

# Muskwa-Kechika Management Area Framework for Strategic Research Plan

## 1. INTRODUCTION

The Muskwa-Kechika is an area of unique wilderness in northeastern British Columbia that is endowed with a globally significant abundance and diversity of wildlife. It is one of the few remaining large, intact and almost unroaded areas south of the 60<sup>th</sup> parallel. In addition to its environmental values, the Muskwa-Kechika contains significant resource values including potential oil and gas reserves, minerals and timber.

In 1992, British Columbia began developing a provincial land use strategy through regional and sub-regional Land and Resource Management Planning. A major component of the initiative was the Protected Areas Strategy, which provided a set of policies to guide the selection and management of protected areas. In 1997 government accepted the multi-stakeholder Land and Resource Management Planning (LRMP) table recommendations in Fort St. John and Fort Nelson for special management of the Muskwa-Kechika area, including the establishment of 11 new protected areas. The Muskwa-Kechika Management Plan was adopted through Order-in-Council in October of that year.

In June 1998, the *Muskwa-Kechika Management Area Act* was passed. This legislation created an advisory board for the Muskwa-Kechika and a \$2 million Muskwa-Kechika Trust Fund. One of the primary purposes of the trust fund is to support wildlife and wilderness resources of the management area through research. More specifically, trust funds are to be used to conduct research into wilderness management, fish and wildlife biology and ecology with emphasis on large predator/prey ecosystems and into the integrated management of wilderness, wildlife, fish, recreation and resource development.

For the purposes of this document wilderness has been defined as follows:

*"an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain." By definition, then, it was a place where vehicles would not be allowed, where no permanent camps or structures could be made, where wildlife and its habitat would be kept in as primitive a condition as possible. [reference: The U.S. Wilderness Act of 1964].*

## 2. PURPOSE

The purpose of this document is to set out a long-term strategic framework for research which advances the legislated requirements of the *Muskwa-Kechika Management Area Act*, and, thereby, realizes the vision developed by the sub-regional land use planning tables for the area. The plan will also enable the achievement of the following goals.

### 3. GOALS

A main consideration in establishing the Muskwa-Kechika Management Area (MKMA) was the need to develop a world class research capability in partnership with the University of Northern British Columbia's (UNBC) Northern Land Use Institute and other institutions to provide basic information on: 1) the unique wildlife and wilderness resources; and 2) how recreation, development and resource extraction can be successfully integrated into these unique wildlife and wilderness resources. Goals of the research strategy are to:

- Provide leadership and direction for the scientific community interested in conducting research in the area;
- Develop the knowledge needed to assist resource managers to maintain the wilderness and ecological characteristics of the area and to manage the social and resource values derived from the area; and
- Communicate the new information and knowledge to the resource management agencies, First Nations, resource user groups, and the public, and assist these groups in applying that knowledge to resource management issues.

### 4. GUIDING PRINCIPLES FOR RESEARCH

The MKMA Advisory Board has identified two sets of principles to guide research activities in the area. The *content principles* provide direction as to the type of research to be conducted, while the *operational principles* address how such research activities should be carried out.

#### 4.1 Content Principles

Research conducted in the MKMA shall:

- Focus on understanding the Muskwa-Kechika's ecosystems (i.e., natural processes such as, tropism, gene flows, migration, and disturbance),
- Examine the effect of human actions in altering the natural system, and methods to reduce these effects and to restore disturbed ecosystems to their natural state;
- Examine methods to maintain the wilderness quality, the abundance and diversity of wildlife, and the ecosystems on which they depend;
- Be responsive to the intent of the *Muskwa-Kechika Management Area Act* and the needs of First Nations and stakeholders in the area.

#### 4.2 Operational Principles

Research projects shall be reviewed, approved, and carried out in a manner that:

- promotes long term continuity of the research by ensuring projects complement each other and create linkage between completed projects and the on-going initiatives.
- achieves high professional standards including quality, credibility, integrity, and responsiveness in all research undertakings;
- utilizes processes of peer review and oversight;
- is timely so that field studies can be completed during the appropriate field season;
- is as non-intrusive as possible to minimize the effects on wildlife and the wilderness resource;
- ensures that all structures deemed necessary for research are consistent with objectives of the Muskwa-Kechika Management Area Act;
- maximizes research productivity by using diverse and creative approaches which focus on high priority issues;
- ensures that the evaluation of proposals will include an analysis of the impacts (both social and biophysical) and potential benefits in an open and transparent process;
- ensures research is consistent with the applicable First Nations and other protocol agreements;
- provides for the dissemination of research results back to the communities (First Nations and Non-First Nations), decision makers, and stakeholders.

## **5. RESEARCH PROGRAM COMPONENTS**

### **5.1 Research**

The facilitation and funding of scientifically rigorous research forms the core of the strategic research plan for the MKMA. Scientific expertise from government agencies, universities and private institutions will be coordinated to produce state-of-the-art knowledge about the area's wildlife and wilderness characteristics.

After the MKMA Advisory Board determines its annual research priorities, a call for proposals will begin no later than November 1 of each year and end on December 31. Proposals may be submitted at any time but will be subjected to a 2 month peer review process beginning December 31 that will provide preliminary recommendations to the board. Final recommendations will be made to the MK Trust Fund's Trustee and funding will be approved by early May. A form\* containing review criteria will be provided by UNBC's Northern Land Use Institute, which reviewers will use to ensure that high professional standards are maintained throughout the process. Single and multiple year funding will be considered, and a yearly summary of research activities will be provided to the Advisory Board (\*See Appendix 3).

Research findings will be disseminated through peer-reviewed reports and publications and UNBC's Northern Land Use Institute's Community Lecture Series for the MKMA. Workshops, meetings and symposia may also be used to report the results of research activities and findings.

Scope of Subject Matter - Under the Muskwa-Kechika Management Area Act, research supported by the Muskwa-Kechika Trust Fund is limited to the following two purposes:

- wilderness management, fish and wildlife biology and ecology, with emphasis on large predator/prey ecosystems;
- integrated management of wilderness, wildlife, fish, recreation and resource development.

Note: Both natural and social sciences may be addressed by trust fund projects.

## 5.2 Application

Communicating and applying information gained through research is a major goal of the research strategy. Achieving this goal requires effective communication and coordination between scientists, managers, First Nations, industry and the general public. Examples of possible activities include:

- updating the Muskwa-Kechika Annotated Bibliography and associated databases;
- extending UNBC's Northern Land Use Institute Distinguished Lecture series to communities adjacent to the management area;
- community workshops and presentations on wilderness management issues in northern communities; and
- developing training and educational initiatives for northern residents;
- extending the workshops, lecture series and communication to the rest of B.C., Canada, and further as appropriate.

## 5.3 Research Themes

The Board will identify priority issues and themes for research proposals annually for each of the funding categories. The five funding categories for M-K research proposals are outlined as follows:

- Ecosystem relationships/maintenance - how do ecosystem components operate in the MKMA and how can their integrity be maintained over time;
- Restoration of ecosystem components - developing strategies to restore and manage natural and human disturbances (including resource development) on the Muskwa-Kechika ecosystems; how management occurs and is it occurring effectively;
- Predator/prey relationships - what are the interrelationships between each species and how are those roles affected by natural and human activities;
- Recreation management - understanding the effects of recreation use and recreation management strategies on the Muskwa-Kechika's ecosystems, wilderness attributes and visitor experiences; and

- Historical and cultural processes - understanding the historical and current interrelationships of humans (culture) and the Muskwa-Kechika ecosystems.

These themes are elaborated upon in Appendix 2.

## **6. COOPERATION AND PARTNERSHIP ACTIVITIES**

To achieve the strategic goals for research in the MKMA, the MK Advisory Board will work cooperatively through partnerships with academic and private institutions and government agencies. The initial collaborative partnership is between the University of Northern British Columbia's Northern Land Use Institute and the MK Advisory Board.

This partnership along with any future agreements with other partners will facilitate the identification of research needs and priorities, development and conduct of research programs and projects and the application of research findings to management programs and policy issues. In addition, cooperative activities will include exchange programs, support of visiting experts, sponsorship of lectures, workshops and symposia, and involvement in professional activities and societies. Mutual supportive relationships with professional societies and interest groups will also be developed.

## **7. SUPPORT**

Primary support (i.e., staff and resources) for achieving the goals for research in the Muskwa-Kechika will come from the Muskwa-Kechika Advisory Board, government agencies and the UNBC's Northern Land Use Institute. Private contractors will also be used when appropriate.

## **8. FUNDING**

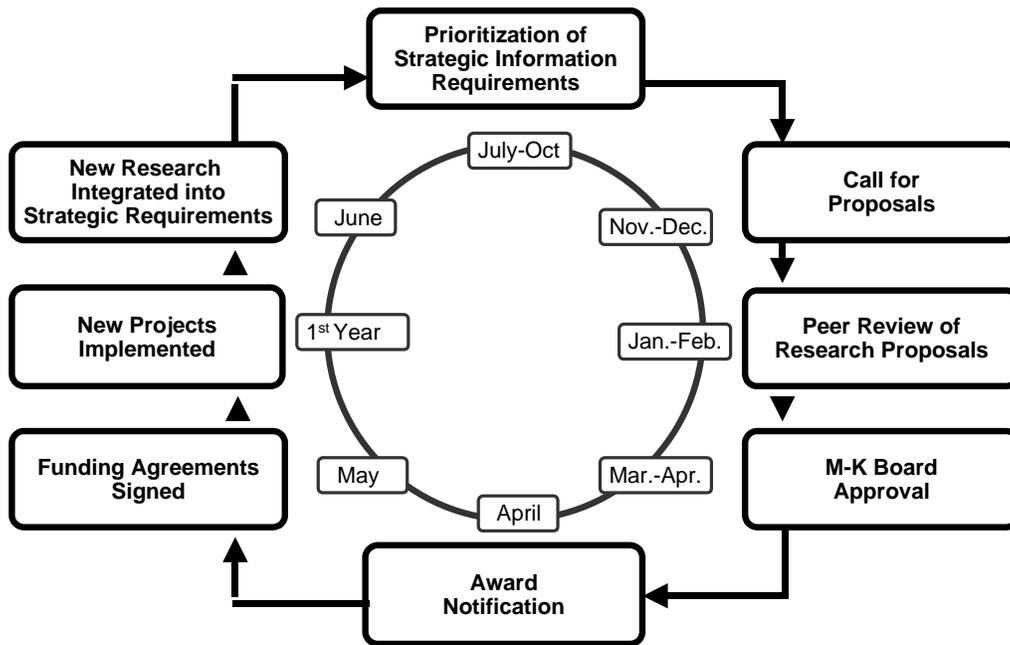
Funding to achieve the MKMA's strategic research plan will come primarily from the Muskwa-Kechika Trust Fund. In addition, project funding from other sources such as NSERC, NLUI, academia, and funding partnerships with other funds such as the Habitat Conservation Trust Fund and the Oil and Gas Environmental Fund will be developed. Researchers are encouraged to pursue additional sources of funding available to them. Preference will be given to UNBC and applicants who partner with researchers from UNBC.

## **9. OVERSIGHT**

The Muskwa-Kechika Advisory Board through the Research Plan Framework will provide oversight and broad, strategic direction to research activities in the management area. UNBC's Northern Land Use Institute by means of a steering committee consisting of UNBC faculty, Muskwa-Kechika Advisory Board representatives, and government staff will facilitate oversight.

## 10. IMPLEMENTATION

The implementation process for the research contributions from the M-K Trust Fund should follow a twelve-month cycle involving prioritization, proposal call, peer review, Advisory Board endorsement, notice of awards, and monitoring performance of the projects. The cycle for this proposed process is shown in Figure 1.



**Figure 1: Steps in the M-K Funded Research**

For a detailed list of the tasks involved in the research cycle, please see Appendix 1.

## 11. TIMEFRAME

The expected life span of this framework is five years. The document will be reviewed at that time (year 2005) and revised as necessary.

## **APPENDIX 1**

Each phase of the research cycle involves a number of detailed tasks to be completed and some of the steps will require the participation of a number of stakeholders identified in the primary partnership agreement between the M-K Advisory Board, their representatives, and the Northern Land Use Institute at UNBC. An initial explanation of the implementation process for the identified steps follows:

### **1. Priorizing**

The objective of this step is to ensure that all possible topics for research funding are defined, to assess their importance to the strategic information requirements, and to set out a set of priorities for a subsequent call for proposals. Selection of individual projects for funding will be based upon research themes identified under the funding categories and upon a set of established criteria such as:

- Quality of the proposal and the research team;
- Significance of the issue or resource;
- Severity of the threat, problem or need;
- Ability to complement ongoing or completed projects in the Muskwa-Kechika area;
- Potential to make significant long-term contribution to knowledge;
- Potential for timely management application;
- Definition of the problem, objectives and methods;
- Feasibility and probability of accomplishing objectives;
- Transferability of results to other situations;
- Cost effectiveness and potential for cost sharing or partnerships; and
- Conformity with Muskwa-Kechika strategic goals and priorities.

This process for refining the research themes will involve a variety of consultation processes to ensure a broad exchange of views for each of the funding categories.

### **2. Proposal Call**

The Request for Proposals (RFP) is planned for the Fall. By means of various channels of communication, notice will be given to the research community and their institutions that proposals pertaining to the mandate of the M-K are being solicited.

### **3. Peer Review**

Each proposal will be submitted to a peer review process based upon the standard criteria referenced in the "Proposal Review" section and the importance of the proposal to the priorities set for the funding cycle. The submissions will be judged for their technical merit and research design.

#### **4. Board Review and Approval**

The recommendations from the Peer Review process will be forwarded to the M-K Technical Review Committee for discussion and endorsement or revision. The Technical Review Committee will submit their recommendations to the M-K Board for review and subsequent submission to the Trustee of the M-K Trust Fund. The Trustee will consider the approved submissions and take the appropriate action.

#### **5. Award Notification**

Proponents of the research are notified of the decision made on their submission. If conditions arising from the peer review process occur, then the details pertaining to those conditions will have to be met.

#### **6. Contribution Agreements Issued**

Successful awards are finalized with the M-K Trustee and the contributions are transferred to the account holder.

#### **7. Project/Strategy Integration**

The objectives and scope for the newly funded projects are recorded and incorporated into the review for the subsequent year. The gaps remaining in the strategic information requirements are identified for the next round of funding.

#### **8. Reporting**

Interim and/or final progress reports will be required of all successful funding applicants. These reports will be reviewed by a peer review committee to evaluate compliance with the original proposal and academic content. Once endorsed by the peer review committee, the reports will be forwarded to the M-K Board for final approval.

#### **9. Dissemination of Research Project Results**

In consultation with the researcher, the M-K Board will have the opportunity to disseminate research results to media, academic institutions and the appropriate decision-makers as they see fit. (e.g. other LRMP's, M-K and NLUI web sites, other Land Use Institutes, etc.)

## **APPENDIX 2**

Five research themes were identified in Section 5.3 (above) as having high priority. The themes are elaborated in this Appendix to identify and illustrate through a series of potential research questions the value of the research that will be carried out in the Muskwa-Kechika area. The questions, if answered through research, will provide information and knowledge of fundamental use to resource managers, users of the area, and to others who have interests in the area.

As the Muskwa-Kechika Management Area Act emphasizes the integrated management of natural and cultural resources within the Muskwa-Kechika (M-K) region, several overall principles/approaches of each of the five research themes were identified. Both social and biophysical variables need to be incorporated in each themes' research approaches and results. Further, the historic, contemporary and future implication of most, if not all research questions generated by each group need to be incorporated in any research project. In addition, while not denying the special properties and needs of the M-K Area, whenever possible, existing models and management strategies that may have relevance to the M-K should be considered in all research projects.

The list of questions identified in each theme below is not intended to be exhaustive, nor are they intended to limit the scope of issues to be addressed through research. The list is intended to highlight issues which are of importance to the Board of the Muskwa-Kechika Trust, and which will therefore receive favorable consideration for funding. As time passes and research results are produced, the priorities of the Board may change, and the list will therefore need to be updated periodically if it is to continue to serve a useful function in guiding research efforts.

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### ***THEME 1: ECOSYSTEM RELATIONSHIP/MAINTENANCE***

**Purpose of Research:** The ecosystems within and outside the M-K influence each other. These influences include biological, physical and chemical flow and interactions across land use designation boundaries within watersheds and terrestrial ecosystems. Research on ecosystem maintenance and interactions should place the M-K within the context of M-K and neighboring Eco regions.

#### **RESEARCH QUESTIONS:**

##### ***I Baseline Data***

1. How do we define ecosystems within the M-K.

2. What are the implications of the existing administrative boundaries on species within and outside the M-K area?
3. Are there key ecosystems adjacent to the M-K that should be included within the M-K to maintain biodiversity?
4. Examine interconnectedness of the area - migration, endangered species, etc.
5. What are the natural disturbance regimes?
6. What disturbance regimes have occurred over time?
7. What is the interconnection between different disturbance regimes over the whole area?
8. What distinct terrestrial and aquatic ecosystems occur and what are the delineation's between them?
  - What is the species composition of each?
  - Are there genetic populational differences in overlapping species?
  - Are there distinct endemic rules in any ecosystems?
  - Are there genetic hotspots.
9. Where is the gene flow
  - Between protected areas
  - Between protected areas and Special Management Zones identified through the LRMP's
  - Within protected areas
  - Within special management areas
  - Between the M-K and surrounding areas
  - Between the M-K and greater Rocky Mountain ecosystem
10. What changes are observed in gene flows as development occurs in and around the M-K?
11. What are the organismal interactions in water in the M-K and how does this knowledge apply to areas outside the M-K?
12. What is the extent of undisturbed watersheds in the M-K?

13. What are "healthy" watersheds? What is the current structure?
14. What are the biological/chemical/physical flows within watersheds inside and outside the M-K?
15. What pollutants exist in the area now? What changes to pollutant levels are observed over time and what are their origins?

## ***II. Management and Maintenance of the Ecosystems***

1. What are conservation design models for the M-K and outside the area which will maintain the ecosystems/gene pools/habitats as a whole?
2. What are the appropriate spatial and temporal scales for development to maintain existing ecosystems?
3. How do principles of IRM (Integrated Resource Management) apply to M-K to ensure that traditional and regional social values are recognized and ecological values are sustained while allowing sensitive economic development?
4. What are the requirements for successful reproduction of organisms in native habitats and what impact does habitat alteration have on these breeding requirements?

## ***III. Historical References***

1. What impact has human activity had on ecosystems over the past 50+ years.
2. What did the ecosystems look like 50+ years ago?
  - What information can Paleolimnology provide to assist in determining this?
  - What information can First Nations history provide to assist in determining this?
3. What are the historic/cultural influences that affect ecosystems?

What about the M-K is important to people:

- Traditional F.N. knowledge of the area - gene flows, wildlife populations;
- Traditional F.N. practices that have affected these ecosystems;
- What do local residents, guides, trappers and hunters value in this area?

- What do non-local people value about the area?
  - How do we integrate these values into resource management decisions?
4. What non-indigenous plant and animal species exist and where are they from?

IV. Control Areas

What is the role of control areas in the management of the M-K? How do they function, and what information do they provide?

Is there validity in establishing control areas within parks and SMZ for impact over time at the 4 different levels:

- Specific sites (i.e. control for human access)
- Watersheds (as an example of predator /prey interaction)
- Northern Rockies Park (as an example of permissible land uses within a B.C. Park).
- Ecological Reserves

**Table 1 - Example only - Not suggested restrictions on activities.**

		Intensity							
<b>Size</b>	<i>Specific Sites</i>				X				
	<i>Watershed</i>			X	MIN				
	<i>Northern Rockies Park</i>	X	X						
	<i>Upper Sikanni - Eco Reserves</i>	X	X	X	X	X	X	X	
		No Forestry	No gas or	No Hunting	No access	No fishing	No hiking	No riverboat	No planes

1/ What kinds of control sites with respect to land use and development are required?

2/ How do we design our control sites to reflect areas that are under disturbance - incorporating elements of size and intensity of human use?

3/ What are the effects of disturbance within this ecosystem?

4/ What are the impacts of land use designation?

V. *Cumulative Effects*

1. What are the cumulative effects of various forms of development on the species within this M-K?

2. Is it possible to design a management system which predicts the cumulative effects of a proposed development on species or habitats within the M-K?

VI. *Access*

1. What are the effects of various forms of linear access (seismic lines, pipelines, trails and roads) on ecosystems within the M-K?

2. What are the effects of various forms of restoration of access on ecosystems in the M-K?

## ***THEME 2: PREDATOR/PREY RELATIONSHIPS***

**Purpose of Research:** To determine the interrelationships between species and how those roles are affected by natural and human activities. Recognizing that specific issues will arise at the individual species level, the applicant must provide a rationale explaining how their specific study contributes to the broader understanding of predator/prey relationships in the M-K. Further, given that there is considerable existing information, including scientific, traditional, and local knowledge relative to predator prey relationships in the M-K, applicants should make full use of this information.

Below are some examples of the questions that need to be answered through research on predator/prey relationships.

### RESEARCH QUESTIONS

#### ***I. Comparison of “Managed” and “Pristine” Systems***

- 1/ What is the historical context of predator and prey populations in the Muskwa-Kechika?
  - What can we learn from historic population levels?
  - What can we learn from changes in hunting and trapping pressures, traditional use and technological advances (e.g. river boats)?
  - What can we learn from historical habitat management such as the effects of burning on predator and prey populations?
  - What can we learn from predator control programs?
  - What have the impacts of domestic and introduced species been?
  - Can we use the historical context to infer the impact of different management regimes in the future?
- 2/ What are the driving factors in the maintenance of present ecosystems, including their biodiversity?
  - How have the interests of various stakeholders in different areas affected predator and prey populations?
    - social (hunters, non-hunters, urban dwellers);
    - legislative;
    - ecological/biological.
  - What is the carrying capacity of the ecosystem to support populations of both predators and prey?

- Is this capacity natural, or is it dependent on continued management of specific habitats and or species?

## ***II. Prey Habitat Relationships***

- 1/ Are there ways to evaluate the quality of specific habitats other than current methods?
- 2/ What do we need to know to identify critical habitats?
- 3/ How do we identify 'good' prey habitat in systems that are also inhabited by predators?
- 4/ Are there habitat capability mapping systems that can be used effectively in managing predator and prey species, including the interactions between species?
- 5/ What are the effects of social influences on habitat capability?
- 6/ How do we maintain links/corridors between critical habitats?
- 7/ How does the occurrence of multiple species affect habitat capabilities for various species?
- 8/ Are there critical spatial and temporal factors that influence these relationships?
- 9/ Do habitat relationships in the M-K differ from other areas?
- 10/ What are the effects of prescribed burns, wildfire and fire suppression in maintaining populations?
- 11/ What are the effects of natural disturbances on habitats?
- 12/ What are the direct and indirect effects of the introduction of domestic and introduced species on habitats?
- 13/ What are the effects of concentrations of domestic species on habitats (inter/intra species)?
- 14/ What are the relationships between habitats that are designated as high value and animal condition and reproduction?

## ***III. Biological Basis for Predator/Prey Dynamics***

- 1/ What population levels are considered acceptable to maintain a diversity and abundance of predators and prey?
- 2/ How do species interactions affect predator and prey abundance and distribution?
- 3/ What are the effects of increasing/decreasing predators on specific prey species?
- 4/ What are the effects of increasing/decreasing prey on specific predator species?
- 5/ What are the effects of increasing/decreasing prey on specific prey species?
- 6/ What are the effects of increasing/decreasing predator on specific predator species?

#### ***IV. Human/Social Influence on Predator/Prey Dynamics***

- 1/ What are the effects of human activity on predator/prey abundance and distribution?
- 2/ What are the effects of introduced species on the dynamics?
- 3/ What are the effects of human activity on animal behavior?
- 4/ What are the effects of access (e.g. industrial, recreational) on predator/prey relationships?
- 5/ How do the effects of access vary at different times of the year (seasonal)?
- 6/ What are the short-and long-term effects of access, including cumulative effects?
- 7/ What is the effect of various access scenario's (i.e. trail vs dispersed access for snowmobiles) on predator/prey dynamics?
- 8/ What are the effects of linear disturbance on predator/prey relationships such as seismic lines, pipelines, trails and all weather roads?
- 9/ How appropriate are habitat-based approaches to understanding predator/prey dynamics?
- 10/ What is the importance of multi-prey and predator interactions in the predator/prey dynamics of the M-K?
- 11/ How do industrial practices that affect natural succession influence predator/prey disturbance and abundance? (e.g. abandoned mine sites, clear cuts, seismic lines, access corridors, reclamation)

#### ***V. Best Practices***

Recognizing that there are different management emphases in different areas in the M-K, continued efforts should be made to re-evaluate existing research methods and management tools, and improve them where necessary. Although it is not the primary intent of the M-K funding to develop specific techniques, examples of technical questions that may need consideration include:

1. how appropriate are pre-tenure plans in the management of predator/prey dynamics;
2. what are the best techniques for estimating populations;
3. what are the best techniques for inventory and mapping habitats as they relate to the predator/prey dynamics; and
4. what are the best techniques for predator and prey management?

### ***THEME 3: RESTORATION OF ECOSYSTEM COMPONENTS***

**Purpose of Research:** Human influence on the landscape usually results in some level of alteration of natural habitats and ecosystems. Informed decisions need to be made about whether the nature and/or severity of the changes merit concern and action. If so, what is the target for restoration? What is the best means of restoration? When should restoration be undertaken? How does one best monitor the success of a restoration? When is remediation adequate?

Below we elaborate more fully on the types of questions that require answers in the restoration of ecosystem components. For convenience we organize the questions on a time scale (before, during, after restoration) as follows:

- (Before) Baseline and needs assessment of the ecosystem
- (During) Best management practices in restoration of the ecosystem
- (After) Evaluation of which restoration techniques/approaches worked best, and why

Please note that baseline data and needs assessment are also important components of themes 1 and 2 (above). They are included again here because the baseline data for restoration work may differ from the data requirements for predator-prey and basic ecology research.

#### **RESEARCH QUESTIONS**

##### ***I. Baseline and needs assessment of the ecosystem***

- I. What habitats exist?
- II. Where are changes expected?
- III. Does the proposed activity have an impact on the ecosystem? If so, what is the expected level of impact?
- IV. What is the definition of an acceptable level of impact - both from a biophysical and socioeconomic perspective. (Focus on areas where development is expected).

##### ***II. Restoration Targets:***

1. What are the restoration targets or objectives of disturbed areas? Is it always necessary to restore to "pristine" values?

2. What areas either inside or outside the Muskwa-Kechika area can be identified as controls for proposed areas of disturbance within the M-K?
  - What changes occur in the disturbed areas compared to the control areas over time?
  - What is the desired ecosystem condition of the disturbed area relative to the control area over a given time period?
  - Are there seasonal fluctuations in the ecosystem that need to be considered in disturbance or restoration activities?
3. How can traditional environmental knowledge be incorporated into management processes and how does it compare to information gathered using the structured scientific method?
  - What additional value is brought to management processes by incorporation of traditional knowledge?

## ***II. Best management practices in restoration of the ecosystem***

The need to develop pilot projects in the Muskwa-Kechika and/or adjacent areas (with focus on the adjacent areas) was identified in order to investigate various management practices and their effectiveness in restoring disturbed ecosystems to desired outcomes.

1. What is the Political/Economic/Social/Historical Context in which resource management decisions are made, and how do those realities affect the outcomes of decisions?
2. What are the consequences and management implications of vegetation re-growth on operational pipelines and seismic lines?
3. Is it desirable to allow vegetation to grow to full height on operational pipelines?
4. What is the impact of a series of road and well site developments? If restoration is desired, are the restoration requirements the same between sites?
5. What are the differences in effects on erosion, recreation, species, etc. between summer and winter drilling programs?
6. What management practices are best to reduce or mitigate the environmental impacts of recreational use or development of the M-K?
7. How do the various forest development management practices and their effects on the environment in areas adjacent to the M-K compare?

8. From a review of the effect of existing forestry practices and their applicability to special management objectives of the M-K, what is the best way to apply these to the area?
9. What is the comparative effectiveness of various access control methods on restricting public use of existing access roads. How can these best be applied?
10. What is the effectiveness of different seed mixes (natural vs introduced) on erosion control either in the M-K or adjacent areas?

*Lower-level planning and implementation.*

Although the questions elaborated here are primarily Ministry questions it is important for researchers to address these questions because of their independent status.

1. How is lower level planning done, and how effective is it at achieving the objectives established for the M-K through the LRMP process?
2. Can lower level planning reduce the need for restoration activities following development?
3. How is pre-tenure planning carried out? Is it achieving the goals and objectives of the LRMP's?
4. How is landscape unit planning carried out? Is it achieving the goals and objectives of the LRMP's?
5. How is fire management planning conducted and is it achieving the desired objectives of the LRMP's?
6. How is range management planning conducted and is it meeting the goals and objectives established by the LRMP's?
7. What are the information gaps that hinder development of effective lower level plans?

***III. Evaluation of which restoration techniques/approaches worked best, and why***

1. Assess existing techniques (literature review and physical investigation) for their applicability to the M-K.
2. Develop new restoration technologies and assess their efficacy in the M-K or adjacent areas.

3. Assess how traditional ecological knowledge can be integrated into restoration techniques.
4. Can a decision making model be developed for various reclamation practices (reference Eric Mohen work)?

## ***THEME 4: RECREATION MANAGEMENT***

The central paradox of outdoor recreation, and wilderness recreation in particular, is that the mere presence of recreationists impacts the values that attracted visitors in the first place. The control of access is particularly important, as access is the primary variable influencing the number of visitors to a recreation site. Recreation and tourism managers must be particularly aware of the i) environmental, ii) economic and iii) socio-cultural impacts of outdoor recreation and resource-based tourism (i.e., those forms of tourism that rely on a natural environment), considering such issues as who benefits and who bears the cost of recreation in the M-K area, how recreation and tourism can be used to benefit people in a region, and what the impacts of tourism and recreation are on Aboriginal and non-Aboriginal communities.

**Purpose of Research:** The overall purpose of the recreation and tourism management research theme is to set out a long-term strategic framework for research into outdoor recreation and resource-based tourism issues in the M-K region. Several purpose statements and principles were developed:

1. To understand the effects and interactions of global dynamics on the M-K and vice-versa;
2. To understand the impacts of recreation and tourism on the environmental, economic and socio-cultural dynamics of and on the M-K region;
3. To assess the benefits and costs of recreation and tourism on the M-K region;
4. To create 'useable knowledge' to improve decision-making, management and public education in and about the region;
5. To ensure that local and regional knowledge and participation is incorporated in the research and management in the area wherever possible; and
6. To ensure that the research is appropriate to and supportive of the communities and the goals of the M-K Area Act.

### **RESEARCH QUESTIONS**

1. What are the positive and negative impacts of recreation on the M-K?
  - Ecological, economic and social/cultural
2. What are the current levels of recreation use for different: Resource Management Zones; activities; user types (i.e., commercial/non-commercial), methods of travel; season of use; length of stay; and various demographics (e.g., place of residence, age, education level, gender, etc.)?

3. What is the history of recreation/tourism in the area? What is the impact of this use?
4. What are the impacts of different institutions (legal, policy, legislation, LRMP zones, Kaska agreement) on recreational use? Do we need new institutions to manage recreational use?
5. What potential resource conflicts exist between resource users, both interactively and between different resource users?
6. How has the supply and demand changed for different types of recreation because of the designation of the M-K?
7. What is the impact of this increased demand and use on the values the M-K was established to protect?
8. What is the implication of the above for increased access into the M-K?
9. Who benefits and who bears the cost of various recreation activities?
10. What is the designation effect of creating this special area?
11. What are the benefits of recreation/tourism on this area?
12. What are the recreationists' and publics' expectations for management of the area?
13. What are the impacts of global environmental change on the M-K (synthetics and natural) and what is the volume of use?
14. What are the impacts of technology on the recreation experience setting and managerial requirements?
15. What are the social and bio-physical carrying capacities of the M-K to support recreation activity?
16. What are the limits of acceptable change in various areas of the M-K?
17. Is recreation displacement occurring and what are the implications?
18. Are there opportunities for co-management of recreation/tourism? How well is it working?
19. What are the impacts of recreation/tourism on other resource use and vice versa?
20. What are the differences in impact between commercial and non-commercial recreation and tourism use?
21. What allowances should be made for people who are physically unable to participate in recreation activities on their own?

22. What is an equitable allocation of resources/land base for non-commercial user vs commercial users. (for residents and non-residents)?
23. What are the interpretive/educational possibilities relating to the M-K?
24. What are the effects of outdoor based recreation on wildlife?
25. What overall levels and balance of tourism options are sustainable and appropriate for the M-K and under what conditions?
26. What types of management systems can be used to minimize the impacts of use in the M-K (e.g. quota system)?
  - Should user fees or use permits be implemented and what would be the benefits/costs of these? When and where would they be appropriate?
27. To what extent do recreation values shape the goals for restoration plans?
28. How do we develop and evaluate effective methods in influencing beliefs and attitudes about wilderness and wilderness use?
29. How do experience motives, attitudes and management preferences vary between different recreation user groups.?
30. How can we evaluate the effectiveness of management actions intended to reduce negative impacts from recreation use on wilderness conditions?
31. What are effective restoration techniques for wilderness campsites/trails and how do they influence visitor experiences and perceptions?
32. What are the benefits of wilderness recreation use in the MKMA and to whom do these benefits accrue?
33. What are the effects of different types of motorized access on recreation experiences in the MKMA?

## ***THEME 5: HISTORICAL AND CULTURAL PROCESSES***

**Purpose of Research:** The Muskwa-Kechika is historically and culturally significant to numerous people, as is evident by the assignment of a First Nations name to the area. The M-K is also known as *Dena Keyih* or 'people's land' to the Kaska Dena First Nations. To further our understanding of historical and current interrelationships of humans (culture) and the Muskwa-Kechika ecosystems, the following purpose statements were developed:

- To determine what human activities have occurred in the area over what timeframe.
- To determine the mutual interaction between humans and the environment and how each affects the other.
- To determine current human activities.
- To determine who the humans are who have interacted here.
- To determine where activities have taken place (concentrated activities and over the full range).
- To investigate historically and culturally specific land use behaviors/patterns.
- To determine the impacts of development on political/social/cultural/economic and gender structures of residents of the area (past and present).
- To determine what has/is taking place in the M-K in relation to the global context.
- To ensure there is a link created between “historical” research and the current mandate and activities of the M-K.

*Traditional Environmental Knowledge can best be defined as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Berkes, 1999:8).*

### **RESEARCH QUESTIONS**

#### ***V. Traditional Environmental Knowledge and Local Knowledge***

1/ What resources do people use, how do they use them, and what impact does that use have on ecosystems - past and present?

- 2/ What sort of history do residents possess about resources in the ecosystem and how those resources have changed over time?
- 3/ What are the gender dynamics of resource use and management, including changes over time?
- 4/ How can visualization techniques of mapping and modeling assist First Nations and resource managers to gain an understanding of traditional environmental values:
- 5/ What are the traditional management systems, “rules” and prohibitions around resource use and how can they be incorporated into contemporary resource management? (knowledge, practice and beliefs as identified by non Aboriginal and Aboriginal communities)?
- 6/ How do we ensure that First Nations people of the area have a fair opportunity to participate in, and benefit from, economic development in the M-K?
- 7/ Assess the cultural value of various resource activities and the changes over time (culturally speaking).
- 8/ What are important sites traditionally (cultural/spiritual/ritual/subsistence)? Which of these can be public?
- 9/ How do you guarantee the protection of intellectual property rights—how do traditional methods translate into modern systems of regulation? Who makes the money from these rights?
- 10/ How can traditional ecological knowledge and management systems contribute to contemporary restoration efforts (i.e. mine sites/ clear cuts)?
- 11/ How do reclamation initiatives contribute to subsistence and cultural activities?

## ***II. Global Influences on Land Use***

- 1/ What have been the historical patterns of the introduction of capital into the area and how has that affected land use, including the economic perspective?
- 2/ What is the current pattern?
- 3/ How does the traditional economy fit into the national/international economy?
  - markets
  - modes of production, etc.
- 4/ What have been the effects of global environmental changes on the M-K ecology?

- 5/ What is the interface between local knowledge and global phenomena?
- 6/ What are the geographic origins of the local populations? What influence have these different groups had on land use in the M-K?

#### **V. *Subsistence and Carrying Capacity***

- 1/ How have definitions of subsistence and subsistence patterns changed over time?
- 2/ Are there links between subsistence patterns and environmental changes?
- 3/ What is the demographic history of the area?
- 4/ What are the relations between social/economic/political structures and changes in the ecosystem?
- 5/ What cultural values are related to subsistence among human residents?
- 6/ How does the ecosystem influence peoples methods of making a living, over time?
- 7/ How do changes in the ecosystem influence people's methods of making a living?

#### **VI. *Ethnography***

- 1/ What cultures are represented in the area (both Aboriginal and non Aboriginal)?

For example: social structures; kinship's; modes of production (material culture); resource use (extraction mechanisms, trade, local economy, definition of currency); gender; belief systems (spiritual value); linguistics (language and meaning change); and genealogy.

- 2/ What is the cultural adaptation to change?
- 3/ What are the different oral histories of the region (place, names past and present, etc.)?

#### **VII. *Culturally Appropriate Economic Development***

- 1/ How do we define culturally appropriate economic development?
- 2/ What are the opportunities for culturally appropriate development and what are its costs and benefits?

- 3/ What mechanisms can be used to resolve potential or actual conflicts between economic development and traditional use?
- 4/ What sort of economic development opportunities benefit everyone in the region?
- 5/ What are the emerging opportunities (i.e. ecotourism, cultural tourism, etc.) that the region might benefit from and how can they be implemented? How can they be integrated with current stakeholders?

## **VIII. *Land Use***

- 1/ How can spiritual/ritual/traditional/historical practices contribute to and enhance understandings of the land and human relationship with the land (bioregionalism & First Nations perspectives)?
- 2/ How do you plan comprehensively for mixed uses?
- 3/ How do we involve First Nations in current land use plans, and future land use plans?
- 4/ How do we create a land use planning process that equitably involves First Nations and other stakeholders?
- 5/ What land use planning will assist in developing management options for smaller sites?
- 6/ How effective have the LRMP's been in directing activity on the ground?
- 7/ How can local and/or traditional knowledge be used to determine what forms of impact assessment are appropriate? How can that knowledge be used in impact assessments?

## **VII. *Interactions within the region between groups***

- 1/ What have been the interactions between groups?
- 2/ What opportunities/strategies can be developed to encourage cooperative interaction and understanding?
- 3/ Are the current administrative structures providing effective management in the M-K area?
- 4/ What are the long term implications/limitations of Treaty 8 on the management options for the M-K?

5/ What are the dynamics of the interactions of various groups (i.e. First Nations, various immigrant groups, economic groups, etc.)?

6/ What types of research do people want?

7/ How do we build integrated, community-based research programs?

"The Muskwa-Kechika Management Area has been established to ensure our environment is used in such a way that the people of British Columbia will benefit from it today and that future generations will also benefit from its beauty and natural resource wealth." [Muskwa-Kechika brochure]

M-K TRUST FUND RESEARCH PROPOSAL  
EVALUATION GUIDELINES  
FOR THE YEAR 2001-2002 SUBMISSIONS

The purpose of this evaluation is to determine: Is the proposal a valid research proposal; is it technically sound; and does it meet the goals and objectives of the Muskwa-Kechika.

The immediate goals of research include: exploration, description, prediction, explanation, and action. From these goals a strategy can be derived for figuring out which questions to ask and which answers to seek. A technical review can be conducted using the following evaluation criteria.

<b>TECHNICAL REVIEW - MUSKWA-KECHIKA PROPOSAL</b>					
1. a) Is the objective of the proposal clear & well understood?	Concise & Clear 5	Very Good 4	Somewhat unclear 3	Weak 2	Limited 1
b) Are the objectives/outcomes clearly defined and deliverable?	5	4	3	2	1
c) Are the timelines reasonable?	YES			NO	
<b>Comments:</b>					
2. Are the methods suitable to fulfill the stated objectives?	Substantial Clearly Evident 5	Very well stated 4	Noteworthy 3	Some uncertainty 2	Not Clear 1
<b>Comments:</b>					
3. Is the research design technically	Outstanding	Excellent	Good	Limited	Not Clear

sound?	5	4	3	2	1
<b>Comments:</b>					
4. Are resource requirements sufficient to complete the work?	Without doubt 5	Some doubt 4	Notable questions 3	Very doubtful 2	Not clear 1
<b>Comments:</b>					
5. Do you feel the project is feasible given the objective(s), budget, & methods?	Clearly Evident 5	Pretty Certain 4	Well Stated 3	Some Difficulties 2	Not stated 1
<b>Comments:</b>					
6. Does the proponent have the formal training or the experience required to carry out the research?	Clearly Evident 5	Pretty Certain 4	Well Stated 3	Some Difficulties 2	Not stated 1
<b>Comments:</b>					
7. Who cares? What does this research contribute to the M-K area?	5	4	3	2	1
<b>Comments:</b>					

8. Have relevant animal care issues been addressed?	5	4	3	2	1
<b>Comments:</b>					
9. Does the research involve human subjects and if so, have the ethical issues been considered/evaluated?	YES		NO		
<b>Comments:</b>					
10. Has the topic of environmental risks been addressed?	YES		NO		
<b>Comments:</b>					
11. Degree of innovation. (ideologically and/or methodologically)	Substantia 1 5	4	3	2	Very Little 1
<b>Comments:</b>					
12. Are the project outcomes clearly defined?	YES		NO		
<b>Comments:</b>					
13. Are there evaluation/measurables included?	YES		NO		

<b>Comments:</b>		
14. Is there a clearly described communication of results component, and is there a clearly defined strategy to communicate results to interested people and decision makers?	YES	NO
<b>Comments:</b>		
Total Technical Merit Points _____		

<b>APPLICABILITY TO THE MUSKWA-KECHIKA GOALS AND OBJECTIVES.</b>		
1. Does the proposal meet the purposes of the M-K trust fund? _____ a) To support wildlife and wilderness resources of the management area through research and integrated management of natural resource development.  b) To maintain in perpetuity the diversity and abundance of wildlife species and the ecosystems on which they depend throughout the management area.	YES	NO
2. Is there evidence of a value-added component? _____ a) Strengthening northern communities by adding incremental employment b) Encourage employment, investment, research and development and purchase of services and supplies in Northern Communities c) New investment in northern communities; and c) Provide opportunities for training & technology for northern communities.	YES	NO
<b>Comments:</b>		
3. Is this a cost sharing project (strongly encouraged)?	YES	NO
<b>Comments:</b>		
4. Does project planning and monitoring exceed 15% of the total cost of the project?	YES	NO
Total M-K Applicability Points _____		
<b>GRAND TOTAL PROPOSAL POINTS _____</b>		

**RECOMMENDATION:**

I.	Does this project merit funding?	YES				NO
	If yes, what priority would you give this proposal?	5	4	3	2	1

II. If this project **does not** merit funding, briefly explain.

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