

3 ENVIRONMENTAL SETTING

3.1 Land Use Planning Context

The Expansion Project is located on Crown lands, within the Regional Municipality of Wood Buffalo (RMWB), in the publicly administered area of the province known as the Green Area. There is no integrated resource plan (IRP) for the LSA as it is located southwest of the boundary of the integrated resource plan for the Fort McMurray-Athabasca Oil Sands Subregion (ASRD 2002). The northeast portion of the RSA is located in the Stony Birch and Athabasca-Clearwater resource management areas of the IRP.

The principles of integrated resource planning are applicable to areas of multiple resource development whether an IRP is in place or not as is evidenced by the Government of Alberta's current development of the Lower Athabasca Regional Plan under the Land Use Framework (Government of Alberta 2009, Internet site). The Land Use Framework "...sets out an approach to manage public and private lands and natural resources to achieve Alberta's long-term economic, environmental and social goals..." (Government of Alberta 2008). Until that process is complete, the existing IRP will remain in effect. The principles of integrated resource planning are currently being practiced throughout the RSA and forest harvesting, aggregate development, and access are being harmonized. The Expansion Project also falls under the Regional Sustainable Development Strategy (RSDS) developed by Alberta Environment (AENV 1999).

The Expansion Project is located on lands administered through Alberta Sustainable Resource Development (ASRD) and governed by the *Public Lands Act*. ASRD administers surface and subsurface dispositions, forest and wildlife conservation, and hunting and fishing management. Development of subsurface minerals is governed by Alberta Energy, and administered through the Alberta Energy Resources Conservation Board (ERCB).

Together, the legislation, guidelines and planning documents of these and other government bodies provide the land and resource use planning framework for the Expansion Project. Some of the other government departments involved in reviewing development in the RSA include Alberta Tourism, Parks and Recreation (ATPR), Alberta Culture and Community Spirit (ACCS) and the Alberta Ministry of Transportation.

Substantial aspen and conifer harvesting for pulp and softwood production occurs throughout the Central Mixedwood and Lower Boreal Highlands natural subregions in which the Expansion Project is located. Intensive petroleum exploration and development occurs throughout the area, ranging from tar sands extraction in the northeast to conventional oil and gas production in the central and northwest portions. Agricultural uses are limited to hay crops and tame or native pasture domestic livestock grazing. Hunting, fishing and trapping provide subsistence and income to some residents, and commercial hunting and fishing ventures operate throughout the Central Mixedwood Natural Subregion. Wood Buffalo National Park occupies a substantial part of the northeast portion.

3.2 Ecological Context

The Expansion Project is located within the Lower Boreal Highlands and Central Mixedwood natural subregions of the Boreal Forest Natural Region of Alberta (Volume 2, Section 12, Figure 12-3).

The greater part of the Expansion Project is located within the Central Mixedwood Subregion, which is characterized by a mosaic of aspen-dominated deciduous stands, aspen-white spruce forests, white spruce and jack pine stands on upland terrain. Wet, poorly drained fens and bogs overlie almost half the area (NRC 2006). Climate in the subregion is sub-humid, continental with short, cool summers and long cold winters. Landforms in the subregion are characterized by gently undulating plains with minor inclusions of hummocky uplands.

Less than one third of the Expansion Project is located within the Lower Boreal Highlands Subregion, which is characterized by aspen and white spruce forests on uplands and white birch forests in seepage areas. Lodgepole pine–jack pine hybrids are also common in pure and mixed stands with black spruce and deciduous species (NRC 2006). Wetlands in this subregion include nutrient-poor black spruce fens with Labrador tea, peat mosses and feather mosses forming the ground cover. Climate in the subregion is continental with short, cool summers and long cold winters but is moister and cooler than the nearby Central Mixedwood Subregion. Landforms in the subregion are characterized by gently to strongly sloping lower elevations of Northern Alberta Uplands. The area also includes some hummocky and undulating uplands areas.

Fire plays a important role in the current composition and pattern of vegetation communities in the Expansion Project area. Around 6953 ha (60% of the LSA) has been influenced by fire in the last 15 years – once in 1995 and again in 2009. As a result, over 41% (4835 ha) of mapped units in the LSA fall within the tall shrub structural height class (2.5 m to 5.0 m).

3.3 Socio-Economic Context

The population in the RSA consists of the following:

- First Nations people on reserve
- people living in rural hamlets, many of whom are Aboriginal, including Métis
- people living in Fort McMurray, including First Nation and Métis
- non-permanent resident workers in camps on or near oil sands facilities

Oil sands development in the Regional Municipality of Wood Buffalo (RMWB) has strongly influenced population growth in the region positively. The average annual growth rate of the population of Fort McMurray was 6.5% per year between 1996 and 2008 and 7.4% per year between 2002 and 2008. Rural populations have grown as well, although at a lower rate. The population of the outlying hamlets grew from 2700 in 1996 to 4690 in 2008 or on average 4.7% per year. Anzac, Fort McKay and Sapræe Creek were the fastest growing rural hamlets. On-reserve populations have been relatively steady over this period.

The non-permanent resident workforce represents the population group that has experienced the biggest increase. The number of mobile workers in the RSA grew from essentially zero in 1996 to 28 000 in 2008. The estimated number in the RSA was 22 100 in early 2009. The vast majority of mobile workers live in industry camp accommodations, with a small percentage staying in hotels, motels and campgrounds in the RSA.

The RMWB provides the full range of municipal services common to urban areas within the urban services area. Service levels in the rural communities vary.

Population increases in the RMWB have led to demand for municipal infrastructure and services.

The RMWB has responded to the demand for additional services and infrastructure. For example, the RMWB's capital budget increased from \$310 million in 2008 to \$537 million in 2009 (a 73% increase) and the operating budget increased from \$290 million to \$518 million (a 79% increase). (RMWB 2007a,b, 2008b,c). Both budgets are updated periodically during the year.

Recognizing the growth pressures experienced by the RMWB, the Government of Alberta has provided funding for a number of projects within the past two years.

3.4 Other Projects and Activities

This section describes the other projects, activities and actions that have occurred and that currently exist in the region. It also discusses reasonably-foreseeable future projects, activities and actions.

Table 3-1 provides a tabular summary of these projects, activities and actions. Figure 1-4 (EIA Volume 2, Section 1, Introduction and Overall Conclusions) shows their location. The table is provided to the discipline leads by the project PM team, following consultation with the team.

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment

	Base Case	Application Case	Planned Development Case
	Existing and Approved Developments	Existing and Approved Developments and JACOS Hangingstone Expansion Project	Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
EXISTING and APPROVED	Alberta-Pacific Forest Industries Inc. (Al-Pac): Kraft Pulp Mill	Alberta-Pacific Forest Industries Inc. (Al-Pac): Kraft Pulp Mill	Alberta-Pacific Forest Industries Inc. (Al-Pac): Kraft Pulp Mill
	Canadian Natural Resources Limited (CNRL) : Burnt Lake, Horizon Mine (Phases 1 to 3), Primrose East, Primrose North, Primrose South, Wolf Lake Project	Canadian Natural Resources Limited (CNRL) : Burnt Lake, Horizon Mine (Phases 1 to 3), Primrose East, Primrose North, Primrose South, Wolf Lake Project	Canadian Natural Resources Limited (CNRL) : Burnt Lake, Horizon Mine (Phases 1 to 3), Primrose East, Primrose North, Primrose South, Wolf Lake Project
	Connacher Oil and Gas Limited: Great Divide Oil Sands Project (Pod 1), Algar (Pod 2)	Connacher Oil and Gas Limited: Great Divide Oil Sands Project (Pod 1), Algar (Pod 2)	Connacher Oil and Gas Limited: Great Divide Oil Sands Project (Pod 1), Algar (Pod 2)
	ConocoPhillips Canada: Surmont Phase 1 and 2	ConocoPhillips Canada: Surmont Phase 1 and 2	ConocoPhillips Canada: Surmont Phase 1 and 2
	Devon ARL Limited (Devon): Jackfish Phases 1 and 2	Devon ARL Limited (Devon): Jackfish Phases 1 and 2	Devon ARL Limited (Devon): Jackfish Phases 1 and 2
	EnCana Corp.: Christina Lake Thermal Project Phases 1A-1D, Foster Creek Phases 1A-1E	EnCana Corp.: Christina Lake Thermal Project Phases 1A-1D, Foster Creek Phases 1A-1E	EnCana Corp.: Christina Lake Thermal Project Phases 1A-1D, Foster Creek Phases 1A-1E
	Hammerstone Corp. (Birch Mountain Resources): Muskeg Valley Quarry	Hammerstone Corp. (Birch Mountain Resources): Muskeg Valley Quarry	Hammerstone Corp. (Birch Mountain Resources): Muskeg Valley Quarry
	Husky Energy Inc.: Caribou Lake Demonstration Project, Sunrise (Phases 1 to 4), Tucker Thermal Project	Husky Energy Inc.: Caribou Lake Demonstration Project, Sunrise (Phases 1 to 4), Tucker Thermal Project	Husky Energy Inc.: Caribou Lake Demonstration Project, Sunrise (Phases 1 to 4), Tucker Thermal Project

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment (cont'd)

	Base Case	Application Case	Planned Development Case
	Existing and Approved Developments	Existing and Approved Developments and JACOS Hangingstone Expansion Project	Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
EXISTING and APPROVED (CONT'D)	Imperial Oil Resources Ventures Limited: Kearl Oil Sands Project (Phases 1-3), Cold Lake In-Situ Project Phases 1-10 (Leming, Maskwa, Mahikan), Phases 11-13 (Mahkeses), Phases 14-16 (Nabiye, Mahikan North)	Imperial Oil Resources Ventures Limited: Kearl Oil Sands Project (Phases 1-3), Cold Lake In-Situ Project Phases 1-10 (Leming, Maskwa, Mahikan), Phases 11-13 (Mahkeses), Phases 14-16 (Nabiye, Mahikan North)	Imperial Oil Resources Ventures Limited: Kearl Oil Sands Project (Phases 1-3), Cold Lake In-Situ Project Phases 1-10 (Leming, Maskwa, Mahikan), Phases 11-13 (Mahkeses), Phases 14-16 (Nabiye, Mahikan North)
	Japan Canada Oil Sands Limited: Hangingstone Demonstration Project	Japan Canada Oil Sands Limited: Hangingstone Demonstration Project	Japan Canada Oil Sands Limited: Hangingstone Demonstration Project
	Laricina Energy Inc.: Germain Pilot, Saleski Pilot	Laricina Energy Inc.: Germain Pilot, Saleski Pilot	Laricina Energy Inc.: Germain Pilot, Saleski Pilot
	MEG Energy Corp.: Christina Lake Regional Project: Pilot, Phase 2A Expansion	MEG Energy Corp.: Christina Lake Regional Project: Pilot, Phase 2A Expansion	MEG Energy Corp.: Christina Lake Regional Project: Pilot, Phase 2A Expansion
	Northland Forest Products Ltd. Sawmill	Northland Forest Products Ltd. Sawmill	Northland Forest Products Ltd. Sawmill
	Opti Canada Inc./Nexen Canada Inc. (OPTI/NEXEN): Long Lake Pilot and Commercial Phase 1, Long Lake South Commercial Project (Phases 1 and 2)	Opti Canada Inc./Nexen Canada Inc. (OPTI/NEXEN): Long Lake Pilot and Commercial Project, Long Lake South Commercial Project (Phases 1 and 2)	Opti Canada Inc./Nexen Canada Inc. (OPTI/NEXEN): Long Lake Pilot and Commercial Project, Long Lake South Commercial Project (Phases 1 and 2)
	Petrobank Energy and Resources Ltd. (Petrobank): Whitesands Phase 1 Pilot and Phase 2 Pilot	Petrobank Energy and Resources Ltd. (Petrobank): Whitesands Phase 1 Pilot and Phase 2 Pilot	Petrobank Energy and Resources Ltd. (Petrobank): Whitesands Phase 1 Pilot and Phase 2 Pilot

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment (cont'd)

	Base Case	Application Case	Planned Development Case
	Existing and Approved Developments	Existing and Approved Developments and JACOS Hangingstone Expansion Project	Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
EXISTING & APPROVED (CONT'D)	Petro-Canada Limited: MacKay River In-Situ Phases 1 and 2, Meadow Creek Phases 1 and 2, Dover In-Situ and Vapex Pilot	Petro-Canada Limited: MacKay River In-Situ Phases 1 and 2, Meadow Creek Phases 1 and 2, Dover In-Situ and Vapex Pilot	Petro-Canada Limited: MacKay River In-Situ Phases 1 and 2, Meadow Creek Phases 1 and 2, Dover In-Situ and Vapex Pilot
	Shell Canada (AOSP): Muskeg River Mine, Muskeg River Mine Expansion, Muskeg River Mine Compensation Lake, Jackpine Mine Phase IA and IB, Jackpine Mine Phase I Compensation Lake, Blackrock Orion (Hilda Lake) Phases 1 and 2	Shell Canada (AOSP): Muskeg River Mine, Muskeg River Mine Expansion, Muskeg River Mine Compensation Lake, Jackpine Mine Phase IA and IB, Jackpine Mine Phase I Compensation Lake, Blackrock Orion (Hilda Lake) Phases 1 and 2	Shell Canada (AOSP): Muskeg River Mine, Muskeg River Mine Expansion, Muskeg River Mine Compensation Lake, Jackpine Mine Phase IA and IB, Jackpine Mine Phase I Compensation Lake, Blackrock Orion (Hilda Lake) Phases 1 and 2
	Suncor Energy Inc.: Millennium Mine and Steepbank Mine and South Tailings Pond (STP), North Steepbank Extension Mine, Base Upgrader, Coker and Vacuum Unit, Voyageur Upgrader, Firebag SAGD Phases 1 and 2 and Cogeneration/Expansion	Suncor Energy Inc.: Millennium Mine and Steepbank Mine and South Tailings Pond (STP), North Steepbank Extension Mine, Base Upgrader, Coker and Vacuum Unit, Voyageur Upgrader, Firebag SAGD Phases 1 and 2 and Cogeneration/Expansion	Suncor Energy Inc.: Millennium Mine and Steepbank Mine and South Tailings Pond (STP), North Steepbank Extension Mine, Base Upgrader, Coker and Vacuum Unit, Voyageur Upgrader, Firebag SAGD Phases 1 and 2 and Cogeneration/Expansion
	Syncrude Canada Limited: Mildred Lake Mining and Upgrading, Aurora North Mine, Aurora South Mine	Syncrude Canada Limited: Mildred Lake Mining and Upgrading, Aurora North Mine, Aurora South Mine	Syncrude Canada Limited: Mildred Lake Mining and Upgrading, Aurora North Mine, Aurora South Mine

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment (cont'd)

	Base Case	Application Case	Planned Development Case
	Existing and Approved Developments	Existing and Approved Developments and JACOS Hangingstone Expansion Project	Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
EXISTING and APPROVED (CONT'D)	Total E&P Canada: Joslyn Creek SAGD Phase I and II Commercial Project	Total E&P Canada: Joslyn Creek SAGD Phase I and II Commercial Project	Total E&P Canada: Joslyn Creek SAGD Phase I and II Commercial Project
	Commercial Camps	Commercial Camps	Commercial Camps
	Williams Liquids Extraction and Storage Facilities	Williams Liquids Extraction and Storage Facilities	Williams Liquids Extraction and Storage Facilities
	Gas Plants and Compressors	Gas Plants and Compressors	Gas Plants and Compressors
	East Athabasca Aerodrome	East Athabasca Aerodrome	East Athabasca Aerodrome
	Pipelines and Roadways	Pipelines and Roadways	Pipelines and Roadways
	Municipalities and Communities	Municipalities and Communities	Municipalities and Communities
	Hunting and Trapping	Hunting and Trapping	Hunting and Trapping
	Recreational Activities	Recreational Activities	Recreational Activities
PLANNED		Japan Canada Oil Sands Limited: Hangingstone Expansion Project	Japan Canada Oil Sands Limited: Hangingstone Expansion Project
			Alberta Oilsands Inc.: Clearwater Pilot*, Clearwater East*, Clearwater West*
			Athabasca Oil Sands Corp.: Dover Pilot, MacKay Pilot
			BlackPearl Resources Inc. (Serrano): Blackrod Pilot Project

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment (cont'd)

	Base Case Existing and Approved Developments	Application Case Existing and Approved Developments and JACOS Hangingstone Expansion Project	Planned Development Case Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
PLANNED (CONT'D)			<p>Canadian Natural Resources Limited (CNRL): Birch Mountain In-Situ Phase 1*, Gregoire Lake In-Situ Phase 1*, Horizon Lease Development Area (Phases 4 to 5)*, Grouse In-Situ Phase 1*, Leismer In-Situ Phase 1*, Kirby In-Situ, Wolf Lake SAGD</p> <p>Connacher Oil and Gas Limited: Great Divide Expansion</p> <p>E-T Energy Ltd.: Poplar Creek Pilot</p> <p>EnCana Corp.: Borealis In-Situ (Phase 1), Borealis Phases 2 and 3*, Christina Lake Expansion Phases 1E-1G and Unnamed Expansion*, Foster Creek Phase 1F</p> <p>Enerplus: Kirby (Phases 1 and 2)*</p> <p>Hammerstone Corp. (Birch Mountain Resources): Hammerstone Project</p> <p>Husky Energy Inc.: McMullen Pilot</p> <p>Ivanhoe Energy Inc.: Tamarack Phase 1*</p> <p>Korea National Oil Corp. (KNOC): BlackGold Project Phase 1, BlackGold Project Phase 2*</p>

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment (cont'd)

	Base Case Existing and Approved Developments	Application Case Existing and Approved Developments and JACOS Hangingstone Expansion Project	Planned Development Case Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
PLANNED (CONT'D)			Koch Exploration Canada: Gemini (Phases 1 and 2)*
			Laricina Energy Inc.: Germain Commercial Phase 1*, Saleski Commercial Phase 1*
			MEG Energy Corp.: Christina Lake Regional Project Expansion Phases 2B, 3A and 3B
			Opti Canada Inc./Nexen Canada Inc. (OPTI/NEXEN): Long Lake Project (Phases 2 to 4)*
			Osum Oil Sands Corp.: Taiga In-situ Oil Sands Project
			Parson Creek Aggregates: Parson Creek Resources Project
			Patch International Inc.: Ells River Phase 1*
			Pengrowth Energy Trust: Lindberg Pilot Project
			Petrobank Energy and Resources Ltd. (Petrobank): May River Phase 1, May River Future Development Phases
			Petro-Canada: Lewis SAGD Project (Phases 1 and 2)

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment (cont'd)

	Base Case Existing and Approved Developments	Application Case Existing and Approved Developments and JACOS Hangingstone Expansion Project	Planned Development Case Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
PLANNED (CONT'D)			<p>Shell Canada (AOSP): Jackpine Mine Expansion (Phase 2), Pierre River Mine Project, Pierre River Water Storage</p> <p>Southern Pacific Resource Corp.: McKay Phase 1</p> <p>Statoil Canada Ltd. (NASOC): Kai Kos Dehseh SAGD Project, Leismer Development and Expansion Area, Corner Development and Expansion Area, Thornbury Development and Expansion Area, Hangingstone Development Area</p> <p>Suncor Energy Inc.: Voyageur South Mine, Firebag Future Development (Phases 3 to 6)</p> <p>Sunshine Oilsands Harper CSS Pilot Project, Thickwood (Phases 1 to 3)*, West Ells (Phases 1 to 3)*</p> <p>Syncrude Canada Ltd.: Mildred Lake and Aurora Expansion</p> <p>Total E&P Canada: Joslyn Creek SAGD Phase 3, Joslyn North Mine, Joslyn South Mine*, Northern Lights Project**</p>

Table 3-1 Project and Action Inclusion List for the Cumulative Environmental Effects Assessment (cont'd)

	Base Case Existing and Approved Developments	Application Case Existing and Approved Developments and JACOS Hangingstone Expansion Project	Planned Development Case Existing and Approved Developments and JACOS Hangingstone Expansion Project and Planned Developments
PLANNED (CONT'D)			UTS/Teck Cominco Joint Venture: Equinox Oil Sands Mine, Frontier Oil Sands Mine, Frontier Future Development Area*
			Value Creation Inc.: Terre de Grace Pilot and Phases 1* and 2*
			Planned Major Pipelines and Roadways
			Municipal Growth
<p>NOTES:</p> <p>*: Indicates projects which have been announced by their respective proponents but for which no formal public disclosure document has been issued.</p> <p>**: The Northern Lights Project has been withdrawn from the regulatory approval process at the request of Total.</p>			

3.5 References

3.5.1 Literature Cited

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3.5.2 Internet Sites

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