laurence Turney (Gartner Lee) initialized new GPS radio-collars prior to capture. George Schultze helped with organization of collars, capture equipment, and radio-telemetry equipment. Norm MacLean (LGL Ltd.) conducted habitat analyses and produced all the maps for the annual summary report.

For More
Information...



For more information on the Morice & Lakes IFPA,
please contact:

*Jim Burbee, RPF, IFPA Manager
c/o Tweedsmuir Forest Ltd.
3003 Riverview Road
Prince George, B.C. V2K 4Y5
Tel: 250-564-1518
e-mail: venturefc@telus.net*

www.moricelakes-ifpa.com