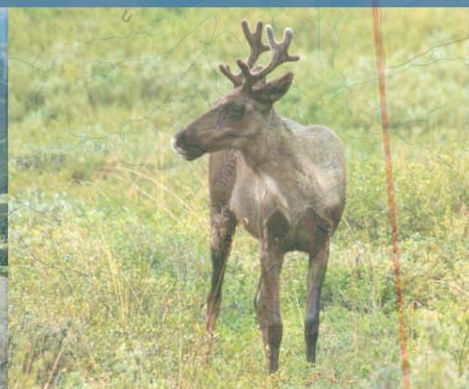


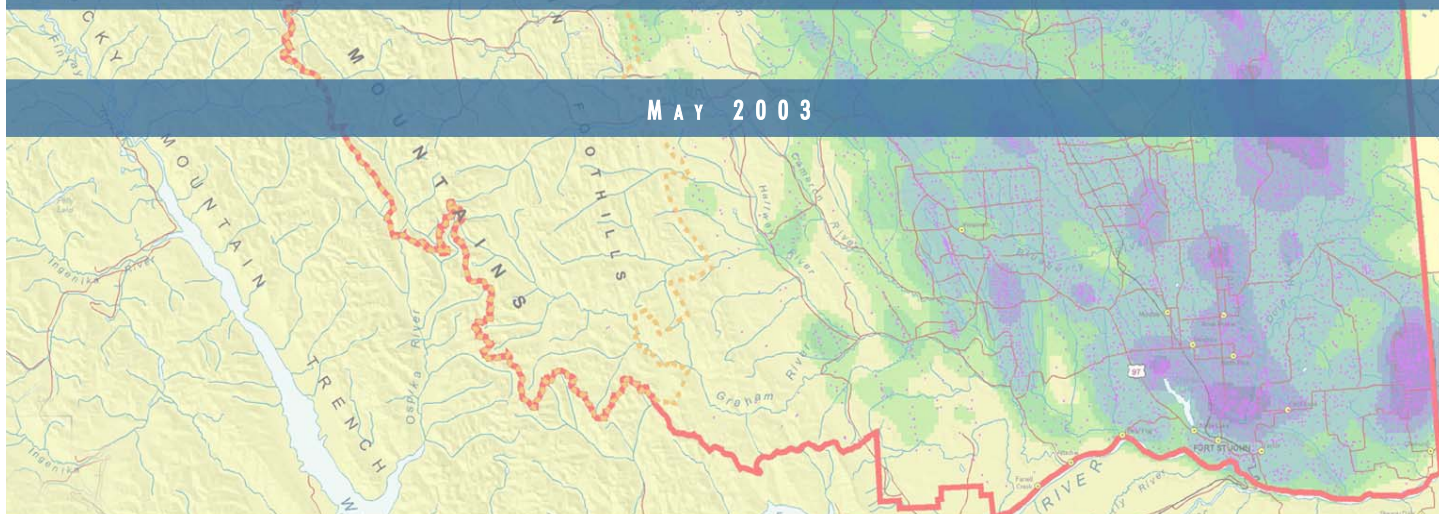
APPROACHING CUMULATIVE IMPACT MANAGEMENT IN NORTHEAST BRITISH COLUMBIA

SUMMARY



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PREPARED FOR: THE BC OIL AND GAS COMMISSION - THE MUSKWA-KECHIKA ADVISORY BOARD

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The Muskwa-Kechika Advisory Board

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May 2003

Preamble

This paper is a summary of a much broader body of work that was undertaken between April 2001 and March 2003. The work, entitled A Cumulative Effects Assessment and Management Framework for Northeast British Columbia, was funded through the British Columbia Oil and Gas Commission's **Environmental Fund** (since renamed the Science and Community Environmental Knowledge Fund), with partial contribution funding from the **Muskwa-Kechika Trust Fund**.

The results of the study were presented in two report volumes:

- *Volume 1: A Cumulative Effects Assessment and Management Framework for Northeast British Columbia; and*
- *Volume 2: Cumulative Effects Indicators, Thresholds and Case Studies.*

The principal authors of these reports were AXYS Environmental Consulting Ltd. (Volume 1) and Salmo Consulting Inc. (Volume 2). Contributing sections were prepared by: Diversified Environmental Services; Paragon Environmental Consulting; Limnotek Research and Development; RWDI West Inc.; and 'There's More to Forests' Policy Advisory and Ecological Services.

For more details on the information presented in this summary report, including the study terms of reference, methods, results and recommendations, please refer to the original documents, which can be obtained by contacting the British Columbia Oil and Gas Commission.

Forward by the BC Oil and Gas Commissioner

Cumulative impact management is applied in all aspects of our duty at the Oil and Gas Commission (Commission). Yet the approach and method that we use will benefit all British Columbians when formalized, improved and integrated further with resources management. The use of Land and Resource Management Plans (LRMP), Pre-Tenure Plans (PTP) and environmental studies provides the overarching context for project examination, regulation and enforcement action by the Commission.

This summary report was developed to provide the key concepts, resulting from two years of research and testing by the consulting team, in an accessible, concise and accurate presentation of the researchers views to facilitate the engagement of all in refining the management of cumulative impacts in northeastern BC.

The journey ahead is as challenging as the path we have come. The enormous effort that was invested in LRMPs and PTPs needs to be enhanced further. As one who has served as a regulator, resource manager, project proponent and community representative, I know that collaboration is essential to access the wealth of wisdom in our agencies, communities, First Nations, industries and universities.

Each of us can identify those concepts that: (i) we can support, (ii) need refinement, and (iii) give us difficulty in examining this summary report and the detailed research reports it mirrors. The challenge is to use these insights to come together to enhance our approach to cumulative impact management in this land so rich in surface, sub-surface and human resources.

May 22, 2003

A handwritten signature in black ink, appearing to read 'Derek Doyle', with a stylized flourish at the end.

Derek Doyle, Commissioner

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INTRODUCTION

What are cumulative impacts?

Cumulative impacts happen when two or more actions result in impacts that overlap in either time or space. They can occur in a number of ways and take a variety of forms. They may affect environmental, social, cultural, economic or human health values. While cumulative impacts can occur any place, they are more pronounced in areas that are rapidly undergoing change as a result of human development. In such areas, disturbances to the landscape tend to happen too often and too quickly for us to take appropriate action to prevent them. As a result, the things we value about our natural and human environments undergo stress and, in some cases, may be damaged beyond repair before we even realize there is a problem. In other cases, we may have recognized a problem but there is uncertainty about how to address it. It is true that regulators and land managers face some tough questions about cumulative impacts (Box 1).

Environmental Impact Assessment (EIA) has traditionally been the tool used to gauge how land use activities affect the natural and human environments. However, EIA has historically focused on addressing the impacts of individual projects in isolation of other actions, activities or events occurring on the same landscape. In the past decade, EIA has evolved to better address the cumulative nature of some types of impacts and to better recognize that a **Cumulative Effects Assessment (CEA)** is a critical and integral component of an EIA. Even more recently, regulatory authorities, governments, First Nations, industry and other stakeholders have come to realize that we need to go a step beyond simply identifying and assessing cumulative impacts. If we intend to preserve the things we value, then we need to *manage* these impacts. This is the concept of **Cumulative Impact Management (CIM)**, and the premise for a regional approach to managing cumulative impacts in Northeast BC.

Box 1. Tough Questions about Cumulative Impacts

- How would one additional project affect an area that is already intensely developed?
- By approving one project, are we opening the door for other related or unrelated uses?
- How can we prepare in advance for impending growth in areas that are known to contain resources we wish to use?
- When is enough really enough?



What are the cumulative impacts issues in Northeast BC?

Northeast BC¹ contains some of the richest oil and gas reserves in the province and, in recent years, has experienced significant industrial growth. The rapid rate of growth of oil and gas exploration and development in the region has raised concerns about cumulative impacts from oil and gas-related activities alone, and in combination with other land uses such as forestry, mining, hydroelectric development, transportation and utility corridors, agriculture, human settlement and other resource-based activities (Box 2).

In addition to its diversity of land uses and significant potential for industrial development, Northeast BC also contains considerable non-industry values such as wilderness, public and commercial recreation, hunting, trapping, fishing, and First Nations' traditional and cultural values. These non-industry values occur throughout the region but are most notably found in the special management area known as the Muskwa-Kechika Management Area (MKMA), an area highly significant for its wildlife and wilderness values, and sensitive to human pressures such as roaded access (Box 3, next page).

Why did this study come about?

The combination of high environmental, social and cultural values, and the increasing demands for access to the area for industrial development, led to concerns in Northeast BC about the possibility of worsening environmental impacts due to multiple land and resource use activities. Some mechanism was needed to address these concerns; specifically, those related to the potential contributions of oil and gas projects to cumulative impacts, and the current process of reviewing new project applications. In response to these concerns, in 2001 the **Oil and Gas Commission (OGC)** and the **Muskwa-Kechika Management Board (MKMB)** funded a research project that would guide how cumulative impacts in Northeast BC are addressed.

Box 2. Types of Cumulative Impacts to the Environment	
<i>Land Uses</i>	<i>Possible Impacts</i>
Oil and gas exploration and development	<ul style="list-style-type: none"> • Increased access to remote areas • Sensory disturbance of wildlife • Habitat loss and fragmentation • Impacts from stream crossings
Forestry	<ul style="list-style-type: none"> • Vegetation and habitat loss • Disruption of natural forest processes (e.g., fire) • Loss of old growth-dependent species • Soil erosion
Mining	<ul style="list-style-type: none"> • Acid mine drainage • Increased access to remote areas
Hydro-electric development	<ul style="list-style-type: none"> • Habitat loss • Barriers to wildlife movements • Changes to aquatic environments
Transportation and utility corridors	<ul style="list-style-type: none"> • Habitat fragmentation • Barriers to wildlife movement • Run-off of oils and chemicals from roads • Exotic and invasive species introduction
Agriculture and livestock grazing	<ul style="list-style-type: none"> • Habitat loss • Run-off of pesticides and herbicides • Soil erosion • Exotic and invasive species introduction
Urban and rural settlement	<ul style="list-style-type: none"> • Habitat loss and fragmentation • Altered hydrology • Air and water pollution
Recreation and tourism	<ul style="list-style-type: none"> • Disturbances to wildlife • Vegetation trampling • Exotic and invasive species introduction
Fish and wildlife harvest (e.g., hunting, trapping and fishing)	<ul style="list-style-type: none"> • Wildlife mortality • Disturbance to wildlife • Illegal harvesting

¹ For the purposes of this study, Northeast BC is defined as the area that is bordered by the Peace River to the south, the Muskwa-Kechika Management Area (MKMA) to the west, the Alberta provincial border to the east, and the BC-Northwest Territories border to the north. This area, comprising approximately 16.4 million hectares, includes the Fort Nelson and Fort St. John Forest Districts, a portion of the Mackenzie Forest District, and the whole of the MKMA.

Box 3. The Muskwa-Kechika Management Area

The Muskwa-Kechika Management Area (MKMA) covers approximately 6.3 million hectares with Northeast BC, and encompasses the eastern foothills of the Muskwa range of the Rocky Mountains (north of the Peace River), the Kechika range of the Cassiar Mountains, and the northern portion of the northern Rocky Mountain Trench. The MKMA comprises one of the largest remnants of untouched wilderness in North America, south of 60° latitude. As such, it provides critical habitat and movement corridors for an abundant and diverse group of large mammals, and supports the continent's largest intact predator-prey systems.

Although the MKMA contains numerous provincial parks and protected areas, it is neither a park nor an ecological reserve. The MKMA is a unique management concept, envisioned and designed as a special management area that will allow resource development to continue while the principles of conservation biology are applied to protect important wildlife and wilderness values. Within the MKMA, 11 protected areas have been established where resource extraction activities are not permitted. These core protected areas are connected by transition areas and buffer zones that allow for a number of sustainable human activities. Elsewhere in the MKMA, extractive resource development is permitted where it is consistent with local level plans and zoning (e.g., pre-tenure plans and wildlife management plans). However, even though the MKMA comprises about one-quarter of the Northeast BC region, it is not presently an area of high demand for resource extractive activities.

A Premier-appointed advisory board has been created to advise on natural resource management in the MKMA. The Muskwa-Kechika Advisory Board (MKAB) is composed of individuals with a broad range of interests, including, but not limited to, First Nations, conservation organizations, business, labour, and local government. The principal role of the MKAB is to ensure that activities within the MKMA are consistent with the objectives of various management plans. Board members also review proposals relating to the Muskwa-Kechika Trust Fund.

What's in this report?

This report presents a summary of recent efforts to define a 'framework' for Northeast BC that would provide an umbrella under which cumulative impacts could be assessed and managed in a practical and meaningful fashion. 'Practical' means that solutions must be realistic and readily implementable given time and resource limitations. 'Meaningful' means that all affected parties must not only play a role, but be provided with the information and tools necessary to make decisions. The ultimate goal is to create and implement, with the help of government, First Nations, industry and other stakeholders, a workable strategy for **sustainable resource management** in the region.

The report defines and describes various elements of this proposed framework, how they would work, and how they would fit together. The framework focuses on cumulative impacts associated with oil and gas activities, and what can be done by the OGC to assess and manage such impacts. Although the OGC is expected to take a lead role in the implementation of CIM, it is recognized that cumulative impacts cannot be effectively managed on a sector-by-sector basis and in isolation of other influences. As a result, specific components of the framework rely heavily on the involvement of other ministries, First Nations, industry and stakeholders.

Note that throughout subsequent report sections key action items are shown in orange boxes. Supplemental information is shown in blue boxes.

What's not in this report?

As a starting point, the components of CIM presented here address only impacts to **environmental values** and do not directly address impacts to social, cultural, economic or human health values. However, the concepts could equally apply to other types of impacts and other types of values. The future incorporation of other values will be a logical and necessary element of the framework and its implementation.

This summary report is intended to highlight the key elements of a regional approach to CIM. Detailed information on all elements of the proposed CIM framework is provided in the full report series.

A REGIONAL APPROACH TO IMPACT MANAGEMENT

What is a regional 'framework'?

A **'framework'** represents a regional approach to coordinating the pace and type of human activities on a landscape and assessing and managing their impacts. This type of approach tends to develop when concerns are raised about the long-term impacts of many land uses over a large geographic region. This is especially true for relatively undisturbed areas (such as Northeast BC) that face rapid and extensive resource development from known and potential future projects.

By its nature, the term framework implies the collection of many pieces, tied together. It also implies an approach that moves beyond individual project decision-making to a process that relies on more broad approaches, of which such decision-making is only one part. A framework may include any combination of the basic elements shown in Box 4. Many of these elements are being applied already in some capacity in Northeast BC.

How does this approach help us?

A framework is useful because it provides a **'one-window' approach** to addressing cumulative impacts over large geographic areas. As such, the various elements of the framework are coordinated to complement each other. Information on environmental and land use conditions is shared, stakeholders become involved, and a useful product is developed that can be used either to assist in the review of individual project applications, or to understand longer-term trends at a regional scale. Without such a coordinated approach, information would likely remain unavailable or would not focus on regional issues of greatest concern. Project proponents, regulatory reviewers and land administrators would likely be hampered by inadequate information, and would continue to make decisions in isolation.

The framework approach to CIM has numerous benefits (Box 5, next page). However, it is also an ambitious and complex undertaking requiring broad-level support from regulators, resource users and other stakeholders.

Box 4. Basic Elements of a CIM Framework	
<i>Element</i>	<i>Example or Application</i>
Ecological monitoring	<ul style="list-style-type: none"> Water quality monitoring Monitoring of wildlife movements
Ecological research	<ul style="list-style-type: none"> Studies of species responses to human disturbances Quantitative analysis of sediment loading on streams
EIA or CEA	<ul style="list-style-type: none"> Measuring the contribution of a project to overall cumulative impacts
Project review processes	<ul style="list-style-type: none"> Screening of applications for cumulative impacts
Coordination among ministries or governments	<ul style="list-style-type: none"> Central body to coordinate information and initiatives relevant to cumulative impacts
Compliance and enforcement	<ul style="list-style-type: none"> Compliance monitoring Voluntary compliance
Databases and mapping	<ul style="list-style-type: none"> Mapping of existing ecological features Mapping of cumulative impact 'hotspots'
Land use planning	<ul style="list-style-type: none"> Land and Resource Management Plans, Pre-tenure Plans, etc. Zoning for various levels of allowable land use
Protected area planning	<ul style="list-style-type: none"> Exclusion of human disturbances from certain areas
Impact mitigation and management	<ul style="list-style-type: none"> Best management practices for industrial projects Opportunities for regionally coordinated access
Scoping	<ul style="list-style-type: none"> Vision for desired land use Identification of issues of concern or features/values of importance
Stakeholder consultations	<ul style="list-style-type: none"> Ongoing involvement of affected communities or parties
Limits to growth	<ul style="list-style-type: none"> Identification of ecological and land use thresholds
Future scenario forecasting	<ul style="list-style-type: none"> Predicting impacts for different levels of future development
Resource management strategies	<ul style="list-style-type: none"> Wildlife management strategies Ecosystem restoration

What would a framework for Northeast BC look like?

Other regions such as Alberta and the Northwest Territories have studied and attempted to implement framework approaches to managing cumulative impacts. While we can learn from these other frameworks, Northeast BC faces unique challenges of CIM, and thus a customized framework is warranted. The framework defined here for Northeast BC includes a number of separate but integrated components, which, when combined, will provide an approach for identifying, scoping, assessing, and managing cumulative impacts in the region. Key components of the framework are described in subsequent sections of this report and include:

- **Regional Assessment:** an assessment of regional values, existing impacts and areas of potential concern (referred to as ‘hotspots’);
- **Project ‘Screener’:** a customized tool for the OGC 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 Thresholds:** measures that define limits of acceptable change so that they can be continually tracked and evaluated; and
- **Research, Monitoring and Adaptive Management:** information requirements and tracking of progress.

These components are all tied together by the overarching framework – referred to in this report as the **Sustainable Resource Management Strategy (SRMS)**. The term SRMS was selected over the more generic ‘framework’ because SRMS emphasizes the critical element of *sustainability* and it is also more consistent with terminology used for other initiatives in this region.

Box 5. Key Objectives and Benefits of a Customized Northeast BC CIM Framework

<i>Objective of the Framework Approach</i>	<i>Benefit to Northeast BC</i>
Identifying preferred tools and approaches for CIM at the project-specific (i.e., local) and regional levels.	<ul style="list-style-type: none"> • Helps the OGC, proponents, and other stakeholders to better understand cumulative impacts and to develop and implement methods to minimize these impacts before they occur. • Provides an ‘umbrella’ under which environmental and cumulative impact assessment and management tools (e.g., application screening, modelling, land use planning, etc.) can be employed and updated.
Initiating the development of a regional, spatially-referenced database and map series which contain information on biophysical attributes and development disturbances.	<ul style="list-style-type: none"> • Supports project-specific assessments. • Aids in applying proactive impact management • Provides an overview of existing cumulative impacts in the region so that potential areas of concern (i.e., ‘hotspots’) can be identified and significant data gaps noted.
Guiding future research priorities by identifying important data gaps regarding analytical methods, mitigation activities, and significance determinations.	<ul style="list-style-type: none"> • Provides direction for other research on cumulative impacts that may be undertaken under the OGC Science and Community Environmental Knowledge Fund or the Muskwa-Kechika Trust Fund, or by academia and industry. • Helps with incorporating results from other research projects into practical applications for analyzing, evaluating, and managing cumulative impacts (e.g., the development of new mitigation measures).
Providing reference points, guidance and options in support of decision-making and which are adaptable to a variety of situations.	<ul style="list-style-type: none"> • Provides a basis for which the government ministries, industry, First Nations, and stakeholders can participate in and monitor progress towards managing regional cumulative impacts. • Facilitates an adaptive management approach to CIM.

How is the SRMS different?

The SRMS is based on the premise that to find solutions to the problem of cumulative impacts, we must tackle the problem from different angles. That is, we can address cumulative impacts at the project level as each new project arises, or we can address cumulative impacts for certain areas (large or small) before any projects arise. Both approaches (or ‘tracks’) have advantages and disadvantages. For example, the first, while relatively easy to do, is not especially effective in addressing regional cumulative impacts; the latter, while more focused on the problem, requires substantially more effort and time. Ideally, two integrated approaches, working together, will allow us to address cumulative impacts at different scales and at different points in time. This **Dual-Track Approach** is illustrated in Figure 1.

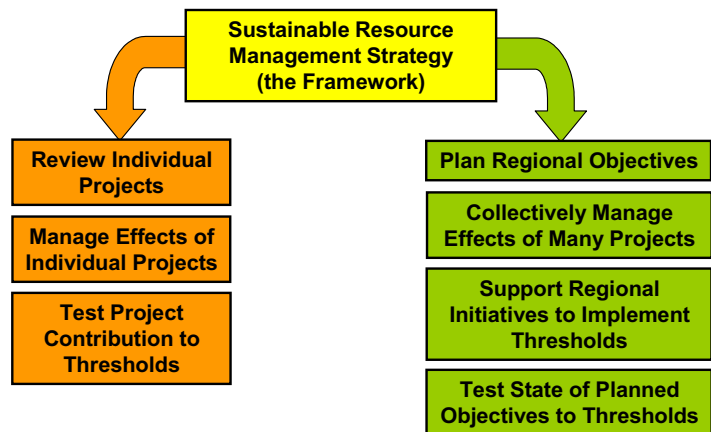


Figure 1. Overview of the Proposed SRMS Structure (The Dual-Track Approach)

CIM Action Item
Adopt a ‘dual-track’ approach so that cumulative impacts can be addressed at two levels: project-specific and regional.

How does the SRMS fit with other regional initiatives?

For CIM to work, it is necessary to have a frame of reference that allows decision makers to know what exactly they are managing for. If the objective of CIM is to ensure that the things we value remain as we want them, then we must already have at least a sense of how we want those things to be in the first place. In other words, to determine if the things we value are being altered beyond a **‘limit of acceptable change’** (Box 6), we need to know what that limit is.

To determine these limits or thresholds, we must have clear land and resource use objectives in mind. These objectives may be broadly defined for many land and resource uses over a large area, or they may be more narrowly defined for certain areas and for certain environmental features. The results of planning processes already in place, such as Land and Resource Management Plans (LRMP), Sustainable Resource Management Plans (SRMP), pre-tenure plans, local level plans, and other initiatives identify some of these objectives. The SRMS framework recognizes and *builds upon* other planning activities in the region, providing a ‘bridge’ between regional-scale land planning and management and site-specific activities.

Box 6. Limits of Acceptable Change

The concept of limits of acceptable change recognizes that some changes are unavoidable and, that within certain bounds, changes to one or more values (e.g., environmental values) may be acceptable if it means maintaining or enhancing other values (e.g., economic certainty). However, to be meaningful, these limits must be determined through processes that involve all affected parties.

The point when the condition of the environmental feature becomes unacceptable is called a threshold. Thresholds are a critical component of CIM and are discussed in more detail later in this report.

A REGIONAL ASSESSMENT OF CUMULATIVE IMPACTS

Can we really assess impacts to a region of this size?

To meaningfully address cumulative impact issues, at both the local and regional scales, we must have a good understanding of the landscape. We need to know what is important (i.e., values), how we are affecting those things that we deem important (i.e., impacts), and areas where we think we are approaching (or have exceeded) a limit of acceptable change.

Thus one of the first steps in the development of the SRMS for Northeast BC was to conduct a **Regional Assessment**; that is, a broad-scale overview of the state of the environment and of land and resource uses in the region. This Regional Assessment, which was undertaken based on existing plans, research, mapping and community knowledge, will act as a starting point for the development and ongoing updating of a regional database of information that will support CIM initiatives. It is not intended to surpass the need for detailed on-the-ground assessment, research and monitoring.

What is included in the Regional Assessment?

The Regional Assessment is a characterization of the state of land and resource use, and of various environmental features including air quality, soils and terrain, aquatic resources, vegetation and wildlife. For each of these topics, work has already begun to define the following:

- **Baseline setting** (i.e., current conditions of environmental features and human use);
- **Issues of concern** (i.e., issues regarding regional matters of concern and potential cumulative impacts);
- **Valued ecosystem components** (i.e., potentially affected environmental components that are of value to people or which have intrinsic value); and
- **Hotspots** (i.e., specific geographic areas of potential concern based on potential conflicts between human use and an identified value).

Work to date includes the development of a database of information using a Geographic Information System (GIS). From this database, a series of 30 maps have been developed that illustrate various themes including regional baseline conditions and potential hotspots (Box 7).

Box 7. Hotspot Maps

Hotspots are defined as specific geographic areas of potential concern based on potential conflict between human use and a defined valued ecosystem component (i.e., something we value). These 'conflicts' are illustrated on maps generated by digitally overlaying the spatial extent of each valued ecosystem component with the spatial extent of a series of disturbances, factoring in the degree to which different types of disturbance affect different values. Disturbances that were typically considered in this exercise included oil and gas related activities, but also other types of industrial uses (e.g., forestry, agriculture, transportation and utility corridors, and residential settlements to name a few (in total, 17 disturbance types were considered).

To date, as part of the Regional Assessment, hotspot maps have been developed for air quality, soil acid sensitivity, erosion risk, vegetation, aquatic ecosystems, and four species of wildlife (i.e., grizzly bear, moose, warbler and caribou). These maps identify areas of potential concern within the regional study area, and can be used as a reference tool for assessing the general environmental conditions of the area, and for strategic planning.

How will the Regional Assessment be used?

The Regional Assessment can be used now to help us put cumulative impact issues into their regional context. More significantly, the Regional Assessment is actually a **spatially-referenced database** of information on the state of the environment in Northeast BC. It provides a centralized repository of land use and environmental information that could be accessed as part of project-specific or regional cumulative impact assessment and management initiatives. It therefore serves as a key element of the SRMS.

As envisioned, the information contained in the regional database would be spatially referenced (i.e., in a GIS system), readily accessible, and available to the public. Information would be collected from existing databases, individual project applications, research results, and regional impact management initiatives (especially regional monitoring programs), and would require regular updating. The results of analyses conducted using these data (e.g., the creation of hotspot maps discussed earlier) could also be made readily available.

CIM Action Item
Establish and maintain a centrally located and publicly-accessible regional database of information that builds on the information collected and utilized as part of the Regional Assessment component of the SRMS.

INDICATORS AND THRESHOLDS

What are cumulative impact indicators?

CIM is largely focused on defining where and how human activities can be conducted without causing irreversible harm to the environment. Experience in other areas demonstrates that 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 the risks of cumulative impacts. Indicators are commonly used in ‘State of the Environment’ reporting for the same reasons.

Many cumulative impact indicators have been used, and all have some value for resource management. Habitat indicators consider the predicted amount or quality of habitat for selected animals. Population indicators consider the number of plants or animals present, their distribution, or perceived health. Biodiversity indicators note the number of species or habitat types present in a specific area. Land use indicators consider the amount and type of human development that has occurred in a specific area. Risk-based indicators predict the chance that animals or plants will disappear from the region. Biodiversity and risk-based indicators are most appropriate where threatened species are the management focus.

What about Northeast BC?

Land managers in other areas have concluded that a combination of land use and habitat indicators is the most practical choice for cumulative impact management. The cumulative impact indicators recommended for CIM in Northeast BC are described in Box 8. These indicators measure the direct and indirect impacts of human development and can be applied to both project-specific and regional cumulative impacts.

Box 8. Cumulative Impact Indicators Proposed for Northeast BC		
	Indicator	Description
Land Use Indicators	Road and Trail Density	<ul style="list-style-type: none"> The best known and most widely applied land use indicator. Used in British Columbia for grizzly bear and bull trout management and State of the Environment reporting. A measure of the direct and indirect impacts of roads, vehicles, harvest, and human activity.
	Stream Crossing Index	<ul style="list-style-type: none"> Watershed indicator used in British Columbia forests. A measure of impacts on water quality, fish harvest, and fish movement barriers.
Habitat Indicators	Core Area	<ul style="list-style-type: none"> Commonly used for grizzly bear management in British Columbia and elsewhere. A measure of the availability and location of relatively undisturbed, ‘wilderness’ areas.
	Patch and Corridor Size	<ul style="list-style-type: none"> Commonly used for forest management in British Columbia and elsewhere. A measure of remaining usable habitat in disturbed areas. Considers minimum size required for temporary or year-round animal use and movement.

What are cumulative impact thresholds?

Indicators provide information about the likelihood of negative cumulative impacts, but provide no direct measure of the acceptability of those impacts. **Thresholds** are science-based standards that are used to define ‘limits of acceptable change’, the point at which a CIM indicator changes from an acceptable to an unacceptable condition (Figure 2). This results-based approach is efficient because the rules are clear and they allow projects to proceed without detailed review until the threshold is approached or reached. At this point, extra regulation becomes necessary.

Chemical and physical thresholds, such as air quality and water temperature guidelines, have been widely accepted and applied. Land use or habitat thresholds have not been as widely applied because there is inevitably some uncertainty about animal responses, and clear shifts between acceptable and unacceptable conditions rarely occur. Social, economic, and technical considerations must therefore be considered when developing cumulative impact thresholds.

Tiered thresholds have been used in BC and elsewhere for air and water quality management. With this approach, science-based and politically defined *Cautionary*, *Target*, and *Critical* thresholds are defined to reflect ‘limits of acceptable change’ and increasing degrees of concern (Box 9).

The primary strength of tiered thresholds is the formal link between the thresholds and impact management. This provides a framework to gather data on actual responses and modify management actions as appropriate. A secondary benefit is that tiered thresholds directly recognize the uncertainty around our understanding of complex environmental relationships. Finally, tiered thresholds provide the flexibility necessary for different land management zones and environmental settings, for a full range of development proposals, and for both project-specific and regional cumulative impacts.

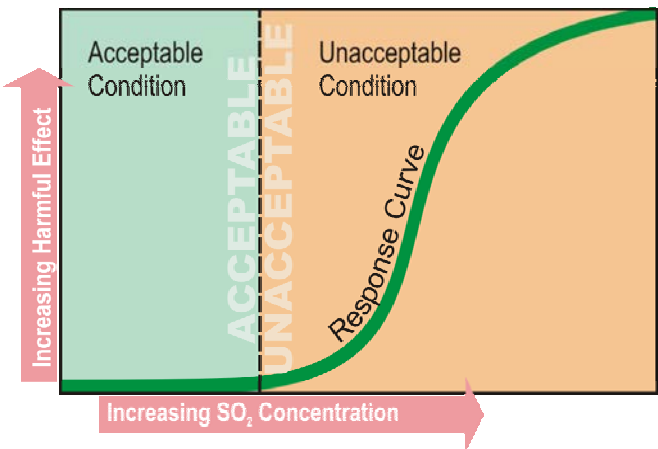


Figure 2. Example of a Chemical Impact Threshold

Box 9. Tiered Thresholds And Management Actions	
Threshold Level	Action Taken
Cautionary	<ul style="list-style-type: none">• The point at which ‘enhanced protection measures’ are begun to slow the rate of change and/or monitoring is started to ‘confirm actual environmental response.• Monitoring ensures that enough local data exists to confirm the scientific predictions of target and critical thresholds, and 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.

How can we develop 'made-for-Northeast BC' thresholds?

Detailed evaluations were prepared for two **Case Study** areas to document land use and animal trends, test the cumulative impact indicators, and help develop made-for-Northeast BC thresholds. The 2690 km² **Blueberry** Case Study area northwest of Fort St. John is moderately to highly disturbed following more than 50 years of agriculture, residential expansion, petroleum development, and forest harvest. The 1215 km² **Sukunka** Case Study area southwest of Fort St. John is lightly to moderately disturbed following 30 years of forest harvest and petroleum development. Historic trends for each cumulative impact indicator were tracked and compared to determine the predictive power of each land use, habitat, and cumulative impact indicator. Lastly, a computer model was used in the Blueberry Case Study area to visualize the effect of ongoing future development and different impact management measures.

Trends defined in the Case Studies can be used to develop forecasts of future conditions in Northeast BC and help refine thresholds. In both Case Studies, the area directly affected by roads, trails, and clearings has increased at a consistent and predictable rate over the last thirty to fifty years. The rate of core habitat decline was much more rapid than the rate of forest clearing; this reflects the importance of indirect cumulative impacts. Petroleum development occurred later in the Sukunka Case Study area than in the Blueberry area. As a result, when it occurred, most seismic was conducted with 'low impact' hand-cut, heli-portable programs. This has reduced the footprint of cutlines in the Sukunka area, and demonstrates the value of project-specific mitigation for cumulative impact management (Figures 3a and 3b).

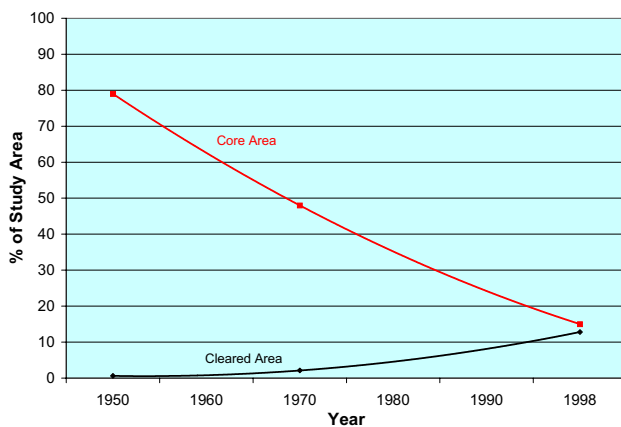


Figure 3a. Trends in Cleared and Core Areas in the Blueberry Case Study Area

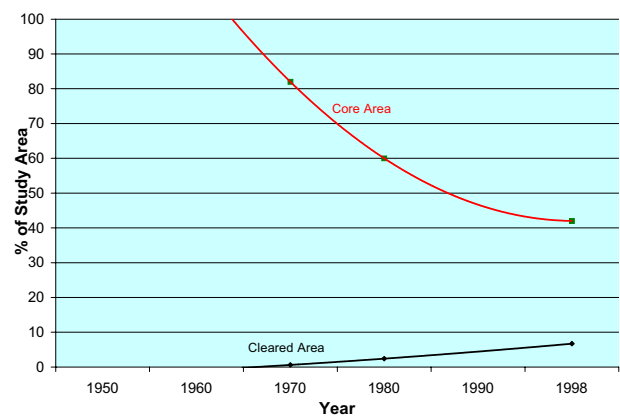


Figure 3b. Trends in Cleared and Core Areas in the Sukunka Case Study Area

The Case Studies showed that cumulative impact indicators were as useful as more complex and costly habitat quality indicators. Case Study results also demonstrated that thresholds developed in other areas may not apply directly to this lightly populated region, and that 'made-for-Northeast BC' thresholds are needed. In broad terms, development in Northeast BC is to be conducted so that natural characteristics and fish and wildlife habitat and populations are maintained over time. In this region, tiered thresholds can be directly related to management objectives provided in approved LRMPs, Landscape Unit Plans, or defined management areas. Using the regional LRMPs as a guide, thresholds should be most conservative or stringent in Protected Area and Special Management Zones, intermediate in General Management Zones, and most liberal in Enhanced Resource Development and Agriculture/Settlement Resource Management Zones (Figure 4).

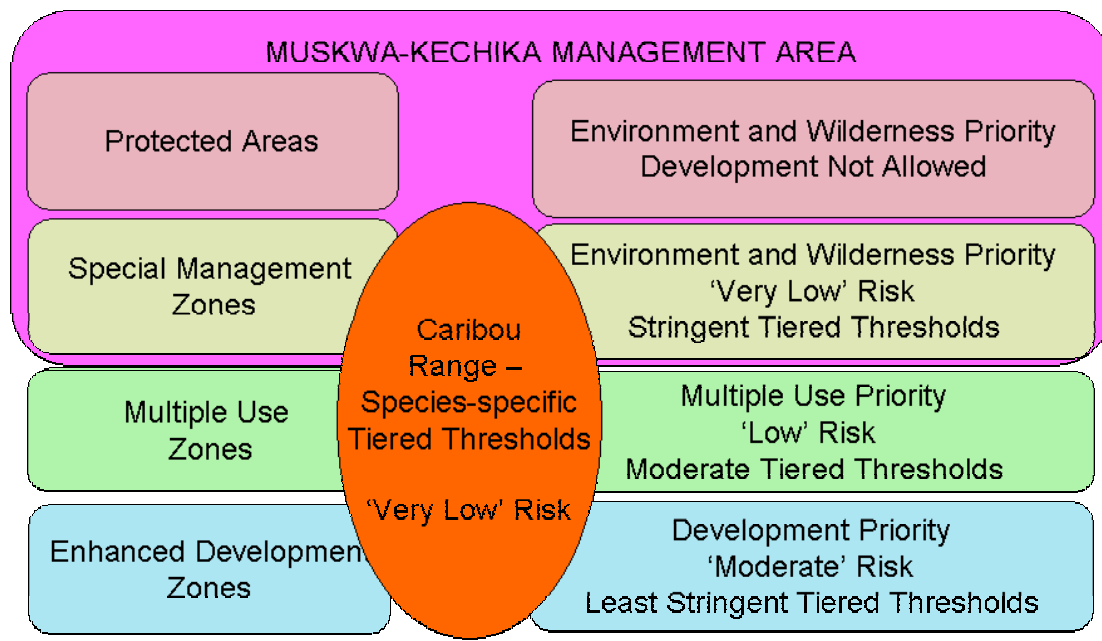


Figure 4. Relationship between LRMP Zones, 'Acceptable Change' and Tiered Thresholds

Candidate 'made-for-Northeast BC' tiered thresholds were developed for each cumulative impact indicator based on a review of scientific literature, and results from the two Case Studies – these are included in Volume 2 of the main report series. Both general and species-specific thresholds are identified.

The generalized landscape and watershed candidate thresholds are intended for application throughout Northeast BC. However, areas with local sensitivity ('hot spots') will likely require species-specific thresholds to provide enhanced protection. For this reason, specific candidate thresholds for boreal-ecotype woodland caribou are also provided in Volume 2. This species is extremely sensitive to habitat fragmentation and disturbance and candidate caribou thresholds are intended to be protective, set at or below the lowest detected impact level for this species.

The suite of cumulative impact indicators and candidate thresholds outlined in the full report (Volume 2) is an important first step towards threshold development in Northeast BC. The next step, as experience in other jurisdictions clearly demonstrates, is to give all affected groups and individuals the opportunity to participate in threshold implementation. This is because implementation is a shared responsibility that will be most effective when thresholds are accepted as both reasonable and based upon accepted science and traditional observations. The 'adaptive management' approach also suggests that proposed management actions should be rigorously tested before they are widely applied.

How can thresholds be used in the Northeast BC CIM?

A number of steps will likely be required to implement thresholds as part of CIM (Box 10). Threshold use will require agreement on definitions of acceptable change and threshold values; a standard public database; a standard process to calculate indicator values using this database; and definition of appropriate project-specific and cooperative management actions. The existing public database will need to be enhanced and made more readily accessible².

The land use footprint in some areas of Northeast BC currently exceeds one or more candidate thresholds. Regional stakeholders will understandably be concerned about the impacts of threshold implementation and will need to be convinced that they provide an appropriate balance between environmental protection and economic development. Formal evaluations are recommended to allow government, industry, and other regional groups to understand the implications of cumulative impact assessment and management. A variety of integrated management models, including the ALCES computer model tested in the Blueberry Case Study, are available for such evaluations.

The information presented here provides a foundation for threshold development, but it is impractical to assume that this can immediately be applied to the entire region. A pilot study is recommended to test the candidate thresholds and implementation process and ensure that they appropriately balance environmental protection and socio-economic interests (i.e., they reflect 'acceptable change' as defined by regional stakeholders).

Box 10. Using Cumulative Impact Thresholds

1. Develop clear definitions of acceptable change.
2. Use candidate thresholds as a foundation for further discussion.
3. Evaluate the ecological and economic implications of threshold implementation.
4. Develop standardized analysis, reporting, and review methods.
5. Provide required land use data in a consistent and readily available format.
6. Implement a pilot study to validate thresholds and optimize analysis, reporting, and review methods.
7. Continue monitoring to refine thresholds and management actions.

CIM Action Item

Continue with the identification and implementation of appropriate cumulative impact indicators and thresholds for Northeast BC.

² The threshold implementation approach described in Volume 2 of the main report series was designed to streamline database development by using project submissions to incrementally build and update data.

ADDRESSING CUMULATIVE IMPACTS AT THE APPLICATION STAGE

How does looking at one application help manage regional cumulative impacts?

A regional perspective to impact management is desirable. In some fortunate cases, efforts have been made to look at large regions and declare what is important, what is allowed and not allowed, and to provide some measure by which to plan human use before it actually happens. However, in most cases, regulators and land managers rely heavily on the more practical approach of checking and tracking individual projects because this is often the only mechanism available to them.



It is true that, ultimately, the review of individual project applications will not solve the problem of cumulative impacts. But it will help in slowing down the pace of change through the management of project-specific impacts, which minimizes the possibility that these impacts will act cumulatively with the impacts of other projects.

Application screening is therefore a critical component of CIM – both because of its direct contributions to minimizing impacts, and because it represents something that we can do now. In fact, we are already doing it.

What is the ‘Project Screener’?

Imbedded within the SRMS is a recommendation to implement an application screening tool to formally address the cumulative impacts of oil and gas related projects. The Project Screener (more simply referred to as the ‘**Screener**’) is a step-by-step process for OGC staff to follow when reviewing project applications for possible cumulative impacts. The objective of the Screener is to provide a more systematic method for reviewing project applications, which will ultimately allow for consistent and accountable decision-making.

CIM Action Item
Amend the current OGC application review process to incorporate a formal screening for cumulative impacts.

The Project Screener will need to be compatible with the current OGC application review process. Given the high volume of applications the OGC receives, it will have to be relatively straight-forward while still meeting the requirements of a cumulative impact review. The details of the new screening requirements will be finalized following further consultation with proponents, First Nations and stakeholders. However, some elements of the proposed new process are reasonably certain, as discussed below.

How is the proposed Screener different from what the OGC is already doing?

The OGC already screens project applications. However, it is proposed that formal requirements to address cumulative impacts as part of the application screening process be strengthened.

Under the proposed new approach, an application would enter and exit the OGC review process in the same way it does now (Figure 5). However, imbedded in the review process would now be a requirement to screen for cumulative impacts. The level of detail of the cumulative impact review would depend on whether the application was ‘**routine**’ or requires an expanded review, of which an ‘**advanced**’ cumulative impact screening would be one component (Box 11, next page).

Similar to what is done now, routine screenings would be undertaken by OGC application reviewers based on the information provided in a project application and supported by other sources of available information, maps and data. If required, an advanced screening would be undertaken by the proponent. However, in either case, the fate of the proponent’s application would be determined by the OGC.

To maximize efficiency, it is likely that the Screener (both routine and advanced) would 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.

In the future, if and when thresholds are in place, they will be one of the elements that would need to be addressed in the cumulative impact screening. In fact, the Screener will provide one of the principal means of determining where thresholds are being approached so that appropriate management action can be taken.

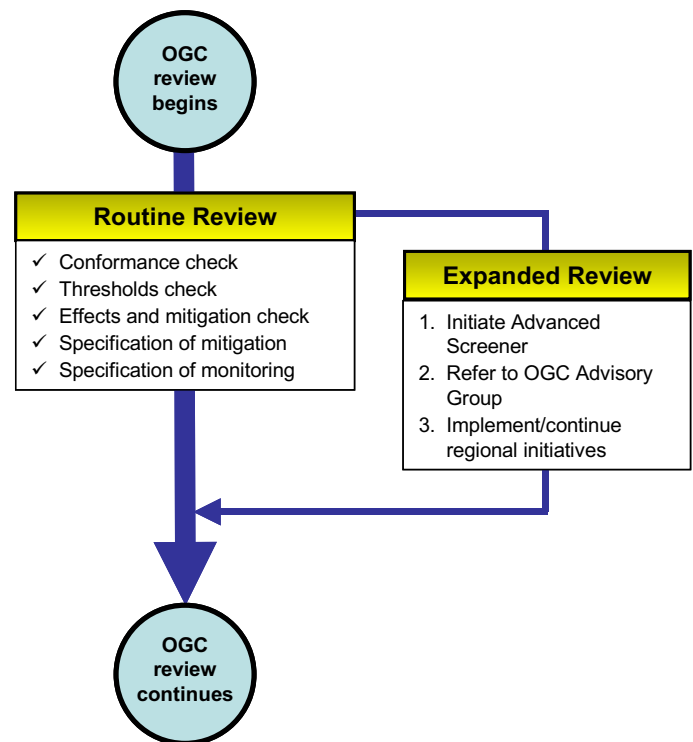


Figure 5. Proposed Changes to OGC Application Reviews to Allow for Cumulative Impact Screening at Two Levels of Review

How would the changes be implemented?

Both the routine and advanced screening processes would be subject to a pilot or test period, after which time the process would be reviewed and refined. In areas where candidate thresholds are recommended, the Screener would be tested in concert with a Threshold Implementation Strategy. In other areas, the Screener would be tested without thresholds. The Screener would not be used to determine the fate of an application during the test period.

The OGC would be responsible for testing and refining the Screener although proponents would be asked to participate by providing information that would be needed to realistically test how the Screener would work. Once fully implemented, the OGC would oversee the screening of all applications using the new process. Proponents would be required to submit some additional information for routine screenings (related to thresholds), and to undertake advanced screenings for more complex projects. First Nations and referral agencies, as well as a proposed SRMS Steering Committee (see section ‘Putting it All Together’), would also be involved. Implementation of the Screener would also require processes for establishing, managing and updating regional databases, as well as staff training.

Box 11. Comparison of Proposed New Screening Components of OGC Application Review Process		
<i>Type</i>	<i>When is it done?</i>	<i>What is required?</i>
Routine	Routine screenings would be required for all new applications submitted to the OGC.	<ul style="list-style-type: none"> • A routine screening would consist of a review of each new application, using available information and data. • The OGC application reviewer would use this information to complete a series of steps or 'checks' that address five components: conformance; thresholds; impact assessment; impact management; and monitoring.
Advanced	<p>An advanced screening would be one part of an expanded cumulative impact review. An expanded review may be triggered in two ways: if a routine screening determines that a critical threshold has been met or exceeded (for areas where thresholds exist); or if a routine screening indicates that predicted project impacts cannot be mitigated. Under either of these circumstances, an advanced screening would be required.</p> <p>The other components of the expanded cumulative impact review are referral of the application to the OGC Advisory Group and potential requirements for proponents to participate in joint or regional impact management initiatives.</p>	<ul style="list-style-type: none"> • The elements of an advanced screening are similar to those of a routine screening only the level of detail and information required to complete each step is greater. • The advanced screening requires a detailed analysis of impacts and a determination of significance.

CIM AT MULTIPLE LEVELS

What is impact management?

Although impact ‘assessment’ has and should continue to play an important role in CIM, traditional environmental and cumulative impact assessments tend to be better at identifying potential impacts than they are at evaluating the importance of those impacts and how to address them. The concept of CIM places the emphasis on ‘management’.

Impact management includes any measures needed to minimize or eliminate impacts from human disturbances. The management of project impacts, whether implemented for individual projects at a time, or jointly for various projects, provides immediate to near-term opportunities to eliminate or substantially reduce environmental impacts and the pace at which those impacts occur.

CIM Action Item

Make information on appropriate impact management measures available to proponents and land and resource planners, coordinate joint and regional impact management measures, and monitor the effectiveness of those measures in reducing cumulative impacts.

‘Impact management measures’ may be the responsibility of a single project proponent, of multiple project proponents, or of government. As such, impact management measures may be project-specific or regional in nature (Box 12). There already are many management techniques being implemented in Northeast BC. Some of these, and others, are gaining wide acceptance and implementation in other jurisdictions (such as Alberta). Selection of the most appropriate impact management measures is based on the particular circumstances involved and therefore must be done on a case-by-case basis. Factors involved in a selection include the nature of the projects, their predicted impacts, mandatory measures (e.g., those required by regulations or legislation), and any voluntary measures for that region. In most cases, the usefulness of these measures will improve with greater collaboration and with a broader regional perspective.

Box 12. Types of Impact Management Measures

<i>Project Level (Implemented by individual operator)</i>	<i>Joint Project Level (Coordinated among operators with government participation)</i>	<i>Regional Level (Government and industry participation)</i>
<ul style="list-style-type: none"> Codes of Practice Conservation/Reclamation Plans Constraints Mapping Construction Best Practices Environmental Protection Plans Forestry Operations/Management Plans Geophysical Operating Guidelines Geophysical/Environmental Field Reports Low Impact Seismic Minimization of Clearing Planning/Engineering Design Setbacks Timing Windows Indicators (for monitoring/thresholds) 	<ul style="list-style-type: none"> Development Plans Integrated Landscape Management Trunk Road Coordination or other access management techniques Indicators (for monitoring/thresholds) 	<ul style="list-style-type: none"> Conservation Area Design Future Scenario Forecasting Indicators (for monitoring/thresholds) Local Area Plans Pre-tenure Plans Protected Areas Strategy Regional Access Management Regional Ecological Monitoring Regional Spatial Databases Regional Plans and Zoning Regional Thresholds Resource Management Plans SRMS Steering Committee (discussed later in this report)

Why not just apply thresholds?

Cumulative impacts, ultimately, can best be managed through the implementation of thresholds. In an ideal situation, the collective contributions of human activities are compared to agreed-upon thresholds. If thresholds are exceeded, management options would be considered, including making adjustments to projects, implementing regional initiatives, or temporarily or indefinitely halting projects.

However, as discussed earlier in this report, the identification and implementation of thresholds is a complex undertaking and although we have made progress in this area, thresholds have not yet been practically applied in Northeast BC (or many other areas for that matter). In the absence of thresholds, cumulative impacts can only reasonably and practically be addressed through the implementation of measures that successfully reduce environmental impacts of projects. Some of these measures may be specific to individual projects, while others require joint coordination and involvement among the various parties involved.

Until we have thresholds, the role of impact management is to do the best that can be done to *buy time* by slowing the pace of an adverse environmental impact, time that can be used to progress other regional initiatives, especially the implementation of thresholds (Figure 6). Therefore, the more effective the impact management measures, the longer the time before an unacceptable level of impact is reached (if ever).

This view is also an application of **adaptive management**, which means (in the context of this discussion) that we should move ahead and apply impact management even if we are not absolutely sure of what environmental impacts are happening, and how they are happening.

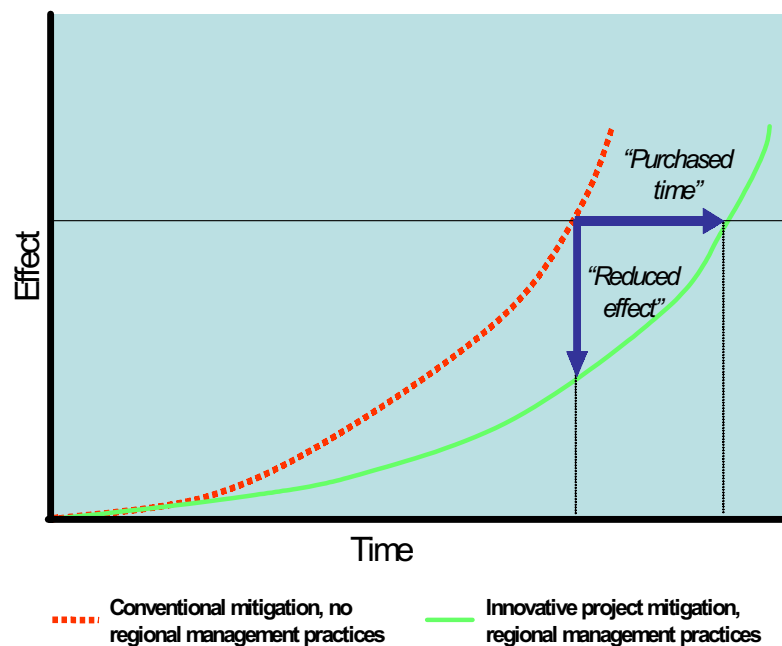


Figure 6. Implications of Impact Management on Pace of Environmental Change

How do we know if impact management is really working?

Given the complexities inherent in identifying and implementing appropriate thresholds, the SRMS places considerable reliance on the *effectiveness* of impact management measures, which can only be determined through monitoring. Adaptively monitoring and modifying impact management measures is critical to ensure that they will continue to contribute to eliminating or reducing cumulative impacts. The importance of research, monitoring and adaptive management is discussed in the next section.

RESEARCH AND MONITORING

What is the role of research in the SRMS?

An important component of any CIM approach is applied research, which provides information necessary for understanding impact mechanisms and interactions, defining thresholds, and employing best management practices and adaptive management principles. The SRMS is structured to allow new information to be incorporated as it arises.

Research themes that will have the greatest potential to advance the assessment and management of cumulative impacts (e.g., development of thresholds) include landscape ecology, ecological response studies, future scenario forecasting, and monitoring. Mechanisms to fund such research are already in place in the form of the OGC's Science and Community Environmental Knowledge Fund and the Muskwa-Kechika Trust Fund, among other examples.

CIM Action Item

Encourage applied research projects on cumulative impact issues in the region, and incorporate the results back into the SRMS.

CIM Action Item

Implement an adaptive management approach that monitors key indicators and collects new information to feed back into the framework and database.

What is the role of monitoring in the SRMS?

Monitoring is a fundamental part of any land and resource management strategy. Monitoring can be used to update land and resource information (which would be incorporated into the regional database discussed earlier), confirm compliance to approval conditions, confirm the application and effectiveness of impact management, and verify the accuracy of impact predictions.

Ideally, monitoring is also used to validate and modify thresholds, and to quantify ecological parameters to ensure that land use pressures do not induce an ecological response that exceeds a threshold. In the absence of thresholds, monitoring is used to quantify ecological response and land use trends. As changes in ecological responses become correlated with changes in land use trends, thresholds materialize.

Monitoring is a critical aspect of the SRMS – one that is directly linked to the principles of adaptive management (Box 13). By helping to measure the effectiveness of impact management measures, monitoring can help reduce cumulative impacts now and improve how cumulative impacts are managed over time. Further, monitoring helps us to evaluate the effectiveness of the SRMS in meeting its overall objectives. With this information, the strategy can continually evolve to meet the mandate of government and the interests of northern BC communities, and resource users.

Box 13. Adaptive Management

Adaptive management is a practice-based approach whereby actions derived from the best available knowledge are taken, and results are monitored and fed back (along with new knowledge) into the actions. Adaptive management is an evolving concept essential to the management of complex natural systems. Mere reference to the concept is no longer sufficient for today's planning efforts.

Adaptive management requires a concerted effort to define measurable indicators, monitor progress, and adjust management actions as appropriate. Developing clear, quantitative 'limits of acceptable change' (see Box 6) is thus a critical component.

PUTTING IT ALL TOGETHER

How do all the pieces fit together?

All of the components discussed above must somehow be made operational within a consistent and integrated regional framework referred to here as the SRMS. Instead of an over-arching framework that supplants existing institutional responsibilities, the proposed SRMS is based on many tools or options that will each contribute in their own way, or will collectively work together over time (Figure 7). As discussed earlier (Figure 1), the framework has two tracks reflecting the two foundations of the strategy: 1) initiatives associated with specific projects; and 2) initiatives pursued at a regional scale not directly associated with specific projects (but typically reflecting the collective or cumulative influence of many projects). As shown by the clocks on Figure 7, the SRMS includes parts that are immediately implementable using existing information and data, and some parts that may be phased in over time as resources, information, and financial support become available.

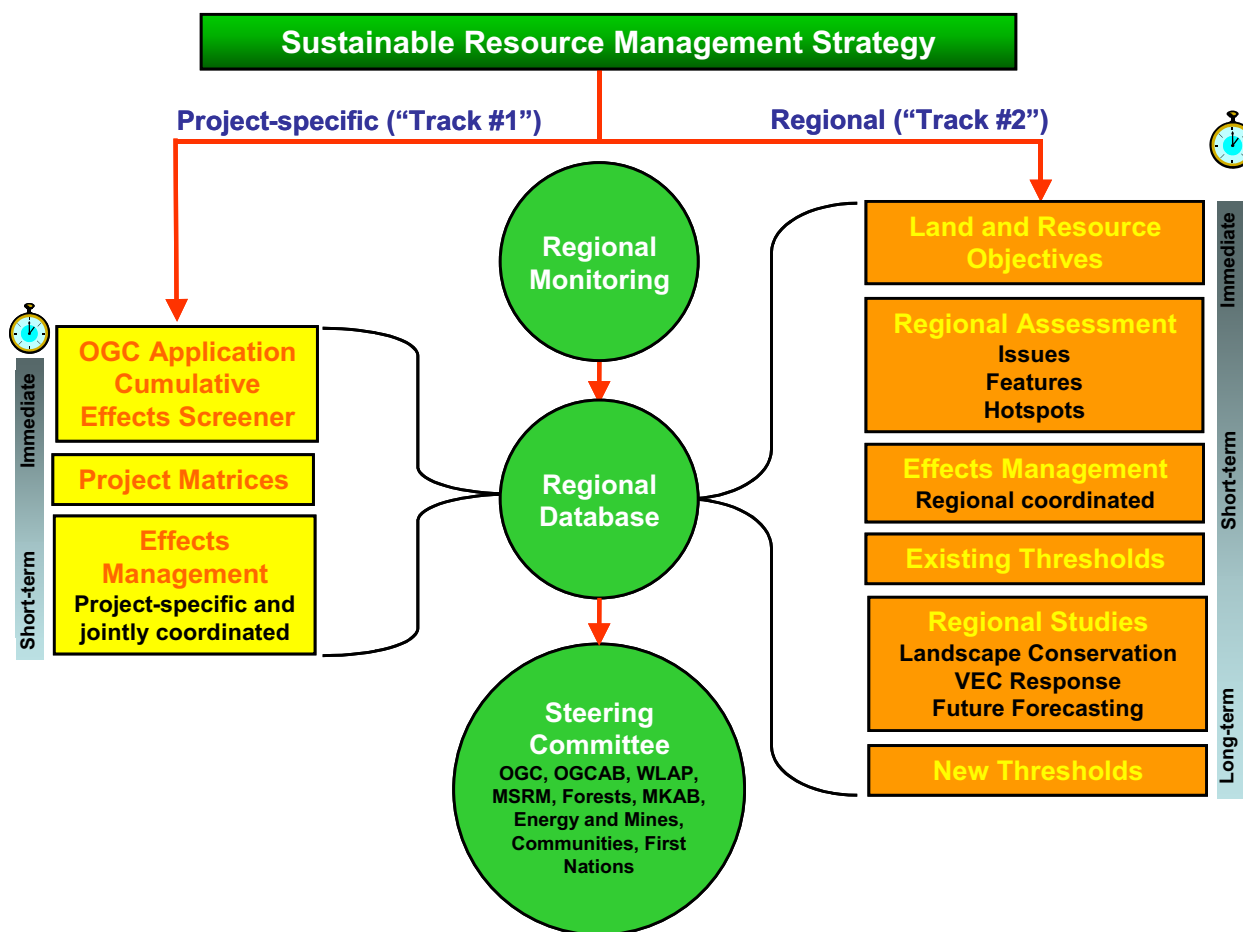


Figure 7. Summary of SRMS Components for each of Two Tracks³

³ The reference to Project Matrices found under Track #1 (Project Specific) refers to a tool developed to assist proponents and reviewers in identifying common types of cumulative impacts associated with selected oil and gas related projects. Although they represent a component of the SRMS, the matrices have not been described in this summary report as they represent a relatively discrete and focused initiative. More information on the matrices can be found in Appendix E of Volume 1 of the full report series.

Who will be responsible for implementing the SRMS?

Solution of the cumulative impacts problem is ultimately a shared responsibility among regional stakeholders. Further, the co-ordination of resource use decisions within government, and the availability of information to support decision-making, are required before any meaningful solutions to the cumulative impact problems become apparent. The dual mandate of protecting the natural environment and accessing and extracting natural resources can only be accomplished through collaboration and the support of new initiatives. Recognizing these realities, some components of the SRMS, and, in fact, many of the critical aspects of the SRMS, can only be exercised collaboratively. Thus the formation of a central **SRMS Steering Committee** is recommended. Precedents to the use of a central advisory body serving similar functions can be found in other existing initiatives.

The Steering Committee would play a key role in advising government and industry on appropriate actions as they relate to cumulative impacts, improving the sharing and communication of information, providing a forum for broad participation in implementation of the SRMS, and identifying priorities for research and regional impact management initiatives.

The committee would be composed of regional stakeholders, possibly drawn from government agencies (local, regional, provincial, and federal), the MKAB, the OGC Advisory Group, First Nations, industry, local communities, and non-government organizations. Among their first tasks will be the development of Terms of Reference based upon the provided preliminary list of roles and responsibilities.

CIM Action Item

Form a central SRMS Steering Committee to advise on regional initiatives.

In addition to this Steering Committee, the practical implementation will necessitate distinct roles and responsibilities for government, land and resource managers and planners, regulatory reviewers, project proponents, other regional committees and boards, First Nations, and the public.

Where do we start?

It is expected that the OGC and the MKAB, in consultation with other ministries and stakeholders, and in consideration of available resources and current priorities, would determine which of the action items (Box 14) they have the capacity to immediately implement, and which would be attended to at some point in the future. Notwithstanding this expectation, the four items on the left-hand side of Box 14 are key.

Box 14. Summary of CIM Action Items	
<i>Over-arching or Critical CIM Elements</i>	<i>Information and Monitoring Needs</i>
<ul style="list-style-type: none"> • Adopt a 'dual-track' approach so that cumulative impacts can be addressed at two levels: project-specific and regional. • Amend the current OGC application review process to incorporate a formal screening for cumulative impacts. • Continue with the identification and implementation of appropriate cumulative impact indicators and thresholds for Northeast BC. • Form a central SRMS Steering Committee to advise on regional initiatives. 	<ul style="list-style-type: none"> • Encourage applied research projects on cumulative impacts issues in the region, and incorporate the results back into the SRMS. • Establish and maintain a centrally located and publicly-accessible regional database of information that builds on the information collected and utilized as part of the Regional Assessment component of the SRMS. • Make information on appropriate impact management measures available to proponents and land and resource planners, coordinate joint and regional impact management measures, and monitor the effectiveness of those measures in reducing cumulative impacts. • Implement an adaptive management approach that monitors key indicators and collects new information to feed back into the framework and database.

NORTHEAST BC: BECOMING A LEADER IN CIM

Will the SRMS solve all our cumulative impact problems?

Theoretically, implementation of any such ‘framework’ would solve all cumulative impact problems, as by our definition a framework is an all-encompassing approach to addressing cumulative impacts through the use of a complete and inter-related set of initiatives. In practice, however, any framework is subject to various real-world limitations that are common to matters affecting regulatory process, public land administration, and industry and public interest. As such, the framework, as proposed in this report in the form of the SRMS, recognizes a phased and modular approach (i.e., users of the framework select appropriate initiatives over time, as required), and the need for time and broad participation to develop the various initiatives as described. Under the SRMS various impact assessment and management strategies may coexist in a complementary and adaptive manner. Only in this way can the framework be accommodating, rather than intrusive.



The SRMS will not solve all our cumulative impact problems. However, once implemented, either in full or in part, the SRMS can eventually be used as:

- a baseline for future assessments;
- a means of flagging regional hotspots and areas that require management or remedial action;
- a project screening tool to aid in the review of future applications and management initiatives;
- a guide to available impact assessment and management tools;
- a practical application for incorporating results from other research projects; and
- a means of identifying important data gaps and setting priorities for follow-up and monitoring.

While we cannot realistically eliminate cumulative impacts altogether, the SRMS presents an achievable approach to managing these impacts which will ultimately help us to slow down the pace of environmental change in Northeast BC. The strategy is workable because it builds on what we already have and recognizes the major challenges that we face now, and in the future, in managing cumulative impacts. In fact, although other regions have attempted to develop and implement strategies for addressing cumulative impacts, the proposed Northeast BC SRMS is unique in comparison to many other strategies and breaks new ground in several significant areas (Box 15, next page).

The SRMS, as described in this report, is a beginning, that with the involvement and support of the various parties recognized, would assist decision-makers in best fulfilling their mandates, and assisting industry, First Nations and the public in becoming effectively involved in the decision-making process. With the incorporation of monitoring, and adaptive on-going evaluation of framework objectives and procedures, the SRMS can continually evolve to meet the mandate of government, and the interests of northern BC communities and resource users.

Box 15. Contributions of the SRMS to Science and Decision-Making

- The SRMS can be immediately and practically applied as it builds on existing tools and requires limited changes to the current administrative and management structures in place for the region (the only change being the addition of the proposed SRMS Steering Committee).
- The SRMS recognizes and is consistent with both local and strategic level planning for the region. Implementation of the framework does not require that land use objectives be re-visited in the short term although it recommends that such objectives occasionally be reaffirmed in light of new information.
- The SRMS builds on and supports applied scientific research and provides a mechanism (in the form of the regional, publicly-accessible database) that can be used to continually update the state of knowledge. The regional database provides a tool to identify geographic areas of concern (i.e., hot spots), prioritize areas for future research, and adapt land management plans and strategies in light of new information and data.
- While focused on the environmental impacts of oil and gas activities, the concepts presented in the SRMS are readily adaptable for use by other land management agencies and for use in the assessment and management of social, cultural, recreational and economic impacts.
- The SRMS provides realistic options for assessing, managing, and mitigating cumulative impacts resulting from oil and gas activities, at both the local and regional scale, based on knowledge of what is appropriate to the region and what has been proven successful elsewhere.
- The SRMS breaks new ground in its identification of scientifically-based indicators and thresholds, which are customized for use in the region to which they would be applied, and which are implementable at a pilot scale in the short term (in conjunction with the recommended Screener). The proposed thresholds represent a coarse scale approach that, if applied over time over large areas for any type of human disturbances, would collectively minimize cumulative impacts.
- The SRMS recommends a workable and non-onerous approach to formally incorporating cumulative impacts into the day-to-day application review procedures currently in place by the OGC, while requiring only minimal changes to those procedures for the majority of application reviews. The Screener provides the OGC with a formalized approach to assessing and managing cumulative impacts and meeting due diligence requirements.
- The SRMS relies not on one management agency to solve the problems of cumulative impacts but rather provides an 'umbrella' under which all cumulative impact management decisions could be made, by any agency or organisation, at any time. The introduction of SRMS Steering Committee to specifically address cumulative impacts issues in Northeast BC is a unique concept for the region.
- The SRMS provides reference points, guidance and options which support decision-making, which are adaptable to a variety of situations, and which are linked to other planning and management processes at the local, sub-regional and regional scales.