



**DISTURBANCE AND ACCESS
Implications for Traditional Use**

**Fort McKay
Specific Assessment**

**Fort McKay
Industry Relations Corporation**

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9.0 Land Disturbance and Access Implications for Traditional Use Opportunities

9.1 Fort McKay Key Concerns Related to Land Disturbance and Access

Intact land and ecosystems and access to traditional resources are fundamentally important to the Community of Fort McKay for the sustainability of their traditional culture and their ability to practice traditional activities (see the *Cultural Heritage Assessment Baseline*, Fort McKay IRC 2010a and *Fort McKay Cultural Model*, HEG 2009). This assessment of disturbance and access examines disturbance of the landscape and how this affects the land-base within Fort McKay's Traditional Lands. Direct disturbance of select key harvesting areas, proximity of development to the Community of Fort McKay and Fort McKay's Treaty Land Entitlement (TLE) lands, linear disturbance within their Traditional Lands, affects on traditional trails and human population levels in the region – all of these affect the availability of resources and the opportunities for Fort McKay Community members to access them.

This section provides a broad overview of disturbance and access as well as the potential implications of this disturbance on traditional use opportunities. Impacts on specific resources (e.g., air quality, groundwater, moose habitat, and peatlands) are discussed in Sections 1 to 8 of the Environmental Specific Assessment. The long-term effects of disturbance and access are strongly influenced by the quality and quantity of reclamation; reclamation and Fort McKay's concerns regarding technical issues and traditional land use implications are discussed in *Section 10*. The effects of land disturbance and changes in access on Fort McKay's culture is assessed in the *Cultural Heritage Assessment Baseline* (CHA Baseline; Fort McKay IRC 2010a) and the *Project-Specific CHA* (Fort McKay IRC 2010b).

9.2 Fort McKay Specific Assessment Approach to Disturbance and Access

9.2.1 Information Sources and Data Limitations

9.2.1.1 Information Sources

Sources of information for this assessment included:

- Disturbance maps and calculations provided by Shell in the data report produced for the Fort McKay Specific Assessment (FMSA) (Golder 2009)
- *Fort McKay First Nation Traditional Knowledge Report*. Prepared for the Jackpine Mine Expansion and Pierre River Mine, Environmental Impact Assessment.

Prepared at the request of the Fort McKay Industry Relations Corporation (FMA Heritage Consultants Inc. 2008)

- *Traditional Knowledge and Land Use*. Prepared for the Shell Jackpine Mine Expansion and Pierre River Mine EIA. Volume 5, Section 8.0 (Shell 2007a)
- *Traditional Land Use Environmental Setting for the Jackpine Mine Expansion & Pierre River Mine Project*. Prepared for Shell EIA Jackpine Mine Expansion and Pierre River Mine, Appendix 3 (Golder 2007)
- Fort McKay internal reports and studies. See HEG 2009 for a listing of reports (Section 7.0 and Appendix A)
- Fort McKay Traditional Land Use Study traditional trails map (FMFN 1994)
- Fort McKay Culturally Significant Ecosystem Maps (analysis by McKillop 2002, based on FMFN 1994 data)
- Sustainable Ecosystem Working Group (SEWG) indicators and analysis related to access (SEWG 2008, Wilson and Stelfox 2008)
- Regional Municipality of Wood Buffalo municipal census information
- Information from the Fort McKay CHA Baseline (Fort McKay IRC 2010a)

9.2.1.2 Information and Data Limitations

Total disturbance information – Disturbance information included in this assessment is considered reliable and up to date.

Linear disturbance information – The direct disturbance created by linear features is part of the total anthropogenic disturbance calculations discussed above. However, linear features can have additional impacts on traditional resources and traditional land use opportunities due to landscape fragmentation and effects on ecological indicators. These effects were assessed using information from Shell (2007, Volume 5) and from regional studies (e.g. Sustainable Ecosystem Working Group modeling of the influence of linear density and access management on ecological indicators; SEWG 2008). However, development of Fort McKay-specific linear density indicators and thresholds was beyond the scope of this assessment.

Quantitative data on Fort McKay access to Traditional Lands – There is currently an abundance of qualitative information about Fort McKay Community member's experience regarding access and disturbance, which offers one valuable way to understand day-to-day impediments to access. Quantitative data compliments qualitative information and provides another, more precise measure of changing impediments to access. However, quantitative measurements of access are lacking and not available for this assessment. From Fort McKay's perspective the number of impediments (e.g., industry controlled-gates, disturbed areas that must be circumvented) and change in travel time and routes to access Traps could be

tracked as quantitative indicators and formalized Community derived assessment criteria could be developed. These sorts of indicators would assist the Fort McKay IRC and community members in tracking changes in access and developing appropriate mitigation strategies.

Access management baseline data - There is regional baseline data on users of land within the region (e.g. Shell's resource use baseline report and assessment; Shell 2007). However, very little of the information on non-industrial access (e.g., hunting, fishing, camping, and recreation) is tracked spatially (e.g. access rates of recreational users of a specific area during a specific time-frame) or in detail (e.g. total number of moose harvested). Further information needs to be collected and monitored in conjunction with the development of access management plans. This would enhance the ability to quantify and mitigate the impacts of access on Fort McKay's traditional land use opportunities.

Culturally Significant Ecosystems (CSE) and traditional trails maps - The Culturally Significant Ecosystem (CSE) maps used in this assessment (see Section 9.4.4) were developed by McKillop (2002) from spatial data analysis of data from the Fort McKay traditional use and occupancy study *There is Still Survival Out There* (FMFN 1994). Note that this analysis was based on one data set and should not be considered a comprehensive mapping or analysis of Fort McKay's traditional use and occupancy.

Similarly, the traditional trails map used in this assessment (see Section 9.4.1) is also from the 1994 traditional use and occupancy study (FMFN 1994).

The CSE maps should not be considered as a definition of the Community's value of the land. Substantial additional traditional use data have been collected since the 1994 study but much of this remains to be integrated into a spatial database, so has not been analyzed according to the methods articulated by McKillop. The CSE maps and the traditional trails maps do, however, provide a realistic spatial picture of Fort McKay's use of the land and are helpful in assessing effects from the perspective of the Community.

9.2.2 Land Disturbance and Access Key Indicators

Key indicators for land disturbance and access implications for traditional use are as follows:

- Direct anthropogenic disturbance
- Linear disturbance
- Traditional trails
- Regional population levels
- Community member's experiences related to access

- Protected areas

9.2.3 Land Disturbance and Access Study Areas

9.2.3.1 Introduction

A number of different study areas are used in this land disturbance and access assessment. These are shown in Figure 9-1 and Figure 9-2. The rationale for the key study areas is discussed below.

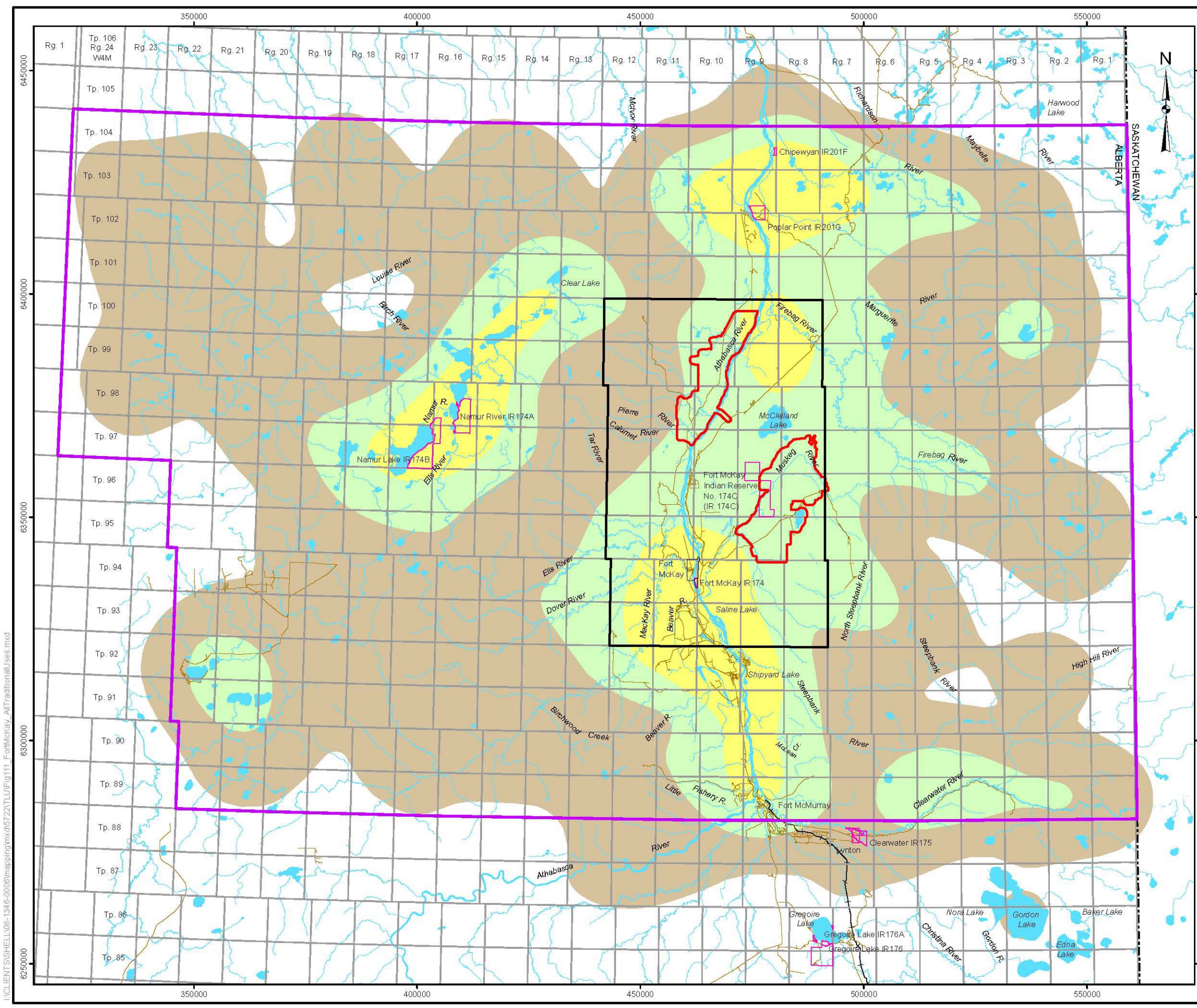
9.2.3.2 Fort McKay Traditional Lands

Fort McKay's Traditional Lands encompass 3,526,226 hectares (ha; 35,262 km²) and extend from Townships 89 to 104 and Range 0 to approximately Range 22-24, W4M. The Traditional Lands boundary is shown in Figure 9-1 (Figure 1.1-1 in Golder 2009). This includes an area extending north to the Wood Buffalo National Park Boundary, south to include Fort McMurray, east to the Alberta-Saskatchewan boundary and west to the Birch Mountains. Within Fort McKay's Traditional Lands, Fort McKay also has a number of Treaty Land Entitlement (TLE) lands: at the hamlet of Fort McKay; to the south, directly across from Fort McKay along the Athabasca River and the lower Muskeg River; to the north, directly across from Fort McKay consisting of Cree Burn (Isadore's) Lake and surrounding area; to the northwest of the Community adjacent to Gardiner (Moose) and Namur (Buffalo) Lakes; and to the northeast, adjacent to the proposed Jackpine Mine expansion, Fort McKay's oil sands lands (Figure 9-2). Fort McKay, through its own land use planning efforts has identified specific uses for each of its parcels of reserve land. In particular, the Cree Burn Lake area and Gardiner/Namur lakes areas have been designated by the Community for protection and cultural areas.

Development impacts within Fort McKay's Traditional Lands are of interest and concern to Fort McKay; the Traditional Lands boundary is used as a study area for this assessment.

9.2.3.3 Traditional Land Use - Culturally Sensitive Ecosystems

Fort McKay's Traditional Land Use CSEs were developed by McKillop (2002) from a spatial analysis of data from a Fort McKay traditional use and occupancy study: *There is Still Survival Out There* (FMFN1994). The intent was to provide traditional use maps that were relevant for the assessment of development impacts on key areas of Fort McKay's traditional land use. The analysis produced several maps, which identify broad areas of Fort McKay's intense, moderate and low traditional land use for a number of key traditionally harvested resources. Culturally sensitive ecosystem maps used in the Fort McKay Specific Assessment include large game, fur-bearers, fish, birds, traditional plants (berries) and all traditional uses (a map analyzing all the data points regardless of category). The All Traditional Uses CSE is shown in Figure 9-1. The other CSE maps are presented in *Appendix 9-1* of this section.



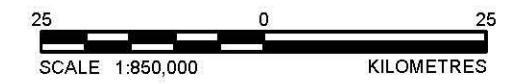
LEGEND

- FORT MCKAY TRADITIONAL USE
- FORT MCKAY 40 TOWNSHIP BLOCK
- TERRESTRIAL LOCAL STUDY AREA
- INDIAN RESERVE
- PROVINCIAL BORDER
- OPEN WATER
- PUBLIC ROADWAY
- RAILROAD

CULTURALLY SIGNIFICANT ECOSYSTEMS (CSE) AREAS

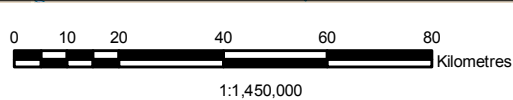
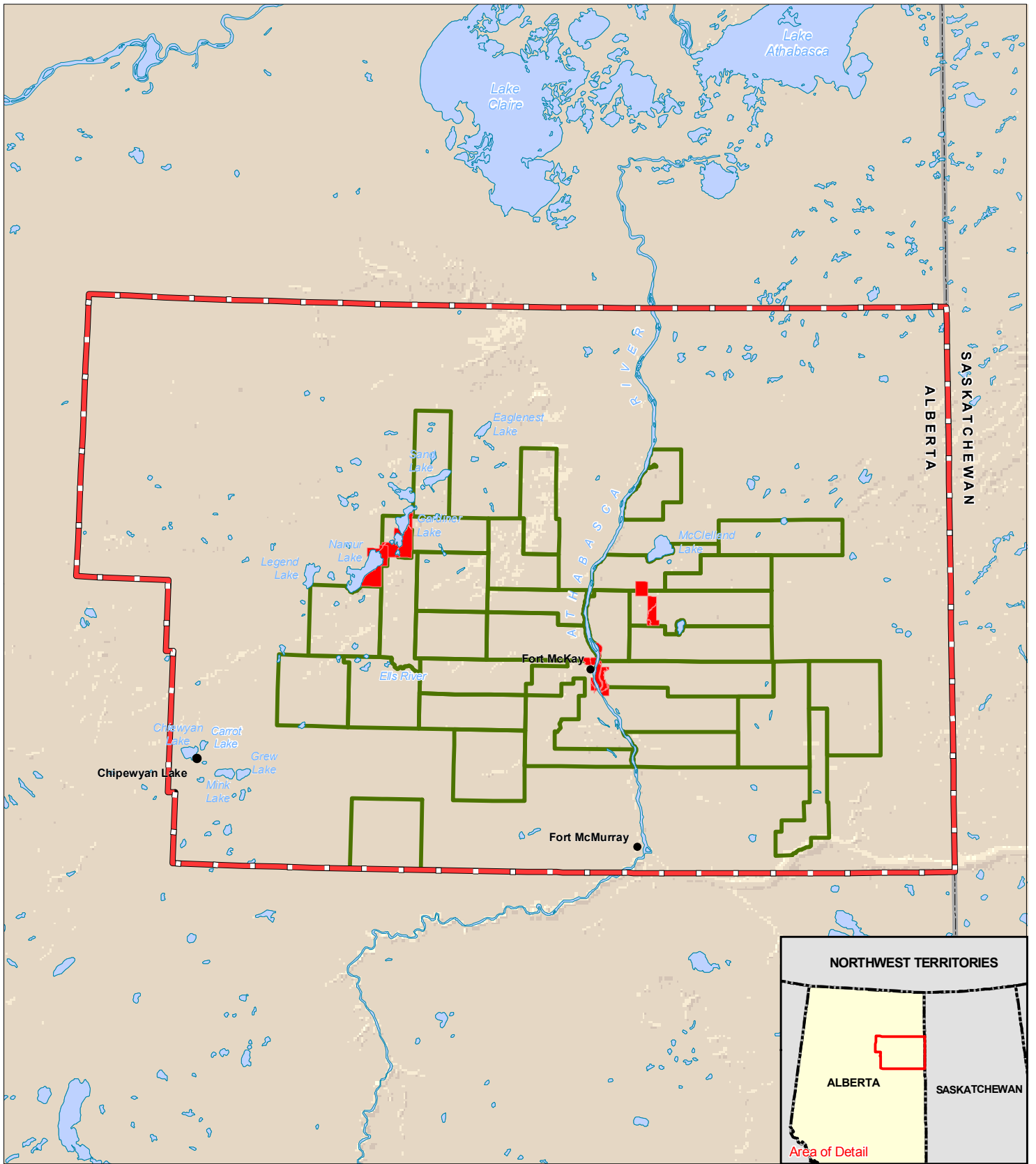
- INTENSE USE CSE (50% UTILIZATION DISTRIBUTION)
- MODERATE USE CSE (75% UTILIZATION DISTRIBUTION)
- LOW USE CSE (95% UTILIZATION DISTRIBUTION)

REFERENCE
 Alberta digital data obtained from AltaLIS Ltd. (September 2004), IHS Energy Ltd. (August 2006), used under license.
 Projection: UTM Zone 12 Datum: NAD 83







PROJECT	JACKPINE MINE EXPANSION & PIERRE RIVER MINE PROJECT		
TITLE	CULTURALLY SIGNIFICANT ECOSYSTEMS - ALL TRADITIONAL USES		
	PROJECT NO. 08-1346-0006.5722	SCALE AS SHOWN	REV. 0
	DESIGN BDW 01 Dec. 2008		
	GIS JH 26 Feb. 2009		
	CHECK AR 09 Mar. 2009	FIGURE 9-1	
	REVIEW WS 09 Mar. 2009		

I:\CLIENTS\SH-HELL-08-1346-0006\mappings\mxd\5722\T12\U\Fig111_FortMcKay_AltTraditionalUses.mxd



Legend

-  Study Area
-  Fort McKay Trapline Ownership
-  Fort MacKay Reserve / Treaty Land Entitlement Lands
-  Waterbody

**Figure 9-2:
Fort McKay Traditional Lands,
Treaty Land Entitlement Lands
and Traplines**

Produced By: J Blyth
Date: October 27, 2009
Data Sources: Government of Canada,
Fort McKay First Nation, McKillop

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Stantec

9.2.3.4 Forty Township Study Area (FTSA)

While Fort McKay's Traditional Lands extend beyond the present area of oil sands development, the majority of this development occurs close to the Community of Fort McKay and along the Athabasca River. It is important for Fort McKay to have a study area that is focused in on the Community and the areas adjacent to it since the impacts that occur in the vicinity of the Community are experienced directly by Community members on a regular basis. Development and disturbances immediately surrounding the Community affect the quality and abundance of readily accessible traditional resources and the opportunities to access and use those resources.

As well, it is essential for the Fort McKay Specific Assessment to have vegetation information at a detailed scale so that impacts on all of Fort McKay's key traditional terrestrial resources can be assessed. Therefore, Fort McKay chose a study area that allowed for vegetation mapping using the Alberta Vegetation Inventory (AVI) classification system, which classifies ecosite phases and wetlands, as well as an Enhanced Wetland Classification System (Ducks Unlimited 2008) and also encompassed areas of high value and use by Fort McKay.

A Forty Township Study Area (FTSA) was selected that includes Shell's two proposed projects (Pierre River Mine and Jackpine Mine Expansion) local study areas (LSAs) and the Community of Fort McKay (Figure 9-1) and is bounded by the following: Townships 93 to 100, Ranges 8 to 12, W4M). The FTSA is considered as a regional-scale study area in the Fort McKay Specific Assessment. The two Shell LSAs represent about 13.3% of the land within the FTSA and approximately 2.2% of the regional study area (RSA) of 2,277,376 ha used by Shell (2007) in the EIA for the proposed Projects.

The 379,641 ha FTSA straddles the Athabasca River and includes the lower portions of the MacKay River, Ells River, Joslyn Creek, Tar River, Calumet River, Pierre River, Asphalt Creek, Gymundson Creek, Big Creek, Firebag River, Fort Creek and Muskeg River watersheds. As a result, the FTSA study area encompasses many areas of high value and use by Fort McKay (Healing the Earth Strategy, Fort McKay IRC 2010c). This study area is used in the FTSA for assessment of terrestrial resources.

9.2.3.5 Traplines

Fort McKay community members hold 29 Registered Fur Management Areas (RFMAs; also referred to as Traplines; Figure 9-2). Traplines are an important traditional land use unit. While people are on the land trapping, they and their extended families also participate in other traditional activities so much of a family's traditional land use may occur within trapline areas. Therefore, effects at the trapline-scale were examined for disturbance and access related impacts.

9.2.3.6 Watersheds

Watersheds are an ecologically relevant boundary and are also used by Fort McKay members for traditional use; for example, many traditional trails follow watercourses (see Section 9.4.1). This disturbance and access assessment examines several key Athabasca tributary watersheds that are traditionally used by Fort McKay. Tributary watersheds assessed include: Clarke Creek, McLean Creek, Poplar Creek, Steepbank River, Muskeg River, Beaver River, MacKay River, Ells (Moose) River, Tar and Calumet rivers, Pierre River, Asphalt Creek, Firebag River, and Grayling Creek.

9.2.3.7 Summary of Study Areas

For assessing disturbance and access implications for traditional use it is important to examine these at different spatial scales and within the context of access to traditional use areas. Therefore, disturbance and access are assessed at several scales and for a number of resources and/or harvesting areas (Figure 9-1). Study areas for each of the indicators assessed are as follows:

- Direct disturbance (Fort McKay's Traditional Lands, FTSA, Traplines, Fort McKay's Traditional Land Use - CSEs for key resource harvesting areas, watersheds)
- Linear Disturbance (Fort McKay's Traditional Lands, FTSA)
- Traditional Trails (FTSA)
- Community Member's experiences (Fort McKay's Traditional Lands)
- Regional Population (Regional Municipality of Wood Buffalo)
- Protected Areas (Fort McKay's Traditional Lands)

9.2.4 Fort McKay Surface Land Disturbance and Access Assessment Criteria

All land disturbance and any impediments to access could potentially adversely affect (both directly and indirectly) Fort McKay's traditional land use opportunities and ability to exercise their Treaty and Aboriginal rights. The relative magnitude of effects of disturbance and impediments to access depends on a number of factors including but not limited to: the type of disturbance, the type of resource(s) affected, the Community value of specific sites that may be affected, the proximity of the disturbance to the Community, accessibility, proximity to industrial development, other competing land uses in the area (e.g., recreation by non-Aboriginal people, outfitters), and whether it occurs on a Fort McKay member's trapline and or specific resource harvesting areas. Indirect effects of disturbance also impact the Community. When one area is affected, this has the effect of increasing pressure on other areas and forcing a change in traditional land use patterns.

Quantification and assessment of the degree of impact is complex. Fort McKay's perspective is that the type of impact, the location of the impact and the effects on Fort McKay's culture need to be considered in determining the significance of the impact. Development of a Fort McKay specific quantitative rating system of the relative effects of disturbance and access was beyond the scope of this assessment due to time and budget constraints. Therefore, impacts are assessed qualitatively using the following principles:

- The greater the magnitude of disturbance, the higher the magnitude of the impact on Fort McKay's traditional use
- Disturbance and access effects in areas near the Community and/or easily accessible from the Community are considered to be of high magnitude
- Disturbance and access effects near Fort McKay's Treaty Land Entitlement lands are considered to be of high magnitude (with consideration to the Community's zoning of the TLE Lands)
- Disturbance and access effects in areas of high traditional use and value including Traplines, and Intense and Moderate Use CSEs areas are considered to be of high magnitude
- Disturbance and access effects on Traplines are considered from the individual Trapline holder's perspective as well as for the Community as a whole

All impacts on Fort McKay's opportunities for traditional land use need to be appropriately mitigated and accommodated. The extent of measures required is dependant on the magnitude of the effects.

To allow for comparisons across components, straightforward linkages between the environmental and cultural heritage assessments, and for easy-to-communicate summaries, Fort McKay uses a green-yellow-red rating system for this assessment. Each component categorizes impacts, into one of three categories. For access and disturbance implications on traditional lands use the following ratings were used:

- **Green** (no or minor adverse effect on traditional land use opportunities),
- **Yellow** (possible adverse effect on traditional land use opportunities) and
- **Red** (significant adverse effect on traditional land use opportunities).

9.2.5 Assessment Cases

Disturbance and access implications for traditional use were assessed for the following scenarios/cases:

- *Pre-Development Scenario* (prior to oil sands development; 1954 air photos were used)
- *Current Scenario* (2007)

- *Base Case* (existing and approved developments)¹
- *Application Case* (Base Case plus the proposed Shell projects)
- *Planned Development Case* (Application Case plus additional planned developments announced at least 6 months prior to Shell's application)

The Pre-Development and Current Case Scenarios were developed for the Fort McKay Specific Assessment. Maps of disturbance for these five scenario/cases are presented in (*Appendix 9-2*, Figures 1 to 5).

9.2.6 Fort McKay's Healing the Earth Strategy

Fort McKay's Healing the Earth Strategy (HTES; Fort McKay IRC 2010c) outlines four strategies (*retain, reclaim, improve* and *offset*) that the Community supports with regard to addressing environmental issues. With respect to disturbance and access the HTES strategy focuses on:

- retaining land for traditional uses;
- retaining existing access;
- improving access that has been negatively affected (e.g. access management);
- reclaiming disturbed land (see *Section 10 – Reclamation* of this FMSA); and
- offsets (e.g., protected areas) for land/access that have been adversely affected.

9.3 Direct Disturbance

9.3.1 Introduction

As discussed above, the spatial location of disturbance influences the magnitude of the adverse effect, therefore direct disturbance is assessed for a number of different study areas, which reflect different resources (e.g., large game harvesting areas) and scales of use (e.g., Traplines).

The focus of this direct disturbance assessment is on anthropogenic disturbance. Fort McKay does not consider forest fires to be an industry-related disturbance. Hence, for this Fort McKay Specific Assessment, all disturbance numbers discussed in this assessment are Anthropogenic Disturbance (e.g., oil sands mines, seismic lines, roads, well pads); burned areas are not classified as anthropogenic disturbance².

¹ For some indicators Current Case information was not available, and therefore Base Case was considered a surrogate for Current Case

² Note that Shell provided disturbance tables in the EIA that documented total disturbance (including anthropogenic disturbance and burned areas) for Base Case, Application Case and Planned Development Case for some of Fort McKay's CSE maps (Shell 2007, Volume 5, Section 8.3). The

This assessment of disturbance implications for traditional use is done using total anthropogenic disturbance, not including reclamation. There are a number of reasons for this. First, there is currently very little (less than a few hundred hectares) of land certified reclaimed in the entire oil sands area. Second, the period of time between disturbance and reclamation is predicted to be a minimum of 20 to 50 years depending on the project; at least a generation and sometimes up to several generations of Fort McKay Community members (a generation is defined as 20 years). Effects lasting a generation or more not only have a direct effect on traditional use, but a long-term, inter-generational effect such as loss of traditional knowledge from the Community as a whole and impacts on culture and values [(as documented in the *CHA Baseline* (Fort McKay IRC 2010a) and *Project-Specific CHA* (Fort McKay IRC 2010b)]. Thirdly, while reclamation is essential, Fort McKay does not consider it mitigation and has some serious concerns about the impacts on traditional use and regarding the technical feasibility and long-term risks. These are discussed in detail in *Section 10 – Reclamation*.

Direct disturbance tables present both total area lost to development (in hectares) and the percentage lost within the given study area. While percentages present relative impacts among study areas, it important to note that the actual amount of disturbance and the location and scale at which it occurs factor in to the level of impact felt by the Community. The criteria detailed in Section 9.2.4 demonstrate that there are a number of factors that influence the magnitude of the impact from the Community's perspective.

9.3.2 Traditional Lands and Forty Township Area (FTSA)

Anthropogenic disturbance types and amounts within Fort McKay's Traditional Lands are shown in Table 9-1 and in *Appendix 9-2* (Figures 1 to 5). The largest anthropogenic disturbances are from oil sands developments followed by seismic lines and pipelines.

Disturbance types are similar within the FTSA centred on the Community. Disturbance areas within the FTSA are presented in Table 9-2, for each development case/scenario and for intense, moderate and low traditional use areas within the FTSA (based on the All Traditional Uses CSE map).

9.3.2.1 Pre-Development Scenario

Pre-Development anthropogenic disturbances of the landscape within Fort McKay's Traditional Lands were minimal, consisting mainly of urban areas (e.g., Fort McMurray) and cutblocks and affecting less than 0.1% of the Traditional Lands (Table 9-1). Similarly, within the FTSA, there is very minor disturbance prior to oil sands development (Table 9-2).

disturbance tables presented in the EIA differ from those presented in the Fort McKay Specific Assessment, which include anthropogenic disturbance and but do not include burned areas.

Table 9-1: Disturbances within Fort McKay's Traditional Lands

Disturbance	Pre-Dev't Scenario	Current Scenario	Base Case	Application Case	Planned Dev't Case
	[ha]	[ha]	[ha]	[ha]	[ha]
Oil sands development	0	95,595	131,087	154,385	281,986
Burned areas	170,065	533,310	528,614	525,683	521,420
Municipal	0	2,445	2,445	2,445	2,438
Pipeline	0	13,425	13,348	13,348	12,062
Plant	0	30	30	30	23
Railway	0	18	18	18	18
Road	0	1,896	1,896	1,853	1,735
Seismic/cutline	0	14,451	14,460	14,157	13,247
Transmission lines	0	454	454	454	354
Wellsite	0	3,319	2,360	2,204	1,600
Cutblock	155	0	0	0	0
Urban/industrial/ other	612	0	0	0	2,840
Total Area of Anthropogenic Disturbance, (does not include burned areas)^{1, 2}	767	131,632	166,097	188,893	316,303
% Anthropogenic Disturbance within Traditional Lands³	<1	4	5	5	9

¹ Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of individual values.

² Anthropogenic disturbance does not include cultural land use modifications such as traditional trails maintenance or use of fire for traditional land use purposes.

³ The Total Area of Fort McKay's Traditional Lands is 3,525,101 ha.

Table 9-2: Disturbances within the Forty Township Study Area (FTSA)

Fort McKay Forty Township Area	Area of Forty Township Study Area (FTSA)	Pre-Development Scenario Total Disturbance Area		Current Scenario Total Disturbance Area		Base Case Total Disturbance Area		Application Case Total Disturbance Area		Planned Development Case Total Disturbance Area	
	[ha]	[ha]	% ¹	[ha]	% ¹	[ha]	% ¹	[ha]	% ¹	[ha]	% ¹
Total Anthropogenic Disturbance											
Low use	60,053	2	0	2,706	5	2,642	4	2,703	5	11,978	20
Moderate use	220,255	0	0	50,959	23	67,775	31	87,131	40	98,498	45
Intense use	99,332	0	0	14,040	14	18,947	19	19,395	20	22,620	23
Total²	379,641	2	0	67,705	18	89,364	24	109,229	29	133,096	35

¹ The percentage indicated is the contribution of the area of disturbance to the total area of the Fort McKay Forty Township Area and is rounded to the nearest whole percent.

² Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of individual values.

9.3.2.2 Current Case

Currently, over 130,000 ha of land within Fort McKay's Traditional Lands is directly disturbed; this is a substantial amount of land disturbance, which adversely impacts Fort McKay's ability and opportunities to use the land for traditional purposes. The magnitude of impact on Fort McKay's potential for traditional land use is even greater when focusing in on the FTSA. Over half (67,000 ha) of current disturbance occurs within the FTSA, which includes the Community of Fort McKay and many areas of high use and value to Fort McKay (e.g., Athabasca River corridor, Muskeg River). Within the FTSA, almost all (96%) of the disturbances occur within Intense and Moderate Use CSEs.

9.3.2.3 Base Case

The Base Case incrementally adds another 34,465 ha loss within Fort McKay's Traditional Lands; about two-thirds (21,659 ha) of this loss occurs within the FTSA.

9.3.2.4 Application Case

Shell's proposed projects would add another 22,796 ha direct disturbance - all of it occurring within the FTSA and 97% of that within Intense and Moderate use CSEs. This results in a cumulative direct loss of 29% of the FTSA.

Significance Assessment

The incremental loss of an additional 22,796 ha on an already adversely affected Base Case is considered a significant adverse effect (a **red** situation) that requires immediate mitigation and accommodation, for project-specific and cumulative effects, to be developed in consultation with Fort McKay.

9.3.2.5 Planned Development Case

Under the Planned Development Case 316,303 ha of disturbance is predicted, increasing the land loss associated with industrial development within Fort McKay's Traditional Lands to 9% (Table 9-1). About 133,000 ha of this disturbance is predicted to occur immediately surrounding the Community, within the FTSA resulting in 35% of this area directly disturbed; most of it (91%) within intense and moderate traditional use areas (Table 9-2). As well as the concentration of disturbance within the FTSA, the Planned Development Case also results in extension of disturbance more broadly throughout Fort McKay's Traditional Lands.

Significance Assessment

Under the Planned Development Case a total loss of 316,303 ha is predicted. This cumulative loss of land upon which to practice traditional activities is assessed by Fort McKay as a significant adverse effect (a **red** situation), that requires mitigation and accommodation, to be developed in consultation with Fort McKay.

9.3.3 Traplines

9.3.3.1 Introduction

The Government of Alberta introduced a permitting and licensing system for trapping in 1920 and the current Registered Fur Management Area (RFMA) system (also called Traplines) in the early 1940s (Hatler and Beal 2007). Alberta Sustainable Resource Development (ASRD) administers the RFMA system. This system has an influence on where Fort McKay's traditional activities take place. Trapping is essentially restricted to the registered Trapline holder and their extended family. While people are out on the land trapping they also participate in other traditional activities. Hence, much of individual family's traditional activity may occur within their RFMA making disturbance effects at the trapline-scale important to monitor. Note that there are specific processes in place to provide individual trapper compensation for adverse effects on Traplines. However, this does not address the cumulative effects of development on Fort McKay's way of life and culture.

While the RFMA system does influence where traditional activities take place, traditional land use is not restricted to Trapline areas and the Community as a whole uses seasonally uses various areas within their traditional lands, across Traplines. For example, Traplines are used heavily in certain seasons by the trapline holder and his or her family but in other seasons (such as summer or fall) people use the entire traditional land base.

An assessment of effects of disturbance on Traditional Land use areas is presented in Section 9.4.4.

Three RFMA's (#1714, #1716, #2137) registered to Fort McKay Community members would be affected by Shell's proposed Jackpine Mine Expansion. The Pierre River Mine does not directly overlap with Fort McKay's Community member Traplines, though it does interfere with their ability to use that portion of their Traditional Lands. The area lost to development under the various development scenarios/ cases within each of these Traplines are discussed in this section to show the cumulative effects from pre-development. Other specific impacts to these Traplines including the results of interviews with trappers are discussed in detail in Shell's Traditional Land Use Environmental Setting Report (Golder 2007) and the Traditional Land Use Assessment (Shell 2007, Volume 5, Section 8.3) and are not repeated here. Shell and the regulators will need to consult with Fort McKay as to how to address the RFMA-specific impacts. However, addressing Trapline specific impacts does not preclude the need to address Community-level and cumulative impacts.

9.3.3.2 Pre-Development Scenario

Fort McKay's RFMA's are shown in Figure 9-2. At pre-development in the 1960s, the RFMA system was in place. There was almost no disturbance to Traplines registered to Fort McKay members (Table 9-3).

9.3.3.3 Current Case

Under the Current Case, Traplines #1714 and #2137 are substantially disturbed, where as trapline #1716 currently has limited direct disturbance from oil sands development (Table 9-4).

9.3.3.4 Base Case

With existing and approved developments in place more than 113,000 ha (about 12%) of direct disturbance occurs within Fort McKay member registered Traplines.

Under the Base Case, the three Fort McKay registered Traplines that overlap with the proposed Shell projects are already disturbed, with disturbances ranging from 29% to 46% (Table 9-4).

9.3.3.5 Application Case

The Application Case adds another 10,852 disturbance to Fort McKay community member registered Traplines overall (Table 9-4). The incremental effect of the proposed Jackpine Mine Expansion on Fort McKay community member's Traplines are as follows: #1714 (5358 ha), #1716 (3168 ha) and #2137(1163 ha). This results in cumulative losses ranging from 42% to 60% of the individual Traplines (Table 9-4). In addition to the loss of trapline area, there are many indirect effects of concern to the trappers including noise, dust, odours, reduced air quality, traffic, wildlife population and habitat loss (see Shell 2007, Volume 5, Section 8.3), increased numbers of people on the land and changes in access (see Section 9.5).

Significance Assessment

Loss of portions of Traplines area can impact the Community at different levels. From the perspective of the trapline holder, his or her opportunities to practice traditional activities are curtailed and this likely impacts their family and extended family. TEK does not get passed down since trappers when trappers spend less time on the land, impacting opportunities for children and grandchildren to experience the land. While there are processes in place to provide individual trapper compensation for adverse effects on Traplines, this does not address the lack of opportunity to use the land. Fort McKay would like, in part, other areas to be made available for trapping.

Table 9-3: Disturbances within Fort McKay Community Members' Registered Fur Management Areas

Area of all Fort McKay RFMA's [ha]	Pre-Development Scenario Total Anthropogenic Disturbance Area ^{1,2}		Base Case Total Disturbance Area		Application Case Total Disturbance Area		Planned Development Case Total Disturbance Area	
	[ha]	% of RFMAs ²	[ha]	% of RFMAs ²	[ha]	% of RFMAs ²	[ha]	% of RFMAs ²
922,430	771	<1	113,770	12	126,431	14	169,346	18

¹ Fire has been excluded from the disturbance areas

² Pre-Development includes cutblocks and urban/industrial disturbance categories

* Percentages rounded to nearest whole number

Table 9-4: Disturbances within Local Registered Fur Management Areas

RFMA	Area of RFMA [ha]	Pre-Development Scenario Total Disturbance Area		Current Scenario Total Disturbance Area		Base Case Total Disturbance Area		Application Case Total Disturbance Area		Planned Development Case Total Disturbance Area	
		[ha]	% of RFMA ¹	[ha]	% of RFMA ¹	[ha]	% of RFMA ¹	[ha]	% of RFMA ¹	[ha]	% of RFMA ¹
#1714	39,096	0	0	11,177	29	17,965	46	23,323	60	23,449	60
#1716	23,657	0	0	440	2	6872	29	10,040	42	10,042	42
#2137	27,097	477	2	10,210	38	10,599	39	11,762	43	11,866	44

¹ The percentage indicated is the contribution of the area of total disturbance to the total area of the CSE and is rounded to the nearest whole percent.

Trappers are some of the most active harvesters in the Community. When their trapline is affected and/or their access to their trapline is affected the whole Community is impacted. Impacts on Traplines are eroding the land-base not only upon which to trap but also upon which to practice of other traditional activities that are part of spending time on the land and at trapping cabins.

In the Base Case there is substantial loss of Traplines, indirect impacts (e.g. noise, dust) and access issues (e.g. access through and around mine sites, increased access recreationalists and non-aboriginal hunters). The incremental effects of the Application Case would worsen an already significantly adverse (**red**) situation related to Traplines and associated traditional land use.

9.3.3.6 Planned Development Case

Under the Planned Development Case, no further disturbance is currently predicted for the three Fort McKay Traplines affected by the Jackpine Mine Expansion project.

However, the Planned Development Case would result in an additional 42,915 ha loss of Traplines resulting in a total loss of 169,364 ha (18%) direct loss of Traplines registered to Fort McKay community members.

In addition to the PDC, there is the potential for development over the long-term as evidenced by tenured land (see Figure 9-3). If development were to occur on all tenured land (including the PDC Case) up to 82% of Traplines registered to Fort McKay could be disturbed.

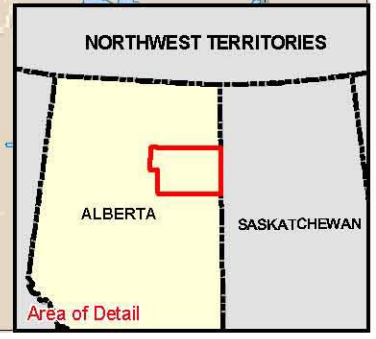
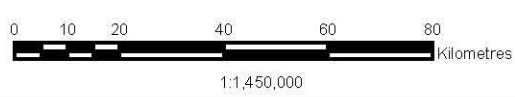
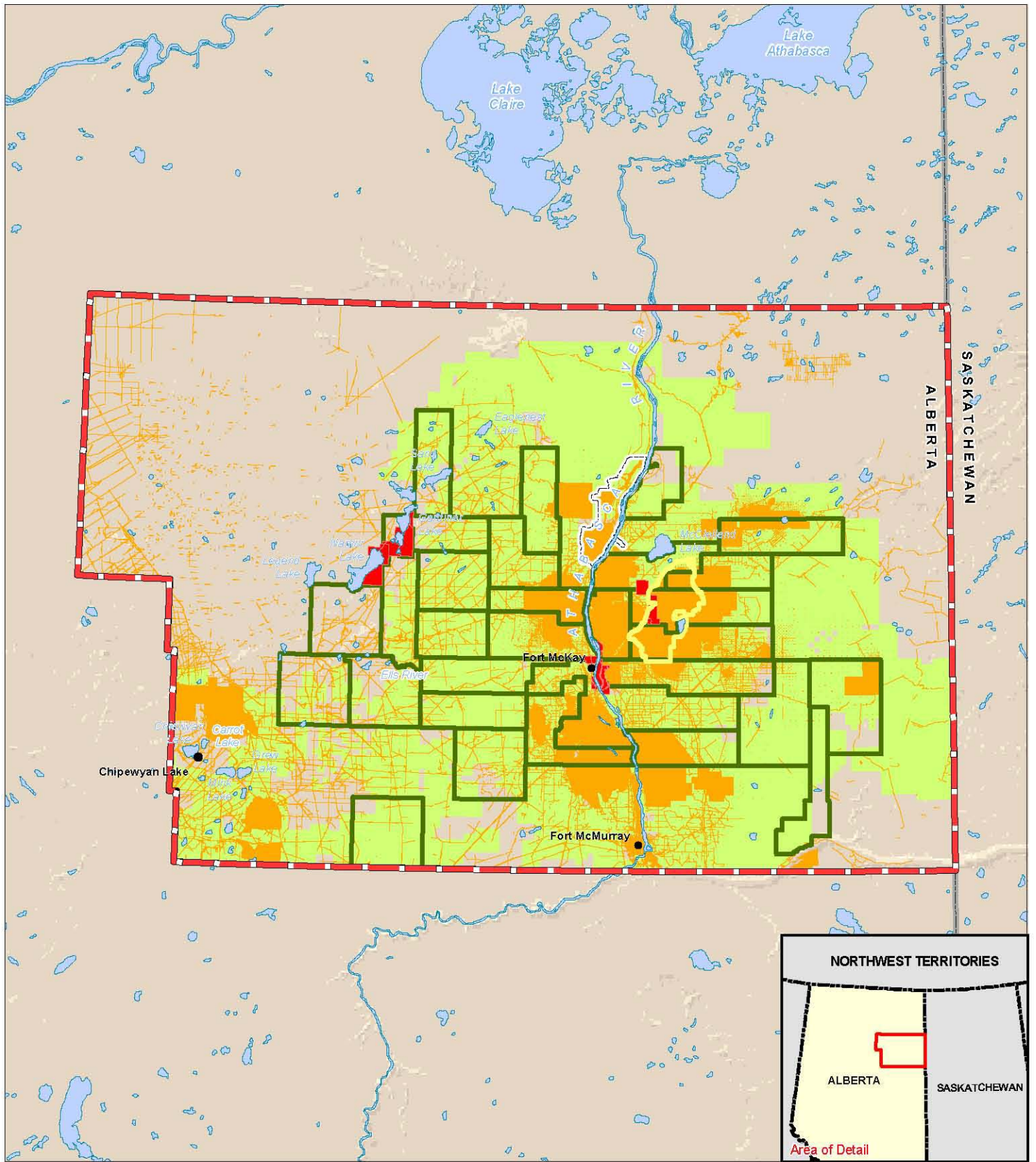
Significance Assessment

In the PDC due to the substantial loss of trapline area, on-going indirect effects on Traplines (noise, odours, traffic, vandalism), the access issues associated with portions of Traplines being blocked off due to industrial development and the potential for even further disturbance, cumulative PDC effects on Traplines are considered significant and adverse (a **red** situation).

9.3.4 Traditional Land Use - Culturally Significant Ecosystems

9.3.4.1 Introduction

This assessment of impacts on Fort McKay's CSE harvesting areas is meant to provide an assessment at the broad landscape scale of impacts on areas of relative intense, moderate and low traditional land use frequency. A general discussion of land use harvesting areas is provided but should not be considered to be comprehensive. Not all of specific resource harvesting sites have been mapped at this scale or included in the database used to produce these CSE maps. Fort McKay may pursue further work to further delineate specific key harvesting sites and to update their traditional land use database. As well, this assessment is done from a pre-development perspective and does not account for changes in land use patterns



Legend

- Study Area
- Fort McKay Trapline Ownership
- Pierre River Mine LSA
- Fort MacKay Reserve
- Jackpine Mine Expansion LSA
- Tenure Land
- Planned Development Case
- Waterbody

**Figure 9-3:
Planned and Potential Development
Disturbances within Fort McKay's Traditional
Lands and Traps**

Produced by: J Blyth
Date: November 3, 2009
Data sources: Government of Canada,
Fort McKay First Nation, McKillop

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that have may occurred in response to industrial development. With consideration of those constraints, this assessment documents important effects and trends on traditional harvesting areas.

9.3.4.2 Pre-Development Scenario

Predevelopment disturbances for all of the CSEs – all traditional uses, large game harvesting, traditional plant harvesting (berries), fish, furbearers, and birds – was very small, less than 0.01% (Table 9-5 to Table 9-9). Disturbance in the Pre-Development Scenario was limited to municipal areas (e.g., Fort McMurray townsite) and forestry cutblocks.

Fort McKay's land use patterns vary, in part, according to the particular type of harvesting. However, in general the areas with intense and moderate use occur along the Athabasca River and its tributaries extending from Fort McMurray north to Poplar Point and the area around Moose (Gardiner) and Buffalo (Namur) Lakes. There are also smaller harvesting areas around Chipewyan Lake (in the southwest), the Birch Mountains (in the northwest) and the Clearwater River (in the southeast) (see *Appendix 9-2*, Figures 1 to 6 for a map of each resource harvesting category).

9.3.4.3 Current Scenario and Base Case

All Traditional Uses CSE

The Current Scenario shows direct disturbance of 133,766 ha within the All Traditional Uses CSE (Table 9-5). However, disturbance disproportionately occurs in Intense and Moderate Use CSEs – 82% of the loss falls into these two categories. The current loss in the All Traditional Use CSEs is 8% and 14% respectively for Moderate and Intense Use CSEs. When approved developments are taken into account losses increase to 11 and 16% respectively for Moderate and Intense Use CSEs.

Large Game Harvesting CSE

The Large Game CSE is the largest CSEs of all the resources harvesting categories that have been mapped, covering more than three million hectares and extending throughout Fort McKay's Traditional Lands. The size of this CSE demonstrates the large distances that people travel to access hunting opportunities.

Even within this very large area 81% of the Current Scenario disturbance is within the Intense Use CSE (Table 9-6) with a current loss of 11% in the Large Game Intense Use CSE. When approved developments are added (Base Case) the cumulative loss increases to 14%.

Table 9-5: Disturbances within Fort McKay's Culturally Significant Ecosystems – All Traditional Uses

CSE	Area of CSE	Pre-Development Scenario		Current Scenario		Base Case		Application Case		Planned Development Case	
	[ha]	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹
Anthropogenic Disturbance Area³											
Low use	2,137,635	91	<1	23,484	1	23,178	1	23,239	1	82572	4
Moderate use	861,563	1476	<1	66,137	8	96,075	11	115,431	13	163104	19
Intense use	309,215	148	<1	44,145	14	48,960	16	49,408	16	64787	21
Total²	3,308,413	1714	<1	133,766	4	168,213	5	188,078	6	310463	9

¹ The percentage indicated is the contribution of the area of total disturbance to the total area of the CSE and is rounded to the nearest whole percent.

² Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of individual values.

³ Anthropogenic disturbance area includes urban/industrial, oil sands development, municipal, pipelines, plants, railways roads, seismic/cutlines, transmission lines, wellsites. Cutblocks are only included in the Pre-Development Scenario.

Table 9-6: Disturbances within Fort McKay First Nation Culturally Significant Ecosystems – Large Game Harvesting

CSE	Area of CSE	Pre-Development Scenario		Current Scenario		Base Case		Application Case		Planned Development Case	
	[ha]	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹
Anthropogenic Disturbance Area³											
Low use	1,235,628	0	<1	7,363	1	7,211	1	7,211	1	34,128	3
Moderate use	1,723,226	1,186	<1	18,801	1	18,451	1	18,632	1	61,809	4
Intense use	1,018,146	525	<1	110,088	11	144,989	14	164,674	16	226,588	22
Total²	3,982,210	1,711	<1	136,252	3	170,651	4	190,517	5	322,525	8

¹ The percentage indicated is the contribution of the area of total disturbance to the total area of the CSE and is rounded to the nearest whole percent.

² Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of individual values.

³ Anthropogenic disturbance area includes urban/industrial, oil sands development, municipal, pipelines, plants, railways roads, seismic/cutlines, transmission lines, wellsites. Cutblocks are only included in the Pre-Development Scenario.

The Fort McKay Specific Wildlife section (*Section 6*, Figure 6-1) notes that, as might be expected, there is a very high overlap between areas of intense large game hunting by Fort McKay and areas of high quality moose habitat. These areas also overlap with the centre of the oil sands minable area and the current development (See Figure 6-1 in Section 6). The wildlife assessment found significant adverse effects (> 20% losses) on moose habitat, for the Base Case, within Fort McKay's Big Game Intense Use CSE and the FTSA as well as documented declines in moose populations within the northwest portion of Fort McKay's Traditional Lands (*Section 6 - Wildlife*).

Traditional Plant Harvesting (Berries) CSE

In the Traditional Plant Harvesting (Berries³) CSE, about 50% of the disturbance is within the Moderate Use CSE and about 25% within the Intense Use CSE. The intense use traditional berry harvesting area is very small compared to harvesting areas for other types of resources. For example, the Intense Use Traditional Plant Harvesting (Berries) CSE is about 74,000 ha (Table 9-7) versus the Large Game CSE, which is about 1,000,000 ha (Table 9-5). Because of these more concentrated harvesting areas, impacts on berry harvesting may be felt more intensely by Fort McKay for the same amount of disturbance than for other resources. Almost 40% of the Intense Use Traditional Plant Harvesting (Berries) CSE is lost under the Current Scenario and Base Case (Table 9-5).

In addition to losses of these broader harvesting areas, Fort McKay has also documented and assessed losses to specific berry producing sites (see *Section 7 - Vegetation*).

Fish CSE

Moderate use fish harvesting areas include Moose and Buffalo lakes and the Athabasca River and include the numerous tributaries that feed into the river within Fort McKay's Traditional Lands (*Appendix 9-2, Figure 4*). Intense use areas are located with the Athabasca River corridor, just north of Fort McMurray and the Poplar Point area.

Losses to fishing areas are summarized in Table 9-8. About 60% of the disturbance of fish harvesting areas occurs within moderate use areas, mainly along the Athabasca River corridor. Losses are 12% in the Current Scenario, increasing to 13% in the Base Case. In addition, the assessment of impacts on watersheds (Section 9.3.5), discusses specific watersheds and tributaries that have been lost to development.

Due to the impacts to tributaries along the Athabasca River as well as concerns regarding the food safety of the fish for consumption Moose and Buffalo Lakes have

³ The Traditional Use Plants CSE assessed berry harvesting locations, other traditionally used plant species were not included. Therefore, many other key plant harvesting sites are missing from this analysis.

Table 9-7: Disturbances within Fort McKay’s Culturally Significant Ecosystems – Traditional Plant Harvesting (Berries)

CSE	Area of CSE	Pre-Development Scenario		Current Scenario		Base Case		Application Case		Planned Development Case	
	[ha]	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹
Anthropogenic Disturbance Area²											
Low use	1,396,491	1,235	<1	27,896	2	44,219	3	50,765	4	104,487	7
Moderate use	396,759	477	<1	65,356	16	82,097	21	95,417	24	117,476	30
Intense use	74,917	0	0	27,814	37	29,408	39	29,408	39	38,443	51
Total³	1,868,167	1,712	<1	121,066	6	155,724	8	175,590	9	260,406	14

¹ The percentage indicated is the contribution of the area of total disturbance to the total area of the CSE and is rounded to the nearest whole percent.

² Anthropogenic disturbance includes urban/industrial, oil sands development, municipal, pipelines, plants, railways roads, seismic/cutlines, transmission lines, wellsites. Cutblocks only included in the Pre-Development Scenario.

³ Some numbers are rounded for presentation purposes. Therefore, it might appear that the totals do not equal the sum of individual values.

Table 9-8: Disturbances within Fort McKay’s Culturally Significant Ecosystems – Utilization Distribution of Fish

CSE	Area of CSE	Pre-Development Scenario		Current Scenario		Base Case		Application Case		Planned Development Case	
	[ha]	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹
Total Anthropogenic Disturbance²											
Low use	1,764,989	149	<1	46,109	3	74,386	4	85,463	5	177,155	10
Moderate use	620,004	1,411	<1	74,786	12	80,758	13	89,547	14	120,521	19
Intense use	132,437	159	<1	2,571	2	2,567	2	2,567	2	3,951	3
Total³	2,517,430	1,719	<1	123,466	5	157,711	6	177,577	7	301,627	12

¹ The percentage indicated is the contribution of the area of total disturbance to the total area of the CSE and is rounded to the nearest whole percent.

² Anthropogenic disturbance area includes urban/industrial, oil sands development, municipal, pipelines, plants, railways roads, seismic/cutlines, transmission lines, wellsites. Cutblocks are only included in the Pre-Development Scenario.

³ Some numbers are rounded for presentation purposes. Therefore, it might appear that the totals do not equal the sum of individual values.

Table 9-9: Disturbances within Fort McKay's Culturally Significant Ecosystems – Utilization Distribution of Birds

CSE	Area of CSE	Pre-Development Scenario		Current Scenario		Base Case		Application Case		Planned Development Case	
	[ha]	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹
Anthropogenic Disturbance Area²											
Low use	1,182,205	796	<1	28,955	2	28,571	2	30,704	3	86,825	7
Moderate use	694,010	916	<1	60,434	9	87,645	13	97,865	14	147,894	21
Intense use	354,791	0	0	36,901	10	44,630	13	52,143	15	63,838	18
Total^{3(b)}	2,231,006	1,712	<1	126,290	6	160,846	7	180,712	8	298,557	13

¹ The percentage indicated is the contribution of the area of total disturbance to the total area of the CSE and is rounded to the nearest whole percent.

² Anthropogenic disturbance area includes urban/industrial, oil sands development, municipal, pipelines, plants, railways roads, seismic/cutlines, transmission lines, wellsites. Cutblocks are only included in the Pre-Development Scenario.

³ Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of individual values.

Table 9-10: Disturbances within Fort McKay's Culturally Significant Ecosystems – Utilization Distribution of Fur Bearers

	Area of CSE	Pre-Development Scenario		Current Scenario		Base Case		Application Case		Planned Development Case	
	[ha]	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹	[ha]	% of CSE ¹
Anthropogenic Disturbance Area²											
Low use	1,119,053	1,557	<1	9,828	1	9,727	1	9,727	1	26,697	2
Moderate use	1,691,405	154	<1	64,266	4	67,091	4	76,948	5	138,411	8
Intense use	1,000,784	2	<1	60,504	6	92,210	9	102,220	10	152,006	15
Total³	3,811,241	1,713	<1	134,598	4	169,028	4	188,895	5	317,114	8

¹ The percentage indicated is the contribution of the area of total disturbance to the total area of the CSE and is rounded to the nearest whole percent.

² Anthropogenic disturbance area includes urban/industrial, oil sands development, municipal, pipelines, plants, railways roads, seismic/cutlines, transmission lines, wellsites. Cutblocks are only included in the Pre-Development Scenario

³ Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of individual values.

become even more important traditional fishing areas than in the past (see CHA Baseline Section 8.3.4).

Birds CSE

Similar to other harvesting categories, the majority of the 97,335 ha of current disturbance occurs within moderate (48%) and intense (29%) bird hunting areas, resulting in a loss of 9% and 10% respectively of Moderate and Intense Use Bird CSEs. This increases to 13% in both of these CSEs in the Base Case.

Furbearers CSE

Similar to moose hunting, the Furbearers CSE extends throughout Fort McKay's Traditional Lands covering almost 3 million hectares. Under the Current Scenario there is 110,282 ha of disturbance, 49% of this occurs in moderate use areas and 33% in intense use areas, resulting in a loss of 4% and 6% respectively in moderate and intense use CSEs. The cumulative losses further increase in Base Case to 4% and 9%.

These cumulative losses may seem relatively small compared to losses within some of the other harvesting categories. However, it is important to keep in mind that currently, trapping by Fort McKay community members occurs within Traplines, and substantially more direct loss has been documented on Traplines (as well as indirect effects on trapping, including access issues, recreational activity, noise, etc.) as discussed in Section 9.4.3.

In addition, Fort McKay assessed impacts on habitat of key furbearers for the Base Case there were substantial habitat losses for furbearers. Habitat losses for Canada lynx and fisher/marten were highest in the FTSA and the Intense Use CSEs. Similar to moose, as discussed above, high quality Canada lynx and fisher/marten habitat is concentrated along the Athabasca River corridor resulting in a high level of disturbance by current and approved developments. High quality beaver habitat is more evenly spread throughout the region and impacts on beaver habitat are as high as for other furbearers but more evenly distributed through Fort McKay's Traditional Lands.

9.3.4.4 Application Case

The Application Case (Shell's proposed Projects) adds an additional 22,796 ha of disturbance that affects all of Fort McKay's traditional harvesting categories. The pattern of the majority of losses occurring in the FTSA (near the Community and the Community's TLE lands along the Athabasca River), and in Intense and Moderate use CSEs continues in the Application Case.

The Application Case increases the loss in the All Traditional Uses CSE to a cumulative loss of 13% (from 11% in the Base Case) in the Moderate Use CSE, with a

small increase in the amount of disturbance in the Intense Use CSE, the percentage loss remains at about 16%.

Large Game CSE losses increase from 14 to 16% in the Intense Use CSE, while disturbance in the Traditional Plant Use (Berries) moderate use CSE increase from 12% to 24%.

Losses in the Fish CSEs increase by 1% in the low and moderate use categories under the Application Case. However, this calculation does not include direct losses of fish habitat that would be incurred due to Shell's proposed projects, including a portion of the mainstem Muskeg River and some of its tributaries as well as several tributaries to the Pierre River. These losses are quantified in Shells Conceptual Fish Habitat Compensation Plan (Shell 2007, Volume 4B, Appendix 4-6). Losses of fish habitat and lost fishing opportunities are assessed in *Section 5 - Water Quality and Fisheries Resources*.

Furbearer CSE losses increase incrementally by 1% in intense and moderate CSEs. However, as discussed above the loss of Traplines and furbearers habitat are the large influences on furbearer harvesting opportunities and these have both been significantly adversely affected.

In the Application Case loss of bird habitat increases 1% and 2% in the moderate and intense use CSEs.

Significance Assessment

Due in part the high overlap between industrial development and Moderate and High Use CSEs for all categories, Fort McKay considers the Current Scenario and Base Case losses to CSEs to be adverse and significant (a **red** situation). Since Shell's projects add another incremental loss to each of the harvesting categories and contribute to cumulative effects, effects of Shell's projects are considered significant as well.

9.3.4.5 Planned Development Case

In the Planned Development Case cumulative losses to resource harvesting areas increase another 3% to 7% depending on the harvesting category (Table 9-5 to Table 9-9) resulting in cumulative losses around 20% in moderate and/or intense use areas. One exception is for Traditional Plant Use (Berries), in which losses would increase by an incremental 12% loss in the Intense Use CSE to a cumulative loss of more than 50%.

Significance Assessment

As discussed at the beginning of this section, any impacts on resources harvesting areas are considered significant and adverse by Fort McKay and impacts within Intense and Moderate Use CSEs are considered to be of high magnitude (a **red** situation). Impacts on traditional use opportunities in general and specifically

disturbances of large game, birds, fish, berries and fur bearers need to be mitigated and accommodated for commensurate to the amount of area disturbed. Impacts on specific sites need to be taken into account. As well, impacts on the habitat that supports key traditional use species and populations (as discussed in the *Water Quality and Fisheries Resources, Vegetation, Wildlife* and *Biodiversity* sections of this Fort McKay Specific Assessment). The loss of harvesting areas and subsequent effects on the culture of Fort McKay have been demonstrated in the *CHA Baseline* (Fort McKay IRC 2010a) and the *Project-Specific CHA* (Fort McKay IRC 2010b) and these need to be factored in when mitigation and accommodation is developed with Fort McKay.

9.3.5 Athabasca River Sub-watersheds

9.3.5.1 Pre-Development Scenario

At pre-development there was almost no disturbance in the subwatersheds of Athabasca River tributaries within Fort McKay's Traditional Lands (Table 9-11).

9.3.5.2 Current Scenario and Base Case

Based on Fort McKay's watershed disturbance assessment criteria⁴, several watersheds are rated as 'threatened' or 'endangered' under current and Base Case conditions; these include the Beaver, Muskeg, Tar, and Calumet river watersheds and the McLean Creek watershed.

In addition to watershed area disturbance areas, these are also direct impacts on portions of the mainstem watercourse and tributaries within each of these watersheds. A large portion of the Beaver River mainstem was diverted around the Syncrude Mine site in the 1970's (described in Keys et al. 1995, Figure 2). Similarly, portions of the Tar and Calumet rivers and their tributaries as well as a tributary to the Pierre River are or will be diverted due to the Canadian Natural Resources Limited (CNRL) Horizon Oil Sands Project (CNRL 2002). A portion of McLean Creek will be diverted due to the Suncor South Tailings Pond (Suncor 2003). Previously, portions of adjacent creeks, Leggett and Wood, were diverted due to Project Millennium. Many watercourses in the Muskeg River watershed will be diverted due to several projects that are already approved within this watershed. The Base Case fish habitat losses in the Muskeg River watershed include (Shell 2007, Volume 4A, Section 6.75):

- Syncrude's existing Aurora North Mine (tributaries to Stanley Creek, the Alsands Drain)

⁴ Assessment criteria for watershed disturbance are as follows: Sustainable (< 20 %), Threatened (20% to 40%) and Endangered (> 40%). These are based on observed changes in surface water runoff that occurred in the Spring Creek and Tri Creeks watersheds in Alberta (DeBoer unpublished data, Jablonski 1978). For more information see *Section 4 - Surface Water Resources*.

Table 9-10: Significance Assessment of Athabasca River Tributary Watersheds Disturbance

Watershed	Pre-Development		Current Case		Base Case		Application Case		Planned Development Case	
	% ¹	Watershed Status	% ¹	Watershed Status	% ¹	Watershed Status	% ¹	Watershed Status	% ¹	Watershed Status
Clarke Creek	0	Sustainable	2.1	Sustainable	2.1	Sustainable	2.1	Sustainable	2.6	Sustainable
McLean Creek	0	Sustainable	30.7	Threatened	30.7	Threatened	30.7	Threatened	41.4	Endangered
Poplar Creek	0	Sustainable	7.7	Sustainable	7.4	Sustainable	7.4	Sustainable	44.1	Endangered
Steepbank River	0	Sustainable	2.5	Sustainable	2.6	Sustainable	2.6	Sustainable	11.6	Sustainable
Muskeg River ²	0	Sustainable	14.2	Sustainable	36.1	Endangered	44.6	Endangered	48.4	Endangered
Beaver River	0.1	Sustainable	35.9	Threatened	35.8	Threatened	35.8	Threatened	63.3	Endangered
MacKay River	0	Sustainable	1.8	Sustainable	1.8	Sustainable	1.8	Sustainable	3.2	Sustainable
Ells (Moose) River d/s of Chelsea Creek	0	Sustainable	1.9	Sustainable	1.7	Sustainable	1.7	Sustainable	6.6	Sustainable
Ells (Moose) River u/s of Chelsea Creek	0	Sustainable	0.8	Sustainable	0.7	Sustainable	0.7	Sustainable	0.7	Sustainable
Tar River	0	Sustainable	30.2	Threatened	30.1	Threatened	30.1	Threatened	36	Threatened
Calumet River	0	Sustainable	27.9	Threatened	27.9	Threatened	27.9	Threatened	28.3	Threatened
Pierre River ²	0	Sustainable	1.8	Sustainable	1.8	Threatened	9.8	Threatened	9.8	Threatened
Asphalt Creek	0	Sustainable	0.6	Sustainable	0.5	Sustainable	0.8	Sustainable	13.7	Sustainable
Firebag River	0	Sustainable	1.3	Sustainable	1.4	Sustainable	1.4	Sustainable	5.2	Sustainable
Grayling Creek	0	Sustainable	0.2	Sustainable	0.2	Sustainable	0.2	Sustainable	0.2	Sustainable

¹Percent anthropogenic disturbance area in the watershed. Does not include burned areas. Includes urban/industrial, oil sands development, municipal, pipelines, plants, railways roads, seismic/cutlines, transmission lines, wellsites. Cutblocks are only included in the Pre-Development Scenario.

²Watershed status for Muskeg River and Pierre River watershed was assessed in detail in Section 4 – Surface Water Resources since these two watersheds are affected by the Application Case. Therefore, the rating is based on both % anthropogenic disturbance and predicted % change in stream flow. For the Muskeg River Maximum change in seasonal stream flow is as follows: Current (-5%), Base Case (126%), Application Case (148%) and PDC (148%). For the Pierre River watershed changed in seasonal stream flow is: Current Scenario and Base Case (0), Application Case (-23%). There are no planned developments in the Pierre River watershed.

- Shell's approved Muskeg River Mine and Expansion project (portion of Mills Creek, several small unnamed creeks; Shell 2009)
- Shell's approved Jackpine Mine Phase 1 Project (portions of Muskeg, Shelley, Khahago, Wesukemina, small downstream portions of Blackfly, Green Stockings and Pemmican Creeks)
- Imperial's approved Kearn Project (portions of upper Muskeg River tributaries and upper Wapasu Creek; Imperial 2006)
- Syncrude's approved Aurora South Mine (portions of upstream tributaries of Kahago and Jackpine creeks)

9.3.5.3 Application Case

Under the Application Case, there are predicted incremental changes in watershed area and in stream flow within the Muskeg River watershed (Jackpine Mine Expansion) and the Pierre River watershed (Pierre River Mine) as described in Figure 9-6 and in *Section 4 – Surface Water Hydrology* and *Section 5 – Water Quality and Fisheries Resources*.

The Jackpine Mine Expansion would involve the diversion of 22 km of the Muskeg River mainstem; diversion of the headwaters of Pemmican, Green Stockings, Blackfly, Wesukemina and Iyininim Creeks to Kearn (Muskeg) Lake (requiring a dyke to contain the higher water levels); and removal of Muskeg Creek, the natural outflow of Kearn Lake, and replacement with two constructed outlets (Shell 2007). The Base Case and Application Case diversions within the Muskeg River watershed and how they are integrated between company's operations in the watershed have yet to be finalized. However, the conceptual integrated closure drainage map shown in Shell's EIA (Shell 2007, Volume 4, Appendix 4-3, Figure 2) presents a summary of the integration of diversions for the various projects.

The upper reaches of Pierre River, Big Creek, Eymundson Creek, Asphalt Creek, and several unnamed creeks are made up of an extensive network of smaller streams that will not be directly impacted by the proposed Pierre River Mine. The lower reaches of these watercourses will ultimately be extensively diverted (some to the Athabasca River), closed-circuited or partially used for filling two pit lakes, the raw water storage lake and the proposed Fish Habitat Compensation Lake. The watershed area would be almost 10% disturbed in this currently essentially pristine watershed.

See *Section 4 -Surface Water Resources* and *Section 5 – Water Quality and Fisheries Resources* for the full Application Case assessment for the surface water, water quality and fish habitat in the Muskeg River watershed (Jackpine Mine Expansion Project) and the Pierre River watershed (Pierre River Mine).

9.3.5.4 PDC Case

In the Planned Development Case the Tar, Calumet, and Pierre River watershed continue to be threatened and the Muskeg, Beaver and McLean Creek watersheds continue are endangers. As well, Poplar Creek watershed moves into the endangered category.

Significance Assessment

The extensive development many of the watersheds within Fort McKay's Traditional Lands not only influences specific traditional land use areas (e.g., fishing areas, Kearn Lake, Traplines); development threatens the very sustainability of some these watersheds. Once that happens, the entire watershed may be lost in terms of the resources that it sustains (e.g., wildlife habitat and corridors, fish habitat, traditional plants) and their availability for any traditional uses for Fort McKay. These watershed losses also in turn affect the Athabasca River (e.g., flow, benthic drift, regional fish spawning and rearing areas).

Impacts on watershed are of concern to Fort McKay. Given that there are no substantive watershed management plans in place for any of these watersheds, Fort McKay concludes that there would likely be significant adverse effects on all the watersheds assessed as threatened or endangered.

9.4 Access

Because multiple impacts inter-relate to impeded Community access, this assessment discusses traditional trails (Section 9.4.1), linear disturbance (Section 9.4.3), human population increases (Section 9.4.3) and community member's experiences (Section 9.4.4) together – as experienced by the Community.

9.4.1 Traditional Trails

9.4.1.1 Introduction

Fort McKay's traditional trail system, as recorded in the traditional use and occupancy study *There is Still Survival Out There* (FMFN 1994), is used as the basis for the traditional trail assessment. The pre-development trail system within Fort McKay's Traditional Lands is presented in Figure 9-4. The trail system consists of an inter-connecting network of trails, many of them along watercourses. The use of these trails would vary depending on seasonal travel and resource harvesting patterns. This trail system afforded access by Fort McKay community members to traditional resources and movement throughout their Traditional Lands. It is important to note that rivers acted as important "trails" in warmer seasons when wet muskeg would impede travel. These rivers are not included in this section unless a trail adjacent to the river was marked on the map.

9.4.1.2 Pre-Development Scenario

The Pre-Development Scenario traditional trail system was essentially unaffected by development disturbance (Figure 9-4). The total kilometers of traditional trails within the FTSA in the Pre-Development Scenario was 1,343 km (Table 9-11). The only 'disturbance' of traditional trails at that time was about 175 km of trails affected by forest fires.

Table 9-11: Traditional Trails (km) in the FTSA by Development Scenario/Case

Disturbance	Pre-Development Scenario	Base Case	Application Case	PDC
	Length (km)	Length (km)	Length (km)	Length (km)
Burns	175	18	14	14
Development Disturbances	0	296	386	493
Other Disturbances	0	24	23	23
Total km of anthropogenic disturbance	0	320	409	516
Total km of traditional trails	1343	1343	1343	1343
% loss of traditional trails due to anthropogenic disturbance	0%	24%	30%	38%

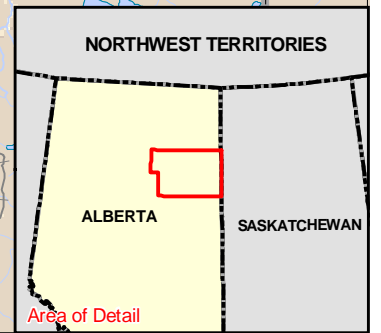
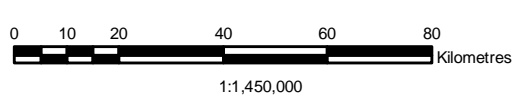
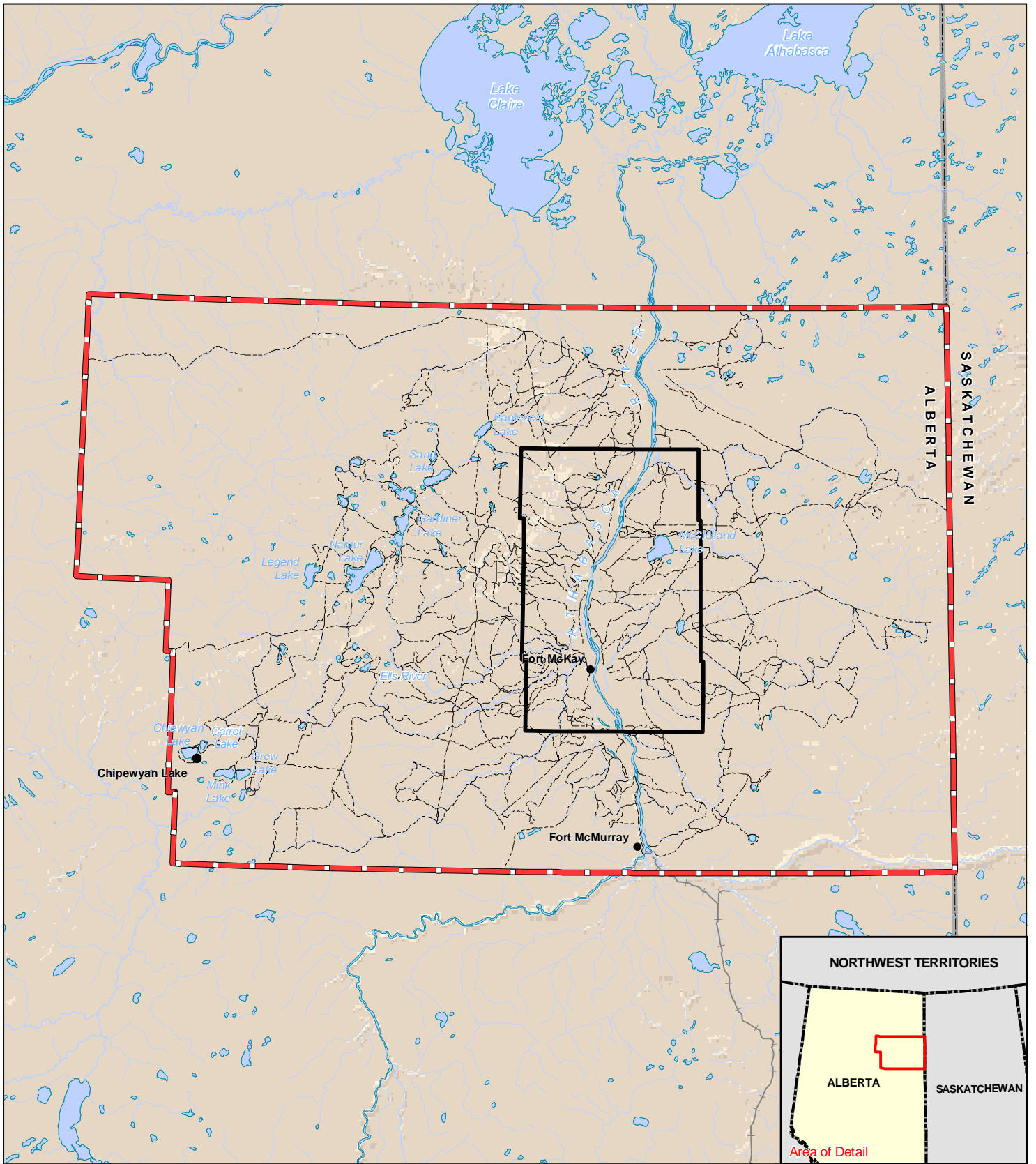
9.4.1.3 Base Case

Within the FTSA under the Base Case, about 320 km of these trails have been disturbed due to development, a 24% loss (Table 9-11).

Not only are the trails that are directly disturbed unusable, but trails missing large sections, particularly in the middle of the trail, are also unusable (Figure 9-10). For example, as shown in Figure 9-5 many trails are cut off due to mining activity: to the south of Fort McKay around Mildred Lake (due to Syncrude's Mildred Lake facility) and trails heading west from the Athabasca River just south of Calumet Lake (due to CNRL Horizon Project). So the loss estimate of 24%, in terms of opportunity for use of the traditional trail system is conservative.

Within the Jackpine Mine Expansion Local Study Area (LSA) 31% of the trails are already disturbed under the Base Case (Table 9-12). As well, most of the trails within the Muskeg River watershed are cut off due to development on both sides of the Muskeg River (Figure 9-5).

In contrast, in the Pierre River Mine LSA existing traditional trails are essentially unaffected (1% loss; Table 9-12). However, there are impacts to trails between the Community of Fort McKay and the Pierre River area (due to CNRL's Horizon



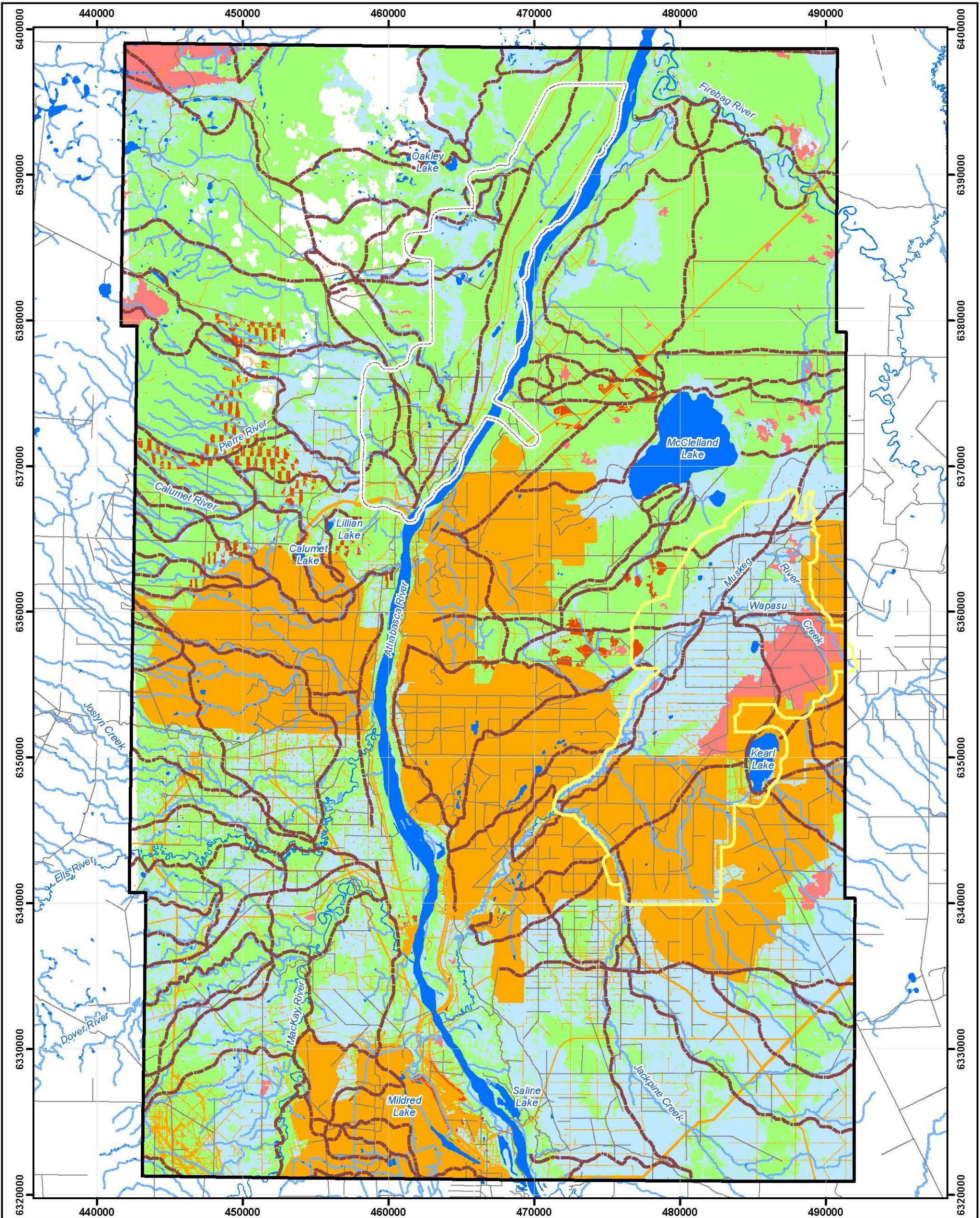
- Legend**
- Traditional Trail
 - Study Area
 - Fort McKay Forty
 - Township Study Area (FTSA)
 - Watercourse
 - Waterbody

Figure 9-4
Traditional Trail System
of Fort McKay

Produced By: J Blyth
 Date: December 14, 2009
 Data Sources: Government of Canada,
 Fort McKay First Nation 1994

Stantec
 11-2042 Mills Rd.
 Sidney, British Columbia
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 Tel. (250) 656 7966
 Fax. (250) 656 4789

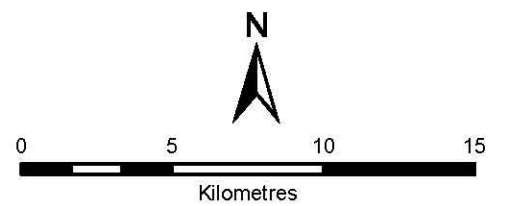




Legend

- Fort McKay Traditional Trails
- 40 Township Study Area
- River
- Lake
- Pierre River Mine LSA
- Jackpine Mine Expansion LSA
- Baseline Disturbance**
 - Development
 - Burned Area
- Land Classification**
 - Upland
 - Wetland
 - Open Water
 - Anthropogenic Influenced
 - Burned Area
 - Unclassified

Source Data: 1) Land Classification-Ducks Unlimited, 2008
 2) Disturbance data-Golder Associates, 2009
 3) Fort McKay Traditional Trails - Fort McKay First Nation, 1994



Scale 1:250,000



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 Fax. (250) 656 4789

**Fort McKay Traditional Trails
 Disturbed in the FTSA
 (Ducks Unlimited Classification) - Base Case**

PROJECTION	UTM - Zone 12 N	DRAWN BY	L. Sherman
DATUM	NAD 83	CHECKED BY	S. Parker
DATE	December 15, 2009	FIGURE NO.	9-5

Project), so in the Base Case ground travel to the areas would require going around the disturbed areas (Figure 9-5). Travel to the area via the Athabasca River would be unaffected.

9.4.1.4 Application Case

For the Jackpine Mine Expansion LSA the disturbance of trails increases from 28 to 67 km under the Application Case, resulting in a 74% loss of traditional trails within the LSA (Table 9-12). Within the LSA main traditional routes to Kearn Lake and along the Muskeg River would be eliminated.

Similarly, a large proportion (59%) of the traditional trails in the Pierre River Mine LSA will be disturbed due to the Application Case (Table 9-13). The large land disturbances associated with Shell’s Projects result in the direct loss of traditional trails as well as the necessity for Fort McKay community members to develop new access routes around these developments (see Figure 9-6).

Table 9-12: Traditional Trails (km) in the Jackpine Mine Expansion LSA by Development Scenario/Case

Disturbance	Pre-Development Scenario	Base Case	Application Case	PDC
	Length (km)	Length (km)	Length (km)	Length (km)
Burns	0	4	<1	
Development Disturbances	0	26	1	
Other Disturbances	0	2	67	
Total km of anthropogenic disturbance	0	28	67	67
Total km of traditional trails	91	91	91	91
% loss of traditional trails due to anthropogenic disturbance	0%	31%	74%	74%

Significance Assessment

Fort McKay considers the existing loss of traditional trails within the FTSA to be a significant adverse loss (a red situation). The loss of trails within this area that is centered around the Community has implications for travel and harvesting throughout Fort McKay’s Traditional Lands as the trails radiate out from the Community and along the major watercourses and the loss of substantial portions of a trail can result the entire network being disrupted. As well, losses to traditional trails are considered permanent. While new trails could be created on reclaimed land they could not be re-created to pre-development conditions and would be

traversing entirely different landscapes and would require that people have an ability to harvest on that reclaimed land – a place where the trail leads to. The incremental increase in loss of traditional trails associated with the Application Case adds to already significant adverse loss. The losses or trails due to the proposed Jackpine Mine Expansion block off the remaining trails to Kearl Lake and along the south side of the Muskeg River. The proposed Pierre River Mine eliminates trails and impedes access north along the west side of the Athabasca River.

Table 9-13: Traditional Trails (km) in the Pierre River Mine LSA by Development Scenario/Case

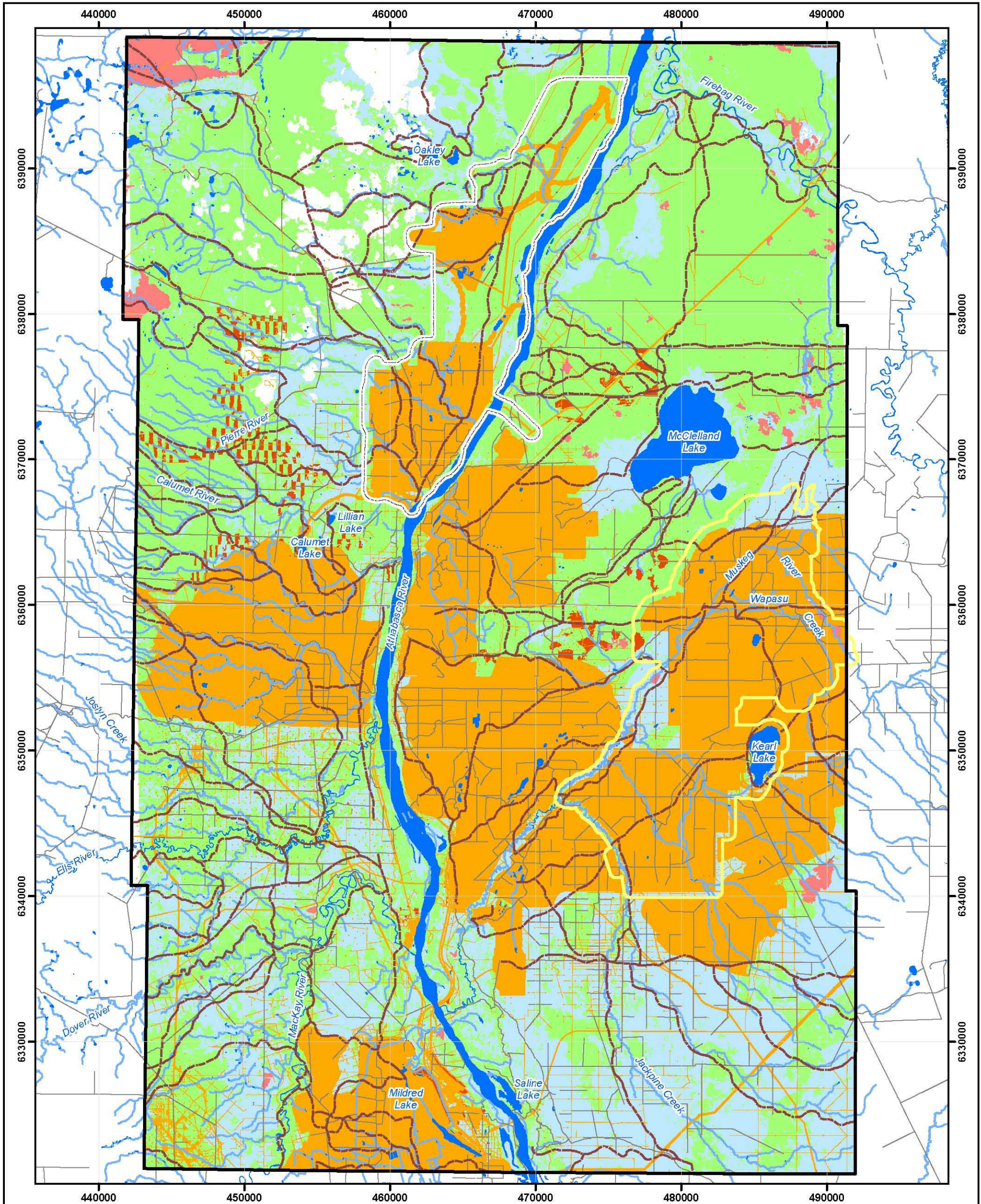
Disturbance	Pre-Development Scenario	Base Case	Application Case	PDC
	Length (km)	Length (km)	Length (km)	Length (km)
Burns	5	0	0	0
Development Disturbances	0	0	<1	<1
Other Disturbances	0	1	49	49
Total km of anthropogenic disturbance	0	1	49	49
Total km of traditional trails	83	83	83	83
% loss of traditional trails due to anthropogenic disturbance	0%	1%	59%	59%

9.4.1.5 Planned Development Case

In the Planned Development Case an additional 107 km of disturbance to trails is predicted within the FTSA. This increases the direct loss of trails within the FTSA to 38%.

Significance Assessment

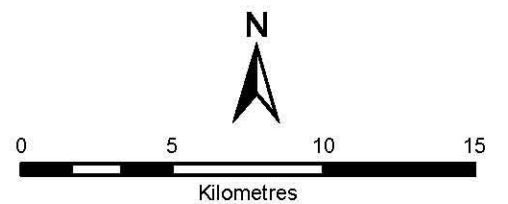
The cumulative effects of development on traditional trails are considered by Fort McKay to be adverse and significant (a **red** situation). Like other losses of specific traditional sites (e.g., berry-picking sites; see Section 7.6.4) losses to traditional trails are considered irreversible, as reclamation cannot recreate a particular trail and the specific landscape that it traverses.



Legend

- Fort McKay Traditional Trails
- River
- Lake
- 40 Township Study Area
- Pierre River Mine LSA
- Jackpine Mine Expansion LSA
- Development
- Burned Area
- Land Classification**
- Upland
- Wetland
- Open Water
- Anthropogenic Influenced
- Burned Area
- Unclassified

Source Data: 1) Land Classification-Ducks Unlimited, 2008
 2) Disturbance data-Golder Associates, 2009
 3) Fort McKay Traditional Trails - Fort McKay First Nation, 1994



Scale 1:250,000



Stantec
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 Fax. (250) 656 4789

**Fort McKay Traditional Trails
 Disturbed in the FTSA
 (Ducks Unlimited Classification) - Application Case**

PROJECTION UTM - Zone 12 N	DRAWN BY L. Sherman
DATUM NAD 83	CHECKED BY S. Parker
DATE October 26, 2009	FIGURE NO. 9-6

9.4.2 Linear Disturbance

9.4.2.1 Introduction

Linear disturbance is a concern to Fort McKay for a number of reasons including direct and indirect effects on resources (discussed in the section), the interaction of linear disturbance with population changes in the region (discussed in Section 9.4.3) and in relation to Community member's access within their Traditional Lands (discussed in Section 9.4.4).

9.4.2.2 Pre-development Scenario

Prior to oil sands development linear developments were limited to Highway 63 and a few forestry roads and cut lines.

9.4.2.3 Current Scenario

Currently, the landscape within Fort McKay's Traditional Lands is characterized by a high density of linear features (e.g., seismic lines, access roads) that afford easy motorized access across the landscape, particularly in areas of active exploration and surrounding active development. Significant ecological damage can be done to boreal ecosystems through motorized human access, through direct damage from access (e.g., damage of aquatic habitats through stream crossings by motorized vehicles, damage to recovering vegetation communities through frequent traffic), and through increased hunting and fishing pressures that accompany access.

Linear anthropogenic features such as seismic lines and roads are a major factor allowing motorized human access to the boreal forest within Fort McKay's Traditional Lands and thus are a major factor in increasing human pressure and damage on these ecosystems. As the density of these features on the landscape increases, so does human presence and resulting damage. Linear densities and the extent of linear development have been increasing in the Lower Athabasca region since the initiation of industrial activities in the area, and are projected to continue increasing substantially in the near future due to continued new development and exploration (See *Appendix 9-1, Figure 5*).

Scenario modeling done for the Regional Municipality of Wood Buffalo indicates that several ecological indicators are sensitive to the influence of linear developments in particular moose, black bear and fish (SEWG 2008). This is mainly due to the fact that linear developments dramatically increase access and consequently hunting and fishing pressure (SEWG 2008).

Linear developments result in landscape fragmentation, which can affect biodiversity. Ecosystem-level landscape fragmentation is discussed in *Section 8* of this assessment. As well, Jordan et al. (2009) examined 'edge effect', the interaction between adjacent ecosystems that is increased due to human-created edge in the

landscape. Edge effects are changes in the structure and function of the ecosystem on either side of the edge (e.g., abundance of a specific wildlife species, changes in structure of a vegetation community such as amount of canopy cover or amount of snags and logs). Based on literature reviews, Jordan et al. (2009) indicate that the influence of edge effects ranges from at least 100 m to several km from the disturbance. Therefore, they suggest the use of buffers in calculating the magnitude of disturbance as a more realistic way to gauge impacts on ecosystems. They give an example of a 1 km pipeline with a right-of-way width of 10 m, which would result in a direct disturbance of 1 ha. However, if a 100 m buffer were added for each side of the pipeline, this would add another 20 ha of disturbance plus the 1 ha from the right-of-way, resulting in 21 ha of disturbance. Buffers can also be applied to polygonal surfaces. It was beyond the scope of this assessment to calculate buffers, however, if buffers were applied to the direct disturbances presented in Sections 9.3.1 to 9.3.5 of this assessment calculated area lost or degraded by development would likely be substantially higher. The current landscape fragmentation due to linear development also has implications for the development of suitable protected areas (see further discussion in Section 9.5).

Access Management

CEMA's Sustainable Ecosystems Working Group determined that one of the most powerful tools for minimizing negative ecological effects in the region is through access management and in particular through restrictions on motorized access and through setting linear density limits.

Currently, there is minimal regional management of access. There are no limits set on motorized access and linear density. There is also very little coordination of access by companies. As well, with the exception of restrictions to access within project boundaries (which companies are allowed to control), there are little or no restrictions on people's movement and access within Crown land.

Fort McKay has identified several key areas that require access management including the corridor between Fort McKay and Moose (Gardiner) Lake, the East Athabasca Highway, and the Richardson Back Country. Fort McKay is willing to work with the regulators to develop access management plans that address Fort McKay's needs related to access management. To date, no comprehensive access management plans are in place within Fort McKay's Traditional Lands.

9.4.2.4 Base Case

Developments that are currently approved but not yet built continue seismic and drilling programs and hence linear development increases. As mine projects begin construction and linear disturbance is replaced by clearing.

9.4.2.5 Application Case

Since there is already existing access to Shell's proposed Jackpine Mine Expansion site, only a small amount of new linear development will occur to access this site, which will be accessed by Highway 63 and Canterra Road (Shell 2007, Volume 1).

Currently, vehicular access to the Pierre River Mine site is limited during the unfrozen part of the year. According to Shell, vehicular access via the Horizon Project road (which is paved), then along the Deer Creek road (which is gravel) is available but further north the road is impassable to vehicles. However, the site is accessible in winter via Highway 63 and an ice bridge across the Athabasca River. An access road west from Highway 63 and a new bridge across the Athabasca River are proposed to allow permanent, all-year access to the Pierre River Mine site (Shell 2007, Volume 2). There would also be road and pipelines connecting the Athabasca River water intake, the raw water facility, the external tailings disposal area (which is not on the same lease as the plant site and mine) and the plant site. Shell states that the new bridge will not increase access since its use will be controlled by Shell during the duration of the project and then the bridge will be decommissioned after the project is over (Shell 2007, Volume 5, Section 8.4.6).

Shell indicates that it will use existing linear corridors for product, diluent, raw water and electrical power lines for the Jackpine Mine Expansion but that a new utility corridor will need to be built for the Pierre River Mine to transport natural gas, power, dilbit and diluent. This additional supporting linear infrastructure would be built by third parties.

Significance Assessment

Due to the extensive linear development within Fort McKay's Traditional Lands, and lack of access management plans or restrictions, Fort McKay assesses the current state of linear development as causing significant adverse effects on the landscape within Fort McKay's Traditional Lands and the resources that it supports (a **red** situation). The additional linear development associated with the Application Case is relatively small compared to the existing linear disturbance. Shell states that the new proposed bridge over the Athabasca River will not increase access since it will be controlled. There will be a new utility corridor associated with the Pierre River Mine. Shell's Projects will add to an already adversely affected situation.

9.4.2.6 Planned Development Case

Appendix 9-1, Figure 5 shows continued extensive linear development under the Planned Development Case, particularly in the western half of Fort McKay's Traditional Lands around Moose (Gardiner) Lake. Additionally, SEWG's modeling predicted declines in moose, bear and native fish integrity for future oil sands develop as discussed in Section 9.4.2).

Significance Assessment

The cumulative effects of planned linear development are considered significant and adverse (a **red** situation). Further work needs to be done to more fully quantify the effects of linear development and to manage access within Fort McKay's Traditional Lands.

9.4.3 Regional Population Levels

9.4.3.1 Introduction

Changes in the human population within Fort McKay's Traditional Lands have an influence on resources (e.g., hunting, fishing pressure, vegetation, damage from quading as discussed in Section 9.4.2) and the accessibility of resources through impacts on Fort McKay community members' enjoyment and sense of safety on the land.

9.4.3.2 Pre-Development Scenario

The Pre-Development Scenario population in Fort McMurray was 2,614 (1966 population statistic; Fort McMurray Historical Society). Regional numbers are not available but can be assumed to be below 5,000.

9.4.3.3 Current Scenario/Base Case

The population of Fort McMurray has increased steadily from the mid-1960s until the early 1980s to about 35,000. It remained fairly steady through the 1980s and mid-1990s (see Figure 9-7). With the second wave of oil sands development, the population doubled in a decade between 1998 and 2008. The current population of Fort McMurray is just over 72,000. For the Base Case (existing and approved project), Shell predicts the urban population to be about 90,000 (Shell 2007, Volume 1, Section 18).

Many oil sands workers live in camps located on or near the oil sands project sites. The Regional Municipality of Wood Buffalo started tracking camp populations in 1999, although previous to that Suncor and Syncrude both had camps. In 1999 camp population was just over 3,500. It rose steadily over the past decade and in 2008 was over 26,000. Most of these camps are located within Fort McKay's Traditional Lands and since many of them are associated with oil sands mines, they are located within the FTSA around the Community.

The regional population, which includes Fort McMurray, other communities (Fort McKay, Fort Chipewyan, Gregoir Lake area, and Anzac), and work camps is now more than 100,000.

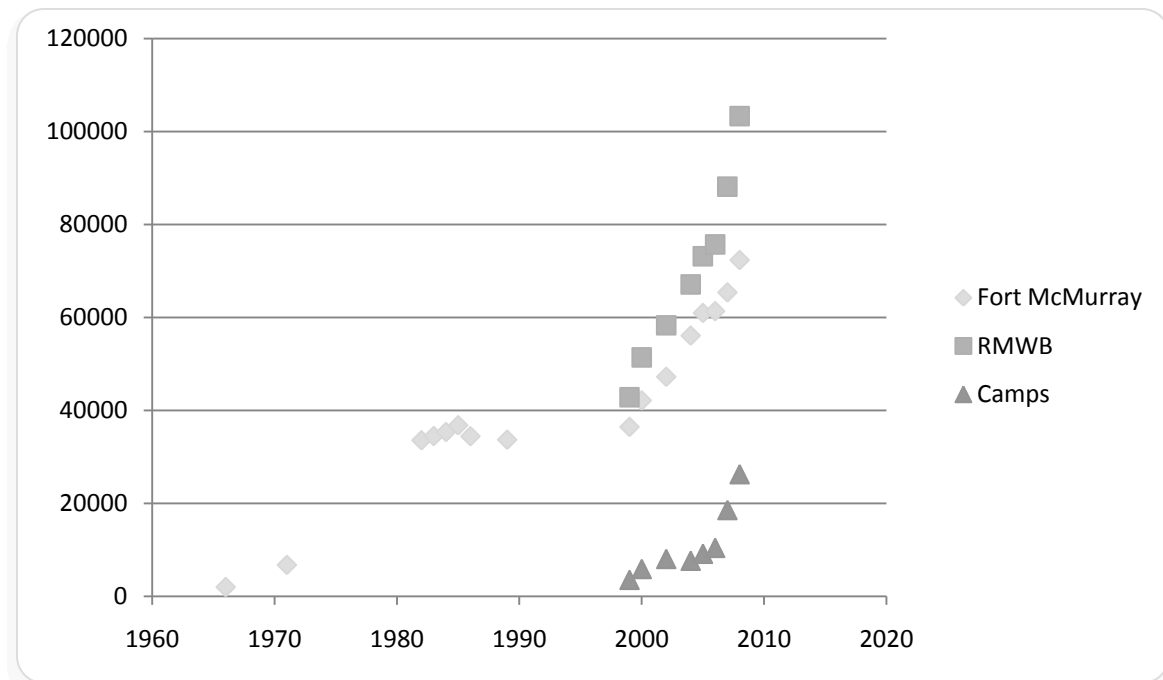


Figure 9-7: Human Population Levels in the Regional Municipality of Wood Buffalo, Fort McMurray and Work Camps

Most of the population growth has been in the past decade and the rapid increase in population has affected Fort McKay's opportunities for accessing traditional resources, in a number of ways. As discussed above, the increased population in the region, in combination with the extensive linear development and access has resulted in increased hunting and fishing pressure. Many of the people in the region also participate in other recreational activities (e.g., quading, camping). This additional activity on the landscape causes competition for resources and has led to conflict and property damage (e.g., to Traplines, cabins).

The increased number of people in the region—particularly the large number of people living in nearby camps—has affected people's sense of safety and well-being both in the Community and while out on the land. Also, see Section 10 in the CHA Baseline, Fort McKay IRC 2010a for discussion of the links between increased population and cultural heritage.

The huge influx of people on the landscape (almost four times the population compared to pre-development), the fact that there is a shrinking land-base within Fort McKay's Traditional Lands and the lack of policy's and management plans to address the access and land use issues is of great concern to Fort McKay and is considered significant and adverse (a red situation) under the Current Scenario and Base Case.

9.4.3.4 Application Case

Shell's proposed Projects would bring additional workers into the area. The workforce for the Jackpine Mine Expansion construction is expected to be about 3,000 workers, peaking in about 2015 (Shell 2007, Volume 1, Section 18). The Pierre River Mine project is scheduled to begin later and its workforce would peak at about 3,000 in 2021.

Shell predicts the proposed Projects would add to the regional population. Their population model predicts an increase in the urban population of 8,000 people - from 90,000 at Base Case to 98,000 in the Application Case.

Significance Assessment

Shell's proposed Project's would incrementally add population growth to an already adversely affected (**red** situation) Base Case.

9.4.3.5 Planned Development Case

A population of about 117,000 is predicted under the Planned Development Case. Shell indicates that population growth will likely level off due to changes in oil sands operations and technologies (Shell 2007, Volume 1, Section 18).

Significance Assessment

The cumulative effects of population increases related planned development would further exacerbate the existing significant and adverse impacts (**red** situation) on Fort McKay's access to resources.

9.4.4 Community Member's Experiences

The following is a sampling of community member's experiences related to access. It is by no means comprehensive, but does give an overview of the types of issues experienced by community members in accessing or trying to access their Traditional Lands.

Access onto or through active oil sands project areas has been limited by industry for safety or other reasons. Within project lease areas, access to traditional hunting, fishing, trapping and gathering areas may be hindered by gates or other restrictions. Access through industrial leases is possible but it often means checking in with security and sometimes having to be escorted across mine sites. This can lead to frustration and real obstacles to access the remaining resources.

"They [industry] blocked us. No fishing, no hunting, nowhere to go"
(Fort McKay Workshop June 2009).

To go to Moose Lake you need a plane; to go to Clearwater you need an outboard motor. Now you need to go a long ways to go fishing...that's money.

(Fort McKay Workshop June 2009)

Companies are really locking things up... long waits and gates to cross lease areas.

(Fort McKay Workshop 2008)

Now we need permission to go onto our trap lines.

(Fort McKay Workshop 2008)

We can't go moose hunting over the (because of) the security gates. They don't let you through.

(FMA 2008, FM Participant 14)

Some people have had to move their cabins due to mine developments and due to problems or delays getting through security to access their cabin (FMA 2008). For example one community member moved their cabin to a location closer to the Athabasca River after development surrounded it (FMA 2008, FM Participant 03) and another will likely have to move their cabin due to the proposed Shell Projects, which would result in a travel time increase from 25 minutes to about an hour and a half (FMA 2008, FM Participant 02).

The loss of traditional trails and the number of seismic lines and changing road patterns associated with industrial development can result in confusion, frustration and impediments to access the remaining resources.

Changing land use patterns, and the subsequent fast pace adaptation required of Community members is challenging. There are so many different linear disturbances that it sometimes becomes confusing to find one's way through the maze of roads, trails, seismic lines, and rights-of-way. Industrial activities are often associated with changing road patterns. For example, the Canterra Road, which heads northeast through the Muskeg River watershed and has been in use for several decades is currently being moved due to mine development.

Its very hard for us to get around on our trapline now because there are so many new roads. You could get lost. It wouldn't take much to get lost. All the new right-of-ways they have cut.

(FMA 2008, FM Participant 05)

Everybody is scared to go in the bush now because cutlines are confusing.

(FMA 2008, FM Participant 11)

Another issue is that once seismic lines are created, they do become travel routes for community members and then are subsequently blocked due to access

management measures that the companies are required to implement by Alberta Sustainable Resource Development (ASRD). For example, one of the community members interviewed for the Shell EIA TLU study indicates that his Trapline can only be accessed by truck because the quad routes are blocked (Golder 2007, TLU Environmental Setting, Section 3.4.4.6).

The high volume of seismic lines and industrial access roads through crown land open up the remaining traditional harvesting areas to non-Aboriginal (as well as Aboriginal) hunters. This increases competition for game and fish and has led to conflict and property damage. For example, a community member interviewed for Shell's EIA TLU study indicated that his cabin was broken into last year (Golder 2007, TLU Environmental Setting, Section 3.4.1.6). Many community members have reported break-ins and vandalism at their cabins as well as garbage and bear-baiting stations that have not been cleaned up at the end of the season (Fort McKay IRC 2010c, Healing the Earth Strategy).

These increased number of non-Community members using the land, often as a result of increased access, has affected, for example, berry picking for some Community members. As the late elder Alice Boucher shared:

There are too many white people, we can't even go berry picking; women are scared to go by themselves

(FMFN 1994: 60)

9.5 Protected Areas

9.5.1 Introduction

In contrast to other indicators discussed in this section in which change to a pre-development indicator is negative, protected areas are a positive indicator. As the amount of protected areas increases, the potential for offsetting losses from disturbances is increased. Fort McKay has identified offsets as one of the key strategies within its Healing the Earth Strategy (along with retain, reclaim, and improve). Protected areas would be an offset for some of the lost traditional land use opportunities that have occurred due to industrial development. Fort McKay has set a target of 40% of its traditional lands to be protected to partially offset the lost opportunities to access the land and conduct traditional activities.

9.5.1.1 Pre-Development Scenario

There were essentially no formally protected areas within Fort McKay's Traditional Lands in the 1960s. This, however, was not an issue at the time as industrial development was minimal and the landscape was intact and minimally influenced by industrial development.

9.5.1.2 Current Scenario/ Base Case

Currently there are only five provincially protected areas within Fort McKay's Traditional Lands:

- Birch Mountains Wildland Provincial Park
- Marguerite River Wildland Provincial Park
- Richardson River Dunes Wildland Provincial Park
- Whitemud Falls Wildland Provincial Park and Ecoreserve
- Quarry of the Ancestors (candidate provincial Historic Site)

As well, Creeburn (Isadore's) Lake, which was transferred to Fort McKay under Treaty Land Entitlement in 2006, has been identified through the Community's land use planning process as an area to protect for preservation of culture.

These existing protected areas comprise about 6.4% of Fort McKay's Traditional Lands; which is nowhere near Fort McKay's HTES target of 40% protection. As well, many of these areas are not easily accessible from the Community.

9.5.1.3 Lower Athabasca Regional Plan Considerations

The Government of Alberta is currently in the process of developing the Lower Athabasca Regional Plan (LARP). The Terms of Reference (ToR) for the Regional Advisory Council (RAC), who is charged with advising the government on the plan, identifies land use considerations and protected areas criteria that are relevant to Fort McKay's protected areas strategy. The ToR state (GoA 2009, p. 11): *"the scope of future oil sands development therefore engages other land-use considerations including the following:*

- *Land use must be managed to meet regional and local environmental objectives, such as the protection of vulnerable waterbodies and wetlands;*
- *Land use must be managed to include Aboriginal traditional use activities; and*
- *Social infrastructure, municipal growth, community and labour needs will need to be addressed".*

As well, the ToR describe the importance of land conservation objectives for the Boreal forest: *"All regional plans will consider conservation of the Boreal forests, which stretches across northern and central Alberta and spans six of Alberta's land-use planning regions. It therefore makes sense that conservation objectives for the Lower Athabasca be established within the context of the Boreal forest."*

As well, the ToR clearly identifies Aboriginal traditional use as an important land use consideration (GoA 2009, p. 18): *It will be important that continued opportunities exist for Aboriginal traditional uses to be in close proximity to First*

Nation's and Métis communities. The Alberta government is committed to consult with Aboriginal people where land management and resource development on provincial Crown lands may adversely affect treaty rights or Aboriginal rights and to consider First Nations and Métis traditional uses.

Fort McKay supports these principles that are described in the LARP RAC ToR and expects to be consulted by the Government of Alberta in the development of the plan, particularly in light of the existing constraints that Fort McKay has identified (see next section) with regard to developing sufficient and appropriate protected areas for traditional use.

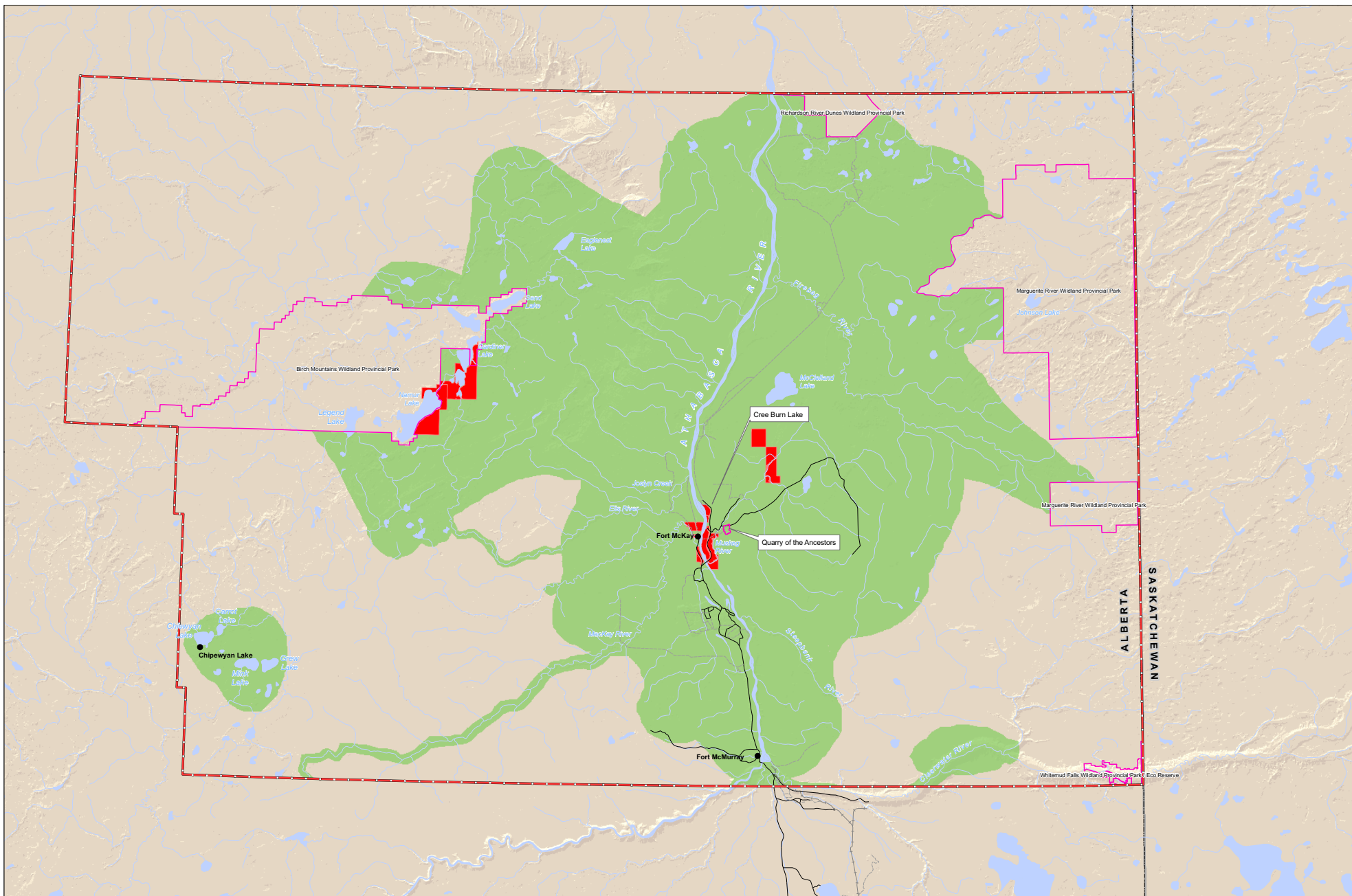
9.5.1.4 Constraints

Fort McKay has identified areas within their Traditional Lands in which specific protected areas could be selected (Figure 9-8). These roughly correspond to moderate and high CSEs and include a large area that encompasses the Athabasca River and its tributaries and the Moose/Buffalo Lake Area and three smaller areas: in the Birch Mountains, near Chipewyan Lake and along the portion of the Clearwater River that is within Fort McKay's Traditional Lands.

Within the proposed areas, priority protected areas that target specific purposes (e.g., key habitat, valued harvesting sites) could be developed to preserve traditional land use values and provide areas within which to continue traditional practices. Fort McKay has identified two areas within their TLE lands, Creeburn Lake and Moose Lake, as high priority for 'preservation of culture'. *It is essential to the Community to have protected areas in close proximity to and easily accessible from the hamlet of Fort McKay.*

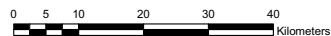
There are several constraints to the development of new protected areas:

- Existing and approved projects already cover about 30% of the proposed protected areas (Figure 9-9).
- The remaining land is already fragmented by linear development. Landscape fragmentation is extensive; the current undeveloped area within the proposed protected areas (1,048,608 ha) is fragmented into 3,180 areas/polygons. Only 559 are 100 ha in size or bigger. This constraints the size and ecological integrity of potential protected areas. More linear development is likely as currently there are no limits on linear development.
- A large amount of disturbance is already located near the Community. In fact the Community is surrounded by development with the exception of small areas directly to the west and the southeast of Fort McKay (Figure 9-9).
- Most of the land within the proposed protected areas is already tenured and if developed, up to 78% of the proposed protected area could be lost (Figure 9-10).



Legend

- Secondary Roadway
- Major Roadway
- +— Railway
- Watercourse
- ▭ Study Area
- ▭ Fort MacKay Reserve / Treaty Land Entitlement Lands
- ▭ High Use Area
- ▭ Park / Historic Site
- ▭ Waterbody



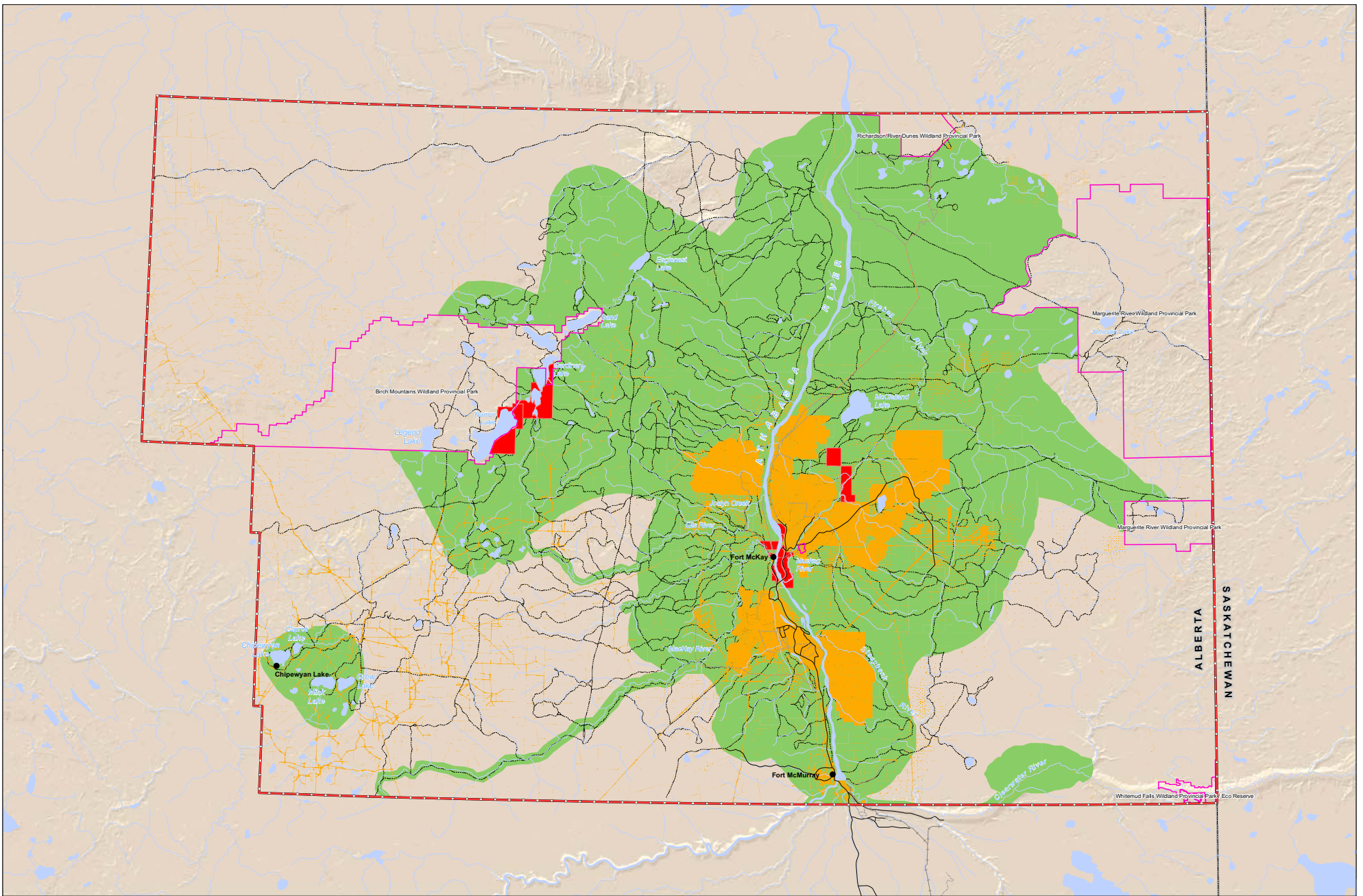
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**Figure 9-8:
Fort McKay Proposed Protected Areas**

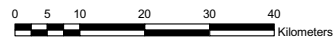
Produced by: R Stohmann
Date: June 23, 2009
Data Sources: Government of Canada,
Fort McKay First Nation





Legend

- Study Area
- Fort McKay Reserve \ Treaty Land Entitlement Land
- High Use Area
- Park / Historic Site
- Development
- Secondary Roadway
- Major Roadway
- Railway
- Traditional Trail
- Watercourse
- Waterbody



1:450,000

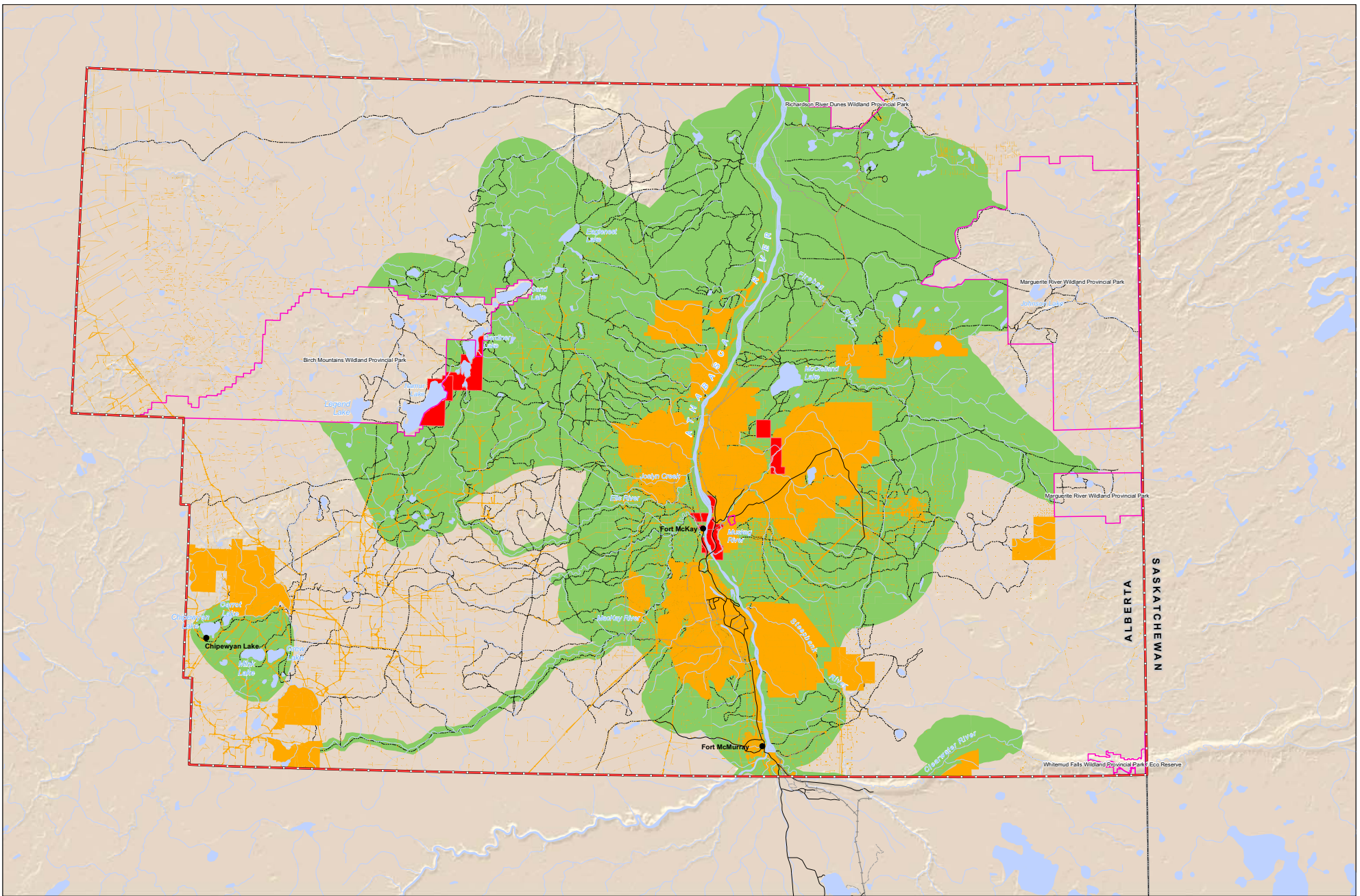


Figure 9-9:
Fort McKay Proposed Protected Areas
with Existing and Approved Development

Produced by: S Parker
 Date: March 17, 2010
 Data Sources: Government of Canada,
 Fort McKay First Nation



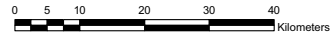
Source Data: Disturbance data-Golder Associates, 2009



Legend

- Study Area
- Fort MackKay Reserve / Treaty Entitlement Land
- High Use Area
- Park / Historic Site
- Development
- Secondary Roadway
- Major Roadway
- Railway
- Traditional Trail
- Watercourse
- Waterbody

Source Data: Disturbance data-Golder Associates, 2009



1:450,000



**Figure 9-10:
Fort McKay Proposed Protected Areas
and Planned Development**

Produced by: S Parker
Date: March 17, 2010
Data Sources: Government of Canada,
Fort McKay First Nation



The disturbance associated with Shell's proposed Projects would add another 1.5% to the disturbed area within Fort McKay's proposed protected areas. More importantly, Shell's proposed Projects are located near the Community and would further constrain the potential for protected areas to be developed near the Community.

9.6 Shell's Proposed Mitigation and Management Measures

Shell's assessment is based on the assumption that reclamation is mitigation for land disturbance impact. While reclamation is necessary and Fort McKay needs to be involved in determining end land uses, Fort McKay does not consider reclamation to be mitigation for lost traditional use opportunities. There are a number of reasons for this perspective including: the time period between disturbance and possible use of reclaimed land by Fort McKay, which is more than one generation and up to several generations of Fort McKay community members; uncertainties regarding potential reclamation success; lack of current technology to reclaim peatlands, which support important traditional resources; potential long-term health, safety and environmental risks (e.g., process-affected seepage, water quality in end pit lakes); and irreplaceable losses (e.g., loss of spirit associated with the land, loss of specific harvesting sites). Fort McKay has many concerns regarding reclamation and these are discussed in detail in *Section 10 - Reclamation*.

Shell's stated mitigation measures for access include controlling access to the site (Shell 2007, Volume 5). Site access control is of course essential, however, it does not mitigate the numerous access issues described above. Most of these issues need to be addressed through government policy (see recommendations below).

9.7 Overall Conclusions and Recommendations Regarding Disturbance and Access

9.7.1 Summary and Conclusions

Prior to oil sands development direct and linear disturbance in Fort McKay's traditional lands was minimal. Access to traditional lands was generally not impeded by industrial development with the exception of the Trapline system that restricted where individuals could trap.

Current and approved developments account for over 188,000 ha of disturbance within Fort McKay's Traditional Lands. This disturbance and access assessment has demonstrated direct and indirect impacts to Fort McKay's key resource harvesting areas (for big game, birds, fish, traditional plants (berries), fur bearers, all traditional uses, and Traplines). Other sections of the Fort McKay Specific Assessment have documented impacts on many specific land-based traditional resources including wildlife [moose populations and habitat, Canada lynx, fisher marten, and beaver (*Section 6 - Wildlife*)], vegetation communities [including

wetlands, uplands, and traditional plants (*Section 7 - Vegetation*), fish and fish habitat (*Section 5 - Water Quality and Fisheries Resources*) and biodiversity (*Section 8 - Biodiversity*).

While Fort McKay uses its entire Traditional Lands there are a few key areas where resource harvesting has been concentrated and these area along the Athabasca River valley and its tributaries, around Gardiner (Moose) and Namur (Buffalo) Lakes, and to a lesser extent the southwest corner of Fort McKay's traditional Lands (near Chipewyan Lake) and in the Birch Mountains (see *Appendix 9-2*, Figures 1 to 6).

Due to the overlap of the oil sands mineable area and the existing/approved developments with the Athabasca River valley and tributaries, impacts to key resources and Fort McKay's harvesting areas occur disproportionately within areas of high and intense traditional use versus areas of low use, as well as near the Community of Fort McKay and Fort McKay's TLE lands that are located along the Athabasca River. From Fort McKay's perspective this intensifies the impacts to Fort McKay.

In addition to direct loss of land, there is substantial linear development throughout Fort McKay's Traditional Lands as shown in Appendix 9-1 (*Figure 2* and *Figure 3*), which fragments the landscape affecting biodiversity, habitat and wildlife populations. There are currently no access management plans in place.

The large disturbances, extensive linear development on the landscape and various other aspects of oil sands development (e.g., noise, odours) significantly adversely affect Fort McKay community member's access to the remaining resources. Traditional trails have been lost. Industrial developments restrict access within active project sites and also substantially impede access to areas on the other side of the development. The huge influx of people into the region causes conflicts and competition for those remaining resources.

Another aspect of access is the changing land use patterns. And the fact that people have to adapt quickly to these. Miles of seismic lines and changing roads, loss of traditional trails, large portions Traplines lost; all of this leads to confusion, frustration and impediments to access the resources that are remaining.

Shell's proposed projects area would add another 22,796 ha of direct disturbance to the 188,893 ha of disturbance from existing and approved developments; following the same pattern of impacts mainly high and moderate use areas. There would also be associated linear disturbance (e.g., pipelines, transmission lines, access roads, new bridge over the Athabasca River etc.) related to the Pierre River Mine. These disturbances would incrementally add to an already adversely affected situation. The proposed Jackpine Mine Expansion would result in additional losses in the Muskeg River watershed, which already has substantial development (see *Section 4 - Surface Water Resources* and *Section 5 - Water Quality and Fisheries Resources*). In contrast, the Pierre River Mine will impact an essentially pristine

area and expand mining development further to north of Fort McKay. Both of these projects are a concern to Fort McKay.

The Planned Development Case is untenable when put in context of an already unacceptable situation. It would add another 67% more disturbance (127,400 ha) as well as expand the extent of oil sands development and linear development as more in-situ projects come into play, particularly in the leases around Moose Lake.

9.7.2 Recommendations

Fort McKay's recommendations related to land disturbance and access address two levels of impacts. Project-specific recommendations are aimed at improving the performance of Shell's Projects, in the event they are approved and proceed. The greatest and most of the adverse impacts on Fort McKay arise from the cumulative effects of Shell's Projects combined with other existing, approved and planned projects. The mitigation and accommodation of cumulative effects requires strategies and measures beyond the project-level. The mitigation and accommodation of cumulative effects requires strategies and measures beyond Shell's control or authority (in most cases); they require governmental authority and action. In many cases, Shell can act in concert with other industry or government to implement the cumulative effects recommendations. These two categories of recommendations overlap because Shell's Projects contribute and form part of the cumulative effects.

With respect to disturbance and access, Fort McKay's recommendations are in keeping with the Community's Healing the Earth Strategy and focus on:

- retaining land for traditional uses;
- retaining existing access;
- improving access that has been negatively affected (e.g., access management);
- reclaiming disturbed land (see *Section 10 – Reclamation*); and
- offsets (e.g., protected areas) for land/access that have been adversely affected.

9.7.2.1 Project-Specific Recommendations

- A maximum area permitted to be disturbed at any one time at both the Pierre and Jackpine Mine Expansion, should be established with further disturbance being permitted only upon successful reclamation of previously disturbed areas.
- Lease/project specific access management plans be developed to facilitate access of Fort McKay community members to Traplines and other traditional use areas.
- Shell address specific trappers issues related to Fort McKay Community members Traplines that occur within the Jackpine Mine Expansion development area.

- Shell develop with Fort McKay a mitigation and offset plan in relation to the adverse effects and loss of key cultural and traditional use areas that would be affected by the Jackpine Mine Expansion and Pierre River Mine.
- Regulators develop with Fort McKay a mitigation, compensation and accommodation plan in relation to the adverse effects and loss of key cultural and traditional use areas that would be affected by the Jackpine Mine Expansion and Pierre River Mine.

9.7.2.2 Cumulative Effects Recommendations

- The regulators should need to ensure that land-uses adjacent to the Community of Fort McKay and Fort McKay's TLE lands are compatible with land-uses identified by Fort McKay and do not adversely impact Fort McKay's lands. In particular, the regulators need to consult with Fort McKay regarding TLE lands that have been identified by Fort McKay, through its internal land use planning process, for preservation of culture (e.g., Moose Lake area, Creeburn Lake) or residential activities (e.g., Community of Fort McKay, proposed new sub-division located near the Muskeg River) to ensure that these lands will not be adversely affected by industrial activity.
- The regulators should establish limits on the amount of development (i.e., ground disturbance) that can occur within the Fort McKay Traditional Lands and oil sands region and any one time.
- The regulators should establish limits on the amount of development (i.e., ground disturbance) and flow changes that can occur within watersheds within Fort McKay's Traditional Lands and the oil sands region at any one time.
- The regulators should establish, in consultation with Fort McKay, protected areas within Fort McKay Traditional Lands that protect a range of traditional uses and values, including the biodiversity necessary to preserve traditional land use. All protected areas need to be accessible to Fort McKay and a portion of protected areas need to be located near the Community.
- The regulators ensure that access management plans are developed within Fort McKay's Traditional Lands, in consultation with Fort McKay including but not limited to areas that have been identified by Fort McKay as high priorities for access management (Moose Lake corridor, East Athabasca Highway Corridor, Richardson Backcountry). Fort McKay should be involved in the implementation of these access management plans.
- The regulators should set limits on motorized access for non-Fort McKay members within Fort McKay's Traditional Lands.
- The regulators should ensure that Fort McKay's access to their traditional lands be restored and maintained in the face of increasing industrial development. This includes preferential access and modes of access for Fort McKay community

members, where access may be restricted for non-Fort McKay community members.

- The regulators should set limits the density of linear features that can be allowed within Fort McKay's Traditional Lands at any given time, in consultation with Fort McKay. Density limits would require successful implementation of Integrated Landscape Management (coordination of access features between users) and would prevent further construction of access features once limits are reached.
- The regulators should ensure that access management plans allow appropriate uses within designated areas. For example, designated high-impact recreation areas – given the interest of a component of the Lower Athabasca Region's population in high-impact recreation (e.g., "quad" usage as a motor-sport, rather than as a means of back-country access), and the damage done to ecologically sensitive areas through this mode of recreation, Fort McKay believes that it may be desirable to designate high-impact recreation areas in areas whose ecological function and integrity may already be compromised. Examples of candidate areas might include quarries, gravel pits and mine waste areas.
- Fort McKay should be made aware of economic opportunities arising from recreation and tourism associated with access and/or land use management plans.
- A mitigation, compensation and accommodation plan should be developed in consultation with Fort McKay in relation to the adverse effects and loss of traditional land use opportunities within Fort McKay's Traditional Lands.
- Development of a co-management strategy with Fort McKay for the management of access and protected areas within Fort McKay's traditional lands.

9.8 References

Canadian Natural Resources Limited (CNRL). June 2002. Horizon Oil Sands Project Application for Approval. Submitted to Alberta Energy and Utilities Board and Alberta Environment.

Deboer, A. (n.d.). Spring Creek Research Watershed, Alberta Environment, unpublished data and reports.

FMA Heritage Consultants Inc. 2008. Fort McKay First Nation Traditional Knowledge Report. In Pierre River Mine Supplemental information, Part 2 Supplements, Appendix A. Prepared for the Shell Canada Jackpine Mine Expansion and Pierre River Mine EIA. Prepared at request of Fort McKay Industry Relations Corporation.

Fort McKay First Nation. 1994. There is Still Survival Out There. The Arctic Institute of North America, Calgary.

- Fort McKay Industry Relations Corporation (IRC). 2010a. Fort McKay Specific Cultural Heritage Assessment (CHA) Baseline: Pre-Development (1964) to Current (2008)
- Fort McKay Industry Relations Corporation (IRC). 2010b. Fort McKay Project-Specific Cultural Heritage Assessment for the Shell Canada Ltd.'s Proposed Pierre River Mine and Jackpine Mine Expansion.
- Fort McKay Industry Relations Corporation (IRC). 2010c. Healing the Earth Strategy.
- Golder. 2007. Traditional Land Use Environmental Setting for the Jackpine Mine Expansion and Pierre Rive Mine Project. Prepared for Shell Canada Ltd. in Shell Pierre River Mine and Muskeg River Mine Expansion EIA, Appendix 3.
- Golder. 2009. Fort McKay Community Assessment. Submitted to Shell Canada Limited.
- Government of Alberta. July 2009. Terms of Reference for Developing the Lower Athabasca Regional Plan. Environ. Res. Lett. 4 (2009) 024004 (15pp).
- Imperial Oil. March 2006. Kearl Oil Sands Project – Mine Development. Application and Supplemental Information. Submitted to Alberta Energy and Utilities Board and Alberta Environment.
- Jablonski, D. 1978. The Tri-Creeks Watershed: a study into the effects of logging on the physical, chemical and biotic conditions of three Alberta East-slope streams, Alberta Forestry Research Centre.
- Jordan, S. M., D.W. Keith, B. Stelfox. Quantifying Land Use of Oil Sands Production: a Life Cycle Perspective.
- Hatler, David F. and Alison M. Beal. 2007. Trapping in Alberta. 2007 Edition Alberta Trappers Education Manual. Alberta Trappers Association. Available at <http://www.albertatrappers.com/>, accessed on March 29, 2010.
- Keys, M., G. McKenna, L. Sawatsky, T. Van Meer. Natural analogs for sustainable reclamation landscape design at Syncrude. Available at: www.infomine.com/publications/docs/Keys1995.pdf
- Fort McMurray Historical Society. The History of Fort McMurray. Library and Archives Canada Electronic Collection. Accessed on March 29, 2010. Available at: <http://epe.lac-bac.gc.ca/100/205/301/ic/cdc/fortmc/index.htm>,
- McKillop. 2002. Toward Culturally Appropriate Consultation: An Approach for Fort McKay First Nation. Jennifer A. McKillop, 2002. Calgary, Alberta.

- Ohno, S. 1996. The Malthusian parameter of ascents: What prevents the exponential increase of one's ancestors? *Proc. Natl. Acad. Sci. USA* Vol. 93, pp. 15276-15278, December 1996.
- Regional Municipality of Wood Buffalo (RMWB) 1999. Municipal Census 1999. Available at: <http://www.woodbuffalo.ab.ca/business/demographics/pdf/1999%20Census%20Report.pdf>
- Regional Municipality of Wood Buffalo (RMWB) Municipal Census 2008. Available at: <http://www.woodbuffalo.ab.ca/business/demographics/pdf/1999%20Census%20Report.pdf>
- Shell. 2007. Application for the Approval of the Jackpine Mine Expansion and Pierre River Mine Project.
- Suncor Energy. December 2003. South Tailings Pond Project. Submitted to Alberta Energy and Utilities Board and Alberta Environment.
- Sustainable Ecosystem Working Group. March 2008 Terrestrial Ecosystem Management Framework for the Regional Municipality of Wood Buffalo. Prepared by the Sustainable Ecosystem Working Group of the Cumulative Environmental Management Association.
- Wilson, B. and B. Stelfox. Indicators Synthesis: Selection Rationale, Modeling Results and Monitoring Considerations for Key Indicators of the Terrestrial Ecosystem Management Framework. Prepared for Sustainable Ecosystem Working Group of the Cumulative Environmental Management Association.