Cumulative Effects Assessment and Sustainability: Diamond Mining in the Slave Geological Province

by

Kaarina Stiff

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I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

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ABSTRACT

The pace of development in Canada's North has renewed concerns about the potential cumulative effects of increasing industrial growth on fragile northern ecosystems. Recent developments in the diamond industry in the Slave Geological Province have highlighted the potential additive and synergistic effects of such development. For example, Aboriginal communities are worried about the health of the Bathurst caribou herd, which is considered central to their way of life. This concern is compounded by the lack of integration of environmental assessment and planning efforts, which could serve to better protect the environment.

This research considers the challenges associated with the assessment of cumulative effects, and various approaches to meet these challenges. Diamond mining in the Slave Geological Province, including the BHP and Diavik diamond mines, is used as a case study. Four sustainability-based criteria are developed to evaluate the past and existing situation in the diamond region, and to form the basis for recommendations that would contribute to a more holistic approach to integrating cumulative effects considerations into environmental assessment and regional planning.

The analysis demonstrates that although several mechanisms are currently in place to assess cumulative environmental effects, no single initiative fully meets each of the four criteria. However, existing tools can be used and supplemented to identify appropriate response options. The sustainability-based criteria developed here can contribute to further research on cumulative effects assessment and sustainability.

The sustainability-based criteria developed here can be adopted for other case studies, to identify strengths and weaknesses, and to develop case specific recommendations for a more holistic approach to integrating cumulative effects considerations into environmental assessment and regional planning. This examination of how cumulative effects assessment has been approached in the Slave Geological Province also provides insight into the broader implications of regional cumulative effects management.

ACRONYMS

Agency	Canadian Environmental Assessment Agency
AWA	Alberta Wilderness Association
BHP	Broken Hills Proprietary Inc.
CARC	Canadian Arctic Resources Committee
CEA	Cumulative effects assessment
CEAA	Canadian Environmental Assessment Act
CEAMF	Cumulative Effects Assessment and Management Framework
CEARC	Canadian Environmental Assessment Research Council
CSR	Comprehensive study report
DIAND	Department of Indian Affairs and Northern Development
EA	Environmental assessment
EARP	Environmental Assessment Review Process
EARPGO	Environmental Assessment Review Process Guidelines Order
EIS	Environmental impact statement
LKFDN	Lutsel K'e Dene First Nation
MVCIMP	Mackenzie Valley Cumulative Impact Monitoring Program
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVRMA	Mackenzie Valley Resource Management Act
NEI	Northern Ecosystems Initiative
NEPA	National Environmental Policy Act
NIRB	Nunavut Impact Review Board
NLCA	Nunavut Land Claim Agreement
NPC	Nunavut Planning Commission
NWT	Northwest Territories
PPP	Policies, plans and programs
RA	Responsible authority
SEA	Strategic environmental assessment
VEC	Valued ecosystem component
WKSS	West Kitikmeot Slave Study

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1. Introduction

In a critique of the environmental assessment of Canada's first diamond mine, Susan Wismer said:

"A beautiful jewel is a delight and luxury, but not a necessity. A good and happy life can be lived without the gem diamonds lying underneath Lac de Gras."[1]

Many people in the Canadian north would probably agree, particularly those concerned about the impact of the diamond mines on the Bathurst caribou herd, which northern Aboriginal communities rely on for their survival. The migration route of an estimated 350,000 caribou in the Bathurst herd passes directly through the diamond region.[2] However, there are a good many more people – in the north and elsewhere – whose happiness is directly connected to the success of that first mine, and the mines that are sure to follow.

The concern about caribou is not simply about the impact of this diamond mine on the herd. Arguably, the total land occupied by the mine site is insignificant compared to the total range of the caribou, which covers some 250,000 square kilometres. As the operator of Canada's first diamond mine, Broken Hills Proprietary Inc. (BHP) has suggested that the project site only covers 0.03% of that space. The concern pertains to the additive and synergistic effects of development throughout the North, which is slowly nibbling away at the land available to the caribou, and threatening other negative cumulative effects on northern ecosystems and communities.

At the same time, the mine is worth a significant amount of money. BHP is expecting to extract some $12 billion worth of diamonds from five kimberlite pipes over the expected 25-year life of its project, which will also contribute $2.5 billion to the gross domestic product of the governments of Canada and the Northwest Territories.[3] In addition, at least three other projects are at an advanced stage of exploration at Lac de Gras,

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[1] Susan Wismer, "The Nasty Game: How Environmental Assessment is Failing Aboriginal Communities in Canada's North," *Alternatives Journal* 22:4 (October/November 1996).
[2] Canadian Arctic Resources Committee, "Critique of the BHP Environmental Assessment: Purpose, Structure and Process," *Northern Perspectives* 24 (Fall / Winter 1996).
[3] For more details, see *NWT Diamonds Project Environmental Impact Statement: Summary*. BHP Diamonds Inc. and DIA MET Minerals Ltd. Vancouver: 1995.

including the recently approved Diavik project, and explorations are also underway on several new diamond projects.[4]

As so often happens in the north, the interests of economic development have clashed with the interests of people whose livelihoods depend on safeguarding the land and water under which the diamonds are buried. The conflict between these perspectives is at the core of how the mining industry has historically crossed paths with environmental and Aboriginal interests, and how the rest of the country has considered industry's relationship to the environment.

The conflict has been highlighted over the past few decades as environmental concerns have become increasingly prevalent. Large-scale disasters such as the tailings dam failures at the Boliden mine in Spain and the Baia Mare mine in Romania have attracted public attention. As more attention has been drawn to the perceived contribution of mining to environmental distress, demands for regulatory controls to protect the environment have increased. Typically, the mining industry is portrayed as the villain.

In recent years, we have developed a greater appreciation for the complexity of environmental issues. We have also recognized the importance of reconciling environmental protection with the needs of the mining industry for a regulatory environment that can still attract investment and provide valued opportunities for community gains. Indeed, northern communities *are* increasingly interested in economic development, to the extent that it can be compatible with their traditional culture and economy. Similarly, the mining industry has expressed a commitment to pursuing sustainable mining strategies, through its participation in roundtable agreements such as the *Whitehorse Mining Initiative*.

That being said, we are left to wonder whether the North can have both the caribou *and* the diamonds. Over the past several years, many northerners have started asking whether the cumulative impacts of development will compromise the ability of northern ecosystems to adapt to change. Or as Wismer asked, can mining make a contribution to the longer-term health and sustainability of northern communities? The answer to

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[4] Government of the Northwest Territories, *A Guide to Mineral Deposits of the Northwest Territories*. 1996.

this question is based, in part, on a thorough analysis of the real impacts of development on the northern environment. In the context of diamonds, we do need to know how much the BHP mine will affect the Bathurst caribou herd; but arguably, it is more important to know what effects the herd is experiencing from *all* kinds of development, because the cumulative effects are what carry the consequences – for the caribou, for the environment, and for the people who depend on the land to survive.

1.1 The Topic and its Significance

This research is concerned with the challenges associated with the assessment of cumulative effects, and various approaches to meeting these challenges. My interest is process, including the mechanisms that are in place to facilitate the assessment of cumulative effects, and how these mechanisms can be enhanced to address the needs of the environment and industry at the same time. This is important from a pragmatic legal perspective, since the consideration of cumulative effects is required under environmental assessment legislation, but also because it also makes sense from an ecosystem perspective, because the environment experiences impacts in a cumulative way.

The assessment of cumulative environmental effects can be approached in various ways. Most frequently, cumulative effects are considered in conventional project-specific environmental assessments, such as those considered under the *Canadian Environmental Assessment Act*. Cumulative effects can also be considered in regional or area assessments, or through the strategic assessment of policies or programs. As well, the cumulative effects of development can also be considered through land-use planning exercises. Each of these options will be considered in this research.

In this regard, this research will contribute to a more holistic approach to integrating cumulative effects considerations into environmental assessment and regional planning. More particularly, this research will consider the cumulative effects of diamond mining in the Slave Geological Province, in the context of the BHP and Diavik mining developments, and anticipated additional projects. This research will be conducted in the overall context of sustainability, which is arguably the ultimate goal for northern communities and the

mining industry alike.

Since no holistic framework is presently in place, the results of this research would make a significant contribution to policy development in this area. In this regard, this research is both timely and necessary. While the consideration of cumulative effects is required under the *Canadian Environmental Assessment Act* (CEAA), it has not played a significant role in the evaluation and decision-making processes for Canadian diamond mining so far. Perhaps, the significant short and long-term considerations that arise from multiple mining projects and associated developments cannot be addressed adequately by individual assessments or through processes of adaptive management of individual undertakings. In the Northern diamond mining cases, the cumulative effects to be considered include, for example, water quality degradation, and the disruption of caribou by multiple projects over time.

This suggests that regional planning might offer a better vehicle for attention to cumulative effects. However, this too has not yet been well used in the Slave Geological Province. Federal and territorial authorities have largely delayed the development of a formal planning approach until outstanding Aboriginal land claims have been settled. Meanwhile, industry and government continue to develop various plans for infrastructure components intended to facilitate diamond mining in the region. Because the industry and government planning process is fragmented and largely closed, it is unlikely to result in a well-integrated, broadly assessed and environmentally sensitive path for maximizing long-term benefits.

A substantial body of current literature regarding strategic and cumulative impact assessment and regional planning programs provides a solid base for developing a holistic approach to integrating the existing assessment and planning processes.

The subject of cumulative effects assessment developed rapidly beginning in the 1980s, with the work of the Canadian Environmental Assessment Research Council (CEARC). There is now an established body of literature on conceptual frameworks and methodologies, and the need to integrate environmental assessment with regional planning exercises.

There is an increasing amount of research that concludes that CEA is not getting done properly through EA. For instance, in a U.S. study in 1997, Burris and Canter reported that the "systematic consideration and assessment of cumulative impacts was typically not found". They concluded that "if EAs are to continue to serve their original purpose … the analysis of cumulative impacts must be more thorough and documented."[5]

Recent literature also supports the need for better integration of CEA at the project level and on a regional planning basis. In this regard, Conacher argues that environmental impact assessment on its own is an inadequate means of maintaining and improving environmental quality, and suggests a need for closer integration of environmental protection with regional land use planning and management.[6]

A growing number of case studies have been used to demonstrate some of the inherent difficulties in conducting cumulative effects assessment. For example, Ross has identified key barriers to conducting cumulative effects assessment, including the rising expectations that people have of the information to be considered in CEA, and the administrative difficulties associated with obtaining this information.[7] Sadler suggests that strategic environmental assessment might be one way in which CEA could be addressed.[8]

Although there is an increasing amount of research on the challenges in CEA, and researchers support the need for integrating cumulative effects considerations into planning processes, the vast majority of the current literature focuses on why this integration is desirable. Less attention has been devoted to the criteria and the means necessary for achieving this integration. This research hopes to contribute to filling that gap.

In this research, key elements of a holistic approach will be developed and elaborated for application in the Slave Geological Province. The research will consider what should be done from a sustainability

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[5] R.K. Burris and Larry W. Canter, "Cumulative Impacts Are Not Properly Addressed in Environmental Assessments," in Environmental Impact Assessment Review. 1997. 17:5-18.
[6] Arthur Conacher, "Integration of Land use Planning and Management with Environmental Impact Assessment: Some Australian and Canadian Perspectives," in Impact Assessment. Vol. 12, Winter 1994-95.
[7] William A. Ross, "Assessing Cumulative Environmental Effects: Both Impossible and Essential," in Cumulative Effects Assessment in Canada: From Concept to Practice. Alan J. Kennedy, ed. Alberta: 1994.
[8] Barry Sadler, "International Study of the Effectiveness of Environmental Assessment, Final Report. Environmental Assessment in a Changing World - Evaluating Practice to Improve Performance. Ottawa: 1996.

perspective, but it will also endeavour to design an approach that can be implemented, given the current political and economic climate.

1.2 Methodology

This research has adopted a case study approach to investigate issues surrounding the assessment of cumulative impacts from multiple developments. An examination of how cumulative effects assessment has been approached in the Slave Geological Province can provide insight into the broader implications of regional cumulative effects management. The challenges associated with cumulative effects assessment has been recognized as a national issue. The Commissioner of the Environment and Sustainable Development noted in his 1998 report to the House of Commons that, "… the assessment of cumulative environmental effects presents some difficulties due to the complexity of the issue and to disagreements on how such effects should be assessed." In fact, concerns are being raised in regions throughout Canada about the cumulative impacts of various types of development, such as ongoing development in the Athabasca Oil Sands region of Alberta, and continuing offshore oil and gas development in the coastal waters of Newfoundland and Nova Scotia. Similar issues are raised in each region, including how cumulative effects should be considered in environmental assessments conducted under the *Canadian Environmental Assessment Act*, how to overcome jurisdictional and administrative barriers, and how to ensure that cumulative effects issues are being properly addressed. An examination of cumulative effects issues in the Slave Geological Province can explore two broader questions, which can be applied to other regions: Can a holistic approach to cumulative effects assessment contribute to sustainable development by improving environmental decision-making? Furthermore, can such an approach successfully integrate various components of regional assessment, such as land use planning and project-specific assessments?

Diamond mining in the Slave Geological Province is also a timely case study because diamond mining is a comparatively new industry in Canada, and the likelihood of increased development is extremely high. In addition, the Canadian North is presently in the midst of tremendous legislative and regulatory change,

including Aboriginal land claims and treaty negotiations, the creation of Nunavut, and the devolution of power from the federal to the territorial governments. This effectively creates a void in which development is taking place in the absence of a coherent long-term vision. This presents a unique opportunity to develop a process for assessing cumulative environmental effects that will improve environmental protection, at the same time as enhance industry's ability to contribute to sustainable northern communities.

1.2.1 Research Objectives

The goal of this research is to explore the issues associated with a holistic approach to cumulative effects assessment, using the Slave Geological Province as a case study. In this regard, the following research objectives have been identified:

- To develop sustainability-based criteria that can be used to measure the success of cumulative effects assessment approaches;
- To review the current approaches to assessing cumulative environmental effects in the Slave Geological Province, in order to evaluate the degree to which a holistic approach to cumulative effects assessment is already established; and
- To identify barriers and challenges to the successful implementation of a holistic approach to cumulative effects assessment, and to suggest how these challenges can be met.

In addition, this research will investigate what lessons can be extracted from the case study for broader application.

1.2.2 Methods

In the context of a case study approach, this research employed the following methods:

- A review of existing literature on sustainable development, cumulative effects and strategic assessment, and regional planning programs relevant to Western Arctic applications;

- A review of the environmental assessments and reviews of the BHP and Diavik mining developments, with particular attention to cumulative effects issues; and
- Development of sustainability based criteria to assess and evaluate CEA efforts and options.

Field research involved:

- Key informant interviews with a range of stakeholders from government, industry, Aboriginal organizations, and environmental groups;
- Collection of documentary information with respect to past and current experience in Western Arctic assessment and planning; and
- Examination of selected central cumulative effects issues related to the diamond mining and associated developments, including review and analysis of baseline data from the BHP and Diavik environmental assessments.

In addition, this research draws on the personal experience of the researcher as a Project Assessment Analyst at the Canadian Environmental Assessment Agency.

1.3 Outline

Various aspects of cumulative effects assessment are addressed throughout this thesis. This first chapter introduces the topic of cumulative effects assessment, and establishes its relevance in a policy context. This chapter also establishes the goal and related objectives of this thesis, and sets out the problem statements to be explored. Further, this chapter describes the methodology used to conduct this research, and establishes a set of criteria that will guide the analysis that follows in later chapters.

Chapter two addresses the discourse of sustainability, and its particular relevancy to the Canadian North. It reviews the fundamentals of cumulative environmental effects and cumulative effects assessment, and the contribution of CEA to sustainable development. It also establishes the theoretical framework on which this

research is based. One of the foremost challenges in pursuing sustainable development is the integration of social and cultural as well as biophysical factors into decision-making.

Chapter three provides an overview of activity in the diamond region of the Slave Geological Province, and the surrounding political and social context. It more thoroughly describes the BHP and Diavik projects, as well as other advanced projects, in order to provide the context for understanding cumulative effects concerns. The pace of development in a comparably pristine landscape underscores the need to take swift action to address cumulative effects issues.

Chapter four reviews the legislative regime for assessing cumulative effects in the Canadian North. It describes the development of cumulative effects assessment within the Canadian federal system, including the relevant provisions of the *Canadian Environmental Assessment Act*, the *Mackenzie Valley Resource Management Act*, and selected Aboriginal land claim agreements. Although the legal requirements for CEA have been strengthened since EA was first introduced, there are still clear gaps that need to be addressed.

Chapter five provides an evaluation of cumulative effects assessment in the Slave Geological Province, to the extent that it has occurred thus far. It examines the key concerns raised by stakeholders in the BHP and Diavik reviews by applying the sustainability-based criteria developed in Chapter one. Innovative solutions are being developed, but there are still significant operational and administrative barriers to implementing effective CEA.

Chapter six explores alternative response options to CEA in the Slave Geological Province. It discusses multi-stakeholder approaches to CEA, with particular emphasis on recent new initiatives aimed at ameliorating the cumulative effects situation in the region. The current initiatives have great potential, but there are key considerations that must be borne in mind if they are to be successful.

Finally, Chapter seven offers some concluding recommendations that should inform the implementation of a cumulative effects assessment and management framework for the Slave Geological Province. The partnership approach could serve as a useful model for other areas, in the North and elsewhere.

1.4 Chapter Summary

This thesis presents an analysis of issues surrounding cumulative effects assessment, using diamond mining in the Slave Geological Province as a case example. The research is guided by the principles of sustainable development, which were used to develop a set of criteria that can be applied to evaluate the state of the practice of cumulative effects assessment and potential response options. The analysis and recommendations are accomplished by providing:

- A review of literature related to sustainable development and cumulative effects assessment;
- An overview of diamond activity in the Slave Geological Province;
- A description of the current legislative process for environmental assessment in the Canadian North;
- An analysis of the current approaches to cumulative effects assessment;
- An exploration of potential alternative approaches to CEA; and
- Recommendations that could inform the development of a framework to address cumulative environmental effects in the diamond region of the Slave Geological Province.

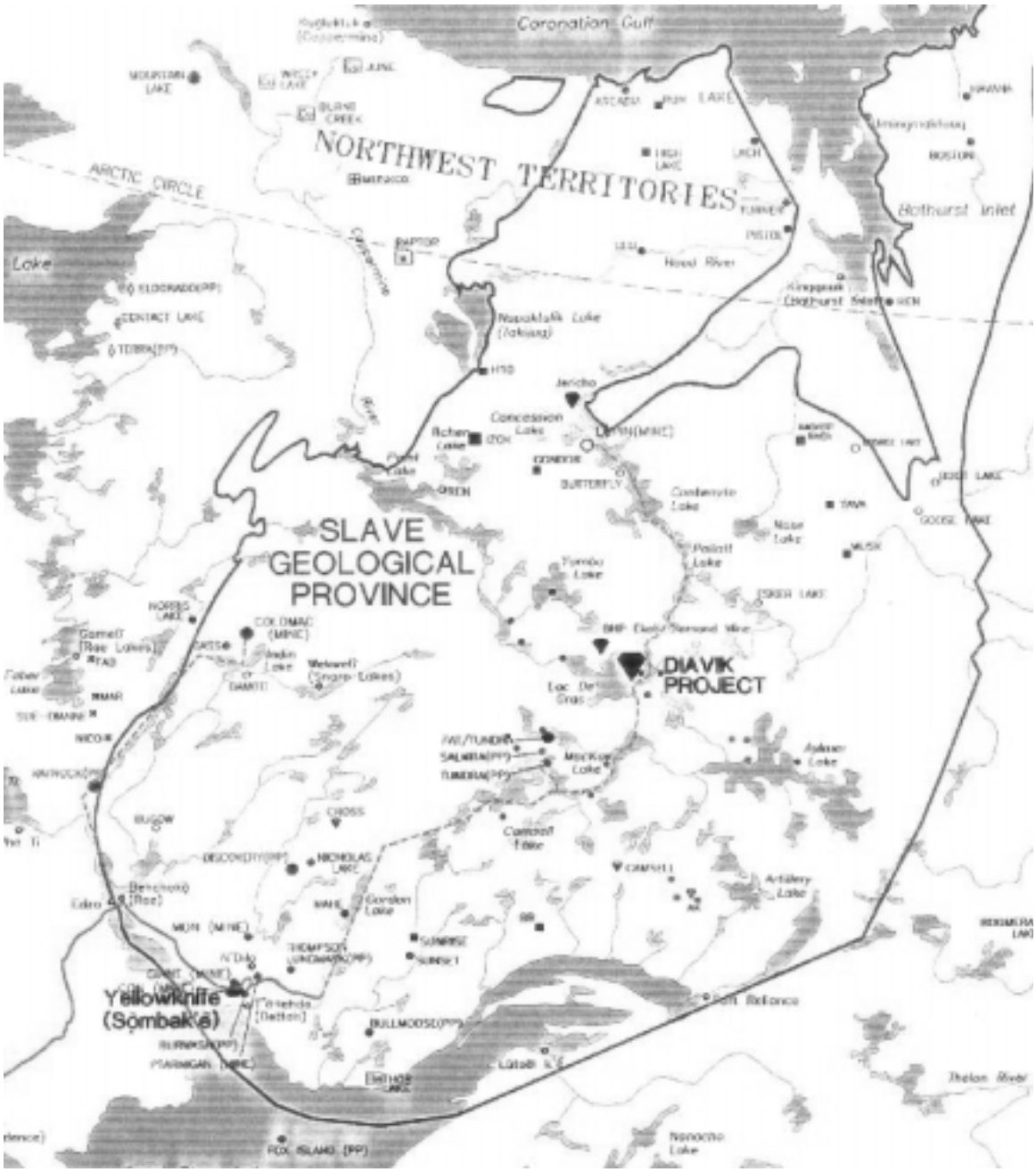

Figure 1: Map of the Slave Geological Province (Diavik Comprehensive Study Report)

Excerpt from the Comprehensive Study Report for the Diavik Diamonds Project. Department of Indian Affairs and Northern Development, June 1999.

2. Sustainability and Cumulative Effects

Years from now, the historical record will likely show that sustainable development was one of the most popular "buzzwords" of the late twentieth century. The phrase, in all of its varied forms – sustainable development, sustainability, and sustainable societies – has certainly dominated the environmental literature for much of the last three decades.[9] This chapter traces the history and key themes of the sustainable development discourse, in order to establish the analytical framework for this research.

This thesis argues that sustainable development is an appropriate analytical approach for the analysis of cumulative effects assessment because it provides a framework for integrating environmental considerations into the decision-making process. Moreover, sustainable development has recently become an objective of the environmental legislation that governs the diamond region of the NWT and Nunavut, and so the results of this research will be applied within the legislative and regulatory regime.

Through a discussion of arctic ecosystems and Aboriginal values, this chapter considers the particular importance of effective cumulative effects assessment in the North. It also provides an operational definition of cumulative effects and describes the key tasks in conducting cumulative effects assessment, in order to provide the necessary context for understanding the strengths and weaknesses of the current approaches to CEA, which will be discussed in Chapter five.

2.1 Sustainability

Much as democracy is considered the only political game in town, sustainable development has become the dominant discourse in the environmental arena. As with democracy, sustainable development has been defined and interpreted in many different ways. In explaining the sustainability discourse, John Dryzek states:

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[9] For the purpose of this research, these terms will be used interchangeably.

> The core story line of sustainable development begins with a recognition that the legitimate developmental aspirations of the world's peoples cannot be met by all countries following the growth path already taken by the industrialized countries, for such actions would over-burden the world's ecosystems. Yet economic growth is necessary to satisfy the legitimate needs of the world's poor. The alleviation of poverty will ameliorate what is one of the basic causes of environmental degradation, for poor people are forced to abuse their local environment just to survive. Economic growth should therefore be promoted but guided in ways that are both environmentally benign and socially just. Justice here refers not only to distribution within the present generation, but also to distribution across future generations.[10]

Dryzek further states that sustainable development is a strategy not just for developing countries, but also for industrialized societies, which must reduce the excessive stress that their economic growth is placing on the earth.

In 1987, the World Commission on Environment and Development defined sustainable development as the "ability to meet the needs of the present generation without compromising the ability of future generations to meet their own needs."[11] There are many other viable definitions of sustainability, which all tend to incorporate social, economic and ecological dimensions. David Lawrence describes a sustainable society as ecologically sound, economically viable, and socially just.[12] Similarly, when Wismer refers to sustainable communities, she is referring to communities in which economic development strengthens social foundations, and preserves or enhances environmental quality.

Various researchers have contributed to the development of sustainability criteria or principles, which can be used to guide the pursuit of sustainable development. The following table addresses the most common themes.

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[10] John Dryzek, *The Politics of the Earth: Environmental Discourses*. New York: 1997.
[11] World Commission on Environment and Development, *Our Common Future*. New York: 1987.
[12] David Lawrence, "Integrating Sustainability and Environmental Impact Assessment," *Environmental Management* 21:1 (1997).

Figure 2: Principles of Sustainability (Adapted from Robinson et al.)[13]

Principles of Sustainability
Environmental / ecological principles
Protect life support systems.
Protect and enhance biotic diversity.
Maintain or enhance integrity of ecosystems, and develop and implement rehabilitation measures for badly degraded ecosystems.
Development and implement preventative and adaptive strategies to respond to the threat of global ecological change.
Socio-political principles
Keep the physical scale of human activity below the total carrying capacity of the planetary biosphere.
Recognize the environmental costs of human activities; develop methods to minimize energy and material use per unit of economic activity; reduce noxious emissions; decontaminate and rehabilitate degraded ecosystems.
Ensure socio-political and economic equity in the transition to a more sustainable society.
Incorporate environmental concerns more directly and extensively into the political decision-making process.
Ensure increased public involvement in the development, interpretation and implementation of sustainable development concepts.
Link political activity more directly to actual environmental experience through reallocation of political power to more environmentally meaningful jurisdictions.

Implicit in all of these principles is the need to consider the biophysical environment and associated socio-political imperatives more carefully in all levels of decision making. This forms the basis for using environmental assessment as a tool to promote sustainable development.

Although the Brundtland Commission popularized sustainable development, the concept has a much longer history. >From the earliest civilizations, a core element of indigenous traditions and beliefs has been the importance of living in harmony with nature. At the height of the industrial age, Thomas Malthus (1766-1834) introduced his theory of limits, which contrasted the potentially exponential growth in population

[13] Adapted from Robinson et al., presented in Bruce Mitchell, *Resource and Environmental Management*. England: 1998.

with the linear rate of food production increase. According to Malthus, the fixed amount of land available meant that as the population grew, diminishing returns would inevitably reduce the per capita food supply, the standard of living would steadily decrease, and the population would cease to grow.[14]

More recently, the 1972 United Nations Conference on Human Environment in Stockholm recognized the importance of environmental management and the use of environmental assessment as a management tool. Although the link between environment and development did not emerge strongly, there were indications that economic development needed to be transformed. The term "eco-development" was introduced in the UN Environment Program review in 1978. The introduction of the World Conservation Strategy in 1980 was another major effort to integrate development and the environment.[15]

The concept of sustainable development was popularized in the report prepared by the World Commission on Environment and Development, chaired by Gro Harlem Brundtland, then prime minister of Norway. The mandate of the Brundtland Commission was to propose long-term environmental strategies for achieving sustainable development, and to identify how relationships among people, resources, environment and development could be incorporated into national and international policies. In essence, the Commission found that many development activities were leaving growing numbers of people poor and vulnerable, while at the same time degrading the environment. As such, a new path for development was needed that would sustain human progress – not just in a few places for a few years, but for the entire planet into a more distant future.[16]

The Brundtland view of sustainable development contains two key ideas: needs (especially the needs of the poor) and limitations regarding the capacity of the environment to satisfy both present and future needs. In this regard, the Commission identified seven critical objectives for environment and development policies:

- Reviving growth

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[14] Desta Mebratu, "Sustainability and Sustainable Development: Historical and Conceptual Review," in the *Journal of Environmental Impact Assessment Review*. Volume 18, 1998.

- Changing the quality of growth
- Meeting essential needs for jobs, food energy, water and sanitation
- Ensuring a sustainable level of population
- Conserving and enhancing the resource base
- Reorienting technology and managing risk
- Merging environment and economics in decision making

The role of environmental assessment and cumulative effects assessment in achieving these objectives will be addressed later in this report. Brundtland also emphasized that there is no generic model or blueprint for sustainable development. Rather, each individual nation must determine what is appropriate for its context, needs, conditions and opportunities.[17]

In essence, sustainable development is about living within our means. It envisions a society where economic growth, environmental protection and rehabilitation, distributive justice and long-term sustainability are mutually reinforcing. In contrast to the contemporary approach to development, this entails positive improvements, not just mitigation of damage. As John Dryzek suggests, sustainable development also calls for more citizen participation in environmental planning and decision-making.[18]

Although sustainable development has become a dominant theme in environmental discourse, it also has its detractors. According to Bruce Mitchell, some critics consider the definition and interpretation of sustainable development to be too vague and ambiguous, allowing it to be something for everyone, or allowing anyone to use it as a justification for either economic growth or environmental protection. Others consider it as a means to perpetuate the western capitalist system, and reject it on ideological grounds. In

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[15] Mebratu.
[16] Bruce Mitchell, *Resource and Environmental Management*. England: 1998.
[17] Bruce Mitchell, *Resource and Environmental Management*. England: 1998.
[18] John Dryzek, *The Politics of the Earth: Environmental Discourses*. New York: 1997.

this regard, radical environmentalists deny that economic growth can be sustainable, and others believe that resources are generally only managed in the context of sustainability after they have collapsed.[19]

The selection of sustainability as the context for this research is considered appropriate for many of the same reasons that some are critical of it. What critics consider ambiguous can also be considered flexible, and in a pluralistic society, offering "something for everyone" has its benefits. The selection is appropriate precisely because sustainability has become such a pervasive discourse. The emergence of sustainable development saw a wide array of people, from environmentalists to industrialists, buy into a common concept. Arguably, putting sustainable development on to the public agenda was Brundtland's greatest achievement.

Moreover, sustainable development has recently become an objective of the environmental legislation that governs the diamond region in the NWT and Nunavut. By taking the same approach in this research, the recommendations presented in this thesis can more easily be applied within the legislative and regulatory regime. In terms of public policy, sustainable development is weaving its way into the highest level of policy development. In 1995, the federal government passed legislation requiring federal ministers to prepare sustainable development strategies for their departments, and a Commissioner of the Environment and Sustainable Development was appointed to assess these strategies.[20] In addition, sustainable development was adopted as a fundamental objective of federal environmental assessment legislation. One of the purposes of the *Canadian Environmental Assessment Act* is "to encourage responsible authorities to take actions that promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy."[21] To this end, the terms of reference established for the environmental assessment review panels of the Voisey's Bay Mine and Mill Project and the Red Hill Creek Expressway both establish sustainability as the underlying context for those reviews. Since this legislation has provided the primary regulatory context for diamond development in the north throughout the 1990s, it is appropriate to develop

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[19] John Dryzek. *The Politics of the Earth: Environmental Discourses*. New York: 1997.
[20] Public Works and Government Services, *Report of the Commissioner of the Environment and Sustainable Development*, 1998.

a cumulative effects framework that will complement the efforts that have been made thus far. Similar principles have been established in the *Mackenzie Valley Resource Management Act* and the *Nunavut Land Claim Agreement*, which now govern environmental assessment in the diamond region.

As a theory, sustainable development is very strong and compelling. In practice, it is extremely difficult to achieve, but the need for it has never been greater, since environmental degradation continues and socio-economic inequity is increasing. Ultimately, we need to develop policies that will allow us to pursue economic development equitably and within our ecological limits. The question then becomes, how do we develop such policies? As suggested in Chapter one, we need to find ways to assess the cumulative effects of development, and incorporate that knowledge into decision-making. It is within this broader context that this research will contribute to the development of a framework for assessing cumulative effects.

2.1.1 Ecosystem Approach

The nature of sustainable development requires a more holistic approach to the relationship between human activity and the environment, because the environment experiences impacts in a cumulative way. As such, as a corollary or subset of the sustainability discourse, this research will also adopt an ecosystem approach to resource and environmental management.

The ecosystem approach refers to the study of living species and their physical environment as an integrated whole. In the context of environmental management, it signifies a comprehensive and integrated approach.[22] According to Bruce Mitchell, this definition captures the essence of what many people associate with an ecosystem approach – the concept of a system, as well as its component parts, and the linkages between those parts.[23]

The ecosystem approach represents a relatively new perspective to environmental decision-makers of how

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[21] *Canadian Environmental Assessment Act*. Section 4.
[22] Stephen Bocking, "Visions of Nature and Society: A History of the Ecosystem Concept." *Alternatives*. Vol. 20 No. 3, 1994.
[23] Bruce Mitchell, *Resource and Environmental Management*. England: 1998.

ecosystems function, and how they ought to be managed, or more accurately, how we should manage our relations with them. It challenges some of the principles of reductionist science, and has necessitated a rethinking of how we consider our relationship with the natural world.

As James Kay and Eric Schneider observe, environmental managers are facing increasing pressure to solve the problems associated with environmental degradation, and scientists are under pressure to develop clear and simple rules for proper ecosystem management. However, ecosystem approaches do not lead to simple formulaic remedies and the traditional scientific method of problem solving is ill fitted to the problems we face.

In order for the scientific method to work, an artificial situation of consistent reproducibility must be created. This requires simplification of the situation to the point where it is controllable and predictable. But the very nature of this act removes the complexity that ecosystems represent. If we are going to deal successfully with our biosphere, we will have to learn that we do not manage ecosystems, but rather we manage our interaction with them.[24]

In essence, the first challenge presented by the ecosystem approach is to the very concept of ecosystem management. According to standard Western models, resource managers should try to maintain ecosystems in a particular state, which is assumed to be good and desirable. Indeed, a great deal of resource management efforts are aimed at maintaining fertile agricultural land, high fish populations, and productive timber stands. However, research suggests that the more we try to control the ecosystems in which we live, the more we set them up for disaster.

As an example, consider the case of forest fire. Through programs of fire prevention and suppression we can successfully limit the incidence of forest fires, which we choose to do because people generally consider fires to be disruptive and dangerous. However, forest fires would normally take place as part of nature's regular life cycle. Consequently, when a fire eventually occurs after years of fire suppression, the

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[24] J.J. Kay, Schneider, E.D, "Embracing Complexity, The Challenge of the Ecosystem Approach", Alternatives Vol 20 No.3, 1994.

magnitude and extent of damage is far greater than it would have been without human intervention. Moreover, it takes proportionately longer for the ecosystem to recover because its natural processes have been disrupted.[25] In other words, the more we try to make ecosystems stay the same, the worse the consequences are when they do change – and such change is inevitable.[26]

According to the ecosystem approach, we should recognize that ecosystems are complex, and they cannot always be predicted and manipulated to meet human needs. Instead, ecosystems should be considered as complex systems that are made up of inter-connected subsystems and components, which each influence the way the others behave. Consequently, in order to begin to understand the ecosystem, it has to be viewed together with the systems that surround it, in the context of their wider environment.

In this regard, the ecosystem approach draws on the foundations of complex systems theory. Complex systems are non-linear, in the sense that they behave as a connected whole. The system's behaviour cannot be explained by decomposing it into pieces, nor can the behaviour of the pieces be summed together linearly to equal the behaviour of the whole system.[27] Understanding these interconnections between human and biophysical systems is central to the concept of sustainability.[28]

This holistic approach stands in contrast to traditional reductionist science, which tends to focus on the structure and function of individual components within ecosystems. While the ecosystem approach recognizes the utility of understanding how the components work, an ecosystem approach places this information within the context of the system as a whole, in order to reflect the influence that outside factors have on how ecosystems function.

In addition, the ecosystem approach includes human goals and values in the analysis of ecosystems, rather

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[25] J.J. Kay, Lecture in ERS 680, October 1998.
[26] C.S. Holling, "What Barriers? What Bridges," Chapter 1, *Barriers and Bridges to the Renewal of Ecosystems and Institutions*, Lance H. Gunderson et al., eds. New York: 1995.
[27] J.J. Kay, "On the Nature of Ecological Integrity: Some Closing Comments" in S. Ecological Integrity and the Management of Ecosystems. Woodley, J. Kay, G. Francis, eds. Florida: 1993.
[28] Barry Sadler and Jacobs, Peter, "A Key to Tomorrow: On the Relationship of Environmental Assessment and Sustainable Development," in Sustainable Development and Environmental Assessment: Perspectives on Planning for a Common Future.

than focusing exclusively on expert description of ecological and biological systems. This is essential because every researcher makes decisions about which parts of the system to study, because they simply cannot study the whole thing. Although these choices are necessary from a pragmatic perspective, they are also inevitably value-laden. To neglect these factors makes it impossible to apply our knowledge from one ecosystem to the next, because the context is rarely the same from ecosystem to ecosystem. In terms of assessing the cumulative effects of development, the ecosystem approach provides a framework for evaluating the integrity of an ecosystem in the context of surrounding human activity.

According to Kay and Schneider, ecosystem integrity has three components:

- ecosystem health, defined as the ability to maintain normal operations under normal environmental conditions;
- the ability to cope with stress, defined as changes (which can be catastrophic) in environmental conditions; and
- the ability to continue the process of self-organization, defined as the ability to continue to evolve and develop through the birth, growth, death and renewal cycle.[29]

In the context of sustainable development, the World Conservation Strategy identified the maintenance (or recovery) of ecological integrity as one of its principal goals related to living resource conservation, and is appropriately applied in environmental assessment. According to Gardner, "adherence to this principle depends on staying within the limits of ecological carrying capacity by promoting ecologically realistic consumption standards and ensuring that ecological priorities are present in decision-making."[30] This also captures the essence of cumulative effects assessment.

The ecosystem approach is only in its infancy, but is rapidly gaining acceptance. Incorporating the

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CEARC, (date unknown).

[29] J.J. Kay, Schneider, E.D, "Embracing Complexity, The Challenge of the Ecosystem Approach", Alternatives Vol. 20 No. 3, 1994.

[30] Julia E. Gardner, "The Elephant and the Nine Blind Men: An Initial Review of Environmental Assessment and Related Processes in Support of Sustainable Development," in Sustainable Development and Environmental Assessment: Perspectives on Planning for a

ecosystem approach more widely into various levels of decision-making through environmental and cumulative effects assessment, would inevitably contribute to the broader goal of sustainability.

2.1.2 Sustainability in a northern context

Pursuing sustainable development in the Slave Geological Province entails some challenges that are particular to the Canadian North. The nature of northern ecosystems, which tend to be more fragile than those in more temperate climates, requires special attention when considering the potential impacts of development. In addition, while many northerners, including Aboriginal peoples, are interested in development opportunities in the North, the desirability of industrial development is not as well accepted as perhaps it is in southern Canada. People often approach development proposals with a great degree of caution. Many Aboriginal peoples are also struggling to maintain cultural traditions that often parallel sustainability principles, against a background of continuing economic expansion. The following sections will explore these issues in further detail, in order to present a clearer picture of the challenges of sustainable development in the North.

2.1.2.1 Northern ecosystems

The sustainability debate in the diamond region is complicated by the fragility of arctic ecosystems. Research has established that polar ecosystems have several characteristics that make them especially vulnerable to pollution inputs, as compared to ecosystems at more temperate latitudes.[31] Low average temperatures in the Arctic, combined with the extensive snow and ice cover during the comparatively long arctic winter, dramatically shorten the productive season for plants and animals. For instance, snow melt in the high arctic usually lasts until the end of June, but fresh snow can arrive in August, so the growing season may only last from one to two-and-a-half months. Lack of clouds and precipitation facilitate the long-range

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Common Future. CEARC, (date unknown).

[31] For an excellent summary of polar ecology, see Arctic Monitoring and Assessment Program, *Arctic Pollution Issues: A State of the*

transport of contaminants because there is very little rain or snow to clean out the air.

In addition, biochemical processes are temperature dependent, and biological activity slows down remarkably in arctic ecosystems. Plants and animals take longer to develop, and it often takes many years before an organism can store enough energy to reproduce. As a result, northern ecosystems are slow to recover from environmental degradation. Moreover, reduced microbial activity slows the rate of nutrient cycling, such that plant growth is often limited by lack of nitrogen and phosphorus in the soil. During the winter, ice and snow cover restricts the amount of light that reaches primary producers such as phytoplankton. Once spring arrives, the snow and ice must melt before the sun can begin to warm the ground. However, as much as half of the total annual input of solar energy in the Arctic arrives before the end of snowmelt, so much of it is reflected back into space without being used for photosynthesis.

Animals in the arctic are especially vulnerable to contaminant inputs. Biodiversity in the arctic, particularly in the terrestrial food web, is considerably lower than in more temperate ecosystems. Often only a few species are found in a particular area, and some levels in the food chain may be occupied by only one or two species. In these circumstances, dangers to these species can threaten the ecosystem as a whole. In addition, arctic animals store energy by producing and accumulating fat reserves, which they can draw on during the long harsh winters. However, many contaminants transported to the arctic are persistent and highly fat soluble, so they accumulate in fat reserves.[32] As animals deplete their reserves during the winter, the contaminants remain in the body, but at higher levels of concentration. This process is magnified by the animals' longer life spans, because there is more time to accumulate contaminants.

For these reasons, polar ecosystems are especially sensitive to contaminant inputs, and they take longer to recover from environmental damage. This poses a particular challenge for those who want to introduce industrial development into northern ecosystems in a sustainable manner.

Arctic Environment Report. 1997.

[32] Des W. Connell. *Basic Concepts of Environmental Chemistry*. Florida: 1997.

2.1.2.2 Aboriginal perspectives

Aboriginal peoples contribute another dimension to the sustainability discourse in northern Canada. The creation of Nunavut, the continuing devolution of powers from the federal to territorial governments, and the evolution of land claim and treaty entitlements have created a distinct and important role for Aboriginal peoples, whose interests and perspectives are often quite different from those of other resource users in the North.

Many Aboriginal peoples understand themselves as part of a sacred geography and ecology that is based on a sense of belonging to the land.[33] Knowledge of local wildlife is still central to Aboriginal culture, which is in important ways still essentially a hunting and gathering culture that has depended on Arctic wildlife for three thousand years.[34] As a result of their reliance on the land for subsistence, Aboriginal peoples developed their own body of knowledge about the habitat and wildlife populations that surrounded them, which is commonly referred to as traditional knowledge. Using this knowledge, Aboriginal groups developed a unique resource management system that is based on a variety of cultural beliefs and taboos, and specific harvesting techniques.[35]

For instance, Aboriginal peoples believe they have a sacred obligation to protect the land for future generations.[36] They follow a stewardship principle, which asserts that the land should be respected, and decisions about its use must account for its ability to maintain a healthy, life-sustaining integrity. Moreover, many Aboriginal peoples believe they should be concerned not just with human life but with all life in the land, and all the life that relies on that land to live, because everything on the land is of value. In fact, many aboriginal peoples are uncomfortable with the term "resource management" because it implies a sense of

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[33] Jackie Wolfe. "First Nations Strategies for Reintegrating People, Land Resources and Government," in Public Issues: A Geographical Perspective. Jean Andrey and J. Gordon Nelson, eds. (Waterloo: 1994) pp. 240, 256.

[34] Anne Gunn, Goo Arlooktoo and David Kaomayok. "The Contribution of the Ecological Knowledge of Inuit to Wildlife Management in the Northwest Territories," in *Traditional Knowledge and Renewable Resource Management in Northern Regions*. Milton M.R. Freeman and Ludwig N. Carbyn, eds. (Edmonton: 1988) pp. 22.

[35] R. Riewe and L. Gamble. "The Inuit and Wildlife Management Today," in *Traditional Knowledge and Renewable Resource Management in Northern Regions*. Milton M.R. Freeman and Ludwig N. Carbyn, eds. Edmonton: 1988, pp. 31.

superiority over nature.[37] Riewe and Gamble suggest that wildlife management would be more appropriately referred to as "people management" because most wildlife populations are actively manipulated by managing the harvesters, by setting season quotas and bag limits, not by manipulating the wildlife species. In this sense, the parallel between traditional knowledge and the ecosystem approach is striking.

Traditional knowledge of natural resources is also an accumulation of the experience of generations of Aboriginal peoples. Hunters make continual observations about things such as weather patterns and animal behaviour, which allow them to make appropriate harvesting decisions and predictions. A significant amount of knowledge is also acquired through the butchery of harvested animals, by observing different consistencies in body fat and other conditions. New observations are acquired through discussions with others in the community.[38]

Aboriginal resource-users give authority for management decisions to specific stewards or hunting bosses, who are considered to have a particularly intimate knowledge of the resource. The steward is generally a resource-user who has an individual stake in protecting that resource, and who works within a community that often uses social sanctions as a means of enforcing the rules. In this regard, there is a strong sentiment, especially among older hunters, against unnecessary harvesting or wastage.[39] With this conceptual base, the Mississauga First Nation developed seven principles for guiding sustainable economic development in their community:

- ecologically and environmentally safe – presents no risks;
- renewable – does not depend on resources that cannot be replaced;
- future oriented – does not jeopardize survival of future generations;

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[36] Mary Laronde. "Co-management of Lands and Resources in n'Daki Menan," in *Rebirth: Political, Economic and Social Development in First Nations*. Toronto: 1993, pp. 93, 97.
[37] Claudia Notzke. *Aboriginal People and Natural Resources in Canada*. Edmonton: 1994, pp. 2.
[38] Gunn et al. at 25.

- human-centred – focuses on growth for people, not on money or profit;
- health-promoting – helps people better themselves emotionally, physically and spiritually;
- encouraging self-reliancε μοϖεσ αωαψ φρομ δεπενδενχψ;
- investing in a future economic well-being – frees people to invest in community health growth.[40]

Despite the growth of the sustainable development discourse, traditional ecological knowledge has not been fully embraced by mainstream Canadian culture as a legitimate knowledge base, and there is still some reluctance among non-Aboriginal resource managers to make decisions based upon it. Some researchers assert that resource managers are uncomfortable with the spiritual content of traditional knowledge, and its foundation in oral culture. By the same token, Johnson suggests that Aboriginal peoples are reluctant to accept Western science because of its overriding need to control and interfere with nature.

> Unlike conventional science, which generally presents itself as a culturally neutral and value-free system of universal knowledge, traditional ecological knowledge invariably focuses on community priorities within the local context … The conceptual roots of traditional ecological knowledge relate more to the timeless mainstream of human experience than to the recent traditions of Western science, which grew up in the service of empire building.[41]

Indeed, traditional knowledge is contextual, to the extent that the knowledge of any Aboriginal group is particular to the region in which they live, and cannot necessarily be applied universally. However, while the knowledge itself may differ from community to community, the basis on which knowledge is acquired remains the same.

The discourse of sustainable development is consistent with many of the principles embodied in traditional ecological knowledge, which implicitly considers the cumulative impacts of human activity. It also seeks to integrate biophysical, economic, social and cultural values. As such, the pursuit of sustainability would be

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[39] Gunn et al. at 26.
[40] Gloria Daybutch. "Economic Development and Healing in Mississauga First Nation," in *Rebirth: Political, Economic and Social Development in First Nations*. Toronto: 1993, pp. 113.
[41] John Corsiglia and Gloria Snively. "Knowing Home," in *Alternatives* Vol. 23 No. 3 (1997) pp. 22.

greatly enhanced by a more thorough integration of traditional ecological knowledge and scientific data. In fact, the evolution of Aboriginal land claim agreements in the North would seem to require it. Unfortunately, there are many obstacles. Many of the principles that underlie traditional knowledge and sustainable development run counter to the prevailing views that dominate the Canadian economic climate, and even the legitimate desire of many Northerners for economic development opportunities. This positions traditional knowledge as a difficult and fundamental challenge to the status quo.

Because of the almost pristine environment in the arctic, it is relatively easy to imagine the application of sustainable development in the diamond region, to the extent that development has not already irreparably damaged the environment, and a sustainability path could conceivably prevent such degradation. This is reinforced by the compatibility between sustainability and the foundations of Aboriginal cultures that are demographically strong in the Canadian north. However, while the concept of sustainable development has begun to infiltrate policy and decision making, Canadian resource management is still focused on economic development and resource exploitation. Combined with the pressing need for economic development in the North, these conditions create a worthy challenge for people who seek to protect the integrity of the northern landscape.

2.2 Cumulative Effects

Cumulative effects refer to the accumulation of change in environmental systems in an additive or interactive manner. While impacts may originate at the local level, they tend to accumulate at ecosystem or landscape levels. These various effects may interact, and the ultimate consequences of human activities can be very significant even though they appear inoffensive when considered individually.[42] This holistic approach demonstrates the link between cumulative effects and the ecosystem approach. Kate Davies (1993), suggests the following:

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[42] Kingsley.

> [T]o a large extent, all environmental effects can be seen as cumulative, in that all environmental effects occur in environments that are already stressed by either natural activities and events, or human activities. Cumulative effects are not a distinct or new type of environmental effect, the difference lies in the way we perceive environmental effects. Instead of looking at one effect in isolation from the other, cumulative environmental assessment implies looking at environmental effects in a more holistic way, as part of a larger ecosystem.[43]

Cumulative effects can also be defined in the context of project development. In this regard, the Canadian Environmental Assessment Agency defines cumulative effects as "changes to the environment that are caused by an action in combination with other past, present and future actions."[44]

Cumulative effects can occur in a variety of ways:

- *Spatial and temporal crowding* refers to when too much is happening within too small an area, or in too brief a period of time. A threshold may be exceeded and the environment may not be able recover to pre-disturbance conditions. This can occur quickly, or gradually over a long period of time before the effects become apparent. Spatial crowding results in an overlap of effects among actions, such as the close proximity of timber harvesting, wildlife habitat and recreational use in a park. Temporal crowding may occur if effects from different actions overlap or occur before the environment has had time to recover.

- *Nibbling loss* refers to the gradual disturbance and loss of land or habitat. This is also connected to spatial crowding, where a number of projects have little individual impact but a large collective impact, such as clearing of land for a new sub-division and roads into a forested area.

- *Growth-inducing potential* refers to new actions that induce further action to occur. The effects of these "spin-off" actions (e.g. increased vehicle access into a previously inaccessible hinterland area) may add to the cumulative effects already occurring in the vicinity of the proposed action, creating a feedback effect. Such actions may be considered as "reasonably

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[43] Kate Davies, "Defining cumulative impact assessment," *Canadian Water Watch* (July/August 1993) 6: 7-8.

foreseeable actions".[45]

Each of these is relevant in the context of diamond mining. In the example of the Bathurst caribou herd, the physical footprint of the BHP project may only represent 0.03% of the 250,000 km^2 range of the herd. However, in cumulative effects assessment, we need to ask what is happening elsewhere in that space. Even if the impact of activities at the mine site itself is negligible, the cumulative effect of habitat loss and habitat fragmentation due to activities happening elsewhere may be significant. The effects could be compounded if activities occur in overlapping geographic areas, or within too short a timeframe.

In addition, future prospects for diamond development should be considered. BHP is operating the first diamond mine in Canada, but more will surely follow. The recently approved Diavik mine, which is only a short distance away from the BHP development, hopes to begin production in 2001. Even if the impact of BHP is minimal, the pursuit of sustainability would necessitate an evaluation of the combined effects of the two projects and the growth in infrastructure required by these mines, in relation to the carrying capacity of the surrounding ecosystem. Similarly, the infrastructure provided for one or two mines may make other development proposals economic, when they otherwise might not be. An ecosystem approach would take a more holistic view, by selecting ecologically relevant boundaries, and examining the additive and interactive factors that impact upon the integrity of the Bathurst herd. The literature has yet to address these issues in the specific context of diamond mining, but the answers are central to the pursuit of sustainable development in the diamond region.

2.3 Cumulative Effects Assessment

A detailed review of cumulative effect assessment methodologies is beyond the scope of this research. However, it is worthwhile to review the key features of cumulative effects assessment, in order to

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[44] Canadian Environmental Assessment Agency, *Cumulative Effects Practitioner's Guide*. Hull: 1999.

[45] Canadian Environmental Assessment Agency, Operational Policy Statement on Assessing Cumulative Environmental Effects Under the *Canadian Environmental Assessment Act*. Hull: 1999.

understand better the concerns that have been raised regarding how cumulative effects assessment has been applied in northern Canada.

In 1983, Beanlands and Duinker coined the phrase valued ecosystem components (VEC) to describe which elements should be given most attention in the environmental assessment process. They defined VECs as components of the natural and human world that are considered to be valuable by public and expert participants in a public review process.[46] Although Beanlands and Duinker used the term primarily to describe elements of the biophysical environment, its use has been expanded to include cultural and socio-economic values as well. In project-specific assessment, CEA should determine whether that particular project has an effect on a VEC. If there is a measurable effect, then CEA should determine what other projects or activities are also affecting the VEC. If there is no effect from the project, there can be no cumulative effect.

Cumulative effects assessment differs in important ways from conventional environmental assessment. Typically, cumulative effects assessments are expected to:

- Assess effects over a larger area;
- Assess effects during a longer period of time; and
- Consider the effect of an activity in combination with other actions - not just the direct effect.

The *Cumulative Effects Assessment Practitioners Guide*, published by the Canadian Environmental Assessment Agency (1999), provides the most recent guidance on cumulative effects assessment methodology. It identifies a series tasks that are involved in assessing cumulative effects, illustrated in the following chart.

In consideration of the ecosystem approach discussed earlier, case-specific criteria should be developed for the selection of regional issues and of VECs. Criteria should also be developed for the identification of

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[46] G.E. Beanlands and P.N. Duinker, "An Ecological Framework for Environmental Impact Assessment in Canada," Institute for

spatial and temporal boundaries, and the selection of other activities that may affect the same VECs. As well, the identification of potential impacts should also identify linkages between systems. Notably, while this approach may be useful in the context of project-specific CEA in environmental assessment, it does not lend itself to CEA in a broader context.

Figure 3: Assessment Framework (Canadian Environmental Assessment Agency)

Assessment Framework	
Basic EIA Steps	**Tasks to complete for a CEA**
1. Scoping	• Identify regional issues of concern • Select appropriate regional VECs • Identify spatial and temporal boundaries • Identify other actions that may affect the same VECs • Identify potential impacts due to actions and possible effects
2. Analysis of Effects	• Complete the collection of regional baseline data • Assess effects of proposed action on selected VECs • Assess effects of all selected actions on selected VECs
3. Identification of Mitigation	• Recommend mitigation measures
4. Evaluation of Significance	• Evaluate the significance of residual effects • Compare results against thresholds or land use objectives and trends
5. Follow-up	• Recommend regional monitoring and effect management

2.4 Sustainability and Cumulative Effects Assessment

Environmental assessment is often described as a tool to promote sustainable development. At minimum, considering the potential adverse effects before carrying out a project can prevent or reduce environmental degradation. Properly done, anticipatory attention to cumulative effects can allow stronger efforts to select and design undertakings that promise net sustainability gains. By beginning an environmental assessment at the outset of a project, environmental considerations can influence project design before irrevocable decisions have been made. However, project-specific environmental assessment has its limitations. As Jacobs and Sadler point out, "considerable improvement in the contemporary practice of EA is required for

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Resource Studies. Halifax: 1983.

this promise to be realized."[47] To this end, they point directly to cumulative impacts as a key area for improvement. "The achievement of sustainable development requires a synoptic ecosystem approach, one that relates the dynamics of natural variability and the effects of human intervention to key indicators of biodiversity, productivity, and so on."[48]

The practice of cumulative effects assessment furthers the contribution of EA to sustainability. In keeping with the principles of the ecosystem approach, it represents a more holistic approach to environmental assessment by offering a more complete and true picture of the real impacts of development. However, it should be noted that the current literature on cumulative effects assessment focuses almost exclusively on biophysical impacts, rather than socio-economic effects. This is a conspicuous deficiency, which EA practitioners and researchers have acknowledged but have not yet begun to address. The provisions of the *Canadian Environmental Assessment Act*, which does not require the direct evaluation of socio-economic effects, reflect this bias. In fact, that legislation defines environmental effect as "… any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions…" As such, unless the socio-economic effect is caused by a direct biophysical effect, there is no legislative requirement under CEAA to assess socio-economic impacts.

In the NWT, the legislative requirements in relation to socio-economic effects changed in 1998 with the passage of the *Mackenzie Valley Resource Management Act* (MVRMA), which now governs environmental assessment in the Mackenzie Valley region. One of the guiding principles of the MVRMA is the "protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley."[49] However, there is little experience with this new legislation, and it will likely be some time before professional practice begins to examine this issue.

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[47] Barry Sadler and Jacobs, Peter, "A Key to Tomorrow: On the Relationship of Environmental Assessment and Sustainable Development," in Sustainable Development and Environmental Assessment: Perspectives on Planning for a Common Future. CEARC, (date unknown).

[48] Barry Sadler and Jacobs, Peter, "A Key to Tomorrow: On the Relationship of Environmental Assessment and Sustainable Development," in Sustainable Development and Environmental Assessment: Perspectives on Planning for a Common Future. CEARC, (date unknown).

Until socio-economic impacts are considered in as much depth as biophysical effects, and accorded the same importance, the utility of environmental assessment (including cumulative effects assessment) as a tool for achieving sustainable development will be impaired.

2.5 Sustainability Based Criteria for Cumulative Effects Assessment

The relationship between cumulative effects assessment and sustainable development highlights the need to develop criteria that can be used to evaluate the central components of a holistic approach to CEA. The analysis in this research will be guided by a set of sustainability-based criteria for cumulative effects assessment, which have been derived from the relevant literature. Several researchers have made significant contributions to developing criteria and principles for environmental assessment. Since the concerns surrounding environmental assessment and cumulative effects assessment are so closely linked, it is worthwhile to review some of the key literature, and adapt these principles more specifically to cumulative effects assessment.

The International Association for Impact Assessment has established a set of basic principles, which are meant to ensure that environmental impact assessment achieves its objectives. According to IAIA, environmental assessment should be:

- Purposive – the process should inform decision-making and result in appropriate levels of environmental protection and community well-being;
- Rigorous – the process should apply "best practicable" science, employing methodologies and techniques appropriate to address the problems being investigated;
- Practical – the process should result in information and outputs which assist with problem solving and are acceptable to and able to be implemented by proponents

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[49] *Mackenzie Valley Resource Management Act*, subsection 115 (b).

- Relevant – the process should provide sufficient, reliable and usable information for development and decision-making;
- Cost-effective – the process should achieve the objectives of EIA within the limits of available information, time, resources and methodology;
- Efficient – the process should impose the minimum cost burdens in terms of time and finance on proponents and participants consistent with meeting accepted requirements and objectives of EIA;
- Focused – the process should concentrate on significant environmental effects and key issues; i.e., the matters that need to be taken into account in making decisions;
- Adaptive – the process should be adjusted to the realities, issues and circumstances of the proposals under review without compromising the integrity of the process, and be iterative, incorporating lessons learned throughout the proposal's life cycle;
- Participative – the process should provide appropriate opportunities to inform and involve the interested and affected publics, and their inputs and concerns should be addressed explicitly in the documentation and decision-making;
- Interdisciplinary – the process should ensure that the appropriate techniques and experts in the relevant biophysical and socio-economic disciplines are employed, including use of traditional knowledge as relevant;
- Credible – the process should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification;
- Integrated – the process should address the interrelationships of social, economic and biophysical aspects;
- Transparent – the process should have clear, easily understood requirements for EIA content;

ensure public access to information; identify the factors that are to be taken into account in decision making, and acknowledge limitations and difficulties; and

- Systematic – the process should result in full consideration of all relevant information on the affected environment, of proposed alternatives and their impacts, and of the measures necessary to monitor and investigate residual effects.[50]

A similar set of 21 principles is presented in the 1996 International Study of the Effectiveness of Impact Assessment.[51] In each case, many of these principles overlap or represent variations of another theme. Robert Gibson has distilled many of the core ideas down to eight principles, which more concisely express the key elements in good EA.

- The process must encourage an integrated approach to the broad range of "environmental" considerations and be dedicated to achieving and maintaining sustainability locally, nationally and globally;
- Assessment requirements must apply clearly and automatically to planning and decision making on all undertakings that may have environmentally significant effects and implications for sustainability within or outside the legislating jurisdiction;
- Environmental assessment decision making must be aimed at identifying best options, rather than merely "acceptable" proposals. It must therefore require critical examination of purposes and comparative analysis of alternatives;
- Assessment requirements must be established in law and must be specific, mandatory and enforceable;
- Assessment work and decision making must be open, participative and fair;

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[50] "Principles of Environmental Impact Assessment Best Practice," International Association for Impact Assessment, in cooperation with the Institute of Environmental Assessment, UK. http://www.ext.nodak.edu/IAIA/principles.

- Terms and conditions of approval must be enforceable and approvals must be followed by monitoring of effects and enforcement of compliance in implementation;
- The process must be designed to facilitate efficient implementation; and
- The process must include provisions for linking assessment work into a larger regime including the setting of overall biophysical and socioeconomic objectives, and the management and regulation of existing as well as proposed new activities.[52]

Gibson has emphasized that these principles are interdependent, and need to be used together as a package.

In a critique of the BHP environmental assessment review panel, the Canadian Institute of Resources Law applied ten similar criteria to the review process, which were considered important by key stakeholders:

- Effectiveness;
- Efficiency;
- Predictability;
- Certainty;
- Fairness;
- Transparency;
- Inclusiveness of interests;
- Inclusiveness of issues;
- Cross-cultural sensitivity; and

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[51] Barry Sadler, "International Study of the Effectiveness of Environmental Assessment, Final Report. Environmental Assessment in a Changing World - Evaluating Practice to Improve Performance. Ottawa: 1996.
[52] Robert Gibson, "Environmental assessment design: lessons from the Canadian experience," in Environmental Professional 15 (1), 1993.

- Promotion of consensus and dispute resolution.[53]

Terry Fenge has noted four core principles of sustainable development. Although they were not presented in the context of environmental assessment, they are directly relevant to the research at hand:

- Respect for ecological integrity;
- Efficient use of natural, manufactured and social capital;
- Promotion of equity;
- Participation of stakeholders; and
- Environmental stewardship by all levels of decision-makers.[54]

Many of these parameters are overlapping, but several key themes are evident: the need for CEA to be integrated, comprehensive, participative and enforceable. By focusing on these themes, the parameters presented above have been consolidated into a set of four criteria. The criteria will be used to assess to degree to which various CEA approaches contribute meaningfully to the pursuit of sustainable development.

Integrated: CEA should be undertaken both at the project-specific level and on a regional planning basis, in order to develop a complete picture of the environmental effects of human activities. Linkages need to be established between these processes, so that proactive measures can be taken to anticipate cumulative effects issues and to develop mechanisms to address them before issues become critical. CEA should also include an adaptive feedback mechanism, so that lessons learned can inform future decision-making in cumulative effects management.

Comprehensive: CEA should be interdisciplinary, and should be undertaken in a rigorous and systematic fashion. The environment should be broadly defined to include physical attributes such as land, water, air and living organisms, as well as social and cultural attributes. CEA should be done on a regional level with

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[53] Canadian Institute of Resources Law, "Independent Review of the BHP Diamond Mine Process," submitted to the Mineral Resources Directorate, Department of Indian Affairs and Northern Development. Ottawa: 1997.

a long-term view, and a broad range of activities should be considered. Spatial and temporal boundaries should be based on relevant ecological, socio-economic and cultural considerations, not jurisdictional ones.

Participative: CEA should be open and transparent. Stakeholders must be given meaningful opportunities to participate in all levels of CEA, including setting regional priorities and objectives. Concerns raised through public participation should be addressed specifically in the decision-making process. Where CEA is being undertaken on Aboriginal lands, consideration must be given to traditional land use and traditional ecological knowledge.

Enforceable: The assessment of cumulative effects, and the implementation of requirements arising from CEA findings, must be legally binding and enforceable. Key requirements and process issues should be based in law, to provide a degree of predictability and certainty to the process. Follow-up and monitoring programs must be undertaken to validate predictions and mitigation measures for cumulative effects, and means must be available to address non-compliance.

These criteria are not intended to be all encompassing. As indicated above, the literature has identified dozens of criteria that are considered important in environmental assessment, such as efficiency and cost effectiveness, which are not fully reflected in the criteria derived here. However, the criteria defined here are intended to broadly cover the key issues, while keeping the scope of the research manageable. Moreover, specific factors can be better elaborated on a case specific basis, using the framework that the criteria provide. In the context of sustainable development, the four criteria being used for this analysis are considered to provide a solid foundation for the evaluation of CEA processes and options that follows.

2.6 Chapter Summary

The items explored in this chapter, including the evolution of the sustainability discourse, and the practice of cumulative effects assessment, will inform the analysis that follows in later chapters. This chapter

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[54] Terry Fenge, "Toward Sustainable Development in the Circumpolar North." Canadian Arctic Resources Committee: 1993.

established the theoretical framework for evaluating the contribution of cumulative effects assessment to sustainable development. In this regard, sustainability was shown to be closely connected to the environmental and cultural characteristics in the Slave Geological Province. Often, the pursuit of sustainable development is at odds with prevailing norms in the North. The next chapter will evaluate more closely the challenges to sustainable development in the diamond region of the Slave Geological Province.

3. Cumulative Effects and Diamonds in the Slave Geological Province

As seen in Chapter two, the physical and cultural geography of the Canadian North has created many challenges for sustainable development, including issues associated with the fragility of arctic ecosystems, and the challenge of balancing the traditions of Aboriginal peoples with economic development. An examination of the history of diamond activity reveals how the pace of exploration and development in the Slave Geological Province, together with the magnitude of the projects under review, have compounded these challenges. The evolving political landscape in the North also strongly influences the policy context in which the cumulative effects debate is taking shape. The information presented in this chapter provides a foundation for understanding the legislative and regulatory structures that are described in Chapter four.

3.1 History of Diamond Activity in the Slave Geological Province

Many people in the North refer to the diamond lands as the "Corridor of Hope". Indeed, many residents have claimed that the rush for diamonds is bigger than the Klondike gold rush at the end of the last century that sparked the biggest staking rush in Canadian mining history. The magnitude of the projects under development is staggering. For instance, the Diavik Diamonds Project has an expected life span of 16-22 years, and will employ about 400 people. Estimated capital costs for the project are $1.28 billion. Diavik also projected that the mine will directly generate $70 million per year in tax revenues, in addition to increases in personal income taxes.[55] This chapter provides the underlying policy context surrounding cumulative effects assessment in the diamond region.

In less than three years, starting in 1991, prospectors and mining companies laid claim to more land in northern Canada than they had during all the previous half century.[56]

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[55] Department of Indian Affairs and Northern Development. "Comprehensive Study Report: Diavik Diamonds Project." Yellowknife: 1999.
[56] Ed Struzik, "Diamonds in the Rough." *Nature Canada*. Fall 1994.

> The diamond prospectors' camps dot a region half the size of Alberta. It stretches from the north shore of Great Slave Lake to Coronation Gulf on the treeless Arctic coast; from the sweeping Mackenzie River valley to Hudson Bay. The scale of the staking is unprecedented: 21 million hectares have been marked of with claim stakes.[57]

Currently only one diamond mine is operating in the NWT--Broken Hill Proprietary's Ekati mine. Ekati went through an environmental assessment review panel under the federal Environmental Assessment Review Process, which has since been replaced by the *Canadian Environmental Assessment Act*. The review panel released its findings in 1996, and the mine began producing diamonds in October 1998. Canada's second diamond mine will be the Diavik Diamonds Project, which underwent a comprehensive study under the Act, and is currently seeking its final regulatory approvals. At least three other sites are in the advanced stages of exploration.

In addition to sparking an exploration boom, the rush for diamonds renewed environmental and economic issues. The pace of diamond exploration, in combination with hydroelectric and oil and gas prospects, has raised many concerns among northern residents about the long-term integrity of northern ecosystems and communities. As noted in Chapter two, northerners are concerned about the potential effects of multiple developments in concentrated geographic areas, such as the potential nibbling effect on wildlife habitat. They are also concerned about the potential for induced projects that might become economical if the appropriate infrastructure is in place. In addition, Aboriginal groups are also increasingly anxious about how current and future development projects will affect their traditional use of the land.

The high degree of concern was reflected in the public hearings that took place during the BHP review. Similarly, although Diavik successfully gained the environmental assessment approval under the *Canadian Environmental Assessment Act*, the federal environment minister's decision faced two court challenges. Both challenges cited cumulative effects issues in their applications for judicial review. The first was initiated by the North Slave Métis Alliance, which charged that the federal environment minister failed to consult with them adequately, and that the environmental assessment did not conform to the guidelines.

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[57] "Finding Common Ground," *Up Here*. Volume 10, Issue 5. Nov/Dec 1994.

The second challenge was initiated by the Canadian Arctic Resources Committee, which charged that the environmental assessment did not meet the requirements of the *Canadian Environmental Assessment Act*. Both challenges were resolved outside the courts, but they highlight the extent to which cumulative effects have become a major issue related to northern development.

3.2 The Area Involved

The diamond region of the North extends from Great Slave Lake north to the Arctic coast. The BHP and Diavik projects are located near Lac de Gras, approximately 300 kilometres northeast of Yellowknife, Northwest Territories, in the middle of the Slave Geological Province. Lac de Gras is in the central Arctic tundra, about 100 kilometres north of the treeline, at the headwaters of the Coppermine River. The regional landscape consists of diffuse watersheds with numerous lakes interspersed among rolling hills, boulder fields, eskers and bedrock outcrops. Lac de Gras is within the continuous permafrost zone, and harsh climate conditions result in minimal soil development and only low-growing vegetation cover.

The area surrounding Lac de Gras is within the traditional hunting and trapping areas of Inuit, Dene and Métis peoples. The Dogrib Nation, the Yellowknives Dene First nation, Métis peoples and Inuit from the Kitikmeot region all claim overlapping rights and interests in the area. In addition, the diamond area is at the heart of the migration route of the Bathurst caribou herd.[58]

Before the creation of Nunavut, the population of the NWT was approximately 60,000. With the creation of the new territory, the NWT population has been reduced to roughly 40,000 people, 48 percent of whom are Aboriginal. The closest community to Lac de Gras is Wekweti, which is 187 kilometres west-southwest. Nine other affected communities include: N'Dilo, Gameti, Dettah, Lutsel K'e, Wha Ti, Fort Rae, Edzo, Fort Providence, and Fort Resolution.

Government has historically accounted for the largest proportion (almost half) of jobs in the NWT. In

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[58] Susan Wismer, "The Nasty Game: How Environmental Assessment is Failing Aboriginal Communities in Canada's North."

addition, the economy is heavily dependent on the resource sector. Mining is the largest private industrial sector of the economy, directly accounting for 1,540 jobs in 1996.[59]

The creation of Nunavut removed roughly 400 government jobs from Yellowknife, which has a population of 17,000. The impact of these losses has been compounded by the recent closure of the Giant Mine, a gold mine previously owned by the now bankrupt Royal Oaks Mines. The closure of the Giant Mine was a major loss for roughly 400 hundred Yellowknife miners, many of whom are now looking to the diamond industry for jobs. It was also a blow for the federal government, which is left holding a $275 million bill for cleaning up arsenic-laced tailings ponds.

As much as northerners are anxious for jobs, many of them – particularly in Aboriginal communities – were not prepared to support the Diavik project until their concerns about the potential effects of the project were addressed. Joe Rabesca, Grand Chief of the Dogrib Treaty 11 Council, wrote in a letter to the federal environment minister: "The Dogrib are in favour of carefully planned economic development. Such development must not put our land, water and wildlife at risk, and must also have positive benefits for present and future generations of our people."[60]

As will be discussed later, many of those concerns are still outstanding. This socio-cultural dynamic is the backdrop against which development often takes place in the north, and it has a profound influence on the environmental assessment process for projects in that region.

3.3 Diamond mining in the Northwest Territories

3.3.1 What is being mined?

Geologically, diamonds are associated with rock formations called kimberlite pipes. The kimberlite bodies

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Alternatives 22:4. October/November 1996.

[59] Statistics Canada, "Labour, employment and unemployment: employment by industry," http://www.statcan.ca/english/Pgdb/People/labour.htm. September 13, 2000.

were formed millions of years ago as a result of volcanic eruptions from deep within the Earth. During these eruptions, diamonds were picked up from the surrounding rock and brought towards the surface, and then the kimberlite solidified into large rock plumes. The presence of kimberlite pipes is usually signaled by the presence of indicator minerals such as garnets, chromium diopside, ilmenite and chromite. As the Ice Age glaciers retreated across northern Canada, they gouged the top of the kimberlite pipes and spread the indicator minerals across the landscape.

Elsewhere in the world, there are only 15 major gem-diamond mines currently in production – all of which are located in Africa, Siberia and Australia – but geologists have long known that the Canadian north is full of potentially diamond-bearing kimberlite pipes. De Beers Consolidated diamond cartel, has been exploring for diamonds in Canada since the 1960s, but never found deposits rich enough to make mining worthwhile. In the early 1970s, six micro diamonds were recovered from a cluster of kimberlite pipes on Somerset Island in the northern Arctic, but the diamonds were not large or plentiful enough to spark investor interest. By the late 1980s, interest in Canadian diamond exploration had waned for all but a few people. Then in 1990, Canadian geologist Charles Fipke successfully followed the trail of the glaciers and discovered the deposit now being mined at Ekati.

3.3.2 Who is mining?

Since 1991 more than 100 companies have staked more than 20 million hectares in the North, but only a handful of companies have reached advanced stages of exploration. The Ekati mine, a joint venture between Fipke's Diamet Minerals and mining giant Broken Hill Proprietary of Australia, was Canada's first. Production began in October 1998. Diavik Diamonds Inc., a joint venture between Aber Resources of Vancouver and Rio Tinto PLC of London, England, received federal environmental assessment approval in December 1999 and began construction during the winter of 2000. In addition, a handful of other project proposals are imminent. The following section provides details about BHP, Diavik, and the more advanced

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[60] Joe Rabesca, letter to Christine Stewart, Minister of the Environment. July 22, 1999.

exploration projects.

3.3.2.1 BHP

BHP intends to mine five kimberlite pipes, four of which are located within a few kilometres of each other, just north of Lac de Gras. The fifth pipe is 29 kilometres southeast, adjacent to Lac de Gras. The pipes – known as Panda, Misery, Koala, Fox and Leslie – lie underneath lakes of the same names. Each of the lakes must be drained to permit open pit mining, which will later be followed by underground mining.

Over the expected 25-year life of the project, approximately 133 million tonnes of ore and 826 million tonnes of waste will be mined. Between 35 and 40 million tonnes of waste rock will be excavated each year from the open pits, and smaller quantities from the underground operations. Most waste rock will be piled in the vicinity of each pit, although some will be used for road building. Recovery of diamonds takes place in a centralized processing plant near the Koala pit. Ore is crushed, and the diamonds are physically separated. Final sorting is done using x-rays to separate the diamond from remaining host materials.

Crushed rock will be deposited in the Long Lake tailing impoundment basin during the first 20 years, and in the mined-out Panda pit for the remaining five years. The Long Lake basin is constructed from three frozen core perimeter dams, which are divided into five cells using intermediate rock dikes. The cells will be filled sequentially, and covered with waste rock and soil.

Ground transportation is via the winter road currently used by Echo Bay Mines to service its Lupin gold mine, and a 29-kilometre all-weather road has been built from the Misery pit to the plant site. In addition, there is an airstrip capable of handling Hercules C130 and Boeing 727 and 737 jets. Other infrastructure includes a 400-person permanent camp, a diesel power plant, an integrated office/warehouse complex, and a security building. Other services include fuel storage and distribution, water supply, sewage treatment and

waste disposal.[61]

The environmental assessment of the Ekati mine was conducted under the Federal Environmental Assessment Review Process Guidelines Order (EARPGO) of 1984. The federal Minister of Indian Affairs and Northern Development referred the project to a review panel in July 1994 because of the unknown potential significant effects, and the level of public concern surrounding the proposal. Apart from uranium mining in Saskatchewan, this was the first mining project in Canada to undergo a full EARPGO panel.[62]

Four panel members were appointed in December 1994, and operational procedures and draft environmental impact statement (EIS) guidelines were issued in January 1995. Scoping meetings were held in eight NWT communities in March and April, for which the panel received 50 written and 125 oral submissions. The final EIS guidelines were issued in May. BHP submitted its eight-volume EIS in July, which was followed by a 90-day public review period. By the close of the review period in October, the panel received 26 written submissions. In November, the panel determined that the EIS was sufficient to begin planning the public hearings, and the hearing schedule and procedures were issued in December. Eighteen days of public hearings were held in January and February 1996. The panel received more than 75 written submissions, and heard approximately 260 presentations.

The panel issued its report in June 1996. The federal government gave conditional approval in August, but required that "significant progress" be made in negotiations of impact and benefit agreements with Aboriginal organizations. The construction permit was issued in October, and cabinet approval and regulatory permits were provided in November. The final licences and authorizations were provided in January 1997.

The BHP environmental assessment has been widely criticized, mostly for the speed with which it happened and the limited resources that were provided for communities to participate. The EIS became available at a

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[61] Canadian Environmental Assessment Agency, "NWT Diamonds Project: Report of the Environmental Assessment Panel." Hull: 1996.
[62] Jane Werniuk, "Great Diamonds." *Canadian Mining Journal*. October 1998.

time when many people were out of communities or were very busy. Resources provided were very limited and did not allow for adequate translation and interpretation of the EIS or for preparation of detailed arguments and positions.[63]

The Canadian Arctic Resources Committee (CARC) has said that the BHP process was not comprehensive, rigorous or fair. CARC charges that the review was woefully under funded, particularly when contrasted with the review panels for the Pearson International Airport Expansion ($1 million), low-level flying in Labrador and Quebec ($2 million), and the Great Whale hydroelectric project ($4 million). The BHP panel was provided $250,000 to conduct the assessment, and an additional $250,000 to assist intervenors. CARC was also disappointed with the scope of the BHP assessment, which it considered too narrow, and out-of-step with the broad mandate originally outlined in the panel's terms of reference and the draft EIS guidelines. CARC further indicated that "attempts to take account of cumulative effects fell far short of expectations."[64]

According to the terms of reference, the panel may "identify issues which, in its view, may also arise in conjunction with other initiatives in the Slave Geological Province and which could, therefore, considered to be generic issues." The document further states that a "review of other development initiatives is not within the panel's terms of reference", but that the panel may "recommend appropriate approaches on how to deal with these generic issues."[65] Arguably, the initial reference to other initiatives in the Slave Geological Province may have heightened expectations of what the cumulative effects analysis would encompass.

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[63] Susan Wismer, "The Nasty Game: How Environmental Assessment is Failing Aboriginal Communities in Canada's North." *Alternatives* 22:4. October/November 1996.
[64] Canadian Arctic Resources Committee, "Critique of the BHP Environmental Assessment: Purpose, Structure and Process." Northern Perspectives. Vol. 24, Numbers 1-4. Fall/Winter 1996.
[65] NWT Diamonds Project. "Appendix B, Terms of Reference," Report of the Federal Environmental Assessment Review Panel. Hull: 1996.

3.3.2.2 Diavik

Diavik Diamond Mines is proposing to mine four kimberlite pipes located on a 20-km square island in Lac de Gras, called East Island, less than 30 kilometres southeast of the Ekati mine. Of the four pipes, A154 south and A154 north are located about 150 metres apart, the A418 pipe is approximately one kilometre southwest, and the A21 pipe is another four kilometres southwest. Kimberlite would likely be mined and processed at a rate of approximately 1.3 million tonnes per year, to an upper limit of 1.9 million tonnes per year. The two highest-grade pipes, A154S and A418, have estimated grades of 4-5 carats per tonne.

The mine plan includes the construction of temporary water retention dikes, followed by open-pit mining, and underground mining for selected pipes. Before the mine closes, mined waste rock and finer sediment material would be placed between the inside toe of the dike and the pit crest. When mining is complete in each open pit, water would be reintroduced. The project facilities would be situated entirely on East Island, including a processed kimberlite containment facility, waste rock areas, a diamond recovery plant, accommodation building, power generation facilities, mechanical and administration buildings, and a 2000-metre airstrip, would all be located on East Island.[66]

The environmental assessment for the Diavik Diamonds Project was conducted under the *Canadian Environmental Assessment Act*, which was promulgated in January 1995. The process was formally initiated when Diavik Diamond Mines submitted its project description to the federal government in March 1998. In April 1998, the federal government decided to undertake the assessment as a comprehensive study. Alternatively, it could have chosen to refer the project to a review panel.

Under the comprehensive study track, the relevant federal departments – in this case, the Departments of Indian Affairs and Northern Development, Fisheries and Oceans, and Natural Resources Canada – are responsible for preparing an assessment. The comprehensive study report (CSR) typically draws heavily on material supplied by the proponent, which is analyzed by government technical staff, who determine

whether the project effects may be significant. In the Diavik project, the federal departments chose to draft EIS guidelines – a process generally reserved for panel reviews – to guide the proponent's submission of information. The guidelines were finalized in August 1998.

Diavik submitted its EIS in September 1998, and held public meetings between September and December to discuss the contents. In addition, the period for receiving written comments was extended to March 1999. The federal government also held technical and public hearings in February and March 1999. The final CSR was submitted in June 1999, and a 30-day public comment period took place in July. In September 1999, the federal departments issued a response to the public comments, and extended an invitation for further comments in late September.

The Mackenzie Valley Environmental Impact Review Board was also requested to provide its comments on the CSR. This request was consistent with a transition agreement between the federal government and the Board, which has since taken over the responsibility for environmental assessment in the region, pursuant to the *Mackenzie Valley Resource Management Act* (MVRMA). Since the Diavik project was initiated before the MVRMA came into force, the transition agreement provided a mechanism for the Board's input, which it submitted in October. The federal environment minister approved the project in December, subject to certain conditions that were adopted by the federal departments, and referred the project back to the federal departments to begin the regulatory process.

The Diavik assessment has been subjected to many of the same criticisms as the BHP review, even though the two projects were assessed under different regulatory regimes. Many Aboriginal and environmental organizations felt that the process moved too quickly, provided insufficient resources to intervenors, and did not provide sufficient opportunities for public review. They also felt that the technical analysis of the project was inadequate and biased. The major concerns included the cumulative effects of the project, the potential effects of the project on the Bathurst caribou herd, the impact on water quality (particularly in Lac

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[66] Department of Indian Affairs and Northern Development Comprehensive Study Report: Diavik Diamonds Project. June 1999.

de Gras and the Coppermine River), the analysis of alternative means of carrying out the project, and the socio-economic effects of the project. As well, several Aboriginal organizations felt that their concerns were ignored throughout the comprehensive study process, a concern that was reflected in public comments submitted after the comprehensive study report was forwarded to the federal environment minister.

As a result of these concerns, the North Slave Metis Alliance and the Canadian Arctic Resources Committee each launched a court action against the environment minister's decision on the Diavik project. In addition, Diavik had difficulty securing the licences and permits it needed to begin construction.

3.3.2.3 Other Diamond Developments

BHP and Diavik are the only two diamond developments to have gone through the environmental assessment process; however there are at least three other potential developments on the horizon, and there are 25 other diamond exploration projects active in the Slave region.[67]

In June 1999, the Tahera Corporation submitted a project description to the Nunavut Impact Review Board for its Jericho property. Jericho is made up of five kimberlite pipes at the northwest end of Contwoyto Lake in Nunavut, about 400 kilometres northeast of Yellowknife, and 170 kilometres of the Ekati mine. Although the project description has changed, Tahera expects to resubmit the application in the near future, once its pre-feasibility study is complete.

The Jericho property is a sharp contrast to Diavik and BHP because the ore reserves are much smaller. The project size is estimated to be 1/15 the size of Diavik, with reserves just 1/10 of those at BHP. The project is expected to last 10 years and create about 100 jobs. The estimated cost is just $40 million because the project design relies on sharing some facilities with the neighbouring Lupin gold mine. As a result of its

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[67] Doug Ashbury, "Low base metal prices fail to deter search for resources." Northern News Services. http://www.nnsl.com/ops/mining.html

small size, some reports suggest that Jericho could be in production even before Diavik.[68]

Mountain Province Mining and Monopros Inc., the Canadian arm of De Beers Consolidated, are jointly conducting mini-bulk sampling of four kimberlite pipes at its Kennady Lake property in the NWT, about 300 kilometres northeast of Yellowknife, over the east arm of Great Slave Lake. Monopros expects to conduct a feasibility study in the year 2000. Monopros is also conducting mini-bulk sampling on the Major General Resources-Ascot Resources' Victoria Island property where five kimberlites were identified.[69] Winspear Resources also expects to submit a project description in the near future, for its project at Camsell Lake, NWT, about 150 kilometres northwest of Yellowknife.[70]

Each of these developments would undergo an environmental assessment process that is different from those done for BHP or Diavik. Projects in the Mackenzie Valley region of the Northwest Territories will be subject to the *Mackenzie Valley Resource Management Act*, and the Nunavut Impact Review Board will assess projects in Nunavut Territory. No full-scale environmental assessment has yet been completed under either of these regimes.

3.4 Chapter Summary

This chapter examined the history of diamond activity in the NWT. Diamond exploration and mine development in the Slave Geological Province since the initial discovery of diamonds is moving forward at a dramatic pace. Several companies are actively working to develop major findings in the region, which illustrates the potential for cumulative environmental effects. The potential exists for cumulative effects to occur, through spatial or temporal crowding, such as when multiple developments occur in a concentrated geographic area, or within a short space of time. Nibbling loss, such as habitat loss or fragmentation, may occur from multiple activities over a wider geographic area. The sharing of infrastructure between the

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[68] Bob Weber, "Other diamond mining hopefuls cheer Diavik decision." http://cbc.ca/cp/business/991107/b110702.html
[69] Bob Weber, "Other diamond mining hopefuls cheer Diavik decision." http://cbc.ca/cp/business/991107/b110702.html
[70] Doug Ashbury, "Low base metal prices fail to deter search for resources." Northern News Services.

existing Lupin gold mine and the potential Jericho mine is an example of how new infrastructure could make other developments economical.

At the same time, there is substantial concern among many northerners, including several Aboriginal and environmental organizations, about the environmental effects of such development, and a great deal of dissatisfaction with the way in which the federal environmental assessment process has addressed these issues to date. The legal challenges to the Diavik environmental assessment illustrate this. Similarly, the political and economic context in the Canadian north illustrates the competing pressures being faced, including the need for environmental protection and economic development.

The description of the environmental reviews outlined in this chapter introduces the cumulative effects issues that have been raised during the environmental assessment that have been undertaken thus far. One of the key issues is the effects of multiple developments on the Bathurst caribou herd. In Chapter 5, these issues will be revisited in greater detail. In the interim, Chapter 4 will provide a more in-depth analysis of the existing tools for cumulative effects in the Slave Geological Province.

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http://www.nnsl.com/ops/mining.html

4. Tools for CEA in the Slave Geological Province

As discussed in the previous chapter, the political landscape of northern Canada is rapidly evolving. In recent years, this has included the settlement of several Aboriginal land claims, and the devolution of power from the federal to the territorial governments. As a result, several legislative and policy tools are currently being used in the Canadian North to address cumulative effects issues, including the evolving federal environmental assessment legislation. The *Canadian Environmental Assessment Act* established the initial context for cumulative effects assessment in the Slave Geological Province. However, this legislation has been superseded by the *Mackenzie Valley Resource Management Act* (MVRMA), which came into force in 1998. Similarly, under the *Nunavut Land Claim Agreement*, responsibility for environmental assessment in Nunavut now rests with the Nunavut Impact Review Board. These new pieces of legislation also contain provisions for land use planning that may significantly influence how development decisions will be made, once they are fully implemented. This chapter will review the development of the policy and legislative framework for assessing cumulative effects, in order to examine how the available tools influenced the manner in which CEA was conducted.

4.1 EA and CEA in the Federal Context

The development of the EA process in Canada was initiated after the United States developed its own national environmental assessment legislation. In the United States, the *National Environmental Policy Act* (NEPA) was proclaimed in 1969, in order to "promote efforts which will prevent or eliminate damage to the environment and biosphere." It required that federal agencies "utilize a systematic, interdisciplinary approach" to ensure that "presently unquantified environmental values may be given appropriate consideration in decision making along with economic and technical considerations."[71] In Canada, in 1972, the newly created Environment Canada completed a six-month study of NEPA and similar environmental

[71]Barry Sadler, "International Study of the Effectiveness of Environmental Assessment, Final Report. Environmental Assessment in

assessment regimes. This led to the introduction of the non-legislated *Environmental Assessment Review Process* (EARP) in 1974, which stipulated that all government projects would be screened to ensure minimum damage to the environment. The process was refined in 1977, and was formally established in 1984 through a cabinet directive as the *Environmental Assessment Review Process Guidelines Order* (EARPGO). Also in 1984, the government established the Canadian Environmental Assessment Research Council (CEARC) to support environmental assessment research.

Federal EA experience began to suggest that single-project assessments would not necessarily reduce cumulative environmental degradation. However, the available tools for EA policy and practice focused primarily on short-term impacts, and did not provide the necessary mechanisms to address cumulative effects. To address these deficiencies, CEARC sponsored a series of research efforts regarding cumulative effects assessment. One of its reports made the following observations on the needs and directions for cumulative effects assessment in Canada:

Table: Needs and Direction for CEA in Canada (adapted from CEARC, 1987)

Area of Development	**Observation**
Theoretical Development	There is an increased potential for cumulative effects. A framework is needed to integrate scientific concerns and public values.
Methodological Development	Available techniques for addressing cumulative effects are under-utilized. New methods must be developed that explicitly incorporate linkages and interdependencies across space, time and sub-systems.
Institutional Development	In Canada, there has been a lack of explicit consideration of cumulative effects in past assessments. It is not clear who will take responsibility for the assessment of cumulative effects. Planning and project assessment have been evolving towards a common context for consideration of cumulative effects.

EARPGO was replaced in 1995 with the *Canadian Environmental Assessment Act*, which does include a specific requirement to assess cumulative environmental effects.

The following review of the evolution of cumulative effects assessment within the federal EA regime will

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a Changing World - Evaluating Practice to Improve Performance. Ottawa: 1996.

provide a basis for understanding the statutory framework for cumulative effects assessment in the Slave Geological Province, and the current limitations of cumulative effects assessment in that region.

4.1.1 Environmental Assessment Review Process Guidelines Order

The federal EA regime is based on the principle of self-assessment, which means that federal departments are largely responsible for administering the EA process. EARPGO required federal departments to ensure full consideration of the environmental implications of proposals for which the federal government had decision-making authority. To this end, the Guidelines Order was to be applied to any proposal:

- that is to be undertaken directly by an initiating department;
- that may have an environmental effect on an area of federal responsibility;
- for which the Government of Canada makes a financial commitment; or
- that is located on lands, including the offshore, that are administered by the Government of Canada.[72]

Within its assessment, a department was required to consider the potential environmental effects of the proposal and the social effects directly related to those environmental effects, including any effects that were external to Canadian territory, as well as public concerns regarding the proposal. If a project had potentially significant or unknown adverse environmental effects, the Minister of the initiating department was required to refer the proposal for a public review panel. Project proposals could also be referred to a public review panel on the basis of public concern.[73]

The Guidelines Order did not include formal requirements to assess cumulative effects. A review of panel reports conducted under EARPGO suggests that cumulative effects issues were selectively considered. However, the terminology was often different, and the level of detail varied from project to project. This

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[72] *Environmental Assessment Review Process Guidelines Order*, section 6.

was increasingly true in the years leading up to the passage of the *Canadian Environmental Assessment Act*.

For example, the consideration of cumulative effects was often limited to future development or expansion directly related to the project under review. The panel report for the CN Rail Twin Tracking Program (1985) addressed the "long term environmental implications of transportation related activities in the Fraser and Thompson River Corridors".[74] Similarly, the Vancouver International Airport Parallel Runway Project panel (1991) was instructed to consider issues relating to "future development plans for the Airport … to enable a more comprehensive examination of the parallel runway in the broader context of airport planning."[75]

Public concern regarding the cumulative impact of developments was highlighted in the panel report for the Port of Quebec Expansion (1984), in which "a number of participants reminded the panel that the proposed expansion was not the only project under consideration for the Beauport area."[76] However, the Panel considered that such concerns were outside the scope of its review:

> Assessment of the impact of projects other than the port expansion does not fall within the Panel's mandate. Moreover, it would be difficult to discuss other projects since little relevant information is available. The Panel does, however, recognize the importance of weighing the cumulative impact of all activities planned in the tidal flats area.[77]

In selected cases, cumulative effects were included as part of the review panel's terms of reference. For instance, in the case of the Beaufort Sea Hydrocarbon Production and Transportation project, the panel was instructed to:

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[73] Environmental Assessment and Review Process Guidelines Order.
[74] CN Rail Twin Tracking Program, British Columbia: Report of the Review Panel. Federal Environmental Assessment and Review Office. Hull: 1985.
[75] Vancouver International Airport Parallel Runway Project: Report of the Review Panel. Federal Environmental Assessment and Review Office. Hull: 1991.
[76] Port of Quebec Expansion: Report of the Review Panel. Federal Environmental Assessment and Review Office. Hull: 1984.
[77] Port of Quebec Expansion: Report of the Review Panel. Federal Environmental Assessment and Review Office. Hull: 1984.

> take into consideration previous and possible future northern activities which are relevant to this specific proposal. The Panel should be aware of the Lancaster Sound Green Paper exercise and previous EARP reviews such as the Arctic Pilot Project, and Norman Wells Pipeline. Furthermore, the capacity of governments to control Beaufort Sea Oil and Gas developments should be considered by the Panel. In addition, the need for any subsequent public reviews of any aspects of these developments should be included.[78]

It should be noted, though, that this case is likely somewhat anomalous because it was an unusual "concept" stage assessment initiated prior to submission of any development proposals.

The panel report for the Terra Nova Offshore Petroleum Project noted that, in spite of uncertainty, concerns about cumulative effects have led many panels to recommend that a variety of studies and research be undertaken. For instance, the Lancaster Sound Regional Study was undertaken as a result of a recommendation by the 1979 Lancaster Sound Drilling Review Panel.

Similarly, participants in the Hibernia Offshore Oil Project hearings in 1985 expressed the view that the panel's mandate was too restrictive in examining strategic issues for area-wide planning of offshore development. That panel recommended that review of future developments should take into account cumulative effects and that research should be conducted to assist governments in wider planning issues.

The 1986 Fraser-Thompson Corridor panel report indicated that existing management systems were unable to properly identify and prevent or mitigate future negative cumulative effects. It found that monitoring programs were required to determine the cumulative impact of future developments.

In the North, the 1990 Arctic Pilot Project panel report noted that other proposals would likely follow, particularly if the first project was successful. That panel suggested that government, in consultation with stakeholders and industry, should be responsible for long-range planning and determination of priorities. Such research and monitoring over the life of the projects was considered an opportunity to determine trends, problems and solutions to projected larger scale activities in the Northwest Passage.

The Northumberland Strait Crossing Project in 1990 indicated a concern for cumulative effects, particularly

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[78] Beaufort Sea Hydrocarbon Production and Transportation: Report of the Review Panel. Federal Environmental Assessment and

noting the possible synergistic effects of global warming. The panel cited a scenario whereby decreased ocean temperatures could result from increased outflow of Arctic melt water, which could cause thicker ice and subsequent ice jams near the bridge. Despite the realization that global changes might be unpredictable locally, the panel did recommend that the bridge design should incorporate a safety factor to accommodate conditions that occur as a result of climate change.

The 1991 panel report for the Rafferty-Alameda Dam acknowledged that concern about cumulative effects was relatively new, and that reliable methodologies to assess these effects had not been fully developed and tested. The panel noted that neither the proponents, nor participants in the panel hearings dealt with aspects relating to the cumulative effects of project, but concluded that a detailed assessment was necessary. The panel emphasized the importance of a comprehensive, well-designed monitoring program to accomplish this.

Finally, a recommendation in the 1993 panel report on Uranium Mining Proposals in Northern Saskatchewan led to the establishment of cumulative effects monitoring programs to assess regional environmental effects resulting from multiple mining operations.

This review demonstrates several important points. Firstly, since EARPGO did not contain an explicit requirement to consider cumulative effects, many review panels were not instructed to include them as part of their review. Secondly, in cases where the panel did address cumulative effects issues, consideration was most often limited to the cumulative impact of other project-related developments. Thirdly, even when public concern regarding cumulative effects was apparent, review panels felt unable to address them, because they were considered to be outside the scope of the panel's mandate. Finally, the review of EARPGO panel reports shows that panels were most frequently directed to consider cumulative effects for northern projects. Each of these points had implications for the development of federal environmental assessment policy, which ultimately evolved to require that cumulative effects be addressed in

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Review Office. Hull: 1984.

environmental assessment.

4.1.2 Canadian Environmental Assessment Act

Only with the coming into force of the *Canadian Environmental Assessment Act* did the federal EA process have an intentional statutory basis. The Act retained the self-assessment principle developed under EARPGO, but the range of projects captured under the federal legislation was slightly broadened. The Act also included an intermediate level of assessment between the screening and review panel stage, called a comprehensive study.

Unlike EARPGO, the *Canadian Environmental Assessment Act* explicitly requires that cumulative effects be considered in federal environmental assessments. Section 16 of the Act stipulates that:

> Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of … any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out.[79]

However, although the Act requires that cumulative effects be assessed, it provides no further definition of cumulative effects, or any indication of how to assess them. The result has been a great deal of uncertainty for federal departments and project proponents.

In 1994, the Canadian Environmental Assessment Agency (the successor to the Federal Environmental Assessment Review Office) issued a reference guide for addressing cumulative environmental effects, as a supplement to Responsible Authority's Guide to the *Canadian Environmental Assessment Act*. The reference guide defined cumulative effects as "the effect on the environment which results from effects of a project when combined with those of other past, existing and imminent projects and activities."[80] The guide further noted that federal and other environmental assessments were already addressing cumulative effects, to the extent that those assessments examined the baseline environmental conditions, which included the

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[79] Canadian Environmental Assessment Act, paragraph 16 (1)(a)

[80] Federal Environmental Assessment Review Office, "A Reference guide for the Canadian Environmental Assessment Act:

cumulative impacts of past and existing projects. However, it stressed that more attention needed to be paid to cumulative effects resulting from the interactions among the environmental effects of a proposed project with those of future projects and activities. In this regard, the Reference Guide advised that consideration of cumulative effects must include, at minimum, projects or activities that have already been approved. It further suggested that "it would be prudent to consider projects or activities that are in a government approvals process as well."[81]

All review panels and comprehensive studies completed under the *Canadian Environmental Assessment Act* have addressed cumulative effects in some form or another. For instance, the report of the review panel for the Voisey's Bay Mine and Mill Project noted that:

> As required by the Panel, Voisey's Bay Nickel Company addressed cumulative environmental effects by assessing the project's predicted effects in combination with the potential effects of projects and activities "which are ongoing or likely to proceed, and have therefore been issued permits, licenses, leases, or some other form of approval, as specified by the Canadian Environmental Assessment Agency."[82]

As later sections will illustrate, there is still a great deal of concern, in the public and within the environmental assessment community, regarding the adequacy and consistency of cumulative effects assessment under CEAA. In a 1999 study, researchers suggested that the standard to which cumulative effects assessment is undertaken in Canada is less than satisfactory. The study cited several key issues, including the need for more specific guidelines for temporal boundary setting and the depth of analysis required.[83] Other studies have emphasized difficulties faced in obtaining the information necessary to conduct CEA, and the lack of administrative authority among regulatory agencies to address issues that are identified.[84] At least one researcher attributes the dissatisfaction to the demands that CEA places on the

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Addressing Cumulative Environmental Effects." Hull: 1994.

[81] Federal Environmental Assessment Review Office, "A Reference guide for the Canadian Environmental Assessment Act: Addressing Cumulative Environmental Effects." Hull: 1994.

[82] Report on the Proposed Voisey's Bay Mine and Mill Project. Canadian Environmental Assessment Agency. Hull: 1999.

[83] Wanda Baxter, William A. Ross, and Harry Spaling, "To What Standard?: A Critical Evaluation of Cumulative Effects Assessments in Canada," in Environmental Assessment, Vol. 7, Issue 2, June 1999.

[84] See Dianne C. Damman, David R. Cressman, and M. Husain Sadar, "Cumulative Effects Assessment: the Development of Practical Frameworks," in Impact Assessment, Volume 13, December 1995; and, William A. Ross and Elizabeth Tough, "Cumulative Effects Assessment Policy Issues: Draft," prepared for the Minerals and Metals Sector, Natural Resources Canada, March 1998.

participants in a project-specific EA, and to the uncertainty and litigation that have become associated with CEA.[85] However, the fact that cumulative effects are at least being included in assessments should be considered an improvement.

The same does not appear to hold true for screening-level assessments. The 1998 Report of the Commissioner of the Environment and Sustainable Development conducted audits of 187 screening-level assessments completed by 11 federal departments. The Commissioner noted that Parks Canada had taken the lead in cumulative effects assessment in the federal government by developing its own internal guide on the subject, and by consistently considering cumulative effects in each of its assessments. Of the 187 assessments in the sample, 159 were conducted by departments other than Parks Canada. Of those 159, only 48 indicated that cumulative environmental effects had been considered.

In most of those assessments, however, there was little evidence to indicate the nature of the cumulative effects, including whether there had been an analysis of the ecosystem and its stressors. In practice, only Parks Canada is considering cumulative environmental effects on a regular and rigorous basis.[86]

In March 1999, the Agency published the *Cumulative Effects Practitioner's Guide*, which provides a best practices perspective on cumulative effects assessment, with emphasis on the assessment of biophysical effects. It is intended to be broadly applicable across Canadian jurisdictions. The practitioner's guide defines cumulative effects as "changes to the environment that are caused by an action in combination with other past, present and future human actions."[87] This contrasts slightly with the 1994 definition, in that "future human actions" can be interpreted more broadly than "imminent projects and activities". The Guide further suggests that future actions must include those that are "certain" and should include those that are "reasonably foreseeable", but not ones that are hypothetical. While this approach is useful in the context of

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[85] Steven Kennett, "The Future for Cumulative Effects Management: Beyond the Environmental Assessment Paradigm," in *Resources* Canadian Institute of Resources Law, No. 69, Winter 2000.
[86] Commissioner of the Environment and Sustainable Development. Chapter 6: Environmental Assessment – A Critical Tool for Sustainable Development.
[87] George Hegmann, et al. "Cumulative Effects Assessment Practitioner's Guide," Canadian Environmental Assessment Agency. Hull: 1999.

project-specific assessment, a more holistic approach to CEA requires broader consideration of

Figure 4: Defining Future Actions (adapted from the Cumulative Effects Assessment Practitioner's Guide)

Certain	• intent to proceed officially announced by proponent to regulatory agencies • submission for regulatory review is imminent • currently under regulatory review for approval • approved
Reasonably Foreseeable	• Not directly associated with the project under review, but may proceed if that provided is approved (e.g. induced action for which little information is available) • Identified in an approved plan in which approval is imminent • Identified in an approved plan • Directly associated with the project under review, but is conditional on that project's approval (e.g. induced action for which some information is available)
Hypothetical	• Conjectural based on currently available information • Discussed on a conceptual basis

human activity, which would need to include consideration of anticipated (i.e. hypothetical) development. For instance, CEA through a planning process or regional assessment would necessarily be based on projected or conceptual development scenarios, which may be inappropriate to consider at the single project level.

Although the practitioner's guide tries to address many of the concerns that have been raised, it is still too early to tell how the guide will influence the practice of cumulative effects assessment. In addition, the guide itself also has its limitations, especially an exclusive focus on biophysical effects. This is acknowledged in the introduction to the guide, in which the authors note that: "the advancement of CEA practice should include more frequent recognition of social consequences and the connections between those consequences and the environment because environmental effects often lead to socio-economic effects."[88] This acknowledgment of the need to address cumulative socio-economic issues still does not recognize importance of addressing socio-economic and cultural issues in their own right, and their connection to sustainability.

[88] George Hegmann, et al. "Cumulative Effects Assessment Practitioner's Guide," Canadian Environmental Assessment Agency. Hull: 1999.

Also in 1999, the Agency issued the Operational Policy Statement for Addressing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*. The policy statement is intended to provide more specific clarification and guidance to RAs on how cumulative effects should be considered in environmental assessments conducted under the Act. It notes that cumulative environmental effects are defined more narrowly in the practitioner's guide than what is contemplated under the Act, because cumulative effects under the Act can also include the effects of biophysical changes on health and socio-economic conditions. As with the practitioner's guide, it is too early to measure its impact on the assessment of cumulative effects.

Until cumulative effects assessment approaches and methodologies are more refined and the guidance becomes more clear, clarification on the requirements for CEA under federal legislation is being obtained from the courts.

4.1.3 Litigation

Since the passage of the *Canadian Environmental Assessment Act*, two court cases have begun to further define the requirements for cumulative effects assessment under the federal EA regime. *Alberta Wilderness Association v. Cardinal River Coals Ltd.* (referred to as the "Cheviot" case), addressed conflicts arising from a panel review of a proposal by Cardinal River Coals Ltd. to construct and operate a coal mine in west-central Alberta, about three kilometres from the border of Jasper National Park. The project was subject to a joint review panel between the federal and provincial governments, which determined that the project could proceed subject to certain conditions. The Alberta Wilderness Association (AWA) challenged the decision on the basis that the panel did not adequately address the cumulative environmental effects of the project. In particular, the AWA argued that the Panel relied too heavily on information supplied by the proponent, and erred by not seeking out additional information about likely forestry and mining operations in the vicinity of the project.

In April 1999, Justice Campbell of the Federal Court Trial Division quashed the project authorization

issued by the federal government, and set out a series of conditions to bring the EA into compliance with the *Canadian Environmental Assessment Act*. The court held that the panel was obliged to obtain all the information required for the conduct of the review, including any available information about likely forestry and mining in the vicinity of the project. Consequently, the panel was required to reconvene, in order to address the outstanding issues. This decision effectively raises the standard which review panels will be expected to reach in their evaluation of the cumulative effects of a proposed development.[89]

Friends of the West Country v. Canadian Coast Guard and Minister of Fisheries and Oceans (referred to as the "Sunpine" case), addressed conflicts arising from a CEAA screening of a proposal by the project proponent to build an access road to supply its forestry operations in Alberta. The project was assessed and approved at the screening level under the *Canadian Environmental Assessment Act*. The Friends of the West Country challenged the screening decision, on the grounds that the scope of project was too narrowly defined, and that the cumulative effects of the project were inadequately assessed. In its October 1999 decision, the Federal Court of Appeal held that the Responsible Authority has discretion to determine which other projects should be considered in a cumulative effects assessment, but that should not preclude the consideration of projects or activities that are outside the scope of project, or outside of federal jurisdiction. This implies that RAs should not limit their cumulative effects assessments to activities included within the scope of project. Similarly, it suggests that RAs cannot seek to limit its cumulative effects assessment by scoping a project narrowly.[90]

The ruling does not require RAs to adopt broad approaches to project scoping. It just requires attention to cumulative effects beyond the project scope. The Sunpine appeal decision is consistent with an earlier case, in which an environmental group, Manitoba's Future Forest Alliance, challenged a screening decision regarding a proposal by Tolko Manitoba Inc. to construct a bridge to cross a creek, which would enable access to its forestry operations. Manitoba's Future Forest Alliance argued that the forestry operations

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[89] Alberta Wilderness Association v. Cardinal River Coals Ltd., [1990] Court File no. T-1790-98, F.C.T.D.

[90] Friends of the West Country v. Canadian Coast Guard and Minister of Fisheries and Oceans, [1999]. Court File no. A-550-98,

should have been included in the scope of the project, however the court held that the responsible authority has the discretion to determine the scope of the project being assessed.[91]

4.2 CEA in Other Northern EA Processes

With the settlement of land claims in the Northwest Territories and the creation of Nunavut, responsibility for environmental assessment in the north is beginning to shift away from the federal government. Throughout the territorial Canadian North, there are currently four new EA regimes, two of which have direct implications for diamond development – the *Mackenzie Valley Resource Management Act* and the *Nunavut Land Claim Agreement*. As well, the Inuvialuit Final Agreement in the northwestern NWT has established an environmental assessment process with screening and review levels, as well as links to broader planning including a conservation and management plan for the North Slope. The Yukon is also developing its own EA regime, called the Development Assessment Process.

4.2.1 Mackenzie Valley Environmental Impact Review Board

The *Mackenzie Valley Resource Management Act*, which took effect in 1998, established the Mackenzie Valley Environmental Impact Review Board (MVEIRB), which conducts environmental assessments and reviews of proposals for developments that would occur in or affect the Mackenzie Valley. The MVRMA defines the Mackenzie Valley as all of the western NWT, except the Inuvialuit Settlement Area. As such, its environmental assessment process covers even areas of the NWT where there are no settled land claims. Under the MVRMA,

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[91] Manitoba's Future Forest Alliance and Donald V. Sullivan v. Canada (Minister of Fisheries and Oceans and Minister of the Environment) and Tolko Manitoba Inc. [1999] Court File no. T-434-98. T.D.

> Every environmental assessment and environmental impact review of a proposal for a development shall include a consideration of … the impact of the development on the environment, including the impact of malfunctions or accidents that may occur in connection with the development and any cumulative impact that is likely to result from the development in combination with other developments.[92]

The factors that must be considered in an EA under the MVRMA are largely similar to those that must be considered under CEAA, and the definition of "environment" is identical. However the requirement for assessing cumulative effects is even less explicit in the MVRMA. Most notably, the MVRMA says nothing about future projects, which strongly implies that an EA need only look at the impacts of a project in combination with other existing developments. Until now, the Board has tended to interpret the MVRMA along the same lines as CEAA; however, this could be challenged.[93]

The MVRMA also provides for the regular conduct of an environmental audit "for the purpose of monitoring the cumulative impact on the environment of concurrent and sequential uses of land and water and deposits of waste in the Mackenzie Valley."[94] The audit is to take place every five years, and among other things, must include an analysis of "trends in environmental quality, potential contributing factors to changes in the environment and the significance of those trends."[95] To date, this audit has not been initiated.

4.2.2 Nunavut Impact Review Board

The environmental assessment regime in the territory of Nunavut was established by the *Nunavut Land Claim Agreement* (NLCA), which was ratified in 1993. The NLCA established the Nunavut Impact Review Board (NIRB), which is responsible for overseeing the assessment of projects within the Nunavut Settlement Area.

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[92] *Mackenzie Valley Resource Management Act*, Section 117 (2) (a).
[93] Heidi Klein, Executive Director, Mackenzie Valley Environmental Impact Review Board. Personal communication, March 1, 2000.
[94] *Mackenzie Valley Resource Management Act*, Section 146.
[95] *Mackenzie Valley Resource Management Act*, Section 148 (3) (a).

The NIRB examines the potential effects of a proposed development upon the physical, biological and socio-cultural and economic environments, including cumulative effects, which are defined as "any effect which results from effects of a project when combined with those of other past, existing and future projects and activities."[96]

Section 12.7.6 of the NLCA also establishes a requirement for general monitoring to collect and analyze information on the long-term state and health of the ecosystem and socio-economic environment in the Nunavut Settlement Area. This section of the NLCA has been interpreted as a basis for a monitoring system, which should identify the cumulative effects of development in Nunavut, and assist responsible agencies in taking corrective action.[97]

The Nunavut Impact Review Board is currently considering a proposal by the Tahera Corporation to construct and operate what could become Canada's third diamond mine, at its Jericho property, which is located at the northwest end of Contwoyto Lake in Nunavut, about 400 kilometres northeast of Yellowknife, and 170 kilometres northeast of the Ekati mine.

4.2.3 CEA in Regional Planning in the Slave Geological Province

The absence of regional land use plans to supplement project-specific reviews is often considered a major barrier to effective cumulative effects assessment in Canada.[98] However, the settlement of land claims has initiated the development of land use plans in various parts of the North.

The *Mackenzie Valley Resource Management Act* requires that land use plans be developed for the Gwich'in Settlement Area and the Sahtu Settlement area. Land use plans are currently being prepared for both of these areas, and these plans are to be integrated into the overall resource management process in the

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[96] Nunavut Impact Review Board, http://aulak.polarnet.ca/nirb/whatnirb.htm.

[97] George Heggman, Kevin Lloyd and John Donihee, "Review of Policy Issues for the Practice of Cumulative Effects Assessments in Canada's North (Preliminary Draft). Natural Resources Canada, 1999.

[98] See George Heggman, Kevin Lloyd and John Donihee, "Review of Policy Issues for the Practice of Cumulative Effects Assessments in Canada's North (Preliminary Draft). Natural Resources Canada, 1999.

Mackenzie Valley. In this regard, section 46 of the MVRMA requires that the Gwich'in and Sahtu First Nations, departments and agencies of the federal and territorial governments, and other bodies with legal authorities, carry out their powers in accordance with the land use plan that is applicable in their region. Moreover, section 61 of the MVRMA prevents the land and water management boards from issuing a licence, permit or other authorization for projects or activities that do not comply with the relevant land use plan. Although the Gwich'in and Sahtu Settlement Areas have little overlap in the diamond region it is worthwhile to discuss them because they will likely set the tone for the development of land use plans in other regions of the Mackenzie Valley as other claims are settled.

In Nunavut, the land use planning process is also intended to be strongly linked to the environmental assessment regime. The Nunavut Land Claim Agreement establishes a formal relationship between land use plans, which are the responsibility of the Nunavut Planning Commission (NPC), and the environmental assessment process under the Nunavut Impact Review Board. The NPC is required to review all applications for project proposals to determine whether they comply with the land use plan. Only proposals that conform to the land use plan can be forwarded to the NIRB for review, unless the project is exempted from the land use plan, or is granted a variance by the NPC. Comprehensive land use plans are currently being developed for each of the six planning regions in Nunavut, including the West Kitikmeot, which overlaps the diamond region.

4.3 Chapter Summary

Until recently, the *Canadian Environmental Assessment Act* was the primary tool for assessing cumulative environmental effects in the North. However, with the passage of the *Mackenzie Valley Resource Management Act*, and the implementation of the *Nunavut Land Claim Agreement*, the responsibility for cumulative effects has shifted to the North. An analysis of panel reviews conducted under EARPGO demonstrates that the federal EA regime evolved into a legislated requirement to assess cumulative effects. It also illustrated the current requirements for CEA under the *Canadian Environmental Assessment Act*, and

some of the legal challenges that have ensued.

The current legislative requirement to assess cumulative effects was created in response to growing concern about the cumulative impact of human activities on the environment. Furthermore, although there are now legislative requirements to assess cumulative effects, further guidance is needed on how effectively assess both biophysical and socio-economic and cultural effects.

A key observation here is that the new environmental regimes in the North have taken a different approach to cumulative effects than that taken under *CEAA*, by making explicit linkages between environmental assessment and land use planning. These linkages will assist project proponents and decision-makers by establishing land use priorities, which will help control the impact of multiple developments. In part, these actions have been taken in direct response to the challenges being faced under *CEAA*, but are also intended as a means to bring decision-making directly to the North, to address unique development issues in the North.

5. An Evaluation of CEA in the Slave Geological Province

The practice of cumulative effects assessment throughout Canada is continuing to evolve, but its application in the diamond region in the Slave Geological Province is, at the time of writing, limited to two project proposals, which were evaluated under different environmental assessment regimes. Each of those assessments was subject to much criticism, but a great deal can and should be learned from those experiences, and how they reflect the current thinking about the way in which cumulative effects issues should be addressed.

Approaches to CEA identified in the literature include CEA as part of project-specific environmental assessment, CEA in a regional or land use planning context, and CEA as part of strategic environmental assessment. The recognition of these approaches is central to the purpose of this research, which was initiated specifically because the integration of project-specific cumulative effects assessment and regional planning is widely considered to be lacking. Similarly, these approaches provide a basis for understanding the primary criticisms by stakeholders of how cumulative effects assessment has been conducted in the Slave Geological Province. A review of how CEA has been handled in the Slave Geological Province, relative to the BHP and Diavik assessments and the associated concerns of stakeholders, will provide context for the critical evaluation that follows of the way in which CEA has been approached in the Slave Geological Province. This evaluation is based upon the sustainability criteria presented in Chapter two.

5.1 Current approaches to cumulative effects assessment

In recent years, four key approaches to CEA have been identified in the literature:

- CEA within EA conceived narrowly at the project level;
- CEA within EA conceived more broadly as a planning tool at the project level, including mandatory consideration of need and alternatives;
- CEA as part of land use planning, in which specific rules are established for approval of projects

within the plan area; and

- CEA as part of strategic EA, in which EA is applied beyond the project level to plans, programs and policies.

The first prevalent approach regards CEA as an extension of environmental impact assessment. As some researchers have described it, "CEA is environmental impact assessment done right,"[99] or "CEA is what environmental impact assessment was meant to be."[100] The second prevalent approach regards CEA as a component of regional or comprehensive planning.

Some researchers have suggested that the distinction between the environmental impact assessment approach and the planning approach is emphasis. The environmental impact assessment approach emphasizes the scientific analysis of cumulative effects, whereas the planning approach addresses the problem from a public policy perspective. According to Spaling and Smit, the two approaches represent different interpretations of the scope of CEA.

> The scientific approach adopts a narrower focus, emphasizing an analytical function, whereas the planning approach adopts a broader definition to also include normative evaluation and management. Each approach can yield a particular contribution to the analysis, assessment, and management of cumulative environmental change.[101]

Spaling and Smit argue that cumulative effects assessment is considered to be an information-generating activity that follows the principles of research design and scientific analysis.

> The aim is to analyze and assess cumulative effects associated with past, present or proposed human activities. A premise of this approach is that scientific analysis and assessment of cumulative effects will be communicated to decision-makers, leading to more rational decisions. CEA is considered distinct from planning or decision-making, but linked to it through information flow.[102]

However, this approach does not reflect the influence of public policy issues on environmental impact

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[99] Kingsley.

[100] Peter Duinker, "Cumulative Effects Assessment: what's the big deal?" in Alan J. Kennedy (ed.) *Conference on Cumulative Effects Assessment in Canada: from Concept to Practice*. Alberta Society of Professional Biologists. 1994.

[101] Harry Spaling and Barry Smit. "Cumulative Environmental Change: Conceptual Frameworks, Evaluation Approaches, and Institutional Perspectives," *Environmental Management* 17:5..

assessment, or the fact that normative evaluation does take place in the environmental impact assessment process.

The environmental impact assessment approach differs somewhat from environmental assessment (EA), which is considered to be a broader process in which a wider range of environmental factors are integrated into planning and decision-making for projects and other undertakings. When done properly, EA requires project proponents to evaluate need, identify alternative responses, select preferred options, and carry out detailed design work in an environmentally conscious way. In this regard, EA was designed as a means to ensure that environmental issues receive the same consideration as economic and technical issues in project conception, selection and development, and that these issues are addressed at the planning stage before irrevocable decisions have been made. In addition, it is a process of identifying and evaluating possible effects of proposed activities, so that environmental damage can be avoided or minimized, and opportunities to maximize benefits can be identified.[103] In this way, EA can be used to incorporate sustainability criteria into the evaluation of needs and alternatives related to the project concept, as well as in the evaluation of the project itself.

Whether or not EA is achieving its objectives is a matter of considerable debate, particularly within the federal regime. EA under the *Canadian Environmental Assessment Act* has been criticized on many counts, not the least of which are its shortcomings in the assessment of cumulative effects. The primary criticisms relate to the project-specific focus of EA, and the relative inefficiency and ineffectiveness of the process. Each of these points is reviewed below.

Environmental assessments are generally triggered under CEAA after a decision has been made to undertake a development activity, such as after extensive feasibility studies have been conducted to determine the economics of a potential development. By this stage, many assumptions and decisions have

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[102] Spaling and Smit.
[103] Audrey Armour, "Integrating Impact Assessment in the Planning Process." *Impact Assessment Bulletin* 8: 1-2 (special issue).

already been made, which restricts the ability of EA to influence the early planning process.[104] Moreover, CEAA only requires the consideration of alternatives that are technically and economically feasible. Since environmental assessments are generally triggered by projects, the assessments under CEAA and similar law tend to be project-oriented and narrowly focused. Spatial boundaries are typically confined to local scales, which are usually defined by project or jurisdictional perimeters. Temporal boundaries are commonly characterized by short time frames, which are usually determined by a project's life span.[105] As such, EA tends to neglect additive and synergistic effects. Instead, it looks at the potential effects of a single proposal abstracted from what is happening elsewhere. However, when assessing cumulative effects, a proposal should be evaluated in the context of everything else that affects the environment.[106] In this regard, environmental assessment as it has evolved under CEAA more closely resembles environmental *impact* assessment, and appears to suffer from the same limitations.

The planning approach to CEA uses planning principles and procedures to consider apparent needs and options, and identify the most desirable response. For example, this can involve the preparation of a land use plan, or planning a specific set of undertakings. The planning approach to EA and CEA can also be required under environmental assessment law, as it is the United States, as well as under land use planning or resource management law.

Armour describes planning as a problem-solving process with several discernible stages: a problem or need is perceived, the problem is analyzed in more detail, and possible solutions are identified. Alternative measures are specified and evaluated, and the best alternative is identified. If there is a commitment to proceed with this alternative, then specific requirements for implementation are developed. If not, some or all of the planning process may be repeated until an appropriate solution is found.[107] Preferences are based on explicit social criteria that act as guidelines to compare and rank alternative choices, and to integrate or

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[104] Spaling and Smit.
[105] Spaling and Smit.
[106] Kingsley.
[107] Armour.

trade off biophysical, economic, and social objectives. The aim is to advance the decision-making process by systematically selecting a preferred choice.[108]

Where it is done well, planning defines how best to use the land base, and how to deal with conflicting land use demands. Such planning has been traditionally based on knowledge of the capability and suitability of various biophysical parameters, and basic assumptions or analysis of economics and social values.[109]

However, the utility of the planning approach to CEA is also hampered by administrative inefficiencies. The planning process is typically institutionally fragmented with responsibilities for economic planning, environmental planning, and social planning distributed among multiple agencies. In addition, CEA requires the setting of broader spatial boundaries, but planning is typically carried out at local or sub-regional scales. Finally, local and regional planning authorities generally do not have the authority to take the action necessary to deal with many kinds of cumulative effects.[110] These barriers hinder the widespread implementation of a regional or comprehensive planning approach to CEA.

Arguably, a combination of EA and planning is necessary to address cumulative effects. Spaling and Smit suggest that EA can provide a scientific basis for the collection of the data necessary to inform decision-makers, while planning can be the mechanism by which this information is integrated into the decision-making process. However, they further suggest that CEA will more likely develop within the institutional and legislative context of environmental assessment, because that is the only framework we currently have in place. Indeed, no land-use plans have been recently implemented in the Northwest Territories because its regulatory affairs are in such a state of flux.

In a similar analysis, Steven Kennett characterizes the approaches to CEA as two paradigms for cumulative effects management, which he calls the conventional EA paradigm, and a new paradigm that involves an integrated approach to land and resource management. He identifies three key characteristics of the

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[108] Spaling and Smit.
[109] Tywoniuk.
[110] E.B. Peterson et al., *Cumulative Effects Assessment in Canada: An Agenda for Action and Research*. Canadian Environmental

conventional environmental assessment paradigm, which are closely related to the observations of Spaling and Smit:

- It relies on a reactive and project-specific process to address cumulative effects. EA is triggered by project applications and is directed towards determining the acceptability of individual projects and formulating the regulatory requirements that should be imposed on those projects that are found to be acceptable.
- It is proponent driven. Project proponents play a lead role in EA, having primary responsibility for providing the information and analysis required by decision-makers and bearing a significant portion of the costs incurred throughout the process.
- The EA process operates in many cases without a developed policy and planning context. Participants, including decision-makers, often have little guidance from policies or planning processes when determining project acceptability.

Kennett argues that these characteristics contribute to an inability to address complex cumulative effects issues adequately, because they create structural problems that cannot be addressed within the conventional EA paradigm. The new paradigm that Kennett describes has five main components:

- The adoption of a proactive and planning-based approach;
- Government leadership;
- The establishment of objectives and thresholds for land and resource use;
- A regional focus for cumulative effects management; and
- A direct linkage between planning and EA.

Kennett further asserts that the new paradigm would establish a broader legal and policy framework to

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Assessment Research Council. Hull: 1987.

replace EA as the primary mechanism for cumulative effects management.

These approaches have been validated by recent experience in the Slave Geological Province where it has become widely recognized that project-specific EA, when used in isolation, is an inadequate tool for managing cumulative effects. As will be discussed in the following sections, stakeholders are increasingly concerned that development is taking place in the absence of a long-term vision for the North.

CEA through strategic environmental assessment (SEA) has received much less attention in the literature. SEA has been defined as the "formalized, systematic and comprehensive process of evaluating the environmental impacts of a policy, plan or program and alternatives, and the use of the findings in publicly accountable decision-making."[111] In contrast to project-specific environmental assessment, SEA is intended to cover an expanded range of activities. For instance, rather than assessing the potential impacts of a new all-season road, SEA could address the transportation infrastructure for an entire region. As Therivel observes, SEA is most often used for three types of actions:

- Sectoral policies, plans or programs – PPPs that regulate specific sectors, such as mineral extraction, energy generation or waste management;
- Regional or area-based policies, plans or programs – PPPs that regulate activities within a given spatial area, such as land use plans, official community plans, or development plans; and
- Indirect policies, plans or programs – PPPs that do not give rise to readily identifiable undertakings but have potentially pervasive environmental impacts, such as fiscal, trade or science and technology policy.[112]

The broad scope of SEA makes it a potentially attractive means to address cumulative effects. Sadler suggests that SEA is better suited to the time and space scales associated with the cumulative impacts of development. SEA can also examine different types of activities, including small projects and non-project

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[111] Riki Therivel et al. Strategic Environmental Assessment. London: Earthscan Publications, 1992.

activities that are often not subjected to an environmental assessment at all. Furthermore, SEA is better suited to address value-based conflicts that often pervade project-specific assessments, such as whether industrial development in the Arctic is necessary or desirable in the first place.

The application of SEA to cumulative effects issues is also not without its problems. As with CEA, SEA methodologies are not well developed, and practical experience is limited. Although the federal government issued a strengthened cabinet directive on SEA in 1999, progress towards consistent implementation has been slow. Nevertheless, SEA remains a promising field that may be able to address some of the limitations associated with other approaches.

5.2 How CEA has been handled

In the Slave Geological Province, CEA has only been undertaken from a narrow environmental assessment perspective, in relation to the environmental assessments of the BHP and Diavik developments. The terms of reference for the BHP review instructed the panel to consider "the project's short and long-term environmental effects within the Northwest Territories and the social effects directly related to these effects; and the project's short and long-term general socio-economic effects within the Northwest Territories."[113] The panel was further instructed to consider "issues relating to long-term cumulative effects of the current project in addition to future development scenarios as identified by BHP on its Lac de Gras properties."[114]

In the Environmental Assessment Guidelines for the Diavik Comprehensive Study, the proponent was directed to "scope the CEA to focus on important ecological, social, economic and cultural components affected by the project for which residual effects remain after mitigation measures have been implemented."[115] The Guidelines further noted that the intent of the CEA was:

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[112] Riki Therivel, "Systems of Strategic Environmental Assessment," in Environmental Impact Assessment Review, Vol. 13(3), 1993.
[113] Canadian Environmental Assessment Agency, "NWT Diamonds Project: Report of the Environmental Assessment Review Panel," Hull: 1996.
[114] Ibid.
[115] Department of Indian Affairs and Northern Development et al., "Environmental Assessment Guidelines for the Completion of a

> … not to provide an exhaustive review of all development and social change in the communities affected, but to provide a broad understanding of the positive and adverse changes occurring within the directly affected communities and the project's contribution to these changes.[116]

The Guidelines also instructed the proponent to "describe and assess how the effects of the project may interact with other past, existing or future projects and activities to affect the physical, biological, social, economic and cultural components."[117] Future projects and activities were defined as:

> Projects and activities which have been approved; which are currently under regulatory review; or whose submission for regulatory review is imminent, as determined by the existence of a project description in the possession of the federal government and publicly available on the day these guidelines are issued.[118]

The Diavik requirements were clearly more comprehensive than those for BHP, which illustrates the evolution of federal environmental assessment legislation, as outlined in Chapter four. The extent to which the Diavik guidelines went beyond citing just the Section 16 requirements in the *Canadian Environmental Assessment Act* also indicates the influence of stakeholders in elevating the expectations for cumulative effects assessment, given the importance of the issue to affected stakeholders.

The way in which CEA was approached in these two examples also illustrates several of the limitations described earlier, and lays the groundwork for the criticisms raised by stakeholders in the BHP and Diavik reviews.

5.3 Stakeholder concerns

A variety of stakeholder groups was actively involved in the BHP and Diavik assessments, through participation in public hearings and meetings, and written submissions throughout the environmental reviews. In addition, several Aboriginal organizations participated in a steering committee that made recommendations to federal departments in relation to the Diavik review. This activity played a significant

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Comprehensive Study of Proposed Diavik Diamonds Project," August 1998.
[116] Ibid.
[117] Ibid.
[118] Ibid.

role in raising the profile of cumulative effects concerns. Among the stakeholders were several Aboriginal groups, including the Dogrib Treaty 11 Tribal Council, Yellowknives Dene First Nation, Lutsel K'e Dene First Nation, Métis Nation, and the Kitikmeot Inuit Association. A range of environmental groups, including the Canadian Arctic Resources Committee and the Canadian Parks and Wilderness Association, as well as northern residents and businesses, was also involved.

The issues raised by these stakeholders in the BHP and Diavik assessments reflect the broader debate surrounding cumulative effects, which is taking place across Canada. To a large degree, the concerns about cumulative environment effects have emerged from a heightened awareness of the additive and synergistic impact of development on natural and social systems, combined with an acknowledgment that our understanding of these systems is still incomplete. There is also a relative lack of practical experience in assessing and managing cumulative effects, compared to the experience that has developed in conventional impact assessment over the past 25 years. Specifically in the north, environmental concerns have also become entwined with outstanding land claim issues and the desire for Aboriginal benefits.

In this regard, the Dogrib Treaty 11 Tribal Council[119], the Yellowknives Dene First Nation[120], Lutsel K'e Dene First Nation, and the Métis Nation, spoke very strongly in the BHP review about the need to settle land claims before the project could proceed. Some, including the Yellowknives and Lutsel K'e Dene, expressed strong opposition to the project and indicated that they were prepared to seek a court injunction to prevent the project from proceeding until the question of land ownership was resolved. Although land claims and impact benefit agreements are often considered to be distinctly separate from environmental issues, the BHP panel report observed that "the concern over the need to settle land claims before development proceeds was heightened by the observation that several diamond mines and other developments in the region could follow closely on the heels of this Project."[121] Concern about future development was also reflected throughout the Diavik review, in which many of the same people and

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[119] The Dogrib Treaty 11 Council represents the communities of Wha Ti, Rae Lakes, Rae-Edzo and Snare Lake.
[120] The Yellowknives Dene include the communities of Dettah and N'Dilo.

organizations participated.

To be clear, not all stakeholders were opposed to the diamond developments. In the case of the Diavik project, many organizations clearly indicated throughout the assessment process that although they had important concerns that they wanted to have addressed, they were not opposed to the project in principle. However, they did consider that their issues should be addressed before the project was allowed to proceed.

5.3.1 Cumulative effects concerns

Specific cumulative effects concerns included the incremental stress placed on the Bathurst caribou herd and its habitat through increased development pressure; reduced ambient air quality, and the associated effects on wildlife and vegetation; incremental pressures grizzly bears and their habitat; and potential cumulative effects on water quality of discharged from BHP and Diavik. Of these issues, caribou and water quality were cited most frequently.

Concerns about cumulative effects were raised from the very beginning of the Ekati project, by Aboriginal peoples who live in the affected communities, and several environmental groups. The concerns included the effects of a potential expansion at Ekati, but they focused mainly on the effects of other development in the region. Of particular concern were proposals to expand northern infrastructure to better serve the mining industry. In this regard, in 1994 the NWT finance minister emphasized the need for a road and port infrastructure to support diamond mining and other base and precious metal activity.[122]

In fact, there has been discussion for many years about building an all-weather road that runs north from Yellowknife, as well as a new port at the town of Coppermine. In a 1994 interview for the magazine *Up Here*, Chris O'Brien from the conservation group Ecology North expressed concern about this long-term picture of northern development.

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[121] Canadian Environmental Assessment Agency. Report of the Environmental Assessment Review Panel: NWT Diamonds Project.
[122] Ed Struzik, "Diamonds in the Rough." *Nature Canada*. Fall 1994.

> One development leads to another. There's much talk about all-weather roads, about hydro dams. The more development that goes ahead, the greater the repercussions become. There's no reason not to believe that if we keep on chipping away at the North, that one day the North will be all fenced off. We're starting a process. Increased access leads to local depletion of animals. An all-weather road leads to other roads and gradually, it's opened up. You hear people saying we've got to open up the North like it's some kind of can. The trouble is once it's opened up, you can't close it down. Nobody was talking seriously about an all-weather road north until the diamond thing happened, and now it seems feasible because of the sheer scale and the big bucks that are going be made. It's a chance for all these folks who have gold or lead-zinc to finally get it developed because with a road it'll be much more economic.[123]

However, none of these potential developments was included in the BHP assessment. Citing similar concerns, David Schindler, an internationally recognized biologist from the University of Alberta, turned down a nomination for a position on the BHP review panel because he felt that the terms of reference were too narrow.

> In this case, as long as the terms of reference are confined to the BHP project itself, and the panel members are forced to ignore the cumulative impact of all of the mining developments in the central Arctic, a meaningful review is impossible.[124]

Indeed, in its final report, the panel acknowledged that "a review of the effect of other development initiatives in the region was not within the panel's mandate."[125] This was a serious concern of environmental groups such as the Canadian Arctic Resources Committee (CARC) and the World Wildlife Fund (WWF), which had being calling on the federal government to conduct a broad regional environmental review of all development in the central Arctic.[126] Although the panel did not directly address the issue of future development, it did acknowledge the need for further studies. In particular, it concluded that further work is needed on the cumulative effects of exploration activities on wildlife in the region.[127]

The treatment of cumulative effects was also widely criticized throughout the comprehensive study of the

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[123] "Finding Common Ground," *Up Here*. Volume 10, Issue 5. Nov/Dec 1994.
[124] Quoted in Ed Struzik, "Diamonds in the Rough." *Nature Canada*. Fall 1994.
[125] Canadian Environmental Assessment Agency, "NWT Diamonds Project: Report of the Environmental Assessment Review Panel." Hull: 1996.
[126] Ed Struzik, "Diamonds in the Rough." *Nature Canada*. Fall 1994.
[127] Canadian Environmental Assessment Agency, "NWT Diamonds Project: Report of the Environmental Assessment Review Panel." Hull, Quebec. 1996,

Diavik proposal. Of particular concern was the incremental loss of habitat for the Bathurst caribou herd, whose range extends across much of the eastern NWT. During the public comment period after the comprehensive study report was submitted to the federal environment minister, Aboriginal and environmental organizations argued that the assessment did not include a sufficient range of future projects, and used inappropriate spatial and temporal boundaries. The degree of concern led several organizations to demand that the Diavik project be referred to an independent review panel – a process that would have taken another 18-24 months.

In another submission made during the public comment period, the Yellowknives Dene First Nation argued that, although assessing cumulative effects is required under the *Canadian Environmental Assessment Act*, neither the Canadian Environmental Assessment Agency or the Department of Indian Affairs and Northern Development provides adequate guidance.

Similarly, the Lutsel K'e Dene First Nation (LKDFN) indicated that its concerns were compounded by the "absence of a strategy for managing the human and environmental impacts on the Bathurst caribou and its habitat." In this regard, LKDFN indicated its view that none of the recommendations made by the BHP review panel in respect of cumulative effects have been implemented in a meaningful way.

A submission by the Dogrib Treaty 11 Council was critical of what the Dogrib called a "consistent pattern of reaching conclusions that significant adverse effects are unlikely without a meaningful explanation of how the conclusions were reached".

In addition, the NWT chapter of the Canadian Parks and Wilderness Society suggested that the cumulative effects assessment for Diavik should have considered the following potential future projects:

- Potential expansion of the Diavik operation;
- Planned expansion of the Ekati mine;
- Continued exploration of non-renewable resources in the Slave Geological Province; and

- Proposed Slave Geological Province Transportation corridor.

The harshest criticism of the Diavik comprehensive study came from the Canadian Arctic Resources Committee (CARC), which pursued a court action regarding the assessment. In its submission during the public comment period, which was prepared with assistance from its legal counsel, CARC charged that the consideration of cumulative effects was incomplete because it failed to consider the effects of projects for which information was readily available.

> DIAND has within its departmental mandate for the north virtually all information required to identify the projects raising cumulative effects issues. Through the *Territorial Lands Act*, DIAND requires land use permits for virtually the entire life cycle of mining activities, from early exploration, to exploratory drilling, bulk sampling, feasibility studies, mineral development, and closure. Equally, the breadth of the *Territorial Land Use Regulations* also means that other land use activities require similar permitting. In short, virtually all past, existing, and proposed land use activity in the vicinity of the proposed Diavik mine will require *Territorial Land Use Regulations* permits or surface leases issued under related regulations.[128]

According to CARC, the comprehensive study considered only a limited range of other projects, having excluded projects such as the proposed expansion of the Ekati mine, and other nearby diamond developments described in 1999 announcements. CARC developed its own list of projects that it felt should have been part of the cumulative effects assessment. The list was created with information compiled from DIAND, and included projects within the regional study area used by Diavik, and within the ecosystem used by the Bathurst caribou herd. CARC identified more than "50 projects and activities, in contrast to the less than 20 projects and activities identified in the CSR."

CARC based many of its comments on a report prepared by a CARC-sponsored Cumulative Effects Working Group. The working group charged that the "ingredients for a full cumulative effects assessment were available but not used" and that the boundaries used for the cumulative effects assessment "bear little relation to the meaning of cumulative effects as set out in the *Canadian Environmental Assessment Act*". In its view, the boundaries should have been based on the Slave Geological Province as a whole, the Coppermine River watershed, and the full range of the Bathurst caribou herd. More particularly, the

Working Group criticized the cumulative effects assessment for caribou, on the grounds that the baseline data were inadequate, rendering the predictions nothing more than "best guesses". CARC also challenged the conclusion that the residual effects of other mineral exploration are negligible, based on an apparent absence of environmental screenings for many land use permits issued in the study area. Similar concerns were raised in submissions by Mining Watch Canada, the Kitikmeot Inuit Association, Lutsel K'e Dene First Nation, and the North Slave Métis Alliance.

In addition to the concerns put forward by Aboriginal and environmental groups, the Mackenzie Valley Environmental Impact Review Board (MVEIRB), in its advice to the federal environment minister, also suggested that the scope of the cumulative effects assessment was too narrow. The Board was concerned that certain projects, such as the expansion of the Ekati mine, were not included in the assessment. In addition, it suggested that the federal departments that prepared the assessment accepted impact predictions that had a high degree of uncertainty, and deferred the responsibility for cumulative effects verification to monitoring that would take place outside of the environmental assessment process.

The cumulative effects concerns raised during the BHP and Diavik assessments are not unique to the Canadian North. Similar concerns have been raised in other federal assessments, such as the comprehensive studies for the Halifax and Saint John Lateral Pipeline projects, and the review panel for the Voisey's Bay Mine and Mill project. While there is clearly no consensus on how to address these concerns, there is a clear need to develop a strategy that can at least begin to tackle the issues. One of the central issues is the lack of other fora to address cumulative effects issues.

5.4 Evaluation using sustainability-based criteria

In Chapter two, four sustainability based criteria were developed to evaluate the state of cumulative effects assessment: integrated, comprehensive, participative and enforceable. The following sections will use these

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[128] John Crump, Canadian Arctic Resources Committee. Letter to Christine Stewart, Minister of the Environment. July 22, 1999.

criteria to evaluate the strengths and weaknesses in how CEA was approached under the federal environmental assessment regime for the two existing diamond developments. Chapter six will apply the criteria to potential response options for cumulative effects assessment in the Slave Geological Province.

5.4.1 Integrated approach

An integrated approach suggests that CEA should be undertaken both at the project-specific level and on a regional planning basis, in order to develop a complete picture of the environmental effects of human activities. Linkages need to be established between these processes, so that proactive measures can be taken to anticipate cumulative effects issues and to develop mechanisms to address them before issues become critical. CEA should also include an adaptive feedback mechanism, so that lessons learned can inform future decision-making in cumulative effects management.

As discussed earlier, the lack of completed or fully implemented land use plans in the Slave Geological Province precludes any meaningful linkages between EA and the planning process, particularly in the short to medium term. Indeed, these linkages were not in place for either the BHP or Diavik assessments. Although land use plans are currently under development in parts of the Mackenzie Valley and Nunavut, it will be many years before environmental assessment and land use plans are linked in the way in which the new legislation intends. The absence of fully implemented land use plans also reveals a weakness in the CEA methodology outlined in Chapter two, where determining significance includes comparing the potential effects of a project against thresholds or land use objectives.

Similarly, the nature of project-specific CEA precludes it from being able to take a proactive role in anticipating or managing cumulative effects, because it necessarily focuses on individual projects. In the absence of a project proposal, there can be no examination of cumulative environmental effects.

With respect to the management of project-specific impacts, some integration can effectively take place through follow-up and monitoring procedures. The Independent Environmental Monitoring Agency established for the BHP project could be considered evidence of this, to the degree that information

generated through environmental effects and mitigation monitoring has been incorporated into decision-making. Nevertheless, a truly integrated approach suggests a need for integrating processes as well as information, which the project-specific model is ill suited to do. This could be improved through broad anticipatory scope in the early planning pages, as well as in project design and assessment.

5.4.2 Comprehensive approach

A comprehensive approach suggests that CEA should be interdisciplinary, and should be undertaken in a rigorous and systematic fashion. The environment should be broadly defined to include physical attributes such as land, water, air and living organisms, as well as social, cultural and socio-economic attributes. CEA should be done on a regional level with a long-term view, and a broad range of activities should be considered. Spatial and temporal boundaries should be based on relevant ecological or socio-economic and cultural considerations, not jurisdictional ones.

The definitions of "environment" and "environmental effect" under the *Canadian Environmental Assessment Act* restrict the range of effects that must be considered in an environmental assessment. Environment is defined as "…the components of the Earth, and includes (a) land, water, air, including all layers of the atmosphere, (b) all organic and inorganic matter and living organisms, and (c) the interacting natural systems that include components referred to in paragraphs (a) and (b)." Environmental effect is defined as:

> … in respect of a project, (a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of land and resources for traditional purposes by Aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and (b) any change to the project that may be caused by the environment.[129]

Consequently, socio-economic and cultural effects only need to be considered if they are the direct result of a physical environment effect. Direct socio-economic or cultural effects do not need to be considered. This

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[129] *Canadian Environmental Assessment Act*, Section 2.

limits the opportunities for a comprehensive assessment of cumulative effects, and conflicts with the basic principles of sustainability.

A comprehensive approach also means considering a broad range of activities, and addressing needs and alternatives. This was shown to be lacking in the BHP review, through the narrow focus on the potential expansion of the BHP project and the lack of attention to other surrounding development initiatives. Interestingly however, based on the CEAA guidance described in Chapter 4 concerning future activities, the all-weather road would arguably be a hypothetical project, in the absence of a more clearly articulated proposal by someone intending to build it. As such, consideration of the cumulative effects related to such a project would only happen outside of the environmental assessment process.

Diavik was required to look at a broader range of other activities, because of the requirements of the *Canadian Environmental Assessment Act*. However, the definition of "future projects and activities" set out in the EA Guidelines still had the effect of limiting the activities that needed to be considered in the CEA. Indeed, not long after the Diavik EA Guidelines were issued, BHP announced its plans to expand its operations and Monopros announced its intention to develop its property. However, neither of these potential developments was included in the CEA. The cut-off date established in the EA guidelines was intended to provide clarity and certainty to the process, but this was done at the expense of flexibility.

As noted in Chapter two, there is also a broader question concerning what actions and activities are appropriately addressed at the project-specific level, and what is more appropriately considered as part of a broader examination of cumulative effects issues. In the example of the all-weather road, no formal proposal has been put forward. Based on the guidance described in Chapter four, the road remains hypothetical and need not be considered in a project-specific CEA. However, such an undertaking would be more appropriately considered in a regional or strategic assessment. In the absence of such a process, project-specific CEA is the only available forum for stakeholders to raise these concerns.

Finally, a comprehensive approach requires the use of boundaries that are based on relevant ecological or socio-cultural considerations. The Diavik assessment was particularly criticized for the spatial boundaries

used for the CEA. In both the BHP and Diavik reviews, the Bathurst caribou herd – which covers a range of approximately 250,000 km^2 – was identified as a key valued ecosystem component. However, the local and regional study areas were often square, and did not appear to correspond with any particular ecological feature or boundary. The consultants who prepared the CEA for caribou in the Diavik review note that they used their professional judgement in selecting a boundary that they felt represented the maximum zone of influence of the project.[130] Although this may be a reasonable approach for a project specific assessment without cumulative effects concerns, the lack of established and widely accepted methodologies provides opportunities for significant disagreement among various stakeholders.

The need for a comprehensive approach to cumulative effects assessment also raises similar issues regarding whose standard of comprehensiveness should be used, and who should be responsible for gathering the data. To a large degree, industry considers that too much is currently expected of project proponents, and that further direction is needed from government agencies as to what information is necessary for individual project reviews. While there is wide agreement that cumulative effects assessment should be comprehensive, there are differing views on who how this should be achieved, and by whom.

5.4.3 Participative

A participative approach requires CEA to be open and transparent. Stakeholders must be given meaningful opportunities to participate in all levels of CEA, including setting regional priorities and objectives. Concerns raised through public participation should be addressed specifically in the decision-making process. Where CEA is being undertaken on Aboriginal lands, consideration must be given to traditional land use and traditional ecological knowledge.

Important issues surrounding public involvement arose during both the BHP and Diavik reviews. The nature of the federal environmental assessment process creates an apparent disconnect between those that

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[130] Ross Eccles, AXYS Environmental Consulting Ltd., Personal Communication, March 28, 2000.

make decisions about project proposals, and members of the affected public. For instance, although there was clearly a great deal of public participation in the Diavik process, the public comments received about the Comprehensive Study Report (CSR) demonstrated that many groups felt that several issues were still outstanding. However, the response to public comments prepared by the federal responsible authorities indicated that no new concerns were raised in the comments, and that the RAs were satisfied that the issues raised had been adequately addressed in the CSR. Consequently, a number of those who participated in the process felt that their contribution had not been heard. In addition, many stakeholders felt that limited resources, which were often dedicated to resolving land claims or other priorities, hampered their participation. In contrast, government (and industry) representatives considered that the consultation that took place throughout the Diavik review was extensive, as reflected in the press release issued by the federal environment minister when the Diavik project received environmental assessment approval.[131]

This disconnect has important implications in the context of cumulative effects assessment at the project level, as well as to CEA in regional planning. As described earlier, the planning process involves setting land use priorities, which requires the application of social values. The public needs not only to be actively engaged in the process, but also to believe that they are a part of the process.

5.4.4 Enforceable

For CEA to be enforceable, the assessment of cumulative effects and the needs of CEA must be legally binding. Key requirements and process issues should be based in law, to provide a degree of predictability and certainty to the process. Follow-up and monitoring programs must be undertaken to validate predictions and mitigation measures for cumulative effects, and means must be available to address non-compliance.

One of the guiding principles of the *Canadian Environmental Assessment Act* is that of self-assessment, and

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[131] News release issued by the Minister of the Environment for the Diavik Diamonds Project, November 3, 1999.

the courts have confirmed that federal departments that are responsible for conducting assessments have the discretion to determine the scope of the project, and the scope of the environmental assessment. Nevertheless, the requirement to assess cumulative effects is based in law, and federal responsible authorities can be held accountable through the courts. That being said, the Diavik review raised other important questions related to enforceability.

Following the Diavik comprehensive study review, federal environment minister David Anderson attached several conditions to his approval, including a requirement that Diavik participate in the development and implementation of a Regional Cumulative Effects Management Framework. Shortly after the approval was granted, a joint announcement was made by Minister Anderson and the federal Minister of Indian Affairs and Northern Development that a working group was being established to do this. The group developed a work plan for the development of the framework, which laid out the financial resources that would be required. However, the group encountered difficulty securing ongoing funding for their work. Following a letter-writing campaign initiated by some of the working group members, funding for the current fiscal year was secured, but was substantially less than what was requested.

This demonstrates the difficulty associated with the enforceability of ministerial commitments. Strictly speaking, under the *Canadian Environmental Assessment Act*, the federal environment minister has no authority to impose conditions in the project approval. Under section 23 of the Act, the minister may only choose one of two options. Section 23(a) states that the minister shall refer the project back to the responsible authority for action if:

i. the project is not likely to cause significant adverse environmental effects, or

ii. the project is likely to cause significant adverse environmental effects that cannot be justified under the circumstances.

Alternatively, section 23 (b) states that the Minister shall refer the project to a mediator or review panel if:

i. it is uncertain whether the project, taking into account the implementation of any appropriate

mitigation measures, is likely to cause significant adverse environmental effects,

ii. the project, taking into account the implementation of any appropriate mitigation measures, is likely to cause significant adverse environmental effects and subparagraph (a)(ii) does not apply, or

iii. public concerns warrant a referral to a mediator or a review panel.

The responsible federal departments are empowered to impose conditions, but some departments will only include conditions that relate to issues under their mandate. As such, it is often difficult to attach more general requirements to individual permits or licences.

The Minister of Indian Affairs and Northern Development supported the commitments that were incorporated into the Diavik approvals, which would seem to facilitate the implementation of the conditions. Moreover, Diavik itself had already made clear commitments to participate in the development of the framework. However, once public attention surrounding the approval had passed, the means to follow through on the framework were not readily available. Although the funding issue was eventually substantively resolved, it is not clear what recourse would have been available if the financial resources to carry out the framework were not made available. Similarly, it draws attention to the weakness in CEAA that the federal environment minister is not empowered to impose conditions other than mitigation measures.

5.5 Implications for Sustainability

As noted in Chapter two, CEA should be undertaken in the context of sustainable development, having equal regard for environmental factors in decision-making as for technical and economic considerations. Sustainability should entail looking for maximum benefits as well as minimization of damages and assurance of net gains. However, as Kennett observes, conventional EA is focused on determining the acceptability of individual projects.

Although one of the purposes for doing environmental assessment under CEAA is to "integrate environmental factors into planning and decision-making processes in a manner that promotes sustainable development", the contribution of project-specific CEA to sustainability is arguably weak, because project specific reviews do not tend to give full consideration to the range of activities that influence one another in a given ecosystem. In addition, assessments under CEAA only need to consider alternatives that are technically and economically feasible. Serious consideration of broader alternatives is also frustrated by late triggering of an environmental assessment and the focus on narrow alternative means of carrying out the project.

In the analysis above, it was demonstrated that project-specific CEA under the federal EA legislation is not integrated with regional or land use planning, and is not as comprehensive as it could or should be. In particular, the definition of "environment" is biased towards physical components, to the exclusion of important social and cultural attributes that are critical to the pursuit of sustainable development. Similarly, although the experiences to date have provided extensive opportunities for public consultation, they are not true participative processes in which affected communities play a role in decision-making.

Although project-specific CEA is based in law, gray areas remain in terms of conditions and commitments that are made outside the EA process, such as those included in the federal environment minister's decision on the Diavik project. This in particular points to the need to develop legally binding mechanisms to address cumulative effects issues. Some of these issues are being addressed through mechanisms such as impact benefit agreements, and environmental or socio-economic agreements, but these mechanisms are not built into the process, and are not firmly based in law. In sum, the project-specific approach to CEA does not meet the criteria set out in Chapter two.

Nevertheless, the cumulative effects assessments done as part of the BHP and Diavik reviews have made important contributions to advancing the debate about CEA. In each case, the public profile of the project meant that the review process was open to a great deal of scrutiny. Although the two assessments were conducted under different regimes, and also as different types of assessments, the BHP process had a

profound influence on stakeholders' expectations in the Diavik review. In the absence of definitive guidance on how CEA should be done, the work done in the diamond region has at least advanced the debate, and has arguably raised the expectations of what CEA should address. Moreover, the CEA studies themselves will contribute to a better understanding of the ecosystems and communities in the Slave Geological Province.

5.6 Chapter Summary

Although methods for the assessment of cumulative environmental effects are becoming better documented, one of the key limitations to high quality cumulative effects assessment is the lack of experience, compared with the expertise that has been developed in conventional environmental assessment over the past three decades.

Four key approaches to CEA have been identified and evaluated in the literature:

- within EA conceived narrowly at the project level;
- within EA conceived more broadly as planning at the project level, including broad definition of environment and mandatory consideration of need and alternatives;
- as part of strategic EA, in which EA is applied beyond the project level to plans, programs and policies; and
- as part of land use planning, in which specific rules are established for approval of projects within the plan area.

In the Slave Geological Province, CEA experience is largely limited to individual project assessment, particularly in the BHP and Diavik environmental assessments. Through these two environmental reviews, concerns were raised about the potential cumulative impact of future development with valued environmental components, such as the Bathurst caribou herd and its habitat. The limitations of project specific CEA as observed in the literature, are consistent with recent experience in the Slave Geological

Province.

The application of the four sustainability-based criteria developed in Chapter two suggests that project-specific CEA, when used in isolation, is an inadequate tool for the pursuit of sustainable development, and does not meet the sustainability-based criteria set out in Chapter two. There is limited integration of processes and information, the scope of activities included is too narrow, stakeholders are not adequately engaged, and the requirement to do CEA is difficult to enforce. The degree of concern is magnified because project-specific assessments have provided the only forum for raising cumulative effects issues, including those that might better be addressed through other means. This highlights the need to have appropriate fora for addressing cumulative effects on different scales.

Although project-specific CEA has enhanced our understanding the natural and social environments in the Slave Geological Province, further work is necessary to improve the contribution of CEA to sustainable development.

6. Response Options for Better CEA in the Slave Geological Province

Although project-specific EA has been the dominant mechanism for addressing cumulative effects in the Slave Geological Province, consensus is growing amongst stakeholders that a broader approach to the cumulative impacts of development is necessary for the long-term health of northern ecosystems and communities. To this end, several initiatives are currently being established in the North that may contribute to more effective cumulative effects management. These response options include new legislation that effectively replaces the *Canadian Environmental Assessment Act* in the Mackenzie Valley region of the Northwest Territories, and a series of multi-stakeholder initiatives that are focused on cumulative effects issues. This chapter describes these options, and evaluates them using the sustainability-based criteria developed in Chapter two.

6.1 Outline of Options

The current response options for addressing cumulative effects in the North include legislative and regulatory options, which are founded in the *Mackenzie Valley Resource Management Act* (MVRMA) and the *Nunavut Land Claim Agreement* (NLCA), in addition to a variety of multi-stakeholder initiatives that were developed in response to growing development pressures. The MVRMA consists of three key components, which include a new environmental assessment regime, land use planning initiatives, and a provision to establish a cumulative impact monitoring program. Similarly, the NLCA contains provisions for land use planning, as well as the Nunavut Impact Review Board. The multi-stakeholder initiatives include two government-led programs, and another managed jointly between government, industry, and other stakeholder groups.

6.1.1 Legislative and regulatory options

The *Mackenzie Valley Resource Management Act* establishes an environmental assessment regime to be administered by the Mackenzie Valley Environmental Impact Review Board. It also provides for land use

planning boards in both the Gwich'in and Sahtu settlement areas. In addition, it includes provisions for the Mackenzie Valley Cumulative Impact Monitoring Program. Similarly, the *Nunavut Land Claim Agreement* established the Nunavut Impact Review Board, and provisions for land use planning.

6.1.1.1 Environmental Impact Review Boards

The Mackenzie Valley Environmental Impact Review Board (MVEIRB) is responsible for conducting environmental assessments of developments that are referred to it, and has essentially replaced the *Canadian Environmental Assessment Act* in the Mackenzie Valley, except in very specific situations. The MVEIRB can recommend ways to protect the environment from impacts caused by a development, and it can also recommend that a development be rejected because the anticipated impacts are too negative.

The MVEIRB is a public board, and is independent from government and independent from any of the bodies that nominate members to the Board. Although it receives its funding from the federal government and is subject to federal Treasury Board guidelines, it is not considered part of the federal or territorial government. Board members represent the interests of all residents of the Mackenzie Valley when they sit down to make a decision on a development, and not the interests of the group that nominated them.

The MVEIRB does not issue permits or licences itself. This is left to the various government departments or the land and water boards, such as the Mackenzie Valley Land and Water Board. However, it may make recommendations that are attached to those permits or licences, such as requirements for monitoring and follow-up programs.

Similarly, the Nunavut Impact Review Board is responsible for overseeing the assessment of projects within the Nunavut Settlement Area. The NIRB examines the potential effects of a proposed development upon the physical, biological and socio-cultural and economic environments, including cumulative effects, which are defined as "any effect which results from effects of a project when combined with those of other past,

existing and future projects and activities."[132]

6.1.1.2 Land Use Planning Initiatives

The *Mackenzie Valley Resource Management Act* requires that land use plans be developed for the Gwich'in Settlement Area and the Sahtu Settlement area. As noted earlier, these initiatives will likely influence the manner in which land use plans are developed in the rest of the Mackenzie Valley, including the diamond region, when further land claims are settled.

The Sahtu Land Use Planning Board is tasked with developing and implementing a land use plan for the Sahtu region of the Northwest Territories. The Board members further defined their purpose as:

- To prepare a draft land use plan;
- To facilitate peoples' understanding of the importance of land use planning; and
- To ensure that the interests of all parties are taken into consideration.

Land use planning under the MVRMA creates policies that are designed to guide how land and resources will be used, and is largely directed by the social, cultural, and economic interests of Aboriginal peoples and other northerners. Both traditional and scientific knowledge are used as a basis for the plan. The plan may include:

- Vision for community development;
- Resource and land management strategies;
- Cultural and traditional land use areas; and
- Land use and protected zones.

The plan is currently under development.

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[132] Nunavut Impact Review Board, http://aulak.polarnet.ca/nirb/whatnirb.htm.

The Gwich'in Tribal Council and the Government of the Northwest Territories approved the Gwich'in Land Use Plan in September 1999. The plan is based on a three-tiered zoning system. Approximately 56 percent of the settlement area is zoned "general use", for which there are no specific conditions for development beyond the existing regulatory regime. A further 34% is zoned "protected", for which specific conditions are applied before permits are issued. The conditions address particular issues, such as safeguarding caribou migration routes and maintaining aesthetic values. The remaining 10 percent of the settlement area is zoned "heritage protected – special management", which are identified as having significant environmental, cultural or heritage resources. Within these zones, no development activities are permitted. However, the plan was also intended to be flexible, in that the planning board can consider an exemption or an amendment to the plan, when requested. The Gwich'in Land Use Planning Board has forwarded the plan to DIAND for final approval.

Responsibility for land use planning in Nunavut rests with the Nunavut Planning Commission (NPC), whose main function is to develop land use plans, policies and objectives that guide resource use and development throughout Nunavut. Its emphasis is on protecting and promoting the existing and future well being of the residents and communities of the Nunavut Settlement Area. The term "land use" also includes water, wildlife and offshore areas.

The NPC is working with the territorial and federal governments and other interested parties, including regional wildlife and environmental organizations, to establish broad planning policies, objectives and goals for Nunavut. It will also develop land use plans that guide responsible resource use and sustainable development. Inuit organizations and the governments of Canada and Nunavut nominate members to the NPC.

During the past few years, NPC has been actively mapping wildlife populations, human use and areas of archaeological significance while examining land use issues. This mapping work combines the knowledge of the Inuit with computer mapping technology.

A draft land use plan for the West Kitikmeot region was developed from 1991 to 1998. The Plan has

undergone additional revision and will soon be submitted to the Nunavut and federal governments for final approval. The draft plan features a detailed account of land-use issues that are of major importance to people living in the area. These issues include cleaning up abandoned waste sites (mining exploration camps, abandoned DEW line sites, etc.), and studying the potential impact of mineral development on the region's environment and its effect on the Bathurst Caribou Herd, which extensively uses the region for calving.

The plan indicates that people in the West Kitikmeot want to see controlled development take place in their region, but also want to ensure that their valuable renewable resources – the land, water and wildlife – are protected for future generations. Among other things, the plan includes information and recommendations concerning:

- caribou protection measures
- the importance of eskers in the environment
- a pilot project that will monitor the well-being of both wildlife and the people of the Kitikmeot
- mineral development
- development of a transportation and/or communications corridor
- marine transportation
- power and energy development
- management of heritage and archaeological sites

In contrast to the Gwich'in Land Use Plan, which sets out land use zones with various restrictions, the West Kitikmeot Land Use Plan was designed as a policy document that describes the vision that has been developed for the region. Because the plan was developed over a period of time through extensive consultation with communities, government, and industry, the plan represents a mutually acceptable

balance, and can act as a guide for development without being too prescriptive.[133]

In both the Mackenzie Valley and Nunavut, the land use planning initiatives and environmental assessment regimes are linked. For instance, section 12.3.4 the NLCA stipulates that NIRB may only screen project proposals that conform with the relevant land use plan. The MVRMA contains similar provisions.

6.1.1.3 Mackenzie Valley Cumulative Impact Monitoring Program

The *Mackenzie Valley Resource Management Act* and the Gwich'in and Sahtu Land Claim Agreements also provide for the regular conduct of an environmental audit. Referred to as the Mackenzie Valley Cumulative Impact Monitoring Program (MVCIMP), the audit is intended to monitor the cumulative impacts of land and water uses on the environment in the Mackenzie Valley, and trends in environmental quality.

An MVCIMP Working Group was established, which includes representatives from the Gwich'in, Sahtu, and Inuvialuit Settlement Areas, and territorial and federal government departments. The Working Group is currently designing a community-based monitoring program. At this time, the focus is on the Gwich'in and Sahtu Settlement Areas, but eventually the program is intended to cover the entire Mackenzie Valley. When implemented, the MVCIMP will be a valley-wide data resource combining existing data sources, coordinating monitoring programs and providing feedback to communities. The MVCIMP is intended to help generate the baseline environmental data, analysis and traditional knowledge input required by proponents and others with an interest in cumulative effects issues. The results from the program are meant to generate recommendations to the land use planning boards, which are required to review their plans every five years. At this time, there is no planned implementation date for the MVCIMP.

6.1.2 Multi-stakeholder approaches

Various multi-stakeholder initiatives in the North have recently been established that are particularly

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[133] Jon Pierce, former executive director of the Nunavut Planning Commission. Personal communication. November 3, 2000.

concerned with cumulative effects issues. Three of these initiatives were selected for further examination in this thesis. The Cumulative Effects Assessment and Management Framework and the Northern Ecosystem Initiative are both government-led studies, while the West Kitikmeot Slave Study is joint arrangement between communities, government and industry.

6.1.2.1 West Kitikmeot Slave Study

The West Kitikmeot Slave Study (WKSS) is a partnership of aboriginal and environmental organizations, government and industry. The group was initiated in 1996 after approximately two years of exploratory workshops, in response to increased development activity in the West Kitikmeot and Slave regions, and the lack of adequate baseline information in several key areas.

Of particular concern was the diamond exploration activity in the Slave Geological Province since 1991. Given the high potential for the development of gold and other metals, this exploration highlighted the lack of information on the region's development potential, environmental quality, wildlife populations, critical habitats and socio-economic situation. It was considered that more data are needed, especially relating to the possible cumulative effects of potential mining and related infrastructure developments.

The work of the WKSS was intended to provide an information base to support sound resource management decisions and to examine the short-term and long-term effects of development. The federal and territorial governments agreed to match funding secured by the WKSS from industry, Aboriginal groups and other non-governmental organizations. The research funded by WKSS uses both scientific and traditional knowledge approaches.

In 1999, the WKSS published an extensive 300-page report entitled “State of Knowledge Report on the West Kitikmeot / Slave Study Area.” The report gathers and interprets written knowledge on the WKSS study area, up to the beginning of the study in 1996. It documents an extensive body of information on the geological history, human history, ecosystems of the area, socio-economic and traditional knowledge information, the reported effects of mining, animal harvest, hydroelectric developments and tourism.

The study has a life span of five years, which ends in 2001. There are no plans to extend its terms of reference. However, the partners have approved in principle a proposal to spend one year to plan a similar organization, which could provide information to cumulative effects assessment or management bodies.[134]

6.1.2.2 Northern Ecosystem Initiative

Environment Canada began the Ecosystem Initiatives Program in 1988 in response to urgent environmental issues, such as pollution in Lake Ontario and Lake Erie, and the near extinction of beluga whales in the St. Lawrence River system. In responding to these issues, it became clear that environmental solutions are closely linked to economic and social issues. The program adopts an approach that integrates all elements of the ecosystem together, including land, water, species and human activities.

There are currently six ecosystem initiatives across Canada, including the Northern Ecosystem Initiative (NEI), which has a five-year mandate. Although the initiatives vary in scope, scale and participation, they share several basic characteristics:

- Recognition of the inter-relationships and interdependency of social, economic and environmental issues;
- Decision-making based on science, in combination with local and traditional knowledge;
- Formation of partnerships among government agencies, Aboriginal governments and organizations, citizen groups and the private sector; and
- Involvement of local community and regional organizations in issue identification, monitoring, planning and management of activities.

To begin planning efforts, four broad issue areas were identified, which were considered important to health and sustainability of the northern ecosystem and its communities:

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[134] John McCullum. Personal Communication, December 6, 2000.

- Biodiversity
- Contaminants
- Climate change
- Impacts of major development

Work to date has been largely preparatory in nature, involving issue scans for the four issue areas. Within the "impacts of major development" category, the development of regional approaches to cumulative environmental effects management was recognized as an emerging need in Canada's North. This resulted in the establishment of the Cumulative Effects Management Framework project. Preliminary scoping within Environment Canada identified four regions of the North that may benefit from the development and implementation of a framework, including the Slave Geological Province.

Through the issue scans and consultation programs, priority issues will be identified by assessing the current state of research and knowledge, and identifying gaps that could be addressed by the NEI. Efforts will then focus on implementing actions to address those priorities, which could involve expanding current programs, or initiating new ones.

Like the WKSS, the NEI is intended to fill information gaps – it is not intended to be an umbrella organization or coordinating body. Due to a quirk in timing, the activities of the NEI have been largely overshadowed by the Regional Cumulative Effects Management Framework, described below.

6.1.2.3 Cumulative Effects Assessment and Management Framework

Since the BHP and Diavik environmental assessments, there has been greater recognition of the need to develop a clear framework to manage cumulative effects at a broader level. In consideration of this need, a working group was formed under the direction of the federal Department of Indian Affairs and Northern Development. The group has prepared a work plan for the development of a Cumulative Effects Assessment and Management Framework for the NWT.

The framework is intended to provide a systematic and coordinated approach to the assessment and management of cumulative effects in the NWT, reflecting the needs of various stakeholders. A number of preliminary objectives were established, which include:

- To provide all parties with a greater level of certainty about how potential cumulative effects of development will be considered in the planning of projects and activities in the NWT;
- Development of regional approaches to adaptive management that will complement those undertaken on a project-specific basis;
- Development of, and agreement on, regional environmental thresholds, carrying capacities, and acceptable levels of landscape change, in order to support decision-making and project planning efforts by governments, regulators, industry and communities;
- A coordinated approach to monitoring, assessment, and management of transboundary cumulative effects; and
- To fulfill the need identified by government agencies for a CEAM framework to support sound decision-making and adaptive management.[135]

The completed framework, together with an action plan for its implementation, is to be submitted by April 2001. As noted earlier, the group encountered significant difficulty securing funding, which has slowed the development phase of the framework.

6.2 Evaluation using sustainability-based criteria

Using the sustainability based criteria from Chapter one – integrated, comprehensive, participative and enforceable – the following sections will evaluate the strengths and weaknesses of the legislative, regulatory and multi-stakeholder approaches described above. This analysis will inform our understanding of what

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[135] Department of Indian Affairs and Northern Development. Cumulative Effects Assessment and Management Workshop:

progress has been made in the evolution of cumulative effects assessment, and where more attention is required to advance the state of the practice.

6.2.1 Integrated approach

An integrated approach to CEA suggests that CEA should be undertaken both at the project-specific level and on a regional planning basis, in order to develop a complete picture of the environmental effects of human activities. Furthermore, linkages need to be established between these processes, so that proactive measures can be taken to anticipate cumulative effects issues and to develop mechanisms to address them before issues become critical. CEA should also include an adaptive feedback mechanism, so that lessons learned can inform future decision-making in cumulative effects management.

Once implemented, the various components of the *Mackenzie Valley Resource Management Act* and the *Nunavut Land Claim Agreement* are intended to integrate several key elements of cumulative effects management. Environmental assessments conducted by the MVEIRB will need to be made in accordance with land use plans. As noted in Chapter 4, section 61 of the MVRMA states that "a board may not issue a licence, permit or authorization … except in accordance with an applicable land use plan". When an initial proposal does not comply, the project proponent will need to request an exemption or amendment, or revise the project plan until it is acceptable. The information generated from these exercises would be supplemented by data gathered through the MVCIMP. Similarly in Nunavut, section 12.3.4 of the NLCA states that "NIRB shall not screen project proposals that are not in conformity with land use plans, unless an exemption has been received under 11.5.11 or a variance has been approved under 11.5.10."

Heidi Klein, executive director of the MVEIRB, suggests that the structure of the MVRMA lends itself to cumulative effects assessment better than the *Canadian Environmental Assessment Act*, because it is based

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Workshop Report. Yellowknife: 1999.

on a model of integrated resource management.[136] In this model, information is integrated as well as processes, a system that would contribute to more informed decision-making that is based on information feedback and adaptive management. In addition, the MVRMA has a mandate to consider socio-economic and cultural issues, something that CEAA assessments did not need to address.

As research and information gathering tools, the WKSS and the NEI cannot be considered as having an integrated approach, based on the operational definition being used here. Although one of the goals of the WKSS is to better integrate western science and traditional knowledge, the studies are intended to fill existing information gaps, and are largely dependent upon the proposals it receives. The data collected are not integrated in any organized way, and so the information remains fragmented and disjointed.

The CEAMF has the potential to take an integrated approach, but its effectiveness will depend on the design of the framework itself. There is an expressed desire to avoid "reinventing the wheel", but there is also a recognized need to pull together the existing work under one umbrella, so that everyone is working with a common understanding toward the same goal. With that in mind, the working group responsible for designing the framework is composed of representatives from a range of organizations, which are also actively involved in other cumulative effects initiatives, such as the WKSS and the NEI. The challenge will be to coordinate the existing efforts without duplicating them.

To a large degree, the efforts of the CEAMF working group could be considered a form of CEA through strategic environmental assessment, to the extent that it addresses some environmental issues and impacts across a specific geographic region. However, in order to be considered a true SEA, the CEAMF would need to have a clearer focal point, such as a federal policy, plan or program related to northern development activity.

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[136] Heidi Klein, executive director, Mackenzie Valley Environmental Impact Review Board. Personal Communication, July 14, 2000. Yellowknife.

6.2.2 Comprehensive approach

A comprehensive approach to CEA suggests that the environment should be broadly defined to include physical attributes such as land, water, air and living organisms, as well as socio-economic and cultural attributes. Furthermore, CEA should be done on a regional level with a long-term view, and a broad range of activities should be considered. Spatial and temporal boundaries should be based on relevant ecological, socio-economic and cultural considerations, not jurisdictional ones.

The definition of 'environment' is the same under the *Mackenzie Valley Resource Management Act* as under the *Canadian Environmental Assessment Act*, and is subject to the same limitations. However, one of the guiding principles of the MVEIRB is the "protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley".[137] In addition, the definition of "impact on the environment" is more broadly defined, as "any effect on land, water, air or any other component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources."[138] Similarly, cumulative effect is defined by NIRB as "any effect which results from effects of a project when combined with those of other past, existing and future projects and activities."[139]

The land use planning provisions in the MVRMA and the NLCA also provide the land use planning boards with a mandate to address social, cultural and economic issues, through the inclusion of cultural and traditional land use areas and a vision for community development.

Through their legislative basis, the various components of the MVRMA and the NLCA are limited to the area within its jurisdiction. Although the MVRMA jurisdiction covers most of the NWT (except the Inuvialuit Settlement Area), the diamond region straddles the territorial border with Nunavut. While the territorial boundary may provide a suitable study area for most socio-economic issues, the ecological

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[137] *Mackenzie Valley Resource Management Act*, Section 115 (b).
[138] *Mackenzie Valley Resource Management Act*, Section 111.

boundaries will often not likely correspond. Although parallel efforts are taking place in Nunavut with respect to land use planning and environmental assessment, the fragmented responsibility in the diamond region will complicate an ecosystem approach to planning in the Slave Geological Province. This is arguably one of the key limitations to the ability of the MVRMA and NCLA to adequately address cumulative effects related to northern diamond development.

Like the MVRMA, the CEAMF is intended to apply only to the Northwest Territories. Although an observer from the Government of Nunavut participates in the Working Group, the framework is only intended to apply within the territorial limits. For certain types of development issues, such as oil and gas exploration in the Liard Valley, this may be appropriate. However, since the diamond region crosses the territorial boundary with Nunavut, much cooperation will need to take place between the territorial governments if cumulative effects issues are to be addressed on an ecosystem-based level.

In contrast, the study areas for the WKSS and the NEI were chosen specifically because of the development pressures being experienced in that region, and in each case the areas extend beyond political boundaries. This approach provides better opportunities to consider the full impact of development in the receiving environment.

The range of activities included in cumulative effects assessments done under the MVRMA could be constrained by the way cumulative effects are defined. As noted in Chapter four, the MVRMA says nothing about future projects, which strongly implies that an EA need only look at the impacts of a project in combination with other existing developments.[140]

In contrast to project-specific environmental assessment, the Mackenzie Valley Cumulative Impact Monitoring Program (MVCIMP) and land use planning provisions enable a long-term view of development activity in the Mackenzie Valley, in that the plans are reviewed in five-year intervals and should be updated

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[139] Nunavut Impact Review Board, http://aulak.polarnet.ca/nirb/whatnirb.htm.
[140] Heidi Klein, Executive Director, Mackenzie Valley Environmental Impact Review Board. Personal communication, March 1, 2000.

based on results from the monitoring program. These components are also able to consider a broad range of activities. Similarly, the nature of the NEI and CEAMF is to take a broader and longer-term view that project-specific analysis permits. The WKSS may achieve this in practice, but is less able to do this in a directed fashion because individual research proposals define its work. In the case of the multi-stakeholder initiatives, there is also more opportunity within their respective mandates to address socio-economic and cultural issues.

6.2.3 Enforceable

The consideration of cumulative effects and the needs of CEA must be legally binding and enforceable. Follow-up and monitoring programs must be undertaken to validate predictions and mitigation measures for cumulative effects, and means must be available to address instances of non-compliance.

Among the alternatives being considered here, only the components of the *Mackenzie Valley Resource Management Act* and the *Nunavut Land Claim Agreement* have a firm basis in law, in that both are federal legislation created pursuant to land claim agreements, which are constitutionally protected.

From an environmental assessment and regulatory perspective, enforcement can take place through conditions that are imposed on permits and licences, such as those issued by the various land and water boards. If the conditions are not met, the permit can be revoked or fines can be imposed.

However, it should be noted that resource issues continue to be a pressing concern, particularly in the realm of enforcement, because resources are already stretched for northern boards as they carry out their basic functions. Experience with the *Canadian Environmental Assessment Act* to date has highlighted several issues: "The difficulties experienced with follow-up programs in terms of inconsistent application, federal coordination and compliance monitoring appear to arise from a general lack of regulations, guidelines, standards or procedures regarding the design and implementation of follow-up programs."[141] In the context

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[141] Canadian Environmental Assessment Agency, Review of the *Canadian Environmental Assessment Act*: A Discussion Paper for

of the northern boards, similar problems will be near impossible to address without appropriate resources.

This gap may eventually be filled by the MVCIMP or the general monitoring program in Nunavut, which may provide data that can help evaluate the effectiveness of the integrated resource management model by evaluating what impacts have occurred from development. However, they do not address larger questions of compliance. In the absence of a workable enforcement mechanism, compliance will remain hard to ensure. As has happened elsewhere, the courts can be used as an enforcement mechanism, but this is impractical on an operational basis, particularly unless serious enforcers are present.

Enforcement can also take place through the integration of land use plans and environmental assessment. As noted earlier in this chapter, the land claims legislation in the Mackenzie Valley and Nunavut has created a system in which development proposals will have to comply with the land use plan before being considered by the impact review boards. The result should be a development proposal that is consistent with the community vision, even if that sometimes means no proposal at all. However, unless exemptions are the exception rather than the rule, the planning vision could be undermined by incremental exemptions.

The multi-stakeholder initiatives are voluntary partnership arrangements in which the level of participation varies, and from which groups can choose to withdraw. Although the participants have a vested interest in the success of these initiatives, recent experience in the Diavik process clearly demonstrated that stakeholders have limited resources, and do not always have the capacity to participate effectively in these initiatives. Without legislative support, these initiatives cannot be considered enforceable.

Arguably, the absence of a broad legislative mandate is an underlying problem for cumulative effects assessment in the North, because no single person or organization has the legislative mandate to assess and manage cumulative effects. Laura Johnston, Manager of the Northern Division of the Environmental Protection Branch at Environment Canada's Yellowknife office, notes that this could be one benefit of the framework, because its mandate is not bounded by or limited to one agency's mandate. However, she

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Public Consultation. Hull: 1999.

further observes that some people are uncomfortable with the notion of collective responsibility, and that it is sometimes easier when one person is in charge or has the big stick.[142] While the CEAMF (and the WKSS and NEI) may develop useful guidelines or policies to aid in the assessment and management of cumulative effects, there is no legal requirement that they be followed.

6.2.4 Participative

Stakeholders must be given meaningful opportunities to participate in all levels of CEA, including setting regional priorities and objectives. Where CEA is being undertaken on Aboriginal lands, consideration must be given to traditional land use and traditional ecological knowledge.

The *Mackenzie Valley Resource Management Act* contains legal requirements to include public consultation in the environmental assessment process. However, because the Mackenzie Valley Environmental Impact Review Board is a quasi-judicial board, its members stay arms-length from individual public contact. In practice, individual board members do not discuss things or meet with project proponents, government representatives, or other stakeholders. Anyone can request a meeting with the Board as a whole with respect to a project proposal, but the meeting will be with the full board, and will be open to anyone else who wishes to participate. According to Heidi Klein, executive director of the MVEIRB, this is necessary in order for the board to be perceived as fair and unbiased, and to be considered free from outside influences.[143] While this may be appropriate from an administrative law perspective, this approach could also be considered a barrier to communication, to the extent that open dialogue is very limited. In this sense, the Board may be seen as operating in isolation.

In contrast, the land use planning process and multi-stakeholder initiatives are designed to be highly participative processes. One of the fundamental objectives of land use planning is to develop a vision that

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[142] Laura Johnston, Manager, Northern Division, Environmental Protection Branch, Environment Canada. Personal communication. July 14, 2000, Yellowknife.

[143] Heidi Klein, executive director, Mackenzie Valley Environmental Impact Review Board. Personal Communication, July 14, 2000.

is based on community values. In the case of the West Kitikmeot land use plan in Nunavut, the plan was developed after extensive community consultation that spanned several years. Similarly, the Sahtu Land Use Planning Board has developed its plan in cooperation with communities, industries and other stakeholder groups. In addition, the MVCIMP working group is developing a community-based program, with representatives from various stakeholder organizations.

The multi-stakeholder initiatives operate on a consensus basis, where each member has a full and equal voice. John McCullum, study director for WKSS, believes that a significant factor in the successes of the WKSS is the fact that it operates on a "true partnership basis, where each partner has an equal voice."[144] The NEI and CEAMF are based on similar principles. However, consensus building can take a significant investment of time, which causes some unease for industry when considered in the context of individual project approvals, because they desire a more certain and predictable process.

The desire of organizations to work on a partnership basis has become increasingly important, particularly in the context of Aboriginal land claims and self-government negotiations. Consultation in the more conventional sense – in which government or project proponents present information, receive feedback, then make a decision – is becoming less acceptable. There is an emerging preference for shared decision-making and consensus building.

6.3 Implications for Sustainability

As previously discussed, CEA should be undertaken in the context of sustainable development, having equal regard for environmental factors in decision-making as for technical and economic considerations. Sustainability should entail looking for maximum benefits as well as minimization of damages and assurance of net gains. In practice, the contribution of cumulative effects assessment to sustainability has focused more on avoiding or mitigating potential adverse biophysical effects. Outside of the environmental

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Yellowknife.

assessment process, increasing attention is being paid to the importance of other instruments, such as impact-benefit agreements, to enhance social, economic and cultural benefits. However, these instruments would be better able to address socio-economic and cultural issues if they were integrated directly into the environmental assessment process, particularly if the environmental assessment had an enforceable decision at the end of the process.

Of the response options considered in this research, the components of the MVRMA and NLCA came closest to meeting the sustainability criteria set out in Chapter two.[145] When fully implemented, these components take an integrated approach to resource management over a broad region, and have a firm basis in law. Although this does not necessarily imply enforceability of results, it represents a more holistic approach to integrating cumulative effects considerations into environmental assessment and regional planning. The development of regional land use plans is a consultative process, in which affected communities play a direct and active role in identifying concerns and priorities.

In contrast to the project-specific EA approach described in Chapter five, the regimes created through the land claim agreements establish direct linkages between project-specific assessment and regional planning. The definitions of environment are broader, and a wider range of activities and effects is required to be considered. Stakeholders are more engaged in the process, and the process itself is based in legislation. In addition, the MVRMA and NLCA measure well against Kennett's components of a new EA paradigm: government leadership, regional focus, proactive approach, and linkages between EA and planning.

In spite of this progress, there are still a number of challenges and limitations. Our knowledge of northern ecosystems is still limited, and a great deal more baseline data is needed to inform decision making at both the regional planning and project assessment levels, and to enable the establishment of thresholds or indicators of carrying capacity. While land use plans may set objectives for land use, it remains unclear

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[144] John McCullum, Study Director, West Kitikmeot / Slave Study Society. Personal Communication, July 13, 2000. Yellowknife.
[145] This analysis is dependent upon viewing the components together as a whole. When viewed separately, each component is missing several key elements. This analysis also does not account for weighting of the factors.

how the necessary data will be collected, and to what degree the monitoring programs will contribute. As well, the potential of the MVRMA and NLCA is limited by jurisdiction, and will be challenged by resource and capacity issues. Consequently, further work is still urgently needed in order to appropriately address cumulative effects issues in the Slave Geological Province.

Nevertheless, each of the response options makes its own significant contribution to sustainability in the North, the importance of which should not be discounted. Sustainability is an ongoing pursuit that can only be achieved through collective effort, which is evident in each of the initiatives discussed. Nevertheless, the analysis presented here illustrates that none of them can singularly address the urgent need for a better framework within which cumulative effects issues can be managed.

6.4 Chapter Summary

The various response options for CEA in the Slave Geological Province have much potential to begin addressing the broader issue of cumulative effects management. They demonstrate substantive progress toward the sustainability-based criteria, compared to the project-specific approach described in Chapter five. The legislative changes that introduced the MVRMA and the NLCA have brought decision-making to the people in the North, and have tried to address some of the gaps that existed under CEAA. The multi-stakeholder initiatives offer a level of participation that is difficult to build into a legislative process, and have more flexibility to address socio-economic and cultural issues.

Despite their relative strengths, there are still deficiencies inherent in these mechanisms. The legislative response options are limited by jurisdictional boundaries that are not compatible with an ecosystem approach to cumulative effects management. The legislation is also constrained by narrow definitions, such as the CEAA definition of environmental effect, which does not account for direct socio-economic or cultural effects, and the MVRMA definition of cumulative effects, which can limit the scope of what can be considered. Although the multi-stakeholder initiatives try to address these issues, they are constrained by lack of enforcement measures and weaknesses in integration. Finally, all of the response options are faced

with capacity issues, a problem that in the long term can undermine any progress that is made.

The response are complicated by the changing political environment in the North. Although the challenges associated with cumulative effects assessment under the *Canadian Environmental Assessment Act* are well documented, there are new public bodies that have only recently taken responsibility for environmental assessment in various parts of the North. It is too early to tell whether the challenges will be the same, or how successful these initiatives will be. Similarly, it takes time to build lasting partnerships that can achieve long-term objectives in resource management. At the same time, there is a sense that something must be done quickly, before the cumulative impact of development in the region significantly alters the northern landscape.

7. Conclusions and Recommendations

Using sustainable development as a theoretical framework, this thesis explored issues associated with the cumulative effects assessment in the Slave Geological Province. These issues are reviewed below to demonstrate how this research contributes to the development of a framework for addressing cumulative effects in the Slave Geological Province, and how the lessons learned from the case study can be extrapolated for broader application.

Key themes are also examined in the context of how outstanding issues can be resolved. Three broad possibilities are explored: the status quo, whereby the current initiatives for addressing cumulative effects issues are allowed to run their course; policy options, whereby policy-based strategies like strategic environmental assessment are used to address outstanding issues; and legislative changes, whereby specific legislative amendments could be used to enhance existing CEA tools. Lastly, a preferred option is selected, which identifies recommendations for future activities and research.

7.1 Summary

Although the subject of cumulative effects has received increasing attention in the literature, our understanding of cumulative effects assessment as it is applied in the North is still modest. In developing a set of sustainability-based criteria and applying it to a specific case study, this research has used the well-documented principles of environmental assessment to advance our understanding of cumulative effects assessment. These criteria can be practically applied in the development of a framework to assess and management cumulative effects in the Slave Geological Province and elsewhere. As noted in Chapter one, since no completed CEA framework is currently in place in the Canadian North, such a contribution is particularly relevant. Although the criteria do not encompass everything that is required in the practice of good cumulative effects assessment, they represent a solid starting point that is founded on the principles of sustainable development. Given that the practice of CEA is still evolving, this is considered an acceptable limitation.

The four criteria – integrated, comprehensive, enforceable and participative – were derived from the literature to guide this research. Several researchers, including Sadler and Gibson, have contributed to the development of principles and criteria for environmental assessment, which were easily adapted for the practice of CEA. The criteria represent a synthesis of key themes that emerged from the many overlapping principles that are described in the literature.

Sustainability was established as the theoretical basis for these criteria, as well as the underpinning of this research. As noted in Chapter two, the World Commission on Environment and Development defined sustainable development as the "ability to meet the needs of the present generation without compromising the ability of future generations to meet their own needs."[146] This discourse was selected for this research partly because sustainable development has been adopted as an underlying principle for much of the environmental assessment legislation that governs the North, but also because sustainability provides a framework for integrating environmental considerations into the decision-making process. More importantly, sustainable development is perhaps the only path that will allow continued economic and industrial development while protecting the integrity of northern ecosystems and communities, even if the pursuit of sustainable development in the North is often at odds with prevailing societal norms.

In recent years, northerners have become increasingly concerned with the cumulative effects of development on communities and ecosystems. Cumulative effects refer to the accumulation of change in environmental systems in an additive or interactive manner. The practice of cumulative effects assessment can make a potentially significant contribution to sustainability. In keeping with the principles of the ecosystem approach, it represents a more holistic approach to environmental assessment by offering a more complete and true picture of the real impacts of development. However, the current practice of cumulative effects assessment focuses almost exclusively on biophysical impacts, rather than socio-economic effects. In the context of sustainability, this is a fundamental weakness that needs to be addressed.

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[146] World Commission on Environment and Development, *Our Common Future*. New York: 1987.

The pace of diamond activity in the North illustrates the need for more sustainable growth. Diamond exploration and mine development in the Slave Geological Province since the initial discovery of diamonds is moving forward with remarkable speed. Several companies are actively working to develop major findings in the region, which illustrates the potential for cumulative environmental effects. While many northerners welcome opportunities for economic growth, there is also substantial concern about the environmental effects of development, and a great deal of dissatisfaction with the way in which the federal environmental assessment process has addressed these issues to date. Similarly, the political and economic context in the Canadian north illustrates the competing pressures facing northern residents, such as the need for environmental protection and economic development. As illustrated in Chapters three and five, northerners have expressed significant dissatisfaction with the way in which cumulative effects issues were addressed in both the BHP and Diavik environmental reviews.

Until recently, the *Canadian Environmental Assessment Act* was the primary tool for assessing cumulative environmental effects in the North. However, with the passage of the *Mackenzie Valley Resource Management Act*, and the implementation of the *Nunavut Land Claim Agreement*, the responsibility for cumulative effects has shifted to the North. At the same time, concerns about the cumulative effects of development, which emerged regularly in reviews under the Federal Environmental Assessment Review Process Guidelines Order, prompted amendments to the federal EA regime, which included a legislative requirement to assess cumulative effects.

The legislative requirement in CEAA, which was largely echoed in the *Mackenzie Valley Resource Management Act* and the *Nunavut Land Claim Agreement*, was created in response to growing concern about the cumulative impact of human activities on the environment. Although there are now legislative requirements to assess cumulative effects, further guidance is needed on how to effectively assess biophysical, as well as socio-economic and cultural effects. Indeed, litigation of environmental issues under CEAA illustrates that responsible authorities are not required to adopt a broad approach to scoping cumulative effects.

The new environmental assessment regimes in the North have taken a different approach to cumulative effects than that taken under *CEAA* by making explicit linkages between environmental assessment and land use planning. Once fully implemented, these linkages should assist project proponents and decision-makers by establishing land use priorities, which should help control the impact of multiple developments. In part, these actions have been taken in direct response to the challenges being faced under *CEAA*, but are also intended as a means to bring decision-making directly to the North, in order to address unique development issues in the North.

Although methods for the assessment of cumulative environmental effects are becoming better documented, one of the key limitations to high quality cumulative effects assessment is the lack of experience, compared to the expertise that has been developed in conventional environmental assessment over the past three decades.

Four key approaches to CEA were identified and evaluated in the literature:

- CEA within EA conceived narrowly at the project level;
- CEA within EA conceived more broadly as planning at the project level, including mandatory consideration of need and alternatives;
- CEA as part of strategic EA, in which EA is applied beyond the project level to plans, programs and policies; and
- CEA as part of land use planning, in which specific rules are established for approval of projects within the plan area.

In the Slave Geological Province, CEA experience is largely limited to individual project assessment, as seen through the BHP and Diavik environmental assessments. The limitations of this approach, as observed in the literature, are consistent with these recent experiences. Environmental assessments, particularly those under CEAA, are generally triggered after a decision has been made to undertake a development activity. Boundaries are characterized by local and short-term scales, which are usually defined by project or

jurisdictional perimeters. As such, EA tends to neglect additive and synergistic effects. In this regard, failure to integrate social, cultural, and environmental factors in decision-making was identified as a key limitation. The application of the sustainability-based criteria to these two project experiences suggests that, when used in isolation, project-specific CEA is an inadequate tool for the pursuit of sustainable development.

Although one of the purposes of environmental assessment under CEAA is to "integrate environmental factors into planning and decision-making processes in a manner that promotes sustainable development", the contribution of project-specific CEA to sustainability is arguably weak because project specific reviews do not tend to give full consideration to the range of activities that influence one another in a given ecosystem. The analysis in Chapter five demonstrated that project-specific CEA under federal EA legislation is not integrated with regional or land use planning, and is not as comprehensive as it could or should be. In particular, the definition of "environment" is biased towards physical components, to the exclusion of important social and cultural attributes that are critical to the pursuit of sustainable development. Similarly, although the experiences to date have provided extensive opportunities for public consultation, they are not true participative processes in which affected communities play a role in decision-making.

Although project-specific CEA is based in law, gray areas remain in terms of conditions and commitments that are made outside the EA process. This in particular points to the need to develop legally binding mechanisms, either within or outside of conventional EA processes, to address cumulative effects issues. This could be achieved through an amendment to CEAA and other such laws to include an enforceable decision.

Nevertheless, the cumulative effects assessments done as part of the BHP and Diavik reviews have made important contributions to advancing the debate about CEA. In each case, the public profile of the project meant that the review process was open to a great deal of scrutiny. Although the two assessments were conducted under different regimes, and also as different types of assessments, the BHP process had a

profound influence on stakeholders' expectations in the Diavik review. In the absence of definitive guidance on how CEA should be done, the work done in the diamond region has at least advanced the debate, and has arguably raised the expectations of what CEA should address. Moreover, the CEA studies themselves will contribute to a better understanding of the ecosystems and communities in the Slave Geological Province.

The various response options for CEA in the Slave Geological Province include legislative and regulatory tools, such as the *Mackenzie Valley Resource Management Act* and the *Nunavut Land Claim Agreement*, as well as a series of multi-stakeholder initiatives focused on cumulative effects issues. Each of these mechanisms has much potential to address the broader issue of cumulative effects management.

The components of the MVRMA and the NLCA, which include environmental assessment, land use planning and monitoring programs, come closest to meeting the sustainability criteria for CEA, presuming that all of the components will eventually be implemented. The legislative changes that introduced these pieces of legislation have brought decision-making to the people of the North, and have tried to address some of the gaps that existed under CEAA. When fully implemented, if done effectively, the components will take an integrated approach to resource management over a broad region, and have a firm basis in law. The development of regional land use plans and monitoring programs are consultative processes, in which affected communities play a direct and active role in identifying concerns and priorities. In addition, the MVRMA and NLCA measure well against Kennett's components of a new EA paradigm: government leadership, regional focus, proactive approach, and linkages between EA and planning. The missing component is the establishment of thresholds. While land use plans may set objectives for land use, it is not clear whether the monitoring programs will provide the necessary data to develop thresholds or indicators of carrying capacity. As well, there needs to be a more formal link between impact benefit agreements and the environmental assessment process. Finally, the potential of the MVRMA and NLCA is limited by jurisdiction, and will be challenged by resource and capacity issues.

The goal of cumulative effects assessment to contribute to sustainability is rarely realized in practice

because it focuses on biophysical factors, such as avoiding or mitigating potential adverse biophysical effects, rather than socio-economic or cultural considerations. Outside of the environmental assessment process, increasing attention is being paid to the importance of other instruments, such as impact-benefit agreements, to enhance social, economic and cultural benefits. As well, the multi-stakeholder initiatives also make their own contributions to CEA and sustainability by offering a level of participation that is difficult to build into a legislative process. The utility of these mechanisms should not be understated. However, this research highlights the general problem of effectively integrating cumulative effects assessment into regional planning efforts and project-specific environmental assessments. There is still a pressing need to ensure that appropriate mechanisms are in place to adequately address cumulative environmental effects, in order to protect northern communities and ecosystems.

7.2 Recommendations

Based on the analysis presented in this research, several courses of action can be taken to address cumulative effects assessment issues in the Slave Geological Province: status quo, whereby the current initiatives for addressing cumulative effects issues are allowed to run their course; policy options, whereby policy-based strategies like strategic environmental assessment and adaptive management are used to address outstanding issues; and legislative changes, whereby specific legislative amendments could be used to enhance existing CEA tools.

7.2.1 Status quo

In this case, the status quo implies doing nothing more than what would ordinarily have been done in the absence of these recommendations. As described in Chapter 6, a variety of tools are currently being used to address cumulative effects issues in the Slave Geological Province, including legislative and regulatory provisions, as well as a series of multi-stakeholder initiatives.

The status quo could be considered a viable response option because the new legislative and regulatory

tools have not had ample time to develop. The components of the *Mackenzie Valley Resource Management Act* and the *Nunavut Land Claim Agreement* have not been fully implemented, and the system of integrated resource management envisioned under this legislation will take some years to be realized. Arguably, because this legislation was designed to bring decision-making to the North, opportunity must be provided for it to fulfill its mandate. Moreover, the work being proposed under the various multi-stakeholder initiatives may fill many of the gaps that are still perceived to exist in the Slave Geological Province.

The analysis provided in Chapter six suggests that the current legislative tools could develop into a strategy that is, to varying degrees, integrated, comprehensive, participative and enforceable, presuming that all of the components are eventually fully implemented. For this option to be viable, it would be imperative that adequate resources be allocated to each component.

In addition, the relative lack of experience in cumulative effects assessment was identified as a key limitation. With time, we can hope that the state of the practice will evolve and the methodologies will be refined, in the same way that conventional impact assessment techniques have improved since the early 1970s. As well, our standards and expectations will likely increase.

Nonetheless, the existing legislative structure is not an entirely adequate response to the cumulative effects pressures. As noted in Chapter six, fragmented responsibility will continue to complicate an ecosystem approach to cumulative effects assessment in the Slave Geological Province, and it is unlikely that voluntary initiatives will fill all of the remaining gaps. In addition, the current definitions of environment, environmental effect, cumulative effect and the consideration of alternatives are still weighted toward economic considerations. Until full and equal consideration is given to social, cultural and environmental issues, sustainability will remain elusive. Although the new regimes in the North should be considered an improvement, tolerating the shortcomings is unreasonable, in the overall context of sustainability.

7.2.2 Policy options

As a supplement to existing efforts, consideration could be given to various policy responses to outstanding

cumulative effects issues, such as jurisdictional boundaries and inter-jurisdictional cooperation. As noted in Chapter five, strategic environmental assessment could be used to investigate broader issues of regional development. This approach would be particularly useful where no land use plans are currently under development, such as parts of the Mackenzie Valley not covered by the Gwich'in or Sahtu land claim agreements. An SEA could be approached from a variety of perspectives, including a sectoral environmental assessment of proposed infrastructure improvements; a sectoral environmental assessment of proposed mining activities in the Slave Geological Province; or a regional assessment of all proposed or potential activities within the Slave Geological Province or some other ecologically based boundary. Such work could be undertaken by through cooperation among a range of government departments with resource management mandates in the North, including the federal and territorial governments and northern resource management boards.

As noted in Chapter five, Sadler suggests that SEA is better suited to the time and space scales associated with the cumulative impacts of development. SEA can also examine different types of activities, including small projects and non-project activities that are often not subject to an environmental assessment at all. Furthermore, SEA is better suited to address value-based conflicts that often pervade project-specific assessments, such as whether industrial development in the Arctic is necessary or desirable in the first place. In this regard, SEA could facilitate the consideration of broad alternatives to a specific policy problem. Such an assessment may also overcome some of the shortcomings of land use planning, such as fragmentation of responsibilities among various agencies and the lack of authority to deal with large-scale cumulative effects issues, if affected agencies and stakeholders entered into an SEA on a cooperative basis. In addition, SEA may be the only option that addresses the jurisdictional conflict with an ecosystem-based approach to cumulative effects. As discussed in Chapter six, the Cumulative Effects Assessment and Management Framework is similar to this approach, but does not have the specific focus that an SEA might.

An SEA approach to outstanding cumulative effects issues could enhance comprehensiveness, by adopting a broader view of environmental effects, and addressing a wider range of activities. It could also contribute

to the integration of information, by providing data that could be used in project-specific environmental assessments and ongoing land use planning exercises. Finally, SEA can also provide significant opportunities for public involvement.

More comprehensive guidance from environmental assessment boards and agencies on how to fulfill existing legislative responsibilities would also contribute to more sustainable CEA. Although documents like the *Cumulative Effects Assessment Practitioner's Guide* and the *Operational Policy Statement on Addressing Cumulative Effects Under the Canadian Environmental Assessment Act* do not have the force of law, the courts have used similar material to inform their decisions. Candidate subjects for further guidance are virtually unlimited, but could include setting boundaries, selecting future projects and activities, or follow-up and adaptive management. Such guidance would promote consistency in approach, and provide some clarity for project proponents and EA practitioners.

A policy-based approach would still suffer the limitation of not being legally-binding or enforceable, and it would be challenging to integrate the results of an SEA into the broader EA and planning regime without a legislative basis. However, since legislative change is often difficult to initiate, a policy-based approach based on existing federal policy options, such as the 1999 Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals, could be considered a viable interim step toward a more lasting solution.

7.2.3 Legislative changes

Some of the shortcomings in CEA could be addressed through changes or additions to environmental assessment legislation. This can be approached on various levels: either through minor or more substantive changes to existing legislation, or through the introduction of new legislative tools. Even minor amendments could address some gaps in the current scheme, and are worthy of consideration. However, in order to substantially improve the contribution of CEA to sustainability, a more aggressive approach would be required.

To begin, neither the *Canadian Environmental Assessment Act* nor the *Mackenzie Valley Resource Management Act* defines "cumulative effect" or "cumulative effects assessment". Several viable definitions are already used in practice; giving them the force of legislation would provide greater clarity to project proponents and EA practitioners. Indeed, the definition set out in the *Nunavut Land Claim Agreement* is very comprehensive. Similarly, a clear definition of "future projects and activities" that encompasses an appropriate range of activities would enhance the quality of CEA, as it relates to the sustainability based criteria used here. The working definition provided in the *Cumulative Effects Assessment Practitioner's Guide* could be used as a base. In addition, the definition of "environmental effect" under the *Canadian Environmental Assessment Act* should also be broadened to encompass social, economic and cultural considerations. The definition of "impact on the environment" in the *Mackenzie Valley Resource Management Act* could be considered as an example.

Environmental assessment decisions also need to have enforceable terms and conditions in their own right, such as monitoring and mitigation, rather than relying on regulators to include such terms and conditions in the permitting process. This could be achieved through the introduction of an environmental assessment authorization, which would be issued at the end of a project-specific EA. This would also address the need for an enforceable decision at the end of the environmental assessment process, as indicated in Chapter five.

More broadly, the context for assessing cumulative environmental effects needs to move away from the focus on acceptability and whether a specific development is likely to cause "significant adverse effects", as with the *Canadian Environmental Assessment Act*. Instead, EA and CEA should require net sustainability gains, which would be achieved by avoiding or minimizing all adverse impacts (not just significant ones) and enhancing the existing socio-economic, cultural and physical environment. This could also include a formal requirement for developing impact-benefit agreements with local communities, which could be integrated into the EA decision.

Consideration could also be given to legislating a requirement for strategic environmental assessment. Under the 1999 Cabinet Directive on the Environmental Assessment of Policy, Plan and Program

Proposals, an SEA is required only when a "proposal is submitted to an individual Minister or Cabinet for approval, and implementation of the proposal may result in important environmental effects."[147] Establishing these provisions in law would elicit the same benefits as if done on a policy level, but would have the force of law. However, further study would be needed in terms of how such legislation would be applied, (e.g. to what jurisdictions, for what types of policies, plans or programs, and under what circumstances), and how the information generated from this process would be integrated into the environmental assessment and planning processes.

One of the primary drawbacks of the legislative change option is the amount of time it takes for such change to happen. The federal government began extensive consultations on reforming the Environmental Assessment Review Process Guidelines Order in 1987. In 1990, the federal environment minister announced a reform package that included the current *Canadian Environmental Assessment Act*. The Act received royal assent in 1992, and was proclaimed in 1995. The entire process took close to eight years. A legislative requirement to review the Act after five years (i.e. the year 2000) informally began in 1998, and is not yet complete. The land claims based EA regimes in the North took even longer. Arguably, the northern environment requires a more expeditious response, given that the development pressures continue to increase.

7.2.4 Preferred option

Given the development pressures in the diamond region of the Slave Geological Province, and the limitations of the various alternative options, it is challenging to determine which option would most appropriately suit the sustainable development path. I would suggest that there is value that can be drawn from each of the approaches outlined above (status quo, policy options and legislative options), which could be developed into a phased move toward a more holistic approach.

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[147] Canadian Environmental Assessment Agency, The 1999 Cabinet Directive of the Environmental Assessment of Policy, Plan and Program Proposals. Hull: 1999.

The new legislation and regulatory tools in the Slave Geological Province should be given time to fulfill their mandates. With the appropriate resources and capacity, these new regimes will have a significant opportunity to fill many of the gaps that were identified in Chapter five. However, further action is necessary in order to fill the gaps that will remain.

In the near term, it is not appropriate to presume that experience will lead to better cumulative effects assessment. More and better guidance is needed to help project proponents, regulatory authorities and other stakeholders fulfill their responsibilities for cumulative effects assessment. This guidance must be consistent in approach, but flexible enough to adapt to various environmental and project-specific considerations. In addition, better use should be made of existing policy tools such as strategic environmental assessment, in order to address the jurisdictional barriers to holistic CEA in the Slave Geological Province.

In the medium term, changes need to be made to our existing environmental assessment legislation, in order to strengthen the requirements for the CEA, and to broaden the range of effects that are considered. At minimum, this should include provisions for an enforceable decision at the end of the environmental assessment process, a legislated requirement for strategic environmental assessment, and inclusion of impact benefit agreements within the EA and CEA framework.

For the longer term, we need to work towards refining and formalizing the requirement for broadly based regional assessments, and reorienting environmental protection policy in a sustainable direction that gives equal consideration to environmental, socio-economic and cultural issues, and requires net sustainability gains. Arguably, this would necessitate a complete paradigm shift, which will take a significant amount of time to achieve. For that reason, this tiered process to a more holistic approach to cumulative effects assessment is a reasonable to begin making positive gains towards sustainability.

7.3 Implications of the Case Study

This research also set out to investigate what lessons can be extracted from the case study for broader

application. As noted in Chapter one, many of the challenges inherent in cumulative effects assessment are not unique to the North. CEA is an evolving practice across the country and around the world. The lessons learned from the CEA experience in the Slave Geological Province can generally inform the practice of CEA at the project level, as well as to guide the development of broader environmental management strategies, such as land use planning and regional assessments.

As Canadians, we need to pay closer attention to the pace and scale of development across the country if we want to pursue sustainable development. While the North provides a conspicuous example of the effects of development because the impacts are often easier to see, one does not need to travel north of 60° to find such evidence. Cumulative environmental change can and does happen across the country, and increasing numbers of people are becoming concerned about the effects of this change. The policy-based options and legislative changes suggested above are equally applicable across Canada, where it is just as important to better integrate environmental, social and cultural factors into decision-making.

In particular, the case study illustrated that project-specific environmental assessment is not a sufficient mechanism to address cumulative environmental effects, and that a more holistic approach is necessary in order to move toward more sustainable development. In addition, the case study demonstrated that integrating project-specific environmental assessment with land use planning and monitoring initiatives is potentially suitable model.

The sustainability-based criteria developed here can be adopted for other case studies, to identify strengths and weaknesses, and to develop case specific recommendations for a more holistic approach to integrating cumulative effects considerations into environmental assessment and regional planning.

7.4 Conclusion

The analysis provided here demonstrates that although several mechanisms are currently in place to assess cumulative environmental effects, no single initiative fully meets each of the four criteria that were identified as necessary for cumulative effects assessment to make a meaningful contribution to

sustainability. However, existing tools can be used and supplemented to identify appropriate response options. The sustainability based criteria developed here can contribute to further research on cumulative effects assessment and sustainability.

That being said, several issues were identified at the outset of this thesis about the compatibility between diamond development and ecosystem protection in the Slave Geological Province: can the North have the caribou and the diamonds? Can it have mining without compromising the integrity of the northern environment? Will the cumulative impacts of development compromise the ability of northern ecosystems to adapt to change? Can mining make a contribution to the longer-term health and sustainability of northern communities?

In the introductory chapter, I suggested that the answer to these questions is partly based on an analysis of the cumulative effects of development. If such an assessment is founded on the criteria established in this research, the likelihood is much greater that the caribou can co-exist with the diamond industry, and that the integrity of northern ecosystems can be maintained. In this context, I would further suggest that mining could indeed make a contribution to the longer-term health and sustainability of northern communities by, provided that all stakeholders are willing engage the type of discussion and work that is essential to do so.

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Alison Armstrong, Dene Nation.

Brenda Kusyk, Diavik Diamond Mines Inc.

Brenda Parlee, Lutsel K'e Dene First Nation

Carey Ogilivie, Environment Canada

Elaine McIvor, Department of Indian Affairs and Northern Development

Heidi Klein, Mackenzie Valley Environmental Impact Review Board

John McCullum, West Kitikmeot Slave Study Society

Jon Pierce, (formerly) Nunavut Impact Review Board

Julie Prystupa, Government of the Northwest Territories.

Kevin O'Reilly, Canadian Arctic Resource Committee

Laura Johnston, Environment Canada