8. Page 96-102, SIR Response 35 and Page 123-129, SIR Response 42

a. Revise the LSA and reassess the potential impacts to wildlife (question and response 35) and caribou (question and response 42), ensuring the new LSA is sufficient to circumscribe all project-related impacts including; but, not limited to all exploration (past, present and future) and monitoring wells. Clearly respond to each request posed in the related SIR2 questions restated below:

SIR2 Response 35 Question: CNRL's terrestrial LSA was "defined as a smoothed 500 m buffer around infrastructure directly associated with the Project footprint". CNRL has not included the full areal extent of exploration or monitoring footprint within the chosen LSA.

b. Discuss all areas of impact that may not have been adequately considered due to the limited areal extent of chosen LSA (e.g. seismic, observation wells).

c. Provide a map depicting the extent of exploration conducted in support of the project, to date, in contrast to the LSA. If the areal extent of exploration undertaken in support of the project is not circumscribed by the boundary of the LSA, adjust the LSA and refine the impact predictions presented. Ensure the LSA is appropriately sized to consider any other areas of impact noted in the response to a. and any future disturbance as described in c.

d. Provide an estimate of the extent of seismic and exploration expected to be undertaken in support of project development and operations. Separate 3D and 4D seismic and identify the likely spacing, periodicity and areal and temporal extent. Ensure the LSA is appropriately sized to assess the full extent of the additional disturbance. Provide an assessment of the impact on terrestrial resources. Ensure all areas identified in the response to a. are considered in the revised assessment (e.g. observation wells).

SIR2 Response 42 Questions a., b., c., and d. CNRL was requested for information required to understand how the proposed Project will affect undisturbed boreal caribou habitat. In order to clearly describe the influence of the Project on boreal caribou habitat, provide the following:

e. A description and map of a modified local study area (LSA) the boundary of which circumscribes all project-related disturbance including past and expected exploration and monitoring (4D seismic and/or monitoring/observation wells) footprint. Identify all disturbance and draw the 500 metre buffer.

f. Summary tables depicting/describing the baseline disturbance in the revised LSA including existing exploration footprint.

g. Map and summary tables depicting/describing the project disturbance in the revised LSA including expected/estimated exploration and monitoring (4D seismic and/or monitoring wells) footprint. Identify all disturbances and draw the 500 metre buffer. Highlight areas of project-related reduction of caribou habitat. Provide a discussion.

h. A quantitative assessment and discussion of any reduction in the remaining 15% of undisturbed Cold Lake herd caribou habitat. Ensure <u>all</u> project-related disturbance has been considered in the assessment including past, present and future exploration and monitoring disturbance (e.g., observation wells).

Response:

a.

Revised Study Area Boundary and Assessment Approach

The LSA has been revised using a smoothed buffer of at least 500 m around the lease area or disturbances that are related to the Project (Figure 8-1). This revised study area encapsulates:

- Project footprint;
- All Project-related seismic (baseline [1997 to 2010], 2012/2013 program and forecasted);
- Seven observation wells (discussed in responses to Round 1 SIR 19, Round 2 ESRD SIR 19 and Round 3 ESRD SIR 5);
- All Project-related oil sands exploration (OSE) wells; and
- Access for Project-related seismic, observation wells and OSE wells.

The southern boundary of the revised study area does not cross the northern boundary of the Cold Lake Air Weapons Range (CLAWR) for the following reasons:

- Canadian Natural's oil sands leases associated with the Project do not extend into the northern boundary of the CLAWR;
- It has been Canadian Natural's experience that generally, the Department of National Defence, through Range Control, does not support industrial activities on the CLAWR if they are required for developments situated off the CLAWR.

480000
500000
6160000
6140000

East Side Athabasca Caribou Range
Cold Lake Caribou Range

Tp.76 Rg.10 W4M
Tp.76 Rg.9 W4M
Tp.76 Rg.8 W4M
Tp.76 Rg.7 W4M
Tp.76 Rg.6 W4M
Tp.75 Rg.10 W4M
Tp.75 Rg.9 W4M
Tp.75 Rg.8 W4M
Tp.75 Rg.7 W4M
Tp.75 Rg.6 W4M
Tp.74 Rg.10 W4M
Tp.74 Rg.9 W4M
Tp.74 Rg.8 W4M
Tp.74 Rg.7 W4M
Tp.74 Rg.6 W4M
Tp.73 Rg.10 W4M
Tp.73 Rg.9 W4M
Tp.73 Rg.8 W4M
Tp.73 Rg.7 W4M
Tp.73 Rg.6 W4M

May River
Christina Lake
Sunday Creek
Glover Lake
Kirby Lake
Rat Lake
Wiau Lake
Unnamed Lake 1
881
Clyde Lake
Clyde River
Ipiatik Lake
Ipiatik River

COLD LAKE AIR WEAPONS RANGE

N

LEGEND

- PAVED ROAD
- UNPAVED ROAD
- RAILROAD
- 2012/2013 SEISMIC
- PROJECT-RELATED BASELINE SEISMIC (COMPLETED BETWEEN 1997-2010)
- CARIBOU RANGE
- OPEN WATER
- PROPOSED KIRBY EXPANSION PROJECT AREA*
- PROPOSED KIRBY EXPANSION PROJECT FOOTPRINT
- PROPOSED OBSERVATION WELL AND ACCESS
- REVISED STUDY AREA (JUNE 2013)
- TERRESTRIAL RESOURCES LOCAL STUDY AREA (DECEMBER 2011)

NOTE

* OIL SANDS LEASES FULLY HELD BY CANADIAN NATURAL

REFERENCE

ALBERTA DIGITAL BASE DATA OBTAINED FROM ALTALIS LTD. © GOVERNMENT OF ALBERTA 2004-2011 (ALL RIGHTS RESERVED) AND FROM IHS ENERGY INC.
DATUM: NAD 83 PROJECTION: UTM ZONE 12

5 0 5
SCALE 1:150,000 KILOMETRES

PROJECT
KIRBY IN SITU OIL SANDS EXPANSION PROJECT

TITLE
REVISED STUDY AREA (JUNE 2013)

Canadian Natural

PROJECT		12-1346-0014	FILE No.	
DESIGN	TGC	27 May 2013	SCALE AS SHOWN	REV. 0
GIS	SS	13 Jun. 2013		
CHECK	TGC	13 Jun. 2013	**FIGURE: 8-1**	
REVIEW	MC	13 Jun. 2013		

I:\CLIENTS\CNRL\12-1346-0014\mapping\mxd\SIR\Round_3\Figures\FINAL\121346014_Rd_3_SIR_8_Caribou_Range_20130527.mxd

The disturbances related to the Project that are included in this reassessment of potential impacts to wildlife are: the updated Project footprint (Project Update, Section 1.2.4, Canadian Natural 2012a), the seven observation wells, the 2012/2013 seismic program and the forecasted seismic program.

The 2012/2013 seismic program included low impact seismic (LIS) as described in the responses to Round 1 SIR 204 and Round 2 SIR 35. Low impact seismic involves 3 m wide source lines running east/west, with an average spacing of about 125 m, and 2 m wide receiver lines running north/south with an average spacing of about 100 m. As described below, widths will be reduced in select areas. Because the exact locations of the lines for the forecasted seismic activity are not currently known, they have not been spatially represented. However, the area of effect has been estimated based on the areal extent of the portions of the reservoir where future seismic is expected to occur, and using a similar spatial pattern as that of the 2012/2013 seismic lines (i.e., 3 m wide source lines running east/west 125 m apart, and 2 m wide receiver lines running north/south 100 m apart). While the exact location of the forecasted seismic is not known, Canadian Natural has sized the revised study area such that it would include the forecasted seismic and access.

The breakdown of Project-related disturbance into existing disturbance and new disturbance is provided in Tables 8-1 and 8-2. Using the updated Project footprint, a total of 258 ha of Project-related disturbances will fall on disturbances that are already existing or approved in the Baseline Case. The 1,824 ha of new disturbances related to the Project represents a 449 ha (33%) increase from the 1,375 ha of new disturbances included in the wildlife assessment of the EIA (Volume 5, Section 3.4.3.1). The estimated new disturbance areas are conservative and represent a precautionary approach for the following reasons:

- Not all forecasted seismic may occur.
- Not all forecasted seismic may occur at once.
- The estimated area of forecasted seismic disturbance assumes the LIS lines widths identified above will be used; however, in riparian areas and within 10 m of waterbodies/watercourse the widths will be reduced to 1.75 m and 0.5 m, respectively.
- Seismic lines will generally be cleared with mulchers to reduce ground and rooting layer disturbance and improve the rate of vegetation regeneration. Canadian Natural is required to apply for a reclamation certificate within 2 years of the completion of a seismic program. Seismic lines will generally be allowed to regrow, although a few may re-cleared at some point to provide ongoing winter access routes.

Table 8-1 Comparison of Project-related Disturbances and Overlap with Existing Disturbances from the December 2011 EIA, August 2012 Project Update and the June 2013 Reassessment

Disturbance Type	Project Footprint (December 2011)[a] [ha]	Disturbances Related to the Project for this Reassessment			
		Updated Project Footprint (August 2012) [ha]	Observation Wells and Access [ha]	2012/2013 Project Seismic [ha]	Forecasted Project Seismic [ha]
Overlap with Existing Disturbance	227	221[b]	3	5	29
New Disturbance	1,375	1,349	2	181	293
Total Area of Disturbance	**1,602**	**1,570**	**5**	**185**	**321**

[a] Represents the disturbance assessed in the EIA (Canadian Natural 2011).

[b] The updated GIS layers used in this reassessment have resulted in a minor change from the values reported in the Project Update (Canadian Natural 2012a).

Assessment of Potential Impacts to Wildlife

New disturbed areas are predicted to be split fairly evenly between terrestrial ecosite phases and wetlands types (Table 8-2). The burned landcover types contain the largest amount of new disturbance relative to the other individual landcover types present in the revised study area. In the assessment completed for the EIA, disturbed areas increased from 11% to 19% of the LSA (i.e., a 76% increase) between the Baseline Case and the Application Case before reclamation (Volume 5, Section 3.4.3.1). In the EIA the percentage of the Regional Study Area (RSA) affected by disturbance changes by less than 1% from the Baseline Case to the Application Case before reclamation, such that after rounding disturbances make up 8% of the RSA in both cases. Using the revised study area and revised estimate of disturbances related to the Project, disturbed areas from the Baseline Case to the Application Case before reclamation increase from 20% to 31% of the revised study area (i.e., a 56% increase), and remain 8% of the RSA in both cases. Therefore, the increased size of the revised study area relative to the LSA used in the EIA and the Project footprint results in a reduced percentage increase in disturbed areas at the local scale from the Baseline Case to the Application Case before reclamation. However, the total area of new disturbance in the revised study area (1,824 ha) is greater than what was calculated for the LSA (1,375 ha). At the RSA scale the incremental change in disturbed areas due to the Project remains <1% and is therefore negligible.

Table 8-2 Ecosite Phases and Wetlands Types Disturbed by Project-related Activities

Map Code	Description	Area Disturbed by Project-Related Activities[ha]				
		2012/2013 Seismic	Forecasted Seismic [(a)]	Observation Wells and Access	Project Footprint[(b)]	Total Project-related Disturbance
Terrestrial Ecosite Phases						
a1	lichen jack pine	<1	5	0	12	18
b1	blueberry jack pine-aspen	2	9	0	60	71
b2	blueberry aspen (white birch)	1	2	0	11	14
b3	blueberry aspen-white spruce	<1	<1	0	4	5
b4	blueberry white spruce-jack pine	<1	<1	0	2	2
c1	Labrador tea-mesic jack pine-black spruce	18	34	0	202	255
d1	low-bush cranberry aspen	9	10	0	71	91
d2	low-bush cranberry aspen-white spruce	3	3	0	26	32
d3	low-bush cranberry white spruce	<1	<1	0	4	6
e1	dogwood balsam poplar-aspen	0	<1	0	<1	<1
e2	dogwood balsam poplar-white spruce	<1	1	<1	3	5
e3	dogwood white spruce	0	<1	0	0	<1
g1	Labrador tea-subhygric black spruce-jack pine	5	20	0	46	71
h1	Labrador tea/horsetail white spruce-black spruce	0	<1	0	5	5
	terrestrial subtotal	*40*	*87*	*<1*	*446*	*574*
Wetlands						
BTNI	wooded bog with internal lawns	0	<1	0	0	<1
BTNN	wooded bog	12	21	0	65	98
FONG	graminoid fen	15	20	<1	73	109
FONS	shrubby fen	10	26	1	89	126
FTNI	wooded fen with internal lawns	0	2	0	<1	2
FTNN	wooded fen	16	40	0	108	165
FTPN	wooded patterned fen	<1	<1	0	0	<1
MONG	marsh	0	<1	0	<1	1
SONS	shrubby swamp	<1	2	0	<1	2
STNN	wooded swamp	<1	2	0	5	7
WONN	shallow open water	0	<1	0	<1	<1
	wetlands subtotal	*53*	*114*	*1*	*342*	*512*

Table 8-2 Ecosite Phases and Wetlands Types Disturbed by Project-related Activities (continued)

Map Code	Description	Area Disturbed by Project-Related Activities[ha]				
		2012/2013 Seismic	Forecasted Seismic [(a)]	Observation Wells and Access	Project Footprint[(b)]	Total Project-related Disturbance
Miscellaneous Landcover Types						
BUu	burn uplands	49	63	<1	412	526
BUw	burn wetlands	30	22	0	95	147
Me	meadow	8	6	0	52	66
Sh	shrubland	<1	<1	0	2	2
	miscellaneous subtotal	*87*	*92*	*<1*	*561*	*741*
Disturbances						
CC	clearcut	<1	2	0	18	21
DIS	disturbance	4	27	3	203	235
	disturbances subtotal	*5*	*29*	*3*	*221*	*258*
Total Area of Disturbances Related to the Project [ha]		**185**	**321**	**5**	**1,570**	**2,082**
Total Area of New Disturbance [ha][(c)]		**181**	**293**	**2**	**1,349**	**1,824**

(a) Areas of ecosite phases and wetlands types disturbed by forecasted seismic disturbances were estimated by multiplying the forecasted seismic disturbance area by the proportion of the total terrestrial area represented by ecosite phase and wetlands type in the revised study area because the specific locations of the seismic lines are currently unknown.

(b) Based on the Project footprint described in the Project Update (Section 1.2.4, Canadian Natural 2012a).

(c) Total Area of New Disturbance is calculated by subtracting disturbances present in the Baseline Case (i.e., disturbance (DIS) and clearcut (CC) rows) from the Total Area of Disturbances Related to the Project.

Note: Numbers have been rounded for presentation purposes, therefore, the totals may not equal the sum of the individual values.

Fragmentation affects organisms through changes in microclimate (e.g., increased sun and wind exposure, and alterations to the water regime), habitat isolation (i.e., reduced landscape connectivity) and changes to the surrounding landscape (Saunders et al. 1991). Therefore, the species most vulnerable to landscape fragmentation are likely to be those which require large areas and are sensitive to edge effects (Donovan et al. 1995), as well as those with poor dispersal ability (D'Eon et al. 2002; Turner 1989).

Woodland caribou are known to be highly sensitive to forest fragmentation within their home ranges (Environment Canada 2012). Forest fragmentation due to vegetation clearing such as seismic lines creates early seral vegetation communities that are thought to support higher densities of ungulates such as moose and white-tailed deer (Rettie and Messier 1998, Seip 1992). Deer are at the northern end of their range in the Oil Sands Region and historical populations tended to be small and localized (Smith 1993). However, white-tailed deer have been expanding their range and increasing in number in northeastern Alberta during the last 5 to 10 years (Latham 2009; Latham et al. 2011b).

Wolf populations are also increasing in northeastern Alberta, largely as a result of increasing white-tailed deer populations, and an increase in wolf population densities poses a threat to caribou (McKenzie et al. 2012; Latham et al. 2011b). In addition, it is likely that wolves selectively make use of seismic lines as movement corridors, and as a result linear clearings represent an increased risk of predation (Latham et al. 2011a). It is likely for this reason that caribou make less use of habitat adjacent to roads, seismic lines and other disturbances (Dyer et al. 2001). Habitat next to roads is used substantially less than habitat adjacent to seismic lines and seismic lines are not barriers to movement (Dyer et al. 2002).

In the boreal forest, it has been suggested that birds may be more resilient to habitat fragmentation due to historically high rates of natural disturbance (Schmiegelow et al. 1997). Most of the effects of landscape change appear to be due to habitat loss, rather than habitat fragmentation (Schmiegelow et al. 2002). Where changes in bird species richness or abundance in association with habitat fragmentation have been documented, they have been largely attributed to increases in predation and nest parasitism near habitat edges (Schmiegelow et al. 1997). However, increased predation and nest parasitism in association with fragmentation has only been documented in the boreal when studies were conducted in agricultural landscapes (Schmiegelow et al. 1997; Bayne and Hobson 1997). Disturbances that do not create habitat favouring predators or nest parasites should therefore result in reduced effects of habitat fragmentation (Schmiegelow et al. 1997, 2002).

Recent work by Bayne et al. (2011) demonstrated that seismic lines three to four metres in width did not disturb the canopy of mature forest (Canadian Natural's LIS lines are generally two to three metres in width, as described above), and canopy openness was the most significant predictor of whether or not bird species did or did not use a seismic line. Of 34 bird species Bayne et al. (2011) evaluated, 16 species showed significant

differences in the use of conventional seismic line (i.e., six to ten metres wide) edges relative to forest interiors. Only three of the 16 species significantly affected by conventional seismic lines (western tanager, bay-breasted warbler and red-breasted nuthatch) showed avoidance of conventional seismic line edges, although the same species did not avoid areas with an increasing density of seismic lines on the landscape (Bayne et al. 2011).

As discussed above, Project-related LIS includes approximately 3 m wide source lines and 2 m wide receiver lines. Bayne et al. (2011) found that marten and black bear used LIS lines that were 2 m wide or less with the same frequency as forest interior. However, seismic lines 3 m wide or wider were avoided by marten and used more by black bear relative to the forest interior. As source and receiver lines occur in roughly equal proportions, half of Project-related LIS may result in increased avoidance by marten and increased use by black bear. However, this effect decreased for black bear and more notably for marten as the degree of seismic line regeneration increased (Bayne et al. 2011).

As described in the EIA (Volume 5, Section 1.6) Canadian Natural has committed to extensive mitigation, including the use of LIS, to reduce the effects of the Project on habitat fragmentation and loss on wildlife. Benefits of LIS include: avoidance cutting to retain large timber and leave habitat more intact and using wandering lines to provide line of site breaks every 200 m. In addition, Canadian Natural has committed to a mitigation program designed to reduce the effects of the Project on woodland caribou, specifically through habitat restoration (the responses to Round 1 SIRs 200b, 204, 205, 254d [Canadian Natural 2012a]; the responses to Round 2 SIRs 37b, 42e [Canadian Natural 2012a]). The primary intent of habitat restoration will be to restore functional caribou habitat by reducing hunter and recreational all-terrain vehicle/snowmobile user access, impeding the movements and hunting efficiency of predators (e.g., wolves), and discouraging the use of caribou habitat by moose and deer (i.e., alternate prey species that attract wolves) (the response to Round 2 SIR 42e). Additional information is provided in response part h.

The increase in habitat fragmentation in the revised study area is expressed in terms of the change in metrics such as patch size and the number of patches (Table 8-3).

Table 8-3 Habitat Fragmentation in the Revised Study Area

Category	Baseline Case					Change from Baseline Case to the Application Case				
	Area [ha]	NP	MPS [ha]	TCA [ha]	ENN_MN [m]	Area [ha]	NP [%]	MPS [%]	TCA [%]	ENN_MN [%]
not disturbed	33,661	10,421	3	12,551	6	-7	119	-57	-55	-2
disturbed	3,877	106	37	91	74	58	-7	69	298	-8

NP = Number of patches; MPS = mean patch size; TCA = total core area; ENN_MN = mean nearest neighbour distance.

Although the effects of habitat loss and fragmentation due to seismic disturbances are discussed above in detail for a select number of wildlife species only, they are an effective sample to facilitate the discussion of effects of habitat loss and fragmentation on wildlife in general.

Project-related disturbances have increased in the revised study area relative to the EIA, largely due to LIS. However, assessing the effects of disturbance on wildlife based on the areal extent of that disturbance is not typically done in EIAs. In Alberta, and elsewhere in Canada, assessing the magnitude of effects to wildlife habitat according to the percentage of habitat predicted to be lost or altered at the LSA and RSA scales is an approach that has been thoroughly vetted and accepted by regulators. This includes EIAs in the Oil Sands Region that have recently been deemed complete (AOSC 2009; Cenovus 2010; Deer Creek 2006; Devon 2010; Dover OPCO 2010; Ivanhoe 2010; JACOS 2010; KNOC 2009; North American 2007; OSUM 2010; Shell 2007). While Project-related disturbances have increased relative to the EIA, so has the size of the study area to encompass them, such that the percent increase in disturbed areas in the revised study area is less than that presented in the LSA. This information is useful for the understanding of disturbances at the local scale, however due to the mobile characteristics of wildlife species, as well as the integrated nature of regional populations, the effects of the Project on wildlife populations are more appropriately expressed at the RSA scale, which has not changed in this reassessment. In the EIA and in this reassessment, the increase in disturbed areas due to the Project is <1% of that present in the Baseline Case at the RSA scale. In summary, the increased amount of disturbance related to the Project in the reassessment does not result in a change to the environmental consequences for wildlife habitat.

During construction and operations, and prior to reclamation, the predicted environmental consequences of the Project on wildlife abundance range from negative and negligible to low for all wildlife KIRs at the LSA scale, and negligible for all KIRs at the RSA scale (Volume 5, Section 4.4.2.1 of the December 2011 Application, Canadian Natural 2011). These predicted environmental consequences take into consideration the combined sources of mortality and reduced recruitment that are considered valid linkages for the Project, including site clearing, interactions of wildlife with infrastructure, increased predation, hunting and trapping, removal of nuisance wildlife, increased vehicle-wildlife collisions and sensory disturbance (Volume 5, Section 4.4.2.1). Project-related disturbances have increased in this reassessment relative to the EIA due largely to LIS. The increase in Project-related disturbances is predicted to result in a measurable change in effects to wildlife abundance for the linkage of increased predation only. Although LIS minimizes vegetation disturbance associated with seismic exploration, it will increase the amount of early seral vegetation on the landscape. Increases in early seral vegetation are associated with higher densities of ungulates such as white-tailed deer (Rettie and Messier 1998, Seip 1992), which is associated with an increase in wolf population densities, and which in turn is associated with an increased predation risk to woodland caribou (Latham et al. 2011b). An increased risk of

predation for moose is also likely. Therefore, the environmental consequence of the effect of the Project on woodland caribou and moose abundance due to increased predation is predicted to increase from negligible to low at the local scale, and remain negligible at the regional scale. However, the increased risk of predation due to LIS in the revised study area is not predicted to result in an increase in the net environmental consequences of the Project on wildlife abundance. The net environmental consequence of the Project on woodland caribou and moose abundance remains low at the local scale and negligible at the regional scale, as predicted in the EIA, After mitigation (Volume 5, Section 1.6 of the December 2011 Application, Canadian Natural 2011), the effects of the increased disturbance related to the Project will not result in a measurable decline in wildlife abundance at the revised study area or RSA scale beyond that predicted in the EIA.

The effects of the Project prior to reclamation on wildlife movement were predicted to have environmental consequences that ranged from negligible to moderate at the LSA scale, and negligible at the RSA scale (Volume 5, Section 4.4.2.3 of the December 2011 Application, Canadian Natural 2011). Project-related disturbances have increased in the revised study area relative to those identified in the LSA. However, the increased amount of Project-related disturbance is due largely to LIS. LIS is unlikely to affect wildlife movement. Woodland caribou is likely the most sensitive wildlife species to human disturbance and is a focal species for assessing and mitigating potential movement barriers (Volume 5, Section 4.4.2.3). It has been shown that even conventional seismic lines do not significantly affect woodland caribou movement (Dyer et al. 2002). It is likely that the movement of other wildlife KIRs will be affected less than caribou (EIA, Volume 5, Section 4.4.2.3). The environmental consequences of the effects of the Project on wildlife movement are, therefore, unchanged from those predicted in the EIA. The reclamation of vegetation communities is predicted to result in the recovery of wildlife populations that may experience declines due to Project construction and operations (Volume 5, Section 4.4.2.1 of the December 2011 Application, Canadian Natural 2011), as well as the removal of barriers to wildlife movement (Volume 5, Section 4.4.2.3 of the December 2011 Application, Canadian Natural 2011).

In conclusion, although the total area of Project-related disturbance will increase due to the addition of the 2012/2013 and forecasted seismic and observation wells, the increase will represent a less than 1% increase in disturbed areas in the RSA, and essentially will not change the percentage of the RSA that will be disturbed during construction and operations from that predicted in the EIA (i.e., 8%). Due to the mobile characteristics of wildlife species in the LSA, as well as the integrated nature of regional populations, the effects of the Project on wildlife populations are more appropriately expressed at the RSA scale. In consideration of the information presented above, and given that the incremental effect of Project-related disturbance, as a percentage increase of disturbed areas in the revised study area, is less than that predicted in the EIA, conclusions of the reassessment of the net effects of the Project on wildlife (habitat

fragmentation, habitat loss, abundance and movement) are unchanged from the EIA at both the revised study area and RSA scales.

b. All areas of impact associated with Project-related disturbances are identified in the response to part a.

c. See the response to part a, and Figure 8-1.

d. See the response to part a. As stated in the responses to Round 1 SIR 19f) and Round 2 SIR 19a, Canadian Natural would only consider 4D seismic if there was a reservoir performance issue that needed to be understood and 4D seismic would bring demonstrated value to that understanding. For those reasons, potential locations of 4D seismic cannot be identified. However, in the event 4D seismic becomes necessary it would be focused on the pad(s) where the reservoir performance issue existed and would make use of historical 3D lines.

e. See the response to part a, and Figure 8-1.

f. Disturbances in the revised study area in the Baseline Case for the purpose of this reassessment are detailed in Table 8-4.

Table 8-4 Disturbances Present in the Revised Study Area in the Baseline Case

Disturbance Type	Area [ha]	Percent of Total Baseline Case Disturbance in the Revised Study Area [%]	Baseline Case Disturbance as a Percentage of the Revised Study Area [%]
acreages	3	<1	<1
borrow pits	36	1	<1
clearings	51	2	<1
Canadian Natural North 2010 and Kirby South 2010 Existing and Approved Footprint	494	16	1
oil and gas facilities	22	<1	<1
OSE	46	1	<1
other industrial	4	<1	<1
pipelines	774	25	2
railroads	95	3	<1
roads	255	8	<1
ROW	35	1	<1
seismic lines/cutlines	937	30	2
transmission lines	65	2	<1
wellsites	283	9	<1
Total	**3,100**	**100**	**8**

g. Disturbances related to the Project in the revised study area are discussed in the response to part a. and are shown in Figure 8-1 and Table 8-2. Disturbances related to the Project include the updated Project footprint, the 2012/2013 and forecasted seismic and seven observation wells.

The effects of Project-related disturbances discussed in the responses to part a) on critical habitat within woodland caribou ranges were quantified. Critical woodland caribou habitat for populations that are not self-sustaining is currently defined by Environment Canada (2012) as any undisturbed habitat within a range when that range is less than 65% undisturbed. Undisturbed habitat for woodland caribou is defined as any area within a woodland caribou range that is not within an area burned within the last 40 years or within 500 m of human disturbance visually identified from Landsat imagery at a scale of 1:50,000 (Environment Canada 2012).

The East Side of the Athabasca River (ESAR) and Cold Lake caribou ranges both overlap with the revised study area. However, disturbances related to the Project will affect critical habitat for woodland caribou only within the Cold Lake caribou range (Figure 8-1). In other words, a 500 m buffer around disturbances related to the Project affects habitat within the Cold Lake caribou range, but does not affect caribou habitat within the ESAR range. The range of the Cold Lake caribou herd (672,422 ha), which is currently in decline and considered to be not self-sustaining, is estimated by Environment Canada to be 15% undisturbed (Environment Canada 2012). Therefore, all undisturbed habitat within the Cold Lake caribou herd range is critical habitat, as defined by Environment Canada (2012).

To quantify the effects of the Project on critical habitat for woodland caribou, all areas within a 500 m buffer of disturbances related to the Project were considered to be disturbed, consistent with Environment Canada (2012). Underlying areas disturbed in the Baseline Case (i.e., areas burned within the last 40 years or within a 500 m buffer of existing human disturbance) were subtracted from areas affected by buffered disturbances related to the Project to quantify the reduction of undisturbed woodland caribou habitat

The disturbances related to the Project are predicted to result in a loss of 225 ha of undisturbed habitat within the Cold Lake woodland caribou herd range. This represents a less than 1% decline (i.e., 0.2%) in the remaining undisturbed habitat within the Cold Lake caribou range.

h. As stated in the response to part g), Project-related disturbances are predicted to result in a loss of 225 ha (<1%) of the remaining undisturbed habitat within the Cold Lake caribou range.

Canadian Natural recognizes the importance of actions to reduce Project impacts in support of caribou conservation in the Cold Lake caribou range and is committed to involvement in the range-level planning and subsequent implementation that will be forthcoming for the Cold Lake caribou range (Round 1 SIR 200b [Canadian Natural 2012a], Round 2 SIR 42e [Canadian Natural 2012b]). As discussed in the responses to Round 2 SIR 42e) and Round 3 SIR 9a), assuming the Project is approved in late 2013, an inventory of caribou habitat restoration opportunities for the Project will start in 2014 and habitat restoration activities will begin in 2016. It will be possible to identify the

specific locations and aerial extent of habitat restoration to be undertaken once this inventory is complete. However, Canadian Natural commits that within the first 10 years of the Project, 20% of the area of seismic lines and pipelines/transmission line ROWS in the Project Area that intersect with Class IV roads (Government of Alberta 2013) will be mitigated using a combination of earthen mounds, slash roll back and tree/shrub plantings to reduce access and line-of-sight. In areas where restoration activities are undertaken, the targeted mounding and tree/shrub planting densities are estimated to be 1,600 mounds/ha and 1,800 to 2,200 stems/ha, respectively, based on Canadian Natural's habitat enhancement experience at the Primrose and Wolf Lake Project. In addition, Canadian Natural will allow natural woody regeneration to grow back along the edge of cleared pipeline and transmission line ROW to the extent that the vegetation growth does not interfere with normal pipeline operations, and does not prevent proper inspection and safety.

The primary intent of habitat restoration will be to reduce hunter and recreational all-terrain vehicle/snowmobile user access, impede the movement and hunting efficiency of predators (e.g., wolves), and discourage the use of caribou habitat by moose and deer (i.e., alternate prey species that attract wolves). It is anticipated that the area of functional caribou habitat restored will extend beyond the specific areas where the physical restoration treatments have been applied. During the 2014 to 2015 inventory, Canadian Natural will work with ESRD to set clearer targets, timelines and monitoring/reporting requirements for habitat restoration and to confirm that plans are consistent with the expected priorities of the range plan being developed by ESRD for the Cold Lake caribou range.

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