



Forest Stewardship Council®
FSC® Canada

Proposed Indicators to Address Species at Risk, including Woodland Caribou, in Canada's Forest Management Standard

Forest Management Standard Revision Process | October 2014





Contents

1	Introduction	3
1.1	Proposed indicators and the USE of this document	4
2	Proposed Indicators	5
2.1	Caribou Specific Indicator	5
2.2	Species at Risk Indicators (Criterion 6.4)	5
2.3	Forest Management and Ecosystem Indicators with Implications for Caribou and Other Species at Risk	6
	APPENDIX 1. Caribou APPENDIX D2-2 (Oct 7, 2014)	12
	APPENDIX 2. Glossary Entries related to Above Indicators and Caribou Appendix	29
	Appendix 3. What FSC Can/Cannot do for Caribou from Science Panel Report	31

Prepared for FSC Canada by:

Chris Wedeles (Lead), Ecologist, ArborVitae Environmental Services
Justina Ray, Executive Director & Senior Scientist, Wildlife Conservation Society Canada
Elston Dzus, Biologist, ALPAC
Christine Korol, Forest Management Associate for Ontario, Rainforest Alliance
Steve Morel, Manager, Mashteuiatsh's Environment Department

For more information

Please contact Vivian Peachey, Director of Standards and Policy, FSC Canada
v.peachey@ca.fsc.org or 647-528-0140

Front Cover Image,

Woodland Caribou.
Copyright: Valerie Courtois



1 INTRODUCTION

The possible impacts of forest management practices on Species at Risk (SAR), including Woodland Caribou (*Rangifer tarandus caribou*), is an issue of significant concern in Canada. Populations of woodland caribou are at varying degrees of risk and are particularly sensitive to habitat disturbance. Providing clear and consistent direction on this issue is of particular importance.

Being aware of a potential gap in the current regional Forest Management Standards, FSC Canada commissioned a Science Panel in 2010 to provide recommendations on revising the National Boreal Standard. The Panel's report has provided a substantive basis for the current effort. As the Forest Management Standards (National Boreal Standard, Maritimes Standard, BC Standard and Great Lakes-St. Lawrence draft Standard) are being revised and aligned to the new Principles and Criteria and International Generic Indicators, FSC Canada is working to develop normative requirements for managing species at risk, including Woodland Caribou. The indicators will fill a needed gap in providing clear direction when considering species at risk, such as Woodland Caribou.

In this document a series of indicators related to the conservation of Species at Risk, including Woodland Caribou, are proposed. The indicators are based on the findings and recommendations of the 2010 Science Panel Report (SPR)¹ and discussions that took place amongst the Technical Expert Panel (TEP) participants a panel formed in 2013 to help develop indicators that are scientifically defensible and operational and will attempt to safeguard Species at Risk and Woodland Caribou habitats.

The Science Panel participants and technical experts attempted to create a balanced approach for addressing the management of Species at Risk and Woodland Caribou while developing indicators that are practical, auditable, and not overly complex. Proposed indicators were developed using the Caribou Science Panel Report (2010) and considers new relevant science, strategies, and guidance including the new FSC Principles and Criteria (v5), traditional ecological knowledge, the Critical Habitat Report and the Federal Recovery Strategy² for the Woodland Caribou (2012). Comments from the (chamber-balanced) Standards Development Group, on the proposed indicators, were also received and considered. Direction also considers mountain caribou as an ecotype of woodland caribou and draws upon the proposed Recovery Strategy for the Southern Mountain population of Woodland Caribou (2014).

Proposed indicators include the following:

- Indicator 1 provides direction solely on caribou. This indicator is long and complex relative to others and includes components that address the contribution of management activities to risk at the scale of caribou population ranges for boreal caribou and subpopulations for mountain caribou. See Appendix 1 for full requirements;

¹ Dzus, E., J. Ray, I. Thompson, and C. Wedeles. 2010. Caribou and the National Boreal Standard: Report of the FSC Canada Science Panel. Report prepared for FSC Canada. 71 p.

² Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. *Species at Risk Act Recovery Strategy Series*. Environment Canada, Ottawa. xi+138 p.



- Indicators 2 through 6, provide direction for management activities for species at risk in general (e.g. training of forest workers, monitoring etc.);
- Indicators 7 through 17 address forest attributes (e.g. age-class structure, connectivity) important in providing and maintaining habitat for caribou and some other SAR.

The indicators are intended to function together and while each serve an intended purpose, compliance to all indicators is required. Although Indicator 1, the only Woodland Caribou specific indicator is unique, and would apply only on woodland caribou habitat areas, all of the proposed indicators are considered equal in importance, and it is intended that Certification Bodies and forest managers provide equal treatment to all indicators.

An Opportunity. FSC Canada’s National Forest Management Standard.

Proposed indicators will be integrated across relevant criteria, into the FSC Canada National Forest Management Standard, as managed through the standards revision process.

A gap analysis, between the FSC International Generic Indicators and regional FSC Forest Management Standards, was conducted to consider the treatment of topics, with standard developers having the option to adopt, adapt or drop International Generic Indicators. In some cases, new indicators are being developed.

To learn more about the standards revision process and Technical Expert Panel go to <https://ca.fsc.org/regional-fm-standard-revision.246.htm>

1.1 PROPOSED INDICATORS AND THE USE OF THIS DOCUMENT

The draft SAR (Caribou) report proposes 17 indicators related to conservation of Species at Risk (SAR) within the context of forest management. Recommendations for indicators are provided in Section 2 of this report. Also included in Section 2 are additional requirements for woodland caribou. Additional indicators can be found in Section 3, Appendix 1 and provides context and caribou-specific direction for the application of indicators.

All indicators are italicised and are in blue.



2 PROPOSED INDICATORS

2.1 CARIBOU SPECIFIC INDICATOR

1. Risk Management and Caribou

The caribou specific indicator is presented in the Caribou Appendix found in Section 3, Appendix 1.

2.2 SPECIES AT RISK INDICATORS (CRITERION 6.4)

2. SAR Definition

Best available information is used to develop a list of the rare species and Species at Risk (SAR) known or believed to exist within the Forest Management Unit and adjacent to the Forest Management Unit. The list is presented in the Forest Management Plan or associated documents and is updated annually. The list of rare species and SAR includes:

- a) All species formally listed in schedules referenced in federal or provincial endangered species/SAR legislation or provincial wildlife/biodiversity legislation that have been classified as Endangered, Threatened, Vulnerable, Special Concern or similar designations;*
- b) All species that have been identified as candidate "at risk" designation by bodies formally recognized in federal or provincial endangered species legislation (i.e. the Committee on the Status of Endangered Wildlife in Canada, plus equivalent provincial bodies) or are under consideration by those bodies*

3. SAR Plans

Plans and/approaches authored by qualified individuals are being implemented to manage the habitat and populations of those SAR identified in Indicator whose habitat is known or suspected to be affected by forest management activities. Plans address SAR protection and restoration through the use of conservation zones, protection areas, connectivity and/or direct measures.

Where plans/approaches do not exist or are inadequate to address known risks to a species, a precautionary approach is being used. The precautionary approach applies to broad habitat requirements (e.g. forest landscapes) local habitat (e.g. known reproductive or feeding areas) and other known locations (e.g. movement corridors).

4. Training

Training is provided to all relevant forest workers in field operations and planning on the identification of SAR, and on appropriate measures to take when a SAR, or sign of a SAR (e.g. a nest) is identified during field operations.

5. Control of Consumptive Uses of SAR

Full cooperation is provided to government (provincial, federal and First Nations) resource management agencies in efforts to control illegal hunting, trapping, and fishing of all rare species and SAR.



6. Collaborative Efforts on Species at Risk

The Organization works cooperatively with government resource management agencies, First Nations, other land managers, and tenure holders, and within its sphere of influence to address the following:

- a) collection of data on SAR populations and habitats;*
- b) management of habitat for SAR;*
- c) monitoring of habitats and populations of SAR;*

**Note the requirements of organizations related to overlapping licensees and tenure holders extend beyond those identified in this indicator.*

Sphere of Influence Intent Box

The notion of "Sphere of Influence" is included in several of the Standard's Indicators. As defined in the glossary the Sphere of Influence is the "Professional associations with colleagues or business or agencies with whom individuals or businesses or agencies interact." It's basically a network of professional contacts. Requiring forest managers to work within their Sphere of Influence means that they should work in association with colleagues and other professionals both inside and outside of their company/agency to attempt to meet the indicators' goals and objectives.

In the Standard, organizations are required to work within their Sphere of Influence in relation to Indicator 1 (Risk Management and Caribou), Indicator 6 (Collaborative Efforts), Indicator 8 (Aggregation of Disturbances), Indicator 9 (Core Areas), Indicator 11 (Connectivity), Indicator 13 (access management), Indicator 15 (Calculation of Harvest Rates), and Indicator 16 (Monitoring and Assessment of Cumulative Effects)

2.3 FOREST MANAGEMENT AND ECOSYSTEM INDICATORS WITH IMPLICATIONS FOR CARIBOU AND OTHER SPECIES AT RISK

7. Range of Natural Variation (Criterion 6.1)

Appropriate to the scale intensity and risk of operations and available information, an analysis of the Range of Natural Variation of the forest has been conducted, and includes at a minimum:

- a) an assessment of the natural range of the amount of each forest unit/ecosystem type;*
- b) an assessment of the natural range of forest units/ecosystem types by age class;*
- c) an assessment of the natural range of patch and disturbance sizes; and*
- d) an assessment of the spatial configuration and number of dead and live trees which occur following natural disturbances.*

The analysis characterizes the Range of Natural Variation by identifying the upper and lower extremes of the range and measures of variance or dispersion between the extremes (e.g. inter-quartile ranges).



8. Aggregation of Disturbances (Criterion 6.8)

Where consistent with the ecology of the ecoregion and forest types being managed, forest management disturbances are aggregated in a manner that facilitates the creation of contiguous blocks of undisturbed areas. The interquartile bounds (i.e. the middle 50%) of the Natural Range of Variation of disturbance sizes are used as a guide for identifying the size range of aggregated disturbances.

To the extent feasible, aggregated disturbances are created so as to avoid disturbing forests of natural disturbance origin.

The extent of aggregated disturbed areas is based on:

- a) the value of contiguous undisturbed areas to species at risk;*
- b) restrictions on timber harvest area imposed by regulatory authorities;*
- c) public and Indigenous community concerns;*
- d) concerns of forest users, such as recreationalists and trappers; and*
- e) the need to manage access infrastructure in constraining the reach of disturbed areas.*

Where significant social resistance to creating large disturbed areas exists and where aggregation of landscape disturbances would be beneficial to species at risk, the organization works within its sphere of influence to move management direction towards the aggregation of landscape disturbances, as a means of avoiding or forestalling the creation of new disturbances.

9. Core Areas (Criterion 6.8)

Consistent with the ecology of the ecoregions and forest types being managed, large areas of contiguous core forest habitat, representative of the habitat types naturally occurring on the land base, are maintained/restored in the management unit. The interquartile bounds (i.e. the middle 50%) of the Natural Range of Variation is used as a guide for identifying the size of the core areas and the proportion of the management to maintain in cores or to restore to cores.

To the extent feasible, core areas are maintained that consist of forest of natural disturbance origin.

Best efforts are being made to minimize the extent of roads and other linear disturbances in core areas. Where roads are included in cores, plans for their management, focusing on removal and reclamation exist and are being implemented

The planning of future cores, and management of current cores focuses on areas, with a high probability of achieving the desired condition (e.g., areas likely to be in a contiguous, roadless condition). The organization works within its sphere of influence to achieve this condition (e.g., access management, decommissioning roads, bridge removal, etc.).



The Caribou Appendix identifies this additional requirement:

For forests recognized as Caribou Habitat Areas, the interquartile range (i.e. the middle 50%) of the Range of Natural Variation is used as a guide in identifying the size of core areas and the proportion of the management unit to maintain in cores or restore in cores of Mature/Old Forest. A precautionary approach is used in identifying the location and size of Mature/Old Forest cores.

10. Forest Community Composition (Criterion 6.6)

Forest communities (i.e. forest units) that are significantly under-represented relative to the interquartile bounds (i.e. middle 50%) of the Range of Natural Variation, or in significant decline are being increased in abundance over the longer term. In the near term, at a minimum, their abundance is being maintained with a clear strategy to increase it over the longer term.

Deviation from the above requirements is permitted providing that it is supported by a peer-reviewed strategy based on adaptation to climate change.

11. Connectivity (Criterion 6.8)

In a manner consistent with the ecology of the ecoregion and forest communities being managed, the forest is managed so as to show consideration for maintenance and restoration of connectivity at the landscape and local scales to meet the habitat and movement needs of wide-ranging wildlife species. Connectivity planning considers the natural mosaic of forest types and disturbance patterns, and managing roads, linear disturbances and other barriers to facilitate connectivity.

The organization works collaboratively with the managers of surrounding lands and within its sphere of influence to foster landscape-scale connectivity.

The Caribou Appendix identifies this additional requirement:

Through the use of empirical information and/or Traditional Knowledge, the organization demonstrates an understanding of the movement needs of caribou on their Forest Management Unit, and demonstrates that planned management will maintain or restore connectivity to a level sufficient to meet caribou movement needs. In the absence of a demonstrated understanding of movement needs, a precautionary approach is used in addressing landscape connectivity concerns related to caribou habitat management.



12. Access Management (Criterion 6.8)

Appropriate to the scale, intensity and risk of operations, a comprehensive access management plan is being implemented for roads used for forest management that:

- a) Avoids road building in protected areas and areas identified as representative sample areas or restoration areas through Criterion 6.5, and near areas of traditional use by SAR;*
- b) Includes abandonment and/or maintenance strategies for all grades of road;*
- c) Maintains remoteness in areas with sensitive biological or cultural values or where required for tourism;*
- d) Manages access development, use, and road reclamation in light of the needs of Species at Risk and access-sensitive species; and*
- e) Identifies and maintains level of remoteness based on achieving a fair and equitable balance based between the ecological, social and economic importance of remoteness and the recreational and operational desire for motorized access.*

The access management plan includes strategies for monitoring that address levels of use of forest management roads to test whether abandonment, maintenance and use strategies are being effectively implemented. Monitoring is being implemented and where it reveals that practices have not been effective, remedial measures are implemented.

Where access and/or other linear disturbances are being constructed or used by other tenure holders or other land users, the organization works within its sphere of influence to address the components of this indicator and encourage others to address the components of the indicator.

13. Pesticides

Integrated pest management, including selection of silviculture systems is used to avoid, or aim to eliminate the frequency, extent, and amount of pesticide applications.

Chemical pesticides are used only when their application is essential to meet silviculture objectives or for the management of habitat of Species at Risk and when non-chemical management practices are:

- a) not available; or*
- b) ineffective in achieving silviculture or habitat management objectives; or*
- c) prohibitively expensive, taking into account environmental and social costs, risks and benefits.*

14. Cross Boundary Management (Indicator 6.8)

Best efforts are made to work with managers/agencies responsible for managing lands adjoining the forest to coordinate approaches to landscape-level management, including:

- a) management of High Conservation Values;*
- b) the setting of objectives and strategies for management of Species at Risk (e.g. boreal caribou);*
- c) management of landscapes to aggregate disturbances where ecologically appropriate;*
- d) management to facilitate landscape-scale connectivity;*



- e) *management of access so as to minimize cumulative disturbances; and*
- f) *maintenance and/or restoration of large core areas.*

The Caribou Appendix identifies this additional requirement:

Where management is taking place within a Caribou Habitat Area, best efforts are made to coordinate landscape-level management activities with the management of adjoining resource management areas so that impacts on caribou habitat can be minimized.

15. Consideration of Harvest Rates in Modelling (Principle 7)

The analysis and calculation of harvest rates of forest products accurately reflects the requirements under other indicators.

All management targets and strategies that have implications for forest structure are accounted for in the calculation of harvest rates. These include topics and direction identified in:

- a) *Indicator 1, associated with management of risk;*
- b) *Indicator 3, which addresses recovery and maintenance of SAR habitat and protection of seasonally important areas*
- c) *Indicator 8, which addresses the need to aggregate disturbances;*
- d) *Indicator 9, which addresses requirements for core areas of mature/old forest;*
- e) *Indicator 10 which addresses requirements for restoration of forest communities that have declined in abundance; and*
- f) *Indicator 11 which addresses requirements related to landscape connectivity.*

If the calculation of harvest rates is not carried out by the organization, the organization works within its sphere of influence to address the requirements of this indicator.

16. Monitoring and Assessment of Cumulative Effects (Principle 8)

The potential cumulative impacts of multiple management activities over time and space on identified environmental values, including Species at Risk are identified, monitored and assessed. The organization works within its sphere of influence to implement the monitoring and assessment necessary.

The Caribou Appendix identifies this additional requirement:

To facilitate the assessment of cumulative effects on caribou, where management is taking place within Caribou Habitat Areas, monitoring is conducted on:

- a) *the occurrence(extent) of anthropogenic and natural disturbances including access networks;*
- b) *the implementation of measures identified in plans and approaches identified under Indicator 3;*
- c) *the success of efforts to restore core areas of mature/old forest (as identified in Indicator 9)*



- d) the success of measures to regenerate conifer forest units (as identified in Indicator 10)
- e) effectiveness of access management practices (as identified in Indicator 13); and
- f) the implementation of cross-boundary caribou management initiatives (as identified in Indicator 14).

17. Traditional Knowledge

Relevant Indigenous Peoples are provided with culturally appropriate engagement opportunities to have meaningful input into the design and development of the SAR Plans for the forest.



3 APPENDIX 1. CARIBOU APPENDIX D2-2 (OCT 7, 2014)

Caribou are recognized as an important species in Canada because of the social significance attached to their continued existence, their status as a hallmark Species at Risk (SAR), and the notion that their populations may serve as an indicator of forest health. This appendix identifies aspects of the SAR indicators of particular relevance to caribou; it provides content that is intended both as context and as mandatory direction which must be followed. **Indicators are indicated in *blue italics*.**

In developing the indicators, the explicit intent was that they should function together in providing consideration for SAR and their habitats. While indicators are separate structures in any certification standard, to be effective in addressing the needs of SAR, all the indicators identified in this effort should be satisfactorily addressed. Although the explicit caribou indicator (Indicator 1) is obviously unique, the indicators are not ranked in terms of importance. Therefore it would not be appropriate for certifiers to assign more value in meeting the requirements of some indicators, or for forest managers to put effort into meeting the requirements of some at the expense of others.

All mandatory direction identified in this appendix is important and must be addressed to meet the requirements of the Standard.

Formatting Note - Because indicators with specific applicability to caribou are not just confined to the SAR section of the Standard, all indicators addressed in the Caribou Appendix should be given special notation in the Standard.

Throughout this Appendix the term “Caribou Habitat Area” is used. It means:

- all areas within Caribou Population Ranges identified by the boreal caribou Federal Recovery Strategy³ (FRS), and Subpopulations identified by the (proposed) mountain caribou Recovery Strategy⁴ (MCRS), or in subsequent revisions, and/or
- areas identified by resource management agencies as recovery zones for caribou.

Indicator 1 – Risk Management and Caribou

Note to Readers – This is a long and detailed indicator. However, at the core is a relatively simple application of a Risk Management Framework to managing caribou habitat. The complexity arises largely from providing detail that attempts to account for various circumstances that may exist in forest management units and so avoid circumstances in which interpretation of the indicators requirements could be unclear.

³ Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. *Species at Risk Act Recovery Strategy Series*. Environment Canada, Ottawa. xi+138 p.

⁴ Environment Canada. 2014. Recovery Strategy for the Woodland Caribou, Southern Mountain population (*Rangifer tarandus caribou*) in Canada [Proposed]. *Species at Risk Act Recovery Strategy Series*. Environment Canada, Ottawa. viii+68 p.



There are two separate spatial components to this indicator – the first is based on the contribution of forest management activities to levels of disturbance **within Caribou Population Ranges** (for boreal caribou) **or Caribou Subpopulations** (for mountain caribou), and the second is based on implications of management activities for caribou habitat **within Forest Management Units**. Effects of management activities on caribou habitat at the two spatial scales (Caribou Population Range/Subpopulation and Forest Management Unit) are not entirely distinct from one another, so there is overlap between the two components of this indicator. *Components 1 and 2 must both be met.*

Component 1: Contribution of Management Activities to Risk at the Scale of Caribou Population Ranges/Subpopulations

This component brings the notion of risk into the management of caribou populations and caribou habitat, based largely on the approach put forward in the FRS on identification and protection of critical habitat. The key supporting documents for the FRS (Environment Canada 2008⁵, 2011⁶) provided empirical evidence of a strong negative correlation between the extent of disturbance within caribou ranges and the condition of caribou populations. The MCRS adopts the threshold of 65% undisturbed area for forested portions of subpopulation ranges based on analyses undertaken for boreal caribou, and so that threshold is used in this indicator for both ecotypes.

This component is based largely on the contribution that forest disturbance within the Forest Management Units make to the overall level of disturbance within Caribou Population Ranges/Subpopulations.

Where population data are not available or where a declining or uncertain trend is apparent, that consideration overrides information on the extent of disturbance, as is explained in more detail below.

Table 1 below provides a framework based on the extent of cumulative disturbance, to be used in the calculation of risk for Caribou Population Ranges/Subpopulations.

⁵ Environment Canada. 2011. Scientific Review for the Identification of Critical Habitat for Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada. August 2008. Ottawa, Environment Canada. 72 pp. plus 180 pp Appendices.

⁶ Environment Canada, 2011. Scientific Assessment to Inform the Identification of Critical Habitat for Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population in Canada: 2011 update. Ottawa, Ontario Canada. 102 pp. plus appendices.



Table 1. Risk Framework to be applied to management of caribou.

Extent of Cumulative Disturbance	Management Requirements
LOW RISK	
0-20% of caribou population range/subpopulation	Carefully planned implementation of forest management activities is permitted.
MODERATE RISK	
20-35% of caribou population range/subpopulation	<p>Carefully planned implementation of forest management activities is permitted.</p> <p>Planning efforts are in progress to ensure that habitat disturbance will not exceed 35% within the long-term planning horizon and habitat recovery will be implemented.</p> <p>The Organization works within its sphere of influence to achieve the above requirements</p>
HIGH RISK	
>35 % of caribou population range/subpopulation	<p>Carefully planned implementation of forest management activities is permitted however net expansion of forest management (based on cumulative disturbance) should not occur.</p> <p>Habitat recovery and restoration is in progress with the objective of lowering the extent of cumulative disturbance to reduce the Risk Level to Moderate or Low.</p> <p>The Organization works within its sphere of influence to achieve the above requirements.</p>

Note on the Overriding Importance of Population Information

The framework in Table 1 is based on the extent of cumulative disturbance in a Caribou Population Range or Subpopulation. However the preferred primary means of evaluating how a caribou population is faring is through data on demographic trends, such as population growth rate, calf recruitment, and female survival.

- i. *In the absence of reliable information that shows the population within the Caribou Population Range or Subpopulation is stable or increasing, the Caribou Population Range or Subpopulation is considered to be at High Risk category **no matter what level of disturbance exists**, and the Management Requirements related to the High Risk Category are applied.*



- ii. *In circumstances where there is no evidence that the population is stable or increasing, and the Forest Management Unit includes only a portion of Caribou Population Range or Subpopulation, best efforts are made to work with other parties (e.g. neighbouring tenure holders and provincial resource management agencies) to implement the management requirements in the Caribou Population Range or Subpopulation associated with the High Risk Category identified in Table 1.*

Notes for Table 1

Management Requirements: The Management Requirements shown in the Table 1 identify the obligations of forest managers associated with given levels of risk. Auditors and Assessors will evaluate the extent to which the Management Requirements are being addressed.

Cumulative Disturbance is defined as the proportion of the Caribou Population Range /Subpopulation with anthropogenic and natural disturbances of < 40-50 years. Definitions of human-induced and natural disturbances are provided in Environment Canada (2008, 2011).

- iii. *Updated measurements of cumulative disturbance for Caribou Habitat Areas may be used provided that the methodology used is comparable to that employed by Environment Canada (2011) and that definitions of human-induced and natural disturbances are comparable; however revised definitions or methodology may be employed provided that justification supported by expert opinion is provided.*

Habitat Recovery is the process of returning habitat to a condition suitable for use by caribou and/or comparable to its condition prior to disturbance.

Natural Disturbance: In the boreal and montane forests, large natural disturbances (e.g. fire or windthrow) may significantly affect levels of cumulative disturbance on Forest Management Units and Caribou Population Ranges/Subpopulations. Large disturbances outside the Forest Management Unit may affect the level of cumulative disturbance in the Caribou Population Range/Subpopulation in which the Management Unit exists. Forest Managers are not expected to cease operations if significant natural disturbances occur within or outside of the Forest Management Unit. Nonetheless, it may be necessary to adjust Management Activities should large natural disturbances occur, to minimize the cumulative impact of natural and anthropogenic disturbances.

- iv. *Best efforts are made to keep projected levels of cumulative disturbance on the Caribou Population Range/Subpopulation below 35% when large natural disturbance occur and significantly elevate the levels of cumulative disturbance.*

Notes Considering Spatial Aspects

Some Forest Management Units may include Caribou Habitat Areas and areas that are not Caribou Habitat Areas.



- v. *The calculation of risk category and implementation of Management Requirements are based only on those portions of Forest Management Units which are Caribou Habitat Areas.*
- vi. *If the Caribou Habitat Area of a Forest Management Unit extends into more than one Caribou Population Range/Subpopulation, the indicator's requirements are addressed for all Caribou Population Ranges which overlap with Caribou Habitat Areas in the Forest Management Unit.*

In some cases Forest Management Units include only a portion a Caribou Population Range/Subpopulation.

- vii. *The contribution of forest management in Forest Management Units to the cumulative disturbance in the entire Caribou Population Range/Subpopulation is calculated. The management requirements associated with risk levels in Table 1 are addressed.*

Figures 1,2, and 3 (at the end of this appendix) provide examples of the indicators requirements in different situations.

Component 2: Contribution of Management Activities to the Quality of Habitat at the Forest Management Unit Scale

Because the level of cumulative disturbance is by itself not appropriate to address issues of habitat quality at a scale finer than the Caribou Population Range/Subpopulation, this component has links to other indicators that address different aspects of forest quality which are related both to caribou habitat and other forest values.

In Caribou Population Ranges/Subpopulations there is spatial variation in the levels of cumulative disturbance, with some areas having greater levels of disturbance than others.

- viii. *Levels of disturbance beyond 35% within Caribou Habitat Areas in Forest Management Units may occur where there is strong evidence of the sufficiency of other aspects of habitat quality within the Caribou Habitat Areas in the Forest Management Unit.*

Strong evidence of the sufficiency of other aspects of overall habitat quality can be addressed by ensuring that the requirements related to aggregation of disturbances, core areas, forest community composition, and connectivity, and access management (Indicators 8 – 12) are met.

Table 2 provides a synopsis of the requirements of Indicator 1. The requirements become increasingly stringent as circumstances progress down the table from the relatively benign circumstances characterized as Increasing/Stable population with low risk at the Caribou Population Range/Subpopulation level and < 35% disturbance on the Forest Management Unit, to the circumstances characterized as Stable or Increasing population with high risk at the



Caribou Population Range/Subpopulation level and $\geq 35\%$ disturbance on the Forest Management Unit (which have the same requirements for any circumstances in which the population is declining or unknown). Forest management activities may occur in some manner under all circumstances, although the requirements for undertaking forest management under the most severe circumstances are characterized as having a high degree of caution, planning, restoration, and collaboration.



Table 2. Summary of the Requirements of Indicator 1

Caribou Population Trend	Range Risk level (From Table 1)	FMU disturbance level	Requirements
Stable or Increasing	Low	< 35%	<ul style="list-style-type: none"> Carefully planned implementation of forest management activities is permitted.
		≥ 35%	<ul style="list-style-type: none"> Carefully planned implementation of forest management activities is permitted providing there is strong evidence of the sufficiency of other aspects of overall habitat quality.
	Moderate	< 35%	<ul style="list-style-type: none"> Carefully planned implementation of forest management activities is permitted. Planning efforts are in progress to ensure that habitat disturbance within the Caribou Population Range/Subpopulation will not exceed 35% within the long-term planning horizon and habitat recovery will be implemented. Forest Managers work within their sphere of influence to achieve the above requirements.
		≥ 35%	<ul style="list-style-type: none"> Carefully planned implementation of forest management activities is permitted providing there is strong evidence of the sufficiency of other aspects of overall habitat quality. Planning efforts are in progress to ensure that habitat disturbance within the Caribou Population Range/Subpopulation will not exceed 35% within the long-term planning horizon and habitat recovery will be implemented. Forest Managers work within their sphere of influence to achieve the above requirements.
	High	< 35%	<ul style="list-style-type: none"> Carefully planned implementation of forest management activities is permitted but net expansion of forest management within the Caribou Population Range/Subpopulation (based on cumulative disturbance) should not occur. Habitat recovery and restoration is in progress with the objective of lowering the extent of cumulative disturbance to reduce the Risk Level to Moderate or Low. Forest Managers work within their sphere of influence to achieve the above requirements.
		> 35%	<ul style="list-style-type: none"> Carefully planned implementation of forest management activities is permitted but net expansion of forest management within the Caribou Population Range/Subpopulation (based on cumulative disturbance) should not occur. Habitat recovery and restoration is in progress with the objective of lowering the extent of cumulative disturbance to reduce the Risk Level to Moderate or Low. Forest Managers work within their sphere of influence to achieve the above requirements.



		≥ 35%	<ul style="list-style-type: none"> Carefully planned implementation of forest management activities is permitted with the provisions that a) net expansion of forest management within the Caribou Population Range/Subpopulation (based on cumulative disturbance should not occur) and b) that there is strong evidence of the sufficiency of other aspects of overall habitat quality.
Decreasing or Uncertain	All	Any	<ul style="list-style-type: none"> Habitat recovery and restoration is in progress with the objective of lowering the extent of cumulative disturbance to reduce the Risk Level to Moderate or Low. Forest Managers work within their sphere of influence to achieve the above requirements.

New Evidence

New science and/or empirically-supported management approaches may be developed prior to updates to this Standard. It is recognized that new approaches and best management practices may surpass those presently advocated here for both components of this indicator. For example, the disturbance-recruitment relationship that underlies this indicator (EC 2011) was developed at the national scale; if new analyses suggest re-calibration of this relationship at regional (provincial) scales, Table 1 could be modified accordingly.

- ix. Alternate approaches to managing caribou habitat may be used provided they are supported by independent expert input validating that the alternate approaches are based on recent scientific advancement.*

Indicator 2 – Species at Risk Definition

No content is required in the Caribou Appendix for this indicator.

Indicator 3 – Species at Risk Plans

Definition of ‘Plans’

Plans to address the needs of SAR need not be approved federal or provincial plans, but can be documents written to fill a gap in existing direction from governments and their regulatory agencies. However, plans written specifically for a Forest Management Unit should not be in conflict with higher-level plans that have regulatory approval.

The Standard’s Glossary explains Species at Risk Plans as:

“In the context of SAR ‘Plans’ are documented strategies and procedures for managing species at risk and/or their habitats. ‘Plans’ can consist of a range of documents including those that have been developed and approved in accordance with federal or provincial legislation, sometimes called “Action Plans” or “Recovery Strategies”. Plans can also include documents written by experts specifically to direct management in the Forest



Management Unit and included in Forest Management Plans. Plans written specifically for the Forest Management Unit should not be in conflict with approved Actions Plans or Recovery Strategies. Plans written specifically for the Management Unit are not intended to replicate the detail and scope of Species Recovery Plans, but simply to outline the ways in which the manager is taking a precautionary approach to mitigating the impact of its activities on the species and/or allowing for its recovery. Measures may involve habitat protection, conservation zones, seasonal closures, etc. They will not necessarily require a stand-alone plan or strategy for each species, and may be reflected in measures to implement other requirements of this Standard.”

Indicator 4 – Training

No content is required in the Caribou Appendix for this indicator.

Indicator 5 – Control of Consumptive Uses of SAR

No content is required in the Caribou Appendix for this indicator.

Indicator 6 – Collaborative Efforts

Responsibility for managing caribou and their habitat extends well beyond forest managers to include government agencies, Indigenous people, and other tenure holders and land managers. This Indicator recognizes that forest managers should work cooperative with others and requires them to work within their sphere of influence to attempt to entrain the efforts of others in several aspects of SAR management.

Indicator 7 – Range of Natural Variation

This indicator requires forest managers to characterize the range of natural variation associated with several forest characteristics. The range of natural variation is then used in subsequent indicators as a reference for desirable/acceptable limits of landscape qualities and characteristics (e.g. Aggregation of Disturbances, Core Areas).

The Boreal Forest is subject to very large natural disturbances which create an extreme range of ‘natural’ conditions. Fires in the order of tens or even hundreds of thousands of hectares are natural occurrences and create landscape extremes which may include vast areas of young forest or forest which is inhospitable to caribou in other ways. Prior to human management of northern forests, such disturbances were part of the natural ebb and flow and ecosystems. However, in the present circumstances creation of extremely large disturbances areas could eliminate currently suitable caribou habitat over too broad an area to be consistent with sustainable management objectives.

Indicators’ requirements to take the range of natural variation into account are constrained to using the interquartile bounds (i.e. the middle 50% of the range) as a means of incorporating variation, but avoiding extremes. This is recognized in Indicator 8, which addresses the



aggregation of disturbances Indicator 9, which addresses core areas, and Indicator 10 which addresses forest community composition.

Indicator 8 – Aggregation of disturbances

Caribou require large tracts of forest with minimal disturbance. Aggregating disturbances actually decreases the footprint in the affected landscape compared to when a comparable total area of disturbances is dispersed across the landscape. The intent of aggregating disturbances is not to create large disturbed areas per se, but to create contiguous areas that are not disturbed at present, preserving tracts of existing habitat; and create contiguous areas of habitat in the future once sufficient regeneration has occurred.

Indicator 9 – Core Areas

Woodland caribou need extensive areas of relatively undisturbed mature/old forest as habitat. These areas provide food, movement corridors and refugia from predation. This indicator requires the maintenance/restoration of such areas on the forest. Reference points for the amount of area to exist in cores of mature and old forest are based on the Range of Natural Variation as identified in Indicator 7

The indicator addresses core areas but does not draw attention to specific requirements for mature and old forest, which are important to caribou.

- x. *For forests recognized as Caribou Habitat Areas, the interquartile range (i.e. the middle 50%) of the Range of Natural Variation is used as a guide in identifying the size of core areas and the proportion of the management unit to maintain in cores or restore in cores of Mature/Old Forest. A precautionary approach is used in identifying the location and size of Mature/Old Forest cores.*

Indicator 10 – Forest Community Composition

For caribou, one concern noted frequently is the loss of conifer-dominated communities and increase in mixed woods and hardwood-dominated communities that do not provide habitat of comparable value. This indicator is intended to address shifts in forest community composition, which will be important for a range of ecosystem concerns.

The indicator uses the phrases 'longer term and near term'. These are defined in the glossary:

Long Term: For indicators which refer to long-term or longer-term as a basis for defining when aspects of indicators should be achieved, the term means the modelling horizon of the existing forest management plan.

Near Term: For indicators which refer to near-term as a basis for defining when aspects of indicators should be achieved, the term means within the time frame of existing management plans.



Indicator 11 – Connectivity

Caribou need expanses of contiguous habitat with minimal disturbance, so in conjunction with Indicators 8 (Aggregation of Disturbances) and Indicator 9 (Core Areas), forests should be managed to foster connectivity across landscapes which provide caribou habitat. This indicator includes the requirement that connectivity be maintained and/or restored to meet the habitat and movement needs of wide-ranging wildlife species.

Simple corridors of intact forest through a disturbed matrix do not suffice to provide connectivity. Because caribou do not consistently travel along the same pathway, broad expanses of contiguous habitat are needed to provide connectivity.

The connectivity needs and migration habits of mountain caribou can be complex and variable depending on the subpopulation and local context of topography, forest type and forest age class distribution. Mountain caribou require their seasonal ranges to be connected by lands that facilitate movement.

- xi. *Through the use of empirical information and/or Traditional Knowledge, the organization demonstrates an understanding of the movement needs of caribou on their Forest Management Unit, and demonstrates that planned management will maintain or restore connectivity to a level sufficient to meet caribou movement needs. In the absence of a demonstrated understanding of movement needs a precautionary approach is used in addressing landscape connectivity concerns related to caribou habitat management.*

Indicator 12 – Access Management

This indicator addresses management of human use of access, and management of access infrastructure which may alter the forest's ecology independent of its use by humans. Access management is a critical component of managing the quality of forests for caribou. Impacts of access include:

- fragmentation of forest communities, degrading the quality of those communities to provide habitat;
- creation of barriers to movement to caribou and other sensitive wildlife;
- provision of access corridors for predators which may increase predation rates;
- facilitation of intentional or accidental harvest by humans; and
- creation of additional development which further degrades habitat quality.

This indicator includes the requirement to avoid road building near areas of traditional use by SAR. For Caribou, these areas may include core wintering habitat and calving areas.

This indicator includes requirements to manage roads through all stages of their life, including development, use and maintenance, abandonment and reclamation. Forest managers must be able to demonstrate that all these activities have been implemented in consideration of the needs of SAR.



The indicator recognizes that there are circumstances in which forest managers are not in complete control of the construction of access in the forest or in control of the use of roads. In those circumstances the indicator requires that forest managers act within their sphere of influence to address the indicator and encourage others to address the indicator's requirements.

Indicator 13– Pesticides

Notwithstanding the requirements of the indicator to avoid or aim to eliminate pesticide use, this indicator permits the use of pesticides when their application is essential for the management of habitat for SAR. From a caribou perspective, this is interpreted as permitting the use of herbicides to foster regeneration of conifer when non-chemical methods would be ineffective at achieving desired results. This addresses one of the oft-identified weaknesses in the previous National Boreal Standard.

When applicants are preparing evidence to demonstrate reductions in herbicide use, they should separate evidence related to herbicides used to foster conifer regeneration for caribou habitat so that the overall intent of the indicator (to reduce pesticide use) can still be examined.

Indicator 14 – Cross Boundary Management

Because caribou use large areas, transcending boundaries of Forest Management Units and other borders, it is necessary that forest managers work in collaboration with neighbouring resource management areas

- xii. Where management is taking place within a Caribou Habitat Area, best efforts are made to coordinate landscape-level management activities with the management of adjoining resource management areas so that impacts on caribou habitat can be minimized.*

Indicator 15 –Consideration of Harvest Rates in Modelling

No content is required in the Caribou Appendix.

Indicator 16 – Monitoring and Assessment of Cumulative Effects

Monitoring requirements are identified in several indicators. This indicator requires monitoring and assessment of cumulative effects, which means that the additive and synergist impacts of management must be considered, including those other than related to forest harvest (e.g. mining, energy, and other development and exploration activities). For caribou, this will require monitoring of several of the indicators and values identified in this appendix.

- xiii. To facilitate the assessment of cumulative effects on caribou, where management is taking place within Caribou Habitat Areas, monitoring is conducted on:
g) the occurrence(extent) of anthropogenic and natural disturbances including access networks;*



- h) the implementation of measures identified in plans and approaches identified under Indicator 3;*
- i) the success of efforts to restore core areas of mature/old forest (as identified in Indicator 9)*
- j) the success of measures to regenerate conifer forest units (as identified in Indicator 10)*
- k) effectiveness of access management practices (as identified in Indicator 13); and*
- l) the implementation of cross-boundary caribou management initiatives (as identified in Indicator 14).*

Indicator 17 - Traditional Knowledge

This indicator requires that Relevant Indigenous Peoples are provided with opportunities to have input into SAR plans for the forest. All the Indigenous peoples and communities identified through the assessment of Principle 3 should be in the efforts to address this indicator.

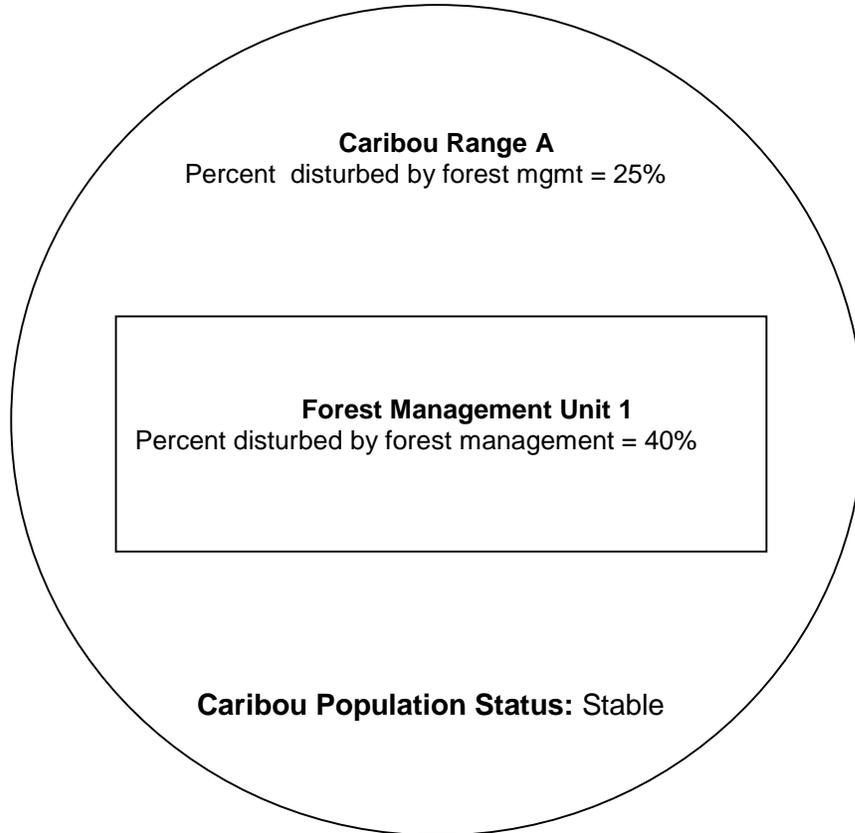


Figure 1. Example of indicator requirements with a stable population

In the example provided in Figure 1, a single forest management is completely enveloped by a caribou population range. The proportion of area disturbed in the range is 25%. Given that the caribou population status is stable, the proportion of area disturbed in the range is used to classify the risk level as Moderate. The level of disturbance within the Forest Management Unit is > 35% and so the requirements of Moderate Risk and Component 2 of the indicator (viii) are relevant.

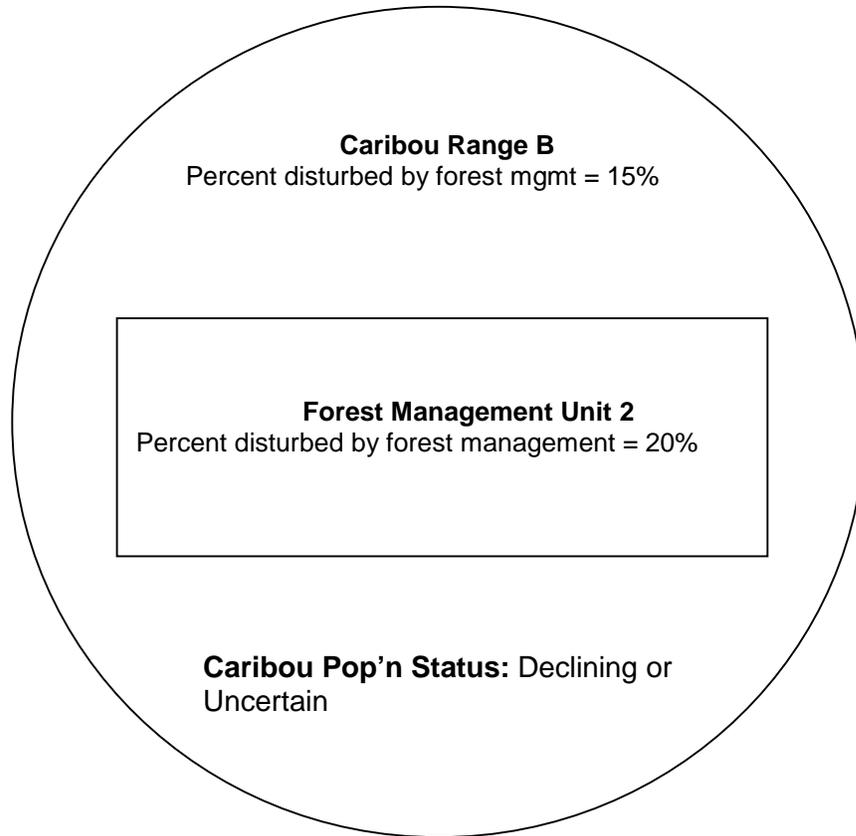


Figure 2. Example of indicator requirements with a declining or uncertain population.

Figure 2 presents a similar example to Figure 1, however in Figure 2, the caribou population is declining or uncertain. Therefore, in spite of the fact that the level of disturbance is lower than in Figure 1, the management requirements associated with the High Risk category apply.

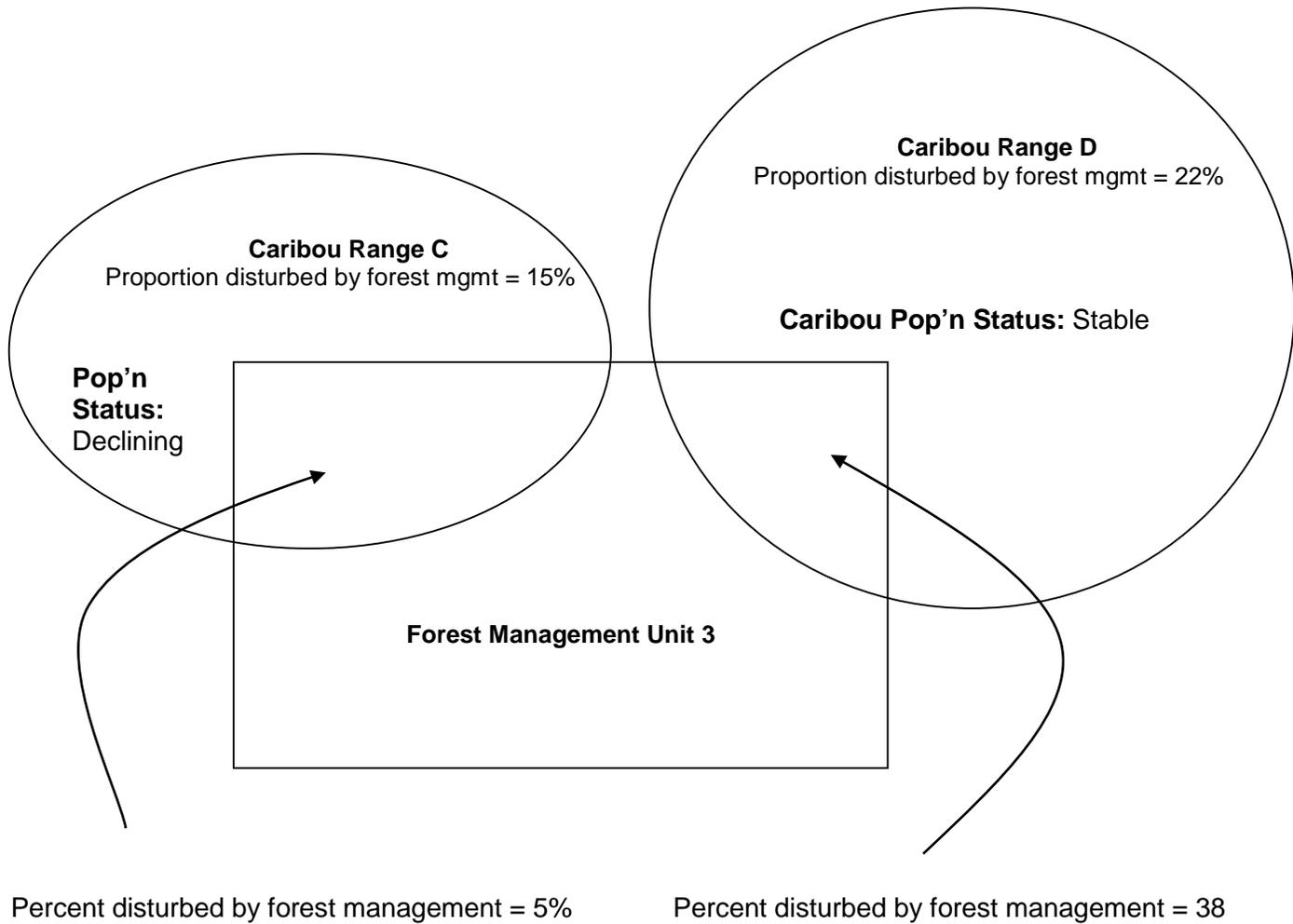


Figure 3. Example of indicator requirements in a complex situation.

Figure 3 presents a situation in which one forest management unit overlaps with portions of two Caribou Ranges. Because the caribou population in Range C is in decline, the requirements associated with High Risk apply to that portion of Forest Management Unit 3 with overlaps with Range C, even though the proportion of disturbance in both Range C and Forest Management Unit 3 are low.



In Caribou Range D, the proportion of area disturbed is moderate (22%) and the caribou population is stable. Therefore, the portion of Forest Management Unit 3 that overlaps with Caribou Range D has a Moderate Risk rating. Therefore, even though the proportion of Forest Management Unit 3 that overlaps with the Range D has a relatively high level of disturbance (> 35%), forest management in excess of 35% is permitted in that area providing that the requirements associated with Moderate Risk and Component 2 of Indicator 1 (*viii*) are addressed.



APPENDIX 2. GLOSSARY ENTRIES RELATED TO ABOVE INDICATORS AND CARIBOU APPENDIX

Caribou Habitat Area: all areas within Caribou Population Ranges identified by the boreal caribou Federal Recovery Strategy⁷ (FRS), and Subpopulations identified by the (proposed) mountain caribou Recovery Strategy⁸ (MCRS), or in subsequent revisions, and/or areas identified by resource management agencies as recovery zones for caribou. (*Derived by the TEP, 2013*)

Connectivity: The degree to which habitat patches or environments are linked by single or multiple corridors or broad expanses of habitat. Connectivity recognizes the need for habitats to address several kinds of movements: 1) daily movements among habitat patches; 2) migrations/movement between seasonal ranges/use areas; and 3) dispersal movements of young animals. Conditions necessary for connectivity and its effectiveness will depend on the specific purpose of the connectivity and the requirements of species or ecosystems considered. (*Adapted from B.C. Standard, 2013*)

Forest Unit: An aggregation of forest stands for management purposes which have similar species composition, develop in a similar manner (both naturally and in response to silvicultural treatments), and are managed under the same, or similar silvicultural systems. (*Taken from National Boreal Standard*)

Indigenous peoples: People and groups of people that can be identified or characterized as follows:

- The key characteristic or criterion is self-identification as indigenous peoples at the individual level and acceptance by the community as their member
- Historical continuity with pre-colonial and/or pre-settler societies
- Strong link to territories and surrounding natural resources
- Distinct social, economic or political systems
- Distinct language, culture and beliefs
- Form non-dominant groups of society
- Resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities.

(*Taken from FSC FPIC Guidelines which identified Source: Adapted from United Nations Permanent Forum on Indigenous, Factsheet 'Who are indigenous peoples' October 2007; United Nations Development Group, 'Guidelines on Indigenous Peoples' Issues' United Nations 2009, United Nations Declaration on the Rights of Indigenous Peoples, 13 September 2007*)

In Canada, Indigenous peoples means Aboriginal peoples, which include Indian, Métis and Inuit; this is in Part II of the Canadian Charter of Rights and Freedoms in the Constitution Act, 1982, as amended (*Taken from the NBS*)

Long Term: For indicators which refer to long-term or longer-term as a basis for defining when aspects of indicators should be achieved, the term means the modelling horizon of the existing forest management plan. (*Derived by the TEP, 2013*)

⁷ Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. *Species at Risk Act Recovery Strategy Series*. Environment Canada, Ottawa. xi+138 p.

⁸ Environment Canada. 2014. Recovery Strategy for the Woodland Caribou, Southern Mountain population (*Rangifer tarandus caribou*) in Canada [Proposed]. *Species at Risk Act Recovery Strategy Series*. Environment Canada, Ottawa. viii+68 p.



Near Term: For indicators which refer to near-term as a basis for defining when aspects of indicators should be achieved, the term means within the time frame of existing management plans. *(Derived by the TEP, 2013)*

Old Forest: Later stages in forest development which may be distinctive in composition, but are always distinctive in structure from earlier (young and mature) successional stages. *(Taken from National Boreal Standard)*

Species at Risk Plans: In this context “Plans” are documented strategies and procedures for managing species at risk and/or their habitats. “Plans” can consist of a range of documents including those that have been developed and approved in accordance with federal or provincial legislation, sometimes called “Action Plans” or “Recovery Strategies”. Plans can also include documents written by experts specifically to direct management in the Forest Management Unit and included in Forest Management Plans. Plans written specifically for the Forest Management Unit should not be in conflict with approved Actions Plans or Recovery Strategies. Plans written specifically for the Management Unit are not intended to replicate the detail and scope of Species Recovery Plans, but simply to outline the ways in which the manager is taking a precautionary approach to mitigating the impact of its activities on the species and/or allowing for its recovery. Measures may involve habitat protection, conservation zones, seasonal closures, etc. They will not necessarily require a stand-alone plan or strategy for each species, and may be reflected in measures to implement other requirements of this Standard. *(Adapted from National Boreal Standard)*

Sphere of Influence: Professional associations with colleagues or businesses or agencies with whom individuals or businesses or agencies interact. When required by indicators to work within one’s Sphere of Influence, forest managers should interact with their colleagues, other professionals, businesses or agencies to achieve the indicators’ objectives. *(Derived by the TEP, 2013)*

Traditional Knowledge: Includes, but is not limited to knowledge of:

- local behaviour, distribution or cycles of fish, wildlife and plant life;
- broader climatic changes or cycles;
- local ecosystem or geomorphologic responses to natural or human disturbances;
- local population densities or chances in fish and wildlife;
- qualitative information about the utility of a variety of medicinal, edible, or material resource plants;
- requirements or activities needed to maintain or enhance local ecosystems. *(Taken from B.C. Standard)*



APPENDIX 3. WHAT FSC CAN/CANNOT DO FOR CARIBOU FROM SCIENCE PANEL REPORT.

Content from the Science Panel Report⁹

Understanding what FSC certification can do for caribou conservation involves examining the factors influencing caribou recovery and the interactions among certification, well-managed forests¹⁰, and SAR conservation. One of the primary purposes of FSC certification is to provide a level of assurance to consumers that forest products have been produced “from healthy forests providing an equitable sharing of benefits from their use, while respecting natural forest processes, biodiversity and harmony amongst their inhabitants” (FSC Canada 2010). A fundamental component of forest management in Canada and an expectation of the National Boreal Standard is proactive engagement of SAR conservation. Forestry companies control their own actions (within bounds set by government regulations) and can collaborate with, or have influence over the actions of others. However, ultimate success will depend on the combined actions of the companies, governments, and other stakeholders engaged in SAR conservation on the same landbase. This collaborative effort will depend on adequately addressing the limiting and regulating factors affecting caribou survival, movements, and reproduction in an integrated fashion.

The proximate and ultimate factors limiting recovery of a given SAR (caribou in this case) may vary in time and space. In Section 4.3, the leading hypotheses regarding the decline of boreal caribou are discussed along with how these factors may vary across Canada. The ability of any certification scheme to positively influence conservation of SAR thus lies at the intersection of those factors that can be influenced by the management actions of the certified company.

Forest management actions that influence conservation of caribou largely relate to habitat loss or change, and access (i.e., road building, reclamation and management). Accordingly, through their planning and operational practices, companies can cause both detriments to habitat suitability and facilitate the long-term habitat needs of caribou. To minimize the impact of their activities and contribute to caribou conservation, companies can limit the extent and distribution of habitat loss and influence habitat recovery through silviculture and other activities. The creation of roads is required by most industrial operators; thus, access development, management, and subsequent reclamation is another key area where forest companies must strive to minimize impact of their activities, collaborating with other industrial users where relevant. In many areas across boreal Canada where forestry is the predominant industry, forest companies have a heightened responsibility for road planning, because forestry roads provide access to new areas that lead to ensuing cumulative effects.

⁹ Dzus, E., J. Ray, I. Thompson, and C. Wedeles. 2010. Caribou and the National Boreal Standard: Report of the FSC Canada Science Panel. Report Prepared for FSC Canada. 71 p.

¹⁰ We note that the National Boreal Standard uses the term “well-managed” to refer to forests worthy of certification. Although different in syntax from the commonly used “sustainable forest management,” we infer that in principle there is little difference between the two terms.



Caribou conservation in many parts of Canada will require a focus on habitat and aspects of population management. In this document, an important distinction is made between two aspects of population management: monitoring, and manipulation. Monitoring is the measurement of various population metrics at regular intervals to track the state of selected populations. Manipulation is the more dynamic aspect of population management, encompassing activities intended to change the density and/or distribution of populations. Manipulation activities could include management of hunting by setting hunting seasons or quotas, predator control to regulate natural mortality, and importation of animals to establish or supplement populations. It is not within the mandate or management responsibility of forestry companies to engage directly in manipulative aspects of population management and it is normally beyond the realm of company activities to engage in monitoring as well. However, in some cases, depending on local circumstances (related to government capacity, co-management arrangements, etc.), companies could play a role in assisting in monitoring activities.

Depending on geographic location and the biota involved, the agency responsible for recovery planning is either the provincial, federal, or territorial government. In some jurisdictions, this involves co-management with aboriginal peoples. Government or co-management boards play a paramount role in providing strategic direction and incorporating socio-economic concerns on issues related to population management. Forest Company staff should participate with other specialists to build comprehensive recovery action plans, carry out practices with specificity to management responsibility, monitor results, and build adaptive management processes towards achieving stated objectives and agreed upon outcomes. Through their influence on the actions of a forestry company, certification systems can influence, but not guarantee, the ultimate success of SAR conservation. Forest management practices implemented to aid in caribou conservation should lead to overall improvements in forest stewardship and associated ecological and social benefits.