



## Canada's woodland caribou: Industrial disturbances in their ranges and implications for their survival

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The endangered woodland caribou are an archetypal species inhabiting Canada's boreal forest.

*"Caribou require a great deal of space to survive, but the clearing of land for one development project after another, combined with the building of roads and other means of access for resource exploration, are bringing about profound changes to their habitat. ... During the past century, caribou have vanished from at least 40 percent of their southern range. They are no longer found in Montana, Minnesota, Wisconsin, Michigan, Vermont, New Hampshire, Maine, Nova Scotia, Prince Edward Island or New Brunswick. Many populations are currently in decline, some by as much as 85 percent over the past 10 years alone .... Sadly, the wild lands that support caribou are up for grabs. The epicenter of their range is in the vast hydrocarbon-rich reaches of western Canada and Alaska, where millions of barrels of oil await extraction for markets in North America and Asia."*<sup>1</sup>

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<sup>1</sup> Justina C. Ray. New York Times Editorial. December 23 2011. Reindeer Are Fading Into Holiday Myth. Retrieved December 23, 2011 from: [http://www.nytimes.com/2011/12/24/opinion/reindeer-are-fading-into-holiday-myth.html?\\_r=2&hp](http://www.nytimes.com/2011/12/24/opinion/reindeer-are-fading-into-holiday-myth.html?_r=2&hp)

## What is the purpose of this bulletin?

The purpose of this bulletin is to analyze the amount of industrial disturbances within woodland caribou herd ranges in Canada's jurisdictions in order to:

- Provide the results of this analysis as evidence to the Canadian government's (Environment Canada) public review of its woodland caribou recovery strategy,<sup>2</sup> using the Canadian government's own science assessment<sup>3</sup> and data,<sup>4</sup> and;
- Investigate the evidence that documents the depth of concern of the health of woodland caribou in Canada's bitumen sands region that was expressed in a newly-released (December 20 2011)<sup>5</sup> "secret", internal-only presentation (prepared May 2011 by the Canadian Government [Environment Canada]).<sup>6</sup>

## What is the status and distribution of woodland caribou?

The woodland caribou (*Rangifer tarandus caribou*), boreal population, was assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Threatened, and added to Schedule 1 of the *Species at Risk Act* (SARA) in 2003. The listing decision was made on the basis of an "observed, estimated, inferred or suspected population size reduction of  $\geq 30\%$  over three generations". Evidence of continued declines exists for many regions of Canada and has been well-documented in a number of closely-monitored populations since the 2002 COSEWIC assessment.

In the Government of Canada's 2011 science assessment, of the 57 identified boreal caribou ranges in Canada, 17 (30%) were assessed in the "self-sustaining" category, 7 (12%) in the "not self-sustaining/self-sustaining" category, and 33 (58%) in the "not self-sustaining" category. These designations were refined to five likelihood categories ranging from very likely (SS) to very unlikely (NSS) with respect to the probability that current conditions would support a self-sustaining boreal caribou population (see map on following page).

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<sup>2</sup> Environment Canada. 2011. Recovery Strategy for the Woodland Caribou, Boreal population (*Rangifer tarandus caribou*) in Canada [Proposed]. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. vi + 55 pp.

<sup>3</sup> 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.

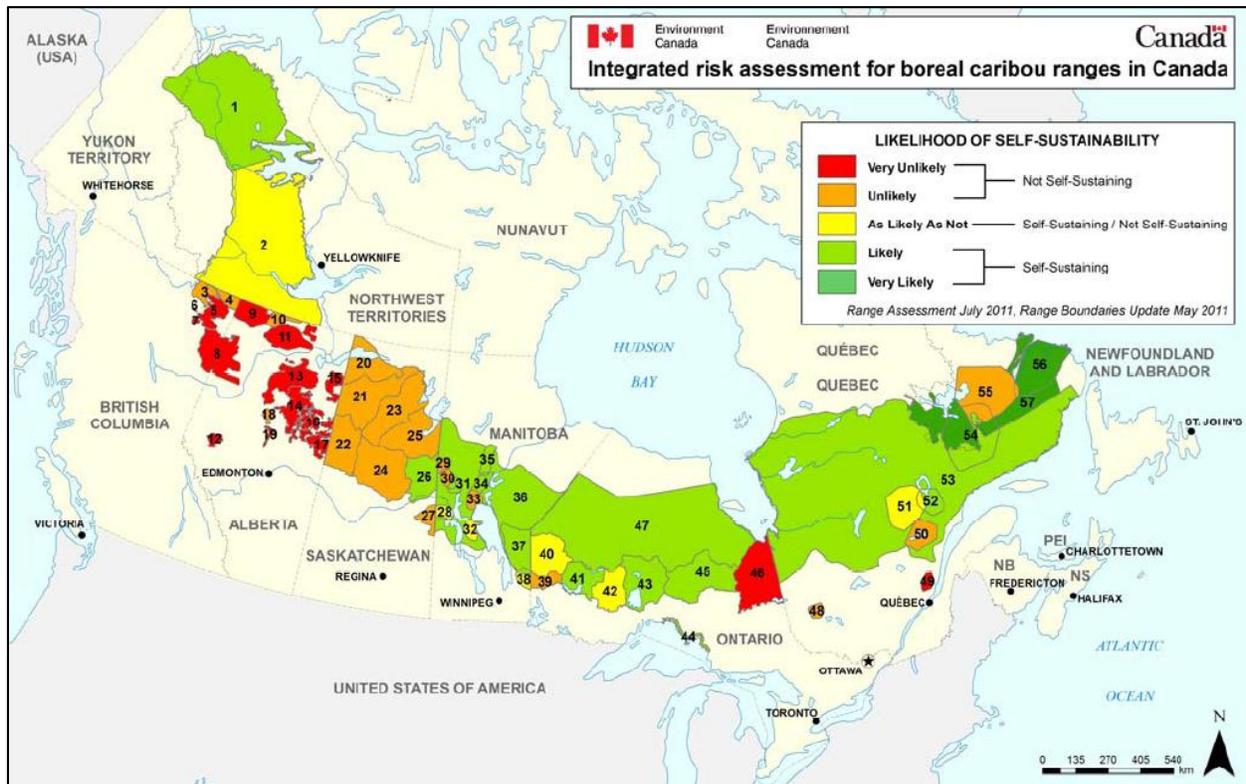
<sup>4</sup> Government of Canada. 2011. Anthropogenic disturbance footprint within boreal caribou ranges across Canada - As interpreted from 2008-2010 Landsat satellite imagery. Retrieved December 21 2011 from:

<http://www.data.gc.ca/default.asp?lang=En&n=5175A6F0-1&xsl=datacataloguerecord&metaxsl=datacataloguerecord&formid=F34DCB32-4845-4E88-B125-5AC03C6E4A7F,%20F34DCB32-4845-4E88-B125-5AC03C6E4A7F>

<sup>5</sup> Mike DeSouza. December 20 2011. 'Secret' Environment Canada presentation warns of oilsands' impact on habitat. Postmedia News. Retrieved December 28 2011 from: <http://www.canada.com/technology/Secret+Environment+Canada+presentation+warns+oilsands+impact+habitat/5894992/story.html>

<sup>6</sup> Government of Canada. May 2011. Environment Canada and the Oil Sands. Secret Presentation. Retrieved December 20 2011 from: <http://www.scribd.com/doc/76259666/Oilsands-Pollution>

Boreal caribou are distributed across Canada throughout seven provinces and two territories, extending from the northeast corner of Yukon Territory east to Labrador and south to Lake Superior.



## What are the threats to the survival of woodland caribou?

There are a variety of threats that directly and/or indirectly affect local populations of boreal caribou and their habitat. The primary threats are:

- Habitat alteration (loss, degradation or fragmentation) as a result of human land-use activities;
- Increased predation resulting from human-caused habitat alterations.

In the Government of Canada's science assessment, total disturbances explained 69% of the variation in calf recruitment based on the percent total disturbance (fire + 500 m buffered human-caused disturbance). Most of the negative effects of disturbance were attributed to human causes (60% in isolation), while only 5% of the variation in recruitment could be attributed to fire alone. Nevertheless, their combined influence was greater than the sum of their individual contributions.

Also, the Government of Canada's science assessment determined that the amount of undisturbed (human-caused plus fire) habitat required for a herd to be likely self-sustaining is 80% (i.e., the amount of undisturbed habitat required for a herd to likely as not be self-sustaining is 60%).

## Industrial disturbances in woodland caribou (boreal population) ranges in Canada's jurisdictions

Canada's current woodland caribou (boreal population) ranges total approximately 2.5 M km<sup>2</sup> or 25% of Canada. More than 50% of Labrador and Ontario contain woodland caribou ranges.

The overall average industrial disturbance in woodland caribou (boreal population) ranges in all jurisdictions is 13.6% (Table 1, Map 1). (Note: These are disturbances buffered by 500 m.)

Nine of Canada's 12 jurisdictions contain populations of woodland caribou (boreal population) (see table below and map on previous page) and caribou ranges comprise 32.4% of those jurisdictions.

Industrial disturbances are substantially greater in those caribou ranges in British Columbia and Alberta (73.4% and 53.7% respectively) than those in other jurisdictions where the average industrial disturbances is only 8.4% (see Maps 1 and 2). The vast majority of the industrial disturbances in these two jurisdictions is caused by the oil and gas industry. The vast majority of industrial disturbances in the other jurisdictions is caused by industrial logging and associated road building. (Note: These are disturbances buffered by 500 m.)

The overall industrial and fire disturbances are 32.9% of all ranges across Canada, with Saskatchewan having the highest percent of their ranges burned. However, industrial and fire disturbances combined are substantially greater in those caribou ranges in British Columbia and Alberta (74.2% and 70.1% respectively) than those in other jurisdictions (Map 3).

Table 1. Industrial disturbances in woodland caribou (boreal population) herd ranges in Canada's jurisdictions.

Jurisdiction	Area (sq km)	Caribou Ranges	Caribou Ranges as % of Jurisdiction	Industrial Disturbances (buffered by 500 m) (sq km)	Industrial Disturbances as % of Caribou Ranges	Industrial (buffered by 500 m) + Fire Disturbances	Industrial (Buffered by 500 m) + Fire Disturbances as % of Caribou Ranges
Alberta	663,197	132,120	19.9	70,906	53.7	92,591	70.1
British Columbia	949,110	39,161	4.1	28,743	73.4	29,076	74.2
Manitoba	649,631	211,433	32.5	19,701	9.3	64,614	30.6
Newfoundland and Labrador	409,836	186,488	45.5	3,775	2.0	13,232	7.1
Labrador	294,330	186,488	63.4	3,775	2.0	13,232	7.1
Northwest Territories	1,349,889	426,338	31.6	34,088	8.0	130,699	30.7
Ontario	986,662	497,386	50.4	58,805	11.8	117,055	23.5
Quebec	1,509,850	698,607	46.3	94,931	13.6	222,194	31.8
Saskatchewan	652,392	279,130	42.8	24,683	8.8	144,464	51.8
Yukon	483,868	9,180	1.9	502	5.5	2,659	29.0
<b>TOTAL/ PERCENT</b>	<b>7,654,435</b>	<b>2,479,843</b>	<b>32.4</b>	<b>336,134</b>	<b>13.6</b>	<b>816,584</b>	<b>32.9</b>

## **What is contained in the Government of Canada’s “secret” bitumen sands presentation (prepared May 2011 by Environment Canada) that is relevant to caribou?**

The bitumen sands presentation prepared in May 2011 and stamped “secret” by the government, was released December 20 2011 by Mike DeSouza of Postmedia News after he received the documents following a legal access to information request. The sections from that presentation relevant to woodland caribou include:

- "Oil sands development will continue to put pressure on vulnerable species (e.g. Woodland Caribou)" (Slide 10)
- "Removal of landscape features for mining reduces available habitat." (Slide 10)
- "Habitat alteration – pipelines, survey “cut lines”, reclaimed land – can make habitat less suitable for forest species” (Slide 10)
- “Beyond habitat issues, oil sands pollutants in the ecosystem could harm wildlife” (Slide 10)
- "Recent studies suggest elevated levels of pollutants near mining sites including hydrocarbons and heavy metals . . . (It) raises questions about possible effects on health of wildlife and downstream communities.” (Slide 7)

## **Industrial disturbances in woodland caribou (boreal population) ranges in Alberta’s bitumen sands region**

Alberta’s bitumen sands region contains eight woodland caribou (boreal population) ranges (Map 4). Most of these ranges that are within the bitumen sands administration area are underlain by bitumen leases, which are tenured concessions to the oil and gas industry for bitumen developments (Map 5). Of the 55,552 km<sup>2</sup> caribou ranges within the bitumen sands area, 45,949 km<sup>2</sup> (82.7%) have been leased to the oil and gas industry. In fact, one-half (50.5%) of the bitumen leases are within caribou ranges.

The woodland caribou ranges within the bitumen sands area have extraordinarily high concentrations of industrial disturbances (see Table 2 and Map 6).

The amount of industrial disturbances in the woodland caribou (boreal population) herd ranges within Alberta’s bitumen sands area is 35,442 km or 63.8% of the ranges in this region. This compares to a Canada-wide average of 13.6% within the caribou ranges. (Note: These are disturbances buffered by 500 m.)

Those caribou ranges that are substantially within (>75%) the bitumen sands region and their concentration of industrial disturbances and industrial plus fire disturbances (Table 3 and Map 7) include (Note: These are disturbances buffered by 500 m.):

- West Side Athabasca River – 69.3% industrially disturbed; 70.5% industrial plus fire disturbed;

- East Side Athabasca River – 82.8% industrially disturbed: 86.8% industrial plus fire disturbed;
- Cold Lake – 78.7% industrially disturbed: 85.0% industrial plus fire disturbed;
- Red Earth – 50.7% industrially disturbed: 71.4% industrial plus fire disturbed.

Table 2. Industrial disturbances in woodland caribou (boreal population herd ranges in Alberta's bitumen sands region.

	Area of Caribou Ranges (sq km)	Area of Caribou Ranges in Bitumen Sands (sq km)	Caribou Ranges in Bitumen Sands as % of Occurrence	Industrial Disturbances (buffered by 500 m) in Caribou Ranges (sq km)	Industrial Disturbances as % of Caribou Ranges	Industrial Disturbances (buffered by 500 m) in Caribou Ranges in Bitumen Sands (sq km)	Industrial Disturbances as % of Caribou Ranges in Bitumen Sands
Chinchaga	30,750	300	1.0	23,524	76.5	132	44.0
Richardson	6,874	4,104	59.7	1,583	23.0	1,388	33.8
Slave Lake	1,486	0	0.0	961	64.7	0	10.0
Nipisi	2,057	515	25.0	1,381	67.1	297	57.7
Red Earth	24,051	18,721	77.8	10,966	45.6	9,493	50.7
Cold Lake	6,574	5,488	83.5	4,828	73.4	4,319	78.7
East Side Athabasca River	12,838	11,101	86.5	10,163	79.2	9,192	82.8
West Side Athabasca River	15,322	15,322	100.0	10,621	69.3	10,621	69.3
<b>TOTAL/PERCENT</b>	<b>99,952</b>	<b>55,551</b>	<b>55.6</b>	<b>64,027</b>	<b>64.1</b>	<b>35,442</b>	<b>63.8</b>

Table 3. Industrial and fire disturbances in woodland caribou (boreal population herd ranges in Alberta's bitumen sands region.

Caribou Herd	Area of Caribou Ranges (sq km)	Area of Caribou Ranges in Oil Sands (sq km)	Caribou Ranges in Oil Sands as % of Ranges	Industrial (buffered by 500 m) + Fire Disturbances in Caribou Ranges in Oil Sands	Industrial + Fire Disturbances as % of Caribou Ranges in Oil Sands
Chinchaga	30,750	300	1.0	132	44.0
Richardson	6,874	4,104	59.7	3,010	73.3
Slave Lake	1,486	0	0.0	0	10.0
Nipisi	2,057	515	25.0	298	57.9
Red Earth	24,051	18,721	77.8	13,373	71.4
Cold Lake	6,574	5,488	83.5	4,665	85.0
East Side Athabasca River	12,838	11,101	86.5	9,635	86.8
West Side Athabasca River	15,322	15,322	100.0	10,803	70.5
<b>TOTAL/PERCENT</b>	<b>99,952</b>	<b>55,551</b>	<b>55.6</b>	<b>41,916</b>	<b>75.5</b>

## **Implications of industrial developments and, in particular Alberta's bitumen sands developments, to woodland caribou**

Industrial developments within Canada's woodland caribou herd ranges and, in particular Alberta's bitumen sands developments, create several negative implications for the long term health and survival of woodland caribou.

Two provinces in particular – British Columbia and Alberta – have levels of habitat undisturbed by industrial activity within woodland caribou (boreal population) herd ranges (26.6% and 44.3% respectively) that are far less than the 80% level of combined disturbances (industrial and fire) for caribou ranges as generally determined by the Government of Canada's science assessment to result in caribou herds likely to be self-sustaining (i.e., 60% undisturbed results in caribou herds as likely to be self-sustaining as not to be self-sustaining). The vast majority of the disturbances in the herd ranges of these two provinces were caused by the oil and gas industry.

The total amount of habitat undisturbed by industrial and fire disturbances in the woodland caribou (boreal population) ranges within British Columbia and Alberta is less, at 25.8% and 29.9% respectively. Similarly, when the amount of fire disturbances is combined with industrial disturbances, Saskatchewan, at 48.2% undisturbed) also has less than the 80% threshold.

The epicenter of the range of North America's woodland caribou (boreal population) is in the vast hydrocarbon-rich reaches of western Canada and Alaska, where millions of barrels of oil are presently being extracted especially for markets in North America.

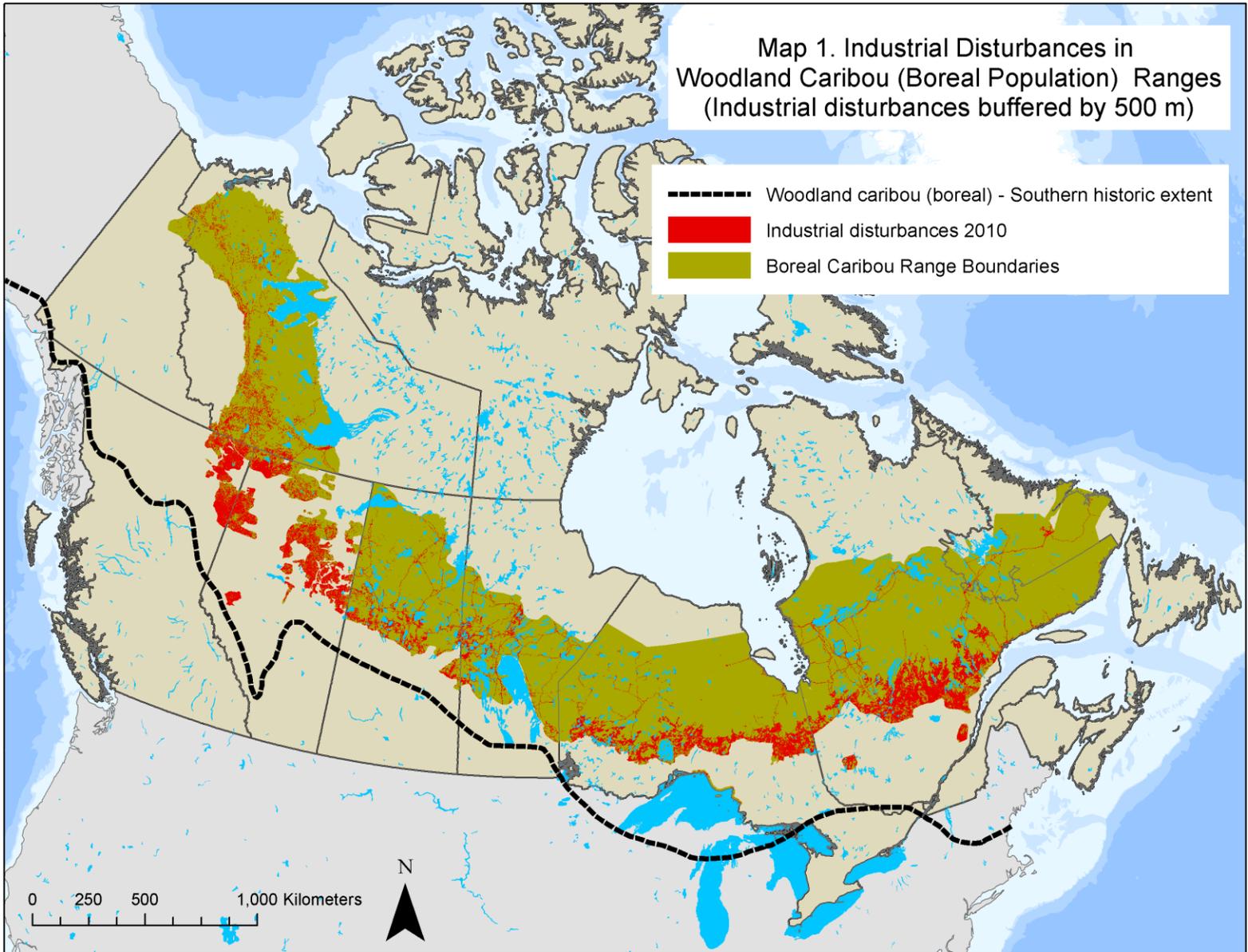
Alberta's bitumen sands industrial developments represent one of the largest energy projects in the world. These are projects on a huge scale, and are increasing rapidly. These developments are within or contain the ranges of eight woodland caribou herds. The Government of Canada has already determined that these eight herds are in trouble, as follows:

- Chichaga – Population trend declining and not self-sustaining;
- Richardson – Population trend unknown and not self-sustaining;
- Slave Lake – Population trend unknown and not-self-sustaining;
- Nipisi – Population trend unknown and not-self-sustaining;
- Red Earth – Population trend declining and not-self-sustaining;
- Cold Lake – Population trend declining and not-self-sustaining;
- East Side Athabasca River – Population trend declining and not-self-sustaining;
- West Side Athabasca River – Population trend declining and not-self-sustaining.

Using Government of Canada recently-released data, our study shows that these eight herds have experienced almost 5 times the amount of industrial disturbances as all woodland caribou (boreal population) herds across Canada (63.8% for the herds in the bitumen sands area versus 13.6% for all herds across Canada). (Note: These are disturbances buffered by 500 m.)

This raises the issue of the enormous extent to which these bitumen developments already are a significant threat to the survival of woodland caribou in that area.

Considering the endangered status of woodland caribou and its central place in Canadian conservation, it is imperative that adequate information about the conservation needs of woodland caribou are dealt with explicitly in land use plans and environmental impact assessments and that decisions regarding any further additional industrial developments in herd ranges that have already experienced significant industrial disturbances be made in consideration of their threatened legal status and the most recent science.



Map 2. Levels of Industrial Disturbances in Woodland Caribou (Boreal population) Ranges

