1 INTRODUCTION

Shell Canada Limited (Shell) is applying to the Alberta Energy and Utilities Board (EUB) and Alberta Environment (AENV) for the expansion of an integrated oil sands mining and bitumen extraction operation near Fort McKay, Alberta. The proposed project, named the Jackpine Mine Expansion & Pierre River Mine Project ("the Project"), will include an amendment to the Shell Jackpine Mine – Phase 1 approval for an expansion on the east side of the Athabasca River and a new approval for development of the Pierre River Mine, located on the west side of the Athabasca River.

For the purposes of this report, the Jackpine Mine Expansion is referred to as the Jackpine Expansion Mining Area (JEMA) and the Pierre River Mine is referred to as the Pierre River Mining Area (PRMA).

The JEMA will increase bitumen production at Jackpine Mine – Phase 1 by 100,000 barrels per day to a nominal bitumen production capacity of 300,000 barrels per day. This expansion will include additional mining areas and associated processing facilities, utilities and infrastructure.

The PRMA will produce up to 200,000 barrels per day of bitumen and will include additional mining areas and associated processing facilities, utilities and infrastructure.

Environmental Setting Reports (ESRs) have been prepared in support of the Environmental Impact Assessment (EIA) for the Project to provide information on existing environmental and cultural conditions in the assessment study areas. The environmental setting field studies for the Project have focused on portions of Leases 88, 89, 15, 631 and 632 for the JEMA and Leases 9, 17, 309, 310, 351 and 352 for the PRMA. Neighbouring leases and swap areas were also included in the field studies.

The Cultural ESR consists of three sections:

- Section 1 – Introduction.
- Section 2 – Resource Use ESR.
- Section 3 – Traditional Land Use ESR.

The associated appendices for each section are provided in entirety at the end of the report.

Golder Associates Ltd.

1000, 940 6th Avenue S.W.
Calgary, Alberta, Canada T2P 3T1
Telephone (403) 299-5600
Fax (403) 299-5606

RESOURCE USE ENVIRONMENTAL SETTING FOR THE JACKPINE MINE EXPANSION & PIERRE RIVER MINE PROJECT

Submitted to:
Shell Canada Limited

Prepared by:
Golder Associates Ltd.

December 2007 **05-1344-027-8500**

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2 RESOURCE USE

2.1 INTRODUCTION

Resource Use is the examination of how resources are used by the existing and planned industrial, commercial, and recreational users within the Athabasca Oil Sands Region. This report provides detailed information on the current state of resources in the Project area and supports the Resource Use component of the Project Environmental Impact Assessment (EIA) (Volume 5, Section 7.4). Some overlap of information exists for traditional land users, but specific information on traditional land use is provided in Volume 4, Section 3 of this report.

This document presents detailed information concerning the Regional Study Area (RSA) and two Local Study Areas (LSAs) for the Project. For the purpose of this report, natural resource users include industrial, commercial and domestic users (e.g., the people who extract gravel, participate in recreation, harvest forest resources, pick berries, hunt, trap and fish or otherwise use natural resources). The following key components are considered in the assessment of the potential effects of the Project on resource use:

- applicable management plans;
- environmentally important areas;
- mineral and surface materials;
- access;
- agriculture;
- forestry;
- hunting;
- trapping;
- berry picking;
- fishing;
- cultural and spiritual locations; and
- recreation and tourism.

Land capability is also considered in this assessment and is discussed within the relevant topic headings. For resource use to occur the resources must be available and users must have access to them. Although access is not a resource itself, it is

a critical component that must be considered when evaluating the availability of a resource for use.

2.2 METHODS

Information sources used to evaluate Resource Use in the RSA and LSAs included the following:

- published material from regulatory agencies and resource user service providers regarding resource use activities;
- Alberta Professional Outfitters' statistics for hunting allocations within Wildlife Management Units (WMUs);
- Alberta Sustainable Resource Development (ASRD) information relating to hunting, trapping and fishing;
- the Alberta Energy and Utilities Board (EUB)'s Land Status Automated System (LSAS);
- environmentally important area studies (Westworth 1990 and Sweetgrass Consultants Ltd. 1997);
- forest operators' annual operating plans;
- integrated resource plan guidelines;
- past EIAs; and
- personal communications with knowledgeable service providers and regulators in the area.

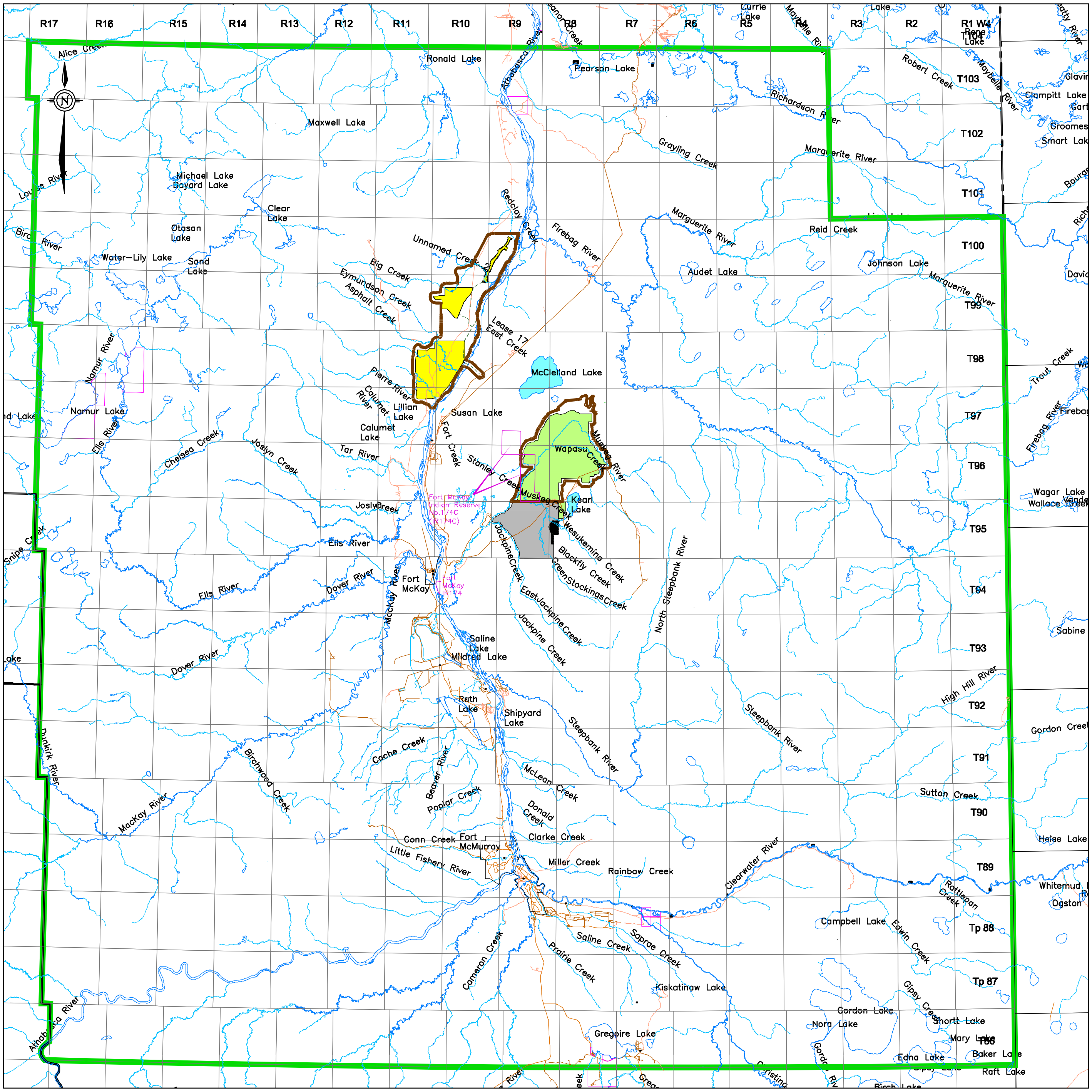
Other primary sources of information about the use of resources in the region were two surveys conducted for Shell in 2007: the Service Provider Survey and the Resource User Survey, which builds on the Athabasca Oil Sands Regional Resource Use Baseline (Golder 2001).

2.2.1 Study Areas

Three areas have been delineated to facilitate data collection and presentation: one Regional Study Area (RSA) and two Local Study Areas (LSAs) (Figure 2.2-1 and Figure 2.2-2).

2.2.1.1 Regional Study Area

The Resource Use RSA includes the city of Fort McMurray, which is the primary economic centre in the region. Both Anzac (south of Fort McMurray) and Fort McKay (north of Fort McMurray) are also included.



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- RESOURCE USE REGIONAL STUDY AREA
- RESOURCE USE LOCAL STUDY AREA
- INDIAN RESERVE

20 0 20

SCALE KILOMETRES

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

REGIONAL AND LOCAL STUDY AREAS

REFERENCE

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USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR
DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12

Shell Canada Limited

PROJECT 05–1344–027.8550			FILE No.	RSA–LSA
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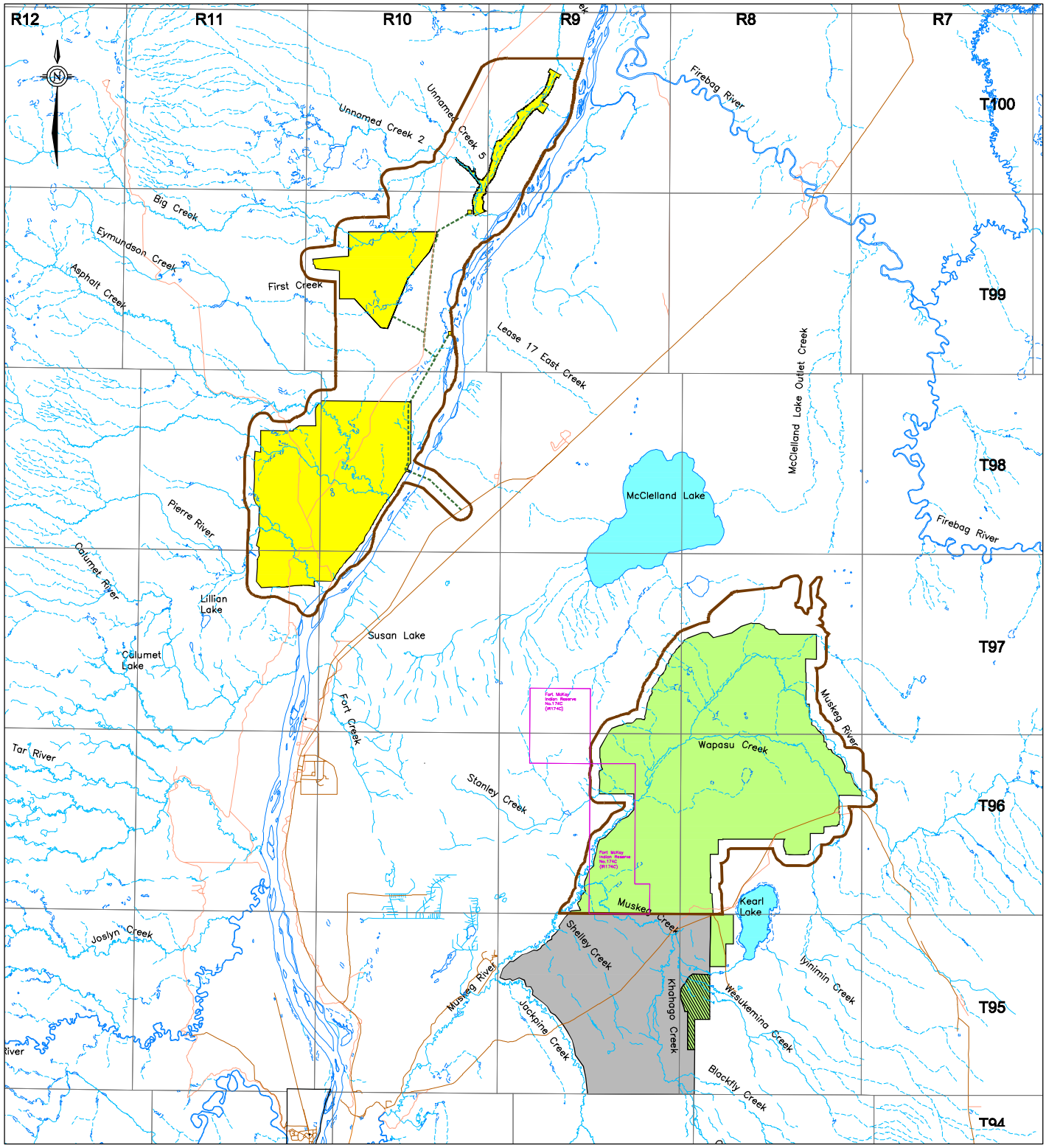
CHECK	JS	14/08/07	FIGURE: 2.2-1	
REVIEW	WES/TC	20/11/07		

L:\2005\1344–OIL SANDS\05–1344–027–Shell Omnibus\8500\8550\Fig 2.2–1_Regional and Local Study Areas.dwg Nov 28, 2007 – 3:50pm



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- INDIAN RESERVE
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- RESOURCE USE LOCAL STUDY AREA

REFERENCE

ALBERTA DIGITAL DATA OBTAINED FROM ALTALIS LTD. (SEPTEMBER 2004.) USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12

PROJECT

JACKPINE MINE EXPANSION & PIERRE RIVER MINE PROJECT

TITLE

JACKPINE EXPANSION AND PIERRE RIVER MINING AREAS LOCAL STUDY AREAS

Shell Canada Limited

PROJECT 05-1344-027.8550			FILE No.	JPM-PRM-LSA
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CADD	TRE	16/11/07		
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REVIEW	WES/TC	20/11/07		

L:\2005\1344-OIL SANDS\05-1344-027-Shell Omnibus\8500\8550\Fig 2.2-2_ PRM-JACKPINE EXPANSION AREAS_Local Study Areas.dwg Nov 28, 2007 - 3:52pm

2.2.1.2 Local Study Area

Two Resource Use LSAs were established to allow the Jackpine Expansion Mining Area (JEMA) and the Pierre River Mining Area (PRMA) to be considered independently. Each LSA encompasses the immediate Project footprint (the area directly affected by the development), including a 500-m buffer zone.

2.2.2 Service Provider Survey

The objective of the Service Provider Survey was to target those clubs, organizations, businesses and services that operate in the resource use sector, including recreation clubs, aggregate suppliers, forestry companies, tourism organizations and government agencies. The survey was conducted between June 21, 2007 and August 9, 2007. Each organization was polled for information that related specifically to their area of expertise and interest.

The survey focused on groups operating within the LSA boundaries, however some groups operating in other areas of the RSA were included to provide a regional perspective. In all, 18 organizations participated in this survey. Table 2.2-1 provides a list of the participants and the type of information obtained from them.

Table 2.2-1 Service Provider Survey Participants and Relevant Resource Use

Organization	Area of Resource Use
Alberta Sustainable Resource Development - Public Lands and Forests	Forestry - management of forest land base
Alberta Pacific Forestry Products	Forestry - timber harvesting issues and concerns
Northland Forest Products Ltd.	Forestry - timber harvesting issues and concerns
NE AB Wilderness Outfitters	Hunting - trends in recreational hunting; important areas and resource concerns
Birch Mountain Outfitters	Hunting - trends in recreational hunting; important areas and resource concerns
Blanch Lake Outfitters	Hunting - trends in recreational hunting; important areas and resource concerns
Alberta Sustainable Resource Development - Fish and Wildlife	Hunting and Fishing - trends in use of these resources; resource concerns
Fort McMurray Fish and Game Association	Hunting and Trapping - public interest in, and concerns about, hunting, trapping and fishing issues
TBG Contracting	Mineral and Surface Materials - aggregate supply and trends
Birch Mountain Resources	Mineral and Surface Materials - aggregate supply and trends
Inland Aggregates - North Parsons Creek Project	Mineral and Surface Materials - aggregate supply and trends
Centennial Park	Recreation and Tourism - camping trends and issues
Gregoire Lake Campground	Recreation and Tourism - camping trends, issues and concerns

Table 2.2-1 Service Provider Survey Participants and Relevant Resource Use (continued)

Organization	Area of Resource Use
Borealis Canoe Club	Recreation and Tourism - important paddling areas, trends in participation; resource concerns
Points North Adventures	Recreation and Tourism - important paddling areas, trends in participation; resource concerns
Ptarmigan Nordic Ski Club	Recreation and Tourism - popular cross-country ski locations
Fort McMurray Tourism Bureau	Recreation and Tourism - popular tourist destinations and activities
Canadian Helicopters	Recreation and Tourism - trends in aerial tours

2.2.3 Resource User Survey

A Resource User Survey (RUS) was developed to target members of the public living within the RSA. Its purpose was to gather information about specific resource uses for which few sources of information are available, such as berry picking, and to supplement government statistics for resources uses that are regulated such as hunting and fishing.

The survey was conducted in two phases by SAW Communications, a company specializing in research on population groups. To qualify for phase one, respondents had to be over 18 years of age and living in the RSA for a minimum of one year. Respondents who qualified, but answered that they did not participate in outdoor activities outside of the Fort McMurray city centre were not asked any further questions. Respondents who did participate in outdoor activities outside the city centre were further questioned regarding the nature of their resource use. Based on this methodology, this survey follows a recruitment design. In a recruitment study, individuals are selected to participate based on meeting specific criteria (i.e., age requirement, living in the RSA for a minimum period of time and engaging in outdoor activities a certain distance from the town). If the criteria are not met, then the individuals are not asked to participate. In this respect, the survey is not considered random even though the phone numbers called were randomly selected.

In total, 653 people qualified for the survey. Of these, 241 indicated that they did not participate in outdoor activities outside the city centre. The remaining 412 surveys were completed. To determine activity participation rates, all 653 people called were included in the analysis to better represent the entire population. In contrast, for those questions that were not specific to activity participation, but to club participation or perception of impacts to recreational opportunities, only the set of 412 respondents were included in the analysis. Typically, the random selection of 400 households from a town the size of Fort McMurray would

represent a 95% confidence limit with an error margin of plus or minus 5%. However, as this was a recruitment study and not a random design, a specific confidence limit cannot be determined.

Table 2.2-2 provides demographic information about the participants who completed the survey process. Sixty percent of the respondents (247) were male. This 60:40 ratio between male and female respondents closely represents the proportion of men in the Fort McMurray population (according to the 2006 municipal census, 55% of Fort McMurray residents are male [RMWB 2006]).

Table 2.2-2 Demographic Data for Resource User Survey Participants

Age Group	Males	Females	Total
18 to 24	23	15	**38**
25 to 34	39	42	**81**
35 to 44	85	64	**149**
45 to 54	70	38	**108**
55 to 64	24	6	**30**
65+	6	0	**6**
Total	**247**	**165**	**412**

Phase two involved questioning a subset of the phase one respondents. Those who answered positively to participating in activities within 60 km north of Fort McKay were asked to participate in another round of questions. This phase was intended to target activities that may be occurring within Shell's lease areas. Maps were provided to phase two respondents allowing the results to be directly related to the Project. Questions were more specific and respondents were asked to pinpoint on the map where they engage in particular activities.

A total of 127 respondents qualified for phase two and, of these, 40 agreed to participate. Of the 40 willing to participate, 36 indicated conducting activities within the target areas and were further questioned. The responses of these 40 participants were used to represent overall population trends. Because the total surveyed population was 653 people, each of the participants of phase two represents 0.5% of the general population. Therefore, if one person indicated fishing in the JEMA LSA, it could be concluded that 0.5% of the population participates in fishing activities within the JEMA LSA.

A map was supplied to phase two respondents (Figure 2.2-3). This map was broken down into multiple numbered areas. For the purposes of the analysis, the JEMA LSA is represented by Area 9. The PRMA LSA is represented by Area 5

and Area 6. A fourth area, Area 2, is also being included in the analysis. This area represents the Athabasca River Corridor (ARC), of which, a portion borders the PRMA LSA. Therefore, responses indicating activity within the ARC are included in the evaluation of resource use activity in the PRMA LSA.

L:\2005\1344-OIL SANDS\05-1344-027-Shell Omnibus\8500\8550\Fig 2.2-3_Phase Two Survey Map-Areas of Interest.dwg Nov 28, 2007 - 3:55pm

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T.97

T.96

T.95

T.94

T.93

Poplar Point IR201G

Peace R.

Fort Chipewyan

SITE

Athabasca River

Fort McKay

Fort McMurray

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Redclay Creek

Firebag River

Unnamed Creek 2

Big Creek

Eymundson Creek

Asphalt Creek

First Creek

Audet Lake

Lease 17 East Creek

Unnamed Creek 1

Pierre River

Athabasca River

McClelland Lake

McClelland Lake Outlet Creek

Firebag River

Calumet River

Lillian Lake

Calumet Lake

Susan Lake

Fort Creek

Muskeg River

Wapasu Creek

Tar River

Stanley Creek

Joslyn Creek

Muskeg River

Shelley Creek

Kearl Lake

Jackpine Creek

Khahago Creek

Wesukemina Creek

Iyinimin Creek

Blackfly Creek

Green Stockings Pemmican Creek

East Jackpine Creek

North Steepbank River

Ells River

Dover River

MacKay River

Saline Lake

63

LEGEND

BOUNDARY OF AREA OF INTEREST

REFERENCE

ALBERTA DIGITAL DATA OBTAINED FROM ALTALIS LTD. (SEPTEMBER 2004.)
USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR
DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12

5 0 5
SCALE METRES

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

PHASE TWO SURVEY MAP-AREAS OF INTEREST

Shell Canada Limited

PROJECT 05-1344-027.8500			FILE No.	Areas of Interest
DESIGN	JS	03/10/07	SCALE AS SHOWN	REV. 0
CADD	TRE	03/10/07		
CHECK	JS	20/11/07		
REVIEW	WES/TC	20/11/07		

FIGURE: 2.2-3

2.3 RESULTS

2.3.1 Management Plans, Policy Documents and Associations

Three policies are applicable to regional land use planning and resource initiatives within the Regional Municipality of Wood Buffalo (RMWB):

- Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan (IRP) (ASRD 2002);
- Regional Sustainable Development Strategy for the Athabasca Oil Sands Area (RSDS) (AENV 1999), including the Cumulative Environmental Management Association (CEMA); and
- Regional Municipality of Wood Buffalo Municipal Development Plan (RMWB 2000).

2.3.1.1 Integrated Resource Plans

Integrated Resource Plans (IRPs) outline the Alberta Government's resource management policy for specific areas of the province. These plans are not regulated and do not apply to municipal, federal or private lands. However, they do provide a comprehensive, integrated framework for the management of resources on public lands. The IRPs outline mechanisms to promote development activities compatible within each Resource Management Area (RMA) by providing direction for the management of public land and resources through future actions of both the provincial government and the private sector.

The Jackpine Expansion and Pierre River Mining Areas fall within the Fort McMurrray-Athabasca Oil Sands Subregional IRP (ASRD 2002). This planning area is subdivided into five RMAs (Table 2.3-1) as shown in Figure 2.2-3. The JEMA and PRMA LSAs overlap both the Athabasca-Clearwater and Mildred-Kearl Lakes RMAs.

Table 2.3-1 Integrated Resource Plan Regional Management Areas in the Regional Study Area

IRP	RMA	Description
Fort McMurray – Athabasca Oil Sands	1	Fort McMurray Fringe
	2	Athabasca-Clearwater
	3	Gregoire Lake
	4	Mildred-Kearl Lakes
	5	Stony-Birch

The management intent of the Mildred-Kearl Lakes RMA is "to promote the orderly planning, exploration and development of resources with emphasis on the area's oil sands reserves" (ASRD 2002). The management intent of the Athabasca-Clearwater RMA is "to protect the natural landscape, which encompasses water, wildlife habitat, ecological and geological features, to ensure aesthetic, recreation, traditional and environmental values" (ASRD 2002).

The IRP guidelines range from documentation of issues related to resource uses and development to definition of limits on how or where an activity is conducted. Two types of guidelines exist within the IRP. Broad objectives and guidelines have been developed for the region in general, and are not specific to any particular area. Specific guidelines have also been developed and these address issues associated with each particular RMA. A specific guideline indicating the requirement to mitigate impacts to ESAs within the Athabasca - Clearwater RMA is not applicable to ESAs within the Mildred - Kearl Lakes RMA.

Guidelines have been developed for several components of resource use such as mineral and surface material resources, forest resources, access and infrastructure, agriculture, recreation and tourism, ecological resources, wildlife resources and fisheries. A series of tables summarizing the guidelines for each resource use component for each RMA are found throughout this report.

2.3.1.2 Regional Sustainable Development Strategy

Creation of the RSDS (AENV 1999) for the Athabasca Oil Sands Region was initiated by Alberta Environment (AENV) in co-operation with provincial and federal agencies and regional stakeholders. The strategy developed from a need to maintain Alberta's commitment to environmental and resource management during the growth of oil sands developments. The RSDS has been in effect since July 1999 and is implemented by AENV, ASRD and CEMA.

Resource use related principles identified for the RSDS region (AENV 1999) include:

- Renewable resources will be managed to ensure their long-term viability and future use potential.
- Renewable resources will be managed for traditional, recreational and resource development uses.
- Non-renewable resources will be managed to maximize benefits to Albertans.
- Resources will continue to be developed within the requirements of provincial legislation, policies and guidelines.

- All resource development will occur in an orderly manner that considers and preserves environmental quality not only within Alberta, but also in neighbouring government jurisdictions.

2.3.1.3 Cumulative Environmental Management Association

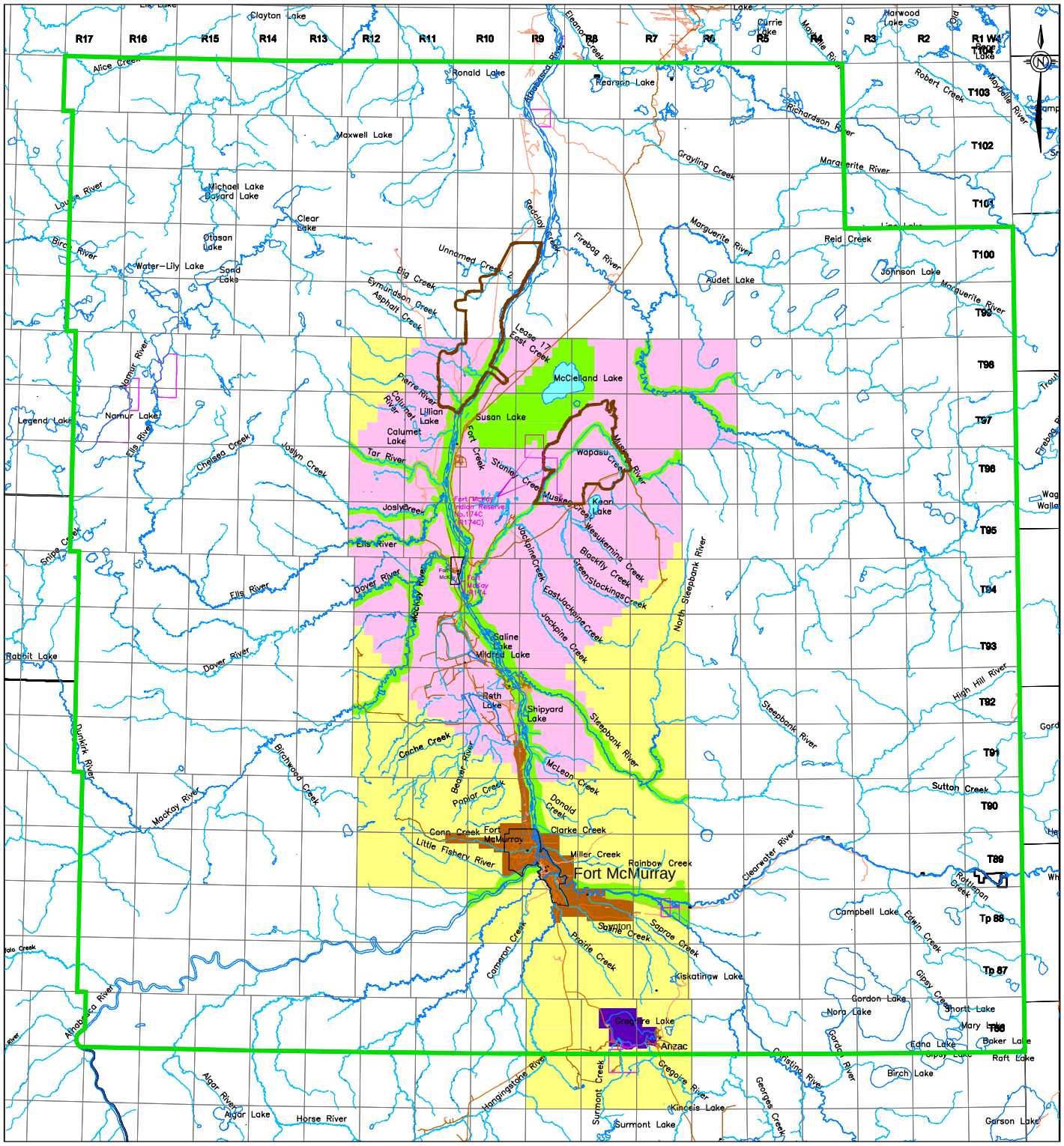
The regional initiative CEMA is a multi-stakeholder organization dealing with cumulative environmental issues in the Oil Sands Region. Defined goals for CEMA are to create an effective, streamlined process for managing cumulative environmental effects, with measurable results that indicate environmental protection or improvement. Working groups within CEMA have been formed to address specific environmental issues. The group formed to address most resource use related issues is the Sustainable Ecosystems Working Group (SEWG). This group has developed various goals pertaining to the protection and maintenance of resources for multiple uses and user groups.

2.3.1.4 Regional Municipality of Wood Buffalo Municipal Development Plan

Municipalities with a population of 3,500 or greater are required under the *Municipal Government Act* to prepare a Municipal Development Plan. The plan for the RMWB is the primary land use document in the region and its policies allow the further development of detailed and specific planning and land use control documents. The environmental management goal outlined in the plan is "to conserve and protect the region's natural, historical and archaeological resources while accommodating development in a manner that serves the community and the greater public interest" (RMWB 2000). This involves maintaining and protecting a healthy natural environment, promoting tourism, regulating development to ensure environmental degradation does not occur and the preservation of historical and archaeological sites.

2.3.2 Environmentally Important Areas

Environmentally important areas are places that have been designated or protected for their significant environmental features. Some areas are legally protected (e.g., Provincial Parks and Recreation Areas) while others, such as Environmentally Significant Areas (ESAs), are not (Figure 2.3-1).



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- RESOURCE USE REGIONAL STUDY AREA
- RESOURCE USE LOCAL STUDY AREA
- INDIAN RESERVE

FORT McMURRAY-ATHABASCA OIL SANDS
SUB REGIONAL INTEGRATED RESOURCE PLAN AREAS:

- FORT McMURRAY FRINGE
- ATHABASCA-CLEARWATER
- GREGOIRE LAKE
- MILDRED-KEARL LAKES
- STONY-BIRCH

REFERENCE

ALBERTA DIGITAL DATA OBTAINED FROM ALTALIS LTD. (SEPTEMBER 2004.)
USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR
DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12

20 0 20
SCALE KILOMETRES

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

RESOURCE MANAGEMENT AREAS

Shell Canada Limited

PROJECT 05-1344-027.8550			FILE No.	res manage area
DESIGN	JS	03/07/07	SCALE AS SHOWN	REV. 0
CADD	PSR	14/08/07		
CHECK	JS	14/08/07		
REVIEW	WES/TC	20/11/07		

FIGURE: 2.3-1

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2.3.2.1 Provincial Parks and Protected Areas

Protected areas are areas in Provincial public lands legislatively protected under the authority of the *Wilderness, Ecological Reserves and Natural Areas Act.* The primary objective of this legislation is to maintain the natural features of the areas while allowing for appropriate public use. Table 2.3-2 describes the types of protected areas in the RSA and the protection level intended for each.

Table 2.3-2 Types of Protected Areas in the Regional Study Area

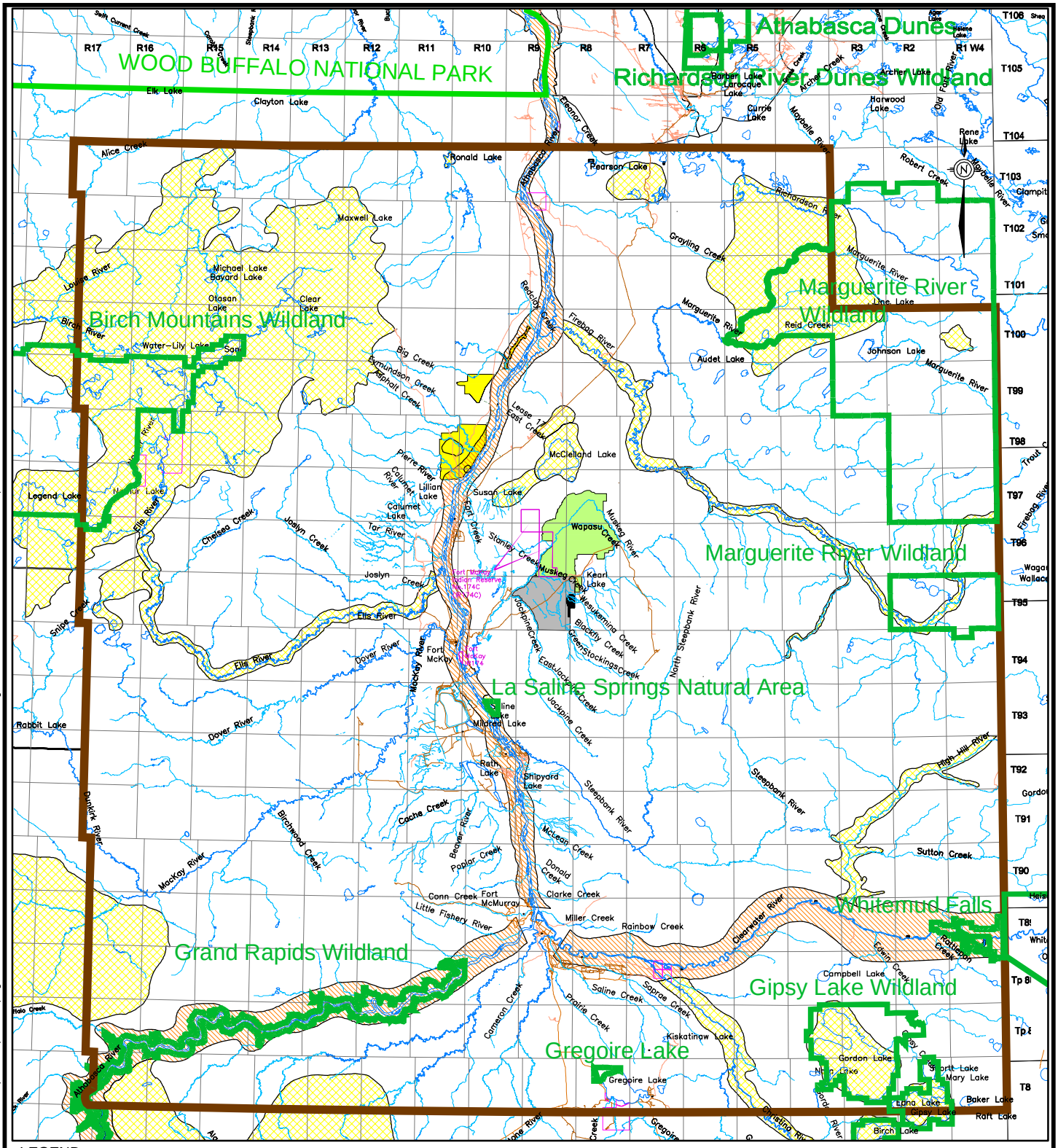
Type	Example	Legal Protection Intent
provincial park	Gregoire Lake	protected to promote preservation of the environment and for recreational use and tourism
natural area	La Saline Springs	protected to preserve sensitive landscapes and to provide education, natural appreciation and low-intensity recreation
ecological reserve	Whitemud Falls	protected for research, education and heritage preservation
wildland provincial park	Grand Rapids Wildland	protected to preserve the natural landscape and for backcountry recreation

Regional Study Area

There are seven protected areas located in whole or part in the RSA (Figure 2.3-2). Of these, four are wildland provincial parks encompassing 172,967 ha. The remaining protected areas in the RSA include one ecological reserve, one natural area and one provincial park (Table 2.3-3).

Table 2.3-3 Protected Areas in the Regional Study Area

Name	Type	Total Area [ha]	Area in RSA [ha]
Whitemud Falls	Ecological Reserve	882	882
La Saline Springs Natural Area	Natural Area	413	413
Gregoire Lake	Provincial Park	706	706
Birch Mountains Wildland	Wildland Provincial Park	144,511	41,245
Grand Rapids Wildland	Wildland Provincial Park	19,603	18,083
Marguerite River Wildland	Wildland Provincial Park	134,433	110,617
Whitemud Falls Wildland	Wildland Provincial Park	3,840	3,022



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- RESOURCE USE REGIONAL STUDY AREA
- PROTECTED AREA
- ENVIRONMENTALLY SIGNIFICANT AREA (NATIONAL)
- ENVIRONMENTALLY SIGNIFICANT AREA (PROVINCIAL)

20 0 20
SCALE KILOMETRES

REFERENCE

Alberta Digital Data Obtained From AltaLIS Ltd. (September 2004.) used under license.
Projection: Transverse Mercator Datum: Nad 83 Coordinate System: Utm Zone 12
Environmentally Significant Areas from Westworth & Associates Ltd. (1990)

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

NATIONAL AND PROVINCIAL ENVIRONMENTALLY SIGNIFICANT AND PROTECTED AREAS IN THE REGIONAL STUDY AREA

Shell Canada Limited

PROJECT 05-1344-027.8550			FILE No. ESA and Protect-RSA	
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REVIEW	WES/TC	20/11/07		

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Local Study Areas

There are no protected areas overlapping the JEMA LSA or PRMA LSA.

2.3.2.2 Environmentally Significant Areas

Environmentally Significant Areas are not protected by legislation; however, they have been identified as areas that contain important and often sensitive features of the landscape, such as unique or representative landforms, rare or endangered vegetation, or significant or important wildlife habitat. Often ESAs contribute to biodiversity because they represent a unique combination of landscape features, vegetation communities, habitats, species populations and genetic resources that are otherwise uncommon in a region. Each ESA is given one of four levels of significance and background information for determining that level:

1. International: features that are unique in the world;
2. National: features that are limited in distribution at a national level or which are the best and only representatives in Canada;
3. Provincial: features that are of limited distribution in Alberta or are best examples of a particular feature in Alberta; and
4. Regional: features that are of limited distribution in the Boreal Forest Natural Region or are the best examples of a feature in the Boreal Forest Natural Region (Bilyk et al. 1996).

Extensive inventories identifying, describing and quantifying ESAs in Alberta's Boreal Forest have been compiled into a database (AENV 2001).

Regional Study Area

There are three nationally, 18 provincially and 52 regionally significant ESAs within the RSA. There are no internationally significant features within the RSA. Table 2.3-4 lists the nationally and provincially significant ESAs located in the Project RSA. These are also shown in Figure 2.3-3.

Participants of phase two of the RUS indicated that there are many areas they would like to see preserved within the region. Commonly, rivers, lakes and riparian areas were cited as general areas for protection. The area north of the Firebag River was mentioned by seven respondents (Area 3 in Figure 2.2-3) as a sensitive and unique area that they would like to see excluded from future oil sands developments. The Six Lakes area and the sand dunes north of the RSA were also identified as areas to preserve from ongoing development.

The majority of respondents (29 out of 36) indicated that they feel that ongoing development in the Athabasca Oil Sands Region is negatively impacting resources and the environment. Pollution and garbage in the area, and overcrowding were identified as the reasons for the negative impact. Four respondents thought there had been a positive effect on resources and the environment because of development, and another four indicated that they had not seen any effects at all.

Local Study Areas

There are no internationally, nationally or provincially significant ESAs in the JEMA LSA. Three regionally significant ESAs are partially contained within this LSA: Fort Hills, Kearl Lake Moose Area and Muskeg River (North) (Table 2.3-5 and Figure 2.3-3).

Fort Hills represents an area of high landform diversity; it functions as an upland ridge between two low-lying areas to the northwest and southeast. Approximately 13 vegetation plots were conducted within the portion of the Fort Hills ESA overlapping the JEMA LSA. Typical upland vegetation types included lichen jack pine (a1), blueberry jack pine-aspen (b1), blueberry aspen (white birch) (b2) and blueberry aspen-white spruce (b3). The Fort Hills ESA provides important moose habitat.

The Kearl Lake Moose Area acts as a wildlife movement corridor and provides important moose habitat. In 2002, the Kearl Lake Wildfire burned large areas of the Kearl Lake Moose Area ESA, including upland and wetlands habitats. Approximately 30 vegetation and rare plant plots were studied within this ESA. The vegetation was typical of that found in burned habitat during the early stages of recovery, such as shrubby fens, shrubby bogs and shrubby uplands.

The Muskeg River is a valuable sport fishery. Approximately 12 vegetation plots were conducted adjacent to the Muskeg River. Common habitats included shrubby swamps (SONS), wooded fens (FTNN), shrubby fens (FONS), Labrador tea/horsetail white spruce-black spruce (h1) and burned areas. Respondents of the RUS indicated that the Muskeg River was a sensitive area within the JEMA LSA that they would like to see preserved.

Table 2.3-4 Environmentally Significant Areas in or Overlapping the Regional Study Area

ESA	Significance	Area [ha] (Area Within RSA)	Description	Management Considerations
Athabasca River-Rapids Reach	National	103,672 (53,444)	• scenic river with many rapids and bedrock outcrops • deeply incised valley • spawning lake whitefish • other important fish species: walleye, Arctic grayling, mountain whitefish, northern pike and goldeye • important sport fishery • important moose and furbearer (lynx) habitat	• clearing and cultivation will reduce the habitat available for a variety of wildlife • ungulates are sensitive to human activities on critical winter ranges • permanent facilities and corridors could act as impediments to movement of sensitive wildlife species and should be kept out of the valley and immediately adjacent upland • the range of habitats should be protected
Athabasca River-Tar Sands Reach	National	61,513 (55,488)	• not as incised as other sections of the Athabasca River • extensive riparian forest, including old growth stands • important sport fishery • important fish species: walleye, lake whitefish, Arctic grayling, northern pike and goldeye • hydrologically important river • important moose habitat and waterfowl staging area • important landforms (bitumen outcrops and point bars)	• clearing and cultivation will reduce the habitat available for a variety of wildlife • ungulates are sensitive to human activities on critical winter ranges • permanent facilities and transportation corridors could act as impediments to movement of sensitive wildlife species and should be kept out of the valley and immediately adjacent upland
Birch Mountains Diversity Area	Provincial	325,704 (255,483)	• large plateau supporting boreal, sub-Arctic and foothills species • high wildlife and vegetation diversity • important osprey nesting area at Big Island Lake • important white pelican and bald eagle nesting areas • important sport and commercial/domestic fishing • important fish species: lake trout, lake whitefish, cisco, Arctic grayling, northern pike, walleye and yellow perch	• maintenance of natural habitats will attract a variety of boreal forest wildlife

Table 2.3-4 Environmentally Significant Areas in or Overlapping the Regional Study Area (continued)

ESA	Significance	Area [ha] (Area Within RSA)	Description	Management Considerations
Clearwater River	National	62,115 (62,115)	• important sport fishery (over 20 fish species recorded) • northern pike and burbot spawning • important moose habitat • high landform diversity (including Whitemud Falls) • rare vegetation species in Clearwater Springs • significant spring features and plant species • wildlife mineral lick	• maintenance of natural habitats will attract a variety of wildlife • has been named a Heritage River
Crag and Tail	Provincial	70,776 (60,880)	• primarily an outcrop of the Precambrian Shield • granite crags rise sharply grading to till on the lee side • crag-and-tail features separated by black spruce bogs • open jack pine woods on exposed granite outcrops • craggy knolls of Precambrian Shield bedrock and "tails" of glacial till deposited during glacial advance • hollows between features with glacial sand and gravel • area described is the core; isolated areas of crag and tail and Precambrian outcrops extend north • disjunct Precambrian Shield plant species	• presently undisturbed, but would be sensitive to recreation activities and development
Egg Lake-Algar Lake Diversity Area	Provincial	495,316 (18,019)	• significant patterned fen • important caribou habitat • high vegetation diversity	• maintenance of unfragmented natural habitats is critical for caribou

Table 2.3-4 Environmentally Significant Areas in or Overlapping the Regional Study Area (continued)

ESA	Significance	Area [ha] (Area Within RSA)	Description	Management Considerations
Ells River	Provincial	18,486 (18,486)	• outstanding sport fishery • important fish species: walleye, lake whitefish, Arctic grayling, mountain whitefish, northern pike, yellow perch, goldeye and burbot • high vegetation diversity • major wildlife corridor	• maintenance of natural habitats will support a variety of wildlife
Eymundson Sinkholes	Provincial	964 (964)	• karst topography	• disturbance in surrounding areas could affect the aquifers that supply the sinkholes
Firebag River	Provincial	26,160 (26,160)	• hydrologically important • high landform diversity (meanders and delta) • old growth alluvial white spruce forest (623 ha) • key moose range • key fisheries habitat and important sport fishery • important fish species: walleye, lake whitefish, northern pike, yellow perch, Arctic grayling and burbot • other fish species include white and longnose suckers	• maintenance of natural habitats will support the greatest diversity of native species
Gipsy Lake	Provincial	6,155 (4,382)	• a boreal forest lake • American white pelican colony	• American white pelicans are very sensitive to human intrusion at their nesting colonies
Gordon Lake	Provincial	19,300 (19,300)	• hydrologically important lake	• maintenance of natural shorelines will keep the area attractive to a variety of water birds
High Hill River	Provincial	12,696 (12,696)	• important sport fishery • important fish species: Arctic grayling, mountain whitefish (edge of range) and northern pike • wildlife movement corridor • hydrologically important river • diverse landforms including canyon and outcrops	• maintenance of natural cover will protect the watershed that supports the fishery

Table 2.3-4 Environmentally Significant Areas in or Overlapping the Regional Study Area (continued)

ESA	Significance	Area [ha] (Area Within RSA)	Description	Management Considerations
La Saline Springs Natural Area	Provincial	856 (856)	• large travertine cone and mineralized springs flowing into oxbow lake • best known example of saline springs in the eastern boreal forest region • rare vegetation species • important waterfowl area (breeding and staging)	• maintenance of natural cover on the uplands will keep the area attractive to a variety of birds
Lower Christina River	Provincial	25,594 (11,490)	• important sport fishery • important moose over wintering habitat • important raptor nesting area • important walleye spawning area • other important fish: lake whitefish, Arctic grayling, mountain whitefish, northern pike, yellow perch, goldeye and burbot • diverse landforms including canyon and slumps	• maintenance of natural vegetation cover will help protect the full range of boreal forest species
Marguerite River Dissected Kame	Provincial	1,790 (1,790)	• deeply dissected kame deposits • ice contact feature composed of coarse sand and gravel, with large boulders • topography is rolling with local relief of 30 to 200 m	• fragile, sensitive to surface disturbance
McClelland Lake	Provincial	6,526 (6,526)	• hydrologically important lake • important waterfowl staging area • important bald eagle nesting area	• maintenance of natural shorelines will keep the area attractive to a variety of waterbirds
McClelland Lake Fen	Provincial	3,193 (3,193)	• rare and significant vegetation species • sandhill crane nesting area	• maintenance of natural cover will keep the area attractive to a variety of boreal species
McClelland Lake Sinkholes	Provincial	2,175 (2,175)	• significant sinkhole features (string of 12 karst lakes) • hydrologically important lake	• sinkholes can be impacted by nearby developments affecting the aquifers

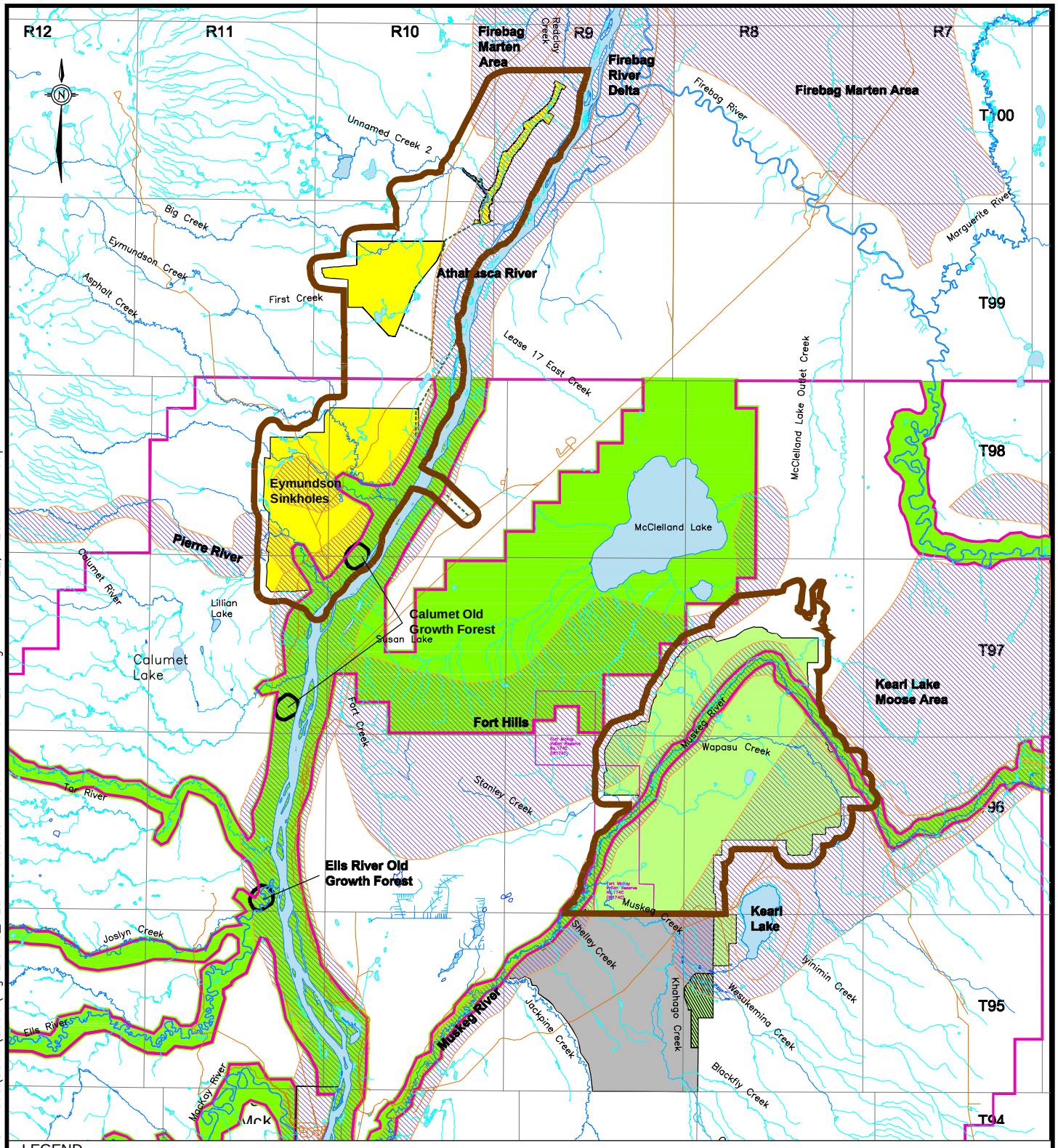
Table 2.3-4 Environmentally Significant Areas in or Overlapping the Regional Study Area (continued)

ESA	Significance	Area [ha] (Area Within RSA)	Description	Management Considerations
Richardson Tower Lakes (Archer– Bowen – Brander Lakes)	Provincial	6,278 (6,278)	• rolling kames, esker and numerous small kettle lakes • classic ice-contact and glaciofluvial terrain features • extensive jack pine forests • high recreation capability, mainly in the lake area • with the possible exception of Old Fort River floodplain, area is most important for non-preservation objectives	• sandy habitats are relatively fragile
Ronald Lake	Provincial	449 (449)	• small boreal forest lake • productive for a variety of waterfowl	• maintenance of natural shorelines will keep the area attractive to a variety of waterbirds
Schultz's Bog Diversity Area	Provincial	78,883 (26,134)	• important caribou habitat • diverse peatland wetlands vegetation community (palsa bog and patterned fen) • high landform diversity	• maintenance of unfragmented native vegetation is critical for caribou

Source: Sweetgrass Consultants Ltd. (1997).

Table 2.3-5 Environmentally Significant Areas in the Jackpine Expansion Mining Area and Pierre River Mining Area Local Study Areas

Local Study Area	Name	Significance	Description
Jackpine Expansion Mining Area	Fort Hills	Regional	• high landform diversity • important moose habitat
	Kearl Lake Moose Area	Regional	• important moose habitat • wildlife movement corridor • hydrologically important creek
	Muskeg River (North)	Regional	• important sport fishery
Pierre River Mining Area	Athabasca River – Tar Sands Reach	National	• not as incised as other sections of the Athabasca River • extensive riparian forest, including old growth stands • important sport fishery • important fish species: walleye, lake whitefish, Arctic grayling, northern pike and goldeye • hydrologically important river • important waterfowl staging area • important landforms (bitumen outcrops and point bars) • important moose habitat
	Eymundson Sinkholes	Provincial	• karst topography
	Calumet Old Growth Forest	Regional	• old growth forest
	Firebag Marten Area	Regional	• important furbearer habitat
	Pierre River	Regional	• wildlife movement corridor • important sport fishery • important furbearer habitat



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- RESOURCE USE LOCAL STUDY AREA
- ENVIRONMENTALLY SIGNIFICANT AREA
- ATHABASCA–CLEARWATER
- MILDRED–KEARL LAKES

SCALE 5 0 5 KM

REFERENCE

WESTWORTH AND ASSOCIATES 1990.
ALBERTA DIGITAL DATA OBTAINED FROM ALTALIS LTD. (SEPTEMBER 2004.)
USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR
DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12.

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

NATIONAL, PROVINCIAL AND REGIONAL ENVIRONMENTALLY SIGNIFICANT AND PROTECTED AREAS IN THE LOCAL STUDY AREAS

Shell Canada Limited

PROJECT 05-1344-027.8500			FILE No. ESA and Protect-LSA	
DESIGN	JS	20/11/07	SCALE AS SHOWN	REV. 0
CADD	PSR	21/11/07	FIGURE: 2.3-3	
CHECK	JS	21/11/07		
REVIEW	WES/TC	21/11/07		

L:\2005\1344-OIL SANDS\05-1344-027-Shell Omnibus\8500\8550\Fig 2.3-3_ ESA+Protected Areas Within the LSA.dwg Nov 22, 2007 - 4:59pm

There are no internationally significant ESAs in the PRMA LSA. One national ESA (Athabasca River-Tar Sands Reach) overlaps the western boundary of this LSA. This reach of the Athabasca provides habitat for numerous fish species, making it an important sport fishery. It also provides moose and waterfowl habitats.

The Tar Sands Reach has been identified as being less incised than other sections of the Athabasca River, with extensive riparian forest including old growth stands and important landforms (i.e., bitumen outcrops and point bars). Approximately 13 vegetation plots were conducted along the riparian area of the Athabasca River. Primary ecosites studied adjacent to the Athabasca River included willow/horsetail aspen-white birch-balsam poplar (e1) and riparian shrubland. Other ecosites included Labrador tea-mesic jack pine-black spruce (c1), Canada buffalo-berry green alder-aspen (b2), Canada buffalo-berry green alder-aspen-white spruce-black spruce (b3) and Canada buffalo-berry green alder-white spruce-black spruce (b4).

River alder/ostrich fern Special Plant Communities were encountered outside of the development area along the west bank of the Athabasca River within the LSA, and were also observed on islands within the river itself. They were recorded as riparian shrubland (RiSh) habitat and were documented in detail at two locations. These communities are associated with intermittent flooding and fluctuating ground water levels, and rich soil nutrient conditions due to fluvial deposition.

The Eymundson Sinkholes is a provincial ESA. This area is identified by Westworth (1990) as important because it is a karst topography formation which is rare in Alberta, except for the northeastern corner of the province where limestone and evaporite formations are near the land surface. This ESA is described as containing three sinkholes within a 766 ha area. They are filled with water, but do not contain an inlet or outlet. The sinkholes are formed over limestone and have not been identified as significant for any other features (Westworth 1990).

Two of the three sinkholes described in Westworth (1990) were observed in the LSA. Depth measurements were taken in October 2007 resulting in depths of 28 m and 38 m. One vegetation plot conducted within the ESA (along the northwest edge of one sinkhole) did not locate any unique or rare species. Vegetation was typical of marshy regions within the boreal forest, and was classified as being graminoid marsh (MONG). Water sedge was the dominant species, covering 75% of the plot. Other characteristic species of marshes present in small amounts included cattail, horsetail species and willow shrubs.

The sinkholes within the LSA are considered to have wildlife habitat similar to other boreal wetlands and as such contain habitats for a variety of wildlife species including moose, black bears, beaver, marshbirds, ducks and geese, and a variety of migratory songbirds. During field visits, beaver lodges and runs were noted along the sinkholes. The sinkholes are not expected to provide habitat unique from other wetlands in the area or contain species uncommon to the boreal forest and are also unlikely to provide unique habitat for fish species, particularly as an inlet and outlet is lacking. Although these sinkholes were not sampled specifically for fish presence, similar pothole lakes have been sampled in other areas of the region with typical forage species such as stickleback being the only species found.

There are also three regionally significant ESAs within or overlapping this LSA: Calumet Old Growth Forest, Pierre River and Firebag Marten Area (Table 2.3-5 and Figure 2.3-3) as described below.

Westworth (1990) states that the Calumet Old Growth Forest ESA is important because it contains a balsam poplar stand estimated to be about 175 years old. During the environmental setting investigation for this Project, no old growth forest was located in the polygon delineated as the Calumet Old Growth Forest by Westworth (1990). The ESA polygon is located 500 m west of an area of balsam poplar dominant old growth forest that is located on the banks of the Athabasca River. This area of old growth forest is located within the buffer between the Project and the Athabasca River, and is therefore outside of the development area. The vegetation plot (4CV005) situated within the Calumet Old Growth Forest ESA identified the vegetation community as an Athabasca Plain willow/horsetail aspen-white birch-balsam polar (e1) ecosite phase. Located on a benched floodplain of the Athabasca River, the tree canopy is composed of a mixture of balsam poplar, aspen, river alder and pin cherry. The shrub layer is dense (75% cover), with red-osier dogwood dominating. There is a limited forest floor cover, of which star-flowered false Solomon's-seal and Canada anemone make up the majority of cover.

The Pierre River ESA was identified by Westworth (1990) for both its wildlife and fish habitat values; it provides important furbearer habitat and acts as a wildlife movement corridor. The Pierre River is considered an important sportfish area due to the recorded presence of sportfish species, including Arctic grayling, walleye and northern pike (Westworth 1990). Environmental setting studies for the Project found a total of 17 species recorded from previous studies combined with fish sampling for the Project. This included five sport (Arctic grayling, burbot, mountain whitefish, northern pike and walleye), two non-sport (longnose sucker and white sucker) and 10 forage fish species (brassy minnow, brook stickleback, fathead minnow, flathead chub, lake chub, longnose

dace, northern redbelly dace, pearl dace, slimy sculpin and trout-perch). The distribution of sport fish species in the Pierre River appears to be primarily limited to the lower reach (km 0 to 2.9) near the confluence with the Athabasca River. Similar to many Athabasca River tributaries, the lower reaches of the Pierre River provide spring spawning and summer rearing and feeding habitat for sport fish species from the Athabasca River. Wildlife habitat suitability models for the Local Study Area indicates that moderate to high-quality habitat occurs along the Pierre River for furbearers such as fisher/marten, beaver, and Canada lynx. These habitat suitability models are described in detail in the EIA, Volume 5, Appendix 5-4. Although winter tracking and photographic bait station surveys indicate that the area is used by furbearers, wildlife movement studies specific to the Pierre River drainage were not conducted as part of the environmental setting studies for this Project.

The Firebag Marten Area ESA was identified by Westworth (1990) for the furbearer habitat it provides. The majority of this ESA is located north and east of the Local Study Area. The portion of this ESA that lies within the LSA is located away from the Project development area. Habitat suitability modelling results indicate furbearer habitat in the portions of the ESA that overlap with the LSA range in value from low from moderate and high. Details of these habitat suitability models are described in the EIA, Volume 5, Appendix 5-4.

2.3.2.3 Rivers

The Canadian Heritage Rivers System (CHRS) was established in 1984 by federal, provincial and territorial governments to ensure sustainable management of Canada's most important river systems. Rivers are designated heritage rivers based on their outstanding natural, cultural or recreational values (CHRS 2007, website).

Regional Study Area

The Alberta section of the Clearwater River was designated a heritage river in 2004 (the Saskatchewan section was designated in 1987). This river is important for its natural, cultural and recreational values (CHRS 2007, website).

Local Study Areas

There are no heritage rivers identified in either the JEMA LSA or PRMA LSA.

2.3.2.4 Integrated Resources Plans for Environmentally Important Areas

Within the Fort McMurray-Athabasca Oil Sands IRP and its amendment (the IRP), the following relevant management guideline is provided for ecological resources in the Athabasca-Clearwater RMA:

- Developments in the Athabasca-Clearwater RMA are required to mitigate potentially adverse impacts on nationally and provincially significant features (including the Athabasca River Tar Sands Reach, and Eymundson Sinkholes on Pierre River).

The Eymundson Sinkholes ESA is located to the south of a tributary to Eymundson Creek, in Township 98, Ranges 11 W4M and a small portion of the ESA falls in the west portion of Township 98, Range 10 W4M. Field inspection and aerial photograph interpretation conducted for this Project identified two sinkholes that fall on, or outside (depending on data resolution), of the east boundary of the Eymundson Sinkholes ESA. Both the ESA and the sinkholes are located south and west of the Athabasca-Clearwater RMA, and within the Mildred-Kearl Lake RMA (Figure 2.3-3). As mentioned earlier in this document, the management intent in the Mildred-Kearl Lakes RMA is "to promote orderly planning, exploration and development of resources with emphasis on the area's oil sands reserves". There is no specific discussion of the Eymundson Sinkholes ESA in this section of the IRP.

2.3.3 Mineral and Surface Materials

2.3.3.1 Aggregate Resources

Regional Study Area

Traditional gravel resources in the RSA are considered to be of limited supply (ASRD 2002; Fownes 2004, pers. comm.). However, the Regional Issues Working Group (RIWG 2003) describes a verified supply of about 56 Mm^3 of aggregate in the northern Athabasca Oil Sands Region (excluding the Birch Mountain Resources reserves). In total, 80 Mm^3 of coarse aggregate within National Topography Survey (NTS) areas 74E and 74D are relatively well-documented (Highwood, Clark and AMEC 2003). However, aggregates are in high demand and many sources are depleted or do not contain sufficient high-quality reserves to be of use for development of large projects.

At present, existing and approved projects in the RMWB consume an estimated 7.2 Mm^3 of aggregates annually (AXYS 2005). Total demand of current projects is 223 Mt (97 Mm^3), and this quantity will continue to increase as more projects

are announced (Birch Mountain Resources 2006a). Some aggregate suppliers do not feel that a critical point has been reached in terms of aggregate supply and demand levels. Aggregate suppliers indicate that there is a concern about limited supplies; however, it is thought that supply is sufficient to meet current and future demands; particularly with the aggregate exploration that oil sands developers now perform during their development process (Clark 2007, pers. comm.; Abercrombie 2007, pers. comm.).

Historically, the main aggregate sources in the RSA have been the Poplar Creek, Susan Lake and Millennium borrow pits. However, as of 2006, Poplar Creek pits 1 and 2 had been exhausted (Griffiths 2007, pers. comm.). Both still supply some sand, but all good-quality aggregate material has been removed (Griffiths 2007, pers. comm.). A series of other, smaller pits supply a variety of users in the RSA; these include the Peden pit, located across the Athabasca River from Fort McMurray and operated by TBG Contracting (TBG); the Algar pit south of Fort McMurray, operated by Burnco; and private pits being developed on several of the oil sands operation leases.

The Susan Lake deposit, which is an important source of gravel for several oil sands users north of Fort McMurray, is expected to supply aggregate at current demand levels until at least 2013 (Highwood, Clark and AMEC 2003; Griffiths 2007, pers. comm.). This resource, operated under license 980110, contains an estimated 34 Mm^3 of coarse aggregate.

In light of the pressures placed on traditional aggregate sources in the RSA, and the difficulty finding high-quality sources, the gravel extraction industry is experiencing increasing pressure to find new sources of aggregate in the RSA (Fownes 2004, pers. comm.; Griffiths 2007, pers. comm.). Some suppliers are turning to alternate sources to meet the demands of the region.

Birch Mountain Resources Ltd. opened their Muskeg Valley Quarry (MVQ) late in 2005 (Birch Mountain Resources 2005). This quarry contains an estimated 1.0 billion tonnes (435 Mm^3) of limestone, and is expected to supply granular resources to 2060 based on baseline consumption levels (Abercrombie 2007, pers. comm.). Current production capacity is 9.0 Mt/year of finished product, with an additional minimum of 2.0 Mt/year of unfinished product suitable for sub-base construction (Abercrombie 2007, pers. comm.). Almost 100% of the MVQ product is servicing industrial needs, with a small amount of rock being used in concrete production for municipal infrastructure needs. Birch Mountain Resources sees this trend staying the same, and is committed to marketing a minimum of 90% of its product to industrial users (Abercrombie 2007, pers. comm.).

Birch Mountain Resources is also proceeding with approval for its Hammerstone Project, which will be integrated with the current Muskeg Valley Quarry once operations begin. The Hammerstone reserves include 460 Mt (200 Mm^3) of proven limestone and 539 Mt (234 Mm^3) of probable limestone reserves (Birch Mountain Resources 2006b). The limestone product from these quarries has slightly different properties than gravel, and in some situations may need to be supplemented with conventional gravel (Fownes 2004, pers. comm.).

A future source of gravel and limestone is the North Parsons Creek Project. This project is located on the outskirts of Fort McMurray along the Athabasca River, east of Highway 63. Graymont Western Canada and Inland Aggregates Ltd. propose to mine gravel and sand over a 10-year period, annually extracting 250,000 to 500,000 tonnes of material (0.1 to 0.2 Mm^3/year) (Parsons Creek 2007; Clark 2007, pers. comm.). Limestone mining will begin after the gravel deposit is removed. This area is within a larger minerals lease held by Graymont. A start-up date is planned for late 2007 (Parsons Creek 2007).

The Service Provider Survey provided aggregate suppliers the opportunity to comment on the ongoing development of the area. Oil sands development in the region has had some negative impacts on certain aspects of TBG's operations. Because of the economic conditions in Fort McMurray (high wages offered by the oil sands industry; increased living costs due to lack of housing), TBG has had to increase their own wages to retain quality staff. This has translated into increased market pricing of aggregate, and prices have increased steadily in the last three years (Griffiths 2007, pers. comm.). However, oil sands projects create a large demand for aggregate material, and TBG has co-operative agreements for retail sales with many of the developers (Griffiths 2007, pers. comm.). Oil sands development is seen as positive for the growth of the North Parsons Creek Project (Clark 2007, pers. comm.).

Local Study Areas

A search of the Land Status Automated System (LSAS) was done on May 25, 2007, to determine the presence of aggregates in the Project footprint. Within the JEMA LSA, there is one Surface Material Exploration (SME) application for the exploration of sand and gravel held by JH Drilling Inc. (SME 070072).

Birch Mountain Resources has metallic and industrial mineral interests that overlap with Oil Sands Leases 88, 89, 9, 17 and 351. No overlap is reported in Township 99, Range 11 W4M and Township 100 Range 10 W4M (Dabbs 2007, pers. comm.). They also indicated that they have a satellite quarry containing high-quality granitic rock northeast of McClelland Lake.

Within the PRMA LSA, no active aggregate removal areas were identified; however, there are four Consultative Notations (CNT) indicating limestone potential within the Project footprint (Table 2.3-6). The LSAS search did not indicate any findings within the Indian Reserve (IR) 174C.

Table 2.3-6 Land Status Automated System Search Results for the Pierre River Mining Area

Designation	Location	Status	Description
CNT-040021	4-11-97-35	Approved	consultative notation with Alberta Department of Energy for metallic minerals (limestone)
CNT-040031	4-10-98-07, 08, 16, 17, 18, 19, 20, 21	Approved	consultative notation with Alberta Department of Energy for metallic minerals (limestone)
CNT-040044	4-10-97-31 4-10-98-06 4-11-97-36	Approved	consultative notation with Alberta Department of Energy for metallic minerals (limestone)
CNT-870307	4-10-97 4-10-98 4-11-97 4-11-98	Application for Amendment	Alberta Energy and Utilities Board for an Industrial/Commercial site

During the Service Provider Survey, TBG indicated that they were aware of some independent aggregate leases in the northern parts of the RSA, but they were not sure if they are in Shell's LSAs (Griffiths 2007, pers. comm.). As well, it was noted that exploration activities in the boreal forest require comprehensive planning. Until there is a market that far north, it is not valuable to conduct exploration (Clark 2007, pers. comm.).

2.3.3.2 Integrated Resource Plans for Mineral and Surface Material Resources

Relevant management guidelines for the Athabasca-Clearwater RMA include:

- Oil sands development, using surface mining techniques, is not permitted in the McClelland Lake wetlands. Within the remaining tributaries of the RMA, surface mining will only be considered where mitigation and reclamation planning that reflects the higher sensitivity of these areas has been demonstrated.
- Experimental and commercial in-situ oil sands recovery will be considered on a site-specific basis in the Athabasca River valley, associated tributaries and the upland drainage basin of the McClelland Lake wetlands. In-situ oil sands development will not be permitted in McClelland Lake or the adjacent wetlands fen.
- Exploration in the McClelland Lake wetlands must not alter the water flow.

- Extraction of mineral and surface materials, and the development of major transportation and utility corridors, will be conducted in a manner minimizing impacts on the significant watershed, wildlife, fisheries, vegetation, aesthetic and recreation values. Operating conditions to minimize impacts on these values will be considered on a site-by-site basis.
- In-stream gravel production is not permitted. Sand and gravel operations require a minimum 50-m buffer from the high-water mark of any river.
- Existing commitments to surface mining of oil sands will be honoured.

Relevant management guidelines for the Mildred-Kearl Lakes RMA include:

- mineral exploration activities, including drill hole programs, will be permitted subject to site-specific operating conditions; and
- review of mineral development proposals, other than oil sands, will consider their compatibility with existing and possible future oil sands surface mining developments.

2.3.4 Access

Use of natural resources requires that the resources be accessible to users. Increased accessibility to an area may result in an increased use of either consumptive or non-consumptive resources. Different road types, terrain and weather are some factors that dictate the type of vehicle used to successfully gain access into an area. Access along some routes varies with season, depending on ground conditions such as water level and degree of freezing.

Roads and increased access by the public are issues addressed by all developers in the Project application and EIA process. Mitigation plans are established at the onset of a project and are considered in the associated environmental and social impact assessments. The Transportation Subgroup of CEMA's Regional Issues Working Group (RIWG), which includes Alberta Infrastructure and Transportation, is tasked to analyze transportation and access issues in the RSA.

2.3.4.1 Roads, Trails and Other Rights-of-Way

Regional Study Area

There are many forms of access in the RSA, including main roads, trails, cutlines and Rights-Of-Way (ROW). The main road in the RSA is Highway 63, which services the city of Fort McMurray and connects the region to the provincial

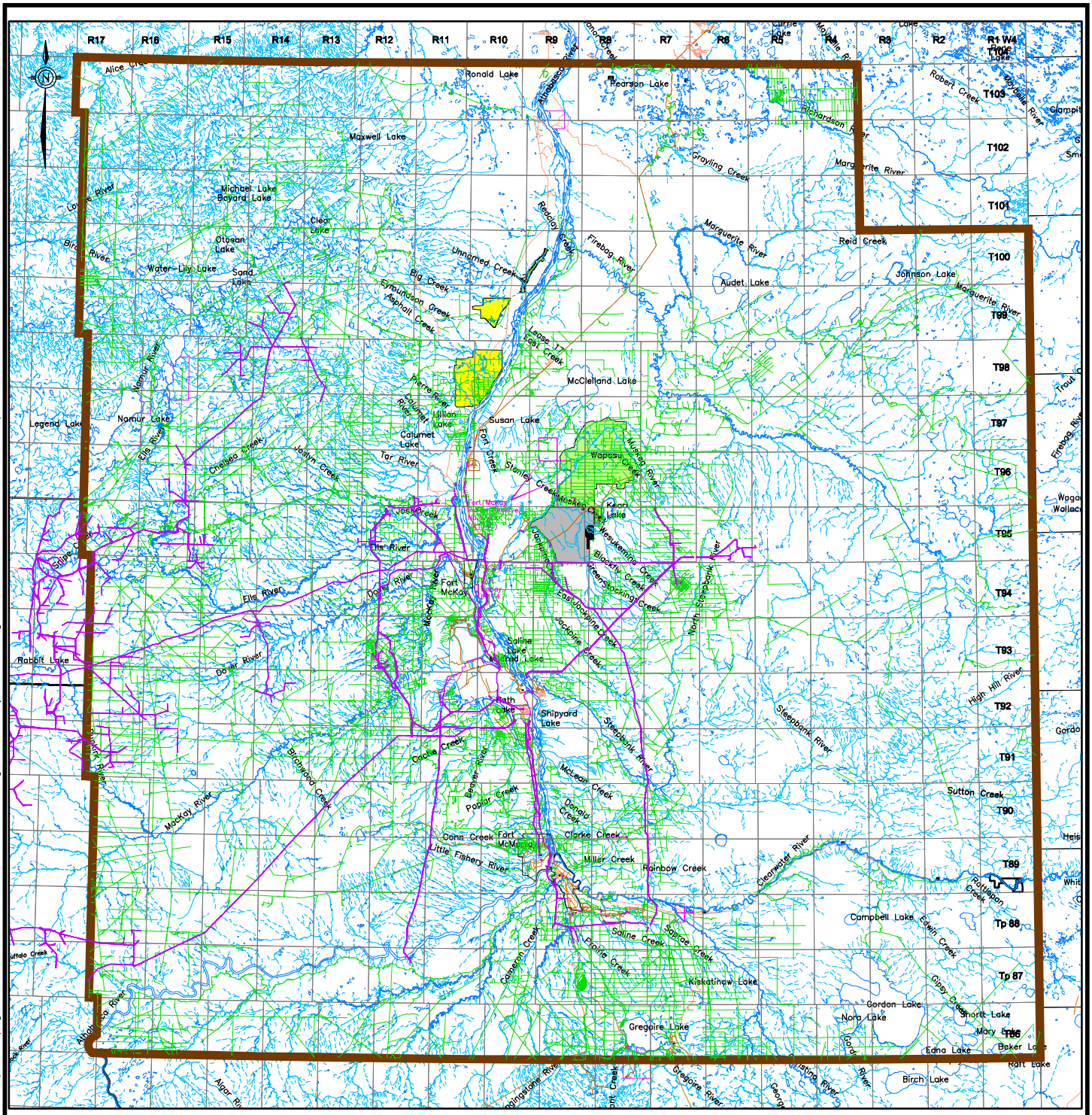
highway system. This highway becomes an unpaved, winter road maintained by the RMWB north of Fort McKay that extends to Fort Chipewyan.

The total density of access routes in the RSA is 0.78 km of access route per square kilometre of RSA. This corresponds to about 1% of the land in the RSA being used for various forms of access (Table 2.3-7). The distribution of these access types is shown in Figure 2.3-4. Water and fly-in access are also used in the RSA.

Table 2.3-7 Access in the Regional Study Area

Access Type	Regional Study Area (2,277,376 ha)			
	Disturbance Area [ha]	Percent of RSA Area [%]	Length [km]	Density [km/km^2]
cutline/seismic	8,492	0.37	10,614	0.46
roads	2,219	0.10	740	0.03
pipeline ROW	10,125	0.44	5,956	0.26
power line ROW	598	0.03	214	0.01
rough trail	222	0.01	277	0.01
railway	89	0.004	18	0.0008
Total	**21,745**	**0.95**	**17,819**	**0.78**

Note: ROW = Rights-Of-Way; RSA = Regional Study Area.



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- RESOURCE USE REGIONAL STUDY AREA
- CUTLINE
- PIPELINE RIGHTS-OF-WAY

20 0 20
SCALE KILOMETRES

REFERENCE

ALBERTA DIGITAL DATA OBTAINED FROM ALTALIS LTD. (SEPTEMBER 2004.) USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12

PROJECT

JACKPINE MINE EXPANSION & PIERRE RIVER MINE PROJECT

TITLE

ACCESS ROUTES IN THE REGIONAL STUDY AREA

Shell Canada Limited

PROJECT 05-1344-027.8550			FILE No.Access Routes in RSA	
DESIGN	JS	23/07/07	SCALE AS SHOWN	REV. 0
CADD	TRE	02/10/07	FIGURE: 2.3-4	
CHECK	JS	17/11/07		
REVIEW	WES/TC	20/11/07		

L:\2005\1344-OIL SANDS\05-1344-027-Shell Omnibus\8500\8550\Fig 2.3-4_ Access Routes in the Regional Study Areas.dwg Nov 29, 2007 - 4:01pm

Truck trails (off-road routes capable of supporting vehicles), pipelines, seismic and transmission lines are located in various parts of the RSA. Such routes vary widely from very rough tracks accessible only to All-Terrain Vehicle (ATV) traffic to dirt roads, which are readily accessible to all vehicles. Many of the more formalized routes are shown in Figure 2.3-4. It is expected that proponents of large-scale projects will consult other land users when developing new access routes to ensure that the route is designed to benefit various resource users (Stryde 2007, pers. comm.).

Within the Fort McMurray area, the Fort McMurray Sno-Drifters Club maintains about 200 km of signed trails, with another 150 km under development. Not all snowmobilers use designated trails. Snowmobilers would like to be kept informed of developments near documented trail systems throughout the RSA, so they can avoid conflicts and find alternate trails. To date, the club has been able to work successfully with industry to achieve this.

Decreased access in the region was one of the primary changes in the region impacting recreational and outdoor opportunities in the area, as indicated by respondents in the RUS. Many respondents would like to see oil sands developers make more of an effort to maintain public access to wilderness areas in the region.

Local Study Areas

The density of access routes, including roads, seismic lines and other linear developments is 1.6 km of linear route per square kilometre in the JEMA LSA (Table 2.3-8 and Figure 2.3-5). Of the LSA, 1.3% (241 ha) has been identified as part of an access route such as a cutline, seismic line, road or trail. There were no powerline, pipeline or railway routes identified in the LSA.

The density of access routes, including roads, seismic lines and other linear developments is 1.0 km of linear route per square kilometre in the PRMA LSA (Table 2.3-8 and Figure 2.3-5). Of the LSA, 1.2% (231 ha) has been identified as part of an access route such as a cutline, seismic line, road or trail. The PRMA is also accessed by boat along the Athabasca River. There were no powerline, pipeline or railway routes identified in the LSA.

Table 2.3-8 Access in the Jackpine Expansion Mining Area and Pierre River Mining Area Local Study Areas

Access Type	Jackpine Expansion Mining Area (18,348 ha)				Pierre River Mining Area (21,136 ha)			
	Area [ha]	Percent of Area	Length [km]	Density [km/km^2]	Area [ha]	Percent of Area	Length [km]	Density [km/km^2]
cutline / trails	229	1.2	286	1.6	99	0.5	123	0.6
roads	10	0.05	3	0.02	98	0.5	33	0.2
pipeline ROW	0	0	0	0	0	0	0	0
power line ROW	0	0	0	0	0	0	0	0
rough trail	2	0.01	2	0.01	34	0.2	42	0.2
railway	0	0	0	0	0	0	0	0
Total[(a)]	**241**	**1.3**	**291**	**1.6**	**231**	**1.2**	**198**	**1.0**

[(a)] Totals may not add exactly due to rounding.

Note: ROW = Rights-Of-Way

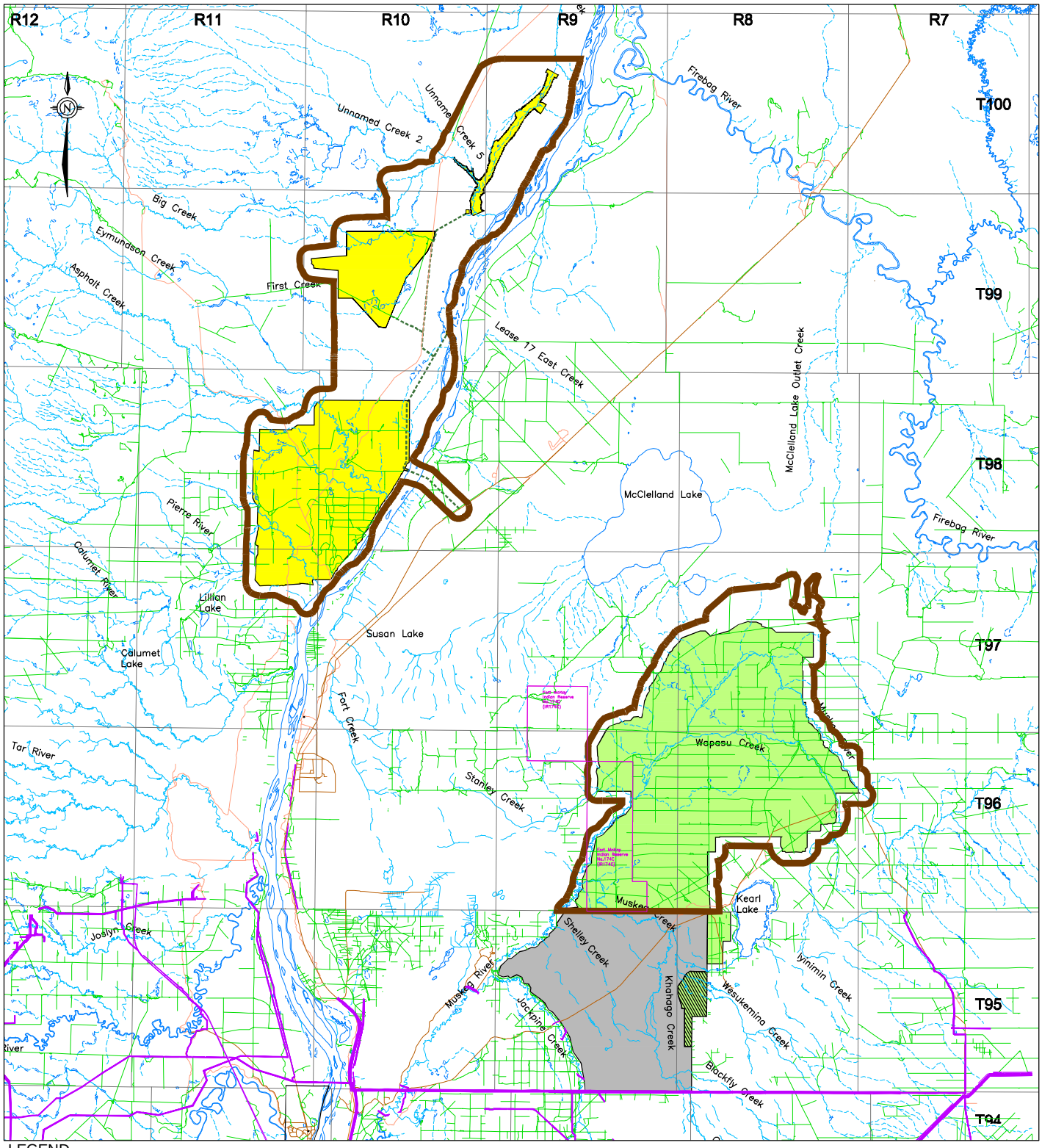
2.3.4.2 Integrated Resource Plans for Access and Transportation Infrastructure

Relevant management guidelines for the Athabasca-Clearwater RMA include:

- Seismic and other mineral exploration in the Athabasca River valley and its tributaries will maximize use of existing access or use portable equipment on hand-cut lines not exceeding a width of 1.5 m. Where this is not sufficient for evaluation of mineral resources or geological structures, construction of new access, to a maximum width of 3 m, will be considered. This guideline will apply except in areas approved for logging over the next five years.
- River crossings for major transportation and utility corridors are to be compatible with the RMA intent. Wherever possible, existing or planned corridor crossings should be used.
- New linear developments used to service resource extraction areas will consider recreation and tourism values, where possible. This does not apply to internal roads in a developing oil sands lease.

Relevant management guidelines for the Mildred-Kearl Lakes RMA include:

- Oil sands developments on the east side of the Athabasca River requiring pipeline connections to the south should use the Athabasca Oil Sands Multiple Use Corridor proposed by Alberta Environment when possible.



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- RESOURCE USE LOCAL STUDY AREA
- CUTLINE
- PIPELINE RIGHTS-OF-WAY

REFERENCE

ALBERTA DIGITAL DATA OBTAINED FROM ALTALIS LTD. (SEPTEMBER 2004.)
USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR
DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

ACCESS ROUTES IN THE LOCAL STUDY AREAS

Shell Canada Limited

PROJECT 05-1344-027.8550			FILE No.	Access in LSA
DESIGN	JS	23/07/07	SCALE AS SHOWN	REV. 0
CADD	TRE	02/10/07		
CHECK	JS	17/11/07		
REVIEW	WES/TC	20/11/07		

FIGURE: 2.3-5

L:\2005\1344-OIL SANDS\05-1344-027-Shell Omnibus\8500\8550\Fig 2.3-5_ Access Routes in the Local Study Areas.dwg Nov 29, 2007 - 4:08pm

2.3.5 Agriculture

Regional Study Area

Grazing, market gardens and wild rice operations are the only agricultural activities occurring within the RSA. In general, the area supports little agricultural activity.

Local Study Areas

A search of the LSAS identified one wild rice operation adjacent to the north-western edge of the JEMA LSA boundary. However, the operation does not overlap the Project footprint and the LSAS indicated that this title had expired.

There are no agricultural activities occurring in the PRMA LSA.

2.3.5.1 Integrated Resource Plans for Agriculture

Agricultural activity will be considered on a site-specific basis in the Mildred-Kearl Lakes RMA. Agriculture is not considered compatible with the intent of the Athabasca-Clearwater RMA.

2.3.6 Forestry

2.3.6.1 Forestry Resource Management

Alberta's forested lands are managed on a sustainable yield forest management basis. To manage the forested lands, there are three types of forest tenure systems:

- timber permits;
- timber quotas; and
- Forest Management Agreements (FMAs).

Timber permits are issued to meet local demands for firewood, Christmas trees and building logs. The Land and Forest Service of Fort McMurray sells timber permits for limited harvesting for these purposes in areas south of Fort McMurray only. In general, harvesting for these purposes is required to be a minimum of 30 m from any roadway. Birch trees and deadfall are recommended as the sources of firewood. No specific statistics are maintained for the number of these permits that are issued (Stryde 2004, pers. comm.).

Timber quotas are rights issued to forest companies to harvest a percentage of the Annual Allowable Cut (AAC) within a given Forestry Management Unit (FMU). Forest management agreements are discussed further in the following section.

2.3.6.2 Timber Rights

Timber rights can be granted to a forestry company under an FMA by the Government of Alberta. Timber rights within most of the RSA have been granted to Alberta-Pacific Forest Industries Inc. (Al-Pac). The coniferous rights are held by Northland Forest Products Ltd. (Northland) under a Quota Certificate with the Alberta Government; Northland's limits of allowable cut are also managed under the Al-Pac FMA.

Under its FMA, Al-Pac has the right to grow and harvest timber on a perpetual sustained yield basis over approximately 58,000 km^2. More than half of the FMA area (59%) is wetlands or other lands not suitable for timber production. A further 11% is allocated to other forest companies. Another 5% is allocated for reserves such as land for lake and river buffers, and other productive areas that will not be harvested. The area managed by the company to meet its fibre requirements is about 25% of the total FMA.

Of the 58,000 km^2 comprising the FMA, about 3,000 km^2 are in the draft Mineable Oil Sands Area (MOSA), which falls within FMU A15. Under a land use plan proposed by ASRD, merchantable timber in the MOSA will be harvested once, after which the MOSA will no longer be included in the Al-Pac FMA (Cheyne 2007, pers. comm.). Although the land use plan is not yet official, Al-Pac treats lands in the MOSA as special areas. The intent is to harvest timber from those areas before development. After this, the land is removed from their forestry base and is not included in their Annual Allowable Cut (AAC) calculations (Rymer 2007, pers. comm.).

2.3.6.3 Timber Supply and Productivity

Regional Study Area

The RSA contains all or part of FMUs A4, A6, A9, A10, A14 and A15 (an amalgamation of A5, A7 and A8), as well as all or part of FMAs A4J, A5J, A7J, A8J and A14J. Within the RSA, Al-Pac intends to harvest about 2,531,000 m^3 of timber (1,716,155 m^3 deciduous and 815,351 m^3 coniferous) within their FMA from 2006 to 2010. Details of Al-Pac's Five-Year Harvest Plan for coniferous and deciduous timber harvest are provided in Table 2.3-9.

Table 2.3-9 Alberta-Pacific Forest Industries Five-Year Harvest Plan 2006 to 2010

Area	Planning Unit	FMU	Wood Type[(a)]	Volume [m^3]
Gipsy Lake	85024	A14	deciduous	248,478
			incidental deciduous	21,173
			coniferous	49,409
			incidental coniferous	20,567
Horse River	86124	A14	deciduous	1,000
			incidental deciduous	37,000
			coniferous	60,000
			incidental coniferous	100
Shortt Lake	87024	A14	deciduous	10,000
			incidental deciduous	4,000
			coniferous	50,000
			incidental coniferous	600
Lobstick Creek	89054	A14	deciduous	25,000
			incidental deciduous	0
			coniferous	0
			incidental coniferous	4,000
Dunkirk River	90174	A4	deciduous	250,000
			incidental deciduous	66,000
			coniferous	179,000
			incidental coniferous	23,000
Beaver Lake	91114	A5	deciduous	180,000
			incidental deciduous	0
			coniferous	0
			incidental coniferous	26,000
Steepbank River	92094	A5	deciduous	not specified
			incidental deciduous	not specified
			coniferous	not specified
			incidental coniferous	not specified
Kearl Lake	95084	A7	deciduous	10,000
			incidental deciduous	12,000
			coniferous	70,000
			incidental coniferous	1,500
Shelley Creek	95094	A7	deciduous	not specified
			incidental deciduous	not specified
			coniferous	not specified
			incidental coniferous	not specified
Joslyn Creek	95124	A7	deciduous	120,000
			incidental deciduous	10,000
			coniferous	50,000
			incidental coniferous	12,000
Tar River	96124	A7	deciduous	91,233
			incidental deciduous	2,471
			coniferous	11,368
			incidental coniferous	8,607
Muskeg River	97074	A7	deciduous	260,000
			incidental deciduous	19,800
			coniferous	56,000
			incidental coniferous	11,800

Table 2-11 Alberta-Pacific Forest Industries Five-Year Harvest Plan 2006 to 2010 (continued)

Area	Planning Unit	FMU	Wood Type[(a)]	Volume [m^3]
Tar River	97134	A7	deciduous	200,000
			incidental deciduous	0
			coniferous	0
			incidental coniferous	26,000
Firebag River	99074	A7	deciduous	0
			incidental deciduous	4,000
			coniferous	100,000
			incidental coniferous	0
Eymundson Creek	99114	A7	deciduous	130,000
			incidental deciduous	14,000
			coniferous	50,000
			incidental coniferous	5,400
		subtotals	*deciduous*	*1,525,711*
			incidental deciduous	*190,444*
			coniferous	*675,777*
			incidental coniferous	*139,574*
Total				**2,531,506**

(a) Deciduous refers to Al-Pac's deciduous harvest from their deciduous land base;
Incidental Deciduous refers to deciduous wood harvested from Al-Pac's coniferous land base;
Coniferous refers to coniferous volumes harvested by their coniferous land base; and
Incidental Coniferous refers to the incidental coniferous harvested by Al-Pac from their deciduous land base.

Note: FMU = Forestry Management Unit.

Northland also operates within the RSA. They maintain a modern sawmill/planer mill complex 20 km north of Fort McMurray next to Highway 63 and the Athabasca River. Northland has timber quotas within FMUs A10 and A15. Table 2.3-10 shows Northland's AAC within these FMUs. These areas are reforested or receive silviculture treatment to accelerate the return of the spruce and pine seedlings as part of the forest landbase. Aspen and poplar removed as an incidental part of the conifer harvest are sent to Al–Pac to be used in the production of pulp (Ehrentraut 2006, pers. comm.).

Table 2.3-10 Northland Forest Products Annual Allowable Cut Within the Regional Study Area

Forestry Management Unit	Annual Allowable Cut [Volume in m^3]
A10	12,800
A15	163,185

Source: Ehrentraut 2006, pers. comm.

The resource service provider survey reflected a negative effect of oil sands development on some timber companies. Northland reported that at least 17% of their harvestable forests on a volume basis are off-limits due to oil sands leases (Ewashko 2007, pers. comm.). The decline in area available for forestry activities north of Fort McMurray and the present pace of reclamation "has a significant effect on the ability of Northland to remain operational", and to date there has not been any compensation (Ewashko 2007, pers. comm.). Access to forest harvest areas is also a critical issue. Because Northland is unable to access their harvestable lands through oil sands leases, they have to create new access routes that go around the developments. This increases their operational costs and further reduces their profitability (Ewashko 2007, pers. comm.). Northland expressed that reclamation was not occurring rapidly enough to offset the loss in land base incurred from oil sands development, and the increase in soil capability and timber productivity expected following reclamation was not considered suitable mitigation or compensation for this loss due to the time-frame involved (Ewashko 2007, pers. comm.).

Local Study Areas

Both the JEMA LSA and PRMA LSA fall within FMU A15 (previously A7), within Al-Pac's FMA A7J. Al-Pac's planning unit 097074 falls within the JEMA LSA. This unit is located along the eastern portion of the LSA and is scheduled to be cleared during frozen ground conditions in 2007 and 2008. Al-Pac's planning unit 099114 falls within the boundary of Shell's northern leases and the PRMA LSA. This unit is scheduled to be cleared during 2009 and 2010. Table 2.3-11 provides the harvest levels expected from these planning units. Al-Pac has developed its Five-Year Harvest Plan with input from the oil sands companies in the area. They are in continuous discussion with the various developers in the area to co-ordinate harvest schedules with development activities (Rymer 2007, pers. comm.).

Table 2.3-11 Anticipated Harvest Levels Within the Jackpine Expansion Mining Area and Pierre River Mining Area Local Study Areas

Local Study Area	Area	Planning Unit	FMU	Wood Type	Volume [m^3]
Jackpine Expansion Mining Area	Muskeg River	097074	A15	deciduous	260,000
				incidental deciduous	19,800
				coniferous	56,000
				incidental coniferous	11,800
	Total				**347,600**
Pierre River Mining Area	Eymundson Creek	99114	A15	deciduous	130,000
				incidental deciduous	14,000
				coniferous	50,000
				incidental coniferous	5,400
	Total				**199,400**

The Timber Productivity Rating (TPR) for the LSAs can be found in Table 2.3-12. The JEMA LSA contains roughly 3,331 ha of productive forest (18% of the LSA), of which 1,200 ha (7%) has a good TPR. Forests with a moderate TPR encompass 1,836 ha (10%). The PRMA LSA has 14,129 ha of productive forest (67% of the total LSA), the majority of which is rated as having moderate timber productivity (7,260 ha or 34%). An additional 6,736 ha (32%) is rated as good timber productivity.

Table 2.3-12 Timber Productivity Rating Within the Jackpine Expansion Mining Area and Pierre River Mining Area

Timber Productivity Rating	Area [ha]		Total [ha]
	Jackpine Expansion Mining Area	Pierre River Mining Area	
Good	1,200	6,736	**7,936**
Moderate	1,836	7,260	**9,096**
Fair	295	133	**428**
Unproductive	8,070	3,856	**11,926**
Non-forested	4,993	2,275	**7,268**
Non-vegetated	1,954	877	**2,831**
Total	**18,348**	**21,137**	**39,485**

Table 2.3-13 presents the results of the LSAS search done on May 25, 2007. Al-Pac has one permanent sample plot in the southeast corner of the JEMA LSA. Northland holds a coniferous timber license that overlaps the LSA. A protective notation exists for the Wood Buffalo Environmental Association to monitor forest health in a research plot in the southwest portion of the LSA. There is also a consultative notation with the Fort McMurray office of Public Lands and Forests for the Kearl Lake Birch Woodlot Area. This is a public woodcutting area along Kearl Lake that borders the Project boundary, but is not located within the LSA.

Northland holds both a coniferous timber license and permit in the IR 174C, in the PRMA LSA and in the leases north of the PRMA LSA.

Table 2.3-13 Land Status Automated System Results for the Local Study Areas

Local Study Area	Designation	Location	Status	Description
Jackpine Expansion Mining Area	CNT-900018	4-08-96-05-SE	Approved	consultative notation with Public Lands and Forests Fort McMurray office – public woodcutting area (Kearl Lake Birch Woodlot Area)
	CTL-A150001	4-08-96 4-08-97 4-09-96 4-09-97	Active/Disposed	coniferous timber license held by Northland Forest Products Ltd.
	ISP-970541	4-08-96-15-04	Approved	industrial sample plot with Alberta-Pacific Forest Industries Inc. – non-harvested, mature permanent sample plot
	PNT-980125	4-09-96-11-14	Approved	Fort McMurray Office, Land Use Area – Wood Buffalo Environmental Association research plots for monitoring forest health
Pierre River Mining Area	CTP-A150001	4-10-99	Active/Disposed	coniferous timber permit held by Northland Forest Products Ltd.

2.3.6.4 Integrated Resource Plans for Forestry

Relevant management guidelines from the Athabasca-Clearwater RMA include:

- Timber harvesting impacts on the watershed will be reduced through special conditions relating to cutblock size, configuration and harvesting techniques.
- Timber harvesting in upland areas of the McClelland Lake wetlands portion of this RMA must incorporate buffers around sinkholes, creeks and the perimeter of the open fen. Harvest activities must not alter the water flow.
- Timber harvesting will occur in accordance with the guidelines identified in the Forest Landscape Management Strategies for Alberta for all river areas in the RMA and will be designed to minimize the impact on aesthetics as viewed from the river. Logging will not be permitted on the deeply incised (gradients of 45 degrees or greater) slopes of the Muskeg River.

Relevant management guidelines from the Mildred-Kearl Lakes RMA include:

- Where loss of the forest land base occurs through surface mining, reforestation may be undertaken at locations identified during the development and reclamation stages.

2.3.7 Hunting, Trapping and Berry Picking

2.3.7.1 Hunting

Regional Study Area

Big game animals with open seasons in the boreal region include white-tailed deer, mule deer, moose, black bears, wolves and coyotes (Sports Scene Publications 2006). Important upland game birds with open seasons in the boreal region include ruffed grouse, spruce grouse, sharp-tailed grouse and ptarmigan. Important waterfowl species include ducks such as mallards, northern pintails, northern shovelers, blue-winged teals, green-winged teals, scaups, redheads and canvasbacks. White-fronted geese, Canada geese, snow geese and Ross' geese may also be hunted (Sports Scene Publications 2006).

There are no restricted rivers or lakes in the RSA; however, there are sanctuaries. Richardson Lake, a Game Bird Sanctuary, can only be hunted with a special permit. There are also two seasonal sanctuaries where access within 800 m is not permitted from April 15 to September 15. These seasonal sanctuaries are:

- the unnamed island in Namur Lake in Sections 35 and 36, Township 97, Range 17, W4M; and
- the unnamed island in the unnamed waterbody in Sections 8, 9, 16 and 17, Township 97, Range 17, W4M.

Hunting in the RSA is regulated within WMUs 518, 519, 529, 530 and 531 (Sports Scene Publications 2006). There are outfitters who have allocations for harvesting black bear, mule deer, white-tailed deer and moose within the WMUs in the RSA. A summary of the number of allocations from 2003 to 2007 is presented in Table 2.3-14; the data were provided by the Alberta Professional Outfitters Society (Brick 2007, pers. comm.). The allocation numbers have remained fairly consistent for all species.

According to the RUS, 29% of RSA residents that participate in outdoor activities hunt within the region. Hunting license sales in the region are fairly constant, indicating that interest in hunting has remained unchanged in the recent past. However, over the last 20 years there has been a slow decline in recreational hunting (Sellin 2007, pers. comm.). Illegal hunting appears to be

occurring at a constant level, with the number of annual infractions remaining the same.

Six outfitters with allocations in the RSA were asked to participate in the Service Provider Survey; three chose to participate. Trends in hunting, important locations and the effects of oil sands development on outfitting business were discussed. One outfitter commented that as the population of Fort McMurray has increased, so has the local interest in hunting, which is putting pressure on the resources. Another commented that the area was not "working country" anymore and was not as aesthetically pleasing to hunt in because of the ongoing development activity. All three identified oil sands development as negatively impacting their businesses. Reasons for this impact included increased noise; increased access and pressure on resources; increased cost of services, such as floatplanes, to reach their locations; increased costs associated with relocating camps in response to development; loss of habitat for target species; reduced aesthetic appeal in the region and reduced locations to hunt from. One specified that due to the changes in the region, it was likely that he would have to stop his hunting activities. Another indicated that many outfitters had stopped working in the area due to the changing conditions.

The Fort McMurray Fish and Game Association was also contacted for information regarding trends in hunting. Membership rates have decreased by 30% in the last year (Stepanuk 2007, pers. comm.). However, this was attributed to an increase in membership fees as a result of reduced funding and sponsorship, and was not thought to suggest a decreased interest in hunting. In fact, there appears to be an increase in the purchase of hunting-related equipment in recent years (Stepanuk 2007, pers. comm.).

The RUS indicated that most hunters hunt for recreation, with some hunting for food. One hunter indicated that he hunts for teaching purposes. As well, many forms of access are used, with ATVing being the most common means of accessing hunting grounds, followed by truck access and air access.

Table 2.3-14 Summary of Big Game Allocations in the Regional Study Area

WMU	Species	Number of Allocations 2003			Number of Allocations 2004			Number of Allocations 2005			Number of Allocations 2006			Number of Allocations 2007		
		Open	Bow[a]	Rut[b]	Open	Bow	Rut	Open	Bow	Rut	Open	Bow	Rut	Open	Bow	Rut
518	black bear	100	6	0	100	6	0	100	6	0	100	6	0	100	6	0
	moose	0	0	29	0	0	29	4	0	29	4	0	25	4	0	29
	white-tailed deer	22	0	0	22	0	0	22	0	0	10	0	0	22	0	0
	mule deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
519	black bear	64	4	0	64	4	0	64	4	0	64	4	0	64	4	0
	moose	8	0	13	8	0	13	8	0	13	8	0	13	8	0	13
	white-tailed deer	22	0	0	22	0	0	22	0	0	22	0	0	22	0	0
	mule deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
529	black bear	36	4	0	36	4	0	36	4	0	36	4	0	36	4	0
	moose	4	0	10	4	0	10	4	0	10	4	0	10	4	0	10
	white-tailed deer	9	0	0	9	0	0	9	0	0	9	0	0	9	0	0
	mule deer	4	0	0	4	0	0	4	0	0	4	0	0	4	0	0
530	black bear	172	9	0	172	9	0	172	9	0	172	9	0	172	9	0
	moose	5	0	44	5	0	44	20	0	44	20	0	44	6	0	44
	white-tailed deer	7	0	0	7	0	0	7	0	0	7	0	0	7	0	0
	mule deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
531	black bear	93	6	0	93	6	0	93	6	0	93	6	0	93	6	0
	moose	6	0	52	6	0	52	6	0	52	6	0	52	6	0	52
	white-tailed deer	13	0	0	13	0	0	13	0	0	13	0	0	13	0	0
	mule deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All	**Totals**	**565**	**29**	**148**	**565**	**29**	**148**	**584**	**29**	**148**	**572**	**29**	**144**	**570**	**29**	**148**

[a] Allocation for hunting with an authorized bow and arrow.
[b] Allocation for hunting during applicable rutting season.

Sources: Brick 2007, pers. comm.

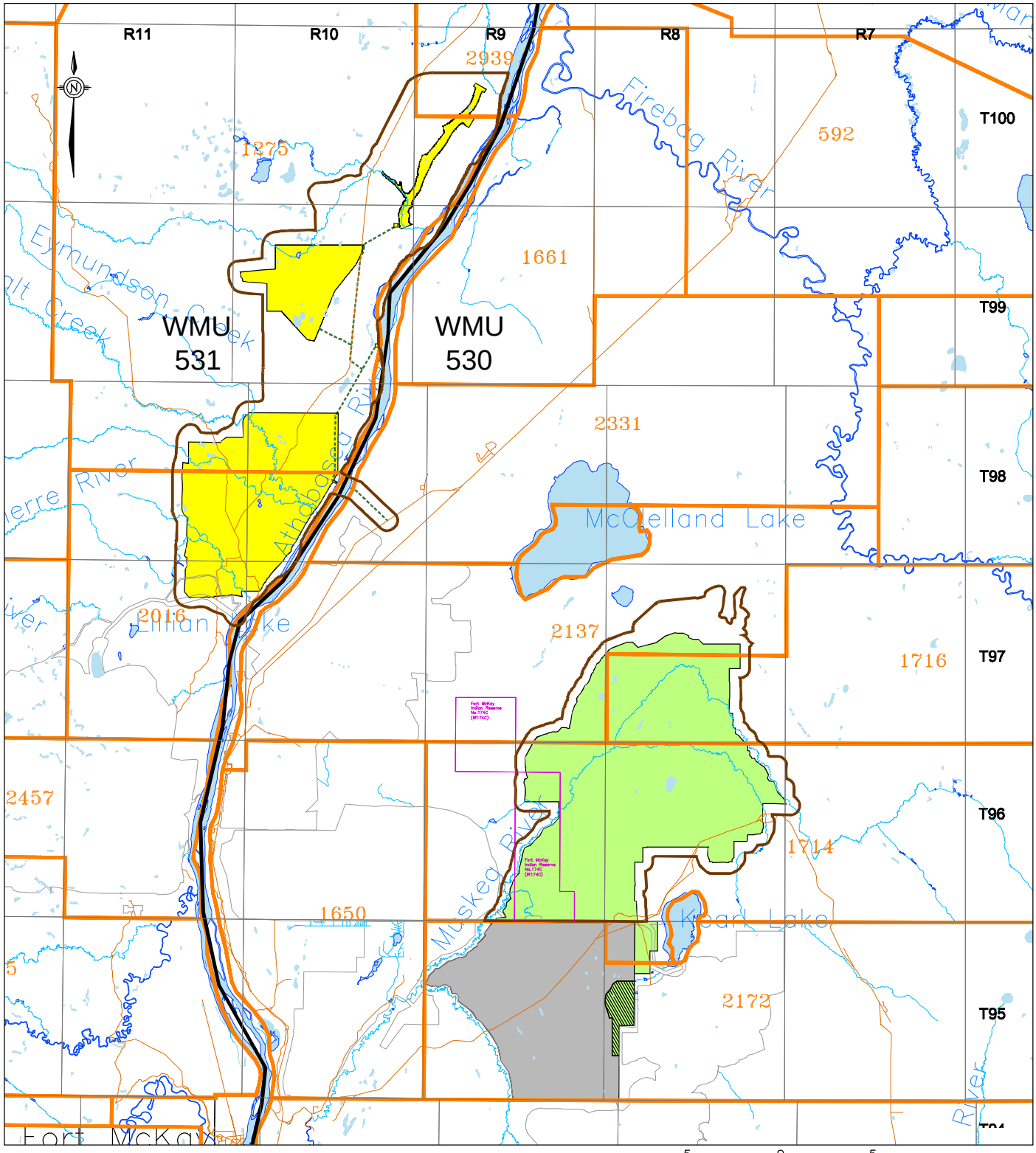
Local Study Areas

The JEMA LSA is within WMU 530 (Figure 2.3-6). Within WMU 530, 21 outfitters hold 238 allocations to hunt moose, black bear and white-tailed deer. The PRMA LSA is within WMU 531 (Figure 2.3-6). There are 170 allocations held by 15 outfitters in WMU 531. Five outfitters working in both WMU 530 and 531, and one working solely in 530, were contacted for the Service Provider Survey including: NE AB Wilderness Outfitters, Birch Mountain Outfitters, Blanch Lake Outfitters, Gypsy Lake Lodge, Wild North Adventures Ltd. and Garrett Brothers Outfitting Ltd. Of these, the first three chose to participate.

The NE AB Wilderness Outfitters operates within the PRMA LSA for most of their activities, but conducts very little hunting in WMU 530. Blanch Lake Outfitters conducts hunting activities north of the JEMA LSA and PRMA LSA at "Mile 125" along the river, and does not operate within the LSAs. Birch Mountain Outfitters hunts actively within both WMU 530 and 531, within both the JEMA LSA and PRMA LSA. Birch Mountain Outfitters operates nine camps in these WMUs. The owner indicated that in the last few years, he has had to move his camp locations numerous times in response to ongoing development in the area. He cited noise, especially from bird deterrent (propane) cannons, as a major deterrent to wildlife, making it more difficult for him to successfully hunt in the area. He has historically had a 90% success rate for moose hunting, and in the 2006/2007 season he did not see a single moose. He views the increase in noise and loss of habitat resulting from oil sands development as responsible for the reduced moose populations.

Moose is the preferred species of many hunters. Moose were identified as a resource of special concern within both the JEMA LSA and PRMA LSA (Sellin 2007, pers. comm.). This species is protected by a complex set of hunting regulations. The ASRD consider moose to be a management concern due to their sensitivity to habitat changes in the region. Within the PRMA LSA, the Redclay Creek bison herd is also a resource concern (Sellin 2007, pers. comm.). This herd is an important species targeted by a small group of recreational hunters. This herd is not protected by the Wildlife Act Regulations and therefore, it provides some of the only bison hunting in the region (Sellin 2007, pers. comm.).

The Fort McMurray Fish and Game Association indicated that they do not participate in association-related activities in the area of Shell's leases north of Fort McKay; however, that does not imply that individual members do not use those areas for hunting activities.



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- WILDLIFE MANAGEMENT UNIT BOUNDARY
- REGISTERED FUR MANAGEMENT AREA BOUNDARY

5 0 5
SCALE KM

REFERENCE

Alberta Digital Data Obtained From AltaLIS Ltd. (September 2004.) used under license.
Projection: Transverse Mercator Datum: Nad 83 Coordinate System: Utm Zone 12

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

WILDLIFE MANAGEMENT UNITS AND REGISTERED FUR MANAGEMENT AREAS OVERLAPPING THE LOCAL STUDY AREAS

Shell Canada Limited

PROJECT 05-1344-027.8550			FILE No. Fur Manage-Wildlife	
DESIGN	JS	23/07/07	SCALE AS SHOWN	REV. 0
CADD	YW	20/08/07	FIGURE: 2.3-6	
CHECK	JS	17/11/07		
REVIEW	WES/TC	20/11/07		

L:\2005\1344-OIL SANDS\05-1344-027-Shell Omnibus\8500\8550\ Drawing file: Fig 2.3-6_Wildlife Management Units and Registered Fur Management Areas Overlapping the LSA.dwg Nov 29, 2007 - 9:56am

The RUS found that four species of game are hunted within the JEMA LSA. Table 2.3-15 lists these by the percent of the population who hunt that game type, and the average number hunted. The game species hunted most often is moose, and deer, followed by black bear and grouse. Of these species, only grouse are hunted in high numbers with one individual reporting annual catches of 100 per year. The average number of moose, deer and black bear taken was reported as one per person per year.

The PRMA LSA shows similar use patterns, as shown in Table 2.3-15. Three game species are hunted in the PRMA LSA, with moose being the most sought after. This is followed by deer and grouse. High annual catches of grouse were reported by one individual, with 75 taken per year. One deer and one moose are harvested annually per person.

Hunting respondents of the RUS generally felt that their hunting success for all species was less (64% of those asked) in 2007 than it was five years earlier. Twenty-nine percent felt their success rate had remained the same, 7% did not respond. The reason cited for the decrease in success was the ongoing development in the area that resulted in clearing of forests and increased access. It was felt that wildlife populations in the region were dropping and that the wildlife in the area was moving away.

Table 2.3-15 Responses to Species Hunted

Local Study Area	Type of Game	Percent of Population that Hunts this Species in Area	Average Number Hunted per Year
Jackpine Expansion Mining Area	moose	1.5	1
	deer	1.5	1
	black bear	1	1
	grouse	0.5	100
Pierre River Mining Area and Athabasca River Corridor	moose	2.5	1
	deer	1.5	1
	grouse	1	75

2.3.7.2 Trapping

Regional Study Area

Trapping is managed by a trapline system of Registered Fur Management Areas (RFMAs). Trapline owners are licensed to harvest in an RFMA and are asked to provide harvest data to Alberta Fish and Wildlife for monitoring and management of harvest rates.

There are 91 RFMAs in the RSA. Harvest records from 1977 through 2001 for each RFMA were obtained from ASRD. The results are provided in Table 2.3-16. More recent harvest data is unavailable because RFMA holders have the option to decline the release of information under the *Privacy Act*.

Historically, the most-trapped species in the RSA have been (in decreasing order of number trapped): red squirrel, beaver, muskrat, lynx, weasel, mink, fisher and marten. In general, there is a predominant trend of declining harvests in the region. The long-term declining trend for most of the species trapped in the RSA can partly be explained by a decline in fur prices. Trappers in the region have indicated that lower fur prices have made earning a living by trapping very difficult. In addition, trappers have stated that the quality of furs from traplines in the region may be declining, which may account for some of the decline in fur value. Another factor that may be affecting harvest levels is the region's changing economic base. Individuals who formerly earned a living in the fur trade are now entering into other industries (e.g., oil sands industry). This has an effect on overall trapping effort.

Three respondents (less than 1%) of the phase one Resource User Survey indicated that they continue to trap in the RSA. The Fort McMurray Fish and Game Association indicated that many of their members are also trappers and they have indicated that trapping success over the 2006/2007 season was reduced by 50 to 75% from previous years and was the worst season in 50 years. The most important species to trappers such as marten and fisher seem to be down in numbers, while species such as moose and wolves are on the rise. There were no speculations as to what was causing this trend.

Table 2.3-16 Annual Harvests in the Regional Study Area for Most-Frequently Trapped Species

Species	Annual Number Harvested Per Season											
	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89
black bear	4	3	3	6	5	11	6	0	4	5	6	0
beaver	900	1,201	1,922	1,495	1,063	1,230	1,110	851	999	1,215	930	289
coyote	6	12	56	68	157	113	64	76	23	44	20	11
ermine/weasel	160	133	525	294	125	155	380	372	122	496	607	168
fisher	29	73	159	221	279	336	236	179	156	221	154	63
fox (all types)	24	60	168	157	147	191	62	77	21	70	59	45
lynx	186	578	859	594	547	278	66	36	27	31	41	65
marten	1	5	17	1	0	2	1	5	12	20	37	65
mink	174	471	979	464	209	109	68	57	70	308	321	92
muskrat	562	801	1,090	698	684	400	1,074	377	1,111	935	876	94
otter	21	28	44	26	29	41	26	16	19	35	26	10
red squirrel	2,299	3,110	11,409	7,205	1,598	2,597	4,581	3,609	1,315	2,453	4,075	955
wolf	10	23	17	8	12	22	21	16	9	38	8	2
wolverine	0	1	1	4	4	2	1	1	1	3	1	1

Species	Annual Number Harvested Per Season											
	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01
black bear	1	0	2	2	0	0	1	16	6	6	12	1
beaver	484	211	524	191	500	530	593	741	831	624	511	382
coyote	20	22	34	42	16	23	19	22	43	16	37	33
ermine/weasel	100	80	151	79	66	126	359	417	192	203	237	61
fisher	131	125	246	148	107	113	119	163	112	86	114	82
fox (all types)	86	37	94	20	203	21	38	53	34	23	49	55
lynx	253	107	158	26	20	23	14	42	32	51	98	57
marten	90	91	183	90	94	114	355	143	412	321	411	355
mink	98	35	55	14	15	19	48	72	114	102	67	49
muskrat	55	166	39	61	66	237	111	511	104	215	126	33
otter	22	5	34	16	43	50	41	50	49	34	32	26
red squirrel	481	252	1,109	624	914	814	610	646	634	273	429	279
wolf	7	6	19	21	22	31	25	28	22	30	46	53
wolverine	3	1	7	0	2	1	3	3	2	2	4	1

Source: Fetter 2001, pers. comm.

Local Study Areas

The JEMA LSA is overlapped by four RFMA #s 1714, 1716, 2137 and 2331; the PRMA LSA is overlapped by two RFMA #s 1275 and 2939 (Figure 2.3-6). Figure 2.3-6 shows RFMA #2016 overlapping the PRMA LSA as well; however, this RFMA was surrendered and has reverted back to the crown. Data for individual traplines are not available due to privacy concerns; however, pooled data was obtained for multiple traplines. In this case, RFMAs from both the JEMA LSA and PRMA LSA were pooled together to obtain harvesting data for the Project area. Table 2.3-17 outlines the harvest results from these traplines.

Trapline holders in the LSA were interviewed as part of the Traditional Land Use study for this Project. The results of those interviews, which include detailed uses, are presented in Section 3, Traditional Land Use Environmental Setting, of this volume.

Table 2.3-17 Pooled Trapline Harvest Data for the Jackpine Expansion and Pierre River Mining Areas

Species	Number Harvested					Total
	2001/02	2002/03	2003/04	2004/05	2005/06	
beaver	34	40	69	59	38	**240**
black bear	4	4	2	5	9	**24**
coyote	6	1	3	5	2	**17**
fisher	11	10	5	8	11	**45**
fox	3	11	2	2	2	**20**
lynx	7	0	11	2	3	**23**
marten	26	21	29	18	34	**128**
mink	6	0	0	0	33	**39**
muskrat	14	0	0	10	20	**44**
otter	0	0	1	0	0	**1**
squirrel	15	0	62	0	150	**227**
weasel	0	0	5	0	0	**5**
wolf	9	5	14	15	16	**59**
wolverine	0	1	0	0	0	**1**
Total	**135**	**93**	**203**	**124**	**318**	**873**

Sources: Fetter 2007, pers. comm.; Wolfram 2007, pers. comm.

Between 2001 and 2006, 873 animals from 14 species were reported harvested from traplines overlapping the LSAs. Beaver was the most common species taken, followed by squirrel, with over 200 of each being harvested during those five years. Marten was also harvested at high numbers, with 128 animals being

taken between 2001 and 2006. The 2005/06 harvest year was the most productive of the last five, with 318 animals of 11 species being taken.

2.3.7.3 Berry Picking

Regional Study Area

Berry picking is an important activity in the RSA. Phase one of the RUS indicated that wild berries, vegetables or flowers were picked to some degree by about 28% of the respondents that participate in outdoor activities, or 18% of the total population surveyed. Respondents to phase two indicated that berry picking locations were only accessed by truck or ATV.

Potential berry picking habitat was mapped using Landsat satellite imagery and a Geographic Information System (GIS) to allow the relative abundance of plant communities to be compared within the RSA. There is about 3,385 km^2 of blueberry habitat (15% of the RSA) and 4,624 km^2 of cranberry and raspberry habitat (20% of the RSA).

Local Study Areas

In the JEMA LSA, there are 12.6 km^2 (7% of the LSA) of potential blueberry picking habitat and 8.5 km^2 (5% of the LSA) of potential cranberry/raspberry picking habitat (Figure 2.3-7). None of the RUS respondents indicated harvesting berries or other wild foods in the JEMA LSA.

In the PRMA LSA, there are 35.2 km^2 (16% of the LSA) of potential blueberry picking habitat and 97.0 km^2 (46% of the LSA) of potential cranberry/raspberry picking habitat (Figure 2.3-7). Two respondents of the RUS (1%) indicated they pick berries near the PRMA LSA, within the Athabasca River Corridor (ARC). One respondent only picked blueberries, while the other picked blueberries, cranberries and raspberries. Both truck and ATV access were listed by the respondents. None of the respondents indicated picking other types of plant foods near the PRMA LSA.

Rg 11
Rg 10
Rg 9
Rg 8 W4M
N
Tp 99
Tp 98
Tp 97
Tp 96
Tp 95
Oakley Lake
Firebag River
Athabasca River
McClelland Lake
Fort McKay Indian Reserve No. 174C (IR 174C)
Muskeg River
Wapasu Creek
Muskeg River
Kearl Lake

LEGEND

- LOCAL STUDY AREA
- OPEN WATER
- INDIAN RESERVE
- PUBLIC ROADWAY

FIELD TYPE

- POTENTIAL BLUEBERRY HABITAT
- POTENTIAL CRANBERRY/RASPBERRY HABITAT

5 0 5
SCALE 1:150,000 KILOMETRES

DRAFT

REFERENCE

Alberta digital data obtained from AltaLIS Ltd. (September 2004), IHS Energy Ltd. (August 2006), Alberta Pacific Ltd. (April 2004), and Alberta SRD, used under license.
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 12.

PROJECT
JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE
POTENTIAL BERRY PICKING HABITAT
IN THE LOCAL STUDY AREAS

Shell Canada Limited

PROJECT No. 05-1344-027.7600			SCALE AS SHOWN	REV. 0
DESIGN	VR	06 Jun. 2007	FIGURE: 2.3-7	
GIS	VR	21 Nov. 2007		
CHECK	JS	21 Nov. 2007		
REVIEW	WES/TC	21 Nov. 2007		

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2.3.7.4 Integrated Resource Plans for Hunting, Trapping and Berry Picking

Relevant management guidelines for the Athabasca-Clearwater RMA include:

- Developments will not be permitted on significant waterfowl nesting habitat adjacent to McClelland and Little McClelland lakes.
- Special constraints might be applied to development proposals of the Lower Muskeg River to maintain critical wintering habitat for moose.

Relevant management guidelines for the Mildred-Kearl Lakes RMA include:

- Development activities that have a negative impact on important moose habitat might require the creation of off-site habitat enhancement or special on-site protective measures.
- A backshore buffer will be maintained around lakes to protect waterfowl nesting and staging areas. However, if a lake must be mined, waterfowl habitat will be replaced whenever possible. A flexible approach will be used for the timing and location of habitat mitigation programs so that off-site and post-disturbance habitat replacement options can be considered.

There are no guidelines addressing the use of berries or other wild food resources in the IRP.

2.3.8 Fishing

2.3.8.1 Fisheries Management

Alberta is divided into three Fish Management Zones. The RSA occurs within Zone 3 (Northern Boreal), which is subdivided into Watershed Units NB1 and NB4. This area encompasses the watersheds of the Athabasca, Clearwater and Christina rivers and their tributaries.

2.3.8.2 Fish Resources and Stocking

Regional Study Area

The phase one RUS indicated that 37% of the population fish in the region. The types of sport fish found in 16 lakes and 25 rivers and creeks in the RSA are listed in Table 2.3-18, based on available literature. Only popular sport fishing locations, or areas where ASRD has identified sport fish, are included.

The Alberta Government operates stocking hatcheries to maintain native fish in Alberta's waterbodies, to re-establish fish populations, encourage new populations in waterbodies with suitable habitat and to allow more fishing diversity and opportunities in locations where fishing is limited. Information on the number of fish stocked in Alberta is provided in Annual Fish Stocking Reports. Within the RSA, there are four artificial waterbodies that have received hatchery stocked rainbow trout in recent years (ASRD 2004, 2006a,b):

- Highway 63 Pond (15-87-9-W4M) - 1,000 fish/year;
- Minimum Security Pond (16-88-8-W4M) - 1,300 fish/year, excluding 2006;
- Texaco East Pond (15-88-8-W4M) - 2,700 fish/year; and
- Texaco Pond (17-88-8-W4M) - 1,500 fish/year.

Local Study Areas

Within the JEMA LSA, there are four waterbodies known to support sport fish populations (Table 2.3-19). Of these, the Muskeg River supports the highest diversity, with ten sport fish species present as residents or migrants. The Muskeg River is accessible year-round from Canterra Road, making it a valuable resource for recreational fishers. The remaining waterbodies within the LSA are not known to be important fishing areas, as described in Section 2.3.8.3 (Fishing Pressure).

The PRMA LSA contains four waterbodies known to support sport fish species (Table 2.3-19). The Pierre River contains the greatest diversity with five species present. However, these creeks and rivers in the PRMA LSA are difficult to access, requiring boat or air transportation to reach them and are therefore less desirable to recreational fishers.

Table 2.3-18 Lakes and Rivers Supporting Sport Fish in the Regional Study Area

Lakes	Access	Lake Trout	Whitefish	Perch	Pike	Burbot	Arctic Grayling	Walleye	Goldeye	Mountain Whitefish
Algar River	fly-in only	–	–	–	X	–	X	X	–	X
Athabasca River	accessible by vehicle	–	–	X	X	–	X	X	X	–
Beaver River	accessible by vehicle	–	–	–	–	X	X	–	–	–
Christina River	accessible by vehicle	–	–	–	X	X	X	X	X	–
Clarke Creek	accessible by vehicle	–	–	–	–	–	X	–	–	–
Clearwater River	accessible by vehicle	–	X	–	X	–	X	X	X	–
Conn Creek	accessible by vehicle	–	–	–	–	X	X	–	–	–
Dover River	accessible by ATV	–	–	–	X	–	–	X	–	–
Eaglenest Lake	fly-in only	–	X	X	–	–	–	–	–	–
Ells River	access via dry river road north of Fort McKay	–	X	X	X	–	X	X	–	–
Firebag River	Fort Chipewyan winter road meets river upstream of its confluence with Athabasca	–	X	–	X	–	X	X	–	–
Gardiner Lake	fly-in only	–	X	X	X	–	X	X	–	–
Gipsy Lake	snowmobile access via Lac La Loche winter road that leaves highway 881 at Cheecham about 60 km SE of Fort McMurray	–	X	X	X	–	–	–	–	–
Gordon Lake	mainly fly-in	–	–	–	X	–	–	–	–	–
Gregoire Lake	accessible by vehicle	–	X	X	X	–	X	X	–	–
Hangingstone River	accessible by vehicle	–	–	–	X	–	X	X	–	–
High Hill River	only access by jet boat on the Clearwater River; campground at confluence	–	–	–	–	–	X	–	–	X
Highway 63 Trout Pond	accessible by vehicle; 8 km south of junction with Highway 69	–	–	–		–	–	–	–	–
Horse River	accessible by vehicle	–	–	–	X	–	X	–	–	–
Jackpine Creek	accessible by ATV	–	–	–	–	–	X	–	–	–
MacKay River	accessible by vehicle	–	–	–	X	–	X	X	–	–
Marguerite River	accessible by ATV	–	–	–	X	–	X	X	–	X
McClelland Lake	fly-in only	X	X	–	X	–	–	X	–	–
Moose Creek	accessible by ATV	–	–	–	–	–	X	–	–	–
Muskeg River	accessible by vehicle	–	X	X	X	–	X	X	–	X
Namur Lake	no road access	X	X	–	X	–	X	–	–	–
Pearson Lake	accessible by quad – 120 km ATV trip to north via Fort McKay to Fort Chipewyan winter road	–	X	–	X	–	–	X	–	–
Poplar Creek	accessible by vehicle	–	X	X	X	X	X	X	–	–

Table 2.3-18 Lakes and Rivers Supporting Sport Fish in the Regional Study Area (continued)

Lakes	Access	Lake Trout	Whitefish	Perch	Pike	Burbot	Arctic Grayling	Walleye	Goldeye	Mountain Whitefish
Richardson River	upper river and lakes accessible by 130 km ATV trip to north via Fort McKay to Fort Chipewyan winter road	–	X	–	X	–	–	X	X	–
Saline Creek	accessible by vehicle	–	–	–	–	–	X	–	–	–
Sand Lake	fly-in only	–	X	X	X	–	–	X	–	–
Saprae Creek	accessible by vehicle via Highway 69	–	–	–	–	–	X	–	–	–
Spencer Lake	no road access, only access may be via cutlines	–	X	X	X	–	–	X	–	–
Square Lake	accessible by vehicle	–	–	X	X	–	–	–	–	–
Steepbank River	accessible by boat, snowmobile, ATV or fly-in	–	–	X	X	–	X	X	–	X
Sunday Creek	accessible by ATV	–	–	–	X	–	–	–	–	–
Surmont Creek	accessible by vehicle	–	–	–	–	X	X	–	–	–
Unnamed (Moose) Lake	accessible by ATV	–	–	X	X	–	–	–	–	–
Unnamed (Portage) Lake	accessible by ATV	–	–	X	X	–	–	–	–	–
Unnamed (Sandy) Lake	accessible by ATV	–	–	X	X	–	–	–	–	–
Unnamed (Snake) Lake	accessible by ATV	–	–	X	X	–	–	–	–	–

– = Species not identified in listed waterbody.

Source: Mitchell 2001.

Table 2.3-19 Sport Fish Species and Locations Within the Jackpine Expansion and Pierre River Mining Areas Local Study Areas

Local Study Area	Waterbody	Species									
		Arctic Grayling	Bull Trout	Burbot	Goldeye	Lake Cisco	Lake Whitefish	Mountain Whitefish	Northern Pike	Walleye	Yellow Perch
Jackpine Expansion Mining Area	Jackpine Creek	X	–	–	–	–	–	X	X	–	–
	Muskeg Creek	–	–	–	–	–	–	–	X	–	–
	Muskeg River	X	X	X	X	X	X	X	X	X	X
	Unnamed Waterbody 1	–	–	–	–	–	–	–	X	–	–
Pierre River Mining Area	Big Creek	–	–	X	–	–	–	–	–	–	–
	Eymundson Creek	X	–	X	–	–	–	–	–	–	–
	Pierre River	X	–	X	–	–	–	X	X	X	–
	Redclay Creek	X	–	X	–	–	–	–	X	X	–

– = Not Detected.

The RUS indicated that four different species are fished within the LSAs. These are listed in Table 2.3-20 by location. One respondent (0.5%) identified the JEMA LSA (Area 9) as a sport fish location. Fifteen people (7.5%) identified the PRMA LSA and ARC (Areas 5, 6 and 2) as sport fish locations. The ARC, which is adjacent to the PRMA LSA, is the most popular area fished by respondents within, or in the vicinity of, the LSAs.

No fish stocking occurs in either the JEMA LSA or PRMA LSA.

Table 2.3-20 Fishing Locations Identified in the Resource User Survey

Location	Number of People Who Use Area	Percent of Population Who Use Area	Fish Species
Area 2 (Athabasca River Corridor)	13	6.5	any type of fish
			grayling
			northern pike (jackfish)
			perch
			walleye (pickerel)
Area 5 (Pierre River Mining Area - Northern Lease)	1	0.5	northern pike (jackfish)
			walleye (pickerel)
Area 6 (Pierre River Mining Area)	1	0.5	northern pike (jackfish)
			walleye (pickerel)
Area 9 (Jackpine Expansion Mining Area)	1	0.5	grayling

2.3.8.3 Fishing Pressure

Regional Study Area

Fishing license sales are a reasonable predictor of trends in fishing pressure. The ASRD Fish and Wildlife Branch indicated that fishing interest in the region has remained fairly constant, with a slight increase in recent years (Sellin 2007, pers. comm.). The area of most concern to ASRD in the RSA is Gregoire Lake, which is experiencing the most fishing pressure within the region (Sellin 2007, pers. comm.). Table 2.3-21 presents the recreational fishing license sales data obtained for Fort McMurray, Anzac and Fort McKay, as well as for the entire Province of Alberta.

Table 2.3-21 Recreational Fishing License Sales

Communities	Number of Fishing Licenses Sold/Community						
	2000	2001	2002	2003	2004	2005	2006
Fort McMurray, Anzac and Fort McKay	3,973	4,325	4,358	4,450	5,909	5,771	6,505
Total in Alberta	**212,137**	**216,137**	**226,449**	**217,245**	**220,970**	**209,825**	**238,483**

Source: Wolfram 2007, pers. comm.

In contrast to the increase in licensed fishing, illegal fishing does not seem to be on the rise. This activity is difficult to measure; however, the compliance rate appears to be unchanged based on the number of infractions as a proportion of the regional population (Sellin 2007, pers. comm.).

The RUS indicated that most respondents fish for recreation, with only two respondents indicating that they fish for consumption. A variety of modes of travel are used to access fishing grounds, with ATVing being the most common. Truck access and air access are also common.

Within Alberta, there has been a freeze on the sale of commercial fishing licenses since 1987. Current commercial license holders can sell their licenses, but there are no new licenses issued. The freeze, combined with a government buyout program of existing licenses in some areas, is intended to encourage a more viable industry. The last two lakes that historically supported commercial fishing activities in the RSA (Gipsy Lake and Gregoire Lake [Westworth 1990]) are no longer licensed, leaving no commercial fishing activity in the RSA (Bodden 2006; pers. comm.).

Local Study Areas

Within the JEMA LSA, one RUS respondent (0.5% of the population) indicated fishing for grayling. No other respondents indicated fishing within the JEMA LSA. The PRMA and adjacent ARC were more commonly cited as fishing locations, with two (1%) and 13 (6.5%) respondents indicating use of those areas, respectively (Table 2.3-20). The most sought after sport fish species are walleye and northern pike. Perch is also targeted only within the ARC, and some respondents indicated that they fish for anything present within the ARC. The results from the RUS indicate that grayling are caught most often (23 per person per year), followed by walleye (9) and northern pike (5). Table 2.3-22 shows the RUS results for fishing in the LSAs.

Table 2.3-22 Responses to Fish Species Caught

Type of Fish	Percent of People Who Fish that Catch This Species	Average Number of Fish Caught per Person per Year	Local Study Area
northern pike	5.5	5	ARC/PRMA LSA
walleye (pickerel)	5.5	9	ARC/PRMA LSA
grayling	1.0	23	ARC/JEMA LSA
any type of fish	1.0	0	ARC
perch	0.5	0	ARC

Most respondents (42% of those asked) felt that their fishing success in the RSA had decreased over the past five years (between 2002 and 2007). Thirty-nine percent felt it had remained the same, and 4% felt that their fishing success had improved. Another 15% did not comment.

The Fish and Wildlife Branch did not identify any areas of concern for ASRD within the JEMA LSA or PRMA (Sellin 2007, pers. comm.).

No commercial fishing occurs within the JEMA LSA or PRMA.

2.3.8.4 Integrated Resource Plans for Fishing

Relevant management guidelines for the Athabasca-Clearwater RMA include:

- an emphasis on site selection and erosion-control measures to maintain riparian habitat and shoreline vegetation, and to protect water quality, fish-spawning and fish-rearing habitat; and

- the creation of artificial beaches and removal of shoreline vegetation will be confined to areas where it will provide significant benefits to the public at large.

Relevant management guidelines for the Mildred-Kearl Lakes RMA include:

- A backshore buffer will be maintained around lakes to protect fish spawning sites. However, if a lake must be mined, a compensation plan is required that will result in full replacement of the fish-spawning habitat. A flexible approach will be used for the timing and location of habitat mitigation programs so that off-site and post-disturbance habitat replacement options can be considered.

2.3.9 Recreation and Tourism

2.3.9.1 Non-Consumptive Activities

Regional Study Area

Non-consumptive recreation involves the passive use of resources, such as canoeing, wildlife viewing, camping, tours and snowmobiling. This form of recreation allows people to take advantage of outdoor areas without removing resources from them. As part of the RUS, respondents were asked if they participated in the following non-consumptive recreational activities: hiking, boating, ATVing, snowmobiling, camping and swimming. Table 2.3-23 provides their responses. Camping was the most popular activity among respondents, with a participation rate of about 44%. This was followed by hiking, which was done by about 37% of respondents.

Table 2.3-23 Non-Consumptive Recreational Activities Queried in the Survey

Activity	Number of 'Yes' Responses	% of 'Yes' Responses[(a)]
camping	286	43.8
hiking	244	37.4
swimming	199	30.5
ATVing	198	30.3
boating	187	28.6
snowmobiling	133	20.4

[(a)] Based on the total surveyed population of 653 individuals.

Fifty percent of the 653 people surveyed take part in activities other than those listed in Table 2.3-23. This represents 80% (329 people) of the 412 people that indicated participating in outdoor activities, suggesting that most outdoor enthusiasts engage in more than one form of outdoor recreation. Table 2.3-24 identifies the 16 additional activities that respondents participate in. In some

cases, people listed up to three additional recreational activities that they do in an outdoor setting. Cycling was the most commonly cited additional activity performed in the RSA, with about 4% of total respondents participating in either road or mountain cycling. This was followed by skiing (about 3%) and canoeing or paddling (about 1%). Walking and motorbiking both had a participation rate of slightly less than 1%. Several other activities were mentioned by respondents, such as outdoor sports, golfing and trapping; however, because these are done within the city centre, or are consumptive in nature, they were not included in the results.

Table 2.3-24 Additional Activity Responses and Frequency

Activity	Number of People Who Do That Activity	Percent of Outdoor Enthusiasts (n=412)	Percent of Total Respondents (n=653)
cycling	25	6.0	3.8
skiing	16	3.8	2.5
canoeing/paddling	7	1.7	1.1
walking	5	1.2	0.8
motorbiking	5	1.2	0.8
jet skiing	3	0.7	0.5
photography/sketching	3	0.7	0.5
bird/wildlife viewing	2	0.5	0.3
horseback riding	2	0.5	0.3
shooting	2	0.5	0.3
sledding	2	0.5	0.3
skating	2	0.5	0.3
jogging	2	0.5	0.3
snowboarding	1	0.2	0.2
visiting beaches	1	0.2	0.2
barbequing	1	0.2	0.2

The oil sands companies have also developed several facilities that cater to non-consumptive recreation. These activities and their locations include:

- wildlife viewing area and nature trails at Suncor's Crane Lake and Syncrude's Matcheetawin Discovery Trails;
- wildlife viewing area, temporary Boy Scout camp and canoeing at Poplar Creek Reservoir;
- wildlife viewing area at Wood Bison Gateway and Wood Bison Trail;
- wildlife viewing area at Wood Bison Viewpoint (Syncrude Mildred Lake);

- canoeing at Ruth Lake; and
- canoeing at Beaver Creek Reservoir.

Fort McMurray is known to have a higher level of participation in motorized, all-season recreation than the rest of Alberta. To accommodate the level of motorized activity in the area, as well as pastimes such as walking, hiking and nature viewing, an additional of 600 km of trails are needed (Greystone 2003).

Construction camp residents were surveyed in 2003 by Nichols Applied Management for the RIWG to determine the effects of camp populations on social, economic and environmental resources in Fort McMurray. The survey found that backcountry areas did not appear to be highly used by camp residents. Seventy percent of survey respondents indicated that they did not engage in backcountry activities (Nichols 2003). Survey analysts suggest that this value understates actual backcountry use. Residents in camps further from Fort McMurray (i.e., PTI Lodge) pursued backcountry activities such as fishing, hunting, camping, off-roading and snowmobiling more often than those in camps closer to town. Also, residents who have been in camp for longer than six months were more likely to participate in backcountry activities than newcomers (Nichols 2003).

Recreation, such as ATVing and camping, is increasing on public lands within the region. These forms of recreation are unregulated north of Fort McMurray because the use density is still considered to be low (Stryde 2007: pers. comm.). However, in some areas, such as the Richardson backcountry, use is very high and ASRD pays seasonal workers to patrol the area and discourage inappropriate uses (Stryde 2007, pers. comm.).

Local Study Area

The RUS respondents were asked whether they participated in birdwatching, camping, hiking, cross-country skiing, canoeing, kayaking, boating, snowmobiling, snowshoeing, swimming, trail biking or ATVing in the LSAs. Non-consumptive recreational activities in and around the JEMA LSA include snowmobiling (four RUS respondents [extrapolating to 2% of the population]); ATVing (three respondents [1.5%]) and camping (one RUS respondent [0.5%]). Although other recreational groups or clubs may use the LSA on occasion, no permanent facilities or regular events occur in the area.

Within the PRMA, including the ARC, respondents participate in ATVing (10 respondents [5%]); snowmobiling and boating (each with four respondents

[2%]). Within the ARC, three respondents (1.5%) participate in camping. None of the respondents indicated participating in any other activities within the LSAs.

The most common means of accessing recreational areas in either LSA was by ATV, followed by truck. Snowmobiles, air transportation and cars were also used to access the areas. The ARC is the most popular area for recreational activities to occur, with 15 respondents (7.5%) using it for various activities. The JEMA LSA was the second most popular area used for recreational outings, with seven people (3.5%) using it. The PRMA, with the exclusion of the ARC, was the least used area, with six people (3%) participating in recreational activities there.

2.3.9.2 Outdoor Clubs

Regional Study Area

Of the 412 people who completed the entire survey, 113 people (27%) responded that they belong to at least one outdoor club within the region (Table 2.3-25). The club that was named by the most respondents (26) was the Fort McMurray Fish and Game Association, followed by the ATV Riders Club and the Snowmobiling Club, named by 14 and 10 people, respectively. The Fish and Game Association indicated that their membership rates were down by 30% in 2007 due to increased membership fees. In total, about 60 clubs were identified by the respondents. Table 2.3-25 only shows those clubs that were mentioned by more than one person. Although they are not included in the table, many sports leagues (e.g., baseball, rugby) were also mentioned by respondents.

Table 2.3-25 Outdoor Club Participation in the Regional Study Area

Club Name	Number of People
Fort McMurray Fish and Game Association	26
ATV Riders Club	14
Snowmobiling Club	10
Skiing Club	7
Running Club	6
Golf Club	5
Rowing/Paddling Club	5
Bicycle Club	5
YMCA	5
Dirt Biking Club	4
Scouts Group	3
Clearwater Archers Club	3
Triathlon Club	2
Search and Rescue	2
Ducks Unlimited	2
Girl Guides	2

Local Study Areas

None of the outdoor clubs active in the RSA are known to engage in activities within the JEMA LSA or PRMA.

2.3.9.3 Camping

Regional Study Area

There are 555 formal campsites within six campgrounds in the RSA, none of which occur within the LSAs. One public campground is located in Gregoire Lake Provincial Park, while the remaining campgrounds are private. There are also provincial recreation areas and remote provincial recreation areas, which accommodate informal camping. A variety of other trails and parks, both public and private, provide recreation amenities in the RSA. The amenities offered at each campground, park and trail are described in Table 2.3-26. About 44% of RSA residents answering the RUS responded that they camp.

Occupied campsite nights for Gregoire Lake Provincial Park are presented in Table 2.3-27. This park is open year-round and activities at the park include wildlife viewing, cross-country skiing, fishing, camping, canoeing, sailing, day-use and boat launching facilities.

The number of campsite users for Gregoire Lake was highest in 2006, with 13,966 occupied campsite nights. Although numbers are inconsistent from year to year due mainly to weather (for example, 2002 generally had poor weather conditions), the average since 2000 (8,878) is substantially higher than the average from the 1990s (5,215). It is important to note that the large increase in campsite occupation in 2006 does not include the months of January through April, during which time the campsite was closed that year. This increase is due to the ongoing development of various oil sands projects, resulting in an influx of workers to the Fort McMurray area. Many of these workers are living at the campsite rather than renting or buying homes in Fort McMurray (ACD 2007, pers. comm.).

Workers staying at the campground are expected to leave after 16 days; however, maintaining space for recreational campers is becoming an issue and many people have been turned away (Spackman 2007, pers. comm.). The trend in increased worker occupancy has not been good for the park, which has been developed using taxpayer dollars to service the general public. In fact, the public has started to indicate that they will no longer come to Gregoire Lake to pursue recreational activities (Spackman 2007, pers. comm.). The feeling of park operators under environmental setting conditions is that industry should make further efforts to accommodate the housing needs of their employees (Spackman 2007, pers. comm.).

Table 2.3-26 Amenities Available at Recreation Areas, Provincial Parks, Campgrounds and Trails in the Regional Study Area

Recreation Areas, Provincial Parks, Campgrounds, Trails	Number of Campsites	Trails	Picnic Area	Boating	Fishing	Swimming	Bird-Watching	Sports Facilities
Birchwood Trail	-	X	-	-	-	-	X	-
Borealis Park and Haxton Centre	-	X	-	X	-	X	-	-
Cascade Rapids Provincial Recreation Area	-	X	-	X	X	-	X	-
Centennial Park	78	X	-	-	-	-	-	-
Christina River Remote Provincial Recreation Area	-	-	-	X	X	-	-	-
Clausen's Landing Remote Provincial Recreation Area	-	-	-	X	X	-	-	-
Crane Lake Nature Trail	-	X	-	-	-	-	X	-
Engstrom Remote Provincial Recreation Area	-	-	-	X	X	-	-	-
Golden Eagle Resort	30	X	X	X	X	X	X	-
Greentree Remote Provincial Recreation Area	-	-	-	X	X	-	-	-
Gregoire Lake Provincial Park	140	X	X	X	X	X	X	-
Heritage Park / Museum	-	-	-	-	-	-	-	-
J. Howard Pew Memorial Park	-	X	X	-	-	-	X	-
Kinsmen Park Group Campground (Fort McMurray)	50	-	X	X	X	X	-	X
Lions Park (Fort McMurray)	-	X	X	-	-	-	-	-
Miseieutin Remote Provincial Recreation Area	-	-	-	X	X	-	X	-
Rotary Park (Fort McMurray)	72	-	-	-	-	-	-	-
Sir Alexander Bicentennial Park	-	X	-	X	-	-	-	-
Snye Park	-	-	-	X	X	-	-	-
Tower Road Campground	185	-	-	-	-	-	-	-
Whitemud Falls Provincial Recreation Area	-	X	-	X	X	-	-	-
Wood Buffalo Gateway and Matcheetawin Trails	-	X	-	-	-	-	-	-

Source: FMVB 2001, 2004.

Note: X = Facility available.
- = No facilities/activity.

Table 2.3-27 Summary of Camping Statistics at Gregoire Lake

Year	Number of Occupied Campsite Nights[(a)]
1990	6,268
1991	5,553
1992	5,436
1993	5,158
1994	5,798
1995	5,417
1996	6,380
1997	6,316
1998	6,566
1999	9,212
2000	7,798
2001	9,423
2002	7,227
2003	9,241
2004	6,560
2005	7,930
2006	13,966

(a) Occupied Campsite Nights refers to the number of nights throughout the year that each campsite was occupied (e.g., if one campsite was booked every night of the year, it would represent 365 occupied campsite nights).

Source: ACD 2004, 2006, 2007, pers. comm.

Most privately run campgrounds near Fort McMurray are open year-round. All campground operators indicated that summer demand is very high, with winter demand being somewhat less. Tower Road Campground is open year-round and has been operating since 2000. Use statistics are not maintained, but the campground usually operates at full capacity during the summer and has a much lower level of use in the winter (Tower Road Campground Personnel 2006, pers. comm.). The campground was expanded from 145 sites to 185 sites in 2005, with no difficulty maintaining 100% summer occupancy (Tower Road Campground Personnel 2006, pers. comm.).

Rotary Park Campground has 72 campsites, for which statistics have been maintained since 2000. In 2000, a total of 810 campers used the area, keeping the campground at about 85% occupancy throughout the summer. In 2001, there were 1,146 recorded campers (Lemke 2004, pers. comm.), and the campground was at 100% occupancy from March 1 through the end of August 2001 (Kasaloni 2001, pers. comm.). In 2002, a total of 992 campers were recorded and in 2003, 890 were recorded (Lemke 2004, pers. comm.). In general, during the winter the campground has 40 out of 72 sites that are booked (Kasaloni 2001, pers. comm.). Updated information was unavailable for this campsite.

Centennial Park is another year-round campground with 78 sites. Although statistics are not maintained, occupancy runs at 100% starting around February and continuing through October (Shaughnessy 2006, pers. comm.). Winter occupancy was about 50% in 2005; however, that was attributed to the mild winter that year. Winter occupancy is usually below 50%. Most users at this campground are long-term occupants as opposed to recreational campers (Shaughnessy 2007, pers. comm.). In most instances, recreational campers are turned away due to lack of space; however, the last few years have seen a decrease in calls from recreational campers (Shaughnessy 2007, pers. comm.).

Use statistics for the Kinsmen Park Campground or Golden Eagle Resort were not available.

As indicated by many of the campgrounds in the area, the Fort McMurray Tourism Bureau indicated that many visitors to the region are unable to find a place to camp because of the worker population using the campgrounds. For this reason, the Bureau has stopped attending RV shows because they can no longer promote Fort McMurray as a destination for RV travellers due to the lack of RV sites (Daymond 2007, pers. comm.).

A recreational demand assessment was completed for the Regional Municipality of Wood Buffalo in 2003. It reported that current recreational facilities in Fort McMurray were not sufficient to meet the demands of the growing population (Greystone 2003). The assessors reported that as of 2003, there was an immediate need for an additional 200 camping sites, particularly for near urban and higher quality camping (Greystone 2003).

Local Study Areas

There are no known camping areas within either the JEMA LSA or PRMA. However, one disposition reservation for a forest recreation campground near the southeast boundary of the PRMA was identified in the LSAS search. The exact location of this area, called Clausen's Landing Remote Forest Recreation Area, is Legal Sub-Division (LSD) 11, 14-30-97-10 W4M.

Four RUS respondents indicated camping in or near the LSAs. One respondent (0.5%) camps within the JEMA LSA, while the remaining three (1.5%) camp within the ARC. No one indicated camping directly within the PRMA.

2.3.9.4 Canoeing and Kayaking

Regional Study Area

There are three canoe and kayak service providers in the region: the Borealis Canoe Club, the Tarsands Canoe and Kayak Club, and Points North Adventures Ltd. Among them, there is a sense that paddling is becoming more common in the area. The Borealis Canoe Club indicated that interest in paddling in Fort McMurray appeared strong. Inquiries into membership are increasing; overall, paddling in the area is increasing in both popularity and frequency. Within the RSA, twelve rivers and seven lakes are paddling destinations for the members of the Borealis Canoe Club.

Points North Adventures regularly uses the Athabasca and Clearwater rivers, and has noted that oil sands companies are using their services more often for employee outings. Other rivers in the RSA used by Points North include the McKay, Ells, Horse and Christina. These account for less than 5% of their total business. One percent of the people that responded to the RUS say they participate in recreational paddling.

Local Study Areas

Within the JEMA LSA, the Muskeg River was the only river identified as an important paddling destination by the Borealis Canoe Club. The Club began the Muskeg River Watershed Stewardship Project in 2006, based on funding from the Alberta Stewardship Network. The goal is for the Club to use this project as a means of executing Water for Life initiatives. Events held to date include a guided canoe trip on the Muskeg River with a geologist and a wildlife biologist to teach the public about the river system and document health indicators. As well, a Muskeg River Shoreline Cleanup event was held in June 2007.

McClelland Lake was identified as an important lake for the Borealis Canoe Club. Although this lake is not within the JEMA LSA, it is near the boundary. None of the RUS respondents indicated paddling in either the JEMA LSA or PRMA.

2.3.9.5 Tourism

Regional Study Area

Information on tourism activity in the area was obtained from the Fort McMurray Tourism Bureau, a walk-in visitor's centre (Daymond 2004, 2007, pers. comm.). The most popular tourism draws identified by the Bureau included the Oil Sands

Bus Tours, fly-in fishing charters, boating (paddling and power boating), historic tours and hunting trips (Daymond 2007, pers. comm.).

Significant increases in the number of visitors to both the oil sands facilities and the Fort McMurray Tourism centre have occurred since 1995. Walk-in visits at the centre totaled 11,216 in 2006 (Daymond 2007, pers. comm.). This number was down slightly than that observed in 2005; however, it is still greater than visitation rates seen before 2005. Bus tour patronage is steadily increasing over time, with about 175 more individuals participating in the tours in 2006 than in 2005 (Table 2.3-28; Daymond 2007, pers. comm.). These tours run from May to September and carry 51 passengers. They are often at full capacity during the summer (Daymond 2007, pers. comm.). Fort McMurray Tourism also has a "1-800" number and use of this increased from 3,099 calls in 2000 to 6,752 calls in 2006. Website traffic has also been increasing with 100,981 visitors viewing the website in 2006.

Table 2.3-28 Tourism Statistics From Fort McMurray Tourism

Year	Oil Sands Bus Tour Patrons	Fort McMurray Visitor's Bureau Visitations[(a)]
1995	1,751	7,663
1996	2,923	8,292
1997	3,066	7,642
1998	3,536	9,255
1999	4,193	10,898
2000	4,380	8,494
2001	5,420	9,171
2002	5,214	7,516
2003	5,373	8,794
2004	5,546	10,932
2005	5,775	11,653
2006	5,950	11,216

(a) Statistics are somewhat subjective as they are taken by staff noting the entrance of each visitor; the drop in 2002 is known to have occurred in part due to negligence in recording the information (Daymond 2004, pers. comm.).

Source: Daymond 2007, pers. comm.

Although increases to tourism are seen as very positive overall, the Fort McMurray Tourism Bureau indicated that tourism is being impacted by business occupancy of hotel rooms. People planning to visit the region are having difficulty finding a place to stay (Daymond 2007, pers. comm.).

Local Study Areas

The only tourism activity that was located in or near the LSAs was fly-in fishing at McClelland Lake, near the JEMA LSA boundary. No activities were

identified within the JEMA LSA, and none were identified within or near the PRMA.

Tours do not occur in either the JEMA LSA or PRMA.

2.3.9.6 Integrated Resource Plans for Recreation

Relevant management guidelines do not exist for the Athabasca-Clearwater RMA. In the Mildred-Kearl Lakes RMA, the following guidelines are specified:

- Alberta Economic Development and Tourism will be included in the referral system for any proposals that could adversely affect potential roadside recreation and tourism opportunities.
- This referral system will be applied to any proposed developments that might adversely affect the Fort Hills future potential as a provincial recreation area.

2.4 SUMMARY

Shell Canada Limited (Shell) intends to construct and operate the Jackpine Mine Expansion & Pierre River Mine Project (the Project) north of Fort McMurray. This project will use an open pit mining and extraction process for bitumen production, and will be located in an area where other land uses occur. This report considers the environmental setting of resource use issues, including management planning, environmentally important areas, mineral and surface materials, access, agriculture, forestry, hunting, trapping, berry picking, fishing, recreation and tourism.

Data on resource use was collected from a variety of sources. Of particular importance were the two surveys conducted by Shell to evaluate the use of resources in the region. This included a Service Provider Survey and a Resource User Survey (RUS), which builds on the 2001 Athabasca Oil Sands Regional Resource Use Baseline (Golder 2001).

This study of resource use includes looking at three distinct areas that may be impacted by the Project. This includes a Regional Study Area (RSA), which encompasses the city of Fort McMurray, Anzac and Fort McKay. It also includes two Local Study Areas (LSAs): one for the Jackpine Expansion Mining Area (JEMA) and one for the Pierre River Mining Area (PRMA). These LSAs represent the Project footprint and an additional 500-m buffer area.

The Project is within the area governed by the Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan. The LSAs overlap the Mildred-Kearl Lakes and Athabasca-Clearwater resource management areas.

There are 81 areas designated as environmentally important in the RSA, including eight protected areas, three nationally significant Environmentally Significant Areas (ESAs), 18 provincially significant ESAs and 52 regionally significant ESAs. Three regional ESAs overlap the JEMA LSA, including Fort Hills, Kearl Lake Moose Area and Muskeg River (North). Additionally, one provincially significant area, McClelland Lake, is located adjacent to the northern border of the LSA. Another five ESAs are located either entirely or partially within the PRMA LSA. The Athabasca River-Tar Sands Reach is nationally significant, the Eymundson Sinkholes are provincially significant, and the Calumet Old Growth Forest, Firebag Marten Area and Pierre River are regionally significant.

Within the JEMA LSA, one surface material exploration application for sand and gravel deposits was identified by the Land Status Automated System (LSAS)

database. It is held by JH Drilling Inc. Within the PRMA LSA, no active aggregate removal areas were identified by the LSAS. However, four consultative notations indicating limestone potential are held within the area. Although traditional aggregate sources are in limited supply, new sources of aggregate, including gravel and limestone, continue to be discovered in the RSA.

Access in the RSA is provided via roads, railways, cutlines and rights-of-way. With the exception of railways, all these access types are present in both LSAs. The density of access routes in the RSA is 0.78 km/km^2. Within the JEMA LSA and PRMA LSA, the density of access routes is 1.6 km/km^2 and 1.0 km/km^2, respectively. Access along these routes varies with the season depending on ground conditions such as water levels and degree of freezing. Large portions of both the LSAs and RSA have very limited access.

Little agriculture occurs in northeastern Alberta. Grazing, market gardens and wild rice farming on small lakes were the only agricultural activities identified in the RSA. No agricultural activities were identified in the LSAs.

The RSA contains six Forest Management Units (FMUs). Alberta-Pacific Forest Industries Inc. (Al-Pac) is the predominant forest management agreement holder in the RSA. The LSAs are located within FMU A15, which is held by Al-Pac with allocations to Northland Forest Products Ltd. Al-Pac plans to harvest timber from the JEMA LSA in 2007 and 2008. They also plan to harvest timber from the PRMA LSA in 2009 and 2010.

Hunting in the RSA is regulated within Wildlife Management Units (WMUs) 518, 519, 529, 530 and 531. The JEMA LSA is located within WMU 530. Within this WMU, 238 hunting allocations are held by 21 outfitters for black bear, moose and white-tailed deer. The PRMA LSA is located within WMU 531, in which 15 outfitters hold 170 allocations for the same species as in the JEMA LSA. Phase one of the RUS identified hunting as an important activity in the RSA, being carried out by 29% of outdoor enthusiasts, or 18% of the total surveyed population. The most common species hunted are moose, deer and grouse. Outfitters operating in the LSAs indicated in the Service Provider Survey that ongoing oil sands development is a detriment to their business operations.

There are 91 Registered Fur Management Areas (RFMAs) in the RSA. The JEMA LSA overlaps four, and the PRMA LSA overlaps another two. Pooled harvest levels from both LSAs showed that between 2001 and 2006, 873 animals from 14 species were harvested from the six traplines overlapping the Project area.

Berry picking is an activity undertaken by 28% of those respondents who participate in outdoor activities, or 18% of the total population surveyed. Approximately 12% of the JEMA LSA is potential berry habitat: 7% as blueberry habitat and 5% as cranberry/raspberry habitat. Within the PRMA LSA, about 16% of the area is potential blueberry habitat, and another 46% is cranberry/raspberry habitat. The RUS identified two people that harvest berries near the PRMA LSA in the Athabasca River corridor. No one indicated harvesting berries within the JEMA LSA.

Fishing is an important activity in the RSA, pursued by 59% of the RUS respondents that participate in outdoor activities, or 37% of the total population surveyed. There are 16 lakes and 25 major watercourses (rivers and streams) in the RSA that contain sport fish. Four of these overlap parts of the JEMA LSA (Jackpine Creek, Muskeg Creek, Muskeg River and Unnamed Waterbody 1). The fish species targeted most often in the JEMA LSA is grayling, and the species caught in highest numbers is grayling. Another four watercourses containing sport fish cross the PRMA LSA: Big Creek, Eymundson Creek, Pierre River and Redclay Creek. Rainbow trout are not indigenous to the region but are stocked in various waterbodies. The fish species targeted most often in the PRMA LSA are northern pike and walleye, with walleye being the most frequently caught.

There are many businesses and organizations that provide recreational services and activities within the RSA. Camping is the most popular outdoor activity in the region, with a surveyed participation rate of 44%. Hiking, swimming, travelling by All-Terrain Vehicles (ATVing), boating and snowmobiling were also popular outdoor activities undertaken by survey respondents.

There are six formal campgrounds within the RSA. There are also important local attractions, including the Oil Sands Interpretive Centre, the Bison Viewpoint and Crane Lake Nature Trail. Although no formal recreational facilities or attractions are located in the LSAs, one LSAS result indicated a forest recreation campground adjacent to the PRMA LSA called Clausen's Landing Remote Forest Recreation Area. The most popular recreational activity listed by RUS respondents was ATVing, which occurs in both the JEMA LSA and PRMA LSA. Boating and snowmobiling also occur in both areas.

Golder Associates Ltd.

1000, 940 6th Avenue S.W.
Calgary, Alberta, Canada T2P 3T1
Telephone (403) 299-5600
Fax (403) 299-5606

TRADITIONAL LAND USE ENVIRONMENTAL SETTING FOR THE JACKPINE MINE EXPANSION & PIERRE RIVER MINE PROJECT

Prepared For:
Shell Canada Limited

Prepared By:
Golder Associates Ltd.

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3 TRADITIONAL LAND USE

3.1 INTRODUCTION

Shell Canada Limited (Shell) is applying for approval to proceed with the construction, operation and reclamation of the Jackpine Mine Expansion & Pierre River Mine Project (the Project).

The Jackpine Expansion Mining Area (JEMA) is an expansion of the approved Shell Jackpine Mine – Phase 1 Project (Golder 2002a,b), which is currently under construction, and includes an open pit mine and bitumen extraction operation for production of bitumen on the east side of Lease 13. The Jackpine Mine – Phase 1 is approved to produce 200,000 bbl/d of bitumen from the McMurray Formation. The proposed JEMA is a 100,000 bbl/d expansion that will increase total bitumen production from the Jackpine Mine – Phase 1 to 300,000 bbl/d.

The proposed Pierre River Mining Area (PRMA) is a 200,000 bbl/d open pit mine and bitumen extraction operation, with facilities and infrastructure located on the west side of the Athabasca River.

The Project is located on lands that fall within the asserted traditional territories of the Athabasca Chipewyan First Nation (ACFN), the Mikisew Cree First Nation (MCFN), the Fort McKay First Nation (FMFN), and the Fort McMurray First Nation (FMMFN).

The Project will be developed in the northern portion of the Regional Municipality of Wood Buffalo (RMWB). The hamlet of Fort McKay is the nearest regional Aboriginal community to the development areas. Fort McKay is situated on the west bank of the Athabasca River, approximately 50 km north of Fort McMurray. This community includes Chipewyan and Cree members of the FMFN, Métis and a small minority of non-Aboriginal residents.

Three reserves have been allocated to the FMFN who are currently engaged in ongoing tri-lateral Treaty Land Entitlement negotiations with the Federal and Provincial governments. Two reserves are present in the Birch Mountains along the shores of the Namur and Gardiner (Moose) lakes (Namur River #174A and #174B). In 2007, the Government of Canada created IR 174C on the east side of the Athabasca River, opposite the community of Fort McKay (Canada 2007, website).

While the majority of Aboriginal community members reside in Fort McKay, traditional activities are practiced within a much larger region that includes Registered Fur Management Areas (RFMAs), or traplines, throughout the

Athabasca and Muskeg river watersheds. The Project will be situated within six traplines, including RFMA #s 2939, 1275, 2331, 1716, 1714 and 2137, which are currently registered to non-Aboriginal people, as well as members of the FMFN and ACFN.

The hamlet of Fort Chipewyan is situated on the northwest shore of Lake Athabasca, approximately 150 km north of the JEMA and 142 km north of the Pierre River Mining Area. Residents include members of the ACFN and the MCFN, Métis and a small minority of non-Aboriginal residents. The following allocated reserve lands were documented by the Government of Canada (Government of Canada 2007, website).

The allocated reserve lands of ACFN include:

- Chipewyan IR #201;
- Chipewyan IR #201A;
- Chipewyan IR #201B;
- Chipewyan IR #201C;
- Chipewyan IR #201D;
- Chipewyan IR #201E;
- Chipewyan IR #201F; and
- Chipewyan IR #201G.

The allocated reserve lands of MCFN include:

- Allison Bay IR #219;
- Charles Lake IR #225;
- Collin Lake IR #223;
- Cornwall Lake IR #224;
- Devil's Gate IR #220;
- Dog Head IR #218;
- Old Fort IR #217;
- Peace Point IR #222; and
- Sandy Point IR #221.

The FMMFN is situated in the Fort McMurray area and has reserves situated east and south of Fort McMurray at the following locations:

- Clearwater IR #175;
- Gregoire Lake IR #176;
- Anzac IR #176A; and
- Anzac IR #176B.

The majority of the town of Fort McMurray's residents are non-Aboriginal. However, Aboriginal members from the communities of Fort McKay and Fort Chipewyan also reside in and around the town of Fort McMurray and participate in traditional activities within the study areas defined for the Project.

3.1.1 Study Areas

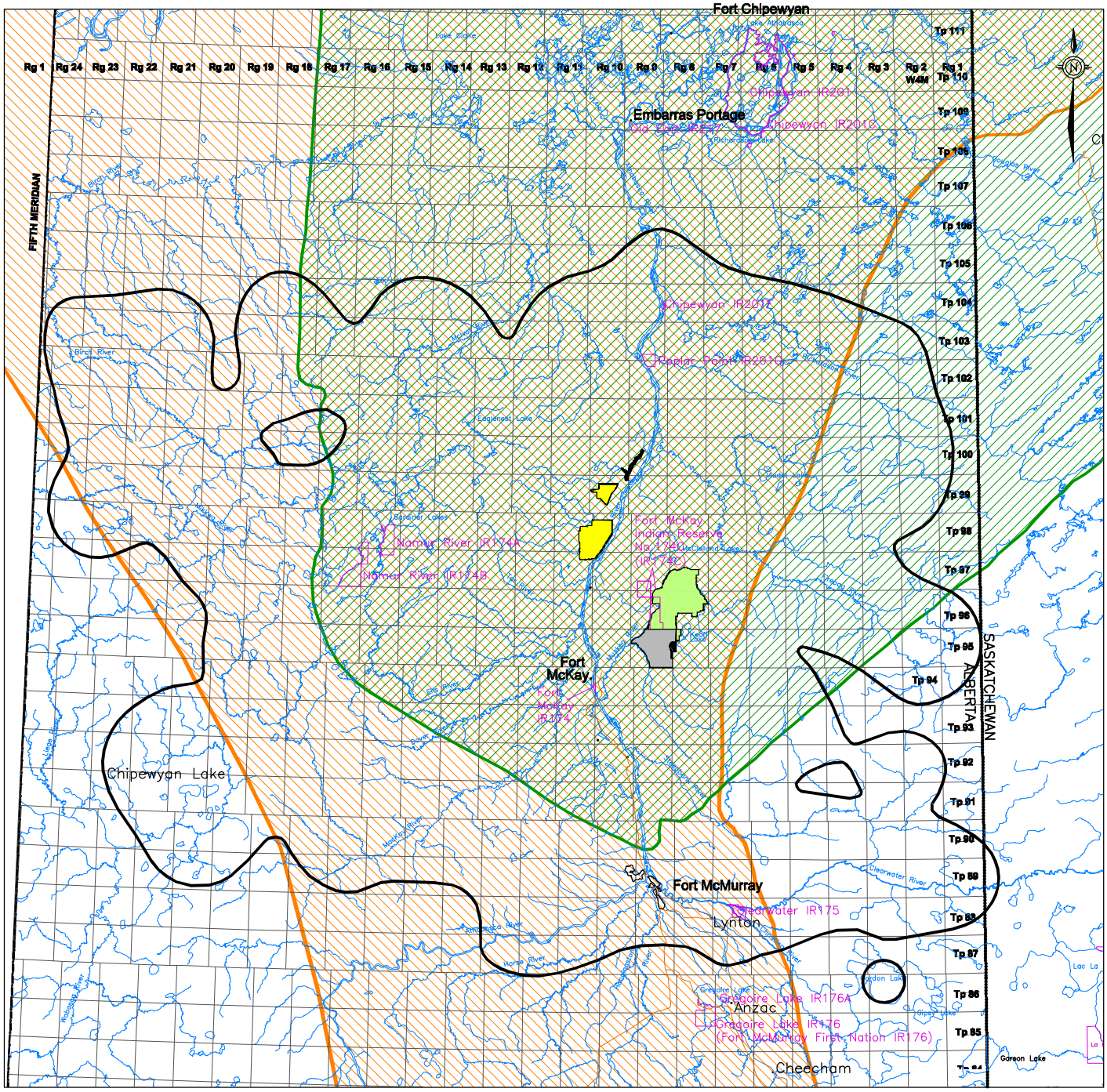
Three Regional Study Areas (RSAs) and one Local Study Area (LSA) were defined for the purpose of this Traditional Land Use (TLU) report. The boundaries and rationale for each area are described below.

3.1.1.1 Regional Study Areas

Three RSAs will be used for the Traditional Land Use assessment based upon the traditional territories of the FMFN, ACFN and MCFN described below. All of the RSAs are shown in Figure 3.1-1.

The RSA for FMFN is based upon the area of traditional land uses described by McKillop (2002) within the province of Alberta. The RSA includes Chipewyan and Cree Treaty Indians, Métis and non-status Indians who live in Fort McKay. The RSA was defined using the latest available information on the areas in which the traditional livelihoods of the Fort McKay people depended (Tanner et al. 2001). This information modifies the area that had previously been depicted as the FMFN traditional territory, as defined in "From Where We Stand" (Fort McKay Tribal Administration 1983). The definition in that document is still applicable, where it describes the traditional territory as "the total land territory used by our (Fort McKay) people and represent(ing) our interest in the land" (Fort McKay Tribal Administration 1983).

The RSA for the ACFN is based upon the area of traditional land uses described in their traditional land use study (ACFN 2003a) and in "Footprints on the Land" (ACFN 2003b).



LEGEND

- RIVER OR STREAM
- ROADWAY
- INDIAN RESERVE
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- ATHABASCA CHIPEWYAN FIRST NATION (ACFN) REGIONAL STUDY AREA
- FORT McKAY FIRST NATION REGIONAL STUDY AREA
- MIKISEW CREE FIRST NATION REGIONAL STUDY AREA

30 0 30
SCALE KILOMETRES

REFERENCE

Alberta NTDB Data Supplied By Geomatics Canada, August 2001. Nad 83 Zone 12. Sheets 74D, E and 74I in Nad 27 Zone 12. Saskatchewan NTDB Data Supplied by ISC, Aug. 2001. ACFN 2003, FMFN 1994. Projection: Transverse Mercator Datum: Nad 83 Coordinate System: Utm Zone 12 Nad 83 Zone 13. Used Under License.

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

TRADITIONAL LAND USE AREAS OF ACFN, FMFN AND MCFN

Shell Canada Limited

PROJECT 06-1346-022.8600			FILE No.RSA-hunting and trap	
DESIGN	HE	26/07/07	SCALE AS SHOWN	REV. 0
CADD	PSR	16/11/07	FIGURE: 3.1-1	
CHECK	MG	16/11/07		
REVIEW	WES/TC	20/11/07		

L:\2006\1344-OIL SANDS\1346\06-1346-022 Shell\8600\8670\ Drawing file: Fig 3.1-1 regional study area traditional hunting and trapping territory of the fort mckay and fort chipewyan communities.dwg Nov 3(

The MCFN are still in the process of completing their TLU study. Therefore, the RSA for the MCFN is based upon the area of traditional land use as described in the TLU assessment for the Muskeg River Mine Expansion Project (AXYS 2005).

Shell is consulting with the FMFN, ACFN and MCFN to conduct additional TLU interviews for the Project. As the consultation process continues, the traditional knowledge and land uses of territories of the First Nations will be updated to incorporate the results of the interviews.

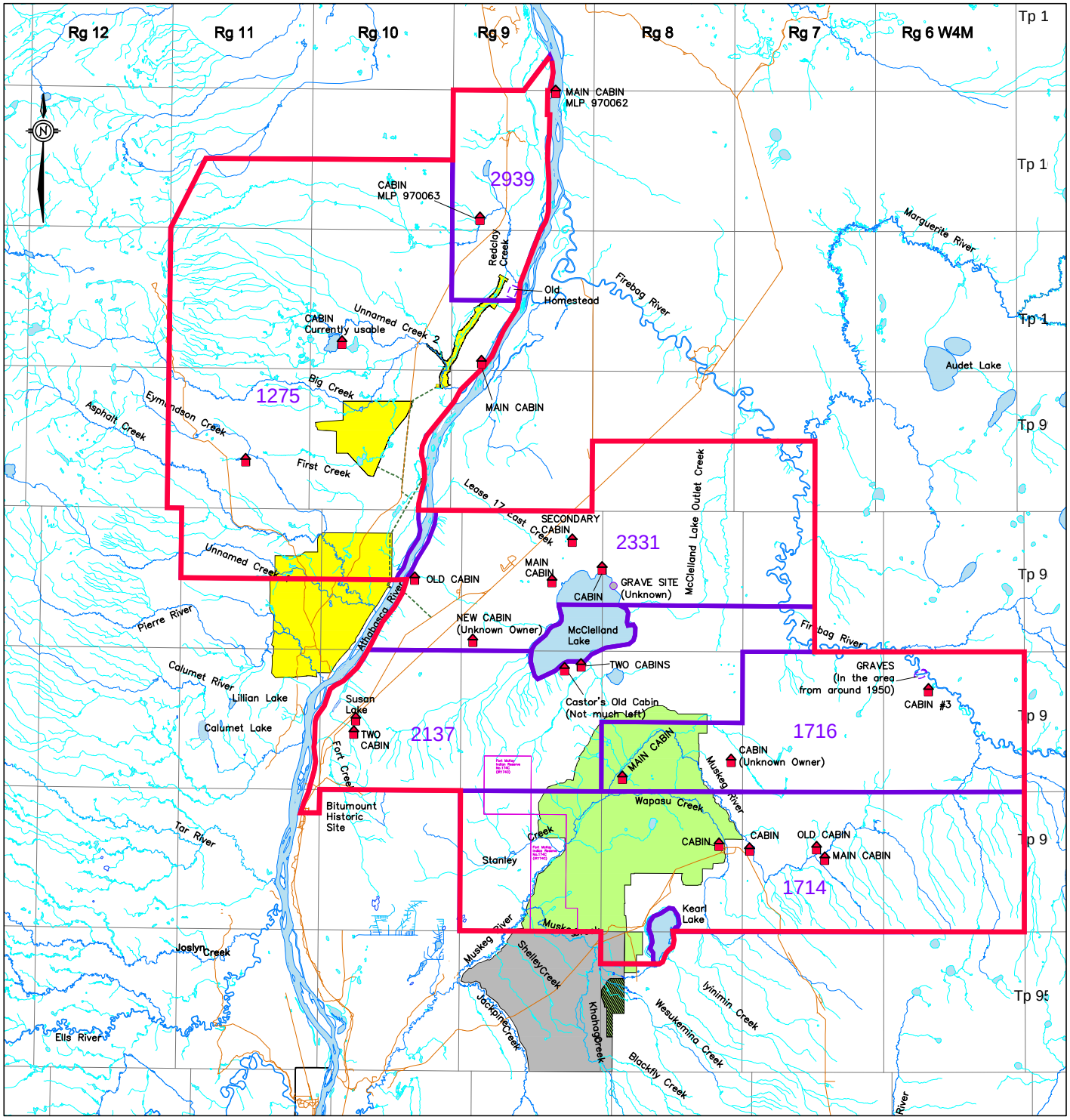
3.1.1.2 Local Study Area

A summary statement made in the regional level Traditional Land Use and Occupancy Study (TLUOS) compiled by the Fort McKay First Nations (FMFN 1994) provides a clear indication of the relationship between traplines and the traditional lifestyle.

> *"The term trapline as used in this study means more than just a place to harvest furs for sale on the commercial market. It means the territory where people hunted, fished, picked berries, gathered duck eggs and trapped fur for local domestic consumption and trade. The trapline was the community food supply for the people interviewed in this TLUOS; it was and is synonymous with meat for the table, with stewardship of all natural resources; with extended family sharing; with socialization of children; with the role of the elders as carriers and teachers of traditional environmental knowledge; and with cultural sustainability."*

The LSA was defined based on consideration of trapline boundaries and the boundaries of the Project (Figure 3.1-2). From the perspective of evaluation of effects to traditional land use for this Environmental Setting Report (ESR), RFMAs provide the most appropriate basis for defining a LSA, since most traditional activities are carried out on traplines.

To analyze the local effects of the Project, in combination with other developments on traditional land use, the LSA was defined as the six RFMAs (traplines) that overlap the Project development area. The boundaries of the LSA shown in Figure 3.1-2 include RFMA #s 2939, 1275, 2331, 1716, 1714 and 2137. South of RFMA #1275, part of the PRMA extends into an area that is no longer an active trapline.



LEGEND

- RIVER OR STREAM
- PUBLIC ROADWAY
- PIERRE RIVER MINING AREA
- JACKPINE EXPANSION MINING AREA
- LEASE SWAPPED TO SYNCRUDE
- JACKPINE MINE – PHASE 1
- TRADITIONAL LAND USE LOCAL STUDY AREA
- 2137 TRAPLINES
- CABIN

10 0 10
SCALE KILOMETRES

REFERENCE

ALBERTA DIGITAL DATA OBTAINED FROM ALTALIS LTD. (SEPTEMBER 2004.)
USED UNDER LICENSE. PROJECTION: TRANSVERSE MERCATOR
DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 12

PROJECT

JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

TRAPLINES WITHIN THE TRADITIONAL LAND USE LOCAL STUDY AREA

Shell Canada Limited

PROJECT 06-1346-022.8670			FILE No.	RFMA-LSA
DESIGN	HE	26/07/07	SCALE AS SHOWN	REV. 0
CADD	PSR	16/11/07		
CHECK	MG	16/11/07		
REVIEW	WES/TC	20/11/07		

FIGURE: 3.1-2

L:\2006\1344-OIL SANDS\1346\06-1346-022 Shell\8600\8670\Fig 3.1-2 Traditional Land Use LSA and Adjacent Traplines.dwg Nov 29, 2007 - 1:37pm

3.2 METHODS

3.2.1 Regional Study Area

3.2.1.1 Objective

The objective of the TLU study for the RSA is to document the traditional land use of the FMFN, MCFN, ACFN and FMMFN, as well as their traditional knowledge about the region.

3.2.1.2 Information Sources

The following written information sources were used to prepare the TLU study for the RSA:

- historical reports written by and in conjunction with the FMFN;
- information provided by members of the ACFN during the Alberta Energy and Utilities Board (EUB) hearing for the Albian Sands Muskeg River Mine (EUB 1998);
- traditional land use studies prepared by the FMFN, (FMFN 1994) ACFN (ACFN 2003a,b) and FMMFN (FMMFN 2006); and
- historical reports completed for the community of Fort Chipewyan.

The following project-specific impact assessments were also included:

- Albian Sands Energy Inc.'s (Albian Sands') Muskeg River Mine Expansion Project (Albian 2005; AXYS 2005);
- Shell Canada Limited's (Shell's) Jackpine Mine – Phase 1 (Golder 2002a,b, 2003);
- Canadian Natural Resources Limited's (Canadian Natural's) Horizon Project (Golder 2002c);
- Petro-Canada/UTS Energy Corporation's Fort Hills Mine (AXYS 2001);
- Suncor Energy Inc.'s (Suncor's) Firebag in-situ project (Golder 2000);
- Shell's Muskeg River Mine (Golder 1997; Fort McKay and AGRA 1998a);
- Petro-Canada's MacKay River Steam Assisted Gravity Drainage (SAGD) development (Fort McKay and AGRA 1997); and
- Syncrude Canada Ltd.'s (Syncrude's) Aurora Mine (BOVAR 1996).

Shell is currently consulting with FMFN, ACFN and MCFN on their traditional land use within the RSAs. Regional information provided in these interviews will be incorporated into project planning as appropriate.

3.2.2 Local Study Area

3.2.2.1 Objectives

The objectives of the TLU study for the LSA were to:

- document historical and current land use, as well as the traditional knowledge of the Project development areas and surrounding areas by local trappers;
- document the traditional land use and traditional knowledge of the FMFN, ACFN, MCFN and FMMFN in relation to the Project development areas; and
- provide information to help minimize the impacts of the Project on traditional land uses.

3.2.2.2 Information Sources

The following information sources were used to prepare the TLU study for the LSA:

- Shell and Golder conducted personal interviews with trapline holders in the area.
- Shell is currently consulting with FMFN, ACFN and MCFN on their traditional uses within the LSA. Information gathered on the LSA will be incorporated into the project planning, as appropriate.

3.3 TRADITIONAL ECOLOGICAL KNOWLEDGE AND LAND USE WITHIN THE REGIONAL STUDY AREA

The Project will be developed in the northern portion of the RMWB. Aboriginal communities in this region are those recognized as pursuing traditional land uses as part of their traditional way of life, including the Aboriginal communities of Fort McKay and Fort Chipewyan. The Aboriginal communities have traditionally practiced ways of life intimately tied with the landscapes in which they lived. The resources provided by the land allowed these communities to survive and flourish and to develop cultural expressions unique to those areas. This detailed understanding of the environment and its resources is important for ensuring the

survival of these unique communities today, when non-Aboriginal commercial and recreational uses are increasing and frequently compete with traditional land uses.

The following overview is regional in scope and summarizes concerns identified from TLU studies, reports and previous interviews conducted with the FMFN, ACFN and MCFN.

3.3.1 The Effects of Oil Sands Development on Traditional Land Use

A summary discussion (Fort McKay 1996a) was done in the context of Fort McKay, but the results are applicable to the whole region. The following points were outlined in relation to regional traditional land use:

- Traditional land use in the region has considerable time depth (i.e., it has occurred for a long time).
- In the past, the east side of the Athabasca River was difficult to access, but this has changed significantly and improved access has increased competing non-traditional use of the area, theft and vandalism.
- The increasing levels of industrial development and the accompanying competing non-traditional uses in the region are having a cumulative negative effect on traditional land use and people in the communities.
- Almost all of the children interviewed reported some participation in traditional land use practices. This type of education is viewed as valuable to maintain the cultural identity of the community. Communities also value the juxtaposition of formal education and scholarship programs with the opportunity to continue traditional use patterns.

3.3.2 Community of Fort McKay

Fort McKay is the nearest regional Aboriginal community to the Project. The FMFN is composed of people with Chipewyan and Cree ancestry. Situated near the junction of the MacKay and Athabasca rivers, Fort McKay has long been a gathering place for Aboriginal people. The Hudson Bay Company recognized this when it established a post named after Dr. W. M. MacKay in 1821. The first Aboriginal people in the area, the Chipewyan, named the community Terascha after the red clay that was used to chink the log houses (Fort McKay 2000). The fur trade attracted Aboriginal people into the area through the early 1800s. Since that time, the histories of the families in the community have been intertwined. The first Catholic mission in Fort McKay was established in 1902. In these early

years, Fort McKay was little more than a trading post. During most of the year, families followed the seasonal cycle of the natural resources of the land, including hunting, fishing and gathering in traditional ways.

Fort McKay has become a permanent base of residence in recent times for members of this community, as schools, government services and employment opportunities have gained importance for community members. However, the area around Fort McKay has always served as a focal point in the seasonal round of traditional activities associated with hunting, trapping and fishing, practiced for generations throughout the surrounding region. Although significantly modified by modern technological and social influences, current land use practices represent a continuation of many ancient patterns of use. With the signing of Treaty 8 in 1899, regional Aboriginal communities, such as Fort McKay, selected Reserves within their traditional use areas, but retained the rights to hunt, trap and fish throughout the Treaty area.

The natural resources of the region have always made, and are continuing to make, a significant contribution to the economic, social and spiritual life of the regional Aboriginal communities. Understanding these contributions provides a basis for developing a strategy that will allow various land uses to be accommodated and the interests of all parties to be satisfied.

Several studies focusing on Fort McKay traditional land use practices have been completed since the early 1980s. Some of these have been regional in scope while others have targeted particular areas in response to specific development proposals. These studies represent the regional baseline information on which the current study seeks to expand. Studies reviewed include:

- *From Where We Stand* (Fort McKay Tribal Administration 1983);
- *There is Still Survival Out There* (FMFN 1994);
- *Report of Wisdom Synthesized From the Traditional Knowledge Component Studies* (Bill et al. 1996);
- *Survey of Consumptive Use of Traditional Resources by the Community of Fort McKay* (Fort McKay 1997a);
- Steepbank Mine Studies (Fort McKay 1995a,b, 1996a);
- Aurora Mine Studies (Fort McKay 1996b,c,d);
- Muskeg River Mine Project Study (Fort McKay 1997b; Fort McKay and AGRA 1998a);
- Project Millennium Study (Fort McKay and AGRA 1998b);

- Firebag Project Traditional Land Use Baseline (Suncor 2000, Appendix VX);
- Some Effects of Oil Sands Development on the Traditional Economy of Fort McKay (Tanner et al. 2001); and
- Fort McKay Medicinal Plant Report 2003. (BG TEK 2003).

Other reports and analyses:

- Culturally Significant Ecosystems Model (McKillop 2002);
- Land and Resource Use Surveys (Fort McKay IRC 2000);
- Reclamation and Land Management Practices (Fort McKay IRC 2004);
- Analyses of the Impacts of Development to Traditional Economies (Fox and Ross 1979); and
- Legislative and Consultation Context for Impact Assessments (Ross 2003).

Aboriginal people have made minor use of bitumen seeps in the Oil Sands Region for decades. European explorers described their presence as early as the late 1700s (Mackenzie 1971). However, it was not until the late 1960s that technology had developed sufficiently to allow large-scale industrial resource extraction of the oil sands to take place. As industrial development progressed in the region and large numbers of non-Aboriginal people migrated to the area to find employment, it became apparent that the lifestyles of the original inhabitants would change significantly. This recognition led to the desire to document the character of the regional Aboriginal communities, their traditional economy and system of land use. This information provides a means for understanding the effects of modern industrial development, and provides the basis for developing strategies to lessen their negative effects and allow these communities to flourish.

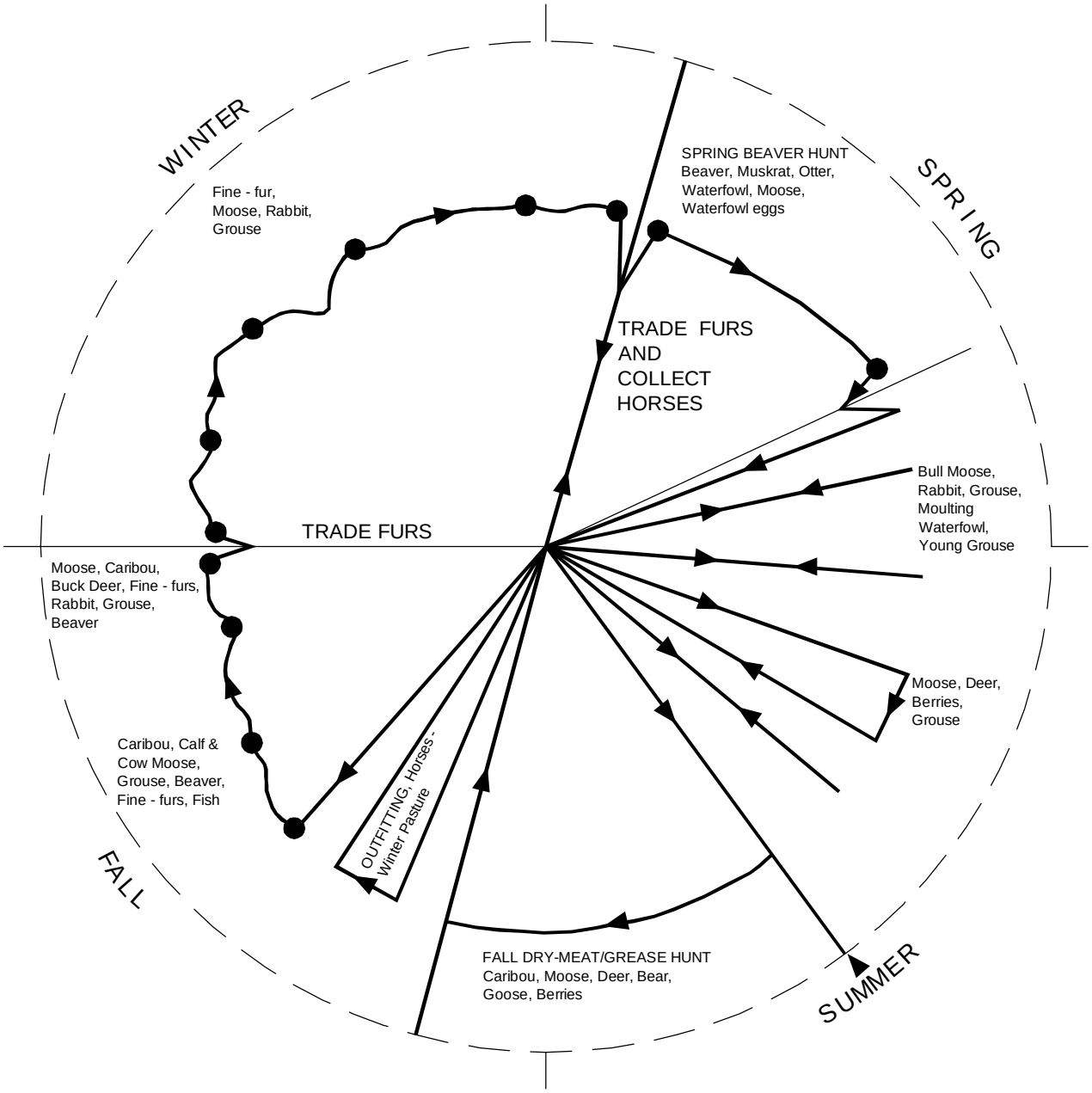
Traditional land and resource use studies conducted by and for the community of Fort McKay address that community's concerns with respect to regional development. Although some regional level studies have taken place in Fort Chipewyan and areas farther south, the Fort McKay studies represent the most detailed and pertinent baseline information available for the Project development area and their relevant findings are summarized in the regional review provided below.

3.3.2.1 From Where We Stand

In 1983, the Fort McKay Tribal Administration released a document entitled *From Where We Stand*, which presented the results of a comprehensive 18-month study outlining a broad spectrum of issues relating to the Fort McKay community. Among the objectives outlined for this study was a detailed identification, assessment and mapping of traditional resource use and harvesting patterns.

This objective was accomplished by completing a literature review, interviewing 53 adult community members, including elders, as well as developing land use maps.

One of the significant outcomes of this study was a comprehensive definition of the lands considered to represent the traditional territory of the FMFN through collection of information related to hunting, trapping, fishing, plant harvesting and the location of cabins. Another important outcome was the description of two patterns of seasonal activities (i.e., seasonal rounds) in the traditional lifestyle: one for periods before 1960 and one for periods after 1960 (Figures 3.3-1 and 3.3-2, respectively).



NOTE

THE CENTRE OF THE CIRCLE REPRESENTS THE SUMMER MEETING PLACE. THE OUTER PORTION OF THE CIRCLE REPRESENTS VARIOUS HUNTING AREAS IN THE BUSH, WITH BLACK DOTS SIGNIFYING CABINS ON TRAPLINES. ARROWS INDICATE MOVEMENT, WITH THE TWO WAY ARROWS INDICATING SHORT DURATION HUNTING TRIPS.

REFERENCE

FORT McKAY TRIBAL ADMINISTRATION, 1983. "FROM WHERE WE STAND".

PROJECT

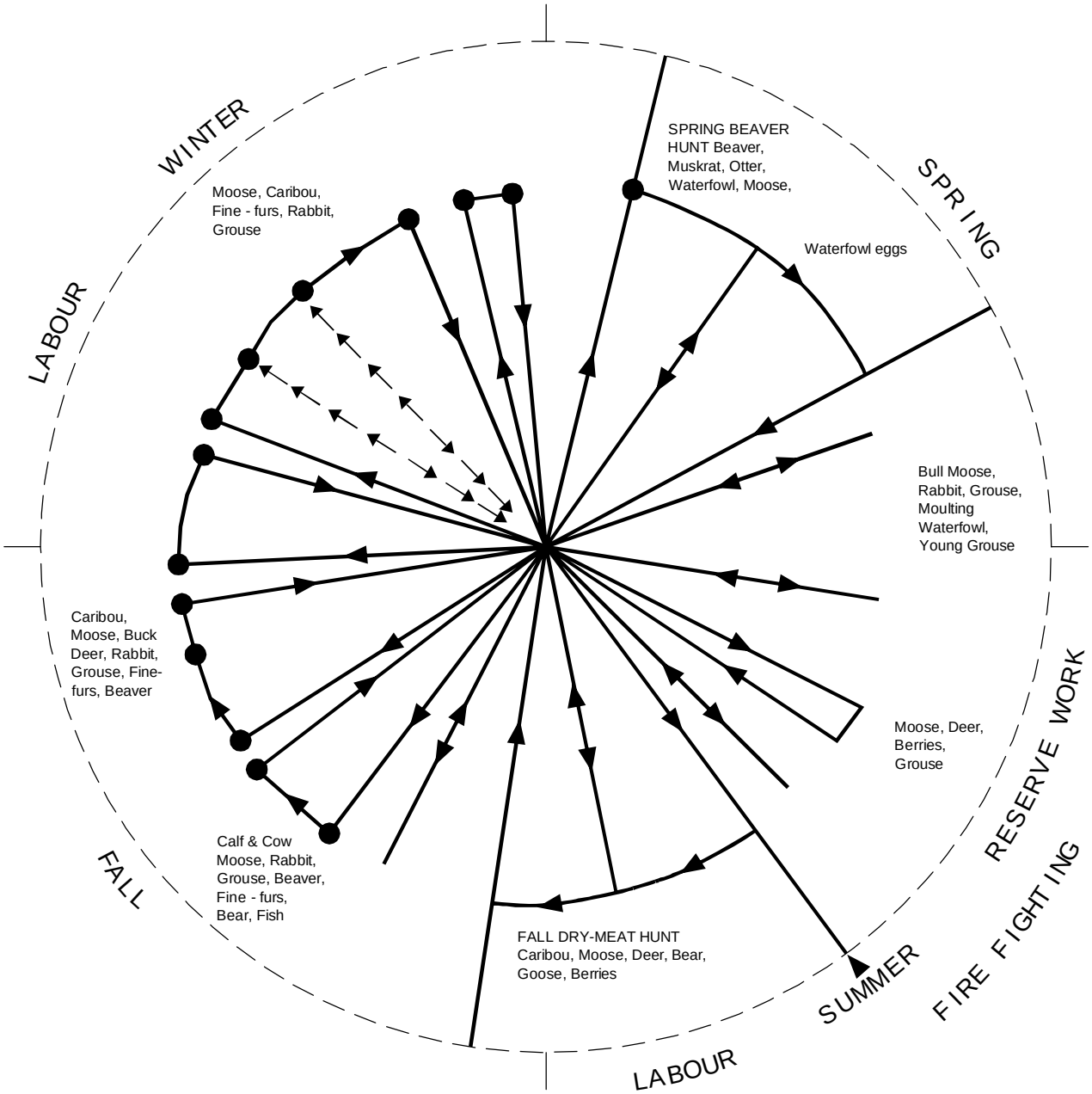
JACKPINE MINE EXPANSION &
PIERRE RIVER MINE PROJECT

TITLE

SEASONAL ROUND PRE-1960

Shell Canada Limited

PROJECT 05-1344-027.8600			FILE No.	PRE1960E
DESIGN	HE	09/08/07	SCALE AS SHOWN	REV. 0
CADD	PSR	16/11/07	**FIGURE: 3.3-1**	
CHECK	MG	16/11/07		
REVIEW	WES/TC	20/11/07		



NOTE

THE CENTRE OF THE CIRCLE REPRESENTS FORT McKAY. HARVEST AREAS ARE SHOWN TOWARDS THE OUTER PORTION OF THE CIRCLE, AND WAGE LABOUR IS SHOWN OUTSIDE THE CIRCLE. ARROWS INDICATE MOVEMENT, WITH THE TWO WAY ARROWS INDICATING SHORT DURATION HUNTING TRIPS.

REFERENCE

FORT McKAY TRIBAL ADMINISTRATION, 1983. "FROM WHERE WE STAND".

PROJECT

JACKPINE MINE EXPANSION & PIERRE RIVER MINE PROJECT

TITLE

SEASONAL ROUND POST-1960

Shell Canada Limited

PROJECT 05-1344-027.8600			FILE No.	POST1960E
DESIGN	HE	09/08/07	SCALE AS SHOWN	REV. 0
CADD	PSR	16/11/07	FIGURE: 3.3-2	
CHECK	MG	16/11/07		
REVIEW	WES/TC	20/11/07		

One important difference between the pre-1960 (Figure 3.3-1) and post-1960 seasonal rounds (Figure 3.3-2) is that by 1960, residency patterns changed from being semi-nomadic to semi-sedentary (Fort McKay Tribal Administration 1983). Figure 3.3-2 also indicates shorter-term hunting and trapping trips, back and forth from Fort McKay (ibid 1983).

3.3.2.2 There Is Still Survival Out There

A report on a follow-up regional-level study conducted within the Fort McKay community was published in 1994 with the title *There Is Still Survival Out There* (FMFN 1994). This study was conducted in conjunction with the Arctic Institute of North America and involved 67 Fort McKay community members using an interview process that employed question sheets identifying use of specific resources: big game, furbearers, fish, waterfowl, fruit plants, birds, herbs, roots, plants, trees and shrubs. Questions were asked about special products sought, special areas, places, names and especially productive habitat. The interviews were taped for archival purposes and were transcribed from Cree and Chipewyan by the interviewers. Another result of the study was the creation of a map series that used symbols to denote locations where certain resources were obtained. The outcome was a detailed inventory of resources used and the locations where they were harvested, as well as the names and locations of special sites and areas.

The mapped information obtained in this study, called Traditional Ecological Knowledge (TEK), is summarized and analyzed in the report. Sections are devoted to each of the 10 maps produced for the report and show information on the following land use categories: trails and cabins, spiritual (grave) and habitation sites, furbearers, big game, fish, birds, berries, trees and plants, place names and traplines. Seasonal information included with this analysis enabled the creation of a diagrammed seasonal round of harvest activities in each of the resource categories mapped. The maps prepared for this study are proprietary information owned by the community of Fort McKay and, although they provide some information relating to specific traditional uses of the Project development area, they cannot be reproduced without community approval. Nevertheless, the general information they convey has been incorporated into this ESR.

3.3.2.3 Report of Wisdom Synthesized From the Traditional Knowledge Component Studies

A third regional-level study was the *Report of Wisdom Synthesized from the Traditional Knowledge Component Studies of the Northern River Basins Study* (Bill et al. 1996). This report was published as part of a wide-ranging study sponsored by the governments of Canada, Alberta and the Northwest Territories. The study incorporated TEK information from interviews with elders and other

recognized traditional land users within the Peace, Athabasca and Slave river basins. Within the Oil Sands Region, information was obtained from residents of Fort McMurray through personal interviews with 24 elders and the analysis of 35 mailed questionnaire responses. Information was gathered on traditional resource and land use, documentation and mapping of harvest locations and special places, attitudes toward the environment, and concerns with respect to observed changes.

The information reported in this study is less specific and detailed than that generated by the other studies. Fewer respondents actually lived from the land and lower proportions of the respondents reported participation in traditional practices, such as hunting and trapping, or use of the land as a source of income.

3.3.2.4 Baseline Resource Use in the Aurora Mine Environmental Impact Assessment Regional Study Area

Syncrude commissioned a 1996 study of resource use within the regional study area defined for their Aurora Mine development. The study was completed by Fort McKay Environment Services (Fort McKay 1996c) and included components relating to both traditional and non-traditional resource use. The results of the traditional use component of that study have a bearing on the present study and are reviewed herein.

A community survey was undertaken using two questionnaires, one for the community of Fort McKay and one for Fort McMurray, both of which were approved by the communities. Each community implemented their own interview program using the questionnaires to structure discussions. Interviews were conducted with a cross section of community members, and maps and air photos were used to record locational information shared by the participants.

The results of the traditional use survey provided a listing of the natural resources traditionally harvested by the communities within the region, along with descriptive information on how they are used. Regional maps in the report show some of the locations from which these resources are obtained.

The report (Fort McKay 1996c) provides the following general observations:

- People inhabiting the region continue to use traditional resources in traditional ways, as well as for spiritual and recreational purposes.
- People are concerned about effects from forestry development as well as from oil sands developments, but recognize the benefits of both developments.

- The local communities communicated the desire for access to available employment; a clean, uncluttered environment; and the ability to continue traditional land use practices.
- The local communities wish to ensure the productivity of the trophy fishery at Namur and Gardiner (Moose) lakes and would like it recognized that subsistence fishing no longer occurs in the region's major rivers because of a concern for contamination from industrial sources.
- More roads into traditional lands will increase the amount of competing non-traditional use throughout the region.
- Concerns raised about mining were related to air and water contaminants affecting the utility of traditional resources, including fish, wildlife and plants.
- While the potential benefits of regional development are recognized, local communities want to ensure that their rights and concerns are acknowledged and incorporated in the development planning process.

3.3.2.5 Survey of Consumptive Use of Traditional Resources by the Community of Fort McKay

Syncrude commissioned a 1997 study by Fort McKay Environmental Services Ltd. to assess health concerns within the Fort McKay community related to the consumption of food resources traditionally harvested throughout the Oil Sands Region (Fort McKay 1997a). This study provides relatively recent information on the types and quantities of traditional food resources consumed by the members of the Fort McKay community.

This study employed a questionnaire and interview program that sought to elicit information from a cross section of community members in a range of age categories. Twelve elders in the 55+ age category participated in the program, along with 29 persons between the ages of 19 and 54, and 19 persons between the ages of 6 and 18.

The results of this study confirmed some of the findings of earlier research. Hunting, particularly of moose and hare, and to a lesser extent beaver and deer, supplies a significant portion of the protein needs of the community. Consumption includes almost all parts of the preferred species harvested. In fact, some people indicate that they eat moose every day. Fishing, too, is widely participated in, with whitefish, pike and, to a lesser degree, walleye and lake trout, harvested primarily from lakes in the region. Almost no one continues to fish the Athabasca River because of contamination concerns, although it once was the major source of this resource. Ducks, duck eggs, geese and grouse are

the preferred avian resources harvested. Of the floral food resources harvested, blueberries, cranberries and rat root are the most widely consumed resources. Many participants commented on the presence of yellow and black dust that settles on these plants in the vicinity of the large industrial projects, but many of the collection locales are also in or near road ditches.

The conclusions and recommendations arising from this study indicate that residents of Fort McKay still rely on traditional food resources harvested from their traditional lands. However, there is widespread concern for potential contamination from industrial development in the region and for the increasing non-traditional use of the region that accompanies it.

3.3.2.6 Previous Studies in Association with Specific Developments in the Vicinity of the Project

Suncor's Steepbank, Millennium and Firebag Projects

Suncor Energy commissioned a series of studies, co-ordinated by Fort McKay Environment Services, to provide a basis for understanding the traditional use of lands and resources in the local study area defined for the Steepbank Mine project (Fort McKay 1995a,b and 1996a,b). One of the studies in particular (Fort McKay 1996a) contained the following elder comments that may still be relevant:

- a reported dissatisfaction with compensation provided by the Trappers Compensation Board for damages to their traplines from theft and vandalism;
- fear that a large portion of existing lines will be lost to seismic and logging activities;
- health concerns for the amount of grey and black dust present on berries, which is attributed to oil sands plants; and
- reports of the cessation of use of a major traditional fishery in the Athabasca River because of industrial use of a traditional meeting place at Tar Island.

At the same time that the survey was being conducted, a quantitative assessment of the types and abundance of wildlife associated with riparian habitats within the Steepbank local study area was conducted by Fort McKay Environment Services (Fort McKay 1995a). The results of that study provide traditional land use information specific to the Steepbank/Millennium Project area, but have limited application to the Project area.

The results of both of these studies are summarized in a document entitled *The Community of Fort McKay Traditional Uses of the Renewable Resources on the Proposed Suncor Steepbank Mine* (Fort McKay 1995b). The community survey portion of this study provided a listing of floral and faunal species used within that study area and surrounding regions. Regional studies conducted independently and in conjunction with regional developers have identified a rich and varied pattern of traditional resource use that occurred historically and continues to occur throughout the region.

Details pertaining to the distribution of these resources, how they were used and the season of the year when the harvest occurred have been provided in the reports cited above and are not detailed here. Nevertheless, the information gathered to date demonstrates the intimate connections regional Aboriginal community members have with the land. The studies reviewed confirm that these connections are still an important part of regional Aboriginal communities today.

Some of the information presented in the above studies was consolidated to create Table 3.3-1 which summarizes the plant and animal species used as part of a traditional lifestyle of the region, as identified by the community of Fort McKay. Rankings (high, medium and low) were given to the individual species based on the number of times that species was referred to and the number of times it was shown on the traditional land use maps or in tables that accompany the studies. These rankings are not meant as a reflection of the importance of specific resources, nor to imply that certain species are unimportant. They are intended to provide an indication of the extent of their harvest and use. Not all plant and animal species used may have been mentioned during the studies. Some species may no longer be used, their use may have been forgotten at the time interviews were conducted, or the use may be spiritual in nature and not discussed because of the sensitivity of this information. Table 3.3-1 also provides the names of plants and animals used by Aboriginal peoples interviewed for the studies.

Table 3.3-1 Traditional Resource Uses

Species	Type of Use							Use Ranking[(a)]
	Food	Medicine	Spiritual	Hunting	Trapping	Fishing	Other	
Vegetation								
balsam fir		X					construction	high
birch - red (bog birch)		X						medium
birch - white	X	X	X				construction/ fire starter/dye	high
black currant	X	X						medium
black poplar		X					construction	high
blueberry	X							high
bracket fungus	X							low
bracketed honeysuckle		X						low
buffaloberry	X	X						low
bulrush	X							low
chamomile		X						low
chokecherry	X	X					hard wood	medium
cloudberry	X	X						low
common cattail	X							low
common juniper	X	X						medium
common pink wintergreen		X						low
common plantain		X						low
common tansey	X							low
common yarrow		X						low
cranberry (bog)	X							high
cranberry (low-bush) (mooseberry)	X							high
dewberry	X	X						low
dogwood (bunchberry)	X							medium
dwarf raspberry	X							medium
fly honeysuckle		X						low
frying pan plant		X						medium
fungi - dry dead wood							fire starter/ insect repellent	high
gooseberry	X	X						medium
green alder		X					utensil/dye	medium
green frog plant (pitcher plant)		X						medium
ground fungus - puffball		X						high
harebell		X						low
hazelnut	X						dye/arrows	medium
horsetail		X					utensil	low
huckleberry	X							low
jack pine		X						low
kinnikinik (bearberry)	X	X	X				dye/tobacco	high
Labrador tea	X	X						medium
lodgepole pine		X						low

Table 3.3-1 Traditional Resource Uses (continued)

Species	Type of Use							Use Ranking[(a)]
	Food	Medicine	Spiritual	Hunting	Trapping	Fishing	Other	
moss		X					chinking, smudges, diapers, dressing	high
muskeg (Labrador tea)		X						high
nettles	X	X						medium
northern bedstraw							dye	low
pincherry	X	X						medium
raspberry	X	X						medium
rat root (sweet flag)		X						high
red currant	X	X						low
red osier dogwood		X	X				dye/tobacco	medium
red touchwood fungus	X							low
river alder		X						medium
rock tripe	X							low
rose hip	X	X						high
saskatoon	X	X					wood	high
seneca root		X						medium
showy aster		X	X					low
snowberry		X						low
stiff club moss			X					low
strawberry	X	X						high
sweet grass		X	X					high
sweet scented bedstraw			X				utensil	medium
tamarack		X					construction/dye	high
trailing raspberry	X							medium
trembling aspen		X					utensil	low
tuckahoe	X							low
twining honeysuckle		X						low
twisted stalk	X							low
western dock							dye	low
white or black spruce		X		X			construction	high
white wintergreen		X						low
wild mint	X	X						high
wild sarsaparilla		X						low
willow		X	X				utensil	medium
willow fungus		X						medium
Fish								
chub	X					X		medium
goldeye	X					X	localized use	medium
grayling	X					X	localized use	medium
lake trout	X					X		high
ling cod	X					X		medium
minnows	X							low
northern pike	X					X		high
perch	X					X	localized use	medium
pickerel	X					X		high

Table 3.3-1 Traditional Resource Uses (continued)

Species	Type of Use							Use Ranking[(a)]
	Food	Medicine	Spiritual	Hunting	Trapping	Fishing	Other	
sucker	X					X		medium
walleye	X							medium
whitefish	X					X	dog food	high
Mammals								
beaver	X	X			X		fur	high
bison	X			X			localized use	low
black bear	X		X	X	X			high
caribou – woodland	X			X			localized use	low
coyote					X		fur	medium
elk	X			X				low
fisher					X		fur	high
grizzly bear	X		X	X				low
hare	X				X			high
least weasel					X		fur	high
long-tailed weasel					X		fur	high
lynx	X				X		fur	high
marten					X		fur	medium
mink					X		fur	high
moose	X			X			multiple	high
mule deer	X			X				low
muskrat					X		fur	high
red fox					X		fur	high
red squirrel					X			high
river otter					X		fur	high
short-tailed weasel					X		fur	high
skunk		X	X		X			high
tree (flying) squirrel					X			high
white-tailed deer	X			X				high
wolf					X		fur	high
wolverine					X		fur	rare-med.
Birds								
Canada goose	X						insulation/stuffing/ wing duster	high
canvasback	X							high
cormorant								low
crow								
eagle							decoration	high
goldeneye	X							high
great blue heron								low
greater scaup	X							high
grebe	X							high
hawk							decoration	low
lesser scaup	X							high
loon	X						waterproof bag (pouch)	high
magpie								
mallard	X							high
merganser	X							high
owl	X						wing duster	high

Table 3.3-1 Traditional Resource Uses (continued)

Species	Type of Use							Use Ranking[(a)]
	Food	Medicine	Spiritual	Hunting	Trapping	Fishing	Other	
pelican							waterproof bag (pouch)	low
pintail	X							low
ptarmigan	X						fan/decoration	low
raven								
redhead	X							high
Ross' goose	X						insulation/stuffing/ wing duster	medium
ruddy duck	X							high
ruffed grouse	X						fan/decoration	high
sandhill crane	X							high
scoter	X							low
seagull								medium
sharptail grouse	X						fan/decoration	high
snow goose/blue goose	X						insulation/stuffing/ wing duster	medium
spruce grouse	X						fan/decoration	high
swan								low
teal	X							high
white-fronted goose	X						insulation/stuffing/ wing duster	medium
whooping crane	X							low

(a) Refers to the number of times a species name was referred to and the number of times a species was indicated on traditional land use maps.

Note: Blank cells indicate that no specific use was identified.
Table adapted from Fort McKay (1995b).

In support of its application to develop Project Millennium, Suncor also commissioned a Fort McKay sponsored study assessing the effects of that project on traditional land use (Fort McKay and AGRA 1998b). Many concerns and recommendations that emerged from that study are sufficiently general to have implications for regional development including the Project. A summary of these concerns and recommendations is presented below:

- Present and future development be planned using a partnership approach, involving the participation of traditional land users.
- Traditional practices and values be passed on to the younger generation to ensure the continuation of the traditional lifestyle, and that all stakeholders participate in this process.
- In-depth Traditional Knowledge studies that create a permanent record be supported by industry and government.
- Trapline use is a way of life. In spite of the low economic value of furs and decreases in the amount of trapping conducted, the trappers and

their families all continue to regularly use the trapline to get away from the city and participate in their cultural traditions. They would like to maintain the current state of the traplines for future generations to enjoy and as a means of retaining their cultural identity.

- The trappers all use their traplines as places to hunt. Concerns raised during many interviews related to competition for game resources from recreational hunters, whose access to the area has steadily increased with the rate of development that has occurred in the last twenty years. New cutlines and the use of all-terrain vehicles have meant that areas that were formerly inaccessible are now seeing increased use. This increased access has also led to more frequent incidences of theft and vandalism on traplines.
- One of the trappers commented negatively on some of the practices of trophy hunters, especially the use of bear bait and the abandonment of the carcass once a kill is made. These practices are considered objectionable.
- Increased development will lead to greater disruption of wildlife due to increased traffic, noise and dust.
- Increases in emissions from all forms of industrial developments will lead to problems with animal and human health.

Syncrude's Aurora Project

Traditional land use studies were conducted in conjunction with planning for the Syncrude Aurora North Mine (Fort McKay 1996b,d). The results of these studies are reviewed here because of their regional significance.

One of these studies is entitled *The Community of Fort McKay Traditional Uses of the Renewable Resources on the Proposed Syncrude Aurora Mine Local Study Area* (Fort McKay 1996d). The objectives of, and methods employed for, this study were the same as the similarly titled study undertaken for the Suncor Steepbank Mine project.

The results of the community survey portion of this study provide a listing of floral and faunal species that are used within the study area and surrounding regions.

Maps produced for this study illustrate the reported locations of active and inactive beaver lodges, trails, cabins, faunal resource harvest locations, floral resource harvest locations, current resource use locales and structures. This information is not directly relevant to the Project, but indicates that other areas within the region are subject to similar traditional land use patterns. Recommendations arising from this study follow a similar format to those cited

above for the Steepbank/Millennium Project and highlight co-operation between industry and community and shared decision making.

The second study associated with Syncrude Canada's Aurora Mine project local study area is entitled *Survey of Wildlife, Including Aquatic Mammals, Associated with Riparian Habitat on the Syncrude Canada Ltd. Aurora Mine Environmental Impact Assessment Local Study* (Fort McKay 1996b). The objectives and results of this study apply strictly to the Aurora Project and have limited relevance for the Project. However, it is of interest to note that wildlife abundance investigations within the previously cleared and drained former Alsands plant and mine site suggest that this area was more productive than unaffected areas nearby, with wildlife activity between 4 and 30 times higher than comparable areas.

Shell Jackpine Mine – Phase 1 Project and Albian Sands Muskeg River Mine Expansion Project

A TLU assessment was prepared by Golder (Golder 2002a,b) for Shell as part of the ESR and EIA for the Jackpine Mine – Phase 1 Project. These studies identify the nature of TLU in the Jackpine Mine project area, document stakeholder concerns, determine impact on traditional use and identify potential mitigation strategies. The studies used existing interviews with relevant stakeholders, available reports and studies specific to the study area, and interviews with trapline holders in the proposed Project area.

Stakeholders identified concerns regarding the loss of land for traditional users, the effects of noise and traffic on traditional use, the effects of development on waterbodies and wildlife, trapline access issues, and the cumulative effects of Jackpine Mine – Phase 1 in combination with other regional developments on TLU in the region.

In 2003, Albian and Shell sponsored (in conjunction with BG TEK Consulting and Four Medicines Consulting) a study to examine traditional plant use within the local area surrounding the Muskeg River and Jackpine Mine – Phase 1. The objective of the study was to assist members of the community of Fort McKay in identifying plants they considered to be culturally important and to be able to pass on this knowledge to future generations. The resulting "Fort McKay Medicinal Plant Report" is a detailed identification guide to traditional plants considered important to the Fort McKay, along with details of the traditional uses of the plants (BG TEK 2003).

3.3.3 Community of Fort Chipewyan

Although situated more than 140 km north of the Project development area, Fort Chipewyan is an Aboriginal community whose members have significant interest in the Project area and actively pursue a traditional way of life in the region. Fort Chipewyan is the oldest settlement in Alberta, with an early history tied intimately to the fur trade (Parker and Tingley 1980). The first post in the region was established by Peter Pond in 1778 at Embarras Portage on the Athabasca River about 40 miles south of Lake Athabasca. Capitalizing on the rich trade in the region, trading posts on the lake were initially established on the south shore in 1788 and later that year, on the site of the present community.

This region had originally been home to Beaver and Chipewyan people, along the south and north shores of the lake, respectively. However, prior to the arrival of Europeans, the Cree expanded into the Athabasca and Peace river basins and displaced the Beaver to the west. By the time European traders arrived, a peace arrangement had been made and Cree and Chipewyan people were living in relative coexistence (Fort Chipewyan 1996), with Cree territory extending into the delta lands in which the Mikisew Cree hunt, fish and trap today. With the signing of Treaty 8 in 1899, the distinctions between the residents of the community of Fort Chipewyan were recognized. Today this community of approximately 1,400 consists of non-natives, the Athabasca Chipewyan or Mikisew Cree First Nations Treaty Indians and Métis of local #124 of the Métis Association of Alberta.

Fort Chipewyan served as the major trade centre of the Athabasca District (Golder 1998) until the 1930s when the fur trade declined and commercial activities (i.e., fishing, forestry, oil sands mining and park maintenance) became a more significant source of semi-permanent employment. Nevertheless, the traditional economy still supplies a considerable portion of the needs of the members of the community and represents an important ongoing tie with a rich cultural past.

3.3.3.1 Fort Chipewyan Community Profile and Attitudes and Perceptions

Within the community of Fort Chipewyan, the attitudes and perceptions toward oil sands development, and Suncor's operations in particular, were sought through completion of a survey (Fort Chipewyan 1996). The objectives of this survey were to ensure that:

- the views of Aboriginal people in the community were voiced;

- concerns for traditional life in the community's traditional lands were taken into account; and
- the input of elders was included.

Responses to a questionnaire were received from 120 households, reflecting a representative range of the three Fort Chipewyan Aboriginal groups and age categories within these groups. Survey results were reported without regard to these ethnic differences. Traditional land use concerns addressed in the survey responses have been divided into several areas, including:

Cultural and Traditional Impacts: There are a wide range of cultural sites situated in the community's traditional lands, most of which are located on the shores of rivers and lakes. At the time of the survey, fewer than half of the respondents felt that these sites had been negatively affected by oil sands industry pollution. Respondents indicated that there were traditional sites in the area where oil sands development was occurring at the time of the survey and indicated that these areas are still used. While a large majority of respondents believed that traditional lifestyles had been negatively affected by oil sands development, other sources of negative impact were identified, including environmental pollution, construction of the Bennett Dam on the Peace River, loss of traditional lifestyle and competition with non-traditional use of the area.

Social Impacts: Respondents believed that traditional settlement patterns had changed since the oil sands development began and that air and water pollution have been responsible for a loss of traditional lifestyle, forcing them to move to Fort Chipewyan from more dispersed traditional settlement areas. However, in response to a specific question about reasons for the move to Fort Chipewyan, respondents indicated that education, jobs, goods and services were the principal attractions. Prior to oil sands development, almost all of the respondents indicated that the knowledge and skills necessary for self-sufficiency were learned by traditional education.

Environmental Impacts: Respondents believed that the distribution and productivity of traditional fauna and floral resources have been affected negatively by air and water pollution from oil sands developments. Lower water levels as a result of changes in the flows in the Peace River were also cited as an important negative effect on traditional lifestyles.

In summary, the study concluded that the presence of oil sands and other industrial developments, along with agricultural and municipal development in both the Peace and Athabasca river basins, have had important negative effects on the traditional lifestyle of the Fort Chipewyan community and on the

environment that supported that lifestyle. Air, land and water pollution were considered the major causes of these effects. Recommendations arising from this study were specifically intended for Suncor and its operations.

3.3.3.2 Athabasca Chipewyan First Nation

Information on the ACFN traditional land use patterns was summarized from the following sources:

- Athabasca Chipewyan First Nation Traditional Land Use Study (ACFN 2003a);
- "Footprints on the Land" (ACFN 2003b); and
- Athabasca Chipewyan First Nation information presented at the EUB hearing for the Muskeg River Mine.

Additional information on community traditional land use patterns was summarized from limited sources of information obtained in the mid 1990s. In advance of the development of the Steepbank Mine, Suncor commissioned a 1995 study by the Fort Chipewyan community. The objectives of the study were:

- develop a comprehensive socio-economic community profile of Fort Chipewyan; and
- determine and identify the prevailing attitudes and perceptions of Indigenous people where it concerns Suncor Energy Inc. (Fort Chipewyan 1996).

Despite this stated focus, much of the information obtained by this study was sufficient to have general application and conveys the general views of the community toward the then existing and proposed development in the Oil Sands Region.

A second source of information on traditional land use patterns of the Aboriginal residents of Fort Chipewyan is available through work completed with communities as part of the Northern River Basins Study. *The Report On Wisdom Synthesized from Traditional Knowledge Component Studies* (Bill et al. 1996) provides a summary of interviews with residents of Fort Chipewyan, many of which were elders, as well as additional information relevant at a regional level. The results of both studies are summarized below.

In addition, information on some of the traditional land uses of the ACFN was provided during the EUB hearing for the Muskeg River Mine. During the

hearing, a panel from ACFN, including community elders, described their various travels in northeastern Alberta for trapping, fishing and hunting. During the presentation, it was noted that members of ACFN did travel into the area of Kearl Lake area and in areas between the Athabasca River and the Saskatchewan border.

3.3.3.3 Northern River Basins Study

The Northern River Basins *Report On Wisdom Synthesized from Traditional Knowledge Component Studies* (Bill et al. 1996) summarizes the results of interviews with 29 residents of Fort Chipewyan, including 23 elders, and responses to 28 mailed questionnaires. Similar to the other communities studied, information was gathered on traditional resource and land use, documentation and mapping of harvest locations and special places, attitudes toward the environment, and concerns with respect to observed changes.

The area identified for traditional land use in this study does not extend as far south as the Project area. However, it can be assumed that the patterns of use described resemble those of community members who operate near the Project. Members of the community showed a relatively high propensity to participate in traditional land use activities. For example, 92% of respondents hunted. Fort Chipewyan was the only community surveyed that showed an increase in trapline ownership. Species of plants, big game, furbearers, fish and waterfowl harvested traditionally are described in this report. The interviewed elders stressed a great concern for the need to preserve the traditional ways of life and pass their knowledge on to younger members of the community.

Concerns identified by the community members highlighted changes in the levels and quality of the water in the region in recent times. In 1996, respondents identified hydroelectric projects, pulp and paper industrial developments and park development as being of concern in relation to the health of the land. Oil and gas development was not as frequently mentioned as being of concern, although some health concerns in relation to air emissions were mentioned. With the increasing number of developments in the Oil Sands Region, these views may have altered to some degree since the publication of this report.

3.3.3.4 Muskeg River Mine Hearing Testimony

During the EUB hearing for the Shell Muskeg River Mine Project, the ACFN panel presented information on community traditional land use patterns within the Oil Sands Region (EUB 1998).

Charlie Voyageur indicated that when he lived at Fort McKay, he trapped with his uncle at Kearl Lake and that he hunted throughout a wide area from Fort McMurray in the south to as far north as Lake Athabasca. Alec Bruno described an extremely wide-ranging pattern of travel that spanned areas between Janvier in the south, La Loche, Saskatchewan in the east and Lake Athabasca in the north. Chief Archie Cyprien was born at Poplar Point (IR201G) on the Athabasca River north of the Oil Sands Region and described an active trapping career during which he shared a trapline along the Steepbank River. He also indicated that an active member of ACFN, Marvin L'Hommecourt, presently operates a trapline near the Project.

Together, this testimony indicates that members of the ACFN continue to actively pursue a traditional lifestyle in the vicinity of the Project. Although few specific concerns and issues with regional development were raised during this testimony, the most consistently raised issue before the panel was for adequate community consultation before development.

3.3.3.5 Athabasca Chipewyan First Nation Traditional Land Use Study

The ACFN completed their TK and TLU study in 2003 (ACFN 2003a,b). This study details the historical and current traditional land uses within their traditional territory. Within the Project area, the study identifies the following traditional uses, and where applicable, the species involved. These include:

- trapping (beaver, otter, muskrat);
- hunting (moose, dear, bear); and
- fishing (goldeye).

The study further indicated that lynx, wolf, rabbit and mink inhabit the Project area. Gravesites have been identified along the Firebag River, at the mouth of Redclay Creek, along Unnamed Creek 2 and near Susan Lake.

Most of the trapping and hunting activities near the JEMA development area are centred on the Muskeg River. The TLU study further indicates that the holder of RFMA #1714 is a member of ACFN. This trapline holder was re-interviewed for the Project in 2007 and this information is presented in Section 3.4 of this report.

3.3.4 Mikisew Cree First Nation

Members of the MCFN were consulted as part of the TLU studies undertaken for the Horizon Project EIA (Golder 2002c). The purpose was to document any concerns or issues regarding both regional and the proposed Canadian Natural Horizon development. Some interviewees indicated the importance of the Birch Mountains for hunting and fishing and described how the location is occasionally used as a stopover or camping place. The Athabasca River is used as a travel corridor around Fort McKay. However, most interviewees reported that their traditional land use activities occurred closer to Fort Chipewyan and in Wood Buffalo National Park. Their experience and knowledge of the regional environment supports their ability to perceive environmental trends or change. Interviews conducted with MCFN regarding existing and proposed development revealed the following concerns:

- The potential for increased recreational non-Aboriginal hunting in the Fort Chipewyan area. One interviewee surmised that increased development around Fort McKay will force wildlife to move north, resulting in a movement of recreational hunters to Fort Chipewyan. This would increase non-Aboriginal competition for game and therefore may reduce opportunities to harvest wildlife for the MCFN.
- It was stated that more development could increase the unpleasant odours in the region. One interviewee stated that all development in the region has an effect on the air quality in Fort Chipewyan.
- Changes in fish quality, populations, health and taste will be affected.
- Reduced water quality in the Fort Chipewyan area.
- Reduced wildlife populations including moose, muskrat, lynx, marten, ducks, rabbits, frogs and red-winged blackbirds.
- Water levels in the Athabasca River are currently low. One interviewee surmised that the water intake for the proposed Horizon Project could affect water levels further.
- Changes in the taste and quality of waterfowl.
- Moose meat from the Fort McMurray area was noted to be of poorer quality than the moose meat procured from the Fort Chipewyan area. One interviewee surmised that industrial pollution is affecting the taste of moose meat.
- One interviewee who hunts in the region expressed concern regarding how the proposed Canadian Natural Horizon development will affect the movement of moose in the area.
- Several interviewees expressed interest in potential employment related to the proposed Horizon Project.

3.3.5 Fort McMurray First Nation Traditional Land Use Study

The FMMFN completed their traditional land use study in 2006 (FMMFN 2006). This study details the historic and current traditional land uses within their traditional use areas. The JEMA development area falls on the northern fringe of the FMMFN traditional land use area and the PRMA development area is located north and west of their traditional land use area. Within the Project area, the study identifies the following traditional uses, and where applicable, the species involved. These include

- trapping (coyote, muskrat, weasel, fisher, beaver and squirrel);
- large game hunting (deer, bear and moose);
- bird hunting (Canada goose and ducks);
- fishing (grayling, chub and jackfish); and
- berry harvesting (blueberries, saskatoons, cranberries, raspberries and strawberries).

In addition to the above activities, the study further indicates that the Athabasca River near the Project area is an area where eagles are found. Cabins were located along the Athabasca River, but south of the Project area.

Trapping, as indicated above, took place around McClelland Lake, as did large game and bird hunting. Fishing for took place in the Athabasca River. Medicine collecting areas were indicated south of the Project area. No graves or spiritual sites are indicated in the Project area.

3.4 TRADITIONAL ECOLOGICAL KNOWLEDGE AND LAND USE WITHIN THE LOCAL STUDY AREA

The following section describes the traditional land use activities conducted historically and currently within the six RFMAs. The majority of this information was obtained through personal interviews conducted by Shell and Golder in 2007. Results of the trapper interviews are presented below and RFMA locations are presented in Figure 3.1-2.

Information presented for the LSA was obtained from interviews conducted with all of the directly-affected trappers:

- RFMA #1275, held by Arne Hermansen;

- RFMA #2939, held by George Clark;
- RFMA #1714, held by Marvin L'Hommecourt;
- RFMA #1716, held by Henry Shott;
- RFMA #2137, held by Emma Faichney; and
- RFMA #2331, held by Victor Amiot.

At the time of writing, First Nation interviews were also being arranged with FMFN, ACFN and MCFN. Information from these interviews will be incorporated into the LSA project planning as it becomes available.

3.4.1 Registered Fur Management Area #1275

The RFMA #1275 is currently held by Arne Hermansen, a non-Aboriginal. The information summarized in this section was obtained from an interview conducted with Mr. Hermansen on May 10, 2007.

3.4.1.1 Historical Use

Mr. Hermansen has owned the line for 35 years and it is where he raised his family for several years. His oldest son, a junior trapper, was raised and home schooled at the cabin until he reached the age of thirteen, at which time the family moved into town. There is one very old cabin on the property that is located 400 yards down river from the main cabin, but the holder is unfamiliar with its history.

3.4.1.2 Current Use

Mr. Hermansen currently lives on his trapline and actively hunts, traps and harvests berries on the trapline. He also maintains a small outfitting business on the line. Mr. Hermansen stated that as he is getting older, he traps less frequently but he intends to continue living on the trapline. He has two sons, one of which does not hunt or trap, but he enjoys visiting the line. The other son is the junior trapper who would like to take the line over one day. His son was interested in taking over the business but believes the environment has changed so much that hunting and trapping are not sustainable into the future.

3.4.1.3 Plant Harvesting

Mr. Hermansen mainly picks blueberries and low bush cranberries. The number of blueberries is good on the trapline but there would be more if the area was opened up to receive additional sunlight. He currently picks blueberries and

strawberries in the yard of the main cabin. There are a few high bush cranberries and chokecherries along the trails, but he does not pick them. Raspberries are found all along the edge of cut lines and the numbers vary from year to year. In some years, raspberries are collected and last an entire winter while in other years few are available. All types of berries located on the trapline are in good health. Mr. Hermansen does not collect medicinal plants. While he is aware that some people eat fiddleheads to aid digestion, he eats them for their taste.

3.4.1.4 Fishing

Mr. Hermansen does not fish on the trapline. He believes fish from this area should not be eaten due to health concerns. However, he does fish on the Firebag River and the side rivers. Mr. Hermansen states that water levels were low a long time ago. The first year he took the trapline he was unable to paddle a canoe in the river. He indicates that water levels vary with the amount of rain and snow and there are big changes in the weather. He also says it is harder to predict when winters will turn cold because it varies year to year.

3.4.1.5 Hunting and Trapping

Mr. Hermansen places traps all over RFMA #1275 including trails, creeks and around the cabin. He traps wolf, fox, beaver, lynx, marten, fisher, mink, otter and squirrel. Last winter he caught many wolves and two beavers. This year the beaver population is high. Fewer of these animals are trapped due to the poor market value for their pelts. Similarly, the mink population is good but they are not trapped due to the current low price of fur. He describes the otter population as fair to good right now. They had died off a few years ago, but now they are slowly making a comeback. Numbers of marten are down, but Mr. Hermansen states there never were many in the area. Three years ago, the population was good and Mr. Hermansen made extra boxes to catch them. The population has since dropped. There are few fisher, but he indicated that this is typical for the area. There are plenty of squirrels and a few fox, but the lynx population is very low because the rabbit cycle is down this year.

Mr. Hermansen also hunts and maintains an outfitting business on the trapline. He hunts bear, wolf and moose. Bear is hunted in the spring and fall and they are generally found around the cabins. The bear population is very poor due to the large number of hunters who bait traps and take too many of them. Wolf is hunted in the spring and the population is good because they are tough and crafty. Moose are hunted in the fall and can be found everywhere along the trapline; however, the numbers are down due to hunting pressure caused by easy access to the area by boats and quads. There is a small herd of buffalo that moves around an area slightly larger than the trapline. Mr. Hermansen states all

the animals in the area are healthy and provide good meat. He believes the general impacts of industry to the environment include an increased number of hunters and easy access to the trapline.

3.4.1.6 Cabins, Trails and Access Routes

Mr. Hermansen currently has two habitable cabins on the property. He lives in the main cabin. The second one was broken into last year. There are two additional cabins on the property. One is not used and the second is very old and located 400 yards down river from the main cabin. Mr. Hermansen does not know who owned it. His line is accessed in the summer by boat and in winter he drives to the Northland Road and then travels by skidoo. There are trails everywhere on the line to trap, hunt, pick berries and access the cabins.

3.4.1.7 Burial and Cultural/Historical Sites

Mr. Hermansen is aware that Emma Faichney's two sisters are buried on his trapline. However, he is unaware of additional spiritual sites located on RFMA #1275.

3.4.1.8 Proposed Future Use

Mr. Hermansen states that he is getting older and traps less frequently, but he intends to continue living on the trapline. The general impacts of industry to the environment include an increased number of hunters and easy access to the trapline. Mr. Hermansen states the area is poor for hunting and will only get worse in the future. He states he will live with current development and still enjoy his cabin. However, if he was younger he would be angry about the situation because he would have to move. The noise levels are currently manageable. There is no noise from truck traffic but caterpillar tractors are loud when they drive through the area. Additionally, when the wind comes from the right direction, the air from Suncor smells bad. Mr. Hermansen states that industry has not really affected his outfitting business because it is very small. However, his son is interested in taking over the business and the trapline but believes the environment has changed so much that hunting and trapping are not sustainable. Another son does not hunt or trap but still enjoys visiting the line.

3.4.2 Registered Fur Management Area #2939

The RFMA #2939 is currently held by George Clark, a non-Aboriginal, who lives in Fort McMurray. The information summarized in this section was obtained from an interview conducted with Mr. Clark on May 9, 2007.

3.4.2.1 Historical Use

Mr. Clark currently resides in Fort McMurray and has owned the trapline since 1997.

3.4.2.2 Current Use

Mr. Clark currently uses RFMA #2939 to hunt, trap and fish. He states that his cabin and trapline are also places to go for fun with the family.

3.4.2.3 Plant Harvesting

He no longer harvests berries on the trapline. He states that Northlands has sprayed the raspberries to kill them off to encourage the growth of planted trees. In terms of medicinal plants, he described fern-like plants that are used for stomach problems.

3.4.2.4 Fishing

Mr. Clark fishes for pike on Swampy Lake, an oxbow lake on his trapline. He has heard from other people that perch may be found there too. He also fishes on the Athabasca River in the fall and finds the overall quality of fish good. Mr. Clark has not noticed change to the water levels. However, last year there was six feet of snow on the ground which he described as more than usual.

3.4.2.5 Hunting and Trapping

Mr. Clark traps everywhere on the line and states the area was once good for beaver, marten, fisher, lynx, wolf, fox and wolverine. As of June 2007, he had caught one marten and fisher. The previous year, he was unsuccessful in his hunt for lynx, wolverine, fox and wolf. He indicated the number of all animals has dropped off significantly and he has not seen any tracks this year. He also hunts large game such as deer and moose and, at times, he gets buffalo in the meadow swamp on his trapline. There were no moose or deer last year. Since the old McKay Road has been cleared, more people access the area and this has affected animal populations. For example, he explained how tree planters came in six years ago and left their garbage behind which created bear problems. Additionally, wolves now feed off the local garbage and this negatively affects trapping activity.

3.4.2.6 Cabins, Trails, and Access Routes

Mr. Clark accesses his trapline by boat in the summer and by snowmobile along RFMA #1275 traplines in the winter. He has two cabins on the property. The main cabin is habitable and the southern cabin is still in development. He states there was another old homestead on the property but there is nothing left to it. He believes a caterpillar tractor may have gone over it at one time.

3.4.2.7 Burial and Cultural/Spiritual Sites

Mr. Clark indicated that Emma Faichney's two sisters are buried on RFMA #1275. However, there are no known burial or cultural/spiritual sites on his own trapline.

3.4.2.8 Proposed Future Use

Mr. Clark would like to continue to hunt, trap and fish on his line and states that it is also a place to go for fun with the family. He would like to retire on the line, but believes the area will be ruined if the mine is constructed.

Mr. Clark states that development in the area has changed his life on the trapline in several ways. With all the open roads there is an increase in people and traffic. Currently, aircraft in the area create noise pollution. Low-flying helicopters and planes are loud and there is additional noise from vehicles and quads. At night there is light pollution from the plants and it is now difficult to hunt with so many people in the area. He feels that people associated with the industrial plants are generally rude and there is no communication with the various contractors who are changing the trapper's environment. He states that he asked Shell to develop the road away from the river, but they did not listen to the request. Additionally, he feels there is excessive road construction in the area and too many companies develop without stating where they are going or what they are doing. He states the area is ruined because of these problems. Mr. Clark believes that the area will never be reclaimed properly because industry cannot re-create an identical environment.

3.4.3 Registered Fur Management Area #1714

The RFMA #1714 is currently held by Marvin L'Hommecourt who lives in Fort McMurray and is a member of the Athabasca Chipewyan First Nation. The information summarized in this section was obtained from interviews conducted on May 10, 2007 with Mr. L'Hommecourt.

3.4.3.1 Historical Use

Mr. L'Hommecourt, the current holder of trapline #1714, lives in Fort McMurray.

3.4.3.2 Current Use

Mr. L'Hommecourt uses RFMA #1714 to hunt, trap and harvest berries. His trapline and cabin are also used as a meeting place for family and friends to regularly gather and sometimes picnic.

3.4.3.3 Plant Harvesting

Mr. L'Hommecourt gathers blueberries and low bush cranberries on a creek along the line. Both types of berries are also gathered on the east side of the Muskeg River where the numbers are good and people often camp there to collect berries. Mr. L'Hommecourt states there are no strawberries on the trapline, but he has seen a few raspberries. Generally, he feels there is no change in the health of berries. He is not aware of locations for medicinal plants, but his mother continues to pick them.

3.4.3.4 Fishing

Mr. L'Hommecourt does not fish, but states that work-camp workers often do in this area. He is aware that grayling are caught in the Muskeg River but they are less abundant in Wapasu Creek. He states there is a lot of water this year due to a large amount of snowfall. He added that generally, the water levels remain the same, but he is concerned they will lower with continued development because industry requires large quantities of water.

3.4.3.5 Hunting and Trapping

Mr. L'Hommecourt traps various types of small animals. Due to the difficulty of travelling over muskeg, he tends to stay close to the cabins and travels along Wapasu Creek and Muskeg River. Animals found on the line include fisher, marten, lynx and beaver. Fisher and marten are trapped on the Athabasca River, but the populations have dwindled over the past five years. Mr. L'Hommecourt does not bother with beaver because the pelts have little monetary value. He knows lynx are on the line because he sees the tracks, but they are difficult to find. He states that large game such as moose, bear, caribou and deer are also found on the trapline. Mr. L'Hommecourt only hunts moose and they are generally found in poplar stands near muskeg. He states there are several bears on the line, but he will not hunt what he does not eat and does not enjoy bear

meat. White-tailed deer are present, but there are no mule deer on this trapline. Mr. L'Hommecourt spotted a couple of caribou two years ago; while there are signs they still frequent the line, they have a tendency to move in and out of the area. He states all the animals are healthy and the meat is good. However, he indicated the animals seem lacidazical as if they have no spirit or they are lost. Mr. L'Hommecourt suspects this is the result of pollution, perhaps from tar that the animals are digesting. He believes that mine development has disturbed animal habitat.

3.4.3.6 Cabins, Trails and Access Routes

Mr. L'Hommecourt states that he must now access his cabin through existing mining projects. He accesses the line along Canterra Road in the summer. In winter he takes the road and then drives a skidoo along cut lines to his cabin. Two cabins on the line are located close together and are actively used. The main cabin has a sweatlodge that is located by a stream and is used by the entire family. Mr. L`Hommecourt's mother owns the second cabin. He is also aware of one older cabin located near a small lake. Due to the difficulty of travelling over muskeg, he tends to stay close to the cabins and travels along Wapasu Creek and Muskeg River.

3.4.3.7 Burial and Cultural/Spiritual Sites

Mr. L`Hommecourt's main cabin has a sweatlodge that is located by the stream. It is currently used by the entire family. He is unaware of additional ceremonial or grave sites on RFMA #1714. However, he states there are archaeological campsites located along a small creek where he picks cranberries. He is also aware of archaeological sites on the northwest side of Kearl Lake.

3.4.3.8 Proposed Future Use

Mr. L`Hommecourt would like to continue trapping close to the cabin because it is where he catches moose as a source of winter food. The cabin is also a place for his family and friends to gather. His mother is there all the time and his sisters frequently visit. Mr. L`Hommecourt states it is a good place for a Sunday picnic, but the industrial view as you enter the property is unattractive. He states that since development has increased there is constant noise from heavy load trucks driving on the road. Because development is so close to his cabin there is also a lot of dust in the air from trucks passing on the roads. Workers are also known to party outside the designated dry work camps. He claims they are often drunk, leave garbage all around and they sometimes enter his empty cabin to party. He would like industry to place a buffer zone around all cabins in the area

to eliminate these sorts of problems. Mr. L`Hommecourt states the area is lost and will never be reclaimed to its original state.

3.4.4 Registered Fur Management Area #1716

The RFMA #1716 is currently held by Henry Shott who is a Métis trapper currently living in Fort McKay. The information summarized in this section was obtained from an interview conducted on May 11, 2007 with Mr. Shott, and his son and junior partner Dennis Shott.

3.4.4.1 Historical Use

Mr. Shott is the current holder of RFMA #1716.

3.4.4.2 Current Use

Mr. Shott and his son currently use RFMA #1716 for hunting, trapping, fishing and berry picking. He and his family also use the trapline for picnics.

3.4.4.3 Plant Harvesting

Mr. Shott harvests plants on RFMA #1716. He mainly picks blueberries and cranberries in the area around his cabin. There are also a few strawberries and raspberries in the area and all plants appear healthy. Mr. Shott states that there are many berries near the Firebag River. He states there are medicinal plants around the small lake by his main cabin and around Muskeg Lake, but he does not pick them.

3.4.4.4 Fishing

Mr. Shott fishes on the Firebag River and catches pickerel, jackfish, perch and grayling. He says there are no white fish because the water levels are too high. He states the fish appear healthy and there have been no changes in numbers or types of species over the years. Mr. Shott states the weather in the summer is colder, but it goes in cycles.

3.4.4.5 Hunting and Trapping

Mr. Shott and his son trap along Firebag River and on the road that leads to the river. They also trap along Wapasu Creek, Muskeg River and in any area along the line with easy access. They state there are numerous animals on the line including lynx, beaver, muskrat, marten, fisher, weasel, squirrel, coyote, fox and

wolf. Wolverine are sometimes spotted along Firebag River. They have heard there are cougar in the area that have moved in from the south. Mr. Shott and his son state the number of animals near Firebag River is constant, but the numbers get sparse near Muskeg River and Wapasu Creek. Mr. Shott feels animals are moving elsewhere due to industrial activity.

Mr. Shott also hunts large game on the road that leads to Firebag River, along the river itself and around his cabin. The hunted species include moose, caribou, white-tailed deer and bear. The holder states that moose are still plentiful and the deer population is good near Firebag River. The bear population has dwindled because outside hunters kill a lot of them during the fall hunt. There are no caribou in the area; they have moved away due to industrial activity. Mr. Shott believes the animals are generally in good health except a few hunted moose that had white lumps in their stomachs. He suspects this is the result of a polluted environment, but the moose meat is still eaten. There are additional people and hunters that use existing roads and this creates hunting pressure. Mr. Shott and his son also state that the animal population has decreased along the Muskeg River.

3.4.4.6 Cabins, Trails and Access Routes

Mr. Shott states that one industrial impact to the environment is his limited access to the trapline. In both winter and summer, the line must be accessed by truck because the quad routes are blocked. They have two cabins that are currently used on the trapline: the main cabin is located on Wapasu Creek and the second cabin is situated on the Firebag River.

3.4.4.7 Burial and Cultural/Spiritual Sites

Mr. Shott and his son indicate there are several cultural/spiritual sites associated with RFMA #1716. They believe there are archaeological campsites along the trapline on the Firebag River. They are also aware of several graves located on the Firebag River about one and a half miles from his cabin. They are unaware of additional ceremonial sites in the area.

3.4.4.8 Proposed Future Use

Mr. Shott states that in the future he would like his children to trap on RFMA #1716. Currently the trapline is used by his family for picnics, but he would like the land reclaimed for hunting, trapping and berry picking. Mr. Shott's son is the junior trapper who feels there is no future in trapping on the line. He explained that the air sometimes smells from pollutants and there is noise from heavy equipment such as the backup alarm of the bulldozer. At one time roll-backs

used to be well controlled, but now they are poorly managed and branches, sticks and high stumps protrude from the ground. Mr. Shott states you have to try to keep your own culture, but it is no longer possible with the effects of industry.

3.4.5 Registered Fur Management Area #2137

The RFMA #2137 is currently held by Emma Faichney, who is a member of the FMFN and lives in Fort McKay. The information summarized in this section was obtained from an interview conducted on May 11, 2007 with Emma Faichney and her son and junior partner, Bruce Faichney.

3.4.5.1 Historical Use

Mrs. Faichney and her son currently trap on the trapline. Her son and daughter were born on the trapline near Bitumont, an historic mining site located on the trapline.

3.4.5.2 Current Use

Mrs. Faichney and her son currently use RFMA #2137 for hunting, trapping, fishing and berry picking.

3.4.5.3 Plant Harvesting

Mrs. Faichney indicated that the best place to pick berries is along McClelland Lake because there are many blueberries, cranberries and moose berries in this area. Raspberries are also collected by Bitumount and Old Fort Hills. When Mrs. Faichney was young, she and her parents would pick berries at Old Fort Hills. Many families would go there and stay in old cabins to access berries in the area. She now finds medicinal plants all over the trapline. She picks strawberries close to the old airport and sometimes the root is used as a diuretic. At Old Fort Hills, the muskeg is good for medicinal plants including red berries Mrs. Faichney referred to as eyeberries. However, the sun is too hot and the leaves of the berries get brown in the summer. She has always picked medicinal plants along the trapline and this was the only medication she gave her children as they grew up.

3.4.5.4 Fishing

Mrs. Faichney states she fishes jackfish, pickerel and goldeye where Fort Creek enters into the Athabasca River. When she was small, she and her parents would fish at McClelland Lake all the time. They would camp, trap and fish as a means of survival. She says she no longer fishes at McClelland Creek because the fish

are the size of minnows and it is not worthwhile. Since Mrs. Faichney does not fish she cannot comment on fish health. There is a lot of snow right now and that is why the water level appears high. However, the water level is generally lower than it was 10 to 15 years ago and she no longer hears ice breaking up.

3.4.5.5 Hunting and Trapping

Mrs. Faichney continues to trap all over the line, but mainly stays near the water and roads. Trapped species include squirrel, lynx, mink, fisher, marten, otter, weasel, beaver, coyote, fox and wolf. There are many rabbits on the line which is in contrast to the other side of the lake. She states that marten were introduced from Manitoba and are not native to the area. There are no beaver left in the area because their habitat was removed. In general, all animals that are trapped have started to leave due to the presence of industry and the loss of trees from forestry, but all the animal pelts are of good quality.

Mrs. Faichney and her son hunt steadily throughout the year. The main animals include moose, bear, white-tailed deer, mule deer and a few caribou (when they pass through). She says the moose population has steadily dropped and believes it is likely because Alberta Pacific Forest Industries Inc. (Al-Pac) has removed all the poplar. The bear population has also declined because there are too many hunters who kill them for the bladder and dispose of the meat. White-tailed deer are plentiful, but the mule deer population is sometimes low. Mrs. Faichney and her son indicate that moose are healthy and all the large game are in good health.

3.4.5.6 Cabins, Trails and Access Routes

Mrs. Faichney actively uses two cabins on the line that are accessed by road or by boat on McClelland Lake. Her other son, Glen Faichney, also built a cabin on a hill that overlooks Fort Creek. A site identified as Castor's old cabin is run down and is located along the lake about 400 m from the main cabin.

3.4.5.7 Burial and Cultural/Spiritual Sites

Bitumount is a historic mining site that stands on RFMA #2137. Mrs. Faichney is aware of grave sites located near the True North (Petro-Canada) site.

3.4.5.8 Proposed Future Use

Mrs. Faichney and her son believe that many negative impacts to the environment are the result of increased population. They feel that there are too many bear hunters in the area and garbage, including pop and beer cans, is scattered everywhere. They state there is too much noise from plant operations,

power saws and caterpillar tractors. Roll-backs are poorly constructed and the presence of tall tree stumps is dangerous. She also dislikes the unpleasant smelly haze produced by local industry. She states that in the winter the snow is dirty, black in some places, and she can no longer use it – even for dish water. Mrs. Faichney feels there are too many industries in the area and the resulting pollution has driven the animals away. She continues to use the cabin at Fort Creek for recreation and she intends to use the trapline in the future for recreation, to trap, collect berries and gather medicinal plants. She hopes the reclaimed land will look the same because she wants to pass the line on to her son (junior partner). However, she doubts the land will ever be reclaimed to its original form.

3.4.6 Registered Fur Management Area #2331

The RFMA #2331 is currently held by Victor Amiot, a non-Aboriginal living in Lac La Biche. The information summarized in this section was obtained from an interview conducted with Mr. Amiot on May 12, 2007.

3.4.6.1 Historical Use

Mr. Amiot, the current holder of trapline #2331, resides in Lac La Biche and took ownership of the trapline in 1987. The previous holder had a cabin near the lake and there is an old cabin by the creek that belonged to the first trapline holder, Edmond Duscharme. The latter cabin is full of old artifacts and the holder is not interested in fixing it up.

3.4.6.2 Current Use

Mr. Amiot uses RFMA #2331 to hunt, collect berries and trap, but he has not fished on the trapline for a long time. He uses the area as a place for relaxation with his family. Both his daughters visit with their children. Mr. Amiot wants to keep the trapline in the family because it is like a park.

3.4.6.3 Plant Harvesting

Mr. Amiot mainly collects blueberries on the trapline. They are very large and he collects them in five-pound pails. He also collects cranberries. High bush cranberries are plentiful on the line and he seldom collects low bush cranberries because they are more scarce. He indicates all berries are good quality, but generally they are less abundant. He also picks raspberries and saskatoons along the Athabasca River.

3.4.6.4 Fishing

Mr. Amiot has not fished on his line for six years. When he did fish, he would travel to the bridge off his line. He indicates that the water level of the Firebag River is generally the same although the flood levels are lower than in the past. Mr. Amiot has observed no difference in the water levels of Moose Creek or the Athabasca River. He has never seen water in McClelland Creek since he took over the line, although he has heard that at one time the creek had standing water.

3.4.6.5 Hunting and Trapping

Mr. Amiot traps along the entire line but mainly makes use of the rivers and roads. He uses the Synenco access road as his main artery to trap a wide variety of animals including pine marten, fisher, beaver, otter, lynx and wolf. In general, the animal population is good. The pine marten is doing well, there is no change to the beaver population, but there are fewer fisher. The lynx population is low and is correlated with the rabbit population. Mr. Amiot cannot comment on the otter population because he has not trapped them in the past two years. He caught only one wolf last year because his wife had died, he had lost interest in trapping and therefore set fewer traps. However, he typically catches six or seven wolves in a year. He says there are fewer wolves in the area due to the high volume of people and traffic in the area, but finds them easier to trap because they seem less smart. He believes this may be the result of industrial pollution in the environment.

Mr. Amiot states that he hunts moose, bear and deer, and indicates there are more white-tailed deer than mule deer in the area. Overall, the numbers have dropped off for all species and there are fewer tracks in the area. He indicated that at one time McClelland Lake had the highest moose population in Alberta, but this is no longer true. Mr. Amiot also mentioned Moose Creek, where increased numbers of people and access roads have led a reduction in wildlife habitat. He further added that last year bear hunters shot and killed 52 bears from an area two to three times larger than his trapline. Mr. Amiot maintains that overall, the animals look healthy and have good quality meat.

3.4.6.6 Cabins, Trails and Access Routes

Five cabins are located on RFMA #2331. Mr. Amiot's main cabin is accessed mainly from the winter road, the Synenco access road, or the old winter road. The previous holder had a cabin beside a small lake referred to as "Figure 8 Lake" by the winter road and the current holder uses this as a secondary cabin. There is another cabin on the winter road by the lake and an old cabin by the creek that belonged to the first trapline holder, Edmond Duscharme. The latter

cabin is full of old artifacts and the holder is not interested in fixing it up. Another cabin is currently being built by a local person who likely does not know that he is on the holder's line. There is also a cabin frame and an associated grave near the shore of McClelland Lake. Mr. Amiot does not know who owned the cabin. A cabin located next to the river has been knocked down and the debris taken away. Mr. Amiot states no structural evidence is left at this site.

3.4.6.7 Burial and Cultural/Spiritual Sites

Mr. Amiot is aware of one grave and an associated cabin near the shore of McClelland Lake. He does not know who owned the cabin and is unaware of any ceremonial or archaeological sites on the property.

3.4.6.8 Proposed Future Use

Mr. Amiot uses the trapline to hunt, collect berries and trap. He uses the area as a place for relaxation with his family. As indicated earlier, both his daughters visit with their children and the trapper would like to keep the line in the family. He will continue to trap and indicated that one of his daughters is interested in taking a trapping course.

Mr. Amiot states the area has totally changed with development. He feels there is an increase in the number of people, roads and traffic noise. He states the area was peaceful, but now there is equipment and his line is getting smaller. Mr. Amiot noted that with all the logging there has also been a loss of animal habitat. His cabin was broken into three times and each time items were stolen. The first theft occurred in 1980 before he took taking ownership of the line. Subsequent thefts occurred in 2000 and again in 2002.

3.4.7 Trapper Traditional Land Use Summary

The following summarizes information identified by trappers interviewed for the Project. Traditional activities such as trapping, hunting and plant harvesting continue to be pursued by all RFMA holders.

All RFMA holders are concerned about the cumulative effects of industry on animal habitat and health. RFMA holders identified the following species that are currently trapped, including:

- beaver;
- wolf;
- fox;
- coyote;
- mink;
- otter;
- squirrel;
- wolverine;

- lynx;
- marten;
- fisher;
- rabbit;
- weasel; and
- muskrat.

All RFMA holders continue to hunt on their traplines. Generally, the animal numbers are down due to hunting pressure associated with increased public access and outside hunters. These factors have had an effect on the quantity of game animals, but they all maintain good quality meat. Animals hunted on the RFMAs include:

- beaver;
- moose;
- wolf;
- white-tailed deer;
- mule deer;
- caribou; and;
- buffalo.

All but one RFMA holder continue to harvest plants on their traplines. Berries are generally in good health, but are less abundant in the area. Harvested berries include:

- blueberries;
- cranberries;
- chokecherries;
- raspberries;
- strawberries;
- saskatoons;
- mooseberries; and
- unidentified red berries one trapper referred to as eye berries.

RFMA holder #2137 also uses her trapline to gather medicinal plants.

The trappers indicate there are several cultural/spiritual sites associated with the RFMAs, including the following gravesites, archaeological sites and one historic site:

- several graves on the Firebag River about one and a half miles from the holder's cabin (RFMA #1716);
- two gravesites on RFMA# 1275;
- one grave and an associated cabin are situated near the shore of McClelland Lake (RFMA #2331);
- grave sites near the True North (PetroCanada) site (RFMA #2137);
- archaeological campsites located along the holder's trapline on the Firebag River (RFMA #1716); and
- a historic mining site (bitumont) with facilities from Alberta's first pilot oil sands operation that was abandoned in 1940 (RFMA #2137).

All RFMA holders have one or more cabins on their traplines. All RFMAs continue to be used for recreation and relaxation. The use, safety and enjoyment of the traplines has been adversely affected by the noise, traffic, increased access and loss of land for traditional activities from existing developments.

3.4.8 Traditional Land Use Conclusions

The RSAs for traditional land use are comprised of the traditional territory of the FMFN, ACFN and MCFN. The effects of the Project were considered in relation to these traditional areas and the traditional ways of life that are recorded in TLU studies and project-specific impact assessments. Shell is currently conducting interviews with the various First Nations whose traditional territories overlap the proposed Project area. This information will be incorporated into project planning as it becomes available. The LSA consists of six traplines including RFMA #s 1275, 2939, 1714, 1716, 2137 and 2331.

Traditional resource distributions and land use patterns have been affected directly by various regional developments including oil sands projects and their associated infrastructure, forestry operations, commercial development and government projects as well as municipal expansion. These effects result from landscape disturbance and ecological disruption over long and short-term intervals. While trappers mostly reported that access into the area has increased, one trapper indicated that quad access to his trapline has been blocked due to

current development in the area. Local and regional development also indirectly affect existing traditional land use patterns as a result of increased noise, traffic, dust, and increased access for competing resource use.

3.5 SUMMARY

This report was prepared by Golder Associates Ltd. (Golder). The bulk of the report summarizes the historical and current traditional land uses of the Fort McKay First Nation (FMFN), Athabasca Chipewyan First Nation (ACFN) and the Mikisew Cree First Nation (MCFN) within their asserted traditional territories. Specific emphasis has been placed on the Jackpine Mine Expansion & Pierre River Mine Project development area.

The information in this report is included in the Environmental Impact Assessment (EIA) of the potential effects of the Jackpine Mine Expansion & Pierre River Mine Project on Traditional Land Use (TLU) in the proposed development area.

1 GLOSSARY AND ABBREVIATIONS

1.1 GLOSSARY OF TERMS

Alberta Energy and Utilities Board (EUB)

An independent, quasi-judicial agency of the Government of Alberta, the EUB was created in February 1995 by the amalgamation of the Energy Resources Conservation Board and the Public Utilities Board. The purpose of the EUB is to ensure that the discovery, development, and delivery of Alberta's resources take place in a manner that is fair, responsible and in the public interest.

Alberta Environment (AENV)

Provincial ministry that looks after the following: establishes policies, legislation, plans, guidelines and standards for environmental management and protection; allocates resources through approvals, dispositions and licenses, and enforces those decisions; ensure water infrastructure and equipment are maintained and operated effectively; and prevents, reduces and mitigates floods, droughts, emergency spills and other pollution-related incidents.

Alberta Sustainable Resource Development (ASRD)

Alberta Sustainable Resource Development (ASRD) is one of the Alberta Ministries whose mission is to encourage balanced and responsible use of Alberta's natural resources through the application of leading practices in management, science and stewardship. ASRD works with Albertans across the province to ensure a balance between the economic, environmental and social values of our province. They fight forest fires, manage fish and wildlife, oversee the development of Alberta's forests, and manage the use of public lands.

Aquifer

A body of rock or soil that contains sufficient amounts of saturated permeable material to yield economic quantities of water to wells or springs.

Any water-saturated body of geological material from which enough water can be drawn at a reasonable cost for the purpose required. An aquifer in an arid prairie area required to supply water to a single farm may be adequate if it can supply 1 m^3/d. This would not be considered an aquifer by any industry looking for cooling water in volumes of 10,000 m^3/d. A common usage of the term aquifer is to indicate the water-bearing material in any area from which water is most easily extracted.

Bitumen	A highly viscous, tarry, black hydrocarbon material having an API gravity of about 9 (specific gravity about 1.0). It is a complex mixture of organic compounds. Carbon accounts for 80 to 85% of the elemental composition of bitumen, hydrogen 10%, sulphur 5%, and nitrogen, oxygen and trace elements form the remainder.
Bog	Sphagnum or forest peat materials formed in an ombrotrophic environment due to the slightly elevated nature of the bog, which tends to disassociate it from the nutrient-rich groundwater or surrounding mineral soils. Characterized by a level, raised or sloping peat surface with hollows and hummocks. Mineral-poor, acidic and peat-forming wetlands that receives water only from precipitation.
Boreal Forest	The northern hemisphere, circumpolar, tundra forest type consisting primarily of black spruce and white spruce with balsam fir, birch and aspen.
Buffer Zone	A transition zone between areas managed for different objectives.
Bush Economy	Representing some of the value of a traditional life, considering hunting, trapping, berry collection and other activities.
Conifer	Trees in the division Pinophyta of the plant kingdom. These are cone-bearing trees with no true flower (e.g., white spruce, black spruce, balsam fir, jack pine and tamarack).
Cumulative Environmental Management Association (CEMA)	An association of oil sands industry, other industry, regional community representatives, regulatory agencies and other stakeholders designed to develop systems to manage cumulative effects associated with developments in the Oil Sands Region.
Cutblock	Previously forested area that has been harvested for timber and is presently regenerating at various stages of regrowth.
Deciduous	Tree species that lose their leaves at the end of the growing season.
Development Area	Any area altered to an unnatural state. This represents all land and water areas included within activities associated with the development of oil sands leases.
Disturbance	An event that causes a sudden change from the existing pattern, structure and/or composition in an ecological system or habitat.

Environmental Impact Assessment (EIA)	A review of the effects that a proposed development will have on the local and regional environment.
Environmental Setting	A quantitative level or value from which other data and observations of a comparable nature are referenced. Information accumulated concerning the state of a system, process or activity before the initiation of actions that may result in changes.
Esker	Long, narrow bodies of sand and gravel deposited by a subglacial stream running between ice walls or in an ice tunnel, left behind after melting of the ice of a retreating glacier.
Footprint	The proposed development area that directly affects the soil and vegetation components of the landscape.
Furbearer	Mammals that have traditionally been trapped or hunted for their fur.
Geographic Information System (GIS)	Computer software designed to develop, manage, analyze and display spatially referenced data.
Glaciofluvial (or Glacio-Fluvial)	Sediments or landforms produced by melt waters originating from glaciers or ice sheets. Glaciofluvial deposits commonly contain rounded cobbles arranged in bedded layers.
Kames	Ice contact deposits associated with the concurrent processes of melting ice and flowing meltwater.
Karst	A topography formed over limestone, dolomite or gypsum and characterized by sinkholes, caves and underground drainage.
Kettle	A small hollow or depression formed in glacial deposits when outwash was deposited around a residual block or ice that later melted.
Land Status Automated System (LSAS)	An online government database containing Alberta Surface Public Land and Crown Mineral dispositions and activities. Includes information about land restrictions and reservations.
Local Study Area (LSA)	Defines the spatial extent directly or indirectly affected by the Project.

Movement Corridor	Travel way used by wildlife for daily, seasonal, annual and/or dispersal movements from one area or habitat to another.
Oil Sands Region	The Oil Sands Region includes the Fort McMurray – Athabasca Oil Sands Subregional Integrated Resource Plan (IRP), the Lakeland Subregional IRP and the Cold Lake – Beaver River Subregional IRP.
Old Growth Forest	An ecosystem distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species, composition, and ecosystem function. Old growth forests are those forested areas where the annual growth equals annual losses, or where the mean annual increment of timber volume equals zero. They can be defined as those stands that are self-regenerating (i.e., having a specific structure that is maintained).
Patterned Fen	Peatlands that display a distinctive pattern due to alterations between open wet areas (flarks) and drier shrubby to wooded areas (strings).
Peatland	Areas where there is an accumulation of peat material at least 40 cm thick. These are represented by bog and fen wetlands types.
Point Bars	Floodplain deposits of alluvium found on the inside bank of a meandering stream.
Productive Forest	Forests on lands with a capability rating of equal to or greater than three, and stocked with enough trees to meet the standards of a merchantable forest.
Reclamation	The restoration of disturbed land or wasteland to a state of useful capability. Reclamation is the initiation of the process that leads to a sustainable landscape, including the construction of stable landforms, drainage systems, wetlands, soil reconstruction, addition of nutrients and revegetation. This provides the basis for natural succession to mature ecosystems suitable for a variety of end uses.
Regional Issues Working Group (RIWG)	A group that works to promote the responsible, sustainable development of resources within the Regional Municipality of Wood Buffalo.

Regional Study Area (RSA)	Defines the spatial extent related to the cumulative effects resulting from the project and other regional developments.
Regional Sustainable Development Strategy (RSDS)	A regulatory framework for balancing development of Alberta's oil sands resources with protection of the environment.
Resource User Survey (RUS)	Completed as part of this setting report to obtain information on the public's perception and patterns of resource use.
Riparian Area	A geographic area containing an aquatic ecosystem and adjacent upland areas that directly affects it.
Silviculture	The science and practice of controlling the establishment, composition and growth of the vegetation in forest stands. It includes the control or production of stand structures such as snags and down logs, in addition to live vegetation.
Seasonal Rounds	A schematic that depicts patterns of seasonal activities, using arrows, and circles. The round shows different activities by seasons, with display of common movement to and from Fort McKay for hunting trips and other activities, including wage labour.
Sport Fish	Large fish caught for food or sport (e.g., northern pike, Arctic grayling).
Timber Productivity Rating (TPR)	The potential timber productivity of a stand based on height and age of dominant and co-dominant trees of the leading species.
Traditional Land Use (TLU)	Activities involving the harvest of traditional resources such as hunting and trapping, fishing, gathering medicinal plants and travelling to engage in these activities. Land use maps document locations where the activities occur or are occurring.
Traditional Environmental (or Ecological) Knowledge (TEK)	Knowledge and understanding of traditional resource and land use, harvesting and special places.
Ungulate	Belonging to the former order Ungulata, now divided into the orders Perissodactyla and Artiodactyla, and composed of the hoofed mammals such as horses, cattle, deer, swine and elephants.
Upland Areas	Areas that have typical ground slopes of 1 to 3% and are better-drained.

Waterfowl Staging Area	Waterbodies used by waterfowl to gather, rest and feed before or during migration.
Wetlands	Wetlands are land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands," and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat.

1.2 LIST OF ABBREVIATIONS

~	Approximately
%	Percent
<	Less than
AAC	Annual Allowable Cut
ACD	Alberta Community Development (Alberta Tourism , Parks, Recreation and Culture)
ACFN	Athabasca Chipewyan First Nation
AENV	Alberta Environment
AEP	Alberta Environmental Protection
ALI	Alberta land inventory
Al-Pac	Alberta-Pacific Forest Industries Inc.
ARC	Athabasca River corridor
ASRD	Alberta Sustainable Resource Development
ATPRC	Alberta Tourism, Parks, Recreation and Culture
ATV	All-Terrain Vehicle
bbl/d	Barrels per day
CEMA	Cumulative Environmental Management Association
CHRS	Canadian Heritage Rivers System
CNT	Consultative Notations
e.g.	For example
EIA	Environmental Impact Assessment
ESA	Environmentally Significant Area
ESR	Environmental Setting Report
et al.	Group of authors
EUB	Alberta Energy and Utilities Board
FMA	Forest Management Agreement
FMA Ltd.	Fedirchuk McCullough Associates Ltd.
FMFN	Fort McKay First Nation

FMMFN	Fort McMurray First Nation
FMU	Forest Management Unit
FMVB	Fort McMurray Visitors Bureau
Fort McKay IRC	Fort McKay Industry Relations Corporation
GIS	Geographic Information System
Golder	Golder Associates Ltd.
ha	Hectare
Hwy	Highway
i.e.	That is
IRP	Integrated Resource Plan
JEMA	Jackpine Expansion Mining Area
km	Kilometre
km2	Square kilometre
km/km2	Kilometre per square kilometre
kt	Kilotonnes
LSA	Local Study Area
LSAS	Land Status Automated System
LSD	Legal Sub-Division
m	Metre
m2	Square metres
m3	Cubic metres
M	Mega (SI prefix)
MCFN	Mikisew Cree First Nation
MOSA	Mineable Oil Sands Area
MSL	Mineral Surface Lease
Mt	Million tonnes
MVQ	Muskeg Valley Quarry, Birch Mountain Resources Ltd.
N/A and n/a	Not applicable
Northland	Northland Forest Products Ltd.

NTS	National Topography Survey
OSL	Oil Sands Lease
pers. comm.	Personal Communication
PRMA	Pierre River Mining Area
RFMA	Registered Fur Management Area
Rge, Rg or R	Range
RIWG	Regional Issues Working Group
RMA	Resource Management Area
RMWB	Regional Municipality of Wood Buffalo
ROW	Rights-of-way
RSA	Regional Study Area
RSDS	Regional Sustainable Development Strategy for the Athabasca Oil Sands
RUS	Resource User Survey
SE	Standard Error
SEWG	Sustainable Ecosystems Working Group of CEMA
Shell	Shell Canada Limited
SME	Surface Mineral Exploration
SML	Surface Mineral Lease
t	Tonne
TEK	Traditional Ecological Knowledge
TLU	Traditional Land Use
TLUOS	Traditional Land Use and Occupancy Study
TPR	Timber Productivity Rating
W4M	West of the Fourth Meridian
WMU	Wildlife Management Unit
WRO	Wild Rice Operators
yr	Year

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