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Northern Transitions

Northern Resource
and
Land Use Policy Study



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Northern Transitions

Volume I

Northern Resource
and
Land Use Policy Study

Edited by Everett B. Peterson
Janet B. Wright



Canadian Arctic Resources Committee
46 Elgin Street, Room 11
Ottawa, Ontario
K1P 5K6

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Northern Transitions

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**Volume I: Northern Resource and
Land Use Policy Study**

**Volume II: Second National Workshop on
People, Resources, and the Environment
North of 60°
20-22 February 1978
Edmonton, Alberta**

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To Douglas Pimlott

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Preface

CARC's Northern Resource and Land Use Policy Study was begun in 1975. It culminated in the Second National Workshop on People, Resources, and the Environment North of 60°, held in Edmonton on 20-22 February 1978. Volume I of *Northern Transitions* contains the results of the study: case histories of major projects in the Canadian North, and an extended analysis of methods for prediction of resource use conflicts in the North. Volume II of *Northern Transitions* contains proceedings of the Second National Workshop.

There is a definitive connection between the Northern Resource and Land Use Policy Study and the Second National Workshop. The Study provides a series of background papers on northern resource policies and programmes, legislative processes, and the development of political and social institutions in the North. At a meeting of the principal Study researchers, held in May 1977, the results of the preceding two years were analyzed and the basic approach to the Workshop was developed. The Workshop was intended to provide an integrative focus for the work which the Study had accomplished. Moreover, in broader terms, it was to provide a forum for the discussion of current issues and the future of the people, the resources, and the environment of the North.

Introduction

A turning point for the Canadian Arctic Resources Committee was reached in 1974. Until then CARC had only reacted to government and industry proposals, but beginning in 1974 there was an attempt to focus on developments in advance of the specific proposal stage and to consider alternative courses of action whenever possible. We had already promoted hearing procedures including the establishment of the Mackenzie Valley Pipeline Inquiry. The prospect of active involvement in the Inquiry led us to develop the study described in this volume. One of CARC's founding objectives had been to promote holistic approaches to northern development. This was a nice sentiment in 1971, but its practical significance meant very little. The pipeline issue and the Northern Resource and Land Use Policy Study provided the chance to test a wide range of new ideas.

We should have been more careful with the title of our project, called it an experiment, not a study. "Policy" and "land use" were much too pretentious, nor was more research required. The problem was not lack of insight but what to do with it. The way to promote is not to make recommendations but to show in practice how it's done. In ancient Athens those who advocated war usually took to the field. "It concentrates the mind wonderfully," is how it was put in a different context.

The Land Use Study first set out to document and analyze past resource decisions that had influenced northern development. A second phase identified situations in which serious resource use conflicts were likely to occur in the future and how to avoid them. The third phase recommended new approaches for land use planning and resource policy. This final stage ended with a national workshop designed to synthesize the various elements of the study. The completed work is now published in the two volumes of *Northern Transitions*. Volume I contains the first two phases of the study — the case studies dealing with specific resource projects and the work on prediction of land use conflicts. Volume II contains the results of phase three — the studies on

northern decision-making, as well as the background papers for the workshop and the recommendations that came out of the workshop.

The publication speaks for itself; but the more important accomplishment lies in the field. Those involved in the Land Use Study were involved in the issues. *Oil Under the Ice* was not a retrospective work; it was the work of people active in the day-to-day issues associated with offshore drilling. Understanding was one objective, but uppermost was the attempt to open up the issue.

What have these studies shown us and how do they relate to present-day events? In Volume II, Lucas and Peterson emphasize that the location in which scientific effort is focused is influenced by the events in the public eye at a particular time. One year it is the Mackenzie Valley; next the Beaufort Sea; then the southern Yukon. Not surprisingly, an *ad hoc* approach to resource development leads to *ad hoc* research.

The work by Dickinson sets out to prove that useful ecological documentation and defensible predictions about potential land use conflicts can be assembled for areas that are not yet the subject of imminent development. She stresses the need to document northern habitats for their own inherent characteristics and not simply in relation to some impending project. Her assembly of ecological information for three specific areas in the North shows that systematic documentation of northern ecological systems will be at least as productive for the prediction and avoidance of resource use conflicts as the present *ad hoc* approach to northern science.

It is difficult to make sound decisions about resource use, development, or research itself without the broad understanding of physical and biological processes that results from systematic documentation of the ecology of an area. Howell's study of the Peace-Athabasca Delta region testifies to a considerable amount of misdirected effort because of a lack of understanding about the workings of the delta ecosystem. The conventional wisdom was that "As Lake Athabasca goes, so goes the delta"; therefore, much of the work centred around an analysis of water levels on Lake Athabasca. In reality, high water caused by temporary ice jams on the Peace River is the main mechanism that restores water levels to the delta — a mechanism that has nothing to do with water levels in Lake Athabasca or with control structures built as a result of the Peace-Athabasca project studies.

Admittedly, the analyses contained in this volume can be quickly superseded by new developments. Not all the case

studies were completed at the same time. MacLeod's analysis of the Dempster Highway examined the consequences of 1978 events. In contrast, the work by Dickinson examined events up to mid-1977; in places such as the Baker Lake region, many things have happened since then.

The summary paper by the Couchiching Study Group was also dependent on the perspective prevalent at the time of its preparation in June 1977. That paper is not simply a summary of the case histories. Its intent was to develop a consensus of the overall setting in which the various development projects took place. Although the Couchiching summary draws upon many examples from the case histories researched by CARC and by the Science Council of Canada, it also goes beyond the case histories themselves by focusing on the broader arena in which resource decisions are made.

It is for the reader to judge what lessons can be taken from the selected case histories. They have common characteristics; for example, in none of the projects did local people initiate or request the project in question. All the projects were imposed by southerners as part of corporate strategies or in response to government policy.

Starting with the confused and contradictory world of northern policy, the intellectual task was to articulate coherence. In practice the real issue had to be posed in institutional terms. Developments of the size of James Bay and the Mackenzie Valley Pipeline heralded a new era of dominance by a few large entities, with an insistence on centralized decision-making bordering on the pathological. The more concentrated the power, the less likely that alternative courses of action would be considered. The subject of monopoly is well understood; the question remains what to do about it. What CARC could do was relative to that time and place.

Both government and industry had used scale and complexity as a tool of exclusion. Debate on northern issues was confined to experts, while information, always difficult to come by, was couched in technical jargon. To focus on specific issues in such a climate was foolhardy; hence our concern with open and fair hearing procedures.

The difficulty of getting information has not been exclusively Ottawa's fault. For example, the author of the Pine Point study visited the mine site in 1975 and was informed that company information would be released only if Cominco were granted editorial approval of the manuscript. Instead, Macpherson chose to use information from government files, the company's open library in Vancouver, and other publicly available information — while acknowledging gaps in the data. After Cominco received a

copy of the final draft in the spring of 1978, the company arranged a meeting between the author and some of the officials originally responsible for bringing the mine into production. Cominco produced information which had previously been unavailable to the author, and provided the company's perspective about the mining development. As a result of the meeting, a substantial portion of the paper was rewritten. The paper had been improved, but the process by which access to the material was gained raises important questions.

Whether policy is right or wrong is often less important than its application. To test application one has to participate in a process where the proponents of a project are called to account. Yet there was hostility to the Berger Inquiry, often showing a remoteness from our political tradition, as though it were an insult to have to account for a policy or programme.

Why call people to account? One reason is that with the best of intentions people have sometimes done things that later caused harm — DDT, for example. Well-meaning or not, when people have it their way too long, the first Rachel Carson who comes by gets vilified. A comparable example from the Mackenzie Valley Pipeline Inquiry occurred with the testimony by a professor from Carleton University; he too was vilified when he dared bring up the question of frost heave. The engineering consultants for Arctic Gas in sworn testimony denied any frost heave problem, theoretical or practical. Their case eventually collapsed, but had there been no Inquiry they would never have been challenged and untold millions might have been spent on a technology that didn't work.

Predicting technological impact is difficult because often there is no indication of adverse consequences until the impact reaches a certain level. The harmful effects of DDT became evident only after years of build-up in the ecosystem. "Destruction of the environment by insignificant increments" is a phrase used by McTaggart Cowan. Break a large project into small units and often you find that each component, looked at individually, is not serious. A procedure that examines cumulative impact is concerned with the total development over the long term. CARC's study tried to emphasize procedures that could achieve a long-term view of the issues through recognition of cumulative impacts.

The economic and political assumptions that mould policy have changed over the twenty-year period covered by the case studies. For example, the W.A.C. Bennett Dam was built when social and environmental concerns were subordinated to fast economic growth. But in the case of oil drilling

in the Beaufort Sea, the new policy criteria that have emerged make the leap from Diefenbaker's "Northern Vision" of the fifties to the issues of the seventies and eighties as dramatic as any that has confronted a single generation of Canadians. What was once a seamless web today has many seams, and future historians will have more difficulty untangling today's resource policy decisions than those in Bennett's day.

The awareness of environmental, cultural, and social values in the late sixties not only made for confusing policy but also created a moral climate conducive to shallow judgment and easy injunction. Reproof and prescription appear too often in the analysis of northern issues, including these analyses by CARC. The Berger Inquiry, however innovative, has left some bitter residues. In spite of pleas for interdisciplinary understanding and holistic vision, better ways of making decisions about northern development still seem a long way off.

A teacher of mine used to say that whenever there is a suspension of sympathy, we leave history. Suspension of sympathy, I suspect, is equally damaging to other disciplines. Collingwood criticized Hume and Voltaire for failing to understand the Middle Ages. "The real cause," he said, "was that with their narrow conception of reason they had no sympathy for, and therefore no insights into the non-rational periods of human history." Sympathy is a precursor to understanding most things, and whether there is enough around to build on the new insights remains to be seen.

Throughout Volume I and Volume II of *Northern Transitions*, one hears the call for statutory back-up. Make policy statements into legislation and we can hold governments accountable. Civil servants are distrusted as well as governments, sometimes unfairly; for the underlying cause of the mistrust is often the failure of Parliament to provide policy and scrutiny. Government may also be the developer. The conflict of interest inherent in being both developer and adjudicator of its own actions, particularly where review procedures such as the Environmental Assessment and Review Process are entirely at Cabinet discretion, is bound to lead to cynicism.

CARC may have overlooked one avenue which, however nebulous, is ultimately important. No doubt some solutions will be advanced by legislative back-up, but discretionary procedures, based on trust, are needed in governing. That trust has gone and the question is how to restore it. Legislative back-up is not a sufficient answer. Nebulous it may be, but until we have the exemplary action

of individuals acting within the public domain, all the calls to codify laws in stone will not provide the solution.

Both volumes of this study document failures in policy formulation and project assessment; both contain ample suggestions for reform. I submit, however, that we have been somewhat glib. To consider alternative policy requires seeing it in relation to other policies. The injunction to move beyond the particular to a more comprehensive perspective requires more than a simple exercise of will; and I think we have underestimated the obstacles to wholeness.

In the Land Use Study contained in this volume, we show what happens in the absence of a long-term viewpoint. In 1975 CARC presented “corridor” evidence to the Mackenzie Valley Pipeline Inquiry, urging that the Alaska Highway be immediately studied as a preferable route for the northern gas pipeline. We were patted on the heads, barely tolerated for being so impractical. Two years later, when the federal government abandoned the Mackenzie Valley in favour of the Alaska Highway route, we asked some serious questions: Why, during the years of study of the Mackenzie Valley route, had they screened out data respecting alternative routes, and why did their policy lack elements which might have prepared them in advance for such contingencies? Volumes I and II contain some answers to those questions, but they do not give us any guarantees that the same mistakes won’t be made again. To be honest, we have a lot of trial and error ahead.

Commoner’s first law is a bit unnerving: “Everything is connected to everything else.” In an age when variables are identified and understood, it may be a good rule of thumb, but how good is it when you haven’t named all the players and while others play by different rules? Throughout recent debate about the North, all sides have called for broad approaches: ecologists have been urged to respect law, lawyers have been asked to learn science, southerners have been asked to sympathize with northerners. One exasperated engineer asked Berger, “What are interdisciplinary studies anyway? Is it when two people go on a trip together?”

The emphasis for decades has been on specialization. To tell experts halfway through 1975 to form a holistic view is unrealistic. The analogy of the ecological system in which all components interact is theoretically fine, but practically it’s very intimidating. Freeboot Commoner’s law into politics and you’re liable to end up like Dostoevski’s underground man; the need to explore every nuance can render the individual unfit for action or incapable of making any decision.

Nor is it a simple matter of deciding the relevance of

various types of evidence; we must also know when to arrest the inquiry at a level appropriate to specific needs, or to enlarge it to meet broader challenges. What isn’t appreciated by many of those advocating the broad approach in science is that Berger acted upon it in making his report, *Northern Frontier, Northern Homeland*. So did CARC in the Land Use Study. Neither of us provides all the answers, but at least we are addressing the right questions. If Berger is guilty of transgressing government guidelines by enlarging the scope of his inquiry, then he earns himself a variation on the Rugby School plaque commemorating William Webb Ellis, “who with a fine disregard for the rules of Rugby football as played in his time, first picked up the ball and ran with it, thus creating the modern rugby game.”

If we accept spaceship earth with its re-discovered connections, what are the practical implications? Our universities are turning out experts rather than generalists. The awesome task of forming an overview is never confronted. When Nietzsche said that the “concept of greatness” should be determined “by the amount and variety that an individual could carry within himself, by the distance his responsibility could span,” this is no mere aspiration. The amount of diversity that individuals can carry may determine whether we remain a self-governing people or whether we turn it over to the experts. In a way, many of those involved in the Mackenzie Valley Pipeline Inquiry were testing the practical implications of Nietzsche’s ideal. If Berger had not broken out of the narrow confines and picked up the ball and run, the experts would still be posing theoretical questions.

Relative to time and place, the Northern Resource and Land Use Policy Study clearly defined many of the impediments to the diversity of mind and institutions. The challenge of the eighties is positive — How do we provide the climate in which these characteristics can flourish? The main obstacle to diversity is the growing lack of independence. If Canada continues to concentrate on industrial projects of large scale and complexity, the disturbing phenomena that happened in the early seventies with James Bay and with proposals for a Mackenzie Valley Pipeline can still occur. The most striking characteristic of that landscape was the absence of independent opinion. One noticed it in the universities as many scientists lost their independence in return for research grants. That wasn’t the only place. Large industrial developments had spawned a type of person dependent on executive power. The petroleum industry, not far behind, bought people on a scale unheard of in peace

time. Institutions started to own men in the same way they owned the furniture.

In 1972 an incident took place that was important to CARC's future. The Canadian Institute for Guided Ground Transport at Queen's University had just completed a study on the transportation of hydrocarbons from the Mackenzie Delta to southern markets. Because Transport Canada partly funded it, they claimed the right to censor it. They went a step further and laid down another ominous rule to the universities. Anything to do with policy, they said, was to be considered "off limits" to everyone but the government. The director of the Institute refused to comply, and Transport Canada threatened to take the Institute to court. The director went to the principal of Queen's, John Deutsch, and asked his advice. The principal replied, "Let them take you to court and I promise you the backing of this office."

CARC's support of research programmes that allow informed reflection about the North independent of particular projects and interests is a new development that provides one of our best hopes for imaginative resource use policies. In the first six years of its life, CARC has provided an outlet for ideas that all too rarely appear in professional journals, government publications, or consultants' reports. The work by Dickinson is an example of what is possible with independent sources of research funds. If each northern settlement had available a review of this kind for the resources around the settlement, many of the misunderstandings that arise between developers, government officials, and local residents might be avoided.

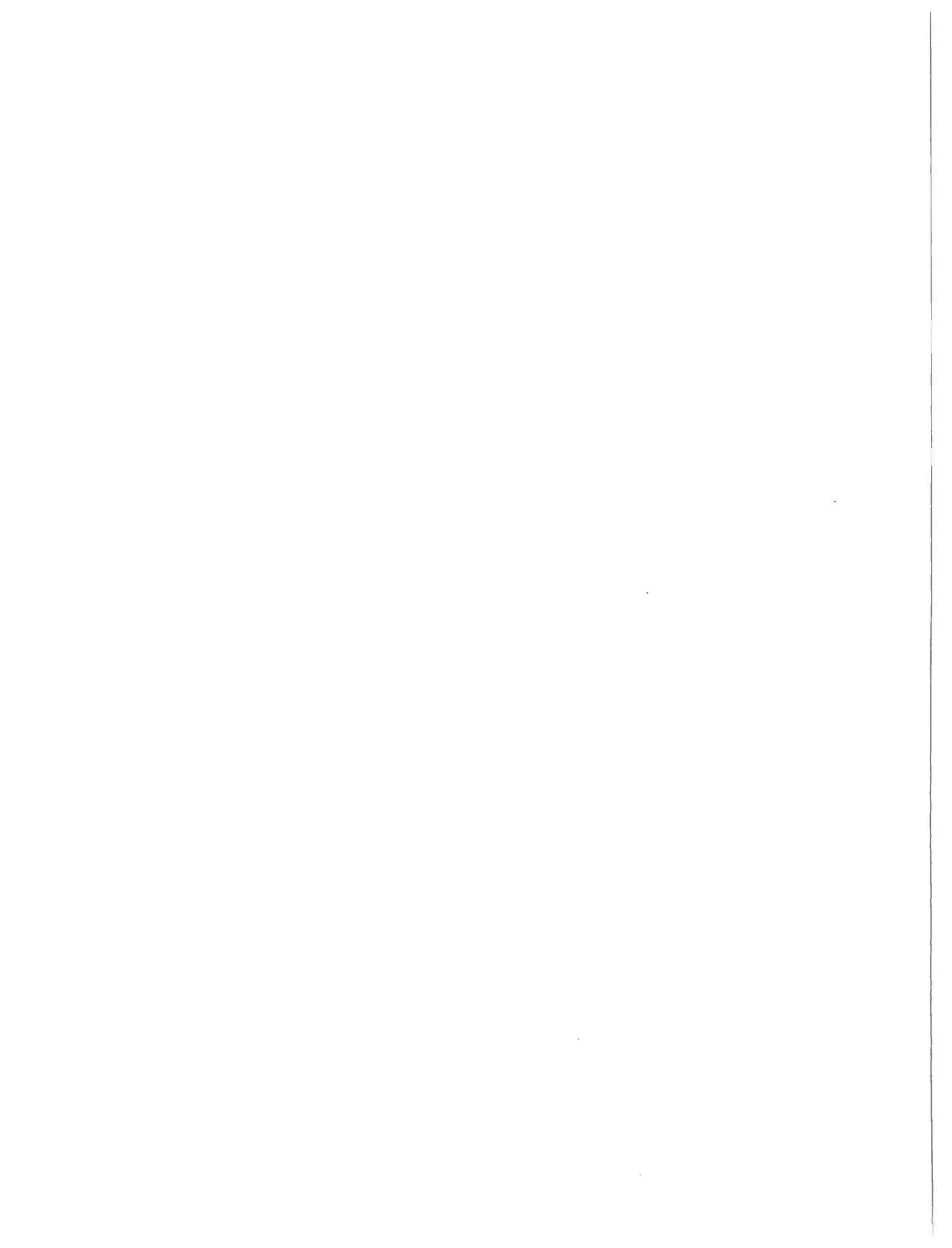
Although Canada has a rich vocabulary to describe the role of the citizen and the value of independence, circumstances today have made it difficult to locate oneself in this tradition. When I say that the value of the Land Use Study lies in the field, I mean that, apart from the stated objectives and finished product, there has been an attempt to find the mainstream of this tradition.

In most cases policy research is conducted at arm's length from events. If a study contains recommendations, follow-up is usually not addressed or, if it is, takes the form of another recommendation. Ignoring the practical aspects of implementing results is less important than failing to recognize that follow-up contains a moral dimension. Sidney Hook referred to it when he said, "All of us assumed too easily that the achievements of intellectual conviction carried with it the moral courage to act upon it. Unfortunately this has not been the case, especially in recent years." The Eastern Arctic Marine Environmental Study, dealing with

the impact of offshore exploration in Davis Strait, did not come about because of studies and recommendations. It came about because Douglas Pimlott left his university and went to Inuvik, where he plunged into a morass of intergovernmental manoeuvrings, knowing that however limited his knowledge, he had to take a stand. All the recommendations on offshore drilling don't equal the exemplary action of one man.

A final word about Douglas Pimlott, to whom these volumes are dedicated. One evening in 1971 after a long meeting on James Bay, many felt it was a hopeless fight and should be broken off. Pimlott disagreed. "Fight it anyway," he said, "even though you lose. We can learn from James Bay and when we go on to the next round we can make a difference." That's how I remember the man. What distinguished him from his peer group was that for the most part they didn't believe individual action counted for much. Pimlott did. High on my list is not his scientific output, teaching, or conservation work; for me the great contribution was his belief that Canada was about people who could make a difference. Without that belief, CARC would never have gotten off the ground, and the North would be a different place today.

Kitson M. Vincent
December 1978





Phase I Case Histories
of Decisions for
Major Northern Projects

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Janet Macpherson

Janet Macpherson

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B.C. Hydro & Power Authority

Analysis



William MacLeod

Analysis

Couchiching Study Group *

I Introduction

From the rapid and massive technological assault on the Canadian North in recent years has come a growing concern for the quality of human existence and the maintenance of a safe and productive environment. Among the many responses to these concerns have been attempts to enhance our understanding of the issues critical to both human and environmental systems. The issues are numerous and complex. Adding to the complexity is an increasing appreciation of the need to take a holistic approach; yet it seems to be overwhelmingly difficult to consider more than one industrial or public works project at a time. We are faced with unprecedented environmental, social, economic, technological, and political concerns, but beyond these are problems which arise from the very way in which northern development is proceeding. There are important questions about who conceives and initiates actions, who bears the consequences, what perceptions and motives lie behind the actions, what strategies prevail, and what policy orientations (or lack of them) direct the course of events. In short, how do currently dominant ideologies and the present means of decision-making shape the direction, pace, and scale of northern development?

Such questions prompted the Canadian Arctic Resources Committee to examine the nature of decision-making about northern development through a number of case studies of selected projects in the Canadian North. In addition to its own case studies, CARC has drawn upon the recent work of the Science Council of Canada, whose studies

* This analysis resulted from a CARC workshop held at Lake Couchiching, Ontario in May 1977. Participants at the workshop, referred to here as the Couchiching Study Group, were: Lew Auerbach, Mara Feeney, Robert Gibson, James Howell, Robbie Keith, Alastair Lucas, William MacLeod, Jan Macpherson, Everett Peterson, Douglas Pimlott, William Rees, Einar Skinnarland, Kit Vincent, and Janet Wright. This paper, the product of three days of discussions, does not necessarily represent the views of all members of the group in all respects.

of northern development also focused on project decision-making. Beyond the understanding gained from these studies is the need to encourage all those involved in directing the development process to become more aware of and more sensitive to the issues of today and tomorrow.

This analysis is based on case studies of the following projects:

- 1 Beaufort Sea petroleum exploration
- 2 Dempster Highway
- 3 James Bay hydro-electric project
- 4 Mackenzie Delta and Arctic Islands petroleum exploration
- 5 Portage Mountain hydro-electric project (Bennett Dam)
- 6 Pine Point mine
- 7 Cyprus Anvil mine
- 8 Strathcona Sound – Nanisivik mine
- 9 Labrador offshore petroleum exploration
- 10 Alberta oil sands development
- 11 Kluane National Park

The case studies span the Canadian North. The resources in question include minerals, water, oil, gas, and indeed the entire northern biosphere. The projects cover the period from the 1950s to the present. Federal, provincial, territorial, and local government jurisdictions are involved. The scale of projects ranges from moderately large to unprecedentedly massive, and they involve not only industry in its traditional development role but also government as a developer. These factors taken together provide a rich and varied basis upon which to draw comparisons and insights and to make predictions regarding similar development programmes in the future. Several of the case studies are published in this volume and others are documented elsewhere.¹

The case studies point to fundamental and underlying issues which have their origins in the nature of institutional structures in Canada. By virtue of their focus on large-scale, capital intensive projects, the case studies do not directly allow assessment of alternative development approaches. A more balanced analysis of opportunities would include a consideration of alternative futures in which such concepts as cultural and ecological compatibility, self-reliance, and self-regulating systems would be focal elements. The preoccupation of decision-makers with large-scale resource development has obscured the need to raise fundamental questions about a sense of overall purpose and direction for human and environmental systems. Such concepts as “appropriate technology” and “eco-development” suggest that

there is no inherent incompatibility between environmental protection and development. Rather, with a focus on the interests of local people, on the capability of communities to find their own solutions to problems, and on the “symbiotic” relationship of man and nature, development that proceeded in a more holistic framework could give long-term benefits not offered by current practices.

The present course of northern development points out the narrow perspective of those who guide that development. In contrast, Mr Justice Berger has argued that there be a period of time in which to develop ways of thinking and doing which have their roots in the North itself, and which reflect the notions of self-reliance, self-regulation, and man-nature symbiosis.

What do we hope to conclude from this analysis? Each of the studies focused upon the decision-making processes surrounding the projects, and from this focus we hope to indicate what must be involved in an “ideal” project assessment process – the characteristics that ensure adequate and timely consideration of issues and opportunities. Based on these characteristics, the objective is to identify the shortcomings of decision-making about northern development as it is presently practised. The shortcomings lead to suggestions for improving project assessments. The hope is that insights gained from the case studies will point out present deficiencies as well as ways of dealing more adequately with the problems of development. An additional intent of this analysis of the case studies is to shift attention to the wider array of needs and opportunities involved with northern development, and which have implications not just for the lifestyles and resources of the North but for all of Canada.

II Criteria for Resource-use Decisions and Project Assessment

The goal of the case histories in CARC’s Northern Resource and Land Use Policy Study was to review the decision-making mechanisms for northern resource development as they have operated historically. Implicit in this process was the notion of a yardstick against which to measure the decision-making apparatus and the quality of its judgments. Unfortunately, our present adversarial model of decision-making virtually compels each of the major “actors” involved in resource development to advance a separate standard, one narrowly defined by his own self-interest.

What criteria then can CARC apply in its own evaluation of the resource decision-making system? Falling back on

the basic principles of the democratic state that Canada claims to be, it was concluded that issues of national significance should be subject to widespread public debate in the formulation of relevant policy. For this debate to have meaning, a number of conditions must exist:

- 1 The public must be fully informed and, with the media, have unhindered access to existing information on issues being considered;
- 2 The policy formulation process should require policy-makers to identify and assess alternative policy positions, rather than only one particular view;
- 3 The policy positions under consideration should take into account the medium- and longer-term future, rather than only the present and short-range future, and assessment of the alternative policies should also consider, as fully as possible, the various consequences over time;
- 4 An adequate consideration of alternative policy positions also requires that a given policy area such as northern development be seen in relation to other policy fields. The political, economic, environmental, social, and technological interdependencies among policy fields should be the object of systematic assessment;
- 5 The development of policy should clearly reflect a sense of purpose and a clear set of goals. Moreover, recognition should be given simultaneously to local, regional, and national goals so that local and regional perspectives can be accorded their due significance.

We believe that these decision-making requirements are democratic and reasonable and are consistent with the attitudes and aspirations of most Canadians. If we accept anything less as our goal, actual achievement will fall shamefully short of the mark. We do not expect that any project will fully satisfy all criteria; nor do we believe that all risk and uncertainty can be eliminated from a given project. We are convinced, however, that society is best served when the forces that direct its development operate openly and fairly. The following criteria reflect this view:

- 1 Major resource development projects should conform to, or be in response to, policies that have been developed openly through a process that includes debate. Such stated policy would provide a framework in which to assess the goals and objectives of the proposed development in the context of public objectives. Many projects are now proposed in a relative policy vacuum and are therefore more difficult to evaluate. For example, policy development in such a critical area as energy has been

woefully inadequate. When this occurs, it is essential that the proposal be assessed in a framework that considers its full implications, including the foreclosure of options which may prove relevant in future policy debate. The rejection of a development proposal under circumstances of high risk and uncertainty should be considered as one realistic option. Such a rejection may be more a reflection of the immaturity of the policy development and decision-making system than the quality of the proposal.

- 2 Whenever possible, a project should represent the "best choice" alternative to satisfy the objectives of public policy. For example, if coal-fired thermal generating facilities have been determined to represent the optimal solution to satisfy short-term increases in electrical demand, a proposal to construct a nuclear generating facility would deserve particular scrutiny. Public policies should be seen by entrepreneurs as guidelines for proposals that are likely to be accepted. At the same time, policy and decision-making should be responsive to new conditions, technological innovation, and social change.
- 3 All major development proposals must involve a detailed assessment of the potential social, economic, and ecological impact of the project, based on a review of past experience under similar conditions and an analysis of project-specific factors. This analysis should take into account both short- and long-term costs and benefits, including synergistic and cumulative impacts. Special emphasis should be placed on the identification of unavoidable and irreversible impacts, mechanisms required to lessen these, and the assessment of fair compensation to those adversely affected should the project be approved.
- 4 Assessment procedures should require effective participation by all affected individuals and groups, and should permit participation by other interested organizations. For this criterion to be fulfilled, it is necessary that there be:
 - (a) full and convenient access to relevant information for all participants;
 - (b) the provision of sufficient time and resources for disadvantaged groups to conduct independent research and prepare both their own positions and responses to the proponents' arguments;
 - (c) independent forums in which evidence can be received and evaluated in a way that allows all potential participants to contribute freely, frankly, and without intimidation;
 - (d) a public information programme.

- 5 Each decision expressing approval or rejection of a resource development proposal should be made by accountable decision-makers (politicians), and should be accompanied by a rationale that explains the basis of the decision. In the case of approvals, the explanation should:
 - (a) specify the conditions and terms for the compensation of individuals or groups adversely affected by the project;
 - (b) define methods to monitor the performance of the project against its own explicit objectives, and to enforce the terms and conditions of the approvals agreement;
 - (c) include provisions for review of the project.
- 6 Any resource decision-making framework, including project assessment procedures, should incorporate explicitly the option of abandoning any project, should environmental or socio-economic conditions significantly change or if new evidence supports such a decision.

These six project assessment criteria are the basis upon which the various case studies have been compared and contrasted. The remainder of this assessment is a discussion of the major issues involved in decision-making about northern projects, as practised to date.

III Analysis of Case Studies

While diverse in many respects, the case studies reveal several common themes that arise again and again in the process of northern development in Canada. At the level of specific projects the issues are numerous and diverse, but fundamental issues inherent in the processes of policy and project decision-making are clearly evident. For the purposes of the present paper, six basic issue areas are discussed with reference to the various case studies:

- 1 Policy
- 2 Conflicts of interest
- 3 Information gathering for social and environmental research and assessment procedures
- 4 Disclosure of information and public participation
- 5 Legislative and regulatory issues
- 6 Native peoples' interests

Policy

The case studies that form the basis of CARC's Northern Resource and Land Use Policy Study span the time period from the early 1950s to the present. With our increased knowledge and evolving concerns about the North, one

would expect to see changes in resource development policies during this period. In fact, some changes in stated policies have occurred.² Certain changes represent increased but not always successful attempts to mitigate the harmful effects of projects. However, no substantial shift in basic policy orientation is apparent even in recent development projects. Furthermore, policy shifts are not always reflected in new practices in the field. In his analysis of northern development policy, K.J. Rea has noted that

*... changes represent a marked increase in public relative to private decision-making power in the resource development field. The experience of the 1960s suggests that this has made little difference in the scale, timing and type of development in northern Canada.*³

The "Northern Vision," articulated in the 1950s by John Diefenbaker at the federal level and W.A.C. Bennett in British Columbia, was exemplified by the "Roads to Resources" programme and was predicated on the assumption that economic growth was an unquestionable good and that large-scale resource extraction in the North was desirable for Canada. Emphasis was laid on the frontier nature of Canada and the pioneering character of its people, with all the attendant attitudes of man's dominion over nature as a measure of the progress of civilization.

This vision of the North has remained relatively intact through the period covered by these case studies. Certainly the emphasis upon non-renewable resources as the hope for the future of the North is still there. However, greater involvement of northern residents in the planning of their own future, a nation-wide awareness of the aspirations of northern native people, and well-publicized accounts of environmental concerns in the North are tending to give the old northern vision new dimensions.

In analyzing northern development policy, it is useful to distinguish between economic growth and economic development. As Rea suggests, economic growth refers

to an increase in the productive capacity of the economy of a region or community as measured, for example, by changes in the real value of goods or services produced in it

and economic development refers to

*a change in structure of an economy, particularly a change in the direction of less reliance on primary extractive activities . . . and more on secondary manufacturing and processing for employment and income in the area.*⁴

This distinction should be kept in mind, without any implications that economic development, as defined by Rea, is necessarily more desirable for the North than is mere economic growth. For example, changing the economic structure of a native society can be as disruptive as changes that flow from developments linked with economic growth.

The case studies clearly reveal an unswerving emphasis on what is referred to above as economic growth. The major criteria used for evaluating these projects were economic in the narrowest sense, since little effort was made to acknowledge or identify anything but the direct costs and benefits associated with the project. In some cases, projects were allowed to proceed despite unfavourable economics, since they were regarded as necessary to provide an infrastructure and appropriate climate for future resource development. The Dempster Highway, one of the “roads to resources,” is a typical example of a road in search of resources. The Pine Point mine, brought into production in 1964, is a telling example of government provision of infrastructure, subsidies, and tax concessions to a project that would likely have proceeded in any case. In his analysis of development projects, some of which were “northern,” Philip Mathias convincingly demonstrates the tendency of governments to pursue growth rather than development policies, the benefits of which are less than anticipated and the costs (to governments) much greater than either expected or desired.⁵

The published Science Council case studies and the CARC case studies contained in this volume indicate that northern development programmes have tended to extract energy and resources from the North for southern use and leave the North to bear the social and environmental costs. Throughout the course of northern development, there has always been a tendency to overestimate and exaggerate the goals and benefits expected to flow from development. Instead of sustained and diversified economic development and projects that are appropriate to northern aspirations and lifestyles, past and present policies have brought cyclical boom-and-bust growth which has, along with other forces, eroded self-reliance and increased the dependence of natives on southern society.

All of the case studies document instances of insensitivity to northerners and the North. This is exemplified particularly by centralized decision-making, remote from the people bearing the impacts, which has been a feature of all the projects reviewed. Though new forces are emerging, particularly in the form of native peoples’ organizations,

“outside control is unlikely to disappear in the foreseeable future.”⁶

In March 1972 a new federal northern policy statement was made public. Northern priorities were stated to be social, environmental, and economic, in that order. Despite this re-ordering, developments characterized by short project life, little involvement of native people, or temporary assimilation of natives into the wage economy to the detriment of traditional lifestyles have continued to be the norm. The Science Council study of petroleum development in the Mackenzie Delta region and Arctic Islands is particularly critical of the Department of Indian Affairs and Northern Development in this regard.⁷ Instead of the post-1972 policy and priorities being operative, large-scale and rapidly paced projects with merely token environmental constraints have been seen by DIAND as a means of lifting the North out of its social and economic malaise. The Strathcona Sound (Nanisivik) mine project is also an example of the government’s priorities. No environmental data were gathered in advance of the decision to proceed with that mine, and “consultation” with local native people was largely a public relations exercise.

There has been little, if any, effort to promote ongoing debate of policies affecting the North. There has also been a profound lack of internal consistency in stated policy objectives, actual goals, and the policies and programmes that have been implemented. The application of southern attitudes towards the “frontier” has precluded development of a northern economy in harmony with existing culture, native aspirations, and the goals of regional self-sufficiency, self-determination, and environmental compatibility.

Conflicts of Interest

Conflicts of interest arise as a significant issue in several of the case studies. Most serious are those situations where assessment and regulation of a project are undertaken or directed by those who are at the same time proposing or promoting it. The many aspects of each of the projects reviewed (environmental, social, economic, technological, and political) are often inherently conflicting. Ideally one would hope for a broadly representative and balanced forum in which such conflicts could be resolved. In practice, the case studies demonstrate that such decisions are frequently taken by organizations or agencies with relatively narrow perspectives or strong orientations to certain economic and technical priorities.

The Beaufort Sea drilling programme, Kluane National Park, the Nanisivik mine, and the Mackenzie

Delta-Arctic Islands case studies all demonstrate various forms of conflict of interest in the Department of Indian Affairs and Northern Development. While having responsibility for and control of native peoples' affairs and other social and environmental matters, the department is also a resource regulator and developer.

It is realistic to expect that there will always be conflicting objectives and interests associated with any project, but a conflict of interest exists when one party is responsible for both the regulation and the promotion of a given project. In the case of the Nanisivik mine, the federal government had eighteen percent equity participation and appointed two members to the Board of Directors. After the development agreement was signed, a conflict of interest arose when the mining company failed to meet all of the conditions of its water-use licence but was not penalized.

Though DIAND admits that such conflicts of interest exist, the department contends that the conflicts are resolved. What is at issue, however, is whether DIAND, which clearly favours encouragement of northern resource extraction interests, is the best arbiter for such decisions or whether some other process should be sought in which a wider array of interests is brought to bear.

Events involving the National Energy Board have pointed to other examples of conflict of interest. The barring of former NEB chairman, Marshall Crowe, from serving on the Mackenzie Valley Pipeline hearing board exemplifies the problem of close relations between the regulator and the regulated. In addition, conflicts of interest have arisen from the NEB's dual role as an advisor to government on energy development and as a quasi-judicial body required to take all relevant matters into consideration in its judgments of applications.

Crown corporations also suffer from the possibility of conflict of interest. When a Crown corporation undertakes a project promoted by its government, it is conceivable that the regulatory process may be compromised. At the very least, governments seem disinclined to seek social and environmental information which may adversely affect the implementation of the project. In the case of James Bay, the Quebec government did not begin to assemble baseline environmental information until after the project had been approved. Similarly, when native claims threatened to delay the project, Quebec took steps to reach a settlement on a time schedule which would ensure that it proceeded. In this case, it was the government and not the Crown corporation, Hydro Québec, which decided *a priori* that the project was desirable.

Information Gathering for Social and Environmental Research and Assessment Procedures

Over the two decades spanned by the case studies (1955-75), some improvement in both the scope and conduct of project assessments can be noted. In particular, recognition that significant social and environmental consequences require attention has led to a much greater emphasis on these factors. For example, while environmental or social concerns have been at the heart of the recent debate concerning the Mackenzie Valley Pipeline, the Nanisivik mine, and the James Bay project, in the case of the earlier Portage Mountain hydro-electric project and the Pine Point mine such factors were almost entirely ignored. National and regional economic issues have also assumed greater importance as the scale of projects and pace of implementation have increased. In response to this change, the public sector has adopted a much more central role in project assessment and implementation.

In spite of these improvements, however, the case studies show glaring weaknesses in information and research processes. Even in the more recent cases, efforts to collect information needed to assess the socio-economic effects or implications of proposed projects have been inadequate. In both social and environmental areas, the collection of data has been hampered by the acceptance of perceived time limitations. In addition, rational assessment of social, economic, and environmental aspects of projects has often been hindered by the need to rely on data provided by proponents of the projects. The development history of the Pine Point mine provides examples of circumstances in which the case was prejudiced in favour of the mining company because the federal government lacked independent sources of data by which to form its own decisions.

More recently, and undoubtedly as a result of criticism of such procedures, there have been several attempts by project participants to become more independent with respect to information gathering. The federal government's Mackenzie Valley Pipeline studies had this as one of their objectives. Industry's environmental and social research, while largely undertaken to meet regulatory requirements, has the advantage of giving them an independent data base from which to assess the claims of others. In addition, those opposed to projects are finding research support from governments and various independent foundations to develop their own information base. One unfortunate result of these changes, however, has been a degree of duplication which is costly and has meant other foregone research opportunities.

In the 1970s there have been obvious attempts by the

government to be seen to be taking social and environmental effects into account. These new initiatives are praiseworthy, even though the resulting information base still falls short of good baseline data. A further problem is that the information which the government did collect has seldom been considered in the basic decision-making process. In the early cases, research and assessment efforts were either initiated after serious negative effects became evident, as in the case of the Portage Mountain project on the Peace River, or were not undertaken at all, as with the Pine Point and Cyprus Anvil mines. In fact, the case studies lead to the conclusion that potential social or environmental effects have rarely been thoroughly considered prior to decisions to undertake projects in the North.

Two of the most recent projects — the Nanisivik mine and offshore drilling in the Beaufort Sea — demonstrate this point in relation to environmental concerns. In the case of the Nanisivik mine, social effects were also a major consideration because government officials promoted the project on the basis that it would provide wage employment for local native people. The goal of assimilating native people into the wage economy, regardless of its advantages or disadvantages, involves a considered intention to cause social changes by approval of new development projects.

If social or environmental studies are initiated before project start-up, the timing of such studies is important. For example, collection of basic social and environmental information required for assessment of the Beaufort drilling programme only began after the federal government had granted “approval-in-principle” to the proponents. Similarly, collection of social and environmental information relevant to the Nanisivik mining project was not attempted until after the signing of the development agreement. Approval-in-principle, a currently common procedure, is essentially approval on the basis of inadequate information.

The case studies indicate that information gathered is normally not intended to question the desirability of the project, but rather to show how best to proceed with it. The terms of reference of the Mackenzie Valley Pipeline Inquiry attest to this problem. That Mr Justice Berger chose to interpret his terms of reference more broadly than the government wished is to his credit. It is also noteworthy that intervenors at both the Mackenzie Valley and Alaska Highway pipeline inquiries gathered and presented information that was designed to question the fundamental desirability of the proposed pipeline projects.

Disclosure of Information and Public Participation

The case histories conducted by CARC were based on the premise that in a democracy people have the right as well as the duty to be well-informed about affairs of the nation, to make these views known, and to call their leaders to account. The system breaks down if information is not readily available, if opportunities to present a variety of viewpoints are not provided, and if decisions are kept secret. All of these weaknesses in public disclosure and public participation have been associated with decision-making for northern resource development.

Examined in the light of the criteria for ideal assessments outlined in the introductory section of this analysis, the case studies demonstrate the inadequacies of existing information and public participation programmes. Indeed, the record for effective consultation in the northern resource development projects studied has been an appalling one. The prerequisites for satisfactory public contribution to decision-making are:

- 1 Access to full information
- 2 Resources for independent research
- 3 Public information programmes
- 4 Adequate time for assessment of and response to information
- 5 Consultation with those most directly affected by the project
- 6 Opportunity for all interested or affected to participate
- 7 Participation and consultation before decisions are made
- 8 Opportunity to identify, examine, and debate fundamental issues, policy implications, and alternative proposals
- 9 Access to decision-makers

With only a few qualifications, none of the cases examined included the essential features of an ideal public participation process. The qualifications involve recognition that in some cases one or two of the prerequisites may have been dealt with, but only in a partial fashion, and that their value is negated when other vital issues have been ignored. Examples of this partial approach were the community information programme associated with Beaufort Sea drilling and the community meetings held at Arctic Bay by proponents of the Nanisivik mine. In the former case, the meetings involved presentation of information by government and industry, followed by question-and-answer periods, “but no public participation in the sense that the people involved might possibly influence decisions.”⁸ The entire programme was characterized by biased

reporting, failure to report many facts which might cause concern about the project, restricted availability of important reports, and the circulation of reports which were incomprehensible to native people and to the public generally. In the latter case, “the Arctic Bay Inuit, as potential employees, were courted in a public relations manner and were given some information about the project. But they were excluded from the decision-making power.”⁹

Admittedly, in some cases, such as the Pine Point mine and the Dempster Highway, resource development decisions were made prior to a northern development policy which required consultation with northern people. But even the more recent cases — such as the Nanisivik mine, James Bay, and the Beaufort Sea drilling programme — show a discouraging failure to improve significantly the record of public information and participation. Although government and industry have become more aware of the importance of informing interested parties and of attempting to involve them in planning, their efforts in this area continue to be inadequate. Superficial consultation is ineffective and merely insulting to those involved.

In northern development, many of the problems commonly associated with public participation are more acute than they would be in southern Canada. For example, access to decision-makers, qualified resource people, and information may be universal problems, but in the North they are made worse by greater distances, complex decision-making hierarchies, and language barriers. Furthermore, native people who may be seriously affected by resource development decisions have only very recently begun organizing to lobby for their interests. Often the opportunities available for public participation are foreign to native traditions, and are insensitive to unique features of northern lifestyles. The credibility of the Mackenzie Valley Pipeline Inquiry, especially among native northerners, was due largely to Mr Justice Berger’s sensitivity to native culture and his insistence on community hearings that were conducted at a pace and schedule acceptable to local people.

A further issue complicating the process of public participation is that in the case of non-renewable or energy resources, which lie outside the present jurisdiction of the territorial governments, most matters are dealt with by regulation. A result is that even the opportunity for debate in Parliament is limited. The Northern Inland Waters Act is the only case where a statute of Parliament calls for hearings to be held in the territories, prior to the issuance of a water licence. However, the Northern Inland Waters Act, as applied in the Yukon, only requires hearings after a site has

been chosen. As a result, social or environmental studies conducted for such hearings are too late to be of critical importance. As W.G. MacLeod has shown,¹⁰ the water licence hearings have in many cases not provided northern citizens with an adequate opportunity to be heard.

In summary, the case studies indicate that northern interest groups were not even informed of major resource development plans, much less consulted or given an opportunity to participate in decision-making. Where consultation did take place, it was after important decisions and commitments had been made, or it occurred in the absence of complete information about development projects, their expected impacts, and alternatives. Such an approach was typified by the comment of a former senior official of DIAND who said, when speaking of native concerns,

... I think that this means we are going to have to move towards a longer warning period for each exploration activity.¹¹

Such a view stands in stark contrast to views expressed at CARC’s First National Workshop on People, Resources, and the Environment North of 60°:

If Canada wishes . . . to soundly plan for the resource development of the North it must pause long enough to design institutions that assure all segments of our society an effective opportunity to participate in decision-making.¹²

Legislative and Regulatory Issues

Many of the problems of the project assessment process identified in the case studies can also be seen as defects in the law and its enforcement. In terms of both the impacts of development projects and the process of project assessment, the following issues are of particular significance:

- 1 The absence of legislation requiring comprehensive project assessments
- 2 Inadequate legislation for environmental and social concerns
- 3 Legislation which favours resource extraction over people and the environment
- 4 Problems of enforcing existing legislation and regulations
- 5 Jurisdictional problems within and between governments
- 6 High costs of litigation

The case studies show that in the North, as with the rest of Canada, there is still not legislation that requires comprehensive and balanced project assessments, undertaken in

advance of fundamental choices. For example, the Environmental Assessment and Review Process (EARP) of the federal government is not required by legislation and its implementation is therefore not assured. The Mackenzie Valley Pipeline Inquiry, though in many ways laudable, was a mechanism created for one particular case, and current indications are that the federal government does not intend to use it as a model for future project assessments. As a matter of both policy and legislation, comprehensive and timely assessments should be a very high priority.

The legislation that does exist has been shown in the case studies to be significantly deficient, especially in terms of environmental, social, and economic impacts. All of the case studies indicate that the law was ineffective in protecting public rights and the fish and game resources which contribute to the food and livelihood of many northerners. The need to resort to approval-in-principle decisions for Beaufort Sea and Lancaster Sound drilling further signifies the inadequate nature of environmental and social legislation. Where legislation does exist, it favours economic growth over people and the environment. In their analysis of northern legislation, particularly the Territorial Land Use Regulations, Usher and Beakhus¹³ show convincingly that the intent of legislation is to interfere as little as possible with resource exploitation.

A further problem is that of enforcing the existing legislation. Prosecution for pollution infractions, while possible in the case of the Pine Point mine, was foregone because the government did not see itself as having the ability to monitor the mine's pollutants. Prosecution in many cases is impossible due to a lack of baseline data on water quality, or other environmental factors, against which to measure changes resulting from industrial activities. Similarly, the Water Board of the Northwest Territories did not cancel the water licence or prosecute the Nanisivik operation when the company violated several of its licence conditions. Critics of the Mackenzie Valley gas pipeline proposals have consistently pointed to the difficulty of adequate surveillance of pipeline construction. The problems of enforcement are even more difficult when governments themselves are the violators; a case in point is the Dempster Highway, along which there were major fish culvert collapses that went unchallenged.

Jurisdictional problems are another source of concern. At the federal level the relative impotence of the Department of the Environment north of 60° and the dual developer-regulator role of DIAND create regulatory uncertainties. This particular situation is further complicated by the territorial governments' control over wildlife management.

Divided jurisdiction between the federal and provincial powers in regulating environmental impact was a notable problem in the James Bay and Portage Mountain hydro-electric projects. The federal Department of the Environment could do little to prevent the provincial governments from proceeding, since the only effective federal powers were under the Fisheries Act and the Migratory Birds Act, which provided no means for exercising general environmental control over the projects.

Even when enforcement of legislation and regulations is followed, several problems arise from the use of litigation to control projects and redress losses. Litigation is expensive, time-consuming, and uncertain in its result. It requires access to lawyers, and for many native people it involves participation in a culturally alien process. Some of these features were illustrated during litigation launched by William Smith in Old Crow in the Yukon, in opposition to the Dempster Highway. Smith's actions have neither slowed the pace of development there nor provided any form of relief. All that has been accomplished is a good deal of publicity and the winning of considerable public sympathy from residents of southern Canada. Indeed, this has been an important by-product of the James Bay controversy as well.

To date, recognition of aboriginal rights has been gained mostly through long protracted litigation, the results of which have been extremely uncertain. In the case of the James Bay project, Mr Justice Malouf recognized the native rights of the Cree and granted an injunction. Though the injunction was overturned on appeal, the recognition of native rights in the judgment did provide the basis, uncertain though it was, that enabled the negotiation of the substantial native claims settlement. Similarly, the judgment of Mr Justice Morrow recognizing native rights in the Mackenzie Valley caveat case, though overturned on technical grounds on appeal, provided strong support for the settlement of native claims before pipeline construction. Such limited negotiating power was all that the law granted to native people, and had to be strenuously fought for. In the case of the Fort Chipewyan Indians affected by the Portage Mountain project, the expense and uncertainty of gaining relief defeated their action in its early stages.

Native Peoples' Interests

Among all the issues which concern the native peoples of the North, that of land claims is paramount. The federal government has responded to shifting judicial attitudes towards native claims, and as a matter of policy has indicated that it recognizes such claims and will negotiate settlements. Yet, in

spite of apparent legal recognition of the legitimacy of the claims, industrial interests with government support continue to press ahead with projects which threaten the land that is the subject of claims and which, indeed, is the very basis of native culture and survival. The case studies indicate that decision-makers have failed to recognize or accept the fact that for native northerners their land and their socio-cultural existence are inextricably linked.

Government emphasis on native assimilation into the wage economy as the overriding policy orientation testifies to this oversight. The “Hire North” programme of the federal government is an example of this strategy; little or no public consultation appears to have preceded the decision to embark on programmes of this nature. The major expected benefits of the Nanisivik project were to be those related to wage employment, although the “beneficiaries” were not involved meaningfully in the decision-making process. Peter Usher has argued, in relation to the Mackenzie Valley Pipeline, that short-term employment generated by large-scale developments will not solve northern problems.¹⁴ Rather, the emphasis should be upon activities based on local renewable resource harvesting and processing, and on activities oriented to long-term employment. It is not a question of having either a subsistence economy or the wage economy. It is a question of allowing those most directly concerned – the native peoples – the opportunity to evolve institutions and programmes in ways consistent with their own aspirations and preferences.

The lumber co-operative at Fort Resolution is the sole example of small-scale development discussed in the case studies. In his report, Mr Justice Berger believed it important to compare

the Pine Point mine development with the Slave River sawmill operation The sawmill provides employment for 30 to 35 men on a labour-pool basis. This means that a man can take time off to go out hunting or fishing, provided someone else can take his place in the mill. In addition, during part of the spring, the mill closes down completely, because most of the men choose to hunt beaver and muskrat at that time. The operation, therefore, provides wage employment, but in a manner consistent with the maintenance of traditional economic activity; indeed it complements that activity by providing the means to buy equipment and supplies. Being community-based, the men are able to work without being separated from their families, and to participate in an endeavour that encourages community cooperation.¹⁵

When discussing the native economy, it is also important to consider the likely impacts of projects on wildlife and habitat and thus indirectly on the native livelihood. The Dempster Highway may pose a serious threat to the Porcupine caribou herd. And many native people in Fort Resolution believe that the Pine Point mine is responsible for the decline in fish and game populations in that area.

Disruption of the native traditional economy is not a recent phenomenon related solely to large hydro-electric developments, transportation corridors, or non-renewable extractive industries. Boom-and-bust cycles in the North began with the influx of whalers and fur traders, and continued with the development of DEW Line sites across the Arctic. Mining operations typify the boom-and-bust approach to development. When the Rankin Inlet mine was brought into production, Inuit were encouraged by the government to leave their land-based way of life and seek wage employment at the mine. Following the closure of the mine five years later, the entire community suffered economic recession, unemployment, and a reluctance or inability to return to the land for a living. The Pine Point case study shows that when that mine was developed, no consideration was given to providing wage employment or other social and economic benefits to native peoples. Subsequently, when the government policy of the late 1960s and early '70s stressed the provision of employment for natives as a desirable goal, inept social development policies hindered the evolution of the desired indigenous labour contingent at Pine Point. By the time the Nanisivik project was underway, it was clear that southern decision-makers had assumed that the economic future for native peoples was through employment in the non-renewable resource sector. Thus, in spite of the lessons from boom-and-bust cycles in the past, present policies persist in making such cycles a likelihood in the future.

The case histories show that decision-making has been extremely centralized, with the major decisions originating from provincial capitals, from Ottawa, and from corporate headquarters. Isolation of decision-makers from the areas to be affected by the development has inevitably resulted in a lack of communication and consultation with local residents. In fact, some of the earlier case studies demonstrate that local residents were the last to know about the development of a project. The Portage Mountain case study indicates that native people were only consulted years after the completion of the project, and that the consultation then consisted of ameliorative measures to be taken following the ecological deterioration which had beset the Chipewyans of the Peace-Athabasca delta region. More recently in the

Nanisivik project, social impact considerations were only examined after the original decision to develop had been made; hence, the meaningfulness of the federal government's expressed northern objectives for the 1970s must be questioned.

The case studies lead to the conclusion that insensitivity to the needs and aspirations of native people is, at least in part, the consequence of highly centralized decision-making which serves the dominant southern interests. Such centralization also encourages a narrow perspective which precludes comprehensive assessments of projects or consideration of a wide range of alternatives. For native people, then, the main hope lies in the possibility of regaining some control of their land and their lives through land claims settlements.

Finally, it should be stressed that much of the frustration that centralized and distant decision-making causes northern native people applies to *all* long-term northern residents. The perspective of non-native residents of the North was not given particular attention in the case studies and is presently overshadowed by the interest in native land claims negotiations. However, initiatives in the search for alternative political arrangements in the North will need to seek out decision-making systems that free all northerners from these disadvantages.

IV Conclusions and Recommendations

The foregoing discussion has identified fundamental shortcomings in both the policy formulation and project assessment processes in northern Canada. Based on that analysis, several recommendations are set out in this section, taking into account ongoing legal and political developments in the North. These developments include matters such as the increasing sophistication of native and public interest organizations, the progress of native land settlement negotiations, and the further evolution of procedures for hearings and assessment methods.

Certain legislative developments — such as the freedom of information Bill C-225, amendments to the Territorial Land Use Regulations, the proposed bill on Petroleum and Natural Gas Leasing, new Drilling and Production Regulations, and amendments to the Fisheries Act — were taken into consideration, as were specifically political issues, such as the evolution of territorial government. With some dismay it was noted that the federal government seems still to be making use of its discretionary powers, using “guidelines” and the technique of approval-in-principle, and failing to legislate assessment procedures. It was also evident

that, with the formation of Petro-Canada, the federal government has further expanded its role as an actual developer, from the construction of roads, railways, and hydro projects to non-renewable resource development.

Northern Policy and Its Formulation

Both the substance of northern development policy and the processes by which it is created are imperfect. The priorities suggested in the federal government's 1972 objectives are in sharp contrast to the realities of project planning and implementation. Short-term perspectives prevail and policy alternatives are seldom, if ever, explored in an open and systematic fashion. Little co-ordination among policy fields is evident, and the need to reassess northern policy is both apparent and urgent. As a result of these circumstances, several recommendations are outlined below:

- 1 Northern development policies and priorities ought to be debated and formulated on a national level, involving all interested parties. Special consideration must be given to northern residents, and their preferences and aspirations should be the basis of new northern policies. Such concepts as basic human needs, self-sustaining and self-regulating systems, and cultural and ecological compatibility should be central features of the discussion.
- 2 Such a discussion of northern policy should seek from the outset to identify the widest possible range of alternative policy positions for the future of the North and the goals which underlie them.
- 3 Policy positions should be assessed particularly for their long-term implications, information about which should be freely available and widely discussed.
- 4 Northern policy should be formulated in such a way that it explicitly takes account of such other national, regional, and local policy fields as energy, the economy, housing, education, industrial development, transportation, and food, rather than focusing on any one of these subjects in isolation.

Conflicts of Interest

Conflicts of interest, especially in those cases where the proponent and regulator of a project are synonymous, are a matter of fundamental concern. The review process must not only be independent; it must be seen to be independent and responsive to public input. Recommendations related to these needs are:

- 1 Within the federal government, all environmental protection legislation and attendant responsibilities for

northern Canada should be assigned to the Department of Fisheries and Environment.

- 2 The present Department of Indian Affairs and Northern Development should be restructured as two separate departments, one responsible for northern development and the other for Indian affairs.
- 3 All government projects, private sector projects, and those joint ventures of which governments are a part should be subjected to comprehensive assessments in advance of fundamental decisions. Specifically included in this requirement would be projects undertaken by Crown corporations in which the government has an actual financial interest or responsibility.

Information Gathering for Research and Assessment

Assessment of northern development projects falls short of the ideal criteria suggested earlier in this analysis. Issues regarding the scope, timeliness, relevance, and co-ordination of assessment procedures are recurring problems in all the case studies, and the following recommendations are accordingly presented:

- 1 Project assessments should be required by legislation to be undertaken far enough in advance for predictive studies to be completed before fundamental decisions are made. All major project proposals and alternatives to them must involve a comprehensive public assessment of the potential social, economic, environmental, and technological impacts, based on past experience, project-specific factors, and new research. The assessment process should ensure effective public participation and should require thorough consideration of both short- and long-term impacts (costs and benefits), including synergistic and cumulative consequences. Special emphasis should be placed on unavoidable and irreversible impacts, the mechanisms required to mitigate these, and the provision of fair compensation to those adversely affected, should a project be approved.
- 2 Comprehensive, long-term, basic research programmes should be undertaken on the aquatic and terrestrial biological resources of the North. Research should include three specific elements: a programme of basic research; a specialized environmental impact research programme; and research to identify the cumulative effects of development. In 1976 the Treasury Board turned down an application to fund a comprehensive environmental research programme, but provided funds for the Eastern Arctic Marine Environment Study (EAMES) and an

Arctic Oil Spill Research Programme. The decision to reject the basic research component of the proposal was very short-sighted, and we recommend that it be reversed.

Disclosure of Information

Procedures associated with the assessment of Mackenzie Valley pipeline proposals provided a sharp contrast to the inadequate information processes generally associated with the pre-development phases of major projects in the North. The approach of the Environment Protection Board, sponsored by one of the pipeline proponents, in making information available to the public, the dissemination of reports from the federal government's Environmental-Social Program, Northern Pipelines, and the free flow of information which resulted from the various aspects of the Mackenzie Valley Pipeline Inquiry stand as examples of better ways to respond to today's expectations for public information. In the spirit of these positive examples, it is recommended that:

- 1 The federal government enact a Freedom of Information Act, with limited exceptions to public disclosure such as those contained in the United States Freedom of Information Act, and with the final decision on applications for access to information to be made by the courts.
- 2 Efforts be made to co-ordinate the work of public interest groups that are seeking adequate public disclosure of information on all aspects of northern development.
- 3 Primary industries operating in the Northwest Territories and Yukon sponsor and fund an organization, modelled after the Environment Protection Board, which would collect and disseminate information related to resource development and environmental protection, as these pertain to their activities.
- 4 The federal government recognize that the secretive approach it has previously employed has usually worked against the public interest, and that it consider the open characteristics of the Berger Inquiry as the approach of the future.

Public Participation

None of the case studies shows public participation occurring in the formative stages of project planning. While a recent trend towards more public participation is evident, such efforts often suffer from a lack of time available to absorb the information and respond to it; in other cases only partial information is provided.

The Mackenzie Valley Pipeline Inquiry must once

again be cited as a significant exception to an otherwise dismal record. The manner in which Mr Justice Berger conducted the inquiry was based on the need to undertake a comprehensive assessment with due consideration for the needs and aspirations of people likely to be affected, particularly native northerners. Specific innovations of the inquiry which enhanced the public participation process included:

- 1 Preliminary hearings to permit public participation in structuring procedure and defining terms of reference;
- 2 Encouragement and funding of participation by the public, particularly environmental and native interests;
- 3 Provisions for access to relevant information from many sources, including government agencies;
- 4 The scheduling of two types of hearings — informal hearings that were designed to elicit the views of concerned citizens in the North as well as in southern Canada, and formal hearings designed to hear expert evidence, to cross-examine on that evidence, and to hear the submissions of the central participants;
- 5 Assessment of the actual impacts of some major existing northern development projects in a public forum, with detailed presentation of evidence and cross-examination.

That Mr Justice Berger has gained widespread respect is evidence that his attempts to involve the public in meaningful ways have been largely successful.

Based on the shortcomings of public participation processes prior to the Berger Inquiry and on the successes of his inquiry in the area of public participation, it is recommended that:

- 1 Amendments to the Public Inquiries Act and newly enacted Environmental Assessment Act should specify the principal requirements for effective public participation and require that these be carried out. The requirements for public participation should apply to all government agencies and officials with authority to set conditions or enter into agreements related to resource developments. Special provision should be made for projects involving multiple approvals under different agencies.
- 2 Legislation be enacted for land use and resource planning in the territories and provinces, which includes enforceable requirements for ongoing public participation; this could involve a representative independent planning commission to monitor the activities of planning agencies.

Legislative and Regulatory Issues

Legislation and regulation in the North have been characterized by a failure to ensure comprehensive assessments, inadequate protection of local residents and the environment, administrative policies and practices that favour resource development, and jurisdictional entanglements between governments. To eliminate some of these problems in the future, it is recommended that:

- 1 Legislation be enacted to encourage the evolution of government in the territories in a way that would accord them the degree of self-determination known everywhere else in Canada, while at the same time being compatible with a settlement of native land claims.
- 2 Environmental and social legislation be upgraded to incorporate both the views of northerners and the life-sustaining requirements of the renewable resource under consideration. Present uncertainties about harvesting of migratory birds indicate that what northerners want may not necessarily be best for the species concerned, because of other regional or international demands on this resource. In cases such as this, it is recommended that environmental legislation have as its central concern the maintenance of species and their essential habitats.
- 3 Provisions be made by the appropriate authorities for improved monitoring of development activities and more rigorous enforcement of legislation and regulations.

Native Peoples' Interests

Government practices respecting native northerners have been paternalistic and assimilative, and have encouraged a hinterland/metropolis economic relationship between northern and southern Canada, involving exploitation of northern lands and people. In none of the projects examined by the case studies did local native people initiate or request the projects in question; rather, projects were imposed by southern decision-makers as part of corporate development strategies or in response to government policy.

Permanent northern residents, especially native people, have been particularly adversely affected by the boom-and-bust cycle common in northern development. The risks of community disruption, health problems, the breakdown of family structure, increased crime and violence, and racial conflict were not sufficiently considered in the decision-making process. Moreover, it has been primarily — and in some cases solely — the native people who have suffered from the adverse impacts of these projects on the physical environment.

Most of the development projects were of too large a scale to be integrated successfully into the local economies. Also, the projects required specialized skills which native people did not possess and, as a result, those who were given employment received less skilled, less prestigious, and lower paid positions. The job opportunities created for native people to date have locked them into non-renewable resource projects for which employment is not reliably long-term. Moreover, such jobs have generally required native workers to leave their own communities, thus resulting in further alienation from the land-based economy. In general, large-scale developments such as those described in the case studies have posed a threat to the native way of life. The traditional hunting and trapping lifestyle and its relationship to the land seem to have been either ignored (in the earlier projects) or undervalued (in later projects). In future northern developments there should be a greater emphasis on the value of the traditional native way of life. It must be stressed, though, that one of the required tools for this step is knowledge of the various factors that influence the abundance of renewable resources.

The case studies emphasize the need for a native land claims settlement before further development proposals are implemented. It has been demonstrated that large-scale development projects contribute to the erosion of native culture, thus rendering more difficult any consideration of alternative futures for native people.

The legal system has not yet given clear recognition to the principle of aboriginal rights to the land. Asserting these rights, in opposition to the specific projects examined in the case studies, has required the native people to undertake long and uncertain processes of negotiation or litigation. Although they have achieved a measure of publicity and sympathy in southern Canada, and a certain amount of negotiating power, they have not yet achieved their main goal of a just land settlement. With the exception of the James Bay settlement, native people have generally not obtained compensation for the deterioration of their hunting, fishing, and trapping grounds, and the general deterioration of environmental quality. But is it in fact possible to "compensate" a people for the loss of things that are beyond evaluation, such as a way of life? Two recommendations for action are that:

- 1 Land claims of northern native peoples should be settled at their earliest convenience, with all due regard to their rights and interests in northern lands. Such a settlement

should provide for their continuing relationship to the land, rather than their further alienation from it.

- 2 Greater emphasis should be placed on identification and implementation of economically viable and socially and environmentally benign development projects based on renewable resources.

In conclusion, the case studies demonstrate that, in spite of great effort and expense at the level of specific activities, a sense of uncertainty exists in the field of northern development. People are called upon to react to events as they unfold, without any clear sense of overall purpose and direction. The case studies provide little evidence that development practices have been compatible with the long-term interest of northern residents. Socially benign innovation has been the exception, not the rule. To re-think the future along the lines suggested in this analysis will require imagination and intellectual courage. It will also require better skills at identification of attitudes and perceived interests. Lastly, it will require a democratic planning process that is based on a devolution, not merely a re-distribution, of present decision-making powers for northern resource management. In the North, as elsewhere, transitions are inevitable when the need for change is perceived by those who live there.

Footnotes

1. See D. Pimlott, D. Brown, and K.P. Sam, *Oil Under the Ice*, (Ottawa: Canadian Arctic Resources Committee, 1976); B. Richardson, *James Bay: The Plot to Drown the North Woods*, (Toronto: Clark Irwin, 1972); R.F. Keith, D.W. Fischer, C.E. De'Ath, E.J. Farkas, G.R. Francis, and S.C. Lerner, *Northern Development and Technology Assessment Systems: A Study of Petroleum Development Programs in the Mackenzie Delta-Beaufort Sea Region and the Arctic Islands*, (Ottawa: Science Council of Canada Background Study No. 34, 1976); Robert B. Gibson, *The Strathcona Sound Mining Project: A Case Study of Decision-Making*, (Ottawa: Science Council of Canada Background Study No. 42, 1978); and L. Pratt, *The Tar Sands: Syncrude and the Politics of Oil*, (Edmonton: Hurtig Publishers, 1975).
2. Subsequent to the preparation of this analysis by the Couchiching Study Group, recent policy changes were summarized by A.R. Lucas and E.B. Peterson, "Northern Land Use Law and Policy Development: 1972-78 and the Future," in *Northern Transitions*, Vol. II, ed. Robert F. Keith and Janet B. Wright, (Ottawa: Canadian Arctic Resources Committee, 1978), pp. 63-93.
3. K.J. Rea, *The Political Economy of Northern Development*, (Ottawa: Science Council of Canada Background Study No. 36, April 1976), p. 231.
4. *Ibid.*, p. 25.

5. Philip Mathias, *Forced Growth*, (Toronto: James Lewis and Samuel, 1971).
6. Rea, p.229.
7. See Keith et al.
8. Pimlott et al., p. 23.
9. Gibson, p. 90.
10. William MacLeod, *Water Management in the Canadian North: The Administration of Inland Waters North of 60°*, (Ottawa: Canadian Arctic Resources Committee, 1977).
11. A.D. Hunt, "Welcoming Address and Opening Remarks," Northern Canada Offshore Drilling Meetings Proceedings, Department of Indian Affairs and Northern Development, (Ottawa: December 1972), p. 8.
12. *Arctic Alternatives*, ed. Douglas H. Pimlott, Kitson M. Vincent, and Christine E. McKnight, (Ottawa: Canadian Arctic Resources Committee, 1973), p. 325.
13. Peter J. Usher and Grahame Beakhust, *Land Regulation in the Canadian North*, (Ottawa: Canadian Arctic Resources Committee, 1973).
14. Peter J. Usher, "The Social and Economic Impact on Native Northerners of Short Term Employment: A Preliminary Discussion," (Ottawa: Northern Science Research Group, Department of Indian Affairs and Northern Development, 17 July 1972).
15. Thomas R. Berger, *Northern Frontier, Northern Homeland: The Report of the Mackenzie Valley Pipeline Inquiry*, Vol. I, (Ottawa: Supply and Services, 1977), pp. 123-124.

Portage Mountain Project



Energy, Mines & Resources



B.C. Hydro & Power Authority

The Portage Mountain Hydro-electric Project

James E. Howell
Barrister and Solicitor
Victoria, B.C.

Introduction

The Peace-Athabasca Delta in northern Alberta near Fort Chipewyan is an area of 1,500 squares miles, comprising large but shallow lakes, smaller perched lakes, many meandering water courses, and sloughs and vast marshland. Approximately half of the area lies within Wood Buffalo National Park (see Figure 1). The delta is an ecologically unique and important area; it serves as a staging area for the spring and fall migrations of countless waterfowl, as well as a nesting and moulting ground for many species of migratory birds, including fifteen species of ducks, four species of geese, and the whistling swan. The vast grasslands and sedge meadows of Wood Buffalo National Park support a bison herd in excess of 10,000 animals. Other large mammals such as moose, mule deer, black bear, coyotes, and wolves are found in the delta region. Barren ground caribou and woodland caribou occur near the delta, although they rarely use delta habitats directly.

In the past the lakes of the delta have provided a bountiful fishery resource which, coupled with the trapping of fur-bearers, particularly the plentiful muskrat, have provided many of the native people of the delta with their livelihood and lifestyle.

The Peace-Athabasca Delta exhibits a complex hydrology upon which its ecological resources are dependent:

Life in the Peace-Athabasca Delta evolves from a hydrological pattern frequently climaxed by the flooding of the Delta in June or July, when all of the channels, lakes and perched basins are filled by flood waters from Lake Athabasca. By late summer, as water drains out of the Lake, levels of Lake Athabasca and the Delta lakes begin to recede, continuing until minimum levels are reached in March and the Delta waits to be recharged once more with spring and summer runoff.¹

These seasonal and annual water fluctuations over the delta

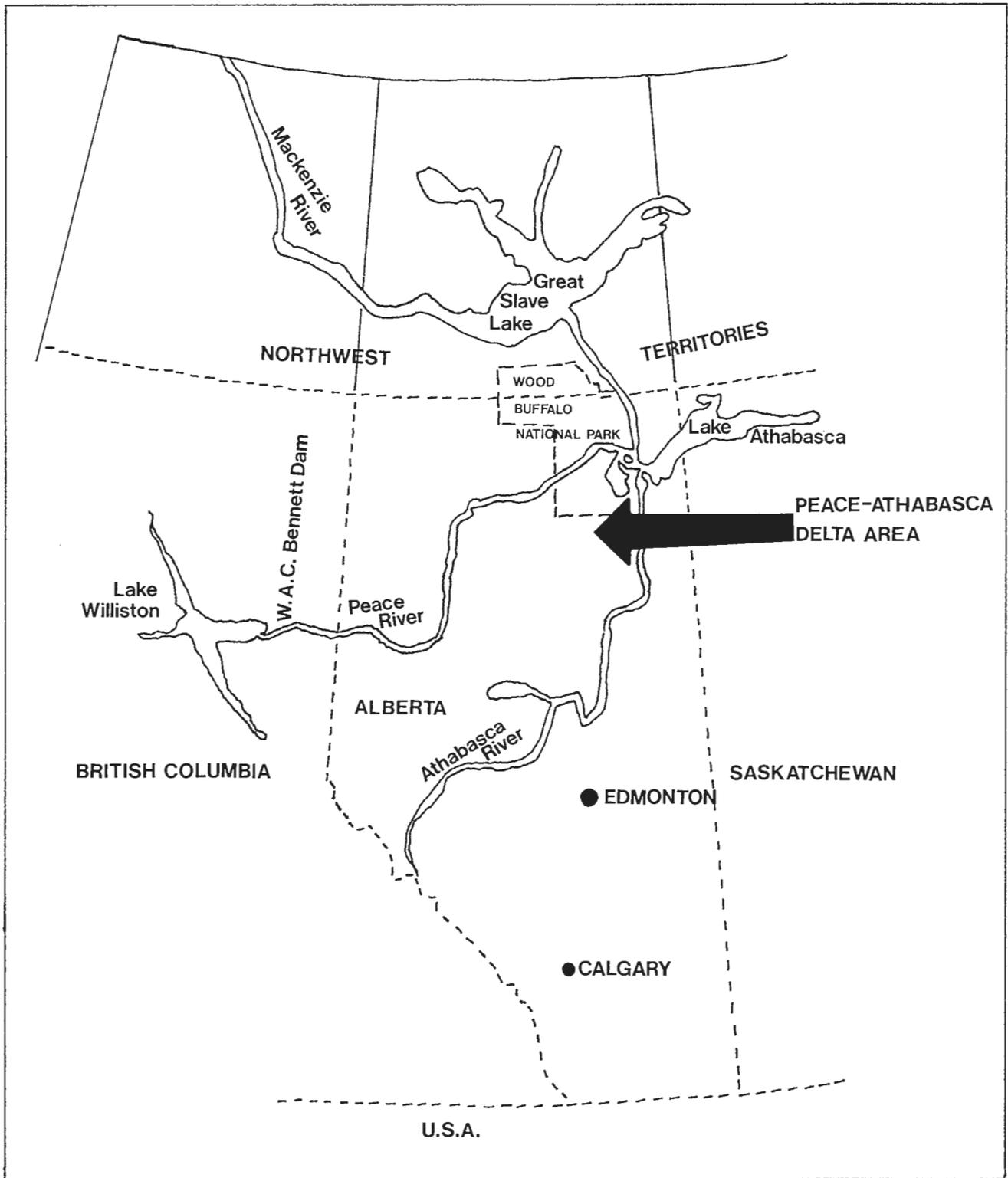


Figure 1 Location of the Peace-Athabasca Delta

have “fostered an environment in which plant and animal life have achieved a balance that is dependent on frequent flooding.”²

In December 1967 the last of three diversion tunnels carrying water around the newly constructed W.A.C. Bennett Dam at Portage Mountain on the Peace River was closed. Water levels fell drastically, allowing willows and other shrubs to encroach upon the marshlands and now-dry lake bottoms. In the following years, many of the smaller lakes and channels began to freeze completely, killing fish, driving out the muskrat, and reducing the habitat available for migratory birds and many of the large mammals. In short, the productivity of the delta was greatly reduced.

The following is an attempt to document the decision-making that brought about these changes and to consider the responses of governments and individuals and their efforts to implement remedial measures.

The Political Climate of British Columbia

W.A.C. Bennett and his Social Credit Party dominated the politics of British Columbia for two decades, from 1952 until the party’s defeat at the hands of the New Democratic Party in 1972. The role that Premier Bennett played in the development of such projects as Portage Mountain cannot be underestimated, although it will be seen that Bennett’s success lay partly in his ability to take credit for economic prosperity while riding the boom of the 1950s. William Hamilton, a former federal cabinet minister, remarked in 1965 with respect to Bennett: “One man’s vision, operating within the constitutional responsibilities assigned a province, has changed the map, the tempo and the economic structure of B.C. We may not yet reckon all the costs. We may not yet appreciate all the benefits. But these things have occurred because of provincial leadership — and, I would be willing to state, provincial leadership alone.”³ As will be seen, Bennett on occasion did not confine himself to the constitutional responsibilities of the province; thus, perhaps inadvertently he has also changed the map, the tempo, and the economic structure of areas beyond the borders of British Columbia.

For Bennett, who in 1951 crossed the floor of the House, leaving the Conservatives and the coalition government to sit as an independent, the Social Credit Party was primarily a vehicle for his political ascension. It is not difficult, however, to understand the attraction that some aspects of Social Credit political philosophy had for Bennett. Major C.H. Douglas, the founder of Social Credit, believed that his

obscure monetary theories should not even be debated. The people, he believed, should be told nothing and should be content to rely on the expertise of their leaders. Douglas remarked that “the voters should [only] be asked whether they are in favour of a larger personal income.”⁴ His follower in Alberta, William Aberhart, told his audiences that they did not have to understand electricity in order to use it. They simply had to “push the button and get the light.”⁵ Premier Bennett described his approach to democratic government in similar terms:

“True direct democracy is that the elected must govern, and must not be governed by the electors. Unless the elected govern, you have a dictatorship. If the electors govern, you have anarchy.

In other words, people in a democratic way select people to do a job. Then they must have the authority to do a job and they must boldly do that job, and they must not ask questions and have royal commissions all the time. They should take responsibility and bold action. Then when election time comes, the people should kick them out if they are not doing the job. In other words, the elected must govern. I believe democracy is the best system.”⁶

There was little sympathy in British Columbia for the strange monetary policies of the Social Credit Douglasites. Major Douglas had once pronounced, “The financial system is essentially a system of black magic, and one of the best protections against black magic is not to believe in it.”⁷ Premier Bennett quickly divorced himself from this economic heresy, for he certainly believed in the “system,” despite not unsubstantiated charges that his own government finances were obfuscatory and deliberately misleading. Bennett’s massive campaign for reduction of the provincial deficit consisted of a transferral of debts to the agency or Crown corporation responsible for the works for which the debt was incurred. This procedure allowed the government to clear its books and declare itself debt-free, despite the fact that a number of government agencies now carried massive debts for which the government remained responsible. The programme also allowed the government to act as fiscal agent while removing most aspects of legislative scrutiny or control over borrowing. In the words of Gordon Dowding, then a CCF Member of the Legislature, “We vote the authority to borrow money, and we have no control over how the money is borrowed or used. It is undemocratic and irresponsible government, because there is no window for the people to see into the accounts.” Dowding wondered if all major government financing might not eventually end up

in “private agencies screened and shaded from public gaze.”⁸

David LeMarquand, in considering the political and social climate of British Columbia, emphasizes three aspects. He argues that, first, the province has a strong “materialist orientation,” and traditionally there are few non-economic considerations to direct political debate; although a number of alternatives to the Social Credit Party exist, they all share the same basic utilitarian attitude towards the environment. Second, in B.C. there are few strong interest groups upon which to base liaisons between the public and government agencies; this lack of intermediate groups tends to allow polarization of debate, frustrating the discussion of alternatives. Finally, the economy of British Columbia is almost wholly dependent on resource extraction.⁹ Black suggests that an underlying reason for the prominence of these factors in B.C. may be the fact that a majority of the province’s population was not born there, but was attracted by the economic possibilities of a frontier economy. This influx not only fostered the ethic of exploitation, but also served to inhibit the growth of local customs and institutions.¹⁰

Bennett’s government stressed the frontier aspects of British Columbia, the pioneering character of its people, and all the attendant attitudes of man’s rightful dominion over nature. The images of great bridges and huge dams served as important political symbols of Bennett’s government. It has been suggested that “This interpretation may be especially applicable to British Columbia . . . large-scale projects may not only be symbols in the political game but they may be used to satisfy a quasi-religious measure of the region’s level of civilization.”¹¹ For Bennett’s government, prosperity was always equated with resource exploitation:

*The Premier’s vision has focused on the development of an infra-structure upon which the natural wealth of the province could be extracted. The massive spending on roads, the extensions of the Pacific Great Eastern Railway, the oil and gas pipelines and the gigantic hydro-electric developments have all been essential in giving this dream a concrete structure. This infra-structure was to benefit ‘not big business or big labour but ordinary people.’ Within the grand scheme public investments that do not generate further investment capital, such as education and welfare, receive minimum support.*¹²

The 1954 sitting of the B.C. legislature became known as the session of the “Northern Vision”; the attorney-general, Robert Bonner, talked in glowing terms of the golden

empire of natural gas in the North and referred with excitement to its oil potential. In his budget speeches of 1954 and 1955, Premier Bennett made the following comments:

*If there is any one thing that is of basic importance to the further development of British Columbia, it is the development of the rich resources of the northern and central interior regions of the Province. The Peace River particularly is one of the areas in Canada most ripe for development. . . .*¹³

*Of immediate and particular concern to our people is the development of our abundant and varied natural resources. A rich portion of these is located in the northern and central interior regions of the Province, but development, of necessity, depends almost entirely on adequate railway transportation. The urgency of this has been voiced repeatedly and vigorously in the House of Commons, our Legislature, the press, and by our people generally.*¹⁴

There were other reasons besides resource potential behind the government’s desire for northern expansion. The premier was concerned about the links between the Peace River area and Alberta: “By most standards, the Peace River was already part of Alberta. It was on the far side of the Rockies from the rest of B.C. Its logical trade outlet was through Edmonton.” Under the circumstances, Bennett saw the proposed extension of the Pacific Great Eastern Railway as a way “to take that whole area and make it tributary to B.C.”¹⁵ Thus B.C.’s northward push began for reasons very similar to those behind the federal government’s broader northern programme. British Columbia was faced with its own mini-sovereignty crisis. Bennett wanted to assert his economic authority over the Peace River area through a northern expansion of the Pacific Great Eastern Railway to the Peace River and a southern connection to Vancouver from Squamish. This expansion was begun despite the fact that then current opinion judged the rail extension to be uneconomical for some years to come.

A similar pattern of northern development with little or no economic justification can be seen with respect to gas and oil pipelines from the Peace region. Frank McMahon, the incorporator of Westcoast Transmission Co. Ltd., had attempted from the early 1950s to promote developments of Peace River area gas, a plan Bennett agreed with and attempted to foster from his first days in office. Bennett’s actions in extending the Pacific Great Eastern Railway were partly prompted by the hope that it would assist and be assisted by petroleum development in the North. Despite American rejection of a proposal to export gas from the Peace, Bennett insisted to Westcoast that preparatory work

for a pipeline should continue. In December 1954 a contract to supply gas to the American northwest was completed, and approval was granted by the U.S. Federal Power Commission. Construction of the 650-mile pipeline began. This arrangement was achieved at the expense of locking British Columbia into a long-term commitment to export gas at a price considerably cheaper than it was sold in Vancouver. It is clear that without the U.S. sales there would not have been a pipeline. Only in 1973 was B.C. able to escape from this resource export arrangement, which had been prompted by the decision to construct a pipeline before it was economical.¹⁶

Bennett's development of a transportation infrastructure — both rail and pipeline — in the northern part of the province was a guarantee of further development. His need to show the wisdom of past decisions virtually assured approval and promotion of any and every resource development scheme proposed for the North. The Wenner-Gren proposal to develop a vast area in the Rocky Mountain Trench was seized upon as a method of bolstering the uneconomical Pacific Great Eastern Railway. British Columbia is only now beginning to feel the effects of this pyramiding of resource developments, each one necessitated in part by another previous one. The economic hangover occasioned by this over-emphasis on the primary sector forms a major element in the economic woes that presently beset the province.¹⁷

Discovery of Peace River Hydro-electric Potential

The scheme proposed by the Swedish firm of Axel Wenner-Gren in November 1956 involved a monorail, pulp mills, mining projects, and a large hydro-electric development in the Rocky Mountain Trench. Wenner-Gren began negotiations with the B.C. government after one of the firm's representatives, Bernard Gore, listened to B.C.'s agent general in Britain extol the resource potential of the region at a London cocktail party.¹⁸ After brief negotiations with the B.C. government, a memorandum of intention was signed in which the company agreed to construct a railway from the southerly end of the Rocky Mountain Trench adjacent to the Pacific Great Eastern Railway north to the Yukon border. The memorandum also provided that the principals would apply for forestry rights, with the objective of building several pulp mills of an annual capacity of not less than 100,000 tons of pulp each. In addition, the company to be

incorporated by the principals was required to survey the water resources in the proposed area of development and deposit \$500,000 with the government, to be returned upon evidence of expenditures totalling \$5 million. The government placed a reserve on lands and timber in the area, with the intent that rights on those lands should be granted to the principals upon application under the relevant statutes subject to the furnishing of satisfactory plans. The memo further provided that it was not to be construed so as to restrict the principals from acquiring mineral rights.¹⁹

When the proposal was announced three months after its signing, having been a closely guarded secret during the intervening period, the reactions ranged from glowing praise to incredulity and strong disapproval. Headlines announced "North exults at dream come true,"²⁰ but groups such as the B.C.-Yukon Chamber of Mines regarded it as an "outrageous give-away," involving virtual alienation of one tenth of British Columbia to a single corporation.²¹ This area was promptly dubbed "Wenner-Grenland" or "Swedish Columbia" by the media.²² One B.C. financier compared it to the historic South Sea Bubble, while a coast lawyer called the agreement "an incredible document . . . the kind of thing British financiers used to write three centuries ago for some ivory colony on the coast of Africa."²³ There was reason to be incredulous, for the Swedish magnate had a chequered past, having been blacklisted in Canada, the United States, and Britain for his alleged relationship with Hermann Goering, second in command of the Nazi regime.²⁴ More significantly, Wenner-Gren in 1952 had proposed a virtually identical development scheme for southern Rhodesia:

in the Rhodesian newspapers of September 1952, and in the Canadian papers of February 1957, appeared almost identical stories.

They said that Wenner-Gren and two associates, an Englishman and a Scandinavian, were planning to put five million dollars into mapping the mineral, water-power and forest potentials of a large territory; they envisioned a revolutionary high-speed monorail railway spanning the area and giving access to its riches, airborne electronic devices pinpointing the region's mineral deposits; and profits of the enterprise would benefit educational and welfare work.²⁵

Wenner-Gren had chalked up a list of grandiose but unrealized schemes, including an international rail and road network stretching from Alaska to the Panama Canal, a \$100-million industrialization programme in Mexico, and a revolutionary transit system for New York and environs.²⁶

The major source of contention arising from the agreement was the land reserve that, to some, was reminiscent of the large land grant to the Canadian Pacific Railway on Vancouver Island. It was felt that the reserve would block the plans of many other large companies interested in northern British Columbia. The premier misleadingly contended that the agreement involved “no deals, no give-aways, no land grabs, no concessions.”²⁷ The government also stressed that mineral and hydro reserves covered only fifteen percent of the total reserve area and, when these reserves were lifted, Wenner-Gren would be in exactly the same position as any other person with respect to staking claims. However, geologists familiar with the trench said “the statement points out that the Wenner-Gren reservation area is in the low-lying, ‘or fault zones,’ and ‘may be more favorable for mineral occurrence than some of the higher levels which are above the reservation.”²⁸

The brunt of criticism centred on the involvement of Einar Gunderson, a long-time friend of Premier Bennett and sometime financial advisor to the government. Gunderson, who witnessed the signing of the memorandum of intention, was apparently acting as an advisor at the time. He became a director of the Wenner-Gren B.C. Development Co. Ltd., which was incorporated three days after the signing. Gunderson, besides acting as a government advisor, was also vice-president of the P.G.E. Railway and a director of the Canadian Imperial Bank of Commerce, Black Ball Ferries Ltd., and Deaks-McBride Ltd.²⁹ These various roles were interpreted by the press as *prima facie* examples of conflict of interest and political patronage. Bennett denied any knowledge of Gunderson’s appointment, referring to remarks in the House as “carping criticism, smear, snide remarks”; in his opinion Gunderson was “that great Canadian ... there is no finer man in British Columbia tonight.”³⁰

After the tumult died, the shiny vision of a northern empire was considerably tarnished.³¹

In February 1957 R.L. Chantrill and N.D. Schell of the British Thomson-Houston Company which was employed by Wenner-Gren to conduct power surveys of the Rocky Mountain Trench, approached the Comptroller of Water Rights, Department of Lands, Forests and Water Resources, seeking advice on available water records and publications on the Peace River basin. They particularly wished hydrologic and climatic information and available data on water resources, and were given a report on the trench area.³² In March they approached the government seeking additional hydrologic data. At this time development of the Peace

River by way of a series of dams was clearly under consideration. The consultants were concerned about potential effects on the Fraser River fishery due to flooding into that system from the Peace River watershed; apparently the topographic maps of the day did not pinpoint precisely the elevations between watersheds. Arthur F. Paget, then the Water Comptroller, sent Schell various in-house surveys and data, including a report entitled “Water Power Possibilities, Rocky Mountain Canyon (Peace River),” prepared by the Water Resources Department. Throughout this initial survey and negotiation phase, the Water Rights Branch provided information and support to the Wenner-Gren interests, and indeed performed a share of the surveying and mapping of the trench area at government expense — a task which the 1956 memorandum of intention had stated was to be performed by Wenner-Gren.³³

At the time that these negotiations and surveys were being performed, there was concern among opposition MLAs at the secrecy with which these plans were being pursued; Gordon Dowding, for instance, requested in the House that all communications pertaining to Rocky Mountain Trench development schemes, between any branches of the B.C. government and any organization or company, be filed in the House. This request was obviously not complied with.³⁴ Throughout the survey phase of the resource development proposal, ongoing discussion took place between Wenner-Gren’s consultants and Bennett and his cabinet. In particular, the minister responsible was Ray Williston, Minister of Lands and Forests, in charge of water resources in the province. In April 1957, according to the Water Comptroller’s files, Williston was discussing with Wenner-Gren via British Thomson-Houston Company a plan to divert Peace water to another watershed. Whether this was an early conception of an alternate approach to harnessing Peace River power potential or whether it was a precursor to the presently proposed McGregor River diversion is not clear.³⁵ Between May and August 1957, R.L. Chantrill, an engineer and director of the British Thomson-Houston Company, corresponded with the Water Resources Department about development of the Peace.³⁶ One important topic discussed at length was the practicality of long-distance, high tension power lines, particularly the 400-kv lines used in Russia at that time. When the Wenner-Gren proposal was announced in 1956, hydro-electric power was contemplated only as a means to power pulp mills, mining developments, and a proposed monorail. However, the discussion of long-distance, high voltage lines seemed to indicate a decision to exploit hydro power for its own sake or

as a means of satisfying general provincial power needs.³⁷ Although it did not receive much discussion at that time, one of the premises of an industrial empire for northern British Columbia was the provision of cheap power for the North. Removal of this advantage by planning delivery to Vancouver undermined a major advantage of industrial location in the Peace area, and virtually ensured that the development would not assume the proportions originally aspired to. Rather than promoting economic growth for the northern part of the province, the government was proceeding along traditional colonial lines by extracting power from the area for southern use and leaving the North to bear the environmental costs.³⁸

In August 1957 F.J. Pine of British Thomson-Houston Company announced to the Water Comptroller that a preliminary survey and reconnaissance of the Peace was completed; by the spring of 1958 they planned to select twenty to thirty potential dam sites for evaluation.³⁹ Throughout these initial stages Arthur Paget acted in his capacity of Water Comptroller, the regulator of water rights for the province, and also as advisor on water resource questions to Williston, Minister of Lands and Forests; it was in this context that the Water Rights Branch provided advice and support to Wenner-Gren consultants.

By October 1957 the provincial cabinet had received a report on the prospects of power development on the Peace River. Development of the Peace was clearly in accord with Premier Bennett's vision of the North. On 7 October 1957, Paget sent a confidential memo to the Deputy Minister of Lands and Forests, W. Bassett:

As of the 4th instant, I was advised that the interest of the Province has become most dominant in the lands within the Peace River drainage area and for which reservations in whole or part have been created. Alienations for any purpose below a maximum flood contour of 2450 will not be tolerated above Hudson Hope An Order-in-Council to complete reservations on all the water in the Peace River to the Alberta boundary is being prepared in this office to submit to Government.⁴⁰

This action, it appears, was correctly assessed by the press, which reported as follows:

The government has placed more "hands-off" reserves in north-central B.C. to protect Wenner-Gren interests in their new hydro development proposals.

And the way in which it was done suggested that the company has already decided it can go ahead with the

4,000,000 horsepower hydro development of the Peace River. . . .

The new reserves put on the Peace River system Tuesday by the Cabinet cover surface, mineral and water rights.⁴¹

The basis for this joint government-developer decision to carry out detailed feasibility studies of a Peace River power project was a three-page document prepared by R.L. Chantrill based on the brief surveys which had been conducted. This report, a major determinant in the decision to develop the Peace, is reproduced largely in its entirety below:

The survey of the assessment of the power potential of the Rocky Mountain Trench and adjacent areas was undertaken with five main factors in view:

1. *To conserve the natural resources of British Columbia;*
2. *To conserve the natural resources of Canada;*
3. *To provide power without interfering with the valuable salmon industry;*
4. *To avoid the disruption consequent from river diversion;*
5. *To avoid the difficulties involved in the development of hydro-electric power on river systems which must await international agreements.*

This involved a study of the catchment areas of the river basins outside the boundaries of the area in order to ensure that the assessment would not prejudice the potential on the individual river basins.

Using the Arctic drainage of the Peace and Liard Rivers provides much needed power without affecting the vital salmon industry.

Investigations carried out to date in the area above-mentioned have brought to light the existence of a power potential appreciably larger than that originally anticipated. These surveys have shown that using as a reservoir that portion of the Trench which forms the catchment of the Peace River, with the water level at approximately 2350 feet above sea level, there is a potential of water power between the Trench and the Alberta border of at least 4 million horsepower. The actual amount is dependent only on the feasibility of constructing suitable dams in that reach of the River. . . .

In assessing the probable cost of the power which would be produced from such a development, it became obvious that with the vast storage reservoir behind the Peace River Canyon, the amount of water stored would reach almost fantastic proportions. While the probable capacity

of the reservoir has not been worked out in detail, the volume of water to be stored can be gauged from the fact that the lake to be created by a dam in the Peace River Canyon may be as long as 260 or more miles. Dependent on what may be agreed as the amount of compensation water which will have to be let down the Peace River during the construction period, it may take as long as seven years to fill the reservoir. Power can be produced before the reservoir is at capacity, however.

If this power potential in the British Columbia reach of the Peace River is developed, it will give the Province a very substantial source of power, and will allow more time for the study of the salmon problem on the Fraser River with a view to finding a solution acceptable to all parties.

No diversion of rivers is necessary.

The planned development is one entirely within the control of the Government of the Province of British Columbia.

The power from the Peace will not only be greater than the potential on the Columbia River within the Province, but it is calculated that the cost of the capital investment in the project should be less than the cost of the dams and plants on the Columbia.

The creation of the reservoir in the Trench would produce a steady and regulated flow in the Peace River, which may be expected to be about 40,000 cubic feet of water per second instead of the variation over the year from some 8000 in the winter to nearly 200,000 cubic feet per second during flood. There can be no doubt that the increase in the winter discharge of the Peace River through Alberta and the North into the Arctic — a natural result of the planned development — can only result in an improvement of the navigational facilities in that vital artery of the North, the Mackenzie River. This would be of great benefit to the whole of Canada.

The steady and regular flow of water in the Peace River through Alberta will also make it possible to construct power plants in that Province to give Alberta substantial benefits at present denied because the Peace River has not been regulated. . . .

Present calculations indicate that power from the proposed development can be delivered to the Southern areas of [British Columbia] . . . at less cost than the far smaller developments in such areas now in operation, or contemplated for the future.

Analysis of the present power position in relation to the anticipated demand in the Province, indicates that the

power position will become critical from about 1964 onwards, unless either a major hydro-electric source is brought into operation or new thermal plants constructed to meet the ever-increasing demand for electricity.

The proposed development should start to deliver power in 1964.

The water reserve to be created in the Trench will be without question the largest man-made reservoir in the world as regards length and the amount of water which will be stored.

It is this very vastness which will give British Columbia the security of its electricity supply for many years in the future, and enable the avoidance of cyclic variations associated with dry years, when the snow and rainfall is short of the average, as well as security against the seasonal differences in river flows caused by either extreme freezing conditions or shortage of rainfall.

This vast generating source in the Peace River makes it possible, as a next stage, to harness the power of the Liard Basin in British Columbia, and to bring such power south for the use of industries not yet conceived in the middle of the Province — in centres such as Prince George — and also down to Vancouver and to Vancouver Island. . . .

Without this very substantial power source in the Peace, the utilization of the power potential of the Liard River would remain merely a dream of the future.⁴²

Prior to the Wenner-Gren survey, the power potential of the Peace River was estimated to be 1,300,000 h.p., and was regarded as being too distant to be of use to the burgeoning population and multiplicity of industries in the lower mainland.⁴³ The newly discovered prospects for Peace power, stemming in part from technological advances in long-distance transmission capabilities, must have appealed to Bennett's grandiose vision for the north of British Columbia. Certainly the opportunity to create, as a monument and symbol of his political career and impact on the province, a project that would form the world's largest man-made lake and produce more power than any development then in existence, surpassing the combined output of both the Grand Coulee and Hoover dams, must have exercised the premier's imagination. But there were also more pragmatic concerns involved; the government's earlier agreement with Wenner-Gren had been subjected to harsh criticism, and "by the summer of 1957, Bennett was hard-pressed to refurbish his fading northern vision."⁴⁴ The Peace seemed to be the magic solution which would also

solve a number of other pressing problems — it would provide a strengthened B.C. position in negotiations over the Columbia River, as well as assure an energy supply to meet shortages expected by 1968.⁴⁵

Justification of the Project

The Peace hydro-electric development can be correctly viewed as an example of inverted planning.⁴⁶ The decision to proceed with the project stemmed not from the attempt to provide necessary electric power, a context in which alternative methods of meeting that need might be satisfactorily compared, but rather because the Peace was recognized as a means, useful to the government in achieving a variety of ends:

*Planning in this context is turned upside-down. There is no agreement on overall objectives; therefore comparison of alternatives is meaningless. The extension of this situation is that the analyst determines whether the project is technically feasible; the politician, especially if he proposes the policy, determines whether the electorate will accept it.*⁴⁷

This approach to planning clearly emerges from the government's attempts to justify its commitment to the Peace project. For example, Ray Williston, in a January 1959 address to the legislative assembly, enumerated the benefits stemming from the Peace project:

- development and protection of northern resources
- a solution to the pressing problems of unemployment
- the attraction of integrated resource development, requiring cheap plentiful power, to the unsettled areas of the province
- improvement of communications and transport to hinterland areas
- satisfaction of future power requirements
- an improved bargaining position with the U.S.A. in Columbia River negotiations, due to satisfaction of B.C. power requirements.⁴⁸

Other, more dubious benefits had been trotted out earlier in support of the Peace project:

- the opening of large recreational areas
- the provision of navigable waterways in B.C.'s North and the improvement of navigation on the Mackenzie system
- beneficial climatic changes in the Peace region, induced by the large reservoir.⁴⁹

In addition, the very possibility of constructing the project became a goal in itself. As Williston remarked,

*The proposed Peace River development is a real challenge to the free enterprise concept which is so strongly supported by this Government. There is nothing sure in this proposal but the challenge to man's ingenuity and this has been accepted in full measure.*⁵⁰

In retrospect, it can be seen that many of the expected benefits from the project were either naive or fraudulent. The development predicted by Wenner-Gren and the B.C. government never did materialize. Short-term growth took place in northern communities such as Hudson Hope, but it was generally of a "boom-and-bust" nature.⁵¹ Integrated resource developments were not attracted to the hinterland area as expected by many, in part because there was no incentive such as cheap plentiful power; the power produced from the Peace was available in the lower mainland at the same price as in the Peace area.

Williston commented in 1959 that:

*If we are to continue industrial expansion which will provide jobs and relieve unemployment it is absolutely essential that present and future users of electricity are assured an adequate supply of power when required. This is a first essential, or planning, expansion, and present installation of industrial equipment will stop . . . The second essential is that this power on the long time basis, should be as cheap as possible.*⁵²

It is clear today that this pursuit of growth as a good in itself, coupled with the goal of most utilities in North America which, until very recently, has been to promote increased use of electricity, has been a major contributing factor in our extravagant use of energy. Even today, B.C. Hydro is reluctant to admit that energy demand is responsive to price, and continues to plan for growth in electrical consumption exceeding six percent a year.⁵³

The Peace project was supposed to enhance the Canadian bargaining position with the United States in the Columbia River Treaty negotiations. Yet that treaty is regarded by some today as one of the more incredible of Canada's resource giveaways, amounting to a sale of Canadian lands rendered useless by flooding for a price of less than \$1 per acre.⁵⁴

Finally, the improved navigation and expanded recreational areas that were supposed to result from the large reservoir have not materialized. Indeed, they ought not to

have been expected, as a description of Lake Williston (the reservoir created by the W.A.C. Bennett Dam) indicates:

It is a spectacular sight — and parts of it are a spectacular mess.

The spectacular views are the huge clay cliffs towering above its expanse of deep blue water, the Rocky Mountains plunging into its depths and the blaze of autumn gold setting off the rich green of the spruce trees over the foothills.

And then there are the miles upon miles of flooded timber, the snags and stumps sticking out of the water, the logs and branches and forest debris tangled up with the dead and drowning trees and scattered over the lake's 600-square-mile surface. . . .

To try to navigate the lake in a small boat, or land a float plane on it without someone to clear a path through the flotsam, is to invite disaster.⁵⁵

The present condition of Lake Williston was anticipated by the government from the outset; in January 1960 W.C. Mainwaring, president of what came eventually to be known as the Peace River Power Development Company, advised Arthur Paget of reservoir clearing plans:

This matter has been discussed with the Minister of Lands and Forests who has stated he does not wish to put us to any unnecessary expense in connection with clearing of the reservoir because he does not want this to have the effect of increasing the price of energy. We have included the sum of \$5 million in our project estimates for clearing up the shoreline around the reservoir where it is necessary and for removing unmerchantable timber that would be protruding above the water surface at the low water mark. I feel that this item is something that will have to be dealt with by the Minister and at the appropriate time it was our intention to discuss this matter with him.⁵⁶

Thus the government's use of navigation and recreational benefits as a partial justification for the project appears doubtful. Current information indicates that it will take another thirty years and up to \$86 million, with no allowance for inflation, before the reservoir can be considered completely navigable and clear of debris.⁵⁷

When the Peace project was announced in 1957, Bennett presented it in unequivocal terms as "the most momentous announcement I have ever made." He went on to say that power would be produced for one third less than power could be obtained from the Columbia, and that an agreement over downstream benefits would be negotiated

with Alberta. The magnitude of the project inspired the premier to predict that it could make British Columbia "one of the great industrial centres of the world."⁵⁸ Editorials in the *Vancouver Province* were no less congratulatory, revealing as well the profound infatuation with an ethic of growth and domination of nature:

Here, suddenly on the horizon, is the prospect of the industrial development of the vast British Columbia northland which not so very long ago was an unknown territory.

Here, in a future that is no longer so remote, is the possibility of a Canadian Ruhr built around vast mineral resources and vast power. . . .

Visionary it all is, and brain-numbing it is in the sheer size of it — the power of Grand Coulee and Hoover Dam combined; perhaps the biggest man-made lake on earth.

But listen to that gas surging into Vancouver through 650 miles of mountains.

Here, in this growing province, dreams can come true.⁵⁹

Feasibility Studies

Under the memorandum of agreement between Wenner-Gren and the B.C. government which supplemented the original agreement between the parties, Wenner-Gren was required in part to:

- 1. . . . undertake to carry out such technical feasibility surveys as are deemed necessary to substantiate preliminary conclusions already reached that the construction of a major hydro-electric project on the Peace River is practicable.*
- 2. . . . undertake to carry out these surveys so that on or before December 31st, 1959, if found feasible from the engineering standpoint, a firm construction commitment may be finalized and a comprehensive plan providing for the maximum economic development of the Peace River potential may be filed with the Comptroller of Water Rights.*
- 3. . . . undertake, should the detailed engineering studies and surveys substantiate the preliminary conclusions, to proceed with the construction of a major hydro-electric project on the Peace River in accordance with the laws of the Province and the terms of this agreement.*

The Province agreed

That the comprehensive plan for the economic development

of the Peace River potential shall be approved by the Comptroller of Water Rights within three months of the filing of same, such approval not to be unreasonably withheld, and that the plan shall show inter alia the phases and times of construction, estimated costs, and in so far as possible physically the programme for placing generated energy on the market. . .

and committed itself

- (a) to maintain a reservation on the waters of the Peace River for power purposes, and*
- (b) if a firm commitment to develop this project is received on or before December 31st, 1959, as herein provided, to ensure priority of application to the Principals for such licences as may be required for the proper development of the project referred to in this agreement.⁶⁰*

Thus, under the terms of this agreement Wenner-Gren's successor, the Peace River Power Development Co. Ltd., had slightly over two years to conduct investigations, engineering studies, prepare a detailed feasibility study, and file a comprehensive plan for the maximum economic development of the Peace River; the comptroller, on the other hand, was given only ninety days to issue his approval. Normally, consideration of feasibility and project design for an undertaking of this magnitude would require three to five years;⁶¹ the developers were under extreme pressure to meet the 31 December deadline. It has been suggested that the government's sense of urgency was occasioned by its desire to have an alternative available, which would provide the province with an improved bargaining position in the Columbia River negotiations.⁶²

The feasibility study prepared for the Peace River Power Development Co. consisted of nine volumes, covering geology, soils engineering, hydrology, dam, transmission system, report, and comprehensive plan. The plan proposed a 650-foot dam on the Peace River, creating a 260-mile-long reservoir and a powerhouse with an installed capacity of 2,535 megawatts, as well as a smaller dam with a gross head of 141 feet and a capacity of 650 megawatts at the lower end of the Peace canyon.⁶³ The whole focus of the study was on the physical possibility of construction and feasibility in the narrowest of economic terms. For example, the second Wenner-Gren agreement called for a "comprehensive plan providing for the maximum economic development of the Peace River potential." This stipulation was interpreted by the power development company to mean the creation of the largest reservoir physically practicable. Accordingly, the

plan called for a dam crest level 2,225 feet above sea level, despite the fact that a reservoir of that elevation made it necessary to relocate a main highway, a railway, and a major pipeline, and necessitated construction of works to reduce leakage in two natural saddles on either side of the river. This work was estimated to cost some \$7 million. It was later found that lowering the reservoir level by fifty feet would eliminate the need for these works and relocations, and the final design was revised accordingly.⁶⁴ The lack of consideration given to environmental costs, and other foregone resource opportunities such as lost timber production and loss of areas with the potential of substantial mineral wealth, will be discussed later.

Due to his limited staff and expertise, Arthur Paget requested additional funds to hire consultants to review the Peace River plans. At a cost of approximately \$200,000 a number of consultants were hired: D.J. Bleifuss, a professional engineer and power consultant from California; H.M. Hunt, an employee of the B.C. Power Commission; Hugh C. Golder to consult on soil mechanics; and Shawinigan Engineering Ltd. to consider transmission systems.⁶⁵ In November 1959 Bleifuss and Hunt outlined a programme of studies to be followed by the Water Rights Branch, and the necessary data to be supplied by the recently incorporated Peace River Power Development Co. In the consultants' view,

The primary concern of the Water Rights Branch is the safety of the structure involved. Its next concern is that the public resource, the Peace River, shall be developed to the best advantage of the Province, and this entails consideration of economics, benefits and possible deleterious effects.⁶⁶

It is difficult to fault the adequacy of the engineering investigations as to the safety of the dam structure. The outline of studies pursued by the comptroller's consultants indicates a careful and thorough review of dam and reservoir engineering.⁶⁷ However, the economic review and consideration of deleterious effects of the project could in no way be considered exhaustive. Under the general heading of economics were listed three deleterious effects of the project: "A, Seasonal navigation of Slave and Mackenzie River affected; B, Alternate icing and flooding of rivers downstream when larger than normal flows occur in winter; C, Submergence of about 589,000 acres of land containing merchantable timber and mineral deposits." No work was performed on these areas by the Water Rights Branch. Apparently these issues were regarded as being the concerns

of — respectively — the federal government and the company, the Alberta government water resources administrators, and the B.C. Forest Service and Mines Branch.⁶⁸

The consultants' report, adopted by the comptroller with slight modifications, stated that the project was feasible from an engineering perspective. Small changes in dam slopes and minimum freeboard were suggested. No consideration of the economics of the project was given in the report, except the statement that there would not be a market for power from more than one such scheme in British Columbia.⁶⁹

The only material produced which bore any resemblance to an impact statement was a document prepared on its own instigation by the British Columbia Fish and Wildlife Branch of the Department of Recreation and Conservation.⁷⁰ The twenty-page paper voiced three major concerns. The first was that northern pike might be introduced into the Fraser drainage system as a result of construction of the Peace River dam, since tributaries of these two great river systems lie in close proximity. In the view of the author, I.L. Withler, this eventuality could have two severe adverse consequences on the Pacific salmon fishery. Since pike are almost entirely piscivorous, within the Fraser system they could feed extensively upon smolt and pre-smolt stages of Pacific salmon. Moreover, pike are the sole host of the adult stage of a tapeworm, *Triaenophorus crassus*, which has been known to infest salmon and trout populations. In these fish it appears as a yellowish cyst about a half-inch long, filled with a viscous yellow fluid and a long, thin, coiled worm. These cysts, while harmless to man and animals, are objectionable in appearance and, when numerous, render the fish unmarketable.

The second major concern of the Fish and Wildlife Branch was the preservation and enhancement of the recreational and fisheries potential of the reservoir area. In their opinion, the creation of a reservoir could improve the fisheries potential of the region. However, they realized that the maintenance of the recreational and aesthetic values of the reservoir area was entirely contingent upon satisfactory clearing of forest cover from within the reservoir area; without such clearing, these values would be seriously reduced.

The following recommendations, predicated upon construction of the dam, were suggested as means of preserving the fishing and general recreational worth of the reservoir and adjacent areas:

1. *Provision must be made to prevent the entry of pike — *Esox lucius* — to the Fraser River drainage from the Peace River drainage system. . . .*
2. *Adequate clearing of the reservoir area must be undertaken to ensure the preservation of the fishing and general recreational worth of the reservoir under storage conditions. . . .*
3. *A flow of water sufficient to maintain fisheries requirements must be allowed to pass the dams during dam construction and reservoir filling and storage.*
4. *The Development Company should provide roads, access trails, campsites and boat launching facilities within the reservoir area for the use and enjoyment of the public. Reasonable public access to all roads, trails and recreational facilities should be guaranteed to the general public.*⁷¹

Awareness of Extra-provincial Effects

There is some truth in the prevailing view that problems in the delta resulting from the construction of the W.A.C. Bennett Dam were a product of the times, stemming from a lack of environmental awareness and a slavish acceptance of growth as an unquestioned good. Others have even suggested that, in retrospect, the entire development may be viewed as a beneficial occurrence, for it acted as a catalyst in raising an awareness of the need for proper consideration of the environmental effects and costs associated with development; it also promoted a greater understanding of the possibility of far-reaching consequences from what may superficially appear to be a relatively benign development.⁷² However, this perspective on the Peace project is only partially correct. It can be seen that there was also a large element of wilful blindness associated with the failure to appreciate the downstream consequences of the Bennett Dam.

By 1959 some consideration had been given to the problems of water levels in the delta and Mackenzie River systems. That year Russell and Kellerhals performed for the Peace River Power Development Co. a study of Athabasca flows and the effect of a proposed dam on the Peace River. Despite somewhat marginal data, their conclusions and predictions of resulting delta water levels were reasonably accurate.⁷³ According to Professor Russell, further data would only have served to refine existing predictions, which were accurate enough to allow reasonable inferences about anticipated effects and appropriate remedial measures.

Russell was assisted in his investigations by the federal government, which surveyed water levels and stream flows.⁷⁴ Thus, the federal government was aware of concerns about water levels in the delta, and in fact conducted its own investigations; E.P. Collier, district engineer in Calgary with the Water Resources Board, Department of Northern Affairs and National Resources, prepared a study of the downstream effects of Peace River regulation.⁷⁵

In March 1959, Arthur Paget, concerned about inter-provincial problems with the Portage Mountain project and yet recognizing that he had no authority to consider any inter-provincial aspect of the water licence application, wrote to the Minister of Lands and Forests, Ray Williston, in part as follows:

The Peace River development as now envisaged would result in material changes in the natural flow conditions downstream in the Peace River in B.C. and Alberta and in the Slave and Mackenzie Rivers in the Northwest Territories. These changes may have beneficial as well as adverse effects to the economy of these lands.

Under Article 4(k) of the agreement any downstream benefit will accrue to the Province rather than to the licensee, and all negotiations in this matter should be carried out by the Province. As to the damage and loss that may result both within and without the Province from the proposed development, it would seem that the responsibility to make full compensation for damage occurring within the Province will lie with the owner of the power development. Responsibility for damage outside the Province may have to be determined by litigation.

This last aspect of the Peace River development brings up a legal problem, namely, the right of the Province to regulate the use of water of an inter-provincial stream and the rights and obligations of a water licensee on such a stream.⁷⁶

Accordingly, Paget requested a legal opinion from the attorney-general on these and other matters associated with the project. It is clear from the above memorandum that there was widespread appreciation by the B.C. and federal governments, as well as by the developers, of the change in water levels that could be expected downstream.

It has been suggested that the delta was largely an unknown quantity at this time. Despite accurate predictions of water levels, the changes in the ecological regime and the effects which these changes would have on local communities and native people dependent on fishing and trapping for their livelihood were unforeseeable. The delta, according to

R.E. Bailey, was for most Albertans a disregarded hinterland.⁷⁷ However true this might have been, the nature of the consequences and the magnitude of harm that would be occasioned by the regulation of the Peace River would have been revealed to a knowledgeable person undertaking a cursory perusal of the pertinent literature available at that time. For example, a study by J.D. Soper published in 1951 described features of the delta and some of the wildlife resources dependent upon it:

The Peace-Athabasca Delta region, including the whole lake-lowland country to Lake Claire's western extremity, is a unit geologically and otherwise. A study of the physical conditions indicates that Lake Athabasca at one time extended westward unbrokenly to about the present west shore of Lake Claire. Since glacial times, great changes have taken place. Enormous quantities of silt have been discharged into the area by the Peace and Athabasca Rivers. Wide reaches of the earlier Lake Athabasca have become silted up, creating far-reaching, muddy lowlands, marshes, myriads of shallow ponds and lakes, and sluggish streams. The relatively shallow Mamawi, Claire, and Baril Lakes, and other bodies of water are remnants of the former west end of Lake Athabasca.

Most of the changes mentioned above derived from the action of Peace River, but Athabasca River also, has caused, and is causing, vast alterations. The amount of transportation and deposition of deltoid materials staggers the imagination. It would appear that in an early geological period a large bay existed in Lake Athabasca southwest of Bustard Island extending wide-open to the sandhills south of Richardson Lake. It is now almost completely filled with sediment and it constitutes the present-day delta of the Athabasca River. Yearly, more and more silt is being poured into the area. Vast deposits are slowly filling up Lake Athabasca off the mouths of the various channels southeast of Chipewyan, making the western extremity of the lake shallow from the mouth of Embarras River to the principal outlet at Riviere des Rochers. . . .

On the whole the country is dreary of aspect, being low, featureless and monotonous. Most of the land is no higher than from a few inches to a few feet above normal lake level (699 feet a.s.l.). Much of the shoreline is permanently swampy.⁷⁸

Soper went on to describe the importance of the delta to waterfowl:

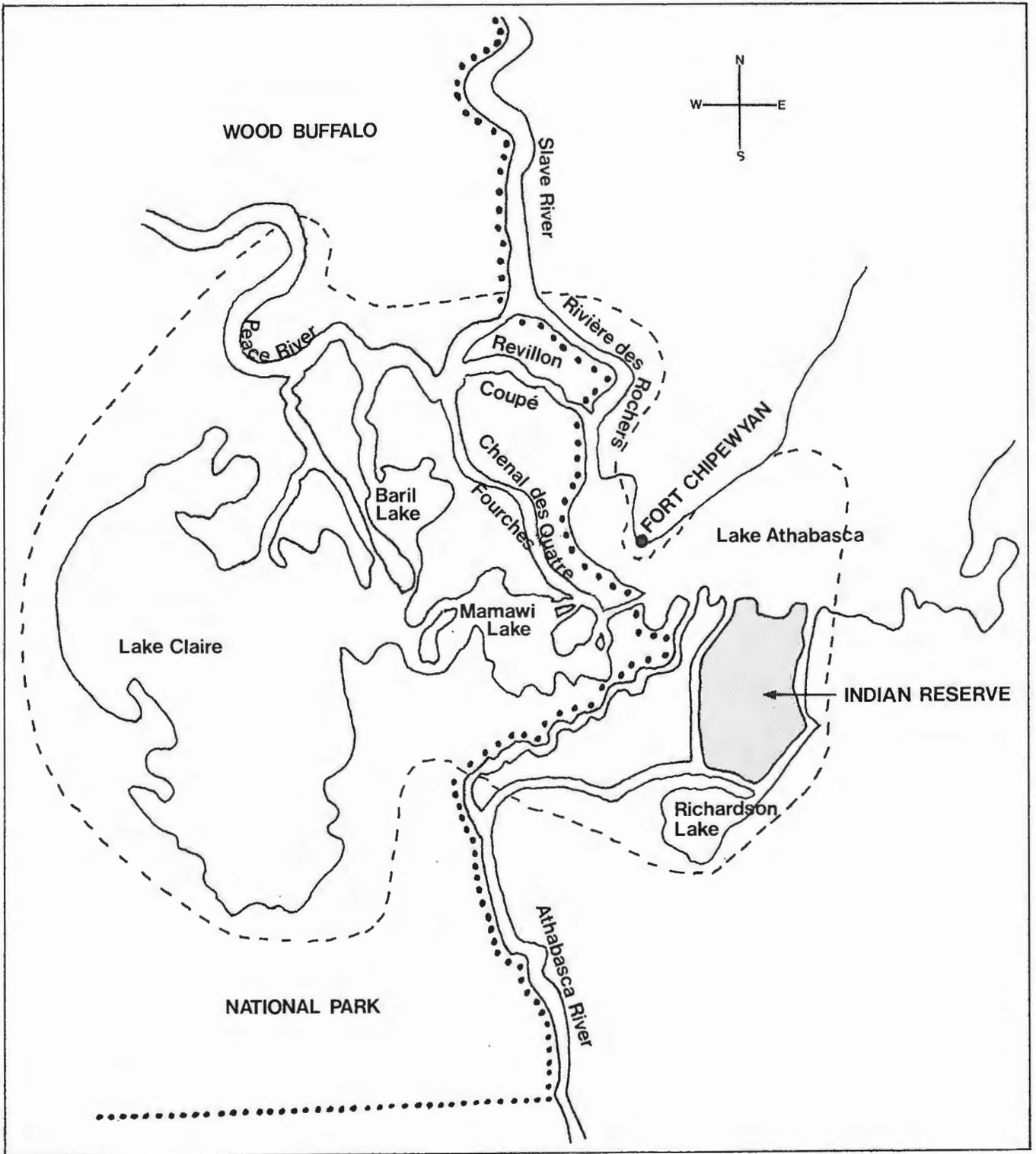


Figure 2 The Peace-Athabasca Delta

The Peace-Athabasca Delta region is the only nesting tract of primary importance for game ducks in the Mackenzie River drainage basin. The Lake Claire marshes support a per-square-mile duck population about nine times as great as that of the Slave or Taltson Deltas, and nearly twice that of the Mackenzie Delta.

Besides being a breeding environment of outstanding merit, it is a great migrational clearing house. Since time immemorial this part of the country has been a favorite stopping-place of migrating ducks and geese. Legions of the birds regularly resort to the region to feed and rest. It is on the direct route from the Mississippi-Missouri drainage region to the far north.⁷⁹

The social and economic importance of the delta to the native and Metis population was extensively detailed in 1951 by W.A. Fuller.⁸⁰ Fuller's report outlined the geology, geography, and vegetation of the area, and went on to describe the nature and behaviour of the muskrat population and its importance to the lifestyle and economy of the surrounding community. Fuller indicated an estimated muskrat productivity of some 43,000 animals annually. He estimated an average annual take of over 30,000 pelts, producing a total cash income of over \$80,000. For many native people, the cash received from pelts represented the only flow of money into an otherwise subsistence lifestyle. In fact, Fuller's figures on the value of muskrat to the local economy must be regarded as conservative; later reports suggest a muskrat catch of 144,000 in the peak year of 1965-66.⁸¹ Further, studies of the fisheries potential of the Athabasca area have pointed out the value of lake trout, walleye, whitefish, pike, and goldeye.⁸²

Given the predictions of reductions in delta water levels of from three to five feet, and the available knowledge that most of the productive delta consisted of shallow marshes and perched lakes, it becomes apparent that a significant impact upon the environment and people of the delta should have been anticipated by the planners of the Peace River project.

Columbia River Treaty Negotiations

By the beginning of the 1960s, development of the Peace River had become firmly linked with plans for the Columbia River, mainly because of Bennett's notorious "two river" policy.⁸³

The Americans provided the impetus for the beginning of negotiations regarding regulation of the Columbia. The

first step in this process was the 1944 referral to the International Joint Commission (I.J.C.) of the matter of cooperative development of the Columbia River Basin. The I.J.C. then created the International Columbia River Engineering Board, and charged it with the task of investigating the various approaches to development of the basin.⁸⁴

As Larratt Higgins has pointed out, the Americans entered this negotiation process with an early advantage because:

... a great deal of work had been done already on the American side. Two of the largest dams in the world were generating power on the main stem of the Columbia at Bonneville and Grand Coulee. In Canada, on the other hand, little was known about the basin, and there were no developments on the Columbia. Topographical maps had to be prepared and streamflow records had to be accumulated for at least a decade in order to provide adequate information of the dimensions of water supply before engineering proposals could be made. Thus the American plans were formulated before the Canadian alternatives emerged.

The [U.S. Army] Corps of Engineers issued a comprehensive report on the American portion of the basin in 1949. This report was important, not only for the detailed information it brought together, but also for a thesis it sought to establish according to which the benefits of storage decline over time. This fallacy was never challenged at the official level by Canada, and ultimately it led to serious defects in the Columbia Treaty as it applied to Canada.⁸⁵

The Americans had pressing reasons for seeking upstream storage on the Columbia. First, there was insufficient storage to justify or render economic the major dams then existing on the Columbia; second, more power was required to satisfy expanding industrialization in the Pacific northwest; third, the Americans were under considerable pressure to provide flood control for the protection of communities and property located within the floodplains of the Columbia; and finally, consumption was increasing because of a growing need for water for municipal, irrigation, and industrial purposes in the American southwest.⁸⁶

Accordingly, the Canadian government negotiators were placed under considerable pressure by the Americans to negotiate a treaty; but they also perceived political and economic benefits to be reaped through the successful negotiation of a treaty that would be in Canada's interest.⁸⁷ Unfortunately, a number of factors militated against such a

happy conclusion. The Americans, as mentioned, approached the bargaining table with considerable information in hand regarding the Columbia system and, more particularly, their own needs. The Canadian negotiating team largely consisted of political appointees, as opposed to its American counterpart which was largely made up of engineers and power experts,⁸⁸ conversant with the various methods available to satisfy American requirements for storage and power production.

Most significantly, the Canadian team had to contend with Premier Bennett, whose ratification of the treaty was required. Bennett touted the Peace River project as an effective means of producing satisfactory compensation from the Americans for the provision of upstream storage on the Columbia. Ultimately, however, he was more concerned that the Columbia River Treaty would jeopardize the Peace project and his expansionist northern plans. He feared that British Columbia could not absorb the power from both these immense developments, as his Water Comptroller, Arthur Paget, had stated in his report on the feasibility of the Peace development.⁸⁹ Gordon Shrum, then chairman of B.C. Hydro, has stated that Bennett proceeded on the basis that if the Peace were to go ahead, the Columbia would be developed as well, as a result of American pressure and the then Prime Minister John Diefenbaker's desire to successfully conclude a Columbia treaty. If the Columbia were to begin prior to any start on the Peace project, however, the power thus provided would forestall construction on the Peace for as long as twenty years, due to lack of domestic demand for power and the capital requirements for Peace construction.⁹⁰

Bennett's concerns led him to veto the then current treaty proposals which would have provided a large amount of electric power, but little money, to British Columbia.⁹¹ Ostensibly his veto was based upon a refusal to tolerate a dam in the East Kootenays; it had the effect of reviving the plan for a Libby dam which the Canadian negotiators had fought hard to forestall.⁹² For Bennett the veto was an unqualified success that resolved his problems. The new treaty did not provide electricity to B.C., but rather emphasized cash payments amounting to some \$275 million for sale of downstream benefits, thus providing part of the capital required for Peace construction without jeopardizing the markets for power provided by the dam.⁹³ However, his success was achieved at great cost to Canada, as Larratt Higgins has remarked:

At one point, early in these political negotiations, the

United States abandoned its demand for Libby and acceded to the Canadian diversion plan, which would provide the needed flood protection downstream in Idaho. Then the Bennett government, for its own political reasons, vetoed the Canadian diversion plan, much to the astonishment of the Americans. It was this action and, incredibly, its acceptance by the government in Ottawa that transformed the development of the Columbia from a triumph of common sense and international co-operation into the wasteful disaster that has integrated the Canadian Columbia into the United States economy. There was no standby Canadian plan. Not only was the Libby proposal included in the Columbia Treaty, but the vested interest so created was reinforced by a clause which effectively prevents Canada from making a significant diversion.⁹⁴

Other examples of anomalous behaviour on the part of both the federal government and Premier Bennett can be explained in light of the conflict over the Columbia River Treaty. At the height of the Columbia negotiations, Bennett and his aides travelled to the United States for some highly publicized meetings with the government and industry as far away as California to discuss markets for the export of power.⁹⁵ In retrospect, the purpose of these forays was mainly to serve notice upon the federal government that the province intended to proceed with the Peace River project. It also created a climate which would prevent the federal government from acting on its long-standing prohibition against the export of electric power, in the event that local markets were unable to absorb the total production from the Peace.⁹⁶

During the course of the Columbia treaty negotiations, the federal government — regrettably — regarded Bennett's proposed Peace project as a bluff to advance the provincial position in the negotiations. In particular, this was the view of E. Davie Fulton, then Minister of Justice, who headed the Canadian negotiating team and who apparently thought the best approach to such a threat was to ignore it.⁹⁷ This attitude prevailed until late in 1962, long after the expropriation of B.C. Electric and after a start had been made on construction of the Peace. At that time the following letter was sent to Gordon Shrum, then chairman of B.C. Hydro, from the federal Department of Public Works, of which Fulton was minister:

While an application under the Navigable Waters Protection Act has been received from you in connection with the Columbia River Power Development, I can find no record of a request relative to the Peace River Power

Development. Up to the present, I appreciate that much of the work was preliminary and planning. However, in the September 1962 issue of the Engineering and Contract Record, I note in an article by Mr. James G. Ripley that more definite plans are now underway.

It is indicated that some \$20 million has already been spent on the preliminary work and plans for a contract for the main dam are underway for next spring. In these circumstances, it seems appropriate that I might write to you about the Navigable Waters Protection Act.

Insofar as the Peace River is concerned it perhaps would seem that navigation will not be affected. On the other hand, we have received considerable comment on how this might affect, adversely, boat travel in the Athabasca, Great Slave and Mackenzie Rivers. For these reasons, we consider that the Navigable Waters Protection Act should be taken into account.⁹⁸

Upon receipt of this request, Shrum consulted with Senator J.W. deB. Farris, legal counsel for B.C. Hydro, whose advice was that there was only an arguable case that the Peace fell within the definition of “navigable waters” as established by case law, and accordingly there was some doubt whether approval was required from the federal government. Farris advised that no response be made to the letter. B.C. Hydro’s major concern was that, given an active confrontation, the federal government would pass legislation defining “navigable waters” for the purposes of the act.⁹⁹

B.C. Hydro’s attitude towards this and other problems signified an abrupt departure from the practice of its predecessor, the Peace River Power Development Co., which had been engaged in a continuing dialogue with the federal government over the downstream effects of the project. The company had clearly thought it necessary to make application under the Navigable Waters Protection Act, as the following excerpt from a letter, dated 14 January 1960, indicates:

With respect to the Dominion Government, we understand that studies are being carried out at present by the Water Resources Branch in Ottawa on the basis of material supplied by ourselves and others. The results of these studies will, no doubt, be taken into consideration when our application under the Navigable Waters Act is made.¹⁰⁰

The federal government made no further requests for approval of the project, a regrettable omission in that an investigation of the effects of the dam on transportation on the Athabasca and Mackenzie rivers would undoubtedly

have brought to light many of the problems experienced in the delta. It might also have led to the imposition of terms requiring at least the provision of remedial measures, and an enhanced schedule of water releases extending the period for the filling of the reservoir behind the Bennett Dam.

Economic Evaluation of the Project

During the course of the Columbia negotiations, the Portage Mountain project was subjected to serious criticism within British Columbia on the basis of its economics. The Columbia River Treaty, as approved by the I.J.C., provided for the return of substantial blocks of power to British Columbia in exchange for storage provided in the province. The construction on the Peace, however, was dependent upon an undertaking by the B.C. Electric Co. to purchase the power from the Peace River Power Development Co., since B.C. Electric held a monopoly on the distribution and sale of electricity within the lower mainland.¹⁰¹ B.C. Electric consistently refused to deliver such an undertaking. A.E. Grauer, president of B.C. Electric, was of the opinion that returned power from the Columbia would undoubtedly be cheaper than that produced by the Peace. He also felt that the company could thermally produce electricity more cheaply, by utilizing the vast Hat Creek coal deposits which were already largely owned by B.C. Electric.¹⁰²

The premier responded on 28 December 1960 by referring the matter of cost to the recently created B.C. Energy Board. The board was advised that “construction of two major projects involving the Columbia and Peace Rivers in British Columbia now appears feasible and conflicting views are entertained as to the cost and benefits to be derived from each project”¹⁰³ Because the B.C. Energy Board was visibly composed of political appointees and because the major local consulting firms had at one time or another been involved in either the Peace or the Columbia projects, the chairman Gordon Shrum refused to engage any consultants who had previously been employed. Instead, he went to Britain and arranged for studies to be conducted by Sir Alexander Gibbs and Partners, and Mertz and McClelland Ltd.¹⁰⁴ These firms considered the cost of power delivered to Vancouver by both projects. The following elements were considered: capital investment; method of financing; annual operating costs; market for the energy during and after completion of the project; and amount of energy delivered by each project to the load centre. Gibbs and Mertz also gave cursory consideration to the cost of power produced by a Hat Creek development, relying solely on figures provided

by B.C. Electric. They concluded that Hat Creek power “would not be any more economical than the development of the hydro resources in the province.”¹⁰⁵

When Shrum received word that the consultants’ evaluation indicated that the cost of power from the Columbia would be substantially cheaper than that from the Peace, he immediately went to England to check their figures. There he apparently discovered that the difference in cost was affected by the mode of financing, the Peace delivering power at a cost similar to the Columbia if its financing was changed from private to public.¹⁰⁶ This change allowed the Energy Board to table before the legislature a report which stated that private Peace power was not competitive with publicly-financed Columbia power, but that there was no significant difference between the two if the Peace were publicly-financed.

This was the justification that Bennett needed to expropriate the recalcitrant B.C. Electric, which was done by way of The Power Development Act,¹⁰⁷ passed 1 August 1961, the same day that the B.C. Energy Board report was tabled. The report, however, was misleading. The Columbia calculations did not include a cash payment from the United States of \$64 million in flood control benefits, and no allowance was made for federal participation in the Columbia financing. Further, Professor H.F. Angus, board member and chairman of the Public Utilities Commission, issued a minority report in which he argued that the evidence before the Energy Board was inadequate to support a finding that the public financing of the Peace River project would be cheaper than private financing. He said of the board’s majority opinion: “it is based on arbitrary percentage figures representing the interest on government guaranteed bonds in the case of public power, and a supposed rate of return in the case of investor-owned power.”¹⁰⁸

The provincial government’s decision and the B.C. Energy Board report were further criticized by a group of professors from the University of British Columbia, chaired by A.D. Scott of the Department of Economics.¹⁰⁹ They issued a report dated 26 February 1962, in which they compared the cost of power from the Columbia River Treaty project, the proposed Moran hydro-electric project, the proposed Hat Creek thermal project, the Burrard thermal project, and the Peace River project. Their conclusions were as follows:

1. *The Columbia River Treaty should be ratified if on-site generation at Mica is shown to be unusually low-cost and if the installation of the generators is to be proceeded*

with immediately. However if these two conditions are not met the Treaty should not be ratified and should be re-negotiated either (a) to postpone Mica indefinitely without altering the terms of the Treaty (thus providing Canada with 916,000 kw at a cost of approximately 2 mills per kwh, which is Class 1 electricity), or (b) to alter its other terms so that the cost of Canada’s share of the energy under the whole Treaty is reduced approximately to that of Class 1 energy (that is, 2 ½ mills per kwh).

2. *The Moran project is more attractive than either the Peace or the present Columbia River Treaty projects.*
3. *The Hat Creek project is attractive, especially if it can be operated at a high load factor.*
4. *A cost of 4 mills per kwh should be regarded as the highest cost that need be paid for energy in the lower mainland of British Columbia under present circumstances.*
5. *Because the costs of the Peace River project are higher than those of a re-negotiated Columbia River Treaty, of Moran, or of Hat Creek, the building of the Peace River project should be delayed until, by comparison with these other projects, it is shown to be the most desirable.*¹¹⁰

Unfortunately, this critique was too little and too late. Contracts had been let and construction had begun almost one year prior to the release of this report. The report also made no attempt to quantify any of the indirect economic costs of the various projects, although the authors did issue the following disclaimer, which is indicative of the state of analysis that was applied to major projects in the early 1960s:

*Decisions by governments about the development of river basins are based chiefly on an assessment of the economic merits of the development, but they are complicated by the need for considering political and sociological issues which are not amenable to precise evaluation. The authors have concerned themselves only with economic studies because they consider economic evaluation to be the common basis for comparing widely different projects.*¹¹¹

The only attempt to transcend a narrow economic evaluation appeared in a brief article by M.Y. Williams in the *Canadian Saturday Night* of September 1962. That article considered the losses of arable land and mineral and forest reserves due to reservoir flooding, and contained the first

published refutation of the Williston argument that the reservoir would enhance navigation. The article concluded with the suggestion for the following alternative:

What is the answer? Substantial blocks of power can be developed at the head of, and in the Peace River canyon at Hudson Hope; at the Gates a few miles below; at Finlay Forks; and probably at the Ottetail and Ne-parle-pas rapids, without closing the transportation route or inundating an undue amount of farm land or timber. Such power will serve local needs and help build up the surrounding country. The huge project planned will develop southern communities at the cost of blighting a public domain comparable in size to Washington State.¹¹²

British Columbia-Alberta Negotiations

A consideration of the decision-making leading to construction of the Bennett Dam causes one to ask whether greater inter-provincial co-operation might have prevented or ameliorated the downstream effects of the project, and whether Alberta could have been more vigilant in protecting its interests.

Communications between Alberta and British Columbia began in November 1957, shortly after the signing of a second memorandum of intention between the B.C. government and Wenner-Gren, in which the latter agreed to undertake studies to determine the feasibility of a major Peace River hydro project.¹¹³ On 6 November 1957, L.C. Halmrast, then Alberta Minister of Agriculture, wrote to Ray Williston. He confirmed their prior phone conversation, wherein the B.C. minister had stated that Alberta would suffer no disadvantage by way of the project, but rather would benefit from the more regulated flow of the Peace River. Halmrast also requested engineering reports concerning the proposal.¹¹⁴ Williston replied, enclosing the requested material and stating:

You may be assured that we have no desire to over-ride your interests in the Peace. We believe development will be in the interest of not only the provinces of Alberta and British Columbia, but of Canada as a whole.¹¹⁵

Further correspondence passed between the two ministers, together with an exchange of information between the B.C. Water Comptroller's office and Alberta Water Resources engineers.¹¹⁶ J.L. Reid, the Alberta supervisor of hydro-electric development, visited officials in B.C. in October 1959 to

gather information and review proposals for Peace River power development.¹¹⁷

In addition, W.C. Mainwaring, president of the Peace River Power Development Co., met with E.C. Manning, Premier of Alberta, in early 1959 to outline the investigations being conducted by his company. Manning's major concern emerges from a letter dated 13 May 1959 from Mainwaring to Arthur Paget:

What Premier Manning is chiefly interested in knowing is just what volume of water will be flowing down the Peace River during minimum flow periods. I feel sure our engineers would like to restrict the flow of the Peace River entirely during the time the reservoir is filling and whether the rivers that flow into the Peace at a point between our own dam and the Alberta border would provide sufficient water to meet Alberta's minimum requirements I do not know, but that is one of the important things that we shall have to discuss.¹¹⁸

The Peace River Power Development Co. was apparently charged with the task of ensuring the acceptability of both the Alberta and federal governments of the proposed schedule for water releases during construction of the dam and filling of the reservoir.¹¹⁹ In a letter of 14 January 1960 to Arthur Paget, F.J. Pine of the Peace River Power Development Co. set forth the various meetings that took place between officers of the company and officials of the federal and Alberta governments. The following excerpt sets out Alberta's requirements for water releases:

Considerable discussion (of the Province of Alberta requirements for minimum flow in the Peace River) followed. Messrs. Bouthillier and Somerville pointed out that from their standpoint the limiting factors on the Alberta portion of the river were:

1. *Maintaining sufficient water at the intake of the town of Peace River water works.*
2. *The dilution of Peace River town's sewage.*

"Both of these requirements would be met by a flow of 6,000 c.f.s. at the B.C.-Alberta border.

"Mr. Reid brought up the question of navigation on the Peace River below Peace Point and of the Slave River during certain seasons. The question of ensuring enough water for navigation would have to be referred to the Federal authorities but it appeared that a flow of about 20,000 c.f.s. to 30,000 c.f.s. would be required near the mouth of

the Peace. The critical period to be about September . . . ¹²⁰

An article which appeared in the *Vancouver Province* in August 1961 under the caption "B.C.'s Peace Project Wins Alberta Approval," however, leaves the impression that Alberta was not overly concerned about the effects of the Peace project. ¹²¹

No further communication on the subject appears to have taken place between British Columbia and Alberta until 25 October 1962. At that time Harry E. Strom, the new Alberta Minister of Agriculture, wrote Williston suggesting that he and members of his engineering staff visit B.C. to obtain a further progress report. ¹²² That consultation never took place. On 10 December 1962 Strom again wrote Williston, apologizing for the delay in answering his correspondence and stating: "Due to pressure of work at this time, I will be unable to visit your Province this year. However, I would like to keep the invitation open for a later date if this can be arranged satisfactorily." ¹²³ Strom never made those arrangements. He did, however, become concerned when he learned of the water licence issued to the British Columbia Hydro and Power Authority (B.C. Hydro) in December 1962. ¹²⁴ Strom wrote Williston on 11 January 1963 to express concern about the licence, in which it was stated that a flow of not less than 1,000 cubic feet per second (c.f.s.) was to be released from the dam at all times. He noted that the Peace River Power Development Co. had agreed to a minimum flow of 6,000 c.f.s., a figure which Alberta wished to have upheld. In a letter dated 26 March 1963 Williston replied as follows:

With respect to your remarks concerning promises by the Peace River Power Development Co., it is first recorded that this government was not associated with these presentations and does not feel bound by pronouncements of its officials. However, it could be noted that only once in the period of record has the flow at Peace River, Alberta been as low as 6,350 c.f.s. which was during March, 1919. Extremely low flows are likely the consequence of ice jams acting as temporary dams and would not be corrected by increased flows. ¹²⁵

It is apparent that Alberta was not actively concerned about protecting the interests of the people in the delta area. Any concern that the province did express was directed at protecting the town of Peace River from the consequences of lowered Peace River flows. There were a number of reasons for this. R.E. Bailey has suggested that the Peace-Athabasca

Delta was considered to be a hinterland, largely an unknown quantity and regarded as being of no great moment both before and after construction of the Bennett Dam had begun. ¹²⁶ Even when concern was expressed about the possibility of falling water levels in the Peace-Athabasca region, Alberta took the view that this was a federal concern. If the major fear pertained to the effect on navigation, this was a federal responsibility; and as the vast bulk of the potentially affected lands lay within Wood Buffalo National Park, they too were of concern only to the federal government.

This view was expressed by F.L. Grindley, Alberta's Director of Water Resources, in a letter of 24 August 1961 to R. Perrault, British Columbia MLA. Grindley remarked that the Peace project would have a beneficial effect in Alberta by absorbing flood peaks and providing a regular flow of some 40,000 c.f.s. which could make feasible a power site in Alberta. He refused to comment on the prediction of lowered water levels made by W. Bruce Hunter, general manager of Northern Transportation Co. Ltd., since this was a federal matter being studied by the federal government. ¹²⁷

Alberta's non-response to the potential effects of the Peace project was dictated by the tacit assumption that the project would, on balance, be of benefit to the province. This approach likely stemmed, in part, from the highly publicized negotiations over the Columbia River development, in which for the first time it had become apparent that the provision of upstream storage on a major river might have a tangible value for which the downstream beneficiaries could be expected to pay. The B.C. government adopted the same attitude. Gordon Shrum has stated that the B.C. government was prepared, if Alberta raised any questions about deleterious effects downstream, to present in answer the benefits to be reaped by Alberta. ¹²⁸ In short, it appears that the Alberta government felt that by keeping silent the province could gain, at little cost, benefits similar to those for which the Americans were willing to pay handsomely. ¹²⁹

Regulatory Procedures

It is usual today in most jurisdictions in Canada to expect at least some form of inquiry or approvals process, usually including a public hearing, before a major project or resource development is allowed to proceed.

As the preceding historical account indicates, the B.C. government, through the feasibility and design stages of the Bennett Dam, acted as project proponent. The memoranda

of intention signed by Premier Bennett were virtual guarantees that the project, if proven feasible in the narrowest sense, would be allowed to proceed. Nevertheless, the Peace project was subjected to certain evaluations, discussed earlier: the feasibility study prepared by the Peace River Power Development Co.; the engineering evaluation and approval-in-principle conducted by the Water Comptroller's office; and the B.C. Energy Board report, which considered in narrow terms the economics of the Peace and Columbia projects.

In addition, the comptroller held hearings in Chetwynd, B.C. and Victoria on 2 August and 15 October 1962 respectively. These hearings were held under the provisions of Sections 9 and 29 of the Water Act R.S.B.C. 1960 which provide:

9.(1) Any licensee, riparian owner, or applicant for a licence who considers that his rights would be prejudiced by the granting of any application for a licence, or the Deputy Attorney-General, the Deputy Minister of Recreation and Conservation, or the Deputy Minister of Agriculture, may, within such time as may be prescribed in the regulations, file an objection to the granting of the application. . . .

29. Whenever it appears to the Comptroller, Deputy Comptroller, Engineer, or Water Recorder that the proper determination of any matter within his jurisdiction necessitates a public or other inquiry he has power to hold such inquiry, and for that purpose has all the powers and jurisdiction of a Justice of the Peace under the Summary Convictions Act.

Some seventy objections to the licence were heard:

In the first hearing representatives of B.C. Hydro were at hand to answer questions of the objectors and the Comptroller. Of the objectors only some major petroleum interests, a representative of Indian Affairs and the Department of Recreation and Conservation made presentations; a few individual objectors with mineral interests had their letters read into the record. Most of the objectors were only concerned with compensation.

The representative for the Indians in the area presented a brief; his aim was to have flooded reservation land replaced by provincial Crown land rather than receive monetary compensation. A Fish and Wildlife fisheries biologist testified that the reservoir would devastate the big game in the area by wiping out essential grazing area and disrupting

the migration patterns. There had been no field investigation to evaluate the extent of this loss. Based on the findings of the scanty 1959 report prepared by the Branch on the possible fisheries problems in the reservoir the author of that report testified that grayling game fish in the river would be diminished, while lake trout would likely flourish. Again concern was expressed that northern pike might be introduced into the Fraser system.¹³⁰

The hearings suffered from the now familiar litany of complaints: the general public had no standing to appear; there was no access to information; there was little relevant information to gain access to; no resources were available to mount an effective intervention; and the scope of the hearings did not allow the public interest to be raised. Obviously the absence of these elements, only today becoming recognized as valid prerequisites to enlightened decision-making, is not an appropriate ground for criticism of a process which occurred almost fifteen years ago. The contrast, however, is instructive. The hearings that were held in 1962 were viewed as merely a formality by the provincial government and B.C. Hydro. Before the hearings began, Gordon Shrum, then chairman of B.C. Hydro, received personal instructions from Bennett — rather than from the cabinet — to commence the project.¹³¹ Accordingly, Shrum called tenders for various stages of the project, and construction of the diversion tunnels began in April 1962. Yet the water licence for the project was not issued until 21 December 1962.

The Peace project also brought about a backward step in the regulatory procedures then existing in the province. Prior to the takeover of B.C. Electric, the B.C. Public Utilities Commission was empowered to hold hearings before issuing a Certificate of Public Convenience and Necessity, required for a power development such as the Peace. The co-ordination of hearings to be held by the commission and by the comptroller had been the subject of some discussion. On 23 November 1959, H.F. Angus, chairman of the P.U.C., wrote to Arthur Paget:

From informal conversation with the solicitors from Northern B.C. Development, I understand that they expect to present applications both to the Water Rights Branch and to the Public Utilities Commission at a very early date and to press for speedy action. . . .

I understand that the view of the solicitors is that they should obtain a Certificate from the Commission and then apply for a water licence but I am inclined to think that this procedure would, as a practical matter, be quite unsuitable in the present case.

My reason for this opinion is that the water licences are the dominating consideration in the disposal of natural resources and that the economic feasibility of a project, which is what the Public Utilities Commission would have to consider, does not arise until the resources problem has been resolved.

*I am, however, of the opinion that the Water Rights Branch and the Public Utilities Commission might very conveniently act concurrently. My idea would be that an application should be made both to the Water Rights Branch and to the Public Utilities Commission and that these two bodies should make the preliminary investigations in collaboration with each other.*¹³²

But this relatively enlightened proposal did not come about. By Section 12 of the B.C. Hydro and Power Authority Act, B.C. Hydro was exempted from the provision of the Public Utilities Act, and hearings regarding the issuance of a Certificate of Public Convenience and Necessity were never held. The Public Utilities Commission is now defunct, having been replaced by a more specialized and expert body, the B.C. Energy Commission. However, B.C. Hydro, in respect of its energy forecasting and the planning and construction of major electrical projects, is still not answerable to the present B.C. Energy Commission, despite the fact that the commission is charged with the task of determining energy needs and regulating every other aspect of energy supply within the province.¹³³

In recent hearings before the Comptroller of Water Rights regarding dams proposed by B.C. Hydro, the comptroller has been willing to listen to any person or group wishing to make a presentation, and has attempted to hold expanded hearings that would touch on the larger interest; but he is not empowered to do so, nor is he empowered to take into consideration questions of policy. His statutory concerns remain the effects of the proposal upon other water licensees and land holders, as well as the safety of the structures involved. These broadened hearings are an improvement but still must be regarded as unsatisfactory, since they serve mainly as a vehicle for the venting of public ire, and provide the illusion but not the reality of an opportunity to influence policy decisions.¹³⁴

In most hearings under the Water Act pertaining to proposed hydro developments, the Department of Recreation and Conservation has appeared as the defender of the natural amenities affected by the project. However, due to a lack of resources and government-imposed restraints, as well as the previously mentioned difficulties with

the forum itself, this department has found itself in a one-sided adversarial contest with the B.C. Hydro authorities. Although Sections 38 (1), 40 (1), and 40 (4) of the Water Act provide for appeals from decisions of the comptroller, these appeal procedures do not afford much opportunity of significantly changing a decision. It has usually been the case that the minister responsible for water resources and the Water Rights Branch — the Minister of Lands and Forests — has also served as one of the directors of B.C. Hydro.¹³⁵ Similarly, an appeal to the provincial cabinet by the Deputy Minister of Recreation and Conservation usually places that department in the position of examining major decisions that have already been taken. Thus B.C. Hydro, as a Crown corporation largely under the direction of the provincial cabinet and exempted from significant accountability otherwise provided by statute, is much less easily regulated than would be a private corporation in a similar position, and is more likely to control the very bodies which are supposed to regulate it.¹³⁶

The federal government possesses significant powers which can allow it to regulate inter-provincial waters and works thereon. The Navigable Waters Protection Act R.S.C. 1970 embodies the federal power over navigation, and Section 5 (1) of the act provides:

No work shall be built or placed in, upon, over, under, through or across any navigable water unless

- (a) the work and the site and plans thereof have been approved by the Minister upon such terms and conditions as he deems fit prior to commencement of construction;*
- (b) the construction of the work is commenced within six months and completed within three years of the approval referred to in paragraph (a) or within such further period as the Minister may fix; and*
- (c) the work is built, placed and maintained in accordance with the plans, the regulations and the terms and conditions set out in the approval referred to in paragraph (a).*

Although the B.C. government was prepared to adopt the view that the Peace project was not a work built upon a navigable river, because the rapids at the dam site did not allow passage of boats,¹³⁷ there is also a defensible view that it was. For example, in *Attorney-General of Quebec v. Fraser* [1906] Mr Justice Girouard remarked:

it is not necessary that navigation should be continuous . . . A river may not be capable of navigation in parts, like the St. Lawrence at the Lachine Rapids, at the Cascades, Coteau and Long Sault rapids, the Ottawa at Carillon, the

*Chaudiere and the Chats rapids, and yet be a navigable river, if, in fact, it is navigated for the purposes of trade and commerce.*¹³⁸

By the above provisions of the act, the federal government possessed sufficient authority to regulate construction of the W.A.C. Bennett Dam and attach such terms and conditions as it saw fit. A measure of blame for the consequences of the project must therefore be placed upon the federal government for its failure to use its regulatory powers. Furthermore, the Alberta government was lulled into inaction by the belief that the federal government would take steps to protect areas within its jurisdiction, such as Wood Buffalo National Park.

Public Interest Action – “Death of a Delta”

Two reports, one published in 1960 and the other in 1962, predicted that after completion of the Bennett Dam the levels of Lake Athabasca would be significantly lowered.¹³⁹ Coulson estimated that during reservoir filling, the maximum levels of Lake Athabasca would be reduced by approximately three feet. These reports were responsible for generating concern over the effect that the Bennett Dam could have on navigation on the Mackenzie River.

By 1965 Dr S.B. Smith, Director of the Alberta Fish and Wildlife Branch, was aware of the possibility that the delta might be jeopardized by the rapidly proceeding construction of the Bennett Dam. Both he and R.E. Bailey of the Alberta Water Resources Branch tried to persuade their superiors to instigate some investigation into the possible effects on the delta.¹⁴⁰ In March 1966 Smith requested funds to investigate the ecological consequences of lowered water levels in the Peace-Athabasca Delta. The Alberta Minister of Lands and Forests, H.A. Ruste, refused funding.¹⁴¹ Smith then took the liberty of writing to federal and provincial agencies having some interest in the delta area. He discovered other individuals in various government departments who had conducted limited investigations in the delta and were concerned about the potential consequences of lowered water levels. These included R.M. Bennett of the Department of Energy, Mines and Resources and W.E. Stevens of the Canadian Wildlife Service (CWS), both of whom were aware of the studies predicting changes in the water regime of the delta.

Out of these initial contacts an *ad hoc* committee was formed to press for action. Due to the efforts of this committee, the CWS became conscious of the delta problem and

in 1968 attempted to obtain funding from Ottawa to conduct a five-year ecological study of the area.¹⁴² Although they failed to receive a positive response from Ottawa, the regional office of the Canadian Wildlife Service in Edmonton asked H.J. Dirschl to conduct studies on succession in the delta. His report, released in 1969, pointed out the vegetational changes occurring in the delta.¹⁴³

Despite its efforts, however, the committee failed to obtain any commitment for action from either the federal or provincial governments. As a result, the group – which by now had expanded to include a number of hydraulic engineers, geographers, and biologists – decided to prepare a brief for presentation to the press, detailing the changes in the Peace-Athabasca Delta.¹⁴⁴ The brief was entitled “Death of a Delta,” and on its cover was a dramatic photograph of the dry basin of Lake Mamawi in the delta. Released on 5 June 1970, it succeeded in galvanizing the governments of Alberta and Canada into almost immediate action.¹⁴⁵

The brief was sent to Pierre Trudeau and Harry Strom and contained the following covering letter:

We the undersigned are familiar with the rapid ecological and hydrological changes taking place in the Peace-Athabasca delta of northeastern Alberta. Those changes have occurred as a direct result of the regulation of the Peace River by the W.A.C. Bennett Dam in British Columbia and will be permanent unless prompt action is taken to reverse them. The accompanying brief expresses our strong concern for the damage that is being caused to the land and the people of the region.

Fortunately, the situation does not appear to be without remedy, provided that certain actions are taken at once. We urge that you consider at least three essential steps to meet the crisis:

1. *Temporary partial obstruction of the outflow channels from Lake Athabasca to the Peace River, to be commenced in the summer of 1970.*
2. *Setting up a task force to plan more complete remedial measures in 1971 and 1972, utilizing the best expertise available in Canada.*
3. *Negotiating at the highest levels with the governments of the adjoining provinces, and the government of Canada, to secure co-operation and to clarify questions of liability and compensation for damages suffered by this province and its residents.*¹⁴⁶

The brief went on to describe the situation and make the following recommendations:

1. *The Government of the Province of Alberta should immediately initiate a crash program to develop Emergency Water Management Measures to allow the delta system to survive until more permanent remedies are found. As a first step the rapids in the Riviere des Rochers could be obstructed during 1970 in order to raise lake levels sufficiently to halt the explosive ecological changes now occurring.*
2. *The governments affected are urged to initiate a thorough study of the present and anticipated changes in the delta region in order to develop permanent remedial measures based upon hydrological and biological considerations.*
3. *Insofar as the Government of Alberta has the duty to protect the rights of the Crown vested in it, as well as the property rights of its residents, we recommend that the Government of the Province demand restoration of the status quo ante from those who knowingly or unknowingly caused damages to happen in the Peace-Athabasca delta that only now are becoming apparent. If restoration cannot be obtained, the Government should take immediate steps to appoint appraisers familiar with the kinds of damages being caused in order that compensation may be demanded. Such mitigation would allow the financing of the above remedial measures, and also compensate the Crown and those residents of Alberta directly affected.*
4. *Insofar as the Government of Canada has duties to safeguard the rights of the Crown with respect to Wood Buffalo National Park, the Migratory Birds Treaty, and Acts in behalf of the Treaty Indians residing in the region affected, it should institute similar action to safeguard the rights being threatened.*
5. *In view of the likelihood that future development will further affect the Peace-Athabasca delta, as well as other unique habitats, it is strongly recommended that studies be undertaken of the ecological consequences of water management planning in the Saskatchewan-Nelson Basin and the Peace-Mackenzie Basin. The intent must be to develop management principles that will allow the hydrological and ecological systems therein to continue to function in the foreseeable future for the benefit of present and future generations of Canadians.¹⁴⁷*

In response to the brief, on 12 December 1970 the governments of Alberta and Canada agreed to establish a joint task force to study the delta problem. Shortly thereafter, F.J.

Forbes of the federal Inland Waters Directorate was dispatched to Alberta to meet with S.B. Smith and R.E. Bailey. The three then drafted the proposal for what became known as the Peace-Athabasca Delta Project,¹⁴⁸ which was then conveyed to the federal government. The proposal suggested a simple administrative arrangement consisting of a study director with a small support staff, and a liaison team consisting of a representative appointed by each of the participating governments. In addition, provision was made for an advisory committee to provide technical advice to the study director, and to assist the director in obtaining technical input from various government agencies.¹⁴⁹

The federal government approached the governments of Saskatchewan and British Columbia, asking them to take part in the proposed study. Saskatchewan, concerned about the effects of the Bennett Dam upon Lake Athabasca — the majority of which is located within Saskatchewan — agreed to participate. British Columbia, whose participation in the study was regarded as essential, because of the possibility of regulating the Bennett Dam in a manner that would lessen the downstream effects in the delta, refused to take part. The province based its refusal on the fact that the B.C. Hydro and Power Authority was currently involved in two court cases dealing with alleged downstream effects of the Bennett Dam, and was therefore “not in a position to participate in any outside study on the Peace River.”¹⁵⁰

A symposium on the Peace-Athabasca Delta was first proposed in May 1970. It was organized by a group containing many of the members of the “Death of a Delta” committee, and was ultimately held in January 1971.¹⁵¹ Whether by accident or design, the timing was fortunate; at the time of the symposium, the study group referred to above had been constituted and was establishing its office in Edmonton. The papers presented to the symposium served to advance considerably the knowledge about the delta, analyzing the hydrology and ecology of the region and recommending remedial measures based upon these studies. In addition, the social, economic, and legal aspects of the delta problem were extensively canvassed. Generally, the symposium was a unique and beneficial occurrence, which has served as a precedent for effective involvement in decision-making. Instead of being merely a platform for the highly vocal castigation of government and developer, the symposium served as a platform for the further investigations of the federal-provincial study group, and many of the recommendations were eventually adopted or implemented.

Although the “Death of a Delta” brief can be viewed as the vital element that prodded the government into action,

in many respects its success as a catalyst was a product of the times. A public awareness of environmental problems was newly ascendant, the public was receptive, and the media were more than willing to provide coverage. In these circumstances, the brief served as a trigger for an already awakened public sentiment.¹⁵²

In one sense, the Bennett Dam's downstream effects in the delta have been instructive, because they have served to alert us to the fact that large developments may have significant indirect effects that are not immediately apparent. Some of the improvements in environmental impact analysis, large-scale resource decision-making, and institutional structuring that have occurred since construction of the Bennett Dam can be attributed in part to the impact that the delta problem has had on decision-makers. Another direct result has been the formation of the Mackenzie Basin Intergovernmental Liaison Committee, made up of officials of the federal, British Columbia, Alberta, Saskatchewan, Yukon, and Northwest Territories governments.¹⁵³ The committee was conceived at a seminar held in June 1972 to consider water management problems in the Mackenzie Basin. It now acts primarily as a vehicle for the exchange of information between the various governments regarding the basin itself and works or developments that are contemplated within the basin. This institutional arrangement will be discussed later in the paper.

The Peace-Athabasca Delta Project: Studies and Remedial Measures

The Peace-Athabasca Delta Project was formally constituted in January 1971, and quickly established a head office in Edmonton and a field office in Fort Chipewyan. D.M. Hornby, appointed as director, set the immediate objective of placing a preliminary report before the government by September 1971 and a major report by July 1972. The decision was made to focus first upon ecological aspects, and to assess potential remedial actions, both short- and long-term. Accordingly, thirty different studies were commenced, examining among other things ice and lake depth; water quality; photo interpretation of vegetation patterns; photogrammetric topographic mapping; fish, waterfowl, and all other significant wildlife in the delta area; water control; various alternatives for control of water levels in the delta; and socio-economic, legal, and jurisdictional studies.¹⁵⁴

The director's September 1971 report to Jack Davis,

then federal Minister of the Environment, made the following recommendations:

- I. *If you accept the lack of an ecological disaster and see instead serious and vital concern for ecological conditions, then I will properly have portrayed the condition I believe exists in the Delta area. Certain matters deserve more attention than others; many will receive attention during the period of study now envisioned to July 1, 1972:*
 - (a) *The Bennett Dam and Williston Reservoir require much more detailed appraisal in order to determine their effects and to consider possible corrective measures to override aspects which, at present, seem to have detrimental effects.*
 - (b) *It is now necessary to act on the question of the diminution of water levels in the Mamawi, Claire and Baril Lake areas in order to protect the groundwater situation.*
 - (c) *The statement "As Lake Athabasca goes, so goes the Delta," indicates that unless there is significant improvement in natural conditions, which I doubt, action will have to be taken in the Riviere des Rochers. I would suggest that this will occur next year.*
 - (d) *Another highly dynamic and extremely important aspect is the possibility of the Athabasca River eroding its own banks into the Embarras River and eventually flowing into Lake Claire or Mamawi Lake. This is a matter of grave concern. On one hand we face the prevailing opinion of the National and Historic Parks Branch which accepts ramifications of natural occurrences. On the other hand, the event itself could eventually affect not only the legal area of the Park, but the very nature of the Park's purpose.*
 - (e) *The most important question concerns the matter of conditioning the groundwater in the area. For some four years groundwater has been affected by receding surface water to a level some 4 to 5 feet below that which is generally suggested as being appropriate.*
- II. *To my mind and at this date, ecologists have identified the immediate problem as undesirable changes in the natural habitat, particularly the encroachment of willows and sedge meadows and the exposure of lake bottoms in the vicinities of Lakes Claire, Mamawi and Baril. While we have given attention to other problems such as the development and improvement of muskrat populations on Indian Reserve No. 201, and portions of the National Park utilized by Cree Indians, we do not think*

that improvement in muskrat alone will necessarily answer the longer range problem. We must solve the groundwater drying-out process.

III. There is a degree of experimentation in our recommendation to place the Quatre Fourches impoundment works this year. I am asking your acceptance of this, based upon the approval of the ecological people who have had some opportunity to appraise the area. There is also the fact that we have only this single possibility, of which I am aware, to undertake simple and reversible remedial works. This recommendation would affect some 60 per cent of the Delta area.

IV. This facility alone would involve movement of 50,000 cubic yards of rock and would cost approximately \$200,000. The possible diversions have not been studied sufficiently to comment further at this stage. I believe that it will be possible for us to appraise these various matters properly and to report to you by July 1st, 1972, provided that you are in the position to convince the Provincial Authority of the Province of Alberta that the utilization of their staff and personnel after December 1971 is almost vital to the ultimate success of this Project.

V. I have been exposed to diverse and valuable expressions of opinion from the Intergovernmental Liaison and Technical Advisory Committees. Certain concerns were expressed, mainly relating to desires and requirements of particular government departments. I must draw them to your attention.

(a) Navigation — There is simply no way we can improve navigation during 1971. This awaits the question of possible works on the Riviere des Rochers and possibly the Slave River.

(b) The Level of Lake Athabasca — As stated, we must address ourselves to the question of raising the level of Lake Athabasca. If outflow through the Chenal de Quatre Fourches and the Riviere des Rochers can be controlled, water levels must be made to intermittently approximate elevation 690 as compared to the existing levels of 683 and 686 [see Figure 3]. The lake not only affects the Delta area but directly and indirectly affects commercial operations in the Province of Saskatchewan. These operations, perhaps unavoidably, may become the ultimate recipients of effects stemming from remedial works in the Delta area. May I stress to you their sympathy and understanding of the problems that we face at this time. This has been expressed by the Saskatchewan

Water Resources Commission. There is, however, firmness in their belief that corrective measures are necessary for Lake Athabasca as a matter of first priority.

(c) Socio-economic Considerations — Comprehensive planning and development will be difficult since unique characteristics of the Fort Chipewyan society must be accommodated.

VI. Without hesitation, I recommend to you the formation of an Authority.

This matter is described in another portion of this report. Basically, the responsibilities of the Authority would be to obtain the highest and best use of the Delta areas in terms of the several demands upon it. Secondly, there is the matter of dispensing statesmanship, judgment and the understanding of your office. I suggest to you, with respect, that the Bennett Dam and its associated works are here to stay, that the problems which arise, at least in a relative sense, can be associated with the development of the Bennett Dam, and that benefits as well as depreciating effects require the mature perspective of the most senior officials in matters of this magnitude.

VII. It is important that we consider these events in perspective. Many of the questions arising during the Project's operations will require as much as ten years to provide solutions. Therein lies the management problem. I also suggest that resource management of the area be structured in the light of changing and dynamic situations.¹⁵⁵

The Quatre Fourches impoundment works mentioned above were considered necessary "to halt the progress of ecological succession that had commenced during the previous four summers of low water. The Quatre Fourches Dam was adopted as a temporary measure until a more permanent solution could be determined."¹⁵⁶ The dam was a simple rock-fill construction, suitable only as a temporary measure since it completely blocked the channel, preventing passage of fish and sediment. It succeeded in raising the water levels in lakes Claire and Mamawi; however, it was an unusually high run-off caused by ice jams on the Peace River in 1972 that actually contributed to the improvement in water levels over some sixty percent of the delta. These naturally recurring floods have always been the mechanism that restores water levels in the delta; and such floods are not influenced by water levels in Lake Athabasca, by the Bennett Dam, or by the Quatre Fourches Dam.

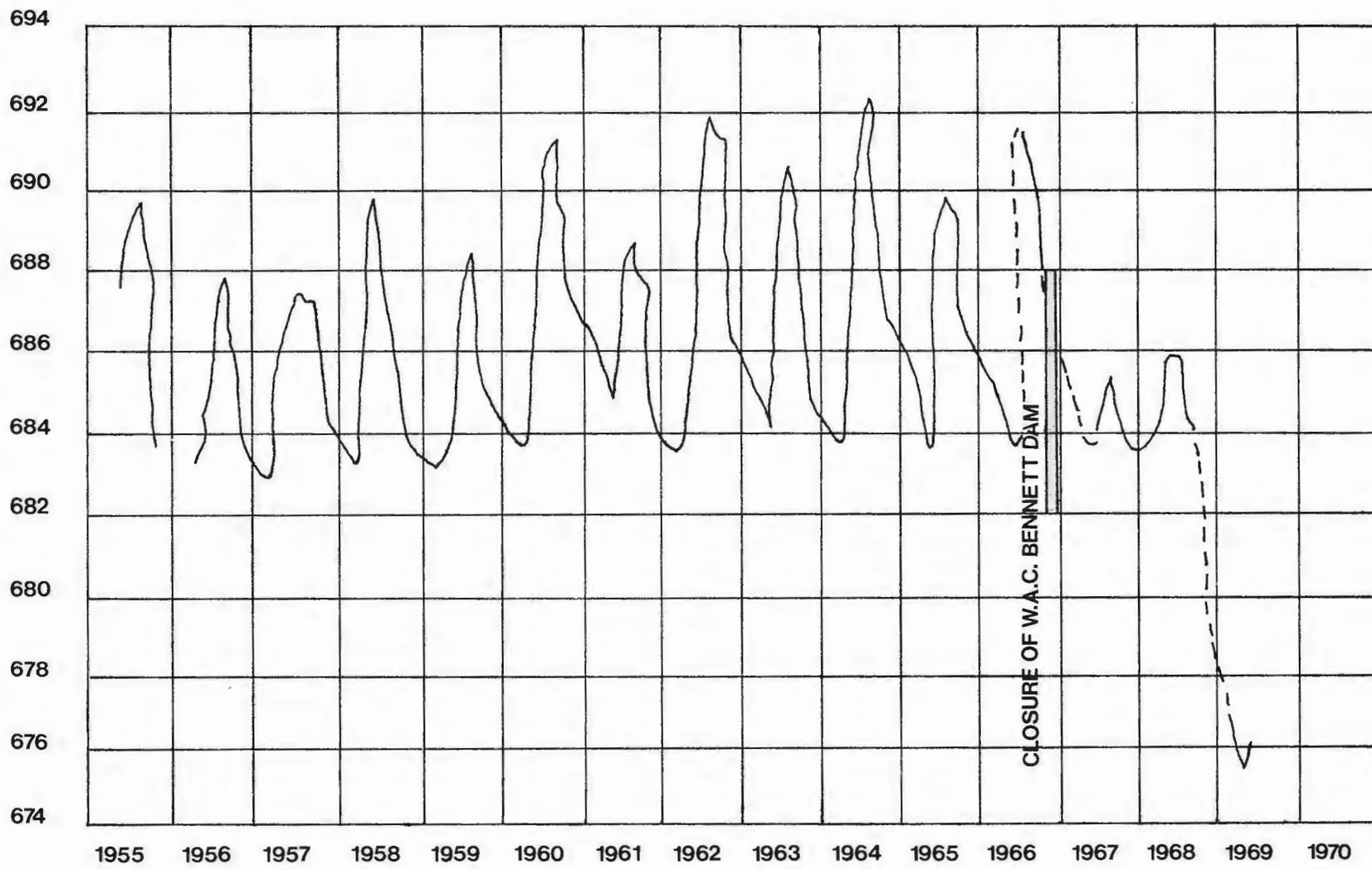


Figure 3 Water Levels in Lake Athabasca 1955-1970

The presence of the Quatre Fourches Dam was not without some cost. According to Smith, the weir was not removed until 1975, due to intense pressure to retain it by local Indian and Metis groups. Because of high run-offs prior to the weir's removal, water levels in the delta area were unusually high for a period and caused high bison mortality. Approximately 3,000 animals drowned.¹⁵⁷

The Peace-Athabasca Delta Project Group issued a summary report in 1972 and a full report in 1973.¹⁵⁸ The full report consisted of four volumes, the first, entitled "Technical Report," containing summaries, syntheses, and recommendations drawn from the three supporting volumes of ecological and hydrological investigations. The Technical Report predicted that the effects that Peace River flows modified by the Bennett Dam would have on the delta would be as follows:

- *Future water levels in Lake Athabasca will be lower than those of the natural regime. The estimated future water levels in Lake Athabasca indicate that the average summer levels will be 1.1 feet lower than those of the natural regime, and that the annual maximum levels will be 1.8 feet lower. It is also estimated that during the summer season the fluctuation in water level will be 0.8 feet compared to a fluctuation of 1.5 feet experienced under the natural regime of the past. Water levels in the Delta will be lower by a similar amount.*
- *Because of the reduction in peak summer levels, many of the Delta's perched basins will be filled less frequently, and it is predicted that shoreline important to many wildlife species will decrease by approximately 50%*
- *A permanent reduction by one foot in average summer levels will eventually shift plant zones to lower elevations around lake margins, advancing plant succession that had already commenced on mud flats during 1968-71.*
- *Waterfowl production is expected to decline by approximately 20% to 35% because of loss of suitable habitat*
- *The average muskrat population under the modified regime will be lower than in the past but will not average as low as during 1968-71. Decreases compared with those of the natural regime are expected to range from 41% to 66%.¹⁵⁹*

Various other effects, some beneficial and some of unknown consequence, were mentioned. Because the delta is an important nesting and staging area for migratory birds, because the National Park portion of the delta embodies

important aesthetic values, and because trapping and fishing constitute an important part of the local economy and an integral part of the lifestyle of the local native people, the Delta Project Group concluded that remedial measures were imperative. The following recommendations were made:

That governments assign a high priority to the conservation of the Peace-Athabasca Delta

That the Governments of Canada, Alberta, and Saskatchewan immediately establish a senior intergovernmental committee to provide liaison and co-ordination for the restoration of water levels and related matters in the Lake Athabasca and the Delta area

That a submerged weir control structure be constructed at the Little Rapids site on the Riviere des Rochers to restore lake levels in Lake Athabasca, and consequently on the Delta, to approximate what would have occurred under natural conditions

That the temporary rockfill dam on the west arm of the Quatre Fourches be removed after the control structure at the Little Rapids site has effectively restored water levels

That the governments establish a program to provide local fishermen and trappers with both technical and financial assistance for the promotion of local industries, particularly with regard to opportunities such as the development of muskrat farming on specific blocks of marshes in the Chipewyan Reserve

That the governments continue to monitor the spring spawning migration of walleye into Richardson Lake and conduct further investigations, if necessary, into migratory problems caused by channel ice

That the governments maintain a continuing resource-monitoring program for Lake Athabasca and the Delta, under the guidance of a senior intergovernmental committee

That environmental impact studies be conducted on Lake Athabasca, the Delta, and the Slave River prior to any construction of major reservoirs, diversions, or other works that may be proposed in the Lake Athabasca drainage basin

That the governments expand consultations with local people and work together to develop goals, employment, and leadership, as these matters run concurrent with other environmental considerations

That the data collected by the Peace-Athabasca Delta Project be made available to the scientific community to

*encourage scientists to continue those studies which are important to the development of the North and to the betterment of its indigenous people.*¹⁶⁰

In addition to the recommended submerged weir on the Rivière des Rochers at the Little Rapids site, a number of other remedial works were also considered. These included a gated control structure on the Slave River, which could be manipulated to produce water levels almost identical to those which occur naturally, and a rock-fill constriction or weir, which would have the effect of generally increasing peak lake levels. It was realized, however, that any such constriction would be unable to reproduce the annual fluctuations in water level that were characteristic of the delta prior to the construction of the Bennett Dam. In addition to the proposed submerged weir on the Rivière des Rochers, construction of a gated structure was also considered at that location, as was construction of a rock-fill constriction similar to the one proposed for the Slave River site.¹⁶¹ The cost of the controlled structure was considerably greater than that of the proposed weir on the Rivière des Rochers, although even the most expensive mechanism — the gated structure on the Slave River at \$20 million — was only approximately two percent of the total direct cost of the Bennett Dam at \$900 million,¹⁶² exclusive of future hydro developments on the Peace River made possible by construction of the Bennett Dam.

After release of the Peace-Athabasca Delta Project Group's reports, the Environment Conservation Authority (E.C.A.) of Alberta was requested by the Government of Alberta to conduct hearings to examine the recommendations, particularly the proposal to build a submerged rock-fill weir on the Rivière des Rochers.¹⁶³ Prior to holding hearings, the E.C.A. prepared background materials, both in English and in Cree. These, along with position papers prepared by the Departments of the Environment of Alberta and Saskatchewan, were distributed prior to the hearings. In September and October 1973, the E.C.A. held hearings in Fort Chipewyan, Alberta, Uranium City, Saskatchewan, and Edmonton.

The major thrust of the inquiry was a consideration of the various means of restoring water levels in the delta, ostensibly "with the intent of duplicating as closely as possible the historic water levels and fluctuations in Lake Athabasca and the Delta."¹⁶⁴ Residents of the delta and the native bands making presentations to the hearings were not prepared to comment on the technical aspects of the various proposals. They were, however, concerned about recent low

water levels as well as low water levels which had occurred naturally in the past. They expressed the hope that whichever structure was built would not only reproduce historical conditions, but improve the delta, particularly with respect to their immediate concerns — fishing and trapping. The Cree and Chipewyan bands were not certain that the proposed dam would live up to its expectations, and therefore wished assurances from the Alberta and federal governments:

*The main thing we wish to say about the dam is that we are a bit worried. We think it might be good, but we are not sure. The Athabasca Cree and Chipewyan Band would like letters from Honorable Mr. Davis and Honorable Mr. Yurko telling us exactly what they think the dam will do, what problems it might create and what other control measures might be necessary in the future, before we commit ourselves If a dam is built we hope that every opportunity will be given to the people of the area for work. Also, still about the water, the Band wishes to say that they will be watching closely for any signs of pollution which might again be caused by development at Fort McMurray.*¹⁶⁵

The recommendations of the Delta Project Group were subjected to careful analysis and criticism by an *ad hoc* committee of the Public Advisory Committee to the E.C.A.¹⁶⁶ Three members of the committee — W.M. Schultz, W.A. Fuller, and Rolf Kellerhals — had been involved with delta problems beginning with their brief, "Death of Delta"; such individuals were admirably prepared to provide a critical review and analysis of the studies and recommendations. Although the committee expressed general approval for the work of the Delta Project Group, they noted the time constraints under which it had operated and regretted the lack of attention in the study to establishing what in fact would be a desirable water-level regime for the delta. In the committee's opinion, the proposal for a simple weir on the Rivière des Rochers was inconsistent with the findings of the Delta Project Group's ecological studies, which emphasized that the productivity and diversity of the delta were dependent upon the wide fluctuations of annual and seasonal water levels; whereas the weir, although raising water levels generally, could not invoke the required pattern of fluctuation and could not produce the high yearly peaks needed to refill some of the perched lakes.¹⁶⁷ The committee remarked:

The alternative (ii-b) recommended by the Delta Project Group for construction, is ecologically the least desirable for two main reasons. The weir might do extensive damage by

*eliminating the seasonal level fluctuations, whose exact significance is not clearly understood at this stage. A possible 40-45% reduction in meadows is mentioned in the Technical Report. With meadows being one of the main assets of the delta, this alone should justify rejection of this alternative. Another, even more compelling reason for rejection of this alternative is its complete lack of flexibility. A high degree of flexibility is needed because of the uncertainties in the ecological studies, the probable difficulties with the Chenal des Quatre Fourches, and possible future modifications to the flow regime of the main tributaries to Lake Athabasca.*¹⁶⁸

In its final technical report, the Delta Project Group made conflicting statements regarding the proposed alternatives. In the summary it was said, in justification of the proposal to construct the submerged weir on the Rivière des Rochers, that:

*Preference between a gated structure versus a nongated control was deliberated. The former would afford facilities to manage water levels according to a predetermined but variable pattern, whereas the latter would produce water levels subject to natural hydrologic variations as they have occurred in the past, and would create in the future conditions more closely resembling the natural state.*¹⁶⁹

It was later said in the section on remedial measures, with respect to the proposed gated structure on the Slave River:

With a network of upstream gauging stations, snow surveys, forecasts of releases from the Bennett Dam, and appropriate simulation runs, gate openings could be managed to duplicate almost exactly the natural regime on Lake Athabasca and the Delta. Additional developments within the Mackenzie basin upstream from the Delta, if planned within certain limits, could be compensated for by appropriate adjustments in gate operation.

*A possible disadvantage of the gated structure might be the reluctance of man to manipulate water levels in the way that nature would so that extreme natural events within the Park would be allowed to recur. For example, it might become difficult or controversial to permit a flood to destroy waterfowl or muskrat nests, to drown bison, or kill meadows, if the manager has the power to avoid this. To the ecologist, these extreme events are just as important in maintaining a natural environment as are average ones, and perhaps even more important. The general public, however, may regard these events as cruel and inhumane, and opposition to this type of management may be expected.*¹⁷⁰

The Delta Project Group concluded:

*The ecological effects of the gated structure [on the Rivière des Rochers] were not simulated because it is assumed that the controls can be designed to duplicate almost exactly the natural water regime. The advantages and disadvantages of this structure are similar to those of the Slave gated control, except that a fish ladder would not be required.*¹⁷¹

The Public Advisory Committee to the E.C.A. was also of the opinion that the exact manner in which the gates on a controlled structure should be operated could become controversial, due to the conflicting requirements of different components of the delta ecosystem; however, they were “of the opinion that this is not an obstacle because of the wide consensus that natural levels were reasonably satisfactory.”¹⁷² They also felt that the computer model of Lake Athabasca developed by the Delta Project Group would facilitate accurate predictions of lake levels and allow natural levels to be duplicated without difficulty.

Despite the evidence in favour of a structure embodying maximum flexibility and capable of ensuring reproduction of historical lake levels, the decision was made to proceed with the submerged weir proposed for the Rivière des Rochers rather than a controlled dam. This decision was made despite the fact that the E.C.A. suggested a further alternate structure on the Rivière des Rochers, which would have had the capability for later installation of controllable gates if necessary.¹⁷³

By an agreement made on 16 September 1974, the governments of Canada, Alberta, and Saskatchewan agreed to adopt the following recommendations of the Peace-Athabasca Delta Project Group:

- (a) *assign a high priority to the conservation of the Peace-Athabasca Delta,*
- (b) *hereby establish the Peace-Athabasca Delta Implementation Committee (hereinafter called “the Implementation Committee”) to provide liaison between the parties in achieving the objectives herein set out;*
- (c) *agree to undertake jointly remedial works with regard to water levels as recommended in the report, including a weir at the Little Rapids site on the Riviere des Rochers and such ancillary works as may be required;*
- (d) *agree to undertake jointly the removal of the temporary rockfilled dam on the west arm of the Quatre Fourches after the control structure at the Little Rapids site has effectively restored water levels.*¹⁷⁴

By the terms of the agreement, the Implementation

Committee was charged with administering the agreement, providing liaison and co-ordination between the parties, and co-ordinating any management programmes that might be undertaken. The agreement further provided that the cost of the works was not to exceed \$2 million, with Canada paying \$1 million, Saskatchewan \$50,000, and Alberta \$950,000. Alberta assumed ownership of the completed weir, subject to the condition that no substantial modifications were to be made without the joint consideration of the parties. The agreement comes up for review in 1984, at which time it may be terminated, amended, or continued.¹⁷⁵

In view of the fact that future hydro-electric developments are planned or underway on the Peace River in British Columbia, of which the potential effects on the delta are presently unknown, and in view of the fact that hydro developments which could have an effect on the delta are being considered in Alberta,¹⁷⁶ it is unfortunate that a more flexible solution was not chosen. The governments may be seen to have abdicated responsibility by refusing to consider the adoption of a proposal that required continued active management of the delta. There seemed to be a fear that such management would be a politically touchy issue, due to pressure from various (mutually conflicting) interests.¹⁷⁷

The E.C.A. hearings, though laudable in their efforts to involve in the decision-making process the people affected, failed to consider the remedial alternatives in light of long-range planning. If the available options had been fully articulated and put to the people affected, no management difficulties need have arisen. Not only did the E.C.A. hearings suffer from the narrow terms of reference under which they were conducted, but they also failed to have significant impact because the Environment Conservation Authority is a purely advisory body.

Although failings are evident, the efforts exerted to rectify the delta problem broke new ground and served as valuable precedents for the future. The actions of those in Alberta who, through their political and publicizing efforts, forced government action on problems in the Peace-Athabasca Delta, demonstrated the necessity and viability of public action in environmental areas, a relatively new field for Canadians. The downstream problems of the W.A.C. Bennett Dam and the attendant publicity served to heighten awareness of the subtle and long-term problems that may stem from major developments.

The work of the Delta Project Group, too, indicates the kind of environmental assessments necessary before proceeding with major projects, but it also indicates the failings to which such short-term studies are subject. For example,

one possible manipulative solution to the problem of regulatory water levels on the delta was tested and then abandoned. This approach involved the use of thermopiles to produce an ice jam, and therefore a spring flood, on the Peace River. These might have been required about two years out of five, they would have disappeared each time the ice-dam broke, and they would have presented no hazards to navigation. Moreover, it has been suggested that they would have cost only a small fraction of the cost of the weir that was built. This technique was tested but never implemented.

Socio-economic Impacts on Fort Chipewyan

About 5,000 people live in five communities in the Lake Athabasca region; some 1,500, primarily Cree, Chipewyan, and Metis, live in the Fort Chipewyan area, the community most affected by the Bennett Dam.¹⁷⁸ Lowered water levels significantly reduced the productivity of the Peace-Athabasca Delta, seriously affecting the residents who fish, hunt, and trap in the area. Almost all families around Fort Chipewyan depend on muskrat trapping for a portion of their cash income, and on fishing and hunting for cash and subsistence goods. Although the annual muskrat catch in the delta has traditionally been subject to rather wide variation, depending on natural conditions and period population cycles, "between 1960 and 1968 the average annual harvest in the Park portion of the Delta was 65,000 pelts."¹⁷⁹ During the period 1968-72, however, when filling of the Williston Reservoir was in progress, the annual harvest of muskrat declined to less than 2,000 animals. During the same period the muskrat catch for the whole delta experienced a similar decline, to 18,500 pelts in 1972.¹⁸⁰

The area has also supported on a sporadic basis a commercial fishery run by the Athabasca Fish Co-operative, the members of which are largely Indian and Metis residents of Fort Chipewyan. However, this harvest is from Lake Athabasca and was not likely affected by the dam. Although this fishery may have been indirectly influenced by events associated with the Peace River project, it also suffered from transportation and marketing problems and declining prices.¹⁸¹

The low water levels in the delta acted as a precipitating factor, jeopardizing the already tenuous economy and lifestyle of the delta people. The Technical Report characterized the problems of the delta communities as follows:

Fort Chipewyan and other Lake Athabasca communities are typical of hundreds of similar communities in Canada's

north. As power, mining, pipeline, and other major developments occur, these communities come more frequently to the attention of government and the general public. Several characteristics which are common to such communities are critical to an understanding of the region:

1. Unemployment and underemployment.
2. Lack of true mobility on the part of the residents.
3. Large numbers of federal and provincial government departments and agencies, generally exhibiting a lack of any real coordination at both the policy and operating levels.
4. Rapid expansion of such urban amenities as housing, education, health care, social assistance, and community organizations, despite the absence of a viable economic base to support the population.
5. The presence of a wide variety of social problems, aggravated by low incomes, lack of skills, and increasing dependence on social assistance.
6. High cost of living.
7. Isolation.
8. Increasing concentration of native peoples.¹⁸²

The Delta Project Group made a number of suggestions designed to alleviate the social and economic problems of Fort Chipewyan. They recommended strengthening local community organizations such as the Cree and Chipewyan bands and the Metis Association, and creating new bodies to implement and generate community progress and new economic ventures. They recommended that the exploitation of the fur resource in the delta be enhanced, and that a viable commercial fishery and fish processing plant be established in Fort Chipewyan. They also proposed that existing employment opportunities be maximized, and that native employment be increased in various government departments and planned government works projects. They recommended that a plan be developed to increase recreation and tourism in the area, utilizing native resources and skills. Moreover, education and training programmes should be provided. An all-weather road should be constructed from the South to Fort Chipewyan. A social assistance programme that retained work incentives should be provided. And finally research should be conducted into the agricultural potential of the area.¹⁸³

In the course of the public hearings held by the Environment Conservation Authority, native associations, the Athabasca Fish Co-operative, and many individuals presented their views, concrete proposals, and aspirations for the community:

The residents of Fort Chipewyan felt very strongly that there was a lack of local employment opportunity and they demanded alternatives to the welfare assistance that seems to be the main financial support of the community. A number of proposals were brought forward for providing more jobs in the area but all were recognized as requiring the type of financial support which residents cannot themselves provide.

The local fish co-operative suggested the establishment of a fish processing plant. At present, the value of the commercial catch is limited by transportation costs and difficulties. This problem also impairs the recruitment of other businesses and industries into the area and contributes to the high cost of living in Fort Chipewyan. Better transportation linkages with the outside world were, however, viewed with mixed feelings. All-weather road links with either Fort McMurray or Fort Smith would help promote economic development and end the physical and social isolation of the town, but such developments were cautioned against for the effects they could have on the social cohesion of the community.

Improvements in transport were basic, however, to schemes for developing tourism. The area was stated to have important tourist attractions in the Delta, in Wood Buffalo National Park, at the nearby Athabasca Sand Dunes and in the historical past of Fort Chipewyan itself. This last was of particular interest to the community and the local "Voice of Women" group expressed a strong desire to develop a museum and other historical exhibits in the town. However, it was also recognized that the lack of basic facilities in the town would have to be overcome before such developments could be viable.

The serious unemployment and underemployment is mirrored in the lack of social amenities in Fort Chipewyan. A range of needed basic public services and facilities was identified: a bank or Treasury Branch for cashing cheques; improved medical services including a hospital; better housing conditions; the extension of water and sewer facilities to all parts of the town; and the establishment of recreation and communication facilities including a T.V. outlet. These improvements were thought to be particularly necessary if the children of the community were to be offered a viable future in the town.

In this regard, the establishment of a composite type high school offering studies including vocational training to the Grade 12 level was felt to be a key requirement. At present, children have to go elsewhere to complete their education and this apparently discourages many. The request

for higher education facilities was strongly linked to the need for vocational training which could prepare young people for skilled occupations and enable them to provide skilled services within the community.

The social and economic goals outlined at the hearings were recognized as being achievable only if government aid was made available. Paradoxically, there were also complaints about the extent of government direction of everyday life in the community. It was stated that no fewer than 30 government agencies currently administer programs in Fort Chipewyan and these were said to be unco-ordinated and to be run in such a way as not to allow public participation. The community feels confused and overwhelmed by such government involvement and is demanding a greater voice in its own destiny.¹⁸⁴

The recommendations of the Environment Conservation Authority essentially mirrored the recommendations of the Delta Project Group and the community as set out above. There were additional suggestions that seasonal or weekly commuting jobs be created in nearby developments such as the Athabasca oil sands, and that an ungulate management programme be instituted, with the intent of developing the techniques for buffalo ranching.¹⁸⁵

When the report to the federal Minister of the Environment from the director of the Peace-Athabasca Delta Project was released in September 1971, it was quickly labelled confidential and retracted. It was re-issued after changes were made, eliminating what the federal ministry considered to be inflammatory statements regarding the liability of B.C. Hydro and whether it should be held financially responsible for any remedial measures required in the delta.¹⁸⁶ In the later publications of the Delta Project Group, questions of liability and compensation were specifically avoided and the view was adopted that the Bennett Dam should be treated as a *fait accompli*.¹⁸⁷

The Public Advisory Committee, however, raised questions of equity in its presentation to the Environment Conservation Authority:

In the National context, a project can be deemed beneficial if at least one person benefits and no one loses [sic] (Pareto Optimum Principle). Unfortunately, in reality there are always some losers in any proposition. British Columbia decided, upon formal review of the proposal within its borders, that it is, on balance, beneficial to build Bennett Dam. Claims for the benefit are substantial . . . deriving principally from the promise of holding the cost of electricity constant in face of general inflation. . . .

It seems reasonable that British Columbia, which stands to reap benefits in the vicinity of hundreds of millions of dollars for the project, reimburse downstream riparians for damages of two orders of magnitude lower. It is clear that British Columbia's benefits will not be affected greatly by reimbursing the co-operating governments for the cost of remedial measures.

*Equity and principles of efficiency demand that damages suffered by innocent bystanders be reimbursed. While the full value of the loss can never be restituted except in kind, the Federal Government's announced intention to bill the province of British Columbia for the cost of downstream remedies is fully endorsed because it is in keeping with the principle of equity and common law, and does not impose unreasonable hardship on the main beneficiary of the Bennett Dam.*¹⁸⁸

In fact, the Government of British Columbia has never been billed for the cost of remedial works, although the federal government still maintains its intention of doing so.¹⁸⁹

The recommendations for social and economic improvements in the Peace-Athabasca Delta area have either been implemented slowly or not at all. It has been suggested that this failure may be attributed to difficulties in clarifying responsibilities between the governments of Canada and Alberta.¹⁹⁰ Meanwhile, the plight of the people of Fort Chipewyan is little better today than it was in 1970 when the delta problems first became visible. There are, however, encouraging signs that the delta people are beginning to develop the skills and initiative to improve their condition.¹⁹¹

The Peace-Athabasca situation provides evidence that the government acts positively and consistently only in situations which are of high public visibility.¹⁹² There is therefore a duty incumbent upon the public interest sector to maintain their involvement with a problem, once it has been identified, to ensure continued visibility and appropriate government action.

Inadequacies in the Legal Process

There have been a number of what may be termed legal failures associated with the Portage Mountain project and its downstream effects. The failures within the B.C. regulatory process and the failure of the federal government to exercise its jurisdiction over inter-provincial waters, works, and navigation have been mentioned. But the legal process has also shown itself to be inadequate in terms of providing

compensation to affected parties for damage caused by the Bennett Dam.

In October 1970, members of the Cree and Chipewyan bands, the Athabasca Fish Co-operative, and the Metis Association of Alberta issued a writ out of the Supreme Court of British Columbia, claiming compensation from B.C. Hydro for damages caused to the Peace-Athabasca Delta and an injunction to restrain Hydro from further interference with water levels in the delta.¹⁹³ No formal steps have been taken to further this action since Thomas Berger, who initially acted as counsel for the plaintiffs, withdrew to assume an appointment as a justice of the Supreme Court of British Columbia. There is now little hope of reviving the action. Apparently some of the plaintiffs thought Berger's withdrawal signified the end of the case, while lawyers in Vancouver who had assumed conduct of the matter complained of receiving no disbursements to bring the action forward.¹⁹⁴ Repeated requests from individuals to the Alberta government for financial support to allow the action to proceed have been either rejected or ignored.¹⁹⁵ A number of formal requests by the Public Advisory Committee to the Environment Conservation Authority have also been rejected.¹⁹⁶ The Department of Indian Affairs and Northern Development also shows no inclination to provide assistance, despite the department's general responsibility to uphold the rights of native peoples affected.

In addition to the difficulties of funding such an action, there are complex issues involved in establishing liability for negligence, nuisance, or interference with riparian rights, as well as problems of proof and determining the proper forum if any.¹⁹⁷ As Lucas and Franson have stated, besides the equitable and ethical reasons for wishing to see these actions against B.C. Hydro proceed, there is a need for clarification of legal liability in such cases.¹⁹⁸ Decision-makers are more likely to consider all the possible effects of major projects if it is clear that these effects will give rise to legal liability.

The Fishermen's Assistance and Polluters' Liability Act, 1970 (Man.), c. 32, would have provided a suitable model for determining liability and recovery of loss in connection with downstream effects from development on an inter-provincial river, had the operative sections not been declared *ultra vires* the Manitoba Legislature by the Supreme Court of Canada.¹⁹⁹ The act provided that Manitoba could make assistance payments to commercial fishermen who suffered financial loss as a result of the prohibition of fishing in polluted waters. People so injured were granted the right to assign to the Manitoba government

their right to sue the persons responsible for the water pollution, and the government then could bring an action for those assigned damages or the assistance payments, whichever were greater. The act further provided that it was not a lawful excuse to show that the discharge causing the pollution was permitted by the appropriate regulatory authority having jurisdiction where the discharge occurred. In *Interprovincial Co-operatives Ltd. et al. v. the Queen in Right of Manitoba*, the defendants were operators of chlor-alkali plants in Saskatchewan and Ontario, who, under permit from the relevant provincial authorities, were licensed to discharge mercury into rivers flowing into Manitoba. As a result of these discharges, commercial fishermen in Manitoba suffered damage and were compensated by the Manitoba government. The latter then, as assignee of the fishermen's rights, brought an action against the defendants. The Supreme Court of Canada held that Section 4 (1), which provided for liability for financial loss caused by the discharge of a contaminant into waters whereby it is carried into waters in Manitoba, and Section 4 (2), which prevented a permit being raised as lawful excuse for such a discharge, were *ultra vires*, since these sections purported to deny a civil right acquired in another province, namely the right to discharge contaminants.²⁰⁰

Despite this decision, the Manitoba legislation is instructive because it is capable of extension to other forms of damage occasioned by major developments whose effects occur solely within one jurisdiction. It is also clear that similar legislation dealing with the extra-provincial consequences of resource developments could be validly enacted by the federal parliament. In any event, measures are required to enable the legal process to perform its basic function of clarifying responsibilities and redressing injuries.

Conclusions and Recommendations

Policy Formulation

When the hydro potential of the Peace River was discovered, development-oriented policies required no justification, either in British Columbia or in Canada as a whole. The frontier ethic was accepted without question, becoming in itself a justification for proceeding with major resource developments.

Now, however, it is apparent that unquestioned growth is no longer tolerable.²⁰¹ This change of perspective requires

that different questions be asked in the process of policy formulation. When the Portage Mountain project was first conceived, little or no consideration was given to the question of goals and alternatives. We now feel compelled to consider the various alternative means of satisfying our needs as a society; indeed, the finite nature of resources and global systems requires that we consider not only alternative means of meeting our needs, but also the validity of those needs themselves.

It is also becoming more widely accepted that individuals should be involved in the decisions that directly affect them. Future policy formulation with regard to resource use and development will directly affect everyone, and therefore should involve consideration of a broad perspective of alternatives in a manner that guarantees meaningful involvement of individuals and groups on as wide a basis as possible. This would ensure the evaluation of alternative policies in the larger context, having regard to other policies and long-term priorities. In short, the policy-making process must include a form of anticipatory planning that considers the kind of future that pursuit of a particular goal will produce.²⁰²

Planning

The planning process for the Portage Mountain project was dominated by engineers with little or no training in the life sciences, who were largely incapable of perceiving water as a vital rather than merely a mechanical fluid or hydraulic medium. This perspective accounts in part for the failure to predict the biological consequences of lowered water levels in the Peace-Athabasca Delta.

Biological and ecological expertise ought to be located centrally in the planning process, rather than serving, as it now does — in both government and development-oriented bodies — as merely an adjunct and accessory conscience to the planning process. The jurisdiction of both federal and provincial Departments of the Environment must be expanded to include significant regulatory powers, rather than merely advisory ones.

Conflicts of Interest

Many glaring conflicts of interest were present during the proposal, planning, and implementation of the Peace River development. Some of these still exist in British Columbia and are markedly similar to those found in other jurisdictions within Canada.

The B.C. Department of Lands, Forests and Water Resources and the Water Rights Branch constituted one

department with interchangeable staff, both responsible to the same minister and charged with the conflicting tasks of advising on policy and performing regulatory functions. In addition, the minister responsible served as a director of the major developer, B.C. Hydro, and decisions by the regulatory arm, which is one of the few bodies having any jurisdiction over B.C. Hydro, were appealed to either the minister or the cabinet. Control of regulators by developers is unavoidable in such a situation.²⁰³

Advisory and regulatory bodies must be clearly separated. The formulation of visible and explicit policies would also provide a greater independence for regulators.²⁰⁴ In addition, Crown corporations must be managed at arm's length from the government, being subject to the same, if not more stringent, controls as those applied to private developers. Ministers and policy formulators should not have a role in the management of such bodies.²⁰⁵

Jurisdiction over Inter-provincial Waters

There is also a need, evidenced by the Portage Mountain project, to clarify responsibility and jurisdiction over inter-provincial waters. The Canada Water Act was enacted "to provide for the management of the water resources of Canada including research and the planning and implementation of programs relating to the conservation, development and utilization of water resources."²⁰⁶ The preamble to the act states in part:

Whereas the demands on the water resources of Canada are increasing rapidly and more knowledge is needed of the nature, extent and distribution, of those resources, of the present and future demands thereon and of the means by which these demands may be met; . . .

And whereas the Parliament of Canada is desirous that, in addition, comprehensive programs be undertaken by the government of Canada and by the government of Canada in cooperation with provincial governments, in accordance with the responsibilities of the federal government and each of the provincial governments in relation to water resources, for research and planning with respect to those resources and for their conservation, development and utilization to ensure their optimum use for the benefit of all Canadians;

Section 3 of the act allows the federal government to enter into arrangements with one or more provincial governments to establish inter-governmental committees, on a national, provincial, regional, or lake or river basin basis:

(a) to maintain continuing consultation on water resource

- matters and to advise on priorities for research, planning, conservation, development and utilization relating thereto;*
- (b) to advise on the formulation of water policies and programs; and*
 - (c) to facilitate the coordination and implementation of water policies and programs.*

By Section 4 of the act, the federal government may, with respect to waters where there is “a significant national interest in the water resource management thereof,” enter into agreements with provincial governments to:

- (c) conduct research in connection with any aspect of those waters or provide for the conduct of any such research by or in cooperation with any government, institution or person,*
- (d) formulate comprehensive water resource management plans, including detailed estimates of the cost of implementation of those plans and of revenues and other benefits likely to be realized from the implementation thereof, based upon an examination of the full range of reasonable alternatives and taking into account views expressed at public hearings and otherwise by persons likely to be affected by implementation of the plans,*
- (e) design projects for the efficient conservation, development and utilization of those waters,*

By Section 5 (1) of the act, upon failure to reach an agreement as provided by Section 4, the federal government may undertake directly with respect to any inter-jurisdictional waters involving a significant national interest, a programme described in Section 4 (d) or (e).

An example of a body similar to those contemplated by the Canada Water Act is the Mackenzie Basin Intergovernmental Liaison Committee mentioned earlier, which was created to “provide a vehicle for data and information exchange on investigatory and research matters and intended developments within the basin.”²⁰⁷ However, this particular committee was not created pursuant to the provisions of the Canada Water Act, despite the fact that its functions clearly fall within the provisions of the act. Since its inception in 1972, the committee has served to inform the parties — the governments of Alberta, British Columbia, Saskatchewan, and Canada for the Northwest Territories — of the existing or contemplated activities of each within the Mackenzie Basin.

Although the formation of such a body should be considered as a significant improvement over the lack of

communication that was the norm during development of the Portage Mountain project, the informality of such an arrangement constitutes its most basic flaw. There is no guarantee of continued involvement by any of the parties, nor is there any clarification of jurisdiction with respect to a river system such as that in the Mackenzie Basin. The exchange of information operates confidentially among the parties, with its release at the discretion of the committee. Despite its role as a quasi-planning body, the committee has no provisions for any formal review of proposals, nor for public involvement or access to information.

A water basin approach to management of inter-provincial rivers would be a definite improvement over existing practice if it were embodied in legislation, approved by the various governments, and if it provided for a formal review and assessment procedure for proposed inter-provincial water developments. It should contain provisions to guarantee effective public involvement in the planning process, particularly by those potentially affected; this would mean a process providing for proper impact assessment, enlightened hearing procedures, and provision of the resources necessary to ensure effective involvement.

Decision-making

The decision-making process today is far more elaborate than that which applied to the Portage Mountain project almost two decades ago. The techniques of justification have become far more sophisticated, relying upon cost/benefit analyses which, it is maintained, allow meaningful comparisons to be made between alternatives. It should be recognized, however, that these efforts are dependent upon the assumption that it is possible to quantify intangibles, an assumption that decision-makers are loathe to reject for it saves them from the difficult task of making decisions based on ethics rather than dollar values. When considering this “scientific” approach to decision-making, it should be borne in mind that “To conceive the world as value-free is a task which men set themselves on account of a value: the vital value of mastery and power over things.”²⁰⁸

It is recommended that greater emphasis be placed upon developing an understanding of the methodology of decision-making and the inescapability of the ethical component therein. In the long term it is not sufficient merely to demonstrate that the assessment of any given proposal has “stacked the deck” in its favour.²⁰⁹

Public Participation

Since the Water Comptroller's hearings regarding the Portage Mountain project, greater efforts have been made to involve the public — especially those directly affected — in the decision-making process. However, present hearings in British Columbia and elsewhere still suffer from significant defects. The terms of reference for the hearings are generally too narrow to allow proper consideration of all relevant evidence. Too often, as was the case in the Environment Conservation Authority's hearings about the restoration measures in the Peace-Athabasca Delta, they are merely advisory in nature. Although it is recognized that such advisory hearings can generate considerable pressure, they are useful in only a limited range of situations.²¹⁰

The provisions for disclosure of information are sadly inadequate. The only solution appears to be freedom of information legislation that would vest with the courts the discretion to release any information for which privilege is claimed.²¹¹

At present, provisions for impact assessment are also either inadequate or non-existent. Impact assessments should be required of all significant projects, whether by private developer or public body. Legislation providing for assessments should take into account the realities of organizational behaviour by precluding, except in limited cases, proponent-conducted assessments. There should also be provision for public involvement in the setting of the terms of reference for such studies.

Legislation providing for impact assessments and hearings into proposed resource developments should also make provision for funding to public interest groups for review of assessment and for participation in hearings. This could be accomplished by requiring the proponent to place in trust, for the benefit of public interest participants, a small portion — perhaps a fraction of one percent — of the total project cost.²¹²

Liability

In very few documented cases has a major resource developer been held accountable, after the fact, for damage caused by a development. There is a need — both to ensure that affected individuals are compensated and that proponents consider even the remote consequences of proposed developments — to clarify the liability for environmental and social effects of major projects. It is also necessary to extend the scope of remedies and provisions for compensation, both legal and political, that are available to injured

parties.²¹³ These changes will necessarily entail, particularly with respect to water developments, clarification of jurisdiction among the territories, provinces, and the federal government. It is a telling indictment of our society and its political and administrative processes that, with respect to the Portage Mountain project, native peoples in both the area of the Williston Reservoir and the Peace-Athabasca Delta received no benefits from the project whatsoever, and the legal process was unable to afford them any redress for injury.

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129. This, of course, was the appearance at the time, but not the reality. Larratt Higgins, in "The Alienation of Canadian Resources: The Case of the Columbia River Treaty," has suggested that a billion dollars is a modest estimate for the worth of benefits conferred upon the Americans by way of the Columbia River Treaty (p. 236). In the British Columbia Hansard of 9 April 1976, the Hon. Jack Davis is reported as stating that the total including interest received under the Columbia River Treaty was \$479,107,523, while to 31 December 1975, \$1,033,588,494 had been spent on construction of storage projects, generation, transformation, and transmission facilities. A further \$434,838,029 was the estimate of the total amount required to complete the project.
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147. "Death of a Delta," pp. 17-19.
148. Forbes interview. See above, n. 77.
149. Report on the Proposed Joint Federal-Provincial Study of the Peace-Athabasca Delta Problem.
150. For the attitudes of the B.C. government and the B.C. Hydro and Power Authority, see the diary of H.K. Pratt of the Authority on the subject of "Portage Mountain Project – Effect on Levels of Lake Athabasca," 25 June 1970. See also letter from Jack Davis, federal Minister of Fisheries and Forestry, to Ray Williston, Minister of Lands, Forests and Water Resources, 9 December 1970, and

- Williston's reply, dated 8 January 1971. Davis refers to the "Peace-Athabasca Delta Problem" as "a touchy subject," and expresses the hope that Williston will agree that "a joint approach is the only one which makes sense." Williston's letter of refusal is fairly terse, but offers to "make available factual information on the operation of the Peace River reservoir including the British Columbia Hydro and Power Authority Peace River operating plans." Water Comptroller's File.
151. *Proceedings of the Peace-Athabasca Delta Symposium*, 14-15 January 1971, (Edmonton: Water Resources Centre, University of Alberta, May 1971).
152. Smith interview, n. 72 above; see, for example, the article appearing in *Time* magazine on 29 June 1970 (n. 145 above), dealing with the delta problem and the environment generally.
153. *The Mackenzie Basin: Proceedings of the Intergovernmental Seminar Held at Inuvik, N.W.T., June 24-27, 1972*, (Ottawa: Inland Waters Directorate, 1973).
154. "Peace-Athabasca Delta Project," Findings of the Director, Peace-Athabasca Delta Project, September 1971, pp. 4-9.
155. *Ibid.*, pp. 10-12.
156. Technical Report, p. 127. See above, n. 81.
157. Smith interview. See above, n. 72.
158. The complete report consists of Summary Report (1972); Technical Report; Volume I – Hydrological Investigations; Volume II – Ecological Investigations; Volume III – Support Studies.
159. Technical Report, p. 12. See above, n. 81.
160. *Ibid.*, pp. 16-17.
161. *Ibid.*, pp. 130-151.
162. W.F. Miles, "The Peace River Project – From Feasibility Report to First Power Output," *Engineering Journal*, Vol. 52, No. 10 (1969), p. 23.
163. "The Restoration of Water Levels in the Peace-Athabasca Delta," *Proceedings of the Public Hearings, September-October 1973*, (Edmonton: Environment Conservation Authority), p. iv.
164. *Ibid.*
165. *Ibid.*, p. 56.
166. *Ibid.*, p. 234 et passim.
167. *Ibid.*, pp. 242-243.
168. *Ibid.*, p. 245.
169. Technical Report, p. 14. See above, n. 81.
170. *Ibid.*, pp. 138-139.
171. *Ibid.*, p. 148.
172. Environment Conservation Authority, *Proceedings*, p. 246. See above, n. 163.
173. See "The Restoration of Water Levels in the Peace-Athabasca Delta," *Report and Recommendations*, (Edmonton: Environment Conservation Authority, September 1974), pp. 40-41.
174. *Peace-Athabasca Delta Implementation Agreement*, between the Government of Canada, . . . the Government of the Province of Alberta, . . . and the Government of the Province of Saskatchewan, 16 September 1974, pp. 2-3.
175. *Ibid.*, p. 7.
176. *The Mackenzie Basin*, p. 73 et passim. See above, n. 153; *Fraser River Upstream Storage Review Report*, Canada-British Columbia Fraser River Joint Advisory Board, Victoria, B.C., December 1976; Lower McGregor Diversion, p. 62.
177. Environment Conservation Authority, *Proceedings*, p. 246; Forbes and Smith interviews. See above, notes 163, 77, and 72.
178. Summary Report, pp. 39, 42. See above, n. 1.
179. Technical Report, p. 70. See above, n. 81.
180. *Ibid.*
181. *Ibid.*, pp. 91-93; Environment Conservation Authority, *Proceedings*, pp. 72-78. See above, n. 163.
182. Technical Report, pp. 85-86. See above, n. 81.
183. *Ibid.*, pp. 97-98.
184. Environment Conservation Authority, *Report and Recommendations*, pp. 21-22. See above, n. 173.
185. *Ibid.*, pp. 33-54.
186. Forbes interview. See above, n. 77.
187. *Ibid.*; Technical Report, p. 163.
188. Environment Conservation Authority, *Proceedings*, op. cit., pp. 254-255. See above, n. 163.
189. J.P. Bruce, Department of Fisheries and Environment, Inland Waters Directorate, interview with the author, September 1976.
190. Dr W.R. Trost, Chairman, Environment Conservation Authority, interview with the author, 12 July 1976.
191. See, for example, an article by Eric Denhoff, "The People: Cree, Chipewyan, Metis Raising a Unified Voice," *The Albertan*, 14 February 1976.
192. The community of Fort Chipewyan has, by and large, languished with very little government assistance since the conclusion of the Peace-Athabasca Delta Project. In addition, according to S.B. Smith and others, there is continuing difficulty in obtaining government funds to monitor the water levels and ecology of the delta.
193. "Indians claim damages," *Vancouver Sun*, 17 October 1970, p. 12.
194. D.K. Pidgeon, barrister and solicitor, personal communication to the author.
195. Schultz interview. See above, n. 144.

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196. Minister of the Environment's response to the 1974 resolutions of the Public Advisory Committee on the Environment, 3 October 1975, pp. 5-6.
197. A.R. Lucas and R.T. Franson, "Legal Liabilities in Water Resource Projects," in *Proceedings of the Peace-Athabasca Delta Symposium*, op. cit., pp. 272-277. See above, n. 151.
198. *Ibid.*, pp. 271-272.
199. *Interprovincial Co-operatives Ltd. et al. v. The Queen in Right of Manitoba* (1975), 53 D.L.R. (3rd), p. 321.
200. *Ibid.*, pp. 321, 322.
201. William Ophuls provides perhaps the most trenchant analysis in *Ecology and the Politics of Scarcity: Prologue to a Political Theory of the Steady State*, (San Francisco: W.H. Freeman and Company, 1977).
202. See, for example, Lawrence H. Tribe, "Technology Assessment and the Fourth Discontinuity: The Limits of Instrumental Rationality," *Southern California Law Review*, Vol. 46, No. 2 (1973): 617-660.
203. See Sax, n. 136 above.
204. In British Columbia, the lack of any explicit energy policy makes the regulatory task much more difficult and allows policies to be formulated by B.C. Hydro rather than by the government.
205. The use by government of Crown corporations as policy implementation vehicles, as is the case with the federal government's petroleum corporation, should also be regarded with suspicion.
206. Canada Water Act, R.S.C. 1970, c. 5 (1st Supp.).
207. Mackenzie Basin Intergovernmental Liaison Committee. First Report (to 31 December 1974).
208. Quoted in William Leiss, *The Domination of Nature*, (Boston: Beacon Press, 1972), p. 109.
209. See Lawrence H. Tribe, "Policy Science: Analysis or Ideology?," *Philosophy and Public Affairs*, Vol. 2, No. 1 (1972): 66-110; "Trial by Mathematics: Precision and Ritual in the Legal Process," *Harvard Law Review*, Vol. 84, No. 6 (1971): 1329-1393; "Ways Not to Think About Plastic Trees: New Foundations for Environmental Law," *Yale Law Journal*, Vol. 83, No. 7 (1974): 1315-1348.
210. One such case was the Mackenzie Valley Pipeline Inquiry, which acted as a form of public enlightenment process and national referendum.
211. The champion of such legislation is the Hon. Gerald Baldwin, Honorary Chairman of "Access," a Canadian Committee for the Right to Public Information.
212. This approach has several advantages. First, it recognizes that public involvement is a necessary and beneficial adjunct to the decision-making process. Second, it directly relates the importance of a project, as measured in dollars, and the amount of funds available for public consideration of the project. Third, it recognizes that the cost of public involvement is a legitimate part of the project cost itself, and places that cost on the party best able to ensure that the cost is passed on to the ultimate consumer. Finally, it provides an assurance of continued funding, not subject to the vagaries and budgetary constraints of the political party in power.
213. It should be recognized that injured parties are not necessarily limited to individuals or corporations. See Christopher D. Stone, "Should Trees Have Standing? — Toward Legal Rights for Natural Objects," *Southern California Law Review*, Vol. 45, No. 1 (1972): 450-501.

Pine Point Mine



Janet Macpherson



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The Pine Point Mine

Janet E. Macpherson
Interdisciplinary Systems Ltd.
Winnipeg, Manitoba

I Introduction

This case history examines the development of the Pine Point mine in the Northwest Territories. The decisions made regarding the mine are analyzed in the context of the federal government's changing policies towards northern development. In particular, the examination of Pine Point is important to illustrate the nature of the government-industry negotiations which brought the mine into production. Pine Point also provides a lesson about economic development in an "underdeveloped" region of the North, and the environmental and socio-economic impacts associated with such large-scale projects. Finally, the Pine Point experience confirms the need to consider alternative approaches for resource development in the North, if the errors made there are not to be repeated.

II Overview of Mining in Northern Canada

Mining has been one of the dominant forces in the development of northern Canada. Not only has the industry generated substantial revenues, but it has also fostered the development of transportation links and the opening up of frontier areas. In 1975 the mining industry contributed \$65 million to the economies of the Yukon and Northwest Territories. The value of mineral production in the N.W.T. stood at \$181,787,000,¹ of which lead-zinc (from the Pine Point mine) accounted for seventy-eight percent.²

Early exploration activity began north of latitude 60° in the 1880s, and was followed by the gold rushes in the Klondike area of the Yukon in 1897-98. During the late 1920s the uranium deposits at Echo Bay were explored and developed, and in the mid-1930s two gold mines began production at Yellowknife. Activities in the Northwest Territories declined during World War II, but resumed with the resurgence of the Canadian economy during the post-war boom. Following the war, the federal government actively encouraged the exploration and development of

mineral and petroleum resources in the North. In 1957 John Diefenbaker's "Vision of the North" had become a campaign slogan for the Conservative Party. After the election of a Conservative government, resource development was encouraged through the creation of incentive programmes, favourable tax concessions and write-off provisions for developers, and improved Geological Survey of Canada services, such as geological mapping and surveying. Under the auspices of one of the most prominent programmes of the era — "Roads to Resources" — the Great Slave Lake Railway was built in 1964.

Prior to the time when the Pine Point mine was brought into production, only minimal staking activity was taking place in the Northwest Territories. However, once the railway had been built, the mine had begun operation, and the potential richness of the deposit had become known, major staking rushes occurred in the area. The federal government's policy of infrastructure support no doubt spurred development in other regions of the North, especially in the Anvil area of the Yukon where major staking rushes took place a few years later.

Pine Point was explored and placed in production at a time when few statutes and regulations applied to mining development. Staking, exploration, and leasing requirements, as well as very low royalty rates, were set forth under the Canada Mining Regulations. The Income Tax Act of the mid-1960s provided generous forms of tax relief, including a three-year tax holiday, capital cost allowances, and automatic depletion allowances, all of which resulted in an economic climate under which Pine Point prospered. With the exception of the Fisheries Act, regulations and policies which attempted to ensure protection of the northern environment and encourage social benefits from development did not evolve until the 1970s. At that time there were introduced the Territorial Land Use Regulations (requiring land use permits), the Northern Inland Waters Act and Regulations (requiring water licences, hearings, authorizations, and water quality survey networks), both introduced by the federal government, and an Environmental Protection Ordinance introduced by the territorial government. The government's national objectives and priorities for the North also emerged at this time, proclaiming an emphasis on the quality of life and equality of opportunity for northerners.

Although there was substantial exploration of the Pine Point area before 1940, significant lead-zinc finds were not confirmed until the late 1940s. By 1955 Pine Point Mines Limited had been formed (owned by the Consolidated

Mining and Smelting Company of Canada Limited, hereinafter referred to as Cominco), the area staked, and the deposit delineated. Indications were that five million tons of lead-zinc ore were economically available for production. Once transportation arrangements were made and the construction of the Great Slave Lake Railway confirmed, other forms of government assistance were provided. Cominco brought the mine into production in late 1964. In 1968 increases in ore reserves merited the expansion of Pine Point's concentrator from 5,000 to 10,000 tons per day, resulting in increased employment opportunities and thus a larger population in the mining town of Pine Point.

Several other mining operations in the North provide a perspective from which to view the Pine Point development. One of them (Rankin Inlet) was established before Pine Point, while Cyprus Anvil in the Yukon and Strathcona Sound (Nanisivik) on Baffin Island were developed afterwards. The Rankin Inlet nickel mine was the first substantial mining operation to take place in the Northwest Territories after the war. The mine was brought into production in 1957 and operated until 1962, an era during which the North was perceived as a "treasure house of riches" to be exploited, as a last frontier to be opened and conquered. The mining company employed Inuit workers who were recruited from the Keewatin region to settle in Rankin Inlet.³ Once the orebody was exhausted, those Inuit who had worked at the mine found themselves jobless and financially destitute. Although some attempted to return to their land-based economy, the decline in game populations impeded their success. During the period following the mine closure, a large number of Inuit were forced to rely on social assistance. Eventually the Department of Northern Affairs and National Resources (DNANR) created other forms of economic activity to replace the collapsed economic base of the community, but the intervening years were ones of hardship for many. The Rankin Inlet experience was important in demonstrating that Inuit workers could adapt to wage employment and undertake mining operations as well as workers brought from the South. However, Robert Gibson, author of *The Strathcona Sound Mining Project*, concludes that the Rankin Inlet development was

primarily a profit-oriented mining venture, designed and implemented in a manner calculated to minimize economic costs to the company involved. Because of the narrowness of the company's interests and because of the absence of significant government supervision or involvement, the long

*term social, environmental and economic costs of the operation and closing of the mine were not seriously considered in the original decision to undertake the project or in the ad hoc problem-solving that typified its brief period of operation. The failure to assess and prepare for the broader and longer term effects of the Rankin Inlet project resulted in significant costs borne by the Inuit residents of Rankin Inlet and, indirectly, by Canadian taxpayers.*⁴

In the development of the Cyprus Anvil and Nanisivik mines, the federal government's approach to regulation of the mining operations indicated a desire to avoid some of the problems encountered with the earlier Pine Point project. When the Anvil mine was developed in the Yukon Territory during the mid-1960s, the Department of Indian Affairs and Northern Development (DIAND, formerly DNANR) attempted to ensure native participation in the operation through negotiation of a "development agreement." Government policy, as expressed in a press release, stated:

*... it is the government's desire where major mineral deposits are developed that the maximum employment and economic benefit should accrue to the region from the mining and processing of these deposits It is . . . expected that the Company (Anvil) will make special provisions for the training and employment of Yukon residents, and will be able to draw heavily on the Indian population of the Territory.*⁵

Nevertheless, despite the articulation of these goals, the record of native employment at the Anvil mine is a poor one.

As in the Pine Point development, the federal government provided infrastructure assistance for the Anvil project. Under the terms of the agreement, most of the transportation facilities, a power transmission line, and municipal services were provided. In contrast with Pine Point, however, the development agreement required the company to conduct a feasibility study for a smelter within five years of the beginning of the operation. If the study favoured the development of a smelter, and the government fulfilled other obligations set forth in the agreement, the company was obligated to build a smelter and to encourage additional native employment during its operation.⁶

The Anvil project differed little from the Pine Point development in the area of environmental concerns. Exploration activity at both sites had a disruptive effect upon native hunting and trapping pursuits, in addition to having a significant impact on the surface of the land as a

result of heavy staking and line cutting. Both mines encountered difficulties with their tailings disposal systems. In fact, spills from the Anvil tailings ponds were of such severity that the company was successfully prosecuted. As was true with Pine Point, at the time when government expenditures were authorized and the Anvil development agreement signed, no environmental protection provisions were included and no environmental impact assessment of the project was conducted to anticipate those problems which later arose.

The disposal of tailings was also an issue in the development of the Strathcona Sound (Nanisivik) mine during the mid-1970s. The necessary environmental research into methods of tailings disposal had not been conducted by the time the development agreement was signed, although the agreement did include provisions for a study evaluating the potential impacts from disposal of the tailings on land or in the waters of the sound. Nor had a social impact study been performed, prior to approval of the project, in order to determine the interests of the nearby Arctic Bay community or the possible alternatives regarding housing and accommodation for employees at the mine. Since the agreement stipulated that sixty percent native employment was to be an objective for the development, appropriate accommodation for native people was important. Like the earlier lead-zinc developments at Pine Point and Anvil, much of the Strathcona ore was slated for export, despite the government's stated policy of encouraging maximum economic benefits within the region in which the extraction was taking place.

Government development policy for the North has evolved significantly since World War II. At the time of the Pine Point development, incentives and subsidies were devised to encourage resource extractive activities. The rationale behind this policy was that increased growth and economic prosperity would benefit both the region and the country as a whole. By the end of the 1960s, however, it had become apparent that the anticipated economic benefits were not accruing to the northern regions. There was concern about the export of raw materials (particularly ore), foreign investment, and the socio-environmental and economic costs associated with resource development. When the Anvil mine was brought into production, with the aid of American interests, some of these concerns were reflected in the development agreement. By the time the decision was made to place the Strathcona mine in operation during the mid-1970s, northern development policy had changed considerably. In March 1972 Jean Chrétien (then Minister of Indian Affairs and Northern Development) announced the

“National Objectives for the North” and the federal government’s order of priorities, which became the official statement of government policy for northern development. The new policy emphasized that socio-environmental considerations were of paramount importance and that strategic non-renewable resource development was to be encouraged if it had “solid” social and economic benefits.⁷

Such has been the general situation of mining in northern Canada. With respect to the Pine Point development in particular, the negotiations between Cominco and the federal government for infrastructure support and the development of the Great Slave Lake Railway demonstrated that government decision-makers approached the negotiations from a very different perspective than did industry, and in some instances suffered from an acute and recognized lack of information upon which to base critical decisions. The recommendations of a royal commission on the railway were virtually ignored. In parliamentary debate, the concerns of the Opposition and concerns expressed in standing committees were also overlooked. The result was that the government spent large amounts of capital to build a railway for the ultimate benefit of Canadian Pacific, Cominco’s major shareholder. Moreover, various other forms of infrastructure support were granted to the mine after the railway decision was made.

The negotiations over exports and smelter feasibility demonstrated the competence of Cominco negotiators and showed that Cominco’s planning orientation was part of a long-term strategy. In contrast, the government interdepartmental committee responsible for making decisions lacked sufficient information. The committee appeared not to have considered long-term planning, and as a consequence it found itself legally bound (by the terms of the Railway Agreement) to recommend the approval of Cominco’s applications to export concentrates.

The impacts resulting from the Pine Point development persist to the present day. No measurable social benefits have accrued to the native people of nearby Fort Resolution, despite the enormous financial backing which the federal government provided to the company. During the early years, native employment at the mine was hindered by the lack of a road between Pine Point and Fort Resolution. Attempts to create employment opportunities during the late 1960s and early ’70s have failed completely, and indicate the importance of pre-planning and consultation with native peoples to be affected by a development. On the other hand, it is alleged that substantial negative impacts have

been generated by the development. Extensive tree kill through the surrounding area, and declines in the fish and game populations have both been attributed to the existence of the mine.

The Pine Point experience provides a typical example of the results of pervasive, large-scale, capital intensive, highly integrated, non-renewable resource extractive development. As Mr Justice Berger points out in the Report of the Mackenzie Valley Pipeline Inquiry, “In the eyes of the people of Fort Resolution, the Pine Point Mine is not simply a development in which they have not participated. It is a development that they feel threatens their land and livelihood.”⁸ The native people have learned many lessons from the development of Pine Point. They know of the tremendous revenues gleaned from the lands adjacent to Fort Resolution. As the numerous schemes to increase native employment at Pine Point, and hence improve the quality of life in Fort Resolution, have failed, the native people have learned to view government policy, programmes, and promises with skepticism. They have no faith in the federal government’s proclaimed strategy for the 1970s.

III Historical Development of the Pine Point and Fort Resolution Region

Pine Point is located some six miles south of the south shore of Great Slave Lake, approximately fifty miles east of Hay River, Northwest Territories (see Figure 1). Little was known about the lead-zinc ore deposits of the area before 1900.⁹ When early explorers — including Peter Pond, Samuel Hearne, and Alexander Mackenzie — passed through the area, they expressed little interest in the “strange rocks” which the Indians described at Pine Point.¹⁰ The first white man to examine the outcroppings was William Ogilvie, a federal government surveyor who in 1888, en route to carry out exploration surveys in the Yukon, stopped in the area long enough to determine that no precious metals were present in the Pine Point ore.¹¹

Early fur traders knew that the Indians obtained galena (the sulphide of lead) in the area. It is possible that these traders instructed the Indians in the art of smelting small quantities for the production of lead shot,¹² for when the Klondike prospectors reached the Fort Resolution area at the mouth of the Slave River, forty miles east of Pine Point, “they noted that local Indians had fashioned musket bullets and fishing weights from native metal.”¹³ The prospectors,

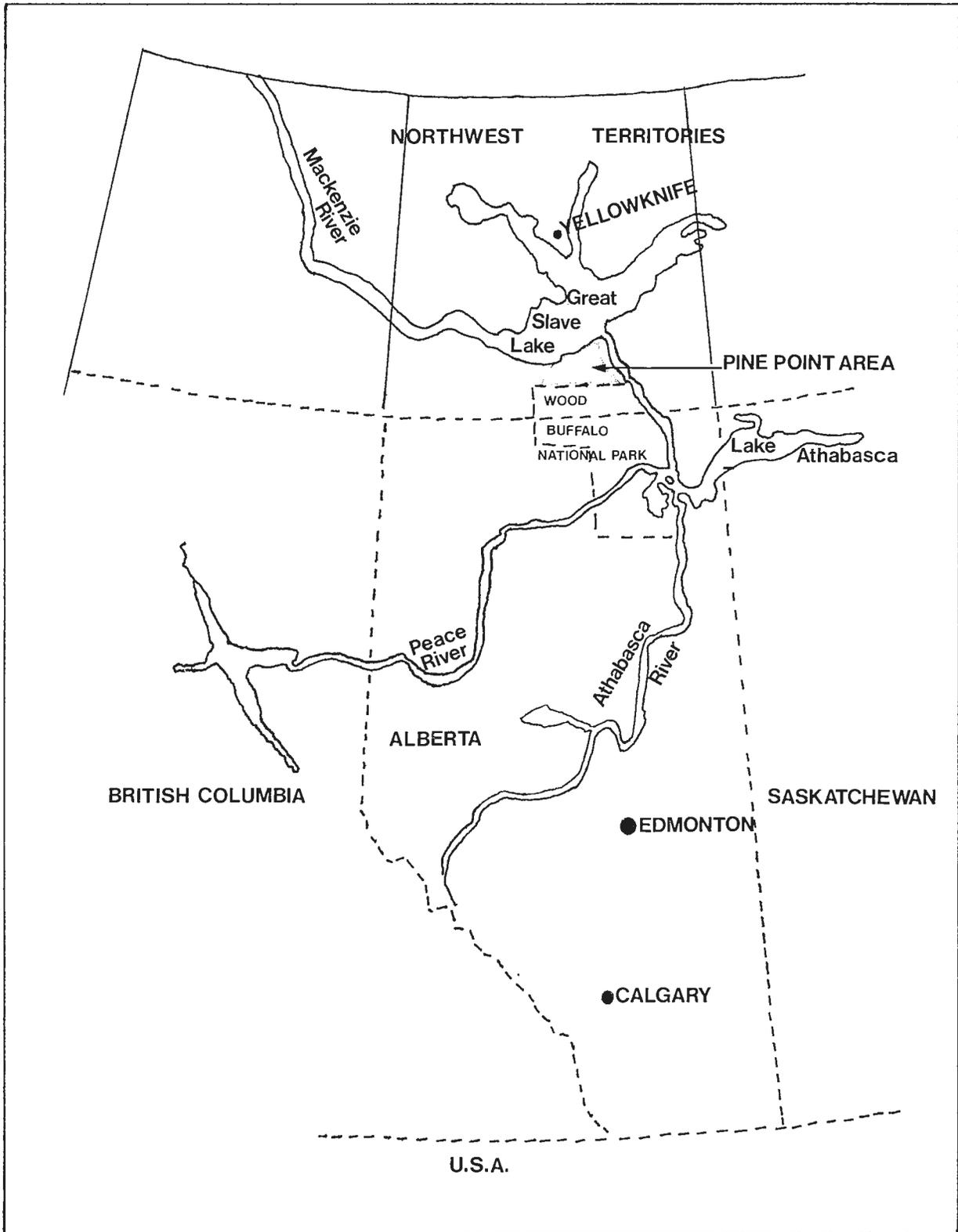


Figure 1 Location of the Pine Point Mine

passing overland to the Yukon gold rush, inquired as to the source of the metal and were directed to the outcrops thirty miles southwest.¹⁴ The first claims were staked in 1897 by these prospectors, who believed the heavy lead and zinc sulphides to contain high values of gold and silver. During the following winter missionaries, traders, and prospectors participated in a miniature “staking rush.”¹⁵

The flurry of activity taking place in the Pine Point area around the turn of the century came to the attention of Dr Robert Bell, director of the Geological Survey of Canada (GSC).¹⁶ Dr Bell provided the first recorded description of the geology of the area and the Pine Point mineralization, noting that it was low in silver.¹⁷ Many prospectors then allowed their claims to lapse and, with the exception of the staking of a few claims in 1908 and 1914, little activity took place in the area for the next fifteen years.¹⁸ Representatives of the GSC returned to the area again in 1916 and reported that the economic possibilities of the area were not impressive.¹⁹

In 1920, Dr J. MacIntosh Bell, a geologist who headed a Boston syndicate (the Paine-Webber interests),²⁰ sent an engineer to examine the Pine Point deposits. After the engineer’s favourable reports, claims were staked,²¹ and systematic surface exploration was undertaken. Results were encouraging, supporting Dr Bell’s theory that the deposits were of geological similarity to the famous Tri-State lead-zinc deposits of southeastern Missouri.²² Despite these findings, however, the deposits were not developed further at that time.

Cominco developed an interest in the property in 1927, when an exploration group visited the Pine Point ore showings. Their favourable report eventually led to the development of the mine. A year later an option of a group of sixteen claims adjoining the original group was arranged. “This option was extremely . . . useful in arranging a deal whereby Cominco participated in financing work at Pine Point through the medium of a newly organized Company.”²³

In order to finance detailed exploration work, the Boston interests, Atlas Ventures Ltd., and Cominco amalgamated their interests to form the Northern Lead Zinc Company Ltd., in the spring of 1929. During the exploration programme of 1929-30, a sixteen-mile road was built from Dawson Landing to the exploration site.²⁴ As supplies were shipped through Waterways, Alberta, a wharf was also constructed on Great Slave Lake. Supplies were brought in and crews hired from the Cobalt, Ontario mining district, and drillers from the Tri-State district.²⁵ The Northern Lead

Zinc Company’s programme of surface exploration sank pits and shafts in mineralized areas, and enlarged the property to 453 claims equalling approximately 21,150 acres, during late 1929 and early 1930.²⁶ As part of the exploration programme, extensive geological maps of all the scattered deposits were developed.²⁷ Following a detailed examination of the location of deposits, their size and grade, Dr Bell became more convinced that the Pine Point deposits were of the Mississippi Valley type. This observation was extremely significant, considering that deposits of this type are commonly clustered together in huge fields such as the Missouri, Kansas, and Oklahoma find, which is approximately a hundred miles long and accounts for twenty percent of the world’s production of lead and zinc. If Bell’s theory was correct and could be proved, Pine Point would indeed have great potential.²⁸

With expenditures totalling approximately \$300,000,²⁹ however, all the known showings of the Pine Point deposits had been thoroughly tested. The resulting estimates of about a half-million tons of fifteen percent lead ore were extremely disappointing.³⁰ Further requests for funding could not be justified in the economic climate of the 1930s. Cominco advanced only enough funds to permit the necessary assessment work to maintain the remaining claims in good standing. Following additional discouraging results in the late 1930s, the property was allowed to diminish to 104 claims by 1940. In fact, consideration was given to abandoning all but the central block of sixteen claims which contained the original discoveries.³¹

During the early 1940s the property was given another re-examination by Dr Neil Campbell of Cominco’s geological staff. He theorized that numerous orebodies might lie undiscovered, beneath overburden, situated along the projection of a major fault. Like Bell, Campbell was convinced that ore reserves might be of significant magnitude to merit a mining operation, despite the great distance to markets and supplies. In 1947 a study was made in collaboration with the staff of Cominco’s Mines and Metallurgical Division, confirming Dr Campbell’s expectations and indicating favourable economic prospects.³²

The area to be explored encompassed a mining district rather than a small property. As Campbell believed deposits might be located far beyond the remaining claims, Cominco applied to the Department of Mines and Resources for a concession covering a 500-mile area, south of Great Slave Lake, centring on the Pine Point area.³³ In 1949 the concession was granted jointly to Cominco, Atlas Ventures Ltd.,

and the Northern Lead Zinc Company, giving them exclusive rights to explore and develop any mineral deposits found there.³⁴ The federal government required a work commitment amounting to an expenditure of \$225,000 over a three-year period, of which the major portion was paid by Cominco. However, no rental was imposed by the government on any of the concessions.³⁵ The subsequent exploration programme, designed to prove or disprove Campbell's theory, produced a number of finds which tended to confirm the existence of a mineralized belt, twenty-two miles long by four miles wide,³⁶ in the Pine Point region. Cominco worked on the original concession until it expired in 1950, and then staked 1,099 claims along the Presqu'île formation in areas where mining potential had been demonstrated.³⁷ An extensive programme of diamond drilling would follow, evaluating the full potential of the deposits.

Later in 1950, Ventures Ltd. assigned its interests in the property to Cominco. This change precipitated the formation of Pine Point Mines Limited, which acquired the Northern Lead Zinc Company properties and claims recently staked. The new company was formed with the specific purpose of furthering development on the property and advancing it to the production stage. Cominco obtained a seventy-eight percent interest in Pine Point Mines Limited.³⁸ Under the direction of Cominco, Pine Point continued its 1948 exploration programme. Following the location of some high-grade ores, approximately 1,017 mining claims (or roughly 52,000 acres of land) were selected from the exploration area of the concession blocks and the remainder returned to the government.³⁹ As a result of the programme, reserves were estimated at greater than five million tons of approximately four percent lead and seven and a half percent zinc. Campbell's theory had been proved correct. In fact, indications were that, with the development of more ore intersections, the estimates could be increased significantly. At a meeting of shareholders in 1955, the president of Pine Point Mines Ltd., W.G. Jewitt, reported that the exploration programme had yielded ore reserves which would justify a mining operation. Extensive development and underground work had delineated the extent of several fields and provided all the information necessary to advance the property to the production stage. Jewitt outlined the transportation problem and explained that additional work on the Pine Point property would not be planned until satisfactory transportation facilities could be arranged.⁴⁰

Thus was concluded the exploration period in Pine

Point's history. During the post-depression years until 1955, extensive exploration took place, much of it based upon earlier theories and observations. Substantial reserves were proven and the stage set for the actual development of the largest mine in northern Canada. These activities, however, took place with little concern for (or impact upon) Fort Resolution, which was then a large and thriving native community about forty-two miles east of the mining operation (see Figure 2).

The recorded history of Fort Resolution (commonly called "Fort Res" or "Res" by local residents) dates back nearly two centuries, although the focus of this case study begins at the turn of the century – at the time that the Indians of Fort Res informed the first overland prospectors of outcrops of lead-zinc in the Pine Point area.⁴¹ Early economic activity in Fort Resolution began with the fur trade and the establishment of a Hudson's Bay Company post. Ancestors of the present-day families at Fort Resolution were either managers or employees of the trading post for decades.⁴² Expeditions northward often started from Fort Res and, as a result, the community became a transportation centre. Most of the Mackenzie River pilots and deckhands were native people. The local inhabitants made their living by fishing or on fish packing plant boats which frequently picked up cargo at Fort Res.⁴³

Between 1900 and 1950 Fort Resolution became the most prosperous town of the Mackenzie River basin. The Roman Catholic Mission relocated there and expanded its facilities to include a convent and later a residential school, a hospital (which was in part a tuberculosis sanatorium for the district), and even sawmill operations. The mission employed many people as millers, cooks, nurses' aides, hospital staff, and employees on the boats that the mission used. All mission activities in the region were directed and administered from this settlement.⁴⁴ In 1926 the government opened an Indian agency to handle the affairs of Treaty Indians and to operate the sawmill. During World War II and immediately thereafter, sawmill operations were further expanded to develop the timber resources throughout the entire region. Several gold mines based in Yellowknife opened sawmills along the Slave River to aid mine construction.⁴⁵ As a result of increased activity, Fort Resolution became an administrative centre in the region. Many decades of intense, successful economic activity in the town led the majority of its citizens to become both industrious and primarily dependent upon, and adapted to, a wage economy.⁴⁶

The prosperity of Fort Resolution came to an abrupt

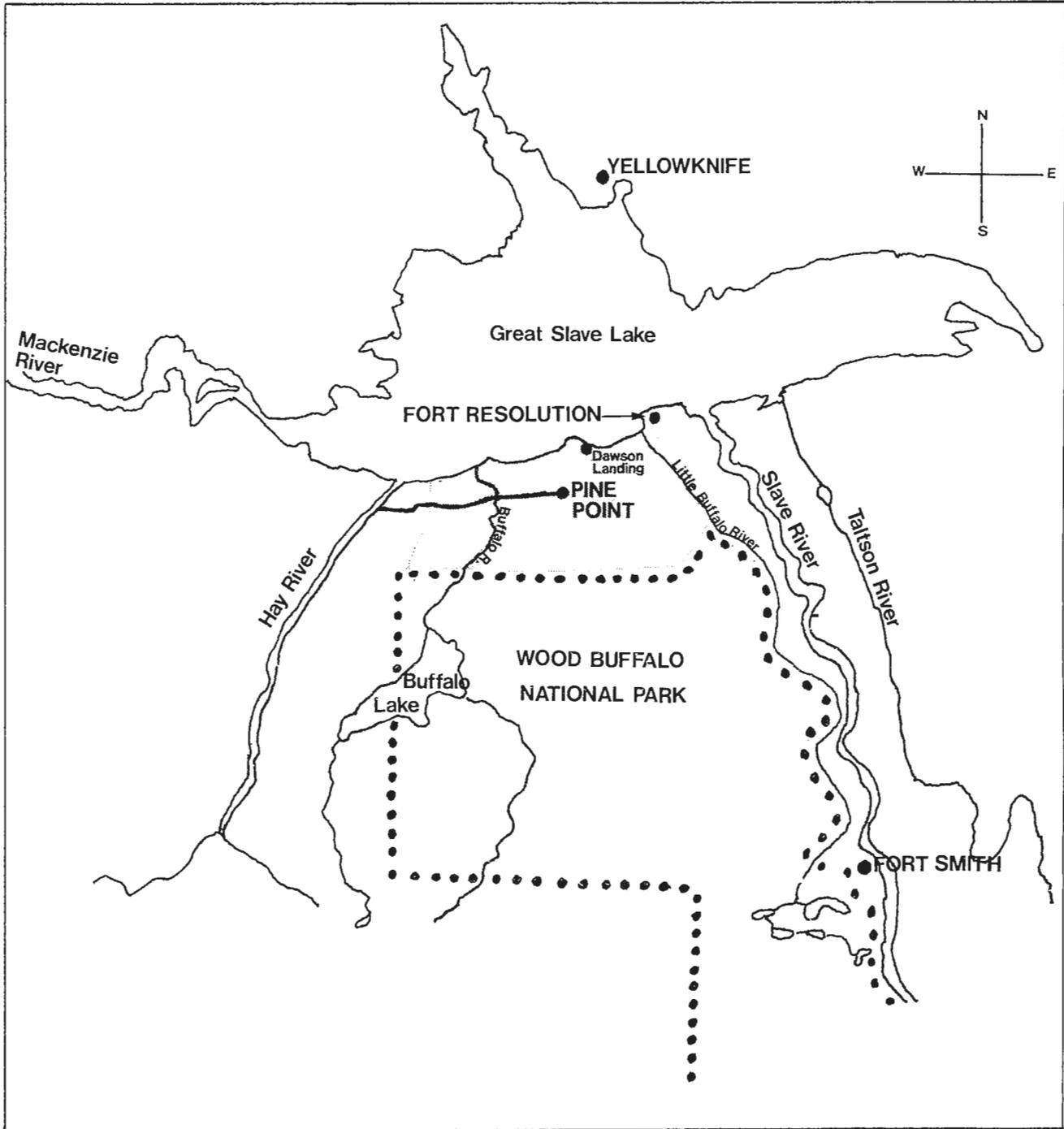


Figure 2 The Pine Point Mine

end during the mid-1950s. A number of factors were responsible for the drastic decline in economic activity, but most important was the shift in the transportation network, which channelled activities away from Fort Res to nearby Hay River. Growth of the town of Hay River was accelerated by the opening of the 380-mile Mackenzie Highway in 1949 and the building of the Great Slave Lake Railway from Grimshaw, Alberta in 1964. Hay River usurped the position of Fort Resolution and became the primary transshipment point for barge routes around Great Slave Lake and the Mackenzie River waterway.⁴⁷ Northern Transportation Company Limited, a Crown corporation, gradually took over barging, and hired pilots from the South and university students as deckhands, eliminating the need for native employees.⁴⁸ A freshwater fish packing plant was built at Hay River and the packers changed their working areas, with the result that commercial fishing at Fort Res declined.⁴⁹ Simultaneously, the Roman Catholic Mission activities in Fort Res were drastically curtailed. The residential school and tuberculosis sanatorium were closed, leaving only nursing staff to care for minor sickness and maternity cases. The church terminated its lumbering operations, as did the two privately operated mills. In less than ten years the community of Fort Res went from “boom” to “bust,” while the reverse process was occurring in nearby settlements. Fort Smith in particular benefited from increased educational responsibilities, hospital facilities, and the establishment of northern regional administrative offices under DNANR’s decentralization policy.⁵⁰

Fort Resolution is now a small centre whose population, according to the 1971 Census, is 623. The community is of divided ethnic origin, with Metis comprising some sixty percent of the population and Indians about thirty percent. Since the 1950s economic activity in Fort Res has been minimal, and the economy of the community has been based primarily on welfare payments.

IV Government-industry Negotiations: Government Assistance

The negotiations between Cominco and the federal government were critical in leading to the decision to place Pine Point into production, and had a profound impact on the profitability of the operation. The conclusions which were reached regarding the provision of government assistance to the mine and the issue of exports and smelter feasibility

clearly illustrate the respective bargaining positions of government and industry, and the process by which decisions were taken relating to the development and operation of Pine Point.

The decision to construct the Great Slave Lake Railway was made between 1955 and 1961. In 1961 the Railway Bill was passed and the Railway Agreement signed.⁵¹ Before considering the development of a railway, Cominco investigated the possibility of trucking concentrates down the Mackenzie Highway and then by rail to its smelting facilities at Trail, B.C.⁵² However, Cominco (a partially owned subsidiary of Canadian Pacific) deemed the trucking scheme uneconomical, and postponed development of the Pine Point project until more satisfactory and profitable transportation arrangements could be made. Despite the Manning Royal Commission’s recommendations in 1959 that the trucking alternative be reconsidered, the government continued negotiations over the railway for which Cominco was lobbying.

A stated justification for the development of the railway was that it would open up new areas for settlement and farming, provide economical transportation for residents, and mark a new era of prosperity “for the patient residents of the rich North West Territories.”⁵³ In August 1955, Jean Lesage, Minister of Northern Affairs and National Resources in the St Laurent government, announced: “we hope that it will be possible to work out with . . . Cominco some kind of understanding under which transportation facilities will be available to take out the orebody.”⁵⁴ It was apparent that the government favoured a northern railway, although the price it was willing to pay for one had not yet been determined.

Support for the railway and the Pine Point development was also generated by R. Gordon Robertson, the first Deputy Minister of Northern Affairs and National Resources and concurrently Commissioner of the Northwest Territories. He played a key role in advancing the development by co-ordinating discussions between different federal departments and Cominco, and by his presentation to the Gordon Commission on Canada’s Economic Prospects. In his brief presented in November 1955, Robertson justified government funding of the railway, “pointing out that the freight that might be generated at Pine Point would make a substantial contribution to the cost, although the railway could only be justified as a national northern development project, not as a mining railroad serving Pine Point.”⁵⁵ He also stated that “This railway is quite different . . . its purpose is to open up a whole new region. The fact that there

happens to be a potential mine of great value at its northern terminus is a piece of great good fortune.”⁵⁶

During 1955, discussions were held with DNANR, the Department of Mines and Technical Surveys (DMTS), Canadian National Railway (CNR), and Canadian Pacific Railway (CPR). CNR officials recommended that government should “take a broad and long-range view” and construct the railway “now in anticipation of growing economic activity in the north,”⁵⁷ and that the Treasury should provide a subsidy on the basis of the substantial economic benefits and tax returns anticipated from the project. Both the CPR and CNR stated that the Great Slave Lake Railway would be uneconomical unless relieved of all capital cost and interest charges. CNR in effect upheld the Pine Point position, even though only preliminary estimates of tonnage figures and railway cost were available. The head of the Mineral Resources Section of the DMTS also favoured the development, believing that Pine Point would place Canada in a competitive position in the world lead-zinc market.⁵⁸ Throughout the negotiations Cominco refused to commit itself to production figures, although it was suggested that the company would consider paying a slight premium on concentrates shipped. Despite strong indications that the railway, which at that time was estimated to cost \$50 million, would require a substantial subsidy, the government continued planning the development.

Once the government was firmly committed to the railway development, Cominco began to exert pressure for construction to begin as soon as possible. The government responded in its Throne Speeches, ordering route surveys and eventually appointing the Manning Royal Commission in 1958. Although the mandate of the commission was to determine the merits of the east and west railway routes and to recommend one or the other, the commissioners addressed themselves to additional questions. In his summary, the chairman stated:

*The Pine Point Mining Company has presented a strong case for the development of their property and argue that this would be warranted only if a railway is built. To the extent that this argument, advanced by the Pine Point Company, is material, we are unable to see why the railway is necessary for the development of the mine. It appears to us that products of the mine could be taken over the Mackenzie Highway by truck at a very substantial profit.*⁵⁹

The commissioners maintained that a railway was not necessary for the development of Pine Point and that the trucking alternative should be given further consideration.

They also argued, using the testimony of W.G. Jewitt, President of Pine Point, that Cominco had revised its estimate of the value of concentrates per ton, thus making the trucking alternative appear unattractive and accordingly enhancing the benefits to be achieved through the building of the railway and the operations of the mine. The greater the ore reserves, the less feasible trucking would be.⁶⁰ The commissioners exposed what was virtually an ultimatum by Cominco. At commission hearings, Jewitt had stressed that Cominco was desirous of the concentrates from Pine Point and would give assurances that, once the railway was built, the property would be put into production; but he had emphasized that “if the railway were not to be built the property might not be developed for a long time.”⁶¹

The concerns of the Manning Commission went unheeded. By the fall of 1960 an interdepartmental committee was assembled with representatives from the Department of Transport (DOT), the Department of Finance (DOF), DNANR, and DMTS, to discuss the amount of contribution Cominco should be expected to make towards the railway.⁶² The committee encountered difficulties in estimating the amount to be charged as a surcharge, in light of the anticipated profits from the mine.⁶³ A memo to the Minister of Transport acknowledged that the greatest problem confronting the committee and the government negotiators was that “the Company is in full possession of the facts and is able to present them in whatever light it chooses.”⁶⁴ The memo also suggested that the CNR should be asked to conduct a location survey of the railway line, since their staff was experienced and had carried out similar work for the government in the past.⁶⁵ No consideration was given to requiring that Cominco’s parent company, Canadian Pacific, perform this work. The memo concluded with the recommendation that any new approaches regarding the participation of the railway in the project should be left until after talks with Cominco officials.

Throughout the negotiations the government was represented by Cabinet Ministers Green (DMTS), Balcer (DOT), and Dinsdale (DNANR).⁶⁶ After extensive deliberations, the ministers decided to ask the mining company to consider various means for providing aid for the railway.⁶⁷ In effect, the government was requesting that the mine suggest the amount of support that it was willing to provide, rather than itself stipulating the amount to be paid as a condition under which the railway would be built. Admittedly, the task of estimating the financial support to be required from Cominco was difficult when the company had all the information. As a result, the government found it

impossible to set the amount of surcharge. This problem clearly identified the need for an independent source of information upon which the government could base its decision.

As a response, a "Proposal by Pine Point Mines Limited Relative to the Construction of a Northern Development Railway to Great Slave Lake"⁶⁸ was prepared by Cominco and submitted to the government in May 1961. It enumerated the beneficial effects which Cominco believed would accrue to the Canadian economy if the project went ahead:

1	Capital Expenditures [includes expenditures for railway]	\$109 million
2	Direct Employment: During 4-year construction period, average	2,000 jobs
	During operations	800 jobs
3	Freight Revenue to Railways directly attributable to Pine Point	\$5.5 million/year
4	Income Tax Increases directly attributable to Pine Point [includes corporate and personal income taxes and royalties]	\$4 million/year
5	Foreign Exchange Position Improvement	\$19 million/year
6	Provision of Service and Freight Savings to some 8,000 people living north of Grimshaw.	
7	Provision of Service and Freight Savings to existing industries such as commercial fishing on Great Slave Lake and the Yellowknife gold mining [sic].	
8	Stimulation of Agricultural Expansion in some 6,000,000 acres of arable land adjacent to the railway.	
9	Stimulation of Forest Industries based on some 13,000,000 acres of adjacent forest lands.	
10	Stimulation of Mineral Exploration which would undoubtedly lead to new mining developments.	
11	Provision of Essential Transportation for Northern Defence. ⁶⁹	

Following this list, the document repeated the ultimatum to government:

The commencement of mining at Pine Point is dependent upon the treatment of ores at Trail and unless there is positive assurance of immediate construction of a railway, the smelting capacity at Trail will be supplied from other sources, and operations at Pine Point would be deferred indefinitely.⁷⁰

The proposal emphasized the great benefit to accrue to Canada, by improving its foreign exchange position through the development of Pine Point:

If the Pine Point operation is not undertaken, the Canadian economy would be adversely affected not only by the substantial loss in employment but by the necessity of importing foreign concentrates, at a cost of about \$13,000,000 annually, to maintain the output of the Trail plants. Further, under these circumstances Cominco would not expand the Trail plants so that additional export business from the sale of metal amounting to about \$6,000,000 per year would not be obtained.⁷¹

Regarding the timing of the development, the proposal again asserted the mining company's position that the railway should be viewed with "considerable urgency," as the Pine Point operation might be postponed indefinitely:

In 1962 a large stockpile of residues, now being smelted at Trail, will be exhausted and it had been hoped that concentrates from Pine Point would become available in time to meet the resulting deficiency in raw materials. If there is positive assurance of immediate construction of a railway, Cominco could arrange to supply the smelting plants from temporary sources and so cover a gap of two or three years. But if such assurance is not forthcoming in the very near future, Cominco will have to make suitable permanent arrangements to supplement raw material supplies for the Trail plant. Once such arrangements are made, it might well prove economically undesirable to open up the Pine Point property for many years even though a railway were in operation. Consequently, the plans for the construction of the proposed railway to Great Slave Lake should be accelerated as far as reasonably possible.⁷²

The proposal suggested that the company pay a surcharge to the Government of Canada for the railway, but the surcharge figures were based on the government's estimates of freight density and transportation costs.⁷³ The validity of these figures is particularly suspect, considering the relative

lack of information made available to the government. Pine Point Mines also proposed to make a contribution which would total approximately \$12.5 million, to be paid annually over a ten-year period, with variations according to annual sales.⁷⁴

In June 1961, Leon Balcer, Minister of Transport, moved that the House of Commons consider a resolution regarding the Great Slave Lake Railway. The motion, which stipulated that the cost of construction would not exceed \$86,250,000, was passed.⁷⁵ Balcer then outlined all the benefits which would result from the railway and the Pine Point mine: increased employment; freight revenues and services; income taxes; improvement of Canada's foreign exchange position; stimulation of agriculture, forestry, and mineral exploration; and transportation for northern defence. This list was identical to that submitted by Pine Point in their proposal of the previous month. Balcer also introduced an amendment to the resolution, raising Pine Point Mines' payment to the government from "not exceeding \$12,500,000" to "not exceeding \$20,000,000" towards the cost of constructing the railway.⁷⁶ The contents of the resolution became Bill C-126, "An Act Respecting the Construction of a Line of Railway . . . by CNR . . . to Great Slave Lake."⁷⁷ During the course of the debates in Parliament, the Liberal opposition criticized the procedure by which the bill had been introduced. Concern was also expressed regarding the availability and reliability of the information which the government had been provided about ore reserves and the profitability of the operation.⁷⁸ The findings of the Standing Committee on Railways, Canals, and Telegraph Lines, which indicated that in 1961 seventy-eight percent of Pine Point was owned by Cominco and that over fifty percent of Cominco was owned by Canadian Pacific, were also discussed.⁷⁹ Suggestions that the chief benefits from the project would accrue to Canadian Pacific were heard, as were suggestions that the DOT consider raising the tonnage requirements of Cominco. One Member of the House stated:

This is a tremendous piece of socialism, to put it bluntly; that is what it is. It is also very clearly a tremendous gamble in which the mining company does not stand to lose and in which the C.N.R. has fixed up its statistical position all right, but fixed it up at the expense of the Canadian treasury. This is a gamble in which every contingent risk is taken, not by private investors which [sic] are supposed to take risks, but by the treasury.⁸⁰

Nevertheless, the bill permitting the construction of the

Great Slave Lake Railway was passed on 26 September 1961.⁸¹ Negotiations were concluded several months later, with the signing of an agreement between Cominco, Pine Point Mines, CNR, and the government on 7 December 1961. The Great Slave Lake Railway was completed fourteen months ahead of schedule, and for approximately \$11,000,000 less than the statutory limit of \$86,250,000 allotted the railway.⁸²

The terms of the Railway Agreement were highly favourable to Cominco and Pine Point Mines. In late 1964 Pine Point commenced shipments of high grade ore and concentrates and was not subject to payment of the special transportation charge, or of contributing to the capital cost of the railway, until March 1968. During the ten-year period beginning March 1968, Pine Point was committed to shipping 215,000 tons of ore or concentrate yearly. In fact, over the ten years the mine shipped approximately 5.7 million tons — almost three times that specified in the agreement (see Table 1). Permitting the company a flat base rate beyond 215,000 tons yearly virtually guaranteed windfall profits. Nor is this obvious only through hindsight, for an open-ended clause setting forth appropriate rates above the 215,000 tons would have been the logical option at that time, considering that the mine was expected to make a profit. The ceiling of approximately \$20 million on the special transportation charge prevented the government from recovering capital costs above this amount.⁸³

Another profound weakness of the agreement was its guarantee that, if ore or concentrates could be treated more economically in a smelter outside Canada, the government would agree to authorize exports, pursuant to the Canada Mining Regulations. The intent of this clause seems clear; Cominco wished to secure a guarantee from the government that it would be permitted to export concentrates, should a foreign smelter offer better prices than Canadian smelters.⁸⁴ The fact that a clause pertaining to export permits and smelting was included in a railway agreement is most unusual. The agreement was signed by Pine Point, Cominco, CNR, and the Department of Transport. If only DOT officials were involved in the Railway Agreement, as signatures to the document indicate, then it may be that representatives of departments such as DMTS and DNANR would not have seen the agreement, nor its contents which were to have a substantial bearing on the granting of export permits and subsequently the feasibility of smelting in the Northwest Territories.

Table 1
Tons of Concentrates and Ore Shipped by Year

Year	Direct Shipping High Grade Ore	Lead Concentrates	Zinc Concentrates	Total
1964	14,070	—	—	14,070
1965	364,168	3,524	8,375	376,067
1966	282,309	79,974	241,005	603,288
1967	333,000	83,000	233,000	649,000
1968	353,000	87,000	223,000	663,000
1969	—	137,000	431,000	568,000
1970	74,000	135,000	451,000	660,000
1971	18,600	118,000	416,000	552,600
1972	—	119,000	391,000	510,000
1973	—	113,000	371,000	484,000
1974	—	123,000	359,000	482,000
1975	—	104,000	301,000	405,000
1976	—	72,000	323,000	395,000
1977	—	85,000	290,000	375,000
1964-1977	1,439,147	1,259,498	4,038,380	6,737,025

Under the Railway Agreement the ten-year term during which Cominco was required to ship a minimum of 215,000 tons yearly ran from March 1968 to March 1978. Shipments for the period 1967-1977 totalled 5,743,000 tons. Average shipments over the ten-year period equalled 574,300 tons per year.

Source: Individual tonnage figures from Pine Point Mines Limited, Annual Reports, 1964-1977.

Parliament never considered the question of the total amount of government assistance to Pine Point. At the time of the railway debate there was no discussion of other forms of government assistance, apart from the railway. Had the House realized the extent to which the mine was to be further subsidized, the members might have been skeptical about the generous railway provisions, which were made under pressure and with insufficient information.

Further assistance was granted to Pine Point with the construction of the Taltson River hydro-electric generating station (including a 170-mile transmission line) at an estimated cost of \$9,120,000,⁸⁵ plus a cost overrun of \$200,000.⁸⁶ Since all projects undertaken by the Northern Canada Power Commission (NCPC) must be self-sustaining, according to the authorizing act, the rates charged must provide sufficient revenue to cover the interest on investment and repayment of the principal of the project, as well as operation and maintenance costs over the economic life of the project.⁸⁷ By 1975 Pine Point, the principal user of Taltson power, had paid \$7 million to NCPC for power supplied to the mine.⁸⁸

It appears that during the early 1950s Cominco had fully intended to bear the costs of providing power for Pine Point, since West Kootenay Power and Lighting Company (a wholly-owned Cominco subsidiary) was commissioned to prepare hydro-electric feasibility studies on the Slave River.⁸⁹ In 1959 Eldorado Mining and Refining Limited, a Crown corporation, also conducted hydro-electric feasibility studies which determined that no practical scheme existed to produce the power required for both Pine Point and the community of Fort Smith.⁹⁰ By the end of 1961 Pine Point Mines had suggested that NCPC consider developing one of the Slave River sites, believing that the lower-cost financing available to the Crown agency would make the project economically viable.⁹¹ When NCPC studies concluded that a power development on the Slave River was uneconomical, Gordon Robertson (the Northern Affairs deputy minister who advocated the development of the Great Slave Lake Railway) recognized the urgency of hydro power for the Pine Point development and recommended that NCPC consider other sources of hydro power. Following further studies, NCPC selected the 25,000-hp Twin Gorges site on the Taltson River. Federal funding of the project was justified on the grounds that power was also being provided for the community of Fort Smith, and would provide incentive for further exploration and development.⁹²

During negotiations for government assistance, a draft agreement was prepared regarding the construction of the Taltson hydro-electric station and the purchase of power by Pine Point Mines from NCPC. Although the agreement (which was to run for twenty years until 1983)⁹³ was never formally executed, the terms were implemented in full until 1976. At that time a revised agreement was negotiated and rates paid by Pine Point Mines were increased by fifty-two percent. The following year rates were again increased, this time by 147 percent.⁹⁴ According to the terms of the original agreement, Pine Point Mines guaranteed full recovery of the costs incurred by NCPC in construction of the plant. It is indeed curious that this original agreement was never signed; why it was not signed is not known. Had the document been signed, NCPC would have been legally bound to provide the mine with cheap power until the agreement expired in 1983. In the context of decision-making during this era, such an agreement would not have been unusual. In addition, the recovery of costs for the plant would have been legally guaranteed. In any case, the Taltson project was completed on schedule and formally opened on 29 October 1965.⁹⁵

Little negotiation took place regarding the provision of roads assistance to the mine. Pine Point did encourage the government to expedite roads construction, in order to permit construction materials to be hauled to the mine site during the pre-production period. As a result, the Pine Point-Hay River road became a priority under the Northern Roads Policy. The government's desire to encourage development in the North, and the Pine Point mining development in particular, is evidenced by the fact that in little more than a year and a half funds were allocated for the road, contracts issued, and the road itself completed. Total cost for the road was \$2,647,384, excluding the cost of the Buffalo River bridge.⁹⁶ Priority was also given in January 1964 to a 120-mile network communication road from Pine Point to Fort Smith, at an estimated cost of \$5 million,⁹⁷ although this road was of little value to Pine Point. In sum, however, the government's roads policy was extremely generous to Pine Point.

As soon as rail and hydro arrangements had been completed, Cominco initiated negotiations for federal and territorial assistance in building the Pine Point townsite. A series of meetings was held by the company, the two levels of government, and the Central Mortgage and Housing Corporation (CMHC). As Cominco requested, special procedures were adopted to ensure that townsite development would coincide with the company's development programme.⁹⁸ Cominco asked that a development authority be established to sell lots, and that the government be responsible for municipal services, which included the installation of sewer trunk lines and a water system. The company proposed to pay for its share of the development costs through the purchase of lots and services.⁹⁹ The government not only agreed, but also suggested that Cominco carry out the actual construction of the townsite, as insufficient time was available for tendering contracts. Accordingly, \$450,000 was allocated by the Treasury Board, at DNANR's request, to the territorial government for Phase I of the Pine Point development, following the signing of an agreement on 4 July 1964 between the Commissioner of the Northwest Territories and Cominco.¹⁰⁰ By this time townsite construction was well underway.

All townsite planning was based on Cominco's population estimates for Pine Point, which ultimately proved inaccurate.¹⁰¹ Cominco's cost estimates escalated at an alarming rate until the townsite agreement was signed; but after that time the company was able to operate well within the specified limits of financing.¹⁰² Its estimates for Phase II also varied greatly from the outcome. Even though sales of lots

from Phase I had been extremely disappointing, the same practice of lot sales was implemented for Phase II, and the costs borne by the territorial government increased. At no time was Cominco required to make any commitment regarding the purchase of lots, although all planning was based upon Cominco's figures.¹⁰³ By 1970 the total expenditures for Phases I and II, including a trailer park and commercial development, amounted to \$777,635.79. Only \$328,796 had been recovered.¹⁰⁴

Information provided by Cominco indicates that by 1978 Pine Point Mines had purchased 344 housing lots and paid for the full cost of servicing those lots on a *pro rata* basis. In addition, Pine Point Mines has paid for lands acquired for bachelor apartments, "industrial" lots for bunkhouses and the cookhouse, and the costs of servicing these properties. In sum,

*Pine Point Mine has paid to the government the initial capital cost of services, plus the value of the land, for all of the lots acquired for PPM [Pine Point Mine] employee and company use. Therefore the government has had returned to it all capital cost except that portion attributable to the 10% of the lots retained by the government for its own purposes.*¹⁰⁵

Assessment of the total costs of townsite development is an impossible task. However, the unknown costs incurred by NCPG in providing hydro to the townsite, and the costs incurred by the Northwest Territories government in providing educational facilities should be considered. So too should the fact that Pine Point Mines provided the original nursing station (which is now used free of charge by the Public Health Service) and has paid for a new medical centre and staff (certain monies will be recoverable from health service plans), in addition to ambulance services. Similarly, Pine Point Mines has paid property taxes since the community became a town in 1972. Moreover, the fact that the company continues to pay taxes to the town on the mill site (included within the town boundaries since 1972 or 1973) substantially increases the tax base of the community.¹⁰⁶

The federal government's desire to co-operate with the town development was further indicated through the fulfilment of Cominco's requests to have the Pine Point community designated a "development area," to prevent squatters, and recognized as an "open town" which would be run by a freely elected local council under the supervision of the territorial government.¹⁰⁷ Cominco also requested the establishment of an Area Development Ordinance,¹⁰⁸

which permitted the company to have access to and build upon lands regulated under the terms they specified, while being relieved of the responsibilities associated with townsite administration. Under the townsite agreement, Cominco agreed to be responsible for normal summer and winter maintenance of the roads, but all major repairs were to be the responsibility of the territorial government.¹⁰⁹ In addition, as long as the company was the only user of services, no rates would be set and the services would be operated “at cost.”¹¹⁰ This was indeed a case of poor judgment on the part of the territorial government, as no formal provision was made for the government to acquire funds, yet it was responsible for costly repairs.

The negotiations involving Cominco, DNANR, and the territorial government resulted in the territorial government being responsible for a major portion of the initial townsite development cost. Had Cominco not purchased additional lots following the mid-1970s, the territorial government would have had to bear a substantial portion of townsite development costs as a result of its early decisions (which had been based on the Cominco estimates, which were neither binding nor guaranteed). Given that the government chose to provide housing and services, which is considered by some to be a questionable practice for single-resource towns of this nature, it should have secured a guarantee from the company for minimum purchases. Since the company was deriving major financial benefits from the project, the burden of costs and obligations should in turn have been borne by the company and “built in” as a portion of the cost of development, to be amortized over the life of the project as are other mine-related expenses.

V Government-industry Negotiations: Exports and Smelter Feasibility

The negotiations regarding export permits and the feasibility of smelting operations in the Northwest Territories also illustrate the relative bargaining positions of government and industry. Decisions regarding exporting and smelter feasibility were made within the context of Cominco’s corporate marketing strategy. One of the key factors which influenced decision-making in this regard was ore reserves. The level of ore reserves at various stages in the decision-making influenced the outcome of negotiations. It is clear that government negotiators operated under a different set of assumptions regarding ore reserves than did

Cominco representatives. Some of the communication differences may be attributed to different methods of defining ore for various purposes.¹¹¹

In 1955, as a result of diamond drilling programmes conducted between 1948 and 1954, indicated or probable ore reserves at Pine Point were established at five million tons. “Projections made by Cominco geologists before 1957 suggested that sixty million tons or more of ore would be found, but only a small proportion of this had been drilled off in sufficient detail to place in an ore reserve category.”¹¹² In correspondence with DNANR concerning the feasibility of trucking concentrates and shipping by rail, Jewitt indicated that “ore potential at Pine Point [is] . . . in the order of 60 million tons, [and] is a much more firm estimate than ore reserves reported by most mines.”¹¹³ This estimate indicated that sufficient amounts of ore would be available to justify the development of a mine, and negotiations leading to the construction of the Great Slave Lake Railway were accordingly begun. When estimates were prepared and discussed, the 1955 “indicated” or “probable” ore reserve figures were used. However, despite the fact that government negotiators were bargaining with the figure of five million tons in mind, the terms of the Railway Agreement of 1961 suggested that Pine Point ore reserves were significantly higher than the official figures which were reported. Indeed, in 1964 a DNANR official noted:

*The company is committed to ship 215,000 tons of concentrate per year over the . . . railway and, to produce this, it will have to mine in the neighbourhood of 3,000 tons per day. At this rate, 5,000,000 tons of ore will last less than five years. Obviously, the company has many times this tonnage in reserve, and the figure of “30 years’ supply,” as quoted in one press release, is probably closer to being correct.*¹¹⁴

This analysis would appear to indicate that a discrepancy existed between anticipated ore reserves and the official figures which were used by the government during negotiations.

Ore reserve figures remained unchanged between 1954 and 1963, as no exploration was conducted on the property. After the nucleus of ore had been found, further exploration was not considered to be necessary until the orebody had been committed to production. Once the construction of the mine began, expensive drilling costs could be lowered, perhaps by as much as a third, since overhead expenses and the general size of the operations would spread out the costs of drilling.

In 1963 more ore had to be delineated in order to plan for production. A major diamond drilling programme produced disappointing results, as new discoveries (including a ten percent allowance for dilution) only increased reported reserves to 8.8 million tons. The relatively new “induced polarization” (I.P.) geophysical survey method was then utilized for the first time on lead-zinc deposits of the Pine Point type, and indicated the presence of sub-ore (mineralized rock which is not of sufficient grade to be considered mineable). The I.P. method was a theoretical success, and a comprehensive programme of I.P. surveys the following year resulted in a doubling of reserves to 17.5 million tons. Some

the purchase of major orebodies (discovered through the use of I.P. surveys) on property adjacent to Pine Point owned by Pyramid Mines.¹¹⁵ The continued success of I.P. work on the Pine Point properties also contributed to the phenomenal increase in reserves in 1966 (see Table 2).

While ore reserves were expanding, Cominco was enlarging its international interests. Participation in mining and smelting operations in other countries ensured long-term sales in the foreign markets upon which Cominco was dependent.¹¹⁶ Indeed, the integration of Pine Point into Cominco’s corporate network made good economic sense. In terms of marketing and export, the development of Pine Point Mines became a great asset to Cominco holdings. The

Table 2
Pine Point Mines Ore Reserves by Year

Year	Ore Reserves (Millions of tons)	Grade (%) Lead/Zinc	Tonnage of Orebody Depleted	Changes in Ore Reserves (Millions of tons)	Exploration Expenditures (\$)
1955	5	4.0 7.4	—	—	—
No further work on property					
1963*	8.8	2.6 5.9	—	3.8	N/A
1964	17.5	4.8 7.4	14,000	8.7	591,948
1965	21.5	4.0 7.2	439,524	4.0	585,000
1966	37.8	2.9 6.8	1,740,299	16.3	1,308,000
1967	40.5	2.6 6.8	1,854,000	2.7	132,000
1968	39.3	2.6 6.8	2,491,000	-1.2	58,000
1969	39.3	2.6 6.8	3,605,000	0	1,000,000+
1970	43.5	2.5 6.0	3,934,000	4.2	1,800,000+
1971	41.9	2.4 6.0	3,910,000	-1.6	N/A
1972	40.9	2.4 6.0	3,810,000	-1.0	1,000,000
1973	38.3	2.3 5.7	3,896,000	-2.6	1,100,000
1974	39.5	2.2 5.7	4,135,000	1.2	1,300,000
1975	39.2	2.0 5.4	3,905,000	-0.3	1,800,000

Source: Pine Point Mines Limited, Annual Reports, 1964-1975.

* 1963 figures provided by W.T. Irvine, former manager, Exploration, Western District, Cominco Ltd., 13 July 1978.

of the strongest anomalies were proven to contain high grade ore right at the surface which could be easily mined. Direct shipments of test ore were sent to Trail and Kimberley. These shipments proved to be so profitable that direct shipping was continued on a commercial basis, even after the concentrator at Pine Point was in operation. After the mine came into production, ore reserves rose to 21.5 million tons in 1965 and jumped to 37.8 million tons in 1966, following

company had extensive experience in marketing, and holdings in a number of companies associated with the production, refining, and smelting of lead and zinc. Pine Point immediately became an integral part of this network, as ore and later concentrates were shipped to Cominco’s Trail and Kimberley operations. Not only would Pine Point concentrates replace declining reserves from Cominco’s Sullivan mine, but they could also be exported. Exports

could be supported on the grounds that Cominco's Trail smelter could not accommodate all the concentrates from Pine Point, despite its expansion in 1964 at an estimated cost of \$10 million,¹¹⁷ in anticipation of Pine Point's production.

Early in 1965 Cominco submitted its first export applications to DNANR, and they were reviewed by an interdepartmental government committee.¹¹⁸ This committee, in assessing the applications in order to provide guidance for DNANR, acknowledged the terms of the Railway Agreement which stipulated:

*Where . . . the price at the mine offered for such ore or concentrates for treatment in a smelter or metallurgical works in Canada is less than that offered for such ore or concentrates for treatment in a smelter or metallurgical works outside Canada, the Government agrees to authorize the export of such ore or concentrates from Canada pursuant to the Canada Mining Regulations.*¹¹⁹

It appears that, prior to the export applications, the ramifications of the Railway Agreement had not been recognized; nor had its impact on the expansion of smelter potential in Canada become clear. The committee recommended that the government obtain a firm commitment from Cominco to operate its Canadian smelters at full capacity. Although the committee agreed that it would be useful to have more information explaining why the company should not expand Canadian smelting facilities, they were hesitant to request it because "unless it had direct bearing on the application, the company might not see fit to provide the information."¹²⁰ Considerations favouring the granting of the exports were set forth by DMTS in a 1965 memo, which also illustrated the momentum of the development:

*Canada has spent about \$80 million on the Pine Point Railway, in encouraging Pine Point to come into production. It might be said that the Government brought Pine Point into production. We now want to encourage the company in its search for markets, not discourage it. We have quite an investment in this project.*¹²¹

Other advantages to be gained from the exports were enumerated in a memo to Cabinet, submitted by the Minister of Northern Affairs and National Resources on 8 April 1965. They included assurance of markets, increased production, further encouragement of exploration and development, additional freight revenues, and improvement of Canada's foreign exchange position. The memo to Cabinet also noted that ore reserves (then 17.5 million tons, grading 4.8 percent

lead and 7.4 percent zinc) probably did not reflect the "potential" ore reserves at Pine Point, but that the figures could not be substantiated because delaying the application would jeopardize Cominco's export arrangements.¹²² The memorandum also noted that alternatives to the expansion of Cominco's facilities at Trail and the possibility of establishing another smelter elsewhere in Canada had not been investigated in detail.

Once again the government was pressured into making a swift decision in order to accommodate industry.¹²³ The exports were approved by an Order-in-Council, and included a ten-year permit for lead exports to Japan. It is significant that, since the government recognized that the decision had been made with what it perceived as insufficient information, provisions were included in the permit stipulating that if Pine Point failed to provide the information requested, the minister could suspend exports.¹²⁴ This change in approach towards Cominco occurred much too late, for the government's hands were tied by the Railway Agreement, but it at least indicated the government's apparent willingness to utilize the severely limited powers left to it.

In November 1965 Cominco also requested further export permits,¹²⁵ and submitted a confidential document outlining additional ore reserves and the reasons for the additional export requests. Again the benefits enumerated were identical to the previous export requests, and resembled the arguments put forward by Cominco several years earlier concerning the railway. By this time the true implications of the Railway Agreement and consequent exports had become apparent, and the interdepartmental committee was concerned that if export permits were granted (particularly those with longer-term contracts) the ore reserves would not be sufficient to support a new Canadian smelter. Following a number of meetings, the committee recommended to Cabinet that the permit be made conditional on the provision of certain information and studies examining the question of smelter feasibility. A letter was drafted to Cominco from DNANR, clearly indicating that the DMTS and the committee believed that the true potential of Pine Point was not being revealed. The letter was also intended to inform Cominco that:

no further extensions or additions to export permits beyond those now sought be approved unless . . . the companies [Pine Point Mines and/or Cominco] . . . undertake to complete and provide the Department within two years . . . a complete economic feasibility and marketing study for the

*purpose of determining whether additional smelting facilities should be built in the Northwest Territories or elsewhere in western Canada.*¹²⁶

Although the draft letter was never sent to Cominco, it reflects impressions within government and the assumptions about reserves under which it was operating at the time.

Correspondence between Cominco and DNANR indicates that the government had requested that any major application for exports “be submitted as far in advance as practicable . . . so that we can analyze the situation”¹²⁷ The government believed that time would be required in order to study in detail the benefits that would accrue from the expansion of Canadian refining facilities. Displeasure was therefore expressed when Cominco requested an export permit on 22 November 1965 to become effective on 1 January 1966. The government then informed Cominco of the kinds of information that might be needed by the Cabinet in order to reach a decision about the export permit. Specific reference was made to the question of ore reserves, noting that government information was “limited to 17.5 million tons of proven ore which would indicate a rather short life expectancy for the project.” Apparently the estimates of sixty million tons given by Jewitt some eight years earlier had either been forgotten or treated as completely unofficial. The company was specifically requested to provide “information respecting ore reserves in terms of generally acceptable categories such as those used by the Department of Mines and Technical Surveys and the United States Geological Survey”¹²⁸

Early in 1966 the Department of Northern Affairs and Natural Resources proposed to undertake a smelter feasibility study and requested the co-operation of Cominco and Pine Point. The companies indicated that they would cooperate in the study, which was to be prepared by an engineering firm chosen by the government.¹²⁹ Exports were approved by Cabinet in February 1966, although one individual permit was reduced from four years to three, as reported ore reserves were insufficient to merit the export.¹³⁰ At the time that the permits were authorized, the Minister of DNANR announced that, “in pursuance of the policy of encouraging the fullest possible processing of raw materials in Canada,” a study of the feasibility of the immediate construction of a lead-zinc smelter in the Pine Point area had been authorized.¹³¹ The investigation was to be undertaken by Canadian Bechtel Limited at a maximum cost of \$160,000.¹³²

The decision to hire a consultant to conduct a study of

feasibility reflected the DNANR’s fervent desire to foster such a project in the North. At a January 1966 interdepartmental meeting it was stated that:

*the Department . . . had a prior responsibility to promote northern development and would use any means available, including building a smelter as a crown corporation project, if its feasibility were proven and if private operators did not act on their own.*¹³³

The question of ore reserves was one of the critical factors in the feasibility studies for a smelter. The October 1966 Bechtel report was based upon Pine Point ore reserves of 1965, which were estimated at 21.5 million tons. The report noted that “widespread and intensive exploration efforts” for new ore during 1966 had been disappointing, and that the study “has therefore been suspended . . . pending the development of reserves adequate to warrant resumption of smelter planning.”¹³⁴

A year later, however, reserves had nearly doubled to 37.8 million tons. By this time it would appear that the DMTS was concerned about ore estimating procedures and the allotment of exploration funds. The department noted that the Pine Point Mines annual report of 1966 indicated that \$1,308,000 had been spent on exploration, and only \$132,000 had been spent in 1967 (see Table 2). Officials stated that “it would probably be difficult to define a satisfactory level of exploration activity, but it might be useful to have Cominco outline its probable expenditures over the next few years.”¹³⁵ The government accordingly requested Bechtel to re-examine its conclusions. However, the second Bechtel report (June 1967) confirmed the view that a Pine Point smelter was uneconomical “within the range of metal prices assumed,”¹³⁶ and that “rates of return would be low when judged by normal business standards.” It was nevertheless stated that:

*future developments in the Great Slave Lake area and advances in the technology of lead and zinc reduction could result in significant improvements in smelter economics and the attractiveness of the project as a business venture.*¹³⁷

In April 1968 DMTS acknowledged its agreement with these conclusions:

Cominco’s ore reserves, large as they are, are not sufficient to support expanded Trail operations, the new zinc plant in India, the new lead plant in Japan, and a new smelter at Pine Point. Bechtel seems to be quite right in finding that a

*new ore source, either at Pine Point or elsewhere as at Anvil, must be found before a subsidized smelter could be built.*¹³⁸

It may be argued that, had Pine Point's official estimates of ore reserves been higher at this time, the company might have been required to build a smelter or to have the majority of Pine Point ores smelted in Canada. Cominco negotiators, however, state that ore reserves were not a major issue, and that the cost of providing the tremendous amounts of electricity required by a smelter, the cost of shipping in large quantities of limestone, plus other factors, contributed to the decision not to construct a smelter.

Despite the discouraging results of the Bechtel studies, the Economic Staff Group of the Department of Indian Affairs and Northern Development re-examined the question of smelter feasibility and attempted to justify the federal construction of a smelter on the grounds of "more readily quantifiable" and "less readily quantifiable" net benefits.¹³⁹ All the benefits were expressed in dollar terms and included additional railway profits, reductions in power cost, reduced social assistance payments through the provision of 300 jobs to indigenes, the "economic momentum" of development, and benefits from imported southern labour attracted by the project. Although the Economic Staff Group's report was inconclusive, the examples of potential capital expenditures, possible subsidization, and the potential capital returns of investment illustrate that the possibility of developing a smelter capacity at Pine Point should have been reconsidered, perhaps at a later date. Nevertheless, the report itself did not recommend further action on the subject, claiming that to do so was outside the scope of the analysis.¹⁴⁰

By 1968 it must have been apparent that, by the time a smelter could be built, Pine Point would have completed mining out the majority of the high grade deposits under the three-year tax holiday and would likely have removed the richest part of the orebody. Export commitments would have further reduced the available ore reserves, thus rendering a Canadian smelter uneconomical. Since 1966 Cominco ore reserves have been maintained around the forty-million ton level, and the ore mined out, including high grade, has equalled approximately 33.7 million tons (see Table 3). From the DNANR's point of view, the question of smelter feasibility was considered far too late — only after export permits had been approved. Had the potential of high ore estimates been substantiated prior to 1965, the question of smelter feasibility might have arisen earlier with entirely different consequences.¹⁴¹

Ultimately, the fact that a smelter was not constructed in the Pine Point region was to the advantage of Cominco, since returns from smelters are lower than from other portions of the mining process. It was also to the advantage of the residents of the area. Although the question of smelter feasibility was examined in depth, no social or environmental consequences of the development were considered, beyond quantifying wage benefits and employment. A lead-zinc smelter employing 700 people would have had a very significant negative impact on the region, perhaps more extensive than the impact of the mine itself.

VI Social Impacts of Development

By the time that development decisions were being made regarding Pine Point, the native community of Fort Resolution had suffered severe economic decline. Anthropologist Richard Slobodin described the atmosphere of Fort Resolution during the early 1960s as follows:

*There is a general sentiment of decline and depression in Fort Resolution. There is a feeling that the settlement has been bypassed — bypassed, that is, by the Mackenzie Highway and by the industrial developments presently or potentially associated with it. Since fish and fur resources of the area have not been seriously depleted, in the opinion of specialists, this sentiment exemplifies that progressive rejection of self-employment in trapping which has become a striking feature of District social and economic life.*¹⁴²

Both the territorial and federal governments were well aware of the situation, since a preliminary survey of the Great Slave Lake area had concluded that "development programs were needed and were feasible" and had identified Fort Resolution as "an area of immediate need."¹⁴³ As a result, the territorial government attempted to provide an economic base for the settlement by establishing a lumber co-operative. The Indians and Metis of Fort Resolution were well adjusted to a wage economy, and many had looked forward to the opening of the mine in the hope that it would provide the economic base that they so badly needed. This opportunity was overlooked by the government, however, presumably in the belief that the lumber co-operative would alleviate some of the economic dislocation that the community was experiencing. The diversification of the economy through the employment potential of both the lumber co-operative and the Pine Point mine would have been a sound policy. By overlooking Pine Point as a source of employment,

Table 3
Tons of Ore Mined 1964-1975

Year	Tons of High Grade Ore Sold	Grade (%) Lead/Zinc		Tons of Ore	Grade (%) Lead/Zinc		Total Tons High Grade and Concentrated Ore
1964	14,070	18.6	25.8	—	—	—	14,070
1965	364,168	22.5	29.1	75,356	4.27	7.63	439,524
1966	282,309	18.8	26.3	1,475,990	4.5	10.5	1,740,299
1967	330,000	18.0	27.9	1,521,000	4.7	9.7	1,854,000
1968	353,000	19.0	25.0	2,138,000	3.5	6.6	2,491,000
1969	—	—	—	3,605,000	3.2	7.4	3,605,000
1970	74,000	14.5	21.5	3,860,000	3.0	7.1	3,934,000
1971	18,000	14.5	21.5	3,892,000	2.6	6.5	3,910,000
1972	—	—	—	3,810,000	2.7	6.2	3,810,000
1973	—	—	—	3,896,000	2.9	6.0	3,896,000
1974	—	—	—	4,135,000	2.5	5.3	4,135,000
1975	—	—	—	3,905,000	2.4	4.9	3,905,000
	<u>1,438,547</u>			<u>32,295,346</u>			<u>33,733,893</u>

Total Ore Mined 1964-1975 33,733,893

(In 1975 ore reserves were 39.2 million tons — average grade 2.0% lead and 5.4% zinc.)

Source: Individual tonnage figures, Pine Point Mines Limited, Annual Reports, 1964-1975.

after acknowledging the needs of the settlement, the government seriously limited its options, a fact that became particularly evident following the closure of the co-op in 1968.

Throughout the railway debate, the federal government had stated that its reason for funding the transportation network into the territories was to further “northern development.” This being the case, the government might have been expected to take steps to maximize the regional benefits from the mine development. Various methods were available to the policy- and decision-makers which would have ensured that such benefits accrued to local native people, a particularly desirable goal considering that by 1964 approximately fifty percent of Fort Resolution’s 650 inhabitants were on welfare.¹⁴⁴ The lack of consideration of two critical measures during the initial phases of development virtually prohibited native employment at Pine Point.

The primary impediment to native employment at the mine was the lack of a road from Fort Resolution to Pine Point. Although roads to the mine were given first priority under the “Roads to Resources” programme in 1964, no road to the resources at Pine Point was provided for the

indigenous peoples of Fort Resolution. The roads proposal developed by DNANR in 1965 stated: “It is suggested that *broad social objectives* [emphasis added] and the chances of profitable development of northern resources are sufficient to warrant initiating . . . a roads program in spite of the risks involved.”¹⁴⁵ A memo to the Minister of Mines and Technical Surveys emphasized that “federal participation is more desirable where the provision of access roads will serve to *develop a region* [emphasis added] or area rather than a particular deposit.”¹⁴⁶ It is curious that, following such a directive, the Fort Resolution road was not initiated immediately, especially when the programme “was designed after consultation with local people to link isolated communities and to encourage exploration and development of the region’s natural resources.”¹⁴⁷ It seems evident that either the people of Fort Resolution were not consulted regarding the roads network proposal or, if they were, their concerns and desire for the road were disregarded. First priority on the ten-year plan of the Proposed Northern Roads Network Programme was granted to the Pine Point-Fort Smith road, while the Fort Resolution road was excluded. Although monies were allocated for the Fort Resolution road by 1967, expenditures and consequently the completion date for the

road were postponed on a number of occasions.¹⁴⁸ As a result, only a small trail which took hours to traverse existed between Pine Point and Fort Resolution during the initial phases of the mine's development and throughout the 1960s. The absence of a road forced all who sought employment at the mine to live in the townsite of Pine Point.

Paul Deprez's study, *Pine Point Mine and the Development of the Area South of Great Slave Lake*, concludes:

*The most disturbing fact, however, is that while the Federal and Territorial Governments showed extreme willingness to invest in anything the Company would require, there was considerably more reluctance to invest in projects that may have permitted that area to reap some of the returns accruing from the Pine Point operation.*¹⁴⁹

This was an incongruous situation, the government having encouraged the development of a sawmill co-operative in Fort Resolution and yet having failed to provide access to markets to ensure the success of the operation. According to Deprez, the absence of the Fort Res road during the 1960s

*... has in all probability hampered, if not prevented, business relations between the Fort Resolution Lumber Co-op and the Pine Point Mine ... thus drastically reducing the economic impact the Cominco operation might have had on Fort Resolution.*¹⁵⁰

Eventually, after a number of crises, the lumber co-op was declared insolvent and closed in 1968. During the 1970s it was reopened, but it has continued to suffer financial difficulties.

The second major factor which substantially discouraged native employment at Pine Point was the housing situation. Under the speedy development plan implemented to meet Cominco's needs, government officials, CMHC planners, and the company failed to consider the housing needs of the native people. During the first phase of construction only a limited number of houses were built, and these were allocated to Cominco's senior officials or skilled staff; housing was often used to entice workers from the South to stay. The only accommodation available to natives from Fort Resolution were the single men's bunkhouses. For a single man it was a very lonely existence, and it was even less desirable for a married man who paid rent to Cominco and maintained a home and family in Fort Resolution, commuting on weekends. On 17 February 1969, following the expansion of Pine Point's concentrator and the subsequent increase in employment opportunities, the Department of

Indian Affairs and Northern Development and the territorial government announced their intention of providing housing accommodation for northern residents, especially native people, in order to increase and stabilize the indigenous component of the mining labour force.¹⁵¹

Various programmes were examined, under which indigenous people might qualify for accommodation. By the end of March 1969 a small number of employees had been identified for the low-rental trailer housing programme, sponsored by CMHC and the territorial government. Paul Deprez notes:

*It had become clear that the native people had indicated a very favourable attitude towards such a program, but that this attitude had been tempered with the suspicion that it would never really happen. A swift start of the housing program would demonstrate to the people of the area that the housing program was much more than just an idea, and that, once implemented, it would act as an incentive for people willing to work at Pine Point.*¹⁵²

Difficulties were encountered regarding costs, installation of trailers, and the extent to which the trailer programme could be considered part of the northern rental housing programme with rent subsidization. The territorial government feared that subsidization at Pine Point might create an undesirable precedent.¹⁵³ Following some debate, rents paid by lessees were established at \$150 and \$175 per month, compared with trailer units with similar accommodation provided to non-native Cominco employees at \$90 and \$125 per month.¹⁵⁴

When examining the various possibilities for housing programmes, the territorial government faced several problems. The mine management expressed concern that new housing would not conform to the existing housing and that class distinctions, especially among the native people, would have detrimental effects upon the community. The territorial government considered an "Off Reserve Housing Programme," but rejected it because it was "ethnically differentiated."¹⁵⁵ Ironically, the terms of this programme, by which income was the only criterion for eligibility,¹⁵⁶ were more favourable than those of the more expensive "Limited Dividend Programme" which was eventually selected. The rental value of the houses established under the programme was \$285. Deducted from the total amount was a Cominco subsidy of \$140 per month, leaving a rent payable of \$145 per month. Other Cominco employees housed by the company paid only \$100 rent for similar accommodation, placing the natives who qualified for this programme at a

distinct disadvantage.¹⁵⁷ When the programme for native people was first set up, the territorial government expected that during training an employee would be housed in a bunkhouse or trailer. Following this period the employee would then be moved to a house “for northerners,” until he could qualify (by skill and eligibility) for Cominco’s housing with lower rent.¹⁵⁸ Understandably, this programme was criticized, because it involved a form of rotating residency and increased maintenance costs.

The housing programme had several negative impacts. For instance, once housing was provided by the government, it was possible for Cominco to procrastinate on Indian applications for accommodation, stating that it was available through the government programme. Obviously, the more houses built and funded by the territorial government, the fewer Cominco would have to build. As the government programme was limited, however, this procedure would restrict the employment potential for native peoples.¹⁵⁹ Moreover, the “northern” housing was more expensive than Cominco housing, and this discrepancy automatically discriminated against native peoples and set up two distinct types of accommodation – precisely the situation that the policy had been designed to prevent. Had commitments regarding housing at Pine Point (including provisions to encourage native employment) been obtained by the federal government at the early stages of development, such a problem would never have arisen. Because the town was developed in stages, housing became more expensive in the later phases.

There were other measures which the federal government might have adopted to encourage native employment at the mine and consequently to assist in regenerating the Fort Resolution community. In negotiations with Cominco, the government could have encouraged employment at the mine by setting arbitrary quotas, and offering incentives such as tax cuts to the company. Any measures to lessen the welfare payments and increase the esteem of Fort Resolution would have constituted a positive undertaking. Canadian residency requirements and “no discrimination” clauses in the contract for townsite development¹⁶⁰ were little incentive to Cominco to employ native peoples. Moreover, had the initial agreements for the provision of infrastructure support stipulated the use of local labour and local materials, there would have been a greater market for the ill-fated Fort Resolution lumber co-operative. Government training programmes were also unsuccessful, since only minimal commitments could be procured from the mine for the hiring of graduates,¹⁶¹ and attrition rates from these programmes were high.

The Department of Indian Affairs and Northern Development responded to criticism regarding native employment opportunities by developing a “training agreement” with Cominco. On 10 November 1969 an agreement aimed at encouraging employment for residents of the Northwest Territories, particularly south of Great Slave Lake, was signed by DIAND, the territorial government, Cominco, and the United Steelworkers Union.¹⁶² The company agreed to create a minimum of six job positions and to offer employment to each trainee as soon as an opening existed.¹⁶³ The agreement stipulated that each trainee was to receive at least ninety days training by the company, and that the Crown would reimburse the company for fifty per cent of the wages¹⁶⁴ paid to a trainee for up to one year.¹⁶⁵ It was unclear whether the company was to have six people in training at all times, or train a total of six people throughout a calendar year. The agreement was signed again on 8 February 1971. According to Article 18 the agreement is not binding, since with thirty days’ written notice any party may terminate the agreement.¹⁶⁶ The document does not specifically read that indigenous peoples are to be given priority as trainees, but rather that opportunities are to be extended to “residents” south of Great Slave Lake. Furthermore, the company’s commitment to employ six trainees out of a general mine work force of about 400 cannot be considered an onerous obligation for Cominco to fulfil.

Because of the government’s poor planning and its willingness to assist the Pine Point development without assurances regarding native employment or local benefits from the mine, both DIAND and the territorial government found themselves in a very vulnerable position by the late 1960s. Lacking legal sanctions, the only negotiating tool which remained was an appeal to Cominco on grounds of moral suasion. As might have been expected, the results from such a weak bargaining position were extremely poor. Since the government was unable to compel the industry to adopt a comprehensive native employment policy, little was accomplished at this time.

Cominco’s actual hiring practices during the 1960s were also a major deterrent to native employment. Hiring for Pine Point was usually conducted through the Alberta and N.W.T. Chamber of Mines,¹⁶⁷ and through centres in Vancouver and Edmonton.¹⁶⁸ Not only was hiring geared towards southern workers, but so were fringe benefits. Free transportation was provided to the “outside” for a leave, but no traditional concessions were granted to indigenes. It has been suggested that local people should be eligible for fringe benefits such as a leave of absence for hunting.¹⁶⁹ In the past,

if a native left to hunt for a short period, it was viewed negatively on his employment record and could jeopardize his chances of being rehired. Another deterrent to native employment, which has only emerged during the 1970s and may now outweigh other considerations, is what could be termed the “stigma” which Fort Resolution people associate with working at Pine Point. Discussions with Metis and Indian peoples of the community indicate that work at Pine Point is disdained, because it is generally believed that the mine is responsible for the pollution of Great Slave Lake and the degradation of lands adjoining Fort Resolution. There is some suggestion by younger people in the settlement that working for Pine Point is a “sell-out,” as Pine Point reaps the profits while simultaneously being able to claim that it employs native people and is thus a “good corporate citizen.”

The issues surrounding native employment in the mining industry, and particularly at Pine Point, are complex. Questions regarding the suitability of industrial employment to indigenous peoples on a community-specific basis have rarely been addressed. The experience at Pine Point suggests that the absence of special incentives and coordinated government programmes to encourage native employment during the mid-1960s resulted in minimal benefits being generated for the people of Fort Resolution.

In fact, the employment of indigenous people from Fort Resolution at Pine Point has been insignificant since the mine came into production. During its construction phase, some native people from the settlement were hired on a casual basis as short-term labourers for work on the sewer and main water line. In 1964, twenty-seven men were hired on road and transmission line clearing projects associated with the power development for Pine Point. Deprez concludes that “as far as the available documents indicate, native employment during the construction phase of the mine seems to have been minimal.”¹⁷⁰ According to statistics prepared for the Deprez report, only five native persons were hired from Fort Resolution between January 1966 and December 1968.¹⁷¹ In 1967 \$6,996 was earned by one Fort Resolution employee at the mine. The following year several native people earned a total of \$10,974. In 1969 a total of \$111,388 was earned by thirty-seven persons from Fort Resolution who worked for part of the year at the mine.¹⁷² The following year employment dropped off, and wage figures since that time have been unavailable. DIAND was provided with an ideal opportunity to rectify the situation in 1968, when the mine’s concentrator was enlarged, necessitating an increase in the labour force. Indeed, there was an

increase of native employment in 1969-70, but it quickly declined due to housing and transportation problems.

It may now be too late to foster meaningful native employment from Fort Resolution at the Pine Point mine, if this is considered to be a desirable objective. With the evolution of a greater political awareness by the native people of the Mackenzie Valley, resulting from the Berger Inquiry hearings, it is likely that they view industrial developments (including Pine Point) as a threat to the realization of a Dene nation, and as an example of northern mercantilist development where benefits accrue only to the South. The alienation of native people, and their fears of acculturation and assimilation, may also provide a general basis for animosity among the people of Fort Resolution towards the Pine Point development.

Bitterness towards the mine has been further increased by the statistics regarding native employment presented in the Pine Point Mines annual reports. The 1969 report stated:

Training programs were instituted to upgrade the skills of the employees including a unique industrial training program for natives implemented with the co-operation of the Local Union, the Federal government and the Northwest Territorial government. In particular, more of the people indigenous to the area are being employed and at the year end about 25% of the total work force was in this category.¹⁷³

In 1974 Pine Point reported: “Our interest in providing employment for the native population has raised the number on our payroll to about 25% of the total.”¹⁷⁴ A year later the annual report stated: “A recent survey of the work force indicated 40% qualify as Northerners who by definition have made their home in the Territories for more than four years. Fifty employees are of Eskimo or Indian ethnic origin.”¹⁷⁵ It is important to distinguish among “locals,” “northerners,” “residents,” and “people indigenous to the area,” on the one hand, and native people or indigenous people, for the statistics provided by industry can be misleading. The presentation of these statistics by the company has led to increasing resentment by native people who believe the figures to be untrue. The Pine Point figures include natives not indigenous to the region, and natives who were working for a drilling company in Pine Point and not directly for the mine.¹⁷⁶ The figures may also include native employees twice, if they were registered twice on the roll after being “rehired” following a period of absence during the same year.

Statistics such as these anger many in Fort Resolution,

because they believe that the figures give a false impression of successful native employment. In February 1977 only three percent of the Pine Point work force of over 600 was from Fort Resolution.¹⁷⁷ Between 1964 and 1977 Pine Point Mines recorded 125 hirings of ninety-two different Fort Resolution residents. In 1976, of thirty natives hired, nine remained on the payroll. Of fifteen hired in 1977, seven remained. When including natives hired from other settlements in the North and South, the percentage of natives employed rises to approximately eight percent of the Pine Point work force.¹⁷⁸

Despite these discouraging statistics, Cominco has made sincere efforts during recent years to provide job opportunities for native people. Throughout the mid-1970s the company undertook several voluntary initiatives to encourage native employment at Pine Point. Unfortunately, Cominco's efforts have met with little success — primarily due to the lack of interest expressed by local people. One notable failure occurred when Cominco arranged a line cutting contract with the Indian Band Council of Fort Resolution. Only seven out of the thirty miles of line were cut and cleared when the first pay day occurred. When the Fort Resolution people failed to return to complete the job following the pay day, Cominco crews were dispatched to cut and clear the remaining twenty-three miles and clean up the campsite.¹⁷⁹ The company also proposed that a community labour pool be established in Fort Resolution, and that any six workers from the pool be transported to work each day by a bus supplied by the company. After some time the band council turned the offer down because “too much travel time would be involved.”¹⁸⁰

These circumstances contrast with other recent northern mining developments. For example, when considering the development of their Arvik mine — a lead-zinc deposit on Little Cornwallis Island in the High Arctic — Cominco held public meetings to discuss the proposal. Inuit communities were canvassed to “determine what the Inuit people thought of the proposed mine development and how many were interested in working at the . . . site.”¹⁸¹ In addition, native community representatives were transported to the potential mine site and to the Nanisivik mine and mill complex where discussions took place with Inuit people working at the latter mine. Cominco considers these undertakings to have been successful, since a greater understanding of the needs and aspirations of potential employees has been generated. A forum was provided in which native people expressed concerns about the effect that the development would have on “housing, language, hunting and their

general environment.”¹⁸² These concerns, Cominco suggests, will be incorporated into the company's planning process. In contrast with Pine Point, where the people of Fort Resolution were not even informed about the development, the recent implementation of community consultation programmes is a significant improvement.

Another policy recently initiated by Cominco is the formation of an Employment Liaison Committee “to promote and encourage the employment of northerners — particularly natives.”¹⁸³ The committee is composed of representatives from the territorial government's Training and Employment Branch, Canada Manpower, and Cominco. With the assistance of the committee, Cominco has visited communities in the Great Slave Lake region to provide information about the mining industry and to encourage applications for employment. Application forms have been simplified and interpreting assistance is now available to native people who wish to apply.¹⁸⁴ Again, the provision of services and programmes such as these indicates a significant change in policy, and a departure from the conditions which surrounded native employment at Pine Point throughout the 1960s and early '70s.

In addition to the discouraging problems associated with the employment of Fort Resolution residents at Pine Point, further negative impacts from the mining development were experienced by the community as a result of the completion of the long-delayed Fort Resolution road in 1974. Alcohol and drugs became readily available at Pine Point. The road also permitted outsiders easy access to Fort Resolution. Ray Orbell, manager of the Slave River sawmill, describes the result: “outsiders . . . don't give a damn about the area. They tear into Resolution up and down the streets and raise hell. They insult the Res women and come out for a ‘fast night.’” Miners have also been accused of instigating fights with the young men of the community.¹⁸⁵ As a result of the completion of the road from Pine Point to Fort Resolution, the Little Buffalo River area — a traditional hunting and fishing campground used by people from Fort Resolution — has become accessible to outsiders. Cabins at the site, which are occupied seasonally by natives from Fort Resolution, have been vandalized. The people had expected that the Fort Resolution road would benefit the community, and that the provision of transportation to the mine would increase employment. They also believed that the road would reduce freight rates and bring in fresh foods, which previously had to be transported by plane or boat. However, the disadvantages which have accrued as a result of the completion of the road have, in their view, far

outweighed the benefits gained.¹⁸⁶ In effect, the tardy completion of the road was responsible first for preventing employment at the mine in the 1960s, and then for considerable negative social impacts during the mid-1970s.

Field workers for the Indian Brotherhood of the Northwest Territories believe that the Pine Point mine has had a significant adverse effect upon the people of Fort Resolution:

*It should be an asset or benefit to the community, but it is exactly the opposite. The people in Fort Resolution should be compensated for the land that has been destroyed. The horrendous amount of money being profited by the mine could be put back into the district. Pine Point has every facility imaginable and Fort Resolution has absolutely nothing.*¹⁸⁷

As a direct result of the Pine Point operations, Fort Resolution has become a community of unfulfilled expectations. The people have been disappointed that the road to Fort Resolution took ten years to come into existence, that proposed northern housing at the minesite was delayed, and that, when houses were constructed, the rents were higher than for Cominco housing.

Although Cominco has made considerable efforts during the 1970s to encourage native employment — through training programmes, special contracts, and transportation offers — little of substance has been accomplished. It seems clear that if native employment is considered a desirable goal, it must be conceived as an integral part of project development, and not as an afterthought. In the Pine Point case, this lack of initial policy direction has led to a situation where, no matter what incentives are provided by the company, the successful employment of Fort Resolution residents may now be impossible to obtain.

VII Environmental Impacts of Development

The major environmental effects of the development of the Pine Point mining project include the impacts of the staking rush, the deposition of tailing effluent (from mill processing), the pit de-watering operations, and increased pressure on fish and game populations.

The initial impact of the development upon the region south of Great Slave Lake became evident during the exploration stage, and was exacerbated during the staking rush of 1965-66. By August 1965, more than 9,000 claims had been recorded in the area.¹⁸⁸ During the next few months, between eighty and a hundred mining and exploration companies acquired grounds adjacent to Pine Point and began

geophysical exploration programmes. The I.P. method of prospecting was commonly used to locate anomalies, followed by diamond drilling in promising areas. One particular find by Pyramid Mines Ltd. in October 1965 precipitated the heaviest staking rush in the history of the Northwest Territories. During the winter months, over 14,000 claims were staked and recorded in Yellowknife.¹⁸⁹ The physical impact of staking and exploration upon the land during the 1960s was described by Drake Hocking, a government scientist:

*Exploration and seismic cut lines and trails criss-cross the entire area In some areas, such as where cuts intersected with water bodies and courses, severe localized soil erosion was occurring as a result of denudation of the surface.*¹⁹⁰

When Pine Point was explored and staked, the people of Fort Resolution were not informed of the potential development, nor of exploration occurring within fifteen miles of the settlement.¹⁹¹ During the winter of 1965 Harold Basille and Ed Lafferty, both of Fort Resolution, had their traplines torn up and destroyed from cut lines bulldozed by caterpillars from Pine Point. Lafferty, who had been trapping the area for over twenty years, was unable to recover his traps or receive compensation for his loss. Ray Orbell sympathizes with the trappers' frustrations, stating that the traplines were cut without warning: "Because every trapline is registered with Forestry, the mine could at least check with the Game Management Office and the settlement before charging through an area on exploration and tearing up the traplines with cats."¹⁹² At the Berger Inquiry Harold Basille testified that "there [were] six of us . . . trapping . . . in the area . . . when they opened up . . . Pine Point . . . when we went back to our traps, they had been cutting lines . . . right on our trapline and between the six of us we lost about 200 traps," and received no remuneration for them.¹⁹³

Later, when the mill site and townsite were being prepared, tree kill and extensive denudation occurred on the surface area of the townsite and in areas adjacent to haul roads and the mining operation. Hocking stated:

planning and development within the extraction complex had been poor with respect to social and environmental degradation. There appears to be an excess of mechanically stripped and devegetated areas relative to requirements for access, road locations, pits and spoil dumps, and domestic services. Efforts to retain natural vegetation within the townsite have, on the whole, not been successful, due in part

*to ill advised landscaping techniques. Away from the townsite, access road and cut-line debris treatment has needlessly interfered with native trap lines. The operation suggests inadequate preplanning in those aspects.*¹⁹⁴

He concluded that these impacts were the direct result of poor townsite planning, hasty development, and hasty construction.

The effects of the Pine Point operation on the environment were not considered prior to the development of the mine. In fact, studies evaluating pit de-watering operations and tailings effluent discharges, and their potential effect on the environment and water quality of Great Slave Lake, did not begin until six or seven years after the mine had been in operation. In the spring of 1971 a group of government scientists led by Yves Bérubé conducted an assessment of waste water handling procedures at the Pine Point mine. Following an examination of the water discharged from pit de-watering operations, the group postulated that mine pump water (rich in mineral salts) reacted with the atmosphere and caused the production of hydrogen sulphate, and the deposit of sulphur and ferric hydroxide precipitates along drainage ditches. They expressed concern regarding the effect of sulfuric acid upon the environment.¹⁹⁵ They also reported that during spring thaw a major portion of tailings water escaped decanting and water clarification, when waters were out of control and overflowed one of the tailings dykes,¹⁹⁶ and they recommended that the tailings pond and effluent discharge system be improved. The Bérubé report was followed by an *Investigation into the Effect of a Lead-zinc Mine in the Aquatic Environment of Great Slave Lake*, conducted by J.N. Stein and M.D. Miller. Their results indicated that small amounts of cadmium, mercury, nickel, iron, and manganese, present in the mine's tailings, were being deposited in a large area of muskeg and in Great Slave Lake in the region of Pine Point. Stein and Miller reported that the effect of these metals upon the fish resources of the area was unknown.¹⁹⁷ Although water samples taken in the vicinity of Great Slave Lake were acceptable by American Fisheries Society standards, the report indicated that fluctuations in effluent discharges in all likelihood increased the levels into the lethal range:¹⁹⁸ "Should the levels of heavy metal contamination of fish increase, the effects could be lethal or at least could render the resource unfit for human consumption."¹⁹⁹ Both the Bérubé and Stein and Miller reports acknowledged that the effects from the disposal of Pine Point tailings had not been thoroughly evaluated, and strongly recommended that further studies be conducted.

Following the release of the reports, discussions were held between the Territorial Water Board and Cominco, which acknowledged that severe problems with water contamination existed:

*It is realized . . . that the initial sulfate concentration in the Pine Point area prior to the commencement of mining operations is not known, however, it was felt that the background level of sulfate would be small relative to the very high concentrations occurring in the decant overflow . . . the area in question is contaminated . . . the quality of the water draining from the muskeg into Great Slave Lake . . . is influenced by the decant overflow.*²⁰⁰

Most of the problems which were encountered with tailings effluent escaping the dykes and the decanting system during the early 1970s were alleviated, subsequent to the implementation of some of the recommendations of the reports. At that time the Northern Inland Waters Act and Regulations had not been implemented, and a water licence governing effluent discharge was not yet in force. Evidence in one of the reports indicating that Pine Point effluent was deleterious to fish could not be regarded as conclusive, due to the lack of baseline data on conditions prior to the start of the mining operations.²⁰¹ Consequently, there was no basis to prosecute Pine Point Mines for the significant discharges and malfunctioning of the effluent discharge system.

Mining activity and particularly pit de-watering operations have also had a substantial impact upon forest vegetation in the Pine Point area. In his forest deterioration survey, Drake Hocking reported that some tree kill in the swampy areas and along the edges of natural channels could be attributed to flooding from pit water which had been allowed to escape into the forest.²⁰² He also suggested that some tree kill was due to drought caused by pit de-watering, but encountered considerable difficulty in substantiating this suggestion, since no climatic data had been collected continuously in the Pine Point area.²⁰³ Hocking observed that drought stress had begun in 1968 at approximately the time that pit de-watering operations were undertaken at Pine Point. His report concluded:

*On balance, the available circumstantial evidence suggests a major contribution to forest injury by the pit dewatering and resulting drawdown of the ground water table. It is impossible to state accurately the area and quantitative extent of that contribution owing to scarcity of data.*²⁰⁴

During the Mackenzie Valley Pipeline Inquiry hearings at Fort Resolution, declining fish and game populations

were attributed directly to the Pine Point mine pollution, and to increased hunting pressures by whites from Pine Point. Harold Basille testified that rabbits, moose, and buffalo from the area around the cut lines had been used for food for natives and for dogs. The area no longer supports subsistence activities. Basille also claimed that the fish in Paulette Creek were disappearing.²⁰⁵ Chief Ed Sayine testified that Basille had fished commercially at Dawson Landing from 1963 to 1969, and had stopped because the water was “no good.” Mike Beaulieu testified that trout, once present in Resolution Bay, were scarce even three miles out from shore. In an historical study of the Fort Resolution people, David Merrill Smith suggests that the decline of fish in the vicinity of Fort Resolution Bay is in fact due to a combination of factors: the impact of extensive commercial fishing on Great Slave Lake; organic pollution of Resolution Bay from domestic sewage; and the potential impact of the Pine Point mine.²⁰⁶ Another impact, albeit indirect, from the mine’s development is the changed hydrological regime of the Slave River delta, as a result of the Taltson River hydro-electric development. Smith reports:

Most native people seem to believe that the construction of hydro-electric dams to the southward, such as ... the Taltson Power Dam some thirty-five miles from Fort Smith, have [sic] created wide fluctuations in the levels of lakes, rivers and sloughs in their trapper areas, seriously affecting beaver and muskrat populations. It is said that, except for unusually wet periods, the Slave River Delta supports only a small fraction of the muskrat population supported twenty-five years ago.²⁰⁷

According to Angus Beaulieu, the mine development has also been responsible for the disruption of the Little Buffalo River area, which has been a traditional fishing and trapping area since the original settlement of Fort Resolution. In the spring families have always travelled to the area, some sixteen miles south of Fort Resolution, to permanent cabins where they live off the land for several months. During the last few years, however, the campground has been inundated with white outsiders, who have gained access to the area by road, snowmobile, or boat. Fish nets have been cut by careless whites with outboard motors. Hunting and fishing by non-natives in this area is viewed as being responsible for the declining game populations, particularly buffalo. Larry McConnell testified at the Mackenzie Valley Pipeline Inquiry that “buffalo have been chased by planes and skidoos, and in one instance we know, because it was reported, that buffalo were at least, if not shot

from a helicopter, were picked up by helicopter.”²⁰⁸ Fish have been poached from nets and game stolen from traplines in the area of Little Buffalo River.²⁰⁹ The campground has been littered with waste and trash from white picnickers, campers, and tourists. Hunters and trappers from Fort Resolution have complained of a decline in the fur-bearing animal population between Paulette and Hanbury creeks, and have worried about the potential effects of high-water ice levels on the animals in the area. Concern has also been expressed about the substantial numbers of waterfowl which frequent the tailings area and the extent to which heavy metal toxins might be present in their body tissues.²¹⁰

The concerns of the residents of Fort Resolution were not unknown to the government prior to the Berger Inquiry. Their fears about further environmental degradation resulting from Pine Point’s operations had been expressed before a Territorial Water Board hearing in 1974. Following the passage of Regulations pursuant to the Northern Inland Waters Act,²¹¹ Pine Point was required to obtain a licence for water use. On 16 January 1974 a public hearing was held in connection with the Pine Point-Cominco application for mill and pit de-watering use of waters. The mine staff presented information relating to mining process, tailings disposal, effluent discharges, and controls, in addition to describing the general ground water conditions of the area, the pit de-watering programmes, and disposal of pumping waters.²¹² François Paulette, Chief of the Fort Smith Band Council, delivered the only other presentation made at the hearing, on behalf of the Fort Resolution Band Council. He demanded that more information be provided about the effects of the pit de-watering on trees, grass, plant life, and wildlife. Specific information was requested regarding the impact of pit de-watering, particularly during spring run-off, on fish spawning in Paulette Creek, the effect of pit water freezing on land during the winter months, and the quality of water leaving the tailings pond during spring run-off and its effect on the water and fish of Great Slave Lake. In summary, the band had resolved that the water licence should not be issued to Pine Point until the requested information had been provided.²¹³

When the information requested at the January hearings had not been received by the end of February, the band council decided to request information from the Environmental Protection Service (EPS), a branch of the Department of the Environment (DOE) in Yellowknife. In March the council formally requested a private meeting with DOE officials for the purpose of improving the Indians’ knowledge of the technical aspects of the Pine Point mine’s

pollution. Mike Beaulieu (on behalf of Chief Sayine) requested that, prior to the meeting, DOE prepare background papers about Pine Point pollution which could be understood by the band.²¹⁴ The request was eventually forwarded through Edmonton to the Senior Assistant Deputy Minister (EPS) in Ottawa²¹⁵ with the following note:

*... there is a need to respond in a substantial way to the Indian Band request as soon as possible, because they are concerned about the impact of mine operations during the "break-up" period. An early response is important to maintain DOE credibility with these people. . . .*²¹⁶

Instructions were issued to Yellowknife officials, stating the conditions under which the meeting would be held:

*SADM [Senior Assistant Deputy Minister] concurs that a meeting be held as a DOE private informal session. No written material. DINA to be informed before and as to results after meeting. While we would like to be able to invite DINA we must respect the request of the Band Council that DOE meet with them It should be made clear to the Band beforehand that the discussions will be limited to environmental matters and that the DOE objective will be to listen, and to answer questions within the scope of our environmental expertise. We should be careful to avoid any discussion which would prejudice the regulatory decision before the N.W.T. Water Board.*²¹⁷

In accordance with the directive, a meeting took place in Fort Resolution in May 1974 between DOE officials from Yellowknife and the Fort Resolution Band Council. Three major concerns were identified. C.A. Lewis, an EPS official, informed the Water Board of the issues which he believed merited further examination: the effects of pit de-watering on the water chemistry of Paulette Creek; the effects of de-watering on local vegetation through flooding; and the effects of de-watering upon the ground water reserves. Lewis urged that the Water Board "ensure that adequate independent studies are carried out and made part of the public record Further, any conclusions from these studies should be considered by the Board before licensing is completed."²¹⁸ The only tangible result was the commissioning of the Hocking forest deterioration survey of the Pine Point region. Despite numerous requests that substantial research be conducted to investigate the deterioration of water quality in the Pine Point region, no studies were commissioned at this time. A milling licence (effective 18 April 1975-31 March 1980), permitting the mine to use up to five million

imperial gallons per day (gpd), and not exceeding 1,420,000,000 gallons per year, was issued to Pine Point Mines on 16 April 1975.²¹⁹

At the time of the Water Board hearings in 1974, Pine Point stated that the mine used four million gpd in the milling process and 34,361,440 gpd in the pit de-watering programme.²²⁰ W.H.R. Gibney, manager of operations at Pine Point, stated that the rate of production (11,000 tons of ore per operating day) was "not expected to change *significantly* in the near future" (emphasis added). He concluded by stating that "it is estimated that de-watering requirements of Pine Point Mines will follow closely that outlined in the Water Use Application submitted earlier."²²¹ A year later, the *Native Press* reported that Pine Point Mines had submitted a second water use application to the Water Board. The 28 February 1975 application indicated that Pine Point intended to increase production from 11,000 to 14,000 tons per day, a significant increase of over twenty-five percent in Pine Point production capacity. The intended increase in production of course necessitated a considerable increase in water discharges. The application indicated that conventional open pit, mechanical underground, and strip mining operations were to be undertaken. Future water discharge requirements, as reported by the *Native Press*, were to increase from the 1974 figure²²² of 34,361,440 gpd to 185,976,000 gpd.²²³ The *Native Press* article alleged that the public was not informed of Pine Point's second application and its contents, and that DIAND had made no effort to consult the public or to meet the requests of the Fort Resolution Band Council for information which could be understood by them.²²⁴ The article emphasized that no information was available evaluating the potential impact that such an expansion and increase in water use would have upon the Pine Point regional environment.

It would appear that, in anticipation of increased water requirements from the expanded operations, Pine Point hired B.C. Research (of Vancouver) to conduct an environmental assessment of mining operations at Pine Point. In its summary of "Environmental Studies at Pine Point, 1976," prepared in May 1977, B.C. Research reported that:

the major effects on birds and small mammals is [sic] the physical removal of habitat, where land has been subject to construction or waste dumping. Large mammals may be less common than in the past due to "people pressure," such as vehicular traffic and hunting.

Mining activities appear to have had little impact on furbearers Additional habitat for aquatic mammals

*may have been created. Alternatively, the relatively low temperature of pit water may have reduced the productivity of [the] . . . area, and thus may have degraded habitat that existed before the discharge of pit water began.*²²⁵

The study also suggested that west of Buffalo River (away from the mining operations) jack pine had “reached an age where they are subject to natural succession, dying from old age. . . . This is a natural phenomenon that bears no relation to mining activity or other activities by man.”²²⁶ The report did indicate that:

*Natural drainage pathways have not been appreciably altered by the present mining activities. However, future developments may interrupt such natural drainage. Therefore, careful design and planning may be needed in the future to prevent ponding of surface water, which could affect vegetation.*²²⁷

Erosion of some of the waste dumps was also occurring, but was “not yet a serious problem.” The results from water samples collected from drainage ditches contained only small traces of heavy metals, insufficient to be harmful to fish, wildlife, or man. Tailings pond water samples indicated that water quality characteristics were below the amounts stipulated in the Pine Point water licence for mill use. The report recommended that a separate study be undertaken to determine the impact of increased water flows on the fish in Paulette Creek.²²⁸

On 10 February 1977 Pine Point Mines Ltd. submitted revised data pertaining to the pit de-watering licence application, and requested that the volume of water be increased from that originally requested (26,064,000 gpd) to 75,000,000 gpd, with a maximum of 110,000,000 gpd.²²⁹ Following receipt of the revised data, the Northwest Territories Water Board recommended that Pine Point call a public meeting in Fort Resolution to explain the programme and its aims to the people.²³⁰ It is curious that the board did not choose to hold a public hearing at this time (as it is authorized to do under the Northern Inland Waters Act), but instead recommended that the company itself handle the matter of public consultation. At the meeting held in late spring 1977, and attended by officials from DIAND and the Department of Fisheries and Environment (DFE), the company explained the proposed changes in water discharge. Following the meeting, a list of proposed DFE studies was submitted to the Fort Resolution settlement council.²³¹ Presumably, the initiation of these studies three years later was in response to the original requests of

the band council, presented at the Water Board hearings in January 1974, and the recommendations which Lewis submitted to the Water Board in May of that year.

On 25 May 1978 the N.W.T. Water Board held another public hearing respecting the application by Pine Point Mines for a pit de-watering licence.²³² The hearing took place over a year after the revised application had been received. At the hearing the findings of the Hocking report were discussed, B.C. Research presented a summary of environmental studies which they had performed at Pine Point, and DFE presented a brief.

B.C. Research repeated many of the conclusions which they had reached in 1977. Their staff and an independent consulting silviculturist testified that tree decline in the Pine Point area was due to natural succession and old age, and that mine de-watering activities were not a significant factor in the process. This evidence refuted some of the conclusions reached by Hocking, and was supported by the District Superintendent of the Department of Lands and Forests in Fort Smith.²³³

Results from the analysis of vegetation and soil samples were also reviewed in the B.C. Research report. Samples taken north of the Pine Point tailings pond, with few exceptions, had metal levels that appeared consistent with regular background levels. “However, samples collected next to the drainage ditch immediately north of the tailings pond had metal concentrations that suggested above-normal accumulation of cadmium, copper, lead and zinc.”²³⁴

Regarding wildlife habitat, the B.C. Research summary repeated that the major effect of mining had been the physical removal of bird and mammal habitat. Further, the report stated that:

*Beaver were once active along Paulette Creek and the creek north of pit A 70, but the population in these two areas has declined. North of A 70 beaver appear to have depleted their food supply. Paulette Creek generally appears to have the most productive fur-bearer habitat in the vicinity of Pine Point.*²³⁵

B.C. Research also examined the impact of increased water flows on the fish of Paulette Creek. Results disclosed that northern pike specimens “did not show evidence of disease or abnormal stress.” It was noted that these samples were caught in Paulette Creek below Highway 6, and that no pike were observed upstream from Highway 6, although minnow-like fish were observed. Further studies are planned.²³⁶

The DFE brief to the Water Board, on the other hand,

stated that Hocking had reviewed the B.C. Research work on tree decline and had concluded that “methods were inadequately described for a complete evaluation, and that some methods were questionable . . . for ascertaining tree mortality.” Hocking indicated that the sampling sites were inadequately described and that “this could strongly affect results.” The DFE brief also noted that “Sound conclusions were not drawn from the data presented, which, in fact, may tend to support Dr Hocking’s observations and conclusions.”²³⁷ An additional factor, not considered earlier, was also presented in relation to tree decline:

*Neither method mentions another alteration in the regional environment that took place in the first half of the 1960’s, the construction of No. 5 and 6 Highway grades which may have modified to some degree the surface drainage patterns in this area of low relief.*²³⁸

DFE reported that it was partly as a result of Hocking’s conclusions in 1975 that a joint research agreement between Pine Point Mines and the Inland Waters Directorate of DFE had been established. Regional and local ground water movements in the vicinity of Pine Point are to be examined. Preliminary analysis of information gathered to date indicates that “the two types of water pumped by the mine, the salty and sulphur water, can be found discharging under natural conditions,” and that “natural ground water discharge in the region exceeds that pumped by Pine Point Mines.”²³⁹ The DFE brief stated that these findings did not prove or disprove that pit de-watering was contributing to the decline of jack pine. However, forest decline could be related to other factors such as rock and soil permeability, and ground water energy gradients which may have been affected by early exploration drilling. DFE agreed with B.C. Research that pumped and natural ground water contained low metal concentrations, but concluded that their effect upon the environment “is not likely easily determined,” although the “interaction of pumped ground water with surface water is suspected to be within naturally occurring limits.”²⁴⁰ In addition, the DFE brief noted that ground water pumped from the pit contained hydrogen sulphide (which when released into the air causes an unmistakable stench, noticeable in the vicinity of drainage ditches), but that this ground water was not likely to be of sufficient concentration to damage vegetation in the area.²⁴¹ DFE indicated that the Environmental Protection Service would complete a study to examine the amount of oil in pit pumped ground water, and the absorptive capacity of the surrounding swampy areas to receive it. DFE also recommended

that the water levels of several lakes that contain fish be monitored as part of the surveillance programme of the Pine Point water licence.²⁴²

In summary, the DFE brief reported:

*the studies undertaken to date do not provide a satisfactory answer to the reason for forest decline. Although progress has been made in delineating the nature of the groundwater regime in the area, the impact of dewatering on the surface and groundwaters cannot yet be assessed with an adequate degree of certainty.*²⁴³

The brief recommended that Pine Point Mines be granted a water licence for only a two-year period, that further studies be reviewed in detail prior to renewal of the licence, and that additional monitoring take place. Generally, studies undertaken to date indicate disagreements among the experts, and are evidence that further work is necessary.

Although the transcript from the Water Board hearing of 25 May 1978 was unavailable at the time of writing, it is understood that residents from Fort Resolution attended the hearing and reiterated their belief that the mine should not be granted a licence for pit de-watering. They still believe that Pine Point Mines is responsible for causing environmental damage in the area. The people of Fort Resolution fear that further degradation of the region may occur if the mine expands its operations and pit de-watering requirements. Their fear has been based upon a lack of understanding, a lack of information, and a lack of communication with Yellowknife officials regarding the nature of the Pine Point operation. It is not known whether these conditions still prevail. Although the situation is complex, with little clear evidence to prove or disprove that the mine is degrading the environment, the natives believe that both the company (as the exploiter of the resources and their land) and the government (as the administrator and protector of land) have been negligent. The government is viewed as being in collusion with Pine Point, because the mine’s manager, W.H.R. Gibney, is on the Water Board of DIAND. The people’s fear of pollution from Pine Point is based upon earlier reports and a heightened awareness of the arsenic situation at Yellowknife. Under these circumstances, it is understandable that the people of Fort Resolution are confused and believe that there is no justice under the federal and territorial governments within the present administrative and political framework for northern development.

Because of continued bureaucratic delays in the Water Board application process, the Pine Point de-watering licence has not been issued. Although it might be argued that

the licence has been delayed because additional information was expected to be forthcoming, and because Pine Point had revised its application (increasing water requirements) in 1977, the Water Board could nevertheless have issued a temporary water licence, as indeed DFE recently recommended. As a consequence of government inaction, Pine Point has been permitted to operate without a pit de-watering licence for over five years (1973-78). It is expected that the Water Board will issue a licence shortly.

Had a serious offence taken place at the Pine Point mine involving the discharge of waste into waters, the government's only recourse would have been to prosecute under the Northern Inland Waters Act and the Fisheries Act. The company could not have been prosecuted for a violation of a water licence issued under the Northern Inland Waters Act, because no such licence existed. In fact, monitoring of the mine's tailings disposal and water discharge system by the Water Pollution Control Section of the N.W.T. District Office of the Environmental Protection Service has revealed that copper levels have exceeded both the Northern Inland Waters Act licence requirements and the Fisheries Act Metal Mining Effluent Guidelines. In addition, ammonium sulphate (which originates from the zinc leach operation) has exceeded the licence requirements, and there are high levels of cyanide present in the Pine Point effluent.²⁴⁴ These discharges are not viewed as serious by Cominco, since copper levels have only been high during spring run-off due to the melting of accumulated ice on the tailings pond, and ammonia acts as a fertilizer on the muskeg into which it is discharged. Cominco suggests that "while there are occasionally high levels of cyanide discharged into the muskeg, its movement through the muskeg is such that the material breaks down into its components of sodium, carbon and nitrogen."²⁴⁵ Nevertheless, the fact is that licence requirements have been exceeded.

When examining the environmental impact of the Pine Point development, it becomes abundantly clear that information deficiencies and disagreements among the experts are a major source of confusion. No impact studies²⁴⁶ were required prior to the development of the mine, and consequently no baseline data are available against which changes in the water chemistry of the area may now be measured. It has repeatedly been recommended that investigations be conducted to prove or disprove the allegations of Pine Point pollution. The need for additional research is imperative, since Pine Point intends to expand operations and thus substantially increase its pit de-watering operations. Only recently have studies to fulfil

these research needs been undertaken — twelve years after the mine began its operation. Studies and preliminary analysis to date indicate uncertainties and disagreement among government, industry, and independent consultants. It is to be hoped that ongoing research will both evaluate thoroughly the potential impact from increased production of the mine and assess the mine's past and present impacts in the context of all environmental changes which have taken place in the region. Above all, such research may serve either to substantiate the fears of the people of Fort Resolution, or to allay their suspicions that the mine is responsible for degradation of the Pine Point regional and local environment.

VIII Economic Impacts of Development

The Pine Point mining venture is noted for its exceptional profitability. Capitalization for the project was provided by the parent company, Cominco. The initial cost of development, paid by Cominco, was approximately \$23 million, of which \$15 million was paid off through sales from direct shipping of ore once the rail connection was completed late in 1964 and before the mill had begun operation in October 1965. A year later the debt was fully redeemed.²⁴⁷ Accumulated net earnings²⁴⁸ by 1966 were so great that a dividend amounting to \$24,840,000 was paid to stockholders, a dividend approximately equal to the entire initial capital cost of the mine site, built three to four years earlier. In April 1966 B.E. Hurdle, then Manager of Cominco's Mines Division, proudly stated: "we thus have an example of a mine and mill plant that paid off the capital investment while the mill was still in the tuning up stage."²⁴⁹ The *Northern Miner* heralded the achievement with the following comment:

*Debt free. Paying dividends. A remarkable performance. . . . Even more so when it is considered the whole operation is in a remote area, posing tremendous challenges for not only the development of a mine, but also of a community, transportation and services The whole thing represents a magnificent chapter in the story of Canada's mining, one which is going to be hard to duplicate.*²⁵⁰

In order to review the overall profitability of the Pine Point mine operation to the corporate mining sector, it is necessary to take into account expenditures made on adjoining properties later incorporated into Pine Point Mines. Table 4, prepared by Arvin D. Jelliss, former economic research analyst for the Indian Brotherhood of the Northwest Territories, illustrates the profitability of Pine Point from

1962 to 1975.²⁵¹ Initial capital expenditures between 1962 and 1965 totalled \$22,982,739. By the end of 1965 net cash flow was sufficient to offset capital expenditures to date and generate a return. The following year \$32,678,442 accrued to the company sector as return, and from these funds the 1966 dividend to shareholders was paid. Total revenues during 1965, 1966, and 1967 were approximately \$113,266,000. These earnings were not subject to tax during

the tax-free "holiday" period. Between 1968 and 1972 total revenue generated was \$203,014,000. Profits to the company were also increased because the Sphinx Mine (formerly the Pyramid claims) was brought into production, granting Pine Point a further tax holiday of three years for production from this orebody. In effect, Pine Point did not begin to pay substantial taxes and royalties until 1973, some eight to nine years after the mine had commenced operations.

Table 4
The Pine Point Project: Profitability to the Corporate Mining Sector, 1962-1975 (\$)

Year	1 Sales Revenue	2 Investment Income	3 Total Revenue	4 Operating Costs	5 Taxes and Royalties	6 Capital Expenditures	7 Net Cash Flow
1962	—	—	—	—	—	1,203,165	-1,203,165
1963	—	—	—	—	—	1,649,875	-1,649,875
1964	1,056,930	299,014	1,355,944	9,592	—	10,987,715	-9,641,363
1965	26,482,000	465,000	26,947,000	1,273,000	—	9,141,984	16,532,016
1966	42,636,000	539,000	43,175,000	6,453,000	—	4,043,558	32,678,442
1967	42,701,000	442,000	43,143,000	5,606,000	—	5,703,000	31,834,000
1968	38,913,000	1,075,000	39,988,000	8,816,000	5,000,000	6,780,000	19,392,000
1969	42,917,000	1,160,000	44,077,000	13,948,000	4,600,000	2,292,000	23,237,000
1970	47,301,000	1,261,000	48,562,000	16,994,000	4,100,000	2,179,000	25,289,000
1971	36,064,000	108,000	36,172,000	15,663,000	2,200,000	1,295,000	17,014,000
1972	33,867,000	348,000	34,215,000	15,715,000	4,400,000	2,666,000	11,434,000
1973	59,585,000	642,000	60,227,000	19,338,000	13,700,000	2,889,000	24,300,000
1974	94,425,000	2,345,000	96,770,000	25,901,000	26,940,000	4,990,000	38,939,000
1975	65,233,000	1,889,000	67,122,000	30,851,000	12,565,000	6,369,000	17,337,000
1962-1975	531,180,930	10,573,014	541,753,944	160,567,592	73,505,000	62,189,297	245,492,055

Prepared by: Arvin D. Jelliss, Former Economic Research Analyst, Indian Brotherhood of the Northwest Territories, February 1977.

Source: Pine Point Mines Limited, Annual Reports, 1962-1975

Col. 1: Sales Revenue is net of Distribution Costs.

Col. 2: Includes Gains on Disposals listed as \$10,296 in 1964, \$22,000 in 1965, and \$62,000 in 1966.

Col. 3: Col. 1 + Col. 2.

Col. 4: 1964: Item listed as ore extraction in statement of earnings; 1965-1972: Item listed as Production, Selling and General Expenses plus, when applicable, items listed as Directors' Remuneration and Exploration; 1973-1975: Sum of items listed as Selling, Cost of Production Sold, and General and Administrative. Operating Cost Figures include Exploration Expenditures.

Col. 5: Taxes and Royalties are those indicated as paid and exclude amounts deferred.

Col. 6: 1962-1964: Expenditures listed in 12th, 13th and 14th Annual Director's Reports, but excluding Repayment of Cominco's Advances in 1964; 1965: Expenditures listed as Pit Preparation, Development, and Buildings and Equipment in 15th Report, plus Expenditures by Pyramid Mining Com-

pany on its Pine Point Property; 1966: Sum of items listed as Net Capital Expenditures and Increase in Sundry Non-Current Items minus item listed as Issue of Shares to Acquire Property in 16th Report, plus Expenditures by Pyramid Mining Company on its Pine Point Property; 1967-1969: Sum of items listed as Capital Expenditures, Pit Preparation, and Reduction of Long-Term Debt minus items listed as Housing Mortgages and Decrease in Non-Current Accounts Receivable in Statement of Source and Application of Funds; 1970-72: Sum of items listed as Buildings and Equipment, Mine Preparation, and other, plus in 1972 items listed as Mining Properties Net of Amount Not Currently Payable and Prior Year's Freight Adjustment, Net of Tax; 1973: Sum of items listed as Mining Property, Plant and Equipment, and Decrease in Long-Term Debt; 1974-1975: Sum of items listed as Mining Property, less Long-Term Portion Payable under Agreement, Plant and Equipment, and Repayment of Long-Term Debt in Statement of Changes in Financial Position.

Col. 7: Col. 3, Col. 4, Col. 5, and Col. 6.

Between 1962 and 1975 sales revenues (plus investment income of \$10,573,014) generated \$541,753,944. Taxes and royalties paid amounted to \$77,640,000 (\$73,505,000 plus deferred taxes of \$4,135,000), of which approximately \$53,205,000²⁵² was paid to the government between 1973 and 1975. Capital expenditures for the entire period (1962-1975) were \$62,189,297, plus \$26,320,000 and \$2,100,000²⁵³ for the purchase of additional mining properties, totalling \$90,609,297; operating costs were \$160,567,592. Overall accumulated net cash flow to the corporate sector between 1962 and 1975 was \$212,937,055.²⁵⁴ Other figures indicative of the success of the mine are dividends paid to shareholders from these profits (see Table 5). Up to and including 1975, \$215,657,000 was distributed among some 8,000 Pine Point shareholders. Cominco, which owns sixty-nine percent of the shares, received approximately \$148,700,000.

*Production . . . must furnish the industry with sufficient earnings to reimburse non-successful exploration expenditures and cover all the costs of the production operation, including depreciation . . . operating expenses, overhead, transportation costs and an adequate return on risk capital. The earnings should also cover environmental costs which should be "internalized" like other operating costs. Revenues in excess of this amount are defined for the purposes of this report as "economic rent"*²⁵⁵

When reviewing Pine Point Mines, Jelliss concludes that the present value (as calculated in 1975) of rents from 1970 to 1974 totals \$142,957,000.²⁵⁶ The present value of excess profits in the same period is \$63,030,000,²⁵⁷ while government revenues (in the form of taxes and royalties) total \$74,927,000.²⁵⁸

Table 5
Pine Point Mines Dividends and Share Prices (\$)

Year	Dividends Paid Per Share	Dividends Paid Total	Approximate Dividends Paid to Cominco (69%)	Stock Market Prices Per Share*	
				High	Low
1965	--	--	--	88.00	43.00
1966	5.50	24,840,000	17,100,000	74.00	48.25
1967	5.00	22,582,000	15,600,000	56.50	45.87
1968	4.50	20,324,000	14,000,000	47.50	36.25
1969	4.00	18,065,000	12,500,000	47.25	33.75
1970	9.00	40,647,000	28,000,000	38.50	28.62
1971	2.50	11,291,000	7,800,000	35.25	20.00
1972	3.50	15,807,000	10,900,000	35.50	24.00
1973	3.75	16,937,000	11,700,000	39.50	25.87
1974	5.50	24,840,000	17,100,000	37.00	24.50
1975	4.50	20,324,000	14,000,000	33.50	25.50
1976	5.50	24,840,000	17,100,000	33.62	26.75
1977	2.50	11,291,000	7,800,000	34.50	21.62
Total		251,788,000	173,600,000		

Source: Pine Point Mines Limited, Annual Reports, 1965-1977.

*Financial Post Summary, 6 June 1978.

In a study of six operating mines in the Northwest Territories, Arvin Jelliss describes excess profits in terms of "economic rent," using the definition of the Department of Energy, Mines and Resources in *An Energy Policy for Canada, Part I*:

In 1971 a DIAND economist suggested that the profitability of the Pine Point operation indicated that the mine could easily have afforded to pay the entire cost of the Great Slave Lake Railway, and still have maintained a healthy profit margin.²⁵⁹ Although available figures do not coincide

with those used by the economist, his analysis can nevertheless be supported. By the end of 1970 the total capital outlay by Pine Point Mines was \$70.2 million,²⁶⁰ total revenues were \$247.2 million, and the accumulated net cash flow was approximately \$110.1 million.²⁶¹ Had Pine Point paid for the entire cost of the railway (an additional \$55 million, since approximately \$20 million of the \$75 million total was repaid under the terms of the Railway Agreement), the mine would still have made a return of \$55.1 million²⁶² after only six years of operation. A similar analysis for the period 1962 to 1975 indicates that, as would be expected, over a longer term the ability of the company to absorb the cost of the railway is increased. By the end of 1975, over the period of the life of the mine, total capital costs were \$90.6 million, while the total accumulated net cash flow was \$212.9 million. If the cost of the railway had been deducted from this figure, total returns after eleven years of operation would have been \$157.9 million.

This analysis indicates that Pine Point would have been a viable development even if the mine had borne the total cost of the railway. The Great Slave Lake Railway has become a major transportation facility to the entire Mackenzie basin. Traffic has exceeded initial forecasts by over three hundred percent.²⁶³ Pine Point traffic alone has nearly tripled the amount stipulated under the Railway Agreement for some individual years (see Table 1). Over the ten-year term in which the Railway Agreement was in effect, shipments totalled approximately 5,743,000 tons, averaging about 574,000 tons a year — well over two and a half times the tonnage required. Yet Pine Point was only charged the base rate for tonnage shipped above the 215,000-ton level.

Under these circumstances, the decision not to charge Pine Point for more than \$20 million towards the construction costs of the Great Slave Lake Railway and to limit the amount of money that could have been redeemed had Pine Point turned into a very successful venture is difficult to explain. When reviewing the decision in the context of northern objectives and the philosophy of northern development during the late 1950s and early 1960s, it becomes clear that the government was less concerned about the cost of northern development (to the taxpayer) than about how northern development was to be achieved. The construction of the Great Slave Lake Railway was one such mechanism.

From that perspective, the railway has been a very successful venture. According to CNR, “approximately 9,000 to 10,000 rail cars travel south on the Great Slave line each year. Pine Point zinc and lead concentrates account for about 5,500-6,000 of those cars. Forest products and grain

fill the majority of remaining rail cars.”²⁶⁴ Inbound freight generally utilizes 5,000 to 6,000 cars.²⁶⁵ Indeed the existence of the railway, which was of course dependent upon the development of the mine, has provided substantial economic benefits to northern Alberta and the entire Mackenzie District of the Northwest Territories. There is no doubt that the profitability of the rail line was enhanced by shipments in excess of 215,000 tons per year, since rates were “apparently based on the assumption that the Canadian National Railway could have a financially feasible operation if 215,000 tons a year were shipped.”²⁶⁶ The terms of the Railway Agreement also included escalation provisions (based upon the value of concentrates and general system-wide rate increases), which resulted in the payment by Pine Point of rates which were apparently fifty percent higher than the rates which were recently negotiated following the expiration of the Railway Agreement.²⁶⁷

Four factors were responsible for the extraordinary profitability of the Pine Point mine. First, the capital cost of the project and debt (at the initial stages) was only approximately \$23 million, because of the initial government support provisions. Second, the Great Slave Lake Railway was completed ahead of schedule in November 1964. Third, some of the Pine Point deposits were exceptionally high-grade, and consequently the mine was able to ship unconcentrated ore by rail through 1968 (and again in 1970 and 1971). Finally, the mine was exempt from taxes, royalties, and repayment of railway debt until 1 March 1968, and on the Pyramid orebody until 1972. The fact that Cominco was able to export much of Pine Point’s concentrates and did not have to build a smelter no doubt enhanced the profitability of the operation.

A conservative estimate of initial government assistance provided to the mine amounts to approximately \$104 million, including hydro and townsite development costs (which were later recovered), roads, and the railway (of which Pine Point paid \$19.8 of the \$75 million it cost to construct, plus special freight rates). Pine Point’s initial capital expenditures totalled \$23 million (for the mine site and concentrator).²⁶⁸ Considering the amount of infrastructure support granted, and in a sense “loaned” to the mine by the government, and the profits which were then generated, the failure to provide employment opportunities or any form of economic benefit for the settlement of Fort Resolution is difficult to accept.

When Mr Justice Berger was examining the local experience of economic development, he felt it important to compare the Pine Point development with the Slave River

sawmill operation in Fort Resolution. Early in the 1970s the sawmill was reopened under the management of Ray Orbell. It now provides employment for approximately thirty to thirty-five Fort Resolution men on a labour pool basis. The system of rotating employment was devised after Orbell encountered heavy absenteeism when the men chose to spend time in the bush. Now, once an employee informs Orbell of his intentions, he can leave his job in good standing to hunt or fish, providing the manager is able to find a suitable replacement. Orbell reports that the system has worked exceptionally well, although the turnover rate appears very high as many men are hired three or four times yearly.²⁶⁹ In addition, sawmill operations are suspended for several weeks in the spring when muskrat and beaver trapping attracts the native workers. Berger concluded:

*The operation, therefore, provides wage employment, but in a manner consistent with the maintenance of traditional economic activity; indeed it complements that activity by providing the means to buy equipment and supplies. Being community-based, the men are able to work without being separated from their families, and to participate in an endeavour that encourages community co-operation.*²⁷⁰

It is evident that the people of Fort Resolution have not benefited financially from the Pine Point development, despite the government policy which claims “to ensure that the inhabitants of the region derive maximum possible benefits from the region’s development.”²⁷¹ The huge sums invested by both government and Cominco to promote the project have not led to employment or a resurgence of the Fort Resolution economy for many reasons. By contrast, the sensible management of the sawmill has produced measurable improvement in the economic life of the community and provides an excellent example of the kind of development which is compatible with traditional and community lifestyles of native people. It has done so at a tiny fraction of the cost associated with development of the mineral deposits at Pine Point.

IX Conclusions and Recommendations

Pine Point has proven to be one of the most profitable mining ventures in Canada’s history. From the time that Cominco initiated the operation, negotiations concerning the mine have been characterized by pressure from the company for swift decisions by the government. However, both the relative availability of information and the platforms

from which the industry and government negotiated differed, and these differences may well have affected the outcome of the initial negotiations. The government had to rely totally on information provided by the industry with respect to ore reserves. It is evident that government negotiators were bargaining with proven ore figures in mind, and that the company was bargaining and developing long-range plans based upon its knowledge of future ore possibilities.

The confusion arising from this issue clearly illustrates the importance of information availability. The mining industry, like the oil and gas industry, regards information about reserves as proprietary; however, in the case of oil and gas, the industry is compelled by law to provide the government with access to logs and other raw data with which government specialists can perform their own analyses, make their own predictions, and reach their own conclusions. The situation differs in the reporting of ore reserves. According to the provisions of the Securities Act, the mining companies are compelled to provide accurate information, but they do not have to provide the government with raw data. In other words, the information which is made available to the government is second-hand — derived from analysis and interpretation by industry; government experts do not have access to the data which would make prediction of future reserves possible.

Throughout the early negotiations, federal government decisions were highly favourable to Pine Point. While normally the beneficiary bears the costs of infrastructure, in this case it was provided by the government without any assurance that, should the venture be successful, these costs would be recouped. At fault was the government’s inability to procure the information on which it could estimate the company’s ability to pay. Even had the information been available, the Railway Agreement placed a ceiling on the amount of capital that could be recouped. Had the recommendations made by the Manning Commission and during the course of parliamentary debate been seriously examined, such extensive infrastructure assistance might not have been provided.

Even after the signing of the Railway Agreement, which obligated the company to bring Pine Point into production, the Department of Northern Affairs and National Resources continued to provide infrastructure at Cominco’s request. The provision of capital for the construction of roads, hydro-electric facilities, and townsite development was made on an *ad hoc* basis, almost as though without reference to previous expenditures. The government also failed to

acquire adequate contractual assurance that the company would purchase townsite properties developed at government expense, and the potentially powerful control tools of export permits and the Canada Mining Regulations (for requiring further domestic processing) were rendered ineffective by the Railway Agreement.

When decisions were made to expedite the development of Pine Point, the human resources aspect, as it related to the native populations in the area south of Great Slave Lake, was also overlooked. It is difficult to comprehend why the government chose not to diversify the already depressed Fort Resolution economy by promoting native employment at Pine Point. Moreover, the government itself was later responsible for the further decline of the local economy with the development of the railway and the relocation of services in other areas. The native people had only limited access to employment in the extractive sector, although they bore the brunt of the negative effects from the development. All investments during the initial stages of development were made solely with the objective of bringing the mine into production; no significant expenditures were made to maximize the possible regional benefits of the project, or to minimize its adverse impacts.

When reviewing the federal government's stated objectives of effecting social improvement by providing a higher standard of living through employment opportunities, it becomes apparent that the Fort Resolution situation represents a total failure. At the time of the Pine Point development, no employment policy or philosophy had been conceived, and hence the mine was permitted to go ahead without any commitment to involve native people. From the outset DNANR placed itself in a very weak bargaining position, and in later years was unable to secure any substantial concessions from the company regarding employment and training. The housing situation (another instance of poor planning), and the absence of a road (when housing needs were critical in Pine Point) both contributed to the low employment statistics of native people indigenous to the area. Had the government initiated co-ordinated social development programmes during the late 1960s, when employment at the mine was increasing, a permanent native labour force might have been established. Although the mine has made concerted efforts since the mid-1970s to encourage the employment of natives from Fort Resolution, the bitterness and resentment which resulted from impotent government policies, and the continued disappointing native employment through the late 1960s and early 1970s have resulted in a very despondent climate in the community of Fort

Resolution. The continuing failure of government programmes to improve the quality of life in Fort Resolution has led to increased skepticism about the ability of the Department of Indian Affairs and Northern Development to act in the best interests of native peoples. The negative social impacts resulting from the mine's operation were the products of the government's initial oversights, its weak bargaining position, and its ineffectual social development policies.

Many people, particularly residents of Fort Resolution, also believe that the presence of the mine has created serious environmental problems. Tree kill, water pollution, and declining fish and game populations have variously been attributed to the mine, and further studies are therefore urgently required. These studies are of particular importance in light of Pine Point's recent application to increase its water use activities. The failure of the government to respond adequately to the information requests of the people of Fort Resolution or to inform them of Pine Point's revised application when it was submitted has also increased the native peoples' lack of faith in northern administrators. Moreover, the native people have little confidence in environment protection legislation such as the Northern Inland Waters Act and Regulations, particularly since Pine Point Mines has been conducting its pit de-watering activities without a water licence for five years. The mine submitted its initial application to the Northwest Territories Water Board in 1973, and has been waiting for a licence ever since. Had major problems concerning tailings disposal arisen at Pine Point in the interim, the government would not have been able to prosecute the mine for violation of a licence which had not been issued.

Throughout the development of the mine, those to be directly affected by it — the native peoples — were not informed or consulted about their preferences and aspirations. Public participation was limited to hearings for railway route selection, and to Water Board hearings which took place ten years after the mine had commenced operations. The project should have been evaluated not only in terms of its commercial viability, but also in terms of its potential contribution to the region and its inhabitants. The evaluation should have involved extensive consultation at the community and territorial government levels. The decision to approve the Pine Point development should have been made on the basis of the socio-economic merits of the project, taking into account the potential environmental costs. At that point a negotiation agreement should have been entered into between the government and Pine Point. The

document should have set forth government participation, and the conditions under which the project would be allowed to proceed, in order to reduce the *ad hoc* fashion in which assistance was granted and to ensure that the benefits alleged by the company would in fact be achieved. The optimum combination of assistance programmes for the project should have been chosen (for example, the integration of training agreements, housing programmes, and so on) and guaranteed through adequate contractual assurance, with the onus on the company to formulate the scheme and present it to the government for approval. The agreement should have included sound monitoring and provision for full cost recovery and a sharing in the event of excess profits. The agreement should also have indicated the expected economic or social benefits, and delineated how the company intended to ensure their realization.

In general, resource development decisions, such as the decision to develop the Pine Point deposit, should be made within the context of northern policies and priorities, based on the preferences and aspirations of northerners. These decisions should assess the long-term situation, taking into account other national, regional, or local policies concerning energy, the economy, resource availability, employment, housing, and transportation. When the government is an equity participant or — as in the case of Pine Point — a substantial supporter of the development, the project should be subjected to comprehensive assessments in advance of fundamental decisions. Adequate baseline data must be generated through a programme of basic research, specific environmental impact research relative to the development, and research oriented towards the identification of cumulative impacts. Impact assessments should also be conducted for any alternative development proposals, in order to determine which proposal has the least harmful impact. In addition, relevant information from government and industry sources must be freely available, in order that those to be affected by and having an interest in the project may make an informed contribution to the decision-making process. In order for it to be effective, public participation must occur at the formative stages of project planning and continue throughout the development of a project. Most of these elements, which are critical to sound resource use decision-making, were absent from the Pine Point development.

No single government department was responsible for the decision-making which led to the development of the Pine Point project. The Department of Northern Affairs and National Resources was the department primarily in charge of promoting the development in the context of the political

and economic climate of the late 1950s and early 1960s. Responsibility for the negotiations resulting in the Great Slave Lake Railway Agreement (and subsequently the problems encountered with exports and smelter feasibility) lay with government negotiators from the departments of Transport, Mines and Technical Surveys, and Northern Affairs and National Resources. Following the agreement, DNANR was responsible for the *ad hoc* provision of additional infrastructure support. DNANR was also responsible for the failure to ensure that adequate socio-economic returns from the project accrued to the region. The fact that no environmental impact assessment was conducted prior to the development cannot be considered an oversight of the decision-makers during the early 1960s. At present, however, DIAND (Water, Lands, Forest, and Environment) and to a lesser extent the Department of Fisheries and Environment (Environmental Protection Service) are responsible for evaluating and monitoring the environmental quality of the region and for anticipating the potential impacts of expanded development. The Game Management Division of the territorial government is responsible for the protection of game in the region, though the people of Fort Resolution have little faith in this department as their complaints have not been heeded.

It is evident from recent mining developments that few lessons have been learned from the Pine Point experience. Although the Anvil Agreement of the late 1960s stipulated percentage goals in the progressive employment of more native northerners, these objectives were never met. The fact that these provisions were included in the agreement made it appear that the government decision-makers were responding to the Pine Point experience, but there was no adequate contractual assurance that these goals would be met. The decision-making process leading to the development of Strathcona Sound also indicates that the federal government's declared objectives for the 1970s have not been implemented. In this case, no environmental impact assessment was carried out prior to the approval of the project.

Although Pine Point was brought into production nearly fourteen years ago, and the decisions leading to its development were initiated over two decades ago, it is clear that significant changes are still required in the way that resource development decisions in the North are made. The continuing impact of the Pine Point development testifies to the results which can be anticipated when large-scale public assistance is granted without consulting those to be affected, without adequately evaluating the environmental impact, and without ensuring through a contractual agreement that

the benefits anticipated from a development cover its public as well as its private costs.

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71. *Ibid.*, p. 5.
72. *Ibid.*, p. 7.
73. *Ibid.*, p. 8.
74. *Ibid.*, p. 9.
75. Canada, Debates, House of Commons Session 1960-61, Vol. VII, 30 June 1961, p. 7318.
76. *Ibid.*, p. 7320.
77. Canada, Debates, House of Commons Session 1960-61, Vol. VIII, 15 September 1961, p. 8406.
78. *Ibid.*, 18 September 1961, pp. 8505-8508.
79. *Ibid.*, 25 September 1961, p. 8879.
80. *Ibid.*, p. 8888.
81. *Ibid.*, p. 8934.
82. Deprez, *Pine Point Mine*, p. 23.
83. When the Railway Agreement expired in March 1978, Pine Point had paid \$19.8 million towards the capital cost of the Great Slave Lake Railway.
84. Railway Agreement, S. 5 (8).
85. "Taltson River Hydro-Electric Development to Supply Power for Pine Point Operations," *Northern Miner*, 19 August 1965.
86. E.W. Humphrys, "Hydro-Power from Twin Gorges," *North*, 11 (May-June 1964), p. 39.
87. "Power for the North Vital to Mineral Development," *Western Miner*, October 1974, p. 41.
88. Pine Point Mines Ltd., Annual Report, Year Ended 31 December 1975.
89. Humphrys, p. 37.
90. *Ibid.*, p. 37.
91. *Ibid.*, pp. 37-39.
92. *Ibid.*, pp. 37-39.
93. Letter from B.J. Partridge, Solicitor, Cominco Ltd., to author, 15 August 1978, p. 2.
94. *Ibid.*, p. 2.
95. Address by the Honourable E.J. Benson, Minister of National Revenue, at Pine Point, N.W.T., following Commissioning of the Taltson River Hydro-Electric Development, October 1965.
96. Paul Deprez, *An Economic Evaluation of Indian and Métis Employment at Pine Point*, prepared under provisions of agreement between the DIAND and Centre for Settlement Studies, University of Manitoba, 22 June 1970, pp. 66-67.
97. DNANR, "A Northern Roads Policy for the Future," Northern Administration Branch, January 1964, p. 27.
98. A.D.W. Dunning, "Townsite and Town Planning," *North*, 11 (May-June 1964), p. 44.
99. Memo from M. Connelly to F.A.G. Carter, 19 November 1962.
100. *Townsite Development Pine Point, N.W.T. with Consolidated Mining and Smelting Company of Canada Limited*, contract no. N.W.T. 13-63, (contractual agreement between A.B. Yates, Chief, Engineering Division, Northern Administration Branch, DNANR, and Cominco).

101. According to Deprez, during 1962 Cominco had stated that it anticipated company employees and families would not exceed 600 and the total population of Pine Point would be 1,000 by 1970. The company also had estimated that it would need a hundred serviced lots for trailers; but when the first phase of development was completed, only fifty-five lots had been sold to the company. See Deprez, *Pine Point Mine*, p. 37.
102. Deprez, *Pine Point Mine*, p. 45.
103. *Ibid.*, p. 42.
104. *Ibid.*, p. 54.
105. In addition, "Pine Point Mines occupies 70 lots with mobile homes and trailers which are leased from the town on a schedule which provides for repayment of total capital costs over the first five years." The N.W.T. Housing Corporation also owns and manages twenty houses which are assigned to northerners on training programmes. Pine Point Mines subsidizes utility costs in these homes, as with those it owns. In the Pine Point community, forty to fifty housing lots are also owned by the federal government and are occupied by police and other public servants.
- Letter from Partridge to author, 15 August 1978, pp. 1-2. See above, n. 93.
106. Letter from Partridge to author, p. 2. See above, n. 93.
107. Dunning, p. 32.
108. Northwest Territories, Area Development Ordinance 251-64; Regulations for the Development and Control of the Pine Point Development Area, 14 September 1964.
109. *Townsite Development*. See above, n. 100.
110. Deprez, *Pine Point Mine*, p. 36.
111. The Canadian Securities Regulations and U.S. Bureau of Mines define "ore" as mineralization that can be mined and treated at a profit. For the purposes of preparing a prospectus and annual reports, different kinds of ore are defined as follows:
- 1) "Measured" or "positive" ore means ore that has been delimited on four sides. This may involve entering into the orebody and exploring it through workings. A very high degree of certainty is attached to this category.
 - 2) "Indicated" or "probable" ore means ore which has been delimited on two sides or mineral concentrations of uniform character which have been outlined by a sufficiently large number of diamond-drill holes. At Pine Point, diamond drilling operations with 200-foot centres indicate ore in this category. These estimates are considered as reasonably certain, but contain a higher degree of risk than 1).
 - 3) "Inferred" or "possible" ore means ore which is believed to exist beyond the known portion of a deposit, but which has been insufficiently explored to be classed as probable ore. At Pine Point, diamond drilling operations with greater than 200-foot centres and ore reserves which involved extrapolating from the known to the unknown, compose this category. These estimates contain the highest degree of risk and are likely to vary greatly in accuracy when proven up.
- 4) "Potential" ore means the sum of measured, indicated, and inferred ore.
112. William T. Irvine, "Development of Pine Point Ore Reserves," 1 May 1978, p. 1.
113. Letter from W.G. Jewitt, Vice-President in Charge of Mines, Cominco, to C.H. Herbert, Chief, Economic Division, DNANR, 5 April 1957.
114. Jordan, p. 17.
115. Irvine, p. 2. See above, n. 112.
116. The expansion of Cominco's international interests included the acquisition of fifty percent interest in a lead mine in Missouri; purchase of forty-five percent interest, and assistance in constructing the Mitsubishi Cominco Seiren Kabushiki Kaisha (Japan) lead smelter in 1965-66; and forty percent participation and assistance in bringing into operation a new zinc refinery – Cominco Biani Zinc Ltd. (India) – in 1966.
117. Hurdle, p. 3.
118. On 29 January 1965 Cominco submitted application to export ore to the Bunker Hill Mining Company at Kellogg, Idaho, U.S.A. at a rate of 1,000 tons per week, not to exceed 50,000 tons total, until 31 December 1965. On 2 February 1965 Cominco requested authorization from the DNANR to enter into a long-term contract with its subsidiary, Mitsubishi Cominco Seiren Kabushiki Kaisha to export up to 50,000 metric tons of lead concentrate yearly for a period of ten years.
119. Railway Agreement, S. 5 (8).
120. "DRAFT Interdepartmental Committee re Export of Ores and Concentrates from Northwest Territories." Recording of interdepartmental meeting held 12 February 1965. A.T. Jordan, secretary, p. 4.
121. "Consideration Favouring the Granting of Permission for the Export of Concentrates from the Northwest Territories by Pine Point Mines," DMTS, p. 2 (undated: November 1965?).
122. Memorandum to Cabinet, "Pine Point Mines Limited – Export of Lead Concentrates." Arthur Laing, Minister of Northern Affairs and National Resources, 8 April 1965, p. 3.
123. Interdepartmental Meeting, Subject: Application by Pine Point Mines Ltd. to Export Lead-Zinc Ores and Concentrates, 30 November 1965, recorded by D.B. Fraser, Materials Section, Mineral Resources Division, DMTS, p. 2.
124. Draft letter from Minister of DNANR, to His Excellency the Governor-General in Council, p. 2.
125. In summary, the company requested to export to the U.S.A. and elsewhere 90,000 tons zinc metal (concentrates) per year for four years beginning 1 January 1966, to export to the U.S.A. 60,000 tons direct shipping ore for two years beginning 1 January 1966, and to change the existing lead export permit to Japan in order to permit a maximum of 15,000 tons per year for a period of four years, to be exported to

- countries other than Japan. "Application of Pine Point Mines Limited to Export Ores and Concentrates from Pine Point, N.W.T. to Destinations Outside of Canada." (no source date), p. 2.
126. Draft letter from E.A. Côté, Deputy Minister, DNANR, to C.H.B. Frere, General Solicitor, Cominco, 15 December 1965, p. 2.
127. Letter from E.A. Côté, Deputy Minister, DNANR, to C.H.B. Frere, General Solicitor, Cominco, 23 December 1965, p. 1.
128. *Ibid.*, p. 2. See above, n. 111 for a full description of ore reserve categories.
129. Letter from W.G. Jewitt, President, Pine Point Mines Limited, to the Honourable Arthur Laing, Minister of Northern Affairs and National Resources, 18 February 1966.
130. Interdepartmental Meeting. "Export of Concentrates from Pine Point," 16 January 1966, recorded by D.B. Fraser, Materials Section, Mineral Resources Division, DMTS, p. 3.
131. Canadian Bechtel Limited, *Lead-Zinc Reduction Plant, Pine Point, N.W.T. Feasibility Study*, Interim Report prepared for the Government of Canada, October 1966, p. 1-4.
132. "Smelter Study Terms Revealed," *News of the North*, 5 May 1955.
133. Interdepartmental Meeting, "Export of Concentrates from Pine Point," p. 2. See above, n. 130.
134. Canadian Bechtel Limited, p. 3-2. See above, n. 131.
135. Memo from D.B. Fraser, Materials Section, Mineral Resources Division, DMTS, to W. Keith Buck, Chief, Mineral Resources Division, Re: Report on Pine Point by Canadian Bechtel Limited, and an application for an Extension of an Export Permit for Zinc Concentrates Produced at Pine Point, 9 April 1968, pp. 1-2.
136. As quoted in Andrew J. Freyman and Graham T. Armstrong, *Cost-Benefit Analysis of a Lead-Zinc Smelter in the Northwest Territories*, (Ottawa: DIAND, Economic Staff Group, Development Branch, January 1969), p. 5.
137. *Ibid.*, p. 5.
138. Memo from Fraser to Buck, p. 2. See above, n. 135.
139. The more readily quantifiable category included increased annual profits for the Great Slave Lake Railway, estimated at \$160,000; benefits resulting from the reduction in the cost of power, estimated at \$170,000 annually; and reductions in social assistance payments, estimated at \$219,000 annually. Total benefits in this category amounted to \$549,000 annually. In the second category of very real but less readily quantifiable benefits were the new "economic momentum" which a smelter would trigger in the region, estimated to be equivalent to an annual benefit of \$250,000, and the benefit imputed to "southern" labour being attracted to the project, placed at \$175,000 annually. Total benefits in this second category were thus placed at \$425,000. Thus, in broad terms, a total of about \$1 million of net benefits were estimated to be generated by the project annually, of which about \$500,000 could be fairly readily quantified. Freyman and Armstrong, pp. 6-7. See above, n. 136.
140. Freyman and Armstrong, p. 8. See above, n. 136.
141. In April 1977 Cominco announced its intention to spend \$425 million over the next eight years to expand and modernize its metallurgical facilities at Trail and to further mechanize mining methods at the Sullivan mine at Kimberley. At the Trail smelter a modern lead concentrate preparation plant will be constructed, in addition to modernization of the zinc refinery. Annual smelting capacity at Trail will be expanded from 195,000 tons to 300,000 tons refined zinc, and from 170,000 tons to 200,000 tons refined lead. "Cominco to Spend \$425 Million at Trail, Sullivan Mine." *Globe and Mail*, 22 April 1977.
142. Richard Slobodin, *Metis of the Muckenzie District*, Canadian Research Centre for Anthropology, (Ottawa: Saint Paul University, 1966), p. 17.
143. Fields and Sigurdson, p. 33.
144. *Ibid.*, p. 32.
145. "A Northern Roads Policy for the Future." p. 4. See above, n. 97.
146. Letter from C.M. Isbister, to the Minister, Subject: Access Roads and Granduc Mines Limited, 24 June 1966.
147. "Northern Roads," (Ottawa: DIAND, Information Canada, 1974), p. 13.
148. Deprez, *Pine Point Mine*, pp. 26-28, 31.
149. *Ibid.*, p. 59.
150. *Ibid.*, p. 32.
151. *Ibid.*, pp. 67-68.
152. *Ibid.*, p. 70.
153. This was the rent after a \$35 and \$25 per month subsidy by the territorial government and Cominco had been deducted. The cost of installation of the trailers (\$1,300), paid by the territorial government, was not provided for in the rents.
154. Deprez, *Pine Point Mine*, p. 31.
155. *Ibid.*, p. 75.
156. *Ibid.*, p. 73.
157. *Ibid.*, p. 77.
158. *Ibid.*, p. 73.
159. *Ibid.*, p. 74.
160. DNANR, Contract for Townsite Development, Pine Point, N.W.T. with Consolidated Mining and Smelting Company of Canada Ltd., A.B. Yates, Chief, Engineering Division, 18 June 1964, S. 4 (1) and (2).
161. Deprez reports that throughout the late 1960s a Heavy Duty Equipment Training Camp was held outside Fort Smith under the auspices of the DIAND and territorial government. Its purpose was to prepare students for employment and apprenticeships in the field. In October 1968 Cominco agreed to place four of the graduates from the camp, but refused to make any additional commitments. By 1970 only

- four of the graduates of 1968 were employed and none of the 1969 graduates. Deprcz. *Pine Point Mine*, pp. 79-80.
162. *Agreement made this 8th day of February, 1971 Between Her Majesty the Queen . . . , The Commissioner of the N.W.T. . . . , Cominco Limited . . . , and Local 804 of the United Steelworkers of America.* Under the terms of the agreement the Commissioner of the N.W.T. agreed to designate a Vocational Liaison Officer who was in effect the Regional Employment Liaison Officer. This official was to be provided with current information respecting employment opportunities and was to nominate persons for trainee positions.
163. Agreement, SS. 7 and 12. See above, n. 162.
164. Agreement, SS. 10 and 11. See above, n. 162.
165. At present Pine Point is developing training programmes for natives in conjunction with Canada Manpower. The mine states that four natives are currently on a mill helper series, and that another series is being developed to include equipment operators and mechanic helpers. Letter from W.H.R. Gibney, Manager, Pine Point Operations, Cominco Ltd., Pine Point, N.W.T., to author, 30 March 1977.
166. Agreement, S. 18. See above, n. 162.
167. Andrew J. Freyman and Graham Armstrong, "The Employment of Indigenes in the Territorial Mining Industry," (Ottawa: DIAND, Economic Staff Group, Development Branch, December 1968), p. 70.
168. "Employment of Indigenous People in the Territorial Mining Industry," prepared by Resources Section, Economic Staff Group, Northern Economic Development Branch, DIAND, p. 8.
169. *Ibid.*, p. 8.
170. Deprcz. *Pine Point Mine*, pp. 91-92.
171. *Ibid.*, p. 101.
172. *Ibid.*, p. 115.
173. Pine Point Mines Limited, Annual Report, 1969.
174. Pine Point Mines Limited, Annual Report, Year Ended 31 December 1974.
175. *Ibid.*
176. Testimony of Mayor Arvid Osing, Mackenzie Valley Pipeline Inquiry, Pine Point, 6 October 1975, Vol. 30, p. 2891.
177. Letter from Gibney to author. See above, n. 165.
178. R.P. Douglas (Group Vice-President at Yellowknife, Cominco Ltd.), "Utilization of Human Resources North of Sixty," Paper presented at the Mining Industry Forum, Edmonton, Alberta, 2 December 1977, p. 14.
179. *Ibid.*, p. 3.
180. *Ibid.*, p. 14.
181. *Ibid.*, p. 7.
182. *Ibid.*, pp. 8-9.
183. *Ibid.*, p. 9.
184. *Ibid.*, p. 10.
185. Field reports of author from trip to Fort Resolution, July 1975. Interview with Ray Orbell, Manager of Slave River Sawmill, 16 July 1975.
186. Interview with Angus Beaulieu, 16 July 1975.
187. Pat Nelson and Mike Beaulieu, Fort Resolution Field Reports, (prepared for the Indian Brotherhood of the Northwest Territories), 21-24 May 1975.
188. "Estimate 9,000 Claims now Staked as Railroad Opens Vast New Base Metal Field." *Northern Miner*, 19 August 1965.
189. *Mining in the North, 1965-1966*, (Ottawa: Resources Economic Development Group, DIAND, 1966), p. 10.
190. Drake Hocking, *Forest Deterioration Survey: Pine Point, Mackenzie District, N.W.T.*, (Edmonton: Northern Forest Research Centre, Canadian Forestry Service, Environment Canada, August 1975), p. 10.
191. Field reports of author from trip to Fort Resolution, July 1975. Interview with Angus Beaulieu, President of Metis Association, 15 July 1975.
192. Interview with Ray Orbell, Manager, Slave River Sawmill, 16 July 1975.
193. Testimony of Harold Basille (incorrectly referred to as Harold Bosley), Mackenzie Valley Pipeline Inquiry, Fort Resolution, 7 October 1975, Vol. 31, p. 2989.
194. Hocking, pp. 11, 13.
195. Y. Bérubé, M. Frenetta, C. Ancil, R. Gilbert, *An Engineering Assessment of Waste Water Handling Procedures at the Cominco Pine Point Mine*, Centre de Recherche sur l'eau, Université Laval, DIAND, April 1972, pp. 48-51.
196. *Ibid.*, p. 39.
197. J.N. Stein and M.D. Miller. *An Investigation into the Effect of a Lead-Zinc Mine in the Aquatic Environment of Great Slave Lake*, Technical Report, (Winnipeg: Resources Management Branch, Fisheries and Marine Service, 1972), p. 43.
198. *Ibid.*, p. 40.
199. *Ibid.*, p. 43.
200. Letter from A.G. Redshaw, Controller of Water Rights, DIAND, to W.H.R. Gibney, Manager, Pine Point Operations, 6 July 1973.
201. *Ibid.*
202. Hocking, p. 10.
203. Hocking based his observations upon climatic data from Fort Resolution and Hay River. He recommended that Cominco be required to maintain meteorological (particularly precipitation) records.

- If such records had been available, it is possible that Hocking's theory could have been substantiated.
204. Hocking, p. 27.
205. Harold Basille, p. 2990. See above, n. 193.
206. David Merrill Smith, "Fort Resolution People: An Historical Study of Ecological Change." University of Minnesota Ph.D. thesis, 1975, p. 295.
207. *Ibid.*, p. 279.
208. Testimony of L. McConnell, Mackenzie Valley Pipeline Inquiry, Fort Resolution, 8 October 1975, Vol. 31, p. 3067.
209. Testimony of Mike Beaulieu, Mackenzie Valley Pipeline Inquiry, Fort Resolution, 7 October 1975, Vol. 31, p. 2995.
210. Letter from D. Hocking, Research Scientist, Canadian Forestry Service, Edmonton, to R. Hall, Supt. of Game, Game Management Division, Government of Northwest Territories, 13 August 1974.
211. Northern Inland Waters Act, R.S.C. 1970, c. 28 (1st Supp.) 883.
212. Cominco Limited, Pine Point Mines Ltd., "Water Use Application Process Water and Tailings Disposal; Summary of Presentation to Public Hearing – Pine Point, N.W.T.," 16 January 1974; Cominco Limited, Pine Point Mines Ltd., "Water Use Application Pit Dewatering at Pine Point; Summary of Presentation to Public Hearing – Pine Point, N.W.T.," 16 January 1974.
213. Fort Resolution Band Council Meeting, held 14 January 1974, Resolution No. 1-7400.
214. Letter from Mike Beaulieu for Edward Sayine, Chief, Fort Resolution Band Council, to C.A. Lewis, District Manager, Environmental Protection Service, Department of Environment, 12 March 1974.
215. Letter from C.A. Lewis, District Manager, Environmental Protection Service, Department of Environment, to Edward Sayine, Chief, Fort Resolution Band Council, 28 March 1974.
216. Letter from J. Eatock, Regional Director, Northwest Region, Environmental Protection Service, Department of Environment, Edmonton, to J. Lupien, Senior Assistant Deputy Minister, Environmental Protection Service, Department of Environment, Ottawa, 10 April 1974.
217. Telex from J.J. Eatock, Acting Chairman, Prairie and Northern Regional Board, to C.A. Lewis, Environmental Protection Service, Yellowknife, 26 April 1974.
218. Letter from C.A. Lewis, District Manager, Environmental Protection Service, to D.J. Gee, Regional Manager, Water, Forests, and Lands, DIAND, 17 May 1974.
219. "Pine Point Mines Threatens Our Land," *Native Press*, 17 April 1975, p. 8.
220. *Ibid.*, p. 8.
221. Transcript of Public Hearings called by the N.W.T. Water Board pursuant to Section 15(2) of the Northern Inland Waters Act, R.S.C. 1970, Chapter 28, (1st Supp.) 883, in connection with an application by Cominco Pine Point Mines Ltd. for the use of waters for the following purposes:
1) mill use
2) pit dewatering. See p. 6.
222. "Pine Point Mines Threatens Our Land," p. 9. See above, n. 219.
223. The Pine Point application proposed that 80,136,000 gpd be consumed in open pit operations, 90,220,000 gpd for underground operations, and 15,120,000 gpd in proposed dragline operations.
224. "Pine Point Mines Threatens Our Land," p. 3. See above, n. 219.
225. B.C. Research, "Environmental Studies at Pine Point, 1976: A Summary," (Vancouver: May 1977), p. 2.
226. *Ibid.*, p. 2.
227. *Ibid.*, p. 3.
228. *Ibid.*, p. 4.
229. Letter from W.H.R. Gibney, Manager, Pine Point Operations, to A.G. Redshaw, Controller, N.W.T. Water Board, DIAND, 17 February 1977.
230. Letter from J.A. Bergasse, Chairman, N.W.T. Water Board, DIAND, to W.H.R. Gibney, Manager, Pine Point Operations, 18 March 1977.
231. Letter from Wayne Maksylewich, Environmental Protection Service, Environment Canada, to C. Lafferty, Settlement Secretary, Fort Resolution, 17 June 1977.
232. Department of Fisheries and Environment (presented by David Fowler, Director, Inland Waters Directorate), "Brief N.W.T. Water Board Public Hearing, 25 May 1978, Pine Point Mines Pit Dewatering," p. 1.
233. Letter from Partridge to author, 15 August 1978, p. 2. See above, n. 93.
234. B.C. Research, "Environmental Studies at Pine Point, 1976 and 1977, A Summary," (Vancouver: May 1978), p. 2.
235. *Ibid.*, p. 3.
236. *Ibid.*, p. 5.
237. DFE, "Brief," p. 3. See above, n. 232.
238. *Ibid.*, p. 3.
239. *Ibid.*, p. 5.
240. *Ibid.*, p. 7.
241. *Ibid.*, p. 7.
242. *Ibid.*, pp. 7-8.
243. *Ibid.*, p. 8.
244. Transcript of Public Hearings, p. 14. See above, n. 221.
245. Information provided by Cominco (Vancouver), 14 July 1978.
246. *Ibid.*

Pine Point Mine

247. Pine Point Mines Limited, Annual Report, 1966.
248. According to Pine Point Annual Reports, net earnings for 1964, 1965, and 1966 were \$476,000, \$22,132,000, and \$34,194,000 respectively.
249. B.E. Hurdle, "The Pine Point Mine," paper presented at the 3rd National Northern Development Conference, Edmonton, October 1964, revised 17 August 1966, p. 7.
250. "A Truly Remarkable Performance," *Northern Miner*, 28 April 1966.
251. Jelliss's analysis did not include expenditures by Cominco previous to 1962, as the decision to bring the mine into production was contingent upon the provision of the railway. The Railway Agreement, which obligated the government and industry to advance the mine's development, was signed on 7 December 1961.
252. When including deferred taxes for the period 1973-75, approximately \$335,000 should be added to this figure.
253. Table 4 does not include \$26,320,000 which was expended in 1966 for the purchase of the Pyramid orebody. In this case the payment was made by the issuance of shares rather than by drawing a cheque, and does not therefore appear as a "cash" expenditure. Table 4 also omits an additional expenditure of \$2,100,000 for the purchase of the Conwest orebody in 1974, since cash payment was not issued that year.
254. Net cash flow as indicated in Table 4, minus purchases of mining properties (totalling \$28,420,000) and deferred taxes (\$4,135,000).
255. *An Energy Policy for Canada: Part I*, (Ottawa: Department of Energy, Mines and Resources, 1973), p. 143.
256. Arvin D. Jelliss, *Estimates of Past and Future Rents and Rent Distribution Associated with Currently Operating Mines in the N.W.T.*, August 1975, pp. 30, 86.
257. *Ibid.*, p. 88.
258. *Ibid.*, p. 92.
259. G.T. Armstrong, "Economic Development of the Northern Canadian Territories," Paper presented to the Australian and New Zealand Association for the Advancement of Science, 43rd Congress, Brisbane, May 1971, p. 21.
260. Total capital outlay up to and including 1970 was \$43.9 million (years 1962-1970 in Table 4), plus \$26.3 million for property purchase.
261. Total accumulated net cash flow up to and including 1970 was \$136.4 million (years 1962-70 in Table 4), minus additional capital outlay of \$26.3 million not included in table.
262. Total accumulated net cash flow up to and including 1970 was \$110.1 million (see above), minus \$55 million for the cost of the railway paid by government.
263. G.T. Armstrong, "Railways in the North," *North*, 16 (May-June 1969), p. 27.
264. "Pine Point Mines pays off debt to CNR," *The Hub*, 28 June 1978.
265. *Ibid.*
266. Letter from Partridge to author, 16 August 1978.
267. *Ibid.*
268. In addition, Pine Point's parent company, Cominco, also spent \$16 million to expand smelting facilities at Trail, B.C. to prepare for the early years of Pine Point production. See Cameron, p. 6.
269. Armstrong, "Economic Development," p. 19. See above, n. 259.
270. Berger, Vol. I, p. 124. See above, n. 8.
271. Armstrong, "Economic Development," p. 19. See above, n. 259.



Cyprus Anvil Mine

Janet Macpherson



Jeffrey Parker

The Cyprus Anvil Mine

Janet E. Macpherson
Interdisciplinary Systems Ltd.
Winnipeg, Manitoba

Introduction

The Cyprus Anvil mine is the Yukon's largest mining project, and Canada's greatest producer of lead.¹ It is the mainstay of the Yukon economy.² Located approximately 120 air miles northeast of Whitehorse in the Anvil mountain range of the east central Yukon,³ the open pit operation is one of the largest in the world (see Figure 1). At present the community of Faro, which was established to house the employees of the mine, is the second largest community in the territory, having a population of 1,519. It is expected that this community will expand to serve additional mining operations which are currently being proposed for the area.⁴

This case study examines the process of decision-making whereby the Cyprus Anvil mine was brought into production, and the consequent effects of the development upon the surrounding region, its inhabitants, and the environment.

The Yukon Territory has a long history of mining. Exploration activity began in the late 1800s when surveyors, explorers, and prospectors traversed the district. The strike at Bonanza Creek near Dawson, heralding the beginning of the Klondike gold rush in 1898, is recognized as the first major bench-mark in the history of Yukon mining.⁵ To facilitate Klondike activities, the White Pass narrow-gauge railway was built between 1899 and 1901, running from Skagway in Alaska to Whitehorse. Sternwheel steamers also operated between Whitehorse and Dawson during that period, transporting treasure seekers down the Yukon River.⁶ The history of hard rock mining in the Yukon began when copper was mined near Whitehorse following the decline of the gold rush. Coal was also mined near Carmacks in the early 1900s.⁷ Although limited exploration activities continued throughout the Yukon, no significant mines were brought into production until the 1920s when several silver-lead deposits were discovered around Keno Hill. Although other mines were in production temporarily (including the

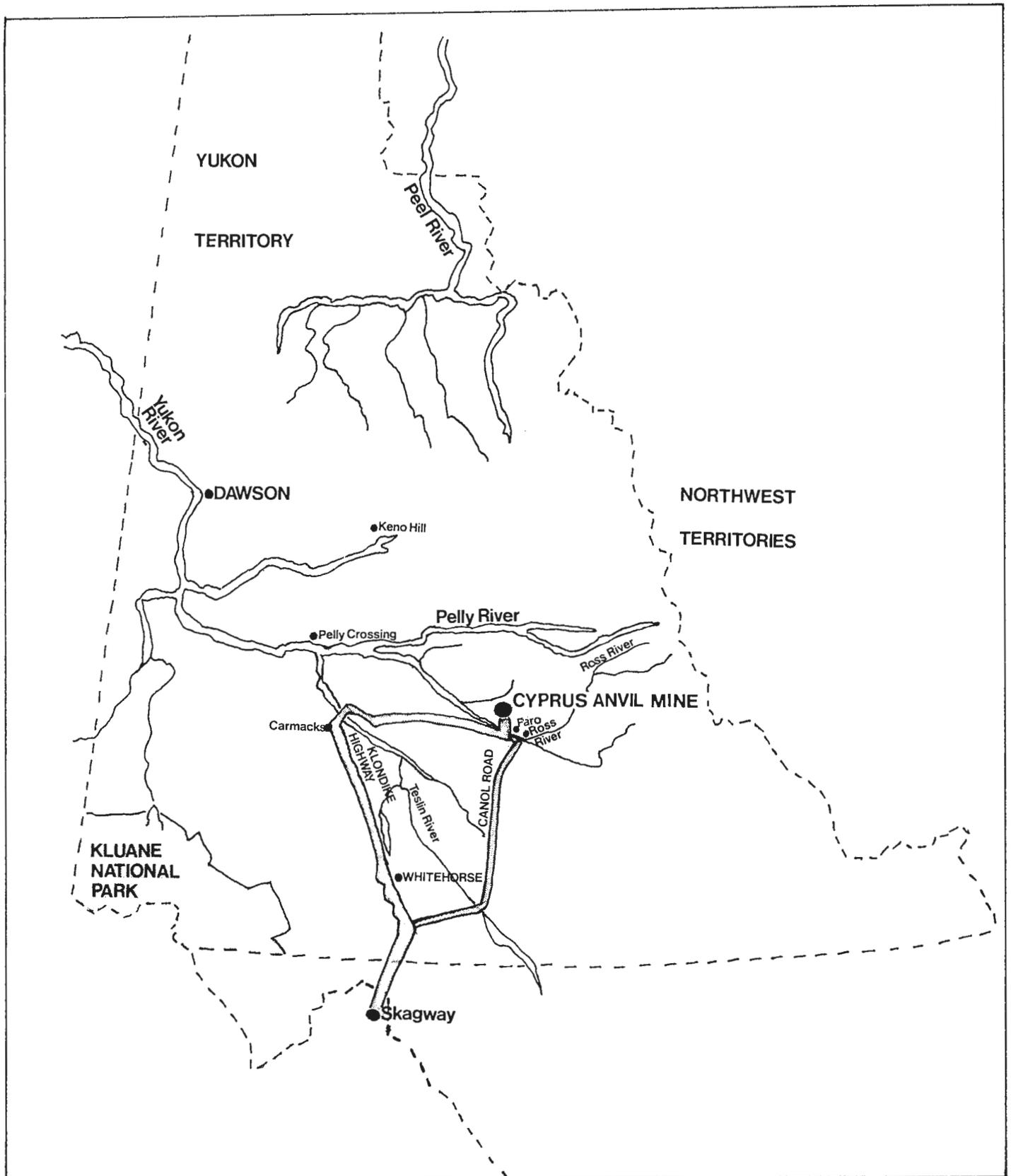


Figure 1 Location of the Cyprus Anvil Mine

exceptionally rich Elsa mine), Keno Hill remained the only successful lode mining operation until its closure in 1941.⁸ The operation was reopened several years later and is still in production.

Following World War II, conditions affecting mineral exploration efforts became more favourable. As a result of Canadian defence policies between 1939 and 1945, the Alaska Highway was built, and the Canol oil pipeline and road were constructed across the territory through the town of Ross River. The improvement of base metal markets during the late 1940s also promoted exploration efforts. Transportation and communication facilities continued to expand throughout the Yukon in the 1950s as a result of the installation of the DEW Line and other defence placements.⁹ During this era a number of discoveries were made, including those which eventually led to the development of the Canada Tungsten deposit in 1962, and the Clinton Creek mine by Cassiar Asbestos in 1967. The New Imperial Mines copper development near Whitehorse also began production in 1967.¹⁰

Government policies respecting mineral development evolved markedly during the 1950s, following the establishment of the Department of Northern Affairs and National Resources in 1953. The federal government initiated cost-sharing programmes to promote road development in support of mining ventures, and in 1958 began the “Roads to Resources” programme.¹¹ During the mid-1960s additional programmes were designed to provide support for northern enterprises. For example, the Northern Mineral Exploration Assistance Programme encouraged exploration expenditures by Canadian companies by providing grants of up to forty percent of approved expenditures incurred during exploration.¹² The federal government also provided exploration and geological services, and other incentive programmes for mineral access roads and airstrips. The presence of these programmes precipitated an expansion of private investment in mining exploration, and a dramatic increase in claim staking in the Yukon Territory.¹³

Under these beneficial conditions a number of mines — among them Cyprus Anvil in 1969 — were brought into production. First, funding was secured to provide for detailed exploration of the orebody. Once the deposit was delineated, project feasibility studies were initiated. These studies included an evaluation of geological potential, economic profitability, and availability of financing; surveys of market potentials; reviews of hydro-electric and transportation services (both rail and road); and townsite development possibilities. When these studies were well underway (and

even, in some instances, concluded), sponsors of the Cyprus Anvil development then approached the federal government to request infrastructure assistance. The outcome of these negotiations appears to have been a critical factor in the ultimate decision to proceed with the development. Data generated by the feasibility studies were submitted to the federal government, in order that government analysts could evaluate the mining proposal, its potential social effects, and private viability, and could subsequently submit policy alternatives and recommendations to the political decision-makers. These negotiations culminated in the signing of an agreement between the private interests, then known as Anvil Mining Corporation, and the public sector, represented by the federal Department of Indian Affairs and Northern Development.

The “Anvil Agreement” was an attempt by the government to contractually ensure that benefits from the mining development accrued to the region in which the development was taking place. The terms of the agreement were evidence of a significant departure from the methods previously employed for the provision of assistance to the Pine Point mine in the Northwest Territories, for example, during the early 1960s. Where assistance provided to Pine Point had been granted on a totally *ad hoc* basis, seemingly independent of other expenditures,¹⁴ the Anvil Agreement clearly stated what kinds of assistance were to be provided (hydro-electricity, townsite, roads, and so on). It stipulated that the company had to prepare a study of smelter feasibility and accordingly build a smelter, with appropriate government assistance, if this proved feasible. The government was clearly anxious to encourage smelting in the region and was aware of the opportunity costs associated with foreign processing. Another policy incorporated in the agreement covered the provision of employment for native people. However, the voluntary goals for native employment which were set forth in the Anvil Agreement did not lead to the successful establishment of a permanent native work force at the mine, as had been desired.

Indeed, the exploration and development of the Cyprus Anvil mine caused a number of serious and unanticipated socio-economic and environmental impacts in the Anvil-Ross River region. Although consideration was given to native employment, no analysis was made of the effects of exploration and development upon the Indian community of Ross River, located approximately forty-five miles from the mine. A road to Ross River had existed since the Second World War, but the community had not been subjected to pressures directly related to development until exploration

began in the Anvil region. As a result of the influx of whites and outsiders into the town, the character of Ross River changed dramatically, and there was a corresponding alteration in the lifestyles, relationships, and social organization of its inhabitants.

The environmental consequences of the mining project were also overlooked during the planning phases of development. No environmental impact assessment was conducted prior to the development, nor were any baseline data collected. The impacts of certain exploration activities were also overlooked, with the result that the incompatibility between exploration and trapping land use activities only became apparent after the exploration had taken place. Despite the implementation of legislation and surveillance by government authorities, a series of tailings spills occurred at Cyprus Anvil, one of which was described by the Environmental Protection Service as an "environmental emergency." Proceedings of the subsequent litigation indicated the level of co-operation between the mine and government officials, and the level of corporate consciousness regarding the environmental consequences of the company's actions.

The following detailed analysis of the Cyprus Anvil mining development illustrates that the negotiation process for infrastructure and the process by which a mine is determined to be feasible were inadequate. Indeed, the negative socio-economic and environmental impacts of the development persist to this day.

Exploration of the Anvil Area (1953-66)

The Anvil region of the Yukon was first prospected by Al Kulan in July 1953. He was drawn to the area by Indians of the Ross River Band,¹⁵ who told him about a rusty creek bank, which he staked after observing a lead-zinc mineral outcrop. This area, known as Vangorda Creek, was located nine to twelve miles south of the present Cyprus Anvil mine.¹⁶ By optioning his claims,¹⁷ Kulan was able to raise funds for a million-dollar geophysical and geochemical exploration programme,¹⁸ which was carried out between 1953 and 1955. The programme revealed the presence of 9.4 million tons of nine percent combined lead-zinc. Although further exploration resulted in the discovery of two small sulphide bodies, interest in the property declined due to depressed base metal prices and the remoteness of the area.¹⁹

Nevertheless, Kulan pursued his prospecting in 1956 and staked twenty-four new claims on the site of the present

Cyprus Anvil mine. Limited funds permitted some electromagnetic and ground surveys to be conducted, but sampling of the Faro ore deposit had to be abandoned when a small gasoline-powered "pack-sack" drill became stuck in the overburden.²⁰ Later, funds ran out and the claims were allowed to lapse.²¹ Although another syndicate staked the Faro deposit in 1963, little work was carried out and the claims lapsed the following year.²² During the early and mid-1960s, markets for lead-zinc began to brighten and exploration was renewed. In 1964, the firm of Kerr Addison located another sulphide orebody containing ten million tons of ten percent combined lead-zinc,²³ at Swim Lakes near Vangorda Creek.²⁴

Encouraged by the find and the improving market situation, Kulan, who had been working for Kerr Addison, approached Dr Aaro E. Aho, a leading Vancouver geological engineer, about funding an exploration programme.²⁵ Impressed with Kulan's reports, Aho and his associates pooled their private resources to form a small B.C. syndicate,²⁶ Dynasty Explorations Limited, on 23 April 1964.²⁷

Early in 1964 Dr Aho and his crew flew into the Swim-Vangorda-Rose Creek area to conduct an exploration programme in an attempt to discover deposits similar to the Vangorda Creek lead-zinc deposit. As a principal result of the airborne geophysical and geochemical surveys, approximately 800 claims were staked by Dynasty by the fall of 1964.²⁸ The claims included magnetic and geochemical anomalies which had been identified as lying in a belt thirty-five miles long by ten miles wide.²⁹ The programme yielded approximately twelve magnetic anomalies — the largest measuring 8,000 feet by 600 feet. Subsequent rotary drilling operations indicated a massive sulphide mineralization of no commercial value. Throughout the winter, further staking was conducted and a drive for additional funds was begun to finance a more intensive exploration programme.³⁰ Approximately \$200,000 had been spent in the 1964 programme.³¹

When Dynasty Explorations Limited was unable to cover drilling costs of \$50,000 a month and helicopter surveys at \$100 an hour, various firms were approached to back the exploration. Since Canadian companies appeared unwilling to gamble on the remote mineral deposit, and exploration capital was exhausted, Dynasty accepted the support of Cyprus Mines Corporation, an American company with headquarters in Los Angeles.³²

On 31 March 1965, Dynasty Explorations Limited and Cyprus Mines Corporation entered into a Joint Venture

Agreement to “discover metallic minerals through exploration and arrange for the development of and production from any orebodies which may be discovered within the Mining Area” described by the agreement.³³ The terms of the joint venture provided that Dynasty transfer all mineral claims located within the “Mining Area”³⁴ to the joint venture. In order to maintain its interest in the joint venture properties, Cyprus Mines was required to provide capital for the exploration and development of the properties. The agreement also tentatively outlined the establishment of the “Anvil Mining Company,” in which Cyprus and Dynasty were to have sixty and forty percent interest respectively. The company was to be developed within six months after completion of the exploration, or at the election of Cyprus after 31 October 1965.³⁵ In this case Cyprus Mines was obligated to provide specified financial contributions, with all properties and assets of the joint venture being transferred to what was provisionally called the Anvil Mining Company.³⁶

The increased funding resulting from the Joint Venture Agreement provided the necessary impetus for the exploration programme. Anomalies discovered during the 1964 field season were further explored by rotary drilling in early 1965. When the 1965 budget had been overspent by June of that year, the drilling camp was moved twenty-eight miles to the Faro target, regarded as one of the last chances for a discovery.³⁷ In the Faro area ground field work showed only traces of surface mineralization,³⁸ although geochemical studies indicated that lead, zinc, and copper were present in soils over a sizeable area. Magnetic, electromagnetic, and later gravity studies also indicated an anomaly over the Faro No. 1 orebody.³⁹ With this information available, rotary drilling was conducted on an electromagnetic and geochemical anomaly. Drill sections indicated the presence of massive sulphides below the overburden. Further drilling indicated a substantial tonnage of high grade lead-zinc.⁴⁰

The joint venture then launched “saturation” exploration over 100 square miles of Yukon Territory in the vicinity of the Faro deposits. Aho’s programme expanded to include the hiring of two full-time helicopters to conduct widespread airborne magnetic-electromagnetic surveys, in addition to geological and geochemical reconnaissance of the entire Anvil range. Drillers were contracted to evaluate sulphide intersections and to provide indications of grade and tonnage of the deposits.⁴¹ A rough access road, and a 3,800-foot gravel airstrip were constructed to accommodate a camp of 117 people, twenty-two tents, and two helicopters. Materials were barged down and ferried across the Pelly River⁴² to

prepare for winter camp. By late October 1965 an additional 1,800 claims had been staked and added to the original 800 claims, bringing the total holdings to about 130,000 acres (see Figure 2). Ample evidence illustrated that the makings of a mine were present.⁴³

Pursuant to the Joint Venture Agreement, all the joint venture assets, including mineral properties, were transferred to the Anvil Mining Corporation Limited, which was organized and incorporated under the Companies Act of British Columbia on 1 December 1965.⁴⁴ In consideration of the assets transferred to Anvil, Cyprus and Dynasty received 900,000 and 600,000 fully paid non-assessable shares respectively, representing sixty percent and forty percent of the capital issued to Anvil.

Following the incorporation of Anvil Mining Corporation, a Master Agreement was signed between Cyprus Mines Corporation, Dynasty Explorations Limited, and Anvil Mining Corporation on 4 December 1965. This agreement permitted Anvil to deduct all prospecting, exploration, and development costs incurred by Cyprus and Dynasty since 23 April 1964, and Cyprus agreed to pay to Anvil the balance of \$1,300,000 according to the joint venture.⁴⁵ Subsequently all properties and assets of the joint venture were transferred to Anvil.⁴⁶

Concerning the availability of funds necessary to place Anvil’s properties into production, preliminary financing was also arranged under the Master Agreement. In the event that Anvil was unable to obtain loans or other debt financing on its own behalf, Cyprus agreed to lend Anvil up to \$10,000,000 or obtain loans on Anvil’s behalf.⁴⁷ Provisions were also set forth regarding the order and repayment of loans before dividends. In the event that Dynasty could not participate equally with Cyprus, means of debt financing were also proposed; Dynasty’s equity would be reduced proportionally. Options concerning the purchasing of Dynasty’s equity securities, and the possible construction of a smelter, were also discussed.⁴⁸

With the exploration camp in full swing, and the establishment of Anvil Mining Corporation in late 1965, the potential of the area became known. Rumours about the Anvil find triggered the biggest staking rush in the Yukon’s history since the Klondike.⁴⁹ More than twenty companies and many individuals flew in by helicopter at an expense of approximately half a million dollars, to stake claims in weather conditions of fifty and sixty degrees below zero. Of the 15,708 claims staked in the Yukon during 1966, nearly

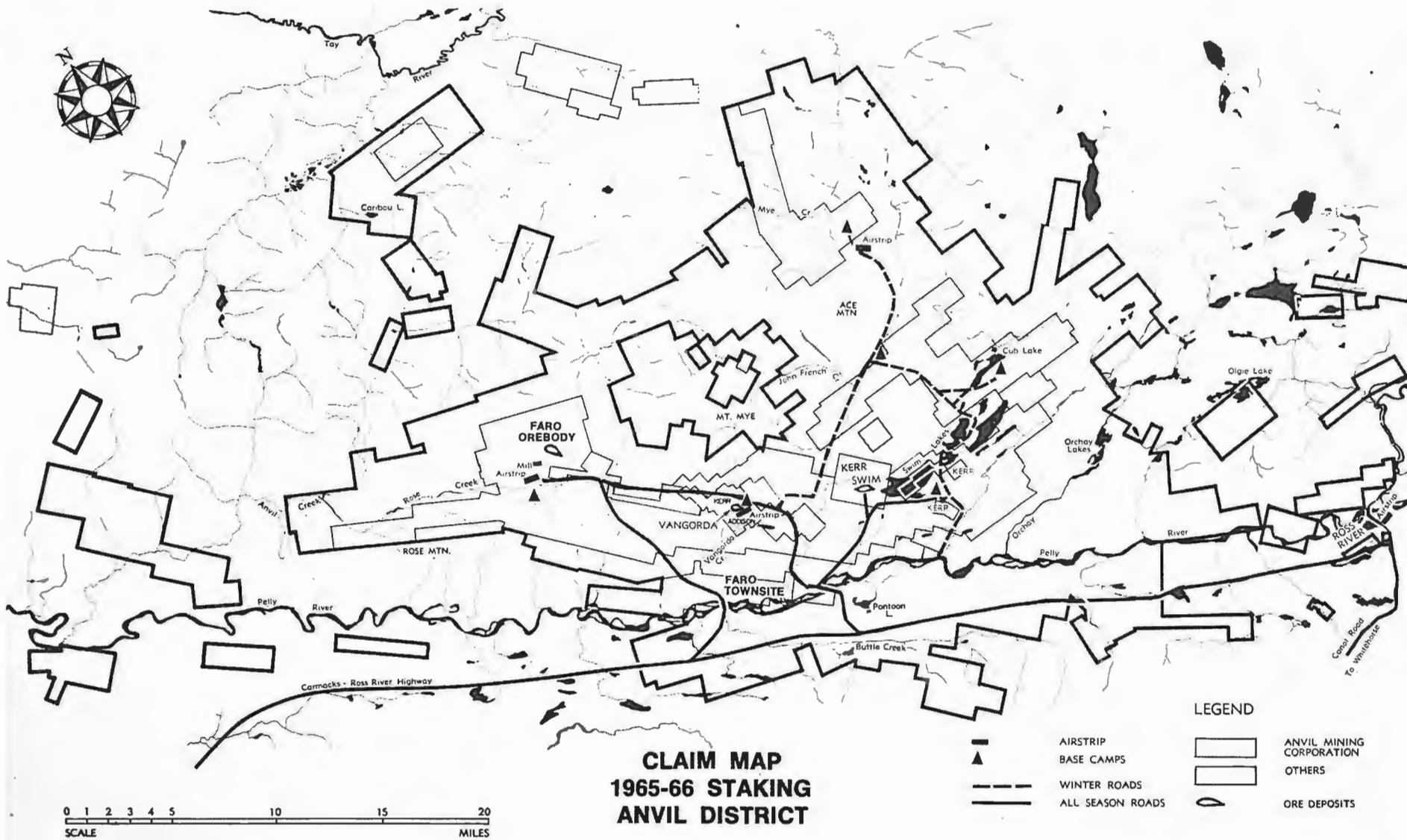


Figure 2

10,000 were in the Faro area.⁵⁰ Approximately eighty percent of these claims lapsed, due to negative results or insufficient monies available for their development. As a result of the staking spree, intense speculation took place on stock exchanges; Dynasty stock, once valued at forty cents, soared to \$20 a share.⁵¹ Over the next few years huge blocks of land were held for drilling exploration and speculative resale,⁵² while Anvil conducted an intensive exploration programme.

In 1966 a \$4 million exploration programme⁵³ was directed towards the delineation of the Faro deposit through diamond drilling. Final delineation indicated that the deposit consisted of two main orebodies. The Faro No. 1 orebody measured approximately 4,700 feet in length by 1,400 feet at maximum width, and was up to 260 feet thick. A faulted extension of the No. 1 orebody (referred to as the No. 3 orebody) lay to the southeast. The Faro No. 2 orebody, further southeast, was 1,600 feet by 1,100 feet wide and up to 40 feet thick.⁵⁴ Exploration and delineation of the three orebodies were completed at an approximate cost of \$7,500,000 (as of 1968). A consulting geologist estimated that the Faro deposits had assured and indicated ore reserves in the order of 63,472,940 tons. An additional 3,169,470 tons of possible ore were also reported.⁵⁵ Once ore reserves were established at this level, planning for the development of the mine was able to proceed.

Mine Feasibility, Financing, and Negotiations

The decision to proceed with development of the Anvil mine was made on the basis of the project's engineering and geological feasibility, the markets for concentrates, financing, and the availability of government assistance.

As soon as the joint exploration venture was reorganized, Anvil's president (and vice-president of Cyprus Mines Corporation), Kenneth Lieber, commissioned feasibility studies for the Anvil Mining Corporation. In November 1965 Parsons Jurden Corporation of New York received the contract to conduct a preliminary feasibility study to determine an economic framework for the mine's development.⁵⁶ The report, completed on 26 April 1966 and supplemented on 1 July 1966, included the following aspects of project development: process engineering studies for concentrating, smelting, and refining, and capital and operations costs for same; market review; methods and costs of transportation of products; power plant studies; a study of logistics for the

proposed construction programme; and a profitability analysis of the project economics for each proposed processing technology.⁵⁷ Following the submission of Parsons' supplementary report, little was accomplished until Anvil decided to re-initiate the study in late September 1966 when additional studies (described below) became available. This information, which permitted a re-examination of the economics of the project,⁵⁸ led to the preparation of Parsons' final feasibility study which was completed and submitted in February 1967.

Complementary studies on other phases of the project were also carried out during 1966. By 1967 Foster Economic Consultants had completed an analysis of the availability of permanent operating personnel, recommending terms and conditions of employment, reviewing and reporting on selected mining towns similar to the proposed Anvil townsite, recommending policies respecting townsite facilities, investigating labour management practices, and recommending wages and salaries necessary to attract personnel.⁵⁹ A report on the problems of transporting dried concentrates by truck between the Anvil plant site and tidewater at Haines, Alaska was also developed and re-evaluated. During the same period the Northern Canada Power Commission (NCPC) began a preliminary power load transmission and cost study of possible hydro-electric sites in the Yukon which could supply power for the Anvil project.⁶⁰ Montreal Engineering Company reviewed the data and prepared preliminary cost estimates of the favourable hydro sites, in addition to reviewing field reconnaissance conducted by the NCPC.⁶¹ Ametalco Inc. of New York investigated the problems of marketing lead and zinc concentrates, including: short-range marketing outlook for lead and zinc concentrates, tonnage distribution, applicable smelter schedules, metal pricing structures, marine transportation, stevedoring and inland freight rates, marine insurance rates, and applicable import duties.⁶² Metallurgical research and studies of engineering feasibility to determine the best methods of extraction and processing of ore were also conducted.⁶³ Bulk samples from the Faro deposit were analyzed over the winter of 1966-67 to provide more structural information about the deposit.⁶⁴ Ore extracted for metallurgical sampling and for pilot plant tests⁶⁵ provided additional information upon which engineering and design criteria were developed.⁶⁶ Consulting geologists were also retained to verify the economic feasibility of the development programme, necessary for completion of the financial arrangements.

As work continued on the feasibility studies, financial

arrangements, and government assistance programmes, negotiations for the marketing of the Anvil concentrates proceeded. Late in 1966 Anvil offered Ametalco an exclusive option to purchase the entire output of lead concentrates in the event of production.⁶⁷ The offer was not accepted. In order to consider other options, Lieber and his staff travelled to Europe, Japan, and the United States in search of potential purchasers for the concentrates. Following lengthy negotiations, \$214 million in contracts (which later expanded to over \$300 million)⁶⁸ were signed with two major Japanese smelting firms on 25 August 1967.⁶⁹ Under identical sales contracts, Anvil agreed to deliver to Japan its entire production of concentrates, estimated to be approximately 128,000 short tons of lead concentrates and 238,000 short tons of zinc concentrates.⁷⁰

The contracts negotiated with Mitsui Mining and Smelting Company Limited and Toho Zinc Company Limited were the largest contracts ever signed by Japanese companies.⁷¹ They were initially for eight years, ending in 1977, but were renewable beyond that date to the end of the life of the mine.⁷² Contract arrangements granted the Japanese buyers first option to purchase additional concentrates in the event that the plant was expanded and production increased. If the contract holders chose not to purchase additional concentrates, these could be sold elsewhere.⁷³ Anvil was also required, as part of its agreement with the Department of Indian Affairs and Northern Development, to arrange its sales contracts in such a manner that concentrates could be made available to a Canadian smelter, built by either Anvil or others, eight years after the commencement of production at Anvil.⁷⁴

In May 1969 Anvil announced that it was expanding its construction programme to increase concentrator capacity by twenty percent, from 5,500 tons per day (tpd) to 6,600 tpd.⁷⁵ Metalgesellschaft A.G. of Frankfurt, West Germany, loaned Anvil additional capital of \$3.5 million to further increase production.⁷⁶ On 26 May 1969, a seven-year contract was signed between Anvil and Metalgesellschaft A.G. for the purchase of additional concentrates which were to be produced.⁷⁷ Another expansion programme to increase concentrator throughput to 10,000 tpd and to compensate for the declining grade of ore was begun in 1973 and completed early in 1974 at a cost of \$4.9 million.⁷⁸ Concentrates produced by Anvil were shipped to smelters located in Canada (Trail), France, England, Italy, Australia, and Yugoslavia,⁷⁹ once the long-term contract commitments with German and Japanese companies had been fulfilled.

While feasibility work was being conducted, contracts

secured for marketing of the concentrates, and negotiations proceeding with the government for assistance, Kenneth Lieber and his associates sought financing for the Anvil project. As of September 1967, according to the Parsons study, the estimated project cost was \$56 million. Under the loan agreement to be described, a contingency allowance of an additional \$5 million was provided for, thus bringing the total requirement for development to \$61 million (U.S.)⁸⁰ or \$68 million (Canadian).⁸¹ Under the supplemented (28 June 1967) Master Agreement of 4 December 1965, Cyprus Mines Corporation would put up \$10 million (U.S.) of the estimated capital requirements for the project. In addition, Cyprus⁸² was to advance \$8 million — of which Dynasty,⁸³ in order to retain its forty percent interest in Anvil, was required to put up \$5.6 million (U.S.).⁸⁴ The bulk of the project was to be financed through a total of \$42 million in bank loans. The \$21-million loan received from the Toronto Dominion Bank was one of the largest ever granted by a Canadian bank for a mining development.⁸⁵ The other half of the \$42 million was provided by the First National City Bank of New York (\$11 million), Bankers Trust Company (\$5 million), and the United California Bank (\$5 million).⁸⁶ Anvil also acquired mortgages on Faro housing from the Central Mortgage and Housing Corporation (CMHC). In 1968 the *Northern Miner* reported that the \$63-million project had an estimated debt retirement period of 5.7 years from the start of production on 1 October 1969.⁸⁷ By December 1974 Anvil's long-term debt, including accrued interest, was \$44,754,266 (Canadian).⁸⁸

As soon as feasibility studies were commissioned, immediately following the formation of Anvil Mining Corporation, discussions were held with A.P. Friesen, Vice-President of White Pass and Yukon Corporation, regarding potential use of the railway for shipping concentrates from Anvil to tidewater.⁸⁹ Officials of the Canadian government were also approached in the spring of 1966 about assistance for the development; however, they stated that they were not prepared to investigate transportation possibilities until "a general review of the preliminary feasibility of the Anvil Project has been made."⁹⁰

The Parsons preliminary feasibility study on the economics of developing the Faro deposit was submitted to Anvil Mining Corporation on 25 April 1966. Implicit in the report were assumptions that the government would provide various services to aid development of the mine. Concerning transportation, particularly rail, specific references were made to the somewhat parallel precedent established during development of the Pine Point mine in the Northwest

Territories.⁹¹ The report stated the advantages of government provision of services:

*Realization of the Government's participation would negate a potential capital investment of between 3.0 and 8.9 million dollars, as well as permitting a rail rate of between \$7 and \$9/ton of product as opposed to the presently utilized truck rate of \$10.50/ton of product. This participation should be of interest to the Canadian Government since it would provide a more economical gateway to either Skagway or Haines and would most certainly aid in the industrial development of the entire Yukon Territory.*⁹²

Having established preliminary power requirements, Anvil executives approached the federal government about the development, construction, and operation of power facilities needed for the mine. The Parsons report stated that conversations with Canadian officials indicated a "willingness and desire on the part of the Canadian Government to provide a power supply for the project." The report went on:

*It is expected that the power cost . . . can not only be met easily, but could be substantially reduced. This improved cost factor could be accomplished by the establishment of a large hydro plant with long term, low interest financing, or the establishment of a mine mouth steam plant large enough to supply other projects as well as Anvil.*⁹³

Excluded from the capital cost estimates for the project were a power plant, transmission line to the plant site, and a primary sub-station at the plant site.⁹⁴

Townsite development costs were also not included in the Parsons evaluation of the capital cost of the project. Again it was assumed that the government would cover the costs of "[t]ownsite and all related requirements," hospital and/or dispensary, and storm sewers. These items were specifically excluded from the estimates, in addition to plant site telephone and radio communication systems.⁹⁵

Subsequent to the submission of the Parsons report, Anvil executives approached the government for assistance. The following anecdote describes the conditions under which negotiations took place:

*Meeting Arthur Laing, then Minister of Indian Affairs and Northern Development, at a Whitehorse cocktail party, Anvil officials told him: "We've got a very fine orebody, but no roads, no power, no people." Laing asked to meet the group again at 11 o'clock that same evening — with happy results.*⁹⁶

On 4 May 1966 Dr Aaro E. Aho, President of Dynasty Explorations Limited, informed the shareholders of the company that the Anvil project was economically feasible according to the metallurgical testing, engineering, and economic studies which had been conducted on the Faro orebody. Robert M. Allan, Jr., President of Cyprus Mines, informed Cyprus shareholders similarly, at that firm's annual meeting in Los Angeles.⁹⁷ Dr Aho's report, also presented at the Cyprus Mines meeting, stated:

*The operation would be contingent upon the Canadian government supplying power at a reasonable cost, a townsite to accommodate mining personnel, and transportation facilities in the form of extension of existing roads to tidewater or a railroad.*⁹⁸

In a letter dated 27 June 1966 Anvil's president, Kenneth Lieber, wrote the Honourable Arthur Laing, to request assistance to bring the property into production. He stated: "We fully recognize your desire, as well as our own, for a complete smelting facility in the Yukon, and are willing to express our intent to continue with further studies of a smelter."⁹⁹ However, the letter went on,

to initially bring the property into production, we need assistance from you and your department in the following areas:

1. *Construction and operation of a power facility capable of delivering 14,000 kw to our plant in the Vangorda Creek area.*
2. *All-weather road transportation from the Anvil property to tidewater, preferably the Haines area of Alaska.*
3. *The development and construction of a townsite to house the people necessary for the operation of the facility.*¹⁰⁰

By September 1966 negotiations with the federal government had proceeded favourably. Laing announced that the Government of Canada would be prepared to provide conditional assistance with regard to transportation improvement, power and communications requirements, and townsite development, upon the resolution of all other outstanding factors and negotiations.¹⁰¹ A conditional arrangement with Anvil Mining Corporation was worked out by the spring of 1967. By the end of February, Anvil had invested \$5.1 million, with an additional \$1.8 million up to 1 June approved for construction preparation.¹⁰²

In an official release issued by Cyprus Mines Corporation in Los Angeles on 20 March 1967, it was announced that Anvil Mining Corporation Limited had

decided to proceed with production of the Vangorda area orebody in the central Yukon. It was emphasized that the decision was tentative, subject to the fulfilment of the following three conditions:

1. *Negotiation of satisfactory sales contracts with concentrates purchasers.*
2. *Adequate financing to be negotiated with financial institutions.*
3. *Conclusion of appropriate arrangements with the Canadian Government. . . .*

*The Decision was made after an intensive engineering and feasibility study. The report indicates that it is commercially attractive to place the property into production. A mine and milling plan has been developed which shows favourable costs and satisfactory metallurgy both as to grade and recovery. Selective lead and zinc concentrates will be produced from an open pit mining operation.*¹⁰³

Arthur Laing announced that Cyprus, the American company which owned sixty percent of Anvil, would direct the development operations and arrange for financing.¹⁰⁴ Laing also stated that a new road or railway might have to be built in order for it to be economical to transport the ore to tidewater; the government had therefore hired a consulting firm for advice on shipping, in order to determine how much, if any, participation would be required by the government.¹⁰⁵ Laing also stated that, although Anvil's initial plans called for only concentrate production, the government would press the company to install a smelter.¹⁰⁶ Provisions for the training and employment of Yukon residents, especially Indians, were also discussed.¹⁰⁷

It was noted that the government by this time had already maintained access roads and installed a ferry at the Pelly River to enable the company to proceed with operations. The all-weather gravel road from Ross River to Carmacks was also under construction, to be completed in 1968; this road would link the mine with Whitehorse during the construction period.¹⁰⁸

The production phase for the Anvil mine began on 8 December 1969. The first cargo of lead-zinc concentrates was transported to Skagway, Alaska and shiploaded for smelters abroad.¹⁰⁹ Celebrations honouring the start-up of the mine took place early in 1970, and on 28 January formal ceremonies were held at the mine. Participants included Jean Chrétien, federal Minister of Indian Affairs and Northern Development; Kenneth Lieber, President of Anvil and senior Vice-President of Cyprus; A.E. Aho, President of Dynasty Explorations and Vice-President of Anvil; R.C.

Sabini, President of Cyprus; James Smith, Commissioner of the Yukon Territory; A.P. Friesen, President of White Pass and Yukon Corporation; and R.E. Thurmond, Vice-President and General Manager of Anvil.¹¹⁰ The following day banquets were held in six major world cities, and communications satellites allowed guests to watch the ceremonies held a day earlier.¹¹¹ At the Vancouver function, a gathering of some 250 guests, Arthur Laing, the former DIAND minister who had by then become Minister of Public Works, spoke of the "visionary" conceptions of the group which had provided financial assistance and of those members of Cyprus Mines Corporation with whom the government had dealt in arranging various aspects of the overall project.¹¹² In Ottawa the new Minister of DIAND, Jean Chrétien, stated:

*There are two things that strike me about this world-wide audience; it is a demonstration that there is a world community of mining and it is a tribute to shared technology. To have brought such a large enterprise into production required the mobilization of those who understand mining as a new technology, those who market and those who use minerals, together with those who finance large scale ventures. This combination of resources, markets, finance and skill has made Anvil possible. Today we must all look ahead and plan, governments as well as mining companies, shipping companies, smelters and fabricators. . . . Within the last five years we have seen the north develop to the point where the first signs of its real potential are beginning to appear. . . . Pine Point has shown itself in the Mackenzie, New Imperial, Clinton Creek, and of course Anvil in the Yukon.*¹¹³

Nearly three years after the mine had been in operation, it was proposed that Dynasty Explorations Limited and Anvil Mining Corporation amalgamate under the British Columbia Companies Act. The agreement-in-principle concerning the amalgamation was subject to approval by the shareholders, regulatory authorities, listing of the new company on the Canadian stock exchanges, and favourable tax rulings.¹¹⁴ Under the provisions of the act, the amalgamating companies, having received special resolution of their respective members, would apply to the Supreme Court of British Columbia for an order approving the amalgamation. With the order, and upon compliance with other administrative requirements, the Registrar of Companies would issue a certificate of amalgamation. From that time on, the amalgamated company would own all assets and be subject to all the debts and liabilities and obligations of each

of the constituent companies.¹¹⁵ In the amalgamation agreement it was stated that Anvil and Dynasty wished to merge for the purposes of:

- i) assuming all the activities presently being undertaken by Anvil and Dynasty and proceeding with a campaign to find by exploration and acquisition economically desirable mineral properties in the Yukon and N. W. T., B. C. and other provinces of Canada with the intent that the amalgamated company will develop into a major Canadian resource company [emphasis added] ;*
- ii) combining the exploration expertise of Dynasty and the operational capabilities and cash flow of Anvil;*
- iii) having the Amalgamated Company with head office in Vancouver, B. C., and;*
- iv) having the shareholders of Dynasty participate directly as shareholders of the Amalgamated Company.*¹¹⁶

Once the amalgamation to form Cyprus Anvil Mining Corporation had been proposed, steps were taken to further reduce the debts and liabilities accrued from the original financing of the Anvil project. By 5 December 1973 Anvil Mining Corporation had completely repaid the \$42 million in loans which had been provided by a consortium of banks to finance and develop the project.¹¹⁷ By the end of 1974 the debt originally incurred to set the mine in production had been repaid in full. All that remained were the 8.5 to 11.5 percent mortgages on the Faro townsite, payable to the year 2000.¹¹⁸

Following the eventual resolution of an unsatisfactory ruling from the United States Internal Revenue Service,¹¹⁹ the amalgamation took place on 21 April 1975. Shares for the Cyprus Anvil Mining Corporation began trading on the Toronto and Vancouver stock exchanges on 28 April 1975.¹²⁰ After the amalgamation the Canadian exploration company, Dynasty, no longer existed. Capitalization of the new company was achieved by an exchange of issued and unissued shares from each of the constituent companies, for those of the amalgamated company.¹²¹

Amalgamation of the two companies had a number of consequences. As explained at the Dynasty shareholders meeting in March 1974, the merger would be of substantial benefit to shareholders since the exploration, financial, and technical resources of each company would be combined. In the past, Dynasty's exploration had been conducted on a modest budget with little development capacity; there had been a great dependence on joint venture participation, which was described as a difficult and time-consuming

method of raising exploration funds. Under the new company, exploration programmes would be expanded — particularly reconnaissance prospecting and geochemical programmes.¹²² On the other hand, the merger meant that the new company was primarily controlled by its major shareholder, Cyprus Mines of Los Angeles. As a result, although important decisions relating to the mine's operations and finances are made by a predominantly Canadian board of directors, a major portion of dividends generated by the company is controlled by foreign interests. For these reasons it is difficult to consider the Cyprus Anvil Mining Corporation a "major Canadian resource company," as was stated in the amalgamation agreement.

Government Assistance:

The Anvil Agreement — 21 August 1967

By late summer 1967 the decision to place the Anvil mine into production was finalized. Sales contracts with Japanese smelters had been signed, financing arranged, and negotiations with the federal government for the provision of infrastructure and transportation were completed with the signing of the "Anvil Agreement" (see Appendix I). In announcing the Anvil Agreement Arthur Laing stated, "The extent to which the government has been able to support the project has played a significant part in Anvil's final decision to go ahead."¹²³

The Anvil Agreement, signed 21 August 1967, clearly sets forth the objectives of the Department of Indian Affairs and Northern Development: "Her Majesty wishes to encourage and support the proposed mining development in order to expand the economic activity of the Yukon Territory and to provide employment opportunity for Canadians, particularly those resident in the . . . Territory."¹²⁴ To further this objective, the agreement involved a commitment from Anvil. The mine agreed to prepare a smelter feasibility study within five years after commencement of production, and to build a smelter within eight years if the study indicated that it would be financially feasible and profitable. Government assistance for the development of such a smelter was also outlined in the agreement.¹²⁵ Laing emphasized during his announcement of the agreement that there was no guarantee that a smelter would be built in the Yukon within the period specified; however, the agreement would guarantee the thorough and careful investigation of the subject. Incentive to build a smelter was provided by including a clause which stipulated that the company must either build or be subject

to a penalty of \$1 per ton of concentrate if a smelter was demonstrated to be financially feasible.¹²⁶ During the Whitehorse press conference Laing stated that, in addition to Anvil, there were three other known deposits in the Vangorda area which, if brought into production, would provide additional ore for a smelter.¹²⁷ “Wherever possible, Yukon resources must be processed to the maximum extent in the Territory,” Laing said. “The agreement we have reached with the Anvil Mining Corporation provides for this in a fair and sensible way.”¹²⁸

To encourage and support the building of the minesite, the minister recommended that the Governor in Council issue a surface lease to Anvil for a mill site, an open pit mine, and a tailings disposal area.¹²⁹ On 15 January 1968 Anvil was granted Quartz Mining Leases Nos. 1462-1473 inclusive. The twelve, twenty-one-year renewable leases included eleven mining claims and one fractional mineral claim located in the Rose Creek area where the three Faro orebodies are situated.¹³⁰ Anvil holds approximately 1,600 mineral claims in the Vangorda Creek-Ross River area. In addition, in 1967 Anvil was granted a thirty-year renewable lease of approximately 3,689 acres, to include the open pit mines, plant, and other facilities.¹³¹

To participate in the financing of the project through the provision of infrastructure, a number of commitments were made by the Minister of Indian Affairs and Northern Development. The commitments included the provision of a power station that would deliver an uninterrupted 9.3 megawatts to the mine, construction of an area development road from Ross River to Carmacks, provision of the lesser of \$40,000 per mile or two-thirds of the cost of a permanent access road, and provision of two-thirds of the cost of a bridge across the Pelly River. Concerning transportation, the agreement stated that “Her Majesty will either construct a route or improve an existing route within Canada from Carmacks to a harbour at either Haines or Skagway . . . America.”¹³²

The Anvil Agreement also outlined government assistance for townsite development. Some of the conditions were based upon the recommendations of an economic policy and administrative study, completed by Foster Economic Consultants in January 1967.¹³³ In the report, the Pine Point development was regarded as having set a precedent for government financing and underwriting of a project. The consultants’ study outlined the background of a number of “instant” communities in the North and evaluated the advantages and disadvantages of “open” as opposed to “closed” towns. The “special procedures”

adopted in the Pine Point case were discussed, in addition to the establishment of a “development area,” which prohibited squatters. The report concluded:

From the point of view of the company, the advantages of an “open” town seem to far outweigh the disadvantages. The major problems to Anvil of a “closed” town would be cost of townsite financing, involvement of mine management in administration of non-mining matters in which it has little experience, and implications on company-employee relationship resulting from the absence of self-government. Regarding townsite financing, a number of other resource townsite developments have received substantial financial support from appropriate federal or provincial governments.

For reasons of expediency, Anvil may wish to make an agreement with the federal government (similar to the one made in connection with Pine Point) whereby servicing of the “open” town is undertaken by the company and then sold to the government. Serviced lots required by the company would subsequently be purchased from the government.¹³⁴

Accordingly, land was provided for the development of a townsite under the Anvil Agreement. Within the development area, which had a radius of fifteen miles, the government (through the Commissioner of the Yukon Territory) planned the subdivision and provided standard municipal services, a school, fire and police stations, and health services.¹³⁵ Lots were to be sold to the mine at a price which reflected the cost of developing these services.¹³⁶

In addition to bringing the mine into production and providing for the construction of all facilities at the minesite, Anvil agreed to assist in development of the area by building a nursing station, single men’s quarters, recreational facilities, and providing the down payment required by the Central Mortgage and Housing Corporation for residential development. It had previously been agreed that Anvil should act as “the prime contractor for the [development] study and for the actual development of the townsite so that the townsite development may be geared directly to the mining development.”¹³⁷ This arrangement was based upon the pattern followed with Cominco at Pine Point. Accordingly, Anvil Mining Corporation, as agent for the territorial government, retained Thompson, Berwick, Pratt and Partners (an architectural/engineering/planning firm in Vancouver) to conduct a townsite location and development study in 1967,¹³⁸ pursuant to an agreement with DIAND. In November 1967 the study was submitted to the Government of the Yukon Territory. Five possible sites were selected and evaluated. A site located immediately to the

east of Vangorda Creek, some 100 to 300 feet above the Pelly River and about twelve miles from the minesite, was recommended as the most suitable location for a townsite to serve the Anvil development.¹³⁹

The initial plans provided for the development of commercial and residential areas for a population of 1,069 persons in the first phase, at an approximate cost of \$1.5 million.¹⁴⁰ With additional funds the plan could be geared to an ultimate population of 3,600, assuming that at least one other mining concern would become active in the area.¹⁴¹ It was the desire of Anvil Mining Corporation that design work begin as soon as possible, in order that road construction, subdivision of lots, and the installation of sewer and water plants could be completed in the summer of 1968. R.E. Thurmond, who later became President of Cyprus Anvil Mining Corporation, made it clear that these steps could not proceed until an agreement had been signed with the Commissioner regarding townsite development.¹⁴²

The cost of townsite servicing and development was originally estimated at \$1.3 million, of which the Yukon territorial government's share was \$500,000. The titles to lots were issued to Cyprus Anvil and the territorial government according to an agreement between the two parties.¹⁴³ Available information indicates that by March 1968 the townsite "was being planned for a population of 1,000 utilizing 161 owner-occupied dwellings, 77 rental apartments, and 62 single-status accommodations."¹⁴⁴ In November of that year capital cost estimates for the townsite development were reported at \$3,749,000, Anvil having an equity of \$1,276,000.¹⁴⁵ Certainly changes and modifications had occurred. Ultimately, lot development and services in the townsite were shared by the territorial government and Cyprus Anvil. The cost of housing was borne solely by Cyprus Anvil.

Construction of the townsite began in the fall of 1968. In June 1969 fifty proposed new houses were under construction, to be completed and ready for occupancy by mid-summer. On Friday the 13th, lightning struck a mountain top two and a half miles northwest of the site; within three hours a wall of flame two miles wide had engulfed the construction site and destroyed all but two homes, the damage amounting to more than \$2 million.¹⁴⁶ The decision was made to reconstruct immediately, as damage to the utilities was not severe.¹⁴⁷ In September, three months later, the first families settled into the Anvil townsite, known as Faro.

The "open" town is now the second largest in the Yukon, and is incorporated with town status under the provisions of the Yukon Territory's Municipal Ordinance. At

the end of 1973 Anvil owned and rented 259 family dwelling units and 174 single quarters; these were rented to its employees and to key community personnel not supplied with alternative housing.¹⁴⁸ The town has a recreation centre which the Recreation Association leases from Cyprus Anvil for the sum of \$1 per year; a nursing station, operated by the Northern Health Services; a twelve-grade school, provided by the territorial government; and a hotel, shopping centre, movie theatre, post office, government liquor store, and two service stations.¹⁴⁹ Government-furnished services include police and fire protection, street maintenance, snow removal, water and sewer systems, and garbage and refuse collection.¹⁵⁰ Further housing facilities have been provided since the initial construction of the Faro townsite. In 1974, thirty-one additional employee housing units were constructed at a cost of \$1,672,000, to bring the total number of housing units for married employees in the town to 291.¹⁵¹ Construction of a three-storey, four-building complex to house 150 single employees took place in 1975,¹⁵² at an estimated cost of \$3.6 million.¹⁵³ Construction of a forty-five unit mobile home park¹⁵⁴ costing \$1.7 million also took place that year, increasing total accommodations at Faro to 485 family and single employees.¹⁵⁵

Some of the government commitments contained in the Anvil Agreement were contrary to the recommendations and conclusions of an internal report prepared for DIAND in September 1966. The report stated:

Assuming that the firm is able to select its optimum [processing and transportation] alternative, it does not appear that the development of this project is contingent on the provision of transportation and townsite facilities by the Government. Taking into account the remote area, the uncertainties inherent in mineral development opportunities and the market conditions for lead and zinc, this opportunity appears attractive even if the investors provide the above mentioned facilities [emphasis added]

From Anvil's viewpoint, a smelting and refining installation does not appear to be economically justified. Rate of return and several other factors mitigate against such a facility. To induce Anvil to pursue the processing to metal alternative, the Government would have to provide some form of large direct subsidy and perhaps market support.

If it was decided that such intervention could be permitted, then justification would depend largely on an evaluation of the benefits that could be realized from furthering the development of lead-zinc-silver mines in the

*Territory. Increased Government revenues realized from the processing to metal alternative could also be considered as a rationale. If sufficient justification for a smelting and refining installation was shown to exist then problems of location, sources of Government funds and method of subsidy would remain to be resolved.*¹⁵⁶

The government was understandably perturbed about the question of smelting in the territories, since the year prior to the signing of the Anvil Agreement Pine Point Mines had requested and received approval to increase its export of lead-zinc concentrates to Japan, and to export zinc concentrates to the Anaconda smelter in Montana.¹⁵⁷ At this time the federal government commissioned Canadian Bechtel Limited to conduct a study of the feasibility of a lead-zinc smelter in the Pine Point area.¹⁵⁸ Although the results of this study were not available when the Anvil Agreement was signed, the government's concerns surfaced in the agreement through the incorporation of provisions requiring the completion of a smelter feasibility report for the Yukon.

Ultimately, a compromise was reached between the federal government and Anvil. The government would assist the project and Anvil would conduct a feasibility study, and possibly construct a smelter, which would provide a large boost to the Yukon economy and to government revenues. Within the five-year period specified by the agreement, a smelter study was completed.¹⁵⁹ Both Anvil and DIAND officials agreed with its conclusions, which stated that development of a smelting complex or separate lead smelter was not economically feasible at the time of submission of the report.¹⁶⁰ Government and company officials agreed that remaining reserves were insufficient to merit the construction of a smelter.¹⁶¹ It is interesting to note, however, that the Anvil smelter situation bears some resemblance to the Pine Point smelter controversy. In each instance the amount of ore reserves was a significant factor influencing the decision of whether or not to construct a smelter. Although the government took steps to have an Anvil smelter feasibility study performed by the company, and intended to have a smelter built to benefit Yukoners, the fact that the company was permitted five years to complete the study *while operating* meant that substantial high grade ore reserves were mined out and exported during that period, which was also a tax holiday. Insufficient ore reserves then contributed to making a smelter unfeasible, and the government's intention to ensure that the Anvil project would contribute to the local economy and regional development was not realized during the 1970s.

Implementation of the Anvil Agreement resulted in the federal government granting considerable financial assistance to Anvil. The first assistance involved the development of access roads to the mining properties. This occurred prior to the Anvil Agreement and was later included as a stipulation in it. DIAND reported that in 1965 an allotment of \$510,000 (expenditure of \$481,000) was made for provision of a road from Ross River to Carmacks.¹⁶² Under federal government subsidy programmes, it was defined as an area development road "to lead into resource-potential areas," and it was hoped that such roads would encourage the development of an overall road network plan in the North.¹⁶³

The following year, road assistance was also given directly to Anvil, in the amount of \$8,500 for the development of a "tote road." Under the initial access road or tote roads programme, the government assisted industry by providing up to fifty percent of the cost of a road which was defined as "low standard winter or year-round," the purpose of which road was "to provide an *established* resource exploration or development project with access to a network road."¹⁶⁴ From piecemeal information it would appear that in total the federal government spent about \$9.3 million on the area development road from Ross River to Carmacks, which was constructed at additional cost to the government.¹⁶⁵ According to the Anvil Agreement, the government also provided two-thirds of the cost of a permanent access road and bridge across the Pelly River to the minesite and to the townsite, at a cost of \$1,520,000.¹⁶⁶ Government monies were also spent on upgrading the highway between Whitehorse and Carmacks to accommodate increased traffic from the mine.¹⁶⁷

Development of a viable network for the transportation of construction materials, and later concentrates, to market was one of the key components determining the feasibility of the Anvil operation. In September 1967, when the final decision was made to go ahead with production plans, a shipping agreement was signed between White Pass and Yukon Corporation and the Anvil Mining Corporation.¹⁶⁸ The contract covered transportation of Anvil's lead and zinc concentrates to tidewater for an initial operating period of eight years, commencing in 1969.¹⁶⁹ Concentrates are transported some 230 miles from the minesite at Faro to Whitehorse by truck using a container system. At the Utah siding near Whitehorse, containers are placed on rail cars¹⁷⁰ for the 110-mile trip to the port of Skagway, where the concentrates are transferred to deep-sea vessels for delivery to foreign smelters. The White Pass and Yukon Corporation is responsible for all on-land transportation. To accommodate

the Anvil contract, White Pass constructed an additional deep-sea wharf with receiving, storage and loading facilities (at an estimated cost of \$4.1 million), purchased new trucks, trailers, and truck maintenance facilities (costing approximately \$2.2 million), and purchased additional railway rolling stock and locomotives, as well as improving the rail-road line (costing approximately \$4.7 million). For the initial estimated expenditure of \$11 million, \$2.5 million in capital was raised through the offering of rights to White Pass shareholders of one new share at \$17 for each five shares held.¹⁷¹ In total, the White Pass and Yukon Corporation spent some \$22 million¹⁷² to provide transportation services for the mine.¹⁷³

As part of the Anvil Agreement, hydro power was supplied for the mine at government expense. For this purpose, the Northern Canada Power Commission upgraded and expanded its generating facilities at Whitehorse.¹⁷⁴ Expansion was accomplished by adding a third generator to the Whitehorse Rapids plant,¹⁷⁵ thus increasing its generating capacity to 21 or 22 megawatts. NCPC was also responsible for the construction of a 230-mile transmission line and a primary substation at the minesite in order to deliver 9,300 kilowatts¹⁷⁶ of dependable power.¹⁷⁷ Development of these facilities by the government cost approximately \$9 million, including \$5 million for the transmission line.¹⁷⁸ Some of this amount was to be recoverable through power rates,¹⁷⁹ which according to the agreement were not to exceed \$985,000 per year for delivering a continuous 9.3 megawatts to the mine and development area. During 1975 the Aishihik hydro-electric project was brought on stream to provide an additional 30 megawatts. Aishihik now provides supplementary power for the Yukon power grid, including the town of Faro.¹⁸⁰ It is transmitted through an 86-mile transmission line, following the Alaska Highway to the existing Whitehorse-Faro grid.¹⁸¹

Under the Anvil Agreement Canadian National Telecommunications, a Crown corporation, constructed telecommunications facilities at Faro. A microwave telephone system now connects Faro to Carmacks, which connects to Whitehorse by land line.¹⁸² Ross River is also connected to existing services through the multi-channel, VHF, long distance communication connection.¹⁸³ An airstrip was also built, but it is uncertain whether any government funds were advanced for this purpose. Some of the capital costs associated with townsite development were absorbed by the government, meagre information indicating that a \$5-million loan was provided by CMHC.

Because of conflicting government memoranda, it is difficult to produce an overall picture of the extent of federal government assistance for the Anvil mine. Information is piecemeal and inconsistent. The most reliable estimates would appear to be those contained in a government memo of 8 September 1972, which read:

Federal Government Assistance

<i>Access road (23 miles) and bridge into mine (1/3 government assistance)</i>	\$1,520,000
<i>Townsite (finance construction costs)</i>	5,000,000
<i>Indirect Assistance – upgrade Whitehorse-Carmacks highway to handle increased traffic; put in water service into Faro</i>	2,810,000
<i>Other Assistance – road from Carmacks to Ross River (130 miles), power line from Whitehorse to Ross River, extra generating at Whitehorse, telecommunications, etc.</i>	18,700,000
	<hr/> 28,030,000 ¹⁸⁴

The memo also indicated the total capitalization of the entire development, and related facilities, by all parties. Initial investments in Cyprus Anvil were as follows:

Cyprus Anvil capitalization, including Metalgesellschaft	
loan; development of properties, mine site	\$63.5 million
White Pass and Yukon Corporation	22 m
Federal Government Assistance	<u>28 m</u>
	113.5 m ¹⁸⁵

In effect, Cyprus Anvil was responsible for a little over three-fifths of the capitalization of the project, while the government subsidized approximately one quarter of the cost through the provision of infrastructure. In addition to this form of subsidy, the government also provided added incentives through its generous exemption of the company from income taxes for the first three years of production.

Socio-economic Impacts on the Community of Ross River

By the time that negotiations were taking place for government support of the Anvil project, the Department of Indian Affairs and Northern Development had already been criticized for the lack of native employment generated by the Pine Point development in the Northwest Territories. As a result, the government endeavoured to encourage regional development and the employment of native peoples through the Anvil project. On 20 March 1967 the objectives of the negotiations were announced in an Indian Affairs and Northern Development press release:

*It is the Government's desire where major mineral deposits are developed that the maximum employment and economic benefit should accrue to the region from the mining and processing of these deposits. The north should not be regarded simply as a source of raw materials which could be extracted with a minimum of benefit to the Territory. It is also expected that the Company will make special provisions for the training and employment of Yukon residents and will be able to draw heavily on the Indian population of the Territory.*¹⁸⁶

The government attempted to ensure that the development objectives were met by establishing employment goals in the Anvil Agreement. The contract provided that, once the mine entered the production stage, Anvil would make a “bona fide” effort to:

*employ competent local residents, particularly Indians and Eskimos, to the extent of at least 5 per cent of the total number of employees within the first year, rising to 10 per cent in the second year and 25 per cent in the fifth year.*¹⁸⁷

It was also agreed that the government would provide training programmes, at no cost to Anvil, to encourage native employment.¹⁸⁸

The Anvil Agreement placed no onerous obligations upon the company to hire native people. The government had no form of legal sanction with which to penalize Anvil if native employment goals were not met, and Anvil merely agreed to make an effort to comply with the employment percentages within the time frame prescribed.¹⁸⁹ The wording of Anvil's obligation — “To employ . . . local residents, particularly Indians and Eskimos . . .” — could be interpreted very broadly. Moreover, the agreement itself was misleading, as it created the impression that the government had the native employment situation well in hand, while

encouraging local benefits from the development. This, in fact, was not the case. According to statistics prepared by DIAND, although native employment at the Anvil mine rose to ten percent in the second year of operation, as specified in the agreement, it quickly declined to approximately one percent thereafter.¹⁹⁰ Of the five Indian residents from Ross River who originally worked at the mine, three left after a short time. The Indians were dissatisfied with the unskilled work, which they described as dusty and depressing. Working at the mine also required that the men be isolated from friends and family, and housed in bunkhouses which they found alien. Eventually all the Indian workers returned to Ross River and reported their experiences and frustrations, thus discouraging others from seeking employment at Anvil.¹⁹¹ As Robert Sharp testified,

*From the standpoint of the Ross River Indian men, the Anvil Agreement was of little relevance. Their intentions to hire locals, particularly Indians, were of no consequence. Neither the permanent jobs nor the style of accommodations appealed to the Indian men. The terms of the Agreement were not reasonable in the light of this consideration.*¹⁹²

The advent of a mining operation in the vicinity of Ross River resulted in a significant influx of outsiders to the region. By the time that the Anvil mine was brought into production in 1969, a shopping centre, bar, and hotel had opened in Faro. Approximately 200 families¹⁹³ lived in apartments and 200 single men lived in the mine's bunkhouses. During the construction period, which began in 1966, Parsons contractors hired men from the South. Approximately 400 employees were accommodated in pre-fabricated bunks at the minesite. Some married men from southern Canada established their families in Ross River and commuted to that community from the mine on weekends. “Throughout the entire construction period approximately 15 Indian men from Ross River were employed in the project.”¹⁹⁴ During the summers of 1965-69 five exploration companies operated from Ross River conducting surveys along the Tintina fault.¹⁹⁵ Indians were frequently hired as assistant prospectors and line cutters, but the more lucrative prospecting jobs were not open to Indian men as they had not passed a prospecting exam administered in Whitehorse. When the Yukon territorial government offered the course at Ross River in 1970, twenty-five men took the course, twenty-two passing with honours. However, very few were successful in finding jobs following completion of the course. Two mining analysis firms also temporarily operated out of Ross River during the

summers, and employed one or two local people in the laboratories.¹⁹⁶

Boom conditions in Ross River began around 1966. The following year saw the construction of a bar, motel, cafe, garage, trailer court, charter airway company, a second store, and Band Saw Mill Co-op. Each business was either owned or managed by white entrepreneurs who had entered the community since 1966.¹⁹⁷ The boom in Ross River also led to an increased demand for government services, and consequently an increase in the government labour force. Facilities for the RCMP, the Department of Territorial Engineering, the Yukon Forest Service, and public health services were constructed in Ross River and staffed between 1966 and 1967. Although eight local people were employed initially and this was increased to thirteen by 1969, opportunities for local employment were generally overlooked by government agencies. A few positions were filled by local whites, while several Indian men were employed as labourers with the Department of Territorial Engineering during the summer. An Indian was also employed as a school janitor. One Indian person was employed as a community health worker. During fire-fighting season five to twenty Indians were temporarily employed. However, by 1970 only two Ross River Indians held permanent employment with government agencies.¹⁹⁸

The boom activities also led to an expansion of the transportation infrastructure in the Anvil-Ross River region. The South Canol road had been reopened in 1962. Intensive mineral exploration spurred the construction of the Robert Campbell Highway in 1968, and the reopening of the North Canol road to the N.W.T. border. As a result, Ross River, located at the junction of the highways, suffered various changes associated with the introduction of a road to a small northern native community. Road access to the settlement was beneficial in that it decreased freight shipment costs, provided better health care for emergencies, permitted greater access to bush camps and hunting areas, and increased employment opportunities. Road access also meant an increase in traffic deaths involving local people. Native people became more dependent on the roads, and car ownership increased. Although access to bush camps was made easier, over-hunting adjacent to roads caused depletion of game.¹⁹⁹ Hunting by vehicle became frequent along tote roads which had been opened for mineral exploration. Whites from Faro also hunted big game along roadways to supplement their food supplies:

A food source which had previously been supplying Ross

River exclusively was now being utilized by Faro as well. This has meant a decline in the number of animals taken by people in Ross River. The Indian people of the settlement felt this loss more than the white residents because game meat represented a substantial part of their total diet. People in Ross River also indicated that increased hunting pressures from vehicles drove the game back some distance from the road. This meant not only less game but less likelihood of sighting game at old haunts.²⁰⁰

The influx of outsiders, and the development of business enterprises by them, caused dramatic social and economic changes for the people of Ross River. Most of the white families came from southern Canada and “brought with them a desire to create their kind of community rather than attempting to function within the established Indian community.” The families “generally found Indian ways incomprehensible” and had no desire to become part of a bi-cultural community.²⁰¹ In effect, the whites attempted to recreate an environment with all the urban amenities to which they were already accustomed.

New patterns of social interaction emerged. Political development in the settlement was led by the whites. The operations of a community club, which was established by the new white residents, were foreign to the Indians. When the native people failed to respond and participate in community affairs, the management of the community was taken over by whites, increasing the Indians’ resentment and bitterness towards the intruders.²⁰² When municipal services were developed in Ross River, the water line was located in the white part of the settlement. Roads in the white sector were gravelled and well maintained, whereas roads in the Indian sector were not. The white entrepreneurs of the settlement believed that the introduction of southern urban amenities and services was for the betterment of the entire community. Many of the changes had a negative impact on native residents, by reduction of physical fitness, loss of native hunting skills, and increased dependence upon purchased foodstuffs and products.²⁰³ Again, to quote Sharp,

Almost every aspect of the Ross River Indian’s life style has felt the impact of changing conditions. Some of these changes the Indians regarded as beneficial, some as detrimental. Whatever the character of the changes accompanying the development, one thing was abundantly clear, the conditions which gave rise to change were not controlled nor appreciably influenced by the Indian people.²⁰⁴

The presence of whites in the Ross River community changed the Indians' patterns of consumption. The Ross River stores responded to the whites' purchasing requests and broadened their range of merchandise. The availability of non-essential luxury items encouraged young Indian people to purchase items with little consideration for their functional value; problems then arose when the Indians had less money to meet their basic needs.²⁰⁵

When a school was constructed in Ross River in 1966, both Indian and white children attended. Between 1966 and 1969 the student population consisted of approximately eighty Indian children and between four and twelve non-Indian children. At the request of the white parents, the B.C. curriculum was adopted in order to ensure that their children would be granted the same kind of education administered in the South:

There was a resistance to school programming designed to overcome problems endemic to schools in predominantly Indian communities. This reaction to local and remedial programs in effect curtailed the school's effectiveness in teaching the Indian children. The point was clearly made to the Indian people that the minority transient white people exercised considerable control over the education of Indian children.²⁰⁶

Moreover, the opening of the school created additional financial burdens for Indian families, as they became responsible for their children's expenses which had previously been met by the residential school system. Pressures were placed on parents to spend more money for the purchase of goods and foods. Parents were restricted to living in town with their school-age children, thus limiting the amount of time that could be spent in the bush hunting, fishing, and trapping. The reduced time spent on subsistence activities further exacerbated the Indians' difficult financial situation.

Little contact was established between adult whites and Indians, outside of the store and the bar. While the mine was being constructed, married men would return to their families in Ross River, and single men would congregate at the bar. In "The Economic Acculturation of an Indian Band," G. Miller described the open conflicts and hostilities that were present:

The natives report that from time to time they are brutally beaten by whites in town. From my direct observations I have concluded that violence between whites and Indians, particularly when the latter have been drinking, is a rather

common occurrence. However, in nearly all cases, it is the whites who are the aggressors, and it is the natives who are the losers.²⁰⁷

The drunkenness, beatings, and sexual exploitation led to a climate of frustration for the Indians, who felt themselves powerless to change any of the conditions present in the community. During the construction phase of the development, Anvil Mining Corporation attempted to minimize some of these adverse effects, while providing limited employment opportunities for the Indian men from Ross River. For instance, the company management requested that their white workers avoid confrontations with the native people. Nevertheless,

... the good intentions of the corporation and the government were of less consequence than the interactions between their employees and the Indians of Ross River, and the attitudes of some of their men toward employing and working with Indians. There were no specific stipulations about employee behaviour or employment of local residents during the construction phase of the mine.²⁰⁸

Development of the Anvil mine resulted in a "dramatic and rapid juxtaposition of western culture on the isolated Indian settlement."²⁰⁹ When native people suffered financial hardship, the government intervened and provided welfare and winter works projects. The availability of government aid contributed to declining use of the bush, and the increasing dependence on processed goods. Summer employment, coupled with a reluctance to leave their families in town, also reduced the number of hunters in the bush, particularly when the Indians considered the employment and government aid which was available in town. As a result, skills related to hunting and fishing were lost. These factors contributed to a major change in the pattern of land utilization in the Ross River area. Long-term hunting and fishing became increasingly infrequent. Those native people who continued to use the bush established camps which were readily accessible to town. The change in lifestyle, from bush to town, is reflected in Table 1, prepared by R.F. McDonnell.

Another important factor which dramatically affected the Indian way of life in Ross River was the provision of housing by DIAND and the Yukon territorial government. Prior to development of the mine and the consequent introduction of government services to the community, various domestic groups provided for their own camp supplies and

Table 1
Profile of Some Recent Changes in the Life Style of the Indians of Ross River
1967 and 1974

	Housing		Transportation Mode		Households spending Sept.-Dec. in Bush		Household Incomes	
1967	Tents	11	Dogteams	21	Bushcamp	13	\$120-250/mo.	12
	Houses	18	Cars	—	Town	16	less	17
			Snowmobiles	1				
1974	Tents	1	Dogteams	5	Bushcamp	3	\$120-600/mo.	30
	*Houses	32	Cars	10	Town	30	less	3

* Note this understates the amount of building. A number of houses had been torn down, and four were low cost rental-purchase homes.

Source: R.F. McDonnell, *Kasini Society: Some Aspects of the Social Organization of an Athapaskan Culture Between 1900-1950*, University of British Columbia Ph.D. dissertation, 1975.

housing. When government assistance was provided, it removed the responsibility for housing — and therefore the choice about lifestyle — from the Indians, thus tying them to the settlement. Despite the fact that the nuclear family was not the form of family organization in Ross River, government housing was allocated on this basis.²¹⁰ Hence, the housing programme disrupted the functioning unit of the family and imposed patterns of family existence typical of white society. The common sharing of food and other resources, which had existed in the bush, was discontinued once family groups became dependent upon government aid.

Marriages were also adversely affected by the changes in family structure as a result of the housing situation. A husband-wife relationship was no longer a part of a larger domestic group which shared many responsibilities. Drinking and instances of infidelity, the latter often associated with miners and construction workers, led to breakdowns in marital relationships.²¹¹

The introduction of whites into the Ross River settlement, which occurred as a direct result of the Anvil mineral exploration and construction activities, has had a profound impact upon the community. Residents of the settlement experienced “desperation and [a] sense of futility.”²¹² Repercussions from the boom period have been pervasive, affecting all aspects of the Indians’ existence in Ross River.

There were no real employment benefits for the native people of Ross River, despite the employment goals articulated in the Anvil Agreement. Attempts to employ native

people at the Anvil mine failed dismally. When these results became evident, DIAND commissioned a special study to examine the causes of unemployment of native people.²¹³ The report concluded that there was no easy solution to such a complex issue, and suggested that:

Much of the difficulty seemed to lie in insufficient sensitivity to potential and actual native employees’ attitudes and aspirations concerning employment, in over-concentration on fitting the worker to the job, and in a pervasive tendency to “blame the victim” of unemployment.²¹⁴

DIAND officials seem to be aware of some of the problems associated with native employment. Nevertheless, it would appear that southern white government administrators have never questioned the suitability of mining projects in the North, in terms of their ability to provide either regional benefits or native employment.

Environmental Impacts of the Development

Exploration and development of the Cyprus Anvil mine caused a number of serious environmental impacts in the Anvil-Ross River region. These included interference with native trap lines, increased competition for fish and game in the area, and substantial effluent discharges from the Anvil tailings pond into the Rose Creek and Pelly River systems, which ultimately resulted in the successful prosecution of the mine.

During the 1965-66 staking rush described in an earlier

section of this study, the region was thoroughly staked, lines were cut to determine claims, and more extensive exploration took place. The proliferation of seismic lines near the minesite and on adjoining properties testifies to the intensive exploration efforts which took place during the mid-1960s. Indeed, further exploration efforts which led to additional funds and the discovery of the “Dy” deposits²¹⁵ twelve miles southeast of Faro have also left a substantial visual impact upon the land. When reviewing the effects of the staking rush, Jim Lotz commented:

*The ruin that the goldseekers visited upon the Klondike streams has again been repeated in the Ross River area. Here the federal government (which administers the resources) gave out permits for staking in areas over which Indians ran their trap lines . . . the obvious incompatibility between traditional and modern uses of the same piece of land is beginning to worry the Department of Indian Affairs and Northern Development.*²¹⁶

When the mine and mill site were constructed during the late 1960s (see Figure 3), no baseline or environmental impact studies were conducted to provide background information about the soils, hydrology, vegetation, or wildlife characteristics of the area prior to development. There was no assessment of the potential impacts on the environment from the open pit operation, pit de-watering, and tailings disposal practices. As was the case at the time of development of the Pine Point mine in the Northwest Territories, there were no legal requirements which stipulated that environmental assessment work had to be conducted prior to construction.

The most serious environmental problem associated with development and operation of the Anvil mine concerned the mine’s tailings disposal system. From the time that the mine began operation in 1969 until a very serious offence took place in March 1975, approximately half a dozen leakages occurred in the tailings impoundment system.²¹⁷ Correspondence between government officials, from the Environmental Protection Service and the territorial Water Board, and the Anvil Mining Corporation indicates that government officials were not satisfied with Anvil’s operations. Frequently the company was requested to modify its tailings disposal system. Concern was also expressed about the potential production of acid mine water and serious seepage problems.

In late 1968 when the mine and mill site was being prepared, the mine waste disposal system was under

construction. The Water Resources Section of DIAND indicated that the facilities must adhere to specific standards. A government official informed Anvil that:

It is the intention of this Department to apply the Ontario standards [for proposed tailings impoundment structures] to all new mining operations in the Yukon and Northwest Territories by means of a suitable clause inserted in the mining company’s lease to lands (see clause 4a. in the Anvil Lease, dated Feb. 20, 1968).

*In applying these standards, it is our intention to ensure that tailings impoundment dams are designed to minimize the chances of structural failure, are of suitable dimensions to adequately contain the quantities of wastes anticipated from the mining operation and are located in an area free of surface drainage channels where flooding could have serious consequence on waste containment.*²¹⁸

With minor alterations, Anvil’s proposed tailings disposal system was approved by DIAND on 4 January 1969.²¹⁹

However, throughout the early 1970s the tailings dam structure failed on a number of occasions.²²⁰ Seepages of effluent discharges, resulting in “high pH, lead, zinc and arsenic levels in the tailings pond effluent and Rose Creek downstream from the effluent,” were also noted by government officials. The mine was requested to implement corrective measures.²²¹ In response, the Anvil Mining Corporation indicated that it intended to extend its tailings discharge line by approximately 2,000 feet, and that detailed engineering plans were being developed for the following summer’s dike building operation.²²² Further correspondence about tailings dam construction indicated that both Anvil and federal government officials believed “that the present situation is not satisfactory,” and that the mine was committed to improving both design and construction methods. It was also noted that the mine had retained Golder, Brawner Associates of Vancouver to evaluate the situation and propose a plan for future tailings area development.²²³

On 17 May 1973 the Yukon Territory Water Board held a public hearing under Section 15 (2) of the Northern Inland Waters Act, “in connection with a water licence application from Anvil Mining Corporation.”²²⁴ Officials from the Water Board, DIAND, and the Department of Environment (Environmental Protection Service) attended. A special invitation was also extended to a technical advisor in mining and metallurgy from the Environmental Protection Service, Pacific region.²²⁵

Throughout the May 1973 hearings, concerns were

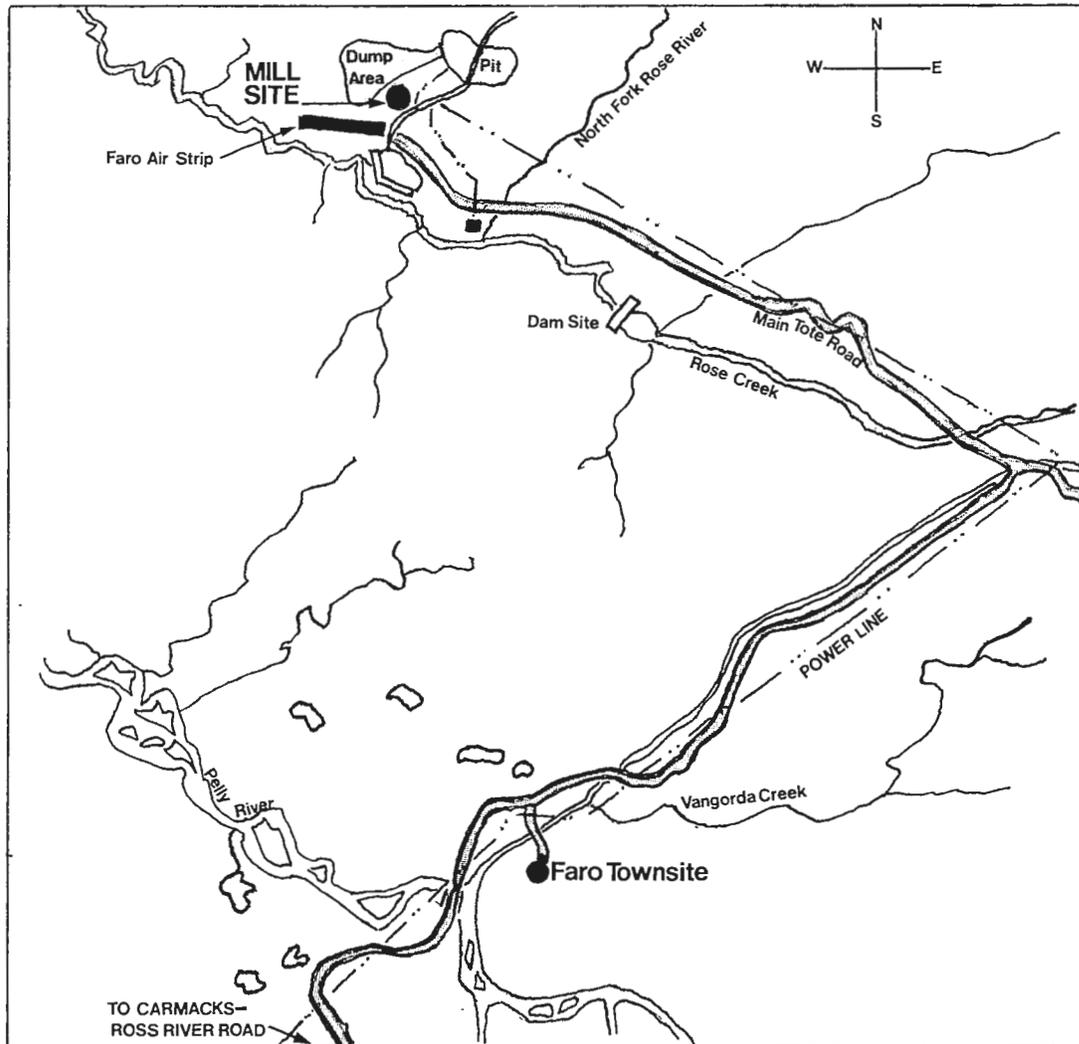


Figure 3 The Cyprus Anvil Mine

expressed by the Water Board and the Environmental Protection Service about Anvil's water use and the water licence application. Since Anvil planned to expand production from 6,600 to 10,000 tons per day, requiring a significant increase in water to be used in the milling process,²²⁶ it was recommended that the company be requested to conduct a detailed water supply study.²²⁷ Concern was also expressed about unacceptably high copper concentrations in the tailings decant which was being discharged into Rose Creek. A potential leaching problem was also identified, since the Anvil ore contained twenty-five percent pyrite, and it was suggested that "the company could test the ore to determine its susceptibility to develop an acid leach problem."²²⁸

Concerns about seepages and difficulties with Anvil's tailings disposal practices were reiterated throughout 1973 and 1974.²²⁹ Government officials requested that remedial action be taken. The general manager of Anvil acknowledged the seriousness of the problem:

I am not very satisfied with the immediate condition at the tailings impoundment area. From time to time we are experiencing a dirty overflow, notwithstanding the presence of a relatively deep pool but one small in area. Rest assured that our efforts are directed entirely toward increasing the retention time, expanding the pool area, and forcing the pool away from the decant itself.

We have experienced a number of serious leakages beneath the pump house dam this winter, largely through ice channels under the dam itself, and we have had to take temporary repair measures in at least two instances. At this time we are unable to entirely seal the flow from beneath the dam. . . . A major rebuilding of this structure will certainly be required this summer.²³⁰

Throughout this period, deficiencies in information were identified²³¹ and recommendations were made, by both the government and the mine, that a number of studies be conducted. The government consulted with B.C. Research of Vancouver regarding the acid producing potential of the mine,²³² and Montreal Engineering Company regarding tailings pond construction practices, acid seepage, and runoff.²³³ Contracts were later issued to both companies to perform studies related to environmental problems at the Anvil mine.

As early as July 1973 Montreal Engineering criticized the methods used by Anvil to construct the tailings dam. They suggested that it was "questionable whether the stability of a dam constructed by this method can be assured

bearing in mind the possibility of earth tremors, future increases in height and other factors." The Montreal Engineering report also stated that:

In addition to any structural problems that might be identified in the course of this investigation it is apparent that the system warrants a thorough review from the waste management standpoint. As presently operated, the tailings pond provides insufficient retention which results in an effluent discharge of poor quality [including high concentrations of suspended solids and mill reagent residuals] The tailings contained in the system, and from which the dam itself is constructed, are reported to contain at least 25% pyrites (66% according to the amended application data) which must result in the generation of acid seepage and runoff from the dam. This is a potentially serious condition due to the proximity of the dam to Rose Creek and the difficulty that can be anticipated in controlling the volume and quality of seepage. This will be particularly problematical when the mine is closed.²³⁴

Throughout 1973-74 the government chose to deal in a consultative manner with the company. Correspondence indicates that the relationship was cordial and that each party approached the discussions in good faith. What is remarkable, however, is the degree of patience exhibited by Water Board and Environmental Protection Service officials when dealing with the company over matters which they considered to be quite serious. The various factors associated with water use and potential pollution from the mine were so complex that advice was sought from experts in Ottawa and the Pacific region. A water licence was finally issued on 4 February 1975, effective 1 December 1974 to 30 November 1979.²³⁵

The terms required that the water licence would not come into effect until Cyprus Anvil Mining Corporation submitted to the Water Board a security deposit of \$100,000.²³⁶ The intent behind this stipulation is clear: "In the event the licensee fails to comply with any provision or condition of this licence the Board may, subject to the Act, cancel the licence."²³⁷ The licence stated that construction of the tailings containment facility was to be carried out according to the plans and specifications prepared by Golder, Brawner Associates.²³⁸ During operation, water use was not to exceed 5,000 gallons per minute, and waste discharge characteristics and the concentration of elements in waste discharge were not to exceed specified limits.²³⁹ It was clearly stated in the licence that waste discharge included "tailings pond effluent, tailings pond seepage, all mine water

drainage and contaminated surface drainage prior to entering the receiving waters . . . ”²⁴⁰ Waste discharge could not be toxic to fish, contain floating solids, or contain visible floating oils or grease.²⁴¹ Clean-up procedures for abandonment of the operation after expiration of the lease were also included. The licensee was required to remove and dispose of stock-piles, reagents, fuels, or other chemicals which could affect water quality, and to bury, remove, and dispose of garbage heaps, construction and other surplus materials which could affect water quality. In addition, the company was required to stabilize any waste rock piles where there was potential for the impairment of waters.²⁴² Specific instructions were also issued for the stabilization and construction of the tailings pond.²⁴³ General provisions were established regarding the company’s duty to file reports, samples, and analyses.²⁴⁴

On 19 March 1975 two of the tailings pond dikes at the Cyprus Anvil mine broke, resulting in the escape of 54,000,000 gallons²⁴⁵ of tailings water into Rose Creek over a three-day period.²⁴⁶ While the mine manager indicated that “the break was a small one”²⁴⁷ and that tailings had not “gone more than a mile down Rose Creek,” the Environmental Protection Service designated the matter an “environmental emergency.” An EPS official flew along Rose Creek the day after the leak occurred and reported that the Rose Creek flood plain was completely covered with tailings for three or four miles, and that tailings were visible for approximately ten miles downstream. Water samples were taken for analysis to determine the toxicity of the water to fish and to determine how much damage had been done to spawning grounds for grayling along Rose Creek.²⁴⁸ Meanwhile, crews at the minesite immediately set to work to repair the dikes. Government officials were satisfied with the temporary measures taken to stop the flow and the adequacy of plans for repairing the dikes.²⁴⁹

On 11 April 1975, however, three weeks after the spill, difficulties were encountered with the clean up. Environmental Protection Service and Fisheries Service officials agreed that:

*no effective action could be taken to clean up the tailings because of the small concentration of tailings in comparison to the total volume of frozen slurry. In addition, accessibility and the requirement to rip up the vegetation within the flood plain were also considered as problems for clean-up.*²⁵⁰

Later that month other clean-up procedures were attempted. Both government and mine officials agreed that, while the area below the tailings pond could be cleaned up

immediately, “it was impossible to clean up the lower area because of the frost conditions.” As a result, efforts were discontinued until thaw, when a loader could skim the area picking up vegetation and tailings together. DIAND was to continue to monitor and to advise about the clean-up operations.²⁵¹

The results of water sampling which took place at the time of the tailings spill provided the basis for prosecution of the mine. Four charges were laid against Cyprus Anvil Mining Corporation jointly by DIAND and the Environmental Protection Service. The Crown laid three charges, one for each day that tailings leakage took place, under the Northern Inland Waters Act. This act prohibits the deposition of waste or “any substance that, if added to any waters, would degrade or alter or form part of a process of degradation or alteration of the quality of those waters to an extent that is detrimental to their use by man or by any animal, fish or plant that is useful to man . . . ”²⁵² The charges against Cyprus Anvil marked the first time that the Northern Inland Waters Act had been used since its passage in 1970.²⁵³ Another charge, applying to only the first day of the spillage, was laid against the company under the Fisheries Act, which prohibits the deposition of waste which is harmful to fish.²⁵⁴ The maximum fine for not abiding by the terms of a Water Board licence is \$5,000, as is an offence committed under the Fisheries Act; thus, if Cyprus Anvil had been convicted on all counts it would have faced a maximum fine of \$20,000.²⁵⁵

The case was heard on 5 November 1975. Eventually the company pleaded guilty under the Fisheries Act and was fined the maximum amount of \$5,000 for the violation; the other charges were dropped.²⁵⁶ In his reasons for judgment, Magistrate O’Connor stated that “the primary responsibility for the proper design, construction, inspection and maintenance of the retaining wall rested with the defendant company.” He admitted that “the maximum fine, \$5,000.00, when compared to the size of the company’s operation, seems hardly adequate to induce the company to do something that it is not otherwise motivated to do.”²⁵⁷ On appeal the sentence was reduced to \$4,500 by Mr Justice J.A. Maddison, on the grounds that the maximum penalty must be reserved for “worst case” situations.²⁵⁸

Such “worst case” situations arose shortly thereafter. Between 31 January 1976 and 1 March 1976,²⁵⁹ effluent discharged into Rose Creek exceeded the conditions specified in the Cyprus Anvil water licence and contravened the provisions of the Northern Inland Waters Act. The details of

the case, in which Cyprus Anvil Mining Corporation was successfully prosecuted, follow.

Between 1 February and 11 February 1976,²⁶⁰ difficulties were encountered with the mine's heating system. The company feared a rupture of storage tanks holding sodium cyanide, and decided to discharge the tanks directly into the tailings pond by disconnecting the sodium cyanide flow return pipe when the mill was not operating.²⁶¹ The pipe was not re-directed, and as a result there were substantial discharges of sodium cyanide into the tailings pond on 13 and 14 February after the mill began operating again. After being informed of the leakage by an anonymous caller on 16 February, officials from DIAND and the Environmental Protection Service took samples from the tailings decant and from seepages until 29 February.²⁶² The first water sample results, available on 19 February, indicated that:

*the levels of cyanide which occurred in the decant and in the seepage, and which were found up to the confluence of the Anvil Creek and Pelly River, can be classified as highly toxic, and would have killed any fish living in the waters up to the confluence of the Pelly River and Anvil Creek.*²⁶³

DIAND officials contacted the mine immediately to inform them of the results, and to recommend that the decant be closed off and that steps be taken to prevent further discharge of decant effluent into Rose Creek.²⁶⁴ The mine was also informed that it might be necessary to cease milling operations in order to "maintain due regard for the safety of the tailings dam."²⁶⁵ In addition, mine officials were reminded of the terms of the Northern Inland Waters Act.

The mine sealed off the decant and the tailings pond but continued milling operations from 19 February to 21 February.²⁶⁶ As a result, the level of the tailings pond increased to eight inches above safety level. When the mine was informed by its engineering consultant that, unless the level was reduced, the dike of the tailings pond might rupture, resulting in the discharge of the entire content of sodium cyanide into Rose Creek, the company opened the decant on 22 February and continued operating the mill.²⁶⁷ On 24 February the Controller of Water Rights, DIAND, served the general manager of Cyprus Anvil Mining Corporation with a notice stating that the mine was committing an offence and that, if it did not cease operations immediately, application would be made to obtain an injunction. Thereupon the company closed the mill.²⁶⁸

When reviewing the facts in the case up until the time of the mill's closing, Deputy Magistrate E. Horembala found:

*(1) negligence on the part of the company in that it did not re-direct the overflow pipe, or (2), a lack of any real concerted effort on the part of the company to co-operate with the government authorities during the entire period of time. I find that the company only reacted to virtually orders from the government authorities; (3) in its action of continuing the operation of the mill, firstly, after the letter of February the 19th which raises the issue of whether or not the mill should be continued in operation, and secondly, after being informed by their consultants of the safety to the dam, the company continued the operation of the mill. I find that conduct borders on wilful blindness.*²⁶⁹

Accordingly, he imposed maximum fines of \$5,000 for the "worst case" category for 31 January to 17 February, and for each of 17, 18, 19, 22, 23, and 24 February. Lesser fines of \$2,000 were imposed for each of 20, 21, 25, 26, 27, 28, and 29 February.²⁷⁰ In total the mine was fined \$49,000.

In his discussion of the case, the deputy magistrate remarked on "the apparent acquiescence by the government in a decades-old mining process which allows the use of a highly toxic substance such as sodium cyanide to be discharged into Canadian water systems"²⁷¹ without expeditious methods of detection being available to determine excessive concentration levels. He also noted that one would expect that, in such a case,

*the government would insist that prior to the granting of a licence to discharge the substance into the water system, that the company be required to have on-site emergency contingency plans such as neutralizing agents, and also require the user of such toxic substances to implement strict procedures both in inventory and consumption control of these toxic substances.*²⁷²

Certainly, by these standards government pre-planning and regulations appeared to be inadequate. Company and government contingency plans, in the event of such an emergency, also were shown to be virtually non-existent. Finally, in the conclusion of his Reasons for Judgment, Deputy Magistrate Horembala stated:

Our society is going through a difficult period of balancing two interests; preserving the environment while at the same time attempting to stimulate the economy with the providing of new jobs and economic opportunity, and business investment. That difficult decision and the rights of all interested parties is at the core of the debate in the Berger Commission Inquiry. One lesson that we as a society have discovered in the past decade and a half is that our ecology is

*in a precarious position. Mistakes now cause irreplaceable damage to our environment. That is the reason that deterrence is such an important part of sentencing when violations of our environmental statutes take place.*²⁷³

A review of the evidence in the case of *Regina v. Cyprus Anvil Mining Corporation* suggests that the mine was aware of substantial leakage and failed to notify government officials. There is also evidence that it continued to operate its milling facility despite advice from its consultants and the government, until authorities threatened litigation. The environmental impacts associated with development of the Anvil mine, the incidents of major pollution, and ultimately the successful prosecution of the mine illustrate some of the serious environmental costs that can be associated with northern mining.²⁷⁴ The economic imperative of keeping the mill operational at virtually any price serves to indicate the mine's first priority. What becomes apparent is the importance of constant government monitoring and surveillance of an operation, and the necessity of a water licence, which in this case provided the basis for the prosecution. The "self-monitoring" approach, now in effect under the terms of a Water Board licence, and reliance upon the "corporate conscience" are not sufficient. The Cyprus Anvil experience provides evidence that the present system of protecting northern Canadian waters, with respect to mining operations, is highly inadequate.

Conclusions

The Cyprus Anvil mine presents an example of the kinds of benefits and costs which occur from large-scale, non-renewable resource development in northern Canada. On the benefit side, the mine provides jobs for northern residents, including native people, if they so desire, and also for people from the South who have sought work in the North. The mine also contributes to an improvement in Canada's balance of payments position, and is one of the largest single industries in the Yukon, providing a stable base for the territory's economy. On the cost side, several examples of social and environmental disruptions were outlined in earlier sections of this case study.

This study reviews the objectives for bringing the mine into production and the framework whereby this was accomplished. A review of the decision-making process leading to the development of Cyprus Anvil illustrates that government policies and mechanisms of review were at that time,

and continue to be, inadequate. There was a failure to evaluate fully all aspects of the development, prior to the granting of assistance to the mine.

By the late 1960s, the federal government had become aware of some of the shortcomings of the development practices associated with the Pine Point mine in the Northwest Territories. As a result, both federal and territorial governments attempted to avoid similar problems by establishing a comprehensive agreement with Cyprus Anvil. A concerted effort was made to eliminate some of the *ad hoc* practices which had previously surrounded the granting of assistance to mines, and to obtain contractual assurances that the obligations of both parties would be carried out. The agreement reached between the government and Cyprus Anvil represented an advancement in attitudes, when compared to the Pine Point mine. There was also a genuine responsiveness to problems encountered in the past, and an attempt to apply lessons learned from previous experiences. Yet, despite a comprehensive effort to ensure that substantial benefits accrued from the mining development, a number of unfortunate and unsatisfactory results recurred.

Although the establishment of goals for employment and the intention to encourage native employment was a positive step in government policy, no attention was given to the broader question of whether the goals of employment for native people in the mining sector were appropriate. It may be argued that the company should have been compelled to meet established quotas of native employees. But would such an approach ensure that the benefits from a development accrue to local native people? Should one question the suitability of local inhabitants to the work, or rather examine how appropriate the work is to native people? In other words, what are the real social benefits to be achieved from a development? Who is to be affected? And should employment for native people in the mining industry be considered a benefit and accordingly used as a rationale to advocate development?

Another complex question which should be examined centres around who should bear the costs of transportation and other infrastructure associated with economic development in a region? The issue of infrastructure assistance is complicated when services are provided to promote the growth of a region, as well as to benefit a specific development. For instance, the Cyprus Anvil townsite, Faro, was established not only to house mining employees but also to provide a regional service and administrative centre. It was intended that the townsite would also serve populations associated with future mining developments in the immediate

area. Thus, government expenditures were not solely for the benefit of the mine, as may be argued was the case with the Pine Point development.

The circumstances surrounding the Cyprus Anvil mine development indicate a need to establish clear guidelines for the development and financing practices associated with mining, with particular respect to the provision of infrastructure. There is also a need for analyses of the costs and benefits associated with development. At present, feasibility information is submitted to the government and an analysis of the project is performed on the basis of its private viability and some of the potential social ramifications. Policy alternatives and recommendations are then submitted to the decision-makers who are responsible for negotiating with industry. Major problems are associated with this practice. The fact that guidelines are not available for the decision-makers and their subordinates who are responsible for reviewing and recommending policy may slow down the process; but it is more likely that, because of the pressures of time, important aspects associated with the issue and alternative scenarios will not be adequately considered.

At the time that Cyprus Anvil was brought into production, procedures used to determine the feasibility of a project did not question the underlying policy assumptions associated with development. Nor were the broader northern development objectives questioned at this time. During the Mackenzie Valley Pipeline Inquiry, Mr Justice Berger recognized this trend in northern decision-making, and attempted to question some of these assumptions and to influence policies through the examination of various means of meeting goals and objectives. In essence, he drew attention to the complexity and inter-relatedness of all factors surrounding northern development.

A comprehensive departure from present public policy practices associated with northern mining developments needs to be considered. The task of planning and co-ordinating programmes to achieve new objectives is a challenging one. It involves liaison between differing jurisdictions and interests, and an extensive and thorough understanding of many complex and sometimes contradictory inter-relationships associated with the development process. A systematic implementation of these long-term objectives would be evidence that lessons have been learned from mining developments such as Cyprus Anvil.

Footnotes and References

1. DIAND, *Mines and Minerals Activities, 1975*, p. 18. For the purposes of this case study, the mine is referred to most frequently by its current name, "Cyprus Anvil." Prior to the formation of the Cyprus Anvil Mining Corporation in April 1975, the mine was known simply as "Anvil."
2. Paul Koring, editor, *Canada North Almanac 1977*, (Yellowknife: Research Institute of Northern Canada), p. D-33.
3. DIAND, p. 18. See above, n. 1.
4. Koring, p. D-33.
5. DIAND, p. 6. See above, n. 1.
6. Dr A.E. Aho, "Mining in Development of the Yukon," January 1970, p. 4.
7. DIAND, p. 6. See above, n. 1.
8. Aho, p. 5.
9. D.W. Carr and F.W. Anderson, *The Yukon Economy: Its Potential for Growth and Continuity*, Volume I, Final Report, (A report prepared by D. Wm. Carr and Associates Ltd. for the Department of Indian Affairs and Northern Development on the Government of the Yukon Territory, Ottawa, November 1968), p. 122.
10. K.J. Rea, *The Political Economy of Northern Development*, (Ottawa: Science Council of Canada Background Study No. 36, 1976), p. 68.
11. *Ibid.*, p. 95.
12. *Ibid.*, p. 135.
13. Carr and Anderson, p. 122.
14. See Janet E. Macpherson, "The Pine Point Mine," in this volume, pp. 65 - 110.
15. "Cyprus Anvil: Canada's top lead producer," *Canadian Mining Journal*, August 1975, p. 29.
16. "New Strike in the Yukon," *Toronto Daily Star Magazine*, March 1970, p. 27.
17. According to Geological Survey Unit Reports on Cyprus Anvil Area, 1966, p. 36, and n. 1. The claims were optioned to Prospectors Airways Limited, a leading Toronto exploration company. In 1955 Prospectors Airways Limited acquired the controlling interest in Vangorda Mines Limited which was formed to further exploration. Kerr Addison Mines later acquired Prospectors Airways Limited.
18. Fred H. Stephens, "Yukon's Biggest Mining Venture," *Western Miner*, October 1969, p. 86.
19. Cyprus Anvil Mining Corporation, "Faro Orebody," (no date), p. 2.
20. Paul Friggens, "Anvil! The Yukon's Fabulous Mine," *Reader's Digest*, March 1973, p. 27.
21. John S. Brock, Vice-President Exploration, "Geophysical Exploration Leading to Discovery of the Faro Deposit, Yukon Territory," Dynasty Explorations Limited, Vancouver, B.C., undated, p. 2.

22. Geological Survey Unit Reports on Cyprus Anvil Area, 1973, p. 51.
23. "Faro Orebody," p. 2. See above, n. 19.
24. "Yukon's Biggest Mining Venture," p. 86. See above, n. 18.
25. "Anvil! The Yukon's Fabulous Mine," p. 29. See above, n. 20.
26. *Ibid.*, p. 29.
27. "New Strike in the Yukon," p. 27. See above, n. 16.
28. Geological Survey Unit Reports on Cyprus Anvil Area, 1966, p. 36.
29. Anvil Mining Corporation, *Birth of a Giant – The Anvil Mine*, January 1970, p. 6.
30. "The Anvil Mining Project," *Mining in Canada*, April 1969.
31. *Birth of a Giant*, p. 6. See above, n. 29.
32. Cyprus Mines had a background of fifty years of experience in exploration, extraction, processing, and marketing of mineral resources, and held interests in Peru, Hawaii, Australia, Europe, and the United States.
33. "Joint Venture Agreement . . . between Cyprus Mines Corporation . . . and Dynasty Explorations Limited," 31 March 1965, p. 2. (Hereinafter cited as Joint Venture Agreement).
34. An area later amended to be bounded by Ross River on the southeast, by Riddell River and Dragon Lake drainage on the northeast, by Macmillan and South Macmillan rivers on the north, by 135 degrees west longitude on the west, and by Pelly River on the southwest.
35. Joint Venture Agreement, p. 6. See above, n. 33.
36. *Ibid.*, p. 6.
37. *Birth of a Giant*, p. 6. See above, n. 29.
38. *Ibid.*, p. 7.
39. *Ibid.*, p. 7.
40. "Anvil! The Yukon's Fabulous Mine," p. 30. See above, n. 20.
41. *Birth of a Giant*, p. 6. See above, n. 29.
42. "Anvil! The Yukon's Fabulous Mine," p. 30. See above, n. 20.
43. Anvil Mining Corporation Limited, "Anvil Presents," undated.
44. Dynasty Explorations Limited, Notice of Issuance of Income Debentures and Shares, March 1968, p. 2.
45. "Master Agreement . . . between Cyprus Mines Corporation, . . . Dynasty Explorations Limited, . . . and Anvil Mining Corporation Limited, 4 December 1965," p. 2. (Hereinafter cited as Master Agreement).
46. *Ibid.*, p. 3.
47. *Ibid.*, S. 10.
48. *Ibid.*, SS. 14, 15.
49. "New Strike in the Yukon," p. 30. See above, n. 16.
50. "Exploration and Development – Anvil Mining Corporation," in *Mining in the North, 1965-1966*, (Ottawa: Resources Economic Development Group, DIAND, 1966), p. 5.
51. Geological Survey Unit Reports on Cyprus Anvil Area, 1966, p. 36.
52. "Drilling the Tomorrow Country," *Edmonton Journal*, March 1966.
53. *Mining in Canada*. See above, n. 30.
54. Brock, p. 17. See above, n. 21.
55. Dynasty Explorations Limited, Notice of Issuance of Income Debentures and Shares, March 1968, p. 11.
56. *Birth of a Giant*, p. 14. See above, n. 29.
57. Ralph M. Parsons Construction Company of Canada Ltd., *Development of the Faro No. 1 Ore Body Preliminary Feasibility Study*, Anvil Mining Corporation Limited, 26 April 1966, p. 4-1. (Hereinafter cited as Parsons, *Preliminary Feasibility Study*).
58. Ralph M. Parsons Construction Company of Canada Ltd., *Final Feasibility Study Development of the Faro No. 1 Ore Body*, Anvil Mining Corporation Limited, February 1967, p. 2-2. (Hereinafter cited as Parsons, *Final Feasibility Study*).
59. Foster Economic Consultants Limited, *Guidelines for Developing a Stable Work Force at a Proposed Yukon Territory Mining Operation*, prepared for Anvil Mining Corporation Limited, Calgary, January 1967.
60. Parsons, *Final Feasibility Study*, p. 2-3.
61. Brian Mackenzie, *The Anvil Project: Preliminary Economic Analysis of a Mineral Development Opportunity*, Economic Staff Group, DIAND, 20 September 1966, p. 114.
62. Parsons, *Final Feasibility Study*, p. 2-3.
63. Anvil Mining Corporation Limited, "Anvil Presents," undated.
64. "Anvil Reports Big Reserve Underground Bulk Sample," *Northern Miner*, December 1966.
65. "Yukon's Biggest Mining Venture," p. 86. See above, n. 18.
66. Dynasty Explorations Limited, Notice of Issuance of Income Debentures and Shares, March 1968, p. 12.
67. "Anvil Reports Big Reserve Underground Bulk Sample." See above, n. 64.
68. Sales Contract Zinc and Lead Concentrates Between Anvil Mining Corporation Limited, and Toho Zinc Company Limited . . . 25 August 1967.
69. *Birth of a Giant*, p. 15. See above, n. 29.
70. Dynasty Explorations Limited, Notice to Shareholders of Proposed Amalgamation, February 1974, p. 6.
71. *Birth of a Giant*, p. 15. See above, n. 29.
72. Memorandum from D. Fraser, Head, Non-ferrous Section, Department of Energy, Mines and Resources, to W. Keith Buck and

Cyprus Anvil Mine

- W.G. Jeffery, Re: Anvil Mining Corporation Limited, 8 September 1972.
73. Sales Contract Zinc and Lead Concentrates, p. 2. See above, n. 68.
74. Anvil Mining Corporation Smelter Contracts, Materials Section, Department of Energy, Mines and Resources, May 1968.
75. Information received from J.F. Olk, Vice-President and General Manager, Cyprus Anvil Mining Corporation, 19 January 1979.
76. *Birth of a Giant*, p. 15. See above, n. 29.
77. Sales Contract Zinc and Lead Concentrates. See above, n. 68.
78. Cyprus Anvil Mining Corporation, First Report, 1974, p. 4.
79. *Ibid.*, p. 10.
80. Anvil Mining Corporation Limited, Loan Agreement, 27 September 1967, p. 3.
81. Cyprus Mines Corporation, Copy of release issued, 20 March 1967.
82. Letter from R.V. Markham, Vice-President Finance, Dynasty Explorations Ltd., to Cyprus Mines Corporation, concerning Anvil (and Agreements), 28 June 1967, p. 1.
83. Dynasty Explorations Limited, Notice of Issuance of Income Debentures and Shares, March 1968, p. 17.
84. *Birth of a Giant*, p. 15. See above, n. 29.
85. Loan Agreement, p. 18. See above, n. 80.
86. *Ibid.*, p. 18.
87. 'Dynasty Hopeful Faster Clearance Anvil's Debt, Output next Fall,' *Northern Miner*, November 1968.
88. Dynasty Explorations Limited, Notice to Shareholders of Proposed Amalgamation, February 1974, p. 6.
89. Parsons, *Preliminary Feasibility Study*, p. 10-2. See above, n. 57.
90. *Ibid.*, p. 10-5.
91. *Ibid.*, pp. 10-2, 10-7.
92. *Ibid.*, p. 10-7.
93. *Ibid.*, pp. 11-2 – 11-3.
94. *Ibid.*, pp. 12-6, 13-3.
95. *Ibid.*, pp. 12-6, 13-3, 13-4.
96. "Anvil! The Yukon's Fabulous Mine," p. 31. See above, n. 20.
97. "Big Project Looms for Anvil in the Yukon," *Northern Miner*, 26 May 1966.
98. *Northern Miner*, 12 May 1966.
99. Reprinted in Mackenzie, p. 112. See above, n. 61.
100. *Ibid.*, p. 112.
101. "Yukon's Biggest Mining Venture," p. 88. See above, n. 18.
102. Cyprus Mines Corporation, Copy of release issued, 20 March 1967, p. 2.
103. *Ibid.*, p. 1.
104. "Lead, Zinc Mines Set by Cyprus in Yukon," *Montreal Gazette*, March 1967.
105. "Gold Rush had Nothing on \$50 Million Project," *Edmonton Journal*, March 1967.
106. *Montreal Gazette*, March 1967. See above, n. 104.
107. *Edmonton Journal*, March 1967. See above, n. 105.
108. "Yukon Base Metal Mine Shaping as Anvil Mining Signals Go-Ahead," *Northern Miner*, 23 March 1967.
109. "Yukon Mineral Enterprise Launched," *Edmonton Journal*, January 1970.
110. "Beginning of Anvil Production Major Event in Growth of Yukon," *Northern Miner*, February 1970.
111. "Anvil Ceremony Marks Startup of Production," *Northern Miner*, January 1970.
112. "Beginning of Anvil Production Major Event in Growth of Yukon." See above, n. 110.
113. *Mining in the North, 1965-1966*, pp. 1-2. See above, n. 50.
114. "Dynasty Explorations Limited (Now Cyprus Anvil Mining Corporation)," in *Financial Post* Corporation Service, Current Information Card, (May 1975), p. 1.
115. Dynasty Explorations Limited, Notice to Shareholders of Proposed Amalgamation, February 1974, p. 8.
116. *Ibid.*, p. 12.
117. *Financial Post* Corporation Service, p. 1. See above, n. 114.
118. Cyprus Anvil Mining Corporation, Annual Report 1975, p. 13.
119. *Financial Post* Corporation Service, p. 3. See above, n. 114.
120. Cyprus Anvil Mining Corporation, Notice to Shareholders for the first quarter ended 31 March 1975, May 1975, p. 4.
121. Dynasty Explorations Limited, Notice to Shareholders of Proposed Amalgamation, February 1974, p. 14.
122. "Dynasty-Anvil Merger Means Larger Program," *Northern Miner*, March 1974.
123. "Largest Mining Venture in Yukon History," *Northern Miner*, August 1967.
124. Agreement between Her Majesty the Queen . . . and Anvil Mining Corporation Limited . . . 21 August 1967. (Hereinafter cited as Anvil Agreement).
125. *Ibid.*, SS. 15, 17, 18, 19.
126. "Largest Mining Venture in Yukon History." See above, n. 123.

127. "Anvil Building 5,500 ton Mill start in 1969." *Northern Miner*, August 1967. The question of smelter feasibility may be reopened as a result of Cyprus Anvil's recent agreement-in-principle to purchase the Swim Lake, Vangorda, and Grum lead-zinc deposits (located in the Anvil area). See "Cyprus Anvil buying properties in Yukon," *Globe and Mail*, 28 November 1978.
128. "Largest Mining Venture in Yukon History." See above, n. 123.
129. Anvil Agreement, S. 5.
130. Dynasty Explorations Limited, Notice of Issuance of Income Debentures and Shares, March 1968, pp. 9-10.
131. Dynasty Explorations Limited, Notice to Shareholders, February 1974.
132. Anvil Agreement, S. 7(6).
133. Foster Economic Consultants Limited. See above, n. 59.
134. *Ibid.*, p. VI-10.
135. Anvil Agreement, S. 10(d), (e).
136. *Ibid.*, S. 10.
137. C.M. Bolger, Associate Director, Northern Administration Branch, DIAND, Memo to File re: Anvil Townsite Development, 13 December 1967, p. 1.
138. Thompson, Berwick, Pratt and Partners, *Townsite Location and Development Study for the Territorial Government of the Yukon in Association with Anvil Mining Corporation*, Vancouver, November 1967.
139. *Ibid.*
140. Memo to File re: Anvil Townsite Development, p. 1. See above, n. 137.
141. Thompson et al. See above, n. 138.
142. Memo to File Re: Anvil Townsite Development, p. 3. See above, n. 137.
143. Information received from J.F. Olk. See above, n. 75.
144. Dynasty Explorations Limited, Notice of Issuance of Income Debentures and Shares, March 1968, p. 15.
145. "Dynasty Hopeful Faster Clearance Anvil's Debt, Output next Fall," *Northern Miner*, November 1968.
146. "Anvil! The Yukon's Fabulous Mine." See above, n. 20.
147. *Faro* (booklet), no date, no reference.
148. Cyprus Anvil Mining Corporation, "Introduction to the Faro Orebody, Mining and Milling Operations, and the Town of Faro," 31 December 1973.
149. *Ibid.*
150. Anvil Mining Corporation Limited, "Anvil Presents," undated.
151. Cyprus Anvil Mining Corporation, First Report 1974, p. 6.
152. Cyprus Anvil Mining Corporation, *Inside Cyprus Anvil*, Vol. 1, No. 6 (August 1975).
153. Cyprus Anvil Mining Corporation, Report of the first general meeting of shareholders, June 1975.
154. Cyprus Anvil Mining Corporation, Annual Report 1975.
155. Cyprus Anvil Mining Corporation, Report of the first general meeting of shareholders, June 1975.
156. Mackenzie, pp. 76-77. See above, n. 61.
157. *Resource and Industrial Development in Canada*, (Progress Report prepared by the Economics Department, Bank of Nova Scotia, Toronto, 1966).
158. See Janet E. Macpherson, "The Pine Point Mine," for a complete discussion of smelter feasibility at Pine Point. In this volume, pp. 65-110.
159. Jan H. Reimers and Associates Limited, a firm of metallurgical consulting engineers in Oakville, Ontario, was commissioned in August 1973 to prepare a "Smelter Feasibility Study of Electrolytic Zinc and Electric Lead Smelter Complex at Little Salmon in the Yukon including Extension of the Initial Study" for Cyprus Anvil Mining Corporation.
160. Jan H. Reimers and Associates Limited, *Smelter Feasibility Study of Electrolytic Zinc and Electric Lead Smelter Complex at Little Salmon in the Yukon including Extension of the Initial Study*, for Cyprus Anvil Mining Corporation, Vancouver, B.C., 1 August 1974.
161. Personal communication between M. Molot and Dr W. Pfeffer, Head, Resources Section, Northern Program Planning Division, DIAND, 31 March 1977.
162. *Mining in the North, 1965-1966*, p. 26. See above, n. 50.
163. DIAND, Communiqué, "Massive Road Program to Stimulate Resource Development in Canada's North," undated.
164. *Ibid.*
165. DIAND, *Prospectus*, "Incentive Programs North of 60" (1974), p. 8-7.
166. "Yukon Mineral Enterprise Launched." See above, n. 109.
167. Memorandum from Fraser to Buck and Jeffery. See above, n. 72.
168. Shipping Agreement, between White Pass and Yukon Corporation Limited, Pacific and Arctic Railway and Navigation Company, the B.C. Yukon Railway Company, the British Yukon Railway Company, and the British Yukon Navigation Company Limited and the Anvil Mining Corporation Limited, September 1967.
169. "Anvil Mining and White Pass and Yukon Route." *American Metal Market*, January 1968; and "White Pass and Yukon Route obtains new Financing," *Northern Miner*, February 1968.
170. Cyprus Anvil Mining Corporation, *Inside Cyprus Anvil*, Vol. 1, No. 4 (June 1975).
171. "Anvil M'g awards Road-Rail Contract," *Northern Miner*, December

- 1967; "Spend \$11 million for transportation of Anvil production," *Northern Miner*, December 1967.
172. "Yukon Mineral Enterprise Launched." See above, n. 109.
173. Although the contract between White Pass and Yukon Corporation was firm, rate increases were requested by White Pass in 1974. Anvil Mining Corporation agreed to a sixteen percent increase and to assist on future cost escalations, despite the previous contractual arrangements, in order to maintain the solvency of the transportation company. See Cyprus Anvil Mining Corporation, Report of the first general meeting of shareholders, June 1975.
174. "Anvil Building 5,500 ton Mill start in 1969." See above, n. 127.
175. "Anvil Ceremony Marks Startup of Production." See above, n. 111.
176. "Yukon's Biggest Mining Venture," p. 91. See above, n. 18.
177. The contract for clearing the right-of-way for the transmission line from Whitehorse to Anvil Mining Corporation was awarded to Alpine Clearing Company of Prince George, B.C. Laing directed that local labour was to be employed to the greatest possible extent, as a requirement of the contract. Strong allegations have since been made concerning extensive environmental damage and destruction of the landscape resulting from the construction of the line. See "Let Contract for Anvil Power Line," *Northern Miner*, January 1968.
178. "Anvil Building 5,500 ton Mill start in 1969." See above, n. 127.
179. "Yukon Mineral Enterprise Launched." See above, n. 109.
180. *Canadian Mining Journal*, August 1975, p. 29.
181. "Power for the North; vital to mineral development," *Western Miner*, October 1974.
182. "Anvil Ceremony Marks Startup of Production." See above, n. 111.
183. "Yukon's Biggest Mining Venture," p. 91. See above, n. 18.
184. Memorandum from Fraser to Buck and Jeffery. See above, n. 72.
185. Information taken from memorandum from Fraser to Buck and Jeffery. See above, n. 72.
186. DIAND, Press Release, 20 March 1967, p. 1.
187. Anvil Agreement, S. 3 (2) (a).
188. *Ibid.*, S. 12 (a), (b).
189. *Ibid.*, S. 3 (3).
190. Robert B. Gibson, *The Strathcona Sound Mining Project: A Case Study of Decision-Making*, (Ottawa: Science Council of Canada Background Study No. 42, February 1978), p. 26. However, Cyprus Anvil reports that this percentage varied from between five and ten percent. (Information from J.F. Olk. See above, n. 75).
191. Robert Sharp, "An Outline of the Impacts the Anvil Mining Development had upon the Indian People of Ross River." A paper for presentation to the Mackenzie Valley Pipeline Inquiry, p. 24. Because of the shortage of other data on the subject, extensive use has been made of Robert Sharp's paper for the section of this case study entitled "Socio-economic Impacts on the Community of Ross River." The Sharp paper, however, represents merely one viewpoint on the issue.
192. *Ibid.*, p. 25.
193. *Ibid.*, p. 18.
194. *Ibid.*, p. 6.
195. *Ibid.*, p. 11.
196. *Ibid.*, pp. 12-13.
197. *Ibid.*, pp. 13-14.
198. *Ibid.*, p. 17.
199. *Ibid.*, p. 22.
200. *Ibid.*, p. 18.
201. *Ibid.*, p. 7.
202. *Ibid.*, pp. 8-9.
203. *Ibid.*, pp. 15-16.
204. *Ibid.*, p. 8.
205. *Ibid.*, p. 8.
206. *Ibid.*, p. 9.
207. G. Miller, "The Economic Acculturation of an Indian Band," unpublished draft paper, (Ottawa: Northern Science Research Group, DIAND, 1972). Quoted by Sharp, p. 10.
208. Sharp, p. 11.
209. *Ibid.*, p. 25.
210. R.F. McDonnell, *Kasini Society: Some Aspects of the Social Organization of an Athapaskan Culture Between 1900-1950*, (University of British Columbia Ph.D. dissertation, 1975). Referred to by Sharp, p. 28.
211. Sharp, p. 29.
212. McDonnell, n. 210 above. Quoted by Sharp, p. 29.
213. Walter J.P. Lampe, *Native People's Perceptions of Factors Associated with Job Acceptance and Retention*, (Ottawa: Territorial and Social Development Branch, DIAND, May 1974).
214. As analyzed by Gibson, p. 26. See above, n. 190.
215. Albert Sigurdson, "Cyprus to continue exploration at lead/zinc mine in the Yukon," *Globe and Mail*, 11 April 1978.
216. Jim Lotz, *Northern Realities: The Future of Northern Development in Canada*, (Toronto: New Press, 1970), p. 193.
217. Shirley Culpin, "No Word Yet on Anvil Action," *Whitehorse Star*, 21 March 1975.
218. Letter from G.B. Armstrong, Head, Water Resources Section, Development Branch, DIAND, to R.E. Thurmond, General Manager, Anvil Mining Corporation Limited, 27 November 1968.

219. Letter from Armstrong to Thurmond, 6 January 1969.
220. Letter from C.E. Wykes, District Manager, Environmental Protection Service (Yukon), to L.V. Brandon, Chairman, Yukon Territory Water Board, 31 May 1973.
221. Letter from M.A. Rychlo, Water Quality Officer, DIAND, to H. Jomini, Anvil Mining Corporation, 11 December 1972.
222. Letter from R.L. Haffner, General Manager, Anvil Mining Corporation, to M.A. Rychlo, Water Quality Officer, DIAND, (Whitehorse), 9 January 1973.
223. Memorandum from A.B. Hollingshead, Controller of Water Rights, DIAND, (Whitehorse), to file, 7 February 1973.
224. Notice to be published in 4 May 1973 edition of the *Whitehorse Star*, according to a letter from A.B. Hollingshead, Controller of Water Rights, DIAND, (Whitehorse), to *Whitehorse Star*, 1 May 1973.
225. Memorandum from A.B. Hollingshead, Controller of Water Rights, to Regional Manager, Water, Forests and Land, 10 April 1973.
226. Information from J.F. Olk. See above, n. 75.
227. Telex from C.N. Williams, Water Rights Engineer, DIAND, to R. Haffner, General Manager, Anvil Mining Corporation, 3 May 1973.
228. Letter from Wykes to Brandon. See above, n. 220.
229. Letter from A.B. Hollingshead, Controller of Water Rights, DIAND, (Whitehorse), to R. Haffner, General Manager, Anvil Mining Corporation, 22 June 1973 and 9 September 1974.
230. Letter from R. Haffner, General Manager, Anvil Mining Corporation, to A.B. Hollingshead, Controller of Water Rights, DIAND, (Whitehorse), 26 April 1974.
231. Letter from A.V. Bell, Assistant Manager, Water Resources and Environmental Division, Montreal Engineering Company, to L.V. Brandon, Chairman, Yukon Territory Water Board, 30 July 1973, p. 2.
232. Letter from D.W. Duncan, Group Leader, Mineral Microbiology, Division of Applied Biology, B.C. Research, to L.V. Brandon, Regional Manager, Water, Forests and Land, DIAND, (Whitehorse), 26 July 1973.
233. Letter from Bell to Brandon, pp. 2-3. See above, n. 231.
234. *Ibid.*, pp. 2-3.
235. DIAND, Water Licence issued pursuant to Northern Inland Waters Act and Regulations, to Cyprus Anvil Mining Corporation Ltd. (licence number Y2L3-0005), issued on 4 February 1975. (Hereinafter cited as Water Licence).
236. *Ibid.*, Part A, S. 3.
237. *Ibid.*, Part A, S. 4.
238. *Ibid.*, Part B.
239. *Ibid.*, Part C, S. 1 (b), (f).
240. *Ibid.*, Part C, S. 1 (a).
241. *Ibid.*, Part C, S. 1 (e), (c), (d).
242. *Ibid.*, Part C, S. 2 (a), (b), (c).
243. *Ibid.*, Part C, S. 3 (a), (b).
244. *Ibid.*, Part D.
245. "Anvil Effluent Flow Stopped," *Whitehorse Star*, 24 March 1975.
246. "No Word Yet on Anvil Action." See above, n. 217. According to J.F. Olk, the original break was caused by water in one of the tailings ponds backing up and washing out decant pipes. As a consequence, increased pressure of tailings water on the dike caused it to give way and loose waters which crashed through an additional dike enclosing a second tailings pond.
247. "Anvil tailings pond collapses," *Yukon News*, 20 March 1975.
248. "No Word Yet on Anvil Action." See above, n. 217.
249. "Anvil Effluent Stopped." See above, n. 245.
250. Memorandum from C.N. Williams, Controller of Water Rights, DIAND, to file, (re: Cyprus Anvil Mining Corporation Ltd., Tailing Spill, 19 March 1975), 11 April 1975, p. 3.
251. Letter from G.E. Jones, District Supervisor, to A. Gibson, Chief, Northern B.C. and Yukon Division (Vancouver), 2 May 1975, p. 2.
252. Northern Inland Waters Act, R.S.C. 1970, c. 28 (1st Supp.), S. 2 (1) (a).
253. For further information about the Northern Inland Waters Act and the administrative arrangements for the management of northern fresh water resources, see William MacLeod, *Water Management in the Canadian North*, (Ottawa: Canadian Arctic Resources Committee, 1977).
254. Fisheries Act, R.S.C. 1970, c. 14, S. 33.
255. "Anvil Pleads 'Not Guilty' In First N.I.W.A. Case," *Yukon News*, 11 June 1975.
256. Personal communication with J.E. MacLatchy, Water Pollution Programs Branch, Environmental Protection Service, Ottawa, 4 March 1976. During a discussion about the prosecution, MacLatchy indicated that generally the issue was to bring the company before the courts — the number of convictions was not considered to be critical. The decision to drop the prosecution under the Northern Inland Waters Act was at the discretion of the crown attorney. MacLatchy commented that it would have been preferable to have proceeded under the Northern Inland Waters Act. From a practical point of view, the Northern Inland Waters Act and licencing provisions under the Act as they apply to existing operations got underway in 1973 and 1974. DIAND was reluctant to take action, considering the recent issuance of the water licence.
257. Magistrate D.R. O'Connor, Reasons for Judgment (Oral), Magistrates Court of the Yukon Territory, *Regina v. Cyprus Anvil Mining Corporation*, Section 33 Fisheries Act, Whitehorse, Yukon Territory, 5 November 1975, 99/S/2487.
258. Honourable Mr Justice J.A. Maddison, Reasons for Judgment (Oral),

Yukon Court of Appeal, *Cyprus Anvil Mining Corporation Limited v. Her Majesty the Queen*, Whitehorse, Yukon Territory, 26 March 1976, S.C. 448/75.

259. Deputy Magistrate E. Horembala, Reasons for Judgment (Oral), Magistrate's Court of the Yukon Territory, *Regina v. Cyprus Anvil Mining Corporation*, Whitehorse, Yukon Territory, 13 September 1976. Reprinted in full in *Canadian Environmental Law News (CELN)*, Vol. 5, No. 5 (1976): 145-151.
260. During this period the mine was being maintained by supervisory personnel due to a labour dispute in the mill. When the dispute was settled on 12 February 1976, milling operations were recommenced. *CELN*, p. 146. See above, n. 259.
261. The company wished to discharge the sodium cyanide into the tailings pond "at controlled amounts daily to minimize the effect of the cyanide . . . and allow it to react with the tailings already in the pond." *CELN*, p. 146.
262. *CELN*, p. 146.
263. *Ibid.*, p. 147.
264. The purpose of the decant structure is to allow liquid wastes which fall within "acceptable" levels to be discharged from the tailings pond, while suspended solids – which are usually more toxic – settle out. Since the Cyprus Anvil decant effluent contained toxic amounts of sodium cyanide, the mine was ordered to prevent its discharge. If further milling operations were to occur, the sealing off of the decant facilities would result in a substantial build up of liquids and pressure in the tailings pond, which could force the dikes to give way.
265. *CELN*, p. 147. See above, n. 259.
266. On 19 February Cyprus Anvil arranged for the shipment of equipment which would permit a faster analysis of the sodium cyanide in Rose Creek. At considerable expense the company also shipped a neutralizing agent, potassium permanganate, to act upon the sodium cyanide present in the tailings pond. *CELN*, pp. 147-48.
267. *CELN*, p. 147.
268. *Ibid.*, p. 148.
269. *Ibid.*, pp. 150-151.
270. *Ibid.*, p. 151.
271. *Ibid.*, p. 149.
272. *Ibid.*, p. 150.
273. *Ibid.*, p. 151.
274. It must be noted that, according to J.F. Olk, Vice-President and General Manager of Cyprus Anvil, there has been "no environmental damage to the downstream area of Rose Creek and subsequent water sheds and fish are spawning and swimming in the creek." Telex to author, 19 January 1979.

Appendix I Anvil Agreement

THIS AGREEMENT was made this 21st day of August, 1967,

BETWEEN

HER MAJESTY THE QUEEN in right of Canada, hereinafter called "Her Majesty",
OF THE FIRST PART,

AND

ANVIL MINING CORPORATION LIMITED, a body corporate, incorporated under the laws of the Province of British Columbia, and having its registered office at 510 West Hastings Street, in the City of Vancouver, in the Province of British Columbia, hereinafter called "Anvil",
OF THE SECOND PART

WHEREAS Anvil is desirous of bringing into operation a mine for the production of lead and zinc concentrates in the Vangorda Creek area of the Yukon Territory, hereinafter called "the mine area", and subject to the terms and conditions specified herein, intends to construct a smelter for the further processing of lead and zinc concentrates;

WHEREAS Her Majesty wishes to encourage and support the proposed mining development in order to expand the economic activity of the Yukon Territory and to provide employment opportunity for Canadians, particularly those resident in the said Territory; and

WHEREAS Anvil has determined that the feasibility of commencing production will depend, to a substantial extent, upon certain development activities of Her Majesty as hereinafter set forth;

NOW THEREFORE THIS AGREEMENT WITNESSETH that in consideration of the premises, and of the covenants and agreements contained herein, the parties covenant and agree, each with the other, as follows:

1. In this agreement,

- (a) "area development road" means an area development road as defined in the Northern Roads Policy of the Department as authorized by Treasury Board Minute No. 641318 dated August 11, 1965;
- (b) "Commission" means the Northern Canada Power Commission;
- (c) "Commissioner" means the Commissioner of the Yukon Territory or any person authorized to act on his behalf;
- (d) "Department" means the Department of Indian Affairs and Northern Development;

- (e) "development area" means a development area as defined by the *Area Development Ordinance*, Revised Ordinances of the Yukon Territory, 1958, chapter 7;
- (f) "mine" means the aggregate of the facilities enumerated in paragraphs (a), (b) and (c) of subsection (1) of section 3;
- (g) "Minister" means the Minister of Indian Affairs and Northern Development or any person authorized to act on his behalf;
- (h) "permanent access road" means a permanent access road as defined in the Northern Roads Policy of the Department as authorized by Treasury Board Minute No. 641318 dated August 11, 1965;
- (i) "project" means the smelter and sulphur recovery systems referred to in subsection (1) of section 15 and the mine; and
- (j) "Territory" means the Yukon Territory.

2. (1) This Agreement will be carried out in two stages.

(2) The first stage starts on the day this Agreement is delivered, after having been signed and sealed, and ends on the day the mine comes into production, within the meaning of section 83 of the *Income Tax Act* as presently written, of lead and zinc concentrates.

(3) The second stage starts on the day following immediately the day on which the first stage ends.

3. (1) During the first stage Anvil will

(a) bring into production a mine, which includes

- (i) stripping of the overburden,
- (ii) blasting and removing the cap rock and waste materials,
- (iii) constructing of waste dumps,
- (iv) construction of an open pit mine, and
- (v) transporting of ore;

(b) construct and operate a crushing and screening plant and a concentrator to produce lead and zinc concentrates, and dispose of its mill tailings in a good and minerlike fashion, satisfactory to the Minister;

(c) construct

- (i) machine shops,
- (ii) warehouses,
- (iii) electrical substations and a distribution system,
- (iv) a safety and emergency first aid centre,
- (v) office buildings,
- (vi) change facilities for its employees, and
- (vii) such roads within the confines of the mine as, in the opinion of Anvil, are necessary; and

(d) assist in the development of a development area by

building a nursing station, single men's quarters, recreational facilities and by providing the down payment required by the Central Mortgage and Housing Corporation for residential development.

- (2) During the second stage Anvil will,
 - (a) subject to subsection (3) employ competent local residents, particularly Indians and Eskimos, to the extent of at least 5 per cent of the total number of employees within the first year, rising to 10 per cent in the second year and 25 per cent in the fifth year after the mine comes into production; and
 - (b) institute a training program for supervisors and foremen to ensure compliance with the undertakings set forth in paragraph (a) of this subsection.
 - (3) The percentages and times referred to in paragraph (a) of subsection (2) and in section 16 may be modified where, in the opinion of the Minister, Anvil has made a bona fide effort to comply with these percentages and times. Once Anvil's labour force is engaged, every attempt will be made by Anvil to fulfill its obligations under paragraph (a) of subsection (2) of section 3 and section 16 as vacancies occur or new positions become available.
 - (4) In addition to complying with the undertakings set forth in paragraph (a) of subsection (2) and section 16, Anvil will comply with the *Fair Practices Ordinance*, Ordinances of the Yukon Territory, 1963 (second session), chapter 3.
4. In assessing whether to proceed with the first stage, Anvil has assumed that the tax incentives contained in the present *Income Tax Act* and the present *Income Tax Regulations* generally, and specifically those contained in paragraph (b) of subsection (1) of section 11, subsection (5) of section 83 and section 83A of the said Act, and sections 701 and 1201 of the *Income Tax Regulations* will be available at the time the mine comes into production, and should the said tax incentives or any of them no longer be available at that time, Anvil may, at its option, void any portion of this Agreement then not yet carried out.
5. The Minister will upon the execution of this Agreement recommend to the Governor in Council the issue of a surface lease to Anvil for a mill site, an open pit mine, and a suitable area for disposal of mill tailings.
6. The Minister will instruct the Commission to construct and operate during the first stage
 - (a) a reliable power station, delivering continuously and without interruption 9.3 megawatts to the mine and the development area; and

- (b) main step down transformer banks at the development area and the mine;

the cost of power not to exceed \$985,000 per annum, and all to be in operation by July 15, 1969.

7. (1) Her Majesty will complete or have constructed at her own cost an area development road from Ross River to Carmacks on or before September 1, 1968; provided, however, that if, due to conditions beyond Her Majesty's control, the area development road cannot be completed by that date, Her Majesty will maintain an all-weather road from Ross River to Carmacks commencing September 1, 1968.
 - (2) Anvil will construct a permanent access road and a bridge across the Pelly River from a point to be determined by the Minister on the road from Ross River to Carmacks to the said bridge and from there to the mine and the development area.
 - (3) Her Majesty will pay the lesser of
 - (a) two-thirds of the cost, or
 - (b) \$40,000.00 per mile of the road (excluding the bridge) referred to in subsection (2).
 - (4) Her Majesty will pay two-thirds of the cost of the bridge referred to in subsection (2).
 - (5) The applications for the subsidies referred to in subsections (3) and (4) will be submitted to the Treasury Board within two months of their receipt by the Department.
 - (6) Her Majesty will either construct a route or improve an existing route within Canada from Carmacks to a harbour at either Haines or Skagway, both in the State of Alaska, one of the United States of America.
 - (7) The Minister will select the route referred to in subsection (6) with the concurrence of Anvil.
 - (8) The Minister will make the selection referred to in subsection (7) on or before October 31, 1967, and commence to carry on engineering and planning of the routes referred to in subsections (2) and (6) on or before December 31, 1967.
 - (9) The routes referred to in this section shall be constructed so that in the opinion of the Minister they are capable of supporting a vehicle weighing up to 95,000 lbs. gross weight.
8. (1) The Minister will instruct the Commissioner to facilitate the granting of a public service vehicle licence under the provisions of the *Motor Vehicles Ordinance*, Revised Ordinances of the Yukon Territory, 1958, chapter 77, to a Canadian trucking company selected by Anvil.
 - (2) The Minister will request the appropriate authorities

- in the Province of British Columbia to issue a public service vehicle licence to the trucking company referred to in subsection (1).
9. Notwithstanding the provisions of section 7, the Minister will proceed with current transportation studies and will commission further studies if necessary to determine whether alternative transportation routes and means should be provided between the harbour selected by him, and Carmacks, or the mine, or the development area during the first stage.
 10. (1) The Minister will set aside sufficient land for the development area which is to be constructed to accommodate initially 1,000 to 1,500 inhabitants, and the Minister will request the Commissioner, subject to the laws of the Territory, to
 - (a) establish the development area within a circle having a radius of 15 miles from the centre of the proposed town and to control all land use within such area;
 - (b) select the location of the proposed development area in consultation with Anvil by December 31, 1967;
 - (c) plan and lay out the development area;
 - (d) subdivide the development area by July 1, 1968 and provide standard municipal services such as surveys, streets, sewers, sewage disposal, street lighting, water distribution and treatment, power and power distribution, parking areas and recreational facilities;
 - (e) construct, operate and maintain school, fire and police stations and health services; and
 - (f) sell to Anvil at a price which reflects the full costs of development, any lots required by Anvil in the development area.
 - (2) Anvil will not be responsible for the maintenance and operation of any of the facilities mentioned in paragraph (d) of subsection (1).
 - (3) The Minister will request the Postmaster General to establish a post office within the development area and to provide mail service to and from such post office.
 11. The Minister will request that the Canadian National Telegraph Company at its own expense provide such telephone lines as are required to provide adequate service for the mine and development area.
 12. In order to assist Anvil to carry out the terms of paragraph (a) of subsection (2) of section 3 the Minister will
 - (a) request the Commissioner to make available to Anvil any training programs operated by him under the provisions of the *Vocational Training Agreements Ordinance*, Revised Ordinances of the Yukon Territory, 1958, chapter 107; and
 - (b) request that other manpower training and relocation programs administered by Her Majesty's Department of Manpower and Immigration are, where applicable, made available to Anvil, and if necessary, the Minister will consider the introduction of his own programs at no cost to Anvil.
 13. The Minister will request that the Central Mortgage and Housing Corporation approve housing loans by December 1, 1967.
 14. (1) During the second stage Anvil will continue its studies of the engineering and economic feasibility in the Territory of various types of smelters and evaluate new smelting techniques as developed and other related activities; such studies and activities to include
 - (a) the economic evaluation of each suitable method of smelting;
 - (b) the market analysis of lead and zinc metals;
 - (c) the exploration for additional raw materials for the smelting process such as coking coal, limestone, flux materials, and additional ore;
 - (d) the evaluation of sulphur recovery and disposal techniques; and
 - (e) market evaluation of sulphur and sulphur by-products.
 - (2) Anvil will commence the studies and activities referred to in subsection (1) as soon as lead and zinc concentrates become available from the mine.
 - (3) Anvil will consult with the Minister when selecting the experts to conduct the studies and activities referred to in subsection (1), will be guided by the recommendations of the Minister and will make the results of the studies and activities available to the Minister at any time on a confidential basis.
 - (4) Anvil will complete all the studies and activities referred to in subsection (1) within 5 years of the end of the first stage.
 - (5) Anvil will conduct studies and activities referred to in subsection (1) in sufficient detail to submit the results of the studies and activities to banks or other financial institutions operating in Canada in support of a request for loan capital.
 15. (1) Within eight years after the end of the first stage Anvil will construct and commence operating a smelter, including sulphur recovery systems, for the production of lead and zinc metal and sulphuric acid or elemental sulphur if
 - (a) a consultant, satisfactory to both the Minister and Anvil, advises that the project will earn, after deducting

- mineral and income taxes, a rate of return, determined by the discounted cash flow method, of a minimum of 15 per cent on the total capital, including borrowings from whatever source, invested by Anvil;
- (b) the Minister undertakes to insure that adequate transportation routes are provided from the project to the harbour selected by the Minister in accordance with subsections (6) and (7) of section 7; and
- (c) the Minister undertakes to instruct the Commission to construct and complete within eight years after the end of the first stage, an electric power station capable of delivering the necessary power to the smelter as indicated by Anvil's feasibility study at a rate which, taken in conjunction with the other operating costs, will at the outset ensure that the rate of return determined by the discounted cash flow method, of a minimum of 15% on the total capital, including borrowings from whatever source, invested by Anvil.
- (2) In this section, "rate of return determined by the discounted cash flow method" means the discount rate, expressed as a rate of interest, which results in the present value of net cash return to Anvil from the project in future years being equal to the present value of the investment.
16. When the smelter commences operation Anvil will employ competent local residents, particularly Indians and Eskimos, to the extent of at least 5 per cent of the total number of employees within the first year, raising to 10 per cent in the second year and 25 per cent in the fifth year after the smelter comes into operation.
17. During the second stage the Minister will
- (a) continue the studies mentioned in section 9 to determine appropriate routes and means of transportation to transport most efficiently and at the least cost the volume of lead and zinc metal that would be produced by the smelter; and
- (b) request the Commissioner to extend the development area to accommodate the increased population on the same terms and conditions as those set forth in section 10.
18. The Minister will recommend to the Governor in Council the issue of a surface lease to Anvil for the smelter including sulphur recovery systems.
19. (1) The Minister will carry out studies that may be necessary to identify suitable sites for the generation of hydro power required by a smelter in the Ross River region.
- (2) The Minister will complete the studies mentioned in subsection (1) within one year of the end of the first stage.
20. If Anvil is unable to obtain funds on appropriate terms and conditions for the second stage, the Minister will consider means of providing loans or guarantees on appropriate terms and conditions.
21. (1) Notwithstanding section 15 but subject to this section should it not be economically feasible to construct a smelter in accordance with the criteria set forth in section 15, Anvil will sell its concentrates to Her Majesty or to the owner of a smelter designated by Her Majesty.
- (2) Subsection (1) applies only if the price Anvil receives for the sale of the concentrates is not less than the price would be if Anvil were selling such concentrates elsewhere.
22. (1) If Anvil fails to construct the smelter although all the conditions set forth in subsection (1) of section 15 are met Anvil will pay to Her Majesty as liquidated damages a sum calculated at a rate of \$1.00 per ton of concentrates produced by Anvil thereafter.
- (2) Subject to subsections (3) and (4) the sum mentioned in subsection (1) is to be held in trust by the Minister for ten years after receipt and then be forfeited to Her Majesty.
- (3) If a smelter is installed by Anvil or any other person at a later date the portion of the sum of damages mentioned in subsection (1) that is not yet forfeited shall be returned to Anvil.
- (4) The Minister may waive the damages referred to in subsection (1) if he is of the opinion that Anvil has made every reasonable effort to finance the smelter but has been unsuccessful in its attempt.
23. If Anvil and Her Majesty agree that the construction of a smelter is not economically feasible, Anvil will continue to operate in the same manner as during the first stage.
24. All of the time limits contained herein shall be extended in the event of any delay caused by an act of God, Her Majesty's enemies, quarantine, riots, strikes, perils of navigation or extraordinary weather conditions or any other conditions beyond the control of the parties. Whenever prevailing levels of cost in relation to prevailing levels of price reasonably obtainable by Anvil for its concentrates or metals causes [sic] Anvil, in the exercise of prudent business judgment, to shut down, such event shall automatically result in an extension of time for the performances by Anvil of any act or the making by Anvil of any payment required under this agreement.
25. This Agreement may not be assigned in whole or in part by Anvil without the prior consent of the Minister in writing.
26. No member of the House of Commons shall be admitted

to any share or part of this Agreement or to any benefit to arise therefrom.

27. This Agreement enures to the benefit of, and is binding upon Her Majesty, Her heirs, successors and assigns and Anvil its successors and assigns.

IN WITNESS WHEREOF the Minister of Indian Affairs and Northern Development, on behalf of Her Majesty the Queen in right of Canada, has hereunto set his hand and seal and Anvil Mining Corporation Limited has hereunto affixed its corporate seal attested to by its proper officers authorized in that behalf.

SIGNED, SEALED AND DELIVERED

by the Minister of Indian Affairs
and Northern Development, /s/ Arthur Laing
in the presence of
Minister

Witness

SEALED, ATTESTED TO AND DELIVERED

by Kenneth Lieber /s/ Kenneth Lieber
the President
and by Gerald G. Kelly /s/ Gerald G. Kelly
the Secretary
of Anvil Mining Corporation Limited (Corporate Seal)

Kluane National Park



T. Sziranyi, Parks Canada



John Theberge

Kluane National Park

John B. Theberge
Faculty of Environmental Studies
University of Waterloo

I Introduction

The Yukon Territory is a vast land, 207,076 square miles or 5.4 percent of Canada. It is sparsely populated, with 21,392 people in 1976,¹ amounting to ten square miles per person.

In the years since 1848, when Robert Campbell established the Yukon's first fur-trading post, Fort Selkirk, the attention of most southern Canadians has been drawn to the Yukon Territory only three times: the Klondike gold rush, the building of the Alaska Highway, and very recently the proposed building of an Alaska Highway gas pipeline. Other events have occurred there, but their importance has been relatively minor: defence establishments were built during World War II and subsequently abandoned; an oil pipeline between Norman Wells, N.W.T. and Whitehorse was built and later closed down; large mines have opened, and some have closed; millions of dollars have been spent recently on largely unsuccessful oil and gas exploration; and the population has risen and fallen a few times.

As with the Northwest Territories, the management of the Yukon has proved a problem to the federal government from the days of the Klondike gold rush onward. The territory has a very limited economic base; a small but widely scattered population to which there has been an obligation to provide basic medical, educational, legal, and social services, all of which are expensive; a native population which has aspirations towards self-determination but which is numerically swamped by the white man (less than five percent of the Yukon's population is native, compared with thirty to forty percent in the Northwest Territories²); and a large transient population, spending on the average less than two years in the territory.

The most obvious solution to these problems has been to develop a resource base, with the result that northern politicians and administrators have appeared to grasp at any scheme that has held economic promise. They have promoted northern development in many ways, such as the

“Roads to Resources” programme in the 1950s, the encouragement of mining exploration with programmes assisting the construction of tote roads, large grants to newly opening mines,³ and laws, such as the Yukon Quartz Mining Act, that put few restrictions in the way of exploitation. Fuelling the federal government’s faith that there exists an economic antidote to its management problems has been a belief in what former U.S. Secretary of the Interior Stuart Udall calls the “myth of superabundance.”⁴

For seventy years the search for some mineral or other resource bonanza has taken place. Yet the total population of the Yukon Territory is presently smaller than when the Alaska Highway was being built in the early 1940s⁵. Mineral production, the economic mainstay, while steadily increasing, is nevertheless only a drop in the Canadian bucket. When the controversy over Kluane National Park was at its height in 1970, Yukon mineral production was two percent of the Canadian total of metallics and non-metallics (excluding mineral fuels and structural materials).⁶

The founding of Kluane National Park spanned twenty-nine years of this uncertain period in the history of the Yukon Territory. As a consequence, no national park in Canada has been created amid equivalent controversy. The park consists of 8,500 square miles (22,014 square kilometres) of wilderness in the extreme southwest corner of the Yukon Territory (Figure 1). Involved in the creation of the park were arguments over constitutional interpretations, rights to control northern resources, a lobby to engineer one of Canada’s largest water diversions, concern over native land claims, economic priorities, and aesthetic values. The twenty-nine years involved letter-writing, briefs, hearings, and harsh words in parliamentary committee and House of Commons debates.

The history of the establishment of Kluane National Park is in one sense atypical, being an example of a severe clash between interest groups. In another sense, however, its history is typical, because the same actors and arguments have traditionally surfaced to oppose any form of land preservation in the North, be it “sanctuary,” “wildlife reserve,” or “park.” They were heard in debates over the establishment of Nahanni National Park in the Northwest Territories; they continue to prevent the establishment of the long-proposed Artillery Lake Park on the east arm of Great Slave Lake; they shrouded the discussions about the “International Wildlife Range” in the northern Yukon; they have delayed the establishment of northern ecological reserves identified in Canada’s International Biological

Programme; and they will likely be heard in relation to Mr Justice Thomas Berger’s proposed northern Yukon Wilderness National Park.⁷

This paper subjects the account of Kluane’s establishment to an evaluation of how preservation, as one of a number of valid strategies to manage northern land, might be accomplished with more fairness, more understanding, and less conflict. I will admit at the outset to my belief that park status for the Kluane area was the right decision; indeed, I studied and lobbied for many years to help the park come into existence. Although I have endeavoured to ensure that my viewpoints do not colour the collection and presentation of the facts, nevertheless, because this study is an analysis, my thoughts are part of it, particularly the last chapter. I subscribe to the definition of wise land management (or conservation) published by John K. Naysmith of the Department of Indian Affairs and Northern Development, in which four strategies must be represented: preservation, protection, managed-use, and restoration.⁸ The problem is, what is the proper balance between these four strategies? Pertinent to this study is the belief that preservation must be given more than the perfunctory lip service which — apart from Kluane and its two sister parks announced at the same time (Nahanni and Auyuittuq) — has usually been the case. With the approval of the Alaska Highway Pipeline, the balance between the four strategies becomes even more of an issue. The Yukon Territory may have found its bonanza, and the pressures on the land will undoubtedly increase rapidly. For example, the pipeline route itself enters a corner of Kluane National Park, and goes through four proposed ecological reserves.⁹

Our society has accepted the idea of preservation, as legally framed in the National Parks Act of 1930, where it is stated that “The Parks are hereby dedicated to the people of Canada for their benefit, education and enjoyment . . . and such Parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations.” The concept is also embodied in various categories of provincial parks, such as Ontario’s primitive parks the purpose of which, in the 1967 “Classification of Provincial Parks,” is “to enrich and expand the outdoor knowledge and recreational experience in natural wild conditions and to provide an outdoor laboratory for non-destructive scientific study . . . and for the psychological need, of many people, to know that unspoiled wilderness areas exist.” A similar concept is involved in ecological reserves, such as those established under British Columbia’s 1971 act which reserves lands for

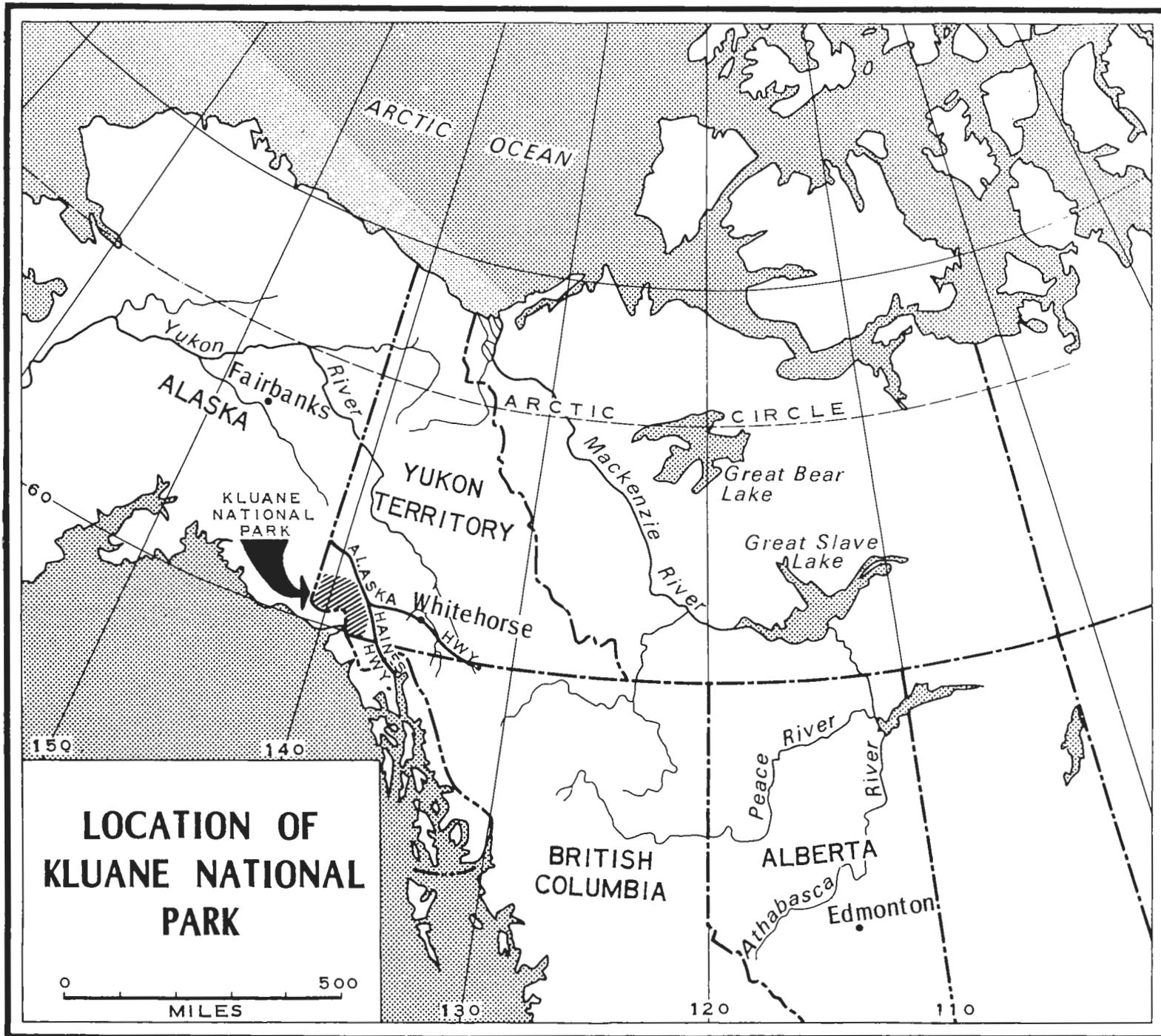


Figure 1

scientific research, education, samples of representative ecosystems, unique ecosystems, or for rare and endangered species. These legal forms of land preservation are evidence of a public acceptance of the concept of preservation. So is the citizen conservation movement, the increasing demand for outdoor recreation, and the flood of books about wildlands that argue the diverse values of such land on the grounds not only of quality of life but of the very survival of man. As Thoreau said, "In wildness is the preservation of the world." Despite our potential shortages in some raw materials, most Canadians would probably accept the late Senator Arthur Laing's statement in the House of Commons in 1964 that, "We have not yet reached the desperate stage in our growth where every cubic yard of land must be squeezed for whatever material potential it may have." Yet, despite the widespread acceptance of the idea of land preservation, when generalities are replaced with specific proposals the subject becomes very controversial. Surely there must be ways to accomplish preservation with less friction and greater fairness. An analysis of the events at Kluane may point out such ways.

II The Land

The southwest corner of the Yukon Territory is a land of superlatives: the highest range of mountains in Canada; our highest peak, Mt Logan (5,966 metres or 19,575 feet); the largest icecap outside the polar regions of the world; the Yukon Territory's largest lake, Kluane; and one of the richest assemblages of plants, birds, and mammals north of the 60th parallel.

In the St Elias Range, the vast high icefield is punctuated by only the very tops of the mountains. Moist Pacific air masses, rising on the Alaska coast, feed the St Elias with heavy snowfalls, and then sweep on to the east, crossing the lower Kluane ranges (elevations 2,130 to 2,740 metres) and fanning out dry and comparatively warm over the Yukon's interior plateau. Tongues of ice flow down from the St Elias ice-sheet to spawn great glacial-wash rivers which surge through valleys in the Kluane ranges. The northern rivers drain into either Kluane Lake or Kluane River and flow northward to join the Yukon River; the southern rivers drain into the smaller Alsek River system to flow less than a hundred miles to the Gulf of Alaska (Figure 2).

The beauty of the Kluane region is apparent to all who see it. The wide valleys, the low treeline approximately a

thousand feet above the valley floors, the dwarf spruce forests, the grasslands on south-facing mountain slopes where Dall's sheep or mountain caribou graze within sight of glaciers, together form a wild northern environment unique in Canada. The Alaska and Haines highways run along the east flank of the Kluane ranges, sampling the region's scenery.

The Kluane region was created over hundreds of millions of years of geological and biological evolution. It has always provided an outdoor laboratory that challenges the scientist and offers new discoveries of basic natural processes. The mountains are geologically extremely complex, made up of a series of elongated crustal blocks of various ages and histories which have moved along major geological faults. The mountains are young — in fact, Canada's youngest range. Sediments, lava flows as young as mid-tertiary (twenty-five million years ago), and metamorphic warpings have been displaced and heaved by uplift and carved by glaciation and erosion. Granite intrusions form most of the highest St Elias peaks.

Periodic advances and retreats of the glacier tongues provide important information for glaciologists; sudden glacial surges have occurred that attract those who study the behaviour of ice; wind-blown loess has buried soil profiles; volcanic ash provides a millenium-old datum reference point to allow an interpretation of ancient floral communities; in some river mouths delta-building is telescoped from century-long processes into decades; the gravel beaches of an extinct lake bed still exhibit hundred-year-old driftwood from successive lake levels.

Lowlands below approximately 1,370 metres are covered primarily with white spruce forests, or their varying earlier successional stages, predominated by aspen and balsam poplar. Along rivers and beside lakes are often dense stands of riparian willows. Above the spruce-line lies a band of sub-alpine shrub birch and willow, which thins out even higher to alpine tundra communities. Discontinuous permafrost characterizes the sub-alpine; while higher, the frozen ground underlies it all and reveals its presence in many geomorphological ways — polygons, stripes, solifluction ridges, and palsas. These in turn limit the tundra vegetation to that with shallow roots, those plants capable of withstanding hydric conditions on level ground or xeric conditions on steep slopes, mat-like growth forms, and a host of adaptations to a harsh cold environment.

Such physical and floral variety has in turn promoted a variety of wildlife. Dall's sheep dot the open south-facing grassland slopes; moose browse riparian willows; grizzlies

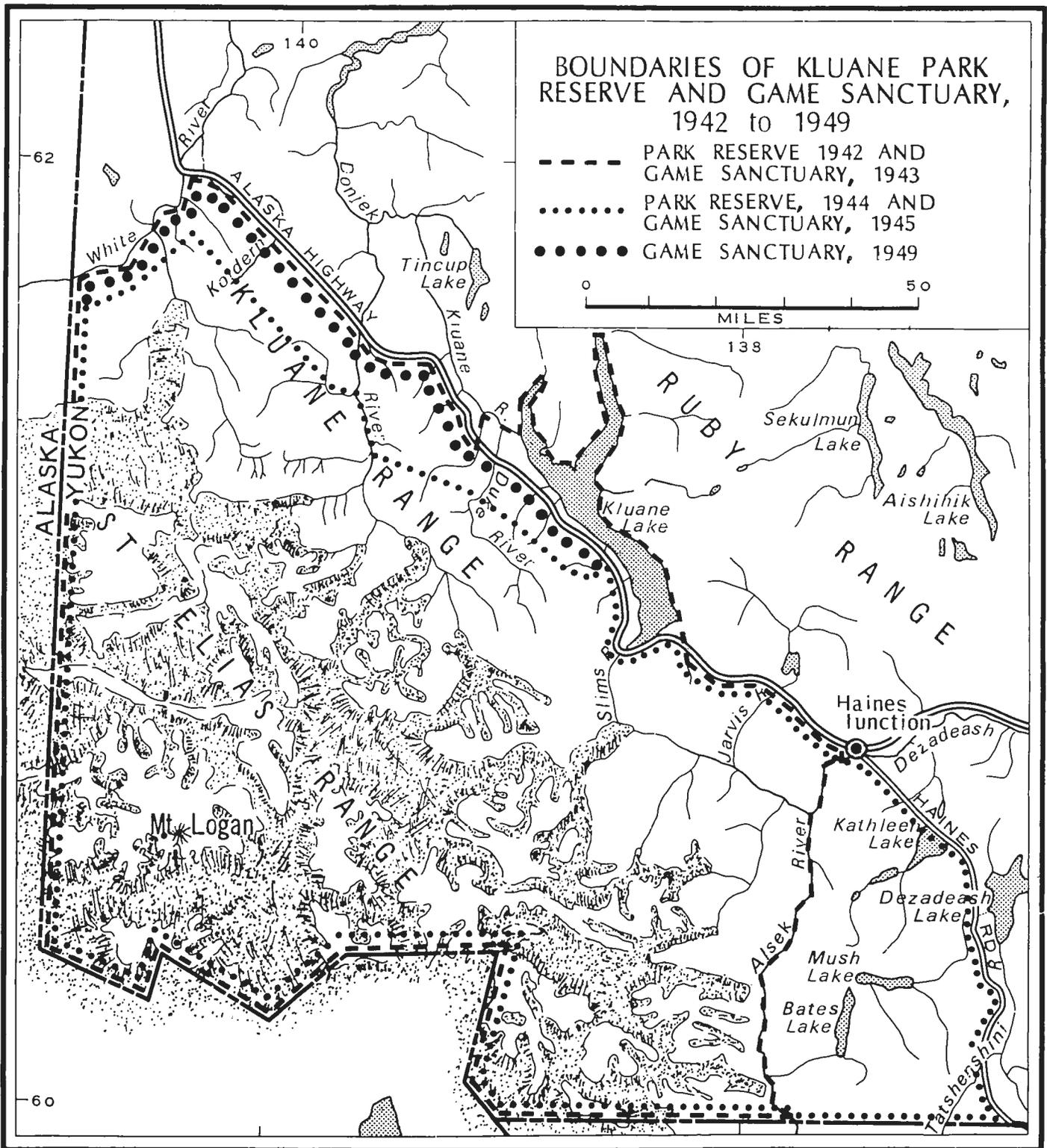


Figure 2

concentrate on the vegetated alluvial fans in the early fall to gorge on the berries of *Shepherdia*; caribou graze the tundra slopes in the northern sector; mountain goats balance on rock faces in the south; and the canids (wolves, red foxes, coyote) patrol them all. The variety of birds also stems from physical and floral diversity. Representative bird species are found from prairie grasslands, such as magpie and sharptail grouse, montane regions such as mountain bluebird and Say's phoebe, coast forest regions such as varied thrush, as well as many boreal and tundra species. The number of species of birds is likely greater here than any other place north of 60°.

This, then, is the land. Early man may have been here as long as 30,000 years ago, but archaeologists are not sure. He was certainly here 5,000 or 6,000 years ago, with discontinuous occupancy since then. In more recent times, Tutchone Indians of a variety of bands hunted in the Kluane ranges. White men first saw its peaks from ship-board, and in 1741 Vitus Bering named Mount St Elias. The first record of white men setting foot in the southwest Yukon was in 1882, when Arthur Krause travelled from the Chilkat River on the coast to near Kusawa Lake.¹⁰ The Kluane Park area was first visited by white men in 1890, when concurrently a mountain-climbing party and an exploration party entered its southern extremity.¹¹ Thereafter white men have come, in small numbers, with a variety of objectives: to search for and mine placer gold and copper; to keep "law and order"; to map the region and determine a satisfactory Canadian-American border; to hunt big game or climb mountains; to explore for "hard-rock" minerals; or to study. Scientists have recognized the usefulness of the land in bettering man's understanding of northern environments, and in 1961 the Arctic Institute of North America's Icefield Ranges Research Station was established at the head of Kluane Lake.

Man's impact on the land has been slight, in general, even though conspicuous in places. Many characteristics of this seemingly rugged land make it vulnerable to severe alteration by "minor" activities of man. Thermokarst erosion caused by indiscriminate use of bulldozers on the tundra mars the beauty of some places, and has started erosion processes that will continue for decades and will cause whole hillsides to slump. Debris, old machines, abandoned buildings, and tailings piles have been left in mined-over creek valleys and some high mountain benches. Plant succession is almost non-existent where tailings, washed of all organic matter, stand out of reach of annual freshets. Aircraft sometimes fly too low over bands of Dall's sheep or mountain

goats in steep places, causing them to run in panic. Some people have poached Kluane's protected wildlife, or poisoned Kluane's wolves when they moved into the valleys. But despite all this, the land is still whole and the wildlife relatively undisturbed, and in most places the hand of man is not evident. To apply the words of R.W. Service, the land is still "steeped in eternal beauty."

III Initiation of the National Park Project

The Kluane National Park project was initiated and "re-initiated" by the federal government a number of times. Each time the framework of external conditions or events was different, and varying degrees of technical assessment and authorization were achieved. Basic to the project was the National Parks Act of 1930, quoted earlier, in which the intent of the government was clearly set forth to establish and maintain a system of national parks. By the time of the National Parks Act, the Canadian National Park System was already partially developed, beginning with Banff National Park in 1887. Thus, the initiation of the proposal for Kluane Park, its funding, authorization, and execution to the final stage of amending the National Parks Act, all fell within the purview of the federal government.

Kluane National Park is partially a Second World War baby. Interest in the area as a national park was stimulated by the decision of the American government to build the Alaska Military Highway to protect the northwest against foreign invasion. In fact, were it not for a letter of 20 July 1942, written by the U.S. Secretary of the Interior H.L. Ickes to the Canadian Minister of Mines and Resources T.A. Crerar, Kluane might not have been considered for a park. In that letter Ickes informed Crerar that, in order to prevent land speculation with consequent delays and increased cost of building the road, he had just signed an order withdrawing from entry the "remaining publicly-owned lands along the route of the Canadian-Alaska Military Highway within Alaska" (twenty miles on each side) on the advice of his War Department. He suggested that the Canadian government do likewise, not only for the stated purpose but "also for long-range conservation." He went on to comment that the highway would make more accessible several fine areas of wilderness, one of which he listed as "west of Whitehorse, from Kluane Lake to the Alaska boundary, . . . the highest mountains in Canada and some of its most famous wildlife." Ickes considered that, while the highway would not "do material or lasting damage to these fine resources, the danger as you know lies in possible misuse and exploitation as a result

of accessibility.” He therefore concluded, “I wonder if we cannot establish a uniform policy of conservation along the entire Highway now and for the future.” Whether Ickes made these statements on the basis of first-hand knowledge, or whether he was giving official voice to comments of individuals involved in assessing the route for the highway, is not known. His letter, however, marked the beginning of the idea to preserve the Kluane area.

Crerar responded by passing the letter to R.A. Gibson, Director of the Lands, Parks and Forests Branch of the Department of Mines and Resources, who in turn requested comments from the Controller of the Yukon Territory, G.A. Jeckell, who passed it to Liaison Officer C.K. LeCapelain. LeCapelain wrote back to Gibson on 1 September 1942 with a direct proposal to establish a national park in the Kluane area:

That stretch of the road running from Bear Creek, a tributary of the Dezadeash River [just north of the present town of Haines Junction] to the White River in the southwest Yukon offers something that you cannot get anywhere else in Canada; a view of the St. Elias Mountains containing the largest glaciers and highest mountain peaks in Canada. Therefore, I respectfully suggest that the area indicated in green on the attached map and bounded on the east by the Alsek River, on the north by the Canadian-Alaskan Highway and White River, and on the west and south by the Alaskan Boundary be reserved for consideration as a National Park. This area is well known for its big game including White Bighorn Sheep (Ovis dalli), mountain goat, Osborn caribou, moose and grizzly bear.

Gibson responded enthusiastically, modifying LeCapelain’s proposal by suggesting that Kluane Lake be included as well. He wrote Controller Jeckell that:

establishment in the Yukon Territory of the exceptionally attractive and readily accessible national park proposed will doubtless conserve and create valuable assets for the Territory since it will conserve big game resources and magnificent scenery, will provide employment for residents, will attract tourist travel and funds to the region, and will add to the prestige of the Territory throughout the world.

He added that he was aware of no alienation of land from the Crown in the area, and asked Jeckell to check further. Jeckell identified one piece of alienated land, that held by the Jacquot Brothers at Burwash Landing. The Jacquots were big game guides who had been there since about 1904.

In December 1942, less than five months after the U.S. Secretary of the Interior had initiated the general idea and three months after the specific proposal by LeCapelain, the Kluane area was set aside as a national park reserve. Privy Council Order 11142 prevented “entry or alienation” of land in the area. The area reserved included everything west of the Haines and Alaska highways in the Yukon Territory, except the southeast corner of this area. The boundary ran from the intersection of the Yukon Territory-British Columbia border with the Alsek River, then up the Alsek, the Dezadeash, and Bear Creek back to the Alaska Highway just north of Haines Junction (Figure 2). It also included all of Kluane Lake.

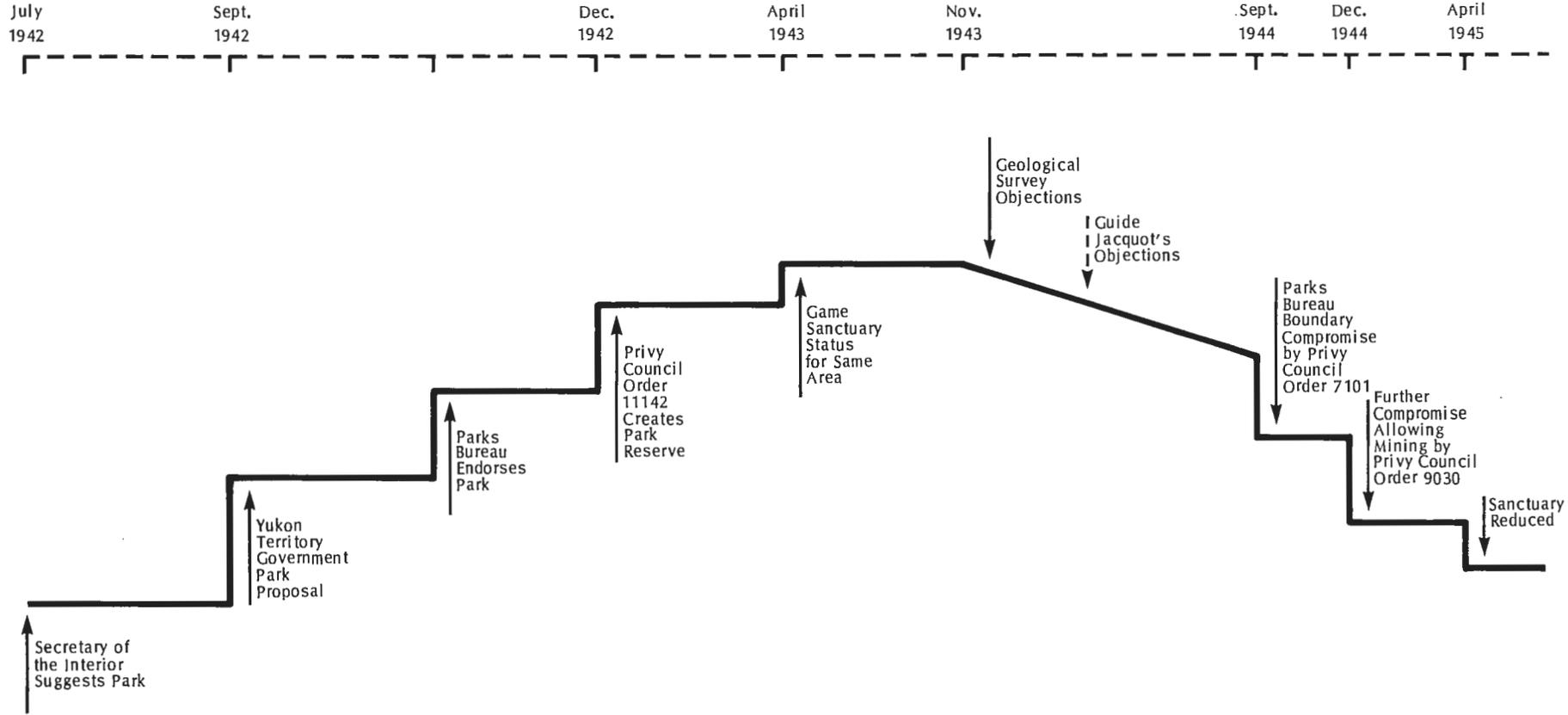
The park reserve was established concurrently with the end of a long period of economic stagnation in the Yukon Territory, dating from the decline of the Klondike gold rush in the first decade of the 1900s. Whitehorse, the capital, supported a population of less than 1,000 people. But the winds of change were obvious to government officials like Jeckell and Gibson. Two years earlier the Canadian government had initiated the construction of northern airfields for defence purposes, one of which was being built at Whitehorse. As well, the Canol project was under construction, being an oil pipeline from Norman Wells to Whitehorse with a refinery at Whitehorse, and the Alaska Highway itself was being built. It seemed a well-timed decision to establish a large national park before the Yukon hinterland entirely disappeared.

Despite the Kluane area being a vast and empty land, three groups of people were directly affected by this action: the native people, whose use of the area at that time is not clear; the Jacquot guiding business; and placer miners and explorers for minerals. So far as can be determined, these interests were not consulted before the park reserve was established, an omission which led to subsequent events as will be discussed.

On 22 April 1943, the same area was given the additional status of game sanctuary, by a revised ordinance of the Yukon Territory. The reason for this additional protective status, which prohibited “hunting, trapping, killing, shooting at, wounding, injuring, or molesting any game,” was that, despite the wording of the Privy Council Order that the land was preserved from “entry or alienation,” only the latter actually applied. Hunting, then, could still go on; but sanctuary status stopped this.

In the ensuing months, objections were raised to the park reserve and sanctuary. Dr H.S. Bostock of the

INITIATION OF NATIONAL PARK PROJECT



Geological Survey of Canada pointed out that certain important mineral resources existed in the region. Bostock had been in charge of the work of the GSC in the Yukon since 1929.¹² While he had worked in various parts of the Yukon, he did not know the Kluane region, and based his opinion on the results of the early geological surveys of R.G. McConnell who had worked in the area in 1904¹³ and 1905,¹⁴ D.D. Cairnes in 1914,¹⁵ and W.E. Cockfield in 1927.¹⁶ In March 1943 Parks Director Gibson therefore requested of the Mines and Geology Branch that geological surveyors investigate the northern part of the park reserve that summer. Obviously Gibson considered that the evidence for, or extent of, possible mineral resources was not fully substantiated. Such surveys were not conducted until 1945, by Bostock,¹⁷ and 1946 by E.D. Kindle.¹⁸ Nevertheless, in summer 1943 Gibson sent his Parks Controller, James Smart, to the Yukon to examine the area. When Smart returned in November, he was directed to prepare a memorandum to council saying that “part of the area has since been examined by officers of the National Parks Bureau and that it appears that an area, interesting from the standpoint of mining development and not attractive from a National Park standpoint, might be withdrawn.”

Smart travelled extensively in the Kluane area from July until September 1943. He was accompanied by other parks personnel, including zoologist Dr C.H.D. Clarke.¹⁹ In his report²⁰ Controller Smart recommended that Kluane Lake be removed from the park reserve because the lake might have commercial fishing potential, and that the southeast portion of the area west of the Haines Highway be added because of its spectacular scenery. He also recommended that the front range of mountains or their eastern slopes along the Alaska Highway north of Congdon Creek be removed from the reserve, because of their possible mineral potential, but be retained in the game sanctuary (both the park reserve and the game sanctuary came out to the Alaska Highway north of Kluane Lake in the original Order and Ordinance respectively). Smart cited the Geological Reports of 1904, 1905, and 1914 as evidence of mineral potential, but did not comment as to why this potential had not been exploited to any great extent in the thirty years after the last report, or mention his director’s request (which had not been complied with) for more geological study of the area. However, the fact that he did not share Bostock’s vision of great mineral potential is evident in a letter which he wrote to the Commissioner of the Yukon, George Black, in May 1944, which said, “there are several mineral claims in the area in the records although development has not been

active for some years.” In his report of his trip, moreover, he commented: “There were two men camped in the creek [Burwash] engaged in washing for gold but I cannot understand why they are bothered with this activity when good wages can be earned outside.” Nevertheless, he stated, with no obvious conviction, “In my final recommendation I am inclined to eliminate this area from the proposed park land.”

The foregoing is significant because today the contentious northern boundary of the national park runs away from the Alaska Highway exactly where he suggested (although the boundary, as drawn by Smart, turned parallel to the Alaska Highway when ten miles away from it and ran up to the White River, whereas today it continues westwardly). Although new evidence both for and against Smart’s northern boundary emerged during the next twenty-nine years, it is obvious that today’s boundary is to some degree a historic artifact, drawn casually, without any understanding of the park values or wildlife that were lost. Since the exclusion of the northern Kluane Range must have had some substantial cause, the inescapable conclusion is that pressure exerted by either the Mines and Geology Branch or the mining industry caused the Parks Bureau to back off its original boundaries. But this is not in the Parks Branch’s record. Controller Smart’s boundaries were solidified as a new Privy Council Order (7101) in September 1944.

This compromise, however, was apparently not sufficient. Although it is difficult to trace the exact source of pressure by mining interests on the Parks Bureau, less than three months later, before any response by the Geological Survey, Privy Council Order 9030 was issued, virtually destroying any rationale for the land being classed as a park reserve. It read:

- 1 *That advice has been received since [Privy Council Orders 11142 and 7101] to the effect that prospectors who have visited that portion of the reserved area lying to the east of the Alsek River desire to record mineral claims which are said to give promise of quantities of ore to justify development; and*
- 2 *That there is not sufficient geological information available to enable the importance of the mineral deposits being appraised and that it seems desirable to allow the mineral possibilities of the area to be explored. Therefore . . . notwithstanding the reservation of the area designated in the Orders in Council referred to, persons be permitted to prospect for minerals and to record mineral claims in the office of the Mining Recorder at Whitehorse on the understanding that in so far as is*

consistent with standard mining practice any mining rights granted will be subject to the provisions of the National Parks Act, providing the said mining claims are situated within the boundary of any park which may be established.

Thus, until a national park was established, mining was free of any encumbrances associated with the park reserve status. Once a park was established, mining would be subject to the provisions of the National Parks Act. Since mining was the only land use detrimental to a future park in the area (forests were non-commercial and homesteading was not prevalent), the park reserve status was now almost meaningless. To further accommodate mining, yet another Privy Council Order 2509 was issued on 3 July 1947 to “grant licences of occupation . . . for one year, with a right of renewal.”

The result of the latter two Privy Council Orders was renewed placer gold claim staking. The area had become easily accessible from the new Alaska and Haines highways which were completed by late 1943, allowing heavy equipment to be used by miners. According to geologist J.E. Muller, the richest creek was Burwash, which in the late 1940s and early 1950s produced in the order of 1,800 ounces of gold per year.²¹ Other creeks produced considerably less.

Besides mining, the interests of the Jacquot guiding business, which had also been affected, were the subject of debate following the initial institution of park reserve status in 1942. Outfitter Eugene Jacquot made representations to Commissioner George Black, who periodically from 1944 to 1946 raised the issue with the Parks Bureau in Ottawa. Jacquot’s position was that he wanted exclusion of the Genere and St Clair watersheds in the northern part of the area where he operated his guiding business. Smart’s replies took the stand that “This particular piece of country is the habitat of wild life not now abundant, and with the greater pressure of hunting resulting from this territory being easier to reach, the remnants of wild life, moose, Osborn caribou, Dall sheep, especially, will soon be depleted to the vanishing point.” He later referred to the area as “the heart of the best game country, and its location we particularly recommend be retained following our investigation in 1943, for the preservation of the Osborn caribou and the Dall sheep.” In much later wildlife surveys conducted in this area, a general conclusion was drawn that this northern section was excellent big game habitat, and had supported more wildlife before guided hunting became common.²²

The third group affected by the game sanctuary and park reserve status were the native people. As far as can be

determined, they did not contest the new status until 1950, when the Department of Citizenship and Immigration made a representation for a portion of the game sanctuary to be declared a fur management area in which local Indians might hunt and trap. Biologist A.W.F. Banfield was sent to assess this request, and reported that the department:

received representations from Father Morrisset, of the Burwash Landing Mission, supported by Bishop Coudert, Whitehorse, to the effect that the establishment of the Kluane Game Sanctuary had deprived the Burwash Landing Indians of necessary and accustomed supplies of game and had resulted in their economic distress and hardship. In order to prevent further hardship the Yukon Territorial Government, at the request of the federal authorities, gave a permit for two hunters to secure 12 moose, 4 caribou and 3 sheep in the Kluane Game Sanctuary under the supervision of Father Morrisset, pending an investigation of the mammal stocks present. In the meantime a proposal to delete the Koidern River valley from the sanctuary for the use of native game and fur management block was submitted by the Indian Affairs Branch.

After travelling through the area, Banfield concluded:

I found no signs of hardship among the Burwash Indians I received no complaints of destitution or unfairness with respect to trapping or hunting privileges from anyone except Father Morrisset The Koidern Valley provides an excellent site for a beaver-muskrat fur management area [which Banfield recommended be established for the native people, and which was subsequently done] The larger areas sought by Father Morrisset contain practically no useful muskrat and beaver country. These areas contain many alpine tundra slopes and plateaus, the range of white sheep and Osborn caribou. To remove these areas, which are, in total, about one-fifth of the productive portion of the Sanctuary, would be to weaken seriously the beneficial role of the Sanctuary, as it would remove much of the best white sheep range, including important winter range.²³

On 30 April 1945 a Yukon Game Ordinance revised the boundaries of the Kluane Game Sanctuary so that once again they exactly fit those of the park reserve, removing Kluane Lake and the eastern slopes of the northern front range and including the southeast corner of the area along the Haines Highway. However, the fact that valuable wildlife populations existed in the northern front range, including the Burwash Uplands, was recognized by a revision of the Yukon Ordinances in 1947, which stated that

two years hence, on 15 October 1949, the boundary of the Kluane Game Sanctuary would again be changed to include the northern front range, by following the Alaska Highway all the way up to the White River (Figure 2).

All further efforts to establish a park at Kluane ceased for many years after the third Privy Council Order in 1943, two and a half years after the idea was initiated. In the ensuing years up until 1958, the Parks Bureau gave a variety of reasons for their inactivity to the few people who wrote requesting information (among them C.K. LeCapelain, who had proposed the park in 1942): lack of funds, lack of tourist travel on the Alaska Highway, and road construction programmes in existing national parks which were taking funds. These years were also a period of stagnation in the establishment of national parks in the rest of Canada; only one (Fundy in 1947) was established.

The events up to 1958 lend themselves to some inescapable conclusions. One is that the Parks Bureau acted with little consultation in its efforts to create a park reserve and, as a result, drew criticism. It is important to note that the Parks Bureau's action was not the creation of a new park, but merely the first step towards creation. Even this step provoked antagonism, because it involved loss of rights, whether real or imagined, for some people. The issue of the adequacy or inadequacy of a park reserve as an initial step in creating a national park will come up again.

A second conclusion is that the opinion expressed by the Geological Survey of Canada — that mineral values might be lost — was central. Why else did the Parks Bureau allow their park reserve to be made virtually meaningless and then, despite great initial enthusiasm, drop the whole proposal? The Alaska Highway would allow greater opportunities for mining exploration, and the hope of a strike, with the attendant economic benefits, apparently appealed to the government as being more desirable than a park. Potential mining values provided then, and for many years thereafter, as good a case for mining interests as if real values were found.

IV Second Initiative

More than a decade passed before the next initiative to establish a park at Kluane. The end of the war had not brought prosperity to the Yukon Territory. Maintenance of the Alaska Highway required only a string of small maintenance camps; the Canol pipeline had closed down; and the northern airports no longer held military significance.

Beginning in the early 1950s, however, the federal government spawned a small economic boom of its own, through the new Department of Northern Affairs and National Resources. According to Lotz,

Road maintenance and construction, new bridges over the Yukon River at Whitehorse, the Takhini River and other rivers, the creation of a new middle-class suburb in Riverdale, the installation of a \$2 million sewer and water system (optimistically planned to serve a Lower Townsite population of from 20,000 to 25,000), new hospitals at Whitehorse and Mayo, new subdivisions along the Alaska Highway, new schools (including a vocational school at Whitehorse), a power dam at the Whitehorse Rapids, street paving, house building — all this erupted in the Territory as tangible manifestations of the belief that development meant building things and recreating southern-Canadian styles in a northern environment.²⁴

Diefenbaker's "Roads to Resources" programme implied that all the North needed to unlock its vast wealth were roads. A large northern national park, accessible and of great beauty, appeared to fit into the vision.

Besides this conducive political atmosphere, another factor lent impetus to a new initiative to establish a national park at Kluane. The area was now much better known to Canada's scientific community. The Alaska Highway had opened up the southwest Yukon to biologists with the National Museum of Canada and the Canadian Wildlife Service, who had carried out a number of studies: E. Godfrey studying birds in 1949²⁵; I.V.F. Allen, whose observations of mammals in 1949 were subsequently published by A.W. Cameron in 1952²⁶; J.D. Soper's studies of the proposed introduction of American wapiti and plains bison to the Yukon,²⁷ the status of caribou along the Alaska-Yukon boundary,²⁸ and waterfowl surveys²⁹; A.W.F. Banfield's studies of birds in 1953³⁰ and mammals in 1960³¹; and W.A. Fuller's reports on a general reconnaissance of wildlife in the southern Yukon in 1955,³² on Yukon caribou in 1957,³³ and on predator control in 1957.³⁴ It was therefore logical that the life scientists should thrust Kluane forward for a political re-run.

In January 1958, biologists in the Canadian Wildlife Service with long northern experience met informally in Ottawa to discuss the possible establishment of northern national parks. Two representatives of the Parks Planning Section were also present. The Canadian Wildlife Service was then a division within the Parks Branch (formerly Bureau) in the Department of Northern Affairs and

National Resources, even though CWS responsibilities were broader than national parks. Kluane was discussed at that meeting.

Two months later, the Deputy Minister of Northern Affairs and National Resources R. Gordon Robertson, writing an intra-department memo, said in part, "I have in mind that we should establish by Act of Parliament certain areas in the Territories as National Parks. I think one should be established in the Yukon, one or possibly two in the Mackenzie District of the Northwest Territories and possibly one on Baffin Island." He requested senior personnel of Parks, Northern Administration and Lands Branch, and Geological Surveys to meet and arrange for reconnaissance surveys of possible sites. Robertson envisaged the introduction of a bill to create this park by the fall session of parliament in 1958 or the spring session in 1959.

As a result of the meeting requested by the deputy minister, biologist W.A. Fuller and Parks Planner L. Ward were sent to the Yukon for two months that summer to assess six potential sites for a national park. Their field work was the first real technical study of the Kluane area, apart from the overview trip of Smart and Clarke in 1943. They divided the Kluane region in half – a northern or Donjek sector, and a southern or Dezadeash sector – thus creating two of the six potential park sites. Fuller devised a selection and scoring system, which resulted in the two Kluane areas ranking almost equally, but far ahead of the other four sites, in terms of suitability for a national park.³⁵ Fuller believed that the Donjek sector was best, while Ward preferred the Dezadeash sector.

While the Fuller-Ward assessment was in progress, Northern Affairs Minister Alvin Hamilton declared at a House of Commons committee meeting on Mines, Forests, and Water the government's intention to establish a national park in the Yukon. The *Whitehorse Star* of 17 July 1958 quoted Hamilton as saying, "Let's demand it right away. Why do people go to Banff? Basically because it's a national park with lots of international publicity. A national park in the north would be a powerful magnet for travellers." He went on to recognize the need to "try to find some area to set aside which would not involve too great a loss in potential resource development."

Not only did the park have ministerial and deputy ministerial support, but it also had the support of the Commissioner of the Yukon Territory, F.H. Collins, who, upon reading Fuller's report, wrote the deputy minister that he believed the Dezadeash sector should be made a national

park and the Donjek sector be "set aside as a 'wilderness area' under the administration of the National Parks Branch." In effect, he was advocating park status for both sectors.

Parks Director Coleman also supported the creation of a national park out of the combined sectors, totalling 8,750 square miles. While not including the St Clair Creek-Generec River area of the northern sector, the boundaries in his proposed park went up the Donjek River from its bridge at the Alaska Highway and thus included the caribou range of the Burwash Uplands, whose ultimate exclusion is still hotly contended by conservation interests. By a letter from the Acting Director of the Northern Administration Branch, Coleman had been made aware of concern over a possible loss to the mining industry of certain mineralized areas. Nevertheless, he wished to proceed with the establishment of the park, considering any possible loss to mining as a "calculated risk." He and his superiors and minister were ready to act.

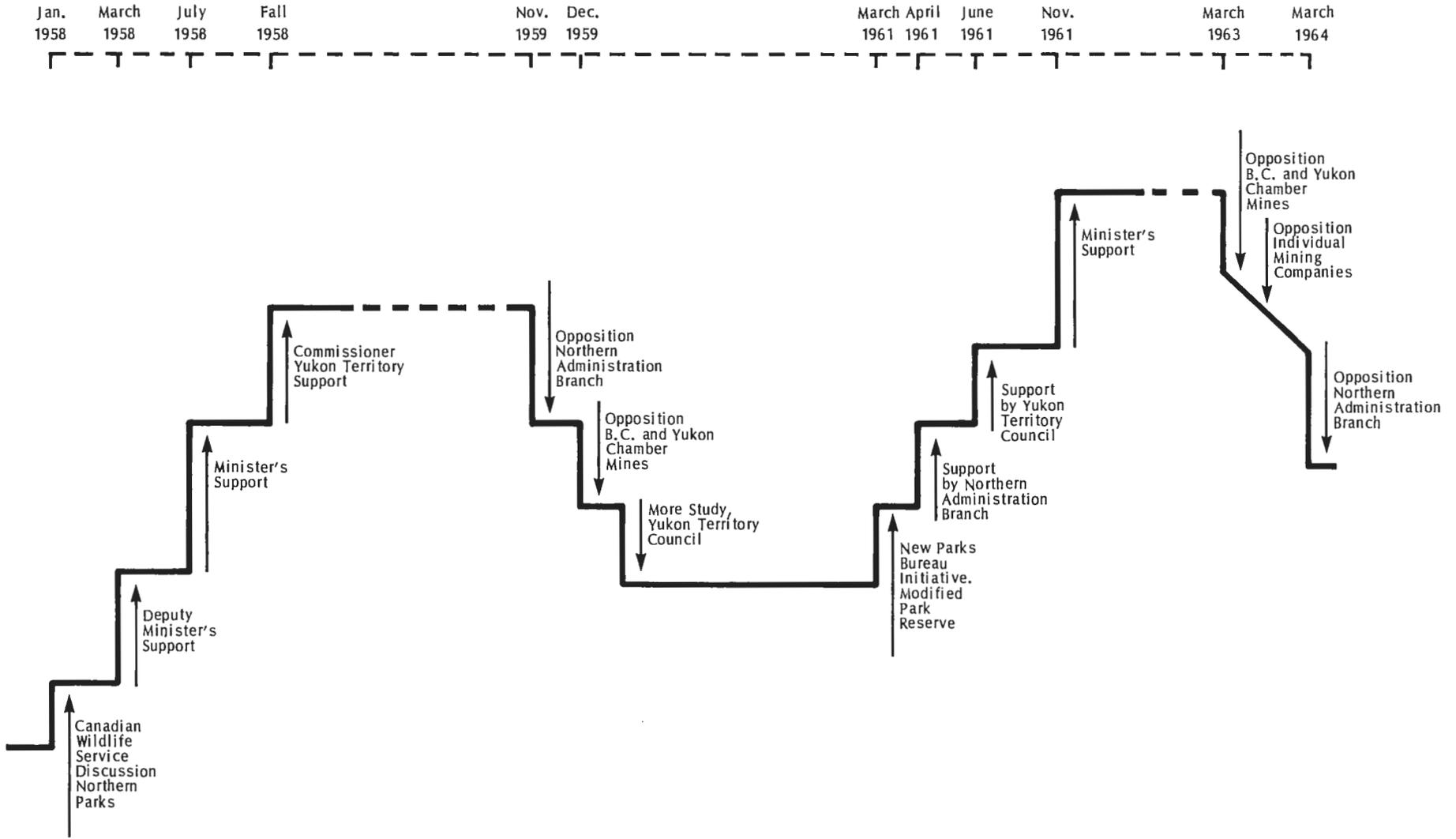
Could anything stop the park now? Apparently so. A full year later no bill had been put forward, even though in October 1959 (in a speech reported in the *Toronto Telegram*) Hamilton announced that "the Federal Government plans a network of new areas. Among them will be an area of 'spectacular beauty' in the Yukon."

Three agencies killed the park proposal: the Northern Administration Branch of the Department of Northern Affairs and National Resources, the Yukon territorial council, and the British Columbia and Yukon Chamber of Mines.

For some unknown reason, the Northern Administration Branch rather than the Parks Branch became the official voice of the federal government in communicating the plans for a park to the Yukon territorial council. The Director of the Northern Administration Branch, B.G. Sivertz, was at that time clearly opposed to the plan. In November 1959, he submitted the detailed park proposal to the Commissioner of the Yukon Territory, and asked for a response. However, in a three-page covering letter he made it clear that "we in the Branch think it would be folly to curtail exploration for minerals at a stage when it is quite impossible to estimate the potential of any large area in the entire northland." He was apparently convincing, since the Yukon Territorial Council called for "additional time for further consideration."

In December 1959, the B.C. and Yukon Chamber of Mines petitioned Minister Hamilton in opposition to Kluane Park. This marked the first entry of a lobby group

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that was destined to play a key role. The chamber's stance, as reported by the *Northern Miner* of 17 December 1959, was that "Any action that could have a restrictive effect on prospecting is deplored by the Vancouver-based organization." As the *Vancouver Province* of 10 December stated, the chamber felt "that the present and potential value of mining in the Yukon is much greater than its tourist potential." This last quotation is important, because the chamber reiterated it for many years. The viewpoint implied a consideration of national parks solely in terms of monetary gain, and made no reference to any other values which parks might have for man. This narrow concept of a national park explains the unwillingness of the chamber to strike any compromise; any national park, so perceived, was obviously inferior to mining interests.

In 1960 the park project was clearly stalled. In March 1961 Parks Director Coleman made what appears as a gallant effort to keep the project alive. He wrote his deputy minister that, "It would seem that some type of interim reserve, permitting mineral exploration, such as you suggest is the only way of resolving the problem of providing for a national park in the Yukon." Such status was not easy to envisage, since the National Parks Act excluded mining. Coleman proposed a new idea for what he called a national parks reserve, but this differed from that which already existed by placing the land under the control of the Parks Branch, which would allow a park to operate as any other national park, while at the same time permitting mineral exploration.

Coleman's idea gained support from B.G. Sivertz, which he conveyed to the Administrator for the Yukon on 14 April 1961, along with assurance that no park would be created without prior consultation with the Council of the Yukon Territory. The council responded two months later with a resolution that "this Council go on record as favouring the establishment of a National Park in the Yukon Territory. In this regard we request the Federal Government to take immediate steps to bring this into being." The resolution, however, was made confusing by a request that the federal government "take into regard the peculiar conditions that exist in this area concerning future mineral developments." In other words, the council, while wanting a national park, also asked for a reconciliation with mining views. In a letter to Yukon M.P. Erik Nielsen of 8 November 1961, the new Minister of Northern Affairs and National Resources, Walter Dinsdale, referred to this resolution of the

council as a "pious hope that somehow we reconcile the *irresponsible*" (which I believe was a typographical error and should have been "irreconcilable").

Minister Dinsdale, too, favoured action on the park. He told Nielsen, "I am prepared, as the Minister responsible for National Parks in Canada, immediately to recommend to the Government the establishment of this area as a National Park, because I am satisfied that there are many urgent reasons for acting." He qualified this view by outlining the idea of allowing mineral exploration for two years, during which time the Parks Branch would conduct more surveys and the mining industry could investigate further. He also noted that the geologist Bostock said that "further geological mapping would add little now," and that "although no major mineral deposits had been found in this mineralized zone, the area . . . should have potential." Dr Bostock had said much the same thing eighteen years earlier in 1943. Since then, mining had been completely free to operate in the area.

In summer 1962 the Parks Branch commissioned consultant W.M. Baker to study "Prospects for national park development in parts of the Yukon and N.W.T."³⁶ Baker advocated that national parks in the territories should include thousands of square miles, not hundreds. Since such a concept would inevitably draw opposition from the mineral industry, his solution was to reserve the area concerned and then conduct an exploration survey to determine exactly what mineralization might be present. If several mineral showings were uncovered, the area would be thrown open once again for prospecting; if no significant leads were found, then the area would be included in a national park.

The B.C. and Yukon Chamber of Mines, however, opposed both Coleman's idea of a national park reserve and Minister Dinsdale's idea of a park with two years of additional mineral exploration. In March 1963, park planner Lloyd Brooks floated the modified park idea at the First Northern Resources Conference in Whitehorse. According to the *Edmonton Journal* of 23 March 1963, he met a hostile response: "As soon as Mr. Brooks enters a panel discussion, delegates let him have it from the floor." The newspaper article also stated that the Yukon territorial council was now opposed to the park. Thomas Elliott, manager of the B.C. and Yukon Chamber of Mines, said that "creation of a park would mean putting the mineral resources in the deep freeze possibly for all time."

For three years thereafter, the mining industry kept up a barrage of letters to Ministers Walter Dinsdale and later Arthur Laing, and periodically published their viewpoints in Whitehorse newspapers. The arguments were always the

same — that mining was the base of the Yukon economy, that tourism was not and never would be as significant, and that mining did not detract from the use of land for tourism in any case. Sometimes an outright disdain was shown for the idea of national parks, as exemplified by one Vancouver mining executive's letter to the *Whitehorse Star* in April 1964: "It would be a most foolish move for us to lock up our mineral resources in a Federal 'deep freeze' simply for the sake of being able to say that we have a National Park."

The park proposal was completely killed by the new Director of the Northern Administration Branch, A.D. Hunt. Early in 1964, he wrote a response to Baker's recommendations. He opposed outright any national park larger than several hundred square miles, and stated that no matter how detailed and thorough an exploration search might be, it could still overlook or fail to reveal valuable reserves of minerals or oil. This was a drastic statement, because it declared that exploration was never complete. With the asserted primacy of minerals over any other values of Yukon lands, and a position of never completing exploration, other uses of the land were effectively precluded.

The park proposal was stalled again. It is constructive to examine how the proposal, with such strong backing this time, failed again because one interest group — the mining industry — opposed it. One would expect that the poor record of actual mineral output of the Kluane area would have seriously jeopardized the advocacy position of the agencies who argued the mining cause at Kluane. Placer gold had been extracted from creeks in the Kluane region in the late 1890s and early 1900s. Mining activity had died down by about 1915 when gold and copper strikes farther north, around Chisana, Alaska, drew miners away. A second but smaller flurry of placer gold mining took place on some of Kluane's creeks just after the region was made more easily accessible by the Alaska Highway. In 1967 J.E. Muller published an assessment of the gold extracted from the creeks of the Kluane region,³⁷ and from his figures it is possible to calculate that the total value of gold taken between discovery and the early 1960s was approximately \$705,000.³⁸ (By comparison, annual mineral production from all sources in the Yukon from 1959 to 1968 was between \$12 and 16 million³⁹). In addition to placer gold mining, one copper mine had come into operation in the early 1960s — Johobo Mine near Sockeye Lake, which shipped 2,000 tons of copper ore, worth very roughly only \$24,000.⁴⁰

Mining interests both inside and outside the government could ignore this lack of mineral production because the law was on their side. The Yukon Quartz Mining Act

(1924) and Yukon Placer Mining Act ensure that land should be available for potential mining. Even private land could be entered and mined, as long as compensation was made to the owner (Section 14, Quartz Mining Act; Section 18, Placer Mining Act). The Yukon Territorial Lands Act (1950) gave the Crown the power to administer and make regulations to control all Crown land, but gave the Crown no limiting powers on the two mining acts.⁴¹ Furthermore, the Kluane Game Sanctuary, being set up by territorial ordinance, did not prevent mining, since the land itself was not under territorial control — any game sanctuary ordinance could only prevent hunting. Admittedly, some members of the mining industry saw mining as only one important use of land. Such a person was James Hanna, president of the Yukon Chamber of Mines, who in April 1964 resigned this position because he did not support the organization's stance against national parks in the Yukon.

To summarize, the early park proposal was revived in 1958 by biologists of the Canadian Wildlife Service, and got official backing very quickly, strengthened by the first real technical assessment of the area. Then it met opposition from mining interests, expressed through the Northern Administration Branch, the Yukon territorial council, and the B.C. and Yukon Chamber of Mines. It was revised into a modified national park reserve idea, or national park after two years of further mining exploration, to which the first two organizations agreed, at least in principle, but the latter still vigorously opposed. Despite the support of two successive ministers, the project died when the new director of the Northern Administration Branch withdrew his branch's support and opposed any large national park in the North.

V Third Initiative

Even as the second initiative to establish the park died, events were occurring to make possible yet another attempt. In September 1964, the new Liberal minister Arthur Laing issued the long-awaited statement on National Parks Policy (thirty-four years after the National Parks Act). He restated and clarified the reasons for national parks: "The fundamental purpose of a National Park is comparable to that of a museum or art gallery," and "our National Park system has as its basic purpose to preserve, for all time, outstanding natural areas and features as a national heritage."

Moreover, two years previously, the National and Provincial Parks Association of Canada had been formed, a citizen conservation organization whose objective was "to encourage the expansion of both the national and provincial

parks systems and the preservation of places having outstanding natural or historic significance.”

By the mid-1960s, the Kluane region had become of even greater interest to the scientific community due to the establishment of the “Icefield Ranges Research Project” by the Arctic Institute of North America and the American Geographical Society. The project continues today, and “seeks understanding of the multiple facets that comprise the natural environment of the St Elias Mountains of Alaska and the Yukon Territory.”⁴² Through the vehicle of this research project, scientists have built up a wider understanding of northern natural processes; an awareness of the need to protect these natural processes by some means has led most of those involved in the studies to favour a national park.

Over the preceding decade the investments of the federal government in the Yukon had helped to establish a small economic base in mining: five mines were in production in 1967, some with the help of considerable government subsidy (\$4 million, for example, to Cassiar Asbestos in Clinton Creek⁴³). These mines may have strengthened the anti-park arguments of mining interests. However, government service industries were still the basis of the economy of the Yukon, employing in a full or part-time capacity more than half the total population.⁴⁴ The rationale for the national park described by Gibson more than twenty years previously was as valid in the mid-1960s as it had been in the mid-1940s: a park would “conserve and create valuable assets for the Territory . . . conserve big game resources and magnificent scenery, will provide employment for residents, will attract tourist travel and funds . . . add to the prestige of the Territory throughout the world.”

By 1967 the stage was set for another initiative, this time under a Liberal administration. Senior parks planner H. Eidsvik envisaged a modification of the old park reserve idea to accommodate the viewpoint of the Northern Administration Branch. His idea was to establish a core park for a few hundred square miles, and to reserve adjacent land for periodic review for inclusion into the park at specified later dates. Eidsvik and park planner D.E. Cline conducted a study in August 1967 to define the boundaries of a core area. Simultaneously, air photo consultant H.E. Dishaw of the firm R.C. Thurber and Associates, Victoria, conducted a study of areas of potential public use.⁴⁵

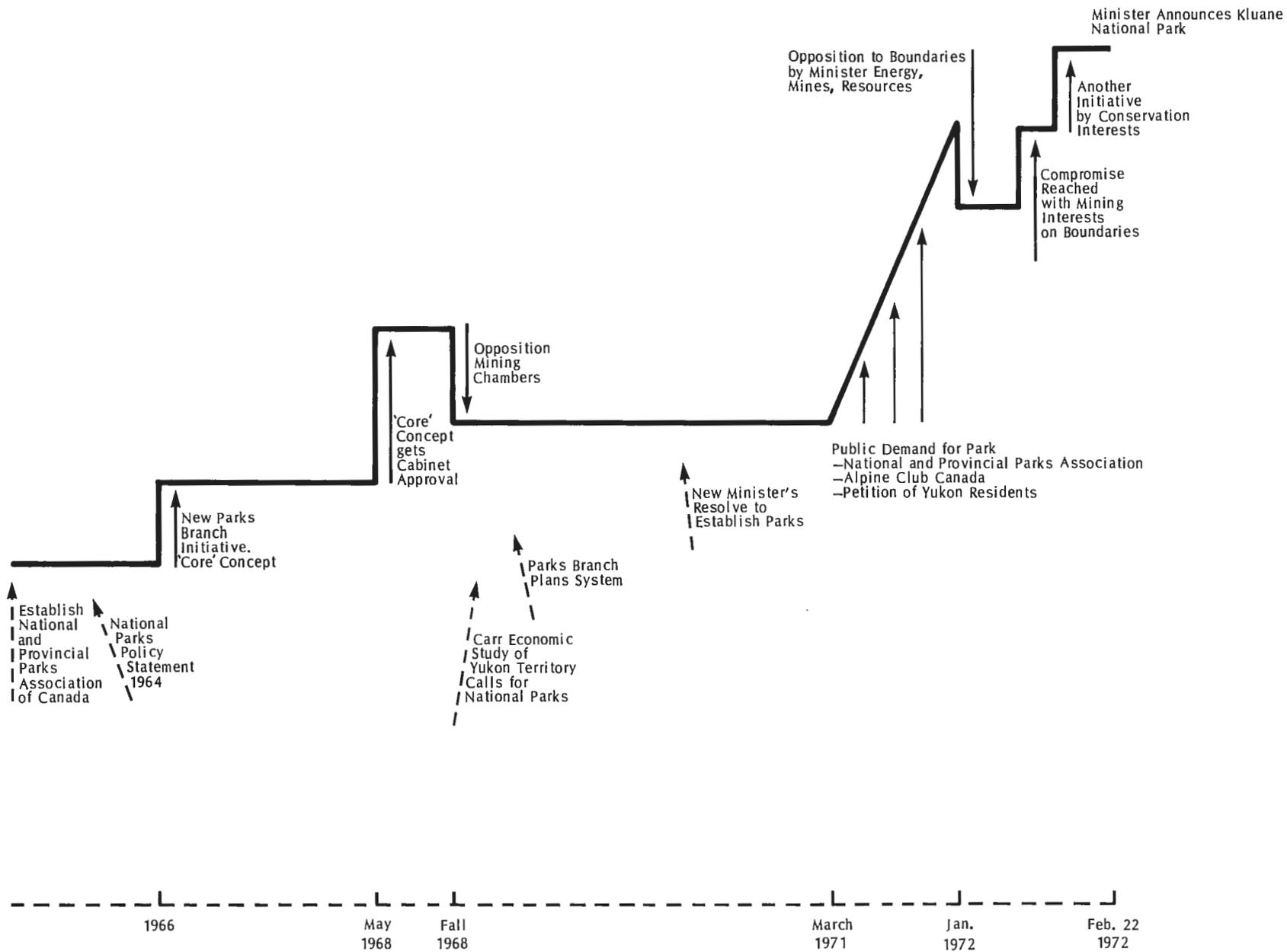
At the Second Northern Resources Conference early in 1968, J.H. Gordon, Assistant Deputy Minister of the Department of Indian Affairs and Northern Development, presented the “core concept.”⁴⁶ Specific areas were not the

subject of his address, since Cline’s report was not yet complete; rather, the concept was discussed. At the same meeting, T.J.R. Godfrey of the B.C. and Yukon Chamber of Mines proposed a “Territorial Park” for the Kluane area.⁴⁷ This park, as he explained it, would be managed by the Yukon territorial council under the philosophy of multiple use, thus placing no restrictions on mining.

The core-plus-reserve concept for a Kluane National Park went to Cabinet on 3 May 1968 and apparently met with some approval. One year later, the new Minister of DIAND, Jean Chrétien, replied to the author’s letter of enquiry about the status of the proposed park by stating that the government’s intent was to establish a core area first and add to it later. However, the core concept was opposed by the mining chambers, on the basis that exploration would never be considered complete. By the time Cline’s report was finished, in October 1969, the core concept which he advanced had met such stiff opposition that the report was prefaced with the comment that its value lay solely in its documentation of the issue.⁴⁸ This new initiative to establish the park had failed, again because of the unwavering stance of certain spokesmen for the mining industry.

Nevertheless, under Chrétien a new series of events gave the park proposal another thrust. One such event was the publication of the “Carr Report” in November 1968. This report, commissioned by the Department of Indian Affairs and Northern Development, was a major study by D. Wm. Carr and Associates Ltd., entitled *The Yukon Economy — Its Potential for Growth and Continuity*. Volume IV, *Reference Studies on Social Services and Resource Industries*, contained a delineation of a “promising copper-gold belt, centered on Whitehorse and extending nearly 350 miles in an east-west direction from Wolf Lake to Beaver Creek across a 75-mile width.” This belt overlapped with only 500 square miles of the Kluane Game Sanctuary. The report made it clear that the establishment of the full Kluane Game Sanctuary as a national park would not rob the Yukon of its potential to develop mines, but would in fact take away less than ten percent of the “promising copper-gold belt” from mining exploration. On the subject of national parks, the Carr Report stated, “The evidence would indicate in the long run the benefits to the permanent economy will be greater if much of the best of the Yukon’s spectacular scenery is soon reserved and developed as a natural wilderness area.” It added, “because the tourist industry can make a major contribution to the stability and output of the Yukon economy

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and because wilderness reserves will make a major contribution to the tourist industry it is recommended that early action be taken to reserve suitable areas for National Parks.” The Carr Report also stated that

tourism has been making a steadily increasing contribution to the growth of the Yukon economy. At this stage in the progress of wilderness in North America, the Yukon Territory may offer a haven of natural wilderness recreation that is particularly attractive to the increasing number of families who have the leisure and income to enjoy it. These three contributions of tourism to the Yukon economy — its stabilizing influence, its economic value, and its natural wilderness atmosphere — suggest that it can have an essential value in the future of the Yukon Territory and that this value will contribute substantially to the economic potential of the Yukon.

While the significance of the Carr Report is not clear, it perhaps began to solidify the support for the park by the Yukon territorial council, which had often changed positions in the past. The report clearly did not influence the Yukon Chamber of Mines, which made its most outspoken statement to a special parliamentary joint committee on the Constitution of Canada in September 1970:

The Chamber of Mines has a very definite policy in respect of national parks. It is not in favour of a national park; it is in favour of parks which could be better termed multiple-use parks in which the harvesting of all the resources in the area is permitted. . . . Any area can be set aside as a multiple-use park and achieve the same results that are intended by the National Parks Act.⁴⁹

The National Parks Act, quoted earlier, states that “Parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations.” The 1964 National Parks Policy states that “impairment implies protection against private exploitation.”

A more obviously direct impact on the park proposal than the Carr Report was the new minister’s intention to expand the national parks system. His resolve was aided by the *National Park System Planning Manual*, produced in 1968 by the Parks Branch, which sub-divided Canada into thirty-nine natural regions, all of which were to be represented in an eventually complete national park system. This systematic approach to planning was patterned after a similar system in the United States National Park Service.

Chrétien developed a special interest in establishing northern national parks, as later events demonstrated. This

may have been part of the federal government’s new concern about environmental matters in the North. The degree to which this concern, which spawned a number of pieces of legislation (the Northern Inland Waters Act and the Arctic Waters Pollution Prevention Act, both promulgated in 1970), was the result of a perceived need to establish greater Canadian sovereignty in the North or a response to general public concern over the environment, is open to conjecture. In 1970 Parliament passed an amendment to the Territorial Lands Act, which enabled the Governor in Council to establish land management zones for ecological protection and to issue regulations to control land use operations. Subsequent to the amendment, the Territorial Land Use Regulations (TLUR) were proclaimed in late 1971. These regulations finally put some environmental constraints on land operations in the Yukon. Eight months previously, Commissioner of the Yukon James Smith, when questioned about the protection of Yukon lands, had remarked, “It appears to me that they can simply point a bulldozer in a particular direction and keep on going . . . that is the total regulation that I am aware of . . .”⁵⁰ The TLUR, however, only applied to land within designated “land management zones,” leaving much of the Yukon Territory still in the state described by Commissioner Smith. While the Kluane region fell within a zone, the regulations did not apply to mineral claims staked in the Yukon.⁵¹

Public support was a decisive factor that made it possible for Chrétien to create Kluane Park where the three preceding ministers, all of whom had wanted to do so, had failed. Even the Yukon Conservation Society had not previously supported the park. In 1969 its president, John Lammers, had stated that there were many other environmental problems which needed attention in the Yukon, and that establishment of the park would cause these problems to be ignored.⁵² But the Alpine Club of Canada had held a different view. In 1967 it had sponsored a number of “Centennial Year” climbs in the St Elias Mountains. Climber James Thorsell wrote in *North* magazine, “If this land is to remain ‘steeped in eternal beauty,’ steps for its preservation under national park status would be welcomed by many Canadians.”⁵³ This article was followed in March 1971 by the Alpine Club’s extensive twelve-page proposal to Chrétien which briefly reviewed the history of the issue, values of the area, and called for creation of Kluane National Park to include all of the park reserve as amended in 1944.

In May 1969, while at Kluane, I first wrote to Chrétien in support of the proposed park. Other than a letter of 21

November 1942 from Professor J.R. Dymond, who was then Chairman of the Committee on the Preservation of Natural Conditions for Canada and Newfoundland, this is only letter in the Parks Canada files from the public or outside government organization. Chrétien's reply, referred to earlier, was that the government intended to follow the "core concept" in establishing a park at Kluane.

Because of the uncertainty that a park would be established after so many years of stalemate, in December 1970 I informed the Director of the Parks Branch, John I. Nicol, that I hoped to focus public attention on the issue. Information from biologist A.M. Pearson of the Canadian Wildlife Service, stationed in the Yukon Territory, indicated that the "core" park would only be 750 square miles, centring on the Slims River and containing much icefield, and that there was still considerable uncertainty as to whether even this area would come into being as a park. Upon learning of these facts in April 1971, the National and Provincial Parks Association wrote a two-page brief to Minister Chrétien, outlining its strong support for a large park:

we sense the ease of compromise with the mining industry by establishing only a small park of a few hundred square miles in area. Such is hardly worth the effort We are asking you to establish Kluane National Park now . . . thus giving Canadians a significant park in the Yukon, and preserving for all time the magnificence of our highest mountains.

In May 1971, Nicol was informed that I intended to act on the Parks Association's behalf on the Kluane issue, and would carry out a survey of the area that summer. Soon after, park planner Gerry Lee was sent to reappraise the area. Wide public exposure was given the issue in the fall of 1971. Ironically, the *New York Times* was the first newspaper to carry an article. The *Times*' report included a partial defence of a small park by the Parks Branch.⁵⁴ This defence drew the fire of the Parks Association, whose president, Dr J. Gordon Nelson, began to pressure the minister because of what he felt was lack of resolve within the Parks Branch. Further publicity was given the issue through an article which appeared in *B.C. Outdoors* magazine in October, in which the public was asked to write Chrétien with their views on a park at Kluane.⁵⁵ At the same time, Chrétien was informed by the Parks Association of its intention to publish a fifty-page documentation of the issue, and its stance that the Kluane Game Sanctuary and Kluane Lake all be included in the park (Figure 3). The letter stated, "In view of

the action we are taking, and the very considerable cost involved in preparing and publishing our report, I sincerely hope that you will not make a decision to establish a National Park in the Yukon of lesser size than we are recommending until the report has been published and the people of Canada have had ample opportunity to react to it." The Parks Association was calling for the sanctuary boundaries plus Kluane Lake (10,700 square miles), on the basis of criteria consistent with those in the statement on National Parks Policy of 1969:

To be considered as a potential National Park an area must be worthy of preservation. This means that it should:

- (i) be an outstanding example of the best scenery in Canada, or*
- (ii) have unique scenic, geographical or geological features of national interest, or*
- (iii) have outstanding examples of flora and fauna of national interest, or*
- (iv) provide outstanding opportunities for enjoying appropriate non-urban forms of outdoor recreation amid superb surroundings.*

The Kluane region obviously qualified as a park in all four respects. The eastern and northern boundaries were proposed by the Parks Association on ecological criteria to fit the National Parks Policy Statement that:

National Park planning should give full consideration to character, size, shape and location of park areas in order to provide for,

- (i) year-round ecological requirements for the indigenous animal species, especially those with migratory habits and,*
- (ii) preservation of representative and unique geological formations and other natural history objects.*

In the Yukon Territory, biologist Manfred Hoefs, who was studying Dall's sheep at Kluane Lake, prepared a petition in support of the park in summer 1971. The petition stated in part, "We cannot speed up government action through apathy and indifference. This petition is meant to indicate that there are at least as many local people interested in conservation and preservation of this unique wilderness as there are people interested in exploiting it." And there were! The petition was sent to Ottawa with more

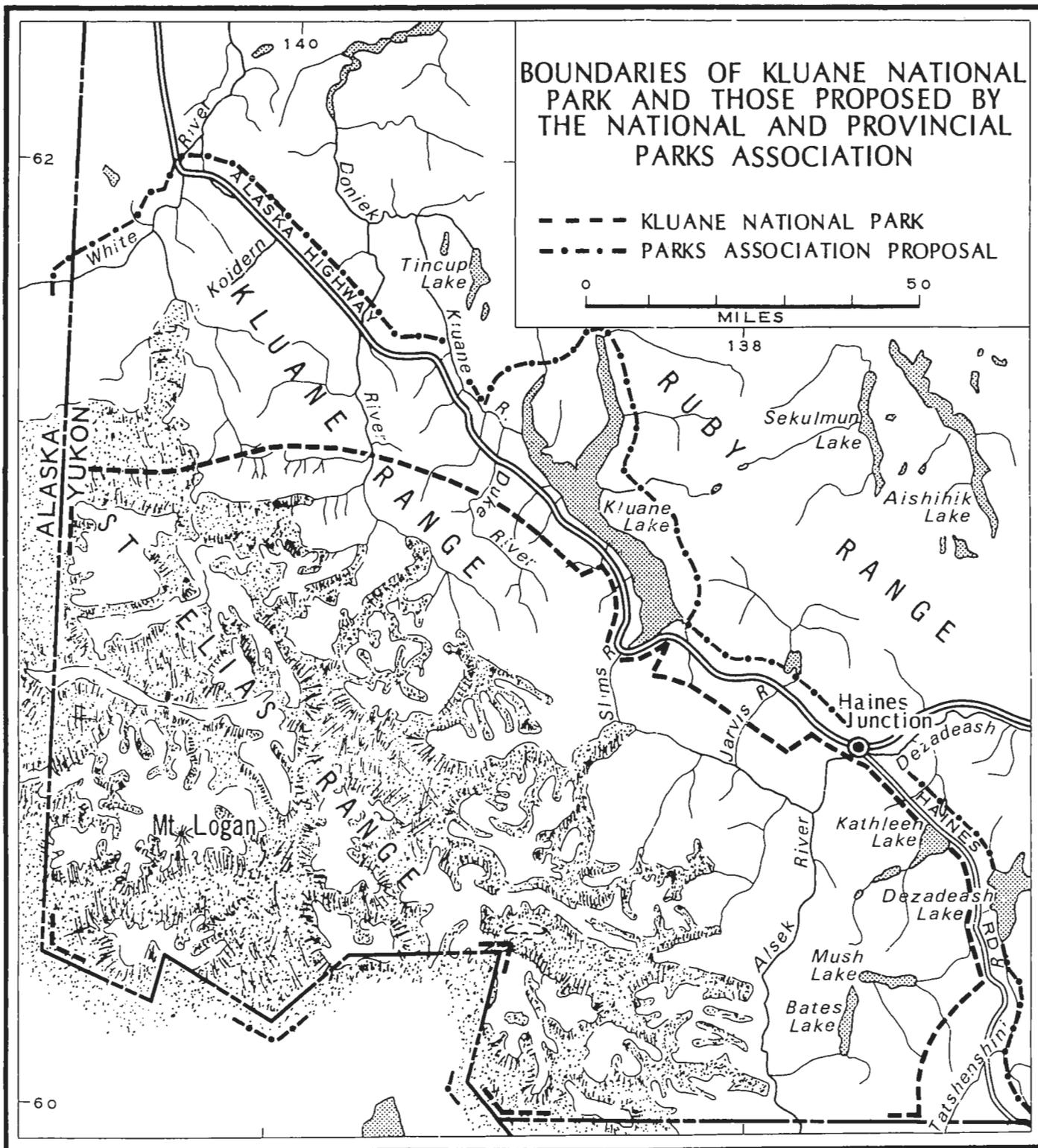


Figure 3

than 1,200 names on it, all from the Whitehorse area (population 12,000) and the Alaska and Haines highways adjacent to the sanctuary (about one tenth of the total population of the area). This show of local support may have been very significant in resolving the issue, in its impact on both the Yukon territorial council and the federal Cabinet.

In the July-September 1971 issue of the *Canadian Field-Naturalist*, Hoefs and W.G. Benjey wrote an article, "The Park in Perpetual Planning: Kluane Park Reserve, Yukon," in which they outlined the issue and appealed to the public to write Chrétien and their Members of Parliament.⁵⁶ In January 1972 the Parks Branch was asked to supply answers to questions about Kluane for the *Canadian Magazine*, and was thus made aware of the very wide public exposure that would be given the upcoming issue.

At this point, the minister acted. On 22 February 1972 Chrétien announced the government's intention of establishing Kluane National Park, encompassing 8,500 square miles⁵⁷ (Figure 3). This land was immediately transferred by Order-in-Council to the control of the Parks Branch. Announced with Kluane was a new national park at Nahanni in the Northwest Territories, and one on Baffin Island, the three parks totalling 18,500 square miles and increasing Canada's national park system by more than fifty percent. This was one of the greatest days in the history of the conservation movement in Canada.

The article in the *Canadian Magazine*,⁵⁸ and the author's publication for the Parks Association,⁵⁹ both of which the minister knew were planned and would support his action, thus came out after the park was announced. Both articles were altered to present what conservation interests thought were doubly compromised boundaries. This topic will be discussed in the next section of the paper.

During this period leading up to the announcement of the park, the Parks Branch had been active in again trying to reach a satisfactory compromise with the mining interests. In mid-January 1972, the Department of Energy, Mines, and Resources was consulted concerning the mineral potential of the three proposed territorial parks. Minister Donald S. Macdonald wrote to the author that his department was

aware that there are many mineral occurrences within the park area, particularly along the northern boundary. However, these occurrences have never been properly assessed by anyone and we are unable to state whether or not they have or ever will have economic significance.

While his department supported the other two parks, he

implied that he was not satisfied with the proposed boundaries of Kluane. As a result, a meeting was held a few days later in Vancouver between the Assistant Deputy Ministers of the Department of Indian Affairs and Northern Development, Commissioner of the Yukon Territory James Smith, and representatives of the Yukon Chamber of Mines and the B.C. and Yukon Chamber of Mines. At that meeting the mining industry apparently indicated the areas which it felt were its highest priorities; however, no public statement came out of the meeting and no notes or tapes were permitted, so its proceedings are unknown. This was the first and only time that the federal government initiated any meeting with any segment of the public over Kluane, and it was with a select audience representing only one interest group whose views had been known for many years.

As an important sidelight to that meeting, one month after the announcement of the government's intention to establish the park, the Third Northern Resources Conference was held in Whitehorse. It included a panel discussion on Kluane. At that time, Assistant Deputy Minister John Gordon was hotly criticized by the same individuals in the Yukon Chamber of Mines who had been at the meeting in Vancouver (especially R.E. Van Tassell) because Parks Canada had not, in good faith, laid out maps and explained its intentions. Gordon had earlier been involved in another long battle to establish a park, at Artillery Lake in the Northwest Territories. There it had been the same story. The Northwest Territories Chamber of Mines had vigorously opposed the park, on the grounds that "The proposed park is smack in the middle of what the Chamber sees as one of the most exciting areas for potential mineral development in the North."⁶⁰ Moreover, there was the same disdain over parks: "And beauty — eight months of the year, it will be frozen solid."⁶¹ Nevertheless, on 24 June 1969 the Parks Branch had met with the Northwest Territories Chamber of Mines in Yellowknife and had laid out maps and explained its intentions. The result was that chamber members immediately went out and staked areas of interest to the Parks Branch.

Chrétien's announcement was not the end of the Kluane issue. A national park is not created until an Act of Parliament amends the National Parks Act and, following that, royal assent is given by the Governor General. Important conclusions can be drawn, however, from the vantage point now reached. Most obvious was that public support for the park, a missing ingredient until this time, had been a key factor in allowing the fourth minister who favoured establishing the park actually to do so.

Second, one may suspect that the timing of the announcement of the northern parks was part of an over-all government strategy on northern development. There was soon to be a “big push” for a Mackenzie Valley Pipeline. Two months later, Prime Minister Trudeau announced the \$100-million construction of a Mackenzie Highway (during the previous winter, thirty-three miles of road common to both the Dempster and Mackenzie highways were built south of Inuvik).⁶² The government was considering expansion of the offshore drilling programme in the Beaufort Sea.⁶³ And in June 1972, the “Expanded Guidelines for Northern Pipelines” were tabled in the House of Commons.

Third, the Parks Branch had reached a new level of sophistication with its new focus on system planning, which placed the creation of Kluane Park in the framework of a total national parks system.

Fourth, the mining interests still refused any compromise when the core principle was advanced. Their residual power in this issue was acknowledged by a private meeting, in which they were consulted but not confided in.

Fifth, Parks Canada now had an axe over its head; there were soon to be problems caused by its failure to provide an adequate forum to hear the views of different interest groups.

VI New Period of Conflict

Chrétien’s announcement of his government’s intention to establish Kluane National Park surprised some factions of the public (such as the native people), and the boundaries which he announced surprised all. The reactions of public groups were to some degree a reflection of the fact that the government had failed to involve them in the issue up to this time. That the full voices of the public would now be heard was not part of any design for public involvement, but a result of the parliamentary procedure. When an Act of Parliament is to be amended, a formal vote must be taken in the Senate and House of Commons. Even though these bodies are not normally forums of direct public debate, some factions of the public succeeded in inserting their views into their deliberations about Kluane National Park.

Upon announcement of the park, personnel of Parks Canada moved onto the site and began setting up a skeleton administration. During summer 1972 a superintendent was appointed, wardens were posted to the park, and funding for initial resource inventories was made available and partly spent, all on the strength of the Order-in-Council placed by Chrétien. These actions may have added fuel to the fire,

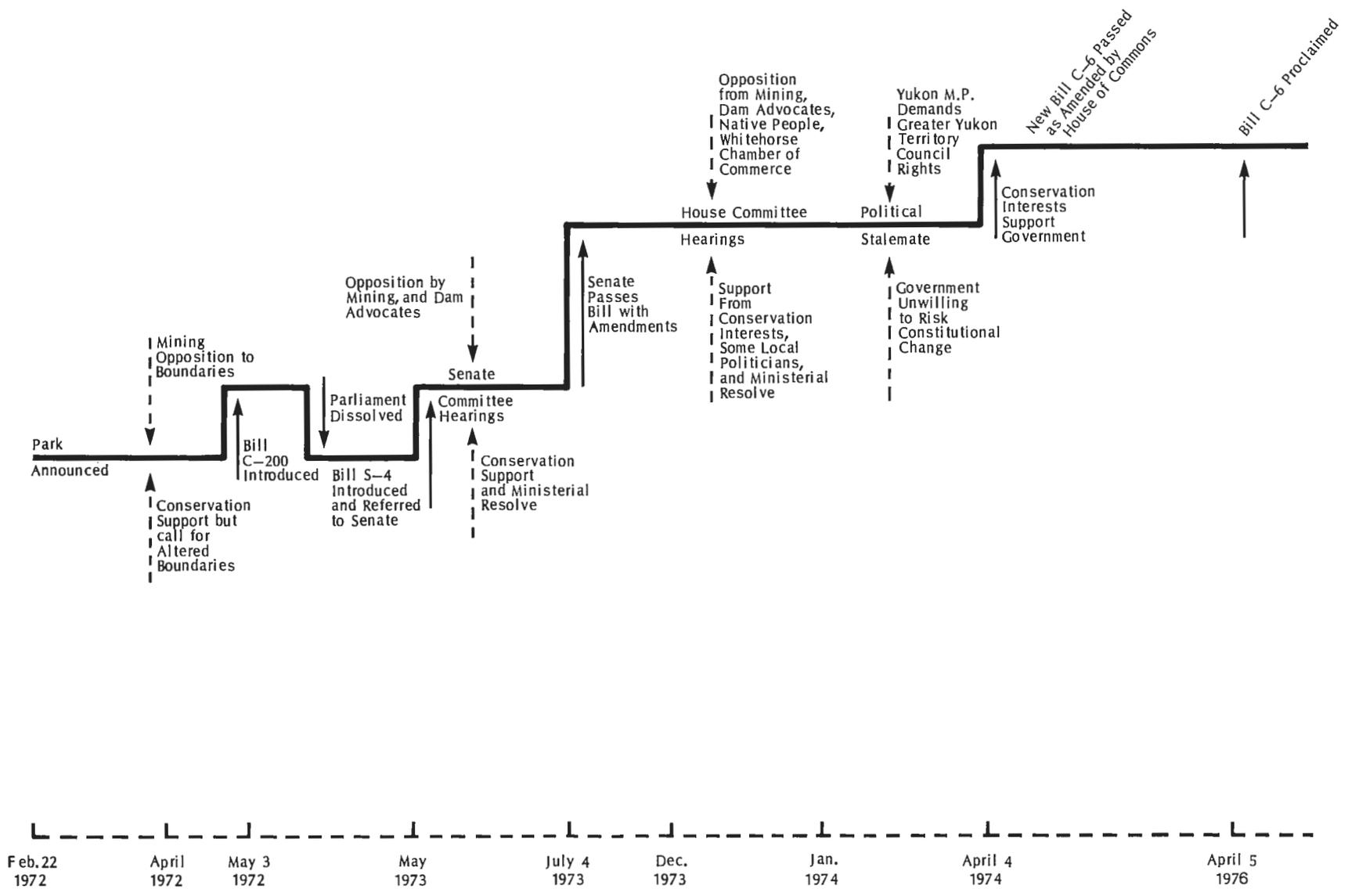
since the park appeared to be a *fait accompli* despite its lack of legal status.

On 3 May 1972, more than two months after the announcement of the park, Bill C-200, “An Act to Amend the National Parks Act,” received first reading. This act would establish all three northern parks. It eliminated the rights to locate mineral claims on any Crown land in the Yukon, which are upheld in the Yukon Quartz Mining Act, by stating that Bill C-200 operated “notwithstanding any other Act of the Parliament of Canada.” Besides making legal the three northern parks, the act included “housekeeping clauses” unrelated to these parks: Sections 5, 6, 7, 8, and 10 made small alterations in boundaries of existing national parks; Section 3(1) Subsection 7(1) allowed provinces to contract concessions in parks. This effort to get all matters attended to in one act placed some public organizations (such as the National and Provincial Parks Association) in the awkward position of qualifying their support for this important bill by opposing the latter clause about provincial concession-granting rights. In any case, Bill C-200 died without further debate when Parliament was dissolved.

One year later, in May 1973, the new minority Liberal government introduced Bill S-4 with the same title as the previous bill, but with the deletion of any reference to provinces contracting concessions in national parks. Bill S-4 was referred to the Senate on 22 May 1973. A motion by Senator Arthur Laing, who had formerly been the minister in charge of national parks, referred the bill in turn to the Senate Standing Committee on Banking, Trade, and Commerce. Why this unlikely-sounding committee was the one chosen for debate is not clear, but it may have reflected the Senate’s concern over the impact of the bill on the mining industry. Nevertheless, this committee — acting on the appeals of certain groups — provided the first forum for formal public debate on the establishment of Kluane Park. It held four meetings, all in Ottawa, on 30 May, 6 June, 13 June, and 27 June 1973.⁶⁴

At the first three meetings, representations were made by those public interest groups which actually knew that the meetings were being held. Many groups did not know of these meetings, and so only partial public reaction to the park was provided to the senators. The full Senate passed Bill S-4 on 4 July 1973, and the bill was then referred to the House Standing Committee on Indian Affairs and Northern Development, on 7 December 1973. This committee had previously been charged with the task of hearing public opinion on the Annual Report of the Department of Indian

NEW PERIOD OF CONFLICT, AND POLITICAL STALEMATE



Affairs and Northern Development for the period ending 31 March 1972, a period which included the government's statement of intention to establish the northern parks, and had been touring the country holding meetings. The day before receiving Bill S-4 for consideration, the committee had decided to reschedule a trip to Whitehorse. Thus, subsequent meetings in Whitehorse were to obtain public response to the Annual Report rather than Bill S-4, although the issue of Kluane Park was common to both. The House Committee held public hearings in Whitehorse on 11 and 12 December.⁶⁵ Bill S-4 was debated by the same committee in four subsequent meetings in Ottawa, on 18 and 20 December 1973, and 7 and 9 January 1974.⁶⁶ At these latter two meetings to debate Bill S-4, the public was not invited.

The following major public interest and other groups were involved in this period of conflict:

- Conservation interests, led by the National and Provincial Parks Association of Canada and the Alpine Club of Canada;
- Mining interests, led by the British Columbia and Yukon Chamber of Mines and its subsidiary, the Yukon Chamber of Mines;
- Local mining claim holders, not organized;
- Dam building interests, led by a private citizen;
- The native peoples, led by three Yukon native groups; and
- Local economic interests, led by the Whitehorse Chamber of Commerce and the Haines Junction Local Improvement District.

Each of these groups had its own perspective about the establishment of Kluane, and tried to express it as opportunities arose. None knew what process of public involvement would emerge prior to legal establishment of the park, because the government had not planned the form which public participation might take. The interest groups were therefore opportunists, and the strength of their cases rested not only on the validity of their arguments but on their unequal opportunities and abilities to express their viewpoints.

Among conservation interests, the National and Provincial Parks Association responded to the announcement of the park with support for the area that was made park, but with a strong objection to the boundaries which excluded very significant park features (some of which, like the mountain caribou range on the Burwash Uplands, had been listed as significant for a national park in Region 6 in the *National Park System Planning Manual*⁶⁷). The association

stated that the park's boundaries were a compromise of a compromise, and should be re-drawn to include the whole Kluane Game Sanctuary and Kluane Lake. This would be a compromise with the mining interests by taking only sixteen percent of the Yukon's copper-nickel belt (including Kluane Lake), as identified in the Carr Report, rather than compromising further by leaving out additional land in the sanctuary, especially since that land contained essential valley areas for wildlife and people, the only caribou range, a number of unique features such as the Duke meadow, Pickhandle waterfowl lakes, the only major salmon spawning streams and attendant bald eagle and bear habitat, and the region's most historic feature, Dalton Post. The association pointed out that less than 2,000 square miles of the park were usable by wildlife, or people other than experienced mountain climbers. The remainder of the park was ice or precipitous rock.

The National and Provincial Parks Association also questioned the validity of the mining interests in the northern area. A major Canadian mining failure at Quill Creek, in the Kluane Game Sanctuary just north of the park's boundaries, seemed to the association to cast serious doubts upon the stance of the Chambers of Mines as to the value of the area. In June 1972, Hudson Bay Mining and Smelting Co. Ltd. had begun production of a published nickel-copper ore reserve of 738,000 tons. The company had built a huge ore concentrator in the Kluane Game Sanctuary beside the Alaska Highway at Mile 1111. Concentrated ore was to be transported by truck to Haines, Alaska, and then by ship to Japan. This mine lasted less than one year and, according to a shareholders' report, lost \$9.4 million after more than \$4 million tax relief.⁶⁸ The mining paraphernalia and concentrator are still there in disuse, in the "sanctuary."

The National and Provincial Parks Association made its views known at the Fourth Northern Resources Conference in April 1972. The "conservation lobby" as a whole then embarked on a campaign to back its stance with wide public support; it did not make *in camera* submissions to the government, but rather published a series of reports and articles in magazines, each of which was sent to Chrétien, House Standing Committee members, other selected Cabinet ministers, and top civil servants in Parks Canada.⁶⁹ Its viewpoints were therefore open to wide public scrutiny. In one article, it even challenged the Minister of Energy, Mines, and Resources, Donald Macdonald, to defend his department's position that the area held mineral values. The

challenge was refused. Besides public writing, the conservationists' point of view was put forward by the media — primarily the article in the *Canadian Magazine* mentioned earlier,⁷⁰ and the television programme *This Land* in February 1975.

The National and Provincial Parks Association was not aware of the hearings of the Senate Committee on Banking, Trade, and Commerce until three of the four meetings were over.⁷¹ No outsiders were permitted at the last meeting. Realizing that conservation interests had not been represented, I wrote Chrétien on 14 June 1973, reiterating conservationist support for the bill as a minimum size for the park and requesting that the letter be transmitted to the chairman of the Senate committee.

History repeated itself with the hearings of the House Standing Committee on Indian Affairs and Northern Development. The National and Provincial Parks Association learned of them by accident on 10 January 1974, the day after the public meetings in Whitehorse and closed meetings in Ottawa had ended. On 17 January the association submitted a brief to the committee, entitled *Proposal for Park Reserve Status for Land Adjacent to Kluane National Park*, drawing on new information on caribou distribution near Kluane. This information, however, was too late for effective consideration.

The Yukon Resources Council was the only conservation organization which knew of and made representation at any hearings. At the House Committee's second Whitehorse hearing, the chairman of the Yukon Resources Council, M. Brine, reiterated a similar viewpoint to that of the Parks Association.

The National and Provincial Parks Association, joined by the Canadian Nature Federation which in 1975 had passed a formal resolution recommending enlargement of the park, and the Federation of Ontario Naturalists continued to press for boundary changes with the publication of "Yukon's Burwash Uplands, The Need for Inclusion in Kluane National Park."⁷² That publication, which was circulated to all major conservation organizations, generated considerable pressure through a flood of letters to the new minister in charge of national parks, Judd Buchanan. It pointed out that the upland-tundra plateau was exceedingly valuable to the park, primarily because of its mountain caribou population and its spectacular scenery. No similar tundra plateau is included in the park.

The three above-named organizations played one further important role by helping break a political deadlock

that developed in the House Standing Committee, as will be discussed in the following section of the paper.

The Alpine Club of Canada did not make any further representations to the government about Kluane, even though their 1971 proposed boundaries were not followed. With the St Elias Range well protected, presumably those people interested in climbing were satisfied. They did, however, appeal the boundaries of the other two northern parks in briefs to the minister, by direct representation at the first two Senate committee hearings.

On the part of the spokesmen for the western mining interests, there was no unanimity in their responses to the announcement of the park. The *Globe and Mail*, reporting on the press release which announced the park on 22 February 1972, stated that the British Columbia and Yukon Chamber of Mines had met with senior park officials and indicated the need for further exploration before any decision on the size of the park was made. One member of the chamber's parks committee said, however, that "on the basis of unofficial description of the park's boundaries [an accurate map was in the newspaper] my initial reaction is one of relief. Most of these mineral districts seem to have been excluded from the park." The Yukon Chamber of Mines, headquartered in Whitehorse, reacted differently. At a panel discussion at the Fourth Northern Resources Conference less than two months later, it objected strongly to the inclusion of the southeast part of the park and most of its frontage on the Alaska and Haines highways. The chamber proposed deletion of these areas with the balancing inclusion of remote areas north of the park boundaries near the terminus of the Klutlan glacier.

Thereafter, the Yukon Chamber of Mines pursued a very different strategy than the conservation interests. They were privy to the Senate and House committee meetings, and made their views known directly there rather than attempting to gain wide public support for their viewpoint. In fact, the date of the third hearing of the Senate committee was set to accommodate the chamber. At that hearing, the representative of the chamber submitted a different position from that expressed at the Fourth Northern Resources Conference, namely that the decision on the boundaries in the southeast area should be postponed until further exploration was conducted. He stated that "we are not asking that the area be excluded," which was in fact what they had asked for previously. Senator Laing observed,

I think there has been a change of heart on the part of the Chamber of Mines. They have varied their opinion of this

*matter from one time to another. I was not in touch with the Chamber of Mines, but I have a letter from Mr Smith, the Commissioner, who, I have no doubt, was reflecting the opinion of the Council [of the Yukon Territory] at that time, and he also told me in discussions today — this was dated March 27 — with the executive of the Yukon Chamber of Mines, they would now appear to be quite agreeable to the boundary of the national park.*⁷³

In all future representations, the chambers continued to maintain that more time was needed for exploration. The British Columbia and Yukon Chamber of Mines knew about the House Standing Committee hearings in Whitehorse, and made representation at the first of these on 11 December; the Yukon Chamber of Mines made representation at the second on 12 December. While their main point was that more time was needed for exploration, they included other concerns such as economic loss for the Yukon, the hydro-electric power potential, the dangerous expansion of the national park system, the viewpoint that the Kluane scenery is not spectacular, and the belief that wildlife is well protected with sanctuary status where mining is free to operate. Mining interests did not raise, nor were they questioned about, the failure of the Hudson Bay Mining and Smelting Co.'s Quill Creek mine.

Local mineral claim holders had no organized voice, and the Chambers of Mines did not mention any specific concerns on their behalf. Although there were in excess of a hundred claims, mostly placer, representing fifty to sixty claim holders, either these people preferred to be bought out and therefore did not raise objections to the park, or they represented primarily individually-owned or very small company-owned holdings for which the chambers did not speak. Upon announcement of the park in February 1972, Parks Canada began individual negotiations with mineral claim holders. Only one individual voiced concern, bringing to the attention of the second meeting of the Senate committee his company's belief that their claims were worth \$18 million. He was assured that negotiations between Parks Canada and his company would continue, and that Parks Canada intended to extinguish all claims, according to their general policy on national parks.

“Dam building interests” were represented by one man. A proposal to dam the Alsek River and reverse the flow of a large section of the Yukon River's upper drainage (the White, Donjek, Slims, Dezadeash, and upper Alsek rivers), with consequent major flooding in the park, was the brainchild of George T. Smith of McElhaney Surveying and

Engineering Company, Vancouver. His thesis was that the area held one of Canada's greatest potential sources of power — “a little better than nine million horsepower, of which five million is certain” (Senate Committee, 13 June 1973). This would produce 1.8 times the power of Churchill Falls. Smith, apparently known and respected in government circles because of his previous involvement with the Kitimat project, combined the approaches used by both the conservation and the mining interests: he aroused public interest and support, and he made direct representations to government committees. He prepared a brief, sent to Chrétien in June 1972, asking that “all further legislative action towards the dedication of the proposed Kluane National Park be held in abeyance until the resource value of the hydro electric potential within the proposed park boundaries can be adequately assessed and compared with the appropriate park values.”⁷⁴

On 31 August 1972, the *Yukon News* first reported the project. In early May 1973, Smith made a verbal representation to a joint meeting of the Whitehorse Chamber of Commerce and the Yukon Chamber of Mines, gathering wide publicity in the Yukon and the support of both chambers. When, one month later, the two chambers requested by telegram that they be represented at the Senate committee's third meeting, their request was for only the presidents of each organization to attend. When the meeting was held, however, Smith appeared as a member of the Whitehorse Chamber of Commerce (even though he was a British Columbia resident and had been repeatedly described in the Yukon press as a “visitor”). Obviously the strategy called for the combined opposition of the mining and dam interests.

Smith also appeared at the first House committee meeting at Whitehorse in December 1973, reiterating his proposal with one basic change. Instead of asking for study, he asked that “the area containing the Alsek-Tatshenshini power site be deleted from the proposed park and immediate steps be taken towards the early development of its power potential.” That Smith's essentially one-man viewpoint went so far was the result of his skill at presenting his case, or the public appeal of what was termed in the press as his “visionary” proposal, or both.

Native peoples did not express concern over the announcement of Kluane National Park, nor were their interests represented or discussed by the Senate committee. Either the native people were not initially concerned, or they did not know how or where to express their viewpoints. When Chrétien announced the parks in February 1972, he

stated that “the creation of the parks will not be permitted to affect in any way the traditional use of wildlife and fish resources by the native people of the North.”⁷⁵ He also stated, “we will discuss with the Indian and Eskimo people who live near the parks ways to make sure they get their share of the jobs created and every other possible economic advantage the park can provide.” These concessions to the native people may initially have been sufficient.

There was confusion at Kluane about whether or not native people could kill wildlife, since their traditional use had been broken by game sanctuary status in 1943. A 1969 court case caused much of that confusion. On 3 October of that year, an Indian, Tom Smith, shot a moose in the Pine Creek Game Sanctuary, violating Section 17(2) of the Yukon Territory Game Ordinance. This was a very small sanctuary adjacent to and on the east side of the Alaska Highway, just north of Haines Junction. It covered what for years was a federal government experimental farm, and now houses Kluane Park headquarters. On 30 December 1969, Magistrate J.B. Varcoe found Smith guilty, and fined him \$25 or seven days’ imprisonment. The case was appealed, and lawyer (and Yukon M.P.) Erik Nielsen defended Smith in front of Mr Justice W.G. Morrow on 10 February 1969. Mr Justice Morrow reversed the decision and set aside the conviction, basing his judgment on the grounds that native people have the right to hunt on “unoccupied crown land,” from “time immemorial,” and that, contrary to Magistrate Varcoe’s interpretation, a game sanctuary was “unoccupied crown land.”⁷⁶

The native peoples’ silence over Kluane Park ended in December 1973 with a unified viewpoint expressed strongly at the House committee hearings in Whitehorse. The Yukon Native Brotherhood, the Council for Yukon Indians (which had been formed one month before), and the Yukon Association for Non-Status Indians all presented briefs to the committee. In the words of the representative of the Brotherhood: “We have worked in consultation with one another [the three native groups]... and oppose all northern development projects until the issue of Yukon land claims has been settled.” The representative of the Council for Yukon Indians stated that “the land in Kluane park and adjacent game sanctuary is land which the negotiators are prepared to claim as Indian land and which we demand must be negotiated.” Concurrent with the process of passing the parks bill was the evolving issue of a native land claim settlement. The three native peoples’ groups had held four meetings with a federal negotiating team, commencing in July 1973.

While supporting the idea of preservation, the native groups made no distinction between the national park and development projects such as the Aishihik power proposal, power lines in the Nordenskiöld Valley, and land to be put into commercial and residential development near Haines Junction, all of which they opposed. Their viewpoint must thus be interpreted as representing not only opposition to uncontrolled development and the consequent destruction of land and wildlife and the traditional native way of life, but also opposition to land commitments of any type, even one that would perpetuate the natural environment, because such would still narrow the scope of their land settlement. Since the Yukon native groups did not view national parks as a system of land tenure which, by preserving the natural environment and protecting their hunting rights, would dovetail with their demands, there was no linking of support between conservation and native interests similar to that which has evolved broadly across the North. In July 1975, after passage of the parks bill, the *Yukon Indian News* reported the Yukon Native Brotherhood as expressing a further desire to be “totally in charge of the park.”

In summary, the native people entered the conflict late, but their viewpoint that the government could not commit further land at the same time as it was negotiating a land claim settlement compelled the government to alter its course of action, as will be discussed later.

Divergent viewpoints characterized local economic interests, as expressed through the Whitehorse Chamber of Commerce and the Haines Junction Local Improvement District. The Whitehorse Chamber of Commerce initially supported the establishment of the park. However, George Smith persuaded it to oppose the park until further study of power potential and, in league with the Yukon Chamber of Mines, until further study of mineral potential. It made representations to both Senate and House committees. In contrast, the Haines Junction Local Improvement District made a representation by telegram to the third Senate committee meeting which said, “we strongly recommend that the boundaries of Kluane National Park remain as designated by the Minister of Indian and Northern Affairs in his announcement on 22 February 1972.” They also stated, “The Kluane National Park development must proceed and any delays promulgated by the Yukon Chamber of Mines or the Whitehorse Chamber of Commerce must be curtailed.” The District made a similar representation at the House committee hearings in Whitehorse.

The Senate committee, after hearing the viewpoints of

some but not all public groups, was uncertain of its proper stance. Its knowledge of the issue had been gained gradually and in a piecemeal fashion, as witnesses representing only some of the interest groups appeared. It therefore requested Chrétien to attend its final meeting. Chrétien extolled the beauty of the area: "the Kluane area is one of the most fantastic in North America," he said, and recounted that "before we made a decision we had extensive discussions with the mining groups," and revealed that "those who are for conservation insist that we have not put aside enough land for preservation." He felt that a compromise had been reached. About mining he said, "after we have made concessions they come and ask for more." His arguments were strong, and the Senate subsequently passed Bill S-4 without further debate, with the addition of four amendments. All of the amendments dealt with the need for publication in the Canada Gazette of a notice of intent to issue a proclamation and description of lands for new parks "at least ninety days before the day on which he [Governor in Council] proposes to issue such proclamation." The intent of this amendment was to ensure public knowledge before proclamation of a national park.

The process was very similar in the House committee. This committee heard a more representative cross-section of public opinion, by virtue of its Whitehorse public meetings on the Annual Report (although conservation interests had not been fully represented). The committee then proceeded to debate Bill S-4 without further public participation.

The evidence of the proceedings indicates the House committee's response to each public group. Since conservation views were not put directly to the committee in its earlier public meetings, they were not considered except as a question raised as to whether adequate public debate had made clear why the park was not 10,000 square miles. Conservation interests were raised also as important evidence that a compromise had been reached, and that conservation viewpoints as well as mining interests had lost something. Mineral values were debated only briefly, since evidence of compromise had been given by Chrétien, who stated on 18 December that the park was initially to be 10,000 square miles. Dam building interests were given more consideration through expert testimony from knowledgeable civil servants. A.B. Yates, Director of Northern Policy and Program Planning, testified on 18 December, as he had previously at the Senate committee, that George Smith's proposal would produce far more power than could be used (6,500 megawatts, as compared with current capacity in the Yukon of 43 megawatts and projection to 1980 of a need for

348 megawatts), and that there existed other potential sources for power. Chrétien stated, "if you want electricity, I can produce a lot of electricity. However, something I cannot produce is another Kluane area — because that is nature at its best." The views of local mineral claim holders received little attention after Chrétien remarked that the government would buy them out if they would sell. In consideration of the native peoples' interests, an amendment to the bill was moved: "Clause 11, sub-clause (3). Any lands so set aside as a National Park shall not in any manner prejudice any right, title or interest of the people of native origin of the Yukon or the Northwest Territories should such right, title or interest be eventually established." The Yukon native people expressed satisfaction with this amendment, as did Chrétien. Its significance was that proclamation would establish the park legally no further than a park reserve, pending settlement of Yukon native land claims, while in the meantime the land would still rest under the control of Parks Canada.

The deliberations of the House committee raised one further concern, regarding the process of public participation, which members felt was somewhat fragmentary and after-the-fact. The committee therefore passed an amendment which in its full form read:

Clause 11, sub-clause (4). A notice of intention to issue a proclamation published in the Canada Gazette pursuant to subsection (2) shall stand tabled in the House of Commons and upon being tabled, shall stand referred to the Standing Committee on Indian Affairs and Northern Development. (5) The Standing Committee shall without delay meet, hear witnesses, consider relevant evidence and then report to the House of Commons approving or disapproving of the proposed proclamation. (6) Under Routine Proceedings of the House of Commons of the sitting day next following the presentation of the report, a motion to concur therein standing in the name of the Chairman of the Standing Committee shall be put and disposed of without debate. (7) In the event the House of Commons concurs in a report disapproving of the proposed proclamation or does not concur in a report approving of the proposed proclamation, the Governor in Council shall not issue the proclamation.

The effect of this amendment was to ensure full public debate. The Conservative M.P. Joe Clark, one of the chief proponents of this amendment, stated that "it would establish the precedent that, in the territories at least, there would be a requirement to hold public hearings so that we would

not have the kind of uncertainty that has unfortunately attended, particularly, the proposed establishment of Kluane National Park.”

VII Political Stalemate

Despite all the preceding discussions, Bill S-4 reached a political stalemate because of another issue which was completely tangential to the establishment of the parks. After missing the first two House Standing Committee meetings on Bill S-4, Erik Nielsen, member for the Yukon, proposed an amendment at the third meeting. Three words of the amendment had great consequences. Nielsen proposed that the clause which read “The Governor in Council may, after consultation with . . .” be changed to “following approval by the Council of the Yukon Territory or the Council of the Northwest Territories, as the case may be, by proclamation, set aside as a National Park in Canada, under a name designated therein, the lands described . . .” Immediate reaction came from Chrétien, who made three points: the Yukon territorial council had debated and approved the park on 16 March 1972; the bill addressed the National Parks Act, whereas Nielsen’s amendment related to the Yukon Act which was currently being considered for amendments; the amendment amounted to constitutional change and would set a precedent by in effect giving veto powers to the territorial councils over the establishment of national parks, and even over other resources. While Nielsen disclaimed the latter, a Department of Justice official, called as a witness, verified Chrétien’s interpretations. Nielsen stated that he “supported the establishment of a national park in the Yukon,” but that “we want some meaning put into the process of government in the north. This is one sure way of achieving it.” The subsequent vote on this amendment to Bill S-4 reflected the balance of power in the committee, which went to the combined opposition members and the amendment was passed.

The bill, so encumbered, was effectively blocked from introduction into the House of Commons. The government could not present it without succumbing to what Chrétien referred to as a “back door” attempt at constitutional change. The Conservative House Leader offered in the House on 10 January that if the government put the bill forward, it would be passed without debate; but Chrétien felt he had no alternative than to see the bill die, and refused the offer.

The conservation interests subsequently presented a written brief stating their position to the House, Senate, and

territorial councils on 27 February, and in a press release on 4 April, supporting the amendments on the native peoples’ concerns and on better public participation, but opposing the Clark-Nielsen amendment to give the territorial council approval rights. The brief was a joint presentation of the National and Provincial Parks Association, the Canadian Nature Federation, and the Federation of Ontario Naturalists. It stated that:

while we appreciate fully the desires and aspirations of the people in the Northern Territories for greater autonomy for their respective governments, we believe that the National Parks Act is not the appropriate vehicle from which to launch a complex debate on constitutional powers. Indeed, we object most strenuously to the National Parks Act being used for any end other than the establishment and management of parks. We believe that, in the process of long debate over Bill S-4, the House Standing Committee lost sight of the original intent of the Bill: to make legal National Parks, which have support from all parties.

Bill S-4, as amended, was re-written as Bill C-6, pertaining only to the three northern parks. It was presented for third reading before the House of Commons on 4 April 1974. Again three issues were raised: public involvement and participation, territorial government approval, and concern that the park not prejudice native land claims. Chrétien moved what was effectively removal of the provision for public participation. His reason was:

If we were to establish an onerous system of public hearings by which the judgment of provincial authorities could be questioned, we could jeopardize in many cases opportunities for Canadians to acquire more national parks. Of course, negotiations are entered into before land is turned over to the federal government. Agreement in principle is reached between the two governments. A system of public hearings in connection with a province’s decision to establish a national park could force provincial authorities to reconsider their decision.

The NDP supported the government, a reversal of their previous stand in committee, on the grounds that the clause under question applied to the three parks in the two territories. The Conservatives vigorously opposed Chrétien’s action as it took out the only provision for public participation in the decision-making process; however, they were defeated.

Chrétien next proposed the reinstatement of the word “consultation” in place of “approval,” relating to the Yukon

territorial council. The NDP also supported this, a reversal of their position in committee, partly because the Yukon territorial council had voted to approve Kluane National Park. Again the Conservatives vigorously opposed this action and were critical of the NDP's change in position, but they were now in a minority position and were defeated.

Finally, the NDP proposed an amendment to "set [Kluane] aside as a reserve for a national park of Canada, pending settlement of any rights, title or interest of the people of native origin . . ." The amendment allowed the National Parks Act to apply to the reserve, with the result that this is an entirely different type of reserve than the rather meaningless one placed in 1942. Chrétien seconded the NDP motion, and the Conservatives concurred in the subsequent vote. Bill C-6, so amended, passed with the NDP supporting the government and the Conservatives opposing.

The act was published in the Canada Gazette on 20 September 1975, and proclaimed on 5 April 1976.

VIII The Future of Land Preservation in the Yukon

The words "balanced development" have, in the past decade, been widely used by the federal government to express some ideal state of northern land management. In the Introduction, reference was made to Naysmith's concept of wise land use as a balance between four strategies. That concept was accepted in Minister Chrétien's report on the federal government's "Northern Objectives, Priorities and Strategies for the 70's," delivered to the Standing Committee on Indian Affairs and Northern Development on 28 March 1972⁷⁷ :

Maintenance of the ecological balance requires recognition of the total relationship of all the elements of nature. Man is included in this totality and his activities must be measured and in some instances regulated to ensure that the probability of imbalance is minimized. The natural environment in the North is very sensitive to alterations and activities related to the natural resource-base which have evolved elsewhere in Canada may not be satisfactory, particularly in the Arctic. It is necessary to develop with respect to natural resource utilization guidelines by which such activities are controlled. A comprehensive program of regulation, based on recently enacted legislation, is required and includes elements of preservation, protection, managed-use and restoration.

Later in the statement, Chrétien again referred to "balanced growth":

The strategy for northern development is aimed at fulfilling the following requirements: (i) In spite of heavy pressures from outside and within Canada for getting resources out rapidly, the delicately balanced ecological system must be maintained and timely data provided to the Government, by all departments and agencies concerned, for making effective policy decisions on protecting the environment.

The federal government is not alone in subscribing to "balanced development"; so do citizen organizations such as the Canadian Arctic Resources Committee. CARC's "Statement on Guidelines for Northern Pipelines, 1972" includes the sentence:

CARC finds itself sympathetic with an official statement which reads: "The Government of Canada is determined that the development of the North proceed in a balanced way with priority and emphasis on those things which concern the social and economic development of the people of the region, the adequate protection of the environment, and lastly the development and exploitation of the vast natural resource wealth for the ultimate benefit of all Canadians."⁷⁸

Despite wide use of the term "balanced development," however, the idea remains elusive, perhaps meaning different things to different people. Nevertheless, the preceding statements clearly show that it reflects a desire for environmental protection.

One essential aspect of environmental protection is the establishment of parks and reserves. Minister Chrétien stated that the number of national parks in our system (twenty-eight) should be at least doubled by the end of the century.⁷⁹ The *National Park System Planning Manual* outlines two additional "natural regions" in the Yukon as yet without national park representation. The federal government has also subscribed to the International Biological Programme, a scientific endeavour encompassing fifty-eight nations, one aspect of which is the preservation of representative terrestrial communities as ecological reserves. Research has been done on some of these reserves proposed for the Yukon.⁸⁰

The backing for the establishment of parks and reserves is broad. Most field biologists lend the support of the life-science community, for reasons such as preserving genetic diversity, providing ecological bench-marks from which to

measure environmental change, and providing outdoor laboratories to study ecological relationships upon which all life, including man, depends. For example, the Science Council of Canada's *Strategy and a Science Policy for Northern Development* states:

*The Science Council believes that geographical areas should be established where no damage would be permitted. Standards of maximum damage should be set in other areas to ensure that no long run degradation of the regenerative capacity of northern lands and waters will occur.*⁸¹

Additional evidence of scientific support for reserves is the Associate Committee on Ecological Reserves, recently formed to continue the work of the IBP conservation of terrestrial communities, with fifteen members from the scientific community across Canada.⁸²

The citizen conservation movement backs the establishment of parks and reserves, partly for the same scientific reasons as the life-scientists and partly for the recreational and related values of wild lands. National organizations (National and Provincial Parks Association, Canadian Nature Federation), provincial organizations (such as the Federation of Ontario Naturalists), and a host of local conservation and naturalist clubs made representations to the government over both the establishment and the boundaries of Kluane National Park. In a recent (October 1977) protest over lack of protection given by Parks Canada to some of its western parks, many of the same organizations and individuals made a representation to Ottawa backed by their more than 750,000 members.⁸³ Thus, a government commitment to parks and reserves, backed by strong support from segments of the Canadian public, means there will and should be more "Kluanes" in both the Yukon and the Northwest Territories, and elsewhere in Canada.

Preservation in the Yukon is made all the more compelling because of a lack of environmental safeguards for mining development. When Kluane Park was first proposed, this was of little concern — the Yukon's resources were in a phase of very preliminary assessment and, with limited transportation, seemed vast. Today, however, the lack of environmental protection concerns the same segments of the Canadian public as promote greater preservation. As mentioned previously, the Territorial Land Use Regulations, put into operation in 1971, did and do not allow the government to regulate the environmental impact of mining on the land surfaces in the Yukon.⁸⁴ Oil and gas exploration and activities do fall under the regulations. In an effort to have equal compliance of the two resource exploitation sectors, in

1970 the federal government proposed a new Bill C-187, entitled the Yukon Minerals Act, to replace the Yukon Quartz Mining Act. Section 8 of the new bill would have brought the mining industry under the land use regulations, by stating that entry on public lands for prospecting and staking would henceforth be subject to the land use regulations and permits. Public hearings were held on this proposed bill in Whitehorse, Vancouver, and Ottawa. The mining industry strongly opposed it, both because of the above section and other reasons related to economic issues (reviewed at the 1972 Fourth Northern Resources Conference by Aho⁸⁵ and assessed by Thompson⁸⁶). Conservation interests such as the National and Provincial Parks Association and the Yukon Conservation Society supported the bill. However, the mining viewpoint prevailed, the government withdrew the bill, and mining is still free to operate unencumbered by the environmental protection that would have been imposed under the land use regulation. Commissioner Smith's comment, mentioned earlier, is still true: a miner can aim a bulldozer anywhere, although there are restrictions on water crossings by virtue of the Northern Inland Waters Act.

Preservation is even more compelling today than in 1972 when Kluane National Park was announced, because of the pending construction of the Alaska Highway gas pipeline. Whatever balance previously existed between preservation and development in the Yukon will be seriously disrupted. The pipeline route proposed by Foothills Pipe Lines (Yukon) Limited runs along the boundary or through four proposed ecological reserves; and it runs across Sheep Mountain, a natural feature of national significance within Kluane National Park. In a brief which the Yukon Conservation Society presented to the Lysyk Inquiry, and also in the submission of the Yukon government's Wildlife Branch to the Hill Environment Assessment Panel, both hearing testimony in July 1977 about the proposed Foothills pipeline, it was pointed out that:

Of the Yukon's living ecosystems (as versus icecap) approximately 2,000 square miles or 1.0% of non-glaciated land is preserved. The Yukon also has two game preserves, a total of 4,350 square miles, 2.9% of the Territory, but this only counts in part because land in sanctuaries and preserves is open to resource exploitation. A full and adequate assessment of both social and environmental impacts of the proposed pipeline must include a concern for the balance (preservation versus pipeline or pipeline-related development). From a social standpoint, at stake are [sic] the extent of recreational, aesthetic, and job opportunities; from

*an environmental standpoint at stake is whether or not the best of the Yukon's wildlife and wilderness will be preserved.*⁸⁷

In summary, new forces and new government commitments lead to the conclusion that parks projects similar to Kluane will again be mounted in the Yukon. They must arise, if the increased public demand for wise land use management — one strategy of which is preservation — is to be satisfied.

Inventory and assessment is in progress or has been completed for new national parks, a system of territorial parks,⁸⁸ bird and game sanctuaries,⁸⁹ and ecological reserves in the Yukon. However, despite the rationale and the government commitment to preservation just described, I believe that unless some new approach is found to establishing parks and reserves other than the type of power lobbying that surrounded Kluane National Park, these systems of preservation will not be put in place rapidly enough to outpace development of land and ecosystem modification through exploratory and other human activities. The Science Council expressed this viewpoint well in its *Issues in Canadian Science Policy*, No. 3: "The core actors dominate any given decision-making system. This means that their largely 'economic' concerns permeate the decision-making process."⁹⁰ The economist J.K. Galbraith expressed it on a broader front: "The industrial system generally ignores or holds unimportant those services of the state which are not closely related to the system's needs."⁹¹ Galbraith cites parks as one example.

Drawing from my personal experience, I have flown over miles of the southwest Yukon, been involved in wildlife surveys, and have had the repeated experience of seeing the scars of bulldozers in areas which I had expected to be pristine. Research with large mammals has indicated that units of preserved land must often be very large in order to constitute more-or-less ecologically self-regulatory units. It is therefore necessary to preserve areas that are not dependent for their ecological integrity on land which is *not* preserved. For example, sufficient room must be left for predators such as wolves to play their role in the ecosystem. In Alaska, pressures by hunters for wolf control on lands open to hunting make it entirely predictable that one day wolves and their large prey — moose, caribou, and sheep — will be found in historic densities only in parks and reserves. On the Burwash Uplands, the caribou research of Oosenbrug⁹² has shown a low productivity in the herd that means it must not be

hunted — yet it *is* being hunted, and recent surveys reveal that losses exceed replacements.⁹³

There are not thirty years remaining to establish a system reserve by reserve. The extent to which preservation is desired must be considered now. The land desirable for preservation has mostly been identified, either on the Arctic Land Use Map Series⁹⁴ or in government and university files. Some more assessment is necessary, but not enough to delay the initiation of a process for establishing the preservation systems. I am proposing a governmental commitment to put these preservation systems in place now, as a companion and counter-balance to its decision to approve the Alaska Highway gas pipeline. The pipeline was proposed, assessed, and approved in three months. There is no reason that we cannot show similar haste in establishing a comprehensive system of parks and reserves.

The events in the establishment of Kluane National Park point to some obstacles, but point as well to some solutions. One is that there must be unshakeable government resolve. Key civil servants must support key ministers. These latter include the Minister of Indian Affairs and Northern Development, supported by senior staff of Parks Canada, the Commissioner of the Yukon Territory supported by the Yukon Wildlife Branch, and the Minister of Fisheries and Environment supported by his Fisheries Branch and the Canadian Wildlife Service. An agreement-in-principle between these government departments and supportive agencies is a first and necessary step. I believe that the government can be assured of strong support from the life science and conservation community.

Secondly, native peoples must be willing to be involved. While they initially opposed the establishment of Kluane National Park, they withdrew that opposition when assured that their land claims would not be jeopardized. I believe that some of the preservation systems may become positive tools, in terms of granting native rights to subsistence hunt, participation in research, and participation in management. The Inuvialuit have taken this view.⁹⁵

Thirdly, spokesmen for mining interests, both inside the Department of Indian Affairs and Northern Development and the Department of Energy, Mines, and Resources, and in the mining chambers must abandon inflexible opposition to preservation of any large body of land. I am optimistic that this is possible, and is indeed taking place. It has been obvious for many years that there is a need for economic diversity in the Yukon. As J.H. Gordon, Assistant Deputy Minister of DIAND, said:

I am enthusiastic about parks, not only from the point of view of the preservation and protection of the lands dedicated, that wildlife can live undisturbed in these areas and the whole complex of plant life upon which they depend, but also because I believe they have a hard-nosed economic value which is one of the best investments that any territory, or province, or region can make for the future.

But beyond economics, the gulf should not be so great between those who appreciate the scientific value of parks and reserves, and those who appreciate the non-economic values of wilderness. Both groups draw people into their ranks because of a desire to spend time in wilderness environments. Particularly disheartening in the arguments over Kluane was the continual lack of acknowledgement and even occasional disdain (mentioned previously) over non-economic values — as if those who value the recreational, cultural, and indeed spiritual aspects of relatively untouched wilderness are wrong. Does society have no right to value its cathedrals, its fine paintings, its libraries? Like wilderness, these also are judged in non-economic terms, cost a lot of money, and may be of interest only to a minority. To argue against them, or against preservation of wilderness, is to deny the validity of other peoples' sets of values.

Another side to the issue is that mining interests understandably want to know their chances of being left alone, and to know what land the resource inventory personnel of Parks Canada or the other reserve system are interested in. Assurance of conflict-free mining activities would, it may be argued, result in the support in principle and participation of mining interests in the establishment and completion of the systems for preservation. One necessary requirement of the spokesmen for mining would be a willingness to indicate areas of greatest potential mineral (or oil and gas) significance. Just as those supporting parks and reserves must have done their homework, so too must mining interests. The Geological Survey of Canada has done extensive work throughout the Yukon for many years; and while geologists, like the supporters of parks and reserves, undoubtedly consider the inventory incomplete, enough is surely known to make some educated guesses. Merely the distribution of presently held mining claims in the Yukon indicates something, since mining companies must pay to hold and explore such claims. For instance, throughout the history of the establishment of Kluane National Park, the opinions of the spokesmen of mining interests were never held up to public accountability: it was never explained why the Kluane area

was considered of potential mineral significance. The admission of the Minister of Energy, Mines, and Resources of his department's inability to comment on the economic significance of minerals at Kluane, after his department's opposition to the full 10,000 square-mile park, referred to earlier, illustrates the lack of accountability. The lack of any impact of the failure of the Quill Creek mine raises further questions of accountability. Mining spokesmen must be able to justify their viewpoints that an area is significant on the basis of present and past mineral claims, geological arguments, and significance relative to other potentially significant areas. Lack of justification by park advocates would be crippling to attempts to preserve an area; the same must hold true for mining.

The State of Alaska, where an attempt is currently being made to establish a total preservation system, may offer some constructive approaches to help us achieve a similar system in the Canadian North. The Alaska Native Claims Settlement put in place a land use planning exercise in which all the land to be placed in a system of preservation is being identified and so protected at once. Although the historical circumstances differ from those in the Yukon, the action shows that such a large step in land preservation is possible. And Alaska's perception of the extent of land that should be protected leaves us thinking small. Bill H.R. 39 will add 179,000 square miles to Alaska's already 47,000 square miles in the national conservation system as national park holdings or wildlife refuges.⁹⁶

That total represents 31.6 percent of the state — the objective of Bill H.R. 39 is to preserve almost one-third of Alaska. The bill has the strong backing of an amalgamation of national and state conservation organizations, collectively called the Alaska Coalition. What makes this bill pertinent to Kluane National Park is the fact that one of the proposed new national parks — the Wrangells-Kluane National Park — will butt up against our Kluane National Park (although not as completely as it would have, had all of the Kluane Game Sanctuary become national park). The U.S. counterpart of Kluane is proposed to be 24,687 square miles — almost three times the size of Kluane.

Writing about Alaska, conservationist Peggy Wayburn expressed thoughts just as applicable to the Canadian North:

If we are to meet the great challenge Alaska's wilderness offers, if we are to be true stewards of this last great land resource, we need to revise some of our land-use priorities. Instead of having to justify the protection of each acre of

Alaskan land we are trying to retain as wilderness, we should begin instead to require justification for the development of each acre turned over to economic exploitation. And the justification for development must be in terms of long-range needs, not just immediate economic or energy demands. Our own survival, as well as the survival of many of our fellow creatures who share our planet home may be at stake.⁹⁷

The establishment of parks or reserves in the North is within the legal purview of the federal government. But the history of Kluane makes it abundantly clear that it must not exercise that right without considering the views of interest groups. Today many voices want to, and indeed will be heard. In moving amendments to Bill S-4 to facilitate public notification before proclamation of a national park, the House and Senate committees made it clear that many politicians already see the need for more adequate public involvement. What is not clear, and needs resolution, is how best to hear from the public. In the case of Kluane, the public was not aware of any format for its participation. As well, abilities to present one's point of view varied considerably between groups, thus preventing impartial hearing by M.P.s and senators on the relevant committees.

The opposition parties attempted to require some formal requirement for public involvement in the establishment of new parks by voting the amendment, previously cited, which allowed the Standing Committee to hear witnesses, in effect to conduct a public inquiry. When this provision was about to be removed, the Conservative Party strenuously objected. Joe Clark led the debate. About Kluane, Clark said:

The second point was that there had been an inadequate explanation of the reasons which led the minister, after a discussion with mining companies, apparently in secret, to exclude 2,000 square miles of land originally scheduled for inclusion in the park. . . . Is the interest of the National and Provincial Parks Association served by a secret decision of this kind arrived at in the course of a meeting between a politician and representatives of mining interests? Is the general interest of the public served? Are the interests of the people of the Yukon served? Of course not. All these interests would be much better served if there were public hearings along the lines of the amendment we were able to introduce, and which was carried in the Committee — an amendment which the Minister is now trying to strike down.

I do not believe that even the procedure almost accepted as a result of the parks bill (that is, prior notice of proclamation with attendant rights of the public to appear before House and Senate committees) represents anything like an adequate public forum. For one thing, such a debate would refer to a proposed piece of legislation. Public involvement must come earlier, in the planning process of the responsible agency, Parks Canada in this case. Then a bill being debated in House or Senate committees can be accompanied by documentation of previously solicited and given public response. Members of Parliament and senators would then have a chance to know the story in more detail; all interests, not just some, would be available to them. The record shows that the debates over Bill S-4 resulted in aggravation over piecemeal evidence, to the extent that both committees invited the minister responsible to assist them in comprehending what was becoming an increasingly frustrating debate, due to their own fragmentary knowledge. I believe that the public should have access to these committees, but certainly not as the initial bodies towards whom they direct invited opinions. There must be a mandatory policy within Parks Canada, consistent to all its five regions, that a common format of public involvement over all proposed new parks be followed at an initial stage. That format may take a variety of forms. Critical to the success of such a policy would be a concerted effort to invite opinions from all interest groups that predictably would be interested, the publicizing of a request for other opinions on possible alternative proposals, and possible financial help to public organizations to assume meaningful public participation. I propose that Parks Canada prepare such a policy statement, allow public review of it, and then distribute it so that in future the process is known by all concerned.

The tool which Parks Canada has to establish new national parks in the territories is the temporary placement of a park reserve on land it wants by Order-in-Council, which prohibits any new resource exploitation or alienation of land. This procedure may be necessary during a short period of resource inventory to delineate the optimum boundaries of the area. If so, Parks Canada must act quickly to resolve whether or not a bill to make a park should be proposed, by instituting the proper forums for public involvement. It may not always be possible for public involvement on any detailed park proposal to precede park reserve status, because of nuisance claim-staking, such as happened at Artillery Lake. But resolution of park reserve status must move quickly, because inevitably some people will be affected by park reserve status, as they were in the 1940s at Kluane. In

addition, Parks Canada must be willing to compensate those affected by even temporary loss of privileges.

The model of *temporary* park reserve, and *early* public hearings, would do much to avoid the Kluane type of conflict over the creation of parks and reserves.

Acknowledgements

Much of the history of the establishment of Kluane National Park was pieced together from file material provided to me by Parks Canada. I am grateful for the co-operation of Parks Canada's Director-General John I. Nicol, Senior Policy Advisor Harold K. Eidsvik, and members of their staff who laboured many days to answer my questions. This study could not have been accomplished without their help.

Gaps in Parks Canada's material, which contained letters to individuals for reply but not the replies, at times left the record incomplete. I must therefore disclaim responsibility for misrepresentation of any government department or individual's stance which may inadvertently occur because of material which was not provided to me. I have attempted to avoid such errors.

Since 1968 I have had a direct involvement with Kluane, both as an advocate of park status and as a research biologist studying birds and large mammals. I have thus drawn on my own files of letters, publications, briefs, and submissions, and National Archival information about the status of the area. In the description of the land, I have drawn in places on the contributions of various authors to the book which I am currently editing, *Pinnacle of the Yukon: The Unique Environment of North America's Highest Mountain Range*.

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Dempster Highway



William MacLeod



William MacLeod

The Dempster Highway

William G. MacLeod
Barrister and Solicitor
Vancouver, B.C.

... a road is, after all, an extension to the Arctic of an idea developed by a society elsewhere, made for vehicles designed and constructed for social conditions typical of other climates and places.

Byron Nupp, Arctic Institute of North America Symposium (1969).

The Road to Resources: 1957-1968

In 1958 the federal government decided to build a highway north from a point near Dawson to the Eagle Plain oil exploration area in the northern Yukon, and ultimately onwards some 450 miles to the site of Inuvik, then under construction in the Mackenzie Delta. In 1963 this road was named the Dempster Highway, after Cpl. W.J.D. Dempster of the RCMP, the "iron man of the trail." Dempster was renowned for his stamina in travelling by dog-sled from Dawson to Fort McPherson along the alignment of the present-day highway, which follows a trail used for centuries by the Kutchin Indians as an overland route between the Yukon and Peel river systems.

The Dempster Highway is a two-lane, gravel-surfaced, all-weather highway capable in most sections of travel speeds of fifty to sixty miles per hour. On steep grades in mountainous areas, and on the older, more curved sections from Mile 25 to Mile 79, slower speeds are required.¹ In early years the Peel and Mackenzie rivers will not be bridged. Ice bridges in the winter and ferries in the summer will provide crossings, except during spring thaw and fall freeze-up periods. The road, scheduled for completion in 1979 at a total cost of approximately \$103 million, is currently the government's highest priority for road construction in northern Canada, for it will link the Mackenzie Delta area with the South for the first time by an all-weather road (see Figure 1). It may also be crucial to the construction of a pipeline along the Dempster alignment from the Mackenzie Delta, to connect with the Alaska Highway Pipeline.

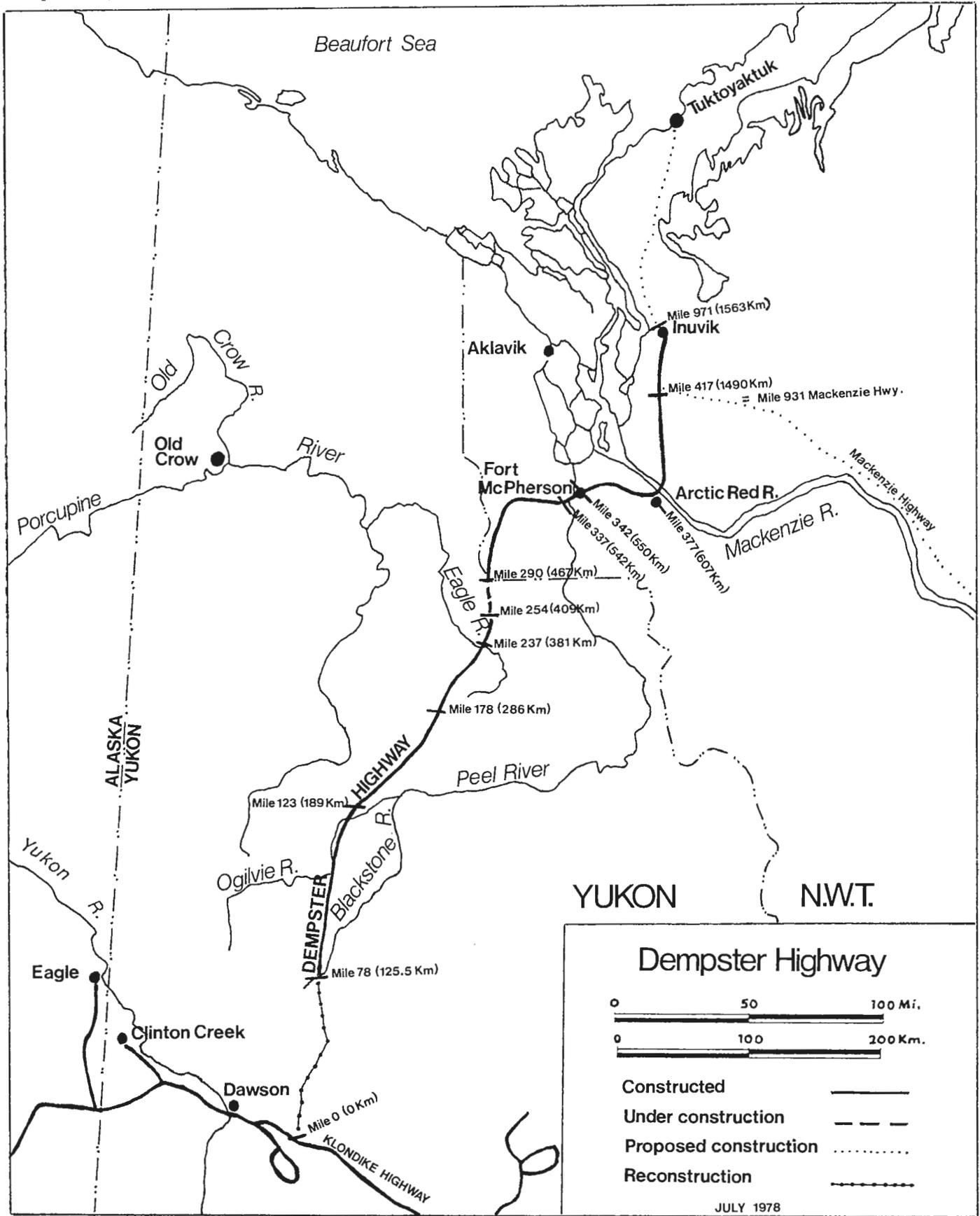


Figure 1

Early History of Roads in the Yukon

Until World War II there were only local roads in the Yukon Territory, around settlements and in mining areas. The basic transportation for the Yukon was provided by steamboats on the Yukon River and its tributaries, together with the White Pass and Yukon Railway, completed in 1900 between Skagway and Whitehorse. In 1943, however, as part of the defence effort against Japan, some 40,000 men — mostly American soldiers — completed the Alaska Highway in less than a year at a cost of approximately \$137 million. It ran 1523 miles from the railhead at Dawson Creek, B.C., to Fairbanks, Alaska, and was the first road connecting the Yukon with southern Canada. Also constructed at this time were the Haines cutoff road, linking the town of Haines in the Alaska Panhandle with the Alaska Highway west of Whitehorse, and the Canol road, paralleling the Canol pipeline from Norman Wells in the Northwest Territories to Whitehorse. The latter road was allowed to deteriorate with the abandoned pipeline almost as soon as it was completed, though some parts of it have since been improved, and the Yukon section of it is now maintained.

By the early 1950s the use of roads became cheaper than shipping on the Yukon River, particularly for transporting minerals from the central Yukon. The navigation season on the Yukon is not longer than five months, and use of the rivers required the storage of large inventories of mine supplies and the costly stockpiling of mine products. As the Commissioner of the Yukon explained:

it became apparent after the war that this traditional mode of serving the central Yukon could not handle the substantially increased traffic that the territory's mining development had created unless heavy capital expenditure were made on new equipment. It was for these reasons that the federal government constructed, at a cost of \$4,454,000, the 247-mile highway which since 1950 has run from Mayo, the site of the Yukon's [then] most important mining enterprise, to a junction with the Alaska Highway near Whitehorse.²

In 1954 a branch road from the Stewart River Crossing on the Whitehorse-Mayo road was constructed, connecting Dawson and the placer mining activity of that region with the road network. At this point, it became feasible to construct a road north from the existing network into the Eagle Plain area and then onward to the Mackenzie Delta. This is now the Dempster Highway route. In the winter of 1954-55, a private winter tractor trail was constructed along this route on behalf of Conwest Exploration Co. Ltd. from Flat

Creek near Dawson, along the North Fork of the Klondike River, and then along the valley of the Blackstone River to the Eagle Plain and Peel Plateau areas. Government memoranda in April 1955 recognized that an all-weather road might soon be warranted to the site of this exploration, and that exploration companies would apply for government money for its construction; but no steps were taken to allocate funds to build it.³

Road policy in the North was not elaborate in the early 1950s. Formulated in 1951 by the Interdepartmental Committee on Federal-Territorial Financial Relations, it amounted to a simple classification of roads and an allocation of responsibility for their construction and maintenance.⁴ Extensive road planning only began in 1953, after the creation of the federal Department of Northern Affairs and National Resources (DNANR), whose mandate was to plan long-term northern development. By the end of 1955, the department had adopted the building of the Dempster as part of its long-term strategy of road development. Of the proposed Eagle Plain road, as the highway was then known, F.H. Collins, the Commissioner of the Yukon, said in his presentation to the Gordon Commission on Canada's Economic Prospects in 1955:

the discovery of oil in the area about the Arctic Circle could bring the construction of a road originating near Dawson and ending at Fort McPherson in the Northwest Territories after turning eastward and passing through the Richardson Mountains. The importance of such developments for Dawson and the northern region of the Yukon is apparent.⁵

About the road programme, Collins concluded:

Although these appear now as the greatest needs that the foreseeable future holds for the construction of roads in the territory, the succession in which they may be built is by no means certain, nor is it unlikely that the priority given each individual road will undergo substantial revision. They nevertheless point to the significance that the provision of further roads will have for the developing Yukon economy.⁶

At this point, however, and throughout 1956, the future Dempster Highway had a very low priority in government planning. The federal government held that expenditures to promote economic development ought to be made chiefly in southern areas, where they would benefit the greatest number of Canadians. Northern development policy during the Liberal years up to 1957 was characterized not by the formulation of development plans, but by an empirical approach which combined notions of *laissez faire* economics for

resource development with welfare state policies for northern peoples.⁷

K.J. Rea, in his analysis of northern roads policy in the 1950s, has distinguished two stages. In the stage prior to 1957, it was accepted that there should be federal participation in the construction of roads which would demonstrably aid development in the North.⁸ The test lay in whether a road was “deemed essential to the effective exploitation of some natural resource,”⁹ that is, whether it was immediately justifiable in market terms. Indeed, the government of the time was accused of only giving aid to mining and oil development after such aid had ceased to be useful. But the government approach was carefully considered, if cautious. As the Hon. Jean Lesage, then the responsible minister, said:

... since the transportation problem is one that we have to cope with, mainly for economic development, it is the one to which I have given and will give the highest priority Of course, we have to be careful, for there have been instances in the past where we have built or participated in the building of roads which were later abandoned because the mines in which there had been placed a high degree of confidence turned out to be uneconomic to operate. I agree that some risks have to be taken and I do not mind taking a few risks, but a balance must be kept and a certain amount of care exercised.¹⁰

In accordance with this policy, Western Minerals’ application for financial aid for the construction of a winter trail along the Dempster route from Flat Creek to Eagle Plain was rejected in 1956.¹¹ Moreover, in October 1956, the Department of Public Works balked at spending money on completing a photomosaic of the route. Funds for the survey of the route were deleted from the government budgetary estimates.¹²

But Aubrey Simmons, the Liberal M.P. from the Yukon, lobbied hard for construction of the Dempster route. On 15 January 1957 he argued in the House of Commons:

a glance at the map of northern Canada will serve to show the great benefit and value of an all-weather road from the Yukon across to the Mackenzie River delta and the site of [Inuvik].¹³

He urged the government to do everything possible to assist in the development of the oil and mineral potential of the north Yukon. According to Simmons’ information, “the proposed route of the road . . . would traverse one of the most highly mineralized areas of the North American continent,” including what one geologist informed him “could be the

greatest reservoir of oil on this continent . . . in the area stretching between Dawson and Aklavik.” Year-round road access would mean that residents of the Mackenzie Delta would no longer need to stockpile their food, provisions, and other material for many months each year. Simmons urged government support for the Peel Plateau Exploration Company, then actively exploring in the Eagle Plain area, by helping to fund the construction and maintenance of their winter road. He said,

If the resources of the North are to be developed it is surely the duty of the federal government to employ all possible means to construct and maintain proper road communications. Official thinking here in Ottawa has in the past fallen far short of meeting the real problem. There has not been the necessary vision on the part of officials to grasp the requirements of the situation. I realize there has been some opposition from certain quarters, but it is opposition that is dictated entirely by self-interest.

Simmons was successful in his lobbying. Later that month he was able to announce a new road programme to take effect on 7 April 1957 with the next five-year Federal-Territorial Financial Agreement. The policy would assist the construction of roads into areas not then considered economically justifiable, but where there was good resource potential.

The rationale behind the new policy is indicated in the 1957 report of the Interdepartmental Committee on Federal-Territorial Financial Relations. The committee noted that the provisions for road development in the three provinces where mining was important (Quebec, Ontario, and British Columbia) were more generous than those for the Yukon and the Northwest Territories. In these provinces it was noted that the provinces paid for the cost of constructing development roads in areas with good geological potential, but where there were not necessarily any proven mines.¹⁴ In keeping with the policies of those provinces, a new category of roads — “development roads,” those “which lead from a main highway or water route into a region containing promising resources” — was established. The committee recommended that:

There need not be an established mine or other industry before the development road is built, but there must have been sufficient exploration to indicate good prospects. One criterion for judging whether such a proposed road is justifiable could be the willingness of the parties benefiting from

*such a road to spend substantial amounts of money on exploration or development in the region which it would serve. In addition, of course, the Federal Government would balance the probable cost of such a road against the benefits likely to result from it.*¹⁵

The committee recommended that the construction costs be borne fully by the federal government, and that the federal government handle eighty-five percent of the maintenance costs and the territorial government fifteen percent, for at least the next five-year period. The division was based on a traffic study done on the Whitehorse-Mayo road, which showed that eighty-five percent of the traffic was accounted for by the development aspect of use, and fifteen percent by local traffic, the territorial government being responsible for the latter. Though any figure chosen to reflect the divided pattern of use of northern roads would be arbitrary, this figure seemed satisfactory to the Interdepartmental Committee, since in their view it probably represented the maximum percentage that could fairly be shifted onto the territorial government. This policy has substantially governed the financing of development roads such as the Dempster Highway to the present time.

Under the new policy, commercial feasibility was not to be a determining factor in deciding whether to build development roads such as the Dempster. Rather, the goal was the encouragement of private investment through the provision of infrastructure capital to promote resource development. The problem with this policy, however, is that when returns from resource development indirectly linked to the development road are merely speculative, it is very difficult to assess the effectiveness of the investment in the road.

The Conservative Government of 1957

Such was the prevailing policy when the Conservatives came to power in the summer of 1957, although expenditures and decisions in line with the new policy had not yet been taken. Alvin Hamilton, who became Minister of Northern Affairs and National Resources in the Diefenbaker government, was to be the single person most responsible for the decision to build the Dempster Highway. Hamilton had a strong personal interest in the North. One relative had staked claims in the Keno Hill area during the Klondike Gold Rush; other relatives were active at various times in the Great Bear Lake area and on Melville Island in the Northwest Territories.¹⁶

Hamilton and a few other Conservatives worked hard for the adoption of a national development programme. The

programme, which he helped to draft, was included in the party platform at the 1948 National Party Convention. As he later explained,

*We knew instinctively that the only thing that could distinguish this party and enable it to fulfil its destiny in the political history of Canada was for it to turn its attention to its great historic mission in Canada, the development of Canada and the building of a nation in the northern half of this continent truly patterned on our own way of life.*¹⁷

Thus, when Hamilton became Minister of Northern Affairs and National Resources, a strategy of resource development was immediately devised which included the taking of an inventory of national resources. The road programme would promote exploration work so as to determine the extent of Canada's resources. Hamilton called this his "rolling inventory programme." The roads, of course, would also help to develop those resources once they were located.¹⁸

Hamilton proceeded by marking all known mineral anomalies and potentials onto maps. Through the areas of high mineral potential, he drew proposed roads. He envisaged "access roads" to serve one or two potential mines, "multi-purpose roads," and "strategic roads" to which he gave the highest priority because they led to areas of strategic significance as well as resource potential. The Flat Creek-Fort McPherson road was just such a strategic road. It provided "the shortest thrust to the Arctic Coast," which had a high priority for Hamilton, who wanted to assert Canadian sovereignty over the arctic seabed both off the mainland and among the Arctic Islands which had not yet been claimed. Hamilton made this claim in the House of Commons for the first time, after discussion with the United States and other nations at the Law of the Sea Conference in Geneva in 1958.¹⁹

In his development plans, Hamilton considered the land route across the Yukon (namely, the Dempster Highway) and the east coast sea route from the St Lawrence River and north around Labrador as important "pincers" in the thrust towards the Arctic Islands, which he thought would be developed before the interior of the Northwest Territories. To take advantage of the sea routes, he speeded the development of icebreakers and hydrographic surveys of the arctic waters.²⁰

From his first weeks in office Hamilton spoke with enthusiasm of building a highway from Dawson to Aklavik. The *Whitehorse Star* of 5 September 1957 quoted him as saying:

I visualize making every corner of the Yukon accessible. We can't develop without access. I see a network of trunk roads branching out from Dawson City. The great development possibilities in the northeast corner certainly justify road investments into the Mackenzie River Delta area. A trunk road from Dawson City area through the Peel Plateau and on to Aklavik is under active consideration.

From the outset, then, resource development was the paramount concern in deciding to build the road. Other benefits were merely peripheral. Even in 1955 government planners recognized that the completed road would have little effect on the volume of freight moved along the Mackenzie River, since barging would still remain the cheapest means of moving freight to the Delta. However, there would be better communications between the northern Yukon and the Delta. It was thought that children from the northern Yukon would more easily be able to travel to Fort McPherson for their schooling. Residents of the Mackenzie Delta would be able to take wage employment in development work in the northern Yukon. And it was thought that natives living in Old Crow would be able to trade with the southern Yukon instead of down river with Fort Yukon in Alaska.²¹

In September 1957, Deputy Minister R. Gordon Robertson suggested that clearing and draining for the proposed road begin both near Dawson and at Fort McPherson in the summer of 1958. His advice, however, was not followed.²²

The two chief issues which concerned the government were the costs of the road and the likelihood of success in oil exploration. In September 1957 Robertson estimated the cost at \$40,000 per mile to the drilling area, but could give no estimate of the cost of the road onwards to "Aklavik E III," the future site of Inuvik. His estimates were based on the cost of building a minimum quality road capable of moving ordinary trucks and equipment into the drilling area.²³

Preliminary plans for the building of the road progressed rapidly through the fall of 1957. On 24 September 1957, the Director of Engineering, DNANR, requested that the Department of Public Works (DPW) estimate the cost of surveys and give rough estimates of the construction cost per mile for the road from the Dawson area to the Eagle Plain.²⁴ At that date, very little was known of the area that the road was to cross. Large portions of the Yukon had not yet been mapped. Nor had DPW any staff based in the Yukon, so that staff had to be quickly dispatched from Ottawa.²⁵ On 8 November 1957, the Highways Division of DPW reported

back to Northern Affairs and National Resources that three routes had been scrutinized by aerial photos:

- 1 from Mayo via McQuesten River to the Hart River and the Peel Plateau;
- 2 from the vicinity of Dawson City to the Hart River via the Klondike River; and
- 3 from the vicinity of Dawson City via the North Klondike River and the Blackstone River to the Ogilvie River and the Peel Plateau [The route ultimately chosen].²⁶

DPW estimated the total cost at roughly \$30,250,000 for a road from Keno or Flat Creek to Aklavik, with bridges and access roads to the Eagle Plain and Fort McPherson. The estimated cost per mile was \$30,000. On 5 December 1957 it was decided that the total cost could be cut to \$22,750,000, as \$7,500,000 of the \$10,000,000 set aside for bridges could be eliminated by the use of ferries and native timber for box culverts and minor bridges. Robertson directed that the road be of "low standard, constructed along an alignment that would provide for future improvement to a higher standard." The right-of-way was to be a hundred feet and the roadway twenty-four feet wide, the minimum allowance for safe two-way traffic. The road was to be gravel for all-weather use.²⁷

On 28 December 1957, the Department of Public Works made a more extensive report after R.F. Peturrson and J.A. Fullerton flew over the alternate routes and after DPW had interviewed a number of persons familiar with the area. On the basis of these investigations, it was recommended that the route proceed from Flat Creek north to the southern edge of the Peel Plateau.²⁸ The Peturrson report concluded that a route from Flat Creek to the Peel River could be found, but foresaw serious difficulties in access from the Peel River to the Eagle Plain and north to Fort McPherson.²⁹ Robertson recommended that the survey begin in the spring and that there be no further reconnaissance north from the Peel to Fort McPherson.³⁰

These proposals were taken to Cabinet on 7 January 1958. However, although they were acceptable in principle, the costs were apparently too high. Hamilton was obliged to see if the costs of the road construction could be reduced from \$35,000 per mile to under \$15,000 per mile, and the costs brought down from \$500,000. There was little that could be done.³¹ Meanwhile, on 15 January 1958 the Assistant Deputy Minister of DNANR wrote to confirm with the Deputy Minister of DPW that the location survey for the road should be carried out from the Stewart Crossing-Dawson road to the Ogilvie-Peel area. On 29 January 1958,

the Cabinet minutes recorded the approval of the survey of the road through to Fort McPherson.

The Northern Vision of 1958

These plans were advancing under Hamilton's direction when another election was called on 1 February 1958. In this campaign northern roads, especially the road to the Arctic Ocean, would become the centre of national politics. According to Peter Newman, on the morning of 10 February Diefenbaker asked Merril Menzies, his economic advisor, to expand on the national development theme that Menzies had recommended for the election. Menzies called Hamilton who, with his special assistants, Roy Faibish and Don Johnston, dictated the long memorandum containing the economic and political justification for northern resource development which was to be the key to the Conservative election platform.³² This memorandum provided the basis of the opening speech of the campaign in Winnipeg on 12 February, where to an overflow audience Diefenbaker outlined his party's national development strategy, the first item of which was the roads programme:

*We intend to start a vast roads program for the Yukon and the Northwest Territories which will open up for exploration vast new oil and mineral areas — thirty million acres! We will launch a seventy-five million dollar federal-provincial program to build access roads. THIS IS THE VISION! . . . We are fulfilling the visions and the dream of Canada's first prime minister — Sir John A. Macdonald. But Macdonald saw Canada from East to West. I see a new Canada. A CANADA OF THE NORTH!*³³

The Liberals' attack on the "Vision," and in particular the roads policy, failed. Lester Pearson's memorable characterization of the roads programme as the building of roads "from igloo to igloo" was seized upon by Diefenbaker as evidence of the Liberals' lack of vision. In the end, Diefenbaker won the overwhelming support of the Canadian electorate for his programme, capturing 212 of 265 seats in the House of Commons.

Alvin Hamilton was allocated \$100 million for a "Northern Roads Programme" to be spent over ten years, to open up new oil and mineral areas. The companion "Roads to Resources" programme (the phrase was Diefenbaker's) allocated \$75 million for joint federal-provincial development roads.³⁴ Such large expenditures were strongly criticized by the Liberal Opposition, but Hamilton argued that the Eagle Plain road (as it was then called) showed the

effectiveness of these expenditures in promoting development. For the \$5 million to \$8 million that it was estimated it would cost, and the four or five years it would take to complete, Hamilton estimated that between \$150 million and \$250 million of private investment had already been pledged in exploration. Actually, more significant in drawing forth these expenditures were concurrent changes in the oil and gas exploration regulations in the fall of 1957. As a result, roughly thirty-six million acres of land had been taken out in the Yukon and Northwest Territories (mostly along the route of the road), where before a total of twenty million acres had been taken out.³⁵ In Hamilton's view, the government could not wait until market demand required northern resources before investing in infrastructure. To open up resources, infrastructure would have to be built five to ten years in advance of demand.³⁶

Ultimately, Hamilton justified the road programme by echoing Diefenbaker's references to the heritage of the Canadian Pacific Railroad. In July 1958 Hamilton said:

One hundred years ago men did have vision. They did have courage and some of them had the energy to go out and do something. It was Macdonald who led his government through those terrible 15 years of building the transcontinental railway known as the Canadian Pacific. If you read the speeches of the men in opposition at that time you see that they said, "Where does this road go? Who will ride on it? Indians and buffalo." I have seen a few "Indians" on those trains in recent years but very few buffalo.

*Those were the words of caution by our Liberal friends 80 years ago. Everyone knows today that this railway through the bush and muskeg of Northern Ontario has opened up a mineral industry that produces over a billion dollars of new wealth a year. That line ran through the west they talked about, through the prairies which they had defined as a desert. Now we have there one of the greatest bread baskets in the world.*³⁷ . . .

*Never in the history of the nation has it been so imperative that we do not overlook the opportunities before us, not only the development of our national wealth but the mere basic fact of maintaining our sovereignty so that generations to follow will have the future to which they are entitled. These matters demand tremendous interest in the north and this interest is not divorced from the needs of the people in the settled areas of Canada and the largest cities.*³⁸

Industry Support for the Highway

The oil industry favoured the Flat Creek-Fort McPherson road because it would tie in with summer barging on the Mackenzie and Peel rivers. During the winter, tractor and sleigh hauls would be shorter. Transportation costs and drilling costs (which are partially dependent on transportation costs) would be reduced. Finally, the working period in the areas would be increased considerably because of access at other times during the winter. With transport conditions as they then existed, it was not economical to return a \$250,000 drilling rig to Edmonton from the Eagle Plain area. As one industry representative indicated to the government,

In deep-test well drilling, the cost of providing the facility and the operating cost for transport alone, of equipment and supplies has run to one million dollars in an undertaking by Peel Plateau Exploration Limited — a cost approximately one-third of the total expense involved in the drilling of the first hole.³⁹

Surveys and Early Construction

Meanwhile, the first ground reconnaissance of the route by DPW was filed in April 1958.⁴⁰ Another route north to the Eagle Plain from Mayo up Haggart Creek, via Braine Pass and the Wind River — which came to be known as the Wind River route — was then also used as a winter road. The Wind River route was examined closely, since it was approximately the same length as the Flat Creek-Eagle Plain route and had better prospects of mineral development along it. However, during an aerial reconnaissance flown on 20 April 1958, many difficulties were noted in constructing an all-weather road along this route.⁴¹

On 24 June 1958, DPW filed an extensive report with DNANR on the alternative routes, recommending the Flat Creek-Eagle Plain route.⁴² Nevertheless, the decision to build the Flat Creek route was a close one. The various considerations were summed up in a government memorandum as follows:

(A) Engineering Considerations

- (a) Overall distance for both routes approximately the same.
- (b) Road material appeared more favourable on Mayo-Wind River route.
- (c) Flat Creek route considered better for alignment and grade.
- (d) Approximately 1300 linear feet of major bridge

structure required for Flat Creek route against 2000 feet for Mayo-Wind River route.

(B) Other Considerations

- (a) For the immediate purpose of oil development in Eagle Plain, a road from Flat Creek is considerably more direct and offers a possibility of readier outside connections. This would be especially true for pipe connection to the Pacific Coast and Alaska.
- (b) In the general economic picture of this part of the Yukon, measures to stimulate the activity of the Dawson area are in high priority.⁴³

In the summer of 1958 Hamilton himself flew over the route. Ground surveys were carried out locating the route to about Mile 150. On 16 October 1958, the Interdepartmental Roads Appraisal Committee decided to build the first 200 miles of the road, beginning in 1959 and continuing over the next six years. The committee felt that at some future time the road would be extended to Fort McPherson with an access road to the Peel Plateau. These decisions were subsequently confirmed by Cabinet, which approved the expenditure of \$1.9 million for the road during 1959-60.⁴⁴

The problems of planning this road, when its justification was so speculative and intangible, were immediately apparent. As the Deputy Minister of DPW, H.A. Young, wrote to Deputy Minister Robertson of DNANR:

The inherent problem in planning for this project is that there is no basis on which the immediate or future traffic requirements of the road can be determined. This requires that an arbitrary decision be made on the standard of road to be constructed. Selection of standard is further complicated by the topographic and climatic features of the area through which the road will pass.⁴⁵

Various standards of construction were considered. Winter road standards were rejected, and the eventual decision was to have a hundred-foot right-of-way with an eighteen-foot embankment for the road, which could be widened to twenty-feet where widening could be accomplished for a minimal amount more.

Construction according to these standards began in the early summer of 1959. The contract work was somewhat shoddy if serviceable, and was progressing according to schedule when Hamilton flew over the route with Prince Philip, who was on a royal tour with the Queen. On seeing the construction from the air, the prince commented on the destructive practices used for the borrow sites, which were numerous and small and located close to the road. The

borrow pits were deteriorating through permafrost degradation and were leaving a very unsightly landscape. On his return to Whitehorse, Hamilton had these practices corrected.⁴⁶

It appeared that the road would be easily completed to Mile 30 by September, when on 17 August 1959 Alvin Hamilton announced the discovery of oil in the Eagle Plain. After this discovery, the Peel Plateau Exploration Co. made a special request to improve the difficult section of the road at mile 50, so that equipment could be moved in earlier. This would require abandoning the construction of the highway and creating a tote trail to the Mile 50 section where the necessary work could be done. As one official commented,

*This suggestion raises a question which has faced us many times in the past, namely, whether we should spend money which we would not otherwise spend in order to be of greater service to resource developers.*⁴⁷

The minister decided to adopt the company's suggestion. The work was done, and further funds were committed to keep the road open in the winter to expedite the oil exploration. The companies were asked only to co-ordinate their plans so as to minimize the length of time the road was to be kept open.

That same winter the commitment to build the road via Flat Creek to the Eagle Plain was re-examined in the light of recent activities by Arctic Oilfield Transport Ltd. The company, a joint venture of the White Pass and Yukon Route companies and Proctor Construction Co. Ltd., delivered some 2500 tons of equipment by truck for Amerada Petroleum, using a winter road which they quickly constructed north from Mayo. This road was constructed as far as Hungry Lake (approximately 200 miles) in the short period of 12 October to 7 December 1959. The temporary timber culverts and bridges which were used would only last till spring, but the cost was a mere \$500 to \$1000 per mile including bridges and culverts.⁴⁸ However, it became clear that the competitive position of this alternative route would be untenable once the Flat Creek road reached Chapman Lake near Mile 70.

During the summer of 1960 the road was easily completed to Mile 60. From there a winter road could be constructed to Mile 70, ensuring the use of the road for delivery of supplies to the northern Yukon. In the winter of 1960-61 the road was first used up to Mile 24 for a small local logging and sawmill operation.⁴⁹

The road's minimal usefulness to the Yukon Territory at this point was reflected in the territorial government's

refusal to pay fifteen percent of the financing of the road while it was still incomplete. Because the federal government was opposed to the use of the road before it was completed, it threatened to allow the road to remain shut down during the winter. This controversy was not fully settled until 1962, when the Interdepartmental Committee on Federal-Provincial Relations reported that the territory would not be obliged to pay its fifteen percent of maintenance costs until the next effective starting date of the Federal-Territorial Financial Agreement following completion of the road or a section of the road. Thus the territory might have up to five years before assuming any responsibility for maintenance.⁵⁰

Construction Slows Down

With the departure of Alvin Hamilton from the Northern Affairs and National Resources portfolio in October 1960, and his replacement by Walter Dinsdale, work on the road slowed down. In 1961 only Miles 60 to 72 were constructed. Though it was not foreseen at the time, after the road reached this point there was to be no further construction until 1969. The main reason was that the oil and gas prospects in the Eagle Plain showed poor results. Standard Oil of California had used the road in 1961-62 and 1962-63 to supply drilling programmes, but these failed to prove commercial discoveries.

The government also became more conscious of the costs of the road in comparison with the results obtained. In 1961, for example, a "roads" category was created whereby the government would provide funds for very low standard roads for temporary, seasonal, or year-round access to resource developments. This theme was expanded upon in the 1962 report of the Interdepartmental Committee on Federal-Territorial Financial Relations. In this policy various categories of roads were defined, financing arrangements were specified, and construction standards set. Priorities for road construction were not dealt with except in the broadest generalities:

... priorities for the construction of roads [should] take into consideration factors such as (1) the density of traffic expected to use the roads; (2) the resource potential and probable development capacity of areas to be opened by the roads; (3) the value of goods expected to be moved over the roads in relation to the cost of the roads; (4) the potential "public" use of the roads for recreational or other general

*purposes; and (5) the effect on local employment and economic conditions that might result from the construction, maintenance and availability of a road or roads.*⁵¹

There was no specific programme of roads, much less a budget for the completion of any set of roads.

When the Liberals regained power in April 1963, Arthur Laing became Minister of Northern Affairs and National Resources. Northern roads were a much reduced priority and were seen in the broader perspective of other transportation alternatives. As Laing said at the time, transportation in the area of the proposed road was a “multi-pronged affair,” involving better facilities for water transportation on the Mackenzie and the development of airplane landing fields, as well as the construction of roads. However, he thought that a road might be finished to the Arctic by 1970, which was the target date for completion. The future routing of the road beyond the Eagle Plain was in doubt:

*The first [alternative] is the extension of the present road beyond Chapman [Lake] . Another is that the route should follow the Mackenzie river. The third is that it should run in the direction of McKay Lake the prospect of a highway right through to the Arctic is an ambition likely to fall short of realization in the face of the difficulties presented by the fantastic delta of the Mackenzie river. Nevertheless, I can assure the hon. gentleman that the government is working in this direction, and we hope to develop properties, mineral claims and oil discoveries, as we go along. This too will help determine the particular direction in which a move will be made.*⁵²

On 3 September 1963 the highway was officially named by Arthur Laing in a ceremony at Dawson. A number of names had been considered, including the Alvin Hamilton Highway. But, the Liberals being in power, the road was named after Cpl. (later Inspector) W.J.D. Dempster who had originally come to the Yukon in 1898. Dempster patrolled the route from Dawson to Fort McPherson by dogsled for four years, and in 1911 he led the party which set out to rescue the patrol of Cpl. Fitzpatrick of the Northwest Mounted Police which had lost its way between Fort McPherson and Dawson. In his report on the trip, on which he found the frozen and starved bodies of the “lost patrol,” Dempster remarked laconically, “I think this trip was the hardest I ever made.”⁵³

The 1965 Programme of Highway Construction

In 1963 the only work undertaken on the road was a survey costing \$288,781. In 1964 surveys costing \$33,977 were done. But in 1965 the government produced a comprehensive northern roads policy for approval of the Cabinet. The Dempster Highway was incorporated into an overall territorial roads policy in September 1965, when the Cabinet approved a report prepared by Northern Affairs road planners called “A Territorial Roads Policy for the Future.”⁵⁴ This policy, revised in 1971, has essentially controlled northern road developments to date.

The report began by criticizing the lack of a “specific construction program and any overall plan or rate of expenditure on roads.” Though the Northern Affairs department under Hamilton had prepared a list of roads, and Diefenbaker and others had said that \$100 million would be committed to carry it out, Cabinet had not approved this list or expenditure. As a result, in the view of the report, the northern road programme was “losing momentum” and was “in danger of failing to achieve its basic objectives”⁵⁵ of developing northern minerals and petroleum resources. The report argued:

. . . the mineral and oil potential [of the North] offers the only realistic chance for the north to become economically independent during the next ten to twenty years. This potential must be realized within that period or face the very real risk of being replaced by alternative sources of supply and types of resources. The millions of tons of coal which lie unused under Alberta and the Maritimes bear witness to the changing use patterns of non-renewable natural resources.

. . . failure to encourage the investment of the capital needed for exploration and exploitation will inevitably result in the north continuing to be a deficit area, depending on a high level of subsidy from the remainder of Canada. Although it is accepted that the actual exploration and development should be undertaken by private enterprise, the Federal Government must provide both incentives and certain facilities such as a roads network before investments will be made on the scale required.

*. . . Roads open up new territory — no area can be successfully developed without a road network. There is no substitute which can achieve the same results. However, the development of a road network should be co-ordinated with other transportation media particularly air and water.*⁵⁶

The role of the Alaska Highway in opening up the oil and gas reserves of northeastern British Columbia was noted:

The fact that many unexpected benefits have accrued through the construction of a road system, built with one specific purpose in mind and without justification on economic grounds, is emphasized since it provides a practical demonstration of the value of a road and the manner in which it can open up virgin country.⁵⁷

The recommended road network would provide a series of loops, so that most resource developments in the Yukon or the Mackenzie District of the Northwest Territories would be no more than 200 miles from a permanent road. The 200-mile figure was chosen to ensure that resources would be reasonably close to roads; it was thought that a mine or oil company could be expected to pay one-third of the cost of an access road which was no more than 200 miles long. The one-third figure was also arbitrarily chosen as representing a fair share of what a resource development should pay to be connected to the national transportation system.⁵⁸ It was also argued that reducing the estimated ten percent or more of resource developers' costs which were spent on acquiring access routes to the properties would free up more money for development and exploration work.

In the report other factors besides resource development were integrated into road planning as well. The loop concept in the road plan was thought to be especially attractive to tourists.⁵⁹ Roads were to reduce the cost differentials of living in the North caused by poor transportation. However, direct subsidies or fiscal incentives to northerners to equalize the cost of living were not considered in the report.

It was also argued that the federal government had a "quasi-provincial responsibility" to build roads, because the federal and territorial governments together have responsibilities that are equivalent to those of a province. And as the territories have not the staff, equipment, or funds to build roads on their own, the federal government ought to "be prepared to build roads on the basis that they are required to open up the region without requiring justification on other grounds."⁶⁰ Most importantly, the brief argued, funds must be committed for long-term road development. The previous ten-year programme begun in 1958, which had entailed the expenditure of approximately \$100 million over ten years, suffered budget cutbacks reducing the actual expenditures to approximately \$48 million over the first eight years. Politically speaking, the cutbacks were understandable. Cutting one item in the road budget produced large savings and only delayed the completion of the road by one

year; and in any case few Canadian voters urgently cared about northern roads.

The report recommended expenditures of about \$10 million per year for a period of twenty years, to build 3378 miles of road in both territories (see Figure 2). The recommended programme of construction was divided into two ten-year plans (1965-75 and 1975-85), the first involving construction totalling \$100 million and the second \$110 million. In this programme, the Dempster Highway was generally given a high priority. The section from Chapman Lake to Fort McPherson, which was estimated to cost \$12 million, was given third priority after roads from Pine Point to Fort Smith, and from Ross River to Carmacks. The sections from Fort McPherson to Arctic Red River, estimated to cost \$1.5 million, only received first priority in the second ten-year plan. The final section of the Dempster route from Arctic Red River to Tuktoyaktuk, estimated to cost \$9 million, was given a very low priority (seventh priority in the second ten-year plan).⁶¹

The policy recognized that "no detailed plan formulated today is likely to be usable five or ten years from now unless it remains flexible and subject to modifications in response to the changing needs and requirements of the north."⁶² To modify priorities as necessary, an Interdepartmental Roads Appraisal Committee was established, consisting of senior advisors in fields such as economics, geology, and engineering, to appraise and plan Area Development Roads, of which the Dempster was one. Representatives from the Departments of Mines and Technical Surveys, Public Works, and Northern Affairs and National Resources sat on this committee.

Though the estimated costs for the roads were based on preliminary engineering studies only and were accurate simply as a guide, the recommended levels of expenditure — \$10 million per year, or about one percent of the total annual Canadian expenditure on roads — were very firm. This figure was to exclude any money spent on paving, reconstruction, maintenance, bridges, or improvement of existing roads. It was felt that "A program where expenditures are any lower will be unlikely to lead to the successful development of the north within the next twenty years."⁶³ It was conceded that the level of expenditure could not be defended on a per capita basis. For Canada as a whole, per capita annual expenditures on roads ranged from \$40 in 1956 to \$56 in 1962; while expenditures on roads in the Yukon ranged from about \$263 per capita in 1957 to a high of \$627

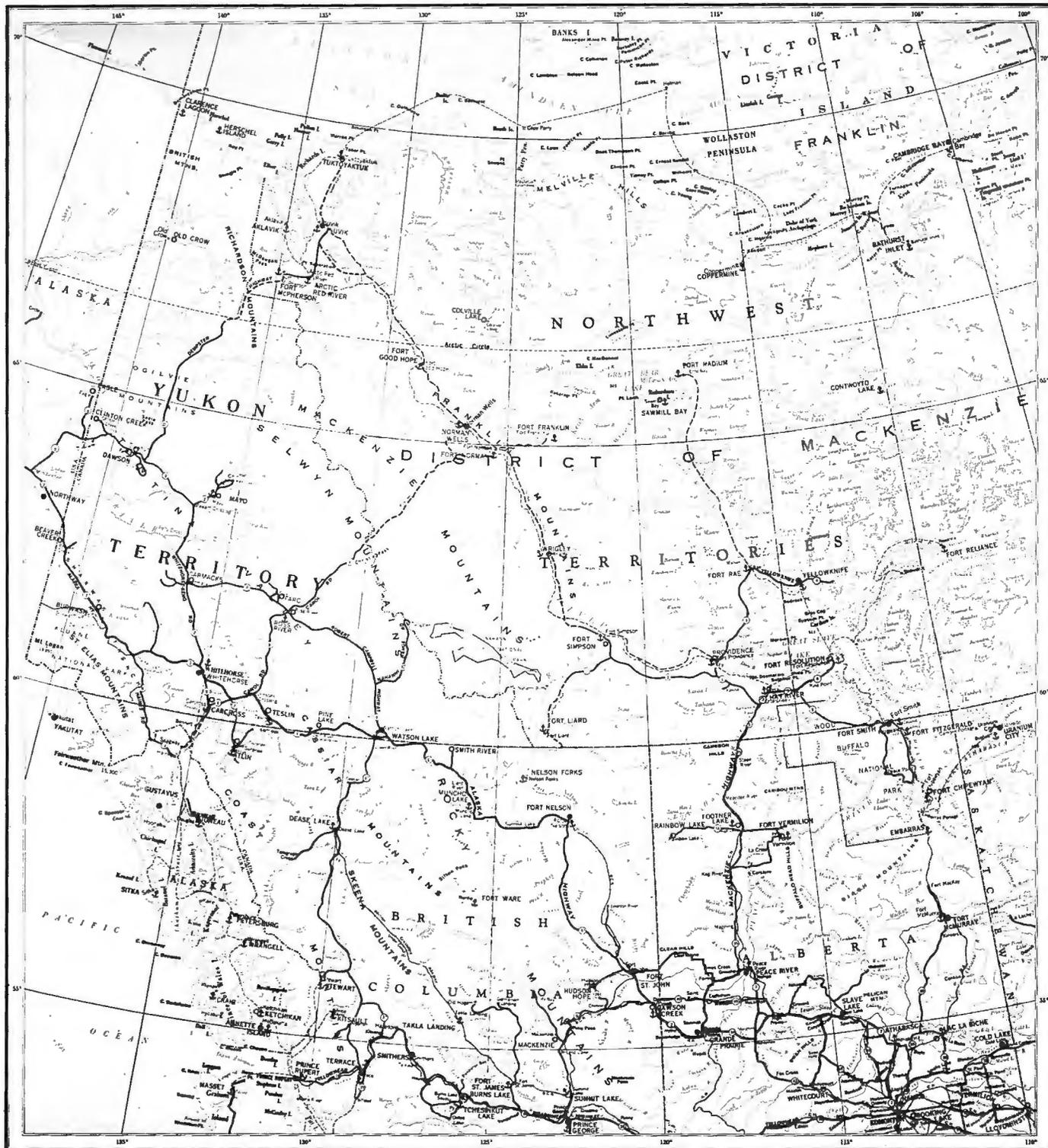


Figure 2 Northern Roads

per capita in 1959. Cost/benefit analysis as a determinant of road policy was also rejected:

The Decision on how much to spend and the manner it is to be spent must be based on two criteria — the degree to which the government wishes to encourage northern development and a business assessment of the chances of future returns by way of resource exploitation. There is no economic yardstick that can be brought to bear at this time — none was available when the C.P.R. was built, none was used when the Alaska Highways System was built, and none is available now. The World's Fair can command a Federal contribution in excess of the sum recommended for a ten year road plan. Surely northern roads are of equal or greater importance in the long run.⁶⁴

Though the report mentioned at the beginning that in the planning stages roads should be considered with other transportation modes — including water, rail, air, and pipeline — there was no further consideration of a general transportation policy. Perhaps implicitly, the low priority for roads along the Mackenzie Valley indicated that barging was accepted as the primary transportation mode for that region. Nevertheless, completing the Dempster Highway to Fort McPherson was given a high priority, even though the road would duplicate barge service. The report argued that:

The type of goods to be carried, or service rendered, dictates the type of transportation used, and where the demand varies widely, or where there is a need for specialized transportation the installation of more than one medium must be accepted.⁶⁵

It was still thought that roads were essential in opening up the country.⁶⁶

The Years of Pipeline Planning: 1968-1977

In January 1968 large reserves of oil and gas were discovered at Prudhoe Bay on the North Slope of Alaska. Since that discovery the history of the highway has been shaped by the various pipeline proposals to transport oil and gas from Alaska and the Mackenzie Delta to the lower United States and eastern Canada.⁶⁷ With the discovery of the reserves at Prudhoe Bay, one or more major pipelines became almost certain. The road gained a high priority, since it would aid in supplying materials for the construction of any pipeline across the northern Yukon, or indeed to a lesser extent any pipeline from the Mackenzie Delta south along the Mackenzie Valley.

During the mid-sixties work on the Dempster Highway had been stopped, as higher priority roads such as the road from Carmacks to the new Cyprus Anvil mine at Faro near Ross River in the Yukon were constructed. Nothing was done on the Dempster in either 1965 or 1966, and in 1967 only an aerial survey of the route from Chapman Lake to Arctic Red River was performed. In 1969 construction on the road began again on Miles 79 to 123. Aerial photography and survey work was done on Miles 123 to 167. And in 1970 construction was completed to Mile 123.

The federal government was worried that the Americans would proceed with their arctic developments without regard to Canadian sovereignty, and without benefiting Canada at all. The American initiative in attempting to sail the ice-breaking supertanker *Manhattan* through the Northwest Passage, and the apparent American intention to build a Trans-Alaska rather than a Mackenzie Valley pipeline gave substance to these fears and led the government to hold an Arctic Transportation Conference in Yellowknife in 1970 to promote Canadian efforts in arctic transportation. At that conference the Hon. Jean Chrétien, then Minister of Indian Affairs and Northern Development, announced that it was the government's plan to complete the highway by 1974, in time to aid in pipeline construction. He characterized the road as "the most urgent road building task in the North."⁶⁸ Accordingly, the sections of the road between Inuvik and Fort McPherson were brought forward from the second ten-year plan for completion in the first ten-year plan,⁶⁹ and approximately fifty percent of the expenditures on new roads from 1970 was scheduled for construction of the Dempster Highway.⁷⁰

In 1971, the government revised its northern roads policy. The major changes were:

- 1 to standardize right-of-way widths and generally to revise the road standards in view of changing traffic patterns and load limits;
- 2 to allow for federal-provincial-territorial technical discussions relating to road standards and construction in Canada;
- 3 to bring road right-of-way selection and construction under the Land Use Regulations, because of public environmental concerns;
- 4 to designate the Department of Public Works as the responsible agency for the supervision of road construction, in conjunction with the engineering departments of the Governments of the Yukon and Northwest Territories;
- 5 in contracts for road projects, to stress the need to employ

local people to a maximum degree. These local people, if qualified as equipment operators, could subsequently be employed on maintenance of the roads; and
 6 to provide for major bridge sites to be considered during preliminary road location.⁷¹

The \$10 million per year allocation for northern road construction was unchanged.⁷²

Also in 1971, construction began in earnest (see Table 1). In the Yukon Miles 123 to 155 were constructed. In the Northwest Territories, construction started south from both Inuvik on Miles 417 to 456, and from Arctic Red River to Fort McPherson – Miles 343 to 378. In the Northwest Territories, however, as a result of the use of inexperienced

materials were used to construct the roadbed. The result was that in the spring of 1972, of the twenty-five miles said to have been completed, only a very few miles survived. Large sections were washed out by spring freshets, and other sections just melted away. Consequently, nearly the whole section had to be rebuilt, at great expense. This attempt by DPW was said to be “experimental,” but R.F. Legget, former chief of the Building Research Division of the National Research Council, expressed the view that the “experiment” was unjustified, as the existing state of knowledge of permafrost engineering would have ruled it out.⁷³

In 1971 as well, the Ogilvie River bridge at Mile 123

Table 1
Dempster Highway Construction Status and Costs

Mile	Location	Contractor	Cost (millions \$) ¹	Cost per Mile(\$)	Year Completed
0-78	North Klondike to Chapman Lake		4.3	55,000	1962
78-123	Blackstone River	Liard Construction	2.2	50,000	1970
123	Ogilvie River Bridge	Canadian Armed Forces	0.46	—	1972
123-166	Ogilvie River	Klemke Construction	3.8	90,000	1972
166-178	Eagle Plain	Herschell Construction	1.1	95,000	1973
178-237	To Eagle River	Majestic Wiley Contractors	8.7	140,000	1976
237	Eagle Bridge	Canadian Armed Forces	2.5 (est.)	—	1977
237-254	Eagle River N.	Kluane Construction Ltd.	6.9	375,000	1977
254-268	To Rock River	B.A.C.M.	6.6	470,000	1979 (est.)
268-290	Rock River to Yukon/N.W.T. Border	Watsko Garage Ltd.	11.2	510,000	1979 (est.)
290-344	Yukon/N.W.T. Border to Fort McPherson	Keen Industries Ltd.	18.1	355,000	1977
344-379	Fort McPherson to Arctic Red River	Watsko Construction	8.2	235,000	1973
379-419	Arctic Red River to Mackenzie Highway junction	Western Construction Ltd.	9.4	235,000	1976
931-964	Mackenzie Highway junction north	Catre Construction	6.7	203,000	1975
964-971	Inuvik south	Beattie Construction	2.7	396,000	1973

1. Cost includes contract, pre-engineering, and supervision costs.

contractors and a desire by the Department of Public Works to cut the expenses of construction, ice-rich, sub-standard

was completed by the Canadian Armed Forces under contract to DPW. The army’s participation resulted from a

Cabinet decision of 12 June 1969 to study ways in which the Canadian Forces could contribute to national development and assist the civil authorities. That fall it was agreed that the army would build the Ogilvie River bridge, and six northern airstrips as part of "Exercise Random Access" (!). Under this arrangement the army would gain valuable experience in construction under difficult conditions, and the Canadian taxpayer would benefit from cheap construction. As a result of their success in completing the Ogilvie crossing, the Canadian Forces were also awarded the Eagle River crossing, which was completed in 1977.

In 1972-73 Miles 166 to 178 were completed by Herschell Construction of Whitehorse at a cost of \$1.1 million.

Meanwhile, on 28 March 1972 the government announced new policies on northern development in its report to the Standing Committee on Indian Affairs and Northern Development, "Canada's North 1970-1980." In it the government placed top priority on providing a

higher standard of living, quality of life and equality of opportunity for northern residents by methods which are compatible with their own preferences and aspirations

and on

*maintain [ing] and enhance [ing] the northern environment with due consideration to economic and social development.*⁷⁴

The only immediate indication of this change of policy with respect to the Dempster was the preparation of the first environmental study of the highway in the summer of 1972 by Schultz International Ltd., under contract to DPW.

The old policies of northern development seemed very much alive when Prime Minister Trudeau announced in April 1972 that the government intended to build the Mackenzie Highway along the Mackenzie Valley. This highway would also provide a road connection from southern Canada to Inuvik, thus duplicating one function of the Dempster Highway. The decision, announced close to election time, again used visionary terms to inspire the electorate. Prime Minister Trudeau said:

A transportation system is the key to rational development in the North. This Northern transportation system is mind boggling in its size. But then so was the very concept of a continent-wide fur trade 200 years ago. It's expensive too, but so was the Canadian Pacific Railway a century ago. Is

*it too big a project for Canada? Only in the view of those who have lost faith in what Canada is all about.*⁷⁵

As with the Dempster Highway, no surveys and no environmental or social impact studies were undertaken before the announcement of the decision to build the highway or, as government planners said, to "accelerate" the building of the highway. The Mackenzie Highway had been a part of the 1965 roads policy approved by Cabinet, though a low priority in that plan. The change in priorities occurred because the government thought that "substantial benefit could accrue to the construction and operating phases of such a [gas] pipeline, if an all-weather highway were available alongside the pipeline route at the time pipeline construction started . . . It was on the basis of this consideration that the decision was taken to accelerate the construction of the Mackenzie Highway."⁷⁶

It had originally been estimated that \$40 million (or forty to fifty percent) of the original estimated cost of \$70-100 million could be levied against oil and gas pipelines.⁷⁷ Costs of the highway escalated, however, from an estimated \$138,876,000 in 1973 to approximately \$300,000,000 in 1975. Moreover, an oil pipeline became increasingly unlikely. Opposition to building a highway grew in the Mackenzie Valley communities; the proponents of the Mackenzie gas pipeline said they did not need a road to construct and maintain a gas pipeline. Finally, the completion of the highway was postponed. Currently, the Mackenzie Highway is to be terminated at Wrigley in 1978-79, and the design of the road to Inuvik is to be completed at the same time.

To administer the Mackenzie Highway construction in line with the objectives of the government's 1972 northern development policy, new administrative arrangements were made which also came to be applied to a limited extent to the Dempster Highway.⁷⁸

An Employment and Local Impact Working Group and an Environmental Working Group for the Mackenzie Highway were created. Under the former, native northerners were hired under a programme called "Hire North" to clear the right-of-way for the highway. According to A.B. Yates, "The concept of Hire North recognize [d] the need to maintain cultural values and traditions in work methods instead of as often has been the case in the past, insisting that northern native workers adopt methods alien to their values."⁷⁹ The government trained natives to operate heavy equipment, and supported highway-related entrepreneurial

and employment opportunities for native people in, for example, highway construction or tourist services.⁸⁰ This scheme was afterwards extended to the Dempster Highway.

The Environmental Working Group considered the design and alignment of the Mackenzie Highway under a systematic review procedure. Extensive geotechnical work was done so that the best ground and the alignment closest to sources of sub-grade and surfacing material would be found. Land disturbance, destruction of vegetation, all aspects of hydrology, aquatic ecology, wildlife habitats, park and recreation sites were all considered by the Environmental Working Group.⁸¹ The terms of reference of that group were soon extended to the Dempster, but no systematic design review was undertaken.

By November 1974, the escalating costs of the Mackenzie Highway led the Treasury Board to request a re-evaluation of the project. Costs had risen from \$100,000 per mile to over \$300,000 per mile for a number of reasons: inflationary pressures, greater attention paid to the environment, and local benefits to native people.⁸²

As a result, some \$9.9 million of the money allocated to the Mackenzie Highway in 1975-76 was reallocated among the various northern roads. Of this, \$4.7 million went to the Dempster Highway, making a total allocation for 1975-76 of \$13,920,000. Since that time money allocated to the Mackenzie Highway has been shifted substantially to the completion of the Dempster.

Meanwhile, in March 1974 Canadian Arctic Gas Study Limited, after some five years' preparation, had presented its applications to the National Energy Board, the Minister of Indian Affairs and Northern Development, and the relevant U.S. authorities for approval of their proposed Mackenzie Valley natural gas pipeline (see Figure 3). Their forty-eight-inch natural gas pipeline would cross northern Alaska and the Yukon from Prudhoe Bay in Alaska and would connect with Mackenzie Delta reserves. The pipeline would then run south along the Mackenzie Valley into southern Canada, and from there would branch off to carry gas to both the eastern and Pacific states of the United States, and to eastern Canada. The estimated project cost in Canada by 1977 would be about \$8 billion, making it the greatest construction project in terms of capital expenditure that private enterprise had ever undertaken anywhere.⁸³

In the spring of 1975, Foothills Pipe Lines (Yukon) Ltd., a breakaway group from the Arctic Gas consortium led by Alberta Gas Trunk Line Co. Ltd., submitted a competing application to build a Mackenzie Valley pipeline limited to

the delivery of Canadian gas reserves to Canadian markets. Both these applications were considered by Mr Justice Thomas Berger, who was appointed Commissioner of the Mackenzie Valley Pipeline Inquiry on 21 March 1974 by the Minister of Indian Affairs and Northern Development. Berger was to hold hearings to investigate the environmental and socio-economic impacts of the pipeline in the North and to recommend on the terms and conditions to be imposed on the granting of a right-of-way for the pipeline. The inquiry hearings, which set new standards for consultation with communities on northern development, provided a forum for native northerners to express their concerns about northern development, including the Dempster Highway. In the community hearings at Old Crow, Fort McPherson, Arctic Red River, Aklavik, and Inuvik, the highway was cited as a major concern.

Some of the issues which were mentioned relating to the highway were the cumulative social and environmental impacts of the pipeline and highway, the pipeline company's plans to use the highway for moving pipe and supplies during construction, and the company's plans to use the Dempster and temporary roads leading from it to supply construction across the North Slope of the Yukon. Much of the environmental research presented to the Berger Inquiry also applied to the highway, particularly the caribou research.⁸⁴

Government planning of the highway construction proceeded in step with the pipeline companies' scheduled plans for pipeline construction. Since it was assumed by the government that a Mackenzie Valley pipeline would be built, the completion date of the highway was adjusted to provide for use during construction.

But the Alaska Highway Pipeline proposal by Foothills to carry only Alaska North Slope gas to the United States, filed with the regulatory agencies in August and September 1976, provided an alternative to the Mackenzie Valley proposals. This route, following the Trans-Alaska oil pipeline to Fairbanks, then following the Alaska Highway through the Yukon and British Columbia to Alberta and onward to the lower United States, was longer than the Mackenzie Valley route. However, it avoided environmentally sensitive areas in northern Alaska, the northern Yukon, and the Mackenzie Delta. It avoided difficult winter construction problems on the North Slope of Alaska and the northern Yukon, and difficult logistical problems in areas lacking access by road — most of the Mackenzie Valley — and thus allowed for greater certainty in planning and less danger of cost overruns. Perhaps most significantly, the native people in the Yukon

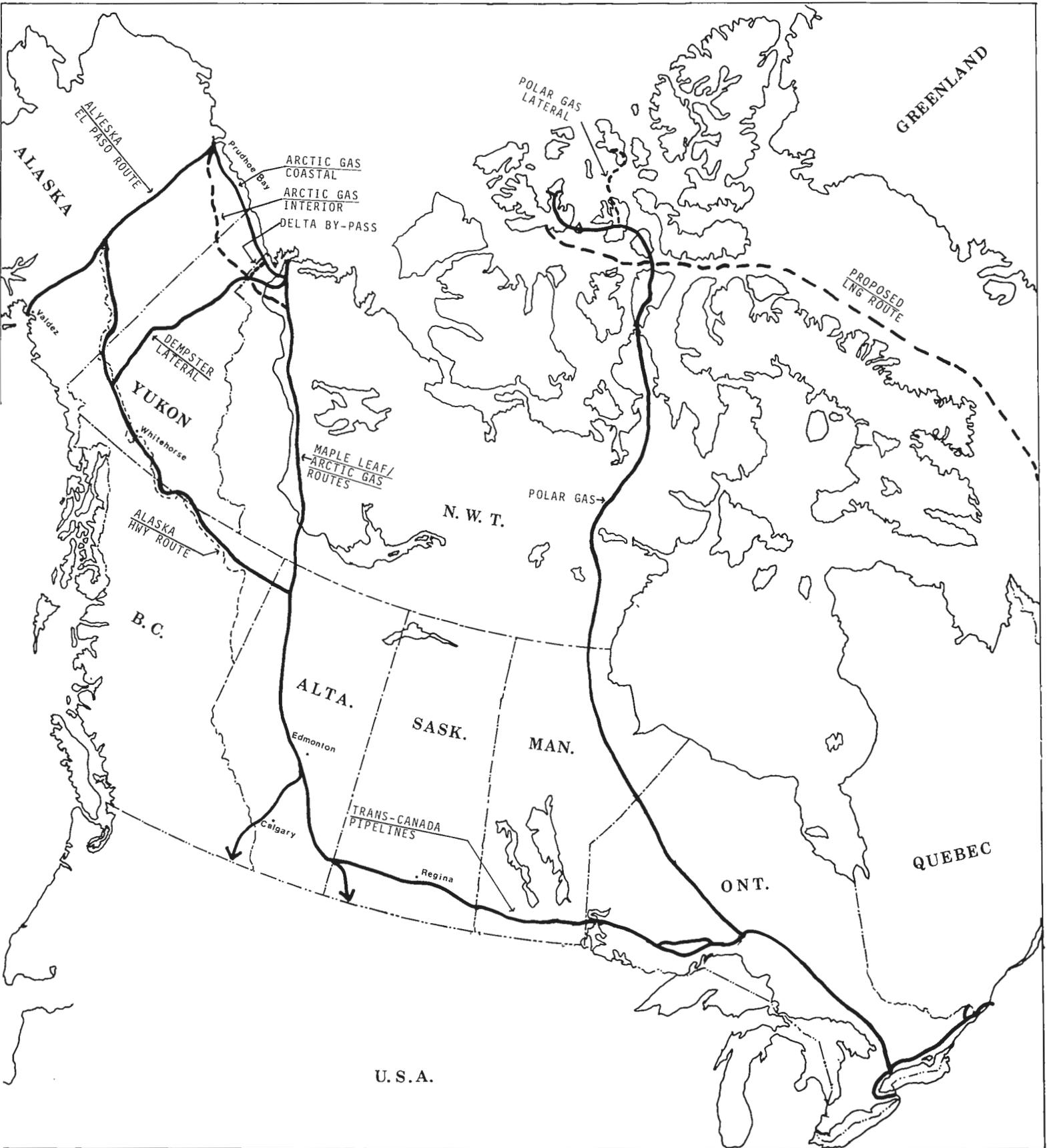


Figure 3 Proposed Pipeline Routes

along the Foothills route had been exposed to southern-type developments since the days of the gold rush, and especially since the construction of the Alaska Highway. The adverse social impacts of such a pipeline were therefore expected to be less severe than in the Mackenzie Valley.

In the first volume of his report, which was submitted on 9 May 1977, Mr Justice Berger tentatively favoured the Foothills Alaska Highway route on environmental grounds, but stressed that socio-economic and native claims issues along that route would have to be carefully assessed before any recommendation was made to build a pipeline along the Alaska Highway.⁸⁵ He further mentioned the possibility of connecting up Canadian gas reserves in the Mackenzie Delta-Beaufort Sea area by a pipeline along the Dempster Highway or, alternatively, a Mackenzie Valley pipeline as was proposed by Foothills.

The National Energy Board, in its decision announced on 4 July 1977, recommended that Foothills be granted a Certificate of Public Convenience and Necessity to build a pipeline along a modified Alaska Highway route, the so-called "Dawson Diversion" route (see Figure 3). As a condition, Foothills would be required to carry out feasibility studies and make an application by 1 July 1979 for the construction of a pipeline along the Dempster alignment to connect up Mackenzie Delta and Beaufort Sea reserves.⁸⁶

The Alaska Highway Pipeline Inquiry, chaired by Kenneth M. Lysyk, was commissioned on 19 April 1977 to investigate the social and economic implications of the Alaska Highway routing. The Lysyk Inquiry also considered the Alaska Highway route acceptable, subject to certain conditions, but found that there had been insufficient study at that time to assess the proposed Dempster lateral route.⁸⁷

The Environmental Assessment Panel investigating the environmental impact of the Alaska Highway route, under the chairmanship of Dr H.M. Hill of Environment Canada, also considered the Dempster Highway lateral routing for a gas pipeline. In its Interim Report, the panel similarly concluded that there was insufficient evidence to decide on the environmental acceptability of a Dempster lateral route. The panel recommended further study.⁸⁸

In the meantime, by the summer of 1977 the highway was constructed almost to Mile 254 in the Yukon and across the Yukon-Northwest Territories border from the N.W.T. The Eagle River bridge was almost finished and the final section of the highway was let for tender on 10 August 1977. The highway was scheduled for completion with ferries at Fort McPherson and Arctic Red River by 1979, at a total

cost (with planned reconstruction) of about \$103 million. Maintenance costs will be about \$2 million per year thereafter for general maintenance, snow plowing, and dust control.

There will apparently be no further delays for environmental and social studies, although plans were being advanced in 1976 and 1977 to manage the impact of the highway. These plans for management, and the issues of public participation in planning, and social and environmental impact assessment, are discussed in the sections which follow.

Public Participation in Planning

Until the mid-sixties the sole public involvement in the planning of highways in northern Canada was the usual informal flow of information between the senior officials of Northern Affairs and National Resources, industrial and commercial groups, and territorial and local government officials. The government dealt mostly with companies involved in oil and gas exploration in the northern Yukon, and their transportation problems were the government's pre-eminent concern. With the 1965 roads policy, though, came a decision that "close liaison . . . [should] be maintained with northern residents, business interests and organizations in order to ensure [that] the road programs are fulfilling the intent of the policy and meeting the needs of both community and resource development."⁸⁹ One result of this decision was that the Northern Roads Administrative Group and the Interdepartmental Advisory Committee on Northern Roads have met jointly in each of the territorial capitals once each year, though these meetings did not provide the general public with an opportunity to express their views.

The 1967 Fact-finding Committee

The first public hearings on northern roads took place in May 1967 when a "Fact-finding Committee," consisting of members of the Northern Roads Administrative Group, made a tour of the North to gather public opinion. On the committee sat senior advisors in engineering, geology, and economics. The committee planned to gather views and advice from "local business interests and organizations such as mining companies, Boards of Trade, Chambers of Commerce, tourist interests and others,"⁹⁰ and set itself three tasks:

- (a) *To seek the opinions and advice of those with whom it met with respect to the routes the Area Development and*

Trunk roads should follow and the priorities that should be allotted.

(b) To seek the opinions and advice of those with whom it met with respect to the adequacy of the Northern Roads Policy itself.

(c) To seek the opinions and advice of those with whom it met with respect to road construction and maintenance generally including such items as road construction, paving and major bridge construction which do not form part of the \$100 million program the Northern Roads Policy covers.⁹¹

At this stage the terms of reference for public consideration of road developments did not include environmental or social impacts, but merely economic, engineering, and geological considerations. The range of interest groups consulted was also limited in comparison with the 1970s, but at this date lack of organization, lack of interest, and lack of funding for environmental and native groups in the North hindered effective representation of those interests.

The Fact-finding Committee's itinerary was rushed. In the space of twenty-one days, meetings were held in sixteen communities. The committee met with eight local organizations including Chambers of Commerce and town councils, four associations representing the resource industries, seven mining or transportation companies, and officials of the British Columbia, Alberta, Alaska, and territorial governments. Twelve written briefs were received, and the committee travelled some 8789 miles. Yet, of the communities potentially affected by the Dempster Highway, the committee visited only Inuvik and Whitehorse; it did not travel to Fort McPherson, Arctic Red River, or Old Crow, thus omitting a number of the communities most likely to be affected by the highway.⁹²

At the meetings, the committee first discussed the objectives of the fact-finding tour, the history of the road building from 1945 to 1965, the revised Northern Roads Policy of 1965, including the ten- and twenty-year road network envisaged by the policy and, finally, the current year's road construction programme. After this presentation, there were questions, answers, and discussion. Written briefs, if any, were presented and discussed.⁹³

The strongest support for the Dempster Highway came from the Mackenzie Delta interest groups. The Inuvik Chamber of Commerce, in consultation with other communities on the Delta, developed a proposal for a Mackenzie Delta road network and named the Dempster Highway as their first priority in road development.⁹⁴ The Aklavik

Advisory Council gave the Dempster a high priority as well, though they thought that first attention should be given to roads in the immediate vicinity of settlements and of vital interest to them.⁹⁵ The Tuktoyaktuk Advisory Council said that road connections with the South were "more necessary . . . to achieving a stable economy than any other item."⁹⁶

The Inuvik Chamber of Commerce plan called for the completion of a number of shorter roads in the vicinity of the towns of the Delta.⁹⁷ Thus the Dempster would be merely the first stage in the construction of an extended road network serving the Mackenzie Delta. The Chamber recommended that construction of the Dempster Highway proceed from both ends to provide local employment and capital expansion in both areas.⁹⁸

In the Yukon, completing the Dempster Highway was a low priority for all organizations except the White Pass and Yukon Route companies, which spoke favourably of the completion of the highway, apparently because they would then expand their trucking services northward to serve the Mackenzie Delta.⁹⁹ The briefs which were presented chiefly favoured roads which would assist in mining developments.¹⁰⁰

The Canadian Petroleum Association thought the early completion of the Dempster Highway would encourage oil and gas exploration in the Mackenzie Basin, the coastal plains, and the Eagle Plain. Though no large oil or gas reserves had been located, they argued that the logical markets for such resources would be best served by access to the Pacific Ocean.¹⁰¹

The committee concluded that, in general, the northern roads policy was "widely well accepted and considered to be an excellent means of opening up the country and of providing an incentive to resource exploration and exploitation."¹⁰² The only complaints which had been made were that not enough money was allocated to road construction, that higher priority should be given to providing relatively low standard roads into undeveloped areas where significant benefits could be achieved, and that reconstruction and maintenance of a winter road network should be supported.¹⁰³ The committee accepted these criticisms and recommended the indicated policy changes.¹⁰⁴ Moreover, it recommended that there be a fact-finding tour of the North every two years;¹⁰⁵ but the next tour was not made until September 1975.

The 1975 Fact-finding Committee

Essentially the terms of reference, itinerary, and procedures of the 1975 fact-finding tour were the same as for the 1967

tour. Of the communities affected by the Dempster Highway, the committee visited Inuvik, Dawson, and Whitehorse, but not the largely native communities of Fort McPherson, Arctic Red River, and Old Crow.

The composition of the committee was changed; it included representatives of both territorial governments and the federal departments of Indian Affairs and Northern Development, Public Works, and Ministry of Transport — Arctic Transportation Agency. Among the participants, the oil, mining, transportation and local Chamber of Commerce/city government interests were again well represented. But a wider range of private citizens and other groups appeared. Attendance at the meetings ranged from five to fifty people, and two-thirds of the meetings were attended by at least twenty-five people.¹⁰⁶ Moreover, thirty-two written briefs were presented to the committee.

The Northern Roads Fact-finding Committee circulated a background paper for the hearings, outlining the purpose of the tour. The ten-year road programme of 1965-75 was coming to an end. Also, the escalating costs of opening up progressively more remote areas were leading to a re-examination of the policy of using roads, as opposed to other transportation facilities, in opening up the land.¹⁰⁷ The committee wanted to consider new road policies in line with the government's priorities for northern development announced in 1972.¹⁰⁸

One major fault of the tour, however, was that environmental studies which the government had commissioned on the Dempster Highway were not made available to participants in the hearings. Thus, informed discussion of the environmental issues could not take place. The Schultz environmental study, prepared in 1972, was not released (except to a very few people) until 1976. It was finally released to the Berger Inquiry and became available generally in early 1976.¹⁰⁹ Similarly, the Tywoniuk-Ingليس study, the other major review of the environmental impact of the highway done jointly by DOE and DIAND in 1974, was not released to the public for the fact-finding tour.

After the hearings the committee concluded that "There is general acceptance that the completion of the Dempster Highway is the first priority for highway construction in the Yukon Territory."¹¹⁰ But if such acceptance truly existed, it was more passive than active. In the Yukon meetings, again only the White Pass and Yukon Route companies gave the Dempster Highway a top priority, as they had the most to gain from its completion.¹¹¹

In the Northwest Territories, support for the Dempster was more widespread. David Nickerson, a member of the

Territorial Council, spoke for many northern whites when he gave the Dempster top priority and said a road network would

*enable [the Northwest Territories] to become again an economically viable part of Canada capable of paying its own way and providing the necessary resources required by Canadian industry. Roads will open up mining, hydro-carbon, agricultural, timber and recreational areas and allow us to develop our full potential, at the same time lessening the isolation of Northern living and providing the vitally needed employment opportunities for Northerners now that "living off the land" is a thing of the past.*¹¹²

Nickerson's brief did not take into account the continued extensive reliance on country food in the native communities.

In contrast to 1967, a number of briefs strongly opposed the completion of the Dempster and the construction of northern roads in general. The Committee for Original Peoples' Entitlement (COPE), the only native peoples' organization to submit a brief, fundamentally opposed the "Roads to Resources" concept of the oil and mining industries. COPE stressed the broad social, economic, and environmental consequences of northern roads. They asked who would benefit from roads, and demanded an integrated approach to transportation alternatives. COPE urged a professional and democratic planning process in which the communities would have input into decisions. COPE argued that roads must not violate land claims negotiations; auxiliary services such as gas stations and maintenance contractors must be controlled; and future road development must not overload the local roads and services. Thus, before any commitment to build a road, the environmental, social, and economic consequences of the proposal must be thoroughly examined both professionally and publicly. After assessment and consultation with the communities affected by a prospective road, the decision to build it would be made on the basis of whether it was in the interests of the northern residents to be affected.¹¹³

Furthermore, COPE challenged the whole concept of roads in the North. They urged that all transportation alternatives be reviewed before making commitments to build roads. In particular, COPE suggested that an improved airport at Tuktoyaktuk would be preferable to a road to Inuvik. They pointed out that roads are dangerous in the North because of dust, washouts, poor topping, and lack of funds for upkeep. The emphasis should be on improving existing local roads rather than constructing new ones, they said.¹¹⁴

Robert F. Legget, an engineering consultant and formerly a senior official in the National Research Council, was just as critical of the northern road policy. His brief, submitted at the urging of the Canadian Arctic Resources Committee, advocated a moratorium on all road building in the Northwest Territories and the establishment of a royal commission of independent experts to review transportation needs, the economic and environmental effects of roads in the North, the Soviet experience with northern transportation, and the interrelation of all modes of transport for the North.¹¹⁵

In the Yukon, Eleanor Millard, the Territorial Councillor from Old Crow, urged that the environmental and social implications of the Dempster Highway be intensively studied before it approached the Old Crow region.¹¹⁶ The Yukon Conservation Society, the only environmental organization to submit a brief, also urged impact studies and public scrutiny of such studies before any new road construction was begun in the North. The society expressed concern about the effect of the highway on the Porcupine caribou herd, and recommended control of traffic in areas where the caribou crossed the highway.¹¹⁷

The Fact-finding Committee report did not attempt to meet all these criticisms, but merely noted that the conclusions of the committee would be passed on to the Interdepartmental Advisory Committee on Northern Roads and “ultimately could be reflected in the Northern Roads Policy for the 1976-1985 period.”¹¹⁸ Significantly enough, the committee noted that there was general consensus that “further consultation must take place between Federal and Territorial governments and local community residents prior to any commitment to construct new roads.”¹¹⁹ And the committee noted that “where native representation was made (Fort Smith, Fort Simpson, Inuvik) the view was expressed that land claims be resolved prior to the construction of new roads.”¹²⁰ From these statements, it would appear that consultation with communities and settlement of land claims did not, in the committee’s view, need to be settled before completion of the Dempster.

In general, the Fact-finding Committee found that the public accepted the current road policy and the terms of reference of the committee. The committee recommended that in the new ten-year road plan communications roads connecting communities, and local recreation roads, should be given a higher priority. Consultation should take place with northern people on social, environmental, and economic matters in advance of any construction, but not, apparently, before making policy commitments to build new

roads. The committee recommended that alternative transportation modes be given greater consideration, instead of roads, and also that higher priority be given to maintenance, dust abatement, and planned reconstruction of existing roads.¹²¹

Community Meeting in Arctic Red River

Separate consultations also took place with the local communities as to the local routing of the highway and provision of ferry crossings at Fort McPherson and Arctic Red River. At Arctic Red River there were at least three formal meetings with the community council regarding the location of the ferry crossing for the road. At the first meeting, on 15 May 1975, the council asked the government to move the ferry approaches out of the town itself because of the possible effects on fishing. Accordingly, the government came back in December with revised plans to build the ferry crossing at a site on the Mackenzie River near the village. But the revised site chosen by the government was also a fishing area used by the village, and on 20 January 1976 Arctic Red River asked that the site be some two-and-a-half miles further downstream. Fisheries and geophysical studies of this and the other locations, costing some \$40,000, were carried out in 1976 and 1977. This relocation of the ferry crossing also involved a local re-routing of the road approaches, costing about \$1.5 million.¹²²

The Mackenzie Valley Pipeline Inquiry

The importance of the Berger Inquiry in making the general public, and the government, aware of northern development issues cannot be sufficiently stressed. The native land claims issue and the many issues relating to adverse social, economic, and environmental impacts of large development projects in the North were exposed in their full dimensions. Furthermore, Mr Justice Berger consciously used both formal inquiry procedures in which expert evidence could be assessed under full cross-examination, and a very informal procedure for community hearings, so that the concerns of individual citizens and particularly native people could be expressed.¹²³

Though the social and environmental impacts of the Dempster Highway were not within Mr Justice Berger’s terms of reference, nevertheless these issues necessarily intruded into the consideration of the pipeline assessment. At the formal hearings there emerged for the first time evidence of the serious impact of the long-term use of the highway on the wildlife of the northern Yukon,¹²⁴ and on the community life of people in the Mackenzie Delta. And at the community

hearings the evidence of potentially serious social dislocation was confirmed by the testimony of local citizens in the Mackenzie Delta communities.¹²⁵

The Yukon Conservation Society Dempster Highway Seminar

As a result of the testimony of the environmental experts at the Berger Inquiry, that the highway posed serious dangers to the environment, the Yukon Conservation Society sponsored a two-evening seminar on the subject of the Dempster Highway. The seminar was held in Whitehorse on 18 and 19 May 1976.

At the seminar, a representative from the Department of Indian Affairs and Northern Development (but not from the Northern Roads and Airstrips Division), a wildlife consultant to Canadian Arctic Gas Pipeline Ltd., the chairman of the Fort McPherson settlement council, and representatives of the Yukon Game Branch, the Yukon Department of Tourism and Information, and the Yukon Chamber of Mines presented papers and led discussions on the highway. Approximately fifty people attended each night. No one advanced compelling arguments for giving priority to the completion of the highway. Those representing the mining and tourism industries suggested that other roads or investments by the government would result in greater benefits to the stimulation of their respective industries than the completion of the Dempster. The Game Branch expressed grave concern about the effect of the highway on the Porcupine caribou herd. The chairman of the settlement council in Fort McPherson expressed opposition to the road because of the dislocation it would cause his community.

As a result of this seminar, the Yukon Conservation Society resolved:

*Whereas the cost of completion of the Dempster Highway is \$25,000,000; Whereas the Yukon Conservation Society is aware as [a result of] a public seminar that areas of major concern have emerged; Whereas the Porcupine Caribou herd is threatened; Whereas the social impact on the communities on the highway will be detrimental to their way of life; Whereas the economic impact is of limited value to the industries of mining, oil and gas, tourism and transportation; This Society, therefore, recommends that construction cease until all areas of concern are investigated and management policies resolved.*¹²⁶

This position was subsequently widely endorsed by native and environmental groups.¹²⁷ In the spring of 1976, the Yukon territorial government voted to recommend a

delay in the completion of the Dempster Highway. Instead, they urged the completion of the Skagway road because it would be more economically beneficial to the Yukon and because it would cause less damage to the environment, referring particularly to the Porcupine caribou herd.¹²⁸

Nevertheless, the federal government continued to push to complete the Dempster Highway as scheduled, without delays for further studies. However, the government did start making plans to manage the impact of the highway.

Consultations regarding the Management Plan for the Highway

On 1 February 1977, the Northern Roads and Airstrips Division of DIAND circulated a discussion paper for a management plan of the highway, to gather comments and suggestions for the preparation of a further draft management plan.¹²⁹ Copies of the discussion paper were sent to the departments of Game, Tourism, and Local Government of the Yukon territorial government, the Yukon Conservation Society, the Council for Yukon Indians (CYI), the village of Old Crow, the towns of Fort McPherson, Aklavik, Arctic Red River, Inuvik, and Tuktoyaktuk, the Northwest Territories Game Branch, and others.

Various officials of the Northern Roads and Airstrips Division working on the management plan held meetings in Whitehorse and Old Crow in February, March, and April 1977, and meetings were held in the Northwest Territories in the same year to discuss the details of the paper. The meeting at Old Crow on 2 March 1977 was the first held in that community to hear local concerns about the effect of the Dempster, particularly on the caribou herd. More than one hundred people (out of a village of just over 200) attended. Representatives from Fort McPherson, the Council for Yukon Indians, and federal and territorial government officials joined in discussions with the people of Old Crow for more than three hours to discuss highway management. The Chief of Old Crow and Grafton Njootli, the vice-chairman of the CYI, spoke of the present and past use of land by the native people for hunting, trapping, and fishing. The President of the Council for Yukon Indians, Daniel Johnson, and the Chief of Old Crow stressed that the land claims must be settled before the highway was completed. The residents of Old Crow emphasized their concern about the effects of the highway on the Porcupine caribou herd; otherwise, they saw little benefit or harm to the village from the highway. Possible over-hunting of the herd as a result of opening the highway was discussed. Some of the representatives from Fort McPherson supported a no-hunting corridor along the

Dempster, extending one-half mile to one mile on either side of the highway, and controls on hunting during the migration season which would apply to the native people as well as to whites. The Chief from Fort McPherson expected that little benefit would accrue to his community from the highway unless his people owned trucks.¹³⁰

The Alaska Highway Pipeline Inquiry

Public discussion of the Dempster Highway again took place at the hearings of the Alaska Highway Pipeline Inquiry and of the Alaska Highway Environmental Assessment Panel. These hearings included discussions of a possible Dempster lateral pipeline, though under the terms of reference set in April 1977 neither inquiry was empowered to consider such a pipeline.¹³¹ However, the National Energy Board decision of 1977 required that Foothills Pipe Lines prepare an application for such a pipeline,¹³² and as a result the Lysyk Inquiry proceeded to hear evidence on the Dempster corridor at the formal hearings of the inquiry. The Lysyk Inquiry was required to report to the government by 1 August 1977, and thus had only about three months for its work. Nevertheless, community hearings were held in Old Crow and in all the towns along the Alaska Highway and Dawson Diversion-Klondike Highway route. Hearings were usually held in two sites in each town to ensure that native opinion as well as the opinion of the white community was obtained.

A number of individual briefs condemned the government's planning of the Dempster for failure to gather environmental and social data, lack of time for adequate socio-economic or environmental assessments, little site-specific knowledge, and failure to appreciate the full consequences of the corridor concept of development. Concern was also expressed for those changes that it was assumed the highway would bring to northern communities: the loss of community leadership, increased hardships for the aged, and increasing dependency on "store-bought" food.¹³³

The Environmental Assessment Panel Hearings

The Environmental Assessment Panel also heard evidence on the Dempster lateral pipeline, but only after a confrontation on the scope of its terms of reference. The original terms of reference of the panel did not include a consideration of the Dempster corridor, and in order to force amendment of the terms of reference the Yukon Conservation Society threatened to boycott the proceedings. The panel conferred

with Ottawa, and evidence concerning the Dempster corridor was heard.¹³⁴

Although the Environmental Assessment Panel was also required to report by 1 August 1977, it nonetheless held some fifteen days of formal hearings in Whitehorse during June and July 1977. Only communities along the Alaska Highway were visited; the panel was unable to visit communities affected by a Dempster lateral pipeline. However, the panel had access to the transcripts of the Lysyk Inquiry, and a representative of the panel accompanied the Lysyk Inquiry and recorded environmental concerns from the communities not visited by the panel.¹³⁵

The panel's hearings were locally advertised, and every effort was made to encourage individuals to make their views known. Public information and documentation centres were established in Whitehorse and in five other communities along the highway.¹³⁶

Analysis

Public participation and consultation with respect to the Dempster Highway may usefully be analyzed according to the following outline of factors identified by Professor A.R. Lucas in a recent paper:

1. *the degree of citizen activist tradition in light of the perceived sanctity of the concept and institutions of representative democracy;*
2. *the nature and extent of citizen organization;*
3. *rights and duties provided by law;*
4. *the scope of political and administrative discretionary powers [especially the government policy with respect to public involvement]; and*
5. *access to information and resources.*¹³⁷

No doubt the weakness of an activist tradition and other related cultural issues were factors which limited native involvement in the Fact-finding Committee meetings of 1967 and 1975. As Peterson and Lucas point out,

The kind of activist tradition that is the basis for citizen participation in southern Canadian communities appears to be culturally foreign to northern native communities. There is a strong tradition of consensual decision-making on issues that arise within the community or which have direct effects on it; but these are decisions by the community. The tradition appears not to extend to initiatives on issues that impinge on the community but are determined by some outside decision-making authority. There is little concept of activism in the sense of advocacy of community interests

*before outside decision-makers. The adversary model, common to southern political and regulatory processes, is regarded as distasteful confrontation.*¹³⁸

Other factors may well have been more significant in limiting native involvement. For example, the committees did not visit the native communities. But even in Inuvik and Whitehorse, native people played only a limited role in meetings. Cultural and language barriers may explain this fact, but it may also be that the native people did not think that participation was worthwhile or that by their participation they could be successful in influencing the government.

On the part of the white northerners, the briefs presented, while relatively few in number, often forcefully represented local interests. The range of viewpoints put forward tended to be narrower than might have been the case in the larger centres of southern Canada; but it is quite likely that white participation was reduced because many people felt that the government was carrying out policies with which they already agreed.

At the committee's hearings in 1975, as compared to 1967, there emerged a wider range of interest groups in the North. Among them were the Committee for Original Peoples' Entitlement (organized in 1970), the Yukon Conservation Society (1967), and the Canadian Arctic Resources Committee (1971). Later hearings and consultations have involved the Council for Yukon Indians (1973), an umbrella organization created for the purposes of land claims negotiations, the Yukon Native Brotherhood (1968), and the Yukon Association of Non-Status Indians (1971).

It is important to remember that the extent of the hearings and consultation was entirely at the discretion of the government. No law required such hearings or consultation to take place, and the environmental statutes applicable to the highway allowed for its approval without hearings.¹³⁹ Even the various pipeline inquiries, which also touched on the Dempster Highway, were created solely at the discretion of the government.¹⁴⁰

The government has consulted with the public concerning the Dempster Highway to an increasing degree throughout the years, to the point where local groups have been intimately involved in the development of the management plan for the highway. Generally, however, such public involvement has been confined to consultation; for example, the Fact-finding Committees were intended "to seek the opinions and advice" of northerners on road policy. Until

recently, such consultation was rare. Though the 1967 Fact-finding Committee recommended that such tours be conducted every two years, it was eight years before another tour took place.

More recently, the consultation with the people of Arctic Red River as to the location of the river crossing granted a role to local citizens in resolving their concerns. Moreover, the consultations with respect to the management plan for the highway have attempted to obtain the cooperation of the full range of potentially interested groups in the preparation of the plan.

Obtaining information has consistently been a problem which has hampered public involvement in consideration of the highway. Perhaps over the long term the most significant difficulty has been the physical distance between the road planners located in Ottawa and those affected by the highway in the North, some 3,000 miles away. Such distances have necessarily made consultation with local groups rushed, and follow-up has been difficult.

Freedom of information has also been a problem. The Schultz environmental study, among others, was treated as confidential by the government. Some studies were not released until the Berger Inquiry, backed up by subpoena powers, formally requested them. With the preparation of the management plan for the highway, however, the government has for the first time begun to disseminate information concerning the environmental issues related to the highway, providing in the circulated drafts short explanations of the issues. In 1975 the government did make available a background paper explaining a number of the issues that it was concerned about pertaining to road policy.¹⁴¹ But this document, in itself an isolated instance, included less than one page of discussion of environmental issues in road construction, and contained no discussion of the social impact of opening new highways in the North.¹⁴²

Access to expertise and other resources has been an obstacle in the past to public participation in road planning. But the increasingly well organized native and environmental groups have in recent years been able to gather advice on caribou and other highway-related issues from a wide range of experts. The Dempster Highway Seminar, organized by the Yukon Conservation Society, successfully brought together various experts, chiefly from among those living or working in the Yukon.

As is evident from even the brief discussion in this section, the impact of the Dempster Highway is complex. Economic, social, and environmental issues arise which extend beyond consideration of roads alone. However, the

Fact-finding Committees tended to confine public involvement to the consideration of road issues in the most narrow sense, such as the relative priority of expenditures on dust control as against new construction or reconstruction programmes. Mr Justice Berger pointed out in more general terms,

*One of the complaints made to the Inquiry by northerners from time to time was that there had already been a plethora of committees, task forces, hearings and reports into some at least of the questions that the Inquiry was examining. Indeed, we came across many of them. But each of these reports and studies had largely been confined to a narrow subject. This has been a major flaw in impact assessment. Each department of government has tended to examine the impact of any given proposal solely within the confines of its own departmental responsibilities. Until this Inquiry was appointed, there was no basis on which an overview of the impact of the pipeline project could be made.*¹⁴³

In comparison with the Mackenzie Valley Pipeline Inquiry, admittedly an exceptional example of the holistic approach to analyzing the impact of a project, the public attention given to the Dempster has been narrow in approach, sporadic, superficial, and – with a few exceptions – unquestioning with respect to the fundamental assumptions underlying highway policy. In particular, the economic costs and benefits of further investments in the highway have not been publicly investigated and considered, nor have the social and environmental costs and benefits of the highway been investigated, then weighed and debated in a public forum. With the preparation of the management plan, the federal government has attempted to deal with the environmental and social issues raised by the highway on an ongoing basis; however, it has not brought to bear the expertise, resources, and political commitment which would ensure the resolution of these issues.

One may finally note that public involvement in the planning of the highway may have been hindered by the fact that public meetings and consultations have generally been undertaken directly by those responsible for the existing roads policy, instead of by an independent board or commission of inquiry. For example, the Fact-finding Committees were chaired in each case by the senior official in charge of road policy – in 1969, the Assistant Director of the Northern Administration Branch of DIAND, and in 1975 by the Chief of the Northern Roads and Airstrips Division of DIAND.¹⁴⁴ Similarly, consultation with communities in developing the

management plan has been directly in the hands of the Northern Roads and Airstrips Division.

It is natural that those who have advised the government and carried out existing road policy should be committed to that policy. And it is natural to be consciously or unconsciously selective in providing a forum for, and in tending to give greater credence to, others with similar views rather than with different views. For this reason it is important to have a body independent from those in charge of carrying out policies to undertake policy reviews, environmental and social assessments, and public consultations. It is perhaps one of the reasons that the environmental dangers of the Dempster Highway were seen in a fresh light at the Berger and Lysyk inquiries.

The Dempster Highway has not had a thorough, independent, public, expert assessment of its environmental, social, and economic consequences, though such an assessment may yet emerge as part of the analysis of a proposed Dempster pipeline. Such an analysis should include:

- *preliminary hearings to permit public participation in structuring procedure and defining terms of reference;*
- *encouragement of participation by the public, particularly environmental and native interests, including funding;*
- *an independent expert inquiry staff;*
- *media communication of inquiry proceedings in . . . native languages;*
- *provision for production of relevant government information, and information in the possession of the parties involved in the inquiry.*¹⁴⁵

Special hearings should be held, in addition to formal hearings, in order to elicit the views of native peoples.¹⁴⁶ Only with such a systematic approach can the obstacles to public involvement in shaping resource management decisions be removed. These procedures would have improved the quality of the decision-making with respect to the Dempster Highway, and such procedures should be incorporated into the planning of future roads.

Environmental Impacts

Studies of the Environment

The environmental impact of the Dempster Highway was not considered when the government decided to build the road, nor indeed at any time prior to the 1970s. The first environmental studies of the Dempster were conducted in

1972, when the first land use permit regulating construction was issued to the Department of Public Works. In its application, DPW stated:

*There is apparently very little knowledge of the area regarding wildlife and the ecological balance. Virtually no biological research has been conducted and even rudimentary zoological cataloguing is unavailable at the present time.*¹⁴⁷

Before that time the government had considered only problems affecting the costs or engineering integrity of the road, such as terrain instability due to permafrost conditions.

The first analysis of the environmental impact of northern roads seems to have been the brief study conducted in July 1971 by the Task Force on Northern Roads.¹⁴⁸ This group, comprising about ten specialists in the Department of Public Works, Canadian Wildlife Service, Agriculture Canada, and Indian Affairs and Northern Development, was established to:

*examine current practices employed in the location, design, construction and maintenance of northern roads, to assess the impact of these practices on the natural environment, and to recommend on improved techniques and systems for future use which will minimize environmental damage.*¹⁴⁹

It examined roads in the Northwest Territories only, over approximately a one-week period. In its report, the task force recommended multi-disciplinary planning of the location and design of northern roads, in order to ensure adequate consideration of ecological problems at all stages of highway design and development. The group considered how changes in location and alignment, design for clearing and excavation, embankment construction, borrow pit excavation, and disposal of waste material could reduce the environmental impact of road construction. And it recommended many improvements in current practices, including:

1. *A thorough review of functional and operational requirements for all classes of Northern Roads and establishment of revised design standards based on these requirements . . .*
2. *Establishment of a system for multi-discipline review and input into the road design process. In development of this system it is proposed to utilize an interdepartmental study group comprising engineering, biological, social-economic and environmental discipline specialists.*
3. *The development of the system for multi-discipline review and input recommended in (2) above requires a*

minimum time interval to ensure adequate consideration of all aspects of the project — engineering, economic, ecological and social.

4. *In addition to the requirement for multi-discipline input throughout the design process, continuing input from Landscape Architects and environmentalists should be scheduled throughout construction and maintenance. . .*
5. *Development of an educational program to increase awareness of and respect for aesthetic and ecological factors in road location, design, construction and maintenance. . .*
6. *Initiation of programs to develop means and methods to be employed to retain optimum environmental balance in areas affected by road construction. . .*¹⁵⁰

While these recommendations seemed to imply that the workings of northern ecosystems were sufficiently clear to be a matter for “design” and “education” and not necessarily for further study, they nonetheless provided a basis for assessment of environmental issues. The recommendations were applied in planning the Mackenzie Highway, but not the Dempster Highway. Instead, in May 1972 DPW commissioned a much more modest study at the request of the officials in the newly created Water, Lands, and Forest section of DIAND, who administered the land use regulations.

The Schultz Environmental Study

This study was performed by Schultz International Ltd. of Vancouver. The principal individuals participating in the study were an engineer as project manager, a fish and wildlife biologist, a soils and geology engineer, a landscape architect, and an archaeologist. The objectives were:

- *to broadly assess the ecological and environmental impact of the proposed Dempster Highway linking Dawson in the Yukon Territory with Arctic Red River in the Northwest Territories.*
- *to examine road construction, operating techniques, and roadway design with regard to the possible impairment of the environment and adverse effects upon the ecology and to make recommendations for eliminating, minimizing, or mitigating against such adverse effects or to make specific recommendations for further in-depth studies to derive more extensive solutions.*

*Attention is drawn to the fact that the terms of reference of this study exclude any socio-economic content.*¹⁵¹

The study was not to determine whether the environmental impact of the highway was acceptable; nor was it to assess

the comparative environmental impacts of other transportation systems which might serve the same ends as the Dempster, such as improvements in the barging on the Mackenzie River or a system of airstrips in the North. Its recommendations were only directed to mitigating measures. The Schultz report assumed that the decision to complete the construction of the Dempster was “irrevocable.”¹⁵²

From the outset, DPW contemplated an overview rather than a thorough environmental assessment of the highway. The study was carried out in only four months, from May to September 1972. The Schultz consultants conducted a literature review, and aerial and on-site investigations. During a preliminary field trip, fixed wing aircraft were used, and during an eight-day on-site field trip land vehicles and helicopters were used. Discussions were held with government officials, citizens’ groups, private citizens, and other consultants. But “the extent and depth of study was limited by time and funds so that complex ecological relationships were not explored.”¹⁵³ Still, the Schultz report concluded:

*the region traversed by the Dempster Highway is sensitive to adverse environmental impact . . . due to special wildlife habitat and life cycles, the short growing season, the relative lack of plant species heterogeneity in many plant communities, and the presence of permafrost.*¹⁵⁴

The report concluded that the items of greatest concern were “man-caused wildfire, damage to fish resources and visual values.”¹⁵⁵ The largest potentially adverse environmental impact was thought “to arise from man’s activities after the Highway is built. These activities are most difficult to control.”¹⁵⁶ The engineering and construction activities were considered to be substantially under control under the Territorial Land Use Regulations and land use permits. Still, the report recommended many specific improvements in construction practices.

Because of the limitations of time and the narrow terms of reference for the study, many important aspects of the environmental impact of the highway were not examined. The effects of the highway’s use after its completion, the impact of increased caribou hunting due to increased access, and the highway’s effect on caribou migrations were only mentioned. But the Schultz report recognized its limitations and recommended some thirteen further studies. It recommended an immediate study of the effects on caribou of noise, traffic, hunting, and physical barriers.¹⁵⁷ To a limited extent, this has been done. Further recommended studies of

falcon and other raptors’ nests were not undertaken until 1975. Schultz also advised studies of fish resources along the Dempster, but these have not been conducted in any detail.¹⁵⁸

A number of the recommended follow-up studies were engineering or geophysical studies — for example, to examine borrow pit engineering and drainage structures, to measure velocity flows for fish passage, and to consider whether bridges might be more appropriate than culverts on certain stream crossings. In most of these areas, work has been done. Borrow pit engineering, for example, has been an ongoing concern, with the government attempting to prevent the collapse of borrow pits and slides of overburden into adjacent lands and streams. Schultz recommended studies of erosion control through the use of native vegetation, and studies for the rehabilitation of badly eroded sections of the highway. These too have been pursued.¹⁵⁹

Schultz recommended an archaeological survey of the highway.¹⁶⁰ Dr Richard E. Morlan, then Yukon archaeologist for the National Museum of Man, conducted the first brief archaeological investigation of the Dempster route in 1972, when the highway was constructed up to the Ogilvie River at Mile 123. In one afternoon, he found three sites that had been exposed by the construction and drastically disturbed; however, because they had been disturbed it was difficult to evaluate their importance.¹⁶¹ After the Schultz recommendation, the Department of Public Works commissioned Dr R. Wilmeth of the National Museum of Man to investigate the right-of-way ahead of the construction areas; but a thorough archaeological survey of the route has yet to be done.

Schultz recommended an educational programme dealing with environmental matters for surveyors, engineers, contractors, and equipment operators.¹⁶² No formal programme has been established; instead, the government has relied on the land use inspectors of DIAND, who in their inspections give such instruction as seems necessary, and on the DPW supervisory personnel who attempt to ensure that the operators are aware of environmental concerns.

Schultz also recommended a study to determine the feasibility and need for a special land status for all or parts of the Dempster Highway route:

The special study team should investigate the feasibility of national or territorial status, special nature conservation area, ecological reserve and other possibilities. Finally, this study should explore the possibility of establishing a special land-use board composed of Government representatives,

*technical experts and local residents from Dawson City, Fort McPherson, and Arctic Red River.*¹⁶³

The government did not, however, initiate such further study until Mr Justice Berger made a similar recommendation in 1977.¹⁶⁴

The Tywoniuk-Inglis Environmental Overview

The major follow-up study by the government was an internal environmental overview. It was proposed at a meeting of the Mackenzie Highway Committee on 21 September 1973, and in March 1974 a study team was formed, consisting of N. Tywoniuk of the Department of the Environment and J.T. Inglis of DIAND.

The terms of reference for the study were:

1. *To review the design of those sections of the Dempster Highway not yet constructed with a view to assessing the environmental impact of:*
 - (i) *the alignment,*
 - (ii) *construction modes to be employed,*
 - (iii) *the placement of bridges and culverts,*
 - (iv) *maintenance operations and post construction use.*
2. *To identify any necessary changes in design or specific protection measures required to minimize the environmental impact of the highway.*
3. *To submit a report by May 31, 1974, detailing the results of the review and containing recommendations specifying any proposed revisions to the highway development.*¹⁶⁵

Because only two months were allotted for the study, field investigations could not be carried out. However, a number of government scientists and field staff from various departments contributed their experience.

Tywoniuk and Inglis based their review chiefly on plans and specifications of the highway, the 1972 Schultz study, an evaluation of borrow sites, culverts, and development sites done by Schultz in 1973, certain geo-technical data prepared by DPW for the Northwest Territories section of the highway, and a hydrological study of the N.W.T. section done by Northwest Hydraulic Consultants Ltd. in 1972. The authors commented that the information available to them for evaluating the unconstructed Yukon section of the highway was "inadequate for the purpose of a thorough review of a major construction project with the potential for significant environmental implications."¹⁶⁶

Furthermore, "Details of culvert design, hydrology, the location of borrow pit access roads and the extent of borrow pits were not presented."¹⁶⁷

This report was completed several months late, finally being passed on to the Mackenzie Highway Committee in December 1974, and to the Department of Public Works in Whitehorse and Edmonton in January 1975. The report contained some seventy-five recommendations. However, as was pointed out by the Department of Public Works, the majority of the recommendations reflected action already initiated by that department, the normal requirements of the Territorial Land Use Regulations and the Northern Inland Waters Act, or general environmental protection statements.

The authors had emphasized the need for a system of multi-disciplinary review and input into the road design process, quoting from the recommendations of the Northern Roads Task Force Report of November 1971.¹⁶⁸ In response, the Department of Public Works said that the time for a multi-disciplinary review of the concept and planning of the Dempster Highway had passed. Although a multi-disciplinary approach would have been appropriate to the pre-planning stage, with the highway well advanced there would be little benefit to applying the structural environmental review process that was being applied to the Mackenzie Highway. In short, DPW rejected a reconsideration at that stage of the environmental issues raised by the highway. From the point of view of DPW, the timing and content of the Tywoniuk-Inglis study were poorly co-ordinated with their work in building the highway.¹⁶⁹

Pipeline-related Studies

From approximately 1971, the most valuable research on the Dempster was performed by Canadian Arctic Gas Study Ltd., which was preparing environmental studies for the pipeline application. In particular, their consultants carried out extensive field studies of the Porcupine caribou herd, its migrations and susceptibility to disturbance,¹⁷⁰ and of the birds, fish, and other wildlife of the northern Yukon. These provided useful baseline data for the first time on parts of the Dempster area. To a large extent this research was carried out in spite of the government, which refused to release a number of environmental studies on the Dempster Highway and the northern Yukon for use in the preparation of the Arctic Gas studies.¹⁷¹ Nor did the government make use of the opportunity to co-ordinate its environmental studies of the highway with those assessing the pipeline.

In June 1977, the Alaska Highway Pipeline Panel, an

independent group of environmental scientists funded by Foothills PipeLines Ltd. to undertake environmental studies of their pipeline proposals, concluded that there was still virtually no research available on the environment along the Dempster Highway route. The chief problem with the highway and proposed pipeline, they said, was that the caribou herd might be depleted or its migration patterns altered as a result of the influx of pipeline workers and others.¹⁷² The panel recommended against accepting the Dempster as a pipeline route at that time, a recommendation which was adopted by both the Environmental Assessment Panel and the Lysyk Inquiry.¹⁷³

The National Energy Board and government requirements of further studies for a Dempster lateral pipeline apparently will ensure that these environmental and social studies are undertaken.

During the summer of 1977, government scientists and pipeline consultants conducted surveys of the fish, bird, and other wildlife resources of the Dempster route.¹⁷⁴ And the Alaska Highway Pipeline Panel, during 1977-78, carried out an environmental evaluation of the highway and the proposed Dempster lateral pipeline.¹⁷⁵ This study was conducted by an interdisciplinary team of eleven scientists who conducted a field survey and a thorough literature search, including consideration of the evidence presented at the various pipeline hearings. The initial evaluation, a 537-page document, reviewed the impact on the physical and biological environment of highway use after opening the highway to traffic, of development of the proposed natural gas pipeline, and finally of the two activities together. It was intended to give decision-makers an initial basis for deciding whether or not to allow the use of the highway.¹⁷⁶ To assist in this regard, the various effects of the highway on the environment were rated on a standard scale for their severity, duration, and extent.¹⁷⁷ The absence of quantitative data made further refinement of the analysis impossible.¹⁷⁸ However, although it was framed by its authors as an initial evaluation only, this study in fact constituted the first comprehensive analysis of the highway's impact on the environment.

The panel is to study the socio-economic impact of the highway and pipeline in 1978-79.¹⁷⁹

Environmental Problems

The environmental problems created by the highway are complex. The major issues have only recently become clear, as the implications of the pipeline studies for the highway have been appreciated. The following discussion is intended

simply to highlight the nature and extent of these problems, and to provide a background for considering the extent to which the government has come to grips with the environmental impact of the highway.

Caribou

The Porcupine caribou herd is the most important wildlife resource in the northern Yukon. It is one of the largest remaining caribou herds in the world; its population is apparently stable at about 110,000 animals.¹⁸⁰ During the course of its annual migrations, the herd ranges over the northern half of the Yukon and parts of northeastern Alaska. The migrations have been described as follows:

*In late April-early May, wintering groups begin a complex northward migration to a common calving ground on the Yukon-Alaska North Slope. The major portion of the population passes through the Old Crow area; a second large segment crosses the Eagle Plain and Richardson Mountains. Calving occurs in early to mid-June and is confined to a relatively small area from Babbage River, Yukon to Canning River, Alaska . . . Calving is followed by a period of summer staging in the British Mountains and Old Crow Plain. Movement back to wintering areas normally begins in September and continues into November.*¹⁸¹

The highway poses a number of threats to the herd. First, there is the likelihood of increasing hunting pressure. Since the highway crosses the winter range and migratory routes of the caribou along a 200-mile front from the Richardson Mountains to the North Klondike River near North Fork Pass, it makes access to the herd very much easier. Overhunting could directly reduce the herd, and hunting pressure from the area of the road could well cause the caribou to avoid or retreat from that area.¹⁸²

Second, the highway may cause the caribou to be delayed or deflected during their migrations. The result would be that they

*would have to spend energy reserves to get back on course or on schedule. If delayed too long in spring, calves could be born outside the calving ground where they would probably be more vulnerable to predators; if delayed in fall, they could be caught by heavy snows en route to wintering areas. In both cases, caribou would become stressed, waste limited energy reserves, and be more susceptible to disease, predation and starvation.*¹⁸³

An even greater danger is that the highway may disrupt the movements of the herd so that the caribou cease to cross

the highway and thus lose part of their winter range. If this “barrier effect” were to occur, the extent of the winter range available to support the herd would be reduced by about one-third. The result would likely be a substantial and perhaps proportionate decline in the numbers of the herd.¹⁸⁴

The patterns of caribou migration (see Figure 4) and the forces which act upon those patterns are not well understood. Nevertheless, it seems that

*caribou populations have a strong homing tendency to traditional ranges and traditional pathways. In a sense, they learn where the best ranges are and how to reach them by following experienced animals. They can also “unlearn” established patterns if they are repeatedly deflected or blocked from traditional areas, a process that would probably take several years and involve several generations.*¹⁸⁵

The importance of the various elements which might contribute to the “barrier effect” of the highway upon the caribou is not clearly understood as yet. An elevated roadway, snow-banks along the side of the road, and lateral ditches filled with snow are possible elements,¹⁸⁶ but the noise and other disturbance from traffic on the road are likely the most important factors.¹⁸⁷ Of course, traffic can be a direct hazard to the caribou as well. Collisions and harassment can be expected along the highway, because caribou are attracted to cleared rights-of-way such as roads, where traffic has compacted the snow making travel easier.¹⁸⁸

Whatever the reasons, the declines in caribou herds after the construction of new roads and railways were well documented at the Berger Inquiry. Mr Justice Berger concluded in his report:

Dr. George Calef presented . . . an analysis of recorded changes in the size of various caribou herds during their contact with industrial man. The Fortymile herd used to roam the Yukon Territory and east central Alaska. In 1920, Olaus J. Murie estimated this herd to be 568,000 animals, but its population stands today at something like 6,000 animals. The Nelchina herd of Southeast Alaska consisted of 70,000 animals in 1962; by 1973, it had been reduced to only 8,000 animals. The Kaminuriak herd used to winter in Northern Manitoba. Although the Hudson Bay Railway, built in the late 1920s, crossed their winter range, the herd continued to use it for many years. By the early 1960s, however, the caribou had stopped crossing the railway, and they no longer foraged south of the Churchill River. The herd stood at 149,000 in 1955 and at 63,000

*in 1967. Dr. David Klein has written about the gradual abandonment of ranges in Scandinavia by reindeer, after their migration routes had been interrupted by rail or highway traffic.*¹⁸⁹

Aside from a possible decline in population, a deflection of the caribou migrations to the west might drive the caribou away from Fort McPherson and Aklavik, communities which have traditionally relied on the herd for food.¹⁹⁰

Another possible danger to the caribou is that wildfires started by human carelessness along the road might destroy portions of the winter range. The experts are divided on the significance of fire as a hazard, though they agree that the impact of such fires on the caribou herd may take a long time to become evident — perhaps thirty to forty years — and not enough is known of the beneficial or detrimental effects of fire.¹⁹¹

Caribou studies to date have been insufficient to understand the impacts of the highway on the animals. The first studies in sufficient detail to account for the Porcupine herd’s distribution over the course of two complete years were pipeline-related analyses carried out from 1971 to 1973.¹⁹² Renewable Resources Consulting Services Ltd. of Edmonton, as part of its pipeline research, conducted some studies of caribou reactions to the Dempster Highway.¹⁹³ On a limited scale, government biologists have monitored the interaction between the caribou and the highway since 1972, and in the fall of 1976 a biologist continued full-time monitoring of the caribou’s response to construction activity, mapped important crossing areas, and considered various hunting and traffic regulations.¹⁹⁴ The government plans a further long-term, small-scale study, perhaps five years long, directed to methods of managing the highway’s impact on the herd.¹⁹⁵ At present, though, according to one Yukon Game Branch biologist,

*We have virtually no management information outside of the very small amount that the Canadian Wildlife Service was able to gather in that one year relative to the Dempster Highway. The management schemes that we implemented were done in a vacuum, if you like. The corridor concept to allow caribou to cross in a certain section didn’t seem to work. Following that we tried closing the entire road and the point is, of course, as I’ve already stated, five years have gone by and this very important question remains unanswered.*¹⁹⁶

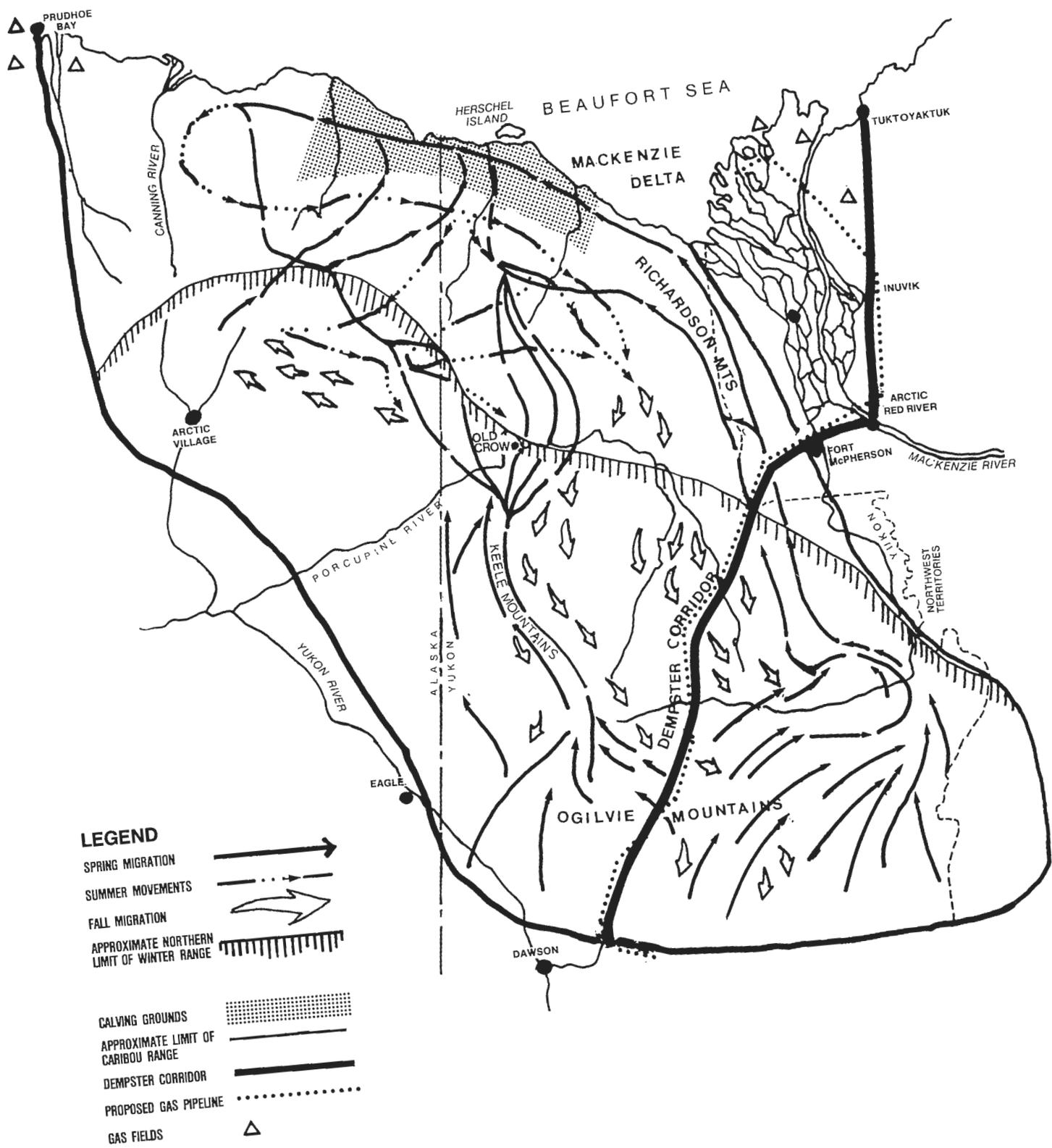


Figure 4 The Porcupine Caribou Herd and the Dempster Corridor

Dall's Sheep

There is little known about the basic populations and habitat of the Dall's sheep which live in the Ogilvie and Richardson mountains. No studies of the sheep's interaction with the highway were carried out until 1977, and by that time it was too late to affect the routing of the road in order to take the findings into account.¹⁹⁷

There is general agreement that Dall's sheep are more sensitive than other large mammals to certain kinds of disturbance.¹⁹⁸ They may react to "the noise and smell of heavy machinery, the movements of vehicles, the lights luminating construction sites and camps, and most importantly, infrequent, unexpected loud noises like rock blasting or the passing by of a helicopter."¹⁹⁹ Such disturbances are thought to have only a short-term and not permanent effect in driving the sheep from the disturbed area. It is known that the mineral licks, lambing, and winter ranges of the sheep are especially critical, but the locations of these areas have not been ascertained.²⁰⁰

The major concerns about the long-term impact of the highway on Dall's sheep are: first, hunting pressures will increase unless harvest levels are strictly controlled; second, the presence of hunters and tourists could force the sheep out of ranges closest to the highway; and, third, traffic may inhibit the normal movements of the animals and eventually partition the sheep range. As is the case with caribou, these problems may interrelate so that increased hunting pressure increases the barrier effect of the highway.²⁰¹

Off-road disturbance from tourists on foot or in all-terrain vehicles is also a problem, especially in winter when such disturbance can be particularly harmful. Because the nutritional status of pregnant ewes influences the condition of the lambs at birth, harassment and displacement from winter ranges can severely depress birth rates and increase mortality.²⁰²

Grizzly Bear

Grizzly bear, which once were common in most of western North America, are now confined largely to the mountains and barrens of Alaska and northwestern Canada. They inhabit most of the area crossed by the Dempster, especially in the Richardson and Ogilvie mountains. They do not make extensive migrations but have different seasonal ranges, from subalpine in spring to river bottoms in summer and fall. They usually remain in subalpine dens for about six months (November to April) and may use the same den sites more than once.²⁰³

The major problems associated with the opening of the

road are expected to be increased hunting pressure by trophy hunters, and the presence of bears near camps and service areas where they are attracted by garbage and food. Even with fenced areas and efficient waste disposal, bears seem to be attracted to camps. The presence of bears near these areas would be dangerous to people and could require the extermination of the nuisance bears.²⁰⁴

Other Mammals

With wolves, as with bears, the major problems are expected to be increased hunting and their danger as a nuisance near camps along the highway, which may require that they be shot.²⁰⁵

Moose are common, though not abundant along most of the highway. However, the highway is expected to have little effect on the moose, provided a no-hunting corridor along the road is maintained.²⁰⁶

The highway is not expected to have any significant impact on beaver and muskrat populations.²⁰⁷

Birds

For geese, ducks, sandhill cranes, ptarmigan, and sharp-tailed grouse, the highway is also expected to have little impact. However, more study, especially of the ptarmigan habitat, may be necessary.²⁰⁸

Raptors, or birds of prey, including peregrine falcons, gyrfalcons, osprey, golden eagles, and bald eagles will be subject to long-term disturbance and potential danger as a result of the increased access to their nesting sites.²⁰⁹ For peregrine falcons and osprey the risks are severe, as they are endangered species.²¹⁰

The principal dangers include disturbance of nesting sites by tourists, hikers, and mountaineers, illegal shooting of adults, and poaching of nestlings, particularly of peregrine falcons.²¹¹ Improperly located borrow pit and quarry operations, especially in the Richardson and Ogilvie mountains, could disturb nesting falcons and golden eagles and destroy their nesting cliffs.²¹² The range of the peregrine falcon is extensive in the Dempster area:

Distribution in the north generally follows river valleys that provide nesting cliffs and foraging areas. Peregrine distribution along the [Dempster] Corridor is well-documented in the Mackenzie Delta area but is less well known in the Yukon. Populations of peregrines breeding on Campbell Lake, Dolomite Lake and along the Mackenzie River downstream of Arctic Red River have been monitored by the Canadian Wildlife Service for several years. Peregrines

*may also nest along the Peel River upstream from Fort McPherson and along Stoney Creek. Knowledge of distribution of peregrines and other raptors along the Dempster Highway is based on a preliminary survey by the Canadian Wildlife Service in 1975 and a highway-related survey by the Yukon Wildlife Branch in 1977. Potential nesting habitat for peregrines exists in the Richardson Mountains along the Rock and Vittrewka Rivers and along the Dempster Highway. Peregrines nest in the Ogilvie Mountains and along the Ogilvie and Blackstone Rivers.*²¹³

The distribution of other raptors is similarly only known in general terms. Golden eagles are known to nest in the Ogilvie and Richardson mountains,²¹⁴ while much of the Dempster area provides potential habitat for osprey.²¹⁵ Studies of the raptors' distribution were insufficient and too late to affect the highway's routing.

The opening of the highway to traffic need not have a disastrous impact upon the raptors "if illegal shooting . . . can be prevented, and accidental and deliberate harassment of nests can be avoided."²¹⁶ However, special measures to protect the birds and their nesting areas will be required, possibly including large fines and imprisonment for those found guilty of poaching falcons. Certain particularly fine nesting areas, for example between Mile 33 and Mile 73 of the highway, should possibly be set aside as a special status area for the raptors.²¹⁷

Measures to protect the ptarmigan, the food base of many of the raptors, may also be required. Lowland riparian vegetation would need to be preserved, and ptarmigan hunting restricted. Similarly, hunting of ground squirrels, which are also prey for raptors, might need to be restricted.²¹⁸

Fish

The greatest danger to fish from the highway is the blockage of fish migrations by inadequate culvert design. Proper design requires that the culvert be large enough that the flow through it remains comparable to that in the stream itself, so that the force of water moving through the culvert is not too strong for the fish to swim through. Further, the lower end of culverts must not drop off sharply, thus creating a barrier, and must not be susceptible to blockage by debris washing up against the upper end. In recent years the Fisheries and Marine Services division of Environment Canada has monitored culvert design, but during construction of the highway many culverts were improperly installed. One benefit of

highway upgrading would be to replace many of these culverts.²¹⁹

The migratory patterns of certain species such as the grayling are still little known.²²⁰ Data on the fish populations of northern streams are not available in detail, and no detailed monitoring has been done of the highway construction to determine the effects of, for example, sedimentation on benthic invertebrates, or on migrations and movement of fish.²²¹

Archaeology

The northern Yukon is the only substantial area in Canada which was not glaciated during the most recent ice age, and thus preserves a long and continuous archaeological record of human occupation. The oldest artifact found to date, a tool made from caribou bone, is considered to be more than 30,000 years old, making it the oldest such artifact discovered in the western hemisphere.²²² The area remains nearly totally unexplored.

A number of archaeological sites have been identified along the highway, and it appears that many more may be found as the highway passes through land known to have been occupied.²²³ But, as G. Will pointed out in 1978,

*No preliminary archaeological reconnaissance of any value was performed before construction of the Dempster Highway started. Therefore, any prehistoric archaeological sites encountered during construction have been damaged or destroyed.*²²⁴

But at the present time archaeological sites off the right-of-way are likely to be undisturbed. As one pipeline impact study summarized the problems of the highway for areas of archaeological significance:

*The greatest threat to archaeological sites from public use of the Dempster Highway is vandalism or souvenir collecting by users of the highway. This impact will be long-term, but generally minor, because of the limited nature of the archaeological resource, in particular historic sites. Such impacts will be concentrated at and around campgrounds and other tourist facilities, as well as at good fishing and hunting locations and at lookout sites, locations most likely to have been preferred by man in the past. Highway maintenance work and construction of support facilities will also have a minor impact on prehistoric archaeological sites.*²²⁵

Terrain Stability

Permafrost, or permanently frozen ground, occurs along almost the whole of the Dempster route.²²⁶ It creates a variety of extremely difficult conditions for road construction. Generally speaking, if the surface layer of soil is disturbed by road construction, the permafrost soils underneath begin to melt, become unstable, and may start to flow away. Such “thermokarst” erosion can be prevented by engineering the road so that the worst permafrost areas are avoided, by using the minimum number of “cuts,” and by laying down four feet — and in some cases six to eight feet — of gravel or its thermal equivalent in crushed rock on the roadbed. The guiding principles are, first, to avoid severe permafrost areas by routing the highway along higher and more stable ground, second, to avoid disturbing the surface in permafrost areas and, third, to attempt to restore quickly the thermal regime of disturbed areas. In the case of the highway, this latter principle has required that the roadbed be laid in sufficient depth to provide an insulating layer against undue melting of the soils beneath the roadbed. Unless such an insulating layer is developed, instability can result.

For this purpose massive amounts of gravel or crushed rock are required, which has made construction extremely expensive. In attempting to avoid this expense, Catre Construction, with government approval, attempted to use sub-standard ice-rich soils as insulation on a thirty-five mile section south of Inuvik and a further section between Arctic Red River and Fort McPherson. As was mentioned earlier, the attempt proved a total failure. In the springtime, large sections of the newly constructed road simply melted away.²²⁷

Slope stability has been another difficult problem with the construction of the highway. Slopes exposed during highway cuts and in borrow pits must be kept stable to protect the integrity of the highway, to protect water quality against excessive siltation, and to preserve the stability of vegetation. Difficulties have arisen with cuts and borrow pits along the length of the highway. Slope failures have been dealt with by the use of highway designs which minimize cuts and by substantial reconstruction after initial slope failures. Borrow pits have been re-engineered where necessary to restore a stable surface.²²⁸ However, re-vegetation, which helps re-establish an insulating cover, has not been used.²²⁹

Settlement of the roadway after spring thaws has also been a problem of construction; and it will continue to be a

problem of maintenance, requiring periodic reconstruction to bring the road surface back to design configuration.

Special techniques of construction have been required in order to avoid disturbing the frozen surface of the land along the highway. In particular, trucks and equipment have had to keep to the partially constructed roadway, so that construction proceeds as though it were a railway laying its tracks ahead of it. This “end-dumping” technique has also added to construction costs.

The most striking failure in dealing with permafrost problems related to the collapse in July 1975 of two large multiplate culverts, thirty-seven feet wide and twenty-seven feet high, which were constructed across the Rengleg River in the Northwest Territories. The culverts were not properly installed, taking into account the frozen nature of the fill used, with the result that the entire roadbed was dumped into the stream and the culverts rendered unusable. Reconstruction cost hundreds of thousands of dollars. The contractor was held responsible by the government and the costs of rehabilitation were negotiated and settled.

Controlling the Impact of Construction

Environmental regulation of the highway construction began when the newly established Water, Lands, Forest, and Environment Branch of DIAND began operations in the winter of 1972. This staff was to administer the new Territorial Land Use Regulations²³⁰ and the Northern Inland Waters Act,²³¹ legislation which for the first time provided for environmental control of northern construction and resource development activities. The Land Use Permits and the Authorizations to Use Water Without a Licence under this legislation have set most of the conditions regulating the construction of the Dempster Highway, though the federal Fisheries Act has also been used by Environment Canada to regulate the design of culverts, and other river and stream crossings.

DIAND granted the first land use permit regulating construction of the highway to DPW on 27 March 1972, for construction of the roadway subgrade from Miles 156 to 178.²³² The permit imposed many standard conditions on the construction activities, but did so in a near vacuum of information about the local natural environment.²³³ In considering environmental impact, the application covered only the short stretch of highway then under construction and was directed only to construction activities, not to long-term impacts. Thus the aim of the permit was chiefly to mitigate the immediate damage caused by construction. Under

the terms of the permit, DPW and its construction contractor were restricted in the movement of vehicles to the routes and areas designated in the preliminary plans or as approved by the engineer, a senior official of DIAND. The engineer had the power to order changes in the proposed location or use of route, if use of it at that time was "resulting in detrimental effects to the land, water, or wildlife." In clearing areas for roadway or campsites, the contractor was to minimize ground surface disturbance by the use of "mushroom" type shoes on bulldozer blades. Debris from clearing borrow pits, campsites, and other areas had to be burned or buried on the roadway or otherwise disposed of according to good forestry practice.

Restoration was to be to the satisfaction of DIAND's Water, Lands, Forest, and Environment Branch. Fill used in crossing creeks was to be snow, not soil or debris unless the inspector so approved, and in any case was to be removed prior to spring break-up. Garbage had to be burned and non-combustible garbage buried. Fuel had to be stored in a manner that would prevent the pollution of streams, and all fuel storage facilities were to be enclosed by an impermeable dyke to contain spilled fuel. Fuel barrels were to be removed at the end of the operation. Explosives were not permitted to be detonated within a hundred feet of a stream. Wildlife was not to be harassed or unnecessarily disturbed by the operator in the use of his machinery or during the conduct of the operation. The Territorial Game Ordinances and the instructions given by game officials were to be followed. Only one rifle was allowed on the operation, and it was to be in the possession of or under the control of the operations supervisor.²³⁴

Later permits have added further requirements. Airstrips, camps, borrow pits, and waste piles must be screened from the public view. Various operations such as constructing airstrips, clean-up and restoration measures, and deviations from preliminary plans, must be approved by the Engineer. Construction activity in stream beds has to be conducted so as not to interfere with fish migrations, and especially critical periods for fish migrations have been designated in the permits. Drainage and land stabilization measures have been specified, and the operator has been required to notify the land use inspector in case of spills of petroleum or chemicals.²³⁵ The permit issued to DPW in 1977 for the last segment of the highway requires the operator to provide board and lodging for a wildlife biologist to monitor the effects of highway construction activities on caribou migration and patterns.²³⁶

Land use permit conditions were generally set by officials in the Lands section of the Water, Lands, Forest, and Environment Branch of DIAND. Some conditions, however, were set in consultation with other government departments on the Land Use Advisory Committee (LUAC). Permit conditions concerning fish were set in consultation with the Fisheries and Marine Service of Environment Canada in each territory. Conditions concerning wildlife were set in consultation with the Canadian Wildlife Service and the territorial game branches, while conditions concerning spills of toxic chemicals and petroleum were set in consultation with the Environmental Protection Service of Environment Canada. The mechanism for all these consultations, the Land Use Advisory Committee, is a purely advisory and internal government committee. Its composition is flexible, but generally includes one representative from each of DIAND, DOE, the territorial Department of Local Government, and territorial game branch officials. The committee is closed. Neither the general public nor representatives of citizens' groups are invited to participate in its proceedings, or to listen to them.²³⁷

The Department of Public Works also obtained authorizations to use water without a licence pursuant to the Northern Inland Waters Act for stream crossings, and for the use of water and disposal of sewage at construction campsites. These authorizations are obtained by application to the Controller of Water Rights in the Water, Lands, Forest, and Environment Branch in Whitehorse or Yellowknife. The controller sets the terms for water use within the limits specified in the act, regulations, and water board policies. In fact, the first authorizations for the Dempster were reviewed by the water boards in each territory.²³⁸

The first authorization for the highway, granted in October 1973, approved water crossings with culverts and domestic water use in the construction companies' campsites from Mile 237 to Mile 290 for a two-year period. Except for the fact that water supply and waste disposal facilities for campsites were to be approved by the controller, the conditions imposed were generally directed to the protection of fish. Before removing sand and gravel from water courses and making stream channel modifications, DPW had to obtain the approval of the controller. Spoil, waste, and debris were not to be deposited in a water course. Water crossings had to have a bridge or culvert, and not present a barrier to fish passage. Culverts and fluming were to be in accordance with drawings approved by the controller. Culvert outfall and ditch erosion were to be prevented by the

use of suitable armouring material. Water intakes had to be screened to prevent the passage of fish.²³⁹

Further authorizations for the use of water during construction have been in essentially the same terms, though in more recent authorizations certain standards for effluent quality from the camps have been imposed.²⁴⁰

Managing the Impact of the Highway – The Dempster Highway Management Plan

During the period from the fall of 1976 to June 1978, the Environmental Manager of the Northern Roads and Airstrips Division prepared a plan for reducing the environmental impact of highway use, especially on the caribou. The plan, which was to come into effect on the opening of the highway, also dealt with the safety of motorists, and employment opportunities generated by the highway. The preparation of the plan involved extensive consultation with various government departments, and native and environmental groups. In February 1977 a Dempster Highway Management Programme discussion paper²⁴¹ was circulated to representatives of the federal and territorial governments, and native organizations and settlements. Biologists and conservation societies were also consulted.

Thereafter, in July 1977, a thirty-seven page draft plan (the “Draft Dempster Highway Environmental Management Programme”)²⁴² was widely circulated for review and comment. The results of that review and comment were incorporated in the Dempster Highway Management Plan, dated January 1978 and distributed in May 1978.²⁴³ No such management plan had ever before been implemented on a major highway; nor did the research available provide a basis for establishing such a plan. Much of the basic data as to wildlife populations and their range are still lacking for species other than the caribou. Nevertheless, with the completion of the highway firmly scheduled for 1979, the completion of some management plan was absolutely necessary. Though insufficient research had been done to predict caribou behaviour under varying conditions, officials in DIAND felt that enough work had been carried out to start a management programme. Nevertheless, the plan had to be flexible enough so that it could be revised in the light of further research.

The stated goals of the management plan were:

1. *To allow year-round use of the highway with minimum adverse impact of the highway and its users on the environment. Conservation and management are to be regarded as interdependent;*

2. *To introduce a method of control that is technically and economically feasible as well as being socially and environmentally acceptable. It is recognized that certain aspects that are environmentally or socially acceptable to one sector of our society are often unacceptable to another group. Conflict of this nature would possibly occur among the following highway users: native people, tourists, hunters, truckers, hikers, campers, canoeists, photographers, artists, miners, petroleum and mineral exploration crews. It is hoped, however, that the plan will be able to accommodate the needs and interests of the majority of people;*
3. *To ensure a comprehensive programme is implemented before the highway is completed;*
4. *To make management sufficiently flexible so that modifications can easily be made to accommodate the conditions of the settlement of native land claims; and*
5. *To be receptive to the findings of research activity pertaining to the northern environment.*²⁴⁴

Clearly controls on hunting the caribou herd are a necessary part of the plan, as the highway has improved access to the area; but formulating effective, legally enforceable, and politically acceptable controls is very difficult. The territorial governments have no authority to make laws restricting or prohibiting Indians or Inuit from hunting for game, except for game declared by the Governor in Council as being in danger of becoming extinct.²⁴⁵ The Governor in Council has not declared the Porcupine caribou herd to be in danger of extinction; thus, neither the federal nor the territorial governments alone can effectively regulate the hunting of the herd. For example, the most recent Yukon ordinance – which created a no-hunting corridor extending five miles on either side of the highway, except for the period of 15-31 October – only applies to non-native hunters within the Yukon.²⁴⁶ But it is estimated that non-native hunters take only about ten percent of the annual kill.²⁴⁷ Moreover, this ordinance does not apply to hunting during the two-week period when the caribou are nearest the road (see Table 2).

The plan seems to recommend that the ten-mile-wide no-hunting corridor apply in both territories, to natives and non-natives. But while the plan reports that “the concept of a no-hunting corridor has had a favourable reception from many natives as well as non-natives in the territories,”²⁴⁸ there have been no steps actually taken to establish an effective set of controls on native hunting.

Table 2
The Dempster Highway and Territorial Caribou Hunting Regulations

<u>Licence Holders</u>	<u>Y.T.</u>	<u>N.W.T.</u>
General Hunting Licence Holders		
Hunting in game management zones in Dempster Highway area	August 31-January 31	All year
Bag limits	2	No limit
Can sell their caribou meat for consumption within the Territory	No	Yes, with total limit of 700 animals per year in zones in Dempster Highway area
Resident Big Game Licence Holders		
Total fees	\$8.00	\$10.00
Hunting in zones in Dempster Highway area	August 1-November 10	August 15-April 30
Bag limits	1	5
Non-Resident Big Game Licence Holders		
Hunting in zones in Dempster Highway area	August 1-November 10	Not permitted
Bag limits	1	N/A
Total fees (Canadian) for kill	\$153.00	N/A
Total fees (Alien) for kill	\$203.00	N/A
Dempster Highway Corridor Hunting Restriction	All hunting within five miles on either side of the highway from Mile 41.6 to Mile 290 (Yukon-N.W.T. Border) is prohibited, except from October 15-31. Interference at any time with caribou crossing the highway is prohibited.	No restriction

Note: There is no compulsion for native people to obtain hunting licences in either territory, although the Northwest Territories encourages the native people to take out general hunting licences for harvest recording purposes.

In the Yukon, general hunting licence holders must have been resident for three years and be "largely dependent upon hunting and trapping for a livelihood." The Northwest Territories requirements are similar. Non-status people in the Old Crow area "living the Indian way of life" may hunt for "actual food and clothing requirements." There is no closed season north of the Arctic Circle for such "Indians"; however, from 1 February to 31 May, only male caribou may be taken.

This table, with some changes, is taken from the Dempster Highway Management Programme, page 10.

Natives see the issue of hunting rights as an integral part of the land claims settlements, and progress toward agreement has been slow. The territorial governments have the general power, under the federal statutes which created

those governments, to regulate the hunting of the herd except with respect to native people. By declaring the caribou to be in danger of extinction, the federal government could give the territorial governments the power to regulate

native hunting as well; but in the face of land claims negotiations such a move would most likely be unacceptable. Until a land claims settlement or some special agreement can be reached, under which natives of the area would regulate their hunting, the herd will be exposed to the serious risk of overhunting as a result of opening the highway. Until a settlement can be achieved, government officials have urged the native people to accept interim hunting controls, including a no-hunting corridor along the Dempster.²⁴⁹

For the longer term, the management plan agrees that the regime of hunting controls will depend on the form of land claims settlement. Nevertheless, the plan discusses various alternative regimes, including community control of the issuance of hunting licences, delineation of the traditional hunting areas for each band, setting quotas on the kill for each community, setting settlement-specific hunting areas, and establishing hunting zones.²⁵⁰ Furthermore, the plan outlines ways of limiting the number of hunting licences. Licences might be issued on a first-come, first-served basis, or by lottery, or at a higher price.²⁵¹ These latter measures would become crucial if the no-hunting corridor were rejected.

To further complicate the question of hunting controls, game regulations are inconsistent between the Yukon and Northwest Territories, in that in the N.W.T. hunters can sell their caribou meat for consumption within that territory, while in the Yukon such sales are prohibited.²⁵² This inconsistency allows Northwest Territories hunters to shoot caribou in the Yukon and take them back to the N.W.T. for sale. If proclaimed in force in the Yukon and Northwest Territories, the federal Game Export Act would require export permits for N.W.T. hunters to take caribou from the Yukon back to the N.W.T.,²⁵³ but this has not been done. To impose such a requirement on native hunters in particular, without general agreement, would complicate land claims negotiations. Without some such action, however, commercial-type hunting is likely to increase with the opening of the highway.

In any case, the plan recommends that the export of caribou meat and hides from the Yukon to the Northwest Territories be strictly controlled, in order to give greater effect to the controls on hunting.²⁵⁴

To deal with the impact of traffic on the caribou, the plan first recommends that speeds be restricted on the highway.²⁵⁵ But speed limits, while necessary, are recognized as ineffective because of the difficulties of enforcement. Second, the plan recommends that during the period of migrations, the road should be closed for two to three weeks.²⁵⁶

Finally, traffic should be convoyed during the period when the caribou are wintering near the highway.²⁵⁷ But such a system has not been attempted on a sustained basis on any other road, and there is no basis in the research for believing that convoying will be effective in protecting the caribou herd. Much more research needs to be undertaken:

*Data are needed on the impact on caribou of vehicles traveling at different speeds, in convoys of different lengths, and with different spacing between convoys. Data are also needed on locations where caribou are most likely to be present under undefined circumstances and on how the animals respond to traffic under different conditions of cover, visibility, etc.*²⁵⁸

For these reasons, in February 1978 a workshop of thirteen caribou specialists agreed that the highway should be completely closed to all but emergency traffic from 1 October to 31 May each year.²⁵⁹

The plan would also control maintenance activities. The highway would be plowed in such a way as not to create snowbanks which might be a barrier to caribou. Gaps would be left in the snowbanks along the road at intervals to allow the caribou to pass, and these gaps would be monitored to see if they were effective.²⁶⁰

The most difficult task in the plan is the control of general activity along the highway. For this purpose, the plan recommends that a land use plan be formulated immediately to locate and regulate roadside services such as gas stations, restaurants, camping facilities, and the like. In the meantime, the plan recommends a freeze on land use decisions.²⁶¹

A land use plan would also control further spur roads from the Dempster. Two roads already lead off from the Dempster, one about sixty-nine miles long to the east of the Dempster from about Mile 50, and the other to the west about twenty-five miles long.²⁶²

The plan recognizes the problems caused by the use of snowmobiles and other all-terrain vehicles in the hunting and harassment of game, and suggests that permits be required for such vehicles in the Dempster area.²⁶³ Snowmobiles cannot usually be controlled under the Territorial Land Use Regulations, as the regulations exempt "anything done by a resident of the Yukon Territory or the Northwest Territories in the course of hunting, fishing or trapping."²⁶⁴ Moreover, the government has found that anti-harassment stipulations in land use permits are largely unenforceable.

According to the plan, camping would be limited to designated and supervised camping sites chosen to avoid

raptor nesting areas and other wildlife habitat.²⁶⁵ However, such controls on camping might be opposed by natives and other northerners accustomed to free access to the land, and would be difficult to enforce. Furthermore, natives may be entitled to such access by virtue of their aboriginal rights.

The plan includes many other features including measures to control garbage and sewage, measures to ensure the safety of those who use the highway, and the regulation of road signs. The plan would be handled by a management committee composed of representatives of the federal and territorial governments and native groups. The committee would in turn hire a full-time Dempster Highway manager, who would be in charge of the actual implementation of the plan and the supervision of the convoy system.²⁶⁶ The plan does not indicate how the committee or highway manager would be accountable to local communities and other groups. (Apparently they would not be accountable.) Nor does the plan specify how management of the highway will interact with whatever plans are made for the management of the caribou herd.

The plan would cost about \$200,000 per year to put into effect. This expense would be borne by the federal government in the early years, and would later be assumed by the territorial governments.²⁶⁷

Yukon-Northwest Territories

Dempster Highway Committee

Shortly after the release of the final draft of the federal management plan in July 1978, the Yukon and Northwest Territories governments formed their own joint committee,²⁶⁸ not including federal representatives, to formulate management plans for the highway. The territorial governments control the immediate 300-foot right-of-way along the highway and thus claim sufficient authority to make such plans, although clearly many of the management problems caused by the highway extend beyond the immediate right-of-way. In any event, the committee is to study the effects of the highway on wildlife, economic development, renewable resources, and tourism. An Interim Management Plan, to deal with immediate issues as well as to identify information and studies required for long-term plans for the management of the highway, will be prepared by the late fall of 1978. The committee intends to use the federal government's plan as a source document, but not necessarily as the basis for its management plan.

It is clear that the co-ordination between the federal and territorial governments in formulating a management

plan has been inadequate. First, the federal government prepared its plan without sufficient consultation with the territorial governments; then in the summer of 1978 the territorial governments set up their joint planning committee which excluded federal representatives. Lack of co-ordination and delay in implementing an effective plan has been the result.

Analysis

Environmental issues were not considered at all until 1972, by which time 123 miles of the Dempster Highway had already been constructed. But environmental consciousness was not strong in Canada until about 1970, and the government had no effective enforcement staff in the North until late 1971 or early 1972.

In 1972 the government adopted the 1971 task force's recommendation for multi-disciplinary planning of highway construction with respect to the Mackenzie Highway, but did not do so for the Dempster Highway. This fundamental failure apparently stemmed from the view that, because the highway had been started so many years before and was partially complete, it was inappropriate to expend the effort at this date to avoid deleterious effects on the environment. The fallacy in this thinking is easily shown: if you are about to be run over by an approaching locomotive, you should get off the tracks, no matter how long ago the train left the station or how near it is to its destination.

But the government has not considered whether the highway is acceptable on environmental grounds. The government has not at any time prepared an environmental impact assessment of the highway, although such an assessment may result as a by-product of the pipeline assessments. The Schultz study and the Tywoniuk-Inglis studies were both short-term, overview studies, intended primarily to minimize the immediate impacts of construction practices. Though such studies are important in themselves, they cannot be a substitute for in-depth study and analysis in a public forum.

By good fortune more than good planning, the environmental studies for the pipelines have revealed many of the environmental problems of the highway. It is disheartening to think of the likely damage the highway might have caused had this pipeline-related research not been carried out. Even with this information at hand, a number of special problems of the highway, such as the effect of traffic on caribou movements, remain as issues requiring further study.

The attempts to formulate a management plan for the

highway have taken place without deciding whether the environmental impact of the highway is acceptable and without basic knowledge of some of the environmental problems caused by the highway. It is not sufficient for the governments to formulate a plan of action when there is no basis for saying that such a plan will be effective. To return to the metaphor of the approaching train, we would not accept someone's advice to remain standing on the tracks, and to shout at the approaching locomotive on the mere chance that this might stay its progress.

The consensus of caribou experts, out of caution for what is presently known, is that the highway should be shut down during the winter. The government seems to have rejected this advice in favour of shut-downs only during migration, and a convoying system during the winter. Yet there is no basis for thinking that this course of action will be effective. Partial measures do not always increase the likelihood of successfully avoiding disaster. Again, to return to the metaphor of the train, consider standing halfway off the railway tracks. Overhunting of the caribou due to increased access along the highway is another unresolved issue in the management plan. But, whether resolved or not, the government plans to open the road.

The government's failure to resolve these issues is partly due to the absence of any legal requirement for environmental impact studies to be undertaken, and to hold hearings for its major projects. Such a legal requirement, as under the National Environmental Policy Act of the United States, forces environmental research, and consideration of the issues at an early stage when mitigating measures, including abandonment of the project, are easier to take. But evaluation of government projects, though generally required under the Federal Environmental Assessment and Review Process,²⁶⁹ is in fact only required after a number of discretionary screenings, the first screening being performed by the proponent department itself. Moreover, this process applies only to projects initiated after 1974. The Minister of the Environment has recently confirmed that "Since the decision to proceed [with the highway] had already been made, a formal review under the federal process concerning the project's acceptability was not possible."²⁷⁰ One must doubt whether such a position would be tolerated for a project in the private sector. This argument suggests that the conflict of interest between the government's position as promoter of the project and its position as regulator has limited the degree of environmental study.

Where environmental protection measures were compatible with or at least not in serious conflict with the

commitment to build and operate the highway, the steps taken by the government were fairly effective. For example, there was a serious attempt, through the land use permits and highway design, to reduce the impact of certain construction practices. But such ameliorative measures must be secondary to a rational assessment of the overall consequences of the highway. That rational assessment of whether the road's environmental impact is acceptable with proper mitigating action has not yet been undertaken.

Social Impacts

There are no permanent inhabitants along the Dempster Highway from about Mile 18 to the town of Fort McPherson at Mile 342. With the exception of possible effects on Old Crow in the Yukon and some local effects near the beginning of the highway near Dawson, the entire social impact of the highway will be felt in the Mackenzie Delta (see Table 3). The village of Old Crow, the only settlement in the northern Yukon, is some 120 miles northwest of the highway. In the Northwest Territories, though, the Delta communities of Inuvik, Arctic Red River, and Fort McPherson will all be tied to the South by the highway. Aklavik, though not connected by the highway, will be affected by it and would have vehicular access to the highway in winter when there is an ice road from Aklavik to Inuvik. In later years Tuktoyaktuk may also be connected by the highway. It too would be accessible via ice roads in the winter (see Table 4).

Social Impact Studies and Planning

Despite the potentially serious social impacts occasioned by the highway, the government has performed no social impact studies. In connection with the pipeline assessments, the government gathered some basic data as to the age, race, education, training, and work experience of the local populations, some of which information is relevant to the highway; but the social impact of the highway was not a direct concern in the terms of reference of any of the pipeline assessments.

The social impact of the Dempster Highway has as yet been unplanned, though not uncontrolled. There has been a freeze on land development along the highway in recent years, and no lands have been made available for service facilities.²⁷¹ Development along the highway will be restricted in accordance with a land use plan which is in preparation.

The government initiated a regional planning effort in

Table 3
Populations of Communities Affected by the Dempster Highway

	Native*	Other	Total	Working Age (15-64)
Tuktoyaktuk	627	40	667	319
Inuvik	1600	1900	3500	1792
Aklavik	520	160	680	295
Fort McPherson	750	90	840	423
Arctic Red River	86	10	95	55
Lower Mackenzie and Delta	3583	2190†	5783†	2884
Old Crow			216	

*Treaty Indian and Registered Inuit only.

†Errors in the original.

Source: Van Ginkel Associates Ltd., *Communities of the Mackenzie: Effects of the Hydrocarbon Industry*, prepared for Canadian Arctic Gas Study Ltd., January 1975, pp. 25, 79.

the Mackenzie Delta in 1975, by creation of the Mackenzie Delta Regional Planning Council, in response to the anticipated Mackenzie Valley Pipeline, gas processing plants in the Delta itself, and related gas developments. Highways and other infrastructure were among the concerns which might have been considered by the Federal-Territorial Regional Planning Committee, but the planning effort proved abortive,²⁷² and the measures to regulate the social impact of the highway were not assessed. These planning bodies have ceased to be active.

The Berger Inquiry generally analyzed the social impact of industrialization in the North, including consideration of highway development; the inquiry's report provides the best discussion of the general social and cultural issues raised by the Dempster and Mackenzie highways.

Native Economy and Way of Life

Native people — Indians, Inuit, and Metis — constitute a majority of the residents of the Mackenzie Delta and thus a majority of the people directly affected by the highway.

Despite substantial cultural change since the arrival of white men, the native way of life has remained very distinct from that of white Canadians. Hunting, fishing, and trapping activities are still important in the communities, particularly in a village such as Old Crow. Nearly every male in Old Crow over the age of eleven joins in the fall and

spring hunts of the Porcupine caribou herd, fishes in the Porcupine River, and traps muskrat in the Old Crow Flats. Revenue from muskrat trapping in 1973 amounted to about \$900 per trapper.²⁷³ A study conducted in 1974 by John Stager estimated that local fish and game made up fifty-five percent of the people's diet — some 90,000 pounds of caribou meat and 30,000 pounds of fish were consumed by the community in 1973. Dr Stager further found that the intensity of hunting by the community had remained stable over time.²⁷⁴

In the Mackenzie Delta communities, similar reliance on the caribou herd continues. In 1974 Eric Gourdeau estimated the value of hunting, fishing, and trapping in the Mackenzie region to the families of the some 170 trappers-hunters who spend over five months in the bush to be around \$4400 per family.²⁷⁵ Such estimates include the value which must be attributed to the use of "country food" — food which is caught and which otherwise would have to be purchased.

Native residents in Tuktoyaktuk and Aklavik tend to do some trapping as well as wage employment.²⁷⁶ Even full-time wage earners in the communities hunt and trap on their weekends and holidays to supply food. And even in Inuvik where virtually no one lives exclusively by hunting and trapping, native men go out hunting and trapping.

At the Berger hearings, Colin Allen said:

*[We] are not like . . . the people that come from [the] South and have government jobs: they go down South and have a rest on their holiday, whereas the Eskimos — they use a holiday to hunt as much food as they can so that they don't have to buy from the store, and that will help them to live through the winter. Even though they have a job, they need to get their food in order to keep up with themselves.*²⁷⁷

There is active trade and exchange in country food as well, among the Mackenzie Delta communities, especially among friends and family,²⁷⁸ for country food is preferred over store-bought food as it tastes better and is more nutritious.²⁷⁹

Socio-cultural Impact of the Highway

The Dempster Highway will accelerate the rate of social change in the native communities with serious and complex results. At the Berger Inquiry, Charles Hobart described the impact of the highway (and the recent launching of the Anik satellite) as introducing "a period of unplanned development" to the area:

By that I mean that it is and will be, simply impossible to

*control the stuff that comes in through television and the people who come in, and who go out and return, on the Dempster Highway. It is impossible to anticipate what the consequences will be, perhaps for many people, of televised inputs, of highway-borne inputs, and of the highway as an escape route. It seems obvious that television, highway, and employment influences must all interact with each other, but with what specific consequences no one can accurately foretell.*²⁸⁰

The problem of highway-induced social change is general, as indicated by comments made about the Mackenzie Highway by residents of Fort Simpson²⁸¹ and Wrigley.²⁸² Some of the social impacts have already been felt in the communities, as the highway has joined Fort McPherson and Arctic Red River to the larger centre of Inuvik. Indeed, the impacts felt in Fort McPherson have led the Fort McPherson Settlement Council to oppose completion of the highway to the South. The highway may cause a decline in the population of Arctic Red River.²⁸³ The town is located at the junction of the Mackenzie and Arctic Red rivers to take advantage of good fishing locations nearby. However, with road access, these fishing sites can still be exploited from Fort McPherson or Inuvik, which are larger communities and which are nearer supplies of caribou. Residents of Arctic Red River may therefore move to these centres.

The highway will contribute directly and indirectly, through induced demographic, environmental, economic, and social change, to the transformation of the native way of life, including family life and values, and the sense of personal and community identity. The increased direct contact with southern Canadians will involve the importation of new and competing cultural values into the native communities. Southern standards of material consumption and southern social values will increasingly constitute alternative models for native people, especially the young. Direct contact with many more southerners will lead to changes in group aspirations and demands, some pertaining to better housing and community services and others relating to spending on gadgets and increased alcohol consumption.²⁸⁴ As Gourdeau said with respect to the proposed Mackenzie Valley Pipeline:

As the opening wedge of industrial development of the North, the pipeline will, suddenly and irrevocably, bring new cultural values and aspirations that will significantly accentuate and precipitate the cultural change process. To a degree, this will impose a pace of evolution not easily compatible, to say the least, with the capacity of important

*segments of the native population to adapt psychologically.*²⁸⁵

The economic base in the Mackenzie Delta will be changed by the growth of tourism and other services related to the highway, not to mention other development generated by the highway. The scope and range of industries that may be promoted by the highway are uncertain, but the cultural problems are illustrated by considering the case of tourism. The economic opportunities to build facilities such as restaurants, service stations, motels, and lodges will for the most part accrue to those who are most experienced in such businesses and who command the capital and skill to be successful. In the absence of government intervention or a substantial land claims settlement, these opportunities will tend to go to members of the white community. Government intervention — which would be one way to create economic opportunities for native peoples — has the potential to be divisive, since preferential treatment for native businesses may be resented.

Further, the growth of tourist-based industries will to some degree compete with the traditional hunting, fishing, and trapping lifestyle for the use of lands. The pressure of tourists will also drive up the costs of local services.

The opening of the highway may also be expected to exacerbate certain social problems in the region. Alcoholism is already a massive problem in the Northwest Territories. As Mr Justice Berger said:

*The subjects of heavy drinking and drunkenness recur in every discussion of social pathology in the North. Both native and white people regard the abuse of alcohol as the most disruptive force, the most alarming symptom, and the most serious danger to the future of northern society.*²⁸⁶

It is clear that increased access to liquor outlets and beer parlours due to the highway, along with higher wages from road construction and other induced economic growth, have tended to promote alcohol abuse. When Fort McPherson residents were employed in the construction of the highway, liquor consumption increased substantially.²⁸⁷ In the estimation of the chairman of the Fort McPherson Settlement Council, alcoholism approximately tripled in the three years after Fort McPherson was connected by road to Inuvik.²⁸⁸ Moreover, many other problems are associated with alcohol — wife-beating, child neglect, and violence.

Crime and violence have increased in native communities with the opening of highway access. The experience of

Fort Simpson was cited by Mr Justice William Morrow of the Northwest Territories Supreme Court:

*Until just recently, the present population [of Fort Simpson] of several hundred Indians and whites had led uneventful and relatively quiet lives. But the highway construction combined with pipeline speculation appears to have changed all that. Last year [1975] the Magistrate's Court had more than seventy juvenile cases in one week, and my court was required to go there more times in that one year than in the previous eight-year total. To me this is a clear indication of what is to come. These small native communities are just not ready to take major developments. . . .*²⁸⁹

Crimes of violence and suicide increased to alarming levels along the Alaskan oil pipeline, with the coming of the industrial frontier. As Mr Justice Berger concluded,

*I am persuaded that the incidence of these disorders is closely bound up with the rapid expansion of the industrial system and with its persistent intrusion into every part of the native people's lives. The process affects the complex links between native people and their past, their culturally preferred economic life, and their individual, familial and political self-respect. We should not be surprised to learn that the economic forces that have broken these vital links, and that are unresponsive to the distress of those who have been hurt, should lead to serious disorders.*²⁹⁰

Alcoholism, violence, and crime have all taken their toll in terms of family breakdown. As an example of family breakdown, Berger referred to the experience of Fort Simpson with the completion of the Mackenzie Highway:

*The Mackenzie Highway was completed to Fort Simpson in 1970, and the Inquiry was told of the social consequences it has had in that community. People in Fort Good Hope, Fort Norman and Wrigley told me that their deepest fear was that, if the pipeline went through, their communities would become like Fort Simpson. Native witnesses at Fort Simpson told me that their people's involvement in the construction of the Mackenzie Highway, through the Hire North project, has resulted in major social problems such as high rates of alcohol abuse, crime and violence, and family breakdown.*²⁹¹

Admittedly, the social dislocation in the native communities in response to the intrusion of the southern industrial economy should not be attributed exclusively to the effect of highways. Highways are not always a necessary element in the industrialization of northern communities, for air and

water transport can have as significant a role, as is shown by the history of Inuvik and Frobisher Bay. Still, highways have been the agents which have vastly accelerated the social disruption of communities; and in comparison with air or water transport, their impact is more general and difficult to control. Perhaps these problems are impossible to control.²⁹²

Aside from these practical difficulties of controlling social impact, there are legal and political limits to planning because there are some matters control over which would not be in keeping with the principles of a democratic society.²⁹³ Accordingly, it would seem that a process of evolutionary social development, ideally in the context of a native land claims settlement, offers the best hope of reducing the social impacts of industrial and road development.

Benefits of the Highway to Native People

The Dempster Highway has brought wage employment and better transportation to the native people of the Mackenzie Delta. Since 1972 the government has attempted to ensure that native people are hired on the construction of the highway. However, the extent of native employment on the construction of the Dempster Highway is difficult to assess, since native employment data for the Yukon section of the highway and for the period prior to 1974 are non-existent, and since then are incomplete. It does seem that prior to 1972 native employment was minimal.

The total employment generated by the highway construction from 1958 to completion is roughly 2500 to 2800 "man-years," or about 5.5 man-years per mile of highway constructed.²⁹⁴ Of this total employment, a substantial proportion went to those from outside the Dempster region, as many construction workers and supervisory staff were recruited in southern Canada. Also, much of the design and administrative work was carried out in southern Canada at the Department of Public Works in Edmonton and the Department of Indian Affairs and Northern Development in Ottawa, though most of the Yukon section of the highway was designed at DPW in Whitehorse.

Catre Construction Co. Ltd., the major contractor on the Northwest Territories sections of the highway in the summer of 1971, at first hired no local heavy equipment operators or technicians, since its contract from DPW did not require it to do so. It subsequently hired bulldozer operators and a heavy equipment welder, and sought others.²⁹⁵ Although the data for the native employment on the N.W.T. section of the Dempster date only from September 1974, they indicate that native people constitute between one-quarter

and one-half of the work force employed on the Dempster in the Northwest Territories.²⁹⁶

In recent years, contractors have been required by their contracts with DPW to meet with Canada Manpower, DIAND, and DPW officials in Whitehorse and in the Mackenzie Delta communities two weeks prior to recruiting their work force. Canada Manpower officials then identify local residents in the area of the contract who appear to be qualified to work on the construction, and the contractor must show Canada Manpower just cause if these local people are not offered employment.²⁹⁷ The contractor must provide on-the-job training as necessary for local workers. The order of preference in hiring has been local residents, territorial residents, and then other Canadian workers.²⁹⁸

Aside from construction work, to date little native employment has been generated by the highway. In Fort McPherson, two taxi services have been created, providing jobs for two families.²⁹⁹

Native Land Claims

No treaties have ever been signed with Indians of the Yukon or Inuvialuit of the Mackenzie Delta. With respect to the Yukon Indians, the Council for Yukon Indians has been negotiating on behalf of the people of Old Crow. The claim of the Inuvialuit of the Mackenzie region has been organized by COPE (see Figure 5).

The position with respect to the Indian people of the Mackenzie Delta is more complicated. Treaty Number 11 was signed in 1921 with respect to a vast area in the Mackenzie Valley,³⁰⁰ in response to the oil discoveries made in the Mackenzie Valley in 1920. It was apparently the intention of the federal government to extinguish all Indian claims in the Mackenzie Valley. However, the natives understood the treaty to be one of friendship only. In September 1973, Mr Justice William Morrow found that the native people had an arguable case that aboriginal title had not been extinguished.³⁰¹ Morrow allowed the registration of a caveat or legal warning of the native claim to be filed against lands in the Mackenzie Valley. On appeal to higher courts, the caveat was struck down on technical grounds;³⁰² but the government has proceeded to negotiate a further agreement with the Indians of the Mackenzie Valley.

Highway development has proceeded in the affected areas despite the land claims. The pace of construction of the Mackenzie Highway and the Dempster Highway has been unaffected by land claims negotiations, though COPE and the Council for Yukon Indians have opposed the completion

of highways pending claims settlements. The government has apparently taken the position that highway construction does not prejudice native land claims, but this is taking the narrow view that those claims can be adequately settled by a payment of money. The position of native groups is that the settlements must provide the basis for ownership or at least control over traditional lands in order to continue the traditional native society and its hunting, fishing, and trapping lifestyle. To the extent, therefore, that the northern environment is affected by the highway and northern society transformed, native claims are indeed prejudiced.

The most important example of the highway's effect on native claims is the potential impact of the highway on the caribou. Lorraine Allison has recently discussed the native claims, management difficulties, and political conflicts with respect to the highway's impact:

*In Canada, Dene from Fort McPherson, Aklavik, and Inuvik; Indians from Old Crow, Dawson, and Mayo; and Inuit from Aklavik and Inuvik all consider some part of the annual harvest of the Porcupine caribou herd to be theirs by right. To date the sport hunt by whites in the Yukon is insignificant, but the claims of the white hunters must be resolved too. Until now, each native group has taken what it needs without restriction. However, the Dempster Highway has produced a conflict of interest between the people of Fort McPherson and Old Crow, despite their kinship ties. The highway will link Fort McPherson to major wintering grounds in the Yukon, and spring and fall migration routes in the Richardson Mountains. Old Crow Indians, who are more than a hundred miles from the highway, fear that Fort McPherson residents will now harvest more caribou and that this may lead to problems with the herd. People from Fort McPherson wish to use the highway to make their hunting easier. How should this problem be resolved?*³⁰³

Thus, reducing the highway's impact on the caribou herd is tied to the resolution of native land claims.

Impact on the White Community

The white community of the Mackenzie Delta has generally supported the building of the highway. The impact has been seen as positive:

The support of northern settlements by road results in better supply and lower cost goods and services. However, it is probable that one of the most important factors is psychological. Remoteness may well be less of a problem if people

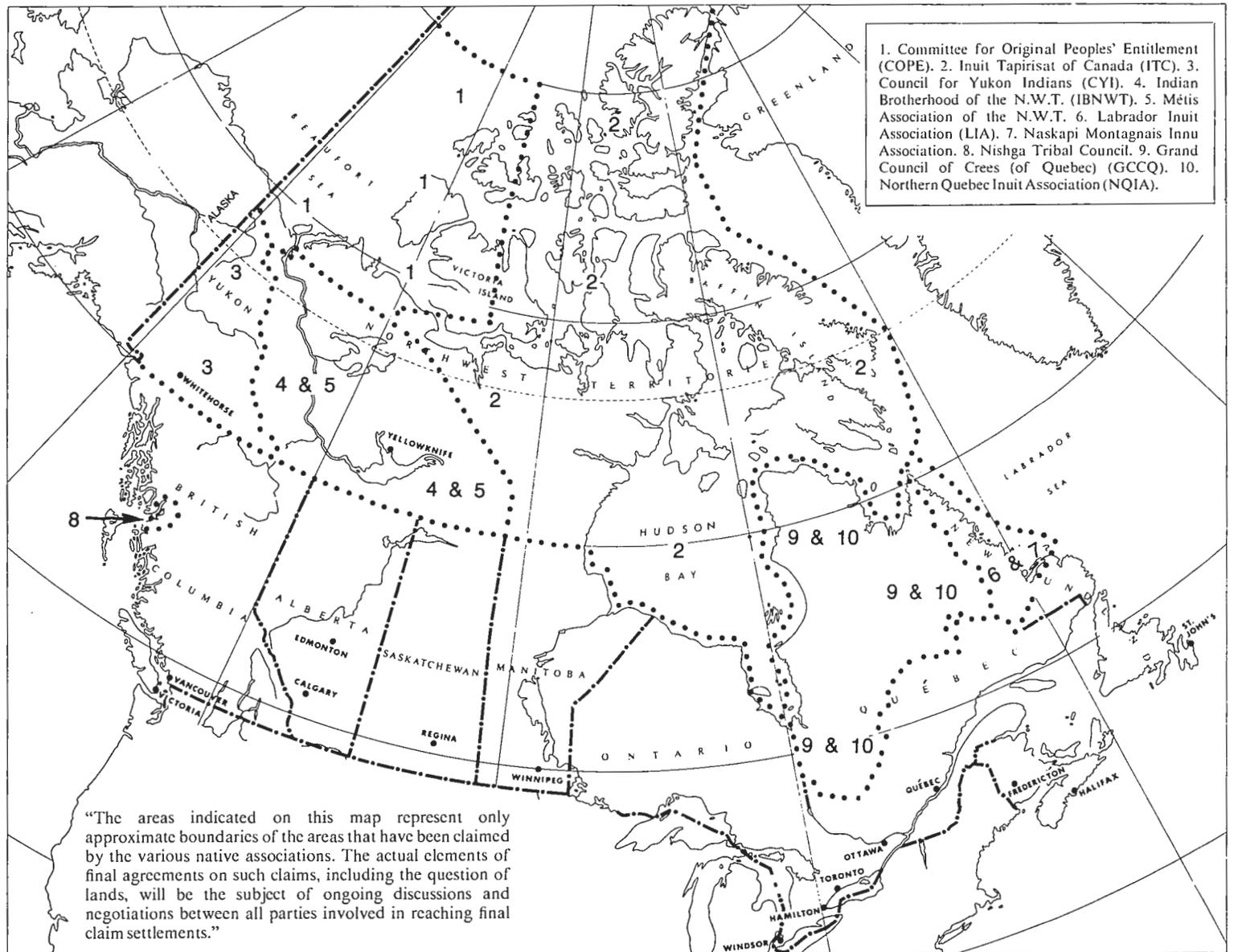


Figure 5 Native Claims in Canada

*know that they are connected to the outside world by road and that they can in fact drive by car to other parts of Canada, even though they may seldom do so. A road network, like a communication network, will be a unifying factor for all northerners.*³⁰⁴

Richard Hill, a northern white resident, former mayor of Inuvik, and strong advocate of the highway, cites the advantages of the highway: cheaper freight in the winter to the Delta; increased local and tourist traffic; possible mineral, oil, and pipeline developments; concomitant job opportunities in maintenance, service stations, restaurants, motels, lodges, or other recreational facilities; and easier travel in and out of the region.³⁰⁵

To the white community, then, the building of a road means the building of a style of life more like the one in which they were raised in the South, or which they have come to expect as whites in an affluent country. Importing the amenities of the South to the North has been part of the development policy since the 1950s. And, indeed, it is typical of colonial societies. As Peter Usher commented at the Berger Inquiry,

I said before that whites are now able to bring the south with them when they come north, and they almost always do that. They bring not only the physical comforts of the south, but southern hopes and expectations as well.

*Now in a lot of ways I don't blame people for that. They have been encouraged by industry and government to come here and feel as though it were home. The government deliberately designed this place to be like any other Canadian town. So people have learned to come here and expect what they get in Regina or Red Deer; when they don't, they start kicking and sometimes they start blaming native people. They want better schools for their kids and none of this northern stuff on the curriculum, you know, because that won't help their little boy when he transfers to a school in Prince George next year. They want better sports facilities for their kids. They want nicer beer parlors for themselves and better shopping facilities, and really they want this place to be just like home.*³⁰⁶

And so they want better roads as well.

Inuvik is the service centre for the Delta and has been the centre of settlement from the South. Thus, upon completion of the highway, Inuvik can likely expect a disproportionate growth in comparison with the native communities. In the years from 1975 to 1978, there has been some concern in the white community in Inuvik that there

may be a flood of transients and unemployed workers from the South who will hitch-hike or drive up the road to Inuvik looking for work.³⁰⁷ This might put a strain on local job opportunities and services. There has also been concern that the road would create a situation where Inuvik would become “the largest used-car lot in North America,” as a result of cars being driven up the highway and subsequently abandoned.³⁰⁸

Whatever else may be said, it is likely that the construction of the Dempster Highway will tend to widen the differences between the native and white societies in the Mackenzie Delta. The values which the white community sees the road as serving — the expansion of the local wage economy, and increased ties with the southern industrial economy — are values which are likely to be opposed in practice to the preservation of native communities based on a hunting, fishing, and trapping lifestyle. The real physical threat which the highway poses to the viability of the caribou herd, which is one of the foundations of the traditional lifestyle, is but one aspect of the diffuse social and cultural threat which occurs when communities are opened up to the continental road transportation system.

Economic Impact

Economic Development Policy

Since the 1950s the government has attempted to bring about economic growth by providing roads and other infrastructure to stimulate investment plans of the petroleum and mining industries. R. Gordon Robertson, former Deputy Minister of Northern Affairs and National Resources, said in 1966, “The application of public capital to provide the ‘infrastructure’ for private economic development has been and still is an active policy in those parts of the North where it has a good chance of producing results.”³⁰⁹ A.D. Hunt, another senior official of the same department, wrote in 1967, “. . . the government has accepted that there is a very real need in the North to assume part of the risk along with the private developer and that in most cases this can best be done by making money available to the oil, mining and forest companies to help offset some of the higher costs involved. Probably the most important program under this category is that for providing financial assistance for building roads and airstrips.”³¹⁰ Under government policy, it has been thought that the first developer in an area should

not have to bear the costs of supporting transportation and communications infrastructure for the area.

The success of the northern roads programme in promoting economic development has perhaps best been argued by A.B. Yates, former senior DIAND official in charge of the programme. He concluded:

... it is impossible at this time to demonstrate conclusively how much the policy has aided development. Developments such as the massive Anvil Mine at Faro, Yukon, the equally massive Pine Point Mine in the N.W.T., the smaller Canadian Tungsten Mine at Tungsten, N.W.T., and numerous exploration programmes not yet leading to the development of mines have indeed taken place. The first and third can be directly related to the construction of the Campbell Highway, one of the Area Development roads under the policy, but it is difficult to establish this relationship as one of direct cause-effect. One can say however, without fear of contradiction, that the developments were both aided and accelerated by these roads. Similarly, while the pace of exploration has quickened, one cannot say that this has been due solely to the roads program. One can say, however, that these roads have contributed significantly to this exploration and have to some extent dictated the specific areas in which the exploration is taking place. Of all the incentive programs offered by government to encourage exploration and development, this is the one supported the most by industry.³¹¹

The government has not attempted to justify the northern road programme, and in particular the Dempster Highway, on economic grounds such as cost/benefit analysis, since it was recognized in the 1965 "Territorial Roads Policy" that on these grounds the construction of northern highways such as the Dempster could not be justified.

Economic Benefits of the Dempster Highway

Petroleum development in the Eagle Plain, which was the original reason for constructing the Dempster Highway, has not proved to be commercially feasible. About thirty-four wells were drilled in the Eagle Plain area from 1958 to 1974, and considerable seismic exploration was carried out, but only one commercial oil well — the Amoco well near the Bell River — has been proven, and this does not justify marketing.

Contrary to early estimates, the Eagle Plain has been shown to be a small hydrocarbon area — one-tenth the size of the Mackenzie Delta hydrocarbon region — and an unattractive one for further petroleum exploration. Still, with

increased prices, and with a pipeline possibly running through the area, local fields may be commercially developed at some time in the future.

Feasibility studies and an application for a Dempster Highway natural gas pipeline, connecting the Mackenzie Delta-Beaufort Sea gas reserves with the Alaska Highway natural gas pipeline, were required by the National Energy Board in its approval of the construction of the Alaska Highway natural gas pipeline. Such a project would use the highway extensively during construction, and on a regular basis during the operation and maintenance of the pipeline. However, the economic and environmental viability of the Dempster lateral pipeline project is yet to be shown, and it cannot be assumed at this point (September 1978) that the project will proceed. The highway will, however, serve as a supply route to the Mackenzie Delta and offshore development in the Beaufort Sea.³¹²

A few mining companies have used the Dempster Highway for access to their properties in the northern Yukon, either constructing winter roads from the Dempster Highway or flying supplies into their properties by helicopter, using the highway as a base. These properties are generally located some distance from the highway, as the potential for mines in the immediate area traversed by the highway is thought to be limited.

Tourism will develop along the highway as it is opened up to tourists. Though estimates cannot be more than a guide, perhaps 1,000-3,000 "tourist parties" (averaging just over three people in a "party") will travel on the road during the early summers of its operation.³¹³ These numbers could be expected to double at a later time. Most tourists would be Americans, as in recent years eighty percent of tourists in the Yukon have been from the United States.

Tourist facilities are very limited along the Dempster Highway. A tourist lodge operates at Dempster Corner on the Dawson-Stewart Crossing road. It has a restaurant, service station, and ten units for accommodation. Another tourist lodge is being constructed on a ridge near the Eagle River at about Mile 230. This operation was let to tender by the Yukon territorial government in the fall of 1977; a Saskatchewan firm was the successful bidder, with no Yukon firms competing. The lodge, to be completed by 1979, will have thirty units, restaurant and service station, and facilities for a highway maintenance camp which will be leased back by the Yukon territorial government.³¹⁴ Otherwise, there are at present only two campgrounds along the highway, at Mile 45 and Mile 123, and two outfitters along the Yukon section of the highway to service tourists.

Tourist expenditures will be relatively small, given that there are few places to spend money, and given that most tourists will travel in campers and other recreational vehicles and will be largely self-sufficient.

Comparative Freight Costs

It appears that the highway will not generally mean cheaper freight charges to the Mackenzie Delta, though if kept open in the winter it will provide reliable surface transportation.

Direct comparisons of the costs of trucking along the Dempster Highway with the costs of barging on the Mackenzie River are difficult to make, as trucking operations have not yet commenced along the highway and firms have not yet set their freight rates.³¹⁵ Furthermore, the tariffs for barging on the Mackenzie are very complex.³¹⁶ Still, a comparison of representative rates for general merchandise reveals a very substantial advantage for the use of barges on the Mackenzie River. Trucking rates for general merchandise have been estimated by the White Pass and Yukon Route companies as follows:³¹⁷

	Rate/100 lb. for 2000 lb.	Transit time (days)
Whitehorse–Inuvik	\$14.00	2
Vancouver–Inuvik	19.00	9–12
Edmonton–Inuvik	24.00	4

In comparison, a representative rate for rail and barge or truck and barge delivery of general merchandise from Edmonton to Inuvik is about \$7.50 to \$8.00 per 100 lb.³¹⁸ Air freight charges at \$39.15/100 lb. for general merchandise from Edmonton would continue to be much more expensive than either barging or trucking, but air transport retains the advantages of year-round same-day service from Edmonton.³¹⁹

Barge service on the Mackenzie River is only available during the summer. The first sailing from Hay River to Inuvik is approximately June 1, with a final acceptance date for shipping of September 5.³²⁰ Goods for use in the winter must currently be stockpiled, which gives rise to storage expenses, and other carrying costs for inventories. Though careful analysis is necessary to compare the total costs of supplying goods to Inuvik through barging as against the

Dempster Highway, it appears that the Dempster provides no cost advantage for the shipping of most freight to the Mackenzie Delta and most freight will therefore continue to be barged to Inuvik. This accords with experience at Whitehorse, where ship and rail transport from Vancouver via the White Pass and Yukon Route still carries about seventy-five percent of the Yukon’s freight, though there has been competition with truck transport along the Alaska Highway since the 1940s.³²¹

The highway will no doubt be used for the shipment of some relatively high bulk, low value goods during winter, as local merchants have confirmed. Perishables such as fresh fruits and vegetables, it appears, will continue to be flown in. Though this is more costly, Inuvik merchants expect people will pay more to obtain fresher produce.³²²

Where delays caused by seasonal transportation are especially costly, the Dempster Highway will also be favoured. During the winter of 1977-78, when the roadway was not yet complete, the highway was used to move heavy construction and oil drilling equipment out of the Mackenzie Delta.³²³ By moving equipment during the winter, extra months of use could be obtained.

Road Closures

Table 4 shows that the combined break-up period for the Mackenzie and Peel rivers has been five to six weeks in the spring — from mid-April to the end of May. The combined freeze-up period will be a similar period between mid-October and late December. It appears that shut-downs to protect the caribou, at least during spring and fall migrations and perhaps during the whole winter, will also be necessary. The timing and exact location of the caribou crossings of the highway will vary from year to year, but the spring migration runs from late April to early May and migration normally begins in September and continues into November. To some extent, then, closures for caribou will overlap with closures for break-up and freeze-up.³²⁴

Furthermore, closures for break-up, freeze-up, and caribou migrations will cause uncertainty among shippers which will preclude reliance on the highway for a period surrounding the actual closure dates. It would appear, then, that in total the highway will not be available for through freight for approximately four months per year.

Maintenance Costs

The total cost of constructing the highway will be \$103 million (see Table 1). These, however, are “sunk costs,”

representing money which has been spent, which is not recoverable, and which is therefore not relevant in considering the options available now for the use and management of the highway. Annual maintenance costs are the most important figures, as they measure the ongoing expense of keeping the road open.

The estimated costs of maintenance are shown in Table 5. It can be seen that dust control measures, i.e., the application of calcium chloride to the road surface to keep the dust down, are very substantial; they almost double the cost of summer maintenance. Such treatment is generally given to

roads in the Yukon where the average daily traffic count from May to October inclusive reaches 250 vehicles or more per day.³²⁵ Traffic on the Dempster may not reach this level for a number of years.

Winter maintenance costs are largely for snow clearing, as the surface of the road is stable at that time and needs little care. Because the highway has generally not been kept open in winter, there is little direct experience to guide estimates for the costs of snow clearing on the highway, but problems with drifting snow on some sections of the highway are thought to be severe.³²⁶

Table 4
Break-up and Freeze-up Dates – Peel and Mackenzie (Arctic Red) River Crossings of the Dempster Highway

Year	Ice Bridge Out	Open Water	Ice Forming	Ice Bridge In
Mackenzie River (Arctic Red River)				
1975	26 April	2 June	20 October	11 November
1976	28 April	25 May	22 October	2 January
1977	27 April	30 May	19 October	15 December
1978	10 May			
Peel River				
1975	18 April	25 May	12 October	11 November
1976	17 April	17 May	15 October	2 December
1977	22 April	20 May	12 October	3 December
1978	25 April			

Source: Capt. J.T. Marsh, Superintendent Marine Operations, Highways Division, DPW, Government of the Northwest Territories, Yellowknife. Communication to Donald Gamble, CARC, 18 May 1978.

Table 5
Estimated Annual Maintenance Costs for the Dempster Highway

		Summer Only Without Dust Control	Summer Only With Dust Control	Winter Only	Year Round Without Dust Control	Year Round With Dust Control
Yukon	Miles 0–290	\$690,000	\$1,270,000	\$553,000	\$1,243,000	\$1,823,000
N.W.T.	Miles 290–340	310,000	–	100,000	410,000	–

Sources: Yukon: K.J. Baker, Director of Highways and Public Works, Government of the Yukon Territory, Letter to author, 1 August 1978. N.W.T.: D.L. Matthews, Director, Department of Public Works, Government of the Northwest Territories, Letter to author, 15 August 1978.

Analysis

There has been little if any formal public examination of the relative costs and benefits of the Dempster Highway. The government's continuing commitment to build the highway, as an incentive to resource development and as a transportation facility, was not made on the basis of such an evaluation. Rather, decisions were based on the informed judgment of planners in Ottawa and on the political commitment to expansionist policies in northern Canada. Given the great costs and uncertain benefits of the highway, a more rigorous economic analysis of the decision could well have applied.

With the use of the highway for pipeline development still uncertain, surface transportation in winter to the Mackenzie Delta will be perhaps the most important economic benefit of the highway. It will be particularly useful for the petroleum industry, assuming the highway is not closed in winter to protect caribou or to save maintenance costs. Petroleum and other resource development companies are expected to be the most important winter users of the highway, as the timely movement of large quantities of bulky equipment and supplies can save them substantial sums of money.

Those with the necessary capital and skills to take advantage of entrepreneurial opportunities will benefit from the growth of tourism, as will those who will take new jobs in the tourist sector.

Whether these and other benefits will in the end outweigh the costs of the highway — its capital cost, its maintenance costs, and the as yet largely immeasurable environmental and social costs — remains to be seen. It does appear, however, that these costs are very substantial in comparison with the expected benefits of the highway. The ultimate judgment on the economic wisdom of the decision to complete the highway must depend on a close economic analysis after some years of experience with the actual impact of the highway.

Conclusion

Over the years, the Dempster Highway has been seen by the federal government primarily as a means of promoting economic development. This was the view held by Alvin Hamilton, who authorized construction of the highway. And this was the view which was formalized in the northern roads programme in the 1960s.

According to government policy adopted in 1972, however, social and environmental concerns were to be given

priority in planning for the 1970s. It thus became necessary to integrate social and environmental concerns into the programme of northern roads. Some initiatives were taken with respect to the Dempster Highway — the commissioning of overview environmental studies, and measures to increase native employment in road construction. But there was insufficient study to identify the potential environmental and social impacts, and to see that effective steps were taken to deal with them. As a result, without a formal public assessment and planning procedure regulating highway development, the social and environmental issues were not brought home to those planning the highway until it was almost completed. Even then the various problems were chiefly revealed as a result of the pipeline inquiries. Efforts to deal with social and environmental issues have necessarily been rendered “after the fact” and accordingly less effective.

What was needed was a concerted effort prior to construction, to ascertain the problems likely to be caused by the highway and to consider alternative plans or options to meet those problems — including the option of not building, or not completing, the highway. Such planning, as the experience of the Dempster Highway demonstrates, is the only sound way to proceed with the development of northern roads.

Acknowledgements

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I would also like to thank Ellen Moore, who typed the manuscript, and the firm of McAlpine, Roberts and Poulus which provided xeroxing and postage services.

Footnotes and References

1. When wet, sections of the highway in the Northwest Territories

- become extremely slippery and dangerous, and speeds must be severely reduced. Moreover, driving at high speeds over the broken shale used in the roadbed in both the Yukon and Northwest Territories tends to puncture tires. For this reason, it is unwise to drive the road without at least two spare tires.
2. F.H. Collins, "The Yukon Territory: A Brief Presented to the Royal Commission on Canada's Economic Prospects, at Edmonton, Alberta on November 22, 1955," p. 17.
 3. "Dempster Highway" File, (previously "Flat Creek-Eagle Plain Road" File) No. 351-2-39, and N-2800-107, Northern Roads and Airstrips Division, Department of Indian Affairs and Northern Development, Ottawa. (Hereinafter referred to as D.H. File).
 4. H.W. Woodward, "Northern Road Program," in *Arctic Transport: Proceedings of the Arctic Transportation Conference*, Yellowknife, N.W.T., 8 and 9 December 1970, Vol. II, (Ottawa: Information Canada, 1971), p. 152.
 5. Collins, *op. cit.*, pp. 19-20.
 6. *Ibid.*, p. 20.
 7. Jim Lotz, *Northern Realities: The Future of Northern Development in Canada*, (Toronto: New Press, 1970), p. 140.
 8. K.J. Rea, *The Political Economy of the Canadian North*, (Toronto: University of Toronto Press, 1968), p. 242.
 9. Interdepartmental Committee on Federal-Territorial Financial Relations, Report on the Yukon Territory, Ottawa, 1957, pp. 25-26.
 10. Hon. Jean Lesage, Minister of Northern Affairs and National Resources, Canada, House of Commons Debates, 1st Sess., 22nd Parl., Vol. V, 1953-54, pp. 4681-2, quoted in Rea, *op. cit.*, p. 242.
 11. D.H. File.
 12. D.H. File.
 13. Canada, House of Commons Debates, 5th Sess., 22nd Parl., Vol. I, 15 January 1957, pp. 264-265.
 14. Report of the Interdepartmental Committee, p. 27. See above, n. 9.
 15. *Ibid.*, p. 29.
 16. Interview with the Hon. Alvin Hamilton, Ottawa, 29 June 1976.
 17. Canada, House of Commons Debates, 1st Sess., 24th Parl., Vol. II, 7 July 1958, p. 1980.
 18. Interview with the Hon. Alvin Hamilton, Ottawa, 29 June 1976.
 19. *Ibid.*
 20. *Ibid.*
 21. D.H. File. However, the road is currently not seen as providing access to Old Crow.
 22. *Ibid.*
 23. *Ibid.*
 24. *Ibid.*
 25. Interview with A.A. Wright, Whitehorse, May 1976.
 26. D.H. File.
 27. Memorandum, 5 December 1957, D.H. File.
 28. D.H. File.
 29. Memorandum, 2 January 1958, D.H. File.
 30. *Ibid.*
 31. Memorandum, 15 January 1958, D.H. File.
 32. Peter Newman, *Renegade in Power: The Diefenbaker Years*, (Toronto: McClelland and Stewart, 1963; new ed. 1973), p. 217 ff.
 33. Quoted in Newman, p. 218.
 34. See House of Commons Debates, 7 July 1958, p. 1980 (n. 17 above), for a statement of the "Northern Vision" programme.
 35. *Ibid.*, p. 1982.
 36. *Ibid.*, p. 1979.
 37. *Ibid.*, p. 1988.
 38. *Ibid.*, p. 1979.
 39. N. Gritzuk, "The Role of Transportation in the Development of the North," in *Western Miner and Oil Review*, Vol. 32 (April 1959), p. 32.
 40. D.H. File.
 41. Memorandum, 24 June 1958, D.H. File.
 42. D.H. File.
 43. Memorandum, 15 January 1960, L.G. McQuarrie, D.H. File.
 44. D.H. File.
 45. D.H. File.
 46. Interview with the Hon. Alvin Hamilton, Ottawa, 29 June 1976.
 47. D.H. File.
 48. Memorandum from F.H. Collins, Commissioner of Yukon, to B.G. Sivertz, Director, Northern Affairs Branch, D.H. File.
 49. Memorandum, December 1960, D.H. File.
 50. Letter from F.H. Collins to B.G. Sivertz, 12 December 1960, and letter from F.A.G. Carter to F.H. Collins, 16 December 1960, D.H. File; and Report of the Interdepartmental Committee on Federal-Territorial Financial Relations, 1962.
 51. Report of the Interdepartmental Committee on Federal-Territorial Financial Relations, 1962, p. 71.
 52. Canada, House of Commons Debates, 2nd Sess., 26th Parl., Vol. I, 9 March 1964, p. 689.
 53. Cpl. Dempster, Report of Fitzgerald Incident, Archives of the RCMP,

- quoted in letter, Yukon Order of Pioneers to Minister. June 1963, D.H. File.
54. "A Territorial Roads Policy for the Future," Northern Affairs and National Resources Road Planning Section, 1965. Unpublished memorandum, DIAND Library, Ottawa.
55. Ibid., p. 2.
56. Ibid., pp. 14, 1.
57. Ibid., p. 10.
58. Interview with A.B. Yates, Ottawa, 23 June 1976. After tax deductions, a resource development company's contribution is substantially less than one third of the cost of an access road.
59. "Territorial Roads Policy," p. 2. See above, n. 54.
60. Ibid., p. 13.
61. Ibid., pp. 22-23.
62. Ibid., p. 21.
63. Ibid., p. 21.
64. Ibid., p. 21.
65. Ibid., p. 7.
66. Ibid., p. 1.
67. On the politics of the pipelines, see Edgar J. Dosman, *The National Interest: The Politics of Northern Development 1968-1975*, (Toronto: McClelland and Stewart, 1975).
68. *Arctic Transport: Proceedings of the Arctic Transportation Conference*, op. cit., Vol. I, p. 8. See also Woodward, Vol. II, p. 167.
69. Woodward, Vol. II, p. 160.
70. Ibid., Vol. II, pp. 166-167.
71. "1975 Northern Roads Fact-finding Committee Background and Current Policy," September 1975, pp. 4-5, in *Report of the Northern Roads Fact-finding Committee*, Unpublished DIAND report, January 1976, Appendix I.
72. Ibid., p. 6. In 1972, however, further funds were budgeted for the Mackenzie Highway.
73. R.F. Leggett, "Re-Inventing the Wheel," *Northern Perspectives*, Vol. 1, No. 8 (1973): 2-4.
74. "Northern Canada in the 1970s," *Minutes and Proceedings of the Standing Committee on Indian Affairs and Northern Development*, 1972-3, No. 3 (28 March 1972), Appendix B.
75. Stephen Duncan, "Northern Vision, 1972 Style: Dief's Dream has Escaped," *Financial Post*, April 1972.
76. A.B. Yates, "Northern Road Development in Canada," Paper presented at the VII World Meeting of the International Road Federation, Munich, Germany, 1973, (Ottawa: DIAND, n.d.), p. 22.
77. Memorandum, 23 June 1976, D.H. File.
78. A.B. Yates, p. 23. See above, n. 76.
79. Ibid., p. 23.
80. Ibid., p. 24.
81. Ibid., p. 24.
82. A.B. Yates, *Minutes and Proceedings of the Standing Committee on Indian Affairs and Northern Development*, 4 December 1975, 32:13. Mr Yates also cited the location of the road in permafrost areas as a reason for escalating costs. However, this is a reason for high costs, not escalating costs.
83. Thomas R. Berger, *Northern Frontier, Northern Homeland: The Report of the Mackenzie Valley Pipeline Inquiry*, Vol. I, (Ottawa: Supply and Services, 1977), p. 16. (Hereinafter referred to as Berger).
84. See the section of this study dealing with Environmental Impacts.
85. Berger, Vol. I, pp. 49-50.
86. National Energy Board, *Reasons for Decision: Northern Pipelines*, 3 Vols., (Ottawa: Supply and Services, 1977).
87. Kenneth Lysyk, Willard Phelps, Edith Bohmer, *Alaska Highway Pipeline Inquiry Report*, (Ottawa: Supply and Services, 1977), p. 130. (Hereinafter referred to as Lysyk).
88. Environmental Assessment Panel, *Alaska Highway Pipeline: Interim Report of the Environmental Assessment Panel to the Honourable Roméo Leblanc, Minister of Fisheries and the Environment*, (Ottawa: Supply and Services, 1977). (Hereinafter referred to as *Interim Report*).
89. Woodward, Vol. II, p. 164.
90. *Report of the Northern Roads Fact-finding Committee*, 1-20 May 1967, Unpublished DIAND report, p. 3. (Hereinafter referred to as *1967 Report*).
91. Ibid., pp. 3-4.
92. Ibid., p. 4.
93. Meetings with individuals were conducted in a similar way, except that the presentation for discussion purposes was typically shortened or omitted. From the proceedings, a summary of discussions was compiled and sent to all participants, except that governmental contributions were held confidential to avoid possible embarrassment to the officials concerned, at least until their clearance was received. Ibid., p. 5.
94. Ibid., p. 56.
95. Ibid., p. 59.
96. Ibid., p. 60.
97. The Inuvik Chamber of Commerce plan included an eleven-mile road from Aklavik to the foothills nearby where gravel was available, the construction of a road from Tuktoyaktuk to the western shores of the Husky Lakes, and the improvement of a trail built by Canadian National Telecommunications from Inuvik to the upper reaches of Campbell Lake. The expansion of roads up the Mackenzie Valley, to

- the east towards Paulatuk and Coppermine, and across the Delta to Aklavik, were all recommended as future priorities.
98. *1967 Report*, p. 56. See above, n. 90.
99. *Ibid.*, p. 65. White Pass and Yukon Route consists of four companies: Pacific and Arctic Railway and Navigation Company; British Columbia-Yukon Railway Company; The British Yukon Railway Company; and The British Yukon Navigation Company, Limited.
100. *Ibid.*, p. 77. Local business interests favoured the completion of the Ross River-Carmacks road (which serves the Cyprus Anvil mine at Faro), the refurbishing of the old Canol road from Ross River to the Yukon-Northwest Territories border, and roads up the Wind River valley or running west from Carmacks — all of which would enter areas of high mineral potential — before the completion of the Dempster.
101. *Ibid.*, pp. 83-84.
Redwater Oils Ltd. of Calgary supported the completion of the Dempster and asked that exploration roads built by its subsidiary, Western Minerals Ltd., count towards a subsidy under the Initial Access Road programme of the department. *Ibid.*, p. 87.
102. *Ibid.*, p. 7.
103. *Ibid.*, pp. 7-8.
104. *Ibid.*, pp. 9-10.
105. *Ibid.*, p. 9.
106. *Report of the Northern Roads Fact-finding Committee*, (1975), 2 Vols. Unpublished DIAND, January 1976, p. 7. (Hereinafter referred to as *1975 Report*).
107. "1975 Northern Roads Fact-finding Committee Background and Current Policy," p. 1. See above, n. 71.
108. *1975 Report*, p. 3.
109. A.W.F. Banfield, *Mackenzie Valley Pipeline Inquiry Proceedings and Evidence*, Allwest Reporting Ltd., Burnaby, B.C., 1975 (hereinafter referred to as *MVPI Proceedings*), Yellowknife, 2 December 1975, Vol. 94, p. 14332.
The justification for the secrecy of the Schultz study is unclear, but seems to be that DPW considered it to be a "private contractual matter" between the department and their consultants. Such a position is not reconcilable with public involvement in environmental assessment.
110. *1975 Report*, p. 13. See above, n. 106.
111. *Ibid.*, Appendix III, Brief N.
The White Pass and Yukon Route companies indicated that they had been approached by potential pipe suppliers and by Canadian Arctic Gas Study Ltd. to put forward transportation proposals for the movement of pipeline equipment, fuels, and supplies via the port of Skagway, White Pass Railway, and the Dempster Highway to the proposed construction staging areas in the Delta. And Dome Petroleum Ltd., which had a \$100-million drilling programme in the Mackenzie Delta-Beaufort Sea area, also approached White Pass to supply all-weather land transportation over the Dempster route.
112. *Ibid.*, Appendix III, Brief C.
113. *Ibid.*, Appendix III, Brief K.
At the meeting in Inuvik, COPE took issue with a brief presented by the Tuktoyaktuk town council favouring the completion of the Dempster Highway and a road from Tuktoyaktuk to Inuvik. COPE disagreed with the Tuktoyaktuk town council that the native people of the town favoured the completion of the Dempster and a road to Inuvik. The council maintained that it was not aware of any "strong opposition" on the part of the residents of Tuktoyaktuk to the building of the road. *Ibid.*, Appendix III, Brief L, and Appendix II, Minutes of Public Meeting, Inuvik, 22 September 1975.
114. *Ibid.*, Appendix III, Brief K.
115. *Ibid.*, Appendix III, Brief DD.
116. *Ibid.*, Appendix II, Minutes of Public Meeting, Whitehorse, 23 September 1975.
117. *Ibid.*, Appendix II, Minutes of Public Meeting, Whitehorse, 24 September 1975.
118. *1975 Report*, p. 9.
119. *Ibid.*
120. *Ibid.*
121. *Ibid.*, pp. 22-23.
122. Memoranda, D.H. File.
123. The practice and procedure of the Berger Inquiry were innovative and precedent-setting in ensuring full public involvement in the process of assessing the Mackenzie Valley Pipeline. See Berger, Vol. II, Appendix I, "The Inquiry Process," pp. 223-230. See also A.R. Lucas and E.B. Peterson, "Northern Land Use Law and Policy Development: 1972-78 and the Future," in *Northern Transitions*, Vol. II, ed. Robert F. Keith and Janet B. Wright, (Ottawa: Canadian Arctic Resources Committee, 1978), pp. 63-93. The style of the native community hearings was pioneered in the trial practice of the Northwest Territories Supreme Court. See Jack Sissons, *Judge of the Far North: The Memoirs of Jack Sissons*, (Toronto: McClelland and Stewart, 1968).
124. See generally the section of this study dealing with Environmental Impacts.
125. See generally the section of this study dealing with Social Impacts.
126. Yukon Conservation Society, Dempster Highway Seminar. Proceedings of Dempster Highway Seminar, Whitehorse, Y.T., 18-19 May 1976, p. 12.
127. The Yukon Conservation Society's position on the Dempster Highway was endorsed by the Canadian Nature Federation, the Arctic International Wildlife Range Society, Greenpeace North, the Council for Yukon Indians, and the Village of Old Crow. The Yukon

Conservation Society even drew some support from the Inuvik and District Chamber of Commerce, which opposed completion of the highway on social grounds during pipeline construction:

Completion of the last section of the Dempster Highway just to the East of the NWT-Yukon border should be held back until the pipeline construction is completed. A rough tote road would be constructed for heavy freight and pipe trucking during the winter, but no casual or tourist traffic would be permitted. This arrangement would allow the benefits of the highway for construction projects and for local supplies but would help to minimize the number of unemployed "transients" in the Delta area during pipeline construction.

Quoted in Dempster Highway Seminar, p. 11. See above, n. 126.

128. Ibid., p. [13].
129. See the discussion of the Management Plan in the section of this study dealing with Environmental Impacts.
130. D.H. File.
131. See Lysyk, p. 155; and *Interim Report*, pp. 2-3. See above, notes 87 and 88.
132. National Energy Board, *Reasons for Decision*. See above, n. 86.
133. See, for example, the testimony of J. Bingham, *Alaska Highway Pipeline Inquiry, Proceedings and Evidence*, (hereinafter referred to as *AHPI Proceedings*), Vol. 39, pp. 5753-5763.
134. Personal communication to the author.
135. *Interim Report*, p. 6. See above, n. 88.
136. Ibid.
137. Lucas and Peterson, p. 77.
138. Ibid.
139. See the section of this study dealing with Environmental Impacts.
140. The National Energy Board hearings in respect of northern pipelines were legally required. See National Energy Board Act, R.S.C. N-6, as amended, ss. 20, 26, 44.
141. *1975 Report*, Appendix I. See above, n. 107.
142. Ibid., p. 13.
143. Berger, Vol. II, p. 229.
144. *1967 Report*, p. 3; *1975 Report*, p. 6.
145. Lucas and Peterson, p. 82. These recommendations are a summary of some of the procedural innovations of the Berger Inquiry.
146. Ibid., p. 78.
147. Appendix to Land Use Permit No. Y72 E028, Lands Section, DIAND, Whitehorse, issued 27 March 1972.
148. *Northern Roads Task Force Report*, Unpublished, DIAND, November 1971.
149. Ibid., p. 2.
150. Ibid., p. 11.
151. Schultz International Consulting Co. Ltd., *Environmental Impact Study of the Dempster Highway*, 1972, p. 1. (Hereinafter referred to as Schultz).
152. Ibid., p. 56.
153. Ibid., p. 3.
154. Ibid., p. 55.
155. Ibid., p. 56.
156. Ibid., p. 56.
157. Ibid., p. 62.
158. Ibid., p. 63.
159. See, for example, N. Tywoniuk and J.T. Inglis, *Environmental Overview of the Dempster Highway*, Unpublished Canadian Wildlife Service Report, 1974.
160. Schultz, p. 67.
161. *AHPI Proceedings*, pp. 3925-3926.
162. Schultz, p. 67.
163. Ibid., p. 59.
164. Berger, Vol. I, pp. 46-48.
165. Tywoniuk and Inglis, pp. 1, 3. See above, n. 159.
166. Ibid., p. 7.
167. Ibid., pp. 6-7.
168. Ibid., pp. 77-78.
169. Memorandum, DPW to DIAND, 3 March 1975, D.H. File.
170. See, for example, R.D. Jakimchuk, ed., *The Porcupine Caribou Herd*, Biological Report Series No. 4, (Calgary: Canadian Arctic Gas Study Ltd., 1974).
171. A.W.F. Banfield, *MVPI Proceedings*, Yellowknife, 2 December 1975, Vol. 94, pp. 14330-14335.
172. Alaska Highway Pipeline Panel, *The Transmission of Prudhoe Bay Gas to American Markets: A Preliminary Environmental Comparison of the Canadian Arctic Gas Pipeline and the Foothills (Yukon) Pipeline in the Yukon and Northwest Territories*, 20 June 1977.
173. Lysyk, p. 130; *Interim Report*, p. 46.
174. See, for example, D. Mossop, "Birds of Prey and the Dempster Highway Transportation Corridor," Unpublished, Yukon Game Branch, 1978, quoted in *Dempster Highway Management Plan*, Northern Roads and Airstrips Division, DIAND, 1978.
175. Alaska Highway Pipeline Panel (I.K. Fox, W.W. Mair, I. McTaggart Cowan, J.G. Nelson, C.H. Templeton), *Initial Environmental Evaluation of Highway Use and Pipeline Development Within the Dempster Corridor, Yukon and Northwest Territories. Volume I:*

- Physical and Biological Environments – Dempster and Klondike Segments*, in preparation. (Hereinafter referred to as *Initial Evaluation*).
176. *Ibid.*, p. 4.
177. *Ibid.*, pp. 5-12.
178. *Ibid.*, p. 5.
179. Personal communication from I.K. Fox. June 1978.
180. Berger, Vol. I, p. 38.
181. R.K. Schmidt, "Mammals," in *Initial Evaluation*, pp. 298-299.
182. *Ibid.*, p. 285.
183. *Ibid.*, pp. 300-301.
184. *Ibid.*, p. 301.
185. *Ibid.*, p. 299, citing G. W. Calef, "The Predicted Effect of the Canadian Arctic Gas Pipeline Project on the Porcupine Caribou Herd," pp. 101-120 in Research Reports, Vol. IV of *Environmental Impact Assessment of the Portion of the Mackenzie Gas Pipeline from Alaska to Alberta*, Winnipeg, 1974 (hereinafter referred to as Calef); and V. Geist, *MVPI Proceedings*, Vols. 53A and 54, Whitehorse, 13-14 August 1975.
186. For a short statement of the consensus of experts, see Alaska Highway Pipeline Panel, "The Porcupine Caribou Herd and the Dempster Corridor," Winnipeg, 1978.
187. *Ibid.*, Question 8.
188. Calef, p. 111. See above, n. 185. A similar attraction to cleared rights-of-way has been observed in Scandinavia and eastern Canada.
189. Berger, Vol. I, p. 40.
190. Manfred Hoefs, "Dempster Highway and Porcupine Caribou Herd." Unpublished paper presented to Yukon Conservation Society Seminar, May 1976.
191. Schmidt, *Initial Evaluation*, p. 303.
192. Calef, p. 102. See above, n. 185.
193. Jakimchuk. See above, n. 170.
194. Hoefs. See above, n. 190.
195. *Ibid.*
196. David Mossop, *MVPI Proceedings*, Yellowknife, 6 April 1976, Vol. 138, pp. 21004-21005.
197. Manfred Hoefs, "Dall Sheep in the Richardson Mountains." Unpublished, Yukon Game Branch, 1978, quoted in *Dempster Highway Management Plan*, p. 31.
198. Schmidt, *Initial Evaluation*, p. 309.
199. Hoefs, p. 31. See above, n. 197.
200. Schmidt, *Initial Evaluation*, p. 309.
201. *Ibid.*, pp. 310-311.
202. Hoefs, p. 32. See above, n. 197.
203. Schmidt, *Initial Evaluation*, p. 316.
204. *Ibid.*, pp. 317-318.
205. *Ibid.*, p. 324.
206. *Ibid.*, p. 334.
207. *Ibid.*, p. 339.
208. D. Moyles, "Birds," in *Initial Evaluation*, pp. 353-357.
209. *Ibid.*, passim.
210. *Ibid.*, pp. 369, 384.
211. *Ibid.*, pp. 353, 370-372.
212. *Ibid.*, pp. 371-372.
213. *Ibid.*, pp. 369-370, 392.
214. *Ibid.*, pp. 377, 390.
215. *Ibid.*, p. 384.
216. Mossop, "Birds of Prey," p. 29. See above, n. 174.
217. *Ibid.*, p. 30.
218. "The Prey Utilized by Nesting Peregrine Falcons, Gyrfalcons, and Golden Eagles near the Dempster Highway Corridor," Unpublished, Yukon Game Branch, 1978, quoted in *Dempster Highway Management Plan*, p. 30.
219. F. Graves, "Fish," in *Initial Evaluation*, pp. 440-441, 470, 487.
220. R.D. Jakimchuk, Testimony in *Minutes of Proceedings and Evidence, Environmental Assessment and Review Panel on Alaska Highway Pipeline Proposal*, Whitehorse, 13 June 1977, Vol. I, p. 34.
221. P.J. McCart, *MVPI Proceedings*, Yellowknife, 2 December 1975, Vol. 94, pp. 14329-14330.
222. Berger, Vol. I, p. 33.
223. G. Will, "Heritage and Land Use – Archaeological Sites," in *Initial Evaluation*, p. 235.
224. *Ibid.*, p. 236.
225. *Ibid.*, p. 229.
226. See generally V. Woo, "Land," in *Initial Evaluation*, pp. 57-112; and N.A. Huculak, J.W. Twach, R.S. Thomson, and R.D. Cook, "Development of the Dempster Highway North of the Arctic Circle," paper presented at the Third International Conference on Permafrost, Edmonton, July 1978, (Edmonton: Public Works Canada Western Region, 1978).
227. See above, n. 73, and text.
228. Interview with J.T. Inglis, Ottawa, 22 July 1976. Stockpiles of overburden from borrow pits have tended to melt and flow onto

Dempster Highway

- neighbouring lands and into lakes and streams. Better design of these stockpiles could have prevented this damage.
229. *Ibid.*
230. S.O.R./71-580, S.O.R./73-683, and S.O.R./75-661; repealed and replaced by S.O.R./77-210.
231. R.S.C., 1970, c. 28 (1st Supp.) as amended.
232. Permit Y72 E028. W.F.L. & E. Branch, DIAND, Whitehorse. The first Dempster Highway Land Use Permit, Y72 F006, regulated winter road traffic. The permit, issued on 21 January 1972 to the Department of Public Works, limited access to the highway to the conveyance of "industrial machinery." Vehicles were to travel in convoy, and keep to the right-of-way. Wildlife harassment was prohibited and no firearms were to be carried in vehicles on the roadway. Brush disposal, waste disposal, methods of stream crossings, and fuel storage were also covered. DPW had to deposit \$25,000 as security, and comply with specified commencement and termination dates for trucking on the highway.
233. See above, n. 147.
234. Permit Y72 E028, W.F.L. & E. Branch, DIAND, Whitehorse.
235. See Permits Y72 H082, Y74 H188, Y75 H260, Y76 H280, Y77 H338, W.F.L. & E. Branch, DIAND, Whitehorse.
236. Permit Y77 H338, s. 9.
237. P. Usher and G. Beakhust, *Land Regulation in the Canadian North*, (Ottawa: Canadian Arctic Resources Committee, 1973), p. 78.
238. See generally W.G. MacLeod, *Water Management in the Canadian North*, (Ottawa: Canadian Arctic Resources Committee, 1977).
239. File No. Y5A4-0025, Water Section, W.F.L. & E. Branch, DIAND, Whitehorse.
240. File Nos. Y4A4-0009 Revised, Y5A6-0350, Water Section, W.F.L. & E. Branch, DIAND, Whitehorse.
241. "Pre-Draft for Dempster Highway Management Programme," Northern Roads and Airstrips Division, DIAND, 1 February 1977.
242. "Draft Dempster Highway Management Programme," Northern Roads and Airstrips Division, DIAND, July 1977.
243. *Dempster Highway Management Plan*, Northern Roads and Airstrips Division, DIAND, January 1978. (Hereinafter referred to as *Management Plan*).
244. *Ibid.*, p. 5.
245. Yukon Act, R.S.C. 1970, c. Y-2, s. 17(3); Northwest Territories Act, R.S.C. 1970, c. N-22, s. 14(3).
246. Commissioner's Order No. 1977/199.
247. *Management Plan*, pp. 9-10.
248. *Ibid.*, p. 10.
249. "Draft Dempster Highway Management Programme," Appendix 1, p. 36.
250. *Management Plan*, pp. 10-11.
251. *Ibid.*, p. 11.
252. *Game Ordinance*, R.O.Y.T. 1971, c. G-1, s. 16.
Game Ordinance, R.O.N.W.T. 1974, c. G-1, s. 17.
- 17.(1) *Subject to this section, no person shall buy, sell or barter, offer to buy, sell or barter, kill for gain or reward, or offer to kill for gain or reward any big game, game bird or any part thereof.*
- (2) *Any person may buy or sell the antlers, horns, hooves, skins, or pelts of big game or skins or pelts of predatory animals.*
- (3) *Subject to regulations prescribed pursuant to subsection (6), the holder of a general hunting licence may sell or barter caribou meat to any other person for consumption within the Territories.*
- (4) *Subject to regulations prescribed pursuant to subsection (6), a person may obtain by purchase or barter caribou meat for*
- (a) *direct consumption within the Territories, or*
- (b) *resale by a commercial establishment for consumption within the Territories.*
- (5) *Any person may buy, sell or barter, offer to buy, sell or barter meat of bison processed in an abattoir.*
- (6) *The Commissioner may, for the purpose of proper utilization of the caribou resources of the Territories, make regulations controlling or prohibiting the purchase, barter or sale of caribou meat anywhere in the Territories or in any area thereof designated by him.* 1960(2nd), c. 2, s. 16; 1969(1st), c. 8, s. 1; 1971(2nd), c. 6, s. 2.
See also N.W.T. Game Regulations, esp. s. 32.
253. Game Export Act, R.S.C. 1970, c. G-1, s. 11.
254. *Management Plan*, p. 12.
255. *Ibid.*, p. 13.
256. *Ibid.*, p. 14.
257. *Ibid.*, pp. 14-16.
258. Alaska Highway Pipeline Panel, "The Porcupine Caribou Herd and the Dempster Corridor," Question 9.
259. *Ibid.*
260. *Management Plan*, pp. 7-8.
261. *Ibid.*, p. 17.
262. David Mossop, *MVPI Proceedings*, Yellowknife, 6 April 1976, Vol. 138, pp. 21020 ff.
263. *Management Plan*, p. 10.
264. Territorial Land Use Regulations, S.O.R./77-210, s. 6(a).
265. *Management Plan*, pp. 21-22.
266. *Ibid.*, pp. 24-26.
267. *Ibid.*, p. 26.

268. The committee has co-chairmen – the acting director of the Yukon's Department of Renewable Resources, and the director of the Department of Natural and Cultural Affairs, Government of the Northwest Territories. The other departments represented are the Yukon's departments of Tourism, Highways and Public Works, and the Game Branch, and the Northwest Territories' departments of Public Works, Economic Development and Tourism, and Fish and Wildlife Service.
269. Chairman, Environmental Assessment Review Panel, Fisheries and Environment Canada, "Guide to the Federal Environmental Assessment and Review Process," Feb. 1977, in Robert T. Franson and Alastair R. Lucas, ed., *Canadian Environmental Law*, (Scarborough, Ontario: Butterworth's, 1976, looseleaf to 1978).
270. Letter from the Hon. Len Marchand, Minister of Environment, to C.H. Templeton, 27 January 1978.
271. A service station operated for a short time at Mile 123 of the highway. It has now been closed down.
272. COPE and local native people saw no point in participating in the newly created advisory body, the Mackenzie Delta Regional Planning Council. They wanted a land claims settlement and did not want to prejudice those claims. Moreover, they preferred to talk to the Berger Inquiry. See William E. Rees, "Development and Planning North of 60° : Past and Future," in *Northern Transitions*, Vol. II, pp. 49-54.
273. Quoted in Berger, Vol. I, p. 105.
274. Quoted in Lysyk, p. 126.
275. Eric Gourdeau, "Native Use of Resources in the Context of the Proposed Mackenzie Gas Pipeline," in Research Reports, *Environmental Impact Assessment of the Portion of the Mackenzie Gas Pipeline from Alaska to Alberta*, Vol. IV, Environment Protection Board, Winnipeg, 1974, p. 296. Peter Usher came to a similar estimate, though his data were not strictly comparable. His estimate was \$8000 per family for the communities of Aklavik, Inuvik, Tuktoyaktuk, Paulatuk, and Sachs Harbour. Mr Justice Berger found this figure "somewhat high." See Berger, Vol. I, p. 106.
276. Berger, Vol. I, p. 106.
277. *Ibid.*, pp. 107-108.
278. *Ibid.*, p. 107.
279. Peter J. Usher, "The Significance of the Land to Native Northerners," Canadian Association in Support of the Native Peoples *Bulletin*, Vol. 17, No. 1 (March 1976), p. 6.
280. Charles W. Hobart, "Socio-Economic Overview of the Mackenzie Delta Region," Prepared for Submission to the Mackenzie Valley Pipeline Inquiry, January 1976, p. 17.
281. The social impact of the Mackenzie Highway on the native community of Fort Simpson was likened to "taking a plate and turning it upside down." Gemini North Ltd., *Social and Economic Impact of Proposed Arctic Gas Pipeline in Northern Canada*, Vol. 2, Canadian Arctic Gas Pipeline Limited, 1974, p. 535.
282. In Wrigley, north of Fort Simpson along the Mackenzie Highway alignment, opposition to the highway was so intense after seeing the impact on Fort Simpson that the right-of-way was stopped just short of the town. *Ibid.*, p. 571.
283. As Jim Lotz has written, "Those building or dreaming of building northern roads do not seem to realize that roads lead in two directions. When roads reached isolated parts of Scandinavia, these places were soon depopulated, although they had been settled for hundreds of years in some places. The northern boosters saw the road leading thousands of settlers into the north; but, as the Yukon experience shows, improved transportation is often sought because people want to get out of an area, not into it." *Northern Realities*, p. 129. See above, n. 7.
284. Gourdeau, pp. 304-305. See above, n. 275.
285. *Ibid.*, p. 306.
286. Berger, Vol. I, p. 154.
287. *Ibid.*, p. 155.
288. Robert Simpson, Address to Yukon Conservation Society Dempster Highway Seminar, 18-19 May 1976.
289. Quoted in Berger, Vol. I, p. 152.
290. Berger, Vol. I, p. 152.
291. *Ibid.*, p. 148.
292. Berger doubted whether there could be
any real control over how much people will drink and over what the abuse of alcohol will do to their lives. There can be no control over how many families will break up, how many children will become delinquent and have criminal records, how many communities will see their young people drifting towards the larger urban centres, and how many people may be driven from a way of life they know to one they do not understand and in which they have no real place. Such problems are beyond anyone's power to control, but they will generate enormous social costs. Because these costs are, by and large, neither measurable nor assignable, we tend to forget them or to pretend they do not exist.
Ibid., p. 161.
293. *Ibid.*
294. The estimate of total employment was derived from the Memorandum: Dempster Highway Employment Statistics, July 1977, D.H. File:
1. *an average crew of 75 men working over a 9 ½ month period (winter shut down 2.5 months) constructed 20 miles of highway; prorated over 12 months this amounts to approximately 60 man-years for 20 miles of highway or approximately 3 man-years per mile . . . Gemini North Ltd., May 74 [see above, n. 281], estimated 3.15 man-years per mile*
 2. *D.P.W.'s input for pre-engineers surveys, geotechnical investigation, design and highway crews for construction supervision was estimated at 1.5 man-years*
 3. *one man-year per mile was estimated for other staff requirements*

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- such as administration, socio-economic and environmental inputs, bridge construction ferries, etc.*
295. *Whitehorse Star*, 12 November 1971.
296. D.H. File. Native people have been employed as heavy equipment operators, mechanics, and foremen. The government has provided special training for these positions.
297. Specifications for Clearing, Grading, and Drainage, Mile 236.8 to Mile 264.6, Dempster Highway, Y.T. DPW January 1976, Standard Specification, Division 1, Section 1, item 23.
298. *Ibid.*
299. Robert Simpson, *op. cit.* See above, n. 288.
300. For the history of the treaty, see René Fumoleau, O.M.I., *As Long As This Land Shall Last, A History of Treaty 8 and Treaty 11 – 1870-1939*, (Toronto: McClelland and Stewart, n.d.).
301. *Re Paulette's Application to File a Caveat*, [1973] 6 W.W.R. 97, 39 D.L.R. (3d) 45 (N.W.T.S.C.).
302. *Re Paulette's Application to File a Caveat*, [1976] 2 W.W.R. 193 (N.W.T.C.A.), and [1977] 1 W.W.R. 321, 72 D.L.R. (3d) 166 (S.C.C.).
303. Lorraine Allison, "Caribou: Management of a Vital Resource," in *Northern Transitions*, Vol. II, pp. 222-223.
304. R.A. Hemstock, "Transportation, People, and the Environment," in *Arctic Transport: Proceedings of the Arctic Transportation Conference*, Vol. III, p. 14.
305. Richard M. Hill, "Dempster Highway – Benefits to the Arctic," in *Proceedings, Fourth Northern Resources Conference*, (Whitehorse: 1972).
306. Peter Usher, *MVPI Proceedings*, Inuvik, 10 February 1976, Vol. 37, pp. 3590-3591.
307. "The Dempster Highway – Inuvik Waits and Sees," *Northern News*, 27 April 1978.
308. Don Cave, Secretary-Manager of Inuvik, as quoted in "The Dempster Highway – Inuvik Waits and Sees."
309. R.G. Robertson, former Deputy Minister of Northern Affairs and National Resources, in a speech given at Trent University, Peterborough, Ontario, 3 November 1966, reproduced in "The Coming Crisis in the North," *North*, 14 (March/April 1967): 44-52.
310. A.D. Hunt, "Development of Resources in Northern Canada," in Beverley F. Sater, ed., *Arctic and Middle North Transportation*, Arctic Institute of North America Symposium, Montreal, 5-6 March 1969, p. 71.
311. A.B. Yates, p. 13. See above, n. 76.
312. Ironically, one of the first major shipments along the length of the highway was a major movement of oil drilling equipment *out* of the Mackenzie Delta region to southern Canada, during the winter of 1977-78.
313. Interview with R. Graham, Department of Tourism and Information, Government of the Yukon Territory, 4 August 1978, Whitehorse.
314. Interview with K. Weagle, Environmental Protection Service, 4 August 1978, Whitehorse.
315. The Yukon Transport Public Utilities Board does not intend to regulate freight rates along the highway. These will be set by competition, according to D.R. Brackenbury, Secretary, Transport Public Utilities Board, Government of the Yukon Territory, in a letter to the author, 2 August 1978.
316. Freight rates for the Mackenzie River are divided into 10,345 classifications. After this there are forty-six rules to be applied to the freight. The conditions of carriage, packaging, and safety factors all enter into the determination of rates. Memorandum of interview with Edgar Martin, Trade and Commerce Division, Canadian Transport Commission, by Caroline Ives, on behalf of the author, 1 August 1978.
317. Letter from J.H. Wood, Traffic Manager, White Pass and Yukon Route, to the author, 27 July 1978.
318. D.S. Robinson, Traffic Manager, Northern Transportation Co. Ltd., Edmonton. Telephone interview with the author, 28 August 1978. A representative barge rate for general merchandise from Hay River to Inuvik is \$4.85/100 lb. per NTCL, Inuvik, N.W.T. (The rate is for Class 5 goods, including terminal and palletizing charges). Rail charges from Edmonton to Hay River for general merchandise (car-load lots only) range from \$2.28 to 2.81/100 lb., depending on the size of the load. Trucking charges from Edmonton to Hay River for general merchandise are approximately \$3.00/100 lb.
319. Pacific Western Airlines, July 1978, Vancouver, B.C.
320. Northern Transportation Company Limited, Schedule of Sailings, 1978.
321. Richard M. Hill, see n. 305 above. However, the White Pass ship and rail service is year-round. Hill provides a number of useful estimations and comparisons of the use of the highway.
322. "The Dempster Highway – Inuvik Waits and Sees." See above, n. 307.
323. Interview with H. Enfield, Land Use Section, DIAND, Whitehorse, 14 August 1978.
324. Caribou experts have recommended complete closure of the highway from 1 October to 31 May to protect the wintering areas of the caribou. This would leave only four months for transport on the highway, the same four months that goods can be shipped on the Mackenzie River.
325. "1975 Northern Roads Fact-finding Committee," p. 12. See above, n. 71.
326. Interview with A. McClure, Highway Maintenance Supervisor, Inuvik, N.W.T., 16 August 1978.



**Phase II Northern Resources:
A Study of Constraints,
Conflicts, and Alternatives**

Northern Resources: A Study of Constraints, Conflicts, and Alternatives

D.M. Dickinson
Western Ecological Services Ltd.
Edmonton, Alberta

I Introduction

(a) Objectives of this Study

In the Canadian North, most developments have been based on the exploitation of a single resource for maximum return on investment over a limited life span. This practice results in boom-and-bust development, the inevitable consequences of which have been degradation of the land and disruption of social communities. Statutes and policies to ensure balanced development and conservation are lacking at all levels of government. Few provisions exist for participation by the public when important decisions have to be made, and fewer still to ensure that the public is well informed prior to participation. Resource conflicts have usually become evident only after a proposed industrial or public works project is well advanced, since it has only been necessary for the developers to demonstrate that a proposal is technologically feasible and economically profitable for preparations for construction to ensue automatically. Consequently, most impact studies that are subsequently undertaken to predict environmental and sociological effects are oriented toward the mitigation of some undesirable consequences that may result from the project. The desirability of the project itself is seldom, if ever, questioned; nor are other options for resource use considered before a decision is made, since the base-line is the project itself.

In December 1973 the federal Cabinet established an Environmental Assessment and Review Process (EARP). The three stated objectives and the entire screening process clearly endorse the past policy of decision-making. That there has been no change in that policy is evident from the adjustments to EARP that were approved by Cabinet in February 1977.¹ It is *a priori* assumed that a given project is the best use of the land and resources. The project is not evaluated in relation to other options. Such a policy ensures the wasteful expenditure of public money on impact studies,

Note: This paper deals with events up to August 1977.

thus drastically limiting the possibility of financing studies that might identify and evaluate options in relation to the capacity of the land and to social needs within the whole northern and Canadian context. The assumptions questioned by Mr Justice Thomas Berger illuminate the inadequacy of Cabinet's directive for the whole process of environmental assessment:

There is a myth that terms and conditions that will protect the environment can be imposed, no matter how large a project is proposed. There is a feeling that, with enough studies and reports, and once enough evidence is accumulated, somehow all will be well. It is an assumption that implies the choice we intend to make.²

As was indicated in the Introduction to this volume, Phase II of CARC's Northern Resource and Land Use Policy Study had the following objectives:

- 1 *To demonstrate that better prediction and avoidance of resource use conflicts can be accomplished if the resource use comparisons are based on intrinsic features of northern ecosystems, instead of the present practice where each specific industrial or public works proposal becomes the reference base for identification of conflict areas.*
- 2 *To demonstrate the important relationships between diverse features of various ecosystems and long-term social values.*

The assumptions that are implicit in these statements are that the biological resources of such ecosystems are vulnerable and of primary sociological importance. If this were not so, there could be no conflict. Documentation of these social-environmental relationships makes those assumptions explicit. However, to demonstrate such relationships as an historical or present-day fact would be profitable only to future historians, if the problem of the meaning of those relationships in a rapidly changing world were ignored.

The relationship of social values to environmental features can be used to predict and avoid or reduce conflict inherent in different kinds of land use, both at the level of mitigation of adverse effects and at the more fundamental level of defining the kinds of land use that are acceptable in a given area. In the case of the proposed Mackenzie Valley Pipeline, an example of the latter form of prediction and avoidance of conflict is found in Berger's recommendation that no industrial activity be permitted in the northern Yukon; while examples of the former kind of prediction and reduction or avoidance of conflict are contained in Berger's

recommendations in the second volume of his report regarding conditions to be imposed on construction of a pipeline along the Mackenzie Valley. However, recommendations at either level may not be accepted if the process of making decisions is dominated by policies made in the South and by Canadian patterns of consumption. If the criteria for making decisions concerning resource use are those of feasibility and economic profit, then unless those criteria (with all that they imply) are considered critically, alternatives for land use planning will be neither identified nor considered.

If Phase II of the Northern Resource and Land Use Policy Study is to be of full value, it is clear that the objectives must be considered within the context of an awareness of the nature of different resources, of human and biophysical constraints, and of the criteria involved in making decisions. Given this perspective, examples of conflicts in the use of resources in three regions north of 60° will be considered. Three detailed reports, as yet unpublished, were prepared for the three regions studied, and were the basis for the summaries presented here. Although technical information on the physical and biological environment is fully referenced in the three background reports, it is not included in the summaries. References are, however, presented for the sections of this paper that deal with developments and potential conflicts in the three regions.

(b) Resources

The failure of the Environmental Assessment and Review Process to give equal consideration to different kinds of resources, when decisions regarding land use are made, is basically due to a widespread lack of understanding of the nature and integration of resources and of the diversity of needs that they fulfil. We lack a clear system of classification of resources. Our concepts therefore differ, and this is a matter of concern not only as a source of conflict and confusion but because our options for action are contingent on our concepts. There are those who, with great solemnity, neatly divide the non-human world into two categories — "resources" and "environment" — and never the twain shall meet. This division has for years been enshrined in economic doctrine. That it is economically profitable to consider resources as being, in some mystical way, distinct from the environment is obvious, if only because it has permitted the concept of "external costs" to remain unexamined for so long.

In this report the word "resources" is defined as the complex that forms our life-supporting system. Hence, resources are the means of fulfilling needs. Who or what is in

need does not have to be specified. And while it is natural for man to think of resource use as *his* use of resources, it is worth remembering that all living things, including man, are resources during their life and at their death to other living things.

Resources are usually classed as renewable or non-renewable and sometimes as recyclable, but without any consensus as to what resources fall into which categories and why. Fuller discussed some of the difficulties associated with this division on the basis of properties of resources, biophysical laws, and perception of resources.³ In this report the terms renewable, non-renewable, and recyclable will be used, but the properties and integration of resources that are assigned to these categories will be outlined briefly, so that the remainder of the report may be understood from this perspective.

Living organisms are the only truly renewable resources. They are renewable because they contain genetic information and are therefore capable of controlled growth and of reproduction. Their level of organization is highly complex, but their basic components are recyclable. When broken down by decomposing organisms, these components normally enter the natural recycling processes, during the course of which they become temporarily part of other living organisms. In natural systems “wastes” do not exist, since components become resources for other organisms. On a global scale, water is a non-renewable resource but fresh water is recyclable. Much of the earth’s water is entropically unavailable to man, because of the presence of dissolved salts in seawater.⁴ However, solar energy makes fresh, “clean” water available through evaporation and transportation, followed by precipitation and run-off.

Bedrock is a non-renewable resource from which the inorganic components of soils are derived. Bedrock may also contain concentrated deposits of ore. These deposits, like bedrock itself, are not recyclable; but metals obtained from them may be recyclable if, as Frosch observed, the use of the metal is non-degrading. For example, copper used as wire may be easily recovered; but if it has been degraded by conversion through use in other commodities, the energetic cost of recovery may be exorbitant. It becomes entropically unavailable.⁵ Components of commodities, and even some commodities such as paper, may therefore be recycled by man, thus extending their “life” or period of usefulness to man. Such extension will retard the rate of our depletion of the resources from which they are derived. The limiting factor in such recycling is the cost in energy. Without recycling, however, used commodities accumulate as “wastes.”

Some of the components of such commodities may be degraded and released into the air, soil, or water, but often in such concentrations that, even if they are not toxic, they may exceed the absorption tolerance threshold of the system into which they are released.

Energy, whatever its source, is a resource with unique properties. It is a force that flows through, and may be temporarily contained in, all resources; but apart from the chemical energy in food, energy that can be used by man is available in two forms. It may be concentrated, as in coal deposits or oil (hydrocarbons), or dispersed, as in solar radiation. The use of concentrated forms of energy results in their depletion and in the dispersal or accumulation of by-products such as carbon dioxide, sulfur dioxide, or radioactive materials and heat. The use of dispersed energy is regulated by availability and the rate of flow, while the only by-product is heat. No form of energy can be re-used at the same level of organization, since the direction of change is irreversible. However, solar energy and its derivative, wind energy, cannot be depleted since the rate of flow is on a cosmic time scale.

A classification of resources based on common properties also requires an understanding of their integration. Frosch indicated the complexity of integration in his consideration of “common heritage properties”:

... not only the fish in the sea, and the plants and animals of the land, but the productive capability of the sea and land; not only the stock of species of plants and animals that are used, but the genetic resources contained in those that are not now used; not only the lumber and land potentials of forests, but their role in maintaining global climate; the property of the ozone layer as an ultraviolet filter; the nature of the global climate itself. In effect we have had to stretch the old meanings of resource to encompass the global properties that make our life possible.⁶

While fulfilling material needs, the same resource may also fulfil needs at the level of perception. Such resources may then be called aesthetic, intellectual, emotional, or spiritual, according to the form of perception. Such perceptions are not limited to any ethnic group, nor to any class of society.

Prediction of conflicts concerning the use of resources requires an awareness of the different levels of organization of their basic components, of irreversible directions of change, of rates of change, and of natural cycles. Soil erosion, for instance, is a natural and irreversible change; but it is a change that, according to vegetative cover, occurs generally,

over a long period of time. Accelerated rates of soil erosion over large areas destroy the ability of the land to support life. Similarly, the extinction of living species is a natural phenomenon, but accelerated rates of extinction may be equally disastrous. The kind of reasoning resulting from a lack of such awareness was shown by the Science Council of Canada: "Energy is the ultimate resource. Given sufficient energy we can obtain supplies of all other resources."⁷ When species become extinct, energy cannot reverse that irreversible fact. Energy cannot bring back genetic resources. The application of energy to form soil from bedrock requires a consideration of the time scale that will allow development of the whole macro and micro soil community. Neither can energy bring back the aesthetic or spiritual resources of the lands and waters of the North, if they have been destroyed in the search for more energy. If energy were to be considered as the Science Council suggested, then the development of, for instance, a hydro project on a northern river would automatically preclude consideration of all other resources related to the integrity of that river system.

Clearly the ways in which we think about resources and the extent to which we understand their nature will determine the ways in which we use them.

(c) Criteria Involved in Resource Development Decisions

In science it is axiomatic that the difference between good and poor research lies initially in the questions that are asked. This principle applies as well to the process of making decisions. It is also axiomatic that not merely the logic of an argument be examined, but that the assumptions on which that argument is based be questioned. Given acceptance of a set of assumptions, the number of possible decisions that can be made is restricted accordingly. If conflicts and alternatives concerning northern resources are to be considered rationally, the assumptions on which the criteria for making decisions are based must be examined. This chapter contains comments on only a few selected assumptions that are involved in the criteria of economics, sociology, and ecology. However, since it was stated initially that, given technological feasibility, economic profit has been the only criterion by which proposals concerning resource use have been judged, it is necessary first to present evidence for that statement and then to determine whether there has been any change in policy.

The North has long been considered a region with great material wealth available for the taking; whether the chosen resources were whales, beaver, gold, oil, or uranium, the

ideology underlying economic motivation has always been that of "the system of the commons" that was described by Hardin in 1968.⁸ Implicit in the system of the commons is a commitment to growth. An economic system committed to growth maximizes the rate of "throughput," that is, the conversion of resources to commodities to wastes. In the absence of effective human protest, such a system must eventually self-destruct, since it ignores the essential finiteness and relatedness of resources and the nature and even existence of biophysical laws. Henderson argued that present economic conceptual models measure the wrong variables and map a vanished system.⁹ It is clearly of relevance to this study to ask whether a sound basis for land use planning in the North is possible, given unquestioning acceptance of an economic system committed to growth.

Rea, in tracing the political economy of northern development, described a history of exploitation and export of specific northern resources with the support and active participation of government, and an acceptance of the tradition of economic growth.¹⁰ Rea distinguished between his use of the terms "economic growth" and "economic development." He associated the former with primary extractive industries without regional diversification, whereas economic development was described as the introduction of secondary manufacturing and processing within a region.¹¹ Such development is dependent on the primary industries, however, and does not *necessarily* exclude growth. For example, introduction of a smelter, as has been suggested for the Yukon, would inevitably result in an increase in growth of the mining industry.

In its assessment of northern decision-making, the Science Council of Canada's Committee on Northern Development found that the economic concerns of the "core actors" largely permeated the decision-making process, while other concerns had only an inferior supportive position. In addition, some affected parties had difficulty in influencing the process, and there was no provision for comprehensive analysis of all major issues.¹² In a background study for that report, Gibson found that the actual practice of decision-making in the Strathcona Sound mining project contradicted government policy, as expressed in the March 1972 policy document on northern development and the December 1973 Cabinet directive on environmental impact assessment.¹³ The Strathcona decision was the first to be made concerning a resource extraction project subsequent to the adoption of the new policies.

Although the objective given priority in the March 1972 policy document on northern development was "To

provide for a higher standard of living, quality of life and equality of opportunity for northern residents by methods which are compatible with their own preferences and aspirations," the third objective was "To encourage viable economic development within regions of the Northern Territories so as to realize their potential contribution to the national economy and the material well-being of Canadians." Economic development has been seen by the Department of Indian Affairs and Northern Development (DIAND) as being dependent almost exclusively on the mining and oil industries. After dismissing the potential for renewable resource development, the policy stated: "a realistic assessment is that in major terms that can affect the overall wealth of Canada, the economic future of the North lies in the ground."¹⁴ Development of renewable resources may be compatible with the preferences and aspirations of the indigenous population, but it is not a means for quickly realizing large monetary profit. The conflicts inherent in the first and third objectives are not examined, but are hidden in rhetoric, as was evident in a statement made by Barry Yates in 1972, when he was director of the Northern Economic Development Branch of DIAND:

The Canadian North has substantial as yet largely undiscovered oil and gas resources which are being vigorously sought out by industry, in response to North American energy demands, under a regulatory structure which encourages exploration but which will ensure a proper return to the owner of these resources, the Canadian public. The key to this development is the balance which must be maintained between the extraction of the resources and the preservation of the environment, recognizing that at all times it is the needs of people that must predominate.¹⁵

Which needs? Which people? What is a proper return for loss of a way of life, or for loss of future options? If extraction of non-renewable resources involves destruction of other resources, what is meant by "preservation of the environment"?

Such questions have not been addressed by DIAND. Instead, where conflicts occur, priority continues to be given to the extractive industries, as was illustrated by the response of Warren Allmand to the community of Tuktoyaktuk which requested, through the Committee for Original Peoples' Entitlement (COPE), a land freeze, pending land claims settlement for the Mackenzie Delta. Mr Allmand replied, "While I cannot accept a total freeze on development related activity I can agree that environmental controls on this type of activity should be adequate to ensure

the continued use of the area for traditional pursuits."¹⁶ Consequently, under Section 20.1.C of the Territorial Land Use Regulations (TLUR), a six-month deferral of a decision on an application by Gulf Oil for an exploration permit in the area was granted, pending a report by a consultant hired by DIAND. On completion of the report and submission of the views of the councils and hunters and trappers concerned, Mr Allmand stated that he would decide on the precise areas to be protected and the form of that protection: "It must be clearly understood that once this review is completed and special protection in place exploration will be permitted under the appropriate environmental conditions."¹⁷ Clearly the possibility that adequate protection might require *no* exploration activity in the area did not, in Mr Allmand's mind, exist. A similar response was made to the Hunters and Trappers Association of Baker Lake and will be discussed later in this report.

As yet there is no indication of change in either the federal or territorial governments' policy of giving priority to the extractive industries, which means priority to economic growth. While recognizing the importance of participatory democracy and accountability, it is evident that such considerations alone will not change decisions that rest on economic assumptions. Or, as Beakhust testified:

To create the trappings of political independence in a reality of economic domination can only produce frustration, suspicion, and eventually anger and hostility. . . . A major theme of my evidence is that a concern with political development compels us to concern ourselves with economic control.¹⁸

A basic assumption of our growth-oriented economic system is that resources are infinite because there are no known limits to technology.¹⁹ As soon as one resource becomes scarce, it can be substituted by another. That assumption was brought into question with the publication of *The Limits to Growth*,²⁰ but nevertheless it is still widely accepted. Because most economists have persisted in thinking of resources as having a single function, they have become incapable of grasping the concept that resources and environment are coextensive. As Henderson observed, "The theory of continual substitution is over-optimistic and does not deal with simultaneous rates of depletion across a whole range of resources."²¹ A single resource can supply many different needs; it is therefore impossible to devise a complete substitute. Technology can only devise substitutes for specific functions of resources and, in doing so, must use other resources in new ways. Historically, we have supplied some

substitutes for single functions of depleted resources, but this is no argument for infinity.

A second assumption is that economic growth is necessary to create jobs. Incentives are offered to increase rates of consumption so that the consequent increase in rates of production will increase employment opportunities. In the North, Berger found that the native people “are challenging the economic religion of our time, the belief in an ever-expanding cycle of growth and consumption.”²² Economic growth, whether under a capitalist or communist regime, is dependent on industrial growth. Industrial growth creates certain kinds of employment opportunities, but in doing so destroys others. As McTaggart Cowan observed, diversity is sacrificed to a spurious efficiency and loss of diversity inevitably reduces the number of opportunities open to future generations.²³ Such loss diminishes the possibility of balancing industrial mass-production with diverse alternative forms of production. Experience in the North has shown that while the extractive industries may create jobs in the short term, the jobs usually go to skilled southern workers. Some native northerners may learn new skills and find employment, but after the resources are extracted, as inevitably they must be, those skills are of no use to them if they wish to continue to live in their own communities. The effect of industrial development on employment was considered carefully by Berger:

The point is simple enough: the extension of the industrial system creates unemployment as well as employment. In an industrial economy there is virtually no alternative to a livelihood based on wage employment. Those who are unable or unprepared to work for wages become unemployed and then dependent on welfare. To the extent that the development of the northern frontier undermines the possibilities of self-employment provided by hunting, fishing and trapping, employment and unemployment will go hand-in-hand.²⁴

The argument that an industrial project *must* be developed in order to create jobs is untenable in a society capable of forming concepts that allow alternatives, both in the conditions for creating employment and in the nature of the employment created. To question the assumption that economic growth (and therefore industrial growth) is necessary to create jobs, means asking what evidence there is to suggest that growth — even in the short term — is the *only* way, and what evidence there is to suggest that it can be sustained in the long term.

A third assumption is that economic goals are necessarily coextensive with social goals. This assumption is generally rejected in principle but not in practice.²⁵ Economic goals and economic conditions are relatively easy to define and measure. Social goals and social well-being are not. However, the one social goal that was expressed repeatedly in the community hearings of the Mackenzie Valley Pipeline Inquiry was the attainment by individuals of a measure of control over the course of their own lives. Such attainment requires a range of alternatives from which to choose. The economic goals of industrial growth demand conformity to the industrial system, and therefore an impoverished range of choices. Many socially undesirable and unavoidable effects of industrial growth in the North have been discussed by Berger,²⁶ Sharp,²⁷ and Gibson.²⁸ However, the social problems germane to a growth economy oriented towards large-scale industrial developments are apparent throughout all of the industrial world. They have been documented and discussed by such economists as Galbraith, Mishan, Schumacher, Daly, Georgescu-Roegen, and Heilbroner;²⁹ and by non-economists such as Goldsmith, Taylor, and Commoner.³⁰

The demand for industrial growth in the North results from the imperative of industrial growth in the South. Northern gas, for instance, is intended almost exclusively for southern markets. Decisions concerning development of northern resources are profoundly influenced by southern patterns of consumption. The extent to which alternatives to industrial growth are available in the North will therefore be either facilitated or obstructed by the extent to which such alternatives are available in the South. In his study of *Land Management in the Canadian North*, Beauchamp made the following statement:

Although some interest groups will not consider it, the initial question is whether or not “northern development” as the term is traditionally used, is a valid end at all. In other words, should the standards of economic success and industrial expansion which dominate the Canadian lifestyle in the South be the primary measurements of northern progress?³¹

Should they be the primary measurements of southern progress? Because as long as they are, the North has little, if any, choice.

Because of its overriding importance in decisions regarding resources and land use, the criterion of economic

growth has been considered in some detail. However, consideration must also be given to social and ecological criteria.

A frequent assumption in the use of social criteria is that social goals can be attained and maintained by technological innovation alone, that we are no longer dependent on the land. The history of man is in one sense the history of his ability to circumvent biophysical constraints. But circumvention always involves some cost, the full payment of which is almost always deferred.

Probably one of the most disastrous circumventions has been the development of a highly industrialized agriculture in North America. Crop production has become a capital- and energy-intensive industry, with the energy input (excluding solar radiation for photosynthesis) coming from petroleum. Taking corn as an example, Pimentel documented that the ratio of energy obtained from corn to the energy used in the process of production declined from 3.24 kilocalories per hectare in 1945 to 2.52 kilocalories per hectare in 1970.³² Because the yields per hectare for crops have increased, we congratulate ourselves on our efficiency but fail to count the costs. More obvious costs include loss of top soil by erosion at the annual rate of 44.1 metric tons per hectare under corn production and 22.6 metric tons per hectare under wheat production; whereas only 0.7 metric tons per hectare are lost under both continuous bluegrass rangeland and mature forest. The total energy input that was required for corn production in 1945 was approximately equal to the energy input for nitrogen fertilizer alone for corn production in 1970. Pimentel estimated that if the known reserves of petroleum were used solely to feed a world population of four billion at an average annual U.S. diet, these reserves would be exhausted in thirteen years. While exact estimates may be debated, the trend is clear. In addition to the loss of top soil by erosion, and the replacement of nutrients by a finite energy resource, there is also the cost of the export of nutrients from a cropland ecosystem to an urban system. These are obvious costs, and there are others which are more indirect, but the greatest and most insidious cost is the fostering of a belief that there are no limits, or no immediate limits, to our ability to feed the world's population; that there will always be a new technological "break-through"; or that equitable distribution will solve everything. Two conclusions can be drawn from this example. First, we are still very much dependent on the land, and second, responsible circumvention requires that we first count the costs and determine when and by whom they will be paid.

It is also necessary to question the assumption that "the greatest good for the greatest number" is in fact, in the long run, the greatest good. There are bills that the majority does not have the right to ask the minority to pay. Or if it does, it had better make very clear the ethical basis for that right and that it is not simply the "right of might." Presumably the assumption of the greatest good for the greatest number was the basis for the acquiescence of the majority of Canadians in such decisions as the W.A.C. Bennett Dam and the James Bay Development. In the latter case, Mr Justice Albert Malouf of the Quebec Superior Court imposed an injunction on construction. His ruling was reversed by the Quebec Court of Appeals, which stated:

*C'est donc l'intérêt public et général du peuple du Québec qui s'oppose à l'intérêt d'environ deux mille de ses habitants. Nous sommes d'avis que les deux intérêts en présence ne souffrent pas la comparaison.*³³

The "greatest good" sounds impressive but does not accommodate itself to definition. It is only possible to infer what is meant by the term, from the context in which it is implicitly assumed. Approximately one hundred years ago George Henry Kingsley wrote from the western plains of the United States, to his wife in England:

*I really fear that they [the Indians] will have to be wiped out if they will not settle and be civilized — and they won't! The world cannot afford to give up enormous tracts of valuable land in order to enable a few bands of wandering savages to live in idleness.*³⁴

The world could not afford it because Europe could no longer support its population on its own resource base. The greatest good was, and still is, material wealth — "enormous tracts of valuable land." Obviously a degree of material wealth is necessary for the well-being of the individual, but we still have to face the question of how much is too much. And Canadians, whatever their ethnic origin, need to think seriously about the inevitable consequences of allowing our population or the demands of that population to exceed its resource base.

Finally, it is also necessary to consider some implicit assumptions that are made in the use of ecological criteria. The assumption that man is dependent on the land not only for his material well-being, but also for his psychological well-being, has been demonstrated repeatedly by statements made by human beings of diverse ethnic origin and various degrees of formal education. These statements all have to do

with feeling, and often with feeling that is associated with experience of beauty.

A second assumption is that man is subject to the laws of evolution which are far more complex, subtle, and comprehensive than is indicated by the phrase, "survival of the fittest," and which include cultural as well as biological evolution. Social Darwinism, as propounded by Spencer, is a distortion of the concept of evolution by natural selection. It has no foundation in scientific fact, since competition between species or individuals is only one force in the evolutionary process. In any consideration of evolution it is necessary to remember that competition also occurs between conflicting drives within the same individual; that co-operation is also a phenomenon of evolution; and that no individual or species is independent of others. Biotic and social communities also evolve by natural selection. Man is part of both a social community and the biotic community of the world. The necessity for stressing such relationships becomes clear from Aldo Leopold's statement in 1949: "All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts."³⁵ As a member of such a community, man is not only responsible for his actions but is responsible for attempting to understand the effects of his actions before decisions are made. As A.N. Whitehead stated, "Duty arises from our potential control over the course of events. Where attainable knowledge could have changed the issue, ignorance has the guilt of vice." It is necessary to emphasize that ethical behaviour is only observed within the community which an individual recognizes. If there is no sense of community, there is no sense of responsibility.

Assumptions implicit in ecological criteria indicate concern for the survival and the well-being of man and of the conditions under which, in the words of Leiss, "we can discover some of the abundant sources of satisfaction that have lain untapped so long."³⁶

(d) Some Basic Requirements for Northern Planning

The need for comprehensive planning in the North has been stressed recently by Naysmith³⁷ and Beauchamp.³⁸ In particular, Beauchamp urged that decisions to use the lands and energy resources of the North be made as part of a strategic plan for development that includes human and ecological components, and values other than those relating solely to growth and production. He found that present land use policies are dominated by the industrial forces which impose a single use on all northern lands in the process of

exploration for and development of minerals; and that the land is being treated as only incidental to the short-term benefits to be gained by the extraction of non-renewable resources. He concluded that, as a preliminary step, a detailed inventory and analysis of land and resources must form the basis for rational and comprehensive planning.

Clearly, options for land use cannot be identified, much less evaluated, without a knowledge of the diverse resources of different regions, the productive and protective capacity of the land, and human values in relation to the land. While the information we possess is detailed in some instances and fragmentary in others, a tenet of this study is that better use can be made of existing knowledge. Accordingly, information from publications and from some unpublished material was compiled for three regions in the North (Figure 1). These regions comprise some of the different biotic communities that are characteristic of northern ecosystems. Their boundaries are arbitrary and they are not in themselves ecosystems. The detailed reports that resulted form the basis for the summaries in the following three sections.

II The Bear Rock-Brackett Lake Region

(a) Description of the Area

The Bear Rock-Brackett Lake region is in the Mackenzie District of the Northwest Territories (Figure 2). It includes the confluence of the Great Bear and Mackenzie rivers, part of the Norman and eastern Franklin ranges, and the wetlands lying between those ranges and north of Great Bear River to Kelly Lake. This area, subsequently call the defined region, is in the subarctic climatic zone and has an average of 115 days free of a killing frost. Mean annual precipitation is 28.2 centimetres with maximum precipitation occurring in August. It lies within the zone of widespread but discontinuous permafrost. Bedrock outcrops occur along parts of the eastern Franklin and Norman ranges. Norman Range terminates in the historic landmark of Bear Rock, above the confluence of the Mackenzie and Great Bear rivers. Geological formations indicate the probability of some oil in the region, and coal deposits have long been known. Glacial tills and thin silts and clays overlain by organic matter are the predominant soils in the region, the stability of which varies according to plant cover, presence of permafrost, slope, and aspect. The wetland complex comprises shallow, thermokarst lakes, marshes, and muskeg. The water table is



- 1 Bear Rock-Brackett Lake
- 2 Baker Lake-Chesterfield Inlet
- 3 Pelly-Macmillan Rivers

Figure 1 Location of Three Defined Regions

high. Ground seepage and ground springs are fairly numerous within the region and in winter cause overflow of ice that may persist on some slopes into July.

Great Bear River is a major eastern tributary of the Mackenzie River. It is unique in that it forms a barrier-free connection between one of the largest lakes in North America and the only major river in the continent that flows northward. Like that of most of the tributaries that flow into the Mackenzie River from the east, the water of the Great Bear River is clear and cold throughout the year. The riverbed is composed of gravel with cobble and boulders. Ice breakup in spring occurs about ten days later than that of the Mackenzie River. Areas of open water in winter occur in Great Bear River, Loche River, Brackett River, and some of the creeks draining the western slopes of the Norman Range. These areas are important to overwintering fish and also to otter in the Loche and Brackett rivers.

The three most abundant species of fish in the defined region are arctic grayling, longnose sucker, and northern pike. The greatest number of fish species occurs in the Mackenzie River near the mouth of the Great Bear River, where cold, clear water mixes with the warmer, more turbid water of the Mackenzie River. Some species, such as lake trout and humpback whitefish, may be locally very abundant in lakes within the defined region. Spring-spawning fish include grayling, walleye, northern pike, longnose sucker, and trout-perch. These spawn before or slightly after ice breakup and the eggs hatch about ten to twenty days later. The critical period for spawning and incubation in this region is 1 May to 15 July. The critical period for fall-spawning fish is 10 August to 15 November. Eggs of fall spawners hatch the following spring. Grayling, inconnu, walleye, and lake trout require silt-free substrate and high levels of dissolved oxygen for successful reproduction. Many of the other species in the defined region can tolerate some siltation and lower oxygen levels. Northern pike are unique in that they require spawning substrates with flooded vegetation for successful reproduction. Spring flooding of muskeg lowlands in the Brackett River drainage is therefore probably important for pike.

Apart from spawning areas, other requirements are nursery and feeding areas, overwintering areas, and migration routes for free access between these different habitats. The Mackenzie River is a primary migration route for grayling and inconnu. The back eddies and creek mouths along the river are important nursery and feeding areas for inconnu and walleye. The Great Bear River is a primary

migration route in spring and fall and a nursery, feeding, and probably overwintering area for many species. Extensive gravel beds and clear, well-oxygenated water provide excellent spawning conditions for grayling. Of the abundant grayling population, some are year-round residents, while others that spawn in tributaries of the Mackenzie River outside the defined region stay within the Great Bear River for the rest of the year. The Great Bear River may be one of the most important areas for grayling in the Mackenzie region. Fisheries biologists class it as a critical aquatic ecosystem, in terms of being vital to the survival of significant numbers of important fish species, and consider it highly sensitive to technological disturbance. Such disturbance includes increased siltation from land erosion, spills of oil, petroleum products, and toxic substances and eutrophication. In the defined region Vermilion Creek is classed as an important aquatic ecosystem and sensitive to technological disturbance throughout the year. Most of the Brackett Lake wetlands complex is also considered to be sensitive to technological disturbance. Kelly Lake is an important aquatic ecosystem, providing essential habitats for major year-round populations of northern pike, humpback whitefish, and lake trout.

Domestic fishing sites and associated camps are shown in Figure 3. Kelly Lake has long been used for domestic fishing and more recently for sports fishing. The outlet at Loche River is a traditional fall-to-winter fishing area. Brackett Lake and the Mackenzie and Great Bear rivers are also traditional areas for domestic fishing. In addition, Fort Franklin residents fish the Great Bear River in June, July, and August. Fish are a traditional source of protein for native peoples and a major food for such dog teams as still exist in the region.

The Mackenzie River is not only a primary migration route for fish; its valley is one of the major flyways in Canada for migratory birds. In spring, concentrations of staging waterbirds are dependent on areas of open water. Open water occurs early, during breakup, around shallow shorelines, sand bars, in old meander channels and snyes, and around islands, as well as in the mouths of some tributary streams. In the defined region Halfway and Windy islands are included in one of the major staging areas, with snow geese being especially abundant in this area and immediately downstream. The Brackett Lake wetlands complex is considered to be an important early spring staging area for whistling swans, as well as one of the most productive areas in the Mackenzie Valley for ducks, loons, and shorebirds,

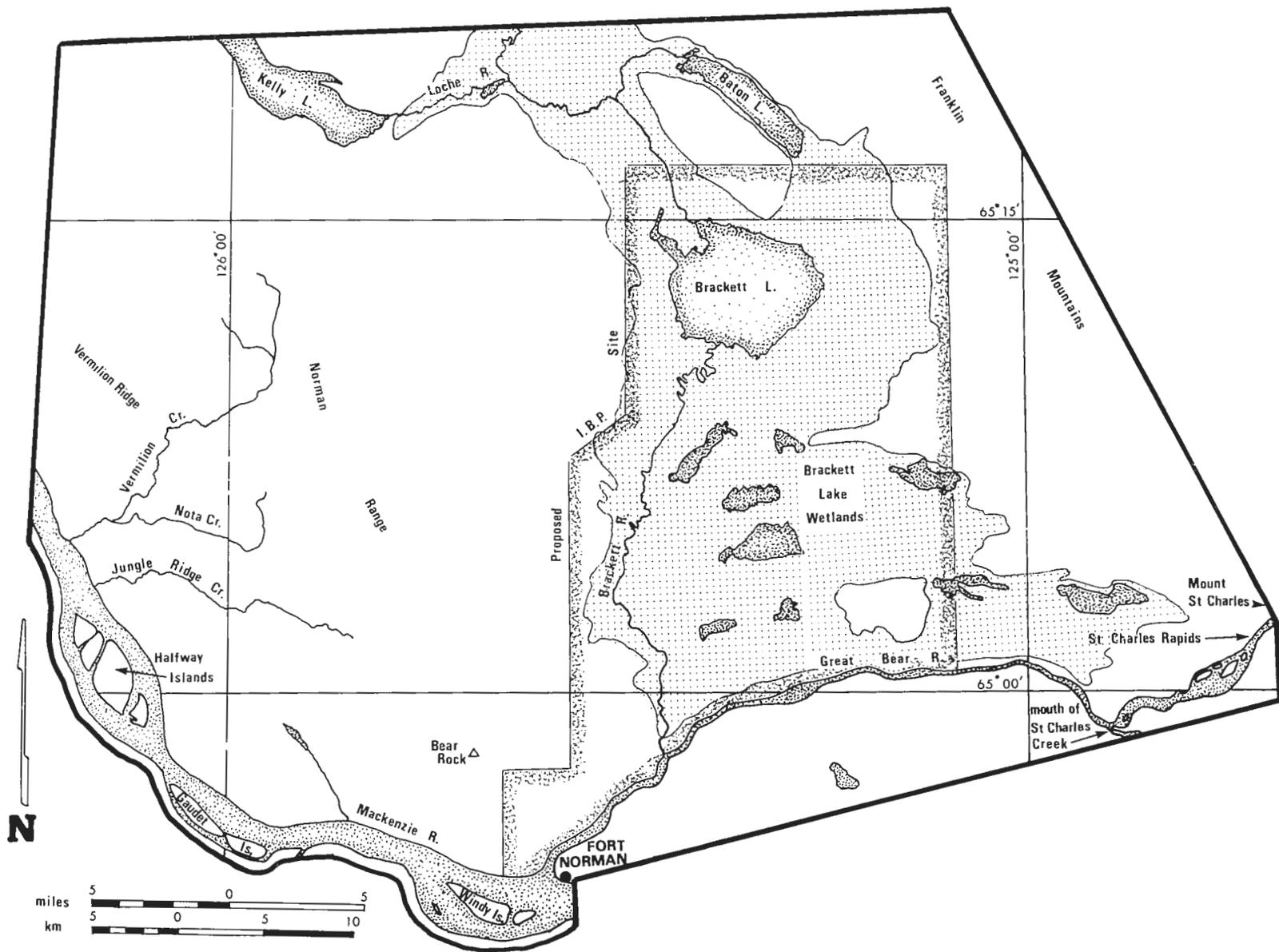


Figure 2 Bear Rock-Brackett Lake Region
 Brackett Lake Wetlands shown in dotted area.

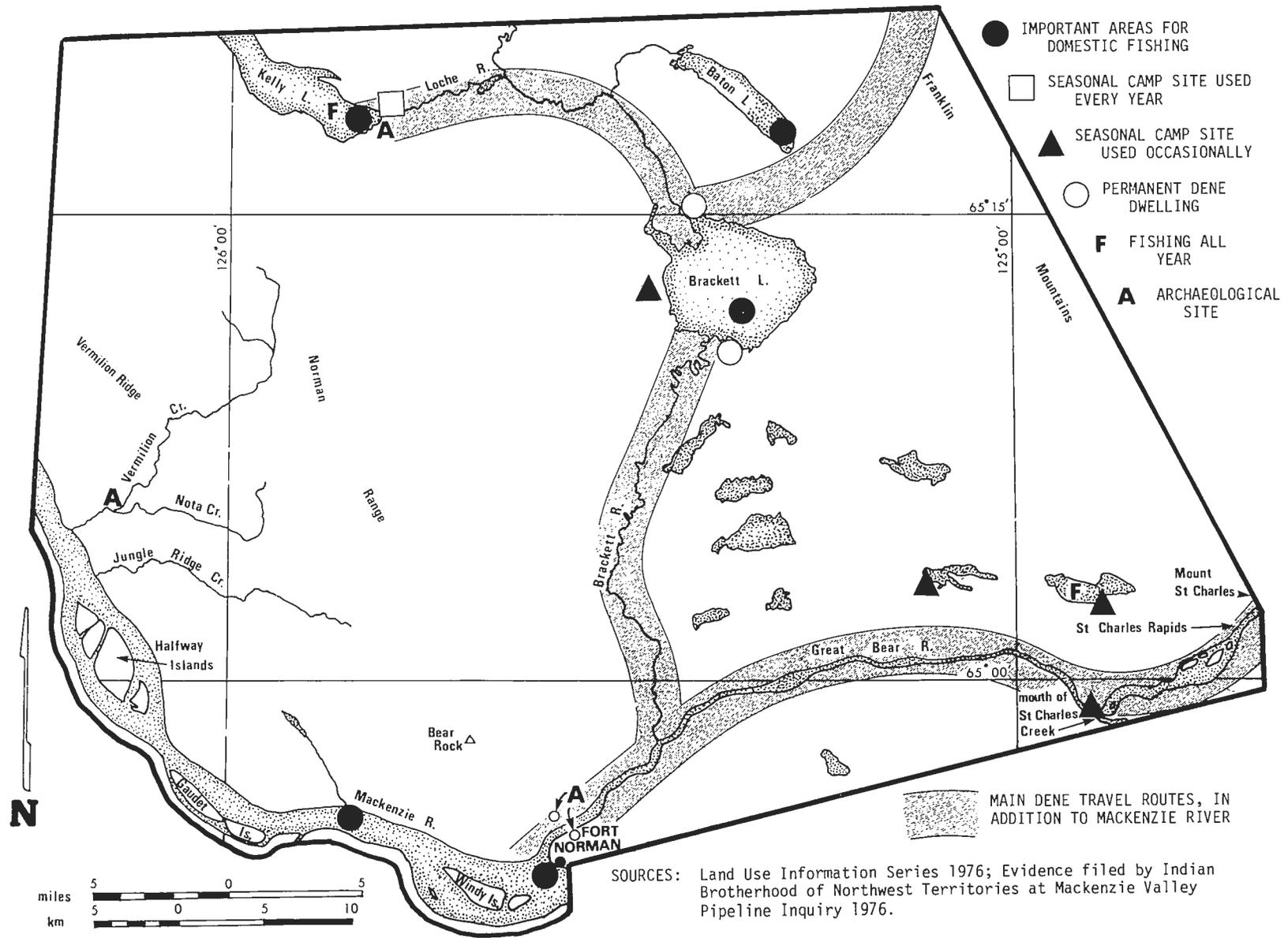


Figure 3 Dene Land Use in Bear Rock-Brackett Lake Region

and a critical moulting and late summer staging area for many species of waterfowl. Its importance for nesting waterfowl may be increased during periods of drought in the prairies. Its importance as a fall staging area for arctic nesting waterbirds is probably high in all years, but may be critical in years when staging in the coastal region is curtailed by poor weather conditions.

Diurnal birds of prey that are summer residents or migrants in the defined region include two declining or endangered species – bald eagle and peregrine falcon. They are associated respectively with fish and waterfowl, and therefore with rivers, lakes, wetlands, and migration routes. Bald eagles usually nest in trees and are not restricted by nesting habitat, while peregrine falcons, south of the tundra, nest in cliffs near water. The availability of such habitat in the Mackenzie Valley is largely confined to the middle and lower regions. In the defined region peregrine falcons are known to nest in the Franklin Mountains, and the Norman Range is classed as a zone of regional importance to raptors (birds of prey). Ptarmigan and grouse are found in areas such as the north bank of the Great Bear River, where deciduous shrubs are in close proximity to black and white spruce, providing food and shelter.

Waterfowl, ptarmigan, and grouse are hunted for food by local residents. Scoters are the only species of waterfowl in the defined region that may be taken legally by Indians during the summer. Their eggs may also be taken. September and October are the months of open season for ducks and geese in the Territories.

The Mackenzie River valley allows northward extension of the true boreal forest. This forest is confined to the river valley, the lower slopes of the Norman Range, and the lower part of the valley of the Great Bear River. Lightning is the major cause of fires, with July being the most hazardous month. Fires in some locations have initiated slumping and flow slides, with consequent siltation of rivers. Fires, however, do not burn uniformly, and while decreasing suitable habitat for some animals, such as marten, they have increased it for others, such as moose. The wetlands and adjacent hills have been subject to fires of varying extent and intensity in different years. Regeneration in burned areas has resulted in plant communities that are in successional stages of growth and change. The wetlands are also subject to flooding during and following spring breakup, as are parts of the shoreline and islands of the Mackenzie River. Seasonal flooding maintains successional stages of riparian plant communities. These communities are characterized by high biological productivity, together with a relatively

high diversity of species. They are stable (but not static) because the plant and animal components have evolved in relation to this form of physical disturbance. In the Mackenzie Valley region, the number of moose is considered to be limited by the amount of suitable winter habitat. Winter habitat is important for moose since, like many other northern wild ungulates, they reduce their food intake and operate on a negative energy balance during winter. They minimize energy loss by staying in sheltered areas where heat loss from wind chill is reduced, and close to an abundant food source so that minimal energy is expended in moving through deep snow in search of food. Repeated disturbance, associated or unassociated with hunting, will increase energy expenditure if moose are forced to move frequently. If winter conditions are severe, or if moose do not enter the winter in good condition, their chances of survival are accordingly decreased.

Winter habitat occurs in river valleys, wetlands, and parts of upland slopes. Halfway, Gaudet, and Windy islands in the Mackenzie River have a high potential winter carrying capacity for moose, but because of their proximity to Fort Norman they have been heavily hunted and constitute one of the “moose vacuums” along the Mackenzie River. Islands of apparently similar carrying capacity, but less easily accessible, were observed to have late winter densities of 2.1 to 3.5 moose per square mile. There are no estimates of densities of moose in the defined region. On a regional basis, the islands in the vicinity of Fort Norman are classed as important winter range, and the Brackett Lake wetland complex as very important winter range because of its size and the lack of winter habitat in much of the surrounding area. Moose are an important resource to Indians of the region for food and for clothing such as mitts and moccasins.

Movements of woodland caribou during winter are governed to a greater extent than those of moose by the density and depth of snow. Little is known about populations east of the Mackenzie River. In the defined region their range overlaps with the winter range of moose in the Loche River area, where caribou were stated to be abundant. The Bluenose herd of barren ground caribou is essentially found east of the Franklin Mountains and outside the defined region. Recently, men from Fort Norman have also hunted barren ground caribou in spring, by joining Bear Lake men from Fort Franklin and travelling by chartered aircraft to the Colville Lake area. Community hunts for woodland caribou have also been made in areas west of the Mackenzie River.

Of the fur-bearers in the defined region, beaver,

muskrat, and snowshoe hare are also traditional sources of food. Snowshoe hares are generally snared, and their fur is cut into strips and woven. The fur was once used extensively by Hare Indian groups, but recently only for trimming. Snowshoe hares are a substantial source of meat in years when their numbers are high. In the wetlands, beaver and muskrat are hunted from canoes in spring and may be trapped in winter. In the North, beaver are limited by suitable lodge or bank denning sites where water levels are adequate, and where there is sufficient growth of poplar or willow close enough to the site to be transported and stored in feed rafts for winter. In some areas abundant production of water lilies may provide an alternative source of food during winter. Both denning sites and food requirements are dependent on natural physical processes that affect water levels of lakes and streams, riparian succession, depth of the active layer in areas of permafrost, and bank stability. Water depth is critical to both beaver and muskrat. Where beaver can control water levels by dams, conditions for muskrats are enhanced. Such dams affect many species of animals by changing water conditions and plant succession. Changes, however, are usually temporary and occur on a small scale in clumped or scattered areas. Beaver have a dynamic effect on their surroundings. The Brackett Lake wetlands are classed among the best habitat for beaver and muskrat in the Mackenzie Valley region. The Mackenzie Delta is good muskrat habitat, but much of it is less favourable for beaver, and only four other areas in the Mackenzie Valley are classed as good habitat. Populations of both beaver and muskrat have fluctuated in the defined region over the years, and there are no recent estimates of densities.

Other fur-bearers in the defined region include marten, fox, lynx, mink, weasel, wolverine, wolf, and black bear. Marten occur on the slopes of the Franklin Mountains and hills adjacent to the wetlands, and on the uplands surrounding Kelly Lake. They generally prefer mature coniferous forest and avoid burned areas for a variable number of years. They are easy to trap because of their curiosity. In the past they have been completely trapped out of some areas and may be slow to return, since their reproductive potential is not high. The status of marten in the defined region is not known, nor is that of the other fur-bearers.

The defined region is used by Dene from Fort Norman, Fort Franklin, and Fort Good Hope. Major routes of travel and campsites are shown in Figure 3. There are many other trails within the wetlands and crossing the Norman and eastern Franklin ranges. The defined region is used by full-time and part-time trappers, and cabins are located at

Brackett Lake. Concentration of people in settlements, with requirements for children to attend school, and the absence of any stability in fur prices have added to the difficulties inherent in trapping. Nevertheless, values associated with the independence and self-reliance of bush life, with country food, and with the need to maintain some contact with the land, were repeatedly expressed at the Fort Norman and Brackett Lake community hearings of the Mackenzie Valley Pipeline Inquiry.

(b) Some Current and Proposed Developments

Extension of the Mackenzie Highway

Construction of an all-weather highway, linking Inuvik with the planned extension of the Dempster Highway and the Liard and Mackenzie highways at Fort Simpson, was started in the winter of 1971. An all-weather highway had been proposed in the mid-1960s, but since so many other proposals of development in the North were made in that decade it was apparently not taken very seriously by the Canadian public or press. Although sections were built in the winter of 1971 between Fort McPherson and Arctic Red River and for thirty-three miles south of Inuvik, little if any publicity was given to this development in the context of a Mackenzie Valley Highway. The full extent of the proposed development was publicly announced by Prime Minister Trudeau in April 1972 and was extensively covered by the press. The stage to which surveying, clearing, and construction had proceeded by the fall of 1973 was described by Wolford.³⁹ Since then, construction has slowed and scheduling is uncertain. In the defined region, routing of the highway was planned to follow the CNT telephone line. Because of a critical shortage of good quality construction material south of Great Bear River, however, Underwood, McLellan and Associates Ltd. were commissioned by the federal Department of Public Works to investigate the feasibility of alternative routes between Saline River (Mile 521) and Bear Rock (Mile 588). Their report was published in May 1973.⁴⁰ One alternative route runs parallel to the Great Bear River from St Charles Creek to approximately one kilometre below the mouth of the Brackett River, where it crosses the Great Bear River and continues to the narrow pass behind Bear Rock. Because of greater distance and cost, this route was not recommended. The other alternative joins the CNT line south of the defined region and crosses the Great Bear River approximately one and a half kilometres above the mouth of that river before continuing to the same pass. Canadian Arctic Gas Study Ltd. showed the

Mackenzie Highway crossing the Great Bear River approximately four kilometres above the river mouth.⁴¹

After construction of the highway had begun, assessment of the design and routing was undertaken by the Mackenzie Highway Environmental Working Group of the federal government. In March 1974 this group proposed future monitoring studies. In the group's proposal, it was stated that "the Mackenzie Highway is being subjected to a systematic environmental examination during the course of its design and construction." In other words, a final design review was made during and after the course of construction, contrary to the policy stated in the Environmental Assessment and Review Process.

Pipeline Transportation of Oil and Gas

Following the oil and gas discoveries in Prudhoe Bay, investigation of the technical feasibility of an oil pipeline from Prudhoe Bay to Edmonton was undertaken in 1969 by Mackenzie Valley Pipeline Research Ltd. In the same year the Northwest Project Study Group and Gas Arctic Study Ltd. started feasibility studies on natural gas transport by pipeline. In 1972 these companies amalgamated to form Canadian Arctic Gas Study Ltd. (CAGSL), and in March 1974 they filed application with the Department of Indian Affairs and Northern Development and the National Energy Board to begin construction of a gas pipeline. A similar application was later filed by Foothills Pipe Lines Ltd. Environmental and social impact studies were undertaken principally by Environment Canada, the Department of Energy, Mines and Resources, the Department of Indian Affairs and Northern Development, consulting companies hired by CAGSL, and the Environment Protection Board which was funded by CAGSL. The Mackenzie Valley Pipeline Inquiry was established in March 1974, at which time Mr Justice Thomas Berger was appointed commissioner. Formal and community hearings were completed in November 1976, and Mr Justice Berger's recommendations to the Minister of Indian Affairs and Northern Development were published in 1977. Under the terms of reference for the inquiry, the applications were considered from the perspective of a transportation corridor and the cumulative impact of such development.

In the defined region the gas pipeline route proposed by CAGSL crosses Vermilion, Nota, and Jungle Ridge creeks on the west slope of the Norman Range. The Norman Range itself is crossed by the pass behind Bear-Rock and the Great Bear River is crossed at a point approximately four kilometres below the mouth of the Brackett River.⁴² The

proposal requires a construction camp, compressor station, stockpile, and helipad at Vermilion Creek, with one mile of all-weather access road. Borrow pits and helipads are required in the vicinity of the route, together with a wharf and stockpile at Fort Norman. The route proposed by Foothills through the defined region is similar to that proposed by CAGSL. Transportation of materials by tug and barge down the Mackenzie requires a doubling of the capacity of the present fleet. The extent and nature of the many activities related to construction and maintenance of a gas pipeline were described by Berger. Canadian Arctic Gas Study Ltd. was disbanded in August 1977, but the "Maple Leaf" route proposed by Foothills remains a distinct possibility sometime in the future.

An alternative route running east of the Franklin Mountains was presented by Roed.⁴³ Construction of such a route would still be dependent on transportation of materials on the Mackenzie River, with a staging area on the Great Bear River at the Bennett Field airstrip. Presumably, transportation of materials from the Mackenzie River up the Great Bear River would either greatly increase barge traffic with associated dredging, or result in pressure for construction of a road.

In relation to the corridor concept, RMC Resources Management Consultants Ltd. recommended to the Government of the Northwest Territories that Fort Norman be developed as a major service area.⁴⁴

Hydro-electric Power

In 1971 the Great Bear River was proposed by the Northern Canada Power Commission (NCPC) for hydro-electric development, and G.E. Crippen and Associates Ltd. undertook a feasibility study which was published in 1972.⁴⁵ Five potential dam sites were selected. These are located at Wolverine Creek, the head of the St Charles Rapids, the St Charles Rapids, above the mouth of the Brackett River, and below the mouth of the Brackett River. Thurlow and Associates Ltd. were commissioned to undertake a preliminary environmental impact study of this scheme, a report of which was submitted to the Northwest Territories Water Board in 1973.⁴⁶ Baseline data on the fish resources were obtained by the Fisheries and Marine Service, Environment Canada, during studies related to the proposed Mackenzie Valley Pipeline.⁴⁷

On 10 December 1974 a Standing Committee on Indian Affairs and Northern Development met with representatives of the Indian Brotherhood of the Northwest Territories and others to consider Bill C-13, which was a

proposal to amend the NCPC Act. The members of the Indian Brotherhood expressed their opposition to Bill C-13, and the then president James Wah-Shee suggested the following amendments:

- 1 *No dams such as the Great Bear development be allowed in advance of a land settlement and after that only with the consent and approval of the Indian Bands affected.*
- 2 *All proposed developments be subjected to environmental and social impact assessment by the Department of the Environment, and all reports be made public and tabled before Parliament.*
- 3 *That the administration of the Northern Inland Waters Act be removed from the Department of Indian Affairs and Northern Development.*
- 4 *That instead of changing the rate structures as proposed, equalization of rates be achieved by subsidizing.*⁴⁸

Wah-Shee's objections to NCPC being part of the Department of Indian Affairs and Northern Development, which constituted an intolerable conflict of interest, and to the lack of input by the Department of Environment were not answered. However, he was told that it was the understanding of the Standing Committee that the Great Bear hydro scheme had been temporarily "shelved." Owing to this indefinite postponement, an impact study which was to have been undertaken by the Canadian Wildlife Service, on the effects of the scheme on migratory waterfowl, was also indefinitely postponed.⁴⁹ The reason given was that the project was to have been funded by the Department of Indian Affairs and Northern Development and the funds were not now available.⁵⁰ Why the funding should come from the Department of Indian Affairs and Northern Development, and not from the Department of Environment of which the Canadian Wildlife Service is a division, is somewhat obscure in view of the Department of Environment's international responsibility for migratory birds.

Exploration for Petroleum and Coal Resources

Nine petroleum exploration companies hold exploration permits in the defined region.⁵¹ Aquitaine Company of Canada Ltd. has the most intensive holdings, and by 1975 had spent more than two million dollars in the search for oil and gas.⁵² The entire wetland complex and west slope of the Norman Range are covered by exploration permits. Seismic lines are extensive and some wildcat wells have been drilled.

In 1973 Thurlow and Associates suggested that local coal deposits be considered as an alternative source of power

in this region.⁵³ Manalta Coal Ltd. holds exploration permits in the defined region south of the Great Bear River, as well as over an extensive area to the south. Coal seams have been encountered in a rotary drilling programme, and there is believed to exist a potential for large coal reserves in the Brackett basin.⁵⁴

Parks and Other Reserves

Part of the defined region was proposed as an Ecological Site (Figure 2) through the Canadian Committee for the International Biological Programme (IBP). A formal application was submitted to the Hon. Judd Buchanan, then Minister of Indian Affairs and Northern Development, in September 1975. To date no decision has been reached with respect to the application for this site.

Areas with potential for outdoor recreational development in the defined region were identified on maps of the Land Use Information Series.⁵⁵ Sites for camping and family beach activity were located along Kelly Lake near the outlet of the Loche River. Access to Kelly Lake could be attained by jet boat or by air. The lake was also included in a canoe route which covered Loche River, Brackett Lake, Brackett River, and Great Bear River. Areas for sports fishing included the Great Bear River, Brackett Lake, and Kelly Lake. The proposed Mackenzie Highway was considered to have potential for tourists, with scenic views occurring along the Norman Range.

(c) **Potential Resource Use Conflicts**

The proposed developments outlined in the previous section clearly indicate that various demands will be made upon different resources in the defined region. This section will outline some examples of predictable resource use conflicts.

Exposed bedrock occurs in parts of the Franklin Mountains, including the Norman Range. In some locations, including Bear Rock itself, these outcrops are important for nesting sites of peregrine falcon. G.E. Crippen and Associates indicated in the Great Bear hydro development study that Bear Rock would be a good source of construction material.⁵⁶ Underwood, McLellan and Associates also marked Bear Rock as a site for bedrock borrow for construction of the Mackenzie Highway.⁵⁷ Furthermore, Bear Rock is proposed as a National Landmark.⁵⁸ Clearly, a scenic area that is a possible National Landmark with nesting peregrine falcons is incompatible with the construction of quarries, or with any activity close to nesting sites.

The Great Bear River and St Charles, Bluefish,

Vermilion, Nota, and Jungle Ridge creeks all contain clean gravel deposits for most of the length of their beds. This gravel provides spawning areas for such important species as grayling, broad whitefish, arctic cisco, and inconnu. The gravel also provides habitat for clear-water benthic invertebrates which are important food organisms for many fish. For physiological reasons, fish tire faster than mammals and take longer to recuperate. In streams where currents are swift, they require areas of slack water. The microhabitats of a gravel and boulder stream bed provide the necessary areas of slack water for resident fish. Territories of stream-dwelling fish are often associated with visual environmental reference points, such as rocks and boulders.⁵⁹

Crippen and Associates suggested that gravel from the Great Bear River and its tributaries would be the most valuable source of unfrozen construction material for the proposed hydro-electric development.⁶⁰ However, the use of stream beds as a source of gravel for any kind of construction is in direct conflict with the maintenance of these areas as important fish habitats. In this part of the Mackenzie Valley, western tributaries are silt-laden and have low densities of fish.⁶¹ The productive eastern tributaries are extremely sensitive to development, and gravel removal or development-caused siltation is completely unacceptable from a fisheries standpoint. Retention of these gravel beds is also necessary if the rivers and streams of this region are to retain their present aesthetic appeal.

The Mackenzie River islands are important to migratory waterbirds in spring and fall, and to moose in late winter. Seasonal flooding often results in alluvial deposits on the downstream end of islands, which form a nutrient-rich, sloping shoreline that favours abundant growth of aquatic plants. The associated water is slack and provides resting areas, escape cover, and food for fish, as well as for those waterfowl which are resident in summer. There is evidence to suggest that some islands have higher populations of voles and deer mice than most mainland areas. These small rodents are an important food source for fur-bearing animals such as weasel, as well as for some raptors. Good stands of white spruce occur both on islands and in river valleys where the soil is relatively rich and well drained. In addition, islands are often protected from mainland fires. In good cone-producing years, white spruce provides abundant food for both squirrels and voles, and birds such as wandering flocks of white-winged crossbills. Such trees also provide nesting sites for bald eagles and osprey. Bald eagles scavenge for fish, and they may have been historically associated with Indian

fishing camps as well as with fish spawning areas. Some islands have traditionally been used by Indians for containing sled dogs during the summer. These dogs forage for themselves and may be fed by their owners with catches of fish. It is not known whether any islands in this region have been used in this way.

Because most construction techniques in the North require sand, gravel, and other kinds of aggregate, islands have a high potential for removal of borrow materials, just as with bedrock areas, talus slopes, streambeds, and eskers. Underwood, McLellan and Associates suggested that the Mackenzie River islands near Fort Norman may yield significant quantities of fine to medium well-graded sands for highway construction, but that further test drilling is required for assessment of their potential.⁶² Excavation of sand from the islands would obviously be in conflict with the biologically important features of these areas. The extent of conflict would depend on the size and locations of excavation sites and the time of year of removal, none of which information is presently available.

In recent years recreational travel by small craft down the Mackenzie River has increased. Islands are a favoured camping or lunch site, with the windward side offering relief from mosquitoes and black flies, and the leeward side offering relief from storms. This form of recreation is not, for aesthetic reasons, compatible with the noise levels associated either with construction on and around islands or with increased density of land, water, and air vehicles. Nor is it compatible with the scars of borrow pits and access roads. However, recreational travel by small water craft may itself destroy various resources, and its own value, if its level greatly increases.

Although bedrock areas, streambeds, islands, and areas of water are the sites of specific, and often very intense, disturbances by man, it is the well-drained land surfaces that in the long term receive most of the conspicuous disturbances. Settlements, roads, airstrips, landing areas along rivers, storage areas, and most other man-made facilities are normally built on well-drained land surfaces. Not surprisingly, then, the potential for resource use conflicts is great on these portions of the landscape. Roads may intersect traplines or migration routes of animals; the best stands of white spruce occur on well-drained land; gravel pits on ridges or eskers may destroy important wildlife habitat; and various facilities such as roads, pipelines, or railroads may compete for precious space in certain topographically restricted terraces or passes.

In the defined region, both the proposed gas pipeline

and the Mackenzie Highway follow the east slope of the Mackenzie Valley, crossing till-plain terrain which includes undifferentiated areas of peat, fen, or peat-fen complex. Zoltai and Pettapiece emphasized that the terrain sensitivity maps provide only a general rating for large areas, and that local variations inevitably occur.⁶³ Neill noted bank stability problems for routes running parallel to the Mackenzie River on the east bank.⁶⁴ Areas subject to large-scale shallow slides included a slope east of Halfway Island. The proposed gas pipeline crosses Vermilion Creek, above which springs ensure a winter flow of water, and the banks of which are classified as unstable. One mile below another spring the proposed pipeline crosses Jungle Ridge Creek, which is a spawning area for grayling, and then runs parallel to the spawning area, although on the downslope side. The highway extension must, by reason of greater terrain sensitivity on the east side of the Norman Range, follow much of the same route. The route of an oil pipeline or a railway would also be subject to similar restrictions.

Silting of river crossings with secondary effects on juvenile fish and therefore tertiary effects on fish harvest has been discussed in relation to the pipeline. But what will be the cumulative effect of two, three, and possibly four lines of transportation within the same relatively narrow area? If all of these are to be constructed along the east side of the Mackenzie River, they must all be funnelled through the narrow pass behind Bear Rock and must all cross the Great Bear River in a restricted area between Fort Norman and the mouth of the Brackett River, the banks of which area are largely unstable.⁶⁵ Will the unavoidable environmental effects become additive or synergistic with construction of other transport lines? And can these combined effects still be called minimal even though the effects of any one facility may be "minimal"? CAGSL proposed a construction camp on the north side of Vermilion Creek with a helipad, compressor station, and an access road to Vermilion Ridge for borrow material. If a pipeline were proposed again sometime in the future, would there be competition for borrow material by highway and pipeline construction contractors? Will the highway also run parallel to the Jungle Ridge Creek spawning area for grayling, and will there be room downslope for both pipeline and highway? What will be the effect on the highway of the springs along the west slope of the Norman Range? Maps prepared by van Everdingen indicate widespread occurrence of springs, perennial groundwater discharge into streams, and related spring and stream icings in the corridor between the Mackenzie River and the Norman Range from Bear Rock to Gibson Pass.⁶⁶

These springs suggest a high probability that both highway and pipeline will encounter groundwater-related problems in this part of the transportation corridor.

Regardless of which development is being considered, construction will involve access to areas, clearance of rights-of-way, communication between sites, removal of local sources of construction material, transportation of construction materials, crossing of streams, use of heavy equipment, immigration of skilled workers, construction of infrastructures required for temporary worker accommodation and support, and supplies of fuel which must be transported to the construction areas. Many of these activities would generally follow routes over well-drained land surfaces.

The Brackett Lake wetlands include muskeg (fens and peat plateaus) and marshes, as well as lakes and streams with various types of shoreline vegetation. Wetland complexes form an extensive area of land and water interface. The associated soils are often deep and rich in nutrients. Natural changes in plant communities (succession) result in a diversity of plants and associated animals. For these reasons wetlands, with the general exception of muskegs, are among the most biologically productive areas in the world. Hunting, especially for waterfowl, has always been and still is associated with wetlands. In addition to hunting, fishing and more recently trapping continue to be traditional uses of wetlands. In temperate regions, agriculture that requires drainage of marshes has been the overriding form of wetland use; but in the North this is not a foreseeable conflict because of the constraints of climate upon agriculture. Stewart, however, suggested that remote peatlands in the North could provide peat for horticultural production, and also observed that some species of grass "have potential for converting our northern peatlands into more productive pastures once the problem of cultivation on permafrost can be solved — if ever."⁶⁷ In regions without permafrost where peatlands have been drained and cultivated, rapid decomposition of the peat occurs, resulting in disappearance of the peat surface. Stewart therefore concluded that peat should be considered a non-renewable resource which allows only short-term cultivation.⁶⁸ It would seem that such use of the resource for increased food production is equivalent to the much deplored slash and burn technique of "underdeveloped" countries.

Use of peatlands for treatment of polluted water was discussed by Ruel et al.,⁶⁹ and Hartland-Rowe and Wright studied the absorption of wastes from sewage disposal near Hay River, N.W.T.⁷⁰ Their findings, however, cannot be extrapolated to all northern wetlands. Muir observed that

mine wastes (waste rock slurry) dumped into muskeg near Pine Point had partly buried and killed some coniferous forests, and stated that the long-term results of percolation of wastes through muskeg to Great Slave Lake were not fully understood.⁷¹

Small-scale removal of peat for local use as a fuel for heating and cooking has been practised for centuries in countries such as Scotland, Ireland, Finland, and Russia. More recently, there has been increased research into the use of peat as a source of paper, construction material, alcohol, and industrial fuel.⁷² Peat has successfully been used to absorb oil from oil spills and may be considered for stockpiling along any oil pipeline route. However, removal of peat in permafrost areas of high ice content in the Brackett Lake area, on the scale necessary for stockpiling or industrial uses, would result in severe thermokarst slumping and erosion. In addition, the presence of muskeg accentuates fluctuation in water flow after heavy rainfall and snowmelt.⁷³ Increased flow after snowmelt is necessary for ice breakup and spring flooding in the defined region and the Mackenzie Delta.

The Brackett Lake wetlands would be entirely unsuitable for any phase of construction related to the Mackenzie Valley corridor concept. However, related to this concept is an expected increase in tourist traffic and increase in resident population along the Mackenzie Valley, if the Mackenzie Highway is completed. In summer and fall, access to the wetlands and to Kelly Lake can be gained easily from Fort Norman by canoe or other small boat. While there is no tourist conflict with use of resources by native people or with research on the proposed IBP Brackett Lake Ecological Site, as long as recreation pressure is light, there is the potential for conflict if such pressure increases.

An indirect conflict for the Brackett Lake wetlands is that which may be associated with hydro development of the Great Bear River. Thurlow and Associates discussed the possible impact of such development on the wetlands, development which might result in changes of groundwater level or in floods from destruction of the levee on the north shore of the Great Bear River.⁷⁴ Most of the wetlands are below the 122 metre contour above sea level, and the area is now mapped at 7.6 metre contour intervals. At the Lower Brackett dam site, the river bed is 53.3 metres above sea level. The full supply level of this dam would be 97.5 metres,⁷⁵ while the full supply level of the Upper Brackett dam would be 108.2 metres. Again, it must be stressed that the Mackenzie Valley is one of the major North American waterfowl flyways, and that the Brackett Lake wetlands complex is one of only a few wetlands in this region. This fact

raises the possibility of various conflicts between proposed developments and long-term maintenance of waterfowl habitat and of beaver and muskrat habitat.

Rivers are systems which evolve from the interactions of flowing water with land. Their diversity of character is formed by this interrelationship, as is the character of the land through which they flow. Seasonal irregularity of flow regimes is a vital factor in the dynamics of terrestrial plant and animal communities along river banks and their mouths or deltas. A brief list of some properties of rivers may suggest why, of all physical features, rivers and their valleys rank highest among areas of potential resource use conflict, particularly in the North:

- 1 they contain kinetic energy which, depending on the river profile, may be harnessed;
- 2 they are a medium of transportation for a variety of living organisms, including man;
- 3 they are a medium of nutrient supply and deposition and are therefore areas of relatively rich soils, especially in the North;
- 4 they allow the extension northward of the range of some plant and animal communities;
- 5 they are an essential habitat for fish, waterbirds, and semi-aquatic mammals, and for the migration and dispersal of these animals;
- 6 for all the foregoing reasons, they are traditionally associated with settlements;
- 7 they are a source of water supply for settlements and a medium for waste disposal of various kinds;
- 8 they have a strong aesthetic, emotional, and intellectual appeal to many people.

Presently the transportation needs of people in settlements along the Mackenzie River are served by barge and other boats during the summer, a winter road after freeze-up, and aircraft year-round. Use of air-cushion vehicles has been the subject of experiment in the upper Mackenzie River near Fort Providence and in the Mackenzie Delta. In the future these vehicles may be proposed for limited use in the Fort Norman-Brackett Lake region of the Mackenzie Valley. Jet boats are also used for recreational and other transportation needs in shallow water.

Although the proposed Great Bear River hydro development is now indefinitely postponed, if it is reconsidered there would be road construction from Fort Norman to the proposed dam site. A road would probably be required the entire way from Fort Norman to Great Bear Lake, since the residents of Fort Franklin and Fort Norman would no longer

be able to travel on the Great Bear River in summer by canoes with small outboard motors. Most of the local residents own such canoes, and when travelling on the river use the opportunity to hunt. Substitution of a road in place of river transport would require the residents to purchase trucks or cars. If the Lower Brackett dam is built, access by river to the Brackett Lake wetlands area, including Kelly, Loche, and Mahoney lakes, would also be restricted at least to the extent of portaging around the dam. Water levels below the dam would be low and possibly no longer navigable.

Construction of dams on the Great Bear River would block fish migration, although ladders might be built to overcome this problem partially. Culverts associated with stream crossings of access roads can also present serious obstacles to fish migration, depending on the culvert length and also on the rates of water flow through the culverts.⁷⁶ A more detailed discussion of the effects of hydro development on fish is given in the section of this paper dealing with the Pelly-Macmillan study area.

The importance of river valleys for resource planning is indicated by a section of the final report of the Pipeline Application Assessment Group.⁷⁷ Although this report by a government assessment team was not intended to make recommendations, it does make recommendations regarding certain broad inter-disciplinary matters, such as where it is best to cross a stream to lessen undesirable pipeline effects in valleys. The initiative taken by the Pipeline Application Assessment Group to make recommendations on this important issue seems to be an admission that no agency or group of agencies is now undertaking co-ordinated environmental planning for areas of above-average importance, such as river valleys.

If lakes in this region are developed for commercialized recreational use, the increased fish harvest, increased transportation activity, and general increase in human presence may conflict with the traditional uses of these areas by native people.

If artificial snow is required for snow roads to transport heavy construction equipment in winter, local sources of water will be required for snow making. In winter, water levels in lakes, streams, and rivers are generally low. If water requirements are such that the levels are reduced further, the survival of overwintering fish, muskrat, and beaver may be threatened. Lakes in forested areas that are protected from wind accumulate snow. Removal of such snow for snow roads may result in an increase in the thickness of the ice, because of loss of insulation, and consequently a decrease in

the depth of the water. In shallow lakes there may again be an adverse effect on overwintering animals. Removal of snow from terrestrial areas may destroy overwintering habitat for small rodents which are dependent on snow cover for protection from most predators, and for protection from extreme cold. They are a basic component of food chains in the North. Low-growing plants and dormant invertebrates are also dependent on the insulating and protective properties of snow cover. While snow removal may affect relatively small areas, the incremental effect may be important locally.

Exploration for oil and gas requires seismic lines to be cut, blasting, and wildcat wells to be drilled. Exploration for coal involves a programme of rotary drilling. These activities involve transportation of men and machinery over various types of terrain, with locally high levels of noise. The Territorial Land Use Regulations were designed to minimize disturbance to land and waters; but they make no provision for disturbance to animals, nor do they consider cumulative effects of a variety of land use operations.⁷⁸ Data on the effects that various activities associated with extractive industries have had on a few species are as yet inadequate to answer questions related to cumulative effects. In relation to the Mackenzie Valley Pipeline Inquiry, the cumulative activities associated with development were described most vividly by Templeton.⁷⁹ McTaggart Cowan emphasized the danger of chain reactions that might occur within biotic communities,⁸⁰ while Usher and Noble stressed the lack of consideration of the cumulative impact of oil and gas exploration and development on social communities.⁸¹ In short, cumulative impact may give rise to cumulative effects, which may be additive or synergistic and are beyond the ability of science to predict, especially when considered in the context of the stresses imposed by natural changes.

As the preceding examples have indicated, there is considerable potential for resource use conflicts in the Bear Rock-Brackett Lake area.

III The Baker Lake-Chesterfield Inlet Region

(a) Description of the Area

The Baker Lake-Chesterfield Inlet region is in the Keewatin District of the Northwest Territories (Figure 4). It includes a marine coastal area and estuary, a large area of low shrub tundra, and many lakes with rivers draining into the Thelon

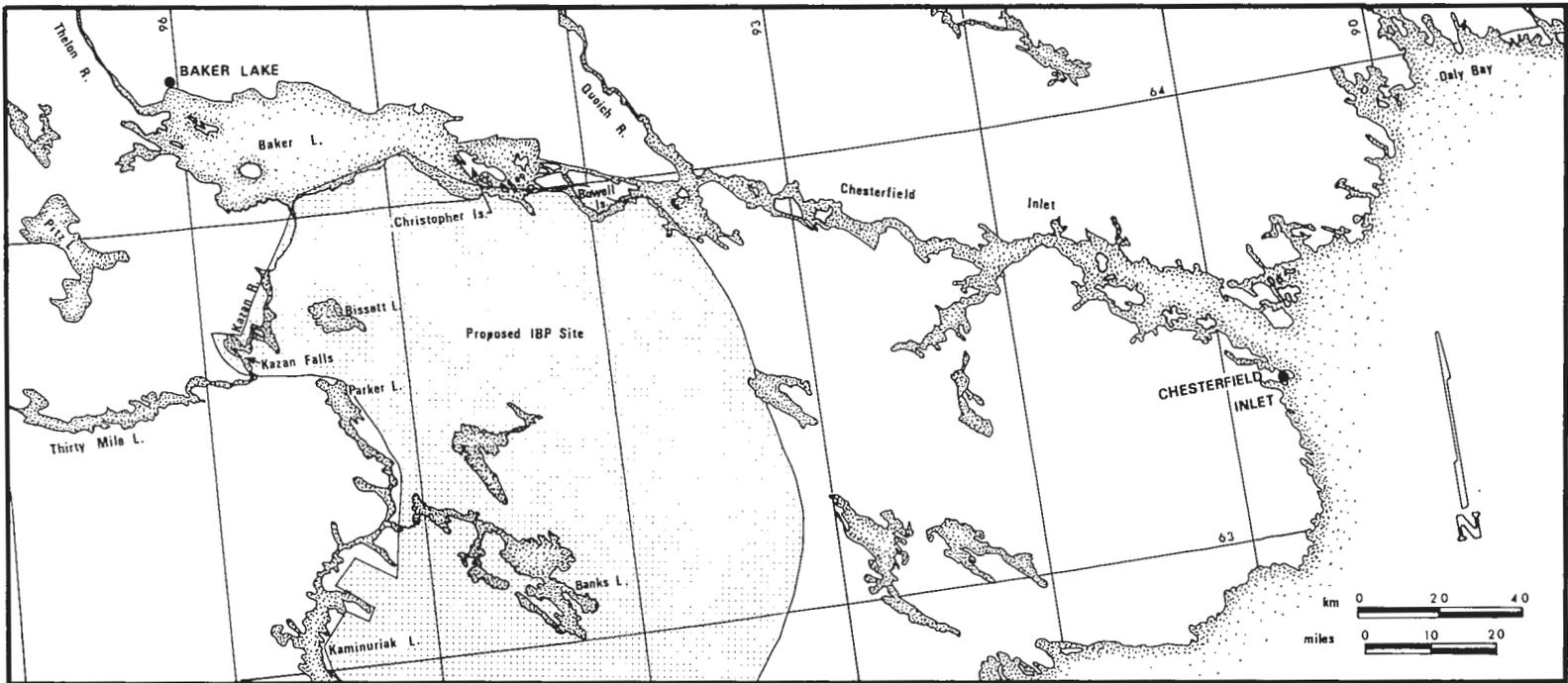


Figure 4 Baker Lake–Chesterfield Inlet Region

system of Baker Lake and Chesterfield Inlet, as well as the headwaters of some rivers draining directly into Hudson Bay. This area, subsequently called the defined region, is within both the arctic and subarctic climatic zone and within the zone of continuous permafrost. Mean annual precipitation is 20.9 centimetres at Baker Lake and 27.8 centimetres at Chesterfield Inlet. July and August are the months of maximum precipitation. Snowfall is relatively light, and prevailing winds cause accumulation of snow in depressions and of packed snow in drifts on the lee side of obstructions, leaving other areas with a shallow snow cover. Ground blizzards, which may produce whiteouts, are common and wind chill values are high. Ice formation in lakes is broken up repeatedly by strong winds, while that at the coast is subject to both tide and wind action. Land-fast ice is separated from drift ice by leads of open water which are estimated to average about five miles in width along the coastal area. Many narrow leads occur north of Chesterfield Inlet in Roes Welcome Sound. The nature and extent of land-fast ice varies according to the roughness of coastline and the presence of islands and reefs, as well as to temperatures, winds, and tides during the freeze-up period. Similarly, snow conditions on the ice will vary according to topographical features and to the roughness of the ice. Land-fast ice is stable in the Chesterfield Inlet region and wider than that which forms south of Eskimo Point.

The land is low-lying, with a general northwest to west orientation. It lies within the Canadian Shield and granitic outcrops are common in some areas. Deposits of copper, lead, silver, and uranium are known, and soapstone also occurs in some locations. Drainage is generally poorly integrated, with the exception of the three major rivers — the Kazan, Thelon, and Quoiich. Peak runoff from snowmelt occurs during late June or early July. Winter flows are very low as a result of depletion of lake storage. Many of the lakes in the Kazan drainage basin are shallow, and they and connecting streams may freeze solid. Chesterfield Inlet and Baker Lake are navigable for small ships by the middle or end of July, until the middle or end of October. The lake is shallow on the south side, especially near the mouths of the Kazan and Thelon rivers. Sandy beaches characterize the south shore, while deeper water is found along the north side where outcrops of granitic rocks occur.

A deep narrow trench of approximately a hundred metres in depth occurs at the mouth of Chesterfield Inlet close to the south shore. Shoal waters associated with islands and reefs are common along much of the coast in the defined

region. The tidal range at Chesterfield Inlet is 2.9 to 4.2 metres, and tidal flats occur south of the settlement, at Cape Silumiut and along many of the offshore islands. Tidal streams are associated with a rotary progression of tides around Hudson Bay. They are strongest on the west coast and are influenced by the frequent strong winds which are characteristic of Hudson Bay. Currents along the coast in the defined region run southward. Frequent strong winds are also responsible for vertical mixing of waters.

Whitefish, lake trout, and arctic char occur in the freshwater systems of the defined region. Anadromous char, studied in the Wilson Bay area, had higher rates of growth and matured later than land-locked populations. Char spawn in freshwater on gravel during the late fall when ice is forming. They deposit eggs in 1.8 metres to 4.6 metres of water and in shallow pools below rapids in rivers. There was evidence that both anadromous and land-locked char may spawn only in alternate years. Adult char leave the lakes at first breakup of ice and crowd river floodwaters close to the shore. Although they are of primary importance to Inuit, the study indicated that char are not sufficiently abundant for commercial fishing in that region. Dunbar found that there was some potential for commercial fishing of arctic char in Hudson Bay. However, he recommended that the take in any region be spread over as many streams and stream mouths as possible, and that each region be studied independently and strict limits on the harvests be set.

Lake whitefish and lake trout were studied in Kaminuriak Lake, where a small commercial fishery has existed since 1972. While the growth rate of Kaminuriak whitefish appeared to be moderately high compared to that of whitefish in some other northern lakes, that for trout appeared to be low. A study from 1970 to 1971 showed that lake trout in Kaminuriak Lake had mercury in muscle tissue in excess of 0.5 parts per million. Under the Food and Drug Act and Regulations, 0.5 parts per million of mercury per kilogram of wet weight is the limit for safe consumption, although this limit is subject to revision and is believed to have a wide safety margin. The source of mercury contamination in Kaminuriak Lake is not known, and lake trout in Baker Lake did not show levels in excess of this amount.

The Land Use and Occupancy Study of the Inuit Tapirisat of Canada indicated areas in the defined region where fish were abundant and commonly harvested. These are shown in Figure 5. In a 1972 report by a federal-territorial task force on fisheries development in the Northwest Territories, it was observed that in many unexploited areas

fish populations appeared to be high, but that these populations represented capital stock with a relatively low sustainable yield. If the biological capital is removed, many years will be required for regeneration, during which time no harvesting can take place. The practice of "mining" fish stocks, which has occurred in the past, was strongly opposed. The task force stated that there was a major risk of over-harvesting, especially for the development of freshwater and coastal fisheries in the Arctic. Consequently, both assessment of fish stocks prior to development and regular monitoring of harvested fish stocks were required, so that quota adjustments could be made. If management for a sustainable annual yield was then found to be uneconomical on a commercial basis, the alternative of a six-year harvest cycle could be used, with lakes being fished for two years and lying fallow for four years. The task force concluded that the necessary information was lacking for a comprehensive assessment of productivity and sustainable yield of fish populations in the Northwest Territories, and that there were no comprehensive estimates of the domestic catch of fish.

The task force recommended that fisheries development should be for the benefit of long-term residents of the North, and that harvesting of fish for domestic purposes should take precedence over commercial or sports development. These were value judgments and quite properly so, since decisions cannot be made unless values are explicitly compared. The task force also recognized that domestic supplies of fish protein might profitably compete with imported protein from the South, and that commercial fishing operations could form the basis of inter-settlement trade. In addition, if operated by northern residents, sports fisheries developments would provide a source of northern revenue and yield a greater return on each fish harvested, generally with less stress on the resource. The Rankin Inlet area, part of which is included in the defined region, was recommended for further investigation, although the cannery was considered to be only marginally viable in economic terms.

Geese, ducks, and swans migrate through the defined region. The wetlands from the Kazan Delta to the Thelon Delta are an important staging area in spring and fall for snow and Canada geese. Snow geese nest in small colonies at Kazan Falls and northeast of Pitz Lake. Canada geese nest at low densities in much of the defined region. Nesting Canada geese make use of small islands or hummocks in tundra lakes which afford some protection from terrestrial predators. Non-breeding geese migrate into the defined

region for moulting. During a study of areas that are used for moulting, an aggregation of about 3,400 birds was observed in the Quoich River. Habitat suitable for moulting geese is restricted mainly to stream and lake shorelines associated with post-glacial lacustrine or marine submergence. In tributary streams and lakes, moulting geese are always associated with sand beaches and sedge meadows that are flooded in spring. Non-breeding birds arrive soon after ice breakup (early June at Kazan River and late June at Quoich River), with post-breeding birds arriving later. Moulting birds use large amounts of energy and must afterwards accumulate energy reserves for migration south. During moult, which lasts between twenty-five and thirty days, geese are highly susceptible to disturbance, and in the Thelon River were observed to desert prime moulting habitat in subsequent years when repeatedly disturbed. Accordingly, it was recommended that prime moulting areas in the Thelon and Quoich rivers be protected from repetitive boat and airplane use from 15 June to 1 August.

Open leads adjacent to land-fast ice in the defined region may be important staging areas for birds that nest on Southampton Island. Mixed flocks of Canada, white-fronted, and snow geese rest on land-fast ice in the Chesterfield Inlet region, and in spring ducks and geese are hunted all along the floe edge by Inuit from Chesterfield Inlet. Common eider both breed and winter in the defined region. They are dependent on open leads for overwintering, and generally use offshore islands for nesting. Oldsquaw are also common breeders in the area. Red-throated loons commonly nest near the coast and on offshore islands. According to nutrient availability and light penetration, phytoplankton (free-floating plants) may be abundant on the undersurface of ice. This community is grazed by zooplankton (aquatic invertebrates) including, in Hudson Bay, large amphipods which in turn are eaten by such fish as Greenland cod and arctic char. Both invertebrates and fish may be eaten by seabirds at the floe edge. Black guillemot, gulls, and parasitic jaeger were observed to be common at the floe edge in the Chesterfield Inlet area in May. Later in the season, many shorebirds are found along sandy beaches where strands of dry seaweed containing larvae and pupae and marine organisms provide a source of food. The abundance of breeding black guillemot and common eider is thought to be related to the abundance of benthic algae (attached seaweeds) in offshore waters. Areas of shoal water and reefs are numerous in the Chesterfield Inlet region. Benthic algae require a firm substrate and protection from ice scouring within the fluctuating shallow waters of tidal

areas (the littoral zone). Such conditions occur only locally in Hudson Bay.

Rock and willow ptarmigan and sandhill cranes nest within the defined region. Ptarmigan are also resident throughout winter. Ptarmigan and waterfowl are hunted by people from the settlements of Baker Lake and Chesterfield Inlet, and guillemot and their eggs may legally be taken by Inuit during the summer.

Kazan Falls, the Thelon River, and areas between Baker Lake and Pitz Lake are important nesting areas for peregrine and, in some instances, gyrfalcons. The northwest shore of Baker Lake is defined as a peregrine falcon nesting area, and peregrine falcon have also been observed at Chesterfield Inlet.

Continuous permafrost, poorly developed soils, and the presence of bedrock near the surface result in groundwater being stored in unconsolidated glacial deposits, and numerous surface ponds in low-lying areas. Snowmelt occurs early on the southern aspects of eskers and raised beaches. Water from melting snow runs off the uplands while the soil is still frozen, and early in the season much of the lowlands is swampy. The active layer ranges from one to two metres during the summer. Broad valleys between low hills near the Baker Lake settlement are covered with heaths, lichens, and grasses. Patches of dwarf willow occur on Christopher Island and on nearby mainland hills. Sedge meadows occur in low-lying areas. Productivity in low arctic sedge meadows is generally high (1.16 to 3.56 grams per day), compared to that in the High Arctic. Fires caused by lightning are not uncommon during hot, dry summers, and fires have been observed on all kinds of terrain. Uplands south of Bissett Lake reach an elevation of 183 metres above sea level. While much of the southern part of the defined region is of moderate relief and is usually described as flat and monotonous, there is sufficient difference in topography and therefore in aspect, snow distribution, and patterns of melting to ensure that phenology differs within the defined region — a factor of great importance to both migratory and non-migratory herbivores. The main mammalian herbivores in the defined region are barren ground caribou, lemmings, arctic hares, and arctic ground squirrels.

Barren ground caribou occurring in the defined region appear to belong to two populations, named after their traditional calving areas. These are the Kaminuriak herd and the Beverly herd. A major proportion of both these herds usually winters in the taiga (boreal forest) in northeastern Saskatchewan, northern Manitoba, and the Northwest Territories. A sub-group of the Kaminuriak herd is known to

winter on the coast in the Rankin Inlet-Chesterfield Inlet region. While it shares the same general calving area, this group would not appear to share the same breeding area as the taiga wintering population. Calving grounds within, or adjacent to, the defined region are shown in Figure 6. The grounds are generally high and rocky. At the time of calving, lichens are usually abundant on the calving grounds and contain a high percentage of moisture. Synchronized group movements which arise from strong social bonds are believed to induce simultaneous oestrus in females, synchronized conception, and thus a short calving period. The brevity of the calving period in turn reduces the period of vulnerability of females in parturition and of newborn calves to predation by wolves. The peak of calving occurs during the first half of June. Calves are precocious at birth, and double their length in the first five months of life. Rapid growth rates are considered to result from selective feeding on high-quality forage.

Post-calving concentrations occur in late June and July, and are shown in the defined region in Figure 6. Concentrations may occur in wet sedges, and are probably a response to rapid new green growth of sedges at that time. Other post-calving concentrations occur in low shrub tundra where dwarf birch and willow are common. In addition to being a response to the phenological availability of plants of high nutritional quality, post-calving concentrations allow the formation of small social units within the larger group. The discreteness of groups of migratory animals and their affinity to certain localities is not well understood, but it is an integral part of their behaviour adapted to their survival. It would therefore seem apparent that known areas of post-calving concentrations require as much protection as calving areas and migration routes, in terms of avoiding disturbance to both animals and vegetation.

Two migratory movements within the defined region were not observed in recent biological studies of the Kaminuriak herd. These are a spring crossing of the Kazan River below the Kazan Falls and a summer crossing of Chesterfield Inlet at the narrows. Manning observed caribou tracks on Christopher Island in late August 1945, and was informed by Corporal Hamilton of the RCMP at Baker Lake that he had seen large numbers of caribou crossing Chesterfield Inlet at its western end in 1944. Inuit of Chesterfield Inlet and Baker Lake maintain that this is a traditional crossing area. In September 1903, Low observed a camp of Inuit at the channel south of Bowell Island, where

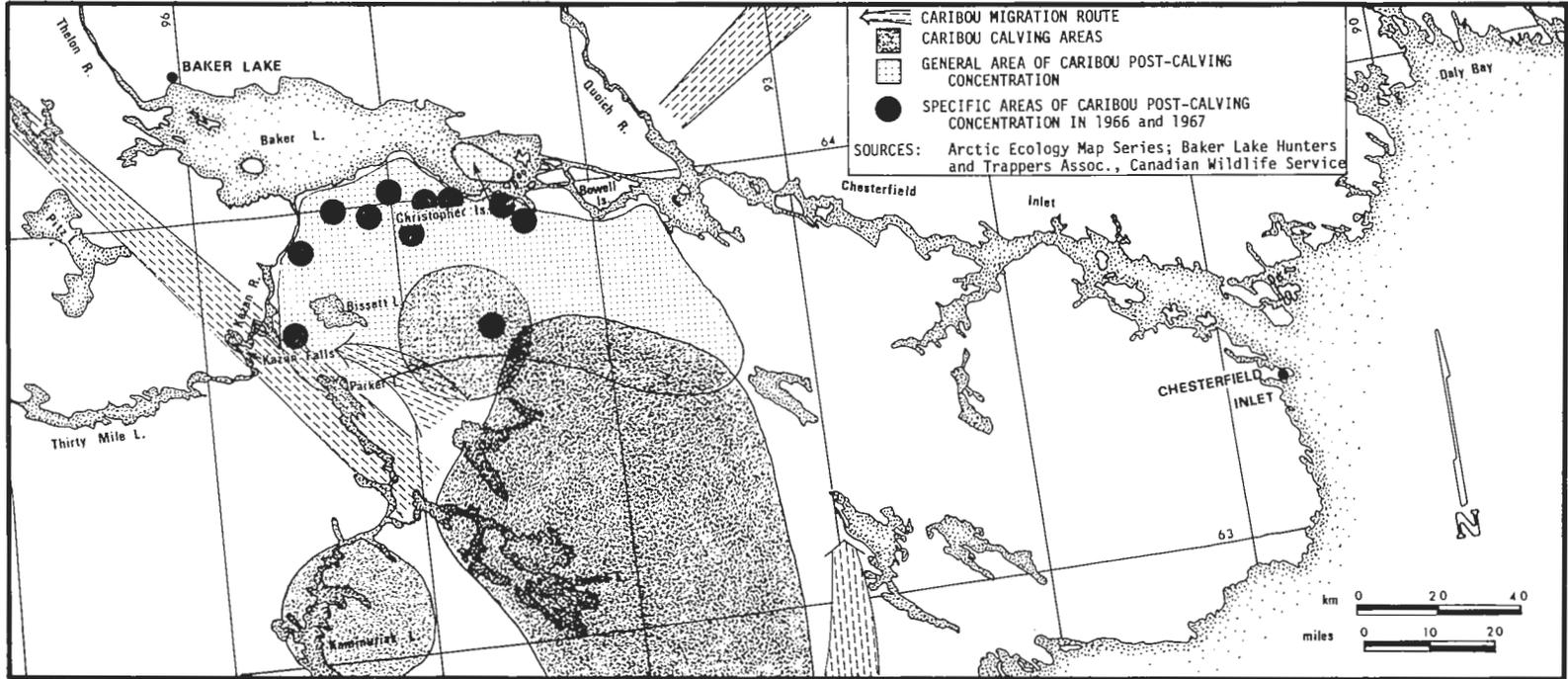


Figure 6 Important Caribou Areas in Baker Lake–Chesterfield Inlet Region

great numbers of caribou had been killed at the crossing. North of Chesterfield Inlet caribou occur year round and are hunted by Inuit. Hunting areas show the north side of Chesterfield Inlet to be heavily hunted, and a small area on both sides of the lower Kazan River to be within caribou hunting range. It is not known whether the Kazan River crossing is no longer used because of natural shrinkage of caribou range following changes in population, or because of disturbance by activities associated with mineral exploration and maintenance of camps.

Estimates of mainland barren ground caribou populations, derived by various techniques, suggest a population decline from the 1940s through the 1950s and an increase in the early 1960s. However, data from aerial surveys made in 1955 and 1967-68 were analyzed and it was found that, when techniques of extrapolation were adjusted to make such a comparison valid, there was no evidence for an increase in population over this period of time. The Kaminuriak population was estimated at 63,000 in 1968 and the Beverly population at 159,000 in 1967. Analysis of the population structure of the Kaminuriak herd indicated a stable herd with a potential for rapid increase.

Insufficient data exist at present from which to make estimates of the carrying capacity of range for both tundra and taiga wintering populations of the Kaminuriak herd. Snow conditions limit the availability of terrestrial and arboreal forage in winter, and also restrict animals to specific habitats or sites. Both snow conditions and plant productivity will vary from year to year. In addition, high-quality summer range is required for the animals to attain sufficient fat reserves to enable the majority to undertake a long fall migration, for cows to conceive, and for the animals to enter the winter in good physical condition. Fat reserves of most animals are depleted during the winter. Poor physical condition of the cows may contribute to death of calves at, or shortly after, birth. Differences in calf survival may therefore be related to the amount of food available to pregnant females on winter range in relation to their energy expenditure, as well as to the quality of food on summer range.

Caribou are a traditional and important food resource to Inuit in the defined region, as well as to Indians in taiga wintering range. They are hunted in winter, at crossing places during migrations, and along the shores of lakes and in coastal areas during the summer.

Wolves are known to breed west of the defined region in Beverly Lake and the Thelon River area. They den, commonly, at tree line or in the taiga. The majority of wolves in

the defined region seem to be non-breeders, which follow caribou herds from winter range in the taiga to summer range in the tundra. During winter in the taiga, caribou constitute the staple diet of wolves, and high wolf densities occur at times during maximum compression of caribou populations. In a study west of the defined region it was found that, while a greater variety of food was available to wolves in summer than in winter, caribou constituted the main prey species. However, lemmings and voles were important prey items regardless of the presence of caribou. Caribou calves were of principal significance to wolves that were near caribou calving grounds. While wolves are an important cause of calf mortality, other mortality factors may have equal or greater importance. Wolves and caribou have evolved together as components of biotic communities, and it is generally agreed that the impact of wolves on caribou populations is not well understood. Since increased requirements for food for increasing human populations in the North will undoubtedly be given as a prime reason for wolf control, the whole question of predator/prey relationships, as exemplified by barren ground caribou and wolves, requires further research.

Wolves are hunted by Chesterfield Inlet Inuit in the Daly Bay area and west towards Josephine Lake. Baker Lake Inuit also hunt wolves when trapping or when hunting caribou. Wolves are not considered to be very abundant in the region, although they are often found in the area of the lower Thelon River.

Arctic foxes occur throughout the defined region. Soil stability is essential for both wolf and fox dens, and the most frequently occupied dens are those on eskers or moraines overlooking broad valleys. Den site availability is not considered to be a limiting factor in the population size of arctic foxes, at least in the western part of the defined region. Survival of fox whelps appears to be closely related to both abundance of lemmings and time of occurrence of lemming reproduction. In summer, birds and eggs, fish, insects, berries, and caribou carrion are eaten, in addition to lemmings. In winter, lemmings remain an important food component, with carrion also frequently occurring in stomach contents. Foxes near the coast are known to scavenge in winter on seals killed by polar bears, and are attracted year round to camps and settlements where garbage is dumped. In the Chesterfield Inlet area, seal is used for fox-trap bait along the coast, but caribou kills are also used for trap bait inland. The relative proportion of foxes trapped on ice areas compared to inland areas is not known, nor is it known from where such

foxes originate. Foxes are an important source of fur to trappers in the Baker Lake area. The most intensely trapped locations in the defined region are south of Baker Lake, from Andrews Lake through the Kazan River area to Thirty Mile Lake; the Parker-Banks lakes area; the St Clair Falls area; the Pitz Lake area; and the Thelon River area.

Two species of lemmings occur year round in the defined region. These are the brown and the collared lemming, which are found in all habitats except rocky eskers, river and lake edges, and sand dunes. However, the collared lemming is commonly found in well-drained lichen heath and heath-sedge hummock areas, while the brown lemming occupies lower and moister areas of sedge meadows and sedge hummocks. Lemmings are an important food source for resident as well as for migratory carnivores. Their populations may fluctuate markedly between years, and such fluctuations may be reflected in the abundance of arctic fox, weasel, and predatory birds in a given area. Winter breeding under the snow occurs in both species of lemmings in some years, and seems to be a prerequisite for peak populations. The wide fluctuations in population numbers that are characteristic of lemmings in all areas are not well understood.

Arctic ground squirrels are common near Chesterfield Inlet settlement and the offshore islands. They are active from the end of May through July. Their distribution is restricted to well-drained soil where deep snow accumulates in winter, so that burrows are well insulated during their long period of hibernation. Arctic hares occur along the coast and offshore islands, from west of Chesterfield Inlet southwest to Big Willow Bay. They are also found in the south channel area at the eastern end of Baker Lake and are hunted in these areas, as well as in the vicinity of both settlements. Like lemmings, arctic hares also fluctuate widely in numbers.

Ringed seals, bearded seals, harbour seals, and harp seals all occur in the defined region. Of these, ringed seals are the most abundant. Adults and some immature animals overwinter under land-fast ice by maintaining breathing holes. Immature seals are more generally found at the edge of land-fast ice, and young adults occur in areas of unstable land-fast ice. Reproductive females make birth lairs on the ice under snowdrifts that are formed around ice hummocks, or along rough pressure-ridge ice. These lairs are entered through breathing holes. Pups are born in April, and birth lairs may be located by scent by arctic foxes, which enter by digging through the snow. It is not known whether such predation is a significant factor in the defined region.

Seals bask in the sun on the ice near their breathing

holes in the spring, during which time they both moult and fast. Reserves of blubber are depleted, which makes them less buoyant in the water. Coastal marine water may also provide less buoyancy during the period of inland ice breakup, when quantities of fresh river water are added to coastal areas. Ringed seals are an important food item to Inuit, and may be harpooned in winter at breathing holes, shot while basking on the ice in the spring, or shot in open water from boats in the summer. Ringed seals feed mainly on benthic crustaceans and zooplankton, in addition to such fish as polar cod. In some areas ringed seals may congregate in the fall in response to concentrations of fish, and in good weather they may then be hunted from boats. Hunting in the spring is relatively easy. However, because of reduced buoyancy and reduced salinity, many shot animals may sink and be lost to the hunter. Populations of ringed seals were formerly considered to be relatively stable and sedentary. However, recent studies have indicated that wide variations in reproductive success occur between years and that seals move over long distances. Estimates of numbers in Hudson Bay, of annual harvest, and of numbers killed by polar bear are at present only tentative.

Bearded seals (square flippers) are relatively common in the defined region, but less abundant than the smaller ringed seals. They feed almost entirely on benthic invertebrates, and are therefore found in relatively shallow waters of less than fifty fathoms. Populations may be limited by the accessibility of shallow, ice-free, feeding banks in winter. Like the ringed seals, they are relatively slow to reach maturity, but unlike the former appear to breed only in alternate years. Late maturation and low productivity mean that populations are slow to recover from disturbance or over-harvesting.

Harbour seals extend some distance into Chesterfield Inlet. They are associated with estuarine and freshwater conditions, and the extent of their dependence on marine habitat is not established. Harp seals occur in small numbers during the summer. They move into the area following ice breakup, and leave Hudson Bay before ice forms again.

Although walrus are common in the defined region, they do not appear to have been an important resource to Inuit from Chesterfield Inlet. They are not a ubiquitous species. The main stocks of walrus are found in northern Hudson Bay in the vicinity of Southampton Island, and northern Foxe Basin. Only small, widely scattered populations exist elsewhere in Hudson Bay and the eastern Arctic. Walrus are gregarious and are associated with pack ice and with shallow inshore areas free of land-fast ice during the

winter. They feed mainly on benthic invertebrates, and are confined to depths between fifteen and eighteen metres. Where waters are shallow with gently shelving beaches, clams are common. When clams are not abundant, walrus prey on seals; and ringed seals are known to leave areas when walrus arrive. During the open water season, walrus concentrate on land at traditional sites. These are usually rocky islands or promontories which give quick access to deep water. Haul-out sites and inshore feeding areas are critical for the survival of walrus; however, there appears to be little information about such sites in the defined region. Because of low reproductive rates, critical sites for survival in winter and in summer, and the concentration of this species in one geographical area in the eastern Arctic, walrus are especially vulnerable to disturbance of their habitat and to over-harvesting.

White whales (beluga) occur widely in the Arctic in summer. In 1975 their numbers were estimated at a minimum of 30,000, including about 10,000 animals in western Hudson Bay. They occur in the defined region and are believed to winter in Roes Welcome Sound, where leads of open water are common. They are coastal animals, capable of swimming in very shallow water. Mature females calve about once in three years, and river estuaries are used for calving. Large concentrations occur in warm estuarine waters during calving season, and whales are considered to be most vulnerable during this period. They feed on crustaceans, as well as on such fish as Greenland and polar cod and arctic char. In Hudson Bay they have no predators other than man. A commercial fishery at Churchill operated during a season of approximately six weeks, and in the 1950s and 1960s the catch was some 400 to 600 animals per year. The operation at Churchill proved only marginally economical. In 1961 a commercial fishery was started at Whale Cove, and meat and muktuk (dermis with subcutaneous fat) were frozen or canned, mainly for consumption in northern settlements. In 1970, mercury levels in excess of 0.5 parts per million wet weight were found in white whale meat. This level of mercury prohibited the sale of white whale meat for human consumption. However, mercury levels in muktuk were low. Fresh or frozen muktuk is rich in vitamin C and is a nutritionally rich food resource. Harvests of 500 to 1,000 animals in western Hudson Bay are considered permissible, on the basis of an estimated annual production of 1,400 young.

Bowhead whales were heavily hunted in the nineteenth century, and by the early twentieth century were almost

totally depleted in northwestern Hudson Bay. They are presently found in low numbers from Chesterfield Inlet to Roes Welcome Sound. Populations are believed to be slowly recovering in the eastern Arctic.

Polar bears are not numerous in the defined region. They occur along the coast in the Daly Bay and Cape Fullerton areas. Seals are their major food source during the ice season. The fat and blubber of ringed seals are the preferred items, and meat is often left for scavengers. In summer a variety of food is eaten, depending on its availability. Seabirds and waterfowl with eggs and nestlings may be used extensively, or the diet may consist largely of plants. Some bears appear to eat very little during the summer and remain quite sedentary. Carrion may also be an important source of food and, like all bears, polar bears are notorious for their affinity to garbage dumps.

Young are born during the winter in dens which are excavated in deep snow banks on the leeward slopes of coastal hills or on the sides of pressure ridges. Pregnant females tend to concentrate in core areas in autumn. These areas may be defined by snow accumulation patterns which are favourable for denning. However, movement of pack ice driven by winds and tides may land bears in large numbers on coasts, such as the east coast of Southampton Island. The status of the defined region for den sites is not known.

(b) Some Current and Proposed Developments

Mining Exploration

In the District of Keewatin, mining exploration associated with aerial surveys and transportation started in a small way in the 1920s.⁸² During the depression and war years exploration was minimal, but it increased during the last two and a half decades. Copper, lead, silver, and uranium have been found in the defined region. Uranium showings occur in the Kazan Falls and Christopher Island areas.⁸³ Ruzicka assessed some uranium occurrences and stated that basement rocks, the Kazan formation, and the Christopher Island volcanics have potential.⁸⁴ LeCheminant et al. described uranium-copper mineralization in sandstones and conglomerates in the Kazan River, Martell, Bissett, and Parker lakes region, and observed traces of molybdenite in the eastern part of Thirty Mile Lake and Kazan Falls area.⁸⁵ Prospecting permits and claims held for 1976 in the defined region are shown in Figure 7.

Increased intensity of exploration has involved the

emergence of large competitive companies using sophisticated techniques and high levels of logistic support. In April 1974 Inuit from Baker Lake stated their concern about the effects of large-scale exploration on the land and water and on wildlife. Activities which gave rise to concern included blasting, aircraft flying at low levels in the course of surveys, and increased air traffic to provide logistic support to various base camps located in areas of importance for wildlife. Such disturbance was reported to have affected wildlife in the Kazan Falls and Christopher Island areas. It was feared that plans for mineral exploration for lead, zinc, and copper on Christopher Island would adversely affect the fox population in that area.⁸⁶ In addition, Inuit hunters reported that caribou migration patterns had already been affected by exploration activity at Kazan Falls. Pan Ocean Oil Ltd. had a base camp at Kazan Falls. Cominco Ltd. notified the Baker Lake Council that it intended to use thirty men and two turbine helicopters to conduct ground and aerial surveys and diamond drilling operations from a base camp six miles southeast of Kazan Falls.⁸⁷ In June 1974 Inuit of the Baker Lake area requested that the then Minister of Indian Affairs and Northern Development, Jean Chrétien, declare the area a Land Management Zone where Territorial Land Use Regulations would be enforced, and that full consultation with settlement councils be undertaken in the case of applications for exploration permits. Although Mr Chrétien promised that this would be done by 1 January 1975, this commitment was not met.⁸⁸ A telegram was then sent to the new Minister of Indian Affairs and Northern Development, Judd Buchanan. Mr Buchanan replied that revisions to the TLUR were being prepared, allowing classification of the area as a Land Management Zone, but that the preparation would take some months. In view of the exploration activities that were planned for the summer of 1975, the Baker Lake Settlement Council stated that such a delay was unacceptable and requested through the Inuit Tapirisat of Canada that a land freeze be obtained for five zones in the Baker Lake area. The reasons for the proposal were well documented by a map which defined critical areas for wildlife and some areas of cultural significance. Mr Buchanan refused the request.⁸⁹

In the defined area, the following exploration was undertaken during 1975: Pan Ocean Oil Ltd. added eight new prospecting permits to its existing one, south of Baker Lake. Its base camp remained at Kazan Falls. Uranerz explored north and west of Baker Lake. Rio Alto Exploration was based at Baker Lake. The Geological Survey of Canada surveyed in the Thirty Mile and McQuoid Lake areas.⁹⁰

Cominco Ltd. set aside \$700,000 for drilling, surface sampling, and geological and geophysical surveys, in connection with a significant uranium prospect near Baker Lake that involved more than 2,300 square miles.⁹¹ Shilts noted that over 100 people were engaged in uranium and base metal exploration in the general area, during the summer of 1975,⁹² at which time the District of Keewatin was still not classified as a Land Management Zone and was therefore not subject to the TLUR. However, the Northwest Territories Division of Game Management requested mining companies to advise their pilots to observe a minimum altitude of 1,500 feet over caribou calving and post-calving areas from 25 May to 20 June. In the 1976 season Cominco planned to resume activity in the Baker Lake area, where the best discoveries from diamond drilling have revealed a mineralized zone at 113 metres averaging 2.6 pounds of uranium oxide per ton.⁹³ Cominco's programme involved twenty-five to thirty men in a camp located south and then west of the Kazan River. Exploration activities included surveying and diamond drilling on permits formerly held by Pan Ocean Oil Ltd. in an area south and southwest of Baker Lake, with twenty holes to be drilled northwest of Bissett Lake.⁹⁴ In the defined region surveys were also planned for the 1976 season in the Pitz Lake area and the southeastern part of Baker Lake.⁹⁵ Baker Lake settlement was the centre of logistic support for other exploration activities in the region.

Under the revisions to the TLUR, all lands in the territories became Land Management Zones on 4 March 1977. At that time the Minister of DIAND, Warren Allmand, under Section 25 of the revised TLUR, deferred a decision for one year on applications for five new prospecting permits and four new land use permits in the Baker Lake area. The decision was deferred on the grounds of concern for the possible effects of increasing levels of exploration activity on wildlife that are of importance to Inuit of Baker Lake. A contract for an environmental impact study was granted in June 1977, the results of which were to be available to Mr Allmand before March 1978. Mr Allmand's action was interpreted by the mining industry and the media as a "land freeze." However, existing permits are not affected, and exploration activity can continue. Section 25 is a revision of Section 20.1.C, which allowed deferral for six months of a decision on an application permit.

Seismic Exploration and Offshore Drilling

Pimlott et al. documented the history of oil exploration in Hudson Bay, including two unsuccessful offshore drilling

attempts made in 1969 and 1974.⁹⁶ In 1975 a total of 625 exploratory permits, involving thirty-eight million acres, were held in Hudson Bay. By January 1976 ninety-six permits involving nearly six million acres had been terminated,⁹⁷ and acreage under permit subsequently continued to decline.⁹⁸ The permits closest to the defined region are located off Cape Kendall of Southampton Island at the entrance to Roes Welcome Sound. On 29 April 1974 the people of Chesterfield Inlet publicly stated that they were opposed to any offshore drilling or seismic activity in Hudson Bay. Their reasons were that such activity would greatly affect marine animals and that oil spillage or leakage could damage large areas many miles distant from the source of spill, due to movements of currents in the bay. While acreage under permit in Hudson Bay has declined each year since 1968, future plans are uncertain. Permits are under the jurisdiction of the Department of Energy, Mines, and Resources, and exploration activity does not appear to be subject to the Environmental Assessment and Review Process, nor to any other form of social or environmental review.

Transportation of Gas

In November 1972 the Polar Gas consortium was formed, comprising Trans-Canada PipeLines Ltd., Panarctic Oils Ltd., Tenneco Oil of Canada Ltd., Pacific Lighting Gas Development Company, the Ontario Energy Corporation, and Petro-Canada Ltd. The consortium was formed to investigate the feasibility of a natural gas pipeline or other modes of transmission to transport natural gas from the Arctic Islands to southern markets. A pipeline was found to offer the most economical means of transportation. In May 1977 reserves from the gas fields were stated to be 12.8 trillion cubic feet.⁹⁹ In order to make such a project economically feasible, reserves of about 20 trillion cubic feet are required, with a minimum throughput of 2 to 3 billion cubic feet per day, increasing to an ultimate of 3.5 to 4.5 billion cubic feet per day. Such a rate of flow would require a pipe diameter of forty-two to forty-eight inches over land routes and up to thirty-six inches for marine crossings.¹⁰⁰ At present, the suggested route for the pipeline crosses the defined region west of Baker Lake. No formal proposal has been submitted to date. However, a proposal is expected to be submitted by early 1978. Review of the project may be undertaken through the Environmental Assessment and Review Process, which would require Polar Gas to submit an Environmental Impact Statement according to guidelines drafted by the Department of Fisheries and

Environment. Alternatively, Mr Allmand indicated that he would consider a "Berger type" inquiry.¹⁰¹ Environmental studies by the Department of Fisheries and Environment have been in progress along much of the suggested pipeline corridor since 1975. Lamoureux summarized preliminary environmental research undertaken by Polar Gas, and research is to continue through 1977.¹⁰²

Marine Transportation

In 1972 a proposal for a deep-water, year-round port located at Chesterfield Inlet was made to Prime Minister Trudeau by Richard Rohmer and Captain T.C. Pullen, as members of the Great Plains Project.¹⁰³ The site for the proposed port, to be called "Northport," has protected water to a depth of 30.5 metres. This depth would accommodate vessels in the range of 150,000 tons. Rohmer stated that there would be no problem from wind-piled ice, since the location would be protected from northerly winds. The plans included a "climate-controlled community" for operation of port facilities, and stated that tertiary-treated, potable, heated effluent together with aeration would keep the port ice-free during the winter. Specially designed ice-strengthened cargo ships were proposed to operate between the Arctic Islands and the port, assisted by the Canadian ice-breaker fleet. It was suggested that "Northport" would have transportation links to the north, east, and south. A railway and possibly a highway and pipeline "laid out on eskers" were proposed to link "Northport" to Churchill. The fact that the eskers in the vicinity run northwest instead of south/southwest appears to have been overlooked. Material quarried from eskers may provide fill, but a railway from Chesterfield to Churchill cannot be "laid out on eskers."

Hydro-electric Power

The hydro-electric power potential of the Thelon, Hanbury, Dubawnt, and lower Kazan rivers was investigated by Ingledow and Associates Ltd. for the Department of Indian Affairs and Northern Development.¹⁰⁴ Compared to flow patterns of the Kazan River, those of the Dubawnt River were found to be more profoundly affected by the greater lake storage capacity of the Dubawnt River basin. High winter flows were maintained in the Dubawnt, and peak summer flows from storms were drastically reduced in comparison with those of the Kazan River. The run-off volumes of the Kazan River were found to be twenty-five to thirty percent higher than those of the Dubawnt River. However, only three years of data were available. Potential dam sites for the Kazan River are at the outlet of Thirty Mile Lake, at

Kazan Falls, and ten miles upstream from Baker Lake. There have been no environmental impact studies of the effects of the development of hydro power on any of the rivers studied.

Pressure for development of the hydro-electric potential of the Kazan River may arise from increased needs for energy in the settlement of Baker Lake. The possibility of electrification of any Polar Gas pipeline would also increase the pressure for development of hydro-electric capacity. However, it is likely that the most immediate pressure for hydro-electric power from the Kazan River would be the development of any uranium project in the area. The value of uranium is high compared to that of base metals. Since uranium can be shipped out by air, development of a mine is not dependent upon the construction of a road or railway.

Territorial Administration Centre

In February 1976 an Inuit Land Claims proposal was presented to the federal government. The proposal involved the creation of a territory — Nunavut — which would be governed by a commissioner and an elected council. The settlement of Baker Lake was suggested as a possible candidate for the administration capital of Nunavut.¹⁰⁵ If such a development were to take place, there would follow an increase in both the resident and transient population and an enlargement of the settlement, with increased facilities for transportation, communication, and accommodation. A long-term source of energy would be required to meet such a development. This might be supplied by hydro-electric development or on a short-term basis by gas, if a Polar Gas pipeline is constructed in the area. Although it has not been suggested, windpower is a possible long-term source for at least part of the energy requirements. The average annual windspeed recorded at Baker Lake is 14.3 miles per hour. Speed and percent frequency are greatest during the winter months, when energy requirements are also greatest.

Parks and Other Reserves

Part of the defined region was also proposed as an IBP-CT site.¹⁰⁶ The site includes known calving areas, as well as much of the area that is known to be used by post-calving concentrations of the Kaminuriak barren ground caribou population (Figure 6). The vegetation is considered representative of mainland tundra, with sedge meadows and tussock muskeg occurring in low-lying, poorly drained areas, and with lichen-heath communities in drier uplands. The site also includes the Kazan Falls and lower Kazan River and the south shore of much of Baker Lake. The proposed

site has yet to be formally submitted for approval, and at present has no legal protection.

(c) Potential Resource Use Conflicts

Bedrock outcrops occur throughout much of the defined region. Wherever such outcroppings form areas that preclude easy access to mammalian predators, they have potential for nesting birds such as falcons, colonies of seabirds and, at Kazan Falls, snow geese. In addition to providing cliff nesting sites for seabirds, coastal and island rock may also provide hauling out areas for walrus, if such areas are associated with relatively deep waters allowing rapid escape. These areas are critical for the survival of walrus, and disturbance on or near such sites would be incompatible with the maintenance of walrus populations. Soapstone occurs on Christopher Island and is used by Inuit from Baker Lake. Bedrock may be used in many different kinds of construction. Dam construction on the Kazan River at any of the three proposed sites would require quarried bedrock.¹⁰⁷ Mining companies blast and drill in bedrock, while the development of mines requires intensive disturbance and removal. As far as is known, potential for conflict lies less in the use of bedrock in this region, than in the locations where construction or disturbance takes place.

Both wolves and foxes require stable areas of well-drained sandy soil for their dens. In a permafrost region where up to twenty-three percent of the terrain is covered by water, and much of the remaining vegetated area is low-lying and poorly drained with a shallow active layer, features such as eskers are of importance for den sites. Similarly, raised beaches afford burrow sites for collared lemmings. During snowmelt, when lowlands are flooded, both brown and collared lemmings are concentrated on these raised beaches. At this season both eskers and raised beaches also afford good travelling conditions for man and caribou, and the slopes, according to their aspect, provide early growing forage for herbivores. During spring breakup eskers and raised beaches are commonly used as landing strips by small aircraft, until the lakes become ice-free and floats can be used. Ingledow and Associates suggested that an esker south-east of the Kazan Falls dam site would provide a good source of sand for mining which, with river gravel or crushed bedrock, would make suitable concrete aggregate.¹⁰⁸ Construction of a railway, an all-weather road, or a pipeline would have potential for conflict either by habitat destruction or by competition for space on well-drained land surfaces.

Wet sedge meadows are areas of high plant productivity and of critical importance to caribou and Canada geese for accumulating the reserves of energy required before fall migration. Toxic chemicals, salt water used in exploratory drilling, and waste materials transported by water may accumulate in such low-lying areas, if these wastes are not transported by defined drainage systems through streams and rivers to lakes. The proposed Polar Gas pipeline route crosses wetlands west of Baker Lake which are important for nesting waterfowl and peregrine falcon, and have been defined as part of a caribou migration route. Wetlands north of Thirty Mile Lake which are crossed by the proposed Polar Gas pipeline may also be of importance to the Beverly caribou herd or part of the Kaminuriak herd. Significant drainage alterations could occur in the wetlands west of Baker Lake (Sugarloaf Mountain), together with disturbance in organic terrain and unstable colluvial areas. If the water tables of the wetlands are changed, there would be significant changes in vegetation which would reduce the productivity of the areas for waterfowl and caribou.

The Kazan and Quoiich rivers, in contrast to much of the Thelon River, do not have well-developed valleys and are consequently not as important to wildlife during winter as many other northern rivers. However, like the Thelon River, they are important for fish and waterbirds. Inuit have stressed the importance of river and stream mouths for fishing, as well as Pitz Lake and parts of Baker Lake.¹⁰⁹ In summer, major tundra rivers still form routes of travel navigable by canoes, and the Thelon River is a traditionally important route. Proposed hydro-electric development on the Kazan River would have various effects, according to the location of the dam. If sited on the lower Kazan, water would be backed up over Kazan Falls.¹¹⁰ Proposed dam sites for the Thelon and Dubawnt rivers are outside the defined region, but such dams would have downstream effects. The potential for conflict with the maintenance of fish and bird populations would be high. Most of the impact studies of hydro development have been related to fish. Nevertheless, from a review of the literature, including Russian and Scandinavian sources, Machniak concluded that there was insufficient knowledge of effects on fish and that it was an area of research that required urgent attention.¹¹¹ The impact of hydro-electric developments in Canadian Shield tundra regions of continuous permafrost is not known, and information about the impact in other arctic regions is minimal.

The proposed Polar Gas pipeline route both crosses and follows part of the Thelon River. The route along the valley

will conflict with caribou range used in August and September, and with peregrine falcon nesting habitat. Unstable colluvial areas may present problems in a crossing of the Thelon River and increase the potential for siltation. The proximity of the pipeline to Pitz Lake, and the necessity of many crossings of streams flowing into this lake, will conflict with the use of the lake and river mouths as an important domestic fishing area for trout, whitefish, and grayling. Newbury outlined major hydrologic concerns associated with the construction of a Polar Gas pipeline as follows: bank instability of valleys and major rivers; streambed instability; upland erosion and drainage; disposal of spoil materials, waste materials, and toxic substances; and use of water supplies during construction practices.¹¹² One feature relating to water supplies is the necessity of creating artificial snow for snow roads. Since snowfall in the defined region is light, and many lakes and streams are shallow and freeze solid, lakes and rivers that are deep enough from which to take water are also likely to be those which are most important for overwintering fish.

Tundra nesting birds are especially susceptible to predation, since most vegetational cover is low and sometimes sparse. Small islands offer protection against mammalian predators and, where distant from navigable waters, offer protection against human predators. There is some evidence that population fluctuations of lemmings may not be as severe on some islands, such as in Baker Lake, as on the mainland.¹¹³ Islands may therefore form reservoirs from which recolonization of depleted areas may occur.

Chesterfield Inlet and adjacent coastal waters are relatively rich in marine and estuarine wildlife. Irregular coastline, tidal flats, islands and reefs, together with mixing of waters of different salinities and temperatures, provide a diversity of conditions favourable for several species of marine mammals, waterfowl, and seabirds in summer. In winter and spring, large areas of stable land-fast ice separated from pack ice by wide leads, and the proximity of Roes Welcome Sound, provide good wintering habitat for ringed seals and common eider. Probably the greatest source of conflict is seismic exploration involving blasting and wildcat drilling, together with the transportation of oil. The effects of blasting on the physiology and behaviour of marine mammals is not known, although some effects on fish have been documented.¹¹⁴ The hazards of oil spills from blowouts, leakage from wells, or leakage during oil transport, and the lack of technology for clean-up in northern waters were documented in 1976 by Pimlott et al.¹¹⁵

If increased shipping is required for transportation of

materials to Baker Lake, it may be necessary to dredge in Chesterfield Inlet and the south channel past Bowell Island in order to accommodate larger ships. It is also possible that the rock sill at the entrance to Baker Lake would have to be blasted. If the present tonnage of ships is maintained, there would need to be an increase in the number of ships to handle sufficient freight during the very short season.

The effects of increased levels of human activity are probably the most difficult to predict, since different animals respond in different ways, and thresholds of tolerance vary according to seasonal activity and other forms of stress. Stress is also difficult to measure. There may be no obvious behavioural response, but metabolic levels may be increased at a time when energy expenditure needs to be conserved. Disturbance from increased human activity is probably the most insidious and also the most difficult form of disturbance to control. Although aircraft may be required to fly at a certain minimum height, bad weather may force them to fly at lower altitudes. The location of camps is sometimes restricted to certain areas for logistic reasons and, when the camps are maintained by helicopter transport, noise levels in such localities may be very high. In addition to logistic support, most forms of surveying or monitoring in the Arctic require intensive use of aircraft. Biological and geological activities, as well as those associated with construction and mining exploration, reach a peak in the short summer season when terrestrial animals need to replenish depleted fat reserves. Movement of these animals away from areas of high human activity may mean movement to areas that are less productive in food. The migratory routes of caribou and traditional river crossings are areas where the potential for conflict is high, even though these areas may not be used in all years.

IV The Pelly-Macmillan Rivers Region

(a) Description of the Area

The Pelly-Macmillan river system is an important head-water tributary of the Yukon River. The confluence of the Pelly and Macmillan rivers lies in the south-central part of the Yukon Territory (Figure 8). The area, subsequently called the defined region, includes the Macmillan and Kalzas ranges to the north and part of the Glenlyon Range to the southeast. It is crossed by a major geological fault, called the Tintina Trench, which extends from the southern part of the Pelly Mountains in the southern Yukon, north-west into Alaska.

The defined region lies within the subarctic climatic zone. Mean annual precipitation is between twenty-seven and thirty centimetres, with maximum precipitation occurring in July. Snowfall is heaviest during November and December. However, due to the influence of mountain ranges there is considerable local variation. The defined region is within the zone of widespread but discontinuous permafrost. Silts and clays of glaciolacustrine origin occur along the Pelly River above the mouth of the Macmillan, and along the Macmillan River. These deposits are unstable when saturated, and there is considerable slumping of the river banks. Massive slides have been known to dam the Macmillan River for brief periods, and large driftwood piles at the heads of islands are common. Nineteen kilometres below the mouth of the Macmillan, the Pelly River passes through Granite Canyon, forming a stretch of navigable rapids. Coal deposits occur in the Granite Canyon area. Ice breakup on the Pelly River at the settlement of Pelly Crossing occurs about the middle of May. Discharge of water peaks during June, and silt loads are fairly high. Permanent ice is formed early in November. During winter, water levels are extremely low. Although some open water areas have been observed on both the Pelly and Macmillan rivers, indicating ground water discharge, as yet none have been located in the defined region.

Unless detailed studies of a particular stretch of river have been undertaken, it is not possible to limit a description of fish resources to such an area. Even where such data are available, description is limited to a region only for the sake of brevity, and it is implicitly assumed that one must think in terms of the entire river system. Most of the subsequent data relating to fish were obtained from studies of the upper reaches of the Pelly and Macmillan rivers and associated lakes, and from the Yukon River. The fish resources are consequently described in relation to the river system. Even so, distribution of fish species within the Pelly-Macmillan system has not been well documented, and there is a paucity of information pertaining specifically to non-anadromous fish. For this and other reasons, the emphasis in the following description will be on salmon. Salmon have not been mentioned before in this report. They are of international importance because they migrate through the Yukon and Alaska, and become a component of the fish resources of the Pacific Ocean; they are highly vulnerable to development-related disturbance; their populations have declined in other parts of the country; and they are of major importance in terms of food, both for humans and as part of a food chain

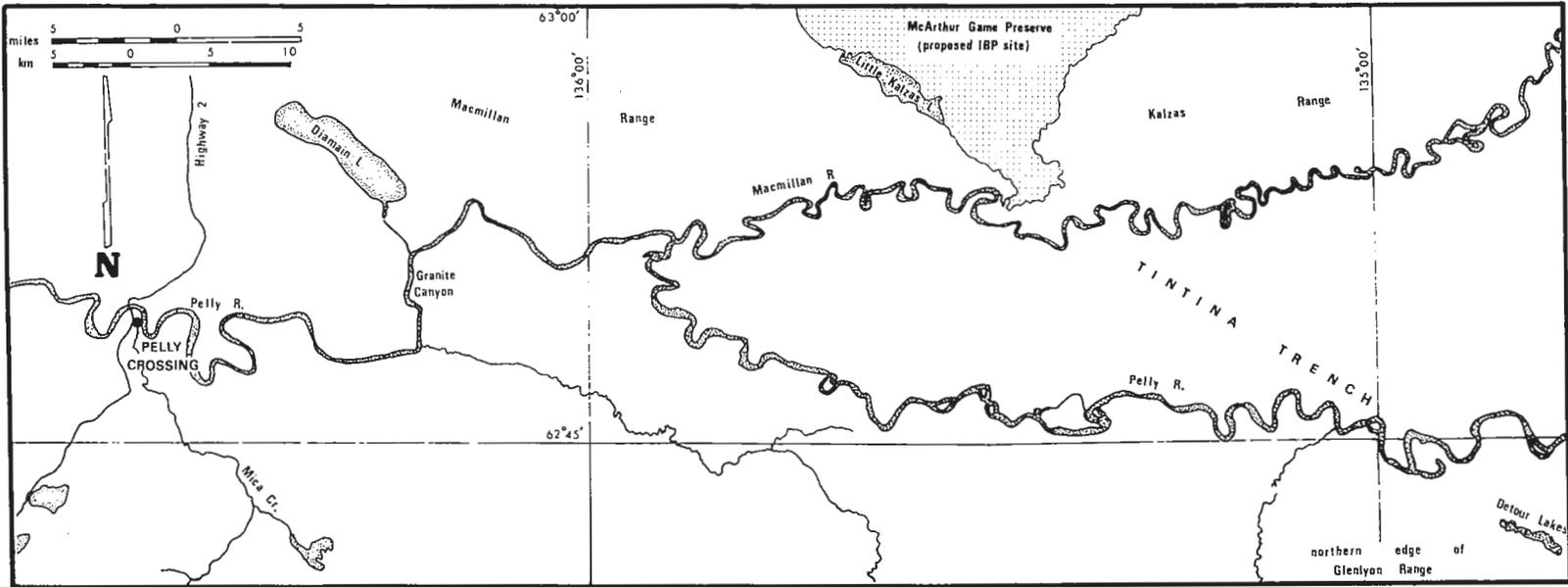


Figure 8 Pelly-Macmillan Rivers Region

in which they tend to reverse the general flow of nutrients to the sea, without benefit of human intervention.

Chinook salmon are the largest of Pacific salmon. They spend four to six years at sea, and return to their natal streams to spawn. The spawning of chinook salmon in the Pelly-Macmillan system involves one of the longest migrations of an anadromous population, with some individuals travelling over 1,950 kilometres to reach their spawning grounds. Migrating chinooks appear at Dawson during the first week in July, and the run peaks in late July and early August. The number of chinook salmon passing Dawson has been estimated at between 29,000 and 36,700. Since this species exhibits a four-year cycle in abundance, the population estimates from different years would be expected to vary. The above estimates are probably low, since large salmon tend to travel in deeper water in mid-channel, and are not often captured with shore-based fishing gear. The first mature chinook salmon enter the Pelly River from the Yukon River around 10 July. Salmon which travel long distances to spawn are often critically emaciated by the time they reach their natal stream. Such fish have little reserve energy to cope with new barriers in the path to their spawning area. Delays in migration, of as little as twenty-four hours, can result in drastic declines in egg production if fish are nearly ripe at the time of delay.

Populations from different river systems probably have unique, genetically determined traits which are suited for coping with the conditions in their natal system. As long as the environmental variations are well within the tolerance limits of the specific population of salmon, the rates of reproduction and survival remain high enough to maintain the population. If conditions are altered sufficiently, the salmon population of a river system will begin to decline. Loss of populations of salmon from a whole river system is serious; because the population may have been a unique genetic race, it is extremely difficult to repopulate the system with different genetic stocks. Headwater races of salmon, as compared with other races from lower parts of the same river system, tend to have a very limited tolerance of environmental variations. A narrow tolerance range would therefore be expected for the salmon populations of the Pelly-Macmillan system, which is a headwater area.

Chinook salmon spawn in water from 1.2 to 2.4 metres in depth, where the substrate consists of clean gravels. The outlet streams of lakes, areas with islands and braided channels, backwater areas, and areas with groundwater flow are preferred spawning areas. The eggs remain in the gravel of the stream bed through the winter months. They cannot

survive where there is heavy siltation or in the absence of well-oxygenated water. Areas of groundwater inflow which remain open all winter, deep pools, and the outlets of lakes all seem to have sufficient water flow through the winter to ensure the survival of the developing eggs. Fall spawning, under natural conditions, usually ensures that eggs will be developing in the gravel at a time when the silt load of the river is at its lowest level.

Chinook salmon fry emerge from the gravel in May. Because feeding is mainly by sight, it is important that nursery streams have reasonably clear water and high densities of food organisms. Since small streams have these characteristics, young salmon often move to these areas immediately after breakup of ice in the spring. Hence the small streams, although inadequate for spawning and overwintering, are indispensable as nursery areas for young salmon during the summer months. With the onset of autumn, the young salmon are forced to return to areas where water flow continues throughout the winter. One or two years after hatching, the young chinooks begin their migration to the ocean.

There are no published estimates of the total spawning population of chinook salmon using the Pelly-Macmillan system. However, there are fifty-one known spawning streams above Dawson, over thirty-three percent of which occur in the Pelly-Macmillan system. The Pelly-Macmillan system appears to rate as one of the most important chinook salmon spawning areas above Dawson. An important point to consider is the fact that the spawning population of the upper Yukon River, above Whitehorse, has been steadily declining since 1959, when the Whitehorse Rapids Dam was installed. If this trend in the upper Yukon River continues, then the Pelly-Macmillan system will become even more important in maintaining the salmon stocks above Dawson.

Chum (dog) salmon from the Yukon River drainage spend three to five years at sea before returning to freshwater to spawn. The spawning distribution of chum salmon in the Yukon system is not as well known as that for chinook salmon. Since adult chum salmon rarely attempt to negotiate barriers of any size, it is likely that these fish are more limited in distribution than chinook salmon of the Yukon River system. The chum salmon run in the Yukon River begins about five weeks later than that of chinook. The first chum salmon arrive at the mouth of the Pelly River around August 30. They travel up the Pelly to the level of Faro, and up the Macmillan to the level of Russell Creek. The spawning areas of chums are usually in shallower water than those used by chinooks, but in other respects the spawning

requirements are similar. One known spawning area exists on the Macmillan River directly south of Moose Lake. No estimates are available for the number of chum salmon spawning in the Pelly-Macmillan system. Chum fry emerge from the gravel in May, but unlike the fry of chinooks, they begin to migrate downstream almost immediately. Most chum salmon fry are gone from the Pelly-Macmillan system by mid-July. The period of downstream migration coincides with high water levels in the river system, which ensure that the descent to the ocean occurs as rapidly as possible. The fry are adapted to spending a limited time in freshwater, and any major delay in downstream migration might significantly reduce their survival.

In addition to its value as one of the major spawning areas for chinook and chum salmon, the Pelly-Macmillan system supports large populations of arctic grayling, round whitefish, broad whitefish, inconnu, longnose suckers, and northern pike. It is probable that there are also migrating populations of these species which inhabit the system for only part of the year. The lakes of the Pelly-Macmillan region contain resident populations of lake trout, lake whitefish, round whitefish, northern pike, and burbot. Most of the system is still in its natural state; its tributaries are important spawning and nursery areas for resident and migratory fish populations, and it probably plays a major role in maintaining the fish populations of the upper Yukon system.

The historical importance of Indian fisheries within the Pelly-Macmillan system is well documented by written and oral records. The availability of salmon as a dependable food source played an important role in determining the group size and social order of Indian bands, and allowed higher summer populations of Indians in this region than in areas in the Yukon Territory which did not have salmon. At present the Pelly-Macmillan system is the second most important salmon fishing river of the Yukon system, after the Yukon River itself. Salmon add a substantial amount to the subsistence economy of Indians at Pelly Crossing and Ross River. In addition they are of importance to trappers who maintain dog teams. Broad whitefish, inconnu, lake whitefish, northern pike, round whitefish, lake trout, and longnose suckers are also obtained at domestic fisheries. In winter, whitefish, trout, and pike are caught in lakes near Ross River; and nets set under the ice at Pelly Crossing have in the past yielded large numbers of broad whitefish. The Pelly-Macmillan region supports seven percent of sport fishing in the Yukon, and there is potential for increase in this use. Arctic grayling, inconnu, and northern pike are the most important sport fish.

The valleys of the Pelly and Macmillan rivers are forested, with good stands of white spruce on better drained areas within the flood plains and on benchlands. Black spruce occurs on wetter sites, and typically in areas of muskeg. Aspen poplar stands and open areas of grasses and forbs are common on south- and west-facing slopes and on benchlands above the rivers. Mixed stands of spruce, paper birch, balsam poplar, and shrubs also occur along the river valleys. Although much of the defined region is well forested, the river valleys are not as productive, in terms of timber potential, as those of the Liard, Peace, and lower Mackenzie rivers. However, like most alluvial soils, they are productive in terms of vegetation and wildlife and, as evidenced by trappers' home sites, garden produce.

Above the mouth of the Macmillan, the Pelly River is characterized by large sandbars which are used for staging by sandhill cranes. Large flocks of these birds migrate to nesting grounds in Alaska and Siberia. Although reported to use the Tintina Trench flyway, flocks are also observed to stage annually near the mouth of the Pelly River. The relative importance of the Tintina Trench flyway is not known. However, numerous waterbirds, including trumpeter swans, Canada geese, diving and surface ducks migrate through the defined region. The presence of Pacific and common loons and kingfishers in Little Kalzas Lake attests to the productivity of the lake for fish. Parts of the defined region are used extensively for nesting by ducks and shorebirds. Oxbows, sloughs, and sedge meadows provide abundant food and cover for fall staging and for nesting waterfowl and shorebirds. These areas are also productive for muskrat and mink. Silt bars along the rivers have extensive areas of horsetail, which are closely grazed by Canada geese in late summer and early fall. Riparian communities are maintained in different stages of development by the regime of the rivers. Annual flooding, undercutting, redeposition of sediments, and changing channels produce diverse and productive plant communities. Beaver are relatively common in parts of the defined region, and along the rivers they use areas of slack current to anchor feed-rafts and build bank dens where the soil is stable and poplar and willow are abundant. Below the mouth of the Macmillan River, colonies of cliff-nesting swallows are numerous on south-facing and stable cutbanks. Spruce and ruffed grouse occur at lower elevations, and willow and white-tailed ptarmigan are abundant at higher elevations in the McArthur Range, and presumably also in other ranges within the defined region.

In addition to beaver, muskrat, and mink, fur-bearers that are trapped in the defined region include black bear,

wolf, coyote, lynx, marten, wolverine, otter, weasel, squirrel, and red and cross fox. The mosaic of plant communities within the region provides diverse habitats which are important to different species at different seasons. South- and west-facing slopes of grassland become free of snow early in the year, and plant growth accordingly begins early. The legume *Hedysarum* is a component of this community, and is an important food source to black bears in the spring. *Hedysarum* also grows on floodplains and, together with other legumes growing on gravelly sites, is sought by grizzly bears, which occur in the defined region. Horsetail forms abundant ground cover under spruce, as well as on silt bars, and is also an important food for bears in the spring. In late summer, the river valleys and upland communities produce an abundance of berries that are used extensively by bears (and occasionally by man). Salmon spawning areas are important to black and grizzly bears as well as to bald eagles.

The movement of animals between different altitudes is governed to a large extent by weather, snow conditions, and seasonal variation in the availability of food and cover. In this respect the defined region is of particular importance to moose. In 1971 large burns occurred on both sides of the Pelly River in the vicinity of Granite Canyon, and in 1969 between the Pelly and Macmillan rivers, south of the Kalzas Range. There are also older burn sites within the defined region where regeneration has provided abundant food for moose. In the uplands such areas are important for moose in summer. However, moose generally overwinter in river valleys, and both the Macmillan and Pelly rivers are important overwintering areas. Unlike some other areas in the Yukon, the Macmillan River is also important for breeding. Twinning in northern populations of moose is not common, and therefore the percentage of a population that can be taken by hunters must remain lower than that in the South. However, moose are an important food source in the subsistence economy of such Indian, Metis, and white persons in the area whose way of life is bound to the land. With high prices for imported meat, moose and other game animals are hunted for food by urban residents as well as for recreation associated with hunting. Caribou, historically abundant during some years, are now uncommon in the defined region. Small populations of Stone sheep (thinorns) are resident in some ranges, and these, together with grizzly bear and moose, are an important resource to big game outfitters.

Use of the land and wildlife resources has changed according to historical events. Because of seasonal differences in concentrations and movements of different wildlife species, large areas of land were originally required to support a

subsistence economy. A traditional Indian gathering place was located at the outlet of Earn Lake just outside the defined region. The remains of a village and a graveyard are situated near the mouth of the Little Kalzas River. The fur trade changed the pattern of land use to some extent. However, highway construction ensured the establishment of permanent settlements along such routes. The Indians of Fort Selkirk were moved to Pelly Crossing with the completion of the Klondike Highway in 1952.

(b) Some Current and Proposed Developments

Hydro-electric Power

Since the early 1950s the Northern Canada Power Commission, a federal Crown corporation, has been involved in the assessment and development of hydro-electric resources in the Yukon Territory. Numerous inventories of potential hydro power sites have been conducted by NCPC since its formation. These inventories were partly a result of rising energy consumption in the Yukon Territory itself, but largely pertained to the sale of power outside the Yukon.¹¹⁶ The previous studies had not provided a comprehensive inventory of the Yukon's power resources, nor did they rank the potential power developments relative to the total power needs of the Yukon.¹¹⁷

To achieve these goals NCPC commissioned Sigma Resource Consultants Ltd. to conduct a detailed study of the hydro power resources of the Yukon. The objectives of the study were to estimate future electrical load demands in the Yukon to the year 1990, to conduct an inventory of available energy resources, and to select the most promising of the alternatives. Load projections were calculated for the period 1975-90, with several contingency plans outlined. The single most critical factor in the load projection was whether or not a lead-zinc smelter would be built in the Yukon before 1990. Several alternative cases for load projections were outlined. The first case assumed that no smelter would be built and predicted a 1990 peak electrical demand of 106 to 202 megawatts, with a standard demand of 143 megawatts. The second case assumed a smelter would be built, and predicted a 1990 peak electrical demand of 218 to 302 megawatts with a standard demand of 243 megawatts.¹¹⁸ Sigma stated that these projections were subject to a large degree of uncertainty, but that the standard load projections were the best guess of future loads at that time.¹¹⁹ The two main cases were also subdivided into several subcases, with revised projections being based on contingencies such as population growth, fuel prices, electrical spaceheating use, and mining

activity. Other industrial loads were also predicted, including power-intensive industries such as aluminum smelting, which might be attracted to the Yukon due to the area's hydro-electric power potential. Such a possibility was suggested even though it is stated NCPC policy to meet power demands as they arise, but not to create a demand.

A brief inventory of alternative power sources was conducted, and all types of power resources except hydro-electric were rejected on the grounds of being unfeasible or unproven. No clear comparison of hydro-electric and thermal power plants was conducted, due to a vague knowledge of fuel costs. No effort was made to assess the potential coal reserves of the Yukon, and a literature review on the subject was apparently not conducted. Sigma did note that, in the low size range of power plants (30 to 50 megawatts), thermal electric plants may be competitive with hydro-electric installations on the basis of the cost of power produced.¹²⁰ The remainder of the report largely consisted of an analysis of the potential hydro-electric sites.

Approximately one hundred potential hydro-electric sites, each having 30 megawatts or more of installed capacity, were identified. The sites included in the inventory are probably technically feasible, but no sub-surface exploration was conducted to prove their feasibility.¹²¹ The Pelly River system was assessed as having five potential dam sites: at Braden's Canyon, Granite Canyon, Detour Canyon, Ross Canyon, and Hoole Canyon. All of the hundred identified sites were then ranked according to their potential for development. Primary sites were classed as level one. Their selection was based on geographical location and investment costs, but with no environmental or social factors taken into consideration. Two of the Pelly River sites — Hoole Canyon and Granite Canyon — were designated as level one sites, of which there were a total of ten. Level two sites were those which would provide cheap power if the corresponding upstream sites were built. Investment cost and location were again the important criteria. The Braden's Canyon site on the Pelly River was included in this category. Level three sites were those with good potential for development in the future. The Detour Canyon site on the Pelly River was included in this category. Level four sites were those that had been described by previous studies as having potential. The Ross Canyon site on the Ross River was included in this category.¹²² All of these sites were designated as having potential on the basis of their geographic location and investment costs, with the provision that, for level two sites, the corresponding upstream sites be built. No environmental, socio-economic, or alternative resource use

considerations were incorporated into the study at this stage. The preliminary group of one hundred sites was then reduced to a total of sixteen, prohibitively high energy costs being the basis upon which most of the projects were excluded from further studies.¹²³

Detailed examination of the remaining selected sites was then conducted. For the sites on the Pelly River, several new alternatives were incorporated for the additional studies. In the level one group, both a high and low dam were considered for the Granite Canyon site. In the level two group, the Braden's Canyon site was re-examined in relation to high and low dams at Granite Canyon. Stephens and Strang suggested that Granite Canyon was the key site on the Pelly and that the Braden's Canyon site would only be economical if the former dam were built.¹²⁴ This detailed examination and ranking of sites was used to determine which sites appeared most promising on the basis of investment cost (including reservoir clearing at \$600 per acre), location, and installed capacity. As in the previous ranking, environmental and social costs were not taken into account, nor were the costs of transmission lines. At this stage in the assessment, the Pelly River scheme was ranked second, after the Yukon River scheme, out of the remaining ten schemes. The area that would be flooded by low or high dams at Granite Canyon is shown in Figure 9.

During the first phase of the planning programme, public information meetings were held by NCPC in several Yukon communities. NCPC informed the public of the information meetings and of the sites being considered, by distributing a pamphlet entitled "Power Development For The Yukon Territory — Choosing The Next Plant." At that time no specific information pertaining to the potential environmental and social disbenefits had been compiled; hence the only information available to the public dealt with the output of the installations and their physical characteristics. A very superficial examination of the potential environmental and social consequences of the various site developments was included in the Sigma report, with recognition given to the inadequacy of such an examination. Little quantitative information was included in this analysis, which simply outlined the fisheries, wildlife, forest, mineral, recreation, historic, and scientific values, and the settlements that would be affected by hydro-electric development. Developments were then ranked according to their potential for conflict with those values. However, because the assumptions made in comparing values, in order to

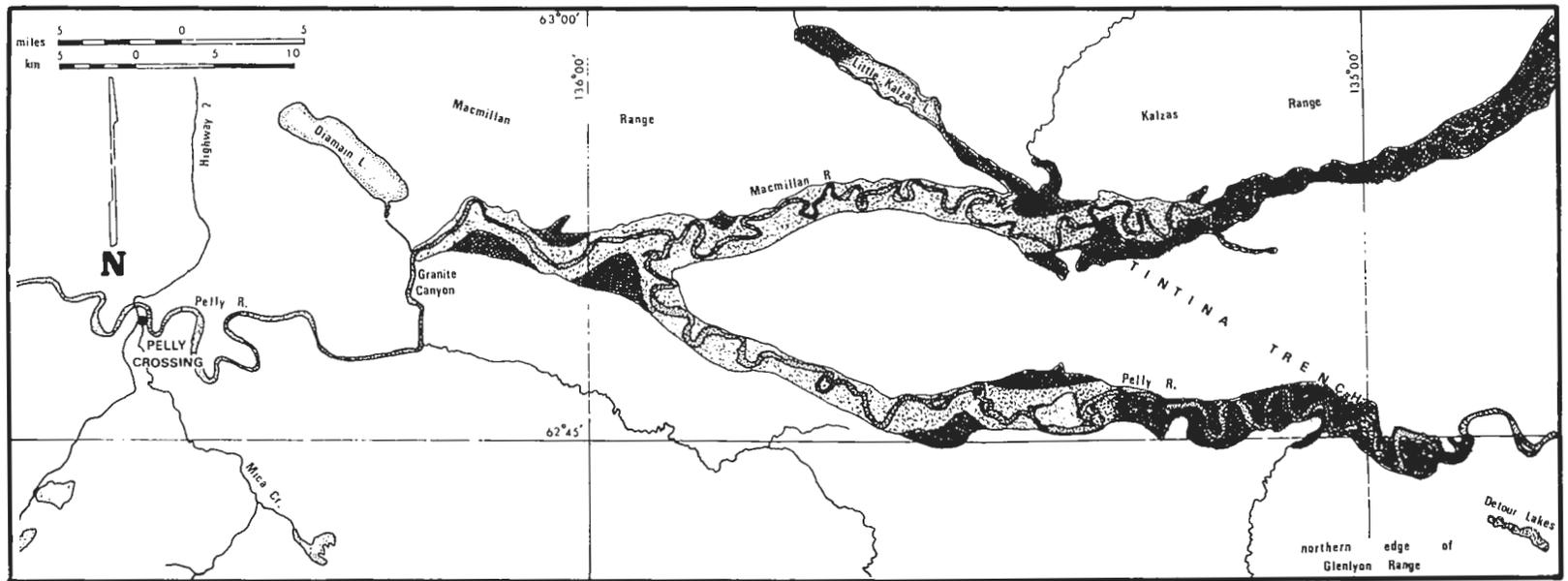


Figure 9 Potential Flood Zones of Pelly-Macmillan Rivers Region
 Flood zone of low Granite Canyon dam (light shading);
 flood zone of high Granite Canyon dam (dark shading)

obtain rankings, were not made explicit, the validity of the rankings must be questioned.

Sigma suggested that the target date for completion of the first plant would be October 1980. The proposed schedule would involve a phase two programme to evaluate leading schemes from Sigma's phase one programme, and for submission of reports to the Water Board and other agencies during 1975. On the expectation that approval-in-principle of a single scheme would be obtained by the spring of 1976, a phase three programme would undertake a complete investigation and environmental impact assessment of the selected site during the remainder of 1976. Application for a water licence would be made by the end of 1976. Final design and construction were planned for 1977 to 1980, with the first unit scheduled to commence operation in October 1980.

It should be noted that this scheduling plan postponed the detailed environmental studies until the third phase when a single site would have been decided upon, and at that time the studies would assess the potential impact and not the value of the renewable resources against the value of the development. The plan demonstrated that the environmental and social impacts and damage to other resources of the region would not be considered in a decision on the choice of a single site for development. Social and environmental impact studies were to have been initiated in the spring of 1976, which would have allowed only six months of study and analysis before the proposed application for a water licence in the fall of 1976. Such scheduling meant that social and environmental concerns would also be excluded from consideration in the decision to grant a water licence, since they could not be adequately researched in that time.

At the preliminary public hearings in December 1974, opposition was expressed to the process of decision-making whereby the public was kept uninformed of alternatives and of social and environmental costs, since the studies that could supply such information were non-existent. The Yukon Game Branch subsequently recommended that detailed environmental information of first priority sites be made available to the public for their informed participation before a decision is made.¹²⁵ Because the expected load forecast is dependent on mining development, including possible construction of a smelter, and since the course of such development is presently uncertain, NCPC postponed all further plans for assessment until such time as the course of mining development is established. This postponement is still in effect.¹²⁶

Mining

While mining exploration has been extensive over a long period of time in parts of the defined region, and claims have been staked, no major ore deposits have been found as yet. At present the only producing mine that affects the Pelly River system is the Cyprus Anvil lead-zinc mine at Faro. There is high potential for additional mining development in this region, since the Anvil Range promises to have one of the most valuable mineral reserves in the Yukon.¹²⁷ The region of potential mineral wealth is estimated as being approximately 1,600 square kilometres. The proven reserves of the combined Faro, Vangorda, and Swim deposits are over eighty million tons of mineable lead-zinc. The Grum deposit was discovered in the Anvil district after 1972, a find which brings the aggregate proven reserves of this region to nearly 150 million tons, making it one of Canada's richest lead-zinc areas.¹²⁸ Tempelman-Kluit suggested that, with the discovery of the Grum deposit, the long life of lead-zinc mining in the Anvil region is assured, and the establishment of a smelter in the area would now be economically viable.¹²⁹

Smelting

Since the mid-1960s, consideration has been given to the possibility of establishing smelting facilities in the Yukon. The potential for establishing an effective smelting operation, particularly for lead-zinc and silver, depends on the availability of suitable carbonaceous reductants (such as coking coal), low-cost energy, reasonable freight costs, and a reliable long-term source of concentrates.¹³⁰ Provision was made in the federal government's contract with Anvil Mining Corporation for the firm to conduct a feasibility study of a smelter to process Anvil's lead, zinc, and silver.¹³¹ While the development of new mines and construction of a smelter may take place outside the defined region, their effects are not limited to their immediate locality. Such developments would require the power loads which would justify an application by NCPC for the construction of a hydro plant.

Railroads

A number of alternative railway routes have been proposed for the Pelly-Macmillan region. The main impetus for railroad development in the region is the need for cheap transportation for moving ore to tidewater ports. Carr and Associates noted that a major consideration in planning new railroad facilities is that the main body of potential ore deposits, which would require transportation, can be expected to lie close to the Tintina Trench. A road bed along this

trench would result in considerable savings in construction costs. This route lies close to known coal deposits, and forest resources have some potential for sawmill and pulp and paper logging. Interest in developing these resources is already high. The Carr report concluded that new extensions of the British Columbia rail lines should enter the Yukon at Watson Lake and proceed northwestward. They also noted that the distance which the railroad should proceed northwestward along this path warrants careful economic appraisal.¹³² It appears that the probable route would follow the highway from Watson Lake to Ross River and on to Carmacks. The line would provide a north-south transportation route into the region, and could transport ore from Faro to tidewater at Prince Rupert at a much lower cost than the existing truck-rail route to Skagway. In a study of railway extension alternatives, Canalog Logistics Ltd. and Canadian Pacific Consulting Services Ltd. proposed an extension from Carmacks to Dawson that would cross the Pelly River just below Pelly Crossing.¹³³

The White Pass and Yukon Corporation examined the possibility of extending a rail line from Whitehorse to Faro via Carmacks. This extension would provide cheaper transportation for ore concentrate than is presently provided by the truck-rail system.¹³⁴ Slaney and Co. Ltd. outlined the potential environmental impact of this proposed rail extension.¹³⁵ MPS and Associates noted that extension of the White Pass and Yukon line to Faro would provide an ore transport route to Skagway, but that the costs would be slightly higher than those of the proposed British Columbia Rail Road extension.¹³⁶ However, Romoff suggested that the potential tonnages hauled on the extended wide-gauge BCRR might not be large enough to make the operation economically feasible; the same tonnages would likely make operation of a narrow-gauge line economically feasible.¹³⁷ However, construction of a smelter would reduce the volume of exported mineral concentrates to the economic detriment of railway transportation.

Transportation of Oil and Gas

On 5 May 1976 Foothills Pipe Lines Ltd., Alberta Gas Trunk Line, Westcoast Transmission Company, and Northwest Pipeline Corporation agreed to sponsor a pipeline to transport Alaskan gas to American markets by a forty-two-inch diameter pipeline. This pipeline was routed to pass through the southern Yukon along the Alaska Highway, by which it would enter British Columbia. Applications for the Canadian portion of the Alaska Highway Pipeline project were filed with the National Energy Board (NEB) and with

Mr Allmand, the Minister of Indian Affairs and Northern Development, on 31 August 1976. Subsequently the project was redesigned to provide a forty-eight-inch diameter pipeline, and revised applications were submitted accordingly.

On 19 April 1977 Mr Allmand established the Alaska Highway Pipeline Inquiry, with Dean Kenneth Lysyk as chairman of a three-person commission. The task of the commission was primarily to examine the social and economic impacts of the project, to report on the attitude of the people of the Yukon, and to make recommendations regarding identified major concerns by 1 August 1977. The Minister of Fisheries and Environment established an Environmental Assessment Review Board to assess the environmental impact of the pipeline within the same time frame. If the pipeline project were approved in principle, another inquiry would be established to produce a final socio-economic impact statement and to recommend terms and conditions for construction and operation. On 4 July 1977, while the Alaska Highway Pipeline Inquiry was still being conducted, the NEB recommended approval of the Alaska Highway route across the Yukon by Dawson and the Klondike Highway to Whitehorse and thence south to British Columbia. Mackenzie Delta gas could then be routed by the Dempster Highway to link with the Klondike Highway. None of these routes has been studied.

During the Lysyk Inquiry several participants recommended that the Tintina Trench be considered as an alternative route, since major areas of mineral potential were adjacent to or east of the trench. It was hoped that gas would be available to mining projects as a source of power. However, Lysyk stated that Foothills proposed to limit the supply of natural gas in the Yukon to residential and commercial uses, and had not studied the economics of supplying gas for industrial use. He recommended, however, that the Tintina Trench be studied, together with other alternative routes, before a final decision on routing was made. In summary, Lysyk recommended that approval-in-principle be given to Foothills, on the following conditions: that construction be delayed a further year beyond Foothills' proposed schedule, to allow for agreement-in-principle and implementation of some of the terms of settlement of a Yukon Indian land claim; that a single planning and regulatory agency be established to plan, control, and monitor all aspects of pipeline construction and activity; and that a minimum of \$200 million be paid by the pipeline company into a fund to provide compensation for inevitable social and environmental damage.¹³⁸

If the Klondike Highway route is chosen, the pipeline

would cross the Pelly River in the defined region at Pelly Crossing. If the Tintina Trench route is chosen, the pipeline would cross the Macmillan River where the latter crosses the Tintina Trench and would then follow, with or without crossing, the Pelly River along the trench. In this event, feeder lines would have to be constructed to supply natural gas to the settlements along the Klondike Highway. Subsequent development would probably include looping of the pipeline to increase capacity and, within the concept of a corridor, construction of an oil pipeline and possibly an extension of a road and railway system. If electrification of the pipeline is economically feasible, there would be pressure for development of hydro power, although the site chosen would be affected by the choice of the pipeline route.

Parks and Other Reserves

In 1972 the McArthur Game Preserve was proposed as an IBP site (Figure 8). The suggested boundaries of this site, and of the sanctuary, include the narrowest section of the Tintina Trench, where the fault is approximately five kilometres wide. Little Kalzas Lake occupies about three of these five kilometres. A formal application for this site has not yet been submitted, since no decision has been made on the IBP sites that were submitted for approval in September 1975.

No parks have been proposed within the defined region. However, areas with potential for outdoor recreational development were identified on maps of the Land Use Information Series.¹³⁹ These include cottaging, boating, and family beach activities along Little Kalzas Lake. The Pelly River between Faro and Pelly Crossing is relatively undisturbed, and was classed as having good recreational potential for canoeing and camping.¹⁴⁰ The Pelly River is also an historic route. The Macmillan River is undisturbed throughout its course. It has potential for white water canoeing, and would be classed as a wild river.¹⁴¹

(c) Potential Resource Use Conflicts

Lakes and rivers are characterized by annual and seasonal changes in water levels and in the rate and volume of water flow (i.e., discharge). These changes are known as the natural hydrologic regime. This regime not only affects the physical and chemical nature of lakes and rivers, but it also profoundly affects all aquatic and terrestrial life associated with such water bodies. Some of these relationships were briefly described earlier as they related to the Mackenzie and Great Bear rivers in the Northwest Territories. Others

will be discussed in more detail below, as they relate to the Pelly and Macmillan rivers.

Construction of a storage reservoir above Granite Canyon or at any other site on the Pelly-Macmillan river system would greatly change the normal hydrologic regime of the river both below and above the dam. Below a dam at Granite Canyon, the existing annual pattern of discharge would be virtually eliminated. At present, the mean monthly discharge of the Pelly River at Pelly Crossing ranges from a low of 47 cubic metres per second in May to a high of 1,428 cubic metres per second in June. With reservoir operation, the discharge below Granite Canyon would be maintained at roughly 224 cubic metres per second to 322 cubic metres per second over the entire year.¹⁴² Rising discharge and rising water temperature in spring are known to act as cues which initiate spawning runs of spring-spawning species of fish.¹⁴³ With the construction of a reservoir, these two environmental cues would be either eliminated (rising discharge) or retarded (rising temperature). As a consequence, the spawning runs of many fish species could be lost or retarded in the lower Pelly River. Stabilization of flow would result in the loss of the pattern of annual flooding of shoreline areas, causing the loss of spawning areas for pike. Under the normal fluctuating flow regime, some silt accumulates during times of low discharge and is removed during times of seasonal high discharge. With the loss of the annual flushing of the river channel, gravel spawning areas would accumulate silt and in time be destroyed, as would associated fish-food organisms. Change in the hydrologic regime below Granite Dam would cause fish production in the lower Pelly River to decline, and consequently sport and subsistence fisheries for grayling, northern pike, chum salmon, inconnu, and broad whitefish would be damaged.

Creation of a storage reservoir above the dam would eliminate the normal river regime, and establish a regime that is still very different from that of natural lakes. Natural lakes are at or near their lowest levels in the fall, when ice forms. Levels drop very little during the winter. Conversely, water levels of reservoirs are usually highest in the fall, when ice formation occurs, and then steadily drop throughout the winter in order to maintain the required production of power. This drop is called "drawdown," and is of far greater magnitude than that occurring in lakes. The difference in height between a low and a high dam at Granite Canyon is 33.5 metres, but to raise the water level this 33.5 metres would involve flooding 272 square kilometres more land area. The wide range of water level fluctuation in such a

reservoir would result in alternate flooding and dewatering of extensive land areas.

Under the conditions of a 14- to 15-metre abnormal winter drawdown, the littoral areas of a reservoir are exposed to freezing and desiccation. Plants of aquatic and riparian communities cannot establish themselves under these abnormal conditions, and few invertebrate species are sufficiently mobile to maintain their preferred depth as water levels rise and fall. Consequently, the productivity of the reservoir area would be greatly decreased for fish, birds, and mammals that are dependent on such communities at different seasons. Beaver and muskrat would be eliminated. Large areas of moose wintering range would be totally lost, and the loss of river valley communities would probably decrease the carrying capacity of upland areas for many fur-bearers.

The abnormal regime of widely fluctuating water levels in areas of unconsolidated frozen materials would result in prolonged instability of shorelines,¹⁴⁴ which, aggravated by wave action, would result in increased siltation and turbidity during the summer, with further reduction in productivity. Finally, the abnormal pattern of water level fluctuation would result in freezing and desiccation of eggs that are deposited by fall-spawning fish within the zone of winter drawdown, while eggs of spring-spawning fish deposited in shallow water could be subject to "drowning" from lack of oxygenated water as water levels rise.

The Pelly-Macmillan river system contains a valuable resource in the form of hundreds of kilometres of waterways that are largely free of natural barriers to fish movement. This feature accounts for the large numbers of anadromous and freshwater fish which use this system for movement between critical spawning, rearing, feeding, and overwintering habitats. Several developments proposed for this region would create barriers to such essential movements. Hydro-electric dams at Braden's and Granite canyons would have the greatest potential impact on migratory fishes, since these sites block access to all upstream areas of both the Pelly and Macmillan rivers. Greater knowledge is required to design fishways at dams that will facilitate the passage of all species of fish. Chum salmon will not attempt to negotiate any major barriers to migration.¹⁴⁵ Local movements of northern pike may also be stopped by a dam, since none of this species was observed to traverse the fishway of the Whitehorse Rapids hydro-electric dam, even though individuals did congregate below the dam.¹⁴⁶

Most species that will use a fishway probably experience some delay in migration. Fish may be delayed while

locating the entrance to the fishway. Chinook salmon are attracted to areas of strong current, and will move toward the tailrace of the dam rather than to the weaker current of a fishway.¹⁴⁷ Some fish are also delayed by a reluctance to enter the shaded areas within a fishway.¹⁴⁸ At times of peak movement, delay may also result when the capacity of the fishway is not great enough to handle all the fish in a short period.¹⁴⁹ Gordon et al. reported that between 28.5 and 64 hours were required for chinook salmon to traverse the fishway at the Whitehorse Rapids Dam,¹⁵⁰ the vertical rise of which is 16.8 metres. Salmon would therefore probably require a minimum of approximately 75 to 130 hours to traverse a fishway at Granite Canyon on a 48.8-metre dam (Low Granite Canyon Dam). Salmon that have already travelled long distances up the Yukon River, and species that cease feeding during spawning runs, are vulnerable to stress caused by the excessive energy expenditures and prolonged delays that are involved in surmounting hydro-electric dams by fishways.

Once above the dam, fish are faced with another physical barrier in the form of the reservoir. For species which home to spawning areas, migration may be further delayed while they attempt to relocate the migratory route. Generally the lack of current, greater water depth, and greater area can all result in an increased amount of random wandering by migrating fish while in the reservoir. Lack of current in a large area also delays downstream migration of juveniles. The inability of fish to locate the outlet of the reservoir can result in further delays at the face of the dam, as was observed with salmon at the Whitehorse Rapids Dam.¹⁵¹ Many downstream migrants may be killed by being swept through the turbines or down the spillway.¹⁵² Direct mortality of juvenile salmon passing through the Whitehorse Rapids Dam is as high as sixteen to twenty percent.¹⁵³ Once below the dam, further problems of abrupt temperature and pressure changes may be encountered by migrating fish.¹⁵⁴ Fish that have successfully passed through the turbines or down the spillway may be temporarily stunned, making them easy prey for predatory fish and birds.¹⁵⁵ All these factors can reduce the numbers of downstream migrants. Stress approaches catastrophic levels when it has reached the stage of eliminating ten percent of the downstream migrants.¹⁵⁶

For fish populations of the Pelly-Macmillan river system, the overall impact of mainstem developments will be greater than that of developments on tributary streams. Fish species or populations which do not complete their life cycle

entirely within the Pelly-Macmillan system will be most vulnerable to damage from mainstem developments. Delays, injuries, and direct mortality of spawning migrants or juveniles will all contribute to population declines of the species affected. Delay or total blockage of feeding migrations can result in a reduction of carrying capacity within the system, and can also contribute to declines in the growth rates of fish. Chum salmon will likely be eliminated from all areas above Granite Canyon if a dam is constructed in that region. Chinook salmon populations may decline steadily, as they have above the Whitehorse Rapids Dam.¹⁵⁷ A series of mainstem developments on the lower Pelly-Macmillan system will probably eliminate chinook salmon from all upstream areas. Inconnu, arctic grayling, and broad whitefish runs will likely be reduced in the lower Pelly River if a dam is constructed at Granite Canyon. Populations of resident species such as northern pike, lake whitefish, least cisco, burbot, lake trout, and round whitefish will probably experience only slight declines in limited areas near the points of migratory route blockage. The overall effect of migration route blockage will be to decrease the carrying capacity of the Pelly-Macmillan river system. Fisheries dependent upon large runs of migrant fish species will suffer the greatest damage. Localized fisheries for resident species will experience declines in areas near points of migration route blockage.

Other kinds of barriers that result from any kind of construction involving river or stream crossings include: improperly designed culverts; ice build-up within culverts; improperly located or designed bridges; coffer dams which constrict river channels; berms or borrow sites within alluvial flood plains; and logs, soil, and debris that are left from ice bridges and winter construction sites. Unlike reservoirs, hydro dams, and fishways, these barriers can be avoided by appropriate regulations.

A major limiting factor for populations of stream fish in northern regions is the availability of suitable overwintering areas. Any activity that affects water quality or physical conditions in these overwintering areas could be detrimental to entire populations of fish. The proposed smelter at Faro would require approximately one million gallons of fresh water per day.¹⁵⁸ To this need could be added the water requirements of the mine and the town site of Faro. During the winter months, pumping from streams to meet such water demands could draw down water levels in critical overwintering areas, causing mass mortality of fish and developing embryos. Another major threat to overwintering fish populations is the addition of waste material to water

courses. With development of new mining activities in the region, the winter water quality of the Pelly-Macmillan system could be severely taxed. During the winter, effluents and other organic substances such as oil may also enter streams from settlements and construction camps. During the summer, fish might avoid areas where wastes are entering streams; but during the winter the large numbers of fish restricted to the overwintering sites cannot escape if the water quality should deteriorate. As a result, entire populations of fish may be eliminated from the system.

There is a high potential for conflict between development of the mining industry and maintenance of water quality in the Pelly-Macmillan system. Tailings ponds are used to remove most of the toxic components produced by mines before waste water is released into receiving waters. The Cyprus Anvil mine has already suffered one retaining dike failure,¹⁵⁹ and one known accidental release of a large amount of cyanide into the tailings area.¹⁶⁰ Both of these mishaps resulted in large quantities of toxic materials entering the Pelly River system. At present, waste water containing a certain amount of toxic material may be released into receiving waters. Such disposal methods have been allowed because pollution standards apply to the quality of receiving waters and not to the quality of the effluent released.¹⁶¹ Using these standards, dilution of toxic materials is depended upon to eliminate lethal effects. Bérubé et al. suggested that this practice fails to consider the harm done during dilution, and does not account for the consequences of the continued introduction of sub-lethal amounts of toxic substances.¹⁶² Such practices can result in acute localized reduction of water quality, near the point of effluent discharge. As the number of mining operations is increased, these disposal methods will tax the water quality of the Pelly-Macmillan river system more and more heavily.

Sub-lethal concentrations of toxic substances such as copper and zinc, and cyanide and zinc, act synergistically causing high mortality of fish, even though the level of the individual substance is "safe." Fish that are already stressed, as from migration or food shortage, may succumb to sub-lethal concentrations of a single toxic substance. Sergy suggested that the effects of heavy metals may also be more serious than predicted, during the winter when dissolved oxygen levels are already low.¹⁶³ Heavy metals may also be consumed and accumulated by benthic invertebrates. Fish such as longnose suckers and lake whitefish, which might then consume the contaminated invertebrates, could develop high systemic concentrations of heavy metals. If the levels were sufficiently high, certain species of fish in the

Pelly-Macmillan system could become unfit for human consumption. Birds and mammals dependent on fish could also be affected. Salter noted that a by-product of smelting ore from the Anvil region would be the production of 200,000 metric tons of sulfuric acid per year.¹⁶⁴ High concentrations of heavy metals may also be emitted by smelters. Clearly, the control of such emissions and the safe disposal of large amounts of sulfuric acid must be included in the economic cost of the operation of a smelter.

Developments associated with a Tintina Trench corridor would require large quantities of gravel. Gravel removal from rivers is clearly incompatible with the maintenance of fish populations, as is the destruction of gravel beds by reservoirs and altered flow regime. Gravel mining operations within the active floodplain of streams can result in increased siltation. Increased siltation is probably the greatest threat to the integrity of streambed gravel deposits. Heavy runoff and erosion from the proposed railroad marshalling yards near Faro, for example, could cause extensive siltation of the Pelly River.¹⁶⁵ If the hydrologic regime is not altered, annual flooding can remove silt deposits and rejuvenate gravel beds, allowing invertebrates and fish to recolonize the disturbed areas. However, there have to be populations of invertebrates and fish available for recolonization; and there are limits to the resilience of populations to extensive, prolonged, and repeated disturbances. If construction of gas and oil pipelines, looping of pipelines, removal of pipelines, extension of roads and railways, trenching, and construction of tote roads from mining exploration are to take place over the next twenty to thirty years, repeated disturbances are inevitable. If fish and aquatic invertebrates are simultaneously subjected to other kinds of disturbance, such as deterioration of water quality from mining or smelting, destruction of overwintering sites, or overharvesting, it is unlikely that populations would continue to be available for the recolonization of disturbed areas. The incremental impact of such development projects may therefore be profound, and to evaluate one project at a time, without reference to the sequence of others, can hardly be called rational planning.

While potential conflicts with the maintenance of the carrying capacity for fish have been emphasized in this section, many of the conflicts discussed will also affect semi-aquatic mammals and waterfowl. Clearly, a reduction of the carrying capacity of the river system for fish will reduce the carrying capacity of the region for mammals and birds that are dependent on fish as a food source. Wildlife resources will also be decreased by loss of habitat and by harassment

through ease of access to populations of animals that are sensitive to human activities. Loss of productive land for small-scale selective logging and for garden produce will also further decrease the renewable resources of the region. Competition for space on well-drained land surfaces will be acute in the Little Kalzas Lake area of the Tintina Trench. While river valleys may offer the easiest routes for construction of transportation corridors, they are also among the most productive areas for renewable resources. This becomes a serious consideration if evaluated in relation to the continuing high rate of loss of productive agricultural land in southern Canada. Over two million acres of farmland were lost over the 1961-71 decade. This is a rate of 780 acres per 1,000 increase in urban population,¹⁶⁶ and there appears to be little, if any, change in this trend.

Finally, the value of the natural and, in some areas, wilderness character of the Pelly-Macmillan region must also be considered. It is a value that is important to Yukon residents,¹⁶⁷ as well as to non-residents. Masse noted that remote areas can fail to provide a balanced lifestyle for residents, since work is usually available but social amenities are few.¹⁶⁸ Under such conditions, residents place a high value on outdoor recreational opportunities. To the extent that these opportunities contribute to the well-being of the area's residents they also contribute to the productivity of local workers and to the stability of the local labour force, reducing the number of transient workers. It is estimated that ninety percent of all recreation in the Yukon Territory takes place in valley bottoms, centred largely on lakes and rivers, since these contain most items of natural and historic interest. The territorial government has included Campbell's exploration route, down the Pelly River to Fort Selkirk, as one of the main river themes in its parks proposal.¹⁶⁹ The Macmillan River is one of the least disturbed rivers in the Yukon.¹⁷⁰ Both rivers are navigable for most of their length, and are rated as good scenic canoeing routes.

Slaney and Co. suggested that an undisturbed buffer zone is required between all transportation routes and water courses.¹⁷¹ However, a zone wide enough to eliminate noise from such sources as heavy equipment operation, compressor stations, vehicle traffic, and increased numbers of people, and wide enough to avoid disturbance to wildlife, would probably be unacceptable. If mines were brought into production at a carefully controlled rate and in relation to presently existing transportation routes, conflict with the recreational potential of the region could be minimized. On the other hand, construction of a smelter would create an

imperative to increase the rate at which mines were developed and at which power was required. It would therefore constitute a conflict with the recreational potential and the renewable resource potential of the region which could not be reconciled by any mitigatory measures. Similarly, construction of hydro-electric developments on the scale envisaged for the Pelly and Macmillan rivers presents an irreconcilable conflict with the productive capacity of these rivers and their valleys for renewable resources, with their recreational potential, and with perception of the wild nature of their beauty. Accelerated development of industrial projects based on depletion of non-renewable resources produces limited short-term benefits. Benefits which accrue from maintenance of wild rivers are permanent and, given the present trends of development and population growth, will increase in magnitude with time.

V Social-environmental Relationships

Social values that relate to diverse features of northern ecosystems have evolved from past patterns of land use. But land use is not limited to material or physical use; it also includes psychological use, which is perhaps defined by perception. Although these kinds of uses are not always easily separated, social values will be discussed from both perspectives.

As Taylor observed, most people do not need to be given security, but need to achieve it for themselves; they need the conditions in which self-help and independence are possible.¹⁷² Such conditions are inherent in a traditional subsistence economy, and are important values in the social-environmental relationships that are part of such an economy. Conversely, total dependence on a wage economy confines people to a situation over which they have no control. The forces which determine levels of unemployment, inflation, and recessions are remote, complicated, and impersonal. Neither economists nor politicians can accurately predict, much less control, such phenomena. In the past, as long as the productivity of the land remained sufficient for populations in the North, the people were able to adjust to natural disturbances — such as fires and fluctuations of animal populations — by a natural mobility and by changing their dependency from scarce species to those that were temporarily more plentiful. That the land offers a basis for a measure of security and self-determination is one reason for native peoples' emphasis on the importance of land, compared to compensation by cash, in negotiating a claims settlement.

Insofar as the productive capacity of the North has

been impaired by demands for economic growth and therefore industrial developments, and insofar as the population of the North and the demands made on renewable resources have increased, there is necessarily a dichotomy in attitude towards industrial development. At the Mackenzie Valley Pipeline Inquiry, the majority of the residents of Fort Norman spoke of their concern for the land, and against construction of a pipeline, at least until land claims were settled. Chief Paul Andrew argued for maintenance of the option of a subsistence economy:

We want to teach our children too, we want to teach them how they can survive off the land if necessary. I am sure that with the unemployment situation in Canada, the Territorial Government realizes that all of the people that graduate are not going to be guaranteed a job. So we want to teach our way of life. So that when necessary, they can go out when they do not have employment, . . . they can go out somewhere where they can live prosperously also. That has not been the case in the past and there is a lot of unemployed people right now that are not entirely capable of handling themselves adequately in the bush.¹⁷³

This amounts to an independent form of unemployment insurance. Such programmes have been initiated at Fort Norman and at Fort Providence¹⁷⁴ for younger members of the communities. These programmes are seen as a way not only of learning self-reliance, but of learning traditions related to the land. However, fear that these measures will be inadequate if renewable resources are insufficient, and a need to obtain some cash income, may have contributed to the decision of sixty-nine Fort Norman residents to sign a petition in favour of early construction of a Mackenzie Valley Pipeline. The petition questioned how young people, now in high school, would survive for ten years if there were no development.¹⁷⁵ That other options for development might be available has not been apparent either to native peoples or to Canadians as a whole. This point will be discussed later in this report. That there is growing dissatisfaction with a way of life that is dominated by an industrial wage economy is evident in many ways, but specifically in the Yukon by an influx of southern Canadians who hope to pursue a subsistence way of life supplemented by a limited involvement in a wage economy. In this respect, their values are similar to those of a large number of native peoples in the North.

Testimony and mapped exhibits presented at the Mackenzie Valley Pipeline Inquiry and the Alaska Highway Pipeline Inquiry, and evidence from the Inuit

Land Use and Occupancy Project¹⁷⁶ document patterns of land use which illustrate the dependence of indigenous peoples on environmental features associated with high seasonal productivity. These features include good fishing areas at mouths of rivers and outlets of lakes; areas of salmon spawning concentrations and caribou concentrations, particularly the migration routes of both groups of animals; areas of early ice breakup and wetlands where waterfowl are seasonally concentrated; areas where seals are abundant; routes of easy access to such areas; and camping places which are favourable for harvesting berries and diverse animals, according to seasonal availability. Also of importance in winter are valleys which provide protection from wind, access to ice fishing areas, and, in forested regions, access to moose winter ranges and supplies of fuel. The values associated with such areas are related to the capacity of the lands and waters of the North to provide the necessities of life and to provide the conditions whereby communities can achieve an adequate measure of security and independence in ways that emphasize co-operation. At the community hearings in Fort Norman, Robert Clement expressed some of these values:

I remember a few years ago, the people lived in their homes. They cut their own wood and hauled their own water. People were happier then, when they didn't have to depend on the government all of the time. We were happier then and we could do it again.

But look what has happened. Now the government gives the people everything, pays for the water and the fuel and the houses, the education. It gives the people everything, everything but one thing — the right to live their own lives. And that is the only thing that we really want, to control our lives, our own land.¹⁷⁷

Other social-environmental values relate to areas that are associated with historical events and which provide links with the traditional use of the land. Awareness that such areas remain unchanged gives a feeling of cultural and spiritual continuity:

Our ancestors used to go to certain places where we don't go very often anymore, but animals still use these places. Things our ancestors made should never be destroyed by mining and oil companies. These places are seen and used by people today. Even when we grow old they will still be there. (Peter Alogut, Southampton Island)¹⁷⁸

These are universal values common to all peoples. Places where historic events occurred, even if the history is almost

lost in myth and there is nothing to mark the place but the memory of a name, still evoke strong feelings in those to whom such places constitute a part of their roots as a people.

A feeling of continuity with the past (and perhaps therefore the future) is an important component of a feeling of identity. But there is more to a feeling of identity than social traditions and values. In a psychiatric investigation of the role of the non-human environment in normal development and in psychosis, Searles concluded that “there is within the human individual a sense, whether at a conscious or unconscious level, of *relatedness to his non-human environment.*”¹⁷⁹ The benefits of a sense of relatedness with the non-human environment were summarized as assuagement of fear and anxiety, the deepening of an individual's sense of his own identity, and consequently a deepened appreciation and acceptance of his fellow man. Individuals, of course, also turn to others for assuagement of fear and anxiety. But people tend to go away, to change, and to die. A sense of continuity is not always to be found in human relationships, nor in the society that we have evolved. But it is to be found in the land. In societies that are permeated by the kind of violence that originates from both suppressed and conscious fear, it is no trivial matter to destroy resources to which men of diverse ethnic origins, and of an entire spectrum of “sophistication,” have turned for reassurance.

Social-environmental relationships form an area of the human mind that has been explored more by literature than by science. It is an area that cannot be dismissed lightly under the terms “economic” or “recreational.” While not well understood, it must be allowed recognition and evaluation in decisions relating to northern resources and land use, since the emotional investment in such relationships may be very great. The long-term social values that are considered here as being relevant to northern resources and land use are: the means for achieving a measure of material security; a sense of identity; a sense of community, or of relatedness; a source of reassurance that has much to do with awareness of beauty, and that goes beyond the reassurance of human relationships; and a sense of continuity in time and place — of a quality of endurance in a world of change.

VI Constraints

(a) Human Constraints

Whatever new forms social development may take, it must recognize both human constraints and environmental constraints if social and biotic communities are to retain

stability and survive. An example of a human constraint is the limit of the ability of individuals to withstand the stresses and demands of human crowding without losing a sense of community, and consequently the ethical responsibility that is inherent in a sense of community. Another example is the limit of human ability to withstand various changes, especially accelerated rates of change, without resorting to violence, suicide, alcohol, or drug addiction. Changes that are destructive of a sense of continuity, or that impose a sense of alienation and helplessness, may preclude any possibility of socially acceptable adaptation. A third constraint is the human requirement for experiencing natural beauty under varying degrees of solitude, at least occasionally, or for the knowledge that it can be experienced when needed. It is not within the scope of this study to discuss human constraints or their variability, but these examples demonstrate their relevance to environmental considerations and to any discussion of conflicts in the use of northern resources.

Freedom is a social goal to which we pay lip service; but if we agree with Hegel that "freedom is the recognition of necessity," then social freedom is unattainable (irrespective of social constraints) without recognition of the necessities imposed by the life-supporting system of the land.

(b) Environmental Constraints

Some environmental constraints that have been defined are peculiar, either in kind or degree, to the North. An example of one such constraint, which has recently been the subject of intensive research, is that of permafrost. Construction in areas of continuous or discontinuous permafrost has had to adapt its technology to accommodate that constraint, and the process is not yet complete. Moreover, there are other constraints to which technological adaptation, if feasible, would be prohibitive in terms of energetic, environmental, social, or economic costs.

Biological productivity in the North is a resource with inherent constraints.¹⁸⁰ Marine productivity ranges from 2 grams to 3,000 grams of organic matter per square metre per year. It is lowest in arctic waters, and generally higher where arctic and subarctic waters meet. Because of ice scour, seaweed communities cannot survive in many coastal areas, and marine plant productivity is restricted to that of small, free-floating, or ice-attached plants (phytoplankton). The availability of marine productivity to man has been restricted to animals — mainly fish and marine mammals. Except in deltas and some other areas, terrestrial and fresh-water productivity in the North are generally low.

Terrestrial productivity is limited mainly by poor soil formation, low precipitation, and low input of solar energy.¹⁸¹ With large areas of low plant productivity, much land is required to sustain populations of the larger herbivores and carnivores. The timing of reproduction in many northern animals, both migratory and resident, is critical and has a very narrow margin of safety. Consequently, there is great fluctuation in reproductive success, or survival of young, from year to year. In addition, the North is characterized by biotic communities with a low diversity of species. Food chains, therefore, are relatively short, and fluctuations in numbers of one species may profoundly affect other species. Cycles, such as those characteristic of snowshoe hare and lynx, are common in the North. Slow growth rates are characteristic of other animals, such as marine invertebrates and fish. These various constraints mean that the concept of maximum sustainable yield, developed in relation to the management of renewable resources in southern temperate areas, cannot be applied to the North. Management must take into account northern constraints.

Native peoples of the North have evolved their ways of living in relation to fluctuating and relatively low levels of biological productivity; and of necessity they have been mainly dependent on wild animals, rather than on wild plants.¹⁸² Most terrestrial plants are unavailable to man as a form of energy, because of his inability to digest the fibrous components which form the major part of such plants. While this dependence on wild animals has been reduced with the introduction of imported foods, it is still of considerable importance in many regions. In a field study made in 1951-52 of a group of northern Athapascans at Lynx Point on the Mackenzie River, Helm observed that at least half of their total food intake by volume consisted of wild flesh or fish.¹⁸³ In a study of Fort Norman and Fort Franklin communities, Weir stated that over half of the food consumed was derived from local resources.¹⁸⁴ Macaulay and Boag found that, in a year of good production, waterfowl formed the major source of protein over the spring-to-fall period for an Indian community near Hay and Zama Lakes in northern Alberta.¹⁸⁵ In one example in the Yukon Territory, it was stated that up to ninety percent of the protein requirements for a family were obtained from wild game and fish.¹⁸⁶ However, the Yukon imports almost all of its food.¹⁸⁷ The value of country food to native peoples was demonstrated in terms of nutrition by Schaefer¹⁸⁸ and in terms of replacement and intangible values by Usher¹⁸⁹ and Rushforth.¹⁹⁰

While certain kinds of foods will probably always need

to be imported, northern communities should at least be self-sufficient in terms of protein; and in a world that has insufficient protein for its population, that is no trivial matter. However, there is a caveat. Non-human predators also require a food source, and nutrients need to be returned to the soil and water. Food webs may be complex, and what is not harvested at one level may be harvested in another form at another level. The moose that “got away” may be consumed by wolves and later scavenged by foxes whose fur grew rich and lustrous on the proceeds. Some overwintering mortality of juvenile muskrat may be a necessary condition for the well-being of mink. “Waste” is a necessary part of harvesting, and must be considered in any estimate of long-term harvest potential. However, the recent incidents of wasteful killing described by Strang,¹⁹¹ where caribou were slaughtered for their tongues or killed and wounded in large numbers, is a practice of excess that can only lead to reduction or extermination of a population.

Because of energy lost at each stage of conversion, from solar energy through photosynthesis to chemical energy in plants, to chemical energy in animals, and finally to man, the major constraint on the carrying capacity of northern lands for man has been that of energy. Because of climatic conditions, the North is a place in which it is energetically expensive to live year round. If the same standard of living that is characteristic of most southern Canadians is required, it is energetically exceedingly expensive, and such living has only been maintained by importing energy, and products that have required energy for their manufacture elsewhere. It is hardly surprising, therefore, that the North is a region of immense distances with a relatively low population. To consider this area a vacuum that must be filled with people and cities, as was the vision of the 1950s and '60s, is nonsense. So is the feeling expressed by Maurice Strong that Canadians must be prepared to defend their right “to a disproportionate share of the world’s territory and its resources.”¹⁹² It would seem appropriate to remember Ambrose Bierce, who lived south of the 49th parallel and defined man as, among other things, a species which “multiplies with such insistent rapidity as to infest the whole habitable earth and Canada.”

(c) Population and Constraints

A study concerned with prediction of conflicts obviously must address the question of population growth in the North. While policy and legislative changes may be recommended to avoid or reduce conflict in the use of northern resources, population increase alone may make avoidance

and even reduction of conflict impossible. The constraints on biological productivity discussed in the previous section clearly indicate the necessity of considering population in the North within the Canadian context. The conclusions of the Science Council of Canada are relevant:

We would like people to understand that Canada is not now well prepared for the impact of its predictable population expansion to the year 2000, even with very limited immigration, because we have not yet solved our short-range energy problems and have hardly begun the planning and research required to ensure a continuing supply of energy in the long range future.

*Prime agricultural land with good climate, which is very scarce in Canada, is as yet unprotected except in British Columbia. We have not yet taken seriously the problem of ensuring our own future food supply, much less protecting our position as an exporter of food. We are only beginning to take a systematic and planned approach to the management of our natural resources, including ensuring that they are used frugally and that they are processed as far as possible within Canada before export . . . We have not yet thought through Canada’s role in an overcrowded and hungry world and are just beginning to talk about a conserver society that would reduce Canada’s consumption of food, energy and resources and make possible a larger contribution to underdeveloped countries.*¹⁹³

Population changes in the Northwest Territories are shown for 1911-76 in Table 1. In the thirty-year period from 1911 to 1941, the population almost doubled. In the next twenty-year period from 1941 to 1961, the population again nearly doubled; while in the fifteen-year period from 1961 to 1976 another doubling occurred. The corrected preliminary population counts for 1976 gave a total population of over 46,000. Lu and Mathurin gave twenty-eight series of population projections for the Northwest Territories to 1981.¹⁹⁴ The series differed according to the assumptions made about fertility, mortality, and migration. Their highest projection for 1976 was 43,208 and for 1981 was 50,298. Since their highest projection for 1976 was an underestimate, given the same assumptions their highest projection for 1981 would also appear to be an underestimate.

The sharper rate of increase from 1951 to the early 1960s appears to be largely a function of an increased birth rate with a decreasing death rate. The decreasing death rate probably resulted from achievement of a more effective

Table 1
Population of the Northwest Territories
from 1911 to 1976

Year	Total	Indian	Inuit	Other ^b
1911	6,507			
1921	8,143			
1931	9,316			
1941	12,028			
1951	16,004			
1956	19,313			
1961	22,998			
1966	28,738			
1971	34,805	7,186	11,400	16,225
1976 ^a	> 46,600	—	—	—

Source: Dominion Bureau of Statistics, *Canada Yearbook*, Annual Publication, Queen's Printer, Ottawa.

^a Corrected population preliminary counts.

^b Including non-status Indian and Metis.

screening programme resulting in early detection of tuberculosis cases. The death rate appears to have been constant from 1964, while the birth rate and therefore natural increase rate has slowly declined. The continued high rate of population increase must therefore be a function of net immigration.

Population changes in the Yukon Territory are shown for 1901 to 1976 in Table 2. The decline in population from 1901 to 1921 was initially in large measure a response to the end of the gold rush and latterly a response in part to the 1914-18 war, accompanied by a continued decrease in prospecting. Lu attributed the doubling of population from 1941 to 1951 to an influx of construction workers and military personnel in response to construction of the Alaska Highway.¹⁹⁵ As a result mainly of government assistance, which stimulated mineral exploration and development, the population again doubled from 1951 to 1971, in spite of the withdrawal of military personnel and federal employees between 1961 and 1966. The natural increase rate was high during 1931 to 1961, and subsequently declined. Lu attributed the dramatic fluctuations of the Yukon population from 1901 to 1971 mainly to migration.¹⁹⁶ The average annual growth rate (which includes net immigration) from 1966 to 1971 was 5.0 percent in the Yukon, compared with 3.9 percent in the Northwest Territories and 1.5 percent for Canada.

Table 2
Population of the Yukon Territory from 1901 to 1976

Year	Total	Indian	Other ^b
1901	27,219	3,322	23,897
1911	8,512	1,489	7,023
1921	4,157	1,390	2,767
1931	4,230	1,628	2,602
1941	4,914	1,508	3,405
1951	9,096	1,533	7,563
1956	12,190	—	—
1961	14,628	2,167	12,461
1966	14,382	—	—
1971	18,390	2,580	15,805
1976 ^a	21,392	—	—

Source: Dominion Bureau of Statistics, *Canada Yearbook*, Annual Publication, Queen's Printer, Ottawa.

^a 1976 Population Preliminary Counts, Statistics Canada.

^b Including non-status Indians and Metis.

If population growth rates remain constant, the population of the Yukon Territory would double in just over twelve years, that of the Northwest Territories would double in just under eighteen years, while the population of Canada as a whole would double in a little under forty-seven years. No one can know whether these rates will remain constant, decrease, or increase. However, from 1970 to 1975 the Canadian population growth rate *increased* from 1.1 percent to 1.5 percent. Canada has the fastest growing population of any of the developed countries.¹⁹⁷

Populations grow in two ways: first, by immigration exceeding emigration (i.e., net immigration); second, by the number of births exceeding the number of deaths (i.e., the natural increase rate). If the natural increase rate declines over a period of time, it does not mean, as appears to be popularly believed, that the population ceases to grow. The population continues to grow but at a slower rate. If it drops to 0.0 percent and remains constant, the population will continue to increase until the number of female children reach menopause. In other words, the population will only cease to grow after about forty years of 0.0 percent increase, or if the rate becomes negative. Data combined for all ethnic groups in the Northwest Territories from 1964 to 1973

showed an almost constant death rate at about 0.7 percent, a birth rate that declined from about 4.3 percent to 3.2 percent, and therefore a natural increase rate that declined from 3.9 percent to 2.5 percent. A natural increase rate of 2.5 percent *exceeds* that of India, which was 2.4 percent in the 1970 to 1975 period.¹⁹⁸ As was previously noted, the continued exponential rate of population growth in the Northwest Territories is a result of net immigration. However, even with no net immigration, the fact that 61.4 percent of the population of the Northwest Territories is under twenty-five years of age¹⁹⁹ indicates a potential for rapid growth. It has been said that the number of Inuit living in the western Arctic a century ago was higher than at present.²⁰⁰ However, with a high infant mortality rate the percentage of the population under the age of twenty-five during that period would have been much smaller. In other words, the potential for increase would have been relatively low. A knowledge of demography is not necessary for such understanding. It is quite clearly evident:

*We old people are not very numerous anymore; only the young people are around now. (Lucy Kaunaq, Baker Lake)*²⁰¹

Although populations of native peoples in the nineteenth century may have been higher in some areas of the North than at present, it is not possible to conclude that because renewable resources may have been sufficient for those populations they are sufficient today. There are no reliable estimates, for that period, of populations of the wildlife species on which native peoples depended. One half of the equation is missing. Many of these species were migratory, or highly mobile; so it is reasonable to assume that changes in other regions, particularly in the South, would have affected those wildlife populations and the carrying capacity of the lands and waters in which they ranged. Populations of some harvestable wildlife species obviously have decreased; others may have increased; and some that were not used in earlier times may have potential for future use.²⁰² We do not know to what extent the renewable resources of the North can support the human populations of the North, but it is a question that cannot be answered unless it is asked. Reliance on non-renewable resources assumes that, at minimum, there will always be a food surplus elsewhere. It has become increasingly evident that this is an assumption that must also be questioned.

Because native northerners understandably see their political strength as being dependent on their numbers,

there is a reluctance to think of population growth as a problem in relation to renewable resources of the North. In August 1976, the Committee for Original Peoples' Entitlement made the following statement:

*Uninformed judgements are made about the so-called population/resources balance which conclude that we can't live on our own resources We know that the main problem in expanding the harvest of renewable resources is not the lack of these resources, but capitalization and organization.*²⁰³

At an Inuit Women's Workshop in September 1975, many of the groups present expressed strong opposition to birth control.²⁰⁴ It was obvious, however, that there was confusion between contraception and sterilization. It is probable that many non-Inuit women share the same confusion. If a white-dominated government health service advocates birth control to Inuit, Indian, and Metis, charges of racism will inevitably be made, even if the white population itself stringently practises what its health service preaches. There is no indication that the latter is the case. Nevertheless, the problem of population increase and immigration has to be faced, not only as it applies to the North but in the general Canadian context. When populations, regardless of ethnic composition, become too large for the resources of the land, what choices do we leave ourselves? Production of the necessities of life may be one part of the equation, but consumption is the other. Resources can be drastically depleted or destroyed by relatively few individuals each demanding too much, and by too many individuals each demanding only a little. In the short run, equity of per capita consumption matters to people very much. But if the aggregate consumption is too great, then in the long run equity matters not at all. The result is the same.

VII Options for Resource Use

Options in the use of resources cannot be considered separately from ways of living, which in turn involve perceptions of different facets of resources in relation to physical, emotional, and intellectual needs. Clearly this report can only suggest some points or examples that perhaps merit consideration in the exploration of alternatives.

In discussing ecological criteria, the necessity of maintaining the integrity of biotic and social communities was stressed. Any discussion of ways of living is of doubtful value unless it considers the concept of community. The feeling of

some of the native peoples of the North towards their communities was expressed by James Wah-Shee: "Our people are concerned in that they want to maintain some sort of control over their own small communities and thereby maintain some sort of control over their own way of life, whether it be traditional or not."²⁰⁵ That population increase alone may make the avoidance or even reduction of conflict in the use of northern resources impossible, is readily apparent. But it is perhaps less obvious that population increase can be destructive of communities and of a sense of community.

Federal and territorial governments alike have insisted on the necessity of the dominance of an industrial wage economy in the North. Such an economy is largely confined to exploration for minerals and hydrocarbons, and to their extraction and export. As the basis for a growth economy, the extractive industries are heavily subsidized and must endeavour to deplete those non-renewable resources at the maximum rate in order to realize the maximum monetary profit. Future needs for those resources are discounted. The rationale for such a short-term perspective of resource use is that it creates employment and that payment of royalties to the North will provide capital for other economic endeavours. It is a rationale that has been questioned by many people. To date, the most compelling argument against relying *only* on extraction and export of non-renewable resources has been presented by Berger.²⁰⁶ The onus now lies with the government to test the thesis that large-scale industrial development in the North is the *only* basis for an economy that serves the needs of the people of the North.

It should be apparent that evidence that will refute or fail to refute the thesis must come from the exploration of alternatives. As Berger observed, we have made no serious attempt to explore alternatives, since it was not in the perceived interests of the South to do so. Critics have argued that the alternative of strengthening the renewable resource sector of the economy will destroy the resources that Berger seeks to protect. If we are locked into the concept of a growth economy, then of course we will destroy those resources. But nowhere in his report did Berger endorse a growth economy; on the contrary, he questioned the wisdom of such a concept.

It should also be evident that it will not be easy to explore alternatives. As Livingston observed, "Like ecologic niches, options do not necessarily advertise themselves in three dimensions and living color."²⁰⁷ It must be emphasized again that this report has no competence to explore alternatives. Such exploration must involve the time and thought and sharing of ideas and experience of many people. It must involve research and experiment and failure.

Moreover, it must involve not only the North, since a search for alternatives in the South will facilitate such exploration in the North. The alternatives that are suggested below, therefore, are randomly chosen, but form a continuum. Some are complementary to others and may co-exist at the same time within the same area. But multiple use is not always the best use, and some alternatives are mutually exclusive, either totally or within the same region.

A subsistence economy in the North involves hunting, fishing, gathering and, more recently, trapping. Participation in this way of life may be full-time or part-time. Acting as guides for hunting and fishing trips has historically been a means that many native groups in Canada have used to supplement an income derived from trapping. Fishing, hunting, and wilderness lodges are traditional approaches to recreational development; but in parts of the central Arctic, boat trips for whale watching and observation of other forms of marine life also have potential for the development of recreation. Extension of recreation into the winter, through guided trips by snowshoe and dogteam, would allow native peoples to retain traditional skills associated with such travel, and allow others to learn something of the wilderness value of the North in winter. Clearly a subsistence economy and such forms of recreation are dependent on maintaining large areas of wild, or at least relatively undisturbed, land.

The potential for small-scale agricultural production in much of the Yukon and parts of the Northwest Territories is considerable.²⁰⁸ Its importance has been underestimated, simply because it is small-scale and does not accord with the imperative of economic growth. The replacement value, particularly of garden produce, to the individual or to the community can doubtless be measured. But the value of such produce as part of a way of life and as a means of increasing self-sufficiency is immeasurable.

Developments that are compatible with the maintenance of communities are those of small-scale secondary manufacturing. Production of leather goods, fur goods, spun musk-ox wool, utensils from antlers and birchwood, snowshoes and fish nets, preserves and liqueurs from wild berries, pemmican, smoked fish, and muktuk are some possible uses of renewable resources that might complement the traditional economy. For local use, lumber and logs and peat for insulation would also be valuable if taken from carefully selected areas. The technology that is involved may be highly sophisticated, and we probably have much to learn from the successes and failures of other northern lands. Small-scale secondary manufacturing has many advantages

that are relevant to the North. Most enterprises are labour- rather than capital- and energy-intensive. Many emphasize aesthetics and craftsmanship in the most sophisticated sense, and are therefore intrinsically satisfying to the craftsman who can express his individuality. They do not have to be inflexible, clock-punching, clock-watching systems; they can be organized so that it is sometimes possible to hang a sign on the door saying "gone fishing." They are also a means of retaining small, economically viable communities, socially strengthened by traditions of teaching and learning skills, whose members can enjoy some feeling of control over their own lives and a feeling of a continuity in time, unlike the boom and ghost towns associated with mining. Finally, because such enterprises are varied, they strengthen diversity and independence, in contrast to the industrial system whereby whole communities are subject to sudden, mass unemployment because of a decision made elsewhere.

While the potential for developments dependent on renewable resources has been emphasized in this report, options for development of mineral resources are not excluded by such emphasis. However, the questions of scale and pace of such developments must be addressed if a diversity of options is to be maintained:

Loss of diversity, whether it be biological or cultural, is not merely a matter of sentimental regret. Both represent a decline in the number of options open to communities, to nations, to humanity as a whole. Cultural diversity is the source material for solving problems.²⁰⁹

We cannot, however, explore resource use options without understanding the nature of resources. As stated earlier, resources can be classified by our perception of them, and by their properties which determine their response to biophysical laws. How we perceive resources will determine how we use them, and therefore perception must include some knowledge of the properties of resources. The often heard argument that unfavourable economic conditions can destroy a physical resource is erroneous, and assumes immutability of the economic system. Such an assumption was implicit in a statement made by Powis in 1973:

Significant adverse changes in exploration capital or operating costs — including taxes and the cost of capital — or in the perceived political climate can convert what previously would have been ore into waste rock.²¹⁰

An ore deposit may or may not be developed in the immediate future, which may or may not be a good thing, but it can only be destroyed by physical means.

Henderson argued that the choices with which we are now faced are at an evolutionary level of change, and that we have to choose consciously between investing in a course of action now "at the risk of hard-programming our future into irreversible paths, *versus* keeping our options open and funding a diversity of approaches."²¹¹ If we wish for balanced development in the North, then, at minimum, there must be equality in funding between exploration for alternative resource use options and exploration by the extractive industries. The alternatives are matters for discussion, but a prerequisite for intelligent discussion is that the participants be well informed. Public participation in the absence of information is virtually meaningless, as was recently obvious in the Alaska Highway Pipeline Inquiry. It is not just a question of making information available to the public by legislative action. If the necessary information does not exist, it cannot be made available. If we have insufficient knowledge and understanding to identify or evaluate options, then we cannot choose. We have an empty freedom. From the perspective of such awareness, the common predilection of scientists to end their reports with recommendations for further research can be seen, not as a preoccupation with individual spheres of interest, but as an inevitable and continuing human concern.

VIII Conclusions

(a) Policies Affecting Research Programmes

There are basically two levels of knowledge gaps: first, how do biotic communities within northern ecosystems function when man plays a relatively small part within those communities; and second, when man plays a significant part, what will be the effects of his actions? It is not possible to answer questions of the second category adequately without reference to the first. Nevertheless, policies, legislation, and decisions to allocate funds for research disregard that fundamental fact. The Northern Inland Waters Act, the Environmental Assessment and Review Process, and the Territorial Land Use Regulations address only questions of the second category. They thereby spawn a flurry of impact studies which, of necessity, must generally begin by collecting the simplest of baseline data in the shortest possible time. With respect to terrain and vegetation, studies have tended to concentrate on sensitivity to disturbance from construction activities; but we know relatively little about natural disturbances, rates of change, or time scales involved. With respect to wildlife, studies have concentrated

on estimates of population size, and on classification of habitat and identification of areas that are critical or important for certain activities, such as overwintering or spawning. Mobility, complexity of behaviour, and wide fluctuations in numbers of wildlife populations present research problems over and above those encountered in relation to terrain and vegetation. Studies at the level of communities and ecosystems are virtually non-existent. To predict effects of activities, it often becomes necessary to extrapolate from studies that have been undertaken in other regions without the means of evaluating whether such information is applicable. Where an area is subjected to an invasion of scientists all pursuing their separate goals under similar time constraints, then the impact studies themselves can create an impact on the resources being studied.

An example of the kinds of questions that such reactive studies are expected to answer is illustrated in the objectives and terms of reference for a "Study of the effects of resource exploration and development on hunting and trapping and on the traditional economy of the Inuit in the Baker Lake area."²¹² The final report of this study is to be submitted by 28 February 1978. Information about possible conflicts must be gathered by monitoring activities in a specified area during the period of the study. The contract for the study was awarded in the last part of June 1977 — after the spring migration of caribou, after calving, and probably after the formation of post-calving concentrations. The field data that can be obtained on the Beverly and Kaminuriak caribou herds are accordingly severely limited and must be collected while non-renewable resource activities are in progress. Historical documents, information from Inuit, and studies of barren ground caribou undertaken by biologists demonstrate that wintering areas, migration routes, calving areas, summer movements and, to a lesser extent, even traditional crossing places may vary from year to year. The numbers of populations fluctuate and the magnitude of their range varies. Yet, unable to consider a multitude of variables, unable even to address, much less answer, the numerous questions and hypotheses raised by the Kaminuriak herd study, this seven-month impact study is expected to reach definitive conclusions about the exact location of areas that are critical, important, or of no significance — not to the resource — but to present levels of hunting by Baker Lake Inuit. Similar conclusions must be reached about fur-bearing animals, fish, and waterfowl. The food and cash value of these resources will inevitably be underestimated, since the study is only concerned with Inuit from Baker Lake and not Inuit from settlements such as Chesterfield Inlet,

Rankin Inlet, and Eskimo Point, nor with Indians in northern Manitoba and Saskatchewan.

Furthermore, during this seven-month period, an assessment must be made of the immediate and cumulative impact of current and anticipated non-renewable resource activities. If the cumulative impact of activities associated with non-renewable resource activities in the Mackenzie Valley could not be assessed after four years of impact studies, it is unlikely that a single seven-month study will succeed in the District of Keewatin. While Mr Allmand must be applauded for having had the courage actually to enforce existing Territorial Land Use Regulations against opposition from the mining industry, the time frame and terms of reference for the necessary study are totally unrealistic. As the proposal stated, "time is of the essence," and therein lies the root of the problem. The extractive industries are organized in such a way that they can only function to the economic imperative of maximum rate of depletion preceded by intensive exploratory activity. Given the assumption that this is desirable, then the long-term diverse values of renewable resources must be discounted in favour of short-term monetary profit. The whole perspective of resource use is accordingly biased.

In a study of *Land Use and Public Policy in Northern Canada*, John Naysmith observed:

*Beginning with the Dominion Lands Act, public land policy in the North has been essentially a series of responses to demands for land, rather than a framework within which decisions respecting use and management are made on the basis of the land itself.*²¹³

Naysmith recommended that a land use policy be based first on a consideration of the nature, capability, and limitations of the land. The premise that a knowledge of the nature, capability, and limitations of northern land is fundamental to the process of northern resource and land use planning would seem to be unarguable. But attainment of such knowledge requires allocation of land and funds for long-term co-ordinated research. An approach that emphasizes inventories will achieve compilation of much necessary data, but will not address questions related to the functioning of biotic communities within northern ecosystems. Naysmith suggested that the allocation of land for public purposes, including the establishment of International Biological Programme sites for scientific purposes, be considered together with the allocation of land to native peoples and the allocation of land for industrial and public works

developments. While native land claims are being negotiated, and industrial and public works projects are the subject of intensive debate, the allocation of land for public purposes is not receiving similar consideration, if it is receiving any consideration at all. Decisions regarding the establishment of IBP sites in the North have been indefinitely postponed. The establishment of such sites would provide areas for long-term studies of relationships and balancing forces, or feedback mechanisms, in relatively undisturbed ecosystems. The sites would provide the baseline necessary to answer questions related to impact at the level of communities, rather than selected components of communities, and would therefore allow the evaluation of recovery processes in ecosystems that have been extensively modified by man. In addition, they would allow preservation of a diversity of genetic information contained in species of plants and animals that have evolved together and are adapted to constraints of the northern environment.

Provision for impact studies implies an acceptance of responsibility for trying to understand the effects of our actions. Yet we continue to deny ourselves the means for such understanding — the yardstick against which such effects may be measured. The practical application of long-term research is not limited only to predicting the effects of industrial or public works developments. It has a far broader application for the exploration of resource use options and ways of living associated with such options. An understanding of the productive capacity of the lands and waters of the North is essential for the maintenance of a subsistence economy. Because such capacity constitutes a range that will vary from year to year, from decade to decade, and from region to region, we need to know not the maximum sustainable yield, but the minimum sustainable yield. Can we increase this yield sometimes for some resources, without destroying other resources or the capacity of natural cycles to function? Without destroying the productive capacity of those lands and waters?

(b) Needs for Research and Policy Changes

A review of relevant literature is a prerequisite for research of all kinds. It is also essential for the identification of specific knowledge gaps and research needs. The searching component of the review process would be facilitated by computerized data banks which include publications that are limited in distribution, such as consultants' reports. However, the evaluation component of the review process can never be computerized. Evaluation of the limitations

and applicability of results of published research is dependent on an understanding of the methods used and familiarity with the fields of research that are being considered. Prediction of conflicts from available information therefore requires an interdisciplinary approach, since the subject matter relevant to resources ranges from engineering design and industrial practices through all branches of the biological and social sciences. While such an approach is saving in time and money, it is not proposed that it be a substitute for field research and local information. These latter will always be of paramount importance.

Maintenance of a diversity of options dependent on renewable resources requires further development of the ability to predict the effects of natural and man-made changes on movements, numbers, variations in recruitment, and health of different populations of animals. The ability to predict clearly involves monitoring a number of parameters as a continuing process. Such monitoring should, where possible, make use of the least destructive or disturbing techniques. Measurement of diverse parameters is also essential to estimate changes in carrying capacity. And finally, accurate information from harvests is required, including data on the expenditure of time and effort in relation to the number of animals killed.

Management of wildlife resources would seem to require a sharing of the perspective of scientists with the perspective of such individuals of Indian, Inuit, Metis, and other origin who spend, or have spent much of their lives on the land. Identification and discussion of problems and ways in which they might be solved must involve people who are most directly affected by those problems. The languages of the Inuit, for example, contain systems of naming that are in themselves detailed forms of classification. Names for different kinds of snow indicate both properties and causes. Names for lairs made by seals indicate forms and functions. On the other hand, concepts related to migratory birds are based on knowledge that is not restricted to observations in the North. There is a need for the development of an indigenous research capability, which involves many people with different levels of knowledge and experience. Such development would not be easy, but it would seek to combine knowledge traditional to northern cultures with knowledge traditional to other cultures. Ultimately, this question must be resolved by the evolution of an appropriate system of education. But, in the meantime, it would seem desirable to develop the existing human potential.

Dependence on renewable resources raises the question

of how much emphasis should be placed on recycling components of renewable resources. Another question relates to the fact that many of the traditionally harvested wildlife species of the North are either migratory or highly mobile. It is natural to think that if such harvesting was traditionally unrestrained, it can continue to be so. In consequence, all peoples in regions traversed or used by such species will consider their rights to be inviolate, to the detriment of the species. Indians of northern Manitoba and Saskatchewan may wish to increase their harvest of the caribou that winter in that region, while Inuit from Keewatin may wish to increase their harvest of the same caribou as they migrate north or south. Similarly, calving and post-calving concentration areas are important to Indians as well as to Inuit; and winter ranges in Manitoba and Saskatchewan are important to Inuit as well as to Indians. We cannot, in anything but a legal sense, possess anything living, if only for the fact that the living can die and death makes a mockery of our illusion of possession. Migratory species, like all wildlife, belong to no man. In a legal sense they belong to the Crown, but such ownership is defined as holding in trust. What is held in trust is not the individual but the species, which means ensuring that populations do not fall below a certain level. Conflicts are inherent in two concepts of legal ownership — ownership as a right of disposal and ownership as a responsibility.

Clearly, there is an urgent need for legislation that will protect migratory or highly mobile species. Comparable protection is also needed to safeguard the areas that are critical to them, and to ensure their unhindered access to those areas. Such legislation can only be based on an understanding of their behaviour and needs, and will be ineffective unless there is a general acceptance of the need for legislation. If wildlife management has been inadequate in the past, it has been in large measure due to a lack of funding for research and for sufficient personnel.²¹⁴ A change of policy is clearly required to ensure that such funding is adequate. When extended to other areas, such as climatology and oceanography, there is potential for creating employment for northerners, which would be long-lasting, and infinitely more productive in human terms than the payment of welfare.

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Appendices

Appendix I

Members of the Canadian Arctic Resources Committee 1978

Steele Curry
Revelstoke Companies
Calgary

Pierre Dansereau
Centre de recherches en
sciences de l'environnement
Université du Québec à
Montréal

Max Dunbar
Marine Sciences Centre
McGill University

Irving K. Fox
Westwater Research Centre
University of British Columbia

Terrence Godsall
Godsall Holdings
Ottawa

F. Kenneth Hare
Institute for Environmental
Studies
University of Toronto

Ralph Hedlin
Ralph Hedlin Associates
Toronto

Connie Hunt
Faculty of Law
University of Calgary

Robbie Keith
Department of Man-Environment
Studies
University of Waterloo

Hal Kroeker
School of Public
Administration
Dalhousie University

Phyllis Lambert
Architect
Montreal

Alastair Lucas
Faculty of Law
University of Calgary

Ian Mc Taggart Cowan
University of British Columbia
Vancouver

Eric Molson
Molson Breweries of Canada
Ltd.
Montreal

Hugh G. Morris
Morris/Bright/Rose
Toronto

Douglas Pimlott
Department of Zoology
University of Toronto

Einar Skinnarland
Terminus Ltd.
Toronto

Carson Templeton
Templeton Engineering
Winnipeg

Andrew R. Thompson (Chairman)
Faculty of Law
University of British Columbia

Kitson Vincent
Toronto

Appendix II

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