

# General Habitat Description for the Forest-dwelling Woodland Caribou (*Rangifer tarandus caribou*)

A general habitat description is a technical document that provides greater clarity on the area of habitat protected for a species based on the general habitat definition found in the Endangered Species Act, 2007. General habitat protection does not include an area where the species formerly occurred or has the potential to be reintroduced unless existing members of the species depend on that area to carry out their life processes. A general habitat description also indicates how the species' habitat has been categorized, as per the policy "Categorizing and Protecting Habitat Under the Endangered Species Act", and is based on the best scientific information available.

## HABITAT CATEGORIZATION

1	Nursery areas, winter use areas, travel corridors
2	Seasonal ranges
3	Remaining areas within the range

## Introduction

Woodland Caribou (Forest-dwelling boreal population) (*Rangifer tarandus caribou*) occur across northern Ontario, existing in a continuous distribution through much of their range.

Two ecotypes for this species are recognized in the Province, distinguished primarily by different predator avoidance behavioural strategies during calving and post-calving seasons (Bergerud 1996 and 2008). Forest-dwelling woodland caribou are generally found within the Ontario Shield Ecozone and James Bay Ecoregion (Crins et al.. 2009), are relatively sedentary and aggregate in relatively small groups (typically 10-50 animals) during the winter, with adult females isolating themselves during calving and post-calving seasons in the spring and summer to minimize the risk of predation. Forest-tundra woodland caribou generally inhabit the Northern Taiga and Hudson Bay Coast Ecoregions (Crins et al.. 2009), winter up to approximately 150km south of the Northern Taiga Ecoregion, and migrate long distances (i.e. over 2000 km) (Abraham et al.. 2012; Wilson 2013; Berglund et al.. 2013 in prep) from these areas to calve in large groups (often hundreds of animals) near the Hudson Bay coast (Abraham et al.. 2012)

The two ecotypes correspond to the Boreal Caribou (DU6) and Eastern Migratory (DU4) Designatable Units, respectively, as identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2011). It is recognized that some overlap between these ecotypes occurs at the interface of the Northern Taiga Ecoregion with the Big Trout Lake and James Bay Ecoregions during winter. Regular winter movements of forest-tundra individuals into the Big Trout Lake and James Bay Ecoregions from the north occur, and individuals exhibiting forest-dwelling characteristics have also occasionally made excursions north (Abraham *et al.* 2012; Wilson 2013; Berglund *et al.* 2013 *in prep*).

Woodland Caribou (Forest-dwelling boreal population) (*Rangifer tarandus caribou*) are listed as threatened on the Species at Risk in Ontario (SARO) List and receive both species and habitat protection under the *Endangered Species Act 2007*.

In this document, caribou refers to Woodland Caribou (Forest-dwelling boreal population) (*Rangifer tarandus caribou*).

### **Habitat at Multiple Scales**

Refuge from predation is regarded as the ultimate factor influencing caribou distribution and habitat use at multiple spatial and temporal scales (Bergerud 1974; Rettie and Messier 2000; Racey and Arsenault 2007; Environment Canada 2012). The primary threat to caribou persistence is habitat alteration from cumulative anthropogenic (e.g. natural resource extraction and development, roads) and natural disturbances (e.g. forest fire, blowdown etc.) and associated changes to predator/prey dynamics that have resulted in the overall long-term range recession for caribou in Canada (Bergerud 1974; Kelsall 1984; Seip 1992; Thomas and Gray 2002; Vors *et al.* 2007; Wittmer *et al.* 2007; Basille *et al.* 2012). These predator/prey dynamics may be reflected in the number and distribution of predators or alternate prey species, the ability of caribou to isolate themselves from predators, their ability to detect and avoid predators and the factors influencing the efficiency of predator movement and hunting behaviour. In Ontario, the northward recession of caribou distribution has coincided with several phases of human settlement and resource development starting in the late 1800's (Racey and Armstrong 2000).

At the broad landscape scale, caribou require large, undisturbed areas of old or mature conifer upland forest and lowlands dominated by jack pine (*Pinus banksiana*) and/or black spruce (*Picea mariana*) (Brown *et al.* 2003; Ferguson and Elkie 2004a). These areas allow caribou to effectively separate themselves from higher densities of moose (*Alces alces*), white-tailed deer (*Odocoileus virginianus*), grey wolves (*Canis lupus*) and black bears (*Ursus americanus*) which tend to be associated with early successional, mixed or deciduous forest (Cumming and Beange 1996; Bowman *et al.* 2010). At smaller scales, caribou seasonally select specific habitat features and areas that support successful reproduction and calf-rearing, provide summer and/or winter forage, and/or facilitate movement between discrete areas of use.

The geographic area occupied by a group of caribou, subject to similar factors affecting their demography and used to satisfy their life history processes over a defined time frame is referred to as a population range (Environment Canada 2012). In Ontario, the continuous distribution of caribou is divided into a number of ranges (Land Information Ontario 2013a). These ranges are part of a continuous distribution and do not represent wholly discrete, spatially disjunct populations, as have been identified in other jurisdictions (Environment Canada 2012), particularly where there have been high levels of anthropogenic habitat fragmentation.

Caribou depend *directly* and *indirectly* on the entire range as habitat. The sum of all constituent sub-range habitat features (see Habitat Categorization) is required for caribou to carry out their life processes and for populations to persist for multiple generations. While the availability, amount, and distribution of these features shift spatially and temporally within the range due to natural and anthropogenic disturbance events and successional change, the primary ecological function of the range is the collective provision of effective refuge from predation (Rettie and Messier 2000; Racey and Arsenault 2007).

The use of disturbance thresholds has been identified as one method of assessing risk to caribou persistence at the range scale (Sorenson *et al.* 2008). In a meta-analysis using data from across Canada, Environment Canada (2008 and 2011) demonstrated a negative relationship between caribou recruitment, as measured by calf/cow ratios, and total disturbance (natural and anthropogenic) within a range. The probability of the stability or positive growth of a caribou population over 20 years is directly influenced by the amount of disturbance within that range. As the amount of disturbance increases, the likelihood of the population persisting decreases (Environment Canada 2011).

Ontario uses a similar approach to determine an overall risk to caribou and range condition for each range. First, the amount of disturbance and evidence of caribou population size and trend is assessed. This assessment is then combined with an evaluation of the amount and distribution of habitat in comparison with an estimated natural condition (Elkie *et al.* 2012). The methodology for this risk analysis and assessment of range condition is described in the *Integrated Assessment Protocol for Woodland Caribou Ranges in Ontario* (OMNR 2013a), and results are documented in an Integrated Range Assessment Report for each range. Risk analysis and assessment of range condition is one part of the Range Management Approach described in the *Range Management Policy in Support of Woodland Caribou Conservation and Recovery* (OMNR 2013b).

Ontario has adopted a Range Management Approach to conserve and recover caribou, with a focus on the management of cumulative disturbances. The Range Management Approach is intended to ensure caribou persistence through the management of caribou ranges, sub-range habitat features and a precautionary approach to land use and resource development decisions relative to the degree of risk to caribou and overall range condition. Thus, when considering the impact of potential activities on caribou habitat features described in the following section, consideration needs to be given to the overall range condition (OMNR 2013b).

Caribou are a wide-ranging species dispersed broadly across northern Ontario. Data sources that document caribou observations and distribution are constantly being updated. The collection of new caribou information in many parts of the Province is ongoing; and accordingly, the best and most current available information should be used when assessing the Habitat Categorization descriptions in this document.

## HABITAT CATEGORIZATION

Below describes the categorization of sub-range habitat features or areas within the range that constitute protected habitat of caribou, based on the best available information at this time. As a wide-ranging and long-lived species, caribou require a hierarchy of habitat at multiple spatial and temporal scales. Ultimately, the overall condition of the range determines caribou persistence (OMNR 2013a and 2013b).

Category 1 (red) identifies habitat features or areas anticipated to have the lowest tolerance to alteration before their function, or usefulness, in supporting caribou is compromised. Category 2 (orange) identifies habitat features or areas anticipated to have a moderate tolerance to alteration before their function is compromised. Category 3 (yellow) identifies habitat features or areas anticipated to have the highest tolerance to alteration before their function is compromised.

In general, this habitat categorization reflects that there is less flexibility or tolerance to alteration at the smaller spatial scales of caribou habitat within the range. All categories may have very low tolerance of widespread and systematic alteration if the overall function of the range is impaired.

### **Category 1**

High Use Areas are sub-range habitat features that currently exhibit repeated, intensive use by individuals or multiple caribou, and include Nursery Areas, Winter Use Areas and Travel Corridors (Racey and Arsenault 2007). Caribou typically exhibit some fidelity to these features over multiple years, with fidelity being higher in the spring and summer than the early and late winter (Bergerud 1990; Schaefer *et al.* 2000; Ferguson and Elkie 2004a). High Use Areas are important to caribou during reproduction and calf-rearing, winter foraging and seasonal movements within the range, and as such these features have a lower tolerance to alteration.

High Use Areas are generally associated with Seasonal Ranges (see Category 2) and as such are connected to other sub-range habitat features or areas within the range. While the underlying configuration of biophysical features such as lakes, islands, peatlands, eskers, and bedrock are static, larger landscape changes in the amount and distribution of mature conifer forest cover in a dynamic, boreal ecosystem determines the refuge value of these features for caribou.

### **Nursery Areas**

Nursery Areas are generalized features in which individual or multiple adult female caribou select during late parturition, give birth, and raise their calves during the spring, summer and early fall. Evidence of specific calving site locations may not be known for all Nursery Areas. These features are typically comprised of lakes and wetland complexes dominated by fens and bogs, particularly those interspersed with upland islands and peninsulas (Carr *et al.* 2011). At the broader landscape scale within the range, these areas are selected by caribou for refuge and security. Adult females tend to be more widely dispersed during the calving and post-calving season than other times of the year, making themselves and their calves rare in the midst from other prey species and predators (Bergerud and Page 1987; Ferguson and Elkie 2004a).

The early calving season tends to be characterized by low rates of travel, with female caribou making relatively swift movements the week before assumed parturition (>500 m [1.1 km/day]: Ferguson and Elkie 2004a). Adult females with calves exhibit comparatively low movement rates, and more clustered movements post-parturition in the early calving season (Ferguson and Elkie 2004a). In northwestern Ontario, peak calving activity is estimated to occur around June 1, with the calving season defined between May 7 and July 14 and post-calving season between July 15 and November 14 (Ferguson and Elkie 2004a). The start of the calving season for caribou in the Far North was estimated between May 1 and May 7, however the length of the decrease in movement varied considerably among animals, from a few days to more than two weeks (Wilson 2013; Berglund *et al.* 2013 in prep) suggesting similar calving seasons. Calves are particularly vulnerable to mortality during the first 50 days following birth, predominantly by predation (Pinard *et al.* 2012). By mid-summer calves become more mobile and females and calves shift behavior, possibly dispersing within the Nursery Area to reduce detection by predators (Ferguson and Elkie 2004a).

Ontario has delineated Nursery Areas based on animal observations from May 1 to September 15 (LIO 2013). This range of dates is consistent with the literature described above and is intended to avoid animal observations associated with the large movements of individual adult female caribou prior to calving and seasonal movements in the fall/early winter.

At the landscape scale, calving females appear to choose areas for overall high refuge value (i.e. from predators), and not necessarily for access to forage (Dyke and Manseau 2011; Pinard *et al.* 2012). However, within the nursery area caribou tend to select areas with relatively high abundance of groundcover vegetation, terrestrial lichens, lower shrub density and higher densities of mature conifer trees in both northeastern Ontario and northwestern Ontario (Lantin *et al.* 2003; Carr *et al.* 2011). Areas with more open upland forest cover afford some lateral cover for concealment, but may also allow adult females and calves to better detect predators and escape to water (Bergerud 1990).

Nursery Areas generally tend to be larger in the James Bay ecoregion, likely due to the more homogeneous lowland fen and bog complexes that dominate the landscape. Adult female caribou have less fidelity to exact calving locations here than on the Ontario Shield ecozone, but do tend to occupy the same general area (within 10-20km) year after year (Hazel and Taylor 2011; Wilson 2013; Berglund *et al.* 2013 in prep).

Adult female caribou show avoidance of suitable locations due to sensory disturbance from development or recreational activities when selecting nursery areas (Carr *et al.* 2007; Schaefer and Mahoney 2007; Vors *et al.* 2007; Vistnes and Nellemann 2008). Based on these studies Carr *et al.* (2011) suggested a critical threshold for parturient caribou of 10-15 km from disturbance. Currently, limited information exists on more precise estimates of caribou response to sensory disturbance at various intensities.

Caribou have lower reproductive rates than other deer species, maturing later (at 2 ½ years of age), and generally having only one calf per year. As such, caribou are less resilient in dealing with disturbances that may disrupt calving or nursery activities.

### **Winter Use Areas**

Winter Use Areas are generalized features associated with soil and forest cover conditions that provide abundant ground lichen (*Cladina* and *Cladonia* species) for winter forage, and tend to have lower average snow depths that may facilitate easier movement than in surrounding areas (Stardom 1975). Caribou aggregate in higher concentrations (6-50 per group) during the winter to take advantage of these features, which may allow individuals to minimize energy expenditure, forage more efficiently or minimize individual risk of predation (Stardom 1975).

Ground lichens are an important winter source of carbohydrates (Schaefer and Pruitt 1991), allowing caribou to meet energetic needs during the winter when more nutrient-rich summer forage is not available. Areas with high lichen abundance are generally lower in deciduous browse and consequently often support lower densities of alternate prey species and predators.

In the northern portions of the Ontario Shield ecozone, areas with open jack pine and/or black spruce greater than 40 years old, with abundant ground lichen is most often associated with shallow soils, deep coarse textured soils, or exposed bedrock with poor nutrients and moisture (Racey *et al.* 1999). In the claybelt region of northeastern Ontario and the James Bay ecoregion, black spruce (all ages) dominated peatlands provide arboreal lichens (*Usnea* species), sedges and ericaceous shrubs (Brown 2005). Eskers or morainal landforms that support ground lichens are less common in these areas.

Lichen availability is not limiting on most landscapes. However, those features that are habitually used by groups of caribou may provide a source of refuge from predators and forage that may not be found in abundance throughout the range. By late winter, wind swept areas or areas of more dense forest cover with lower snow depths may be selected more often depending on snow depth conditions within a particular year.

In the early winter season, approximately November 15 to January 20, caribou movement rates tend to be higher (2.5 km/ day) compared to other times of the year (Ferguson and Elkie 2004a). Caribou reduce movements and become more sedentary in the late winter season, approximately January 21 to March 5 (Ferguson and Elkie 2004a). The location and amount of area individual caribou use during the winter varies widely across Ontario, and individual fidelity to specific Winter Use Areas is generally less than for Nursery Areas (Cumming *et al.*. 1996; Ferguson and Elkie 2004a; Hazell and Taylor 2011).

Ontario has adopted the use of animal observations from December 1 to March 31 to inform the delineation of Winter Use Areas. When available, Winter Use Areas will be documented in Land Information Ontario (LIO 2013).

### **Travel Corridors**

Travel Corridors are generalized habitat features that caribou may use to move between Nursery Areas and Winter Use Areas. These features are widely variable and are less distinct than other High Use Areas. In some ranges, specific travel corridors may not be used or identified, and seasonal movements of caribou are generally subsumed within the larger Seasonal Ranges (see Category 2) and may cross remaining areas within the range (see Category 3). Where evidence of more discrete repeated use exists (e.g. telemetry), it can be used to delineate a Travel Corridor. Variation of travel corridor use between years may be due to changes in disturbance, snow cover depth and condition, ice freeze/thaw and temperature.

Caribou travel between Nursery Areas and Winter Use Areas is characterized by higher movement rates (1.8 and 2.5 km/day) during April and November/December, respectively, than at other times of the year (Ferguson and Elkie 2004b).

While lakes and rivers and associated landforms have been considered important for caribou movements in the spring and fall (Racey *et al.*. 1999), caribou may not be choosing to travel on waterways, such as chains of lakes and large rivers (Ferguson and Elkie 2004b). Saher and Smigelow (2004) showed that caribou traveled through areas that were less rugged and close to water, and were associated with mature conifer forest.

Ontario has adopted the use of animal movements observed during April and/or November to inform the delineation of Travel Corridors. When available, Travel Corridors will be documented in Land Information Ontario (LIO 2013).

### **Other Features or Areas**

Other features or areas that are habitually used by caribou may exist within a range, but may not be well known. For example, adult male caribou aggregate in the fall to compete for females during the rut (near October 15, based on Ferguson and Elkie 2004a). It is assumed these aggregations occur in more open habitats (e.g. open fens), but no specific "rutting areas" have yet been identified in Ontario and there is no indication whether these features are limiting.

## Category 2

Seasonal Ranges are large sub-range habitat features that encompass the majority of current caribou distribution during all seasons within the range. Caribou are generally not distributed evenly within Seasonal Ranges in any given year. Individual animals utilize the extent of these large features over multiple years to effectively space themselves out from threats that may change annually (e.g. anthropogenic disturbance, predators) and carry out all their life processes (Racey and Arsenault 2007). Consequently, these features tend to be much larger than the current, known annual home ranges of individual caribou currently occupying the range at any one point in time. Known caribou distribution within a range is generally based on observations and GPS collar tracking of relatively few adult females. Wide variability in movement patterns of caribou derived from this type of data have been attributed to local environmental conditions and individual differences over time (Avgar *et al.* 2013).

Caribou tend to select large (>100 km<sup>2</sup>), interconnected tracts of mature (>40-60 years), conifer dominated (jack pine and/or black spruce), low shrub forest cover composition that are relatively undisturbed and unfragmented and are interspersed with wetlands and lakes within the range. These areas generally do not support high densities of moose and white-tailed deer, and thus provide refuge from wolves and black bears. High Use areas are typically nested within these Seasonal Ranges, and are dependent on the refuge function provided at this larger spatial scale. Seasonal Ranges have a moderate tolerance to alteration.

The conifer forest cover composition and associated attributes that support the refuge function at this scale is most often associated with lower productivity and shallow soils in upland areas (or richer soils with long term conifer occupancy), and swamp, bog and fen complexes in lowland areas. More aggressive fire regimes in the western portion of the Ontario Shield ecozone generally result in the shorter renewal of forest cover by fire than in the east. Less change is observed in the black spruce wetland complexes in the claybelt region of northeastern Ontario and the James Bay ecoregion.

Caribou typically occupy different portions of Seasonal Ranges at different times of the year, and some variability in habitat selection is observable across the Province. Despite differences in methodologies, most analyses of home range size and seasonal movements of boreal caribou identify 4-6 distinct seasons. These seasons are based on changes in movement patterns and behavioural changes (Brown *et al.* 2003; Ferguson and Elkie 2004a; Hazell and Taylor 2011; Basille *et al.* 2012) and generally divide the year into a summer calving and post-calving season, a late winter season where caribou were more sedentary, and spring and early winter seasons where caribou made much larger and directional movements.

In the northern portions of the Ontario Shield ecozone, caribou have smaller home ranges than in other parts of the Province. Average home range size has been estimated at 1148 km<sup>2</sup> (Shuter and Rodgers 2011), with caribou moving an average of 37.2 km between areas of summer and winter distribution (Shuter 2010). In the portion of the Ontario Shield ecozone in northeastern Ontario, home range sizes varied from 3000 to 5000 km<sup>2</sup>, with caribou travelling 34-53 km average distances between seasons (Brown 2005). Caribou in the James Bay ecoregion have large home-ranges (15000 to 75000 km<sup>2</sup>) and move large distances between summer and winter ranges (31 km to 384 km: Hazell and Taylor 2011).

These differences appear to be reflective how caribou use different landscapes within the Province. Maintaining the function of seasonal ranges may mean considering larger tracts for Seasonal Ranges in the James Bay ecoregion and the portion of the Ontario Shield ecozone in northeastern Ontario. These regions are dominated by black spruce lowlands with a much less aggressive fire regime than upland areas in the boreal shield.

### Category 3

The remaining areas within the range support caribou indirectly by maintaining the overall refuge function within the range. Category 3 areas generally have the biophysical features and forest composition consistent with seasonal ranges, yet are currently young or disturbed (< 40 years old). These areas are generally not currently occupied for long periods of time, however caribou may travel through them. In an early-successional state, these areas generally do not support high densities of alternate prey and predators for long periods if the forest cover composition is dominated by jack pine and black spruce and the area is not fragmented by roads or other disturbance.

Based on the ecological processes within a natural disturbance driven boreal forest landscape with which caribou have evolved, it is predicted that the biophysical features typical of High Use Areas that are nested in these younger disturbed areas will become used when forest cover matures and connectivity with other currently occupied seasonal ranges is restored within the range.

These areas have a higher tolerance to alteration when compared to other, currently occupied sub-range habitat features. However, permanent or long term anthropogenic disturbances such as large linear corridors and other disturbances that fragment or alter forest cover composition, will diminish their future function. The future provision of seasonal ranges (with nested potential high use areas) is critical to long-term caribou persistence within a range.

The remaining areas within the range that have the highest tolerance to alteration within the range do not have the biophysical features and forest composition consistent with Seasonal Ranges (i.e. tracts of high productivity soils that are shrub rich and deciduous dominated forest composition). Caribou typically avoid these areas due to increased risk of predation. While these areas may already support higher densities of alternate prey and predators, additional anthropogenic disturbances that lead to further increases of these species may exacerbate predation risk to caribou in adjacent areas.

The apparent current absence of caribou in these areas is expected, and it is important that these areas be considered and managed as part of the broader landscape within the range.

#### Activities in Caribou habitat

Activities in general protected habitat can continue as long as the *function of these features or areas for caribou is maintained, and individuals of the species are not killed, harmed, or harassed.*

In addition to the habitat categorization of sub-range habitat features, OMNR assesses the potential for activities to impact the function of sub-range habitat features by considering the risk to caribou and range condition (i.e. sufficient, uncertain, or insufficient to sustain caribou as described in OMNR 2013b) for each range or range(s) that the development activity is occurring in. Direction on this assessment is found in the following supporting policy documents:

- Range Management Policy in Support of Woodland Caribou Conservation and Recovery (OMNR 2013b)
- Guidance for Assessing Impacts of Activities on Woodland Caribou and Their Habitat (OMNR 2013c)
- Categorizing and Protecting Habitat under the Endangered Species Act, 2007 (OMNR 2012a).
- Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits (OMNR 2012b)

The *Range Management Policy in Support of Woodland Caribou Conservation and Recovery* (OMNR 2013b) describes the Range Management Approach, including the decision making process for managing range condition to sustain caribou.

In general, ranges that are sufficient to sustain caribou have lower amounts of disturbance, an amount and distribution of habitat that is consistent with the estimated natural condition for the particular range, and a stable or increasing population trend. There is space available within the range for caribou to carry out their life processes and for populations to persist for multiple generations. As such, there may be greater flexibility for development activities to occur in these ranges overall. For some development activities, minimizing impacts to caribou and caribou habitat may be sufficient to avoid impacting overall population persistence. However, authorization under the ESA may still be required when there are residual adverse effects on individual caribou or sub-range habitat features.

Conversely, ranges that are insufficient or uncertain to sustain caribou generally have higher amounts of disturbance, an amount and distribution of habitat that is inconsistent with the estimated natural condition for the particular range, and a declining population trend. Sub-range habitat features in these ranges are in more limited supply, caribou may be at higher risk to predation within the range due to fragmentation or loss of connectivity between these features, and the function of refuge within the range is diminished overall. The potential future function of a large tract of a recently burned or disturbed (<40 years old) area (Category 3), may be critically important to the future refuge function of the range and just as significant as protecting other, currently occupied features (Categories 1 and 2). As such, there may be less flexibility for development activities to occur in these ranges overall.

*Generally compatible:*

- Development activities that do not increase the cumulative disturbance and loss of habitat within a range, and do not negatively affect range condition
- Development activities that do not fragment, alter conifer forest cover, or alter the biophysical features in High Use Areas (Category 1) and Seasonal Ranges (Category 2), and do not reduce the current refuge value of these currently occupied areas
- Development activities that do not fragment, alter conifer forest cover, or alter biophysical features in the remaining areas within the range (Category 3), and do not reduce the current and future refuge value of these currently unoccupied areas
- Development and recreational activities that do not result in sensory disturbance within 10km of High Use Areas (Category 1), potentially displacing caribou during sensitive periods:
  - Nursery Areas (May 1 to July 14 - very low tolerance, July 15 to September 15 - low tolerance)
  - Winter Use Areas (December 1 to March 31)
  - Travel Corridors (April and/or November)

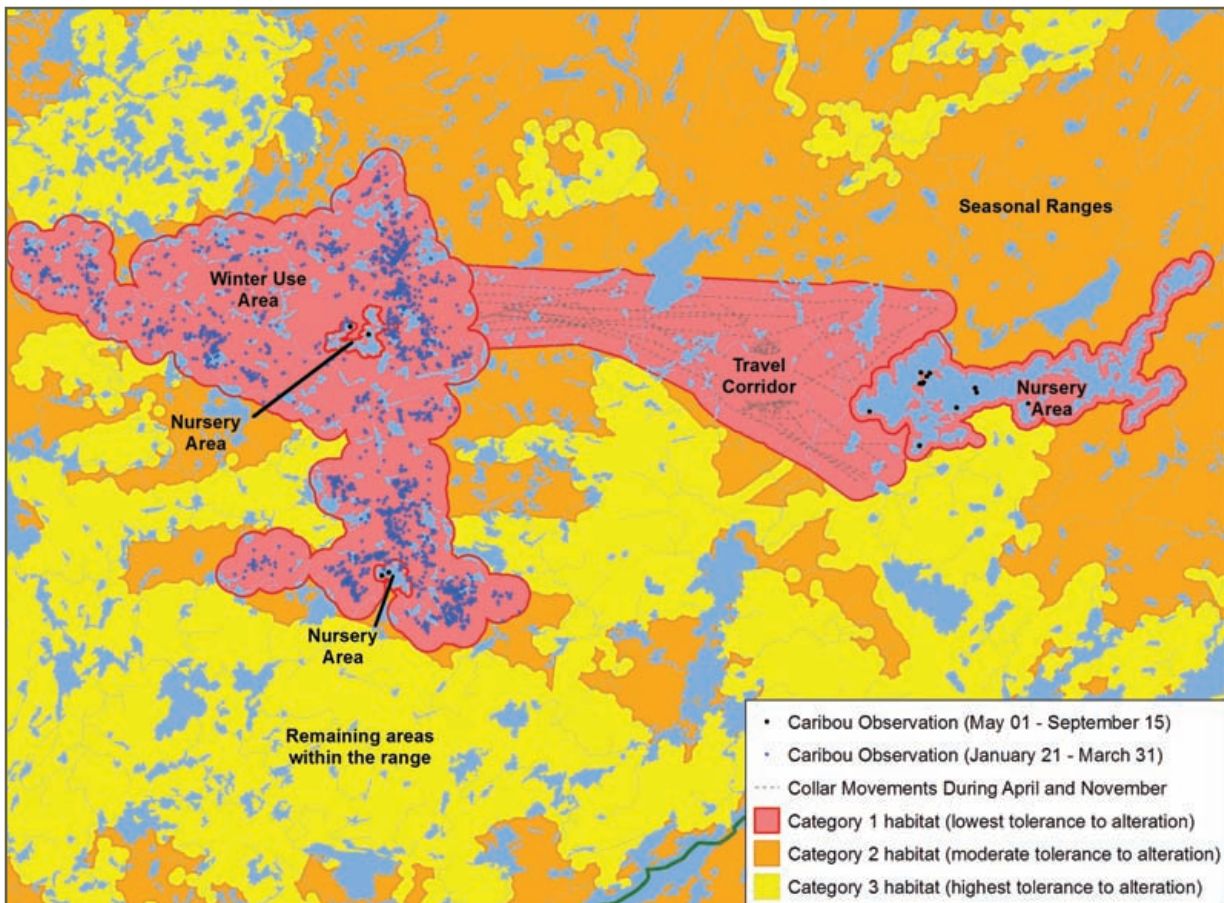
*Generally not compatible\*:*

- Development activities that increase the cumulative disturbance and loss of habitat within a range, and negatively affect range condition
- Development activities that fragment, alter conifer forest cover, or alter the biophysical features in High Use Areas (Category 1) and Seasonal Ranges (Category 2), and increase the potential for higher alternate prey densities and predator efficiency, reduce access to forage, or otherwise reduce the current refuge value of these currently occupied areas
- Development activities that fragment, alter conifer forest cover, or alter the biophysical features in the remaining areas within the range (Category 3), and reduce the current and future refuge value of these currently unoccupied areas

- Development activities that fragment, alter conifer forest cover, or alter the biophysical features in Seasonal Ranges (Category 2), and increase the potential for disrupting caribou movements
- Development or recreational activities that result in sensory disturbance within 10km of High Use Areas (Category 1), potentially displacing caribou during sensitive periods:
  - Nursery Areas (May 1 to July 14 - very low tolerance, July 15 to September 15 - low tolerance)
  - Winter Use Areas (December 1 to March 31)
  - Travel Corridors (April and/or November)

\* If you are considering an activity that may not be compatible with general habitat, please contact your local MNR office for more information.

### Sample application of the general habitat protection for Caribou



## Additional Resources

### **Range Boundaries:**

Land Information Ontario (LIO). 2013. Caribou Range Boundary. *Ontario Ministry of Natural Resources, Peterborough, Ontario*. Available from: <https://www.appliometadata.lrc.gov.on.ca/geonetwork/srv/en/main.home?uuid=b50e1f7d-4c39-49e8-afa3-fc4fdadbea55>

### **Caribou Observations and Occurrences:**

For access to caribou observation and occurrence data maintained by OMNR, contact Information Access Section (email: LIO@ontario.ca; phone: 705-755-1878) for information required when requesting the following caribou data:

LIO. 2013. Species Observation, Provincially Tracked. *Ontario Ministry of Natural Resources, Peterborough, Ontario*. Available from: <https://www.appliometadata.lrc.gov.on.ca/geonetwork/srv/en/main.home?uuid=134b7992-cef7-4780-93ce-04e82b2c16a6>

LIO. 2013. Species Occurrence, Locally Derived. *Ontario Ministry of Natural Resources, Peterborough, Ontario*. Available from: <https://www.appliometadata.lrc.gov.on.ca/geonetwork/srv/en/main.home?uuid=2ce6b85a-bdb1-4a58-9a11-bd062a07f193>

LIO. 2013. Species Search Area. *Ontario Ministry of Natural Resources, Peterborough, Ontario*. Available from: <https://www.appliometadata.lrc.gov.on.ca/geonetwork/srv/en/main.home?uuid=fe1c5a63-4b68-4564-bff9-34992a7e4764>

### **Caribou Survey Methodology:**

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