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To the reader:

On October 16, 2007, government announced the Mountain Caribou Recovery Implementation Plan (MCRIP) with a goal to restore the mountain caribou population to the pre-1995 level of 2,500 animals within 20 years. As per this plan, government committed to managing commercial backcountry winter recreation activities associated with the heli- and snow-cat skiing to address the potential displacement of mountain caribou from preferred habitat by sector activities. The attached report outlines an implementation and effectiveness-monitoring plan for the heli- and snow-cat skiing sector to ensure sector activities are meeting government's recovery objectives.

The attached report was developed in 2009 and launched as a pilot during the 2009/2010 skiing season to assess operational feasibility. The pilot was completed in spring 2010 and moved forward to full implementation in fall 2010 for the anticipated 2010/2011 skiing season. The report has been recently revised to ensure consistency and accommodate new wording associated with the January 25th signing of a Memorandum of Understanding between government and sector representatives.

This report is a significant accomplishment and will guide government in moving forward with mountain caribou recovery. For more information on mountain caribou recovery in British Columbia, please visit the recovery website at:
www.env.gov.bc.ca/wld/speciesconservation/index.html

If you have any questions on the attached report or Mountain Caribou recovery, please feel free to contact me (250-614-9910).

Sincerely,



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Implementation and Effectiveness Monitoring of Standard Operating Procedures for Heli-skiing and Snow-cat Skiing Activities in Mountain Caribou Habitat

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Executive Summary

The British Columbia government announced the Mountain Caribou Recovery Implementation Plan in October 2007. Since then, the Ministry of Environment and partner agencies have been implementing the announced management actions. With respect to the winter recreation sector, government has committed to working with backcountry commercial winter recreation tenure operators to address the potential displacement of mountain caribou from preferred habitat by heli-skiing and snow-cat skiing activities. The purpose of this report is to outline an implementation and effectiveness-monitoring plan for the heli- and snow-cat skiing sector. The work was developed collaboratively by representatives of the heli-skiing and snow-cat skiing sector, the Ministry of Environment and Integrated Land Management Bureau.

Government's intent is to require all backcountry commercial winter recreation tenure operators who use helicopters and/or snow-cats in mountain caribou habitat to follow standard operating procedures. These procedures were first developed for a Memorandum of Understanding with Helicat Canada. The goal of implementing standard operating procedures is to ensure that mountain caribou are not displaced from preferred habitat. The purpose of monitoring outcomes is to ensure that operators are in compliance with the procedures and that they are provided with as much relevant information as possible to allow them to innovate and adapt their practices to improve the effectiveness of their company's program. Where the standard operating procedures are inadequate to meet the goal of preventing displacement, then the operating procedures will need to be revised.

The team developed a monitoring program comprised of the following elements:

- a *reporting template* that captures operator and mountain caribou behaviour in the event of an encounter from a helicopter, snow-cat, or while skiing;
- a *report card* that operators use to self-report information related to compliance with the requirements of the monitoring program;
- a *dashboard* that summarizes and presents key metrics related to the actions taken by operators and the reactions of caribou;
- a *third-party audit* system that assesses the reliability of operators' self-reporting; and,
- *adaptive management* processes that strive to improve outcomes of the program over time.

Results of the monitoring program will be used to support different initiatives to improve outcomes over time. This could include supporting the development of innovative practices, reviewing outcomes to determine whether adjustments should be made to standard operating procedures, reviewing outcomes to determine whether certain areas within tenures should be closed, or supporting additional inventory work or original research.

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Acknowledgements

I would like to thank team members for their work in developing the monitoring program presented in this report. The team was led by Chris Pasztor (Ministry of Environment, Victoria) and included: Adam Brown (Mike Wiegele Helicopter Skiing), Dave Butler (Canadian Mountain Holidays and HeliCat Canada), Doug Krogel (Integrated Land Management Bureau, Kamloops), Rick Kunelius (Mike Wiegele Helicopter Skiing), Tom Morgan (Monashee Powder Snowcats), and Barbara Rose (Mica Heliskiing and HeliCat Canada).

1. Introduction

The British Columbia government announced the Mountain Caribou Recovery Implementation Plan in October 2007. Since then, the Ministry of Environment and partner agencies have been implementing the announced management actions, including: protecting additional habitat from road-building and tree-harvesting, revising management of predators and their primary prey, restricting snowmobiling in key areas, planning transplants of caribou into very small herds, and developing an adaptive management program.

With respect to the winter recreation sector, government has committed to working with backcountry tourism operators to address concerns expressed by the [Mountain Caribou Science Team](#); namely the potential displacement of mountain caribou from preferred habitat by heli-skiing and snow-cat skiing activities, and by snowmobiling. This report addresses activities of the heli-skiing and snow-cat skiing sector, as well as other backcountry operators using helicopters or snow-cats in their operations. Snowmobiling activities are being addressed through another process.

The purpose of this report is to outline an implementation and effectiveness-monitoring plan for the heli- and snow-cat skiing sector. The work was developed collaboratively by representatives of the heli-skiing and snow-cat skiing sector, the Ministry of Environment and Integrated Land Management Bureau (hereafter “the team”).

2. Background

This document builds upon several processes that have addressed practices of the heli-skiing and snow-cat skiing sector in British Columbia in relation to mountain caribou and other wildlife.

Tourism-Wildlife Guidelines

[Wildlife Guidelines for Backcountry Tourism/Commercial Recreation](#) were developed collaboratively by government and the adventure tourism sector in 2006. The guidelines cover a variety of backcountry activities and address potential impacts on wildlife and habitats throughout British Columbia. All tenure holders are expected to follow the guidelines or propose alternatives that are designed to achieve the same results. The guidelines or alternatives are being adopted in management plans as they come up for renewal. The guidelines provide specific references to mountain caribou.

Memorandum of Understanding with HeliCat Canada

In 2005 a Memorandum of Understanding (MOU) was signed between HeliCat Canada and the Province of BC (Ministry of Agriculture and Lands on behalf of the Species at Risk Coordination Office, Ministry of Tourism, Sport and the Arts, and Ministry of Environment). The MOU outlined principles of common interest with respect to mountain caribou recovery, and set out standard operating procedures (see below) for members of HeliCat Canada to follow when operating in mountain caribou habitat. The procedures are consistent with the *Wildlife Guidelines for Backcountry Tourism Commercial Recreation* but provide additional operational detail. The current MOU expires in November 2010 but a revised MOU is being developed with HeliCat Canada and concurrently with Mike Wiegele Helicopter Skiing.

Workshop on Compliance and Effectiveness Monitoring

The BC Species at Risk Coordination Office contracted Mark Taylor (AMEC Earth and Environmental) and Dennis Jelinski (University of Victoria) to hold a two-day workshop in May 2008 to develop recommendations for compliance and effectiveness monitoring programs for heli-skiing and snow-cat skiing operations, and also to identify future research needs. Their recommendations (AMEC and Jelinski 2008) were considered in the development of this report.

Standard Operating Procedures for Gliding, Helipad and Trail Development

In addition to practices related to operator behaviour in mountain caribou habitat, some backcountry commercial winter recreation tenure operators also undertake activities that can directly affect mountain caribou habitat through the development and maintenance of landing sites, trails and ski runs. Best practices related to these activities have been developed collaboratively with the sector and will be linked with the Government Actions Regulation under the *Forest and Range Practices Act* that enabled incremental habitat protection for mountain caribou (Hamilton and Pasztor 2009).

3. Standard Operating Procedures

The HeliCat Canada-government MOU established standard operating procedures for operating in mountain caribou habitat. Other operators, such as Mike Wiegele Helicopter Skiing, have developed similar procedures based on the uniqueness of their own operations. Government's intent is to require all backcountry tourism operators who use helicopters and/or snow-cats in mountain caribou habitat to follow these standard operating procedures (Appendix I). These procedures include:

1. demonstrating due diligence regarding awareness of mountain caribou habitats and use in operating areas;
2. training of staff on standard operating procedures prior to each season;
3. maintaining an information management system to track caribou observations and associated reactions by operators;
4. specific field procedures to minimize encounters with caribou and best practices to minimize reactions when encounters occur; and,
5. a commitment to continuous improvement.

4. Monitoring Approach

The goal of implementing standard operating procedures is to ensure that mountain caribou are not displaced from preferred habitat as a result of the activities of commercial backcountry commercial winter recreation tenure operators. The purpose of monitoring outcomes is to ensure that operators are in compliance with the procedures and that they are provided with as much relevant information as possible to allow them to innovate and adapt their practices to improve the effectiveness of their company's program. Where the standard operating procedures are inadequate to meet the goal of preventing displacement, then the operating procedures will need to be revised (see *Adapting Practices to Address Poor Outcomes* below).

An approach to monitoring and adaptively managing human-related activities in mountain caribou habitat was outlined by Wilson and Nyberg (2009). The adaptive management program has two

objectives:

1. to determine whether the intended recovery actions are being fully implemented; and,
2. to determine whether the recovery actions are meeting the recovery goals.

The means to assess these objectives are compliance and effectiveness monitoring, respectively. Making adjustments based on outcomes is the adaptive management component of the program.

The monitoring and adaptive management program is structured around indicators, desired conditions and key adaptive management questions. The components relevant to the heli-skiing and snow-cat skiing sector are described below.

Indicators and Desired Conditions

Indicators from Wilson and Nyberg (2009) have been revised to reflect discussions with the team:

1. **Indicator:** data reports by commercial backcountry operators. **Desired Condition:** 100% compliance within 2 years of the implementation of the program.
2. **Indicator:** reaction of mountain caribou to encounters by helicopters, snow-cats or skiers. **Desired Condition:** declining rate of alarmed or concerned responses by mountain caribou in response to encounters.
3. **Indicator:** evidence of displacement of mountain caribou from commercial recreation tenures. **Desired Condition:** no evidence of displacement¹.

The first indicator is focused on compliance and the remaining indicators are focused on effectiveness. Data collected by operators are sufficient to address indicators 1 and 2, while additional data and analyses by government or researchers will be required to address indicator 3. Consequently, the team focused on first two indicators in the development of the monitoring program.

Key Adaptive Management Questions

Key adaptive management questions articulate significant knowledge gaps that should be addressed through further research. For commercial backcountry recreation the key adaptive management question is: are caribou displaced by the frequency, distribution and nature of heli-skiing and snow-cat skiing activity? Research to address the question is underway (see *Support for Inventory and Research Projects* below).

5. Monitoring Program

The team developed a monitoring program comprised of the following elements:

- a *reporting template* that captures operator and mountain caribou behaviour in the event of an encounter from a helicopter, snow-cat, or while skiing;
- a *report card* that operators use to self-report information related to compliance with the requirements of the monitoring program;

¹ Displacement is defined as the temporary (for a period of days or longer) or permanent abandonment of suitable and occupied mountain caribou habitat caused by the activities of the operator.

- a *dashboard* that summarizes and presents key metrics related to the actions taken by operators and the reactions of caribou;
- a *third-party audit* system that assesses the reliability of operators' self-reporting; and,
- *adaptive management* processes that strive to improve outcomes of the program over time.

6. Implementation of the Monitoring Program

Implementation of Standard Operating Procedures by Operators

As a signatory to an MOU with government, HeliCat Canada is working to ensure that their members are complying with the operating procedures outlined in the MOU. The intention is to ensure that all operators in mountain caribou habitat enter into similar agreements with government, so that everyone is obliged to follow the same general operating procedures.

On the advice of the sector, government may also codify the standard operating procedures specified in the MOU's as policy, thereby requiring all operators to follow them.

Data Collection by Operators

Operators will be required to collect and submit data annually as outlined in the *reporting template* and the *compliance report card*. The deadline for submission will be 31 May of each year. The data will be submitted to the Chris Ritchie, Manager, Mountain Caribou Recovery, Ministry of Environment. Specific responsibility within the Ministry of Environment for analyzing data will be determined by Chris Ritchie to ensure outcomes benefit the Mountain Caribou Recovery Program.

Operators will be free to use whatever data collection methods fit best with their businesses. The *reporting template* (Appendix II), in the form of a Microsoft Excel spreadsheet, will be made available to all operators with tenures in mountain caribou habitat. Operators will submit their information electronically using the template. Consistent data submission will ensure efficient and timely analysis of data.

The *compliance report card* (Appendix III) will also be made available to operators. It consists of a number of simple yes/no questions with additional fields for comment. Again, Operators will submit their information electronically using the compliance report card.

Data analysis

The Ministry of Environment will be responsible for all data collation, warehousing, analysis, and reporting of monitoring data and outcomes. The information and data submitted to government may be used and analyzed to address specific inventory or research questions related to government's Mountain Caribou Recovery Implementation Plan. More specifically, the data will be used to report out to operators and the public as to the compliance and effectiveness of operator practices. Reporting out will be made available as per the *Reporting of Outcomes* below.

Reporting of Outcomes

Compliance outcomes (from the report cards) will be summarized and made public after operators have reported in the spring of each year. Operator-specific and sector-wide metrics, in the form of a “dashboard” (Appendix IV) will be provided to all operators following analysis by government; however, only the sector-wide metrics will be released publicly.

The dashboard is intended to provide feedback to operators on how their practices and outcomes compare with their peers, and to stimulate changes and the development of innovative practices to improve outcomes.

Auditing

Because the proposed monitoring program relies primarily on data collected and reported by operators, independent audits will be an important component to the program, in order to engender agency and public trust in the process and outcomes. Developing a detailed audit program was beyond the scope of this project; however, the team agreed that such a program was an important part of the overall effectiveness-monitoring implementation. As a result, they provided the following advice on how an auditing program could be structured and implemented.

The goal of the auditing program should be to ensure that data submitted by operators are as accurate as possible. The team proposed two levels of auditing:

1. *Reporting audit*: this would ensure that data submitted by operators accurately reflects company records of mountain caribou encounters, as well as the behaviour of guides, pilots and snow-cat operators. This level of auditing could include the following:
 1. a comparison of submitted data with original records of mountain caribou encounters;
 2. interviews with guides, pilots and snow-cat operators regarding specific caribou encounters (if practical);
 3. interviews with guides, pilots and snow-cat operators to assess knowledge of standard operating procedures;
 4. a review of training materials;
 5. review of internal procedures for data recording, management, and reporting; and,
 6. reporting to operators with requirements and recommendations for improvement.
2. *Practices audit*: this would ensure that activities occurring in the field are accurately reflected in company records. This level of auditing is more difficult to implement. Mountain caribou encounters are rare for most operators, and how operator actions and caribou reactions could be validated by an independent third-party is not clear. Guests could be a source of information in some cases; however, company staff normally take actions without the knowledge of guests, and guests play no part in decision-making regarding the use of terrain. As a result, including guests in audits would be of limited value. Ground observers are largely impractical because of terrain, weather, and low caribou encounter rates. Where mountain caribou are fitted with GPS collars and GPS track records are available from operator helicopters, data can be analyzed to assess both compliance with standard operating procedures and the effectiveness of the procedures; however, the costs and logistics will limit the application of this technique. Moreover, some biologists are reluctant to collar mountain caribou in small herds because of the stress to animals, and that they are commonly net-gunned from helicopters, confounding

behavioural responses of collared animals to helicopters, at least in the short term.

Without a clear vision of how practices audits could be implemented in the short term, the team recommended first implementing reporting audits. This could begin soon after the monitoring program is rolled out to the entire sector and after operators have had sufficient time to implement internal audit procedures. Implementing practices audits should be a stated goal and government should seek additional input on how an effective program could be developed and resourced.

To be credible, audits need to be transparent, consistent, and need to be conducted by authoritative third parties with an understanding of mountain caribou biology and of the heli-skiing and snow-cat skiing sector. Audits could be conducted by a team comprised of a knowledgeable government biologist, a sector representative (with no connection to the company being audited), and a representative from an interested environmental non-governmental organization.

Timeline for Implementation

The monitoring and effectiveness program will be implemented on the following schedule:

- Fall 2009: development of program collaboratively with sector representatives;
- Winter 2009-10: pilot implementation with select heli-skiing and snow-cat skiing operators;
- Spring 2010: analysis and reporting of pilot implementation;
- Summer 2010: review and adjustment of monitoring and effectiveness program;
- Fall 2010: roll-out to entire sector (via MOU or policy);
- Winter 2010-11: first season of full implementation;
- Spring 2011: first full sector and public reporting; and,
- Summer-fall 2011: development and implementation of report auditing program.

7. Adaptive Management

Results of the monitoring program will be used to support different initiatives to improve outcomes over time. This could include supporting the development of innovative practices, reviewing outcomes to determine whether adjustments should be made to standard operating procedures, or supporting additional inventory work or original research.

Supporting Sector Initiatives to Improve Outcomes

The draft MOU (Appendix V) outlines collaborative approaches to improving practices and outcomes. Most significantly, the MOU commits both government and operators to share information to ensure that practices are being adapted and implemented based on the best available data. This sharing could take many forms, but at a minimum should include:

- ensuring access to updated telemetry information and habitat mapping;
- sharing outcomes of innovative trials;
- sharing monitoring data;

- distributing relevant scientific literature; and,
- maintaining informal communication among operators and agency staff regarding all aspects of mountain caribou recovery.

Adapting Practices to Address Poor Outcomes

Poor outcomes result when compliance is poor and/or when the desired conditions associated with compliance or effectiveness indicators are not being achieved. Addressing poor outcomes requires a careful diagnosis of available data (Figure 1) to determine possible causes.

There are two issues that make evaluating outcomes more difficult. First, the standard operating procedures are not being implemented as controlled experiments; and second, other management actions and stresses are also affecting mountain caribou populations. As a result, a weight-of-evidence approach is required when diagnosing poor outcomes, in contrast with an approach based on hypothesis testing. The problem with hypothesis testing is that, with so many uncontrolled factors, the probability of making a Type II error (failing to detect an effect where there is one) will likely be very high. As a result, managers could be misled to believe a stressor is having no effect on a caribou population when it actually is. The standard of evidence is going to have to be lower and precautionary to address poor outcomes effectively.

Actions to Improve Compliance

Government and the heli-skiing and snow-cat skiing sector together have several mechanisms to ensure compliance with the standard operating procedures. First, operators will have internal audit procedures that can be used to identify compliance issues and make required adjustments. Second, sector associations can play a role in encouraging and/or requiring compliance with standard operating procedures and an obligation of membership (although membership is voluntary). Third, public reporting of compliance data and audit outcomes is intended to encourage compliance by publicly exposing the performance of different operators. Finally, government can mandate compliance by amending management plans to include the standard operating procedures. Any evidence that operators are not complying with the practices would be a violation of their management plan and would enable ILMB policies for addressing non-compliance. This involves a series of escalating actions that could result in the cancellation of all or a portion of an operator's license.

Support for Inventory and Research Projects

The mountain caribou location data provided by operators can contribute to analyses aimed at addressing a number of inventory and research questions. These could include:

- correlates of population trends (e.g., observed group size);
- behavioural responses of mountain caribou to specific stimuli;
- range occupancy information; and,
- mountain caribou sightability and survey reliability.

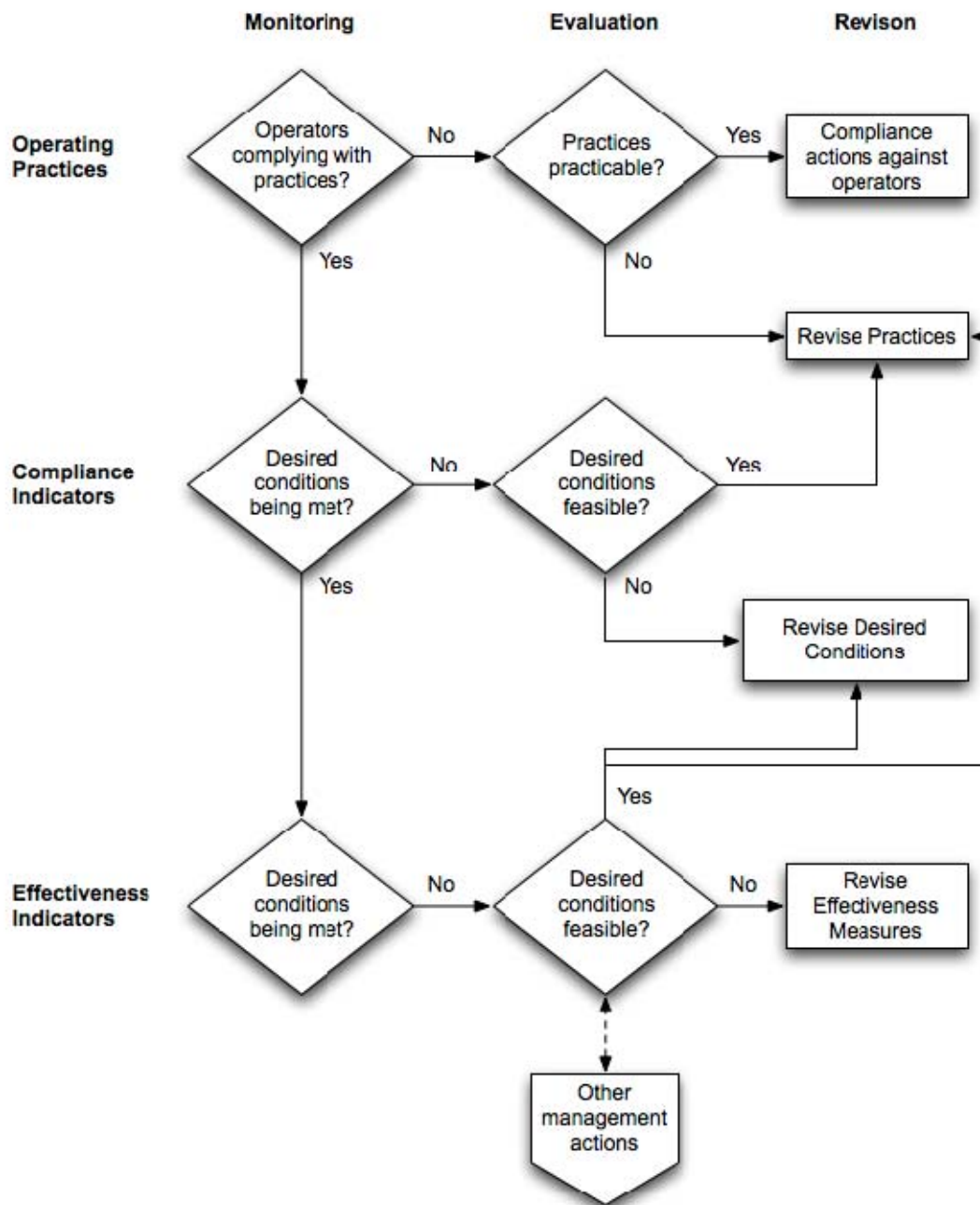


Figure 1. Proposed process for evaluating poor outcomes related to monitoring heli-skiing and snow-cat skiing activities in mountain caribou habitat.

Research is currently underway in the North Thompson to address the key adaptive management question relevant to the sector. Specifically, Mike Wiegeler Helicopter Skiing and Thompson Rivers

University, in cooperation with the BC Ministry of Forests and Range, are collaborating on a project to determine whether there is evidence that helicopter and skiing activity has, or is currently displacing mountain caribou from preferred habitat.

The intention is to seek additional opportunities to collaborate and share information in order to improve outcomes and achieve the goal of preventing displacement of mountain caribou from preferred habitats. Additional research questions will be generated through reviews with the sector on an *ad hoc* basis.

8. Conclusion

This work expands upon the original MOU signed with HeliCat Canada in 2005 and accommodates the monitoring and adaptive management requirements of the Mountain Caribou Recovery Implementation Plan announced in 2007. It also extends the reach of operating guidelines to all commercial backcountry operators in mountain caribou habitat that use helicopters or snowcats. The implementation and effectiveness monitoring plan represents a collaborative effort between government and representatives of the commercial recreation sector to contribute to recovery efforts for mountain caribou and to ensure the continued viability of the sector.

9. Literature Cited

AMEC and Jelinski. 2008. Mountain caribou recovery implementation plan and heli ski operations in southern British Columbia. Prepared for: Integrated Land Management Bureau.

Hamilton, D., and C. Pasztor. 2009. A guide to commercial backcountry skiing standard operating practices for ski run development, helicopter landing and pickup site development, and snow trail development in mountain caribou habitat. Prepared for: Species at Risk Coordination Office, BC Ministry of Environment, Victoria.

Wilson, S. F., and J. B. Nyberg. 2009. A proposed monitoring and adaptive management strategy for mountain caribou recovery implementation. Prepared for: Ecosystems Branch, BC Ministry of Environment, Victoria.

Appendix I. Wildlife Operating Procedures

Objectives

The objectives of these practices are to ensure:

1. that backcountry commercial winter recreation tenure operators (hereafter “operator”) activities in all tenures that overlap with mountain caribou habitats do not result in displacement² of mountain caribou from their preferred winter habitats;
2. consistency in the approach by operating in mountain caribou habitat; and
3. consistency in the approach by government agencies in managing and administering tenured activities for the operator.

Recognition of Habitats and Caribou Use of Habitats

Operators will work regularly with the Ministries of Natural Resource Operations and Environment to ensure that they are aware of:

4. mapped mountain caribou habitats in their operating areas;
5. management activities related to mountain caribou being undertaken within their region; and
6. the most current information available with respect to mountain caribou habitat use and other important information related to mountain caribou recovery efforts.

Operators will use this information in efforts to achieve the objective of “no displacement.” However, operators will use the procedures in this appendix in any areas where mountain caribou are located, whether or not they are in mapped mountain caribou habitats.

Staff Training

Operators will commit to include at least one 2-hour module about mountain caribou (habitats, habitat use, and the operators’s practices to address the same) in its annual training of staff (guides, pilots, snow-cat operators, etc) prior to each operating season. Where practical, the operator will use outside experts to assist with the training.

The training will review:

² For the purpose of this agreement, displacement is defined as the temporary (for a period of days or longer) or permanent abandonment of suitable and occupied mountain caribou habitat caused by the activities of the operator.

1. relevant aspects of mountain caribou biology, including general life history characteristics and habitat use;
2. action an up-date on current recovery efforts;
3. scientific and management literature related to the effects of helicopters, snow-cats and skiing activities on the behaviour of mountain caribou and other wild ungulates;
4. company operating procedures, including:
 - A. office and field procedures designed to minimize the probability of displacing mountain caribou during activities;
 - B. actions taken when mountain caribou are encountered;
 - C. office procedures for recording observations and actions taken; and
 - D. roles and responsibilities of guides, pilots, snow-cat operators and other relevant staff.

Information Management

Operators conducting activity in mountain caribou habitat will commit to developing an information management system that captures relevant mountain caribou information (e.g. current mapping, telemetry locations, etc.) as well as wildlife observations (tracks and animals) made by field staff and any operational decisions arising from those observations. The system, which can be either manual or computer-based, will:

1. ensure that observations are consistent and accurate;
2. include the location of observed animals (to the nearest 100 m, using UTM coordinates), the behaviour of those animals when observed, and their reaction to the presence of humans;
3. include a description of the specific operational actions taken by the operator to prevent displacement; and
4. ensure that the most current information is used to minimize the probability of displacing animals during activities.

Furthermore, operators will submit the collected data annually as outlined in the *reporting template* and the compliance *report card* identified in the document entitled "Implementation and Effectiveness Monitoring of Standard Operating Procedures for Heli-skiing and Snow-cat Skiing Activities in Mountain Caribou Habitat".

The *reporting template*, in the form of a Microsoft Excel spreadsheet, will be made available to operators. Operators will submit information electronically using this template. Consistent data submission will ensure efficient and timely analysis of data. The deadline for submission will be 31 May of each year. Operators will submit the *reporting template* to Chris Ritchie, Manager, Mountain Caribou Recovery Implementation, Ministry of Natural Resource Operations (unless otherwise advised through this agreement). Operators will be provided with contact information to ensure consistent data submission is successful.

The compliance *report card* will also be made available to operators. It consists of a number of simple yes/no questions with additional fields for comment. The deadline for

submission will be 31 May of each year. Operators will submit the compliance *report card* to Chris Ritchie, Manager, Mountain Caribou Recovery Implementation, Ministry of Natural Resource Operations (unless otherwise advised through this agreement).

The Ministry of Environment will be responsible for all data warehousing, analysis, and reporting of monitoring data and outcomes. Any use or distribution request associated with data submitted as per the *reporting template* will need to be jointly approved/denied by the Manager, Knowledge Management Section, Ministry of Environment and Chris Ritchie, Manager, Mountain Caribou Recovery Implementation, Ministry of Natural Resource Operations, in collaboration with an operator representative.

The information and data submitted to government may be used and analyzed to address specific inventory or research questions related to government's mountain caribou recovery implementation plan. More specifically, the data will be used to report out to operators, and the public, as to the effectiveness of operator's operating practices, which is outlined in the *Reporting of Outcomes* section of the document entitled "Implementation and Effectiveness Monitoring of Standard Operating Procedures for Heli-skiing and Snow-cat Skiing Activities in Mountain Caribou Habitat".

All Parties will continue to collaborate on information and data exchange that may support and benefit government's mountain caribou recovery implementation plan.

Working with Other Organizations

From time-to-time, operators may work with other businesses, organizations, sector associations or clubs to enhance mountain recovery objectives.

Operators agree to directly include all affected organizations in those discussions (particularly those with legal tenure rights) to ensure that:

- all Parties are able to comply with the expectations of government's mountain caribou recovery program; and
- their legal tenure rights and/or operational plans and practices are not adversely affected by the outcomes of those discussions.

Operational Practices to Achieve Objectives

1. Adapt Activities to Best Information Available

Operators conducting activities in areas used by mountain caribou will use their information system to:

- proactively highlight specific areas where the probability of displacing mountain caribou is relatively high and to ensure that these areas are not used for skiing until appropriate reconnaissance is completed to confirm that animals are not in the vicinity;
- when caribou are in the area, suspend activities there for at least 48 hours and until a reconnaissance can confirm that the caribou have left the area;
- sufficiently document their actions to demonstrate diligence and to improve the effectiveness of the procedures in meeting the “no displacement” objective.

2. Flight Paths and Flight Practices

Except where client or staff safety is an issue, guides and pilots will choose helicopter flight paths to maintain at least 500 m. (1640 ft.) horizontal or vertical separation from occupied caribou habitats. This separation distance should be immediately increased if animals occupying these habitats show any evidence of being negatively disturbed (via “flight or fright” behaviours) by the presence of the machine.

The Parties recognize that scientific evidence to support specific separation distances between helicopters and mountain caribou is weak due to the large number of variables that can influence the potential impact on animals (e.g. prior experience of caribou, group size and composition, size of aircraft and approach vectors). As a result, the Parties agree to regularly review the effectiveness of the operating procedures in relation to current scientific and management literature and to modify separation distances (and other practices under the control of the operators) as required.

Guides and pilots will make all possible efforts to use regular and predictable flight paths to minimize disruption to animals and maximize the predictability of the human presence.

In all cases, known cow-calf groups will be completely avoided, and the helicopters will not be used for wildlife viewing.

3. Ski Run Development, Helicopter Landing and Pickup Site Development, and Snow Trail Development

Operators will need to meet the general wildlife measures established for mountain caribou under the *Forest and Range Practices Act*, as well as follow the guidelines identified in the document entitled “A Guide to Commercial Backcountry Skiing Standard Operating Practices for Ski Run Development, Helicopter Landing and Pickup Site Development, and Snow Trail Development in Mountain Caribou Habitat”, to ensure operators minimize mountain caribou habitat impacts and the

potential for their disturbance and displacement from forest-related cutting activities associated with commercial heli-skiing and cat-skiing tenure holders.

4. Skiing

If an operator's guide observes mountain caribou on, or in the immediate vicinity of a ski run once he/she is on that run with a group, it is important to do all necessary (within the bounds of safety) to ensure that the presence of the group does not displace those animals. This will include any or all of the following:

3. Choosing a ski line and/or pick-up that will take the group away from where the animal is located;
4. Using slopes that are steeper than those preferred by caribou;
5. Keeping groups of skiers together to minimize the chances of disturbing animals that may not be visible prior to starting a run and to avoid the possibility of separating animals from each other if they are encountered;
6. Holding the group until the animal(s) has continued on its intended path;
7. Immediately contacting any following groups by radio to ensure that they use other lines or runs to avoid any further disturbance of the animals;
8. Ensuring that the incident is properly entered in the information management system and that further skiing activities do not occur until a reconnaissance trip can confirm that the animals are no longer in the area.

5. Miscellaneous

Helicopter and snowcat skiing operators will minimize facility development in identified mapped caribou habitats.

Appendix II. Wildlife Observation Reporting Template

Name of Operator
Tenure Number
Date
Time
Surveyor
Species
Count
UTM Zone
UTM Easting
UTM Northing
Comments
Number of Animal Tracks
Detect Distance (m)
Aspect of Animal
Inventory Method
Ski Run
Elevation Band
Animal Reaction
Action Taken
Snowmobiles Observed?
Snowmobile Tracks Observed?

Appendix III. Compliance Report Card

Monitoring Form for the Implementation of Wildlife Operating Procedures³ Associated with Helicopter and Snowcat Skiing

Company Name:

Tenure Document #:

Please answer all the questions on this form and submit to Chris Ritchie, Manager, Mountain Caribou Recovery, Ministry of Natural Resource Operations, by May 31st of each year. If you have questions please contact Chris Ritchie by email (Chris.Ritchie@gov.bc.ca) or phone (250) 614-9910.

Questionnaire:
Procedure 1) Recognition of Habitats and Caribou Use of Habitats
1a. Are you aware of mapped mountain caribou habitats in your area, management activities related to caribou, and the most up-to-date information regarding caribou habitat use and recovery planning?
Yes - Explain how you do this?
No - Explain why?
Procedure 2) Staff Training
2a. Are you conducting wildlife staff training prior to each operating season?
Yes - Explain how you do this?

³ Procedures identified in the [Wildlife Guidelines for Backcountry Tourism/Commercial Recreation](#) and agreed to by the heli- and cat-skiing sector in the Memorandum of Understanding between operators and government.

No - Explain why?

Procedure 3) Information Management

3a. Have you developed an information management system that captures relevant mountain caribou information (e.g. current mapping, telemetry locations, etc.) as well as wildlife observations (tracks and animals) made by field staff and any operational decisions arising from those observations?

Yes - Explain how this works in your operation.

No - Explain why?

3b. Do you share relevant caribou information from your information management system with staff from the Ministry of Environment and/or Integrated Land Management Bureau?

Yes - Explain how you do this and how often?

No - Explain why?

Procedure 4) Operational Practices

4a. Have you used your information system to proactively highlight specific areas where the probability of encountering mountain caribou is relatively high?

Yes - Explain how you do this?

No - Explain why?

4b. Have you used your information system to suspend activities when caribou are in the area for at least 48 hours and/or until a reconnaissance can confirm that the caribou have left the area?

Yes - Explain how you do this?

No - Explain why?

4c. Do you document all actions taken to mitigate caribou disturbance and displacement, to demonstrate diligence, and to improve the effectiveness of the procedures in meeting the “no displacement” objective?

Yes - Explain how you do this?

No - Explain why?

Procedure 5) Flight Paths and Flight Practices

5a. Do guides and pilots chose helicopter flight paths to maintain at least 500 m (1640 ft.) horizontal or vertical separation from occupied caribou habitats when client or staff safety is not an issue?

Yes - Explain how you do this?

No - Explain why?

5b. Do you take all possible efforts to use flight paths to minimize disruption to animals and maximize the predictability of the human presence?

Yes - Explain how you do this?

No - Explain why?

5c. Do you minimize the probability of “surprise” approaches or encounters with caribou? Yes - Explain how you do this?
No - Explain why?
5d. Do you take all possible efforts to completely avoid cow-calf groups? Yes - Explain how you do this?
No - Explain why?
Procedure 6) Skiing 6a. Do you modify ski activity when caribou are encountered? Yes - Explain how you do this?

No - Explain why?

Procedure 7) Minimize Facility Development

7a. Has your operation minimized facility development in mountain caribou habitat since 2005?

Yes - Explain how this is accomplished?

No - Explain why?

Appendix IV. Dashboard Example



Commercial Recreation Monitoring Outcomes 2009-10 Mountain Caribou Recovery Implementation Program

Monitoring Outcomes for Nosebleed Heliskiing Inc.: Mountain Caribou Encounters and Reactions to Aircraft Activities



Metric		Sector Data																
# caribou observations	31	19																
Caribou group size	8 ± 4	4 ± 3																
Caribou reaction (frequency of different responses)	<table border="1"> <caption>Caribou Reaction Frequency Data (Nosebleed Heliskiing)</caption> <thead> <tr> <th>Reaction</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Alarmed</td> <td>4</td> </tr> <tr> <td>Concerned</td> <td>11</td> </tr> <tr> <td>Other</td> <td>15</td> </tr> </tbody> </table>	Reaction	Frequency	Alarmed	4	Concerned	11	Other	15	<table border="1"> <caption>Caribou Reaction Frequency Data (Sector Data)</caption> <thead> <tr> <th>Reaction</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Alarmed</td> <td>150</td> </tr> <tr> <td>Concerned</td> <td>250</td> </tr> <tr> <td>Other</td> <td>750</td> </tr> </tbody> </table>	Reaction	Frequency	Alarmed	150	Concerned	250	Other	750
Reaction	Frequency																	
Alarmed	4																	
Concerned	11																	
Other	15																	
Reaction	Frequency																	
Alarmed	150																	
Concerned	250																	
Other	750																	
Response score	3.5	4.7																

Nosebleed is among the top 25% of operators with respect to achieving low caribou reactions while flying in mountain caribou habitat.

Monitoring Outcomes for Nosebleed Heliskiing Inc.: Operator Response to Caribou Encounters



Metric		Sector Data
Operator reaction (frequency)		
Mean detection distance (m)	660 ± 45	634 ± 12
Consecutive days a run was closed after an encounter (frequency)		
No. of safety calls	6	3.4

All caribou sightings have been entered into the Provincial wildlife observation database and will be used to inform future research and management. Thank you for collecting and reporting your sightings data.

Metric Definitions

Metric	Definition	Notes
# caribou observations	The number of times caribou were observed by operator staff.	Observations made from helicopters, snowcats, or while skiing are tallied separately.
Caribou group size	Average and standard error of the number of animals seen during observations of caribou.	This is not a measure that is expected to be influenced by the behaviour of operators, but is of interest to biologists.
Caribou reaction	Frequency of different reactions observed. "Concerned" is alert behaviour without movement, while "alarmed" is any response that involves movement.	Note that encounters with caribou are brief because operators are expected to respond immediately to the presence of caribou, so detailed behavioural observations are not practical.
Response score	Weighted average and standard error of reaction scores, where "other" = 1, "concerned" = 3, and "alarmed" = 10.	Lower scores are better.
Operator reaction	How operators responded to the observation: "flightpath" = altered course, "landing" = changed pick-up or drop-off points, "run" = altered ski program, "closed" = closed a run.	All observation don't necessarily result in run closures because caribou might be encountered en route.
Mean detection distance	Mean and standard error of the distance between the helicopter and caribou.	This is either measured via GPS/GIS or estimated in the field in distance categories.
Consecutive days run closed	Number of days a run is closed due to a caribou observation before it is re-opened for skiing.	This provides information on the effectiveness of the 48 h closure guideline. However, operators might not reopen runs for some time after closure for reasons unrelated to the caribou observation.
Safety call	Number of caribou observations excluded from the calculation of other metrics because operators were not able to make necessary adjustments to caribou observations due to safety or other concerns.	

Appendix V. Amended MOU Example

MEMORANDUM OF UNDERSTANDING REGARDING MANAGEMENT OF HELICOPTER AND SNOW-CAT SKIING IN MOUNTAIN CARIBOU HABITATS

BETWEEN:

The Province of British Columbia Represented by

The Ministries of

**Natural Resource Operations, and
Environment,**

AND:

OPERATOR NAME HERE

(Collectively referred to as the “Parties”)

WHEREAS, the Ministry of Natural Resource Operations is responsible for policy, administration, and use of Crown land for adventure tourism purposes such as helicopter and snow-cat skiing;

AND WHEREAS the Ministry of Environment is responsible for policy, planning, and regulatory development for species at risk such as mountain caribou;

AND WHEREAS it is part of the mission of the OPERATOR NAME HERE and mandate;

AND WHEREAS the Parties agree that there is a range of human, biophysical and climatic factors that may affect recovery of mountain caribou in British Columbia;

AND WHEREAS the Parties agree that – at the time of signing of this agreement – there is no established causal link between declines of mountain caribou and activities associated with OPERATOR NAME HERE;

AND WHEREAS the Parties recognize that OPERATOR NAME HERE have developed, and continue to develop wildlife operating practices, and that these practices have improved significantly in response to mountain caribou conservation concerns;

AND WHEREAS the Parties agree on the need to understand the effects, if any, of helicopter and snow-cat skiing on mountain caribou;

AND WHEREAS the Parties agree on the need to develop a more consistent approach in the way commercial backcountry recreation is managed in BC;

THEREFORE the Parties agree to enter this Memorandum of Understanding (MoU) as follows:

Principles

Activities undertaken in the context of this memorandum will be based on the following principles:

Consistency with mountain caribou recovery objectives – any actions or initiatives undertaken need to be consistent with relevant objectives set for mountain caribou recovery at the provincial level through the Ministries of Natural Resource Operations and Environment.

The role of science – to the greatest extent practicable, proposed management activities will be driven by the best available science relevant to this sector. Where science is available, it will be immediately applied to the operational approaches taken by the sector.

Information sharing – between the Parties will allow for the application of the best available science to the specific realities of this sector and facilitate the development of the most effective management recommendations possible.

Adaptive management – activities will – without putting the mountain caribou at risk - be considered as learning experiences that will allow for continued improvement of operational practices.

The role of local processes – it is also recognized that in some parts of the province, existing local processes (such as land use plans, tenure review committees, etc) should, where appropriate and consistent with the current provincial recovery process, continue to play a key role in ensuring that the operational practices (below) are implemented, monitored and improved.

Ecosystem approach – while the focus of this agreement is on mountain caribou, both Parties recognize the need to take an ecosystem approach to mountain operations. This normally means that activities and procedures will be conducted in a manner that recognizes and addresses the need to maintain the integrity of ecosystem processes, functions and native species.

Operating Practices

In order to ensure appropriate and consistent operational approaches in all areas of the province, the Parties agree that OPERATOR NAME HERE will operate under authorized tenures in a manner that is consistent with their government-approved management plan and the operational practices outlined in Appendix A.

It is recognized that OPERATOR NAME HERE may need to enhance or modify these practices in specific areas where, through collaborative efforts with the Ministries of Natural Resource Operations and Environment, and the operator, an agreement is reached that such enhancements or modifications are necessary. It is also recognized that differences between these practices and those currently being used by operators under government-approved management plans will be dealt with in a manner that is consistent with implementation of the Tourism-Wildlife Guidelines.

Research and Adaptive Management Trials

The Parties agree to work together to develop, pursue funding for, and implement specific research projects and adaptive management trials which will address questions related to the potential effects of sector activities on mountain caribou and their habitats. Further, that OPERATOR NAME HERE agree to support – through expert consultation and information sharing – the provincial mountain caribou recovery implementation process currently underway under the auspices of the Ministry of Natural Resource Operations.

Monitoring and Inventory

The Parties agree to work together, along with other partners in government, industry and conservation groups, to develop monitoring and inventory projects that will:

- monitor the effectiveness of, and compliance with the operating practices in Appendix A; and
- continue to build an understanding of the distribution, sub-population sizes and nature of habitat use by mountain caribou and caribou-human interactions.

Communications

The Parties agree to work together to prepare communication materials relating to any aspect of this agreement, and to look for opportunities to promote this agreement through academic, professional and public presentations.

Dispute Resolution

The Parties agree to resolve disputes related to this agreement, or related to activities or projects undertaken through this agreement through the manager responsible for mountain caribou recovery (or the individual otherwise designated by government as being responsible for mountain caribou recovery) and OPERATOR NAME HERE. Only where disputes cannot be resolved at those levels will resolution be pursued at higher levels.

Term

The Parties agree that the term of this agreement will be in effect from January 25, 2011 until June 30, 2014. This term will allow the Parties to continue to collaboratively work together to manage sector activities as per this MoU and other related documents in order to support government's mountain caribou recovery efforts. At any time, each party may request to amend this MoU, to remove and/or add practices and other management tools that – using the best available science - better support government's mountain caribou recovery efforts, and to extend or cancel this agreement, but both Parties must collaboratively discuss and agree to any such amendments, extensions or cancellations.

Signatories:

Hon. Steve Thomson
Minister, Natural Resource Operations

Hon. Murray Coell
Minister, Environment

OPERATOR NAME HERE