

Conserving Canada's Natural Capital: The Boreal Forest

Muskwa-Kechika Case Study

(Northeastern British Columbia and adjacent areas
of Yukon and the Northwest Territories)

Prepared for:

The National Round Table on the Environment and the Economy
Ottawa, Ontario

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This case study has been commissioned as background research for the NRTEE's Conserving Canada's Natural Capital: The Boreal Forest program. The views expressed in the case study are those of the authors, and do not necessarily represent those of the National Round Table, its members, or the members of the program's Task Force.

1. INTRODUCTION

1.1 THE BOREAL FOREST PROGRAM

The National Round Table on the Environment and the Economy (NRTEE), through its Conserving Canada's Natural Capital: The Boreal Forest program, is examining ways to balance conservation with economic activity in Canada's boreal forest. It is focusing in particular on the use of regulatory and fiscal policy to advance conservation on lands allocated for resource development in the boreal forest. *Regulatory* policy is a key driver in determining how resource development is allocated and managed, and it has clear impacts on conservation. On the other hand, *fiscal* policy is one of the most powerful means that governments have of influencing outcomes in the economy, but it is not typically employed in a consistent and strategic manner to achieve sustainable development objectives. The program is guided by a task force consisting of representatives from extractive resource industry sectors (company and association representatives), non-governmental organizations (NGOs), academe and national Aboriginal organizations.

The objectives of the Boreal Forest program are to:

- develop specific short- to medium-term recommendations in the area of regulatory and fiscal policy that can alleviate barriers to conservation;
- identify best practices and national-level incentives and instruments; and
- describe the current challenge, the role of “major players” and the range of policies as they affect conservation in Canada's boreal forest.

The program will result in two products: a *State of the Debate* report and a set of three case studies. The *State of the Debate* report will outline the current “state of play” in Canada's boreal forest, describe best practices and assess the potential use of regulatory and fiscal policy in furthering conservation and integrating it with economic activity in the boreal forest. That report will assess the debate surrounding conservation in the boreal forest and summarize the extent of consensus and reasons for disagreement.

The program recently completed its first phase: the identification of general issues and three regions suitable for more in-depth examination of the issues through case studies. The second phase consists of analysis of the case study regions, while the third phase will entail a detailed investigation of key issues and themes raised during Phase 2, with the aim of developing specific recommendations for approval by the program's task force.

1.2 CASE STUDIES

A major part of the final *State of the Debate* report will be informed by the findings of the case studies. The objectives of the case studies are to:

1. Outline key regulatory and fiscal barriers to conservation in the case study regions, focusing on those that are national in scope;
2. Identify pragmatic and nationally applicable areas of recommendation on how regulatory and fiscal policy can promote conservation in the boreal forest in a way that promotes the general program goals and informs policy development in this area; and
3. Identify (where applicable) examples of current best practices and national-level incentives and instruments that seek to balance conservation with economic development.

Three case study regions—the Muskwa-Kechika Management Area in northeastern British Columbia (plus adjacent areas of Yukon and the Northwest Territories), the AlPac Forest Management Area in northeastern Alberta and the Abitibi region on the Quebec–Ontario border—were chosen by the program task force using the following criteria:

- pressure of multiple use and conflicts (many resource sectors involved);
- presence of multiple jurisdictions;
- presence of innovative approaches (examples of best practices);
- incorporation of aspen parklands, taiga and boreal forest;
- potential for generating forward momentum; and
- balanced geographic representation.

This report presents the Muskwa-Kechika case study prepared by R. McManus Consulting Ltd. and Salmo Consulting Inc.

1.3 MUSKWA-KECHIKA CASE STUDY

The Muskwa-Kechika case study region (pronounced musk-quah ke-chee-kah) was defined to include the boreal forest of northeastern British Columbia and adjacent areas of southeastern Yukon and southwestern Northwest Territories (Figure 1). This region includes the 6.4-million-ha Muskwa-Kechika Management Area (M-KMA), located in northeastern British Columbia west of the communities of Fort St. John and Fort Nelson. The M-KMA is unique because it represents the first legislated example of conservation biology in action and provides a new model for conservation planning and design. As described more fully in Section 2, the management plan for the M-KMA explicitly balances resource management with conservation.

Figure 1. The Muskwa-Kechika case study region.

The NRTEE specified that the M-KMA case study objectives defined above were to be achieved as follows:

- review relevant legislation, policies and information, and interview knowledgeable regional and external stakeholders to develop a draft plain-language case study summarizing real and perceived conservation barriers, best practices and incentives;
- participate in a multi-stakeholder workshop to critique and add to the Muskwa-Kechika case study analysis. Workshop participants (Appendix 3) would also be asked to name key issues that should be carried forward and examined in more detail in the third phase of the program;
- revise the draft case study to incorporate input provided by participants in the multi-stakeholder workshop; and
- participate in the NRTEE's boreal forest task force meeting to be held in Ottawa on June 29, 2004, to present and verify case study findings.

1.3.1 Methods

1.3.1.1 Literature Review

Primary research using existing literature, land use plans, resource development policies, etc., was undertaken to identify relevant legislation, regulatory frameworks and policies governing the M-KMA and surrounding area. The initial research was completed through electronic and physical means to acquire relevant land use plans, legislation, regulations and policies.

1.3.1.2 Interviews

The literature review was supplemented by structured interviews with land and resource managers in Victoria and Fort St. John to identify materials that might not be available through desktop research efforts. These managers represented the British Columbia Oil and Gas Commission (OGC), British Columbia Ministry of Energy and Mines (MEM), British Columbia Ministry of Forests (MOF), British Columbia Ministry of Sustainable Resource Management (MSRM) and British Columbia Ministry of Water, Land and Air Protection (MWLAP). Representatives of the Yukon Ministry of the Environment (YMOE) and Energy, Mines and Resources were also contacted.

In addition, Aboriginal and stakeholder representatives were interviewed to determine the perspectives of different resource users regarding decision-making processes and structures established to address conservation and resource development objectives (Appendix 2).

A structured interview form was developed (Appendix 1) based on (1) the consultants' knowledge of the area, the issues, and policy and legislated decision-making processes and (2) on information gathered in the primary research for the case study. The questions were designed to elicit information the following areas:

- the current legislative and policy framework of the M-KMA;
- regulatory and fiscal policies that have been used to remove barriers to conservation in the M-KMA, northeastern British Columbia and adjacent areas of Yukon;
- the effectiveness of these policies in removing barriers to conservation in the M-KMA, northeastern British Columbia and adjacent areas of Yukon; and
- M-KMA governance issues and how they relate to key conservation issues, themes, goals and objectives.

1.3.1.3 Multi-stakeholder Workshop

The literature review and interviews were supplemented with feedback from a multi-stakeholder workshop hosted by the NRTEE in Fort St. John on May 6, 2004.

Approximately 60 people (Appendix 3) attended a full day of presentations and round table discussion of the preliminary analysis completed by the consultants. Participants included representatives from Aboriginal groups; academe; local communities; federal, territorial and provincial governments; various industry sectors; and non-governmental organizations.

2. LEGISLATION AND POLICY FRAMEWORK

The Muskwa-Kechika case study presented here describes an unprecedented example of conservation planning in a working boreal forest landscape. Many consider the M-KMA to be a model for the principles of conservation biology and consensus-based planning, and a number of its elements represent innovative or best practices. To best identify elements that are transferable to the national arena, however, it is important to place this initiative in both regional and historical context.

The legislative and policy framework for three nested analysis areas is provided below to enable a comparison of conservation management regimes:

1. The **Muskwa-Kechika case study region**—includes the boreal forest of northeastern British Columbia and adjacent areas of southeastern Yukon and southwestern **Northwest Territories (Figure 1)**.
2. **Northeastern British Columbia**—includes the area covered by the Fort Nelson, Fort St. John, Dawson Creek and Mackenzie land and resource management plans (Figure 2).
3. The **Muskwa-Kechika Management Area**—includes the special management area defined by the Fort Nelson, Fort St. John and Mackenzie land and resource management plans (Figure 2).

Figure 2. Analysis areas for the Muskwa-Kechika case study.

2.1 CASE STUDY REGION

Canada's boreal forest covers one-third of the country's total land area. The northern boreal forest in the Muskwa-Kechika region includes rugged foothills and mountains as well as extensive taiga plains. Mixedwood forests in the foothills and mountains are interspersed with grassland, meadows and alpine tundra. Common animals include woodland caribou, moose, Dall's and Stone's sheep, mountain goat, grizzly bear, marten, marmot, ptarmigan and migratory songbirds. The taiga and boreal plains support a mosaic of open, slow-growing conifer forests, muskeg wetlands and upland mixedwood forests. Characteristic wildlife in the taiga and boreal plains ecoregions include woodland caribou, moose, black bear, marten, lynx, birds of prey, raven, and migratory songbirds and waterfowl. Unlike many other areas of the boreal forest, large areas of the Muskwa-Kechika case study region are still undeveloped.

2.1.1 Major Players

Major players in the Muskwa-Kechika case study region include regional, provincial, territorial and federal governments; Aboriginal groups; community and rural residents;

resource extraction industries; trappers and guide-outfitters; and conservation organizations.

Residents rely on the natural resources of the region for their livelihood. Residents also place significant value on the continued availability of large wilderness areas (ARA et al. 1996a,b). The main regional economic sectors are government and public services, oil and gas, forestry, and tourism and recreation. Agriculture, hydroelectric generation and mining are locally important. The population of the region is increasing, as is demand for renewable and non-renewable resources.

2.1.1.1 Government Sector

Land and resource management responsibilities in the case study region are divided among five levels of government: municipal, regional, provincial, territorial and federal. Historically, the government and public services sector has been the largest employer in the region.

Municipal governments are responsible for management within established community boundaries. Five regional government bodies overlap the case study region in northeastern British Columbia: Northern Rockies Regional District, Peace River Regional District, Stikine Regional District, Bulkley-Nechako Regional District and Fraser-Fort George Regional District. Working cooperatively with member municipalities, these regional governments provide a wide range of services including management of development, information, noxious weed control, regional and community recreation, fire protection, regional solid waste management, rural water supplies, sewage collection and disposal, parks, building inspection, television re-broadcasting and feasibility studies. Municipal and regional governments have limited impact on boreal forest conservation in the Muskwa-Kechika case study region, in contrast to some other areas of Canada. Provincial government responsibilities in northeastern British Columbia are discussed in detail in Section 2.2.

2.1.1.2 Aboriginal Groups

The ancestors of today's Aboriginal peoples have lived in the boreal forest for thousands of years. Several Aboriginal groups occur in the case study region: the Deh Cho First Nation in the southwestern Northwest Territories, Dene Tha' in northwestern Alberta, Treaty 8 Tribal Council in northeastern British Columbia, Kaska Dena Council in southeastern Yukon and north-central British Columbia, and the Carrier Sekani Tribal Council, Gitksan Nation and Wet'suwet'en Nation in north-central British Columbia. These groups include people of several cultures, and there is overlap of traditional use areas.

Many Aboriginal peoples in the region still rely on fish and wildlife harvesting for much of their food and on furbearers for much of their income. In most communities, the local economy is a mix of cash income and traditional resource use (Dickie 2003).

Aboriginal and treaty rights are complex and continue to evolve. In general, Aboriginal rights are more entrenched in Yukon and the Northwest Territories than in British Columbia. In both territories, Aboriginal groups have the right to protect large areas of land for conservation and cultural purposes (through the Deh Cho Interim Measures Agreement and Yukon Umbrella Final Agreement). Both resolved and unresolved land claims occur in northeastern British Columbia (Dickie 2003).

2.1.1.3 Petroleum Sector

The oil and gas sector is now the dominant resource development sector in the Muskwa-Kechika case study region, with most activity centred in northeastern British Columbia. Hydrocarbon development is estimated to account for more than 80% of the gross domestic product of northeastern British Columbia (Canadian Energy Research Institute unpub. data). This sector is also a major contributor of resource revenues to the provincial government in the form of land sales and royalties on oil and gas production.

Approximately 100 companies pay royalties; the 20 largest gas producers (based on data from Q1, 2003) account for approximately 85% of natural production in northeastern British Columbia (Table 1).

Yukon is largely unexplored and undeveloped compared with the rest of Canada. Only 71 wells have been drilled in Yukon, mostly in the Liard and Peel plateaus and the Eagle Plains basin. The only producing natural gas field is Kotaneelee, located immediately north of the British Columbia border in the Liard Plateau district of southeastern Yukon.

Table 1. Major oil and gas players in northeastern British Columbia.

Company Name	Gas Production (Sales Volume 10 ³ m ³ , 1st quarter 2003)	Proportion	Oil Production (Sales Volume m ³ , 1st quarter 2003)
Canadian Natural Resources Ltd.	974,362.50	15.29%	59,022.7
EnCana Oil and Gas Co. Ltd.	674,546.50	10.58%	308.6
Petro-Canada	434,630.90	6.82%	2,903.1
Burlington Resources (formerly Canadian Hunter Exploration Ltd.)	422,913.60	6.64%	988.0
Devon Canada Corp.	419,465.60	6.58%	33,443.3
Talisman Energy Inc.	313,653.40	4.92%	9,907.9
ExxonMobil Canada Ltd.	255,066.50	4.00%	NA
Penn West Petroleum Ltd.	216,085.90	3.39%	1,258.0
Burlington Resources Canada	209,319.90	3.28%	873.4
Dominion Exploration Canada Ltd.	183,568.50	2.88%	13,226.8
Apache Canada Ltd. (acquired Fletcher 2001)	175,569.10	2.75%	2,865.9
Husky Oil Operations Ltd.	156,324.10	2.45%	2,793.6
Murphy Oil Company Ltd.	149,216.50	2.34%	2,459.2
Anadarko Canada Energy Ltd.	131,346.60	2.06%	10,822.0
Murphy Canada Exploration Co.	127,410.80	2.00%	NA
Imperial Oil Resources (affiliate of ExxonMobil)	117,341.30	1.84%	6,829.5
Anadarko Canada Corporation	114,349.70	1.79%	3,831.2
Pioneer Natural Resources Canada	106,864.00	1.68%	1,343.9
El Paso Oil & Gas Canada	98,313.20	1.54%	682.2
Pengrowth Corp.	91,115.90	1.43%	117,538.7
Total		84.26%	

Five regions in the Northwest Territories have hydrocarbon potential, but the Fort Liard producing area is the only one located in the Muskwa-Kechika case study region. Natural gas production in this area began in the 1970s; produced gas is transported via pipeline to Fort Nelson, British Columbia, for processing. Additional production began in 2000, and a new cross-border pipeline was constructed across the border to the Maxhamish gas plant located north of Fort Nelson. Five existing discoveries remain undeveloped, and exploration continues.

Large volumes of undiscovered oil and natural gas reserves are thought to occur throughout the Muskwa-Kechika case study region. Increasing external demand is expected to increase oil and gas exploration, development and production activities in this region (PACTeam 2003). This expansion is reflected in recent drilling statistics from northeastern British Columbia (Table 2).

Table 2. Recent petroleum drilling activity in northeastern British Columbia.

Oil and Gas Wells Drilled	Within M-KMA ¹	Northeastern B.C.
1999	2	620
2000	0	770
2001	2	875
2002	2	643
2003	1	1,040
2004	5 pre-tenure plans 2000 to 2003; 30 seismic programs	800 (est.)

2.1.1.4 Forestry Sector

The forestry sector is an important employer and revenue generator within the Muskwa-Kechika case study region. Most harvesting currently occurs in northeastern British Columbia, but commercially viable stands are present on the Liard Plateau immediately north of the border in both Yukon and the Northwest Territories (PACTeam et al. 2003). Major forestry companies active in the region include Abitibi Consolidated Company in Mackenzie; Canfor Corporation in Fort Nelson, Taylor and Chetwynd; and Louisiana Pacific in Dawson Creek.

No published annual allowable cuts (AAC) were located for the Northwest Territories, but the last available figure was approximately 236,000 m³ cut in 1996. The AAC for the entire Yukon is 450,000 m³.

The AAC for northeastern British Columbia is approximately 8.30 million m³, including 1.50 million m³ from the Fort Nelson Forest District, 2.02 million m³ from the Fort St. John Forest District, 1.86 million m³ from the Dawson Creek Forest District and 2.95 million m³ from the Mackenzie Forest District. A joint forestry development plan was submitted by Abitibi Consolidated and the Kwadacha Band for a 1,693-ha cutblock within the Mackenzie Forest District portion of the M-KMA (Interagency Management Committee 2002).

¹ Bob Purdon, B.C. Oil and Gas Commission, Personal Correspondence, May 7, 2004.

2.1.1.5 Tourism and Recreation Sector

Tourism in the region consists of two major components: (1) front-country visitors who primarily confine their activities to the main communities and travel routes such as the Alaska Highway; and (2) backcountry/outdoor recreation visitors who seek relatively undisturbed natural settings with plentiful fish and wildlife or cultural resources (e.g., guide-outfitting and backcountry lodges).

Guide-outfitting plays a significant part in the historical and cultural makeup of northeastern British Columbia, the M-KMA and the case study region. It also provides income for a number of Aboriginal community members and associated guide-outfitting businesses. As an example, 75 guide-outfitters operated in the Peace-Omineca region of northeastern British Columbia in 2002. These operations generated approximately \$23 million in operating revenues and had 757 employees. Thirty annual guide-outfitter licence renewals were issued in 2001–02 within the M-KMA (Interagency Management Committee 2002).

2.1.1.6 Mining Sector

There are no active mines in the Muskwa-Kechika case study region, but mineral resource potential is high, particularly in the territories and north-central British Columbia. The Bullmoose coal mine in the Dawson Creek Forest District closed in 2003 following 20 years of operations. Other large coal deposits are present in the region, and interest in coal mine development has increased recently in response to offshore market demand. Intensive mineral development is not anticipated in the short- to medium-term, but long-term development prospects are considered to be reasonably high (ARA et al. 1996a,b).

2.1.1.7 Agricultural Sector

Agriculture has a long history in the Fort St. John and Dawson Creek areas, but it is not a significant land use elsewhere in the case study region. Agriculture has expanded steadily in recent years, and suitable lands are protected from incompatible uses by provincial legislation.

2.1.2 Regulation of Development Activities

A detailed discussion of government roles and responsibilities in the territories is beyond the scope of this case study; however, the key observation is that land and resource management responsibilities in the case study region are divided among multiple governments and ministries.

Responsibility for management of most lands and resources in Yukon was transferred from the federal government to the Yukon territorial government in 2003. In the Northwest Territories, federal ministries are still responsible for managing non-renewable resources (oil and gas and minerals), while the territorial government is responsible for

managing renewable resources (wildlife and forestry). In both territories, the federal government still plays a role in environmental assessment, land claims negotiations, conservation planning, and fish and wildlife management.

Aboriginal residents have strong ties to the land and have been supportive of protected areas for many years. Aboriginal input into land and resource management is being or has been negotiated through co-management agreements in the territories.

2.1.3 Conservation Initiatives

Each jurisdiction in the case study region has implemented conservation initiatives to protect representative or unique features of the boreal forest; examples are provided in Table 3.

Table 3. Examples of conservation initiatives undertaken in the Muskwa-Kechika case study region.

Jurisdiction	Conservation Initiative
British Columbia	<ul style="list-style-type: none"> • Protected Areas Strategy: establishes provincial target for representative areas and for special natural, cultural and recreational features. • Land and Resource Management Plans: develop regional strategic land use plans based on community consensus.
Northwest Territories	<ul style="list-style-type: none"> • Sustainable Development Policy: promotes consistent application of sustainable development principles to all territorial lands and waters. • Protected Areas Strategy: provides guidelines for planning protected areas in the N.W.T., including representative areas within each ecoregion (NWTPASAC 1999). • Deh Cho Interim Measures Agreement: withdraws lands from development for up to five years until a final agreement and land use planning can be completed; 10.1 million ha of these lands will receive protection in an interconnected network of culturally and ecologically significant areas. • Deh Cho Cumulative Effects Indicators and Thresholds: consist of 18 social, cultural, ecological and land use indicators and candidate thresholds identified for land use planning and project-specific review (Salmo et al. 2004).
Yukon	<ul style="list-style-type: none"> • Umbrella Final Agreement (1990): enables Yukon First Nations to negotiate special management areas to protect regions within traditional territories; almost 1 million ha have been protected. • Yukon Economic Development Act: identifies sustainable development objectives. • Protected Areas Strategy (1998): develops a network of science-based, representative protected areas in each Yukon ecoregion; 640,000 ha have been protected. • Yukon Land Use Planning Council: helps government and Yukon First Nations coordinate community-based land use planning in eight regions. • Kaska Dene Forestry Agreement: enables the Kaska Forest Resources Stewardship Council to initiate ecosystem-based forest planning processes that integrate Kaska traditional knowledge with forestry and ecological science.

Federal	<ul style="list-style-type: none"> • Green Plan: identifies targets for new national parks and sets a protected areas target of 12% of the country. • Species at Risk Act: protects individuals, residences and critical habitat of listed species; “safety net” provision can establish federal management responsibility.
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2.2 NORTHEASTERN BRITISH COLUMBIA

For this analysis, northeastern British Columbia includes the area covered by the Fort Nelson, Fort St. John, Dawson Creek and Mackenzie land and resource management plans (LRMPs) (Figure 2). The combined area represents almost one-quarter of the province and incorporates mountain, foothill, forest and agricultural landscapes that provide provincially significant renewable and non-renewable resources.

2.2.1 Land Resource Management Planning

The economy of British Columbia is heavily reliant on resource extraction industries, particularly the forestry, petroleum and mineral sectors. The province is also home to well-organized environmental groups who have frequently opposed resource extraction proposals. Public demands to preserve wilderness and parklands in British Columbia reached a critical point in the late 1980s, when the so-called war in the woods involved valley-by-valley conflicts between NGOs and logging companies.

The confrontations between the environmental movement and industry, coupled with a change of government in 1991, led to the development of a new model of decision making for natural resource management in British Columbia. In 1992, the Commission on Resources and Environment (CORE) process was adopted to implement a community-based approach to land use planning. This process was superseded in 1995 by the Land and Resource Management Planning process. Northeastern British Columbia was divided into the four LRMP areas corresponding to forest district boundaries (Figure 2).

The Protected Areas Strategy (PAS) was also adopted. The PAS called for a doubling of provincial parkland from 6% to 12% by the year 2000. Protected areas were to include viable, representative examples of the natural diversity of the province as well as special natural, cultural and recreational features.

The government’s decision to develop regional strategic land use plans through the LRMP process created a vehicle or forum for addressing conservation issues in northeastern British Columbia. Multi-stakeholder planning tables were established in each area to develop strategic land use plans that set out a vision for appropriate land use(s), economic diversity and stability, and environmental conservation. A key driver of the LRMP negotiations was the desire to balance wilderness conservation and resource development by creating a sustainable development model.

LRMP discussions in northeastern British Columbia were conducted over a four- to seven-year period. Consultation with First Nations was encouraged, and all regional and provincial stakeholders were consulted: industry (oil and gas, mining, forestry); conservation groups; recreation interests; labour; hunters, trappers and guide-outfitters; and local, provincial and federal governments. Specific protected area goals were also established for the Fort St. John, Fort Nelson and Mackenzie forest districts (4.3%, 11.4% and 10.4% of their land base, respectively). Some observers believe that these targets created the negotiation platform for establishing the core protected areas critical to the conservation biology model in the M-KMA. The recommended LRMPs (with or without full consensus) were forwarded to the provincial government for approval.

Each LRMP is based on a framework of resource management zones that reflect the spectrum of potential land uses:

- **Settlement/Agriculture Zones:** lands managed consistently with historic patterns of settlement and agriculture (primarily private lands).
- **General Resource Development Zones:** lands managed for a variety of integrated resource values.
- **Enhanced Resource Development Zones:** lands managed for intensive resource development, typically forestry, petroleum, agriculture and tourism.
- **Special Management Zones:** lands containing sensitive values, where resource development can proceed while minimizing impacts on the sensitive values.
- **Protected Areas:** includes provincial parks established by the Park Act, protected areas including protected areas established under the Environment and Land Use Act, ecological reserves established under the Ecological Reserve Act, and recreational areas to be protected for their natural, cultural, heritage and/or recreational values as defined by the PAS.
- **Wildlands Zones (Mackenzie LRMP only):** lands where the emphasis is on their remote and natural characteristics and where priority is placed on ecological conservation while providing the opportunity for commercial and industrial activities, particularly mineral and oil and gas development; timber harvesting is not allowed.

The sustainable development model created by the northeastern British Columbia LRMPs includes large conservation areas set within a working landscape, where responsible development is encouraged to generate economic and social benefits. This approach is intended to balance conservation and socio-economic objectives (Figure 3).

Figure 3. The northeastern British Columbia LRMP sustainable development model.

The Fort Nelson and Fort St. John LRMPs included specific recommendations to create the Muskwa-Kechika special management area. When approved in late 1997, these LRMPs represented an unprecedented achievement in North America: the creation of the largest conservation system on the continent through a consensus-based, multi-stakeholder agreement. (“Consensus” was understood to mean that total concurrence on every aspect of a decision was not possible, but that all participants were willing to accept the overall plan.)

The Dawson Creek LRMP approved in 1999 added additional protected areas to the regional network, but these were not included within the M-KMA boundary. In 2001, the Mackenzie LRMP region added additional protected and special management areas to the system, expanding the M-KMA to its current total of approximately 6.4 million ha (twice the size of Vancouver Island).

The LRMP zoning recommendations accepted by the provincial government for northeastern British Columbia are summarized in Table 4.

Table 4. Approved resource management zones in northeastern British Columbia LRMPs.

LRMP Area (million ha)	Special Management	Protected Areas	General Resource Management		Settlement Agricultural	Enhanced Resource Development
Dawson Creek (2.9)	13%	6.75%	45%		13%	22%
Fort St. John (4.6)	13%	4%	54%		13%	15%
Fort Nelson (9.8)	28%	10%	23%			37%
Mackenzie (6.4)	21%	13.9%	Wildland 18%	General 16%	<1%	29%
M-KMA (6.4)	75%	25%	0		0	<1%

2.2.2 First Nations

The province of British Columbia is committed to respecting treaty and Aboriginal rights in decisions on resource management.

The Fort St. John, Fort Nelson and Dawson Creek LRMP processes included lands from most of the Treaty 8 First Nations. Consistent with the government consultation policies, the participation of respective Treaty 8 First Nations was encouraged during the development of these LRMPs. While Treaty 8 representatives chose not to participate formally in the LRMP planning tables, they now actively participate on the M-KMA Advisory Board. Archaeological, cultural and heritage values were recognized and endorsed by all LRMP participants in these plans (Fort Nelson LRMP Working Group 1997; Fort St. John LRMP Working Group 1997). Both the Kwadacha and the Noostel Keyoh participated on or provided advice to the planning table during the development of the Mackenzie LRMP.

All First Nations in the Muskwa-Kechika case study region advocate greater control over land use planning and resource development in order to protect treaty rights, participate in the economic benefits of resource development within their traditional territories, and maintain and protect cultural values, wildlife and plants that are critical to the Aboriginal peoples of the region.

2.2.3 Regulation of Development Activities

The province of British Columbia has undertaken a comprehensive review of the regulatory regime as part of its New Era program, and it has revised or is revising much of the legislation that affects land and resource management. Sustainable development principles have been adopted that are meant to address three key themes: certainty, shared stewardship, and accountability and responsiveness.

- **Certainty** is about improving access to Crown land and resources, streamlining decision making, seeking to accommodate First Nations' interests, improving Crown land tenure management, improving the investment climate and ensuring access to markets.
- **Shared Stewardship** is about working cooperatively to achieve a sustainable future by shifting toward results-based approaches, providing incentives and taking into account economic, environmental and social objectives.
- **Accountability and Responsiveness** from government is about setting clear standards and ensuring those standards are being met through monitoring, enforcement, auditing and reporting.

2.2.3.1 Timber Harvest

In British Columbia, forest harvest activities are primarily regulated by the Forest Act and the results-based Forest and Range Practices Act, which recently replaced the Forest Practices Code of British Columbia Act and associated regulations and guidance documents (the Forest Practices Code).

Forest development within special management zones is subject to special planning, consultation and approval requirements in addition to those in the Forest and Range Practices Act. Forest management will be carried out in a manner that respects sensitive wildlife and backcountry values with a long-term objective of maintaining the area in a state that is as close to natural as possible.

2.2.3.2 Petroleum Exploration and Development

Petroleum exploration, development, production and transportation activities in British Columbia are subject to a comprehensive provincial regulatory regime that includes more than 20 provincial acts and more than 30 regulations. The province regulates all oil and gas activities with the exception of trans-boundary projects and federally regulated companies that are under the National Energy Board's jurisdiction (e.g., Duke Energy).

The two provincial bodies most involved in regulation of petroleum activities are the Ministry of Energy and Mines (MEM) and the Oil and Gas Commission (OGC). The disposition of oil and gas tenures is governed by the Petroleum and Natural Gas (PNG) Act administered by MEM. The OGC is generally responsible for exploration and development approvals; the construction, operation, inspection and monitoring of pipelines, compressor stations and other facilities; and monitoring spills and emissions.

In May 2003, the provincial government announced an Oil and Gas Development Strategy designed to promote all-season oil and gas activities, create stable job opportunities and increase provincial revenues. The strategy included fiscal and regulatory initiatives to spur long-term investment by the energy sector and encourage exploitation of resources that would otherwise have been left untouched.

The OGC has created the General Development Permit (GDP) process to enable review and approval in principle of a company's overall plans for development of an area. The GDP will allow for up-front consultation on overall project activities, and it replaces the standard approach of independent review of each activity (e.g., well, road, pipeline). The desired benefits of this approach include enhanced cumulative impact management, early identification of potential areas of concern and more efficient application reviews.

2.2.3.3 Mineral Exploration and Development

Mineral activities in British Columbia are primarily regulated by the Mineral Tenure Act and Mines Act administered by MEM. The province has instituted a two-zone system for mineral exploration and mining that identifies lands that are closed to mineral development and those that are open to mineral exploration and mining, subject to applicable legislation. New mineral tenures can be staked and recorded on all mineral lands outside protected areas, subject to applicable legislation; however, pre-tenure local strategic plans are not required for mineral, placer or coal tenures in the M-KMA.

Mine proposals are subject to either the Mine Development Review Process for small projects or Environmental Assessment Process time frames and requirements for large projects. The objectives and strategies of the applicable resource management zone will be considered in the review process.

2.2.4 Access Management

Control of human and predator access is believed to be a critical component of conservation on working landscapes. The legal framework for access management is complex and unclear, but land managers have generally interpreted it to suggest that public use of "traditional access" can be restricted only in exceptional circumstances.

Coordinated road access planning was first initiated in the early 1970s in southeastern British Columbia, but this program was not successful due to the lack of widespread support and an implementation framework. The Ministry of Forests subsequently instituted the Coordinated Access Management Planning (CAMP) process to develop plans with input from forest users (MOF 1989).

In northeastern British Columbia, the cumulative effects of access development and subsequent uses was identified as an issue of increasing concern to government, industry and conservation interests. The petroleum sector established a multi-stakeholder Access Management Initiative in northeastern British Columbia in the early 1990s to develop a toolkit of practical methods for public lands. This initiative completed a review of relevant legislation and administrative procedures (Ladner Downs 1994), a review of physical access control measures (Axys 1995) and a review of the CAMP process (Carmanah 1995). This information was considered by the LRMP planning tables.

2.2.5 Conservation Initiatives

2.2.5.1 Sustainable Resource Management Plans

Sustainable resource management (SRM) planning incorporates local, watershed and landscape unit planning, usually for areas of 500 to 1,000 km². It takes an approach that projects what the landscape should look like in the future and then builds the objectives, strategies and indicators needed to get there. The ultimate goal is to produce an integrated land and resource management plan that integrates management of other planning processes such as LRMPs and landscape unit objectives into a comprehensive, single source of information (MSRM 2002c).

2.2.5.2 Science and Community Environmental Knowledge Fund

In 1998, the provincial government entered into an agreement with the Canadian Association of Petroleum Producers (CAPP) and the Small Explorers and Producers Association of Canada (SEPAC) to establish the Environment Fund. The fund was allocated \$5 million over five years to support studies on practical tools to address environmental issues related to oil and gas exploration and development in northeastern British Columbia. In 2002, CAPP and SEPAC restated their support of the fund for a total of nine years. They also agreed to reorient and rename the fund, changing it from a purely research-based environment fund to a broader fund that incorporates both science and community environmental knowledge. The resulting Science and Community Environmental Knowledge Fund (SCEK Fund) focuses on the following issues: health and safety, ecosystem and cumulative impact management, engineering technology, education and extension, and community environmental knowledge.

Its objectives are to:

- provide credible, research-based findings that are useful to both government and industry;
- improve scientific and community environmental knowledge relevant to the management of oil and gas activities in northeastern British Columbia; and
- communicate research findings in formats suitable for industry, regulators, First Nations, stakeholders and the general public.

More than 35 projects have been funded by the SCEK Fund. These include:

- developing a cumulative impact assessment framework and regulatory screening tools for assessing the cumulative effects of both individual and general development permit applications;
- completing an inventory of vegetation response to flaring;
- conducting research into the long-term conservation of grizzly bears to provide resource managers with the necessary knowledge and planning tools;

- carrying out a radiotelemetry study to provide critical data on the threatened, boreal-ecotype woodland caribou in the Snake-Sahtaneh area (the study is documenting key habitat areas, population status and limiting factors);
- developing guidelines for oil and gas operations in the woodland caribou's key habitat areas based on data collected from the Snake-Sahtaneh study area;
- verifying the nature of internal and external cysts affecting moose in the Prophet River First Nation area;
- cataloguing traditionally important plants and their uses and identifying Aboriginal environmental concerns related to industrial development; and
- collecting information and designing processes that can be used to integrate indigenous knowledge into the planning and reclamation activities associated with oil and gas projects.

Additional information on the SCEK Fund is available on-line at:
www.ogc.gov.bc.ca/purpose.asp.

2.2.5.3 Habitat Conservation Trust Fund

The Habitat Conservation Trust Fund is a directed conservation fund created in 1996 by an amendment to the Wildlife Act. It replaces the former Habitat Conservation Fund. Hunters, anglers, trappers and guide-outfitters contribute to the Trust Fund's enhancement and education projects through licence surcharges. The province contributes to the acquisition of land through an annual allocation from the Crown Land Account. Voluntary contributions, proceeds from the sale of educational materials and court awards provide additional revenue.

The Habitat Conservation Trust Fund funds the acquisition of land and water rights, and it supports projects not eligible for support from existing research funds or not within routine government responsibilities. Projects supported by the Trust Fund improve the management of species and habitats by improving knowledge, restoring or managing habitats appropriate to planning and landscape contexts, and enabling stewardship.

Additional information on the Habitat Conservation Trust Fund is available on-line at:
www.hctf.ca/.

2.2.5.4 Cumulative Impact Management

The SCEK Fund, in conjunction with the Muskwa-Kechika Advisory Board, sponsored research into cumulative impact management in northeastern British Columbia. The resulting Sustainable Impact Management Strategy included a framework linking project-specific and regional management tools (Axys et al. 2003) and candidate cumulative effects indicators and thresholds to LRMP resource management zones (Salmo et al. 2003). The cumulative impact management framework includes the following key components:

- regional assessment: an assessment of regional values, existing impacts and areas of potential concern (referred to as “hotspots”);
- a project “screener”: a customized tool for the Oil and Gas Commission to use in screening cumulative impacts at the application stage;
- impact management measures: techniques for managing impacts at the project and regional scales;
- indicators and tiered thresholds: four measures that proponents and regulators can use to define limits of acceptable change so that they can be continually tracked and evaluated; tiered thresholds are linked to resource management zones identified in regional LRMPs; and
- research, monitoring and adaptive management: information requirements and tracking of progress.

Project Screener

The project screener was proposed as a tool for formally addressing the cumulative impacts of oil- and gas-related projects at the application stage. The SCEK Fund has provided additional funding to develop this tool.

The screener is step-by-step process that will be followed by OGC staff when reviewing project applications for possible cumulative impacts. The objective of the screener is to provide a more systematic method of reviewing project applications, which will ultimately allow for consistent and accountable decision making.

The project screener will be compatible with the current OGC application review process and high volume of applications. It will be designed as a checklist to ensure that all required elements have been addressed while still allowing for some discretion and flexibility in the process. By addressing thresholds, the screener will provide one of the principal means of determining when appropriate management actions need to be taken.

Indicators and Tiered Thresholds

Cumulative impact indicators can help to describe or monitor environmental or land use conditions simply and quickly. These measures also help land users and managers speak a “common” language when they assess conservation risks. Many cumulative impact indicators have been used, and all have some value for resource management. However, land managers in other jurisdictions have concluded that a combination of land use and habitat indicators is the most practical choice for cumulative impact management. Four indicators were recommended for northeastern British Columbia to measure the direct and indirect impacts of human development from both project-specific and regional cumulative perspectives. These include: (1) road and trail density, (2) stream crossing index, (3) core area and (4) patch and corridor size. Case studies conducted in two areas of northeastern British Columbia showed that these indicators were as useful as more complex and costly habitat quality indicators.

Indicators provide information about the likelihood of negative cumulative impacts, but they provide no direct measure of the acceptability of these impacts. Thresholds are science-based or socially based standards that are used to define the “limits of acceptable change,” the point at which a cumulative impact indicator changes from an acceptable to an unacceptable condition. Tiered thresholds have been used in British Columbia and elsewhere for air and water quality management. With this approach, science-based and politically defined cautionary, target and critical thresholds are developed to reflect limits of acceptable change and increasing degrees of concern (Table 5).

“Made for northeastern British Columbia” tiered thresholds were developed for each indicator based on a review of scientific literature and results from the two case studies. Candidate thresholds were related to the LRMP resource management zones: that is, they are most conservative or stringent in protected areas and special management areas, intermediate in general management areas and most liberal in enhanced resource development areas (Salmo et al. 2003).

Table 5. Tiered thresholds and management actions.

Threshold Level	Description/Action Taken
Cautionary	<ul style="list-style-type: none"> The point at which “enhanced protection measures” are implemented to slow the rate of change and/or monitoring is started to “confirm” actual environmental response. Monitoring ensures that enough local data exist to confirm the scientific predictions of target and critical thresholds, as well as the actual benefits of effects management actions.
Target	<ul style="list-style-type: none"> The desired value or range of an indicator. At this point, “restrictive protection measures” are initiated to further slow the rate of change.
Critical	<ul style="list-style-type: none"> The maximum acceptable value of an indicator (e.g., maximum access density, minimum core area size). Effects management actions are designed to keep the cumulative effects indicator below this level.

The SCEK Fund has provided financial support to integrate Aboriginal concerns and values into the tiered threshold framework.

2.2.5.5 Old Growth Order

The Ministry of Sustainable Resource Management has released a draft order establishing non-spatial old growth objectives for landscape units across the province of British Columbia. The order will apply to the approximately two-thirds of the province where objectives for old growth have not already been formally established. The intent of the order is to clarify the amount of area available for timber harvesting by confirming the area of old forest that will be conserved to address biodiversity values. Additional information is available on-line at: <http://srmwww.gov.bc.ca/rmd/oldgrowth/index.htm>.

2.2.5.6 Working Forest Initiative

MSRM announced a working forest initiative in early 2003 to provide greater certainty about land areas that will be made available for timber harvest. This initiative will be developed during preparation of sustainable resource management plans. Additional information is available on-line at: <http://srmwww.gov.bc.ca/rmd/workingforest/index.htm>.

2.2.6 Management Framework

The graphic included in Figure 4 depicts the link between provincial, regional and sub-regional (landscape-level) management tools that govern land and resource management in northeastern British Columbia. The four regional LRMPs provide strategic and local management objectives for each resource management zone (RMZ). In general and enhanced development RMZs outside the M-KMA, regulators such as OGC and MOF consider these objectives along with any applicable provincial, regional and sub-regional policies and plans when reviewing proposed activities. The LRMP provides the only

formal mechanism that coordinates or links land and resource management in these areas. As described further below, additional guidance and coordination is provided in protected and special management areas inside the M-KMA.

2.3 MUSKWA-KECHIKA MANAGEMENT AREA

The M-KMA Special Management Area represents almost 27% of the four LRMP areas in northeastern British Columbia. This area is the result of an unprecedented attempt to balance competing development and conservation interests for land resources in this region. The historical events and factors that contributed to its creation must be considered because these were of equal or greater importance than its science-based foundation.

The Northern Rockies were recognized as a region of ecological significance by government biologists in the early 1980s. The 5.3-million-ha Muskwa-Kechika Access Management Area was established in 1993 as an interim step under Section 111(b) of the Wildlife Act. Motor vehicle use was restricted in this area, and oil and gas tenure requests were deferred, pending deliberations of the Fort Nelson and Fort St. John LRMP groups.

Within the context of the province's changing land use planning paradigm, conservationists, led primarily by George Smith of the Canadian Parks and Wilderness Society and Wayne Sawchuk of the Chetwynd Environmental Society, established an innovative vision for a large protected area in the Northern Rockies. This vision included a conservation biology-inspired system of large core protected areas and surrounding special management buffers, set in a working landscape (Noss and Harris 1986; Noss 1995; Figure 5).

Figure 4. Resource management structure in northeastern British Columbia

Figure 5. A conservation biology-based protected area network (adapted from Noss et al. 1996).

Although conservationists are largely credited with driving the integrated, innovative vision for the M-KMA, it was ultimately made possible by the provincial government. The government set up the land use planning tables (including representatives from industry, conservation groups, labour and government), gave these tables sufficient time to reach consensus (insisting on full consensus on all recommendations), legislated protection, and provided funding (NRTEE n.d.). The forest and oil and gas sectors also played a key role.

The M-KMA vision was captured in specific recommendations in the Fort Nelson and Fort St. John LRMPs approved in late 1997. A year later, the Muskwa-Kechika Management Area Act was passed by the B.C. government, formalizing the creation of the M-KMA.

The M-KMA applies the conservation biology model by protecting 1.6 million ha of important ecosystems and wildlife habitats. These areas are buffered by almost 4.8 million ha of special management zones, where wilderness and wildlife habitat will be maintained while resource development such as logging, mineral exploration and mining, and oil and gas exploration and development will be allowed in a way that is sensitive to wildlife and environmental values. These core protected and special management areas within the M-KMA are set within roaded lands zoned for general or enhanced resource development. Together these constitute the working landscape of northeastern British Columbia (Figure 6).

Figure 6. Applying the conservation biology model in the M-KMA.

The final establishment of a special management area the size of the M-KMA through the consensus-based LRMP planning processes is a significant and unprecedented achievement. It represents a shared stakeholder vision of the M-KMA as a working landscape where sustainable resource development is allowed.

2.3.1 The Muskwa-Kechika Management Area Setting

The M-KMA is largely devoid of roads and is widely recognized as having very high wilderness, wildlife and resource development (forestry, oil and gas, and mineral) values.

2.3.1.1 Physical and Biological Features

The M-KMA is centered in the foothills and mountains of the northern Rocky Mountains. It is bordered to the west and northwest by the mountains of the boreal cordillera ecozone, to the north and east by the boreal forests, muskeg and settled lands of the taiga plains and boreal plains ecozones, and to the south by Williston Reservoir and the continuation of the Rocky Mountains and foothills.

Both representative and unique landforms are present in the M-KMA. Vegetation includes boreal white and black spruce and sub-boreal spruce wetlands and forests at lower elevations; spruce-willow-birch and Engelmann spruce-subalpine fir forests and high-elevation wetlands below the treeline; and alpine tundra, rock and glaciers above the treeline. Fire is the dominant natural disturbance agent, although landslides and floods can be locally important (MSRM 2004).

These ecosystems support a diversity of wildlife habitats and populations. The M-KMA has the greatest combined abundance and diversity of large wild mammals in North America, and it makes up a significant intact predator-prey system. Key wildlife species include caribou, elk, grizzly bear, moose, mountain goat, Stone's sheep, wolf and many species of furbearers and birds. The area also supports the only plains bison population in British Columbia (MSRM 2004).

The M-MKA is entirely within the Arctic drainage and encompasses 50 undeveloped watersheds. Major watercourses include the Finlay, Fox, Frog, Halfway, Kechika, Liard, Muskwa, Prophet, Rabbit, Toad, Tuchodi, Turnagain and Sikanni Chief rivers. The Kechika River drains most of the western half of the area and at 2.2 million ha is North America's largest remaining unroaded watershed south of the territories (Figure 7).

Most larger waterbodies support sport fish, primarily Arctic grayling and bull trout, as well as lake and rainbow trout (MSRM 2004).

Figure 7. The Muskwa-Kechika Management Area.

2.3.1.2 Cultural Heritage

The M-KMA is also culturally important. Traditionally, the land has been used by First Nations for hunting, gathering and fishing, and it overlaps the traditional territories of the Carrier Sekani Tribal Council, Halfway River Band, Fort Nelson First Nation, Kaska Dena Council and Prophet River First Nation.

No communities are located in the Fort Nelson and Fort St. John portions of the M-KMA. The Kwadacha Band of the Kaska Dene and the Tsay Keh Dene Band have communities located inside the Mackenzie LRMP area. The town of Kwadacha, formerly known as Fort Ware, is at the end of the logging roads in the Northern Rocky Mountain Trench and is the western gateway to the Muskwa-Kechika wilderness.

Many heritage and archaeological sites are present within the M-KMA. Examples include a historic fur-trading route with related trapper cabin sites, the remains of a Hudson's Bay trading post, a former commercial fishery site, a native village abandoned after World War II, an old wagon trail and native pack trails (NRTEE n.d.).

2.3.1.3 Economic Resources and Values

The M-KMA is rich in resource development opportunities: forests, oil and gas fields, metallic and non-metallic resources, and wilderness recreation and tourism potential. The Muskwa-Kechika Management Plan aims to “protect the natural wildlife and habitat” while allowing resource development “including recreation, timber harvesting, mineral exploration and mining, oil and gas exploration and development.”

A well-developed guide-outfitter and tourism industry exists in Muskwa-Kechika, capitalizing on the rugged beauty of the region. Approximately 25 guide-outfitters operate in the M-KMA, offering services related to hunting, fishing, boating, hiking, camping, caving, nature photography and horseback riding in remote and pristine areas. This sector is considered to have potential for further growth.

Trapping occurs throughout the M-KMA on registered trap lines. Commercially harvested furbearers include beaver, black bear, coyote, fisher, fox, lynx, marten, muskrat, red squirrel, river otter, weasel, wolf and wolverine.

Timber resources in Muskwa-Kechika are relatively limited, although some areas have high timber values. The most productive forests are found within the major river valleys. However, most of the timber harvesting land base for the Fort Nelson, Fort St. John and Mackenzie forest districts is located outside the M-KMA.

Metallic and non-metallic resources are found in the central and western areas of the M-KMA. The provincial government has developed a “two-zone system” for mineral exploration and mining, which identifies lands that are closed to mineral development through legislation or order-in-council and those that are open to mineral exploration and

mining, subject to applicable regulations. To maintain the environmental integrity of certain areas, mineral exploration and development is not permitted in the M-KMA protected areas and ecological reserves. However, exploration and mine development in special management areas is permitted as long as the provincial standards are adhered to and environmental impacts on wildlife habitat are minimized. So far, mineral exploration has been limited. However, geoscience surveys and frontier mineral exploration indicate that significant opportunities exist for the mining of metallic and industrial mineral resources. According to the Resource Management Division of the MSRM (n.d.):

- significant deposits of lead, zinc, silver and barite may exist in shale and carbonate rocks. The western North American lead–zinc belt extends from Alaska and Yukon south through the region. Recent exploration has focused on the well-mineralized Gataga River area and the adjacent Cirque and Akie deposits;
- copper and silver deposits occur in the Yedhe Lakes–Churchill areas in very old sedimentary and igneous rocks along a copper–lead–zinc–silver–gold mineral belt extending south from Yukon. The complex nature of these deposits makes exploration challenging, and many years may be required to evaluate prospective terrain and develop an economic deposit;
- diamonds and rare earth elements such as niobium and lanthanum (both scarce and valuable commodities) occur adjacent to the southern boundary of the Muskwa-Kechika area, and potential for additional deposits to the north is considered excellent; and
- the Turnagain River area is underlain by rocks known to be highly prospective for a variety of gold, copper and tungsten deposits as well as industrial minerals such as wollastonite. Prospective geology extends through the western part of the Muskwa-Kechika Management Area, where the geology is similar to the mineral-rich Cassiar region.

British Columbia’s potentially richest oil and gas reserves are found in its portion of the Muskwa-Kechika case study region. Total provincial oil and gas revenues (almost exclusively from northeastern British Columbia) exceeded \$2.1 billion in 2003. Significant reserves of natural gas are anticipated to occur within the M-KMA. As in the case of mining and mineral development, oil and gas exploration is prohibited in all protected areas within the Muskwa-Kechika but is permitted in the special management areas. Exploration is conducted under the auspices of provincial guidelines and standards, which require the submission of oil and gas pre-tenure plans for ministerial approval. Post-development road abandonment is a key requirement for these areas.

2.3.2 The Muskwa-Kechika Management Area Act 1998

Specific management objectives for protected and special management areas within the M-KMA were developed as part of the Fort Nelson and Fort St. John LRMPs. Participants in these processes recommended that the objectives for this area be formally designated to establish a separate jurisdiction: the M-KMA.

The preamble to the Muskwa-Kechika Management Area Act (Bill 37, 1998; the M-KMA Act) acknowledges that the M-KMA is “an area of unique wilderness in northeastern British Columbia that is endowed with a globally significant abundance and diversity of wildlife” (Government of British Columbia 1998a). Conservation interests worked hard to ensure that the area’s environmental integrity was legally protected, and their intent is clearly stated in the Act:

[T]he management intent for the Muskwa-Kechika Management Area is to maintain in perpetuity the wilderness quality, and the diversity and abundance of wildlife and the ecosystems on which it depends while allowing resource development and use in parts of the Muskwa-Kechika Management Area designated for those purposes including recreation, hunting, trapping, timber harvesting, mineral exploration and mining, oil and gas exploration and development.”

The Act provides the legal basis for the multi-stakeholder Muskwa-Kechika Advisory Board (see Section 2.3.4) to advise on natural resource management in the M-KMA. It also establishes the Muskwa-Kechika Trust Fund (see Section 2.3.6) to be used for scientific research, planning initiatives, projects, training and administrative costs. This legislation also established the resource planning and management framework discussed below.

2.3.3 The Muskwa-Kechika Management Plan

The Muskwa-Kechika Management Plan (the Management Plan, available on-line at: <http://srmwww.gov.bc.ca/rmd/lrmp/frtnelsn/app7/app7toc.htm>) and five local strategic plans are development prerequisites defined by the M-KMA Act. The Act specifies that decisions affecting the M-KMA must be consistent with these plans.

The Management Plan was adopted by regulation in 2003 (regulation available on-line at: www.qp.gov.bc.ca/statreg/reg/M/53_2002.htm; Government of British Columbia 2002). It is unique in several ways. These include the centrality of the “wilderness concept,” the management model, the formal inclusion of First Nations, the emphasis on scientific research, the defined funding sources and the pre-tenure planning requirements. Management Plan sections 2 through 6 describe the management framework, and sections 7 through 10 specify management objectives.

The Management Plan is implemented by all relevant government agencies through agency-specific management activities, local strategic plans, resource development permits, and Crown land and natural resource dispositions. Development plans and permits are required to be consistent with the objectives and strategies of resource management zones and any local strategic plans as specified in the Management Plan. A graphic of the M-KMA resource management framework is provided in Figure 8; framework elements are discussed in more detail below.

Figure 8. M-KMA management framework.

The stated management intent for the M-KMA is to “ensure wilderness characteristics, wildlife and its habitat are maintained over time while allowing resource development and use, including recreation, hunting, timber harvesting, mineral exploration and mining, oil and gas exploration and development. The integration of management activities especially related to the planning, development, management, and reclamation of road accesses within the M-KMA is central to achieving this intent. The long-term objective is to return lands to their natural state, as much as possible, as development activities are completed” (Government of British Columbia 2002).

Special management zones are recognized as key to creating a balance between resource use and wilderness preservation. Although these zones allow resource development, they attempt to ensure that such development has minimal effects on the ecological integrity of the region. Operational plans must consider and address all significant values present on the land base, such as fish and wildlife habitat, wilderness recreation and tourism, visual quality, culture and heritage, and major river corridors (Government of British Columbia 1998b).

2.3.4 Muskwa-Kechika Advisory Board

The Muskwa-Kechika management model continues the initial community-based participatory approach. LRMP participants demanded that management responsibility be assigned to a Muskwa-Kechika Advisory Board (Advisory Board) that includes local representatives, rather than the traditional bureaucratic agencies. The Advisory Board structure is clearly outlined in the Management Plan. The premier appoints up to 17 members, who represent a broad range of interests. They include representatives from First Nations, environmental groups, industry (oil and gas, forestry, mining), guiding and outfitting businesses, recreational groups, trappers’ organizations, and local, regional and provincial governments. The premier may also appoint up to five members to an honorary board, who are individuals of provincial, national or international stature. These members serve as ambassadors to assist in raising the profile of the M-KMA, but they do not participate fully in the working of the Advisory Board proper.

The Advisory Board’s legislated role includes:

- advising government on natural resource management in the M-KMA to maintain the area’s values;
- making recommendations on planning and strategic management;
- ensuring that activities are consistent with the objectives of the Muskwa-Kechika Management Area Act, the Muskwa-Kechika Management Plan and approved local strategic plans; and
- making recommendations on expenditures from the M-KMA Trust Fund.

To date, the Advisory Board has emphasized the need for joint plan approval. In the past, planning approvals for resource and recreation developments were the sole responsibility of the ministry under whose legal mandate the specific activity fell (e.g., mining development plans were approved by the Ministry of Energy and Mines). To enhance integrated management in the M-KMA, joint approvals are required for local strategic plans. Accountability is shared by government agencies that have a broad range of environmental and developmental mandates.

2.3.5 Inter-Agency Management Committee

An Inter-Agency Management Committee made up of the regional managers of provincial government ministries has been created to supplement the Advisory Board. This committee:

- assists in resolving conflicts between agencies and resource users;
- maintains a registry of plan documents and plan amendments, including the Muskwa-Kechika Management Plan and local strategic plans, which are available to any interested parties;
- reviews proposed amendments and provides recommendations to the Environment and Land Use Committee;
- provides for and coordinates public review and consultation as necessary in partnership with the Advisory Board;
- prepares an annual inter-agency work plan to facilitate the implementation of the Management Plan in consultation with the Advisory Board; and
- works in partnership with the Advisory Board to prepare an annual monitoring report on plan implementation, amendments and expenditures (Government of British Columbia 2002).

2.3.6 Muskwa-Kechika Trust Fund

The Trust Fund was established for scientific research, planning initiatives, projects, training and administrative costs. The intent of the Trust Fund and allowable expenditures are stipulated in the Act. The Act also permits private sector donations to the Trust Fund to support individual projects. Under the original approval, the Trust Fund received an annual contribution of \$1 million from the provincial government. This was subsequently increased to \$3 million per year, exclusive of donation matching. In 2003, base government funding was reduced to \$1 million per year, and the funding ceiling for matching private sector donations was increased to \$1 million. This change was intended to encourage private sector donations and reduce future reliance on government funding; with sufficient private sector donations, funding could be maintained at the \$3-million level.

The Trust Fund is not intended to replace the annual operating budgets for the resource management agencies but rather to support the M-KMA's specific planning initiatives, special projects, and ecological and social research.

2.3.7 First Nations

The Muskwa-Kechika Management Act specifically acknowledges that the "long-term maintenance of wilderness characteristics, wildlife and its habitat is critical to the social and cultural well-being of First Nations and other people in the area."²

Prior to the establishment of the M-KMA, a letter of understanding, dated September 24, 1997, established a formal agreement between the Kaska Dena Council and the Province of British Columbia regarding the M-KMA. The letter of understanding recognizes the Kaska Dena's rights, culture and heritage, including the right to harvest fish and wildlife using traditional or contemporary methods in accordance with their Aboriginal rights to harvest for sustenance, social and ceremonial purposes.

First Nations are encouraged to have a direct role in the implementation and monitoring of the Muskwa-Kechika Management Plan (Government of British Columbia 2002), and representatives are appointed to the Muskwa-Kechika Advisory and Honorary Boards.

2.3.8 Local Strategic Plans

The Act identifies five types of local strategic plans to be used for resource management within smaller defined landscapes. These local strategic plans must include a description of the linkages to the Management Plan and an explanation of how the local strategic plan meets the objectives and strategies outlined in this plan. Conversely, it is recognized that the resource management zone objectives and strategies in the Management Plan may be amended in the future based on feedback from local strategic plans.

These plans are described in more detail below:

1. Recreation Management Plan.
2. Wildlife Management Plan.
3. Park Management Plan.
4. Landscape Unit Objectives.
5. Oil and Gas Pre-tenure Plan.

2.3.8.1 Recreation Management Plan

A Recreation Management Plan prepared for the original 4.4-million-ha M-KMA (by a working group of government agency staff and representatives of First Nations and the Advisory Board) was approved in January 2001 (available on-line at:

² British Columbia, *Muskwa-Kechika Management Area Act*, 1998, p. 1.

<http://srmwww.gov.bc.ca/rmd/lrmp/mk/recreation.html>). The Mackenzie addition recreation plan is currently being prepared and will complement the original Recreation Management Plan.

The Recreation Management Plan establishes desired future conditions for five recreation types: small parks; large, remote northern RMZs; major river corridors; large southern RMZs; and the Alaska Highway corridor.

For the most part, all traditional recreation activities are acceptable throughout the M-KMA. There may be, however, specific areas where activities or activity levels are not appropriate for reasons such as environmental sensitivity, protection of special features, wildlife and wildlife habitat protection, user conflicts and/or protection of the wilderness recreation opportunity itself. The determination of such specified areas will be developed in more detailed planning initiatives (e.g., Forest Service district recreation planning, park management planning processes, wildlife management planning) and through public and First Nations' consultation (BC Parks and BC MOF 2001).

The Recreation Management Plan identifies specific monitoring requirements to determine whether desired outcomes are being achieved. An implementation schedule for carrying out the actions and recommendations is identified. This schedule contains 22 specific action items and provides target completion dates for each action. The agencies and groups responsible for each action are also identified.

Annual reviews of plan implementation are to be carried out by the appropriate government agencies, with a complete review of the plan required in five years or earlier if needed.

2.3.8.2 Wildlife Management Plan

The recommended Wildlife Management Plan is currently awaiting executive approval and was not available for review. The plan was developed by Ministry of Water, Land and Air Protection staff with input from an advisory group. This group represented the views of First Nations, trappers, guide-outfitters, sports enthusiasts, and environmental and resource managers (MELP 2001). The objectives of the Wildlife Management Plan are to:

- maintain, enhance or restore the populations and habitats of wildlife species that occur within the M-KMA. Management prescriptions may range from non-intervention to intensive management;
- identify wildlife management activities and levels that are consistent with LRMP management objectives and strategies;
- identify priority areas for more detailed, local strategic wildlife management planning;
- identify priority direction for research and inventory activities;

- provide direction and guidance for all activities affecting wildlife and their habitat in the M-KMA;
- utilize a fair, open and consultative process for developing and implementing the Wildlife Management Plan, which takes into account local, regional and provincial priorities, First Nations' rights and interests, and public interests.
- provide a mechanism for ensuring that the final plan can be implemented and amended—and more detailed management prescriptions developed, implemented, monitored, evaluated and updated as required;
- provide for appropriate and sustainable appreciation and use of wildlife in the M-KMA;
- seek the collaboration and support of resource managers, resource users, tenure holders, First Nations, academia and the general public in the integrated management of the wildlife resource and in identifying resource use practices that are compatible with management objectives; and
- monitor whether resource use practices adopted for the plan are appropriate for the intended wildlife management objectives.

Additional information on the wildlife management planning process is available on-line at: <http://srmwww.gov.bc.ca/rmd/lrmp/mk/wildlife.html>. The approved plan will ultimately be posted at this location.

2.3.8.3 Park Management Plan

BC Parks, now the Environmental Stewardship Division of the Ministry of Water, Land and Air Protection, is the lead management agency for protected areas within the M-KMA. MWLAP has been gathering data, consulting stakeholders and developing three types of planning products (management plans, management direction statements and purpose statements) for parks in the M-KMA.

- **Park Management Plans** guide how a protected area will be managed over the next 10 to 20 years. The plan sets out objectives and strategies for conservation, development, interpretation and operation of a protected area. A management plan relies on current information relating to such subjects as natural values, cultural values and recreation opportunities within a protected area, as well as resource activities occurring on surrounding lands. Park management plans are currently being finalized for four areas: Northern Rocky Mountains Park, Dune Za Keyih Park, Graham-Laurier Park and Redfern-Keily Park.
- **Management Direction Statements** are simple documents that describe protected area values, management issues and concerns, and management direction in relation to immediate priority objectives and strategies. They provide strategic management direction for all protected areas that do not have a full management plan. Management direction statements do not negate the need for future, more detailed plans.

- **Purpose Statements** are documents prepared to provide background information on a protected area. These reports present information on natural and cultural values; land tenure, occupancy rights and resource uses; outdoor recreation opportunities and facilities; visitor use and trends; and known management issues.

Management direction statements or purpose statements will be developed for Hornline Creek, Liard River Corridor, Prophet River Hotsprings, Sikanni Chief Ecological Reserve and Toad River Hotsprings.

Park management plans or management direction statements for existing parks within the M-KMA (Liard River Hotsprings, Muncho Lake and Stone Mountain) will be reviewed in future.

2.3.8.4 Landscape Unit Objectives

The Ministry of Forests authorizes use of timber resources within the Muskwa-Kechika Management Area. Operational plans such as forest development plans are required before timber harvesting and road construction can proceed. Operational plans outline the location, timing and characteristics of forest development activities.

Timber tenures, operational plans and permits approved prior to the designation of the Muskwa-Kechika Management Area are exempt from the requirements and objectives of the Muskwa-Kechika Management Plan. Renewals and replacements, as well as new tenures, plans and permits, must demonstrate consistency with the Muskwa-Kechika Management Plan and local strategic plans that are in place.

Small quantities of wood have been harvested from various locations for operations associated with guide and outfitting activities, and grazing forest development is prohibited in all protected areas within the Muskwa-Kechika Management Area. The MWLAP and MSRM work together to manage fire and forest health within protected areas.

Landscape unit objectives are required before new forest development plans can be approved or new forest tenures or dispositions can be issued. Local strategic plans and forest protection activities must be consistent with the Muskwa-Kechika Management Plan.

Landscape unit objectives may also be identified in the M-KMA as defined in the Forest Practices Code of British Columbia Act. The Obo River and Fox landscape units have been identified in the Mackenzie Forest District (available on-line at: http://srmwww.gov.bc.ca/rmd/lrmp/mk/docs/fox_obo.pdf). Specific objectives are provided to contribute to the conservation of biodiversity. These include targets for patch size distribution, seral stage (age) distribution and wildlife tree patch retention, as well as riparian buffers to protect lake trout habitat.

2.3.8.5 Oil and Gas Pre-Tenure Planning

One of the most unusual aspects of the M-KMA is the requirement for oil and gas pre-tenure planning before petroleum tenures are issued. Pre-tenure planning is not a prerequisite for geophysical activities. MSRM is mandated to complete oil and gas pre-tenure plans (PTPs) in a manner that is consistent with the Act and Management Plan. Seven PTP areas have been identified in the M-KMA (Figure 9). The need for PTPs in areas outside the M-KMA may be identified through strategic land use plans. Information on PTPs, including approved and draft plans, is available on-line at: <http://srmwww.gov.bc.ca/rmd/ecdev/mog/ptp/index.htm>.

The first PTP, prepared for the Upper Sikanni Management Area, was approved in 1995, prior to establishment of the M-KMA (MELP and MEMPR 1995). Independent reviews of plan implementation were conducted (Culling and Culling 2000; Ward 2000). PTPs were approved for the Dunlevy Creek area and part of the Besa-Prophet Management Area in 2002 (MSRM 2002a,b). With the change in provincial government and the resulting Oil and Gas Development Strategy (see Section 2.2.3.2), MSRM was encouraged to fast-track PTP development, and planning for additional areas within the M-KMA began in the spring of 2002.

The five pre-tenure plans, the Sulphur/8 Mile, Churchill, Muskwa West, Besa Prophet II and Halfway-Graham could produce an estimated 66.8–129.2 billion m³ of natural gas, which accounts for over half of the entire M-KMA natural gas resource potential.

Figure 9. Oil and gas pre-tenure planning areas in the M-KMA.

The PTPs also adopted a new results-based framework linked to a monitoring and adaptive management system. Public advisory groups were established to provide input to the government working group preparing the plan; the public advisory group discussions were paralleled by consultations with First Nations. The following discussion of the results-based approach is based on MSRM (2004), except where noted.

The purpose of a PTP is to encourage and guide environmentally responsible development of oil and gas resources by providing results-oriented management guidance applicable to the M-KMA in general and to specific plan areas. The plan also sets out government requirements for monitoring various activities and outcomes (MSRM 2004). Existing data for each PTP area were used to identify resource values and use and to create a single biophysical zone map representing a range of biophysical values. This map is intended to convey overview information to oil and gas proponents when they are planning activities in the area.

The results-based management framework focuses on measurement of key indicators tied to management objectives (Figure 10). Where possible, targets have been established as a means of quantifying the acceptable future state of the indicators. The numerical targets represent an initial attempt to find the balance that optimizes resource values in the M-KMA. New information and research and monitoring results will be used to amend the targets as required. It is anticipated that assessments of wildlife research and other projects being completed in 2004 will lead to consideration of a plan amendment in 2005. A specific plan amendment is scheduled for 2009 to incorporate the results of research on Stone's sheep.

Figure 10. Oil and gas pre-tenure plan results-based management framework (from MSRM 2004).

2.3.9 Other Initiatives

2.3.9.1 Conservation Area Design

A Conservation Area Design (CAD) is currently being developed for the M-KMA by an independent team made up of the Craighead Environmental Research Institute, Nature Conservancy Canada and Round River Conservation Studies. The objective of the CAD is to help link the landscape-level objectives and zoning with local on-the-ground decisions within an overall planning and management framework. This will help direct the Advisory Board regarding the location, level and type of development activities that

should be allowed and their potential impact on ecological processes in the area. Information the CAD project is available on-line at: www.grizzlybear.org/MKMA.html.

This CAD work has five separate parts: (1) data amalgamation in a geographic information system or GIS, (2) application of existing CAD methods (representation analysis, special elements mapping and focal species analysis), (3) development of new CAD methods (riparian features modelling, connectivity analysis and additional focal species analysis), (4) synthesis and peer review and (5) integration of the CAD with M-KMA management plans.

2.3.9.2 Access Management

Access management is identified as a primary conservation tool in the M-KMA. Motor vehicle travel is limited to designated routes determined on the basis of environmental sensitivity, public recommendation and past use. Four types of routes have been designated under the Wildlife Act and the Muskwa-Kechika Management Area Regulation:

- motor vehicles restricted to 400 m on either side of the route;
- motor vehicles restricted to within 10 m of the route;
- only vehicles under 500 kg allowed and these restricted to 400 m on either side of the route; and
- only vehicles under 500 kg allowed and these restricted to within 10 m of the route.

2.4 STAKEHOLDER ROLES AND MANDATES

The roles and mandates of the various stakeholders, including government, industry, First Nations and environmental groups, in northeastern British Columbia are summarized in Table 6.

Table 6. Stakeholder roles and mandates in northeastern British Columbia.

Organization	Role and Mandate	
	In Northeastern British Columbia	Within M-KMA
B.C. Ministry of Energy and Mines	<ul style="list-style-type: none"> Issues oil and gas tenures within and outside the M-KMA Represented on LRMP planning tables 	<ul style="list-style-type: none"> Issues oil and gas tenures within and outside the M-KMA Represented on local strategic plan working groups
B.C. Ministry of Sustainable Resource Management	<ul style="list-style-type: none"> Directs sustainable resource management planning Represented on Inter-Agency Management Committee Represented on LRMP planning tables 	<ul style="list-style-type: none"> Directs pre-tenure planning within the M-KMA Directs Parks Management and Recreation Plans Provides M-KMA program manager Represented on Inter-Agency Management Committee and local strategic plan working groups
B.C. Ministry of Water, Land and Air Protection	<ul style="list-style-type: none"> Directs preparation of Parks Management Plan, Wildlife Management Plan within M-KMA Directs preparation of species recovery strategies and action plans Represented on Inter-Agency Management Committee Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on Inter-Agency Management Committee and local strategic plan working groups Directs Wildlife Management Plan
B.C. Ministry of Forests	<ul style="list-style-type: none"> Regulates timber harvest, including identification of annual allowable cut, wildlife habitat areas and landscape unit objectives Represented on Inter-Agency Management Committee Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on Inter-Agency Management Committee and local strategic plan working groups Directs preparation of Recreation Management Plan and landscape unit objectives within the M-KMA
B.C. Oil and Gas Commission	<ul style="list-style-type: none"> Regulates oil and gas exploration, production and transportation within and outside the M-KMA Represented on Inter-Agency Management Committee Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on Inter-Agency Management Committee and local strategic plan working groups
M-K Advisory Board	N.A.	<ul style="list-style-type: none"> Advises government on natural resource management in the M-KMA to maintain its values Makes recommendations on planning, strategic management and expenditures from the M-KMA Trust Fund Ensures that activities are consistent with the objectives of the M-KMA, the Management Plan and approved local strategic plans

Inter-Agency Management Committee	<ul style="list-style-type: none"> Coordinates resource decision making to ensure consistency with strategic and local land use plans 	<ul style="list-style-type: none"> Coordinates resource decision making to ensure consistency with Management Plan and strategic and local land use plans
Resource Sector - Oil and Gas	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
Resource Sector - Forestry	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
Resource Sector - Mining	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
Resource Sector - Guide-Outfitters Association	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
Resource Sector - Trapping	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on local strategic plan working groups
Environmental Sector (Local)	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
Environmental Sector (Provincial)	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
Local Community	<ul style="list-style-type: none"> Represented on LRMP planning tables 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
First Nations	<ul style="list-style-type: none"> Represented on Mackenzie LRMP planning table 	<ul style="list-style-type: none"> Represented on M-K Advisory Board and local strategic plan working groups
Independent Technical Specialists	<ul style="list-style-type: none"> Tool development: conservation area design Tool development: cumulative impact management Monitoring and adaptive management: reviews pre-tenure plan implementation 	<ul style="list-style-type: none"> Baseline and applied research

3. CASE STUDY FINDINGS

This section describes conservation objectives, barriers and tools identified for northeastern British Columbia and the broader Muskwa-Kechika case study region. The sustainable development objectives described in Section 3.1 reflect the land and resource management vision established for northeastern British Columbia. Regulatory and fiscal barriers to conservation in this region are discussed in Section 3.2. Section 3.3 describes nationally applicable best practices, incentives and instruments identified in the Muskwa-Kechika case study. The consulting team believes these practices, incentives and instruments have the highest probability of success.

3.1 SUSTAINABLE DEVELOPMENT OBJECTIVES

The consulting team was asked to translate regional land and resource management objectives into objectives consistent with the Canadian Council of Forest Ministers (CCFM) Sustainable Forest Management framework (CCFM 1995, 1997, 2003). The Sustainable Forest Management framework consists of a tiered series of criteria, elements and indicators. It has been applied in a modified fashion in northeastern British Columbia for the Fort St. John Pilot Project (MOF et al. 2001) and the Muskwa-Kechika oil and gas pre-tenure plans to link these strategic components to the operational level (MSRM 2004; Figure 10).

The six CCFM sustainable forest management criteria were simplified into two criteria for this analysis: conservation and socio-economic. This breakdown was adopted because the M-KMA and the remainder of northeastern British Columbia have different legislative and management regimes, and because their overall management objectives differ. Taken together, however, the criteria represent the balance between conservation and socio-economic values envisioned by LRMP participants for northeastern British Columbia (Figure 3). Sustainable development objectives for LRMP resource management zones within and outside the M-KMA are summarized in Table 7.

3.1.1 Conservation Objectives

The **conservation** criterion includes six elements: (1) ecosystem diversity, (2) species diversity, (3) areas of special biological significance, (4) restoration of ecosystems, (5) conservation of soil quality and quantity and (6) conservation of water quality and quantity.

The overall conservation objectives interpreted for protected areas within and outside the M-KMA are identical, that is, very low risk to conservation values. However, there are fewer protected areas outside the M-KMA, and these are smaller than those inside the M-KMA.

Table 7. Sustainable development criteria and overall objectives in northeastern British Columbia.

Resource Management Zone (RMZ)				
	Protected Areas	Special Management Areas	General Resource Management Areas	Enhanced Resource Development Areas
1. Conservation Criterion				
Within the M-KMA	Very Low Risk	Low Risk	None in M-KMA	Moderate Risk
Outside the M-KMA	Very Low Risk	Low to Moderate Risk	Low to Moderate Risk	Moderate to High Risk
2. Socio-Economic Criterion				
Within the M-KMA	Natural, recreational, cultural and heritage values priority	Wilderness and wildlife priority	None in M-KMA	Tourism and visual quality priority
Outside the M-KMA	Natural, recreational, cultural and heritage values priority	Special values priority	Multiple integrated use priority	Resource development priority

Special management areas within the M-KMA will be managed to maintain low risk for conservation values. The level of acceptable risk is considered to be somewhat higher than in protected areas to accommodate the careful development of timber, hydrocarbon and mineral resources. The level of acceptable risk in special management areas outside the M-KMA is assumed to be variable and depends on the special values to be managed in each RMZ. Because the LRMP plans suggest that more intensive human disturbance will generally be allowed in special management RMZs outside the M-KMA, the derived objective was assumed to be low to moderate risk to conservation values.

Most of the land area outside the M-KMA consists of general resource management and enhanced resource development zones where the primary management focus is on providing land use opportunities for more intensive timber and hydrocarbon resource development.

A moderate to high risk to conservation values was considered to reflect the management focus in enhanced resource development areas, given the primary economic objective established for these areas. General resource management areas should reflect a slightly lower risk to conservation values because management for non-conflicting use is the overall objective.

The combined conservation objective for the northeastern British Columbia study area was interpreted by the consulting team to be management for low to moderate risk to conservation values. However, a wide range of opinions on overall conservation risks was expressed by workshop participants and interviewees. Some interviewees and participants at both the Fort St. John and Ottawa workshops said that risk to regional conservation values is high because of high resource development intensity in northeastern British Columbia, and because the M-KMA does not protect resources restricted to taiga plains habitats that fall outside the M-KMA boundaries. Other interviewees and workshop participants suggested that regulatory standards and processes guiding resource development outside M-KMA areas are adequate to achieve economic objectives while sustaining conservation values.

This diversity of opinion reflects three issues. First, the M-KMA initiative is very recent, and the implementation of this shared vision is in its early stages—its ultimate success cannot yet be measured. Time will also tell whether the existing regulatory standards and processes will be sufficient to achieve the desired balance on the remainder of the land base in northeastern British Columbia. Second, the wide range of views reflects the challenge inherent in translating consensus-based regional policy objectives into clear management directions. Finally, as suggested by several workshop participants, this diversity supports the need for dynamic planning processes that provide land use certainty within an adaptive management framework.

3.1.2 Socio-Economic Objectives

The **socio-economic** criterion includes five elements: (1) treaty rights, Aboriginal interests and traditional knowledge, (2) First Nations' economic opportunities, (3) petroleum and mineral benefits, (4) renewable resource benefits and (5) wilderness.

Both within and outside the M-KMA, protected areas are interpreted as those that should be managed primarily for natural, cultural, recreational and heritage values (Table 7).

Within the M-KMA, the legislated goal of special management areas is to protect wilderness and wildlife values. Outside the M-KMA, the identified special values differ between RMZs, so the local management objectives vary accordingly.

Recreation and tourism interests are the primary objective for the Alaska Highway corridor enhanced resource development RMZ within the M-KMA. In enhanced resource development zones outside the M-KMA, renewable and non-renewable resource development is the primary socio-economic objective.

The overall socio-economic objective for general resource management zones is to manage for a wide variety of resource values and reduce conflicts through appropriate planning and decision making.

3.2 CONSERVATION BARRIERS

Perceived barriers to conservation in the Muskwa-Kechika case study region are summarized in Table 8. This summary focuses on regulatory and fiscal barriers that are national in scope.

3.2.1 Lack of Explicit Conservation Targets

Most development proposals are small, and decisions regarding their acceptability are made independently based on compliance with regulations, standards and administrative guidelines, including LRMP objectives. In the absence of clear targets, it is difficult or impossible for regulators to determine whether desired landscape conditions are being achieved. Management targets or thresholds—such as air and water quality standards—provide the best means of differentiating acceptable and unacceptable conditions.

The four northeastern British Columbia LRMPs provide clear land and resource management objectives—especially when compared with objectives established for many other areas of the boreal forest. However, the strategic nature of the LRMP process required local participants to focus on balancing conservation and resource development principles fairly broadly. This approach favours the development of consensus on landscape-level principles and a vision.

LRMP management objectives are provided in narrative form and are not directly related to measurable targets. The lack of explicit conservation targets outside the M-KMA increases the risk that regional conservation objectives will not be achieved over the long-term. Differing perspectives on what constitutes acceptable change create significant difficulties within the planning processes and, where interpretations are inconsistent between plans, may hamper effective implementation and regulatory enforcement.

The Advisory Board is keenly aware of the tension created in a management plan that aims to conserve wilderness while allowing resource development. A constant challenge is to ensure that the objectives in the LRMP are implemented in local strategic plans such as PTPs. The overall management intent for the M-KMA has been interpreted in different ways by different parties. In particular, there are varying perspectives on the degree to which resource development should be constrained in order to “maintain in perpetuity the wilderness quality, and the diversity and abundance of wildlife and the ecosystems on which it depends” (Government of British Columbia 2002).

Table 8. Conservation barriers in the Muskwa-Kechika case study region.

Within M-KMA Very Low to Low Conservation Risk	Northeastern British Columbia Low to Moderate Conservation Risk	Case Study Region Low to Moderate Conservation Risk
<ul style="list-style-type: none"> • M-KMA area may not be sufficiently large or diverse enough to accommodate natural disturbance and climate change over long-term • Innovative mitigation techniques have high risk (unproven or uneconomic) • Geophysical activities not subject to pre-tenure plan disturbance targets • Lack of effective integration and sequencing of “local strategic plans” to ensure that conservation objectives are achieved • Local strategic planning processes based on adaptive management are unproven • Incomplete baseline data and poorly understood cause–effect relationships for many species • Conservation area design tools not used for M-KMA design; tools unproven • Current ungulate populations may be unsustainable • Funding uncertain • Erosion mitigation tools unproven in high hazard areas 	<ul style="list-style-type: none"> • LRMP management goals are descriptive, rather than quantitative, and do not provide clear targets that differentiate acceptable and unacceptable levels of development • M-KMA core area may not be sufficiently large or diverse enough to accommodate natural disturbance and climate change and sustain regional conservation values in regional working landscape over the long term; spatially explicit planning and evaluation was not done to evaluate this • Independent legislation and decision-making processes for each sector; indirect effects of private land (agricultural and settlement sectors) not specifically addressed • Tenure issuance process disconnected from regional conservation planning and objectives; significant tenure commitments were made before regional land use planning was completed (some conservation opportunities were precluded) • Tenure parcels are small, and competitive acquisition process is a barrier to planning between resource sectors • Tenures are allocated vertically, which could result in multiple subsurface owners vying for surface access • Workers’ Compensation Board legislation prevents adoption of some innovative mitigation (e.g., right-of-way width) • Non-native species distribution and abundance will continue to increase; ecosystem restoration tools unproven or unavailable • Lack of explicit, quantitative water management targets; no legislative process to manage non-point sources • Government policy focusing on generating resource revenues to address fiscal and policy needs; fiscal incentives that promote road development • Current development intensity higher than previously anticipated • Footprint of petroleum sector not specifically accounted for in AAC recommendations; largely additive to forest harvest 	<ul style="list-style-type: none"> • Conflict between “rancher” (forestry) and “hunter” (oil and gas) planning and management paradigms • Multiple jurisdictions responsible for land and resource management; absence of coordinated conservation objectives, indicators, targets, and management tools and decision-making processes • Short-term fiscal pressures to realize socio-economic objectives from resource development without balancing long-term conservation goals • Increased North American and global demand for hydrocarbons, minerals and forestry products • Natural disturbance and climate change effects not directly accommodated in static planning models • Incomplete baseline data and poorly understood cause–effect relationships for many species • Planning and management initiatives must deal with pre-existing tenures and land use footprints • Lack of market mechanisms to encourage conservation efforts in resource development • Depreciation tax rates for legacy equipment lag pace of development of new technology with low footprint • Long-term indirect effects of access not evaluated or managed; ineffective tools to manage access

3.2.2 Inconsistent Planning and Management Paradigms

It would seem that the best way to achieve conservation objectives would be to fully coordinate the pace and type of all human uses so that desired ecological and cultural features are not harmed or lost. This central planning approach can be compared to that of a rancher, who deliberately regulates where and how long livestock will graze to ensure that pastures remain productive over the long term. The rancher's model of planning and management has been applied to the forest sector, where long-term harvesting rights are provided for large areas. This form of tenure is intended to encourage the holder to properly manage the resource by providing economic certainty. The approach generally emphasizes long-term stability over short-term economic return.

A different planning and management paradigm has been applied to the petroleum sector to maximize short-term economic return to the government. This approach can be likened to that of a hunter, who is not tied to a specific area and systematically or randomly searches the landscape for animals whose distribution and abundance is variable. Unlike ranchers, hunters are competing with others for the same resource over the same areas. Thus they have little or no direct incentive to manage their prey or its habitat. This system essentially discounts long-term stability and can inadvertently lead to loss of conservation values, even where this is not the objective of developers or the government.

Application of these inconsistent planning and management regimes creates significant regulatory and fiscal conservation barriers in areas of the Western Canadian Sedimentary Basin, where forest and petroleum sectors coexist. Integrated land management is difficult because the two sectors must adhere to two fundamentally different sets of rules and planning horizons. In addition, the activities of one sector may adversely affect the other. The clearing of land for wells, for example, reduces the forest land base for 20 years or longer.

Figure 11 shows the allocation of petroleum tenures within the M-KMA, where conservation values are the management priority, and outside the M-KMA, where short-term economic return is the policy priority. Each box represents an individual petroleum tenure; it is evident that, outside the M-KMA, land use decisions are made independently by a large number of competing interests. To further complicate this situation, tenures are allocated by geological formation; this frequently results in vertical layering of subsurface tenures for the same land area. A comparable graphic of forest tenures would show rights held by only one or two parties. A related conservation barrier is that the issuance of rights has been largely disconnected from regional planning, and subsequent management initiatives must recognize pre-existing tenures and land use footprints (Schneider 2001). This lack of connection restricts management options in highly developed landscapes or those where many land rights have already been issued. For example, legislated or traditional rights to a single area may be simultaneously held by a trapper, a guide-outfitter, a rancher, a forest company, one or more petroleum companies and a mineral claim holder.

Figure 11. Petroleum tenures issued within (blue) and outside (red) the Muskwa-Kechika Management Area.

3.2.3 Emphasis on Short-term Economic Returns

Intensive pressures for oil and gas development, forestry and other industrial uses of the landscape are evident throughout the Western Canadian Sedimentary Basin. These pressures will continue to intensify based on future projected North American and world demand for commodities. As noted earlier, regulatory and fiscal policies may inadvertently create perverse incentives that compromise conservation values.

Some interviewees and workshop participants contend that the current provincial policy emphasis on short-term economic returns in northeastern British Columbia fails to integrate true long-term costs and benefits that are not easily quantified (i.e., intangibles and incommensurables such as ecological benefits). Failure to integrate the true costs and benefits of nature has also been identified as a key conservation barrier in a *State of the Debate* report from the NRTEE (2003a). This report argues that incomplete evaluation of natural and human capital compromises our ability to adequately evaluate trade-offs between development and conservation goals.

Participants in the Fort St. John workshop noted that, although the social and ecological costs of resource extraction in northeastern British Columbia are borne locally, most benefits accrue to other areas. The Peace River Regional District's Fair Share initiative was instituted in the late 1990s to encourage the return of more resource revenues to the region.

3.2.3.1 Confidentiality Provisions

Seismic lines frequently represent the largest footprint on the landscape. Because geophysical data are protected by confidentiality provisions, seismic lines must be re-cleared, or new lines cleared nearby, for competitors to obtain desired subsurface information. This increases the overall land use footprint.

3.2.4 Cross-Jurisdictional Inconsistencies

One challenge to boreal forest conservation is the lack of cross-jurisdictional coordination of conservation initiatives. As an example, although declining woodland caribou populations are shared by Yukon, the Northwest Territories, British Columbia and Alberta, herd management and recovery planning efforts have been local and independent.

At a more local scale, there is no formal mechanism to integrate the development activities of renewable and non-renewable resource sectors and regulatory reviews of government line agencies (MOF, MWLAP, MEM, MSRM). The M-KMA implementation framework, for instance, is currently being developed to translate "strategic" direction from the M-KMA vision and LRMP plans into more results-based

local strategic plans. Local plans are intended to provide resource management decision makers with direction in reviewing proposed activities within the M-KMA and ensuring that these are consistent with the overall objectives of the plans. However, the M-KMA legislation provides no procedure for integrating the five local strategic plans.

Due to the nature of petroleum activities, companies must normally obtain separate licences for surface activities such as seismic exploration, drilling, pipeline construction and road construction. In the M-KMA, geophysical exploration activities are specifically excluded from pre-tenure requirements. This exclusion is a barrier to evaluation of potential long-term, landscape-level impacts.

3.2.5 Inadequate Tools and Resources

Land use planning and conservation initiatives will always be challenged by insufficient information and inadequate science, tools and resources. Consequently, translating a vision into operational “on the ground” decision making is an inherently uncertain process. While there can never be enough knowledge to completely remove this uncertainty, efforts must be made to ensure that decisions as to likely trade-offs are as well informed as possible.

3.2.5.1 Inadequate Science

Many interviewees and workshop participants identified insufficient scientific knowledge as a barrier to conservation in the Muskwa-Kechika case study region. Baseline data for this region are limited, cause–effect relationships between human activities and ecological response are often poorly understood, and data collection costs are higher than in other areas. Because of the interest in resource extraction, many respondents felt that too little time has been allowed for gathering the required data and completing plans. An example is the Conservation Area Design initiative, which is being completed following creation of the M-KMA. Ideally, this science-based evaluation would have been completed prior to the design of the M-KMA; problems could arise if the CAD project makes recommendations that are incompatible with current plans and practices.

An uncertainty that could affect conservation values in the region is the long-term effect of climate change. This could modify fire regimes and forest growth and succession, as well as water quality and flow regimes. Static, area-based land use planning approaches may not adequately address these changes.

3.2.5.2 Innovative Mitigation Measures

Another identified barrier is the lack of financial (and in some cases regulatory) support for innovative mitigation techniques. Even where all parties advocate adaptive management, experimental mitigation normally increases costs with uncertain benefits. This reduces incentives for proponents and regulators to use new and unproven methods.

3.2.5.3 Financial and Human Resources

Providing sufficient financial and human resources is a challenge that must be addressed in any major conservation initiative where government, First Nations and stakeholder partnerships are anticipated.

3.2.5.4 Access Management

The legal framework for access management is complex and unclear, but land managers have generally interpreted it to suggest that public use of traditional access can only be restricted in exceptional circumstances. This creates a barrier to access control and road deactivation, two methods that are believed to have significant benefit in maintaining conservation values.

3.2.5.5 Political Will

Lack of consistent political support has previously been noted as a barrier to conservation in Canada (NRTEE 2003a). The impetus for land use planning in northeastern British Columbia was based on strong political will and recognition by government that community-based strategic land use plans were critical to meeting provincial economic and conservation goals. A strong business case existed when British Columbia's economy was strong, employment and economic growth were not at the top of the agenda, and conservation and land use planning initiatives fit the political circumstances of the time.

In 2001, the Campbell government came to power with an “overwhelming mandate to significantly change the way resource management is done in the province” (CERI 2002). This mandate included a focus on encouraging economic development through enhanced investment in natural resource development, especially in oil and gas exploration (the government established a target to double the number of oil and/or gas wells in the province). The government is completing the necessary plans to expedite economic development in the M-KMA, with a focus on expediting the completion of oil and gas pre-tenure plans.

Case study interviewees and workshop participants expressed a broad range of opinions as to whether the political will exists to maintain the vision for the M-KMA. Some indicated that the current provincial government has abandoned the pursuit of conservation values in the M-KMA, while others indicated that the current focus on implementing the resource development element of the M-KMA vision is long overdue. Proponents of this view mentioned the lack of any economic activity in special management areas and the extended time frame between the completion of LRMPs in 1997 and implementation of the operational planning and regulatory framework. Identified implementation issues include:

- lack of sufficient scientific information and data for developing effective local strategic plans; and

- lack of leadership by government agencies in developing the planning and regulatory structures necessary to achieve the conservation and resource development objectives established in the M-KMA vision.

3.2.5.6 Field Variances and Enforcement

With the move to proponent-led, results-based management, third-party enforcement of existing regulations is required. Some interviewees indicated that lack of enforcement is a barrier to conservation in the Muskwa-Kechika case study region. The inappropriate use of field variances to waive restrictive conditions was also mentioned.

3.3 REGULATORY AND FISCAL TOOLS

One of the principal objectives of the Muskwa-Kechika case study was to identify fiscal and regulatory best practices used in the region that could be applied at a national level. Fiscal and regulatory policy tools can create opportunities to establish win-win policy approaches to more complex environmental challenges such as conservation of natural resources on the working landscape (NRTEE 2002).

3.3.1 Regulatory Tools

Legislative and regulatory policies and instruments allow governments to require activities that are beneficial to achieving conservation objectives or, conversely, to restrict those activities deemed to be detrimental to desired objectives. There are several types of regulatory policy tools in use, or that could be considered, for achieving conservation objectives in the case study region.

3.3.1.1 Command and Control

Command-and-control regulation has been the most common policy instrument used to achieve conservation objectives on the working landscape. These regulations establish specific rules (standards, limits, procedures or practices) that must be followed by those subject to the legislation. These directives are typically quite prescriptive; in other words, they define what must be achieved and how it is to be achieved.

Examples of legislated command-and-control regulatory tools exist throughout the Muskwa-Kechika case study region in the form of legislation, regulations and standards for renewable and non-renewable resource development (see Section 2.2.3). Specific examples include the Forest Practices Code of British Columbia and the British Columbia Oil and Gas Commission Operating Guidelines, which provide direction to the forestry and petroleum sectors respectively. These regulatory tools include guidance for conducting development activities in an environmentally acceptable manner.

3.3.1.2 Results-based

The B.C. provincial government has undertaken a comprehensive review of the regulatory regime as part of its New Era program, and it is moving toward results-based regulatory tools for land and resource management. Results-based tools achieve public policy objectives by establishing regulations that establish performance goals or desired outcomes, standards or end results rather than prescriptive methods. This approach has been adopted to provide greater flexibility and allow developers to achieve these results in the most efficient and effective manner, while still providing the same level of protection. This approach is intended to promote innovation and clearly differentiate acceptable and unacceptable conditions.

Results-based regulatory tools are comparatively new in the Muskwa-Kechika case study region. The first example was the Fort St. John Forest Practices Code Pilot Project (Fort St. John Code Pilot) initiated in 1999. Three forestry companies and the provincial Small Business Forest Enterprise Program developed a cooperative Sustainable Forest Management Plan for the Fort St. John Timber Supply Area. This provides strategic guidance for local operational plans. The management plan reflects LRMP objectives, the performance objectives of the Canadian Standards Association sustainable forest management system, and the CCFM sustainable forest management criteria (available on-line at: www.for.gov.bc.ca/hfp/rbpilot/canfor_ftstjohn/canfor_ftstjohn_Detailed%20Proposal.pdf).

Another innovative example of results-based regulation is the M-KMA oil and gas pre-tenure plans (see Section 2.3.8.5), which included specific conservation targets such as maximum allowable habitat disturbance. The pre-tenure plans were designed to be consistent with the sustainable forest management framework developed for the Fort St. John Code Pilot (MSRM 2004).

3.3.2 Fiscal Tools

Fiscal tools include general revenue distribution, targeted fees and levies, and fiscal incentives and market instruments.

One group of fiscal policy tools raise revenues through involuntary taxes or levies and direct some or all of these revenues toward public policy objectives such as conservation. Specific fiscal instruments include licence fees, user fees or access charges that are earmarked to provide or enhance specific goods or services. In some cases, these fees are transferred directly to help provide the goods or services for which the fees are charged (e.g., under the B.C. Habitat Conservation Trust Fund, a portion of fishing or hunting licence fees is used to purchase or enhance habitat and associated fishing or hunting opportunities; see Section 2.2.5.3).

Other fiscal policies can be designed to change behaviours or encourage new behaviours by providing a fiscal incentive to land users (individuals, companies, etc.). Fiscal incentives are part of a wider group of market-based instruments that use economic and market logic to encourage desired behaviours. An example of a fiscal incentive for

conservation is the current federal program that provides grants to improve energy efficiency in homes, thereby reducing greenhouse gas emissions.

3.3.3 Muskwa-Kechika Case Study Best Practices

The unique land use planning and conservation initiatives within the Muskwa-Kechika case study region include a number of best practices applicable to boreal forest working landscapes. Many of these best practices resulted from the regional multi-stakeholder LRMP processes completed in northeastern British Columbia (see Section 2.2.1). Initiatives in the Yukon and N.W.T. portions of the case study region focus more on emerging co-management agreements between First Nations and the territorial and federal governments.

Table 9 summarizes best practices identified by the consulting team, interviewees and workshop attendees. At present, most innovation in this region has involved regulatory tools, and the use of fiscal incentives is limited.

Table 9. Regulatory and fiscal best practices identified in the Muskwa-Kechika case study.

Best Practice	M-KMA	Northeastern British Columbia	Case Study Region	National Applicability
Regulatory Tools				
LRMPs: regional, consensus-based, land and resource management planning processes to establish comprehensive landscape-level plans that balance conservation and economic objectives (see Section 2.2.1).	√	√	√	Yes for lightly tenured areas
M-KMA legislation: established conservation vision and Advisory Board with stakeholder representation, governance structure, and legislated trust fund for research and implementation of a large conservation area (see Sections 2.3.2 and 2.3.3).	√	√		Yes
M-KMA legislation: requirement to establish local strategic plans and operational instruments linking the conservation vision for the M-KMA with regulatory decision making (see Sections 2.3.2 and 2.3.3).	√	√		Yes
LRMPs: conservation biology-based design, including core protected areas, special management buffers and working landscapes (see Section 2.2.1).	√	√	√	Yes for lightly tenured areas
M-KMA legislation: requirement to complete pre-tenure planning activities prior to selling oil and gas mineral rights for development (see Section 2.2.3.2).	√	√		Yes for lightly tenured areas
Thresholds: suite of 17 specific conservation and social indicators and targets established in results-based M-KMA oil and gas pre-tenure plans to help link management objectives with on-the-ground implementation (see Section 2.2.3.2).	√			Yes
Sustainable Resource Management Plans: provincial initiative to produce integrated land and resource management plans that integrate management of other planning processes such as LRMPs and landscape unit objectives into a comprehensive, single source of information for areas of 500 to 1,000 km ² (see Section 2.2.5.1).	√	√		Yes

<p>Cumulative Impact Management Framework: a “made for northeastern British Columbia” framework including regional assessment, screener tool for OGC review, impact management techniques, and thresholds linked to LRMP plans (see Section 2.2.5.4).</p>		√		Yes
<p>Memorandum of Understanding on Forest Stewardship for the Kaska Traditional Territory: enables the Kaska Forest Resources Stewardship Council to initiate ecosystem-based forest planning that integrates Kaska traditional knowledge with forestry and ecological science in the planning processes.</p>			√	Yes for lightly tenured areas
<p>Yukon Government Kaska Bilateral Agreement: will facilitate the co-management of issuance of oil and gas rights in southeastern Yukon.</p>			√	Yes for lightly tenured areas
<p>Deh Cho Interim Measures Agreement: lands withdrawn from development for up to five years until a final agreement and land use planning can be completed; 10.1 million ha of these lands will receive protection in an interconnected network of culturally and ecologically significant areas.</p>			√	Yes
<p>Deh Cho Cumulative Effects Indicators, Thresholds and Limits of Acceptable Change: a suite of 18 social, cultural, ecological and land use indicators and candidate thresholds developed for the Deh Cho Land Use Planning Committee for land use planning and cumulative effects management (Salmo et al. 2004).</p>			√	Yes
Fiscal Tools				
<p>Muskwa-Kechika Trust Fund: M-KMA Advisory Board funding requirement established legislatively in the M-KMA Act (see Section 2.3.6).</p>	√			Yes
<p>Science and Community and Environmental Knowledge Fund: collection of a special levy on applications to drill oil and gas wells for environmental research (\$1 million) allocated annually for nine years. Research funds are intended to enhance land use planning and regulatory decision-making processes for achieving conservation objectives (see Section 2.2.5.2).</p>		√		Yes

4. CONCLUSIONS AND RECOMMENDATIONS

Canada's boreal forest is facing rapidly increasing demands on its ecology and its human inhabitants. The greatest challenge in boreal forest conservation is to develop practical and effective tools to translate broad, landscape-level objectives into local, on-the-ground decision making across multiple jurisdictions. The regulatory and fiscal tools needed to accomplish this must:

1. Reflect a **clear vision** of the desired balance between social, ecological and economic values. This requires understandable and measurable objectives, indicators and targets that are consistently applied and enforced.
2. Be **flexible and complementary** to handle the large geographic areas and long time frames over which cumulative impacts on conservation values are expressed. This requires tools that apply to both local and regional scales and that address both short- and long-term effects.
3. Encourage **stakeholder participation and support**. Because we all contribute to cumulative impacts in the boreal forest, we must all be part of the solution.

The Muskwa-Kechika case study region encompasses portions of two territories and one province and includes, arguably, the most innovative and significant legislatively established conservation area in North America. The case study region has a history of partnership between First Nations, public stakeholders, industry and government in developing pragmatic solutions to balance conservation and economic objectives.

The Muskwa-Kechika case study, in particular the Muskwa-Kechika Management Area network established by the regional LRMP process, provides a sustainable development model for Canada's boreal forest. This science-based network of protected and special management areas was made possible by the existence of clear government policy and political will, the shared vision and support of major players in the region, and a legislated mandate and implementation framework.

It must be acknowledged that the M-KMA initiative is very recent and the challenging task of implementing this shared vision is in its early stages. Ultimate success in protecting ecological and wilderness values in this special management area will depend on the ability of those responsible for implementing the vision through local strategic plans and decision-making processes.

Time will also tell whether the existing regulatory standards and processes will be sufficient to achieve the B.C. government's economic development goals and to maintain the level of environmental change within acceptable limits on the remainder of the land base in northeastern British Columbia. For the areas of Yukon and the Northwest Territories immediately adjacent to the M-KMA, implementing the vision must await the resolution of land claims, which will enable the next steps to be taken in developing conservation and economic development policy objectives.

4.1 RECOMMENDATIONS

A principal objective of the Muskwa-Kechika case study analysis was to identify pragmatic, nationally applicable recommendations on how regulatory and fiscal policy can promote conservation in the boreal forest. The consultants' analysis has identified a number of best practices in the Muskwa-Kechika case study region, all of which could be considered nationally to promote conservation in the boreal forest. In addition to these best practices, there are opportunities in three key regulatory and fiscal policy areas that would promote conservation in the Muskwa-Kechika case study region and other areas of the boreal forest.

Recommendation 1 – Based on interviews, research and a regional workshop, the consultants recommend that the NRTEE encourage further research into policy options that promote the integration of Aboriginal treaty and land claims discussions with landscape-level conservation planning on working landscapes in the boreal forest. The case study analysis illustrates the links between successful boreal forest conservation strategies and resolution of land claims and treaty concerns by federal and territorial government agencies. The consultants believe that an opportunity exists to demonstrate the integration of these government policy objectives and that, through its prior work on Aboriginal issues and boreal forest conservation objectives, the NRTEE is well positioned to play an important role in highlighting this opportunity to decision-making bodies such as the Cabinet Committee on Aboriginal Affairs (chaired by the Prime Minister).

Rationale:

Unresolved First Nations land claims and treaty issues are a significant barrier to efforts to address conservation objectives in the boreal forest. These unresolved concerns preclude the establishment of true multi-stakeholder land use planning initiatives such as those illustrated in British Columbia's LRMP processes. Aboriginal participation in regionally based land use planning processes is critical. The partnership and co-management approaches critical to the success of conservation objectives also provide opportunities for First Nations to protect biological resources and cultural practices and to achieve land claim and treaty right protection objectives.

An opportunity exists to link boreal forest conservation objectives and First Nations treaty and land claims aspirations more effectively through the implementation of regional multi-party land use planning initiatives. Illustrating and promoting this opportunity could be appropriately undertaken by the NRTEE.

Recommendation 2 – The NRTEE should highlight the research on conservation thresholds in northeastern British Columbia and the adjacent Northwest Territories, as well as the policy and regulatory initiative to establish thresholds in pre-tenure planning processes in the M-KMA. The precedents established by this work could provide nationally applicable approaches to guide economic development by providing clear “rules of the road” for all major players.

Rationale:

Numerical thresholds have been identified as one of the most efficient and effective regulatory tools in managing both the project-specific and cumulative effects of development. Air and water quality criteria have been developed individually and cooperatively by the federal, provincial and territorial governments to provide long-term protection to the environment. These established criteria demonstrate both the inherent value and the practicality of thresholds for boreal forest conservation. Thresholds can also be linked to sustainable development indicators proposed by the NRTEE (2003b).

The perceived regulatory advantage of thresholds is that they allow development activities to proceed without detailed review until the defined threshold is reached. Once the threshold is reached, extra review or regulation is necessary (Zeimer 1994). Harmonized thresholds are one of the best ways of managing cross-jurisdictional resources. Thresholds can also provide a framework for market-based tools such as tradeable land use credits.

Numerical threshold development presents significant challenges because science cannot provide clear, unequivocal boundaries between acceptable and unacceptable ecological conditions. Several initiatives in the Muskwa-Kechika case study region provide innovative models and the opportunity to generate forward momentum. The results-based targets and indicators identified in the pre-tenure plans for oil and gas development in the Muskwa-Kechika Management Area (MSRM 2004) provide the only known example of legislated ecological thresholds. Candidate ecological and land use thresholds have also been developed for other areas in northeastern British Columbia and the Deh Cho land claim area as part of studies funded, respectively, by the Science and Community Environmental Knowledge Fund and Muskwa-Kechika Advisory Board (see Section 2.2.5.4) and by the Deh Cho Land Use Planning Committee.

The NRTEE is uniquely positioned to lead the development of pragmatic, science-based limits of acceptable change for the boreal forest because of its recognized, independent status. Such an initiative would also build on earlier NRTEE work on sustainable development indicators (NRTEE 2003b).

Recommendation 3 – The NRTEE should promote the establishment of a pilot project to develop a market-based system for allocating “land use or surface access units” in areas of the M-KMA where oil and gas pre-tenure plans have been established with conservation thresholds.

Rationale:

The unique decision to establish thresholds as part of the operational planning process in the M-KMA presents an equally unique opportunity to apply market-based principles in the development of a demonstration model that could be proposed for actual implementation. The NRTEE should take advantage of this opportunity.

In partnership with the Muskwa-Kechika Advisory Board and the British Columbia Ministry of Sustainable Resource Management, the NRTEE should establish a surface access market pilot project. The establishment of market-based instruments to “allocate” land use or access credits would encourage oil and gas, seismic, forestry and other users requiring roaded or other surface access to locate disturbances in the most efficient manner, that is, to maximize the economic value derived from available surface disturbance while maintaining wildlife and conservation objectives. Fees from auctions or other mechanisms to allocate surface disturbance units could be targeted for conservation objectives such as reclamation or research.

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APPENDIX 1

Questionnaire for Muskwa-Kechika Case Study

1. PURPOSE OF QUESTIONNAIRE

Few places in the world can match the environmental significance of the Muskwa-Kechika Management Area (M-KMA). Twice the size of Vancouver Island, the Muskwa-Kechika is located in North-Eastern British Columbia, encompassing mountains in the west and vast boreal plains and muskeg in the east. It is recognized internationally for its ecological significance and for the innovative vision for conservation that established the M-KMA with its *protected areas* and *special management areas* where carefully managed resource development was anticipated.

As part of the *conserving Canada's Natural Capital: the Boreal Forest Program*³, the National Roundtable on the Environment and the Economy (NRTEE) has retained Salmo Consultants and R. McManus Consulting Ltd. to prepare a case study on the Muskwa-Kechika Management Area to:

- Identify key regulatory and fiscal barriers to conservation in the M-KMA and adjacent regions
- Identify recommendations on how regulatory and fiscal policies can promote conservation in the M-KMA and adjacent regions
- Identify regulatory and policy “best practices” being employed in the M-KMA and surrounding region to balance conservation and economic development objectives, and;
- Make recommendations on regulatory and fiscal policies which would be appropriate for promoting conservation and economic development objectives at a national level consistent with the NRTEE boreal forest program.

Questionnaire:

Respondent information:

Name:

Title:

Phone number:

E-mail address:

Organization:

Date:

Questionnaire completed by:

³ www.nrtee-trnee.ca/eng/programs/Current_Programs/Nature/Nature-SOD-Report/Nature_SOD_E.pdf

2. KEY REGULATORY AND FISCAL BARRIERS TO CONSERVATION IN THE M-KMA

The NRTEE identifies a number of systemic barriers to conservation in Canada including:

- Lack of political will and accountability by governments to support conservation objectives
- Lack of conservation planning at a landscape level
- Key stewards are often not “at the table”
- Lack of economic benefits and incentives for key stewards
- Failure to integrate the true costs and benefits of nature
- Lack of financial resources to support conservation and partnerships

In the context of the list of barriers to conservation identified above by the NRTEE, what fiscal or regulatory policies have worked or not worked in promoting conservation of biological resources and economic development in the M-KMA and adjacent areas in NEBC or the southern Yukon?

2.1 What has worked?

2.2 What has not worked?

2.3 What improvements would you recommend?

3. POLICY BEST PRACTICES

In the context of the list of barriers to conservation identified above by the NRTEE identify regulatory and policy “best practices” being employed in the M-KMA and surrounding region to balance conservation and economic development objectives, that would be appropriate in other areas:

3.1 Fiscal and regulatory policies being applied in the M-KMA:

3.2 Fiscal and regulatory policies that might apply to areas adjacent to the M-KMA in NEBC and the southern Yukon;

3.3 Fiscal and regulatory policies that might apply to areas throughout Canada

4. GOVERNANCE

The M-KMA governance structure includes a specific legislative act which outlines specific land use management objectives, intergovernmental management processes to implement the objectives in the act, and an advisory committee with a legislated mandate to oversee the implementation of the objectives in the act. With respect to this structure, please respond to the following questions:

4.1 Does the M-KMA management structure contribute to achieving the conservation and economic development objectives of the M-KMA? If yes, please describe how governance is effective in achieving these objectives;

4.2 If no, please describe how the governance structure for the M-KMA could be improved?

5. RECOMMENDATIONS FOR NATIONAL APPLICATION

In the context of the list of barriers to conservation identified above by the NRTEE, what recommendations would you make regarding fiscal or regulatory policies which could enhance conservation *and* economic development objectives in M-KMA and/or in the adjacent M-KMA regions of NEBC or the southern Yukon? Please describe these recommendations and how you believe that they would enhance conservation *and* development objectives?

Would any of these recommendations be appropriate for promoting conservation and economic development objectives at a national level? Please add comments as appropriate.

5.1 Recommendation 1 –

5.2 Recommendation 2 –

5.3 Recommendation 3 –

5.4 Recommendation 4 –

5.5 Recommendation 5 –

On behalf of Terry Antoniuk and myself, thank you for the effort to complete this survey

APPENDIX 2

Interviewees for the M-KMA Case Study

Organization	Representative
B.C. Ministry of Energy and Mines	Randall Sweet, Land Use Manager Errol Dennison, Consultant
B.C. Ministry of Forests	Dave Hails, District Manager, Fort Nelson Forest District
B.C. Ministry of Sustainable Resource Management	Howard Madill, M-KMA Program Manager and Inter-Agency Management Committee Member Graeme McLaren, Chair, Pre-Tenure Planning Working Group
B.C. Ministry of Water, Land and Air Protection	Andy Ackerman, Regional Manager and Inter-Agency Management Committee Member Pierre Johnstone, M-KMA Wildlife Management Plan
B.C. Oil and Gas Commission	Bob Purdon, Sr. Aboriginal Prog. Specialist Tom Ouellette, Director, Aboriginal Affairs
Yukon Energy, Mines and Resources	Myles Thorp, Manager Forest Planning and Development
Yukon Ministry of Environment	Bill Oppen, Former ADM
Resource Sector – Oil and Gas	Brad Herald, Canadian Association of Petroleum Producers (CAPP) Shira Mulloy, CAPP
M-K Advisory Board	David Luff, Member David Stuart, Former Member
Resource Sector - Guide Outfitters Association	Ross Peck, Guide Outfitter, M-KMA Advisory Board Member
Environmental Sector (Local)	Wayne Sawchuk, Chetwynd Environmental Society, M-K Advisory Board Member
Environmental Sector (Provincial)	George Smith, Canadian Parks and Wilderness Society, M-K Advisory Board Member
First Nations	Dave Porter, Kaska Dena FN
Technical – Upper Sikanni Management Plan Review	Brad and Diane Culling, Diversified Environmental Services

APPENDIX 3

Workshop Participants

Name	Title	Organization	City
Borland, Bill	(NRTEE Member) Program Co-chair	Director, Environmental Affairs, JD Irving Limited	Saint John
Carter, Wendy	(NRTEE Member) Program Co-chair		North Vancouver
Ackerman, Amy	Regional Manager	B.C. Ministry of Water, Land and Air	Fort St. John
Addison, Paul	Director General	Natural Resources Canada	Victoria
Benton, Scott	Director Regional Operations	B.C. Ministry of Water, Land & Air Protection	Victoria
Bittman, Kim	Manager	Teck Cominco	Vancouver
Bombay, Harry	Director of Strategic Initiative	National Aboriginal Forestry Association	Ottawa
Butterworth, Eric	Senior Biologist	Ducks Unlimited Canada	Edmonton
Campbell, David	Coordinator	Muskwa-Kechika Advisory Board	Fort St. John
Campbell, Karen	Staff Counsel	West Coast Environmental Law	Vancouver
Carrs, Rob	Manager of B.C. Operations	Canadian Association of Petroleum Producers	Calgary
Choury, Christine	Media & Public Relations Advisor	National Round Table on the Environmental and the Economy	Ottawa
Churchill, Brian	Consultant	Chillborne Environmental	Fort St. John
Connor, Mike	Director	Yukon Ministry of the Environment	Whitehorse
Dickie, Angus	Muskwa-Kechika Advisory Board Member	Fort Nelson First Nation	Fort Nelson
Doyle, Derek	Commissioner	B.C. Oil and Gas Commission	Fort St. John
Erlandson, Gordon	Workshop Facilitator	Erlandson Consulting Inc.	Victoria
Forest, Tara	Associate Coordinator	Muskwa-Kechika Advisory Board	Fort St. John
Hébert, Karen	Policy Advisor	National Round Table on the Environment and the Economy	Ottawa
Herald, Brad	Environmental Advisor	Canadian Association of Petroleum Producers	Calgary
Huebert, Ed	Deputy Minister of Environment	Yukon Ministry of the Environment	Whitehorse
Johns, David			Victoria
Johnstone, Pierre	Wildlife Biologist	B.C. Ministry of Water, Land and Air Protection	Fort St. John
Kuhn, Kevin		Canfor	Fort Nelson
Langin, Herg	Regional Director, Muskwa- Kechika Office	B.C. Ministry of Sustainable Resource Management	Fort St. John

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Name	Title	Organization	City
Lewis, Wayne	Woodlands Manager	Abitibi-Consolidated Company of Canada	Mackenzie
Luff, David	Managing Partner	Inukshuk Consulting Inc.	Calgary
MacLean, Norm	Wildlife Biologist	LGL Ltd.	Whitehorse
Madill, Howard	Sust. Econ. Development Manager – Peace Region	B.C. Ministry of Sustainable Resource Management	Fort St. John
Malley, Diane Frances	(NRTEE Member) President	PDK Projects, Inc.	Nanaimo
McManus, Robert		R. McManus Consulting Ltd.	Calgary
Mitchell, Warren	Regional Director	British Columbia Land Use Coordination Office	Nanaimo
Mueller, Fritz	Northern Conservation Division	Canadian Wildlife Service	Whitehorse
Oppen, William	Consultant	William A. Oppen and Associates	Dawson Creek
Peck, Ross	Chair	Muskwa-Kechicka Advisory Board	Fort St. John
Pokiak, Roslyn	Chief	Halfway River First Nation	Wonowon
Porter, Dave			Edmonton
Sawchuk, Wayne	Muskwa-Kechika Advisory Board Member	Chetwynd Environmental Society	Chetwynd
Skarstol, Steve	Foothills Environmental Region Lead	Encana Corporation	
Smith, George	National Conservation Director	Canadian Parks and Wilderness Society	Gibsons
Sparling Erik	Research Associate	National Round Table on the Environment and the Economy	Ottawa
Staniland, Rob	Environmental Biologist	Talisman Energy Inc.	Calgary
Stuart, David	Senior Director	Petro-Canada	Calgary
Sweet, Randall	Land Use Manager	B.C. Ministry of Energy and Mines	Victoria
Symington, Neil	Business Analyst	Encana Corporation	Calgary
Tate, Leilah	Director/Community Relations & Technical Services	B.C. & Yukon Chamber of Mines	Vancouver
Thorpe, Myles	Manager	Yukon Energy, Mines and Resources	Whitehorse
Waberski, Michael		Waberski Darrow Survey Group Ltd.	Fort St. John
Walker, Jim			Victoria
Wolf, Brian	Band Manager	Prophet River First Nation	Fort Nelson
Wolf, Liza	Chief	Prophet River First Nation #546	Fort Nelson