

Habitat Conservation Trust Foundation

Project Proposal Application
Funding Cycle 2009-2010

DETAILED PROJECT PROPOSAL OUTLINE

1. EXECUTIVE SUMMARY

The current mountain pine beetle (MPB) epidemic is one of the greatest threats to Northern Caribou populations in British Columbia and Alberta. Northern Caribou in the Southern Mountains National Ecological Area (SMNEA) were recently designated as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Before the project in this proposal was initiated in 2005/06, no information was available on the effects of the MPB epidemic on caribou habitat use. This project investigates habitat use and movements of the Tweedsmuir-Entiako caribou population, the first Northern Caribou population to experience the MPB epidemic, during the grey attack phase of the epidemic. The project biologist is Deborah Cichowski with the Bulkley Valley Centre for Natural Resources Research and Management. The Bulkley Valley Research Centre is a registered not-for-profit society based in Smithers, BC, that has been conducting high quality interdisciplinary research on temperate, montane and boreal ecosystems since 2002.

The objectives of this project are: to improve the understanding of the effects of the current MPB epidemic during the “grey-attack” phase on Northern Caribou migration, landscape level habitat use, stand level winter habitat use and winter forage site selection; to use information collected during this study to provide wildlife and forest managers with baseline information on the effects of epidemic MPB numbers on Northern Caribou; and, to develop winter habitat management strategies for Northern Caribou populations experiencing MPB outbreaks. The fieldwork portion of the project (2005/06 to 2008/09) was based on radio-collared caribou and included monthly radio-telemetry flights and monthly winter site investigations. The focus for this year (2009/10) is to complete a final report.

The Tweedsmuir-Entiako population is the first to experience the current MPB outbreak; therefore, information collected will benefit all Northern Caribou populations where MPB levels are currently increasing. The costs of not completing the final report are postponing data analysis, and postponing developing recommendations for winter habitat management strategies.

The measures of success for the short-term objectives (2009/10) and long-term objectives for this project include: a final report that contains a detailed analysis of data collected from 2005/06 to 2009/10 and compares it to data collected prior to mountain pine beetles attack, and includes recommendations for management strategies; a final project summary for wider distribution; final presentations to the Northern Caribou Technical Advisory Committee, and the Bulkley Valley Research Centre seminar series; and, a presentation at the next scheduled North American Caribou Workshop.

The Bulkley Valley Research Centre is requesting \$27,000 from HCTF for 2009/10. An additional \$27,000 has been secured from Forest Sciences Program (FIA).

2. ISSUE

The Tweedsmuir-Entiako caribou population is the first Northern Caribou population to experience the recent mountain pine beetle (MPB) epidemic. During winter, caribou select mature lodgepole pine forests where terrestrial lichens are abundant, and forage primarily by cratering through the snow to obtain terrestrial lichens (Cichowski 1993). COSEWIC recently listed all caribou in the Southern Mountains National Ecological Area (SMNEA), which includes the Tweedsmuir-Entiako population, as Threatened. The Recovery Strategy for Northern Caribou in the SMNEA in BC identifies research on the effects of MPB on Northern Caribou as a

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priority (NCTAC 2005). Since this scale of MPB attack has been unprecedented on caribou ranges in recent history, prior to the initiation of this project in 2005/06, no information was available on the effects of MPB on caribou habitat use, making it difficult to develop management strategies that minimize impacts to caribou. From 2006/07 to 2008/09, this project has assessed the impacts of the MPB epidemic on Northern Caribou habitat use and winter foraging habits during the grey attack phase of the epidemic using radio-collared caribou and winter snow tracking. Although there is no hunting season for the Tweedsmuir-Entiako population, all Northern Caribou populations in BC and Alberta, including hunted populations in northern BC and in the Itcha-Ilgachuz area, are at risk of experiencing the MPB epidemic due to climate change and a northerly expansion of MPB distribution. Not completing the final report in 2009/10 will result in having to postpone data analysis and management strategy development.

3. PROJECT OBJECTIVES

The long-term objectives of this project are:

- to improve the understanding of the effects of the current mountain pine beetle epidemic during the “grey-attack” phase on Northern Caribou migration, landscape level habitat use, stand level winter habitat use and winter forage site selection using radio-collared caribou and snow tracking and comparing results to similar information collected prior to mountain pine beetle attack;
- to use information collected during this study to provide wildlife and forest managers with baseline information on the effects of epidemic mountain pine beetle numbers on Northern Caribou; and,
- to develop recommendations for winter habitat management strategies for Northern Caribou populations experiencing mountain pine beetle outbreaks.

The short-term objectives of this project for 2009/10 are:

- to complete a final report that includes:
 - an analysis and summary of data collected during the 3 years of fieldwork (2006/07 to 2008/09);
 - a comparison of MPB (grey attack) habitat use/winter foraging (2006/07 to 2008/09) to pre MPB habitat use/winter foraging (1984-2003); and,
 - recommendations for management strategies;
- to complete a final project summary for wider distribution; and,
- to present results to the Northern Caribou Technical Advisory Committee, the Bulkley Valley Research Centre seminar series, and the next scheduled North American Caribou Workshop.

4. ACTIVITIES/METHODOLOGY

Long-term objectives have been partially achieved during the 3-year field study of radio-collared caribou. This project was initiated in 2005/06 (Year 1) with data collected from 2006/07 (Year 2) to 2008/09 (Year 4). Year 5 (2009/10) will focus on the final data analysis and report.

To assess the effects of the mountain pine beetle epidemic on caribou habitat use at the landscape level, ideally, caribou seasonal movements and habitat use would be studied prior to, during and following mountain pine beetle attack. The Ministry of Environment tracked radio-collared caribou in the Tweedsmuir-Entiako area from 1983 to 2003, prior to the grey stage of the MPB epidemic. All radio-collared caribou location data collected during the 20-year period has been analyzed and summarized in Cichowski and MacLean (2005). Fieldwork for the current project was conducted from 2006/07 to 2008/09 during the grey stage of the mountain pine beetle epidemic. During the 3-year study, VHF and GPS radio-collared caribou were located by fixed-wing aircraft approximately monthly from April to November, and approximately bi-weekly from

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December to March. GPS data were downloaded when collars were retrieved. Habitat selection by caribou during the grey attack phase of the mountain pine beetle epidemic will be assessed using radio-collared caribou locations and will be compared to habitat selection prior to the epidemic. Stand and site level responses of caribou winter habitat use to mountain pine beetle attack was investigated by snowtracking. Four monthly winter site investigations were conducted from December to March. Fresh tracks were followed or backtracked and feeding site type (terrestrial vs. arboreal lichen feeding), general habitat class (pine, pine/spruce, spruce, etc.), disturbance class (none, forest harvesting, mountain pine beetle attack), snow depth, canopy closure and % vegetation cover in feeding craters was recorded at each terrestrial feeding site. In addition, snow was excavated every 100 steps where caribou were traveling and not cratering and the same measurements were recorded at those sites. These data will be compared to similar data collected from the 1985 to 1988 intensive winter habitat field study. Snowtracking data from 1985 to 1988 will be entered into databases set up for the current project. In addition, population parameters (calf survival, adult mortality) were opportunistically collected during this study based on adult survival of radio-collared caribou, and survival of calves associated with adult female radio-collared caribou. All population data will be compared to population data from 1983 to 2003.

The combination of snowtracking and using radio-collared animals provides a multi-scale approach to assessing habitat use (Cichowski 1993, Johnson 2000) and was used for both this project, and the intensive winter habitat field study from 1985 to 1988 (Cichowski 1993) so data is directly comparable.

Data compilation, data summary, report writing and presentations will be conducted by the project biologist, Deborah Cichowski. GIS analysis of radio-collar location data will be conducted by Norm MacLean and data analysis of snowtracking data will be conducted by Sybille Haeussler, who conducted data analysis for the MPB/lichen project in 2005 and 2007. Project objectives, methods/activities, and timelines for 2009/10 are summarized in the following table.

Project Objective	Activities/Methods	Timeline
To complete a final report that includes an analysis and summary of data collected during the 3 years of fieldwork, a comparison of pre and post MPB (grey attack) habitat use/winter foraging, and recommendations for management strategies	Enter winter foraging data from 1985 to 1988	April to September 2009
	Conduct GIS analyses of radio-collared caribou locations using ArcGIS9.2	June to October 2009
	Conduct winter foraging analysis	September to November 2009
	Interpret data analyses, format report including maps and charts, write report	October 2009 to February 2010
	Develop recommendations for management strategies	January to February 2010
	Review report (MOE staff, MOFR staff)	March 2010
	Finalize final report	April 2010
To complete a final project summary	Summarize final report into a 2-4 page stand-alone summary	March 2010
To present results to the Northern Caribou Technical Advisory Committee, the Bulkley Valley Research Centre seminar series, and the next scheduled North American Caribou Workshop	Complete a powerpoint presentation	Northern Caribou Technical Advisory Committee (date not yet determined)
		Bulkley Valley Research Centre seminar series – April 2010
		North American Caribou Workshop – likely in 2011

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5. BENEFITS/RISK

Because the response of caribou to mountain pine beetle attack was unknown and the Tweedsmuir-Entiako caribou population was the first caribou population to experience a significant mountain pine beetle outbreak, investigating impacts on the Tweedsmuir-Entiako caribou population will aid in developing caribou management strategies for all Northern Caribou populations in BC, including hunted populations such as the Itcha-Ilgachuz population and populations in northern BC. Information obtained from this project includes stand conditions that caribou select following epidemic mountain pine beetle levels and forage selection. This will aid in identifying forest stands on other caribou winter ranges that will be important caribou winter range following epidemic mountain pine beetle levels, and therefore will aid in directing mountain pine beetle management and salvage efforts to minimize impacts to all Northern Caribou populations in BC. This project addresses one of the priorities in the Recovery Strategy for Northern Caribou in the SMNEA in BC (NCTAC 2005) to conduct research on the effects of MPB on Northern Caribou.

Another benefit is that all activities conducted in Years 1 (2005/06) and 2 (2006/07) and the majority of activities in Year 3 (2007/08) and Year 4 (2008/09) have been funded by other sources (\$360,000 contributed to date) and an additional \$27,000 has also been secured from Forest Sciences Program of FIA for Year 5 (2009/10). Therefore, the HCTF contribution to the completion of the final report will benefit from data that was also funded by other sources. This project will also complement the project already underway on the response of terrestrial lichens to the mountain pine beetle epidemic.

Expected returns include: a final report to be completed by April 2010 that contains a detailed analysis of data collected from 2005/06 to 2009/10 and compares it to data collected prior to MPB attack, and includes recommendations for management strategies; a final project summary for wider distribution that will be completed by April 2010; final presentations to the Northern Caribou Technical Advisory Committee at their next meeting (date not known at this time) and the Bulkley Valley Research Centre seminar series in April 2010; and a presentation at the next scheduled North American Caribou Workshop (most likely in 2011).

6. EVALUATION/MEASURES OF SUCCESS

The measures of success for the long-term objectives for this project and for the short-term objectives for 2009/10 are the same and include:

- a better understanding of caribou movements and habitat use during the grey phase of the mountain pine beetle epidemic in sub-boreal forests;
- a completed final report that contains a detailed analysis of data collected from 2005/06 to 2009/10 and compares it to data collected prior to mountain pine beetles attack, and includes recommendations for management strategies (completed by April 2010);
- a final project summary for wider distribution (completed by April 2010);
- final presentations to the Northern Caribou Technical Advisory Committee (date not known at this time) and the Bulkley Valley Research Centre seminar series (April 2010);
- a presentation at the next scheduled North American Caribou Workshop (likely to occur in 2011).

The success of the project will be evaluated based on completion of these items.

7. COMMUNICATION/OUTREACH

Communications will be in the form of the final report and presentation of final results since the focus of Year 5 will be data analysis and completion of the final report. The final report will be completed by April 2010 and target audiences for the final report will include the Northern Caribou Technical Advisory Committee and

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associated Recovery Implementation Groups, and, wildlife and forest managers where Northern Caribou ranges are affected by mountain pine beetles. Presentations of final results will be made at the Bulkley Valley Research Centre's seminar series in April 2010 and at the next Northern Caribou Technical Advisory Committee (date not yet known). Results from the study will also be presented at the next North American Caribou Workshop (likely to be held in 2011). In addition, a final project summary will be completed by April 2010 that will be used for wider distribution. The final report and final project summary will be available through the Bulkley Valley Centre for Natural Resources Research and Management's website. The final report will also be available on the Ministry of Forests website through the FIA Forest Sciences Program. HCTF support will be acknowledged on the cover page and acknowledgements section of the final report and project summary, and on the funding sources slide in the powerpoint presentation.

8. LITERATURE CITED

- Cichowski, D.B. 1993. Seasonal movements, habitat use, and winter feeding ecology of woodland caribou in west-central British Columbia. B.C. Min. For., Victoria, B.C., Land Manage. Handb. No. 79. 54p. (www.for.gov.bc.ca/hfd/pubs/docs/mr/lmr079.htm)
- Cichowski, D. and N. MacLean. 2005. Tweedsmuir-Entiako Caribou Population Technical Background Information Summary. Prepared for Ministry of Environment, Smithers, B.C. 199p. (Source: Rick Marshall, Ministry of Environment, Rick.W.Marshall@gov.bc.ca)
- Johnson, C.J. 2000. A multi-scale behavioural approach to understanding the movements of woodland caribou. PhD Thesis. University of Northern British Columbia, Prince George, B.C. 210p. (Source: Chris Johnson, UNBC, johnsoch@unbc.ca)
- Northern Caribou Technical Advisory Committee. 2005. A Strategy for the Recovery of Northern Caribou (*Rangifer tarandus caribou*) in the Southern Mountains National Ecological Area in British Columbia – Version 1.0. Ministry of Environment, Victoria, B.C. (Source: Ian Hatter, Ministry of Environment, Ian.Hatter@gov.bc.ca)

9. CONTINUING PROJECT SUMMARY

a) Project Update

As of October 2008, the project has been progressing as planned with fieldwork focussing on monthly radio-telemetry flights, and monthly winter site investigations (snowtracking), with calf surveys and mortality investigations occurring if funding is available. The table in section b) Summarize Project Results summarizes all fieldwork activities that have occurred to date, and that are planned until March 2009. For the remainder of 2008/09, we are expecting to complete one radio-telemetry flight in November, bi-weekly radio-telemetry flights from December 2008 to March 2009, four monthly winter site investigations sessions from December 2008 to March 2009, and a calf survival survey/collar removal session in March 2009.

At the end of the current fiscal year (2008/09), approximately \$440,000 will have been spent on this project for Years 1 to 4 (2005/06 to 2008/09), with HCTF contributing \$108,000. Other funding sources include Ministry of Environment, Forest Sciences Program of FIA, Tweedsmuir Forest Ltd. (Morice & Lakes Innovative Forest Practices Agreement), Houston Forest Products, and the Ministry of Forests and Range. Ministry of Environment has also provided an additional approximately \$18,000 of in-kind contributions in personnel wages and travel costs.

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The only aspect of the project not progressing as planned is the durability/reliability of the GPS collars. Out of 6 refurbished and 12 new GPS collars, 1 refurbished collar failed and 6 new collars failed. In addition, remote release mechanisms failed on 3 refurbished collars, which had to be manually removed. We currently have 5 new GPS collars deployed. In October 2008, we were able to capture and remove 3 failed new GPS collars and are hoping to retrieve the other 4 failed collars in March 2009 if the caribou are still alive. All GPS collars were Televilt (6 old Posrec collars; 12 new Tellus collars). I recommend that any other projects considering using Televilt collars consider the high failure rate that we experienced with this project, and the difficulty in communicating with the service center (Sweden) due to the time difference and distance from BC.

b) Summarize Project Results:

Project Objectives	Activities/Methods by Objective	Results	Explanation /Summary Notes
To assess the effects of the current MPB epidemic during the grey-attack phase on Northern Caribou in the Tweedsmuir-Entiako caribou population by using radio-collared caribou	Monthly radio-telemetry flights	2006/07 – 5 flights Apr-Nov 2006; 10 flights Dec 2006-Mar 2007 2007/08 – 7 flights Apr-Nov 2007; 11 flights Dec 2007-Mar 2008 2008/09 – 6 flights April – Oct 2008; 1 flight expected for Nov 2008 and 8 flights expected for Dec 2008 to Mar 2009	Some summer flights cancelled due to poor weather; extra winter flights due to extra funding and savings from cancelled summer flights
	Monthly 3-day winter site investigations (snowtracking)	2006/07 – 3 completed (Jan-Mar 2007), 1 day completed Mar 30, 2007) 2007/08 – 4 completed (Dec 2007, Jan-Mar 2008) 2008/09 – 4 to be completed (Dec 2008, Jan-Mar 2009)	All winter site investigations completed as scheduled; an extra 1-day session was added on Mar 30, 2007 due to extra funding
	Calf survival surveys (June, October, March)	2006/07 – 2 completed (Nov 2006, Mar 2007) 2007/08 – 3 completed (July 2007, Oct 2007, Mar 2008) 2008/09 – 1 completed (Oct 2008), 1 to be completed (Mar 2009)	Calf survival surveys were conducted when funding was available; no calf survival surveys were conducted June 2006 or June 2008
	Mortality investigations	2006/07 – 5 mortalities (5 investigated) 2007/08 – 7 mortalities (7 investigated) 2008/09 – 4 mortalities Apr-Oct (3 investigated)	The one mortality not investigated in 2008/09 was a GPS collar that was retrieved in Oct 2008 during the calf survival survey
	Capture and collaring	2005/06 – 2 GPS (Mar 2006) 2006/07 – 12 GPS, 15 VHF (Jan 2007) 2007/08 – 4 VHF, 5 GPS (Dec 2007)	
	Capture and collar removal	2007/08 – 3 GPS collars with failed remote release mechanisms (Mar 2008) 2008/09 – 3 failed GPS collars (Oct 2008)	We hope to remove 4 other failed GPS collars in Mar 2009; we may also have to remove up to 5 GPS collars in Mar 2009 if remote release mechanisms fail